

IROQUOIS NATIONAL WILDLIFE REFUGE

Alabama, New York

ANNUAL NARRATIVE REPORT

Calendar Year 1993

U.S. Department of the Interior
Fish and Wildlife Service
NATIONAL WILDLIFE REFUGE SYSTEM

IROQUOIS NATIONAL WILDLIFE REFUGE

Alabama, New York

ANNUAL NARRATIVE REPORT

Calendar Year 1993

Jm V. Tillar
Refuge Manager

12-14-94

Date

Donald H. Fuchie

Associate Manager

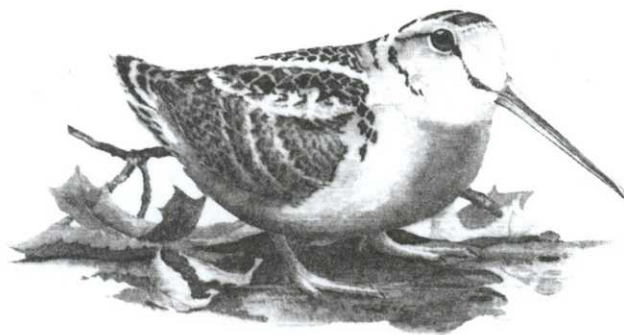
1-17-95

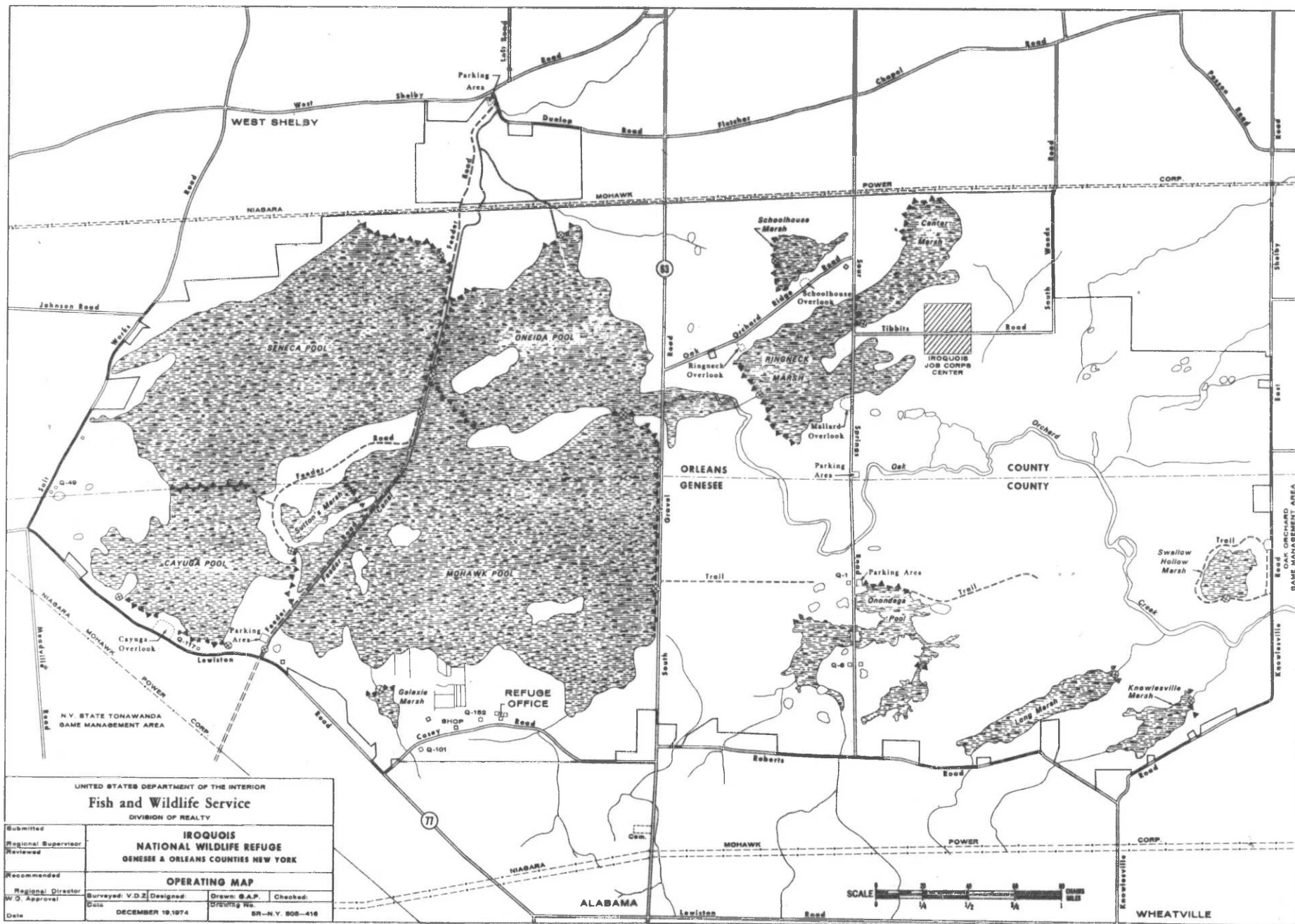
Date

Donald H. Fuchie
Regional Office Approval

5-11-95

Date





INTRODUCTION

Page

TABLE OF CONTENTS

i

A. HIGHLIGHTS

1

B. CLIMATIC CONDITIONS

2

C. LAND ACQUISITION

1. Fee Title Nothing to Report
2. Easements 5
3. Other Nothing to Report

D. PLANNING

1. Master Plan Nothing to Report
2. Management Plan 14
3. Public Participation Nothing to report
4. Compliance with Environmental and Cultural Resources Mandates 14
5. Research and Investigations 21
6. Other Nothing to Report

E. ADMINISTRATION

1. Personnel 22
2. Youth Programs Nothing to Report
3. Other Manpower Programs 24
4. Volunteer Program 27
5. Funding 28
6. Safety 30
7. Technical Assistance Nothing to Report
8. Other 31

F. HABITAT MANAGEMENT

1. General 42
2. Wetlands 42
3. Forests 64
4. Croplands 70

F. HABITAT MANAGEMENT (Cont.)

Page

5.	Grasslands	70
6.	Other Habitats	Nothing to Report
7.	Grazing	74
8.	Haying	74
9.	Fire Management	74
10.	Pest Control	77
11.	Water Rights	Nothing to Report
12.	Wilderness and Special Areas	78
13.	WPA Easement Monitoring	Nothing to Report

G. WILDLIFE

1.	Wildlife Diversity	Nothing to Report
2.	Endangered and/or Threatened Species	79
3.	Waterfowl	82
4.	Marsh and Water Birds	90
5.	Shorebirds, Gulls, Terns and Allied Species	91
6.	Raptors	93
7.	Other Migratory Birds	93
8.	Game Mammals	97
9.	Marine Mammals	Nothing to Report
10.	Other Resident Wildlife	97
11.	Fisheries Resources	97
12.	Wildlife Propagation and Stocking	99
13.	Surplus Animal Disposal	Nothing to Report
14.	Scientific Collections	Nothing to Report
15.	Animal Control	Nothing to Report
16.	Marking and Banding	101
17.	Disease Prevention and Control	Nothing to Report

H. PUBLIC USE

1.	General	103
2.	Outdoor Classrooms - Students	104
3.	Outdoor Classrooms - Teachers	106
4.	Interpretive Foot Trails	106
5.	Interpretive Tour Routes	107
6.	Interpretive Exhibits/Demonstrations	107
7.	Other Interpretive Programs	108
8.	Hunting	109
9.	Fishing	114
10.	Trapping	116

H. PUBLIC USE (Cont.)

Page

11.	Wildlife Observation	118
12.	Other Wildlife Oriented Recreation	118
13.	Camping	Nothing to Report
14.	Picnicking	Nothing to Report
15.	Off-Road Vehicling	Nothing to Report
16.	Other Non-Wildlife Oriented Recreation	Nothing to Report
17.	Law Enforcement	119
18.	Cooperating Associations	Nothing to Report
19.	Concessions	Nothing to Report

I. EQUIPMENT AND FACILITIES

1.	New Construction	120
2.	Rehabilitation	124
3.	Major Maintenance	125
4.	Equipment Utilization and Replacement	131
5.	Communications System	133
6.	Computer Systems	133
7.	Energy Conservation	134
8.	Other	Nothing to Report

J. OTHER ITEMS

1.	Cooperative Programs	Nothing to Report
2.	Other Economic Uses	Nothing to Report
3.	Items of Interest	Nothing to Report
4.	Credits	136

K. FEEDBACK

L. INFORMATION PACKET - - -(inside back cover)

INTRODUCTION

Iroquois National Wildlife Refuge (NWR) is located midway between Buffalo and Rochester, New York, with the headquarters situated in the Town of Alabama. The refuge straddles the Genesee-Orleans County line with 50 percent of the refuge lands lying in each county, some 20 miles south of Lake Ontario and 25 miles northeast of Lake Erie. The topography of the refuge area is relatively flat, but with gentle sloping uplands around the swamp which borders Oak Orchard Creek. Land elevations range generally between 610 and 640 feet mean sea level (msl), with an average elevation of about 620 feet. The highest point on the area is 675 feet msl. Oak Orchard Creek enters the refuge from the east and meanders in a westerly direction through the eastern half of the area before turning northwesterly, leaving the refuge at the north boundary. Eventually, the creek empties into Lake Ontario at Waterport where the lake elevation of 245 feet msl is some 365 feet below the creek elevation at its point of departure from the refuge. However, from its source in the town of Barre, the stream drops only 30 feet in the first 25 miles to the point where it leaves the refuge.

The swamp portion of the area has been known as the Alabama Swamp or Oak Orchard Swamp. The Seneca Indians, one of the six tribes of the Iroquois Nation, inhabited this part of the State and cleared garden plots in such a manner that the remaining large oak trees near their villages presented the appearance of an orchard of oaks. Thus, the first white man arriving here applied the name "Oak Orchard". When the refuge was first established in 1958, it was named Oak Orchard National Wildlife Refuge, but was later renamed to more closely identify it with the Iroquois Nation and to avoid confusion with one of two adjacent state wildlife management areas already named Oak Orchard.

Much of the refuge was cleared of timber while the open uplands were farmed. Operations in the mid-1800's to provide more farming area by draining the swamp were thwarted by a large outcropping of dolomitic limestone just north of the refuge through which Oak Orchard Creek flowed. A number of attempts to break through this limestone and increase drainage failed and no further attempts were made. The prohibitive expense of carrying out complete drainage of the area is the primary factor that has preserved the swampland to this day.

Iroquois NWR consists of 10,818 acres and is bordered by two New York State Wildlife Management Areas (WMA): Oak Orchard WMA on the east and Tonawanda WMA on the southwest. Together, the three areas provide approximately 20,000 acres of prime waterfowl habitat. The refuge habitats are divided into the following types and acreage: Wetlands 7,746 acres; grasslands 1,072 acres; woodlands 700 acres; croplands 620 acres; brushlands 622 acres; and administrative lands 58 acres.

A. HIGHLIGHTS

Weather causes damage, sets new records. (Section B, F.2).

Archaeological Survey completed. (Section D.4).

Contaminants remediation continues. (Section D.4).

Personnel changes hamper attainment of refuge goals. (Section E.1).

Iroquois subject of Regional and National Safety Audit. (Section E.6).

Cayuga Overlook Challenge Grant funded. (Section H.11).

Spring and fall Canada goose migrations below average. (Section G.3).

Eagles fail to produce any young this year. (Section G.2).

Accessibility Transition Plan rewrite completed. (Section H.1).

Refuge Open House proves popular. (Section H.5).

Youth fishing derby a success. (Section H.9).

Refuge Office victim of late night break-in. (Section H.17).

Refuge barn torched by arsonists. (Section H.17, I.3a).

Oneida Dike rehabilitation completed; inspected by SEED team. (Section I.2).

Swallow Hollow rehab project initiated in November. (Section I.2).

New phone system installed in office. (Section I.5).

GIS computer and software received, and program development started. (Section I.6).

B. CLIMATIC CONDITIONS

Overall, 1993 was a cooler, wetter year when compared to the 30-year means for precipitation and temperature. Total melted precipitation of 40.85 inches was 4.07 inches above the 30-year mean of 36.78 inches. The majority of the increase is related to above average snowfall. The 103.1 inches of snow was 36.8 inches above the 30-year mean of 66.3, and was the second highest snowfall on record. The 105.6 inches of snow in 1989 is the record high. The mean annual temperature of 46.7° was 1.0° below the 30-year mean of 47.7°. However, only four of the twelve months had above average temperatures.

A wet spring with 4.04 inches of precipitation above average, mostly in the form of snowpack(the Blizzard of '93), coupled with a quick thaw and more rain, resulted in flooding throughout western New York, and the second highest water levels recorded in the history of the refuge.

Above average rainfall during the growing season, June-September, provided good growing conditions for all refuge habitats.

The first frost was recorded on September 20, while the 4.6 inches of snow in October was a record high.

Table 1. Monthly preceipitation and mean monthly temperatures for Iroquois NWR in calendar year 1993 as compared to the 30-year mean.

	PRECIPITATION IN INCHES 1/				MELTED PRECIPITATION 2/		MEAN MONTHLY TEMPERATURE DEGREES F 3/	
	RAIN		SNOW		TOTAL		1993	30-YR MEAN
	1993	30-YR MEAN	1993	30-YR MEAN	1993	30-YR MEAN		
JANUARY	2.57	0.42	16.3	18.9	4.20	2.31	28.2	23.4
FEBRUARY	0.25	0.77	27.5	14.5	3.00	2.22	18.3	24.6
MARCH	1.08	1.70	28.3	8.4	3.91	2.54	29.3	34.2
APRIL	1.47	2.64	0.4	3.5	1.51	2.99	46.8	46.0
MAY	1.68	2.90	-	0.3	1.68	2.93	56.3	56.6
JUNE	3.94	3.60	-	-	3.94	3.60	65.1	65.7
JULY	4.19	3.19	-	-	4.19	3.19	73.1	70.4
AUGUST	5.19	3.78	-	-	5.19	3.78	70.1	68.6
SEPTEMBER	3.74	3.70	-	-	3.74	3.70	57.5	61.4
OCTOBER	2.92	2.87	4.6	0.2	3.38	2.89	48.1	51.0
NOVEMBER	2.49	2.82	1.2	6.1	2.61	3.43	39.6	40.9
DECEMBER	1.02	1.76	24.8	14.4	3.50	3.20	28.2	29.2
TOTALS	30.54	30.15	103.1	66.3	40.85	36.78		

1/ 30-year mean calculated from 1961-1990.

2/ Melted precipitation calculated as: 1" snow = 0.1" melted precipitation.

3/ 30-year mean calculated from 1963-1992.



Nearly 18" of snow and winds up to 50 mph contributed to the "Blizzard of '93."
ELD 3-13-93



October was the snowiest in 76 years. We recorded 4.6" of snow on October 31 over twice the average snowfall for any October. DVT 11-1-93

C. LAND ACQUISITION

1. Fee Title

2. Easements

On May 6, Refuge Manager (RM) Tiller accompanied Ian Drew, Biological Technician, on an inspection of three potential Farmers Home Administration (FmHA) Conservation Easement properties in Orleans County. Two of the properties have excellent wetland values and the other may have some restoration possibilities.

RM Tiller and Assistant Refuge Manager (ARM) Caldwell met with James Flint, County Supervisor, Orleans County FmHA, on May 10 to flag the boundaries of the Metcalf FmHA Conservation Easement in preparation for a formal survey to set the corners of the easement.

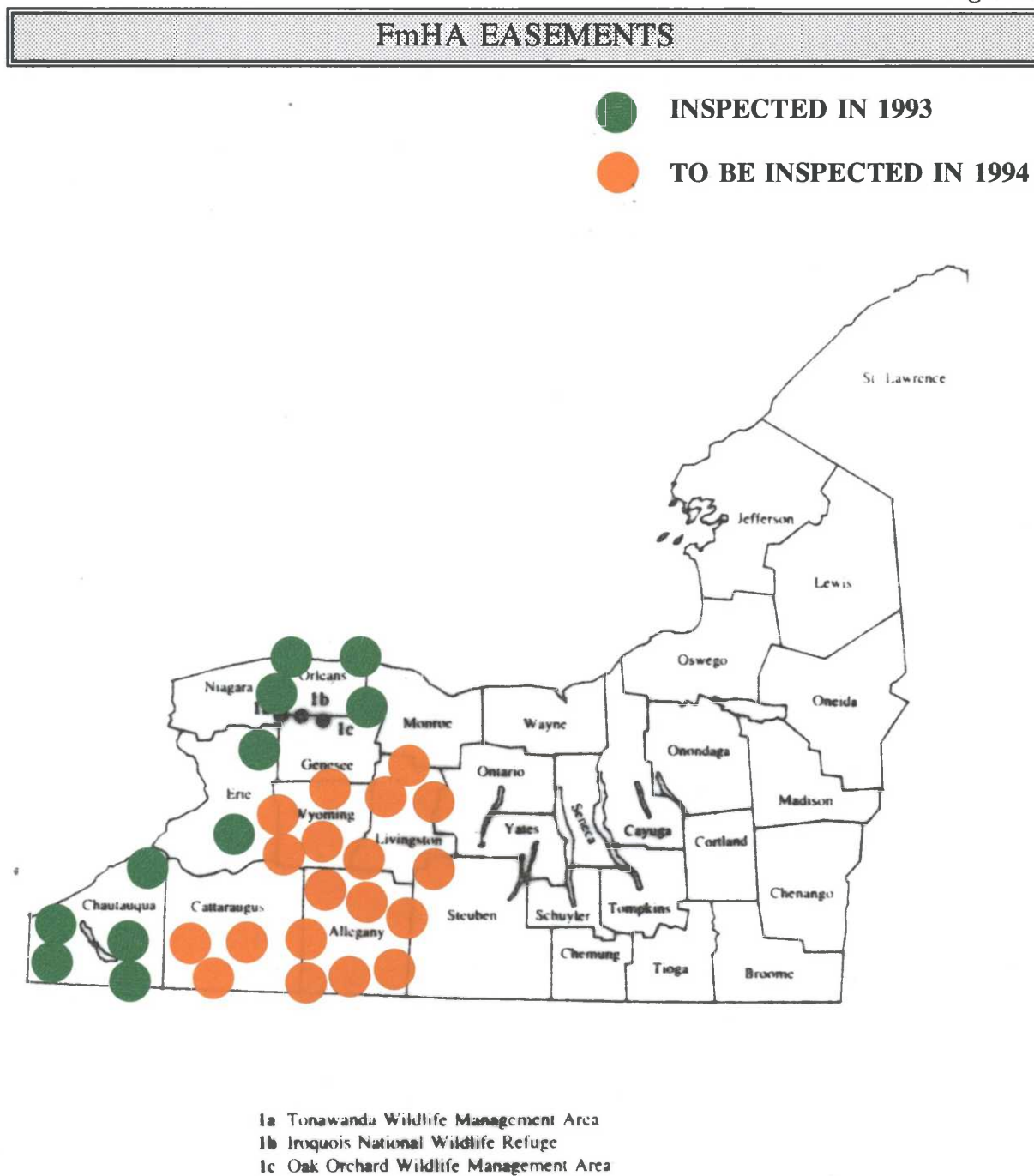
An inspection of those FmHA Conservation Easement properties in Chautauqua County on June 29, 1993 (5 easements) indicated no mercury or nonmercury meters present on the easements.

On September 27, RM Tiller visited two FmHA Conservation Easement properties in Orleans County. FmHA called to say that surveyors would be at one of the properties if we were interested in being present.

On October 6, RM Tiller inspected three FmHA Conservation Easement properties in Livingston County. The Cicero property is 5.5 acres near Livonia, NY. The Ivan Davis property consists of six (6) wetlands of approximately 15 acres total near Hunt, NY. The Robert House property is 45 acres of emergent, submergent and/or bottomland hardwood wetlands near Caledonia, NY.

Of the seven counties involved, with 31 easements, totaling 445.3 acres, we still have to visit the following FmHA properties: Allegany (8), Cattaraugus (4), Erie (1), Livingston (1), and Wyoming (5) (See Figure 1).

Figure 1





Siebert FmHA Conservation Easement with Marsh Creek in the foreground.
DVT 5-6-93



Ian Drew looking at a small wetland on the west side of the Siebert FmHA
Conservation Easement.
DVT 5-6-93



Metcalf FmHA Conservation Easement, looking south from the bridge on Route 18 in Orleans County. DVT 5-6-93



The Metcalf FmHA Conservation Easement is about 38.1 acres of forested wetlands on an unnamed tributary in Orleans County. DVT 5-10-93



Barr FmHA Conservation Easement pipeline station on the east unit. An inspection indicated no mercury meters present. DVT 6-29-93



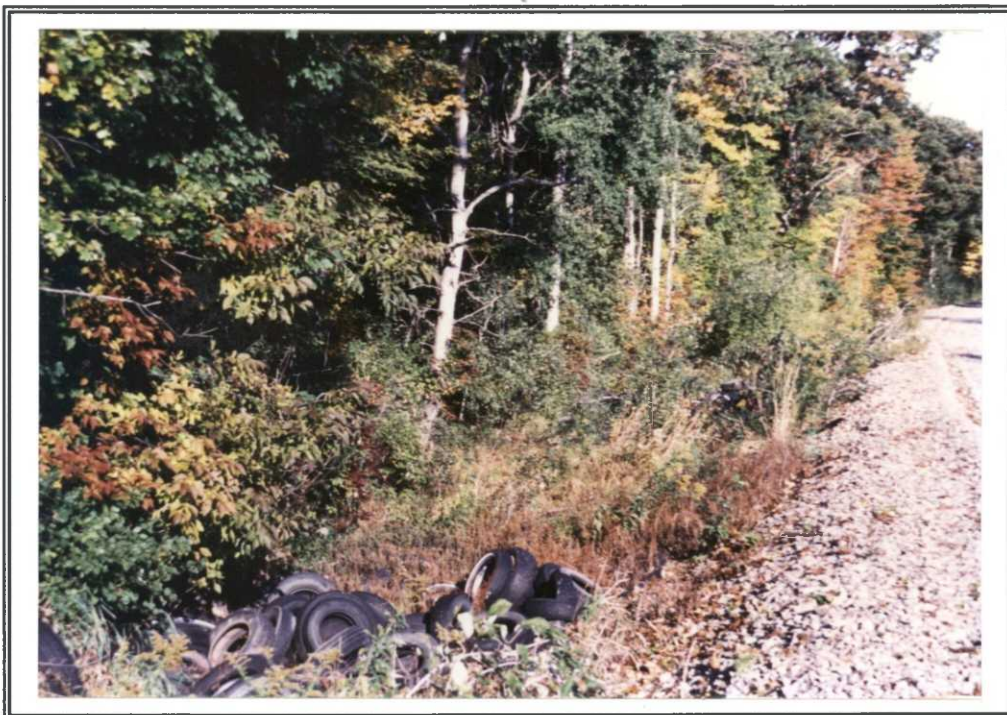
Kahabka FmHA Conservation Easement, south unit, approximately 18 acres of scrub/shrub-forested wetlands along Walnut Creek in Chataqua County. Water levels were low at the time of this inspection. DVT 6-29-93



The Restivo FmHA Conservation Easement is approximately 8.5 acres of scrub/shrub-forested wetlands adjacent to Silver Creek in Chautauqua County (looking north).
DVT 6-29-93



The Mosier FmHA Conservation Easement in Chautauqua County consists of a 200' wide buffer strip along the east side of Walnut Creek totaling approximately 6 acres (looking north).
DVT 6-29-93



The Ivan Davis FmHA Conservation Easement in Livingston County. There is a northern and southern unit with three wetlands in each unit totaling 15 acres. This is wetland No. 3 (on the south unit), the largest of the six wetlands, with a tire "dump" along the north side. DVT 10-6-93



A small cattail wetland No. 5 along the railroad tracks, looking northeast on the northern unit. DVT 10-6-93



Davis FmHA Conservation Easement, wetland No. 6. This wetland is a bog, dominated by leatherleaf, sphagnum, arrow arum and iris. This is the west end looking northeast.
DVT 10-6-93



Davis FmHA Conservation Easement, wetland No. 6 at the north end, looking southwest.
DVT 10-6-93



Robert House FmHA Conservation Easement cattail marsh on the east side of Middle Road in Livingston County. There are approximately 45 acres of submergent, emergent and forested wetlands on the easement. DVT 10-6-93

D. PLANNING

2. Management Plans

The Annual Marsh and Water Management , Hunting, Trapping and Prescribed Burning Programs were submitted and approved during the year.

4. Compliance with Environmental and Cultural Resource Mandates

a) Contaminants

A Draft In-Progress Site Characterization Report, Phase II - Part I was received from Denver Service Engineering Center (DSEC) for review on February 12. Groundwater samples collected in September and December, 1992 were analyzed, and no dioxins or furans were detected from the groundwater monitoring wells around the refuge contaminant site.

Law Environmental, Inc. collected soil borings from around the contaminant pit on June 15-16 as part of the continuing analysis of the extent of spread of 2,4,5-T from the burial site.

We were notified by the DSEC in August that results of the soil borings at the contaminant site revealed some unexpected "hot spots" that will probably require more sampling! On a brighter note, we were also told that a site in Texas will accept 2, 4,5-T for storage. So there is hope that the hazardous wastes can be stored off-refuge.

A Draft Site Characterization Report for the refuge contaminant site was received from the DSEC on September 24. A meeting was scheduled for October 13 at refuge headquarters to discuss the report and remediation efforts to date.

On October 13, a meeting was held at refuge headquarters regarding the next phase of remediation efforts of the refuge contaminant site. Tony Parker of Armour, Cape and Pond; Larry Jeffers, Greg Myers and Mary Anne Brookshire of Law Environmental; Tammy Angel, Fish and Wildlife Service (FWS) Denver Service Engineering Center; Dick Tuers, New York State (NYS) Health Dept.; Wayne Mizerak, NYS Department of Environmental Conservation (DEC); Diane Mann-Klager, Ecological Services (ES), Cortland; and refuge staff met to go over the draft report of completed work and to plan the next steps in remediation. A tour of the site was given to those individuals requesting a site visit after the meeting.



Soil borings were completed in and around the contaminant pit.

DVT 6-16-93



Soil cores were collected and prepared for analysis.

DVT 6-16-93



Surface samples were also taken around the contaminant area. DVT 6-15-93



Surface samples were also prepared for analysis.

DVT 6-15-93

Iroquois National Wildlife Refuge was the site of a feasibility study using the Biomonitoring of Environmental Status and Trends Program's (BEST) detailed plan and workbook. This was coordinated with the U.S. Environmental Protection Agency's (EPA) Environmental Monitoring and Assessment Program (EMAP) - Surface Waters Program to eliminate duplication of efforts. The time and staff hours to complete some of the components in the tiered approach were documented, also the expertise required was determined. Some of the techniques utilized included small mammal, fish, and herbaceous plant surveys, as well as contaminant burden sampling. The results of this study will be available after residue analyses are completed.

Refuge staff met with Diane Mann-Klager, ES, Cortland, on April 8 and 21, to discuss her proposed flora and faunal surveys for Iroquois as part of the BEST Program.

Diane Mann-Klager, ES, Cortland, was on the refuge twice during June conducting flora and fauna surveys as part of the BEST Program. She also visited the refuge during July and August on several occasions to conduct surveys.

The field operations of the Northeast Surface Waters component of EMAP including sampling at Ringneck Marsh and Oak Orchard Creek in July. This was to compare the Lakes and Stream sampling techniques. The Northeast Surface Waters Component of EMAP sampled 79 lakes and approximately 150 streams throughout Region 5. Fish samples were submitted to a FWS contract laboratory via the Patuxent Analytical Control Facility. The data from these samples will provide improved information on the current status of, and long-term trends in, the condition of the nation's major ecological resources, particularly inland surface waters. Additionally, the data will be useful to Service personnel as a comparative database to assist them with their assessments of localized conditions.

On July 27, a representative from Safety-kleen sampled an unlabeled 55 gallon drum in our oil storage house to determine its contents. The drum had been there for approximately 15 years and no one on the staff knew what it contained. If conditions allow, we will have the company dispose of the drum.

On August 24, Refuge Officer Gerhart responded to a report of dumping adjacent to Ringneck Overlook. Some of the miscellaneous junk and household garbage was packed in two cardboard canisters bearing labels of hazardous substances. The NYSDEC Spills Team, and John Hickey, ES, Cortland, were notified. It was ultimately determined that no hazard existed.



Diane Mann-Klager, ES, taking blood samples of bullheads for the BEST program.
DVT 8-20-93



EPA's EMAP personnel took gall bladder bile and blood samples of bullheads from refuge waters.
DVT 8-20-93



Someone dumped refuse at one of our overlooks in containers labeled hazardous materials. The State HAZMAT Team responded. Fortunately, there were no hazardous materials!
DCG 8-27-93

b) Cultural Resource Mandates

The archaeological survey conducted under Contract No. 14-48-0005-92-085, Archaeological Reconnaissance Study Services, was completed in January.

Refuge staff assisted the contract archaeologists by digging two trenches with our backhoe so they could obtain geomorphological data for the refuge archaeological survey.

In April, a draft report entitled "Iroquois National Wildlife Refuge Archaeological Reconnaissance Study, Genesee and Orleans Counties, New York," was received. Comments on the draft report were submitted to the Regional Office (RO). A final report was received at the end of the year.



A geomorphology test trench was dug by refuge staff in the Sutton's Knoll area. The trench exposed an intact hearth, charcoal from which was later Carbon - 14 dated to 1020 ± 70 AD. DVT 1-12-93



Another geomorphology test trench was dug near the Oak Orchard Creek - Mohawk Pool area. DVT 1-12-93

5. Research and Investigations

Iroquois NR93 - "Trophic Interactions Within a Wetland Food Web that Influence Populations of Midge Detritivores (52540-4)

Principle Investigator	-	Dr. Darold P. Batzer
University	-	Dept. of Entomology, Comstock Hall, Cornell University, Ithaca, New York
Sponsoring Agency	-	National Science Foundation Washington, D.C.

BACKGROUND AND OBJECTIVES.

The lack of knowledge about the dynamics of food webs is considered to be a major research gap in the study of wetland ecosystems. Midge larvae tend to be the most abundant primary consumers in many marshes, and thus are particularly important components of those food webs. In addition to their importance as consumers, they are food resources for many higher animals such as waterfowl and fish.

This study examines the interactions of midges with their detritus food supply and with higher-level predatory fish. Several other research projects have already investigated the link between detritus and primary consumers like midge larvae. However, in most cases, primary consumers do not seem to be limited by the availability of detritus resources. Few studies have investigated whether populations of invertebrate consumers in wetlands can be regulated by predators. In this study, the impact of detritus availability and predatory fish on midge populations will be examined concurrently. In mesh-walled cages (1.5 X 1.5 m), detritus will be added or excluded, or predators will be enclosed or excluded, and the impacts on midge populations will then be determined. Experimental examination of the relative importance of resource versus predatory limitation of midge populations will give insights into the dynamics of wetland food webs.

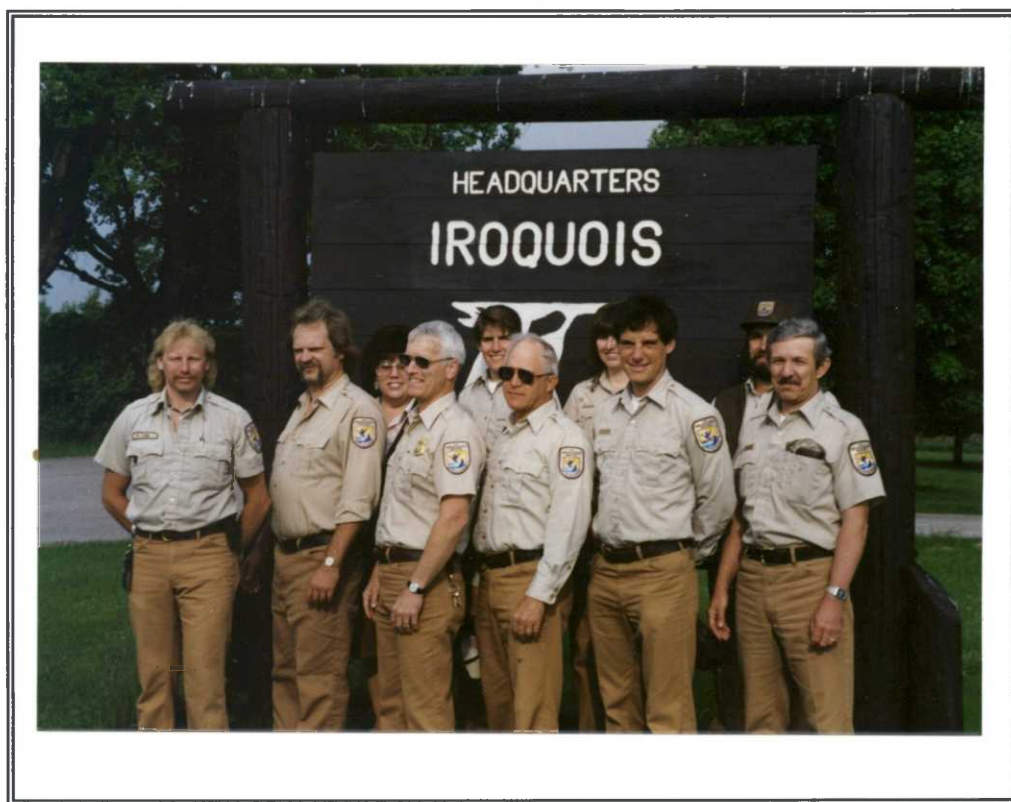
PROJECT PROGRESS

Preliminary investigations were conducted at Iroquois National Wildlife Refuge (INWR) during the summer of 1993, although the official start date for this project was September 1, 1993. In June, Cayuga Pool, a habitat dominated by emergent cattail, was found to support high densities of invertebrates, including many midge larvae. By July, young-of-the-year fish (bluegill sunfish, brown bullhead, and carp) became abundant and invertebrate numbers then declined. This pattern is consistent with predatory regulation of invertebrates by small fish, a focus area of this study. The site also supported large numbers of adult brown bullheads that may consume small fish and large predatory insects. Reductions in the densities of these midge predators by adult bullheads may indirectly benefit midge populations. Based upon these findings, Cayuga Pool was selected as the site for 1994 and 1995 experiments addressing midge population response to cattail detritus availability and higher-level predator densities. The proposed experimental plan has already been presented to the manager and biologist at INWR and they feel it is compatible with the management scheme being practiced at Cayuga Pool.

In autumn 1993 and winter 1994, experimental cages will be constructed for subsequent introduction into Cayuga Pool in spring 1994. That experiment will end by September 1994. The experimental plan for 1995 has not yet been finalized and will be based upon 1994 results.

E. ADMINISTRATION

1. Personnel



9 7 5 2 10 6 4 3 8 1

Personnel

1. Don V. Tiller	Refuge Manager	GS-12	06/07/87	PFT
2. Paul D. Caldwell	Assistant Refuge Manager	GS-11	05/08/88	PFT
3. Eric L. Derleth	Wildlife Biologist	GS-11	Transferred 11/08/93	PFT
4. Dorothy C. Gerhart	Outdoor Recreation Planner	GS-9	06/09/91	PFT
5. Nancy J. Pender	Refuge Secretary	GS-5	06/05/88	PFT
6. Allen D. Nice	Tractor Operator	WG-6	08/04/85	PFT
7. Ira R. McCoy, Jr.	Automotive Mechanic	WG-10	02/02/83	PFT
8. Jeffrey R. Graves	Engineering Equipment Op.	WG-8	09/02/90	TFT
9. Kevin A. Lamm	Engineering Equipment Op.	WG-8	Transferred 07/26/93	TFT
10. Aimee S. Trader	Biological Technician	GS-7	04/19/93	TFT



October 30, refuge staff and volunteers gave Eric Derleth a "going away party" and presented him with several gifts to remember his time at Iroquois.

Photo courtesy of Faye Dumbleton 10-30-93



On July 18, refuge staff gave Kevin Lamm a "going away party". Kevin transferred to Missisquoi NWR.

DCG 7-18-93

Table 2. FIVE-YEAR STAFFING PATTERN, 1989 - 1993

FISCAL YEAR	PERMANENT FULL-TIME	TEMPORARY FULL-TIME	SEASONAL	TOTAL FTE
1989	8	0	0	8.0
1990	8	1	0	9.0
1991	7	2	0	9.0
1992	7	2	0	9.0
1993	6	2	0	8.0

Paul Caldwell, Eric Derleth, Dorothy Gerhart, Ira McCoy Jr., Allen Nice, Jeffrey Graves, Kevin Lamm, and Don Tiller received Performance Awards for the year.

Aimee Trader entered on duty (EOD) April 19 as a temporary full-time (TFT) Biological Technician to develop a forest covertype map and implement a Geographical Information System (GIS). Aimee was hired from the Colonial National Park, Yorktown, VA where she was a Natural Resource Specialist. Aimee transferred to the RO effective December 25.

Kevin Lamm, Engineering Equipment Operator(EEO), TFT, transferred to Missisquoi NWR as a PFT Maintenance Worker on July 26. Kevin and his expertise on heavy equipment is missed at Iroquois. Kevin's departure left Iroquois' maintenance program 1.5 FTEs below authorized level and the habitat program continues to suffer.

Jim Bohm EOD on September 7 as a TFT Regional Force Account EEO to replace Kevin Lamm.

Refuge Biologist Derleth accepted a wildlife biologist position with the Lake Champlain Fishery Resources Office in Essex Junction, VT. His transfer was effective October 31. Eric's biological knowledge and dedication to the resource helped move Iroquois' program ahead.

Iroquois closed the year two FTEs below authorized staffing level.

3. Other Manpower Programs

a) Job Corps

This was another year of nonperformance for the Iroquois Job Corps Civilian Conservation Center (JCCCC) in relation to refuge programs. None of the projects discussed at the Vocational Skills Training meeting in January 1993 were acted on, and one remains from 1991 (repair to a fieldstone wall in the office lobby). Regional Engineering drew up plans for a disabled ramp at the rear of the office that will serve as a fire escape for occupants of the auditorium, and the refuge went through the

procurement process for the concrete and stainless steel railings, but JCCCC reneged at the last moment, putting the project off until spring 1994.

Failure of the JCCCC impacts many refuge programs since some of our Individual Project Worksheets (IPWs) are written expecting the labor to be supplied by the JCCCC. If these projects are selected by Region for funding but JCCCC fails to cooperate, the cost difference can break the project or require monies to be taken from the station's O&M funding, disrupting other station programs

We have an extensive list of potential projects that the JCCCC could assist us with, but either they lack the interest or cannot mobilize their people for off-Center projects.

b) Job Development Program

March 24, refuge staff met with Jim Tabor and Edwina Billings, Orleans County Summer Youth Employment Program (SYEP) staff to discuss potential for a summer program on the refuge.

ARM Caldwell attended a meeting of the Orleans County Job Development Program on June 24 relative to a teenage worker for the refuge under the SYEP.

Bruce Dugan, Orleans County SYEP enrollee, EOD July 6, and completed his detail on August 20. Bruce was a disappointment when compared to previous workers under the SYEP. He did assist with placement of rip rap, mowing of lawns, etc., but only seemed to work well when under constant supervision.

c) Boy Scouts

RM Tiller attended a T.R.A.I.L. Boss introduction meeting in Avon, NY on February 18 to hear what the scouts can do for conservation organizations. He then attended another meeting on April 20, 1993, in Avon, NY. The idea of the scout program is to train the scout leaders who then complete the project without much agency involvement after the initial visit.

RM Tiller, and ARM Caldwell met with scout leaders under the T.R.A.I.L. Boss Program in October to discuss potential refuge projects. The Scouts did spend one day in early November installing four benches they had made, replacing signs and brushing back parts of Mohawk Ski Trail.

d) Student Intern

Jennifer Cinotti, a Board of Cooperative Education Services (BOCES) Action Learning Intern Program (ALIP) student from Akron High School started her four month intern program on February 1. Jennifer worked with refuge staff approximately eight hours a week to get an idea what kind of projects we get involved with. She completed her internship on June 7.



Jennifer Cinotti, ALIP student intern, spent some time looking for neck collared geese during her internship. DVT 5-27-93



Although Don Cook is not a volunteer at the refuge, he certainly has "volunteered" his time and effort in promoting Iroquois through his photos and newspaper articles. The refuge presented him with a small token of our appreciation for all his work over the years. DG 8-5-93

4. Volunteer Program

Approximately 45 volunteers provided support in administration, maintenance, public use and resource management. A strong core of 10 volunteers presented audio-visual programs on-site, led nature walks, presented public outreach programs, participated in refuge special events, staffed the visitor center for spring migration, staffed exhibits at the Erie County Fair and the NYS Duck Calling Competition and performed trail maintenance and wildlife surveys. Volunteers projects included: assisting staff in removing trees from Cayuga Overlook as part of the renovation; maintaining bluebird nest boxes; posting signs; renovating Mallard Overlook parking bumpers; writing sections of the Kanyoo Trail Guide; serving as mentors and instructors and staffing the registration desk at the National Fishing Days Derby; and constructing the new kiosk at headquarters.

A picnic lunch was held August 28 at Genesee County Park as an informal get-together between refuge staff and volunteers. Twenty members of the refuge staff and volunteers and families attended.

Nineteen members of the Western New York Chapter of the National Campers and Hikers Association contributed a total of 100 hours in June as a community service project. Projects included clearing trails, landscaping, and painting.

A volunteer orientation day was scheduled in the spring. Although interest seemed high attendance was low as snow kept many away. Five new volunteers were brought on staff in 1993.

The following table illustrates the contributions made by volunteers over the past six years.

Table 3. Volunteer Contributions at Iroquois NWR, 1988-93

YEAR	NUMBER OF VOLUNTEERS	HOURS CONTIBUTED	SAVINGS FOR REFUGES ¹
1988	45	3,362	24,241
1989	45	2,755	19,946
1990	72	3,282.50	23,765
1991	45	1,767.75	12,799
1992	49	1,728.50	12,515
1993	51	1,473.25	10,666
	TOTALS	14,369.00	104,032

¹ Based on current Region 5 figure of \$7.24/hour.

5. Funding

Funding for FY 93 was initially proposed at \$791,671 in 1260 including \$334,000 for contaminants cleanup and \$95,900 for maintenance projects. An additional \$7263 was allocated for quarters maintenance. Approximately \$16,000 was added at the end of the year for a pickup truck and computer purchased as end-of-year items. Funding is summarized in Table 4.

Table 4. Operations and maintenance funding summary FY 89 - FY 94

ACTIVITY	FY 90	FY 91	FY 92	FY 93	FY 94
1260 - O&M	\$308,051	\$291,269	\$321,153	\$332,489	\$293,767
BASE O & M		\$44,107	\$31,500		\$4,400
² BASE MAINT		\$41,700			
MAINT. MGT. SYS		\$37,651	\$34,000	\$90,000	\$104,000
1260 - ARMM	\$52,200				
1260 RES. PROB.	\$7,000				
CONTAMINANTS	\$100,000	\$20,000	\$50,000	\$334,000	\$173,877
WATCH. WILDLIFE			\$10,000	\$9,900	\$4,000
¹ WETLANDS EDUC.			\$2,000		
VOLUNTEER			\$2,500	\$1000	\$500
REDUCTIONS	-\$85,000	-\$28,000	-\$28,000		
RECURRING FUNDING TOTALS	\$382,251	\$434,727	\$423,153	\$767,309	\$580,544
8610 - QUARTERS	\$9,326	\$11,512	\$7,672	\$7,850	\$7,263
6860 - SALES	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000
CHALLENGE GRANT		\$39,500	\$10,000	\$15,000	\$13,500
9120 - FIRE	\$500	\$1,000	\$500	\$500	\$500
1260 - YCC	\$14,280				

1

Watchable Wildlife and Wetland Education Combined in FY 93.

2

MMS and Base Maintenance Combined in FY 92.

6. Safety

Iroquois completed the year without any lost time accidents. Minor scrapes and scratches were the only injuries reported.

Staff completed their required fire and law enforcement physicals and audiometric testing twice during the year. The second testing was required in December because of a change in due dates for the WO.

Wells were tested quarterly and all wells except the one at Q-152 passed. The Q-152 well tested unacceptable for coliform bacteria with confluent growth. Disinfecting the well with chlorine did not resolve the problem, and no source for the contamination could be found. A UV light disinfection unit was installed in the water system to eliminate the contamination.

Several days were devoted to cleaning up the woodshop side of the shop. Items were sorted, and scrap thrown away to eliminate clutter.

Batavia Garage Door Company completed the annual safety inspection of all the overhead doors on station buildings.

An electrician installed ground fault circuit interrupters(GFIs) in all the shop receptacles, and several in headquarters building. A 504 compatible panic bar was installed on the auditorium fire exit door in the headquarters building.

Both Q-101 and Q-49 were rewired during the year to bring them up to current electrical codes. All four residences are now up to recent electrical codes.

All station fire extinguishers were inspected and tested as needed by Monroe Fire Extinguisher Co..

Furnaces were inspected and tested for efficiency, safe burning, stack temperature, as well as any unacceptable fume and emission levels.

The refuge continued its monthly inspection of all station and residence fire extinguishers, smoke detectors and GFIs, etc.. A different staff member is assigned to complete the safety inspection checklist each month. In addition, personnel living in government quarters fill out a checklist specifically for their quarters, documenting the condition and certifying monthly inspection of fire extinguishers, smoke detectors and GFIs.

A safety meeting was held on September 8 to view the Hazard Communication video tape from the RO-SMO, and to discuss the meaning of Material Data Safety Sheets(MSDS). A basic Hazard Communication Program was written for the station.

Industrial Hygienist Cheryl Statz, RO-SMO, conducted a safety inspection of the refuge on August 16-17 in preparation for a Safety Audit by personnel from Denver Safety Office and Safety Management Officers (SMO) from Regions 1, 3 and 5. The audit was conducted on September 13 by Earl Markwell, Chief, Safety/Health (WO); Hannah Burns, Job Corps (WO);

Ed Bajakian, SMO-R5; Jim McNulty, SMO-R1; and Jerry Mohl, SMO-R3. A tour of the refuge was provided to all in addition to the inspection of the office and shop buildings.

A local electrical contractor corrected several safety deficiencies identified in the September Safety Audit: outlet boxes were replaced; electrical cords shortened; and magnetic start switches were installed on woodworking tools (radial arm saw, drill press, and joiner).

A lockout/tagout center with appropriate tags, locks, instruction booklets, etc. was installed in the shop for use by staff.

Reciprocal station safety inspections between Iroquois and Montezuma NWR's were conducted on October 6 and 21.

8. Other

a) North American Waterfowl Management Plan

The North American Waterfowl Management Plan (NAWMP) - an international agreement between the United States (U.S.), Canada and Mexico to protect, enhance and restore wetland habitats across the continent presents a number of new opportunities and challenges for refuges. The Plan establishes conservation goals for wetland habitats in specific regions of the continent, sets objectives for restoring waterfowl populations, and provides a framework for accomplishing local, regional, and international goals. In the U.S., six key waterfowl breeding, migration, and wintering habitat regions called Joint Ventures (JV's), have been established to implement the Plan. In Region 5, The Lower Great Lakes/St. Lawrence Basin (LGLSLB) and the Atlantic Coast (AC) JV's have coalitions of federal, state, and private partners working together to restore waterfowl populations. Iroquois NWR lies within the LGLSLB JV and is an integral part of the Tonawanda-Iroquois-Oak Orchard Focus Area. As such, Iroquois is playing an active role in achieving the objectives of the LGLSLB JV and NAWMP.

Iroquois staff have participated in the first and second drafts of the Tonawanda-Iroquois-Oak Orchard Focus Area Plan. To date, an implementation team has not been selected.

Habitat management on Iroquois is designed to meet the goals of the LGLSLB JV. Completion of the DU MARSH project at Olsen Marsh, continuing dense nesting cover development, and construction of ditch plugs (Section F.2) are examples of our participation and support of the JV and NAWMP. Other examples of our participation are noted in the NAWMP Activity Highlights summarized below.

NAWMP Activity Highlights

- A contract was issued and work began on replacing the water control structures at Swallow Hollow with four galvanized half-round risers (Section F.2, I.2).

- Schoolhouse Moist Soil Unit was drawn down in the spring for the first time (Section F.2).
- Completed four ditch plugs for a total of 4.5 acres, and began construction on a fifth. Two existing plugs were repaired. Approximately 30 potholes were excavated in drainage ditches on Forrestel Flats (Section F.2).
- Six impoundments: Seneca, Oneida, Ringneck, Center, Schoolhouse Moist Soil Unit, and Cayuga subimpoundment, totaling 2,016 acres, were drawn down to stimulate moist plant production (Section F.2).
- Approximately 1,200 linear yards of eroded dike were repaired and/or rip rapped to maintain water management capabilities (Sections F.2, I.2).
- Three acres of warm season grasses were planted to provide waterfowl nesting cover (Section F.6).
- Approximately 250 acres of grassland were sprayed, mowed or disced to preserve or prepare waterfowl nesting cover.
- Monitor black tern populations and use areas on refuge, and develop challenge grant proposal for tern research project.
- Extended the Knowlesville water control structure riser 18 inches to increase size of marsh, and improve shallow water areas along shoreline.
- Iroquois NWR administers more than 31 FmHA easements totaling more than 445 acres in the seven counties of western New York (Section C.2).
- Iroquois NWR supported wildlife related research during the year (Section D.5).
- Iroquois NWR provided administrative and support services for the Partners for Wildlife Program (Section E.8b).
- Completed 6 wetland restoration projects on private lands under the Partners for Wildlife Program totaling 20 wetland and 8 upland acres with 6 landowners using 1 private contractor (Section E.8b).

b). Partners for Wildlife

Shane Holmes, WNY Partners for Wildlife Biological Technician, ES, Cortland reported for duty at Iroquois on June 3. After continuing administrative problems with the Cortland Office, including a mix-up with his paycheck, he resigned suddenly on June 25. Biologist Caryn Crook, ES, Cortland assumed the increased workload. Before his resignation, Biological Technician Holmes and Biologist Derleth spent

about a week visiting completed restoration sites and developing a protocol to identify and design new wetland restoration projects.

Caryn Crook and Biologist Derleth visited 7 landowners and made 20 initial site visits for the Partners for Wildlife Program. One contractor was selected late in July to work on restorations in both Genesee and Orleans Counties. Restoration of 28 acres, 21 wetland and 7 upland buffer, was accomplished on six sites. Repairs were made to one project constructed in 1992.



The Tiranno private wetland site in Orleans County was constructed in 1991. DVT 5-7-93



This site also on the Tiranno property was constructed in 1992. DVT 5-7-93



The Weiss private wetlands project number 1 was completed in 1993.

ELD 6-93



Weiss private wetlands project number 2 was also completed in 1993 in Orleans County.

ELD 6-93

c) **Training**

Outdoor Recreation Planner (ORP) Gerhart departed February 22 to attend the three week Refuge Academy at Charleston, SC.

March 1-5, ARM Caldwell attended a Small Purchase/Contracts Course.

March 16-19, RM Tiller attended "Fire Management for Line Officers" fire training in Portland, Oregon.

March 30-April 2, ARM Caldwell attended the first session of the in-service law enforcement refresher at Patuxent NWR. ORP Gerhart and EEO Lamm attended the second session, April 5-9.

ORP Gerhart attended a Project Access seminar April 13-16 in Colonial Williamsburg, VA.

Automotive Mechanic (AM) McCoy, and EEO's Graves and Lamm attended the first Region 5 Maintenance Workshop at Patuxent Wildlife Research Center the week of April 19.

Five staff attended CPR, and five completed the step test for firefighter during April. EEO Lamm served as EMT for the step test.

Secretary Pender attended a half day workshop on travel sponsored by GSA.

Station Safety Officer Caldwell attended the OSHA sponsored training course "Safety Training for Collateral Duty Safety Officers" at Roger Williams University, Bristol, RI, July 27-30.

Secretary Nancy Pender attended a GSA Seminar on the new "MUFFIN" system, Federal Supply Schedules and FEDSTRIP orders in October.

RM Tiller, ARM Caldwell, AM McCoy and Tractor Operator Nice attended a three hour "Right to Know" class sponsored by Safety-kleen in November. The class discussed Hazard Communication Programs, MSDSs, and employer responsibilities. Staff began the hazardous materials inventory.

Staff from Iroquois, Erie and Montezuma NWRS, Lower Great Lakes Fisheries, Iroquois JCCCC and the Buffalo Law Enforcement Office attended a half day training session at Iroquois on the use of the Government I.M.P.A.C.T. Visa Credit Card on November 3. Della Frost, RO-BF, and Gary Dupuis, RO-CGS, provided the instruction.

d) Support of Regional and Washington Office's Programs

Biologist Derleth submitted comments to the RO on the Station Management Plan. He also submitted additional revisions to the WO on the wildlife inventory chapter of the new FWS Manual.

EEO Lamm left for Edwin B. Forsythe NWR on January 31 for a two week detail to assist with their subimpounding project.

EEO Graves traveled to Great Swamp NWR March 8-20 to demolish two excess buildings.

EEO Graves traveled to Great Swamp April 5-8 to assist them in setting roof trusses for their pole building and transporting the excavator back to Montezuma NWR.

EEO Lamm transported the Hydro-Ax from Erie NWR to Back Bay NWR, April 12-15.

EEO Graves transported a dozer from Great Swamp NWR to Connecticut for repairs, April 28-30.

Staff reviewed and commented on the proposed regional Hydro-Ax schedule, and assisted with scheduling several regional equipment transfers.

Don Stover, EEO, Erie NWR, used the truck tractor and lowboy to transport Montezuma's excavator to Great Swamp and the Swamp's Hydro-Ax to Erie.

Biologist Derleth sent out 74 forms for the NYS woodcock singing ground surveys in April.

Biologist Derleth cooperated with the Migratory Bird Management Office(MBMO) during the aerial waterfowl population surveys in Ontario, Canada from May 9-19. Derleth flew as an observer during low-altitude helicopter surveys to collect data which will be used to estimate visibility indices for various waterfowl species that are surveyed from fixed-wing aircraft.

AM McCoy traveled to Eastern Shore of Virginia NWR on May 15 to move a pan to Back Bay NWR. He then moved the Hydro-Ax from Back Bay to Eastern Neck NWR where he ran the Hydro-Ax until May 23.

EEO Graves operated the Hydro-Ax at Eastern Neck NWR from May 24 through June 4.

EEO Lamm traveled to Eastern Neck NWR for a two-week detail, June 21-July 2.

ORP Gerhart participated in the ORP Strike Team that assisted with the dedication of the new RO June 2-4.

AM McCoy transported the Hydro-Ax from Eastern Neck NWR to Prime Hook NWR on July 26-28.

Biologist Derleth departed for his third consecutive Canadian banding assignment on August 9, and returned from Woodstock, New Brunswick on September 17.

EEO Graves traveled to Prime Hook, DE to operate the Hydro-Ax. Heavy rains, scheduled maintenance, and a developing leak in the hydraulic pump forced him to return to Iroquois early with the Ax. He then loaded Iroquois' Ax and moved it to New Hampshire in order to maintain the rotating schedule.

Kevin Lamm, EEO-Missisquoi NWR, worked at Iroquois from September 13-23, assisting with the rehab of Onondaga Dike and grassland maintenance.

AM Ira McCoy completed a two week detail on the Hydro-Ax in Maine from September 25 to October 9.

November 1-4, ORP Gerhart attended a work group meeting at the RO to develop a national environmental education program for Job Corps.

Carl Schwartz, ES, Cortland, visited Iroquois to inspect some of the Partners for Wildlife project sites completed during the last year. The State Habitat Plan was also discussed.

e) Visits and Other Items of Interest Not Discussed Elsewhere

Richard Yee, RO-EN, visited Iroquois in January to gather data on the headquarters parking lot resurfacing project.

Gary Swihart, Fishery Assistance, VA visited Iroquois February 1-3 to evaluate Ringneck and Center Marshes for their ability to support a sport fisheries. A location for an accessible fishing pier was also evaluated.

March 8-11, RM Tiller attended the Region 5 Regional Conference in Herndon, VA.

March 23, Biologist Derleth attended NYSDEC waterfowl meeting held at Montezuma NWR. Preliminary discussions were held regarding potential harvest restrictions on Canada geese (migrant population) and the September season for the "resident population."

March 29, AM McCoy traveled to the RO to retrieve some additional excess furniture for use at Iroquois.

Lee Wright, DARD-RW, visited Iroquois on April 8.

George Cortes, RO-HR, visited Iroquois on April 8-9 to review the station 504 Transition Plan and make recommendations on its update.

Biologist Derleth participated in the NYSDEC public meeting on April 20 regarding NY waterfowl hunting regulations for 1993.

In the midst of repairing our blocked septic system on April 26, Iroquois sent two maintenance staff to Montezuma NWR on very short notice to assist them in setting "bladders" for flood control around the refuge office building.

On April 27, AM Caldwell spoke with Ed Kain, Works Coordinator, with Iroquois JCCCC about scheduling JCCCC assistance with the installation of the 504 ramp at the rear of refuge headquarters.

RM Tiller attended a half-day seminar put on by the New York Telephone Company entitled "Building Bridges To The Information Age." It was a "look at the future" for new computer/telecommunications in schools, business and government.

ARM Caldwell met with Richard Yee, RO-EN, to discuss the survey results and inspect parts of the Swallow Hollow Dike scheduled for repair.

Biological Technician Trader met with Paul Steblein, Regional Biological Data Manager (RBDM), and visited the Regional GIS lab at University of Massachusetts on May 10-11. The protocol for developing the GIS project at Iroquois, as well as RO support with equipment and technical assistance was discussed.

On May 20, RM Tiller presented the Town of Alabama with their FY 1992 Refuge Revenue Sharing check in the amount of \$10,929.00. On May 21, a check was presented to the Town of Shelby in the amount of \$9,644.00. Needless to say, the Towns were not very happy with a reduction in the amounts received!

On May 25, Linda Repasky, Carolyn Mach, and Kerre Kelly, RO-Personnel, were given a brief tour of the refuge by RM Tiller during their visit to the Iroquois JCCCC.

On May 26, RM Tiller attended a luncheon for all ALIP sponsors. ALIP student, Jennifer Cinotti, worked at the refuge from February through May, eight hours per week during her internship.

RM Tiller attended the Refuges-North Project Leaders meeting June 1-3, and the RO dedication June 4.

Biologist Derleth and Biological Technician Trader visited the National Center for Geographic Information and Analysis at State University of NY (SUNY) Buffalo to discuss cooperative efforts in implementing GIS at Iroquois. A letter detailing specific topics of mutual concern and also inviting cooperative efforts was developed and sent subsequent to the visit.

ARM Caldwell met with JCCCC staff to discuss the construction of an access ramp for the fire exit for the auditorium. The sketches were revised by RO-EN and returned to the refuge.

Biological Technician Chuck Hayes, Moosehorn NWR, visited Iroquois during June 28-July 1 to discuss methods and protocol for forest coertyping, forest management planning, and GIS standards. His visit was very informative as his expertise in GIS software is extensive. Cooperation between Moosehorn and Iroquois on GIS topics will be enhanced because of the visit.

Biologist Derleth and Biological Technician Trader participated in a conference hosted by Cornell University - "Enhancing Biodiversity in the Northeast through Management of Early Successional Forest." Trader attended field trips on the following day to look at old field, brushland, and forest sites managed by burning and selective cutting to perpetuate early-successional stage wildlife habitat.

Rick Sodja, Office of Information Transfer, Fort Collins, CO, visited on July 30 to observe refuge habitat management activities and western NY participation in the Partners for Wildlife Program.

Our first false alarm for the new headquarters security system occurred July 24. NY State Police responded but no intruders were observed.

RM Tiller attended the budget conference in the RO August 9-13.

Two waterfowl I.D. classes were held at refuge headquarters on August 26 and 31, to certify people to hunt on Refuges in NYS. As in past years, the classes were presented by members of the Finger Lakes and Western New York Waterfowl Association. Total attendance for both classes was 79.

Paul Steblein, RBDM, visited Iroquois NWR September 3 to meet with Biological Technician Trader. Steblein was given a demonstration of the GIS equipment.

Biological Technician Trader traveled to Erie NWR September 21 for an initial visit to set up their GIS program. She was able to bring aerial photos and topo maps of Erie NWR back to Iroquois to do a portion of the coertyping here.

On September 22, RM Tiller and ORP Gerhart attended the Iroquois JCCCC Community Relations Council Meeting dinner held in the JCCCC dining hall.

Richard Yee, RO-EN, met with ARM Caldwell October 13 to discuss engineering needs for FY 94 funded IPWs.

Biological Technician Trader attended a GIS Conference - "GIS and the Environment" at Cornell University on October, 4-5.

Biological Technician Trader travelled to Moosehorn NWR on October 31 to use the ARCINFO software and digitize coertype maps for Iroquois and Erie NWR's. She also received training on the Global Positioning System equipment for eventual use at Iroquois and Erie NWR's.

Marshall Fox, FWS Denver Engineering, and Craig Harris, a private consultant, inspected Oneida Dike and Dam #5 (Structure 'L') on November 18, and were impressed with the fill and rip rap rehabilitation completed by refuge staff during the summer.

Biologist Derleth and RM Tiller conducted a tour of moist soil/wetland management activities for Murray Laubhan(Gaylord Lab, U. MO), Zone Biologist-South, Zone Biologist-Central and 2 other individuals. It appeared as if they were all impressed with our wetland management activities. (There was a good exchange of management options for our wetlands.)

F. HABITAT MANAGEMENT

1. General

Habitat management activities at Iroquois emphasize numerous goals including: enhancement of existing wetlands and grasslands; restoration of wetlands on and off refuge; creation of additional grassland; active management of early successional forest; and the maintenance of climax and late second-growth forest. With two Regional Force Account TFT Engineering Equipment Operators (EEO) on the staff for the past three years, we have made some inroads on the backlog of projects in spite of a vacant EEO position on the permanent staff.

The extensive damage to existing dikes and roads caused by the record high spring flood waters (Section B) had to be corrected during the summer (Section I.2). This effort distracted from the habitat program, limiting our efforts. In addition, the Regional Force Account EEOs were in high demand during the construction season, and were not always available when most needed.

NYSDEC flew an aerial reconnaissance of the refuge and adjacent state areas on April 6, providing us with several slides of high water levels on Iroquois.

2. Wetlands

The water in Oak Orchard Creek and the larger impoundments reached the second highest levels ever recorded on the refuge. The emergency spillways for Oneida, Mohawk and Cayuga Pools were all passing water at the end of March. The Mohawk and Cayuga spillways suffered extensive erosion. Water overtopped a few of our dikes causing only minimal damage, but Cayuga, County Line and Cayuga Subimpoundment dikes, suffered damage to approximately 350 linear yards of dike. Water also came within six inches of overtopping Oneida dike adjacent to Structure 'L'. Estimated cost to repair the damage was \$7,000.

Oneida Pool

Water levels were held at 614.0 during January, then lowered to 612.0 in preparation for the spring runoff. High spring runoff raised this pool to 615.3 (2 1/2' above planned level). Water about 6" deep overtopped Route 63 for three days during flood crest, the first time it has done so since 1979. An early drawdown was initiated in April and completed in June when levels were reduced to 610.6. The unit was gradually reflooded in September to provide habitat for the fall migration. Water levels ranged from 612.7 to 613.4 from October through December.

The early drawdown stimulated a good mix of wetland vegetation response. Smartweed spp. and *Bidens* dominated Oneida Pool.

The John Deere 750B was utilized in the Forrestel Flats area to construct ditch plugs. Early winter ground conditions were favorable there and one ditch plug and approximately 50 potholes were constructed. The potholes were constructed by dozing out existing ditches that were too steep sided to allow traditional, shallow water ditch plug construction.

Mohawk Pool

A total of 11.11" of precipitation during the first three months of the year resulted in very heavy spring runoff and an extremely high pool level (616.5) during early April. Water overflowing the unit resulted in damage to the spillway (eroded approximately 18" of the spillway) and created an erosion gully through the Mohawk/Cayuga subimpoundment dike. Otherwise, planned water levels were maintained throughout most of the year.

Repairs to the spillway and dikes were completed during the summer (Section I.2).

Phragmites and purple loosestrife in this pool were not treated.

Galaxie Marsh

Water levels in Galaxie Marsh were maintained at or just slightly below the 1993 target levels. Water levels stayed slightly below the planned elevation of 616.5 during the summer months. Starting in September, water levels were gradually raised to full pool.

Current vegetative conditions are excellent with a diversity of wetland plants being present e.g. cattail, hardstem bulrush, wild millet, red-rooted nutsedge, various sedges and rushes, and rice cutgrass. The vegetative conditions within the impoundment will be monitored closely during 1994.

Cayuga Pool

Water levels were maintained at or slightly below the planned elevations. This impoundment was managed at 613.0 January through February, and then lowered to make storage available for spring runoff. In April, the second highest water level ever recorded on Oak Orchard Creek and the refuge overflowed into Cayuga Pool resulting in erosion damage to approximately 350 linear yards of dike. The high water raised the impoundment to 614.3. The pool was then lowered in May to 612.5 and was maintained at or near this elevation until September. From October through to December, the impoundment was gradually raised to 613.2.

The eroded portions of the dike were repaired force account. Geotextile cloth was placed over the filled and graded areas, then covered with 6-8" surge stone to protect it from erosion in the future.

Isolated stands of purple loosestrife in Cayuga were treated with 2% Roundup.®

Black terns did not return to nest in Cayuga in 1993.

Cayuga Subimpoundment

Water levels in this unit were managed as close to the planned levels as possible. Levels were kept at 614.0 from January through March. Then in April, the high spring runoff raised water levels to 615.2 (almost 2' above the target level). In May, levels were reduced to 612.5 for the planned summer drawdown, then raised in late September to near full pool (613.80) for the winter months.

Surface repairs were made to the Subimpoundment - Cayuga dike and Subimpoundment - Mohawk spillway by hauling clay to repair April flood damage (Section I.2). The common dike between Cayuga Pool and the subimpoundment still needs to be raised and widened to avoid future problems.

The subimpoundment drains through screwgate "C" into the Feeder Canal. Because water levels in the canal remain too high during spring and early summer, early drawdowns are not possible. A site investigation is still needed to assess the possibility of constructing a new outlet water control structure for the subimpoundment.

Phragmites and purple loosestrife were not treated this year.

Olsen South

1993 was the first year that this unit was fully flooded throughout most of the year. Water levels were managed at full pool, 617.0, during the early part of the year, but it gradually evaporated to 616.1 by August. Levels returned to full pool in December.

Vegetation included cattail, nutsedge, sedge, willow, beggarticks, reed canary grass, and softstem bulrush. Cattail was the dominant vegetation, expanding to cover approximately 90% of the unit.

This unit as well as Olsen North had excellent invertebrate biomass, consisting of chironomids and physid snails, with fewer numbers of fingernail clams. On July 27, during the moist soil tour with Murray Laubhan, zone biologists, and refuge staff, six bitterns (Americans and Least) and a snipe were flushed out of this unit.

Three additional ditch plugs, totaling approximately three acres, were completed, and one ditch plug was enhanced adjacent to the Olsen Marsh complex. The last, planned, ditch plug was almost completed in December before soft ground bogged down the TD-20. All that is left to do is spread the topsoil around the site.

Olsen North

Water levels in Olsen North were also maintained at the planned elevation of 617.0 during January-March period. Water levels were gradually reduced to about 616.7 by the end of April, and continued to drop slowly during the summer to 615.5 by August. They gradually recovered to 616.7 by the end of the year.

Vegetation composition and invertebrate biomass in this unit were similar to Olsen South.

Seneca Pool

Planned water levels were maintained until late March when spring runoff raised water levels in this unit to 614.0. In late May, the planned drawdown was implemented and water was maintained only in the ditches. Water levels were gradually raised in September, and the impoundment was maintained at approximately 610.6 for the remainder of the year.

The wet summer did not permit refuge staff to either level the remaining spoil piles or to regrade the side slopes of the main channel that was rehabilitated in 1991..

Ringneck Pool

Water levels were generally managed as planned. During January and February, levels were maintained at 620.6. In March, spring runoff raised this unit to 621.0. A planned partial drawdown was initiated in July to provide mudflat feeding habitat for migrating shorebirds. Water levels were then gradually raised in September for fall migration and the pool filled to 619.3 for the winter months. The planned level of 620.6 was not achieved because Center Marsh had undergone a summer drawdown and had to be partially refilled before water could be passed to Ringneck.

The transplanted cattail is starting to slowly expand. Beggarticks and nutsedge were present at higher elevations and *Elodea* was found in the lower elevation.

Two existing ditch plugs south of Ringneck Marsh were repaired; one required modification of the spillway, and the other repair of a hole in the plug itself.

Center Marsh

Water levels in Center Marsh were successfully maintained as planned. Levels were kept at 626.0 from January to March. The early gradual drawdown (at a rate of 6"/wk) was initiated in May and completed in June. This unit, like Ringneck, Galaxie, Knowlesville, and Long Marsh, is an upland marsh. Because this impoundment does not receive its water supply from Oak Orchard Creek it is dependent on precipitation for reflooding. As a result, Center Marsh did not start to refill until November. Water levels finally reached 625.2 (near the planned level of 626.0) in December.

The early drawdown stimulated an excellent response from moist soil vegetation such as smartweed (3 species), beggarticks, and spikerush. However, some undesirable plants such as velvet leaf, willow, and cottonwood species that are indicative of mid-to-late drawdowns, germinated as well.

Schoolhouse Marsh

Schoolhouse Marsh water levels were maintained steadily at or slightly below the planned levels throughout the year. This pool served as a reservoir for the Schoolhouse Moist Soil Unit (MSU).

Schoolhouse Moist Soil Unit

Water levels were maintained at or close to 621.0 during the first three months of the year. The planned drawdown was initiated in April but did not reach the proposed May level (618.9) until June. The drawdown stimulated a diversity of moist soil vegetation. Levels continued to recede through August, then was reflooded in September with water from Schoolhouse Marsh to make moist soil plants accessible to migrating waterfowl. Levels gradually recovered to 620.4 by the end of the year.

A low level berm is needed perpendicular to the Schoolhouse Marsh dike in order to prevent leakage from the MSU when water levels are greater than 621.0.

Long Marsh

Water levels in Long Marsh were maintained at or slightly below 632.0 throughout the year. At this level, the lowest elevations in the pool remained flooded even during July. Consequently, shallow water and mudflats at higher elevations occurred later in the growing season, resulting in germination of willow, cottonwood, aster, and spikerush.

Existing invertebrate populations (i.e., corixids and beetles) in this unit are beneficial to pre-breeding and migrating waterfowl.

Knowlesville Marsh

Water levels in Knowlesville Marsh were managed at lower than the proposed levels throughout the year due to the lack of adequate inflow of surface water. Finally, in December, water levels recovered to almost full pool.

The riser on the Knowlesville Marsh water control structure was extended about 18" to allow us to hold water higher and achieve the following objectives: increase the size of the marsh, especially the shallow water area around the perimeter; encourage muskrat activity throughout the summer; enhance waterfowl brood habitat and; provide high water to stress cattail that dominates most of the marsh. The combination of the above factors will hopefully improve the emergent marsh open water ratio which is currently at about 70:30.

Muskrat activity in this impoundment has been increasing.

Swallow Hollow

Swallow Hollow dike and pool bottom were surveyed by C.T. Male Company, under an RO contract, during May to collect elevations relative to the spillway and water control structure rehabilitation project scheduled for this year. Bids were opened on September 23 for the Swallow Hollow Dike Rehab project. The contract was issued, and work begun in early November. High water in Oak Orchard Creek forced construction to a halt after only two of four water control structures were installed. Construction will be completed in the spring of 1994.

Other

A new ditch plug was constructed adjacent to the Job Corps that included a nesting island and three potholes.

A new plug was started along the cross-country ski trail adjacent to Galaxie Marsh, but surface water filled the hole making it unworkable for the TD-20.



Olsen Marsh, north unit, one year after construction.

DVT 9-24-93



Olsen Marsh, south unit, one year after construction.

DVT 9-24-93



Three ditch plugs were constructed near the Olsen Marsh, south unit, in the surrounding grasslands.

ELD 7-93



A ditch plug constructed in 1992, one year after construction near Ringneck Pool.
DVT 4-5-93



A ditch plug was constructed near the Iroquois Job Corps during the year.
DVT 6-22-93



Once the plug fill up with a little water, Canada geese took it over.

DVT 9-24-93



One ditch plug and more than forty "potholes" were constructed in the Forrestel Flats area.

DVT 12-8-93



More than forty small "potholes" and one ditch plug were constructed in the Forrestel Flats area, west of State Route 63 in December.

DVT 12-8-93



For the first time since 1978, water went over State Route 63 in the "swamps".
DVT 3-30-93



Sour Springs Road usually has a little water over the road, but this year it was really inundated.
ELD 3-31-93



School House Marsh at the peak of spring flooding.

Photo courtesy of NYSDEC 4-6-93



Ringneck Pool at the peak of spring flooding.

Photo courtesy of NYSDEC 4-6-93



Mohawk Pool spillway just starting to overflow in the spring.

DVT 3-30-93



Mohawk Pool spillway three days later at the peak of spring flooding.

DVT 4-2-93



Structure "L" on Oneida Pool and the spillway at the peak of spring flooding.

Photo courtesy of NYSDEC 4-6-93



Water nearly went completely over Oneida dike (Dam No. 5) at the peak of spring flooding.

ELD 4-2-93



We came this close to losing Oneida dike at structure "L"! DVT 4-2-93



Logs and other debris need to be cleared in Oneida Pool spillway at the peak of spring flooding. DVT 4-2-93



Most of the summer was spent repairing dikes/spillways lost this spring. Oneida dike was repaired in July. Filter fabric was placed on the dike prior to rip rapping.
DVT 7-8-93



After large stone was placed on the slope, stone was added to the top of the dike.
DVT 7-23-93



Our new Cayuga Pool water control structure nearly was lost in the spring flooding. The spillway functioned properly but was damaged.

Photo courtesy of NYSDEC 4-6-93



The Cayuga Pool spillway at the peak of spring flooding.

DVT 4-2-93



Cayuga Pool spillway "before" repairs.

DVT 4-2-93



Cayuga Pool spillway "after" repair work was completed.

DVT 8-25-93



Cayuga Pool

DVT 9-24-93



Oneida Pool after a complete drawdown and refilling.

DVT 9-24-93



Olsen Marsh, south unit and adjacent grasslands.

DVT 9-24-93



Ditch plugs adjacent to Olsen Marsh, south unit.

DVT 9-30-93

3. Forests

The Hydro-Ax was utilized during January and February to cut 2 acres of woodcock strips and clear a proposed grassland area adjacent to Oneida Pool. Wet conditions and lack of ground frost limited Ax operation to the higher, dryer sites until deep snow made operation impossible. An additional 2.5 acres of woodcock habitat were cleared during November.

On May 7, RM Tiller accompanied Herb Darling of the American Chestnut Foundation (NY State Chapter), and a local deer hunter who found an American Chestnut tree on the refuge. The tree is about 60+ feet tall and approximately 16 inches in diameter. Several seedlings were also found around the base of the tree.



Strips were cut with the Hydro-Ax in forest areas near Oneida Pool for improving the habitat for woodcock.

DVT 1-11-93



The same area eight months later.

DVT 9-21-93



Additional areas were cleared near Galaxie Marsh.

DVT 10-28-93



Refuge Manager Tiller is standing next to a 60' + American chestnut tree, approximately 16" d.b.h. The tree shows only minor blight damage.

Photo courtesy of Doug Domedian 8-16-93



Unfortunately, most of the burrs are sterile - no seeds, or few are being produced.

Photo courtesy of Don Cook 9-22-93

Geographical Information System

The major forest related emphasis during 1993 was the development of a Geographic Information System (GIS) with forest data layers under a Challenge Grant funded by the Ruffed Grouse Society. The following is a summary of the progress during the year.

Refuge Biologist Derleth and TFT Biological Technician Trader developed a classification scheme for Iroquois habitats, using the format accepted by the GAP analysis program. They worked with Paul Steblein, RDBM to accept GIS standards. Biological Technician Trader made telephone contact with the GIS Extension Office at Cornell University to discuss cooperative efforts in GIS and GAP Analysis. A visit to the university was scheduled to compare our analysis using aerial photos versus what they are interpreting from satellite images.

A back-lit drawing table received from the RO (U Mass GIS Lab) will be used for aerial photo interpretation and digitizing.

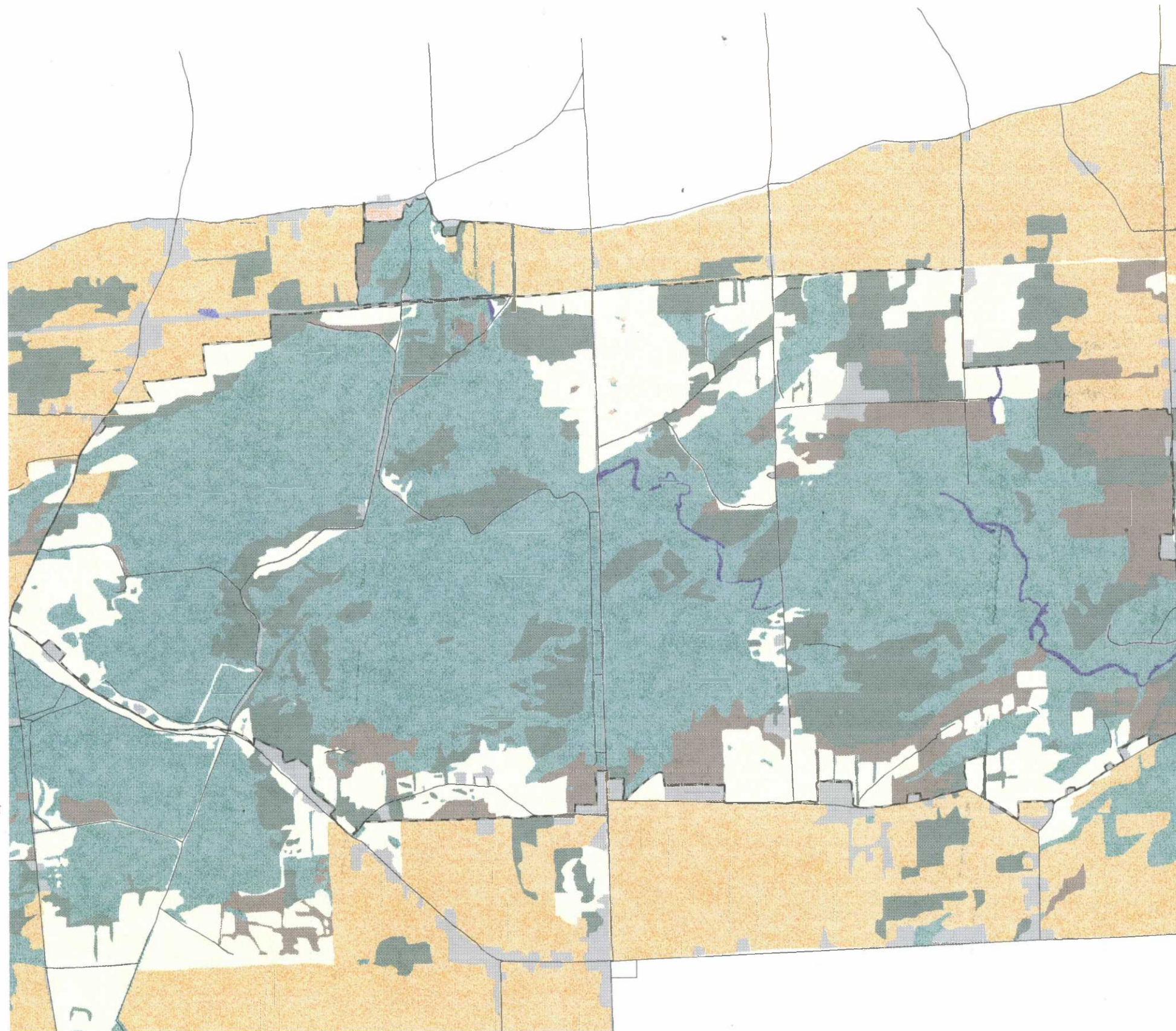
Biological Technician Trader met with the Genesee County Planner and GIS staff to discuss data sharing. The county provided a digital copy of the tax parcel maps for land adjacent to the refuge. This and other data was converted to a format compatible with our system.

ARCVIEW software was installed in the GIS computer. This is a user-friendly package to view, query, and plot geographic data. Digital data - digital coverage of the state designated wetlands for Orleans and Genesee Counties was received from NYSDEC Habitat Inventory Unit. The refuge boundary was put in a digital format thanks to a volunteer who converted an AUTOCAD boundary file to an ARCINFO format. Digitizing the covertyping map at a facility with ARC/INFO produced a cleaner product, more efficiently, than possible with EPPL7. Digital data from Orleans County and Genesee County was converted from their software format to a format that we can view using ARCVIEW. The Genesee County Planner and the Genesee County Highway Department were kind enough to let Biological Technician Trader work on their computer for two days. Using their GIS software, ATLAS, she was able to do data manipulations not possible with our GIS software, EPPL7. We now have hydrology, political boundaries, primary and secondary transportation routes in our geographic database. The data will still require some cleaning up. Biological Technician Trader continued to map the vegetation of the refuge using the GAP Analysis classification system, Society of American Forests (SAF) cover types, and Ecological Communities of New York State by the New York State Natural Heritage Program to cover type each vegetation polygon. She developed an Rbase database to store the cover typing data, which can be imported into EPPL7. Digitization of those polygons was also completed.

Biological Technician Trader coordinated Global Positioning System (GPS) work for Iroquois NWR and Erie NWR, so that control points can be established and utilized in the GIS database. She spent the first week of November at Moosehorn NWR utilizing the Regional Woodcock Specialist's facilities. She needed to use their software to digitize the vegetation coverage for Iroquois NWR. Polygons within the refuge boundary were digitized and most of the editing was completed at the Moosehorn facility. All remaining editing for this phase of data collection was completed using Work Station ARC/INFO at the Lower Great Lakes Fisheries Resource Office in Amherst, NY.

GIS work continued during December with a week spent collecting and entering GPS data. Chuck Hayes, Moosehorn NWR, spent December 5-10 here assisting Trader with learning how to use the GPS unit and software. Two days were spent collecting points on Iroquois. Points were collected at least twice to reduce post-processing error in the event that the base station and the rover unit were not tracking the same satellite. An additional day was spent picking up base station points from the Allegheny National Forest, then correcting the Iroquois data. Standard deviations were well within the acceptable range. Two days were spent transforming the file using the GPS points and performing all the necessary cleaning and building required by ARC/INFO. The coverage will ultimately be linked with the database for use. These points or known locations will be used to register our geographic data.

Volunteer Kathy Kos assisted with data entry for the GIS database.



Iroquois
National Wildlife Refuge

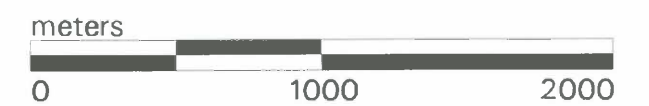
Iroquois NWR, Refuge Boundary

Roads, Access

Landcover, GAP Level 2

- Agricultural
- Barren
- Forest
- Herbaceous Vegetation
- Lacustrine Littoral
- Palustrine
- Riverine
- Shrubland
- Urban or Built-up Land

Vegetation analysis using the GAP Analysis classification system.





Chuck Hayes, Biological Technician from Moosehorn, and Biological Technician Aimee Trader worked on forest coverytyping as part of the GIS Challenge Grant project. ELD 6-29-93

4. Cropland

A coop farmer seeded a 50 acre crop field to timothy and trefoil in August as part of his agreement. Overall, the station's coop farming program is fading into non-existence. Early and late field accessibility is limited due to heavy soil conditions, and our location away from any large farming operations makes our program a very low priority for local farmers. No new fields were cropped in 1993.

5. Grassland

Although April was relatively dry, the flood waters did not recede fast enough to permit fields to dry to the point where equipment could operate in them without causing rutting until late May.

Olsen Marsh grassland units, Q12 and Q13, were mowed and sprayed. Parts of these two units remained upland after the construction of Olsen South.

A field adjacent to Olsen Marsh North, totaling 5 acres was disced in preparation for seeding in 1994 as nesting cover.

Schoolhouse grassland unit, H9 was mowed and sprayed.

Center Marsh grassland unit G6 was mowed this year.

Galaxie grassland unit L6 was disced in preparation for planting with warm-season grass. Unit L7, a 3-acre field was fertilized (0-22-20, 300 lb/acre) and seeded with switchgrass (10 lb/acre PLS).

An area near Ringneck overlook was mowed by refuge staff to prevent the field from reverting to shrubs.

Approximately 26 acres of newly seeded (planted June 1991) switchgrass adjacent to Ringneck Marsh were mowed for the second time this season to control forbs and cool season grasses and enhance the warm season grasses.

Approximately four acres of brush were Hydro-Axed on Forrestel Flats adjacent to the potholes in preparation for disking in 1994.

Approximately 100 acres of grasslands were sprayed with a Banvel/2,4- D mix (1pt/acre each) to control invading forbs and woody vegetation.

Biologist Derleth and Dr. Chris Norment, SUNY-Brockport, submitted a Research Challenge Grant to investigate the effects of grassland habitat management on nongame bird community structure and organization.



A field near Cayuga Pool was disced in preparation for planting the area to grassland.
DVT 5-20-93



By the end of summer, we were not able to get the field planted.
DVT 9-24-93



Grassland field No. 9, in Unit "K", near refuge headquarters was sprayed in June by a local contractor.
DVT 6-11-93



A pasture/hayfield on South Woods Road was overseeded in April.

PDC 4-93

7. Grazing

Three of seven pasture units (approximately 144 acres of the 398 acres available) were grazed in 1993. Reductions in herd size accounted for two of the vacancies, one pasture remained too wet to graze without causing damage to the grasses, and one pasture needs fence repairs before it can be grazed.

A third stock pond was dug in Pasture 6 during February as part of a long term goal to initiate rotational grazing in all refuge pastures.

Approximately 114 acres (83 acres of fallow pasture and 31 acres of hay fields) were overseeded with a mixture of timothy and trefoil (6 and 4 lbs/acre, respectively) to improve their condition.

8. Haying

Haying of refuge pastureland and selected grassland units is conducted as part of our overall grassland management activities. These activities, which are conducted after the waterfowl nesting season, eliminates the need for the refuge to mow or spray certain fields to control undesirable forbs and woody vegetation.

Because our hay is of relatively low quality, contains woody debris and broadleaf plants, and is harvested after July 1, there is little or no demand for it from local farmers. Two permittees, one a coop grazer, the other an adjacent farmer, hayed approximately 107 acres in 1993. Baled hay was removed from all but two fields before the fall migration. Refuge staff annually mows about 300 acres of grassland in an attempt to control broadleaf weeds and invading woody plants without using chemicals. Haying by cooperators reduces the amount of mowing we must do.

9. Fire Management

Prescription burning occurs on Iroquois primarily as a management tool to enhance grassland habitat by reducing the duff layer, returning nutrients to the soil and reducing competition from undesirable forbs and woody vegetation. Because of high moisture conditions, our window of opportunity for burning is quite narrow, usually from mid-March through early April.

Three prescribed burns were successfully completed in April. Grasslands adjacent to Mallard Overlook (18 acres) and a switchgrass field adjacent to Cayuga Pool (6 acres) were burned April 8, and half of Sutton's Knoll switchgrass (12 acres) and all the reed canary grass (5.9 acres) were burned on April 14. These sites are some of the higher, dryer grasslands on the refuge, so we were able to burn them even with the near record high water levels in the adjacent impoundments.

There were no wildfires reported on the refuge in 1993.



Prescribed burn at Ringneck Pool "before".

DVT 4-8-93



Prescribed burn of switchgrass two months later.

DVT 6-16-93



Prescribed burn of switchgrass at Sutton's Knoll.

DVT 4-14-93



Sutton's Knoll switchgrass five months after burn.

DVT 9-24-93

10. Pest Control

Purple loosestrife and Phragmites are isolated but recurring pest plants on the refuge. Both species exist on the periphery of many of our impoundments. Generally, a 2% Roundup® solution is applied with backpack sprayers or our 40 gallon slip-on sprayer. In July and August, approximately one acre of purple loosestrife (mainly Cayuga Pool) was sprayed (Section F.2). Lack of staff time prevented us spraying any Phragmites. Spot spraying of brush occurred around our four overlooks, and under shrubbery in the headquarters area that are inaccessible to mowers.

We are optimistic that the biological controls for purple loosestrife, released on the adjacent Tonawanda WMA in 1993, will reduce our need to spray in the near future.



"Media Day" at the release of insects for biological control of purple loosestrife on NYS's Tonawanda WMA. Photo courtesy of NYSDEC



Containment cages with either European weevils or beetles for biological control of purple loosestrife. Photo courtesy of NYSDEC

12. Wilderness and Special Areas

The Oak Orchard Creek Marsh National Natural Landmark (NNL) is our only special area. This 600 acre natural marsh is primarily comprised of floodplain cattail marsh interspersed with small islands and hummocks of lowland hardwood trees. Numerous dead snags are dispersed throughout the natural area and provide ample cavities for bluebirds, tree swallows, woodpeckers and a variety of other wildlife. The 600 acre unit is heavily used during spring and fall migration by mallards, black ducks and wood ducks. Beaver and muskrat activity is also visible throughout the floodplain. A small 15 acre parcel located on the northeast corner of the NNL unit is designated as the Milford Posson Research Natural Area. This area is a prime example of a mature, hemlock-beech-yellow birch forest cover type. Some of the trees on this site are estimated to be 150 to 200 years old.

G. WILDLIFE

2. Endangered and/or Threatened Species

a) Bald Eagles

Two adult bald eagles were observed occasionally from January through early March at or near the two nests sites. The pair again chose the "old nest" (established in 1986) and began incubation on or about March 20. About the time hatching should have occurred, it seemed as though we had miscalculated the time of incubation. The pair continued at the nest into early May. The birds appeared to be no longer incubating but were not acting as if they were feeding young either. NYSDEC biologists were concerned something might be wrong. On May 14, a NYSDEC biologist climbed to the nest and retrieved one infertile egg. No evidence of any other egg was found. It is felt that the "blizzard of March 13" may have contributed to chilling of the egg.

The two adults were seen throughout the remainder of the year. Several two or three year old eagles were observed in July and August.

b) Golden Eagle

Only one sighting of this species occurred during the year. One immature golden eagle was observed during spring migration on April 11.

c) Osprey

This was the second year of NYSDEC's three-year project to establish an osprey population in the area. Twelve ospreys were brought by plane from Long Island, NY on July 8. Two other birds were brought here later but because they were much younger than the others they were taken to a wildlife rehabilitator. All the birds were released from the hacking tower on Oak Orchard WMA on July 29.



Young Ospreys were retrieved from nests on Long Island in July and flown to WNY by jet.

Photo courtesy of NYSDEC 7-93



Ospreys were selected out of each nest for age or size to be sure of obtaining "healthy" birds.

Photo courtesy of NYSDEC 7-93



The hacking tower was sterilized before releasing the transplanted ospreys. The refuge fire pump was utilized to get the job done.

Photo courtesy of NYSDEC 7-93



A "media day" was held on Oak Orchard Wildlife Management Area prior to releasing the ospreys from the hacking tower. DVT 7-28-93

d) Northern Harrier

This NYS threatened species is occasionally seen foraging over the refuge grasslands. They were observed during March - April and July - September.

3. Waterfowl

a) Spring and Fall Migration

A few Canada geese were present in early January along with several black ducks and one drake common goldeneye. About 3,000 Canada geese arrived March 7 but tundra swans didn't arrive until March 21 when 13 were observed roosting on the iced-over impoundments with the geese. Spring migration seemed about three weeks later than usual. During the last ten days of March the following were observed: hooded merganser (3/22), northern pintail (3/26), brant (one on 3/26), ring-necked duck (3/26), wood duck (3/27), snow goose (275 on 3/27). American wigeon (3/27), blue-winged and green-winged teal (3/31), northern shoveler (3/31), bufflehead (3/31), and common merganser (3/31).

Migrant Canada geese did not arrive in any numbers until late March. Only about 14,000 were estimated to be using the refuge. Possibly only 30,000 were present in the entire "Alabama Swamp". Flooded conditions throughout western NY provided excellent habitat conditions and probably resulted in lower than average peak migration numbers on the refuge.

The Canada goose peak population was the lowest in years. Only about a maximum of 30,000 birds were present in April compared to about 60,000 in previous years. The usual large flocks of mallards and northern pintails were also notably absent.

Unusual sightings in April were: greater white-fronted goose (1) on April 11 and a male Garganey from April 16 through the end of the month. This is a first record for western NY. It is, however, probably an escapee from a waterfowl aviculturist collection.

Fall migration began in mid-September with the arrival of a few hundred American wigeon. Mallards and wood ducks continued to build up by the end of September. Wigeon, mallards, black ducks and green-winged teal were the most numerous species in October. Wood ducks had essentially left the refuge during the third week of October. The Canada goose fall migration was also disappointing with only 4,000 birds using the refuge in October. Only about 2,500 Canada geese remained in late November. One brant was observed on November 5 with Canada geese at Ringneck Pool.

b) **Production**

1) **Wood Duck Box Program**

Our annual wood duck box check to monitor the results of the 1992 breeding season was conducted over the ice from December 1992 through March 1993. Because our winter box check is ongoing, only partial information is available for the 1993 breeding season.

The total number of available boxes (compartments) decreased slightly from 1993 (Table 5). Compartments used solely by wood ducks (67.2%) has increased over last year, whereas the proportion used by both wood ducks and hooded mergansers remained the same as the previous year. Interspecific as well as intraspecific competition for available wood duck boxes has increased dramatically as our box program has matured over the last 18 years.

Table 5. Wood duck box use from 1991 to 1992 at Iroquois NWR.

Boxes (compartments)	<u>Number</u>		<u>Percent</u>	
	1991	1992	1991	1992
Available	529	513		
Used, Wood duck (WD) only	314	337	59.4	65.7
Used, Hooded merganser (HM) only	34	43	6.4	8.4
Used, WD and HM	156	98	29.5	19.1
Used Waterfowl (undetermined species)	6	11	1.1	2.1
Used, other wildlife	5	8	1.0	1.6
Not used	15	16	2.9	3.1

From our wood duck program, estimated production (number hatched) for wood ducks declined slightly (-3%) and increased slightly (8%) for hooded mergansers (Table 6). Estimated recruitment from our box program remained the same as in 1991.

It appears that relocating boxes from the open areas into more hidden wooded areas helps to reduce the number of dump nest incidents.

Table 6. Number of successful clutches and estimates of production for wood duck and hooded mergansers from the nest box program at Iroquois NWR, 1990 - 1992.

	1990	1991	% change 90-91	1992	% change 91-92
Successful wood duck clutches	202	127	-37	127	0
Successful hooded merganser clutches	29	21	-28	32	+34
Successful mixed species clusters	64	55	-14	45	-18
Number wood ducks hatched	2819	1841	-35	1795	-3
Number hooded mergansers hatched	748	603	-19	650	+8
Wood duck recruitment	1268	829	-35	803	-3
Hooded merganser recruitment	336	271	-19	293	+8

Table 7. Comparison of nesting success and percent use of wood duck boxes at Schoolhouse Marsh between 1990 (highly visible, grouped boxes) and 1991-1992 (isolated, less visible boxes).

	1990	1991	1992
Available compartments	24	20	20
Number Used (%)	19 (79%)	19 (95%)	19 (95%)
Number clutches	19	21	20
Number successful clutches	4	17	12
Percent success	21%	81%	60%

Table 8. Comparison of nesting success and percent use of wood duck boxes at Ringneck Marsh between 1991 (highly visible, grouped boxes) and 1992 (isolated, less visible boxes).

	1991	1992
Available compartments	19	30
Number used (%)	19 (100%)	22 (73%)
Number clutches	20	24
Number successful clutches	3	14
Percent success	15%	58%

2) Nest Baskets

This year marked the eighth season of providing nesting structures for breeding mallards. These "mailbox" type baskets, constructed of vinyl-coated welded wire are provided to give relatively predator free nesting sites. Unfortunately, the use rate of these structures has only been about 15-20% (Table 9). In 1992, eleven baskets were used, ten mallard and no wood duck nesting attempts were successful.

Table 9. Use of experimental nest baskets by ducks on Iroquois NWR, 1986 - 1993.

	<u>Available baskets</u>	<u>Nesting Season</u>			
		<u>No. used - %</u>		<u>No. successful - (%)</u>	
1986	13	1	(8%)	0	
1987	39	6	(15%)	6	(100%)
1988	57	10	(18%)	9	(90%)
1989	60	15	(25%)	10	(67%)
1990	68	14	(21%)	11	(79%)
1991	80	14	(19%)	10	(67%)
1992	80	11	(14%)	5	(45%)*
1993	97	23	(24%)	20	(87%)

* Three nesting attempts abandoned during radio-telemetry project (Section D.5).

Note: In 1987 a design change was made from inverted cone to "mailbox" type wire basket.

In 1992, we initiated a small study to compare the use rate and nesting success of the "mailbox" nesting baskets with another design (a tripod). Nesting tripods are constructed from 0.5- inch electrical conduit with a cone-shaped nesting basket made of chicken wire suspended over the water. An inverted cone of chicken wire is suspended over the nest basket. Use rates of tripods have been about 40 - 50%, and nesting success has been about 60%, over the last 4 years on adjacent NYSWMA's.

During the 1993 nesting season, we installed 20 tripods, each paired (within 20 ft) with existing "mailbox" nest pairs, nine (4 tripods, 5 "mailbox") were used. Five nesting attempts in "mailbox" type were made by mallards (4 successful). In the tripods, mallards made 3 nesting attempts (all successful) and the other by a Canada goose (not successful). Comparison of the two types of nesting structures will continue in 1994.

We provided four Canada goose nest baskets for public observation. All were used and were successful.

3) Waterfowl Nest Searches

In order to monitor waterfowl response to grassland management activities, we conduct annual nest searches on selected grasslands. In 1993, we searched 25 acres of warm season (Blackwell switchgrass) and 69 acres of cool season grasslands using a chain-drag (Table 10). Three searches (early - April, late - May, mid - June) yielded a total of 21 nests (13 mallard, 9 blue-winged teal, 1 gadwall). Of these, 12 (57%) were found during searches 1 and 2. Search 1 yielded 5 mallard nests while on search 2 we found 3 mallard and 4 teal nests. During search 3, we located 5 mallard, 3 teal, and 1 gadwall nest.

Table 10. The number of waterfowl nests found during chain-drag searches of grassland habitat on Iroquois NWR in 1993.

Grassland type	Area (acres)	Number of nests		
		Mallard	Blue-winged Teal	Gadwall
Warm season	25	2	2	0
Cool season	69	11	5	1
Total	94	13	7	1

4) Waterfowl Brood Counts

Waterfowl brood surveys from stationary, hidden observation points were conducted from July 14 through July 24, 1993. Total wetland area surveyed encompassed 632 acres (256 ha) from 11 wetland units.

Table 11. The total number of broods observed in 1993.

Total number of broods observed	
Wood duck	51
Mallard	21
Blue-winged teal	5
Hooded merganser	4
Gadwall	2
Total	83

TABLE 12. Results for the 511 acres surveyed in both 1992 and 1993 indicated decreased mallard and wood duck production.

Number of broods			
	<u>1992</u>	<u>1993</u>	<u>% change</u>
Wood duck	45	47	+5%
Mallard	13	12	-8%
Blue-winged teal	6	1	-83%
Hooded merganser	<u>4</u>	<u>2</u>	<u>-50%</u>
Total	68	62	-9%

Table 13. Mean class IIb - III brood sizes for 1990 - 1993.

	<u>1990 (n)</u>	<u>1991 (n)</u>	<u>1992 (n)</u>	<u>1993 (n)</u>
Wood duck	4.94 (32)	5.44 (32)	5.76 (33)	4.53 (39)
Mallard	5.74 (19)	4.71 (17)	4.18 (17)	3.88 (17)
Blue-winged teal	- (<5)	5.94 (16)	4.38 (8)	5.5 (4)
Hooded merganser	4.80 (10)	4.00 (5)	5.40 (5)	5.0 (4)

Refinements to the waterfowl brood survey continue to take place. Surveys to more accurately estimate Canada goose production are still needed.

5) Estimated Waterfowl Recruitment

Estimated recruitment (number reaching flight stage) for each waterfowl species breeding on Iroquois is shown in Table 14. Estimates were derived from brood surveys using mean class IIb-III brood sizes (see below). Recruitment for the rarer waterfowl species was estimated from pair sightings, nest dragging, incidental brood sightings and/or historical records.

Table 14. Estimated waterfowl recruitment (number reaching flight stage) on Iroquois NWR, 1980 - 1993

Species	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989 ^a	1990 ^a	1991 ^a	1992 ^a	1993 ^a
Canada goose	400	566	455	560	460	480	450	525	550	500	850	600	600	635
Mallard	750	540	870	660	750	600	550	340	300	635	750	815	670	525
Northern pintail	0	0	0	0	0	0	0	10	10	15	15	15	15	15
Black duck	20	0	0	0	0	0	0	0	0	15	15	15	15	15
Gadwall	40	20	20	20	20	0	12	15	12	15	75	50	80	90
Blue-winged teal	1100	770	1055	190	245	245	265	200	175	360	580	780	280	180
American wigeon	0	0	0	0	0	0	0	15	15	15	15	15	15	15
Northern shoveler	0	0	0	0	0	0	0	10	10	10	10	10	10	10
Wood duck ^b	2850	2600	3535	1945	1320	1700	1515	1350	1455	1570	1840	1730	2200	1500
Hooded merganser ^b	270	225	180	155	430	355	405	380	388	400	370	140	240	130
Totals	5430	4721	6115	3530	3225	3380	3197	2845	2915	3535	4520	4170	4125	3115

^a Estimates of recruitment for 1989 - 1992 were based on fixed point brood surveys.

^b Recruitment estimates from wood duck box program only from 1980 - 88. Since 1984 a modified production formula has been used for wood duck and hooded merganser; earlier figures have not been adjusted.

4. Marsh and Water Birds

A complete census of nests in the great blue heron rookery in Seneca Pool was completed on February 3, 1993. A total of 270 nests remained from the 1993 breeding season (Table 15. This represents a decrease of 15% from the previous year and a 68% decrease from the highest count (1985).

Table 15. Nest census (winter) of great blue heron rookery from 1977 - 1993.

<u>Breeding season</u>	<u>Number of nests</u>
1977	179
1978	356
1979	436
1980	441
1981	579
1982	670
1983	716
1984	no count
1985	834
1986	698
1987	782
1988	662
1989	597
1990	543
1991	568
1992	317
1993	270

Our annual production survey of the heron rookery also proved unsettling. Of 55 randomly chosen nests, 34 were unoccupied on June 15, 1993. Very few adults were seen in the rookery during this visit.

Other marsh and waterbirds which nest locally include: piedbilled grebes, common moorhens, American coots, green herons, Virginia rails, sora rails, belted kingfishers, American and least bitterns.

Rarities reported on Iroquois included: Sandhill crane (3) March 31 and (2) April 6; black-crowned night heron (2) June 27; double-crested cormorant (7) May 3 and (16) September 24; great egret (19) September 27 and (3) October 13; and common loon (1) May 12.

5. Shorebirds, Gulls, Terns and Allied Species

Killdeer, spotted sandpipers and American woodcock are the only species of shorebirds that are common breeders on the refuge. Common snipe are thought to be breed locally as their winnowing flights are commonly heard throughout the breeding season. Management of some refuge impoundments each year is geared toward providing migrant shorebird habitat during May and July - September. Commonly observed migrants include: greater and lesser yellowlegs, least sandpipers, semipalmated plovers, semipalmated sandpipers, dunlins, and short-billed dowitchers. Dunlins were especially abundant during May with a flock of 250 observed on Tonawanda WMA. Rarities reported in 1993 included: Hudsonian godwit (1), whimbrel (1), Wilson's phalarope (1), all in May, and upland sandpipers (2) in August.

During late -April and early-May we conducted surveys of singing male American woodcock. The roadside survey, established in 1989, provides an index to the breeding population and will allow us to make inferences regarding specific habitat management actions. This was only the fourth year of a complete refuge-wide survey. The total number of individuals heard increased (+10%) from that recorded in 1992 (Table 16) The total number of males heard on the refuge increased by 10%, and the number heard off (adjacent to) the refuge increased by 10%. With only four years of a refuge-wide survey, we are not yet able to determine whether 1990 and 1991 represent abnormally high years of woodcock abundance or if 1992 represents an abnormally low year. On a brighter note, we are encouraged that we are recording singing males in areas where we have specifically managed for woodcock.

Table 16. Survey of singing male American woodcock (unique individuals) on Iroquois NWR, 1990 - 1993.

Number of singing males	1990	1991	1992	1993	% change
Peenting on refuge	85	65	57	70	+19%
Flight song on refuge	18	30	15	10	-33%
Total <u>on</u> refuge	103	95	72	80	10%
Peenting off refuge	26	28	14	15	+7%
Flight song off refuge	8	19	4	5	+20%
Total <u>off</u> refuge	137	142	90	100	+10%

The black tern has recently been listed as an endangered species in New York State and has been proposed as a candidate for listing as a federally endangered or threatened species.

A NYSDEC biological technician monitored black tern nesting activity throughout the Iroquois - Tonawanda - Oak Orchard complex during May and June. Approximately 30 nests were located.

Preliminary results from the black tern surveys indicate that breeding black terns have an affinity for burreed stands as nesting habitat. In addition, nest site locations appear to be associated with muskrat activity (feeding platforms, old houses). In the future there may be a possibility to apply muskrat management actions to benefit black tern breeding habitat. Several artificial platforms were placed in areas adjacent to active colonies in 1992 and four of these had nesting attempts.

The best available habitat for black terns on Iroquois (Cayuga Pool) was flooded during spring/summer 1992 after two successive summer drawdowns in 1990-91. Habitat conditions have improved significantly (Section F.2.), with extensive stands of burreed and cattail now in existence. Four of the 30 nests were believed to have occurred on Cayuga Pool. At least one at Cayuga has been successful. We submitted an IPW requesting funding for graduate student research on breeding black tern ecology and it was funded by the RO for FY94. This research project will provide an excellent opportunity to learn more about impoundment management for nongame wetland birds.

Rare species recorded on Iroquois this year included: Caspian terns (1) on May 23 and (4) on July 20; lesser golden plover (2) on September 6.

6. Raptors

Red-tailed hawks and American kestrels breed on the refuge. Approximately 6 - 8 pairs of each species are thought to occur on Iroquois. During the 1992 breeding season, only two of the 10 compartments specifically maintained for kestrels were successful; six compartments were occupied by wood ducks (but only three were successful); one compartment was used by a hood merganser, unsuccessfully, and one was not used at all.

Sharp-shinned and Cooper's hawk are not known to breed on the refuge, although both species are occasionally observed during spring and fall. Rough-legged hawks, a usual winter resident, were observed only during November.

Eastern screech owls and great-horned owls nest on the refuge. Screech owls were banded in 1993 during the winter check of wood duck boxes. Short-eared owls were not observed this year; a snowy owl was observed in March.

Turkey vultures were recorded from March through November and are thought to nest locally. The first spring sighting was one bird on March 22. The last sighting for the year was one bird on October 21.

7. Other Migratory Birds

The pilot program to monitor long-term trends of nongame birds, initiated by volunteers in 1992 using roadside surveys, was not completed in 1993 due to a lack of staff time and volunteer interest.

Eastern bluebirds were present from March through November. Three known nesting attempts occurred in the 100 bluebird boxes maintained by volunteers. Blowflies and heat caused the loss of nestlings in one nest. Tree swallows continue to utilize the majority of the boxes.

Purple martins were observed during April through September. Successful nesting occurred in only one of six martin houses on the refuge.

Notable rarities reported on the refuge in 1993 included: tufted titmouse (January - March and November - December), yellow-headed blackbird (April), black-billed cuckoo (May), red crossbill (November), red-breasted nuthatch (October - December), evening grosbeak (November - December), northern shrike (January and November - December), and common redpoll (December).

The 27th annual Oak Orchard Swamp (Figure 3) Audubon Christmas bird count as conducted on December 27. It was one of the coldest in memory. The low temperature was -9° F but it warmed all the way up to 16° F! A total of 57 species was found (the record is 60), one more than last year, with 11,013 birds counted, down from 1992's 12,424. However, we did break a number of records: 33 common mergansers were a record number and only the second time seen since 1984; 10 sharp-shinned hawks was the highest ever; 130 red-tailed

hawks bettered the record by 23 birds; 55 wild turkeys set a new record; 10 greater black-backed gulls was a record and only the second time seen since 1989 when two birds were recorded; 15 short-eared owls set a new record; 10 tufted titmouse set a new record; 75 brown-headed cowbirds was a new record; 352 northern cardinals set a new record by nearly 100 birds; 360 dark-eyed juncos was a new record; and a new record that will be difficult to top was 2,017 common redpolls!



The big surprise of this year's Christmas bird count was a record total of 2,017 common redpolls. Photo courtesy of Don Cook 12-27-93



A new record of 130 red-tailed hawks counted bettered the old record by 23 birds. Photo courtesy of Don Cook 12-27-93



A rare opportunity to photograph ruby-throated hummingbirds resulted in the above photograph. Photo courtesy of Doug Domedian 7-93



Red-billed woodpeckers are one of the two most common woodpecker species seen on the Christmas bird count.

Photo courtesy of Don Cook 12-27-93

8. Game mammals

Our white-tailed deer population appeared healthy again this year. Hunter permits for an additional deer (10,000) remained undersubscribed in 1992. Vehicle counts on Iroquois indicated substantial interest by visiting hunters (Section H.8). Because the refuge maintains the most liberal season allowed under NYS regulations, and the goal of those regulations is to reduce the deer herd, no changes in refuge hunting regulations are expected in the future.

In 1993, muskrat populations recovered with houses becoming much more numerous in Cayuga Pool and Knowlesville Marsh. Extreme fluctuations in water levels along Oak Orchard Creek and in Oneida Pool limit muskrat overwinter survival.

Beaver activity was much less notable in 1993 when compared to the previous year. Known colonies existed along Oak Orchard Creek, but no activity was observed in any of the other refuge impoundments. In an attempt to reduce the beaver population in western NY, the state has liberalized the trapping season to include trapping every year instead of alternate years.

10. Other Resident Wildlife

Turkeys, reintroduced into the area in 1977, were observed occasionally throughout the year. Three turkeys were harvested during the spring season. Although the refuge has no specific monitoring program, the population is believed to be near its carrying capacity due to the amount of available habitat.

Grassland habitat management activities continue to benefit the resident ring-necked pheasant population. Crowing cock pheasants commonly are heard throughout the spring and several broods were observed during the summer.

Iroquois provides only marginal habitat for ruffed grouse. There has been no apparent increase in recent years.

11. Fisheries Resources

Gary Swihart, Fisheries Assistance (FA), White Marsh, VA, visited Iroquois February 2-3 to evaluate Ringneck and Center Marshes for their ability to support a sport fisheries. A location for an accessible fishing pier was also evaluated. An inspection report indicated that Center Marsh would be the best location. Personnel from the Lower Great Lakes Fisheries Office, Amherst, NY, were kind enough to take D.C., pH, and water temperatures at Ringneck and Center Marshes on February 12.

From September 8-14, Gary Swihart and Mike Odum, FA, White Marsh, VA, and Morgan McCosh, from the Lower Great Lakes Fisheries Resources Office, Amherst, NY, were on the refuge collecting fish and water quality data from all refuge waters. The data will assist us in preparing a fisheries management plan and update our sport fishing plan next fiscal year.



Lower Great Lakes Fisheries Resources personnel collected data (pH, temperature, dissolved oxygen) for preparation of a fisheries management plan.

DVT 2-21-93



Winter fish kill on Cayuga Pool was noticed shortly after ice-out.

DVT 4-2-93



Fisheries Assistant personnel collected fish and water quality data in all refuge impoundments for our fisheries management plan preparation.

DVT 9-14-93

12. Wildlife Propagation and Stocking

During 1992, a hacking program for ospreys was initiated by the NYSDEC on Oak Orchard WMA (Section G.2.c.). Plans are to hack 12 birds/year for 3 years in an attempt to (re) establish breeding ospreys in this area. Birds were again hacked in 1993. Fourteen birds were released in 1993.

Mike Sorenson (National Zoological Park, Front Royal, VA) in cooperation with Mike Haramis (Patuxent WRC) released 45 second-year redheads on April 15, another 70 on August 5, and 87 on September 20. All of these birds had been captive-reared at the zoo, but had been raised as broods by hen redheads. This brings to a total of 338 released on the refuge since 1992.



Redheads (45) were released in Cayuga Pool for the second year.

DVT 4-15-93



An additional 70 redheads were released on August 5 and 87 more on September 20, 1993, in Cayuga Pool.

DVT 4-15-93

16. Marking and Banding

Preseason waterfowl banding started on August 10 and ended on September 24. We attained our mallard quota (300 total) but did not reach our wood duck (300 total) nor the black duck (75 total) quotas (Table 17).

The total number of banded waterfowl was slightly higher than last year (774 as opposed to 521 ducks). Local mallard production appeared better in 1993 (55% immatures) when compared to 1992 (42% immatures). This year Tractor Operator Nice supervised all waterfowl trapping because Biologist Derleth was on a waterfowl banding assignment in Canada for five weeks. This assignment at Woodstock, New Brunswick was successful with 842 waterfowl banded, including 262 mallard, 389 black ducks, and 97 blue-winged teal.

Table 17. 1993 Preseason Waterfowl Banding at Iroquois NWR.

Species	Total	AHY		HY		L	
		M	F	M	F	M	F
Mallard	506	62	61	207	174	1	1
Wood duck	245	60	35	70	73	4	3
American black duck	15	4	2	5	4	-	-
Mallard X Black duck	4	1	0	3	-	-	-
Blue-winged teal	2	1	-	1	-	-	-
American Green-winged teal	1	1	-	-	-	-	-
Northern pintail	1	-	1	-	-	-	-
Total	774						
		Total Imm/Ad				% Imm	
Mallard		383/123 = 3.11				383/506 = 75.7 %	
Wood duck		150/95 = 1.58				150/245 = 61.2 %	



Biologist Derleth assisted NYSDEC in their annual
goose roundup and helped put on neck collars for the
last year. Courtesy of NYSDEC 7-93

H. PUBLIC USE

1. General

The major emphasis of the public use program is to focus on the station message and related management strategies through public relations, outdoor classrooms, outreach programs, exhibits and demonstrations. Non-consumptive activities such as: wildlife/wildlands observation, photography, walking/hiking, cross-country skiing/snowshoeing, and canoeing are available to the public. Consumptive recreation including: hunting (waterfowl and other migratory birds, big game and small game), fishing, trapping and frogging are also permitted. A large part of the public use program still relies heavily on an active volunteer program.

Total visitation to the refuge in 1993 was approximately 60,000. Peak visitation is during spring migration, March and April, when the refuge receives nearly half its annual visitation. Visitors look forward to the eagle watch at headquarters and the refuge tours during spring Open House.

Table 18. Statistical breakdown of major public use activities.

Activity	# Uses	% Usage
Interpretation: includes trail walks, exhibits, visitor center use, talks and demonstrations.	20,891	26.5%
Educational Services: Teacher workshops, Conservation Field Days.	1,849	2.3%
Hunting	3,364	4.3%
Fishing	2,034	2.5%
Trapping: Marsh	735	0.1%
Upland	31	>0.1%
Wildlife Observation: by foot, vehicle and photo blinds	31,272	39.6
Cross-country skiing	156	0.2%
Off-site programs	19,492	24.5%

The refuge issued 15 news releases throughout the year announcing special events and addressing management issues. Two volunteers appeared on a local cable access station program on volunteering.

The refuge Visitor Center/Headquarters building is open from 7:30 am - 4:00 pm Monday - Friday, except holidays, and on weekends 9:00 am - 5:00 pm from mid-March - April for spring migration.

The visitor center houses a 70- seat auditorium for audio-visual programs, talks and meetings or workshops.

Refuge staff and volunteers present audio-visual programs and interpreted trail walks to local schools and civic groups throughout the year on a reservation basis. The most popular times for group programs are March - May and October.

In 1993, the refuge initiated plans to improve the overlooks for watchable wildlife opportunities. The renovation of Cayuga Overlook, the largest and most popular, was approved as a Challenge Grant project. Improvements will include: graveling the parking area, replacing the parking bumpers, establishing a pedestrian only observation area, construction of a low level deck with ramp and general landscaping improvements. Mallard Overlook, located on Sour Springs Road and one of two overlooks on Ringneck Marsh, were scheduled for renovations in the late fall of this year. Work was halted due to weather.

The refuge purchased and installed new signs for the cross-country ski trail as well as regulatory signs.

2. Outdoor Classroom - Students

The refuge participated in both Orleans and Genesee County Conservation Field Days, May 11-12 and June 2-3, respectively. The Orleans County event is held annually on the Refuge. Participation in the Genesee County event is an outreach program, held at Genesee County Park, Batavia, NY. These annual programs provided approximately 1,200 fifth and sixth grade students with a broad range of environmental education subjects. Refuge staff presented two stations: "The Bald Eagle" and "Nesting as Man Provides", at both sites. A station on "Wildlife Management" is presented at the Orleans County Program.

In September, volunteer Jim Wojciechowski prepared and presented a wildlife identification test to 30 Orleans County 4-H students at the Orleans County Fair.



Volunteers and refuge staff at one of the stations at the Orleans County Conservation Field Days. DVT 5-12-93



Visitor at the Erie County Fair computer exhibit - a joint effort with the Lower Great Lakes Fisheries Resources office. DCG 8-14-93

3. Outdoor Classrooms - Teachers

The refuge hosted one teacher workshop in 1993. Project WILD was presented by Celeste Carmichael, Orleans County 4-H associate and was attended by 10 area teachers, volunteers, and scout leaders.

4. Interpretive Foot Trails

The refuge maintains three nature trails for hiking, wildlife/wildlands observation and interpretation. Swallow Hollow and Kanyoo Trails are open throughout the year. Onondaga is closed during the shotgun deer season. In addition, Mohawk Ski Trail is open to hiking after July 14. Currently, no self-guided interpretive format exists for any of the nature trails, however, the Kanyoo Nature Trail Guide is in the process of being updated.

Swallow Hollow Trail, a combination of elevated boardwalk and man-made dike, continues to be impacted by vandalism. Sections of the boardwalk have been removed and burned and signs are repeatedly removed or destroyed. Part of the southernmost loop of the boardwalk has deteriorated to the point of requiring extensive repairs. The trail was closed in December to allow contractors to repair the dike and install water control structures.

All three trails are inspected throughout the year for safety hazards. Mohawk Ski Trail is mowed and checked after nesting season ends.

Conducted interpretive trail walks were given to approximately 944 visitors in 1993. An additional 6,400 people used the trails for wildlife/wildlands observation and hiking.

5. Interpretive Tour Routes

No formal self-guided auto tour route exists on the refuge. Volunteers have presented interpreted bus tours during open house activities which highlight habitat diversity and management objectives on the refuge.

6. Interpretive Exhibits/Demonstrations

The refuge visitor center houses exhibits of indigenous waterfowl, and other birds and mammals in the form of mounted specimens, paintings, photographs and posters. A touch table in the lobby is particularly popular with young visitors.

The refuge's Annual Open House was held on March 29, from 12 Noon until 4 PM. Approximately 1,700 visitors attended the event which offered audio-visual programs, guided nature walks, interpreted bus/van tours, eagle watch and exhibits.

Two vans and one school bus, borrowed from the Iroquois JCCCC, provided interpreted auto tours of the refuge to 293 people. The maximum of eleven tours were booked to capacity well in advance of departure time.

One of the most popular events this year was guest speaker Larry Keating from the Institute of Environmental Learning, Lyndonville, NY. Mr. Keating, accompanied by Liberty, a live captive bald eagle, presented an ongoing talk and answered questions on bald eagles and other raptors.

Once again, the refuge participated at the Erie County Fair August 11-22. The exhibit on aquatic food webs, a cooperative effort between the refuge and the Lower Great Lakes Fisheries Office was viewed by approximately 19,000 people. Also available at the booth was a computer loaded with the FWS Storybook, an interactive informational program about the FWS. Volunteers and staff answered questions and distributed printed material.

The refuge participated in the second annual NYS Duck Calling Championship in Medina, NY on Sept 25-26. The refuge had an exhibit and presented three van tours of the refuge to

approximately 33 people. Participation was low at the event compared to last year. Fewer than 1,000 people attended, possibly due to conflicts with many other events, not the least of which was National Hunting and Fishing Days.

The 22nd Anniversary of National Hunting and Fishing Day was held Sunday, September 26. The visitor center was open to the public and received approximately 60 visitors. Movies and videos were shown in the auditorium, however, no special exhibits or demonstrations were available as in past years.

The new six-sided kiosk at headquarters was completed in 1993. After the staff set the posts and poured the concrete pad, the remainder of the construction was done by volunteers Charles Owen and Jim Wojciechowski. The kiosk will house both permanent and seasonal interpretive panels and a bulletin board for general information (Section I.1).

An old kiosk from Cayuga Overlook was renovated and placed at the trail head at Kanyoo Nature Trail. The kiosk will house an interpretive panel and a bulletin board for general information.

Wilderness Graphics is completing two "Refuge Orientation" panels and an interpretive panel for Kanyoo Nature Trail and should be received in 1994..

7. Other Interpretive Programs

The refuge provides a general brochure, bird list and handouts for hunting and fishing, nature trails (in English and French), Wildlife Happenings, and general Service information as well as literature on the neighboring state lands and other local information. A revision of the general brochure was completed in 1993 and is being produced first as a large print brochure.

The refuge provided public outreach programs to five civic groups in 1993 with a total audience of 154 people.

Refuge staff and volunteers presented 34 on-site programs to schools and civic groups which were attended by 1,394 people (not counting the programs given during Open House).

The refuge also assisted local Boy Scouts, Cub Scouts and Girl Scouts to earn merit badges by providing suitable activities.

The refuge maintains a lending library of slides, movies and video tape programs on a variety of environmental subjects. This service is open to all schools and not for profit organizations on request. New video titles added to the library are: Wetland World and CITES - (Conservation Treaty Support Fund); Video Guide to Waterfowl and Game Birds and a video version of Watching Wild Wings - (DU).

8. Hunting

a) General

There were no significant changes in refuge hunting regulations for 1993 except for the implementation of Canada goose harvest restrictions for all of NY.

b) Waterfowl

1) Regular

Western NY and refuge duck hunting regulations remained unchanged from 1992 except for later opening date (October 23) of a 30 - day split season. The daily bag limit for Canada geese remained the same as the previous year (1 bird before November 16; 2 birds for November 16 - December 31).

After a summer of excessive precipitation, high impoundment water levels allowed us to offer 30 blind sites again during the 1993 season.

Preparation for the fall waterfowl hunt began in late - August. All water control structures within the hunt zone were adjusted to maintain appropriate water levels. In September, trail mowing began, followed by the clearing of blind sites, repair of walk bridges and the placement of trail and blind markers. Thirty suitable sites were readied by late - September.

This year 79 people (vs. 92 in 1992) attended two NYS Waterfowl Hunter Training classes presented at the refuge by state certified waterfowl identification instructors. Successful completion of this 4-hour training course is required of all waterfowlers who wish to hunt on the refuge.

The refuge season opened on October 23, with 1/2 day hunts on Tuesdays, Thursdays and Saturdays. Reserved hunt sites (3 hunters/site) were offered through a preseason mail - in lottery for opening day and the first Saturday. Selection for the remaining eight days was made by lottery on the day of the hunt. For the season, 259 permits were issued at \$10/permit, resulting in \$2,590 collected for the waterfowl hunt program. Of this, 30% (\$777) was returned to Iroquois as the refuge share.

A total of 586 ducks and 78 geese was taken by 579 hunters. The number of hunter visits decreased by 10% from 1992 to 1993 (Table 19). The total duck harvest was down 37%, whereas the goose harvest was up 41% from 1992. Hunter success was down 24% when compared to the previous year.

Table 19. Iroquois NWR Waterfowl Hunt summary, 1988 - 1993*.

	1988	1989	1990	1991	1992	1993	% change from 1992
Number of hunter Spaces available	1200	1200	1260	600	900	900	0
Number of hunter visits	801	880	926	494	641	579	-10
Waterfowl harvested: Ducks	839	1023	1427	712	926	586	-37
Geese	153	160	104	55	46	78	+41
Total	992	1183	1531	767	972	664	-32
Bird harvest/hunter visit	1.23	1.34	1.65	1.55	1.52	1.15	-24
* Excluding youth hunt							

Compared to 1992, there were some dramatic changes in the species composition of the waterfowl harvest in 1993 (Table 20). Mallards and American wigeons still represented 58.1% of this year's harvest. However, several species showed significant harvest declines. The Wood duck bag was down 67%, American wigeon down 64%, while Black duck, Mallard and Green-winged teal harvest declined by 40%, 32%, and 30%, respectively.

Table 20. 1993 Waterfowl harvest at Iroquois NWR. ^a

Species	Number harvested	% change from 1992	% of total harvested
Canada goose	78	+42	11.7
Mallard	314	-32	47.3
Black duck	45	-40	6.8
American wigeon	72	-64	10.8
Green-winged teal	66	-30	9.9
Blue-winged teal	3	-81	0.5
Northern pintail	24	+4	3.6
Wood duck	17	-67	2.6
Northern shoveler	8	-62	1.2
Hooded merganser	22	+45	3.3
Gadwall	8	-64	1.2
Redhead	5	-29	0.7
Bufflehead	0	0	0
Ringneck duck	0	-	0.2
Common goldeneye	0	0	0
Black duck x mallard	1	-	0.2
Greater scaup	1	-	0.2
Common merganser	0	0	0
Ruddy duck	0	0	0
Total	664	+32	100

^a Excludes Youth Hunt

2) Youth Hunt

Each year the refuge hosts a youth waterfowl hunt made possible through cooperative efforts of Ducks Unlimited and area 4-H and sportsmen's clubs. Young people between the ages of 12 and 18 who have completed the NYS Hunter Safety Course and are currently licensed are invited to participate. Each youth is also required to complete an on-refuge course of instruction covering hunter safety, waterfowl identification, hunter ethics, dog handling, duck calling and decoy setting. On August 29-30, 18 youths participated in this year's training course.

Eighteen youth participated in this year's waterfowl youth hunt. Each party of youths was accompanied by an experienced adult guide and a trained retriever. A total of 31 ducks and 4 geese were taken in the hunt. As usual the experience and comments of participants indicated success beyond that measured by birds in the bag.

c) Big Game

Deer hunting on the refuge is open subject to NYS regulations for the "southern zone". No special permit is required. Deer may be legally harvested by bow, shotgun, handgun or muzzleloader within the respective seasons. The only special requirement for refuge hunting is the wearing of 400 square inches of blaze orange during the gun hunting portion of the season.

The refuge white-tailed deer herd appears to be healthy and maintaining itself at a moderate level. The harvest strategy for DMU 88, which encompassess the refuge, is one that seeks deer herd reduction. Conversations with NYSDEC personnel indicate that deer densities are much lower and hunting pressure much higher on the refuge when compared to the remainder of the DMU. Monitoring is difficult, however, since we do not have a deer check requirement on the refuge. Based on car counts, hunting pressure has remained steady over the past three years with 350 - 400 "first day" hunters and approximately 250 - 300 afield on the first Saturday and Thanksgiving Day.

d) Small Game

Iroquois is open to small game hunting, without special permit, subject to seasons and bag limits set by NYS. Eastern cottontail, gray squirrel, ring-necked pheasant, ruffed grouse and American woodcock provide the majority of small game hunting opportunity.

Our spring turkey hunt (gobblers only) continues to be very popular. One hundred thirty-three (133) permits were issued, and only 3 birds were reported as taken on the refuge during the May hunt. Winter observations of flocks on, and adjacent to, the refuge show that there are an adequate number of birds existing in the area.



A successful spring turkey hunter.

PDC 5-4-93

9. Fishing

Fishing was moderate on both Oak Orchard Creek and on the impoundments. Most fishing took place on Ringneck Marsh after the dike was opened for access. Fish species include: Largemouth and smallmouth bass, crappie, carp, perch, northern pike, and bullhead. Ice fishing is allowed on Ringneck, Schoolhouse and Center Marshes, weather permitting.

On June 12, the refuge celebrated National Fishing Week (NFW) by hosting a youth fishing day. The event was co-sponsored by the refuge, the Iroquois JCCCC and the Lower Great Lakes Fisheries Resources Office, all of whom provided staff and support. Also, members of a local sportsman's club volunteered to assist as mentors and instructors. Area merchants in Batavia, Lockport and Buffalo donated rod/reel sets, tackle, gift certificates, free passes, soft drinks and other items to be used as prizes. The area along the west dike of Ringneck Marsh was used for the event. Fifty-seven youths aged 2-14 participated in the six hour event which included the fishing derby and a casting competition. With accompanying adults, total visitation was approximately 100. This year Pathway to Fishing, a learning seminar program which teaches aquatic ecology and basic fishing techniques, was presented prior to the derby. Each participant receive a "goody bag" with NFW items to take home.



Ice fishing at Ringneck Pool is our most popular winter activities.

DVT 2-21-93



Volunteers at the registration booth for the annual kid's fishing derby held at Ringneck Pool.
DVT 6-12-93



Volunteers, Lower Great Lakes Fisheries personnel, and refuge staff at the "Pathway to Fishing" stations prior to the kid's fishing activities.
DVT 6-12-93

10. Trapping

Fourteen trapping permits were issued for the 1992-93 season. In 1993, the number of trappers using the refuge was as follows:

Jan	-	7 marsh/1 upland
Feb	-	3 marsh/0 upland
Dec	-	12 marsh/0 upland

Refuge trapping for the 1992-93 season was administered through a permit system similar to that used in recent years. However, because of declining interest, probably due to poor fur prices, we reduced the marsh permit fee from \$100.00 to \$50.00/person. Sixteen no-fee upland trapping permits were issued and 13 adults and one youth were issued marsh permits. In total, 30 trappers participated in the two programs as compared to 21 in 1991-92, 20 in 1990-91, and 25 in 1989-1990.

The 1991-92 upland trapping season opened on October 24, with marsh trapping opening on November 28, 1992. The muskrat and raccoon harvest increased slightly from the previous year, however, beaver harvest dropped from 19 in 1991-92 season to 0 in 1992-93 season.

Table 21. Reported trapping harvest, 82/83 - 92/93, Iroquois NWR.

Trapping Season	Muskrat	Raccoon	Mink	Opossum	Beaver	Striped Skunk	Red Fox	Gray Fox	Eastern Coyote	Weasel
82 - 83	3860	50	20	13	4	0	6	0	0	2
83 - 84	1392	28	6	5	0 ^a	0	1	0	0	0
84 - 85	1143	48	8	4	2	0	4	0	0	0
85 - 86	588	11	18	7	0 ^a	0	3	0	0	1
86 - 87	1903	63	16	41	5	4	5	0	0	1
87 - 88	5677	172	17	45	0 ^a	2	16	2	0	0
88 - 89	6750	129	21	51	31	4	2	0	0	0
89 - 90	3606	11	5	23	0 ^a	5	0	0	0	0
90 - 91	2239	55	13	16	5	0	1	0	0	0
91 - 92	872	55	16	31	19	6	6	1	0	0
92 - 93	1258	75	8	22	0	2	7	4	0	0

^a Beaver trapping closed

11. Wildlife Observation

Wildlife observation is a major activity on the refuge particularly during spring and fall migration. Families, birding groups, schools and passers-by from many areas are drawn to the refuge by the honking of geese and the flutter of wild wings. Cayuga Overlook, located along State Route 77, is the most popular spot, especially for first-time visitors. At the peak of the spring season, the parking lot can be filled to capacity. From there, visitors can observe resting migratory waterfowl, the heron rookery and perhaps spot the pair of nesting bald eagles. Other drawing points are the two overlooks at Ringneck Marsh and one on Schoolhouse Marsh. The visitor center is staffed on weekends during the spring months to answer questions and to offer a glimpse of the eagle nest through a spotting scope. Spring and summer weekends are also popular times for family outings on the refuge's nature trails. Also, caravans of birders are seen year-round.

12. Other Wildlife Oriented Recreation

a) Cross-country Skiing

Cross-country skiing is still a favorite winter activity when conditions permit. Onondaga and Kanyoo Nature Trails provide for the majority of skiing on the refuge. These short trails provide an easily traversed and protected area where individuals and families can enjoy an afternoon of skiing. The refuge also has a 7.5 mile ski trail circling Mohawk Pool. As an Eagle Scout project parts of the trail were reposted and rest benches were installed. Skiers may also use the Feeder Road and dike.



Cross-country skiing is quite popular along Mohawk Ski Trail.

DVT 2-28-93

b) **Canoeing**

Canoeing is limited to Oak Orchard Creek only. From March 1 through July 14 it is restricted during the nesting/brood rearing season to a stretch starting at the east boundary of the refuge to a wire cable two miles downstream. From July 15 through the end of February canoeing is permitted between the east boundary up to Route 63 (weather permitting).

c) **Photography Blinds**

The refuge continues to maintain three photo blinds for public enjoyment. Use of the three blinds, located on Ringneck, Onondaga and Oak Orchard Creek are by special use permit on a reservation system. March, April and May are busy months for photo blind use.

17. **Law Enforcement**

Three major incidents occurred on the refuge in 1993. On February 3, person or persons unknown broke into a refuge residence while the employee was at work. As far as could be determined only cash was taken. However, the refuge incurred the cost of a new front door. Three other houses in the area (off-refuge) were also hit over the next two weeks. On May 18, the refuge headquarters building was broken into. Person or persons unknown took approximately \$10.00 in cash from staff desks and the donation box in the lobby doing over \$1,400 in damages to door frames and glass in the process. Last but not least, on August 22 the barn at the corner of Sour Springs Road and Oak Orchard Ridge Road was destroyed by fire. Two Job Corps enrollees were subsequently arrested on third degree arson charges.

An unused residence on Sour Springs Road was repeatedly broken into and vandalized during the year. Windows were broken, lighting fixtures smashed and the storm door was ripped off the hinges. It appears to be the site of drug and alcohol parties.

Table 22. Breakdown of other law enforcement incidents in 1993.

Incident	NOV issued	Warning	Other
Hunting/closed area	3		
Trespass: vehicle	1	3	
fishing		3	
canoe		2	
Dog off leash	1	1	2 (animal control)
Vandalism (sign)			1 - no suspect
Dumping			5 - no suspect
Snow mobiles			2 - no suspect
Blocking gates		6	

I. EQUIPMENT AND FACILITIES

1. New Construction

Eight ditch plugs were constructed during the year (Section F.2).

Construction of a new kiosk at headquarters, started in June, was completed by mid-December. The majority of the work was accomplished by volunteers. The kiosk is based on the Wilderness Graphics design.



Refuge staff began construction of a new kiosk at refuge headquarters.

DVT 5-21-93



Concrete pouring.

DVT 5-28-93



"Finishing touches"

DVT 5-28-93



Refuge staff stopped construction at this point.

DVT 6-10-93



Volunteers took over.

DVT 6-16-93



Continuing on.

DVT 6-26-93



Volunteer Charlie Owen began the final construction.

DVT 9-29-93



Nearly completed.

DVT 10-14-93

Two new pipe gates were installed; one on the road into Olsen Marsh, and the other at structure T on the Feeder Road.

2. Rehabilitation

The rehab of Oneida Dike was completed during September. Approximately 400 cubic yards of fill and 200 tons of riprap were placed on the dike to eliminate erosion of the side slope and bring the top of the dike back up to original elevation. The dike was within six inches of being overtopped during the high water levels this past spring. Disturbed areas were seeded with grass to complete the project.

The rehabilitation of Onondaga Dike, consisting of grading, filling of collapsed muskrat runs, and gravelling of the surface, was completed in September.

Approximately 200 cubic yards of fill were placed and graded in two areas of Cayuga Dike that were overtopped in the spring. Approximately 300 tons of surge stone and 100 tons of 2" crusher run were placed on the fill. The spillways should be able to withstand a similar future event with minimal damage. Final levelling of the rip rap and gravel was accomplished in September.



The office was broken into on May 17. Several doors and other items were smashed requiring replacement.

DVT 5-18-93

The rehabilitation of Swallow Hollow water control structures by Allegheny Landscaping got off to a good start in mid-November. Two structures were set the first week, but the inch plus precipitation on November 27 raised both Oak Orchard Creek and impoundment levels too high to dewater for installation of the remaining two structures. The project is on hold until the water recedes.

3. Major Maintenance

a) Buildings

The workspace cubicle retrieved from the RO was erected in the basement as a work area for the GIS computer and programmer. Additional fluorescent lights were installed to complete the initial preparation for the workstation.

A heat control valve was replaced on one of the office heaters, and a connector replaced on one of the circulator pumps.

The office space and the woodshop side of the maintenance shop was cleaned and painted.

The septic system for the headquarters system started to back up in April. The top of the 2000 gallon tank, five feet below the surface of the ground, had to be excavated in order to pump it out and clear the blockage. A culvert was installed over the access cover of the tank and backfilled to permit easier access in the future.

A security system was leased from and installed by ADT in June in response to the break-in that occurred May 17.

Oil furnaces in the shop and headquarters building were inspected and serviced in September.

Two sections of gutter were replaced, and a new section with downspout added on headquarters building.

Two external speakers were installed in the auditorium by volunteers to improve sound quality over the internal movie projector speaker.

The aluminum railing for the rear steps of the office was repaired and reinstalled during December.

The chlorinator pump for the office/shop water system seized up in December and had to be replaced.

On the afternoon of August 22, the "Gink" Barn at the corner of Oak Orchard Ridge and Sour Springs Roads was destroyed by fire. Two Job Corps enrollees were subsequently arrested on third degree arson charges. Special Agent Lisenbee was notified and interviewed the suspects. The FBI was also notified, but did not actively participate in the investigation. From September 28 through 30, a contractor hired by the Iroquois JCCCC, completed removal of the debris from the "Gink" Barn. Metal and other items were salvaged, and the site restored to grassland.



Two JCCCC enrollees set the Gink Barn on fire one summer's fine day!

DCG 8-22-93



Four volunteer fire departments responded to the fire.

DCG 8-22-93



Job Corps hired a contractor to salvage and clean up the site.

DVT 8-28-93



Contractor just about finished cleaning up the site.

DVT 9-30-93

b) Quarters

All oil furnaces were inspected and serviced during September.

A new metal clad, exterior door was installed on the front door of Q-1 to replace the door vandalized in the break-in attempt on February 12. A deadbolt lock was installed by a locksmith.

The water softening system in Q-1 was upgraded after the control mechanism failed.

The sump pump was replaced in Q-49.

The contractor completed the rewiring of Q-49 on December 29 at a cost of \$2,230. The sump pump discharge line was repaired by staff.

The rewiring of Q-101 was completed during April at a cost of \$2,590. The second floor bedroom required replacement of the plaster ceiling with drywall and fiberglass insulation for the existing cellulose, blown-in variety.

New gutters and downspouts were installed on Q-101.

A UV light water disinfection unit was installed in the water system at Q-152 in August after disinfecting the well with chlorine failed to eliminate contamination.

A new fluorescent light was installed in the kitchen at Q-152, gutters cleaned, a new downspout added and screening installed.

c) Facilities

Stone was added to the entrance road of Onondaga Trail to eliminate a pothole that developed during the spring thaw.

Approximately 12 staff days in April were devoted to cleaning debris away from water control structures to ensure that water could drain from the flooded impoundments as soon as possible.

The eroded emergency spillway for Mohawk Pool was regraded after the floodwaters receded to make it passable for Service vehicles and the hiking public.

Replacement entrance sign frames were installed along South Woods Road and Casey Road.

The old kiosk at Cayuga Overlook was brought into the shop for repairs, modification and repainting, then it was relocated to the head of Kanyoo Trail. A new shingle roof was installed and the structure reinforced.

The concrete and iron bridge over the outfall of Seneca Pool was removed during July and replaced with twin, three foot diameter, corrugated metal pipes. The mortared stone abutments of the iron bridge were collapsing and the deck was slipping off the abutments.



A bridge on Feeder Road was in an impassable state and was replaced.

DVT 7-20-93



Two four' CMP were installed in it's place.

DVT 7-23-93

Bids were opened in September for the resurfacing of the visitors parking lot at headquarters. However, the low bid exceeded the budgeted amount, and no contract was let. The project was readvertised at the end of 1993 after more money was provided for the project.

Fill was hauled from a stockpile on-refuge to Onondaga, Mohawk, and the subimpoundment dikes to repair muskrat damage and/or fill low areas. The filled areas were graveled. Access to the handicapped waterfowl hunting blind was upgraded.

The visitor parking lot at refuge headquarters was striped and signed during October to improve traffic flow and designate handicapped parking areas.

Wood chips were placed on Kanyoo Trail.

Two plastic drain tiles were installed by staff in the maintenance yards to help alleviate poor drainage conditions that caused puddles and icy conditions.

4. Equipment Utilization and Replacement

As documented in Sections E.8, F, and I.1-3, 1993 was another year of heavy equipment utilization. Although wet conditions plagued us at various times during the year, the equipment was utilized at a steady pace.

A new stationary air compressor was purchased to replace the 20- year old unit in the shop. Replacement parts were no longer available.

A new Simplicity 18 hp riding lawn mower with 50" deck was received in November to replace an older model.

Major items related to our vehicle fleet management included:

1979 Chevrolet 4X4 Pickup #1, I120350: new U-joints installed, a rusted out brake line replaced, and a new winch cable installed.

1979 Chevrolet 4X4 Pickup #2, I120351: fan belts and radiator hoses were replaced, and a new starter installed.

1979 Chevrolet 4X4 Pickup #3, I120355: the cooling system was repaired, and the windshield wiper motor replaced.

1989 Chevrolet Celebrity Station Wagon, I151046: exhaust system replaced.

1990 Ford LT9000 Truck Tractor and Lowboy Trailer: rear fenders repaired, the rear frame crossmember that carries the pintle hook was replaced after it started to twist, the clutch was adjusted; repairs made to the pony motor on the lowboy.

Heavy equipment maintenance is summarized below:

TD-20 Dozer - rebuilt turbocharger, injectors and pump; changed fuel filters; belly pans removed and entire unit steam cleaned; new batteries installed; a leaking hydraulic fitting tightened.

Hydro-Ax 621-B - Iroquois - hydraulic hose was replaced; cold start clutch replaced; small cracks in rotary head deck welded; a threaded elbow on the rotary head cracked and had to be replaced.

Hydro-Ax 621-B- Great Swamp - small cracks in rotary head deck welded; blades changed; changed the crankcase oil to a lower viscosity.

Motor Grader - muffler and cutting edge on blade replaced; seal on gear box replaced.

5 Ton Offset Disc - bracket supporting the transport axle and the two attaching bolts were replaced.

John Deere 750B Dozer - replaced vandalized ignition switch; new muffler installed; rebuilt turbocharger; ruptured hydraulic hose for the blade angling cylinder replaced.

Ford TW-15 Tractor - new PTO shaft was installed after the shaft snapped inside the housing causing damage to other parts. The repair cost \$2,350.00.

Case 9170 Tractor - Batteries and cables replaced.

Brillion Seeder - new hydraulic hose for the lift cylinder.

Woods 20' Batwing Mower - New clutches installed on the wing PTO shafts.

Three slide projectors and one movie projector were repaired and cleaned.

The slip-on pumper and indian tanks were inspected and tested prior to the prescribed burns.

New blades were installed in the wood planer during May.

The spin spreader attached to a trailer pulled behind the ATV broke its mounting bracket while being used to overseed Pasture 6. The mount was modified to attach the spreader directly to the ATV, eliminating the original, high maintenance system.

A Caterpillar E120B low ground pressure excavator was leased from Syracuse Supply, Tonawanda, NY, to assist us with funded IPWs: the rehab of Oneida Dike, replacement of the bridge on Feeder Road, and repair of dikes damaged in the spring flooding.

5. **Communication Systems**

All portable radios were given the annual inspection by FM Communications of Buffalo during August.

A new phone system was installed in the headquarters and shop building on July 29-30. The Toshiba Strata DK system was installed by COMTEL, Amherst, NY, a GSA POTS Contractor, and includes items such as: speed dial, intercom and redial that our old system did not have.

6. **Computer Systems**

The PC's Unlimited 286 computer suffered a hard drive failure on January 22. The "crash" could have been a result of the "brownout" that occurred on January 13, old age, or a combination of both. The computer is six years old. A new 40 Mb hard drive was installed for \$349. Since the drive had been backed up to tape two weeks before, the crash cost us only the loss of a few letters.

A 486 DX66 computer with 17" monitor was purchased from Gateway 2000, a digitizer from Calcomp, an HP 550C Inkjet Printer, and an EPPL7 site license for our GIS workstation. All items were funded as part of the Ruffed Grouse GIS Challenge Grant.

The video card on the University System 286 was replaced during February.

A Colorado Memory Systems Trakker external tape backup system was purchased to allow quick, efficient backup for two of the station's CPU's that do not have internal tape backup systems. Both computers were backed up to tape.

The internal tape backup program for our University Systems 386 computer was installed and the hard drive backed up.

The monitor on the PC's Unlimited 286 computer failed during March and was replaced.

CC:Mail was installed on a computer and several staff days wasted trying to figure out how to make the system work.

RBase, Version 4.0a was purchased as an upgrade from version 2.1, and it was upgraded automatically to RBase, Ver. 4.5 by the manufacturer. It is used as the database for the GIS project.

Iroquois received an IBM 4039 10R Laser Printer by LEXMARK during October.

A new 486 DX66 computer with color monitor, purchased with EOY money, was delivered and setup by Marchese Computers, Inc. on November 29.

The NEC Spinwriter 8850 was cleaned and adjusted in November in hope that it can be used to print out purchase orders.

WordPerfect 6.0 was purchased and installed on the 486. WP 6.0 accesses WP 5.1 files without any converting.

7. Energy Conservation

Some energy conserving projects completed this year included:

- Installation of weatherstripping on refuge buildings.
- An electrician installed an energy efficient high pressure sodium light on the back of headquarters building. It lights up the parking area, providing staff safer access to the building and giving the equipment parked there a little more security.
- Oil burners in refuge residences and administrative buildings were cleaned and serviced, and filters cleaned or replaced.
- Two replacement windows were installed in the headquarters building during the year. The new windows have a screened tilt-out section that the original windows did not. This reduces the need for air conditioning by improving fresh air circulation in the offices.

Energy use over the past five years is summarized in Table 23. .

Table 23. Iroquois NWR calendar year energy use summary 1988 - 1992.

		CALENDAR YEAR					
		1988	1989	1990	1991	1992	1993
<hr/>							
ELECTRIC							
KWH		25310	31537	34540	31519	35352	26913
COST		\$2,857	\$3,282	\$3,697	\$3,943	\$4,679	\$3,443
<hr/>							
FUEL OIL							
GALS		2208	5071	3469	2477	3750	3477
COST		\$1,796	\$4,850	\$3,565	\$2,632	\$3,256	\$2,710
<hr/>							
VEHICLE GAS							
GALS		3345	3346	3566	2830	2956	2247
COST		\$2,634	\$2,609	\$3,640	\$2,717	\$2,820	\$2,139
<hr/>							
VEHICLE DIESEL /1							
GALS		0	0	0	2522	1665	2173
COST		\$0	\$0	\$0	\$2,295	\$1,676	\$2,073
<hr/>							
PROCESS GAS							
GALS		720	636	1295	493	1181	615
COST		\$623	\$506	\$1,450	\$467	\$1,266	\$593
<hr/>							
PROCESS DIESEL							
GALS		8224	6588	3812	4253	2150	3471
COST		\$6,970	\$5,265	\$4,125	\$3,932	\$1,738	\$2,994
<hr/>							
TOTAL MILES		36354	35911	38780	52222	54386	59315

/1

Fuel utilized by semi tractor for Regional Force Account habitat projects throughout the Region.

J. OTHER ITEMS**4. Credits**

The sections of the narrative were written and compiles as follows:

Refuge Manager	-	C.2; E.1; G.2,7,11; J.4 and edited and proofread.
Assistant Refuge Manager Caldwell	-	Intro.; A; B; d.2-4, 6; E.2,3,5,6, parts of 8; F.1-9; I; J.
Biologist Lor	-	D.5; E.8a-c; G.3-6,8,10,12,16; H.8,10.
Outdoor Recreation Planner Gerhart	-	E-4, and H (except H.10).
Tractor Operator Nice	-	Tables (B, H.8, H.10).
Refuge Secretary Pender	-	Formatted and typed on the computer.

K. FEEDBACK

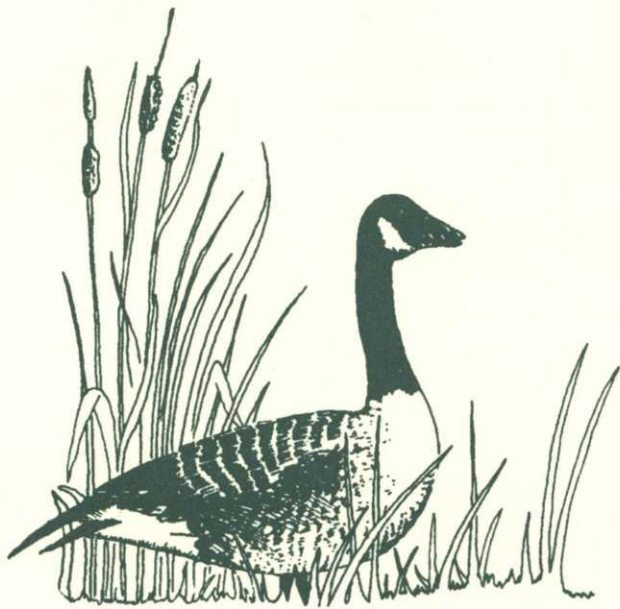
Nothing to report.

L. INFORMATION PACKET

(inside back cover)

Iroquois

NATIONAL
WILDLIFE
REFUGE



NEW YORK

THE CAROUSEL OF TIME

Spring announces the arrival of the Canada goose on its way north, and a kaleidoscope of natural design begins its complicated cycle at Iroquois.

Growing broods are summer's bounty; devoted parents of nature watch their offspring mature and gain the wisdom and experience necessary for survival.



Fall prepares many inhabitants to join the returning geese in their journey south, the bright colors offer fond farewell and the promise of nourishment and rest in the spring.

Winter waits in frozen silence.

The yearly cycle at Iroquois is truly a demonstration of supreme order and design. Each season offers to us Nature's Legacy - providing nourishment and fulfillment while demanding our care.

LONG AGO

At the end of the last glacial period, a huge lake covered what is now Iroquois National Wildlife Refuge. The lake, called Lake Tonawanda, drained and filled until only a few swampy areas remained. Later, after the Seneca Indians settled the area, the garden patches around their villages made the few remaining oak trees look like orchards to the first settlers. This led to the naming of this area: "Oak Orchard Swamp." The early settlers engaged in logging and farming operation and proposed the first swamp drainage schemes to improve the land for farming in 1828. Fortunately, the high cost of draining the entire swamp prevented complete destruction of the natural area.

MAN INTERVENES

Iroquois Refuge, established in 1958 by the U.S. Fish and Wildlife Service, is part of a chain of National Wildlife Refuges whose primary purpose is to provide, preserve, restore, and manage a national network of lands and waters sufficient in size, diversity, and location to meet society's needs for areas where the widest possible spectrum of benefits associated with wildlife and wildlands is enhanced and made available. Iroquois National Wildlife Refuge consists of 10,818 acres of marshland, wooded swamp, wet meadows, pasture, and cropland. New York State Wildlife Management areas are located adjacent to the Refuge. The combined Federal and State areas provide approximately 20,000 acres of prime waterfowl habitat.



Canada geese

Located midway between Buffalo and Rochester in western New York, the Refuge is a stopping point for thousands of Canada geese and numerous species of ducks during their spring and fall migrations. In addition to the migrating populations at Iroquois, nesting flocks of both Canada geese and ducks have been successfully established. The number of birds hatched each year at the Refuge is increasing.

Iroquois, with its diversified habitat, also provides living space for many species of wildlife besides waterfowl and offers an opportunity for people to enjoy life through outdoor recreation.

THE BENEFIT OF MAN'S INTERVENTION

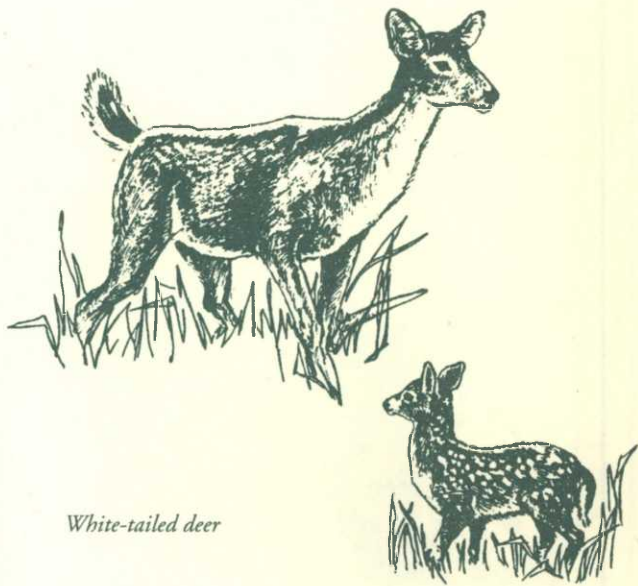
Through natural succession, lakes become forests; marshes are seldom permanent. Only by manipulation can a good variety of prime waterfowl habitat be maintained. At Iroquois, mechanical brush control, cooperative farming agreements, and grazing leases are utilized to curb succession. In addition to this control of vegetative growth, a series of dikes and dams has been established to control water levels. Without water control structures, the entire area of Oak Orchard Creek Watershed would be dry from April through November. As a result of the structures, up to 4,000 acres can be flooded. Besides fostering excellent waterfowl habitat, this plan allows us to maintain a natural flood plain and some creek flow all year.



Wood duck

WILDLIFE REAP THE BENEFITS

In the spring Canada geese generally arrive in early March, with concentrations peaking the first two weeks in April. The average spring peak migration is 40,000 geese; however, up to 88,000 have been counted at one time. In addition to the migrants, a nesting population of Canada geese remains for the summer, their goslings starting to appear the first week in May.



White-tailed deer

The fall migration starts between the second week in September and the first week of October and is much smaller than in the spring as most of the geese tend to pass east of Iroquois. The geese usually leave for their wintering grounds by early December. Peak fall numbers range up to 7,500 geese.

Twenty-four species of ducks have been recorded at the Refuge on their yearly migration. Their timetable is very similar to that of the Canada geese. Peak migration numbers average 4,000 ducks in the spring while fall migration peak averages 8,000 ducks. Ten different species of ducks nest on the Refuge. The main nesters are wood duck, mallard, and blue-winged teal.

Although the primary objective of the Refuge is to provide habitat for ducks and geese, many other species of birds are attracted by the wide variety of habitats found here. 253 species of birds have been sighted at Iroquois since its establishment in 1958. Thirty-three mammal species have been recorded, including muskrat, opossum, beaver, mink, cottontail rabbit, raccoon, red and gray foxes, and white-tailed deer. Reptiles, fish, and amphibians are common on the Refuge. No poisonous snakes are found at Iroquois.

YOUR OPPORTUNITIES AT IROQUOIS

Both hunting and fishing are allowed at Iroquois. Waterfowl hunting is controlled by a special permit system. Others types of hunting, as well as fishing, on the Refuge require only a state license. Rules, regulations, seasons, and maps showing open areas may be obtained by contacting the Refuge Manager.

Many visitors find enjoyment at Iroquois by participating in other wildlife-oriented recreational activities. The visitor center on Casey Road is open 8-4, Monday through Friday year-round (except for holidays) and is open on weekends during the spring and fall migration. The visitor center offers displays and information on waterfowl, mammals, management, and other facts of the Refuge.



OTHER OPPORTUNITIES

Facilities

- Hiking Trails
- Overlooks
- Photography Blinds
- Canoeing (by permit)

Services

- Presentations
- Films
- Environmental Education Activities

YOUR RESPONSIBILITIES

The U.S. Fish and Wildlife Service invites you to take advantage of the unique opportunities for outdoor enjoyment at Iroquois. Observe the landing of a flock of Canada geese on a still frozen pond; watch Spring awaken from her long sleep.

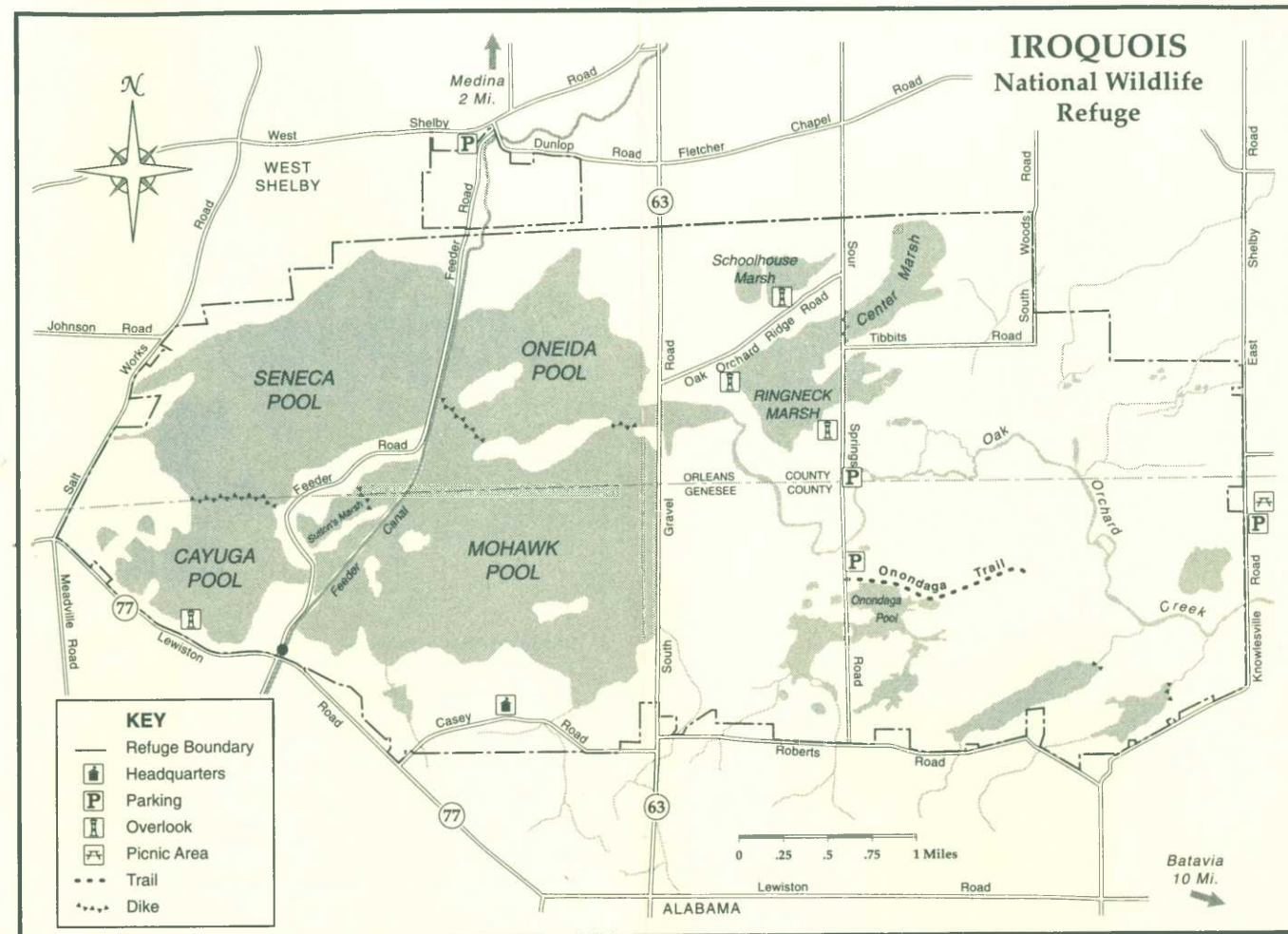
When you see a brood of goslings awkwardly follow their mother or catch a glimpse of a fox or a deer - be thankful - for this offers proof to us that we are not too late. We still have time to right the scales and help maintain the delicate balance of life itself.

We cannot reverse the passing time, but with combined concern and action we can guarantee survival of our valuable wildlife heritage for our descendants.

This survival requires that every visitor respect the following regulations:

- Motor vehicles, including snowmobiles, are restricted to State roadways.
- Firearms are permitted only on open areas during hunting seasons.
- Picking flowers, shrubs, or other vegetation is not allowed.
- Camping, picnicking, and fires are prohibited.

All areas of the Refuge except roads, overlooks, and designated trails, are closed to the public between March 1 and July 15 - the waterfowl nesting season.



SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Canada Goose †	•	•	•	•	•	•	•	•	•	•	•	•
Whistling Swan			•	•								
Mallard †		•	•	•	•	•	•	•	•	•	•	•
Black Duck †		•	•	•	•	•	•	•	•	•	•	•
Gadwall †		•	•	•	•	•	•	•	•	•	•	•
Pintail		•	•	•	•	•	•	•	•	•	•	•
Blue-winged Teal †		•	•	•	•	•	•	•	•	•	•	•
Green-winged Teal †		•	•	•	•	•	•	•	•	•	•	•
American Wigeon		•	•	•	•	•	•	•	•	•	•	•
Wood Duck †		•	•	•	•	•	•	•	•	•	•	•
Hooded Merganser †		•	•	•	•	•	•	•	•	•	•	•



LOCATION MAP

U.S. FISH AND WILDLIFE SERVICE

Iroquois is one of over 500 Refuges in the National Wildlife Refuge System administered by the U.S. Fish and Wildlife Service. The National Wildlife Refuge System is a network of lands and waters managed specifically for the protection of wildlife and wildlife habitat and represents the most comprehensive wildlife management program in the world. Units of the system stretch across the United States from northern Alaska to the Florida Keys and include small islands in the Caribbean and South Pacific. The character of the Refuges is as diverse as the nation itself.

The Service also manages National Fish Hatcheries, and provides Federal leadership in habitat protection, fish and wildlife research, technical assistance and the conservation and protection of migratory birds, certain marine mammals and threatened and endangered species.

For further information please contact:

Refuge Manager
Iroquois National Wildlife Refuge
P.O. 517
Alabama, NY 14003
Telephone: (716) 948-5445

★U.S. GOVERNMENT PRINTING OFFICE: 1992-0-602-080



DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE

Birds of Iroquois

**National
Wildlife
Refuge**



New York

The Iroquois National Wildlife Refuge, in Genesee and Orleans counties, New York, was established in 1958 to provide nesting, resting and feeding grounds for ducks, geese and other water-loving birds. This Refuge contains 10, 818 acres of marsh, swamp, woodland, shrub and thicket, wet meadow, pasture, old field and cropland. Primary Refuge objectives include offering food, rest, and protection for birds, especially in spring and fall migration, and providing nature-oriented recreation for people.

Public use includes nature study, especially bird watching and observation of concentrations of migrating waterfowl from convenient overlooks, walking nature trails, photography, hunting, fishing, and leisurely driving through the Refuge.

Birding is best from March through November. Peak migrations of waterfowl are in mid-April and early October. May is the best time to observe warblers, with the most species likely to be seen between the tenth and the twenty-first of the month. Visitors can readily view summering waterfowl and their broods. One can always expect to see some interesting birds on a tour of the Refuge, regardless of the season.

Enjoy yourself. Whether you're a seasoned birder or a beginner, we wish you a rewarding and memorable experience from this visit to your Refuge.

This folder lists 266 birds that have been identified on the Refuge, and is in accordance with the Sixth American Ornithologists' Union Checklist. Most birds are migratory, therefore, their seasonal occurrence is coded as follows:

SEASON

s - Spring	March 21 - June 20
S - Summer	June 21 - September 20
F - Fall	September 21 - December 20
W - Winter	December 21 - March 20

† - Birds known to nest on or near the Refuge
Italics indicate threatened/endangered species

RELATIVE ABUNDANCE

Relative abundance indicates how frequently you might see a bird in its favored habitat.

a - abundant	a species which is very numerous
c - common	likely to be seen or heard in suitable habitat
u - uncommon	present, but not certain to be seen
o - occasional	seen only a few times during a season
r - rare	may be present but not every year

LOONS - GREBES

Common Loon	o			
Pied-billed Grebe †	c	c	c	
Horned Grebe	o			
Red-necked Grebe	r			

CORMORANTS

Double-crested Cormorant	o	r		
--------------------------	---	---	--	--

BITTERNS - HERONS

American Bittern †	u	u	u	
Least Bittern †	u	u	u	
Great Blue Heron †	c	a	c	o
Great Egret	o	o	o	
Cattle Egret	r	r		
Green-backed Heron †	u	u	u	
Black-crowned Night-Heron	o	o	o	

SWANS - GEESE - DUCKS

Tundra Swan	c	r	o	r
Greater White-fronted Goose	r			
Snow Goose	o		o	
Barnacle Goose	r			
Canada Goose †	a	c	c	u
Wood Duck †	c	c	c	r
Green-winged Teal †	c	o	c	r
American Black Duck †	c	u	c	o
Mallard †	c	c	c	o
Northern Pintail †	c	o	u	r
Blue-winged Teal †	c	c	u	
Northern Shoveler †	u	o	u	
Gadwall †	u	o	c	r
American Wigeon †	c	o	c	
Canvasback	o		o	
Redhead	o		o	
Ring-necked Duck	c		c	
Greater Scaup	o		o	
Lesser Scaup	u		u	
Oldsquaw	o		o	
Black Scoter			r	
Surf Scoter			r	
White-winged Scoter	r		r	
Common Goldeneye	u		u	r
Bufflehead	u		u	
Hooded Merganser †	c	u	u	r
Common Merganser	o		o	
Red-breasted Merganser	o		o	
Ruddy Duck	o	o	o	

VULTURES - HAWKS - FALCONS

Turkey Vulture †	c	c	c	
------------------	---	---	---	--

Osprey	o	o	o	
Bald Eagle †	u	u	u	r
Northern Harrier †	u	u	u	o
Sharp-shinned Hawk †	o	o	o	o
Cooper's Hawk †	o	o	o	o
Northern Goshawk				r
Red-shouldered Hawk †	o	o	o	r
Broad-winged Hawk	o			
Red-tailed Hawk †	c	c	c	c
Rough-legged Hawk	o		o	o
Golden Eagle	r			
American Kestrel †	c	c	c	u
Peregrine Falcon	r		r	

GROUSE - QUAIL - TURKEY

Ring-necked Pheasant †	u	u	u	u
Ruffed Grouse †	u	u	u	u
Wild Turkey †	u	u	u	u

RAILS - CRANES

Yellow Rail			r	
King Rail †	r	r	r	
Virginia Rail †	u	u	u	
Sora †	u	u	u	
Common Moorhen †	c	c	c	
American Coot †	c	c	c	r

PLOVERS - SANDPIPERS

Black-bellied Plover	o	o	o	
Lesser Golden-Plover	r	r	r	
Semipalmated Plover	o	r	o	
Killdeer †	c	c	c	
Greater Yellowlegs	c	o	c	
Lesser Yellowlegs	c	o	c	
Solitary Sandpiper	u	o	u	
Spotted Sandpiper †	c	c	u	
Upland Sandpiper †	o	o		
Ruddy Turnstone	r			
Semipalmated Sandpiper	c	o	c	
Least Sandpiper	u	o	u	
White-rumped Sandpiper	r	r	r	
Pectoral Sandpiper	c	o	c	
Dunlin	u	o	c	
Stilt Sandpiper		r		
Short-billed Dowitcher	o	o	o	
Long-billed Dowitcher			r	
Common Snipe †	c	u	c	
American Woodcock †	c	u	u	
Wilson's Phalarope	r	r		
Red-necked Phalarope		r	r	

	s	S	F	W
GULLS - TERNS				
Bonaparte's Gull	o	r		
Ring-billed Gull	c	u	u	o
Herring Gull	o	o	o	o
Great Black-backed Gull	r	r	r	r
Caspian Tern	o	o		
Common Tern	o	o		
Black Tern †	c	c	r	
DOVES - CUCKOOS - OWLS				
SWIFTS - HUMMINGBIRDS				
Rock Dove †	u	u	u	u
Mourning Dove †	c	c	c	u
Black-billed Cuckoo †	u	u	u	
Yellow-billed Cuckoo	o	o	o	
Barn Owl	r	r	r	r
Eastern Screech-Owl †	u	u	u	u
Great Horned Owl †	c	c	c	c
Snowy Owl			r	r
Barred Owl †	u	u	u	u
Short-eared Owl	o		o	o
Northern Saw-whet Owl				r
Common Nighthawk	o	o		
Whip-poor-will	r	r		
Chimney Swift	o	o	o	
Ruby-throated Hummingbird †	u	u		
Belted Kingfisher †	u	u	u	o
WOODPECKERS - FLYCATCHERS				
Red-headed Woodpecker †	o	o	o	o
Red-bellied Woodpecker †	u	u	u	u
Yellow-bellied Sapsucker †	o		o	
Downy Woodpecker †	c	c	c	c
Hairy Woodpecker †	u	u	u	u
Northern Flicker †	c	c	c	o
Pileated Woodpecker †	u	u	u	u
Eastern Wood-Pewee †	c	c	u	
Alder Flycatcher †	o	o		
Willow Flycatcher †	u	u		
Least Flycatcher †	u	u	r	
Eastern Phoebe †	c	c	c	
Great Crested Flycatcher †	c	c		
Eastern Kingbird †	c	c		
LARKS - SWALLOWS - JAYS - CROWS				
Horned Lark †	c	u	c	u
Purple Martin †	u	u	r	
Tree Swallow †	c	c	c	
Northern Rough-winged Swallow	r	o	r	
Bank Swallow †	u	c		

	s	S	F	W
Cliff Swallow †	o	o		
Barn Swallow †	c	c	c	
Blue Jay †	c	c	c	c
American Crow †	c	c	c	u
TITMICE - NUTHATCHES - WRENS				
Black-capped Chickadee †	c	c	c	c
Tufted Titmouse	o	o	o	o
Red-breasted Nuthatch	o		o	
White-breasted Nuthatch †	c	c	c	c
Brown Creeper †	u	u	u	u
Carolina Wren	o		o	
House Wren †	c	c	c	
Winter Wren	o		o	r
Sedge Wren †	r	r	r	
Marsh Wren †	c	c	o	
KINGLETS - THRUSHES - THRASHERS				
Golden-crowned Kinglet †	u	o	u	o
Ruby-crowned Kinglet	u		u	
Blue-gray Gnatcatcher †	u	u	o	
Eastern Bluebird †	u	o	u	r
Veery †	c	c	o	
Gray-cheeked Thrush	r		r	
Swainson's Thrush	u		o	
Hermit Thrush	u		u	r
Wood Thrush †	c	c	u	
American Robin †	c	c	c	o
Gray Catbird †	c	c	c	
Northern Mockingbird	o	o	o	r
Brown Thrasher †	u	o	o	r
WAXWINGS - SHRIKES - STARLINGS				
American Pipit	o		o	
Bohemian Waxwing			r	r
Cedar Waxwing †	c	c	c	u
Northern Shrike	o		o	o
European Starling †	c	c	c	c
VIREOS - WOOD WARBLERS				
Solitary Vireo	o			
Yellow-throated Vireo †	u	u		
Warbling Vireo †	c	c		
Philadelphia Vireo	o		o	
Red-eyed Vireo †	c	c	u	
Blue-winged Warbler †	u	u		
Golden-winged Warbler †	u	u		
Tennessee Warbler	u	u	u	
Orange-crowned Warbler	r	r	r	
Nashville Warbler	u	u	u	
Northern Parula	r	r	r	

	s	S	F	W
Yellow Warbler †	c	c		
Chestnut-sided Warbler	u	r	u	
Magnolia Warbler	u	u	u	
Cape May Warbler	u	o	o	
Black-throated Blue Warbler	u	o	o	
Yellow-rumped Warbler	c	o	c	
Black-throated Green Warbler	u	u	u	
Blackburnian Warbler	u	r	u	
Pine Warbler	r	o	o	
Palm Warbler	u	o	o	
Bay-breasted Warbler	u	r	u	
Blackpoll Warbler	u	r	o	
Cerulean Warbler †	u	u		
Black-and-white Warbler	u	o	o	
American Redstart †	c	c	u	
Prothonotary Warbler †	u	u		
Ovenbird †	c	c	u	
Northern Waterthrush †	u	o	u	
Mourning Warbler †	u	o	u	
Common Yellowthroat †	c	c	u	
Hooded Warbler	r			
Wilson's Warbler	o	o	o	
Canada Warbler	o	o	o	
Yellow-breasted Chat †	r	r		

TANAGERS - SPARROWS

Scarlet Tanager †	u	u	u	
Northern Cardinal †	u	u	u	u
Rose-breasted Grosbeak †	c	c	c	
Indigo Bunting †	u	u	u	
Rufous-sided Towhee †	u	u	u	r
American Tree Sparrow	u		c	c
Chipping Sparrow †	c	c	c	
Field Sparrow †	c	c	u	
Vesper Sparrow †	o	o	o	
Savannah Sparrow †	c	c	c	
Grasshopper Sparrow †	o	o		
Henslow's Sparrow †	o	o		
Fox Sparrow	o		o	
Song Sparrow †	c	c	c	o
Swamp Sparrow †	c	c	c	o
White-throated Sparrow	c		c	o
White-crowned Sparrow	c		c	r
Dark-eyed Junco	c		c	u
Lapland Longspur				r
Snow Bunting	o		o	o

BLACKBIRDS - FINCHES

Bobolink †	c	c	o	
------------	---	---	---	--

	s	S	F	W
Red-winged Blackbird †	a	c	a	o
Eastern Meadowlark †	c	c	c	o
Rusty Blackbird	u		u	
Common Grackle †	c	c	c	r
Brown-headed Cowbird †	c	c	c	o
Northern Oriole †	c	c		
Pine Grosbeak			r	r
Purple Finch †	u	o	u	o
House Finch †	u	u	u	u
Common Redpoll				o
Pine Siskin	r	r	r	r
American Goldfinch †	c	c	c	u
Evening Grosbeak	u		u	u
House Sparrow †	c	c	c	c



ACCIDENTALS

The following 36 species have been seen on the Refuge one or two times:

Red-throated Loon	Western Sandpiper
Eared Grebe	Baird's Sandpiper
Snowy Egret	Ruff
Little Blue Heron	Lesser Black-backed Gull
Glossy Ibis	Glaucous Gull
Fulvous Whistling-Duck	Black-legged Kittiwake
Brant	Forster's Tern
Eurasian Wigeon	Long-eared Owl
Merlin	Three-toed Woodpecker
Gyrfalcon	Acadian Flycatcher
Sandhill Crane	Loggerhead Shrike
American Avocet	White-eyed Vireo
Willet	Summer Tanager
Whimbrel	Lincoln's Sparrow
Hudsonian Godwit	Yellow-headed Blackbird
Marbled Godwit	Orchard Oriole
Red Knot	Red Crossbill
Sanderling	White-winged Crossbill

NOTES

Date _____ Time _____

Observers _____

Weather _____



U.S. Fish and Wildlife Service

Iroquois is one of more than 445 refuges in the National Wildlife Refuge System administered by the U.S. Fish and Wildlife Service. The National Wildlife Refuge System is a network of lands and waters managed specifically for the protection of wildlife and wildlife habitat and represents the most comprehensive wildlife management program in the world. Units of the system stretch across the United States from northern Alaska to the Florida Keys and include small islands in the Caribbean and South Pacific. The character of the refuges is as diverse as the nation itself.

The Service also manages National Fish Hatcheries, and provides Federal leadership in habitat protection, fish and wildlife research, technical assistance and the conservation and protection of migratory birds, certain marine mammals and threatened and endangered species.

Please report sightings of birds that are not included in this list to:

Refuge Manager
Iroquois National Wildlife Refuge
P.O. Box 517
Casey Road
Alabama, New York 14003
Telephone: (716) 948-5445

Illustrations by Julien Beauregard



**DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE**

RL-51530-4

January 1991