

OTTAWA NATIONAL WILDLIFE REFUGE COMPLEX
(OTTAWA, CEDAR POINT, & WEST SISTER ISLAND NWR'S)

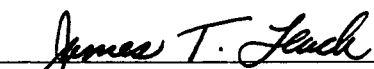
Oak Harbor, Ohio

ANNUAL NARRATIVE REPORT

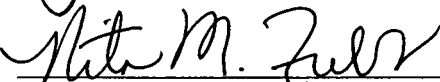
Fiscal Year 1998


Refuge Manager (Acting)

1-12-2001
Date


Refuge Supervisor Review

2-14-01
Date


Regional Office Approval

2-16-01
Date

Photo by Stanley Cornelius



Mallards

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*NTR - nothing to report

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*NTR - nothing to report

INTRODUCTION

The Ottawa National Wildlife Refuge Complex is made up of three refuges: the Ottawa Refuge which has three divisions: Ottawa, Navarre, and Darby; Cedar Point Refuge; and West Sister Island Refuge.

The Ottawa Division was established in July 1961 with land acquired under the authority of the Migratory Bird Conservation Act to preserve a portion of the remaining Lake Erie marshes. West Sister Island was established as a refuge in August 1938 by Presidential Order. Cedar Point was donated to the Service and accepted by the Department of Interior in December 1964. Darby was acquired in 1966 in exchange for Navarre, with the agreement that most of Navarre would remain under management for wildlife under conditions of a 25 and 50 year lease.

The cities of Toledo, Detroit, and Ann Arbor are within a 2 hour drive of Ottawa National Wildlife Refuge (NWR). Cleveland, Akron, Columbus, and Dayton are between 2 to 3 hours driving distance. The refuge is within the bounds of an 8 million person megalopolis. Currently, it is receiving about 120,000 visitors per year who primarily visit the refuge for bird watching and wildlife observation.

The total refuge acreage is 8,318 acres of which 5,350 acres are either open pools, marsh, or moist soil units. Water levels in 3,306 acres of wetland and 794 acres of moist soil units are controlled by pumping. The remaining acreage of 2,968 is a mixture of grassland, forest, cropland, and administrative areas.

Wildlife use of the refuge is high and is approximately as follows: (use days) ducks, 1 to 5 million; Canada geese, 1 to 2 million; marsh and water birds, 1 million; shorebirds, gulls, and terns, over 1 million. Production is: ducks and geese 500 to 2,000 each; marsh and water birds, 4,000 to 6,000; shorebirds, gulls, and terns, up to 500; bald eagle, 6 to 10, and wetland mammals 6,000 to 10,000.

West Sister Island, located 9 miles out in Lake Erie, is a wilderness area and is the site of the largest colonial nesting bird colony in the Great Lakes chain.

HIGHLIGHTS

Severe weather struck the refuge in April with strong winds that caused flooding, and again in June with several storms causing damage to many trees on the refuge. (See climate)

Visitors services were improved with a new wheelchair accessible ramp to the hiking trails and a restored footbridge. (Section 8a)

An unfortunate accident resulted in refuge staff discovering the car and the body of a man who had been missing for two weeks. (Section 6a)

In efforts to expand nesting habitat on West Sister Island NWR, refuge staff and volunteers performed an experimental tree cut on a 1 acre plot of the Island. (Section 3e)

The Junior Duck Stamp Contest for the State of Ohio attracted 695 entries from all over the state. (Section 8b)

A special Congressional appropriation allowed for the rebuilding of 1.25 miles of dike on the Woodies Roost unit of Ottawa NWR. (Section 2a)

CLIMATE

Table 1. Annual Precipitation and Temperature, CY-1998

Month	*Precipitation		Snowfall		Temperature in °F			
	CY-1998	Avg.	CY-1998	Avg.	Max.	Avg. Max.	Min.	Avg. Min.
JAN	3.71	1.78	1.50	8.73	56	51	15	-4
FEB	3.76	1.62	1.25	7.95	59	54	21	0
MAR	3.60	2.46	2.50	5.87	82	70	18	11
APR	3.10	2.91	0.00	1.69	74	81	33	22
MAY	1.48	3.06	0.00	0.00	92	87	52	35
JUN	1.09	3.46	0.00	0.00	92	93	40	45
JUL	8.13	3.39	0.00	0.00	83	94	46	51
AUG	5.33	3.71	0.00	0.00	81	92	36	47
SEP	1.64	3.26	0.00	0.00	78	89	28	38
OCT	1.79	2.30	0.00	0.00	68	80	19	26
NOV	1.25	2.86	0.00	3.11	10	66	53	19
DEC	1.17	2.70	5.20	6.11	55	56	-6	3
Totals	36.05	33.51	7.40	27.56				
Extremes					92	94	-6	-4

* Precipitation does not include melted snow.

^ Averages are calculated by averaging data from 1964 through 1998.

An official National Weather Service station is located at the refuge headquarters and is monitored for precipitation and temperature. Although precipitation in the form of rainfall was at normal levels, snowfall was well below the cumulative average.

Strong northeast winds in April brought Lake Erie upon us and caused flooding far inland. This created some situations throughout Ottawa NWR and Cedar Point NWR where water levels were pumped and lowered to accommodate drainage from upland areas.

Severe weather returned in June with a series of thunderstorms spawning tornadoes. The Navarre Unit of Ottawa NWR received a direct hit with three funnel clouds converging on the Davis-Besse Nuclear Power Station cooling tower! Davis-Besse survived with some damage, but we lost many trees throughout the entire refuge and suffered a hole in the roof of our shop building. The dike system throughout the refuge received the greatest amount of damage with waves from Lake Erie washing over them.

Photo by © Sharon Cummings



Krause Road during the flood

Photo by © Sharon Cummings



Krause Road after the flood

Photos by refuge staff



Wildlife Biologist Christy Smith and YCC enrollees Sara Mason and Adam Pfeiffer cleaning up after the storm.

1. MONITORING AND STUDIES

1a. Surveys and Censuses

A Biological Inventory and Monitoring Plan (BIMP) was initiated in 1998 to support the Comprehensive Conservation Plan (CCP) that began in 1997. The BIMP describes, in detail, biological work outlined in the CCP. Surveys and census previously conducted on the refuge were examined, ranked and expanded to encompass an ecosystem and landscape approach that included a wide variety of species. While some traditional surveys were retained, emphasis on specific species was re-directed to address broader ecosystem concerns, such as colonial waterbirds, passerine migrants and wetland preservation, within the USFWS. Species' list needs were also addressed and it was found that a series of surveys would be needed to compile baseline data for species lists and GIS needs.

Waterfowl

The Ottawa NWR Complex is primarily a stopover for migratory waterfowl in both spring and fall. However, the refuge maintains a small population of ducks (mainly mergansers, mallards, and black ducks) and a few thousand Canada geese throughout the winter. Waterfowl numbers peak in the fall with large concentrations of dabblers, especially mallards and black ducks.

In 1998, a total of 2.5 million duck use days and 530,000 thousand goose use days were recorded. Throughout the months of August through March, two aerial counts per month are conducted by the Ohio Division of Wildlife. These counts are used as comparisons with ground counts that are made twice each month during the same period of time.

Fall migrations of waterfowl were very low this year throughout the entire southern Lake Erie Region with low numbers recorded by the Ohio Division of Wildlife on aerial surveys. It is suspected that milder weather in northern areas may have allowed waterfowl to remain on the breeding grounds for a longer period of time. When migration finally began, the birds stopped in the Lake Erie region for a shorter than normal span of time. Canada geese peaked at 10,105, snow geese at 163, tundra swans at 470 and trumpeter swans at 7.

Passerine/Neotropical Migrants

Neotropical and other passerine migrants are monitored each spring and fall through a combination of point counts and mist net stations located on two units of the refuge. The data is collected by Black Swamp Bird Observatory (BSBO), a local conservation organization that receives funding through Challenge Cost Share grants and local support. BSBO also operates a Monitoring Avian Productivity and Survivorship (MAPS) site which is located on the Navarre Division of Ottawa NWR. See 1.b. **Studies and Investigations.**

Table 2 . Selected Waterfowl Populations on Ottawa NWR Complex; CY-1998.

SPECIES	AVERAGE POP.	PEAK POP.	USE DAYS
Mallard	4,010	15,168	1,094,066
Black Duck	651	2,552	179,525
Gadwall	794	1,935	215,234
Pintail	223	1,975	58,223
Green-winged Teal	896	9,045	277,277
Blue-winged Teal	305	3,436	85,782
Wigeon	1,294	14,866	401,466
Shoveler	150	879	45,767
Wood Duck	153	1,045	47,946
Redhead	23	88	5,955
Ringneck	43	262	14,938
Scaup	104	904	30,567
Common Merganser	130	988	39,277
Hooded Merganser	77	350	18,833
Total Duck Use Days			2,528,604

Bald Eagle /Peregrine Falcon

The 1998 nesting season was excellent for Ohio eagles. A total of 46 pair were monitored in the state documenting 44 fledglings produced. Ottawa NWR Complex had a total of 4 active bald eagle nests, with three that successfully fledged 8 eaglets. The number of eaglets produced every year fluctuates depending mainly on winter conditions and weather during the incubation period.

Midwinter bald eagle and peregrine falcon counts are conducted each year in cooperation with the Ohio Division of Wildlife (ODOW). Five adults and 1 immature eagle were found on the refuge during the 1998 survey period. ODOW uses the data in conjunction with their state-wide surveys to determine monitoring strategies for the following breeding season.

Peregrine falcons are transient visitors on the refuge and their occurrence is recorded from time to time. Peregrines nest in downtown Toledo, Ohio where buildings provide nesting sites and food supplies are abundant. During the 1998 survey period, no peregrines were located on the refuge.

Amphibian/Reptile Surveys

Amphibian call surveys are conducted each spring on Ottawa and Darby Divisions of the refuge to determine relative abundance of each species. Limited staff prevented census of Cedar Point NWR and the Navarre Division of Ottawa NWR. As volunteers are made available, these surveys will be implemented. Three species of frogs are abundant including Northern leopard frogs, green frogs and bullfrogs. American toads were found abundant within one pool unit of Ottawa and spring peepers were recorded at Metzger Marsh. A single small-mouthed salamander was found at the Darby Division of Ottawa NWR.

Reptile surveys are conducted each spring and summer through the use of cover board arrays. Future surveys on the Navarre and Darby Divisions are planned. Fox snakes are common on drier inland sites with water snakes such as the northern and queen most abundant around the wetlands. Eastern garter snakes are common throughout the refuge. Common turtles include the snapping, painted, and soft-shelled. Blanding's turtles are also sighted on a regular basis.

Marsh Birds

Marsh birds are surveyed using protocols of the ODOW for the Ohio Breeding Bird Survey and Long Point Bird Observatory in Canada. Both protocols require the use of taped calls but each differs by the amount of time spent at each station, the extent and layout of survey routes, and the selection of morning versus evening surveys. Virginia rails, soras, moorhens, least and American bitterns are counted throughout the refuge each year.

Owls

Owl surveys were conducted in 1998. Among the species known to breed on Ottawa are great horned owls and eastern screech owls.

Muskrat

Musk rats are important management tools of wetlands, since they help to maintain open water in otherwise dense vegetation. However, they also cause losses of time, money, and habitat when they burrow into dikes and roadways. Therefore, muskrat numbers are monitored through hut survey counts. Hut numbers fluctuate greatly from year to year depending on the water management within the units. Excess muskrats are controlled through a refuge trapping program that allows local trappers to bid on open units. See 8.b. **Outreach.**

White-tailed Deer

Winter spotlight surveys indicated a population of 239 deer on the Ottawa Division and another 65 on the Navarre Division. No surveys were conducted on Cedar Point NWR or the Darby Division of Ottawa NWR.

Christmas Bird Count

Each year, Christmas Bird Counts are conducted on Ottawa NWR by the Toledo Naturalists Association. Birds recorded during the count include pied-billed grebe (4), great blue heron (48), tundra swan (30), Canada goose (54), wood duck (10), green-winged teal (63), black duck (122), mallard (478), pintail (10), shoveler (226), gadwall (201), ring-necked duck (2), hooded merganser (49), red-breasted merganser (2), bald eagle (2), Cooper's hawk (2), red-tailed hawk (10), coot (1), Bonaparte's gull (11), ring-billed gull (115), herring gull (9), great black-backed gull (9), great horned owl (1), downy woodpecker (8), blue jay (1), black-capped chickadee (1), Carolina wren (1), golden-

Photo by © Sharon Cummings



Researcher conducting reptile survey

crowned kinglet (1), starling (15), cardinal (16), tree sparrow (54), song sparrow (3), swamp sparrow (7), dark-eyed junco (1), red-winged blackbird (5), rusty blackbird (100) and American goldfinch (3).

Shorebird Surveys

Spring shorebird migration peaks in early May with birds remaining in the area for only a short duration. In contrast, the fall migration tends to have a smaller number of birds but lasts for a longer period of time. Some refuge water impoundments are drawn down during the spring providing optimum habitat. The most abundant shorebird species is the dunlin with as many as 4,000 observed at a time. A pilot study was initiated in 1993 by the Black Swamp Bird Observatory to relate shorebird use and needs to water management regimes on the refuge. The study is expected to provide valuable information to aid management. See 1.b. **Studies and Investigations** for more information.

Gypsy Moth

Seven gypsy moth traps are placed throughout the refuge each year. This year a total of 77 male moths were trapped which indicated a 27% decrease in the average moths per trap from previous years. No impacts to forest resources is expected in the immediate future.

Vegetation Surveys and Monitoring

Current surveys include cursory surveys of areas within Cedar Point and Ottawa where a few State-listed rare, threatened, and endangered species were found. Formalized surveys are being developed for specific units. Seed yield counts were not conducted during 1998 in moist soil units.

Water Birds

Ottawa and Cedar Point Refuges provide vital feeding areas for a colony of great blue herons, great egrets, and black-crowned night herons on West Sister Island NWR. West Sister Island NWR is located on southwest Lake Erie, approximately 9 miles off shore from Ottawa NWR. The island colony contains approximately 4,500 nests and is the largest heron/egret rookery on the Great Lakes. Studies have shown that these water birds will fly from the island to the main refuge complex several times a day to feed their young. Very heavy feeding occurs in the marshes, drawdown areas, and mudflats created by Lake Erie wind tides. Species found less common in the area include little blue herons and snowy and cattle egrets. See **Studies and Investigations** for more information.

Raptors

A migrational study of raptors through the western Lake Erie region was continued this year. The Black Swamp Bird Observatory is conducting research to determine raptor movements over the Ottawa NWR Complex and surrounding areas. The study includes trapping birds. See 1.b. **Studies and Investigations** for more information

1b. STUDIES AND INVESTIGATIONS

Ottawa WMS19 - "Migrational Movements and Habitat Usage of Passerines on the Ottawa NWR, Ohio" - Julie Shieldcastle, Black Swamp Bird Observatory.

Long term monitoring of migrating passerines continued this year at the Navarre and Darby Units of Ottawa NWR. Lake Erie presents a barrier that most passerines will not cross when migrating north. This causes a large build up of migrants along the southwestern shoreline. Monitoring Avian Productivity and Survivorship (MAPS) station information is also included in this report.

Spring

Spring monitoring in 1998 recorded the lowest bird concentrations along the southwestern shoreline since monitoring began in 1989. In addition to the lower concentrations of birds during the spring, capture effort was reduced due to weather. Spring storms initiated 90 MPH winds and multiple tornadoes that hit Navarre and Darby destroying mist nets and monitoring stations. Approximately 80% of the mature canopy trees were toppled. Several weeks were spent removing debris and trees from the net sites and nets had to be replaced. A 60% drop in capture rate was recorded at both Navarre and the two Darby units. This decline was echoed by banding stations throughout the eastern half of the country which indicated that disruption of data collection may not have been the cause of the decline. The cause of the decline of neotropical species during the spring migration is unknown. Continued monitoring in the next few years may provide more information.

Total spring banding numbers at both sites include 6,592 individuals captured for a total of 129.6 birds per 100 net hours.

Table 3. Top Ten Species Banded at Ottawa NWR in Spring 1998.

Magnolia Warbler	503	Swainson Thrush	252
White-throated Sparrow	456	Ruby-crowned Kinglet	238
Gray Catbird	318	Myrtle Warbler	233
Common Yellowthroat	291	Red-winged Blackbird	220
American Redstart	281	Hermit Thrush	188

Spring point counts are conducted at Navarre in conjunction with mist net operations. Point count data collection totaled 47 days with 130 species recorded representing 24,659 individuals. The most abundant species recorded were red-winged blackbird (5,084), blue jay (2,294), European starling (2,254), cedar waxwing (1,674) and tree swallow (1,612).

Breeding Season

This was the seventh year the MAPS station was operated on the Navarre unit. Constant effort mist-netting utilized 10 nets for 6 hours once each 10 day period from June 1st to August 15th. Banding was conducted on 2 days totaling 120 net hours. The spring storm canceled the last 8 days of the breeding study.

Seventy-three birds were banded representing 28 species. The top 5 species banded were gray catbird (8), American robin (7), yellow-bellied flycatcher (6), mourning warbler (5) and Canada warbler (4). Point counts conducted during the two days of MAPS station operation included 23 bird species. Yellow warbler, red-winged blackbird, northern cardinal, gray catbird, and house wren were the 5 most commonly recorded species. Tree swallow, American goldfinch, common grackle, cedar waxwing and purple martin were observed as flyovers during the counts. Some wetland species recorded during the counts were great blue heron, herring gull, black-crowned night heron, double-crested cormorant, ring-billed gull, great egret, and wood duck.

Fall

Fall monitoring recorded higher than normal capture rates with Navarre up 108% and Darby units up 34%. BSBO theorizes that since spring migrations were much lower than normal, there was less competition for good breeding and nesting territories on the breeding grounds. With less competition there was likely a higher breeding success rate.

Table 4. Top Ten Species Banded at Ottawa NWR in Fall 1998.

Blackpoll Warbler	667	Magnolia Warbler	227
White-throated Sparrow	459	Swamp Sparrow	214
Swainson Thrush	429	Gray Catbird	181
Golden-crowned Kinglet	254	Common Yellowthroat	178
Ruby-crowned Kinglet	244	Myrtle Warbler	145

Spring point counts are conducted at Navarre in conjunction with mist net operations. Point count data collection totaled 47 days with 130 species recorded representing 24,659 individuals. The most abundant species recorded were red-winged blackbird (5,084), blue jay (2,294), European starling (2,254), cedar waxwing (1,674), and tree swallow (1,612).

Ottawa WMS42 - "Spring Migrational Movements of Raptors on the Ottawa NWR and Surrounding Lake Erie Marshes" - *Julie Shieldcastle, Black Swamp Bird Observatory.*

Objectives of this study are: 1) to monitor long term trends in migrating raptors utilizing the region and examine spatial and temporal differences in migration among the various age and sex classes of individual species and between species; 2) to analyze energetic condition of a sample of raptors to assess habitat quality; 3) to provide environmental education to improve the public's perception of avian predators.

Raptor counts were conducted on 77 days with 329 individual trips involving 924.5 observer hours and 1,792 volunteer hours. A total of 14,720 raptors were counted. High count dates appear to be positively correlated with southwest quadrant winds. Southwest winds allow raptors to tack into the wind as they migrate along the western basin. The five most abundant species in the observations were: turkey vulture (9299), red-tailed hawk (1951), broad-winged hawk (1283), sharp-shinned hawk (860) and red-shouldered hawk (526). One banding station was constructed on Ottawa NWR to capture a sample of migrating raptors to determine age and sex composition and energetic condition. Trapping methods included bow traps, modified dhogaza nets, triangle and drift mist nets. No banding was done in 1998. Data analysis had not been completed at the time of this narrative writing.

Ottawa WMS46 - "Migrational Survey and Habitat Usage of Shorebirds in the Lake Erie Marsh Region" - *Julie Shieldcastle, Black Swamp Bird Observatory.*

Objectives for this study are: 1) to survey populations of shorebirds along the southwestern coast of Lake Erie during spring and fall migrations; 2) to explore effects of weather on migration and year to year differences; 3) to relate migrational data to habitat conditions; 4) to relate migrational data to management of marsh unit; 5) to fulfill requirements for site identification of the Western Hemisphere Shorebird Reserve Network.

The 1998 field season was the fourth full year of data collection for shorebird migration. Ten marshes were sampled at least once in the spring and eleven in the fall. Primary sampling areas included Ottawa and Navarre Divisions of Ottawa NWR, Metzger Marsh Wildlife Area, and Pickerel Creek Wildlife Area. During spring migration, a total of 22,162 birds of 20 species were counted during 81 trips. Dominant species counted and their peak movements were: Dunlin (May 11-31); pectoral sandpiper (April 11-20); killdeer (April 11-20); lesser yellowlegs (April 11-20); semipalmated plover (May 21-31); common snipe (April 1-10); greater yellowlegs (April 11-20); and black-bellied plover (May 21-31). The pectoral sandpiper was the dominant species in early April followed by both yellowlegs. Dunlin become dominant in May with sub-dominants in late May of semipalmated sandpiper, semipalmated plover, black-bellied plover and least sandpiper.

During fall migration, a total of 9,472 birds representing 28 species were counted in 74 trips. Dominant species observed and peak movements included: semipalmated sandpiper (Aug. 1-10); lesser yellowlegs (Aug. 1-10); killdeer (July 11-20); pectoral sandpiper (Sept. 1-10); short-billed dowitcher (July 11-20); dunlin (Oct. 21-31); and greater yellowlegs (Sept. 1-10). Fall migration is more drawn out than spring, running from early July into November.

Ottawa WMS - "Breeding Bird Diversity and Abundance in Woodlots of Ottawa NWR and Surrounding Ottawa County" - Julie Shieldcastle, Black Swamp Bird Observatory.

A five year study designed to investigate breeding birds of small woodlots in Ottawa County, Ohio was initiated in 1996. Woodlots on Ottawa National Wildlife Refuge were utilized to represent woodlots without human dwellings. Woodlots containing occupied human dwellings were selected in Ottawa and surrounding counties. The objectives of the study are to investigate breeding bird richness and diversity in woodlots with and without occupied dwellings. A total of 40 species were recorded during surveys in 1998 and bird abundance was highest on Ottawa NWR woodlots. Questions regarding effects of dwellings, distance of woodlot from Lake Erie and the role of surrounding habitats will be addressed in the coming year.

Ottawa WMS28 - "Movement and Habitat Use of Black-Crowned Night Herons of West Sister Island Rookery" - Mark Shieldcastle, Ohio Division of Wildlife.

This survey monitors the nesting habitat use and population status of various colonial nesting birds on West Sister Island. Two to 3 annual nest counts are conducted between June and July to count active nests (15% of island). The number of breeding birds by species are then estimated by extrapolation.

Presently there are 3 concerns confronting colonial waders at the island. Two of them addressed by this study are habitat loss and habitat degradation from double-crested cormorant fecal deposition. Habitat loss, due to canopy height increases, continues to pressure black-crowned night herons compressing them toward the western end of the island. Approximately 1 acre of trees adjacent to black-crowned nesting habitat were hand cut to a four foot height in 1998. This cutting should encourage shrubby regrowth of the vegetation and allow expansion of night heron nesting. The second concern involves habitat degradation from white wash by cormorants nesting and roosting in same areas. Highly acidic guano produced by cormorants degrade lower shrubs and under story. At the present time, there is no clear solution to the cormorant issue. A third concern regarding contaminants is being investigated by another study.

Table 5. West Sister Island Breeding Pair Information 1992 - 1998.

Species	1992	1993	1994	1995	1996	1997	1998
Great Blue Heron	2444	2393	1591	1380	1225	920	1160
Great Egret	774	742	1036	1120	687	705	807
B. C. Night Heron	844	746	726	560	500	480	467
Double-Crested Cormorant	186	307	580	1480	1467	1380	1513

Ottawa WMS52 - "Biomarkers for Contaminant Associated Immunosuppression in Colonial Waterbirds of the Great Lakes" *Dr. Keith A. Grasman, Dept. Of Biological Sciences, Wright State University.*

Persistent organochlorines, especially polychlorinated biphenyls (PCBs) and 2,3,7,8-tetrachlorodibenzo-*p*-dioxin, are powerful immunosuppressants in birds and mammals. Previous investigations have found associations between organochlorines and suppression of T cell-mediated immunity in herring gull and Caspian tern chicks of the Great Lakes. This study further investigates those immunotoxic effects, employing additional biomarkers and assessing organochlorine concentrations in individual birds. Investigations of immunotoxic effects in West Sister Island gulls reveal that immunosuppression is consistent with that seen at other Great Lakes sites with similar contamination. This study will continue and may be expanded to include possible effects on black-crowned night herons depredation on local herring gull chicks. PCB contaminants may be further bio-concentrated when gull chicks are ingested by black-crowned night herons on West Sister Island.

2. HABITAT RESTORATION

2a. Wetland Restoration: On-Refuge

A special Congressional appropriation allowed the rebuilding of 1.25 miles of dike on the Woodies Roost unit of Ottawa NWR. The project included rehabilitation of both slopes of the 5,000 foot dike using material draglined from the adjacent ditch, moving approximately 20-25,000 cubic yards of material, resloping both slopes and applying an estimated 6-7,000 tons of rip-rap to the north slope. Estimated value of the work was over \$300,000.00 and was done for an approximated cost of \$120,000. Ditch clean out, re-sloping of the dike and the placement of rock was all done by refuge staff using our own equipment. The recent addition of a dragline crane to our equipment complement, courtesy of Mingo NWR, really made the project possible. Doing the work in-house resulted in considerable cost savings and the crew accomplished a tremendous amount of work in one season. After the inside dike slope is rocked, and some minor dike work is completed, the project will be finished in 1999! The result is 180 acres of wetland restored to management capabilities. Based on the vegetation that germinated when the unit was drained, this will be a very productive area.

Other work included the placement of approximately 1,000 tons of rip-rap on the inside of the MS-4 south dike, rebuilding 1,800 linear feet of dike between unit 7c woods and Crane Creek; hauling approximately 2,700 cubic yards of fill material and placement of 1,200 ton of rip-rap; build up of the lodge area by hauling over 5,000 cubic yards of material; repair and improvement of the Darby unit 4 southwest dike by hauling and placing approximately 800 cubic yards of fill material and 800 tons of riprap. These projects enhanced over 200 acres of wetlands and stabilized nearly one mile of dike.

Volunteer Charles Wood helped accomplish much of this work by hauling all of the fill needed at the lodge and 7c/Crane Creek Dike (over 7,500 cubic yards) as well as helping with equipment repair, surplus property acquisition, and maintaining and operating pumps used in the Woodie's roost project. Charles was instrumental in acquiring two D7 dozers as surplus property which can be used in future restoration projects.

2b. Upland Restoration: On-Refuge

In cooperation with Pheasants Forever, twenty acres of native prairie seed was planted on the refuge. An additional twenty acres will be planted in 1999.

2c. Wetland Restoration: Off-Refuge

This season the Partners for Fish & Wildlife Program once again performed wetland restorations on private lands. Restorations were completed in two counties in Michigan (Lenawee and Hillsdale) and one county in Ohio (Williams). Most of the basins were restored in the two Michigan counties. Thirty-three sites were restored for a total of 173 acres.

Due to changes in the Conservation Reserve Program (CRP) and the popularity of the Wetland Reserve Program (WRP), the Natural Resources Conservation Service (NRCS) and the Farm Service Agency (FSA) are completing an ever increasing number of wetland restorations on their own. These programs, which the Partners for Fish and Wildlife Program cannot cost share with, are sometimes in direct competition with the Service's wetland restoration efforts. This factor, in conjunction with the vast number of sites we have already restored, is making potential "quality" restoration sites more difficult to find.



Photo by © Sharon Cummings

Woodies Roost before
construction began.

Photo by © Sharon Cummings



Photo by © Sharon Cummings

Woodies Roost after
construction had begun

Hillsdale County, Michigan

Once again the Ottawa National Wildlife Refuge (NWR) assembled a crew of operators to perform wetland restorations on private lands. Equipment from the refuge as well as a rental dozer were used to complete the earthwork on the projects. The entire field season was plagued with equipment problems and uncontrollable periods of heavy rain. During the rental period, one of the downpours or "Gullie Washers" as the locals call them dumped more than eleven inches of rain on a half-completed project. Seven of those eleven inches of rain came in 24 hour period. Despite the troubles, the field season still netted 16 restored wetlands for 92 acres.

Lenawee County, Michigan

This year in Lenawee County the US Fish & Wildlife Service entered into a cooperative agreement with the local Soil & Water Conservation District to implement the Partners for Fish & Wildlife Program. This was an experimental agreement also involving the local chapter of Pheasants Forever. Through this agreement, 15 wetland basins were restored for 73 acres.

Williams County, Ohio

Two wetlands for 8 acres were restored in Williams County by the Ottawa NWR crew and equipment.

Since the 1997 field season, landowners are being held responsible for maintenance of wetland restoration projects. In 1998, four wetlands were repaired due to poor design and/or construction flaws at the time they were built.

2d. Upland Restoration Off-Refuge

This year the Ottawa National Wildlife Refuge facilitated the establishment of 250 acres of native prairie through the Challenge Cost Share program. The recipient of the Challenge Cost Share Grant was the Erie-Ottawa Sandusky Chapter of Pheasants Forever. Cost share dollars were used to purchase a native grass seed mixture consisting of big bluestem, little bluestem, Indian grass, and switchgrass. The prairie grass was planted throughout the spring and early summer and should really make a good showing this coming year.

Ottawa County, Ohio

In Ottawa County, 10 sites for a total of 150 acres were planted with the Native Grasses Mix.

Sandusky County, Ohio

In Sandusky County, six sites for a total of 100 acres were planted with the Native Grasses Mix.

Photo by Steve Dushane



Sometimes it just doesn't work out as planned!

Photo by Steve Dushane



Hillsdale County, MI
Wetland Restoration

Photo by Steve Dushane



Installation of an inline water control structure on a county tile

Photo by Steve Dushane



Chain link fence on berm face to deter muskrats

3. HABITAT MANAGEMENT

3a. Manage Water Levels

A series of pools are established throughout the refuge and intermixed with moist soil units. The pools are maintained as emergent marshes and drawn down as needed to reestablish vegetation. The pools provide a variety of habitat from shallow water areas for shorebirds to deep pools utilized by diving ducks.

Ottawa - Pool 1

Pool 1 was maintained as a pool this year with a small amount of water drawn off to fill a teal pond at Magee Marsh State Wildlife Area. Emergent vegetation, including cattail, arrowhead and water lilies, is interspersed throughout the pool providing excellent cover and feeding opportunity. Some shallow areas have small stands of willow that provide habitat for wood ducks, owls and other species. Submergent vegetation was widespread throughout the pool and consisted of potamogeton, coontail and milfoil. This unit received excellent waterfowl use throughout the year especially by mallards, black ducks and Canada geese.

Ottawa - Pool 2A

This unit was drawn down in late summer for shorebird use. Shorebirds used the unit sporadically but mudflats were heavily used by terns, gulls and Canada geese. Further efforts are needed to encourage vegetative growth in this unit and develop organic deposits and invertebrate populations.

Ottawa - Pool 2B

This unit was maintained as a pool through the year. Over 60% of the unit was covered with water smartweed and received excellent waterfowl, swan and goose use through the year.

Ottawa - Pool 2C

This unit remained at full pool for the duration of the year with increases and decreases associated with precipitation and evaporation, respectively. Moist soil annuals and emergents such as cattail and bulrush dominate this pool. Purple loosestrife also was present and was treated with Rodeo.

Ottawa - Pool 3

This unit was maintained at capacity until late summer when it was partially drawn down to expose some mudflats. It was refilled for winter use by mergansers and other winter residents. Over 40% of this unit is covered with water lilies which were probably impacted by the draw down. This unit was moderately used throughout the year by ducks, geese and mergansers. A pair of red-tailed hawks and bald eagles have nests on opposite edges of this pool.

Ottawa - Woodies Roost

This unit was completely dried up in early spring and the dikes were rebuilt. During the dry up there was an excellent response of smartweed growth throughout. Completion of the dike work will occur in 1999. The unit will be flooded again when construction is complete and waterfowl use is expected to be high.

Ottawa - Pool 9

Pool 9 is a solid stand of cattail and reed canary grass with some sedge areas. Water was removed in April of 1994 to facilitate borrow removal for dike construction of Metzger's Marsh dike. The area

where the borrow was taken from produced an excellent stand of cattail and bulrush. The deep pool area was heavily used by scaup and ring necked ducks. No rehabilitation was conducted in this unit in 1998.

Ottawa - Entrance Pool

The unit was partially de-watered in 1998. The eastern third is dominated by cattail and the remainder is moist soil and emergent marsh vegetation. Purple loosestrife is well established and interspersed with cattail in this unit. Biological control measures have been implemented in this unit in the past to control purple loosestrife. Both the *Galerucella spp.* and the *Hylobius spp.* were released but no effects have yet been documented. A very small portion of purple loosestrife on the south edge of the area was sprayed with Rodeo with 100% effectiveness. This pool provides the visitor with excellent opportunities to view many wildlife species including white-tailed deer, pied-billed grebes, Canada geese, ducks, wading birds and muskrats.

Ottawa - Show Pool

This pool has an island/remnant dike in the middle which was a moist meadow at one time. Purple loosestrife, cattail and phragmites are currently the dominant species. Some smartweed can still be found growing between the cattail. Aerial applications of Rodeo on the purple loosestrife is beginning to eliminate that species. This pool has limited use by ducks, geese, and herons but provides a nice view for the visitors that come to the office.

Ottawa - LL

This unit was partially dewatered in spring to remove water from a nearby woodlot. The majority of the unit is rough-leaf dogwood, cottonwood and some upland flora. Sedges and rushes are increasing from the north side (lower ground elevation) and along the borrow/ditch area on the west side. Moist soil plants, including barnyard grass and yellow nutsedge, are scattered throughout. This unit is not intensely managed to allow successional growth of hardwood tree species.

Cedar Point - Pool 1

This unit is normally maintained as a permanent marsh. Some water was removed during the spring and summer to allow drainage from neighboring lands. Water was allowed to accumulate in fall. An excellent hemi-marsh condition with a variety of cattail, bulrush, pickerel weed and wild rice can be found in this unit. This unit is heavily used by all waterfowl species throughout the year. Particularly large numbers of wigeon, blue-winged and green-winged teal, mallard and black duck.

Cedar Point - Pool 2

Pool 2 is directly connected to Pool 1 through a water control structure, however, this unit is slightly higher in elevation. The higher elevation in Pool 2 results in a reduced water depth and emergent vegetation is maintained. Water was removed from this unit into Pool 1 to drain neighboring lands. This unit still remains heavily vegetated and could use sustained water to reduce the vegetation. Muskrat activity is on the rise. Open areas are frequented by wigeon, pintail and mallards in large numbers.

Cedar Point - Pheasant Farm

Pheasant farm was maintained at mid capacity throughout the year. Purple loosestrife is abundant in this unit and is sprayed with Rodeo herbicide each summer. Muskrat activity is on the rise in this unit and will be subject to trapping in the next year. Canada goose use is high in the fall.

Darby - Pool 1

This unit is managed as a semi-permanent marsh, with a drawdown conducted every few years to maintain the emergent vegetation and wetland productivity. The majority of the vegetation present is water lily and cattail. Purple loosestrife has invaded the edges of this unit. Scaup, ring-necked ducks, canvasbacks and other divers flock to this unit during the spring migration along with high numbers of mallards, black ducks, Canada geese and herons.

Darby - Pool 2

This unit has had various water manipulations in the past which caused various responses of desired vegetation. However, purple loosestrife is becoming a problem in this unit. The unit was kept flooded through the year and received some duck use in the fall. Biological controls are being implemented in this area with releases of *Galerucella* sp. beetles. Since Darby is surrounded by private lands that are infested with high amounts of purple loosestrife, it is believed that biological control may be the only long term control measure that is successful.

Darby - Pool 3

Vegetation in this unit consists of cattail, bulrush, water smartweed and purple loosestrife. This pool was kept dry through summer to allow construction on dikes to be completed then flooded in the fall. Waterfowl use was limited.

Darby - Pool 4

This unit remained flooded the entire year and had an excellent hemi-marsh condition with cattail, bulrush, pickerel weed and arrowhead. The cottonwood trees that got a start during a drawdown several years ago are dead. The southern corner of this unit is heavily infested with purple loosestrife. Waterfowl use in this unit was moderate.

Navarre Pools 1,2, and 3

Navarre marshes are managed in cooperation with the Davis-Besse Nuclear Power Station personnel. Refuge personnel play a consulting role over these marshes that are part of the lease agreement with Davis-Besse. All three pools are managed as semi-permanent marshes with a drawdown conducted every 4-5 years to rejuvenate the vegetation. Only minor dewatering occurred in 1998 to prevent damage to dikes during storm events. Waterfowl use is heavy in these units, particularly in the water exchange canal where the water that is used to cool the pipes in the cooling tower is returned to Lake Erie. This artificial "hot springs" attracts over a thousand Canada geese and hundreds of mallards in the winter.

3b. Moist Soil Units

Ottawa - Mini-Marsh

This unit was kept at mid level throughout the year after a drawdown in the spring. There is a good cover of cattail in the shallow half of this unit. The other half is a deep pool due to borrow pits. Waterfowl use in this unit is sporadic throughout the year.

Ottawa - MSU 3

The water level in this unit was maintained throughout the year. This was the third year of maintaining the water level in order to flood out reed canary grass and cattail. Muskrat populations grew and created openings in the cattail. Waterfowl use was moderate to heavy.

Ottawa - MSU 4

This unit has a history of problems with willow and reed canary grass. Some areas were disced then planted to millet, corn and milo. Other areas of reed canary grass were either sprayed or sprayed and disced. Millet, corn, and milo grew well and when the unit was flooded in the fall it received high use by mallards and black ducks.

Ottawa - MSU 5

Water evaporated from this unit during the summer months and was refilled to capacity during the fall. The higher ground to the west produced more stunted millet and bidens, whereas the lower area to the east produced mostly smartweed and millets. Waterfowl use was excellent throughout the year.

Ottawa - MSU 6

This unit remained flooded throughout the year. Muskrat house numbers increased during the fall and started to open up small areas in the cattail vegetation. Black ducks, wood ducks, mallards and teal use this unit in moderate numbers. Pied-billed grebes and black crowned night herons have been observed routinely as well.

Ottawa - MSU 7A

This unit was kept dry through most of the summer and then flooded to capacity for teal and other waterfowl use. Waterfowl use by all species was high, particularly blue-winged teal, in the fall.

Ottawa - MSU 7B

This unit was kept dry through most of the summer and then flooded to capacity for teal and other waterfowl use. As with 7A, waterfowl use was high. In addition to teal, mallards and black ducks use the deeper northern end in high numbers. This unit is adjacent to a woodlot that has a bald eagle nest.

Ottawa - MSU 8A

Water was lowered in early May and kept dry until later in the summer. Smartweed dominated the unit in the spring, but as summer approached, milkweed dominated. Half of the unit was mowed and then some areas were lightly disced at the end of summer. These areas were shallow flooded for shorebird and teal use in September. Teal use was high, but shorebird use was marginal. Bald eagles frequented the area for teal meals.

Ottawa - MSU 8B

This unit held water until May and then was slowly de-watered. A screw gate water control structure was replaced and the unit reflooded. Hundreds of herons and egrets were seen during the drawdown providing excellent visitor viewing opportunity. During September small patches of purple loosestrife were treated by spraying Rodeo. Muskrat use was moderate in the unit and was controlled with a one day youth trapping course. Nineteen muskrat were removed during that course.

3d. Farming

The cropland program for 1998 included 62 acres of coop-planted corn and 34 acres of refuge planted corn in the normal croplands. Other coop planted crops consisted of 59 acres of soybeans and 68 acres of wheat. Other refuge planted crops included 8 acres on milo and 3 acres of buckwheat in unit 6, 32 acres of corn and milo in MS-4 and approximately 35 acres of Japanese millet in MS-4.

Early spring was relatively wet until mid May and then it turned dry. Ground preparation started approximately May 12th with the disking and plowing of units 4, 6 and 11. Planting of these units was done approximately May 28th. Approximately 16 acres of corn and 16 acres of milo were also planted in MS-4 and 8 acres of milo planted in unit 6 in early June. However, no rain was received until mid-to late June and the extreme dry conditions did not allow any germination for 3-4 weeks after planting. Growth after germination was also slow. Because of the poor stands and growth, a mid-season nitrogen application was not done. Yields were low for all fields.

Table 6. Acreages and Plantings on Ottawa NWR in 1998.

UNIT	2	6	9	10	11	MSU4	TOTAL
Ref. Corn		12		10	12	16	50
Coop corn	42		20				62
Milo		8				16	24
beans		14	15	18	22		59
wheat	20		13	21	14		68
buckwheat		3			12		15
clover	32		21				53
Millet						35	35

Blackbird damage was very heavy in the milo and Japanese millet fields with these birds using an estimated 75-90% of the crop in both MS-4 and unit 6. Damage to the corn was probably less than 10%. Moist soil unit 4, unit 6 and unit 10 was flooded in the fall with good waterfowl use in all of the flooded units. Over 90% of the grain was consumed by the end of the year.

3e. Forest Cutting

West Sister Island NWR is an 80 acre island 9 miles offshore in the western basin of Lake Erie. The refuge is the site of the largest heron and egret rookery in the Great Lakes. It is also the only Wilderness Area in the State of Ohio. The dominant vegetation on the island is a near monoculture of mature hackberry trees (*Celtis occidentalis*) and successional progress over the years has increased the height and density of the canopy cover over the island. A decreasing trend in the number of nesting black crowned night-herons has refuge and State biologists concerned that the shrub/understory layer vegetation, preferred by night-herons for nesting, has decreased due to hackberry dominance. In an effort to revitalize the shrub layer, an experimental cutting of trees was carried out on a one acre plot of hackberry in the center of the island. Trees were cut off at a height of 3-4 feet in hopes that stump sprouting will quickly provide additional nesting habitat for the night-herons. Wildlife biologist Smith, fisheries biologist Wells, seasonal biotech Stowe, and ROS Brewer, along with five volunteers, and three Ohio Division of Wildlife employees spent one day cutting off hackberry trees. Since the island is a Wilderness Area, all tree cutting was done by hand! Hopefully the effort will pay off with an increase in the numbers of black-crowned night-herons nesting on the island. The experimental plot is within the nest monitoring study area so that results of the cutting can be evaluated.

3g. Control Pest Plants

Biological control methods were utilized on only one unit of Ottawa NWR in 1998. Two releases of 19,214 *Galerucella sp.* were made in the Darby Unit. There has been no real sign of success from sites of previous year's releases. The two sites at Darby were selected because they remain dry throughout the winter and there was no concern that the larvae would drown while dormant.

Spraying efforts were limited to Ottawa Unit and Cedar Point NWR. Total amount of spray solution purchased was 45 gallons of a 1% solution of Rodeo. The Division of Wildlife used 40 gallons to aerial spray show pool and Cedar Point. A special pesticide proposal was needed for aerial spraying.

4. FISH AND WILDLIFE MANAGEMENT

4a. Bird Banding - See 1.b. Studies and Investigations

4d. Provide Nest Structures

Wood Duck Nest Boxes

Ten wood duck nest boxes were cleaned and repaired for the spring 1998 season.

Tern Platforms

Two platforms were built in 1994 to provide nesting habitat for Common terns in Crane Creek on the Ottawa Division of Ottawa NWR. Approximately 39 pair of terns nested on the platforms and successfully fledged 23 young.

Nest Box Monitoring

Nest boxes placed on refuges provide habitat to several species of birds including wrens, bluebirds, tree swallows and wood ducks. However, maintenance of boxes can be time consuming and costly if not done on a regular basis. Likewise, monitoring can be time consuming and years of valuable data lost when staff shortages or time constraints cause these programs to be placed on a back burner. In order to offset these problems, the nest box program on Ottawa was placed entirely in volunteer hands. The Nest Box Parent Program selects volunteers (Parents) who are rooted in the community. Each Parent was assigned a route with a dozen or more nest boxes on it. Their job was to clean each nest box before spring and monitor it through the spring and summer seasons once each week. Data sheets were provided to the volunteers who turned them in each week at the Refuge headquarters. Volunteers repaired the boxes with materials provided by the refuge. When volunteers encountered house sparrows using the boxes they were instructed to notify the refuge biologist so that appropriate measures could be taken to discourage further nesting attempts. When eggs began to hatch, the volunteer notified the refuge and assisted with banding fledglings. This allows the volunteer to gain hands on experience with banding and monitoring. It is hoped that these programs, which the volunteers share with other family members and friends, will establish a closer link to the community.

Bluebird nest boxes were re-established on the Ottawa and Navarre Divisions of Ottawa NWR. An additional 52 boxes were added to the 53 already present for a total of 105. There were records of one bluebird nest attempt early in the nesting season. However, the nest was destroyed by house sparrows. The house sparrows were eliminated from the boxes, but the bluebirds did not return. Most of the boxes were inhabited by tree swallows and three were used by house wrens. The name of the program will be changed in 1999 to the Tree Swallow Nest Box Program.

Photo by © Sharon Cummings



Tree Swallow sitting above its nest box

Table 8. Bluebird/Tree Swallow Nest Box Data 1998

LOCATION	# BOXES	BOXES USED	TRSW EGGS	AVERAGE EGGS/NEST	FLEDGLINGS BANDED
Ottawa	58	28	122	5	57
Navarre	47	35	209	6	145
TOTAL	105	63	331	na	202

Wood duck nest boxes were counted and it was found that of the 25 boxes that had been placed on the refuge in 1994, less than 20 remained. It was determined that due to the amount of time required to monitor and maintain the nest boxes, the boxes would be assigned to volunteers on the parent program as was done with the bluebird nest boxes. Two volunteers came forward during 1998 and data on 20 boxes will be collected for 1999.

6. RESOURCES PROTECTION

6a. Law Enforcement

Refuge law enforcement capabilities were increased as Public Use Specialist Hinkle and ROS Brewer attended Law Enforcement Training at FLETC in 1998, bringing the number of collateral duty officers to three. Hinkle also attend ROBS training in July. Project leader Martin attend annual law enforcement refresher training at Camp Dodge in March.

In June, Refuge Officers assisted the Ottawa County Sheriff and Ohio Highway Patrol in the discovery of a car containing a body on refuge property. The driver of the vehicle had been missing for two weeks when he and his car were discovered by a refuge staff member cutting grass. The driver had a fatal heart attack and veered off the road into heavy vegetation.

6h. Land Acquisition

The 1998 budget included money for land acquisition in high priority areas surrounding the refuge. Appraisals and negotiations were conducted on several parcels, but no purchases were closed. Negotiations are ongoing on one parcel adjacent to the Ottawa NWR. This parcel is seen as a key piece of property since it would allow access to an area of the refuge with no direct entry.

Refuge staff continue to identify potential property for acquisition. Contacts with landowners and site meetings will continue into 1999.

8. PUBLIC EDUCATION AND RECREATION

8a. Visitor Services

Refuge visitation increased this year to 120,378. Special events included two open houses, which included an auto tour through normally closed areas of the refuge. The first on International Migratory Bird Day attracted 1,984 visitors. The second was to celebrate National Wildlife Refuges Week. A week of special events and programs ended with the fall open house and auto tour. 860 people came out to celebrate this special event.

Access to the public trail system was improved with a ramp from the parking lot to the dike top that the trail system begins on. The Ottawa National Wildlife Refuge Association contributed funds and volunteers to the project. Previously access for disabled visitors was gained through the office parking lot and over a footbridge. Since the gate to the office parking lot is closed on weekends this was a long distance to travel to get to the trail entrance.

The first step in expanding the public trail system was completed this year. For his Eagle Scout project, Nick Burnard and his scout troop removed the planks from an abandoned foot bridge, repainted the metal frame and replaced the planks. This bridge renovation cost \$1,384 with the refuge contributing \$400.

Waterfowl Hunting

Canada, snow, and white-fronted geese along with ducks are hunted by permit on portions of the Ottawa Refuge. The hunt is conducted from blinds in and around agricultural fields and a few moist soil units. Hunting occurs four days a week from half-hour before sunrise to noon for a total of 16 days. The Ohio Department of Natural Resources administers the hunt including publicity, receipt and handling of permits, applications, preparation and distribution of special one-day permits, collections of hunting data, and operation of a mandatory check station. Personnel from the adjacent State-operated Magee Marsh Work Unit oversee the hunting operations with assistance from Ottawa NWR personnel. Ohio regulations allowed for a 30-day split goose season in 1998 with two weeks in November and two weeks in December. Ottawa's managed hunt is conducted Monday, Wednesday, Friday, and Saturday of each week.

The opening day of the refuge hunt is reserved for a special youth hunt. The youth are selected and can bring one partner (adult) to hunt with them. This year 28 people (14 youth and 14 adults) participated. Total participation this season was 156 hunters harvesting 67 ducks and 49 geese resulting in a harvest rate of 0.74 waterfowl per person. The success rate for the first half of the split season was 74% and 34% for the second half.

Deer Hunt

Two deer hunts were conducted on Ottawa (Refuge) during the dates of January 3, 1998 (Youth Hunt) and January 8, 9 and 10, 1998 (Adult Hunt). The Refuge cooperated with the Ohio Division of Wildlife (ODOW) to conduct the hunts. The ODOW included the Refuge youth and adult hunts on their list of controlled hunts again this year, so that individuals could be selected randomly by computer. The overall success rate of both the youth and adult hunts combined was 31%.

Seven youth hunters, 7 to 15 years old, participated in the hunt on January 3. Nine youths were selected from a total of 553 applicants, but only 7 actually showed. Regulations required that each youth hunt with a licensed, non-hunting adult. Overall the youths did well with 4 of the 7 getting deer for a 57%

Photo by © Sharon Cummings



Dedication of new ramp

Photo by © Sharon Cummings



Dedication of footbridge that was repaired by Nick Burnard and his scout troop

Photo by refuge staff



Two happy hunters

success rate. The youths were given an either sex permit and harvested 3 bucks and 1 doe.

Adult hunters applied for the hunt with 2 individuals per party, with one getting an either sex permit and the other receiving an antlerless only permit. A total of 27 parties were selected from 1,811 that applied. Each hunt day consisted of 9 regular parties, and 2 alternate hunters. Alternates were allowed to hunt only if there were no shows. The majority of the hunters spent the entire day allotted to them in an effort to bag a deer. Adult hunters harvested a total of 15 deer; 12 does and 3 bucks.

Nineteen deer were harvested from the Refuge during the 1998 hunt. This compares with 1997 when 20 deer were harvested and the hunter success rate was 34% overall. Using the deer survey data provided by ODOH for 1998 which indicated a deer herd population of 149, an estimated 61 deer should have been harvested to reach the goal of 15 deer per square mile described in the Refuge White-tailed Deer Hunt Plan.

Table 9. 1998 Deer Harvest Information

Date	Number Hunters	Age of Deer Harvested						Total Deer	Hunter Success
		0.5	1.5	2.5	3.5	4.5	4.5+		
1/3/98	7	0	3	0	0	1	0	4	0.57
1/8/98	16	4	2	1	1	0	0	8	0.50
1/9/98	20	3	0	0	0	1	0	4	0.20
1/10/98	18	1	1	1	0	0	0	3	0.17
Totals	61	8	6	2	1	2	0	19	0.31
% of Harvest		0.42	0.32	0.11	0.05	0.11	0.0		

Fishing

Refuge sport fishing is limited to a 15-acre borrow pit at Cedar Point NWR from June through August. Anyone fishing over the age of 15 must possess a valid state fishing license. Random license checks are conducted during the season to monitor visitor regulation compliance. Maximum use generally occurs during weekends in June. Sport fish harvested include blue gill, crappie, bass and channel catfish.

Trapping

The refuge is divided into 9 adult and 3 youth trapping units. Harvesting of muskrat, raccoon, mink, fox, opossum, and skunk is permitted following State of Ohio trapping regulations and special conditions set forth by the refuge. The refuge allows trappers on the refuge after the closure of the waterfowl hunting season in December and trapping continues through March 15 the following year. The adult trapping units are awarded to the highest bidder through a sealed bid process. Youth units are awarded by a lottery system. Revenues received for the 1997 - 1998 trapping season totaled \$3,527.77.

Two adult and three youth trapping units were opened during the 1997-98 season. Trapping units 2 and 3 at Cedar Point NWR were trapped by adults and the Entry Pool and Units 7A and 7B on Ottawa NWR were opened for youth trapping. Units 7A and 7B were combined as a single unit due to the low numbers of muskrats estimated to be in the area. The units required trapping because muskrats were tunneling into the roadways around the unit. All other trapping units were closed due to lack of muskrat activity or construction activity. Another unit on Ottawa NWR was scheduled to be used for a trapping instructional course in March 1998 which was primarily geared toward youth. Ohio DNR conducted the course in cooperation with Ottawa NWR.

Table 10. Furbearer Harvest for Ottawa NWR Complex 1998.

Unit	Muskrat	Mink	Raccoon	Fox	Opossum	Skunk
2	1,966	0	13	0	10	0
3	704	0	9	0	1	0
Entry Pool	237	1	0	0	0	0
7A/7B	147	2	0	0	0	0
*Totals	3,131	3	22	0	11	0

* Includes 8-B

8b. Outreach

Environmental Education

1,167 students came to the refuge to participate in environmental education programs. The largest group was part of the Ottawa County Fifth Grade Conservation Day. This was the 37th year that all fifth graders from Ottawa County come to the refuge to learn about a variety of natural resource topics. This year 565 students participated in the tour. Refuge staff presented "Life in the Marsh" for the refuge section of the tour.

The 1998 Junior Duck Stamp Contest for the state of Ohio attracted 695 entries from throughout the state. Co-sponsor Toledo Edison hosted the judging in their education center at the Davis Besse Nuclear Power Station. Michael Diem, a seventeen year old, from Deshler, Ohio took Best of Show honors. His entry went on to place in the Honorable Mention Category in the National Contest.

The Ottawa NWR and many of its volunteers again produced a float that represents the beauty of the refuge. The float was entered in the Oak Harbor Apple Festival Parade in October, where it placed first among the service floats. Approximately 10,000 people viewed the float and many received refuge handouts about upcoming events and the Ottawa National Wildlife Refuge Association.

Programs

Forty-eight programs were held reaching 1,636 people, these included field trips and programs for the general public. Off site programs were presented to groups reaching a variety of people, these included Earth Day programs, high school programs, and career talks at local schools.

Scouting Program

One Eagle Scout project was completed and another began which is expected to be completed in the spring of 1999.

650 scouts participated in programs and field trips to the refuge. 18 participated in an overnight camp and 230 in a camp in cooperation with the Davis-Besse Nuclear Power Station.

Volunteer Program

Volunteers contributed 8,708 hours to the refuge through bird census, programs, maintenance and providing visitor services. For the first time the refuge provided resident volunteer facilities.



Students participating in an environmental education program

9. PLANNING AND ADMINISTRATION

9a. Comprehensive Conservation Planning

Preparation of the CCP for the Complex continued in 1998. Project leader Martin and ROS Brewer traveled to the Regional Office for an Ottawa NWR Open House. The Open House provided an opportunity for RO staff to make comments on refuge planning. A display of new aerial photos of the refuge and a slide presentation rounded out the event. Interagency meetings with focus groups, such as migratory birds, were also held to gather specific information. In late fall, a newsletter was mailed out to interested parties updating the progress of the CCP.

9b. General Administration

Personnel

Larry D. Martin, GS-0485-13/1, PFT	Refuge Manager
Douglas Brewer, GS-0485, PFT	Refuge Operation Specialist
Stanley S. Cornelius, GS-0485-11/10, PFT	Refuge Operation Specialist
Joyce Smith, GS-0486-11/1, PFT	Wildlife Biologist
Rebecca E. Hinkle, GS-0025-9/1, PFT	Park Ranger (Public Use Specialist)
Marjorie L. Miller, GS-0303-7/5, PFT	Administrative Technician
Steven D. Dushane, GS-0486-7/2, PFT	Wildlife Biologist (Private Lands)
David L. Day, WG-5716-8/5, PFT	Engineering Equipment Operator
Kenneth L. McConahay, WG-5716-10/4, PFT	Engineering Equipment Operator
Robert Reynolds, WG-4749-8/5, PFT	Maintenance Worker
Nelson Reau, WG-5705-6/9, TFT	Tractor Operator
Dale Hall, WG-5705-6/9, TFT	Tractor Operator
Susan Wells, GS-0485-5, PFT (employed by Alpena Fisheries Research Office)	Fishery Biologist
Matthew Stowe, GS-0404-3/1, TFT, EOD 6/22/98	Biological Science Aid terminated 10/1/98
Adam Pfeiffer EOD 6/21/98	YCC Enrollee terminated 8/1/98
Sara Mason EOD 6/21/98	YCC Enrollee terminated 8/15/98

CEDAR POINT NATIONAL WILDLIFE REFUGE

Cedar Point NWR is administered as a unit of the Ottawa Complex. The refuge encompasses approximately 2,500 acres and is entirely marsh except for the dike system and a few acres of remnant beach covered with hardwoods. The dike system isolates the marsh from Lake Erie and divides the refuge into three pools. All pools are predominately cattail, bulrush and other emergent vegetation. The pools are managed to provide stable water levels which are lowered during the summer months only to the extent necessary to encourage and maintain aquatic vegetation.

The refuge provides habitat for migrating waterfowl and nesting habitat for a variety of birds including the bald eagle. Herons and egrets make extensive use of the area for feeding. Purple loosestrife is a problem that is being controlled with integrated pest management efforts. A 15 acre borrow pit near Yondota Road gate is open for fishing from June through August.

WEST SISTER ISLAND NATIONAL WILDLIFE REFUGE

West Sister Island NWR is an 82 acre island located in the southwestern basin of Lake Erie. It is jointly owned by the U.S. Coast Guard (USCG) and the U.S. Fish and Wildlife Service (USFWS). Five acres, which includes a lighthouse, are owned by the USCG and the remaining 77 are managed by USFWS as a wilderness area. Tall hackberry trees with an under story of abundant poison ivy, some of it 12 feet tall, dominate most of the island. Great Solomon's Seal reaches 7-9 feet in height and a great variety of ferns, wildflowers, mushrooms and other plant life abound.

The island is composed of glacial till over a limestone shelf. The limestone shelf protrudes along the island showing where large coves have been eroding by hydrological forces. There are no sand beaches but rather two rocky shoals for access to the island. The soil contains a great amount of clay, loam and humus layers which annually receives a topically applied layer of nitrogen supplied by thousands of nesting colonial birds. West Sister Island is noted for having the largest heron/egret rookery in the Great Lakes. Great blue herons and great egrets comprise 65% of the nesters, followed by black-crowned night herons and little blue herons (See **1. b. Studies and Investigations**).

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Lesser Scaup