

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

Oak Harbor, Ohio

ANNUAL NARRATIVE REPORT

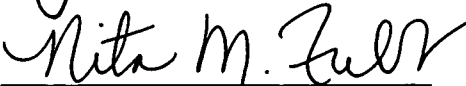
Fiscal Year 1999


Refuge Manager (Acting)

1-12-2001
Date


Refuge Supervisor Review

2-14-01
Date


Regional Office Approval

2-16-01
Date

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Ottawa NWR - MSU 6

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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 122,000 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.

Photo by © Sharon Cummings



HIGHLIGHTS

Refuge visitation increased again this year totaling 121,846 visitors. (Section 8a)

A three panel kiosk that was built as an eagle scout project made a new addition to our visitors services. (Section 8a)

57 deer were removed from the refuge during the 1999 hunt. (Section 8a)

Ottawa NWR and many of its volunteers created a float and entered it in the Oak Harbor Apple Festival Parade where it placed first among the service floats. (Section 8b)

Ottawa held its first "Free Fishing Day" where the public was invited to participate in fishing, a casting contest, a children's fishing contest, and fish printing. (Section 8a)

The Partners for Fish & Wildlife Program performed restorations on private lands to restore 51 sites for 283.5 acres of wetlands and 48 sites for 542 acres of grasslands. (Section 2c and 2d)

CLIMATE

Table 1. Annual Precipitation and Temperature, CY-1999

Month	<u>*Precipitation</u>		<u>Snowfall</u>		<u>Temperature in °F</u>			
	CY-1999	Avg.	CY-1999	Avg.	Max.	Avg. Max.	Min.	Avg. Min.
JAN	1.12	1.76	23.75	8.95	59	52	-5	-4
FEB	1.40	1.61	5.05	7.66	71	54	15	0
MAR	2.27	2.46	6.10	5.76	72	70	13	11
APR	5.19	2.97	0.00	1.69	78	81	34	23
MAY	1.56	3.02	0.00	0.00	88	87	44	35
JUN	3.76	3.47	0.00	0.00	92	93	51	45
JUL	1.53	3.34	0.00	0.00	100	94	61	51
AUG	3.10	3.69	0.00	0.00	87	92	56	48
SEP	1.22	3.21	0.00	0.00	87	89	42	38
OCT	2.72	2.31	0.00	0.00	79	80	34	27
NOV	2.11	2.84	0.00	3.11	75	67	26	18
DEC	2.55	2.70	2.50	5.99	60	56	11	3
Totals	28.53	33.37	37.4	33.16				
Extremes					100	94	-5	-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. The temperature gauge stopped functioning in July so the monthly temperatures were obtained from Davis-Besse Nuclear Power Plant located on the Navarre Division of the refuge.

Unlike the previous year, precipitation was below average. Snowfall was slightly above the average but most of it occurred during 3 storms in the first half of January.

1. MONITORING AND STUDIES

1a. Surveys and Censuses

Development of the Biological Inventory and Monitoring Plan (BIMP) continued in 1999. It will support the Comprehensive Conservation Plan (CCP) that is still under development. The BIMP describes, in detail, biological work outlined in the CCP. Surveys and census currently conducted on the refuge are under examination. Surveys that are retained will be ranked and expanded to encompass an ecosystem and landscape approach that includes wetland preservation and a wide variety of species such as shorebirds, colonial water birds and passerine migrants. Development of GIS themes for surveys and census routes and data storage continued this year as well.

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, scaup and black ducks) and a few thousand Canada geese throughout the winter. Waterfowl numbers peak in the fall with large concentrations of dabblers, mallards, and black ducks.

A total of 2.9 million duck use days and over 580,000 goose use days were recorded in 1999. Throughout the months of September through April, 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. During the months of May through August, ground counts are conducted once each month to monitor summer or year round species.

Table 2. Selected Waterfowl Populations on Ottawa NWR Complex; CY-1999.

SPECIES	AVERAGE POP. ¹	PEAK POP. ¹	USE DAYS
Mallard	4,671	20,659	1,135,096
Black Duck	848	4,142	206,029
Gadwall	853	5,480	207,262
Pintail	607	2,166	147,390
Green-winged Teal	2,076	12,148	504,399
Blue-winged Teal	536	4,343	130,179
Wigeon	1,764	8,641	428,609
Shoveler	154	605	37,480
Wood Duck	278	1,906	67,625
Redhead	3	25	778
Ringneck	13	93	3,200
Scaup	31	383	7,517
Common Merganser	174	1,099	42,323
Hooded Merganser	42	345	10,275

¹ Calculated over 8 months.

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 Studies and Investigations.

Bald Eagle /Peregrine Falcon

The 1999 nesting season was excellent for Ohio eagles. A total of 57 pair were monitored in the state documenting 72 fledglings produced. Ottawa NWR Complex had a total of 3 active bald eagle nests, but all nests failed by April. The Cedar Point nest failed when the chicks died at 2 weeks of age. Reasons for deaths are unknown since no specimens were collected. The Ottawa nest failed when the female was abandoned by the male. After staying with the nest for 2 days, the female finally left it to feed. During the period of time that she remained at the nest she was continually harassed by other eagles. Once the female left the nest, other eagles began to position themselves in nearby trees and on the nest itself. The Butternut nest failed after the eggs hatched. This nest has never produced successful fledglings. The birds using this site are older and effects of contaminants are suspected.

Midwinter bald eagle and peregrine falcon counts are conducted each year in cooperation with the Ohio Division of Wildlife (ODOW). No adults and only one immature eagle was found on the refuge during the January 1999 survey period. These results are unusual since January is typically the time period when bald eagles begin mating and nest building activities are at their peak. 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 January 1999 survey period, no peregrines were located on the refuge. They were noted during the spring and summer months feeding along the lake shore.

Amphibian/Reptile Surveys

Amphibian night-call surveys are conducted each spring on Metzger's Marsh, Cedar Point NWR, Ottawa NWR and the Darby Division of Ottawa NWR to determine species richness and relative abundance of each species. Limited staff prevented census of the Navarre Division of Ottawa NWR. As volunteers are made available, these surveys will be implemented. The three most numerous species on Ottawa include bullfrogs, green frogs and northern leopard frogs. Small numbers of American toads, Blanchard's cricket frogs, spring peepers, wood frogs, and chorus frogs were found in several units of the refuge this year.

Species richness and relative abundance were determined for each site and represented in Table 3. Relative abundance was determined using peak numbers of each species from the three surveys. Reliable population sizes cannot be estimated using call surveys. Species richness was the same through all units except Cedar Point NWR. Cedar Point was surveyed by a volunteer that may need more experience in recognizing calls. Further training will be implemented in 2000. Although more species should be present on these marshes, there should also be more individuals. As Lake Erie

Photo by © Sharon Cummings



Bull Frog

Photo by © Sharon Cummings



Snapping Turtle

continues to become a “cleaner” body of water, and as marsh and hemi-marsh management on Ottawa NWR is expanded, higher densities and a greater number of species of amphibians should result.

Table 3. Amphibian Call Surveys 1999 - Specie Richness and Relative Abundance.

		Metzger Marsh	Crane Creek	Pool 1	Darby	Cedar Point
<i>Species Richness</i>		<i>n = 5</i>	<i>n = 5</i>	<i>n = 4</i>	<i>n = 5</i>	<i>n = 2</i>
Relative Abundance		%	%	%	%	%
	NLFR	35	52	22	18	5
	GRFR	24	5	29	52	0
	BULL	24	24	45	26	95
	AMTO	0	10	4	0	0
	WOFR	11	0	0	2	0
	BCFR	0	10	0	0	0
	SPPE	5	0	0	0	0
	CHFR	0	0	0	2	0

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. For general marsh bird counts, evening surveys are conducted by volunteers following the protocol of the 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 and moorhens are abundant throughout the refuge complex. Least and American bitterns are found in a few units of the refuge each year.

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 water management within the units. Excess muskrats are controlled through a refuge trapping program that allows local trappers to bid on open units. See **8a. Visitors Services**.

White-tailed Deer

Winter spotlight surveys indicated a population of 104 deer on the Ottawa Division and approximately 60 on the Navarre Division. The Ottawa Division population was 57 % lower than the previous year (239). It is doubtful that the refuge hunting program caused this reduction (see **8a. Visitors Services** for 1999 hunt results). Although there are many reasons the deer herd could have declined, a likely reason is that there is little pressure off-refuge to push the deer in. Unlike the past 2 years, winter weather conditions during the end of 1999 were very mild. No deer spotlight 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 (10), double-crested cormorant (1), great blue heron (72), trumpeter swan (3), tundra swan (283), mute swan (2), Canada goose (1,480), wood duck (2), green-winged teal (8), black duck (290), mallard (1,300), pintail (10), blue-winged teal (6), shoveler (20), gadwall (77), American wigeon (40), lesser scaup (10), hooded merganser (65), common merganser (335), red-breasted merganser (2), ruddy duck (1), bald eagle (7), Northern harrier (8), Cooper's hawk (1), red-tailed hawk (11), rough-legged hawk (4), American kestrel (1), coot (50), Bonaparte's gull (5), ring-billed gull (1,050), herring gull (10), mourning dove (5), great horned owl (4), downy woodpecker (17), hairy woodpecker (1), blue jay (3), tufted titmouse (4), white-breasted nuthatch (7), Carolina wren (1), American robin (1), northern shrike (1), starling (16), cardinal (24), tree sparrow (225), fox sparrow (1), song sparrow (24), swamp sparrow (1), dark-eyed junco (4), snow bunting (256), red-winged blackbird (6), rusty blackbird (1) common redpoll (7), American goldfinch (47) and 1 house sparrow.

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 spring shorebird species is the dunlin (9,732) with golden plovers running second (4,952). The Black Swamp Bird Observatory is in its fifth year of data collection in an effort 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 **Studies and Investigations** for more information.

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. The platforms had little success during the first three years due to predation by great horned owls. The numbers of nests ranged from 48 to 60 with only 2 or 3 fledglings surviving each year. Modifications to the platforms that allowed young terns to escape and hide under raised structures on the decks of the platforms have greatly improved the fledgling survival rate in the past 3 years.

Photo by © Sharon Cummings



Tern Nesting Platform

Photo by © Sharon Cummings



Lesser Yellow Legs

Table 4. Common Tern Platform Nesting History on Ottawa NWR 1997 - 1999.

Year	Pairs	Nests	Young	Young/Nest
1997	34	36	27	0.75
1998	30	40	23	0.58
1999	40	61	47	0.77
3 year average	35	46	32	0.70

Gypsy Moth

Seven gypsy moth traps are placed throughout the refuge each year. This year a total of 119 male moths were trapped which indicated an increase in the average moths per trap from previous years. Ottawa was advised to watch and look for other life stages of the moths. Aerial surveys to check for defoliation will be scheduled by the US Forest Service during 2000.

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 will be developed for specific units after completion of the CCP.

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 nesting 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 5,000 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 commonly 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 **Studies and Investigations** for more information.

Lepidopterans and Odonates

A small collection of butterflies and dragonflies was started in 1999 by an enthusiastic volunteer. The collection includes 34 butterfly species, 2 moths, and 12 dragonflies.

Butterflies and Moths of Ottawa NWR 1999

Spicebush Swallowtail	Mourning Cloak	Peck's Skipper
Tiger Swallowtail	Little Copper	Question Mark
Silvery Checkerspot	Spring Azure	Silver Spotted Skipper
Cabbage White	Viceroy	Eastern Comma
Orange Sulphur	Bronze Copper	Eastern Tailed-Blue
Common Sootywing	Red Admiral	Tawny-Edged Skipper
Monarch	Hackberry Emperor	Achemon Sphinx
Pearl Crescent	Great Spangled Fritillary	Yellow Woolly Bear
Least Skipper	Tawny Emperor	
Fiery Skipper	Common Buckeye	
Black Swallowtail	Giant Swallowtail	
Summer Azure	Clouded Sulphur	
Common Large Wood Nymph	Northern Crescent	
Dun Skipper	American Snout	

Dragonflies of Ottawa NWR 1999

Swift Long Winged Skimmer
Red Saddlebag
Green Clearwing
Green Darner
Bluebell
Brown Spotted Yellow Wing
White Tail
Twelve Spot Skimmer
Jagged Edge Saddlebag
Low Flying Amber-Wing
Saffron-winged Meadowhawk Skimmer
Widow Skimmer

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 may present a barrier that most passerines will not cross when migrating north. Large build ups of migrants occur along the southwestern shoreline of Lake Erie creating excellent opportunities for study and attracting large numbers of birding tourists. Monitoring Avian Productivity and Survivorship (MAPS) station information is also included in this report.

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Black Swallowtail

Photo by © Sharon Cummings



Eastern Tailed Blue

Photo by © Sharon Cummings



Bluet Damselfly

Spring

Temperature patterns were above the ten-year average for spring 1999. Good weather conditions and patterns resulted in timely avian movements through April and May. Total spring banding numbers at Darby and Navarre include 11,310 individuals captured for a total of 122.63 birds per 100 net hours.

Table 5. Top Ten Species Banded at Ottawa NWR in Spring 1999.

Magnolia Warbler	863	Gray Catbird	358
Yellow Warbler	564	American Redstart	329
Ruby-crowned Kinglet	445	White-throated Sparrow	298
Traill's Flycatcher	432	Common Yellowthroat	281
Red-eyed Vireo	385	Swainson's Thrush	238

Spring point counts are conducted at Navarre in conjunction with mist net operations. Point count data collection totaled 44 days with 141 species recorded representing 23,020 individuals. The most abundant species recorded were red-winged blackbird (4,348), cedar waxwing (2,106), blue jay (1,444), Canada goose (1,408), and tree swallow (1,283).

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 7 days totaling 420 net hours.

One hundred eighty-eight birds were banded representing 31 species. The top 5 species banded were yellow warbler (25), house wren (22), red-winged blackbird (21), gray catbird (21) and Baltimore oriole (19). Point counts conducted during the two days of MAPS station operation included 33 bird species. Red-winged blackbird, yellow warbler, gray catbird, house wren and Baltimore oriole were the 5 most commonly recorded species. Tree swallow, chimney swift, and cedar waxwing were observed as flyovers during the counts. Some wetland species recorded during the counts were great blue heron, pied-billed grebe, Canada goose, Trumpeter swan, snowy egret, mallard, double-crested cormorant, great egret and killdeer.

Fall

Fall migration starts in late July for many species and some breeding neotropicals are practically gone from the study area by mid-August. Temperatures remained above normal through the fall. Total fall banding numbers at Darby and Navarre include 7,571 individuals captured for a total of 93.72 birds per 100 net hours.

Table 6. Top Ten Species Banded at Ottawa NWR in Fall 1999.

Blackpoll Warbler	1,105	Gray Catbird	336
Swainson's Thrush	937	Golden-crowned Kinglet	273
Common Yellowthroat	462	Ruby-crowned Kinglet	266
White-throated Sparrow	429	Magnolia Warbler	219
Cape May Warbler	349	American Redstart	212

Fall point counts are conducted at Navarre in conjunction with mist net operations. Point count data collection totaled 52 days with 110 species recorded representing 61,381 individuals. The most abundant species recorded were red-winged blackbird (46,682), European starling (4,099), common grackle (1,337), white-throated sparrow (998) and ring-billed gull (691).

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 70 days with 300 individual trips involving 876.1 observer hours and 1,421 volunteer hours. A total of 8,875 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 (5,017), red-tailed hawk (1,623), red-shouldered hawk (665), sharp-shinned hawk (473) and Cooper's hawk (263). Northern harriers, broad-winged and rough-legged hawks, bald eagles, American kestrels, and osprey rounded out the top eleven species counted. Observations of rough-legged hawks increased from 0.03 birds per observer hour to 0.16, amounting to over a 4 fold increase! This increase was noted by staff members and other volunteers on Ottawa that were not participating in hawk observations.

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 has been done since 1991.

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 units; 5) to fulfill requirements for site identification of the Western Hemisphere Shorebird Reserve Network.

The 1999 field season was the fifth full year of data collection for shorebird migration. Fifteen marshes and estuaries were sampled at least once in the spring and sixteen in the fall. Primary spring

sampling areas included Ottawa NWR, Metzger Marsh Wildlife Area, Magee Marsh Wildlife Area, Pipe Creek Wildlife Area and Pickerel Creek Wildlife Area. Heaviest bird concentrations were observed in flooded agriculture fields followed by Magee Marsh and Winous Point Conservancy. During spring migration, a total of 20,280 birds of 21 species were counted during 111 trips. Dominant species counted and their peak movements were: Dunlin (May 21-31); pectoral sandpiper (April 1-10); killdeer (June 11-20); lesser yellowlegs (May 1-10); semipalmated plover (May 11-20); common snipe (April 11-20); greater yellowlegs (April 21-30); and golden plover (May 1-10). The pectoral sandpiper was the dominant species in early April followed by both yellowlegs and common snipe. Dunlin become dominant in May with subdominants in late May of semipalmated sandpiper, semipalmated plover, black-bellied plover, and least sandpiper. The first five birds listed have shown this pattern of dominance each spring since 1995, although the dates of peak migrations may shift within a week or two.

During fall migration, a total of 83,164 birds representing 34 species were counted in 179 trips. Primary fall sampling areas were Magee Marsh Wildlife Area, Moxley Marsh, Erie Marsh and estuaries on Ottawa NWR, Sheldon's Marsh, Turtle Creek, and Huron River. Low lake levels provided extensive mudflats throughout the western Lake Erie basin throughout the fall migration. Dominant species observed and peak movements included: least sandpiper (July 1-10); killdeer (July 11-20); short-billed dowitcher (July 11-20); semipalmated sandpiper (Aug. 21-31 and Oct. 11-20); lesser yellowlegs (Aug. 11-21 and Oct. 11-20); pectoral sandpiper (Oct. 11-20); greater yellowlegs (Oct. 11-20); long-billed dowitcher (Oct. 21-31); dunlin (Oct. 21-Nov. 10); and black-bellied plover (Nov. 1-10). Fall migration is more drawn out than spring, running from early July into November. The dominant species composition is also more variable than during spring migration.

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. 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 increas, continues to pressure black-crowned night-herons compressing them toward the western end of the island. Approximately 2 acres of trees adjacent to black-crowned nesting habitat were hand cut to a four foot height in 1998 and 1999. These cuttings encourage shrubby regrowth of the vegetation and may allow expansion of night heron nesting. The 1998 cutting re-sprouted as predicted but no movement of nest sites by any heron species was observed in 1999. 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 cut solution to the cormorant issue. A third concern regarding contaminants found in herring gull chicks is being investigated (See **Ottawa WMS52**).

Table 7 West Sister Island Breeding Pair Information 1992 - 1999.

Species	1992	1993	1994	1995	1996	1997	1998	1999
Great Blue Heron	2,444	2,393	1,591	1,380	1,225	920	1,160	1,107
Great Egret	774	742	1,036	1,120	687	705	807	840
B. C. Night Heron	844	746	726	560	500	480	467	387
Double-Crested Cormorant	186	307	580	1,480	1,467	1,380	1,513	2,073

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 focuses on the immune and endocrine systems and reproductive ecology of herring gulls. It investigates immunotoxic effects, employs additional biomarkers and assesses 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. The western basin of Lake Erie is contaminated with large amounts of organochlorine pollutants. Results from eggs collected in 1998 show high concentrations of PCBs and DDE that are at levels associated with a variety of physiological effects.

Reproduction studies in the western basin (W. Sister Island and Monroe, Michigan) during the 1990s suggest significant reproductive impairments, although the spatial and temporal distribution, and the cause(s), of these reproductive problems remain to be determined. During 1998 and 1999, excessive mortality 2-4 weeks after hatch caused almost complete reproductive failure on West Sister Island. Fledging rates were 0.19 chicks/nest in 1998 and 0.61 chicks/nest in 1999. These rates were below the level of 0.8 chicks/nest needed to maintain a stable population. At other Great Lakes sites, fledging rates are often well above 1.0 chicks/nest. Several hypotheses are currently being evaluated to explain this reproductive failure: PCB-induced wasting syndrome, infectious disease, cyanobacterial toxins (microcystins), or some combination of these factors. It is clear that this excessive chick mortality was not caused by predation. A potentially toxic concentration of microcystin liver toxin was found in one gull chick from the 1998 die off on West Sister (the only bird analyzed). No microcystin toxin was detected in two chicks found dead in 1999. The cause(s) of these reproductive failures warrant(s) further investigation.

During 1998 and 1999, we noticed many empty herring gull nests, primarily on the edge of the wooded areas along the cliff, that should have contained small chicks or eggs. It is possible that predators such as black-crowned night-herons could have been eating gull chicks and eggs. Such predation by black-crowned night-herons has been observed at other colonies. Given the high concentrations of organochlorines in gull chicks and eggs, consumption of these foods by herons could

significantly increase contaminant exposure because other heron foods such as small fish and amphibians are generally less contaminated. Because black-crowned night-herons have declined on W. Sister Is. throughout the 1990s, we are interested in investigating the potential effects of contaminants on herons of W. Sister Is. Funding is currently being sought.

Ottawa WMS53 - Foraging Habits of Adult Double-Crested Cormorants (DCCO) and DCCOs as Indicators of Fish Distribution in Western Lake Erie. *Michael T. Bur, USGS-BRD, Great Lakes Science Center.*

This collaborative effort is an expansion of a study on the diet of western Lake Erie cormorants in which diets of cormorants and walleye were compared. Twenty adult cormorants were captured and fitted with VHF transmitters. The cormorants were then tracked to their foraging areas between April and October at least three times per week. Areas where intense foraging took place were bottom trawled to determine spatial and temporal distribution of prey fish. The first year of data indicates that cormorant foraging areas do not match up with the areas where bottom trawling has indicated large fish populations are found. Further study is planned.

Ottawa WMS54 - Native Clam Rescue and Re-Establishment in Lake Erie Marshes. *Susan Jerrine Nichols and Douglas A. Wilcox.*

In 1996 a large population of native clams was discovered during the dewatering of Metzger Marsh on the southwest shoreline of Lake Erie. The population is one of the few that survived the negative effects of zebra mussels. It is theorized that survival is due to the specific sediment type and water temperature characteristics of the wetland habitat. Native clams were removed from Metzger Marsh, marked with washers and placed in Crane Creek Estuary on Ottawa NWR. In 1999, Metzger Marsh gates were opened for a duration of 4 years to study fish movements. Using a metal detector, clams were re-captured from Crane Creek and put into Metzger Marsh. They had grown more than expected while in Crane Creek for unknown reasons. The clams will be monitored during the 4 years of experimentation on Metzger Marsh.

Clam Species found in Crane Creek and Metzger Marsh.

<u>Common Name</u>	<u>Scientific name</u>	<u>Total found</u>
Fragile Papershell	Leptodea fragilis	2378
Giant Floater	Pyganodon grandis	1660
Pink Heelsplitter	Potamilus grandus	741
Threeridge	Amblema plicata	390
Lilliput	Toxolasma parvus	257
Mapleleaf	Quadrula quadrula	91
Fawnsfoot	Truncilla donaciformis	25
Threehorn Wartyback	Obliquaria felexa	22
Pimpleback	Quadrula pustulosa	20
Heelsplitter	Lasmigona complanata	13
Fatmucket	Lampsilis r. Luteola	9
Plain Poketbook	Lampsilis cardium	8
Deertoe	Truncilla truncata	6
Pondhorn	Unio merus tetralasms	5
Paper Pondshell	Utterbackia imbecillis	3
Round Pigtoe	Pleurobema sintoxia	2
Wabash Pigtoe	Fusconaia flava	1
Spike	Elliptio dilatata	1
Squawfoot	Strophitus undulatus	1
Hickory-nut	Obovaria olivaria	1

2. HABITAT RESTORATION

2a. Wetland Restoration: On-Refuge

Approximately 1,500 ton of rip-rap was placed on the interior of the north Woodies Roost dike to complete the project started in 1998. Approximately 3,000 feet of dike on the south side of MS-3 was resloped and approximately 4,500 ton of riprap placed. Approximately 3,000 feet of ditch along Stange Road Ditch and Lindsey-Limestone Ditch was cleaned to supply water to pumps for flooding of various units. Material was placed on old remnant dikes to allow restoration of these dikes in the future. A new 84" concrete culvert crossing was installed across Stange Road ditch to allow access to unit 6a on the south side of Crane Creek.

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 five counties in Ohio (Ottawa, Sandusky, Seneca, Morrow and Williams). Most of the basins were restored in the two Michigan counties. Fifty-one sites were restored for a total of 283.5 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 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.

Hillsdale County, Michigan

This year the Ottawa National Wildlife Refuge (NWR) crew consisted of one Equipment Operator (Dale Hall) and one Biologist (Steve Dushane) to perform wetland restorations on private lands. Equipment from the refuge was used to complete the earthwork on the projects. The dry weather was a blessing for doing earthwork in the early summer months. However, as the summer drought continued, the construction became more difficult. In some areas the ground had dried to a concrete-like texture making for hard digging. Some areas of the Management District only had one half inch of rainfall between June and September. Without above average precipitation in the winter and spring of 2000, many of these basins will have trouble filling.

Once again, many hours of down time were spent working on equipment. Maintenance help was hard to find due to construction activities on the refuge.

All this being said, the 1999 field season was very productive netting 26 restorations for 106 acres in Hillsdale County.

Lenawee County, Michigan

Again 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 the second agreement with the district and also involved the local chapter of Pheasants Forever. A North American Wetlands Conservation Act (NAWCA) grant with Ducks

Photo by refuge staff



New Culvert
left to right: Dale Hall and Nelson Reau

Photo by refuge staff



Construction on ditch side of MSU 3

Unlimited and The Michigan Association of Conservation Districts helped to fund one-third of the construction of these restoration projects. Through this agreement, 15 wetland basins were restored for 101 acres.

Williams County, Ohio

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

Ottawa, Sandusky, Seneca, and Morrow Counties, Ohio

The wetland restoration projects in these counties were all carried out by the local soil and water conservation districts. All of the projects were cost-share projects due to the higher cost of restoration in these areas. The Partners for Fish and Wildlife Program contributed materials in the form of pipe and/or water control structures for the projects. One of the projects in Seneca County and the project in Morrow County were at environmental education facilities. Other contributors to the projects include the Ohio Division of Wildlife and the United States Department of Agriculture. Six such projects were completed for a total of 66.5 acres.

Since the 1997 field season, landowners are being held responsible for maintenance of wetland restoration projects. I am happy to report that in 1999, NO wetlands were repaired due to poor design and/or construction flaws at the time they were built.

A big "pat on the back" to Dale Hall for all of his hard work and dedication throughout the summer. The accomplishments would not have been possible without him.

2d. Upland Restoration Off Refuge

Again this year the Ottawa National Wildlife Refuge facilitated the establishment of 512 acres of native warm season grasses 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 switch grass. The native warm season 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, 16 sites for a total of 154 acres were planted with the native grasses mix.

Sandusky County, Ohio

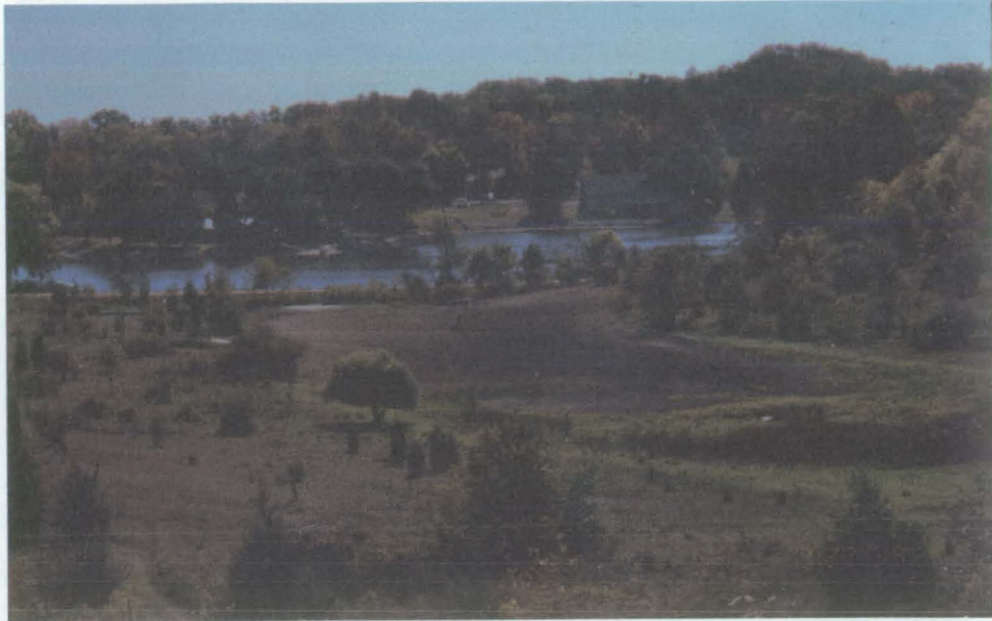
In Sandusky County, 20 sites for a total of 235 acres were planted with the native grasses mix.

Erie County, Ohio

In Erie County, 10 sites for a total of 123 acres were planted to the native grasses mix.

Hillsdale Co, MI
Wetland restoration

Photo by Steve Dushane



Before

Photo by Steve Dushane



After

Photo by Bill Daub



Lenawee Co, MI
Board of Commissioners at wetland dedication.

Photo by Steve Dushane



"Restoration Tools"

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.

In Pool 1 at Cedar Point a log was stuck in the flapgate. 6-8" of water was lost which had an overall positive effect on the marsh. High pumping cost were incurred in the fall to bring water levels back to full pool

3b. Manage Moist Soil Units

Moist soil units are managed to provide annual growth from early successional mudflat species such as smartweeds, millets, etc. Annual drawdowns cause the unit to progress through a series of successional stages from early smartweed/millet stage through the beggars tick/perennial stage, to the woody vegetation or cattail stage. The early stages are the most productive and are maintained by prolonged flooding or tilling for problem species.

MSU 2a was drawdown in May. Dry weather throughout the summer created some velvetleaf problems. The unit was diked in July prior to anticipated rain, but the weather remained dry. Aside from the velvetleaf, there was good growth of nutsedge and millet in the unit, which was reflooded in late September.

3d. Farming

The cropland program for 1999 included 92 acres of coop-planted corn and 45 acres of refuge planted corn in the normal croplands. Other coop planted crops consisted of 116 acres of soybeans and 56 acres of wheat. This totaled 309 acres of crops.

Except for a short rainy period in late April, spring was relatively dry, which provided good weather for planting and ground preparation. Corn was no-till planted in fields 6A and 11C. Fields 6C and 11A were tilled by heavy and finish disking before planting. All refuge corn was planted by May 15th, somewhat earlier than other years. Rains during late May gave the corn a good start. Yield was good and estimated at 90-100 bushels/acre.

Soybeans yields were only fair due to the dry summer, especially during June and July.

Heavy use of croplands by feeding waterfowl in the fall of 98 left only small quantities of corn available for the winter and spring migrants after the first of the year. In addition, the croplands received very little waterfowl use during the fall months, since the harvesting left a large stalk residue in the harvested strips and this was not mowed during the fall as in past years. The only cropland use was in farm unit 6 and this was relatively light since it was not fully flooded until mid December rather than mid November as in previous years. This was due in part to late soybean harvest in FU 6. Thus, the low waterfowl numbers for 1999 are partially a reflection of not making these croplands available to the waterfowl as in past years.

3e. Forest Cutting

Approximately 2 acres of trees on West Sister Island were hand cut to a four foot height in 1998 and

1999. These cuts are adjacent to black-crowned night-heron nesting habitat. These cuttings encourage shrubby regrowth of the vegetation and may allow expansion of night heron nesting. The 1998 cutting re-sprouted as predicted but no movement of nest sites by any heron species was observed in 1999. The cuts will continue through 2002 at which time the effectiveness for enhancing black-crowned night heron nesting will be evaluated. If the cuttings do not enhance nesting habitat and the herons have not moved nesting activities into them, the cutting will stop.

3g. Control Pest Plants

Biological control methods were utilized on the Darby Division of Ottawa NWR in 1999. A single release of 20,316 *Galerucella sp.* were made at Site 1 in Darby. There has been no real sign of success from sites of previous year's releases and it is hoped that the cumulative effect of the three releases will have an impact during the growing season of 2000. 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 40 gallons of a 1% solution of Rodeo and 5 gallons of 2,4-D4 Amine IVM. The Division of Wildlife used 35 gallons to aerial spray show pool and Cedar Point. A special pesticide proposal was needed for aerial spraying. The 2,4-D 4 Amine IVM, approved for over water use, was purchased to experiment in a wetland area that had a thick understory of sedges and other grasses. Five gallons were applied at the recommended rate and a good kill of purple loosestrife occurred. Browning occurred at a slower rate than areas sprayed with Rodeo, but only targeted plants browned as opposed to the dead patches created by Rodeo. The non-target monocots showed only small signs of wilt, but survived the spraying. The area will be checked during the growing season of 2000 to determine the re-growth rate of purple loosestrife.

4. FISH AND WILDLIFE MANAGEMENT

4a. Bird Banding

See Studies and Investigations

4d. Provide Nest Structures

Nest boxes placed on refuges provide habitat to several species of bird 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 limits 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 in 1998. Twelve boxes were added to Ottawa this year and due to a very enthusiastic volunteer, 56 new boxes were added to Navarre. The name of the program was changed in 1999 to the Nest Box Program.

Although most of the boxes throughout the refuge were inhabited by tree swallows, 6 were used by house wrens. Three separate nesting attempts were made by bluebirds on Ottawa. Each time, the nest was either predated by house sparrows, or in one case the site was taken over by a house wren. The bluebird would re-locate to a box nearby and start over each time. The volunteers are hopeful that bluebirds will be more successful in the future. Only 9 of the 156 boxes were ultimately occupied by house sparrows through the season on both Ottawa and Navarre. None of the house sparrows bred successfully. Each time a house sparrow was located in a box it was killed and the box cleaned out.

Table 8. Bluebird/Tree Swallow Nest Box Data 1999

LOCATION	# BOXES	BOXES USED	TRSW EGGS	AVERAGE EGGS/NEST	FLEDGLINGS
Ottawa	70	56	206	3.7	187 (34 banded)
Navarre	86	64	314	4.9	158 (All banded)
TOTAL	156	120	520	na	345

Photo by © Sharon Cummings



Tree Swallow on nest box

5. COORDINATION ACTIVITIES

5a. Interagency Coordination

Agencies involved with the Partners for Fish & Wildlife Program include: Natural Resources Conservation Service, Lenawee County Soil & Water Conservation District, Hillsdale County Soil & Water Conservation District, Pheasants Forever, Ducks Unlimited, The Michigan Department of Natural Resources, and The Ohio Division of Wildlife

5c. Private Land Activities (Excluding Restorations)

More than 500 individuals were contacted by mail or telephone to encourage involvement in the Partners for Fish & Wildlife Program. Many of the contacts were made through a mass mailing to all CRP enrollees. Many individuals learned about the program through the Partners for Fish and Wildlife Display. The display was exhibited at various refuge events as well as at the Region 3 Biologists Training Forum.

Site evaluations were conducted on 74 parcels of land. Technical assistance was provided to many landowners who had areas that were not restorable but still wanted to help benefit wildlife and/or the environment. Technical assistance was also provided to landowners having projects that were too costly for the program to restore with our available funding.

Wildlife Biologist Steve Dushane was appointed to the East Fork Advisory Group. This group was started by the Nature Conservancy to help guide conservation practices on the East Fork of the West Branch of the St. Joseph River. This stretch of the St. Joseph River is one of most biologically diverse streams in the Midwestern United States. It's inhabitants include more than 17 different species of mussels including the Federally Endangered club shell mussel. The U.S. Fish and Wildlife Service, through the Partners for Fish and Wildlife Program has entered into a cooperative agreement with the Nature Conservancy to plant trees along the East Fork. Many landowners are now signing up and the planting should begin in the spring of 2000.

Farmers Home Administration (FmHA) Conservation Easement Program

The Ottawa National Wildlife Refuge manages a total of 29 conservation easements in three different states. There are 16 easements in Michigan, 11 in Indiana, and 1 in Ohio. During 1999, Wildlife Biologist Steve Dushane and Refuge Operation Specialist Doug Brewer visited 9 of the easements in Michigan and 2 of the easements in Indiana. Some of the signs were missing and there were a few easement violations. In the spring of 1999, many of the easements in Lenawee County, Michigan were flown over and low level aerial photos were taken for the files.

Schoonover Waterfowl Production Area

The Ottawa National Wildlife Refuge manages one waterfowl production area (WPA) located in Lenawee County, Michigan. The WPA has a 53-acre wetland that was finally restored in 1997. In the spring, the wetland holds high numbers of redhead and ringneck ducks with an occasional canvasback mixed in. In 1999, 20 acres of the WPA were planted to a native warm season grasses mix. The mix consisted of big bluestem, Indian grass, Eastern gamma grass, switchgrass, and a mixture of native forbes. Also, two parking areas were constructed for public use. One sign was ordered to notify the public of the rules and one large sign was ordered for the highway. The installation of the signs is planned for 2000.

1999 Private Lands Habitat Numbers

Michigan Wetland Restorations		<i>Sites</i>	<i>Acres</i>
Lenawee County	-	15	101
Hillsdale County	-	<u>26</u>	<u>106</u>
MICHIGAN TOTALS:		41	207

Ohio Wetland Restorations		<i>Sites</i>	<i>Acres</i>
Ottawa County	- 2	19	
Sandusky County	-	1	38
Seneca County	-	2	4.5
Morrow County	- 1	5.0	
Williams County	-	<u>4</u>	<u>10</u>
OHIO TOTALS:		10	76.5

Michigan Warm Season Grass Restorations/Establishment		<i>Sites</i>	<i>Acres</i>
Lenawee County	-	<u>2</u>	<u>30</u>
MICHIGAN TOTALS:		2	30

Ohio Warm Season Grass Restorations/Establishment (PF Challenge Grant)		<i>Sites</i>	<i>Acres</i>
Ottawa County	- 16	154	
Erie County	-	10	123
Sandusky County	-	<u>20</u>	<u>235</u>
OHIO TOTALS:		46	512

Wetland Totals: **51 Sites for 283.5 Acres**
Grassland Totals: **48 Sites for 542 Acres**

6. RESOURCES PROTECTION

6a. Law Enforcement

ROS Brewer attended Refuge Officer Basic School at NCTC in February 1999. Manager Martin, ROS Brewer and Park Ranger Hinkle attended Law Enforcement Refresher training at Camp Dodge, Iowa in March 1999.

6h. Land Acquisition

The land acquisition program at Ottawa NWR was revitalized in 1999 with the purchase of 30 acres of land along the Little Portage River in Ottawa County. This purchase is the first of several acquisitions, other hopefully will close in early FY 2000. The refuge has been authorized to expand an additional 5000 acres in the Lake Erie/Sandusky Bay acquisition area. Purchases are made entirely from willing sellers, and the refuge has had enough interested parties to exceed the purchase allotment dollars currently available. Additional appraisals have been ordered and those property owners will have to be patient and wait for additional land acquisition allocations by Congress.

8. PUBLIC EDUCATION AND RECREATION

8a. Visitor Services

Refuge visitation increased again this year to a total of 121,846 visitors. Special events included three open houses, which included an auto tour through normally closed areas of the refuge. The first was to celebrate National Wildlife Refuges Week. A week of special events and programs ended with the fall open house and auto tour, 575 people attended the open house and 194 cars took the auto tour. The second, in July, was held as a conclusion to Wetland Celebration Week. The third on International Migratory Bird Day attracted 984 visitors.

Another new event held at the Ottawa National Wildlife Refuge was Free Fishing Day on June 5. This event included fishing in the refuge show pool, casting contest, children's fishing contest, and fish printing. It was a fun day for the whole family.

This year another eagle scout project helped to improve visitor services. Marcus Driver chose to build a new three panel kiosk in the visitor parking lot to provide visitor information. This project included revising standard kiosk plans to include a roof to shelter an enclosed bulletin board. This area will also provide shelter for volunteers stationed in the parking lot on weekends to inform visitors about birding locations and rare bird sightings.

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, wetland and 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 and collections of hunting data. Ottawa NWR staff assist ODW in the operation of a mandatory check station and oversight of all hunting operations. Ottawa's managed hunt is conducted Monday, Wednesday, Friday, and Saturday of each week.

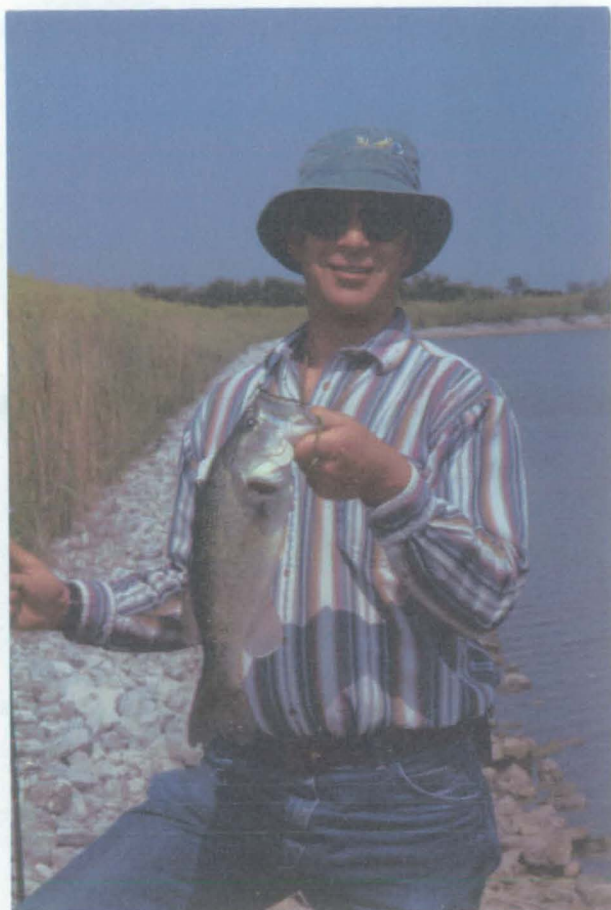
The opening day of the refuge hunt is reserved for a special youth hunt. The youth are selected and can bring one partner (adult) to hunt with them. This year 26 people (13 youth and 13 adults) participated. Total participation this season was 325 hunters harvesting 154 ducks and 68 geese resulting in a harvest rate of 0.68 waterfowl per person.

Deer Hunt

Two youth deer hunts were conducted on Ottawa National Wildlife Refuge (Ottawa) on the dates of January 2, 1999 and January 16, 1999. Due to bad weather and heavy snowfall, a youth hunt scheduled for January 3 was canceled and re-scheduled for January 16th. During the same time periods, youth hunts were conducted for the first time on the Navarre Division of the Refuge with the cooperation of Davis-Besse Nuclear Power Station. Twenty-two youth hunters participated in the hunts from a total of 30 that were selected. Regulations required that each youth hunt with a licensed, non-hunting adult. The youth success rate on the Ottawa hunt, using shotguns, was 34% on January 2 and 29 % on January 16th. Youth hunters harvested a total of five deer; 4 bucks and 1 doe. The youth on the Navarre hunt were required to use primitive weapons only, no shotguns were allowed. The success rate for youth on Navarre was 0% for both days but all youth enjoyed the opportunity to hunt in a primitive fashion.

The adult primitive weapons hunt was conducted on January 6 - 9, 1999 on both the Ottawa and the Navarre Divisions. Again, this was the first adult hunt conducted on the Navarre Division. Through a cooperative effort, the Ohio Division of Wildlife (ODW) included the hunts on their list of controlled hunts again this year, so that individuals could be selected randomly by computer. The success rate of adults on the Ottawa hunt was 35% and the success rates of adults on the Navarre hunt was 56%.

Photo by © Sharon Cummings



Members of the public participating in Fish Day
1999.

Photo by © Sharon Cummings



Photo by © Sharon Cummings



International Migratory Bird Day

Photo by © Sharon Cummings



Members of Ottawa National Wildlife Refuge Association

Changes were made for the 1999 Ottawa adult hunt with an increased number of hunters per party from 2 to 3. There were only 2 hunters per party on the Navarre adult hunt. The Ottawa hunt included one individual receiving an either sex permit and the other two receiving antlerless only permits. A total of 40 parties (120 hunters) were selected for Ottawa. Twenty-four parties (48 hunters) were selected for the Navarre hunt. Adult hunters harvested a total of 51 deer; 32 does and 19 bucks.

A total of 57 deer (22 bucks and 35 does) were removed from the Refuge during the 1999 hunt. This compares favorably with 1998 when only 19 deer were harvested. An additional day and the increase of one hunter per party on the Ottawa adult hunt proved to be a satisfactory decision. Spotlight deer survey data on Ottawa indicated a deer herd population of 239 at the end of 1998 with a harvest goal of 153 deer. Thirty-nine deer were harvested from Ottawa falling far short of the goal. The 1998 hunt harvest of 19 deer had little to no impact on the deer population on Ottawa. Surveys conducted on the Navarre Division indicated a population of 64 deer within the single square mile unit. Most of this unit is wetland habitat and therefore actual habitat available to deer would be only a few hundred acres. A harvest goal of 50 deer was not met with only 18 deer harvested there.

Table 9. 1999 Deer Harvest Information-Ottawa Division

Date	Number	Age of Deer Harvested						Total	Hunter
	Hunters	0.5	1.5	2.5	3.5	4.5	4.5+	Deer	Success
1/2/99	9	1	1	0	0	0	1	3	0.34
1/6/99	27	6	1	5	2	1	0	15	0.56
1/7/99	22	6	1	2	1	0	1	11	0.45
1/8/99	27	2	0	1	0	0	0	3	0.11
1/9/99	21	4	1	0	0	0	0	5	0.27
1/16/99	7	1	0	0	0	0	1	2	
Totals	113	19	4	9	2	1	2	39	0.34
% of Harvest		0.50	0.11	0.24	0.05	0.03	0.05		

Table 10. 1999 Deer Harvest Information -Navarre Division

Date	Number	Age of Deer Harvested						Total	Hunter
	Hunters	0.5	1.5	2.5	3.5	4.5	4.5+	Deer	Success
1/2/99	4	0	0	0	0	0	0	0	0.00
1/6/99	10	3	1	2	0	0	0	6	0.60
1/7/99	6	0	0	0	0	0	5	5	0.83
1/8/99	10	0	1	0	0	1	1	3	0.30
1/9/99	6	3	0	0	0	0	1	4	0.67
1/16/99	2	0	0	0	0	0	0	0	0.00
Totals	38	6	2	2	0	1	7	18	0.47
% of Harvest		0.33	0.11	0.11	0.0	0.05	0.39		

Photo by refuge staff



Wildlife Biologist Christy Smith checking a deer after the hunt.

Photo by © Sharon Cummings



White-Tailed Deer

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

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.

Darby was opened to a single trapper for a bid of \$527.87. A count of huts was conducted on Pool 4 where most muskrat activity was observed and more than 500 huts were estimated to be in the unit. The trapper was instructed to concentrate efforts in Pool 4, but that he would also be expected to trap the dikes and roadways within the entire Darby unit.

A single youth applied for a youth trapping permit. He was assigned to trap the entrance pool. With adult assistance, the youth was able to trap the unit clean by January 7, 1999. He was reassigned to trap MSU 3 after January 16, 1999 when the deer hunt ended. He was unable to trap for the entire season due to bad grades in school. His father took his trapping privileges from him.

A total of 442 muskrats were harvested from Darby and the Entrance Pool this year. No other species were trapped. The average price for a pelt in extremely good shape this year was estimated at \$1.00 to \$1.50. At that rate, the trapper at Darby could possibly have earned between \$417 and \$625 if the pelts were all in excellent shape. The youth trapper's possible earnings were between \$25 and \$37. More efforts will be made within the outreach program to encourage youth to participate in trapping on the refuge.

Table 11. Reported Harvest by Unit for 1998-99 on Ottawa NWR.

Unit	Muskrat	Mink	Raccoon	Fox	Opossum	Skunk
Darby	417	0	0	0	0	0
Entrance Pool	25	0	0	0	0	0
MSU 3	0	0	0	0	0	0
Totals	442	0	0	0	0	0

8b. Outreach

Environmental Education

902 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 38th year that all fifth graders from Ottawa County come to the refuge to learn about a variety of natural resource topics. This year 531 students participated in the tour. Public Use Specialist Rebecca Hinkle presented "Life in the Marsh" for the refuge section of the tour. Other groups included six scout groups, a local second grade learning about soils, and 71 students from the Discovery Center. One teacher workshop participated in a refuge tour, 16 local teachers attended.

The 1999 Junior Duck Stamp Contest for the state of Ohio attracted 740 entries from throughout the state. Co-sponsor Toledo Edison hosted the judging in their education center at the Davis Besse Nuclear Power Station. Sixteen year old, Travis Lee from Eaton, 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 made a special effort this year to produce a float that represents the beauty of the refuge. The float was entered for the second year in the Oak Harbor Apple Festival Parade in October, where it placed first among the service floats. The float was also entered in the Genoa Parade in June. Approximately 10,000 people viewed the float and many received refuge handouts about upcoming events and the Ottawa National Wildlife Refuge Association.

Programs

23 programs were held on the refuge reaching 330 people, these included field trips and programs for the general public. Refuge volunteers assisted with many of these programs including bird hikes and Owl Prowls.

Off-site programs were presented to 9 groups reaching 1715 people, these included Earth Day programs, high schools programs, and career talks at local schools.

Scouting Program

In addition to Eagle Scout Marcus Driver's project, 6 programs were presented to scout groups. The refuge also hosted a week long day camp for the Maumee Valley Girl Scout Council. The Wind, Waves and Wildlife Day Camp attracted 9 Cadette and Senior Girl Scouts. The scouts earned three badges while learning about bird banding, fisheries, wetlands, bird watching and identification, canoeing skills and technology. Off site activities included a tour of the Davis Besse Nuclear Power Station and Toledo City Water Plant. The girls spent one night on the refuge practicing primitive camping techniques.

Photo by Cheryl Hall



Ottawa NWR float in Oak Harbor Apple Festival Parade

Volunteer Program

A total of 99 volunteers contributed 4890 hours to the refuge through bird census programs, biological monitoring, maintenance and providing visitor services. A volunteer recognition party was held in their honor on November 5. Volunteer Gene Anderson received Volunteer of the Year Honors for contributing 499 hours. Gene has been very helpful in keeping our trail system and public use areas neatly mowed and trimmed. Gene has also been instrumental in keeping the trail system safe for visitors by filling in holes created by woodchucks and muskrats. Special mention went to the following volunteers for their contributions:

<u>Volunteer</u>	<u>1999 Hours</u>	<u>Total Hours</u>
Ed Pierce	120	2251
Art Weber	224	2348
Chris Crofts	49	1932
Mike Crofts	139	1335
Tom Kashmer	70	844
Rex Miller	20	228
Sheila Miller	20	241
Gene Anderson	499	1453
Lee Crofts	11	42
Paul Sherwood	30	79
John Hinkle	188	433
Sharon Cummings	82	395
David True	6	54
Shana Smith	10	26
Tim Musolf	16	16
Gary Smith	80	58
Lindsay Crofts	3	9
Bob Schwenk	35	55
Pat Schwenk	35	52
Jack Volker	3	14
Janet Volker	9	20
Bill Dailey	376	416
Sharon Dailey	117	147
Doris Ayling	20	20
Jackie Breno	35	35
Nicole Breno	35	35
Jennifer Langel	37	37
Bob Morrison	70	70
Mary Brewer	30	30
Doug Breno	14	14
Julia Vasko	25	25
Christine Bosch	20	20
Frank Pauff	20	30

9. PLANNING AND ADMINISTRATION

9a. Coordination work on the draft CCP document continued throughout 1999 with several meetings with Planner Gary Muehlenhardt and Writer/editor Jane Hodgins from the Regional Office. In July Manager Martin and ROS Brewer traveled to the Regional Office to preside over a CCP "Open House" for RO staff. Comments from the open house were compiled and integrated into the Draft CCP which should be printed in early FY 2000.

9b. General Administration

Personnel

Larry D. Martin, GS-0485-13/3, PFT	Refuge Manager
Douglas Brewer, GS-0485-11/10, PFT	Refuge Operation Specialist
Stanley S. Cornelius, GS-0485-11/10, PFT	Refuge Operation Specialist
Marjorie L. Miller, GS-0303-7/6, PFT	Administrative Technician
Joyce Smith, GS-0486-11/3, PFT	Wildlife Biologist
Steven D. Dushane, GS-0486-9/3, PFT	Wildlife Biologist (Private Lands)
Rebecca E. Hinkle, GS-0025-9/2, PFT	Park Ranger (Public Use Specialist)
Kenneth L. McConahay, WG-5716-10/4, PFT	Engineering Equipment Operator
David L. Day, WG-5716-8/5, PFT	Engineering Equipment Operator
Robert Reynolds, WG-4749-8/5, PFT	Maintenance Worker retired 8/31/99
Nelson Reau, WG-5705-6/2, TFT	Tractor Operator
Dale Hall, WG-5705-6/2, TFT	Tractor Operator
Gwen Kolb, GS-0404-3, TFT, EOD 6/21/99	Biological Science Aid
Sara Mason, GS-0404-3, TFT, EOD 6/21/99	Biological Science Aid terminated 8/24/99
Tim Vanderhorst, EOD 6/21/99	YCC Enrollee terminated 8/14/99
Patrick Lockwood EOD 6/21/99	YCC Enrollee terminated 8/14/99

*The following are people who work at Ottawa NWR, but are not employed by Ottawa NWR.

Susan Wells, GS-0482-7, PFT Fishery Biologist
Alpena Fisheries Research Office

Katharen Kleaver, GS-0404-3/1, EOD 3/29/99 Biological Science Aid
Alpena Fisheries Research Office
Terminated 8/27/99

Brian Ellrot, EOD 5/99 Fisheries Technician
USGS
Terminated 7/99

John Biggert, EOD 6/21/99 County Work Program
Terminated 8/14/99

Tim West, EOD 6/21/99 County Work Program
Terminated 8/14/99

Jeremy Goetz , EOD 6/21/99 County Work Program
Terminated 8/14/99

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.

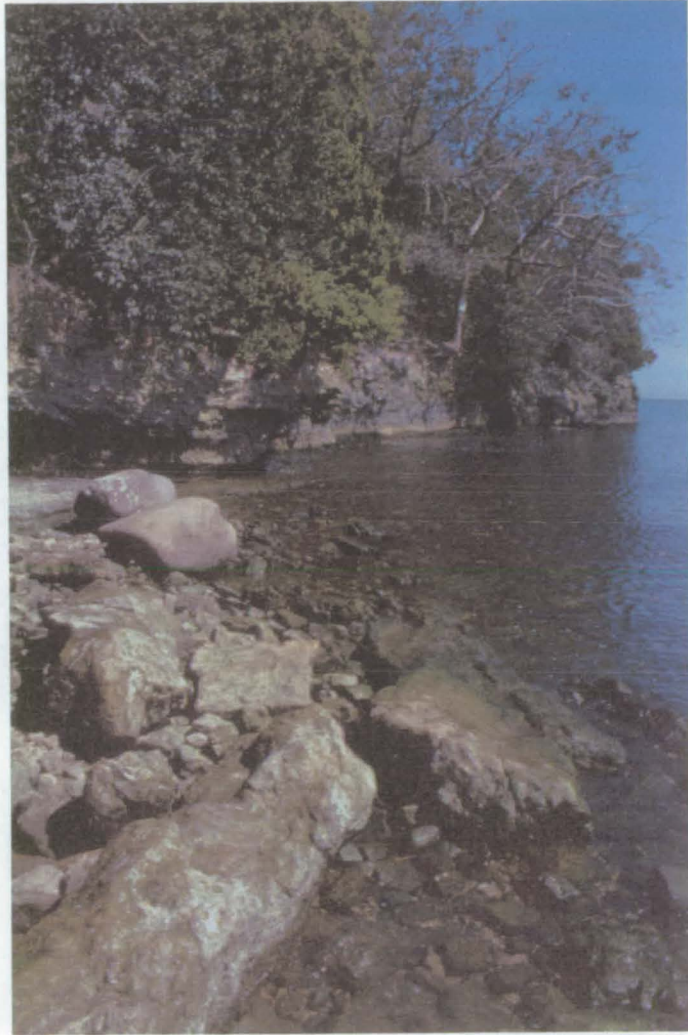
The refuge provides habitat for migrating waterfowl and nesting habitat for a variety of birds including the bald eagle. Herons and egrets make extensive use of the area for feeding. Purple loosestrife is a problem that is being controlled with integrated pest management efforts. A 15-acre borrow pit 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 receive 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. See **Studies and Investigations** for more information.

Photo by © Sharon Cummings



West Sister Island