LONG ISLAND NATIONAL WILDLIFE REFUGE COMPLEX
Shirley, New York

ANNUAL NARRATIVE REPORT

Calendar Year 1993

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

REVIEW AND APPROVAL

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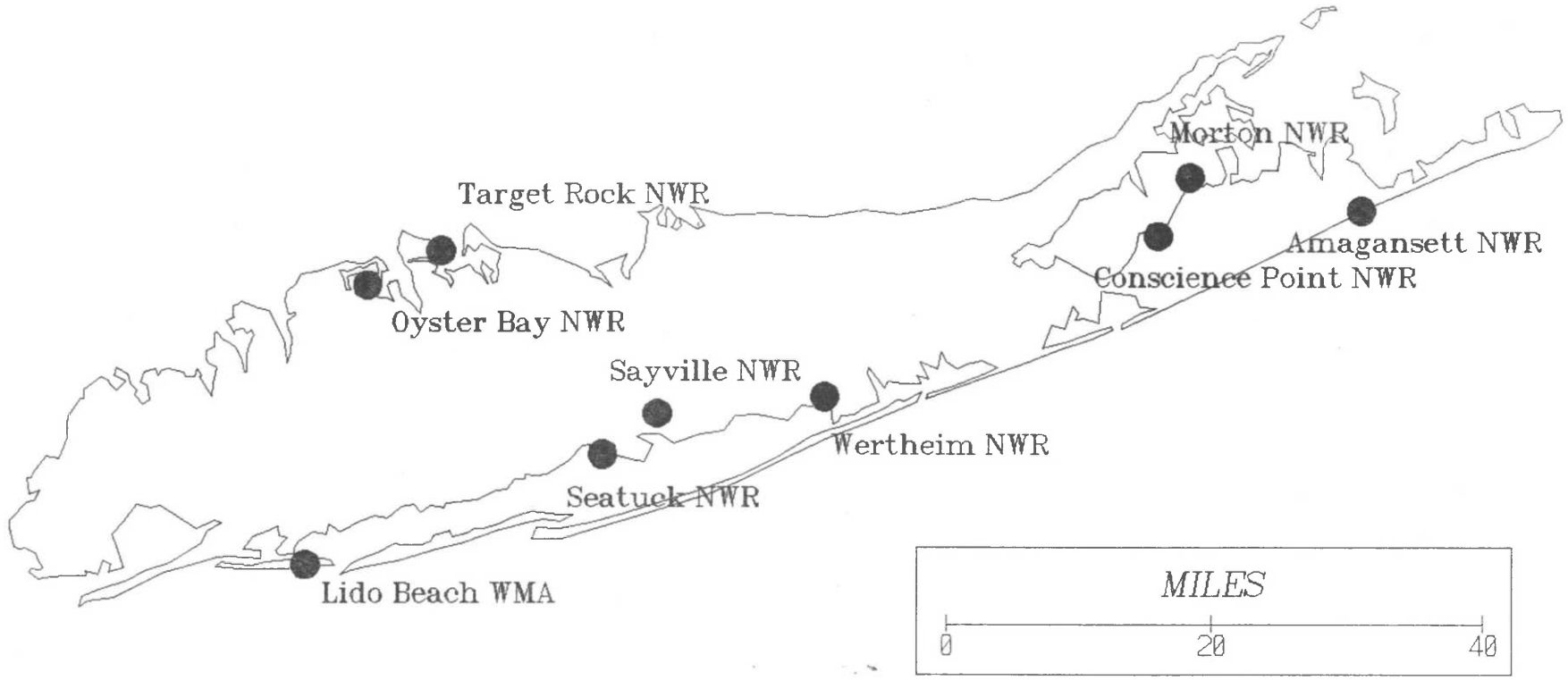
Paul F. Casey — 9-29-94
Acting Refuge Manager — Date

Donald M. Fricke — Oct. 7, 1994
Refuge Supervisor — Date

Donald G. Young — 5-11-95
Regional Office Approval — Date

Wertheim National Wildlife Refuge
Morton National Wildlife Refuge
Seatuck National Wildlife Refuge
Target Rock National Wildlife Refuge
Oyster Bay National Wildlife Refuge
Amagansett National Wildlife Refuge
Conscience Point National Wildlife Refuge
Sayville National Wildlife Refuge
Lido Beach Wildlife Management Area

LONG ISLAND NATIONAL WILDLIFE REFUGE COMPLEX



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LONG ISLAND NATIONAL WILDLIFE REFUGE COMPLEX

The Long Island National Wildlife Refuge Complex consists of nine Refuges. These include the Target Rock NWR, Oyster Bay NWR, Morton NWR, Conscience Point NWR, Wertheim NWR, Amagansett NWR, Seatuck NWR, Sayville NWR and Lido Beach Wildlife Management Area. The Complex totals 6,211 acres - the largest being the Oyster Bay NWR and the smallest Lido Beach 22 acres. The Complex's Refuges occur in Suffolk and Nassau Counties - the two easternmost counties on Long Island, New York.

The first Refuge established was the Morton NWR in 1954. The most recent Refuge, Sayville, was established in 1992. The nine Long Island Refuges were designated as a Complex in 1991. Enabling legislation for the Long Island Refuges include the Migratory Bird Conservation Act, Fish and Wildlife Coordination Act, Refuge Recreation Act and Endangered Species Act. The Wertheim NWR acts as the main office for the Complex but staffed satellite offices are at Target Rock NWR, Seatuck NWR and Morton NWR (seasonal).

Long Island is situated in New York State's coastal lowland zone. Although much of Long Island has been intensively developed, the two western counties are boroughs of New York City, many significant wetlands and upland habitats remain. Long Island has over 750,000 acres of wetlands and over 3000 miles of coastlines. A major portion of eastern Long Island comprises the pine barrens - a unique forest type in the State. The Complex's Refuges, although principally wetlands, contain many of the varied habitat types found on Long Island. The Oyster Bay Refuge is largely a marine system consisting of a sheltered bay of Long Island Sound and associated salt marshes. Amagansett NWR bordering the Atlantic Ocean consists of a unique double dune system. The Morton NWR consists of the Jessup's Neck peninsula in Peconic Bay and has marine beach, salt marsh and oak forest. Conscience Point Refuge, also part of Peconic Bay, contains salt marsh and oak forest in addition to a maritime grassland - one of the rarer habitat types in New York. The Seatuck NWR consists of uplands and salt marsh and borders Great South Bay. The Sayville Refuge contains pine barren vegetation and has potential as a transplant site for the endangered plant - sandplain gerardia. The westernmost unit, Lido Beach WMA, consists of salt marsh and is part of Hempstead Bay. The Target Rock NWR contains a high quality oak forest, representative of north shore forests, and a marine beach adjoining Long Island Sound. The Wertheim NWR contains the Carmans River, a New York State designated Wild and Scenic River, and estuary as well as uplands composed of oak and pine barren vegetation. The major influences and challenges of managing the natural resources

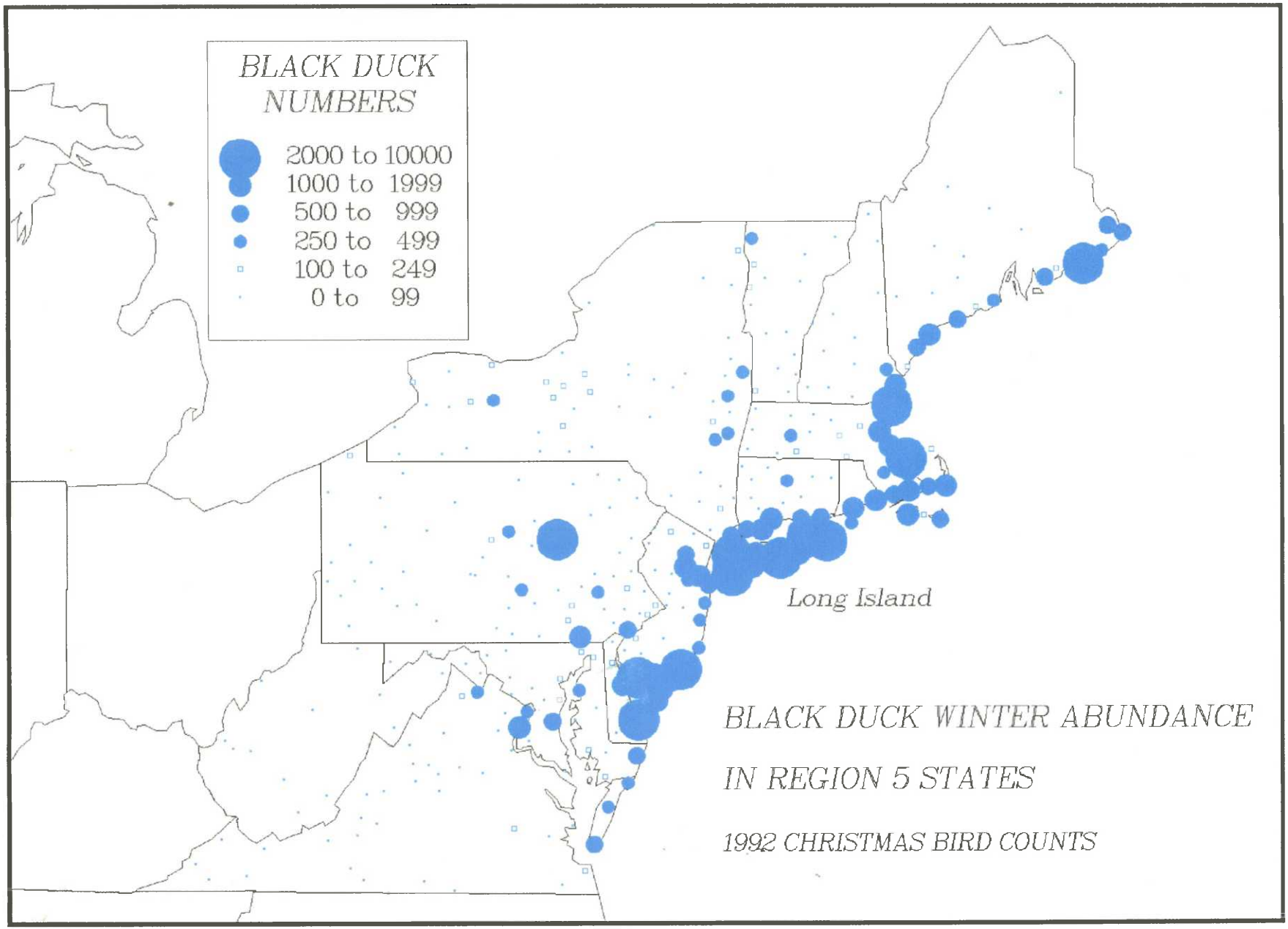
of the Complex's Refuges include ameliorating the problems of urbanization, habitat fragmentation and small Refuge sizes.

Long Island also supports a diversity and abundance of wildlife. Over 300 avian species have been documented including over 130 which breed. The Island supports over 120,000 colonial nesting waterbirds at over 300 breeding sites. Long Island also serves as critical winter habitat for a variety of waterfowl. Mid-winter surveys indicate that sixty percent of all waterfowl in New York State are on Long Island. Long Island also provides winter habitat for black duck, a species declining in range and abundance. A review of Christmas Bird Counts indicates the importance of Long Island for wintering black ducks (see figure on following page). Typically, the highest black duck count on a Christmas Bird Count is either from a Long Island or south New Jersey count. The Island also supports a variety of endangered and threatened birds and sea turtles. Approximately 200 piping plover pairs and 1300 roseate tern pairs breed on Long Island. The Complex's wildlife community is also diverse. In most years, winter waterfowl numbers at the Complex peak at over 10,000 birds although this past winter numbers peaked at over 15,000. The most common waterfowl include greater scaup, black duck, bufflehead, oldsquaw, gadwall and canvasback. Over two hundred and fifty avian species have been documented at the Complex of which over one hundred have nested. Federal and State listed threatened and endangered species documented at the Complex include roseate tern, piping plover, bald eagle, peregrine falcon, ridley turtle, loggerhead sea turtle, leatherback, northern harrier, common tern, least tern and eastern mud turtle.

Visitation to the Complex is close to 400,000 people a year. Most use involves boating, hiking, wildlife viewing and recreational angling. It is estimated that over twenty million people live within a hundred mile radius of the Complex and nearly one million school children are within a two hour drive. Nature trails are available to the public at Morton, Target Rock, Amagansett and Wertheim Refuges. The Target Rock and Morton NWRs offer both beach and upland trails. Boating is a common recreational activity at both Wertheim (canoes) and Oyster Bay Refuges. Recreational angling is permitted at five Complex units.

COMPLEX HIGHLIGHTS:

Several local natural resource groups and the Nature Conservancy have pooled their efforts to form the Friends of the Long Island NWR Complex whose purpose is to seek and facilitate land acquisitions for the Complex (C.3 Wertheim).


BLACK DUCK NUMBERS
2000 to 10000
1000 to 1999
500 to 999
250 to 499
100 to 249
0 to 99
Long Island
BLACK DUCK WINTER ABUNDANCE
IN REGION 5 STATES
1992 CHRISTMAS BIRD COUNTS

A town meeting was held with over 100 participants to discuss the Oyster Bay NWR and local concerns and issues (D.3 Oyster Bay).

Project Leader Stewart served on several Region 5 Planning Teams including Refuge Complexing and Ecosystem Management (D.6 Wertheim).

Contaminant study of Long Island Refuges by USFWS Ecological Services - New York Field Office - completed their fourth field season (D.5 Wertheim).

A tidal survey was completed at the Oyster Bay NWR by the National Ocean Service to delineate the Refuge's boundary - mean high water (D.4 Oyster Bay).

The South Shore Mainland Marshes Restoration Program initiated several wetland projects and secured additional Cooperative Agreements (E.9 Wertheim).

Docks and various land use issues continue to be major concerns at the Oyster Bay NWR (D.4 Oyster Bay).

Wood duck production (nearly five hundred) continued to increase at the Wertheim Refuge (F.2 & G.3 Wertheim).

The 1992 marsh restoration project at the Seatuck NWR continued to exhibit increased wildlife use (F.2 & G Seatuck).

The maintenance and creation of permanent herbaceous forest openings and grassland management continued at the Complex (F.3 Wertheim, Morton, Seatuck, and Conscience Point).

The upland and forest inventory for the Wertheim Refuge was completed (F.3 Wertheim).

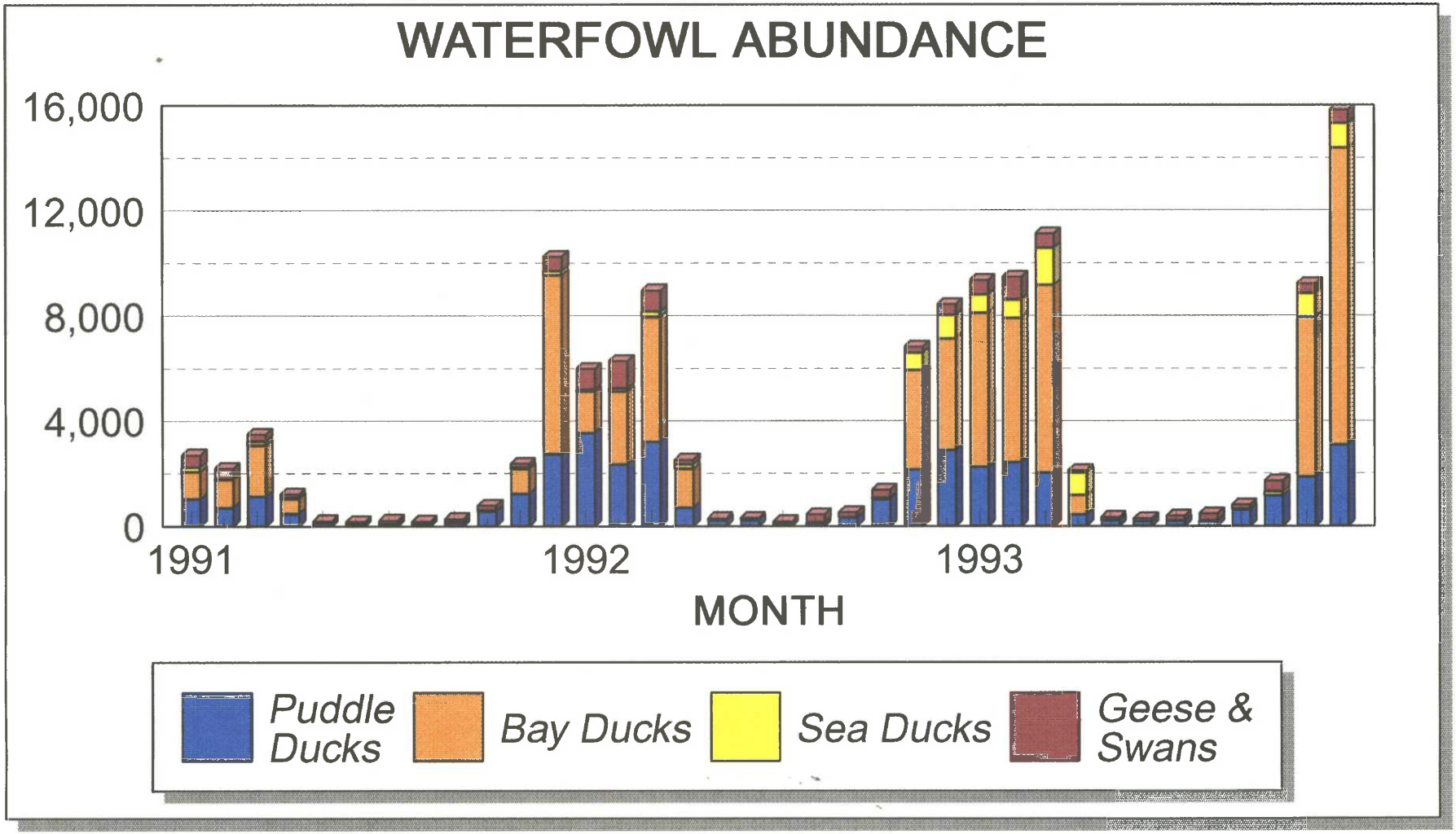
Prescribed burn of great reed was successfully and safely completed at the Wertheim NWR (F.9 Wertheim).

Piping plovers successfully fledged young for the third consecutive year at the Morton NWR (F.2 & G.2 Morton).

Nesting osprey at the Complex increased to nine pair and fledged sixteen young - the most in the last twenty years (G.2 Wertheim, Morton, Seatuck, and Oyster Bay NWRs).

The Long Island Complex in 1993 reached a winter peak of over 15,000 waterfowl (see following figure and G.3 for all Refuges). The Oyster Bay NWR alone peaked at over 12,000 ducks in December (G.3 Oyster Bay).

LONG ISLAND NWR COMPLEX



Wild turkeys were reintroduced on Long Island by New York State and found their way to the Wertheim NWR (G.10 Wertheim).

The Target Rock NWR was closed to the public for six months due to storm damage (H.1 Target Rock). Repairs and cleanup from the winter storms of 1992/93 was a priority at the Complex this year (I.2 Morton, Target Rock, Oyster Bay, Conscience Point, and Amagansett).

Over two hundred volunteers assisted the beach cleanup effort at the Target Rock NWR this summer (E.4 Target Rock NWR).

Major renovations were made to the upland nature trail at the Morton NWR (I.2 Morton).

Black ducks at the Wertheim NWR. RWP - 93.

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K. FEEDBACK

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INTRODUCTION

The Wertheim National Wildlife Refuge is 2,400 acres in size and situated on the south shore of Long Island in Shirley, New York. Wertheim NWR serves as the headquarters of the Long Island National Wildlife Refuge Complex. Refuges managed from Wertheim include Morton, Amagansett, Conscience Point, Target Rock, Oyster Bay, Seatuck, Lido Beach and Sayville.

The Wertheim Refuge is the second largest NWR on Long Island and contains a diversity of habitats. The Refuge is bisected by the Carmans River, a New York State designated Wild and Scenic River and the second longest river on the Island. Yaphank Creek, Little Neck Run, Big Fish Creek and Little Fish Creek all join the Carmans River within Wertheim's boundaries. The Refuge protects one of the last undeveloped estuary systems remaining on Long Island. The USFWS Northeast Estuary Program has recognized the Refuge's wetlands as significant coastal habitat.

Approximately half the Refuge is composed of aquatic habitats and the other half upland habitats. Aquatic habitats at Wertheim include marine bay, tidal river, freshwater streams, ponds, salt marsh, brackish and freshwater marsh, red maple swamps and shrub swamps. Uplands, aside from a small portion in old field and brush, include the following forest types: mixed oak, oak-pitch pine, pitch pine, red maple, red cedar and others.

Because of the diversity of Wertheim's habitats, most wildlife species known to occur on Long Island have been documented on the Refuge. The Refuge supports use by over 240 avian species of which over one hundred breed. The Refuge provides important winter habitat for waterfowl as the Carmans River is one of the last water bodies to freeze on the south shore. Approximately two thousand ducks winter at Wertheim principally black ducks. The Refuge also supports the largest breeding population of wood ducks for any park or preserve on Long Island. Federal and State listed endangered and threatened species which have been documented at Wertheim include: bald eagle, peregrine falcon, roseate tern, common tern, least tern, eastern mud turtle, loggerhead sea turtle and northern harrier.

Public use of the Refuge is principally the Carmans River for canoers. A parking area and associated portage trail is open daily for the public to launch their watercraft. A one mile long nature trail, through pine barrens, located at the center of the Refuge is also available for canoers. Recreational angling for trout, white perch, blue claw crab and other gamefish

is also permitted at Wertheim.

Wertheim NWR was acquired by the USFWS in 1947 as a donation from Cecile and Maurice Wertheim, who maintained the area as a private reserve for waterfowl hunting. An additional donated parcel was added in 1974. The lands for the Refuge were acquired under the Migratory Bird Conservation Act and the Refuge Recreation Act.

Autumn foliage along the Carmans River. J. Hollingsworth - 93.

A. HIGHLIGHTS

US Fish and Wildlife Service Ecological Services - New York - completes the fourth field season of their contaminant study of the Long Island NWR Complex and are in the process of releasing the results from the 1992 season (D.5).

The Refuge receives the benefits of a crew from the Suffolk County Youth Conservation Corps this summer (E.2).

The South Shore Mainland Marshes Restoration Program initiates several wetland projects and secures additional Cooperative Agreements (E.9).

Staff complete the cover typing and base map of the Refuge on the Complex's geographic information system (F.1) and include in the system information on forest and upland characteristics from the forest inventory which was completed this year (F.3).

Creation and maintenance of permanent herbaceous forest openings continued this year (F.3).

Prescribed burn of great reed is successfully and safely completed (F.9).

Wood duck production continues to increase at Wertheim (F.2 and G.3).

Wild turkeys are reintroduced on Long Island by New York State and find their way to Wertheim (G.10).

B. CLIMATIC CONDITIONS

The climate of Long Island is greatly modified by the Atlantic Ocean and is categorized as humid-continental. The climate is dominated by continental influences and the proximity of the ocean produces a significant maritime influence. These climate characteristics result in an extended period of freeze-free temperatures, a reduced range in both diurnal and annual temperature, and heavy precipitation in winter relative to that of summer as compared to other areas in southern New York.

Temperatures are highest in July and August and most severe in January and February. Daily high temperatures above 90 F occur on average ten days a summer. The growing season is from 200 to 210 days. A temperature of 0 F or colder is recorded on one or two days annually. Yearly rainfall averages 43.4 inches. The snow season is from late December through early March; snowfall averages 26 inches. Reduced precipitation occurs during June, July and September and months of high precipitation include March, August,

November and December.

Total rainfall and snowfall for 1993 was similar to the ten year average. However, monthly rainfall was skewed and the period between May and August received little precipitation. Monthly minimum and maximum temperatures for 1993 were well within the ten year ranges. Although, summer temperatures particularly in July and early August were warmer than normal with a substantial increase in the number of 90 degree plus days. The climatological data (in the table at the end of this section) was recorded at Long Island MacArthur Airport at Islip, NY, which is situated approximately ten miles west of the Wertheim NWR; the data is also fairly representative of climatological conditions for the other Long Island Refuges.

High water from storm tide at salt marsh. Storms caused numerous problems on the Complex this year. RWP-93

Weather caused numerous problems on the Complex this year. In December 1992, a major northeast storm hit Long Island. Damage from this storm in terms of shore erosion and flooding was great and the Island was declared a disaster area. Damage to the Refuges included severe shoreline erosion, loss of signs, structure damage, and the large quantities of storm tossed debris left on the Refuges. An additional storm coupled with a blizzard

occurred in March 1993 which further exacerbated the damage which occurred in December. The March storm also caused additional problems of heat shutdowns in some structures, frozen pipes, high water breached Refuge roads and impoundments, and the snow removal required significant resources to keep Refuges open. Some of the problems caused by these storms kept the staff busy through the first half of 1993.

Aside from winter storm damage, the summer of 1993 was the driest for the last forty-four years (according to Brookhaven Lab) - precipitation during the summer months was less than a third of normal. The lack of rain and high temperatures resulted in an increase in the fire danger and the south shore of Long Island experienced a substantial increase in the number of fires. The Connetquot State Park experienced a large fire requiring several fire departments to control it and wooded areas along the Sagtikos Parkway experienced numerous fires where reburning of the area was occurring for three weeks. Numerous small burn areas could be seen from most major roads on the south shore. Fortunately the Complex did not have an increase in the number of fires this year. The drought also caused problems in maintaining vegetation in herbaceous forest openings and in maintaining water levels in impoundments and ponds.

1993	Temperature (F)		Precipitation (inches)	
MONTH	Maximum	Minimum	Rain	Snow
January	41.7	27.5	2.6	2.3
February	36.9	19.8	3.6	10.9
March	44.4	29.1	5.4	13.3
April	57.5	41.3	3.0	0.0
May	70.7	50.9	1.4	0.0
June	77.6	60.4	1.3	0.0
July	84.8	66.5	2.0	0.0
August	80.7	65.4	1.6	0.0
September	72.6	58.2	4.1	0.0
October	65.5	50.2	4.8	0.0
November	56.6	37.2	3.8	0.0
December	46.4	32.2	5.2	0.3

C. LAND ACQUISITION

2. Easements

Complex and Division of Realty staff with the Town of Brookhaven obtained utility easements for the Suffolk County Water Authority to install water mains at the Wellington Unit of the Wertheim NWR. The easements allowed for hook-ups to a municipal water system for two Refuge residences located in Brookhaven Hamlet, an area where many private wells have been contaminated.

3. Other

Complex Biologist R.W. Parris visited a land parcel, Montauk downs, at the request of the Regional Office Realty Section in January. The site has a population of sandplain gerardia, an endangered plant, and the property may be suitable for acquisition. Sandplain gerardia is only known from twelve locations in North America. A LARC presentation check list and memorandum on the property was forwarded to the Regional Office for their consideration in February.

In January, the Complex received inquiries from the offices of Senator D'Amato and Congressman Hochbrueckner concerning the Services's interest in the Southaven property. The Southaven parcel is one of the few undeveloped properties left adjacent to the Wertheim NWR.

In February, the Southaven Properties Coalition contacted Complex staff several times to clarify the Service's position on the Southaven parcel. The Coalition was assisted and further referred to the Realty Section in the Regional Office. The group contacted Senator Moynihan's office in an effort to have the Service acquire this property.

Complex staff were contacted in February by the South Fork/Shelter Island Chapter of the Nature Conservancy concerning the Service's interest in Gardiner's and Robins Islands.

In February, a constituent of Senator D'Amato requested through the Senator's office information on how to obtain federal funds to protect Udalls Cove in northeast Queens, New York. Complex staff worked with Ms. Mary Varteresian in Region 5 Realty to prepare a response for the Regional Director. It was determined that this area may not be an appropriate candidate for Service acquisition and inclusion into the NWR system.

Complex Biologist R.W. Parris and Mr. Walt Quist from the Regional Office - Realty met with Congressman Hochbrueckner and New York State Assemblyman Engelbright regarding the Service's potential acquisition of the US Navy's Calverton property. Assemblyman Engelbright was interested in determining the Service's interest in preventing private development of the area and other natural resource management concerns. The Calverton property contains a sizable amount of pine barren habitat.

In April, PL Tom Stewart met with the Brookhaven Village Association to discuss the Southaven Properties, and possible acquisition of an adjacent school as a site for an Environmental Education Center. Ms. Marilyn England, spokesperson for the Southaven Properties Coalition, made contact with Complex staff several times this spring concerning the property.

Information on Robin's Island and the federal property at the Calverton New York Naval facility was provided to the Regional Realty Office in July at their request. Also in July, information on Southaven Properties was provided to the Service's Washington office.

In August, PL Tom Stewart met with Ms. Phyllis Reich of the Trust of Public Lands for a tour of the eastern Long Island Refuges. The Trust for Public Lands is interested in assisting with new acquisitions for Long Island.

In September, the Region 5 Realty Office was contacted regarding a potential inholding by the fishing access site at the Wertheim NWR. The information was requested because of proposed improvements at the site for handicapped access. Investigation indicated no inholding at that particular Refuge tract.

In October, staff from Region 5 Realty and the Complex were asked to assess Calverton's natural resource value by Congressman Hochbrueckner's office.

Complex Biologist R.W. Parris examined a ten acre land parcel situated to the southwest of the Wertheim NWR as a potential acquisition site at the request of the landowner.

A meeting among natural resource agencies and groups on Long Island to discuss land acquisitions by the USFWS was held at the Wellington facility on the Wertheim Refuge in December. Groups participating included the Nature Conservancy, Brookhaven Open Space Council, Peconic Land Trust, New York Department of State, and others. Complex staff and Mr. Walt Quist of the Region 5 Realty Office attended. Items discussed included the federal land acquisition process and lands on Long Island which would be suitable acquisitions for the Complex. Several groups also summarized their activities regarding land acquisition during the preceding year on behalf of the Complex. A consensus of participants at the meeting decided to form a "Friends of the Long Island NWR Complex" organization to promote and facilitate the acquisition of lands for the Complex. A second

meeting is planned for the early part of 1994.

D. PLANNING

2. Management Plan

Planning progressed in fits and starts this year partially due to staff shortages and to temporary assignments or lengthy training courses. However, significant progress was made on the Complex's Safety Plan and Wertheim's Upland and Forest Management Plan. It is likely both these plans will be completed in 1994. Progress was also made on the Complex's Law Enforcement Plan.

The CY1993 annual burn plan for the Wertheim NWR was submitted to and approved by the Regional Office. The annual burn plan dealt with the prescribed burn of great reed at the Big Fish Creek Impoundment. The burn was conducted in March of this year.

Project Leader Tom Stewart and Complex Biologist R. W. Parris met with the Assistant Regional Director to discuss potential white tailed deer management programs for the Wertheim and Seatuck NWRs. It was decided that the Complex should initiate the planning process for management at these two Refuges.

Complex Biologist R. W. Parris met with the New York State Department of Environmental Conservation (NYSDEC) Deer Biologist for Long Island to discuss deer management programs on Long Island and applicability to the Long Island Refuges. Meetings between the Complex and the NYSDEC and other interested groups concerning this program will continue. The Complex requested and received information on the white tailed deer management program at the Minnesota Valley NWR and on the deer contraception study currently underway at the Fire Island National Seashore.

3. **Public Participation**

Assistant Secretary of the Interior Hayden visited the Oyster Bay and Target Rock NWRs in January. Project Leader Tom Stewart showed the Secretary the storm damage at the Target Rock beach, and at Oyster Bay NWR. Large numbers of wintering waterfowl were present at Oyster Bay during the trip. PL Tom Stewart reviewed with the Secretary many of the issues concerning the Oyster Bay NWR. The Secretary then went on to the Fire Island National Seashore to view their storm damage.

Congressman Peter King's staff attempted to visit the Target Rock and Oyster Bay NWRs during January in order to assess storm damage but their visit was precluded by inclement weather.

ARM Bill Kolodnicki attended a meeting at Great Meadows NWR on public outreach in Region 5. The meeting was concerned with developing more effective outreach programs by the Service in the Region. The Complex intends to remain active in this project.

ARM Bill Kolodnicki met with members of the Brookhaven Village Association to discuss littering, dumping and related problems near the Squassux Landing area on the Wertheim NWR. Members of the association participate in a monthly clean-up of that area and the group thinks that fence repairs along the Refuge boundary would help to control dumping. As a result of this meeting, the Refuge plans to extend the fence along the Squassux Landing Tract. This would be a cooperative effort with the Association in an attempt to control dumping and vandalism in that area.

4. Compliance with Environmental and Cultural Resource Mandates

The New York State DEC contacted the Complex regarding continued sampling for contaminants at two underground oil tank sites at the Wertheim NWR. The tanks had been removed in 1989 and the DEC felt there may have been oil leaks. A contractor, Environmental Assessment and Remediation, was contacted in August to obtain samples from the test wells previously installed at the sites. The results from this sampling activity were forwarded to the NYSDEC. Based on these results the NYSDEC indicated no additional sampling at these sites would be required and that these sites would be removed from their active list of oil spill sites.

Complex staff met with Ms. Diane Mann-Klager of the USFWS Ecological Services New York Field Office in April regarding the draft report on the second field season of contaminant sampling at the Long Island Complex. The report was released later in the month.

Complex staff provided Mr. Charles Merkel from the Ecological Services Long Island Office a tour of the Morton and Conscience Point NWRs in anticipation of his contaminant work on these two Refuges.

Regional Historic Preservation Officer John Wilson and Assistant Historic Preservation Officer Rick Kanaski conducted an archaeological investigation along the route of a proposed waterline to be installed at the Wellington Facility at the Wertheim NWR. Their determination noted that the proposed project would have "no effect on significant archaeological or historical resources".

Applications for permits for improvements to the fishing access site at the Wertheim NWR were submitted to the New York State DEC, the US Army Corps of Engineers (New York District), and the Town of Brookhaven. A Consistency Certification was also provided to the New York State Department of Coastal Zone Management Program. The project involves construction of a stone dust trail, and construction of a canoe launching dock and two small fishing platforms in the Carmans River.

A determination that the Complex has no mercury or nonmercury gas meters was provided to Mr. Tim Fannin, Ecological Services (RO).

Information was provided regarding compatibility problems and issues at the Oyster Bay NWR to USFWS's Washington, D.C. office.

5. Research and Investigation

Long Island NWR Complex NR90 Contaminant Study of the Long Island National Wildlife Refuge Complex.

In 1990, biologists from the Cortland USFWS Ecological Services Office began investigations of contaminant levels at the Long Island Complex. Initial sampling occurred at the two largest Long Island Refuges: Wertheim and Oyster Bay NWRs. Sediment, pore water, and surface water samples were taken from both Refuges to ascertain the levels of deleterious substances as well as for conducting bioassay. Snapping turtles were also collected from the Wertheim Refuge for analyses.

The Ecological Service Office's activities during the first sampling season drew a great deal of interest from the local media and local municipalities. This interest resulted in an interview on a local news station and generated several newspaper articles as well as queries on sampling results from local municipalities particularly those adjacent to the Oyster Bay NWR and from local environmental groups. Interest in this activity by the media and others remained high through 1991 with many queries for the results of the sampling.

During the second sampling season, soil and sediment samples were collected from the Wertheim, Amagansett, and Oyster Bay NWRs. Results from the this sampling season were released in 1992 - "Preliminary Assessment of the Long Island National Wildlife Refuge Complex Environmental Contaminants Background Survey - Second Year Results". The last paragraph of this report's summary read as follows:

"The 1991 sediment sampling results at Wertheim NWR and Oyster Bay NWR confirmed the 1990 findings. There is a transport of contaminants onto these refuges. On Wertheim NWR, three areas can be considered depositional areas which indicate the maximum contamination on the refuge. The biological uptake of the contaminants discovered in the

sediment at both refuges needs to be determined."

The 1992 report, like its predecessor, indicates that in certain areas of both Refuges there was cause for concern regarding contaminant burdens. The report also recommended additional sampling at both Refuges to confirm earlier results as well as to better delineate problem sites. Sampling at other Refuges of the Complex was also recommended.

Both the 1991 and 1992 reports alerted the NYSDEC to possible contaminant problems in areas adjacent to the Oyster Bay NWR. These reports led the State to examine certain off Refuge sites as potential contaminant sources (see D.4, Oyster Bay NWR).

Both the Oyster Bay and the Wertheim NWRs were sampled again during the 1992 field season. Aside from sediment, biological specimens were also obtained for Wertheim (American eel, banded killifish and snapping turtle) and Oyster Bay (blue mussel and silversides). In addition, sediment and surface water samples were taken from the Seatuck and Target Rock NWRs.

During the winter of 1992/93, it was decided by Ecological Services to split the contaminant study between the Cortland Field Office and the Long Island Field Office. The Cortland Field Office would finish the results from their three field seasons and continue to address issues at the Oyster Bay NWR and the Long Island Field Office would initiate field work at Morton, Lido Beach, Sayville and Conscience Point NWRs.

The Cortland Field Office is still awaiting the complete analyses of samples collected during the 1992 field season. Analyses of environmental contaminant residue from sediment, soil, and biotic samples collected from Wertheim, Seatuck, Oyster Bay and Target Rock NWRs in 1992 are not yet complete. A preliminary review of the results already received suggests that some heavy metals are elevated in sediment and soil from Target Rock, Seatuck, and Oyster Bay NWRs. Snapping turtles, American eel, and banded killifish samples from Wertheim NWR and blue mussels and Atlantic silversides from Oyster Bay NWR have concentrations of some heavy metals and polychlorinated biphenyls (PCB) greater than predator protection levels.

The Long Island Field Office initiated field work at four Refuges. At most of these areas, samples of surface water and sediment were obtained. At select Refuges, aquatic organisms were also collected for analyses. Results from this work are expected early in 1994.

Wertheim NR92 Survey of the Eastern Mud Turtle (Kinosternum subrubrum) at Selected Long Island Sites.

The eastern mud turtle is listed by the NYSDEC as a threatened species. Although formerly well distributed, the species is presently known to exist at less than ten areas in

the State, one of which is the Wertheim NWR. A cursory investigation on mud turtles at the Refuge was conducted by a local researcher in 1990. The current project which is funded by the NYSDEC is in its second field season.

The study has three principal objectives: 1) the identification of and field checking of historic and known eastern mud turtle sites and field checking of suitable habitat to locate currently unknown populations, 2) the setting of and tending of turtle traps in suitable areas identified, and 3) a radio telemetry investigation to determine habitat use and movement-behavior of mud turtles at the Wertheim NWR.

During the first field season, researchers N. Soule and A. Lindberg radio-tagged ten mud turtles and followed their movements from June through September at Wertheim. During the second field season an additional four turtles were radio-tagged. Turtle movements were monitored from time of capture through hibernation. Aquatic home ranges for radio-equipped mud turtles are provided on the following page.

Two reports submitted to the NYSDEC have been received on this project. The first report dealt with the results of trapping historical and potential mud turtle habitats on Long Island. The second dealt with the movement behavior and habitat use at the Wertheim Refuge.

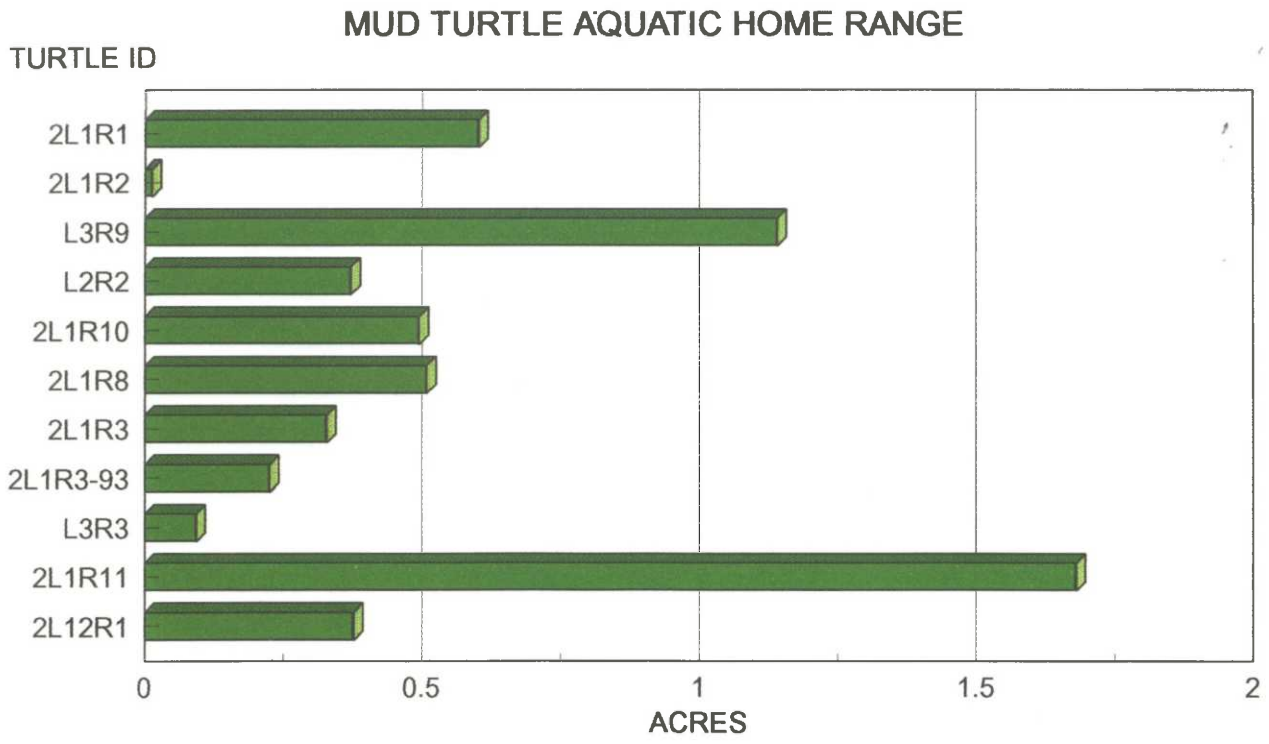
Seatuck NR91 <u>An Analysis of the Small Mammal Population at Seatuck NWR</u>.

This study was conducted by graduate student Ms. Alexandra Krevitz of Hofstra University as part of an independent study course. The investigation consisted of monitoring through live-trapping the composition and abundance of the small mammal community at the Seatuck Refuge. Additional live trapping was also conducted during 1992 at the Morton Refuge for comparative purposes. At Seatuck, the trapping effort consisted of over 800 trap nights. The results indicated that the Refuge has an impoverished small mammal community both by species composition and by abundance when compared to other areas and other Long Island Refuges. Several possibilities were suggested to account for the depauperate small mammal fauna at Seatuck.

Conscience Point NR89 <u>Floristic Characterization of Maritime Grasslands in New York</u>.

In an effort to describe the flora of the maritime grassland community in New York and to establish baseline data that can be monitored over time, researcher Dr. Robert Zaremba of the New York Nature Conservancy established permanent plots at Conscience Point NWR in 1989. This activity is also being used to produce a Nature Conservancy Fact Sheet on Long Island maritime grasslands. This project was inactive this past year.

WERTHEIM NWR



Aside from the studies previously mentioned several special use permits were issued for other research related activities. A special use permit was issued in March to the Seatuck Foundation to collect several cranberry rhizomes during April at the Amagansett NWR. The Foundation was providing assistance to a researcher who is examining the genetic diversity of cranberries in the Middle Atlantic States. A special use permit was also issued to Professor Rowland of Indiana State University to collect sticklebacks from the Carmans River at the Wertheim NWR. Professor Rowland is interested in the taxonomy of the species. A special use permit was issued to the Seatuck Foundation to conduct bird observations at the Seatuck NWR on a biweekly basis. A permit was issued to a researcher to collect a small number of short tailed shrews from the Wertheim and Morton NWRs. The researcher is interested in the chemical nature of the shrew's toxin. A special use permit was also issued for a researcher to collect a small number of goldenrod at the Wertheim NWR. The investigator is interested in the subspecies of seaside goldenrod present on Long Island.

6. Other

PL Tom Stewart served on two total quality management teams this past year. The first team was involved with the Complexing of Refuges in Region 5. The team examined what savings might occur if more Refuges were Complexed in the Region. A report was issued in summer. PL Tom Stewart also served on the Ecosystem/Watershed Management team. Their purpose was to examine if an ecosystem approach in the Region might produce more effective natural resource management than the current program approach (i.e., Refuges, Ecological Services, Law Enforcement, etc.). The idea and report on ecosystem/watershed approach is being seriously considered as a critical management option and opportunity for this Region.

E. ADMINISTRATION

1. Personnel

The Complex was understaffed this year. The Deputy Project Leader and Outdoor Recreation Planner positions remained vacant throughout the year due to budget constraints. No Student Conservation Association Volunteers were available to the Complex because of a lack of funds. Completing projects and meeting deadlines, which had formerly been considered routine, became a trying experience for the remaining staff.

Project Leader Thomas Stewart. RWP - 93.

The following was the Complex staff roster for 1993:

(1) Thomas Stewart, Project Leader, GM-13, PFT, EOD 8/14/88.

(2) Barbara Pardo, Deputy Project Leader, GS-12, PFT, EOD 6/4/89, transferred to Sherburne NWR 1/24/93. Position remained vacant throughout the year.

(3) William Kolodnicki, Refuge Operations Specialist, GS-11, PFT, EOD 12/3/90.

(4) Kathryn Jahn, Refuge Operations Specialist, GS-9, PFT, EOD 10/6/91. Leave without pay status starting 10/01/93 through 1/10/94. Kathryn was on maternity leave and on 6 October gave birth to Jennifer Rose, her second daughter.

(5) Robert Parris, PhD, Wildlife Biologist, GS-11, PFT, EOD 1/27/91.

Complex staff: Bob Woerner, Bill Kolodnicki, Kathryn Jahn, Jim Bowden, Esther Hernandez, Bruce Marto and Bob Parris. MG - 93.

(6) Outdoor Recreation Planner, GS-9, PFT. Position remained vacant the entire year.

(7) Bruce Marto, Engineering Equipment Operator, WG-10, PFT, EOD 4/4/71.

(8) James Bowden, Maintenance Worker, WG-8, PFT, EOD 3/10/91.

(9) Esther Hernandez, Office Assistant, GS-6, PFT, EOD 12/17/90.

(10) Robert Woerner, Laborer, WG-3, TFT (TAPER), EOD 7/14/91.

(11) Michael Glova, Forestry Technician, GS-4, TFT, EOD 4/4/93.

(12) Philip Seifert, Forestry Technician, GS-4, TFT, EOD 5/3/93, terminated 9/30/93.

Seasonal Forest Technicians Phil Seifert and Mike Glova by weather station. RWP - 93.

2. Youth Programs

In April, the Complex made initial contact with the Suffolk County Department of Labor to inquire about the use of a Youth Conservation Crew (YCC) at the Complex. Suffolk County's YCC program recruits only disadvantaged youths and seeks to expose those in

Suffolk County YCC crew used at the Refuge this summer. KJ - 93.

the program to a daily work experience and routine. Youths between the ages of fourteen and seventeen are targeted for the program. The County had over fifty YCC crews this year and each is assigned to one park or Refuge. Preliminary meetings with the Department of Labor determined which activities the crew could work on and realistically accomplish. The crews are limited to the use of hand tools only. To further obtain the most from the crew a Complex employee was assigned to the crew on a rotating basis to facilitate and provide directions for work assignments.

The crew began work on the Complex during the first week of July and completed their work at the end of August for a total of eight weeks. The Complex staff provided the crew every Monday morning with a presentation on the USFWS's programs or on facets of the Long Island Complex. Several topics covered in these presentations included overview of the Complex, Long Island wildlife, wetland restoration programs, piping plover biology, basic fire fighting skills, hand tool safety and the continental waterfowl resource.
The crew's efforts resulted in brush being cut back from over fourteen miles of trail at Wertheim, building over twenty brush piles, assisting with the clearing of five new forest openings, constructing twenty waterfowl nest baskets, removing downed hazard trees from improved grounds, clearing brush from two miles of public use trail at the Morton NWR,

cleaning and reorganizing the flammable shed and pole barn, and cleaning up Refuge grounds. All crew members worked the entire eight weeks and provided the Complex with over 2500 man hours of labor.

Project Leader Stewart presenting certificate of appreciation to YCC crew boss. RWP - 93.

A recognition ceremony was held on 18 August at which each member of the crew received framed certificates and other mementoes of their summer at the Complex. The crew was visited at the work site on one of their last days by the Suffolk County Commissioner of Labor Michael Falcone who commended them on their work. The Commissioner visited only a few of the over fifty county YCC crews in August and commented on how well this crew had worked.

4. Volunteer Program

In the past four years, the Complex has averaged over 2,300 man hours of volunteer activity on an annual basis. This year, we had over 5,000 man hours of volunteer activity. The big increase was largely due to the use of a Suffolk County YCC crew and the use of

a corporate sponsor volunteer program for a beach clean-up. With several unfilled staff vacancies this year, the volunteer program proved a tremendous asset to the Complex.

As in previous years, many volunteers assisted with filing and administrative tasks, answering the phones, road clean-ups, checking and the repair of songbird nest boxes and wood duck nest boxes, trail maintenance, and checking on buildings at unstaffed Refuges. A get together to thank the Complex's volunteers was held at the Wellington facility at Wertheim in December.

A large number of volunteer man hours was provided for the Target Rock NWR's beach clean-up. Several large corporate sponsors (i.e., Olympus, Newsday, Grumman, IBM and others) provided volunteers to remove by hand large amounts of storm deposited debris from the Refuge beach. The volunteers worked for three weekend days and on the last day over one hundred volunteers were on hand. Due to the efforts of these volunteers, the Complex was able to reopen the Target Rock NWR to the public shortly after the cleanup.

In March, Maintenance Worker Bowden and volunteers conducted a clean-up of Smith Road bordering the Wertheim NWR. Several truck loads of debris were removed from the road's border.

The Old Brookhaven Association cleaned up the litter at the Squassux Landing area by Wertheim on a monthly basis.

Mr. Adrien Taunguay was selected as the Natural Resources Intern for the Morton NWR. In past years, a student through the Student Conservation Association (SCA) was selected to staff the Morton Refuge during the piping plover and tern breeding seasons. Unfortunately budget restrictions precluded the use of the SCA program. Fortunately through an intern program of Colorado State University we were able to get an intern for ten weeks for the Morton Refuge.

Ms. Miriam Rapalt a student at Long Island University also did part of an internship at the Target Rock and Oyster Bay NWRS. Miriam principally worked on the nature trail guide for Target Rock NWR.

5. Funding

Based on the final printing of the Regional Goals and Objectives ("Blue Book") in 1993, the following was the fund target for the Long Island NWR Complex (by project type and funding source):

Minimum Level (11.0 FTE salaries and fixed costs)	$456,773
MMS and Base Maintenance	$49,050
Watchable Wildlife	$4,200
Volunteer Programs (SCA)	$0
Fire Management (Presuppression)	$24,500
Challenge Grant	$30,000
Private Lands (Wetland Restoration)	$26,000

Subsequent adjustments to the budget included adding projected rental receipts from Refuge quarters, salary adjustments of staff and elimination of select funded projects. The final end-of-year budget figures were as follows, by subactivity:

1261 (Operations)	$338,568
1262 (Maintenance)	$191,087
1230 (Habitat Restoration)	$26,000
8610 (Quarters)	$2,643
9120 (Fire Management)	$24,500
TOTAL	$582,798

6. Safety

Safety meetings were typically conducted on a monthly basis for the Complex however due to staff shortages and absences, meetings were frequently held after staff meetings when all personnel were present and in some instances safety meetings were combined for two months to facilitate complete staff attendance.

Several safety meetings were held on fire fighting both before and after this year's prescribed burn at the Wertheim Refuge. Videos on fire watched by all staff included urban fire fighting, fire safety, and proper hand tool use. Other topics presented were as follows: Employee's Assistance Program, Lyme disease prevention, chain saw safety, hand tool safety, home safety, the step test for fire fighters, boating safety and proper operation of heavy equipment.

Tail gate safety sessions were also a common method employed this year to address safety training. Tail gate sessions included chain saw safety, pumper operation, hand tool use,

mower safety, and use of fire hand tools.

Fire training this year included basic fire fighting for ARM Bill Kolodnicki and Biologist R. W. Parris, chain-saw and pumper operation for EEO Bruce Marto and Laborer Bob Woerner, and Wildfire in the Urban Interface for Biologist R. W. Parris.

A Special Use Permit was issued to the Brookhaven Ambulance Company providing them with keys to the entrance gate at the Wertheim NWR for access in an emergency when the Refuge is closed or when Complex staff are not available.

During the summer, safety guards were installed in all Complex pick up trucks to protect the back window and riders when loading or hauling equipment.

In November, seven staff members successfully completed a Defensive Driving Course. Refuge staff attended the course with personnel from the nearby Fire Island National Seashore.

In December, PL Tom Stewart prepared and circulated a memorandum to all staff regarding safe watercraft procedures for the Complex.

In early January 1994, all Complex staff successfully completed CPR and first aid training.

Annual comprehensive physical examinations were completed for all Complex Officers by February of 1993. Physical examinations for 1994 were completed for officers and Complex firefighters in December of 1993.

The following table describes station accident/incident reports filed in 1993. As in previous years, tick bites were the most commonly reported incident.

Date	Incident	Personal Injury	Property Damage
4/11	Vehicle Hit Snag	NA	Damage to Fender
5/14	Vehicle Hit Pipe	NA	Damage to Fender
5/24	Contact with tick	Tick Bite	NA
5/29	Contact with tick	Tick Bite	NA

6/10	Contact with tick	Tick Bite Lyme Disease	NA
6/18	Contact with tick	Tick Bite	NA
6/22	Contact with tick	Tick Bite	NA
7/5	Contact with tick	Tick Bite	NA
7/6	Contact with tick	Tick Bite	NA
7/8	Contact with tick	Tick Bite	NA
7/20	Contact with tick	Tick Bite	NA
7/30	Poison Ivy	Rash	NA
7/31	Vehicle Damaged While Being Loaded	NA	Wind Screen Broken
8/11	Accident While Sharpening Hand Tools	Cut Hand	NA
11/12	Contact with tick	Tick Bite	NA
11/17	Accident While Fixing Gate	Leg Injury	NA

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7. Technical Assistance

Complex Biologist R. W. Parris was appointed to a project action team with personnel from other agencies to develop a plan for reducing nuisance wildlife problems at Hecksher Park - part of the New York State Park System. The park's deer and red fox have become tame and readily approach the public for handouts - long term feeding of wildlife by the public and the park has produced this result. Concern was expressed by the park's staff that public safety could be jeopardized by this situation. By the end of March, the team produced a plan to reduce these negative interactions. The plan will be implemented beginning in September.

Complex staff participated in the waterfowl count sponsored by the Federation of New York State Bird Clubs (FEDNYSBC) by censusing the waterfowl at the Wertheim NWR.

The FEDNYSBC annually conducts a winter waterfowl survey throughout New York in January.

All geese encountered on Complex waterbird surveys were checked for neck collars. RWP - 93.

Radio telemetry data for eastern mud turtles, a New York State threatened species, at the Wertheim NWR was input into the Complex's geographic information system. The information was provided by the turtle researchers who wanted the output and analyses from the system.

Mr. William Drummond (RO Realty) and two National Oceanic and Atmospheric Administration staff inspected the Oyster Bay NWR with ARM Bill Kolodnicki and Biologist R. W. Parris in March to determine monitoring sites for tidal gauges in the Refuge. The Complex is seeking to better delineate the mean high water which is the Refuge's major boundary. Eleven sights were identified as possible gauge locations.

Information on neck collared Canada geese observed on the Complex were provided to the New York State DEC - which is collecting the observations for Long Island. During the winter of 1992/93, information on over six thousand goose sightings, of which 27 were

collared birds, was submitted to the State. Information is also being collected this winter, thus far 53 collared birds have been documented.

Information on mute swan numbers at the Wertheim NWR was provided to the NYSDEC at their request for their Long Island summer swan count which is conducted once every three years.

Information on piping plover numbers and nesting colonial waterbirds at the Complex was forwarded to the NYSDEC for their annual survey of nesting waterbirds on Long Island.

Information on digitizing tablets and similar input devices was provided to personnel at the Key Deer NWR at their request.

Weather data, in particular wind direction and speed, for the month of June were obtained from the Brookhaven National Lab and forwarded to personnel in the National Oceanic and Atmospheric Administration who requested the data for their efforts in measuring mean high water at the Oyster Bay NWR.

Mr. Dennis Jorde, Biologist with the Branch of Migratory Bird Research, was provided information on habitats, management and biological programs at the Complex.

The Gateway National Park was provided information on great reed control methods and efforts at the Long Island NWR Complex. The Park requested the information because they are trying to reduce reed habitats.

Information on the Complex's wood duck nest box program was provided to Dr. Rebecca Field of the Massachusetts Cooperative Fish and Wildlife Research Unit at her request.

A response was forwarded to Mr. Dennis Jorde of the Patuxent Wildlife Research Center regarding wildlife inventory at the Complex and research needs.

Mr. John Hollingsworth, one of the photographers who produce the National Wildlife Refuge Calender, was provided access to the Morton, Conscience Point, Wertheim and Seatuck NWRs to photograph wildlife and habitats. Several of his photographs were used in this year's narrative.

Complex staff met with personnel of the Region 5 Estuary Program to discuss their upcoming project on the New York Bight area.

Information on mosquito control efforts at the Wertheim and Seatuck NWRs was sent to the Stone Lakes NWR in California at their request. The Stone Lakes NWR wanted the information to address mosquito problems possibly associated with that Refuge.

Data on fish communities at the Wertheim NWR, particularly the Carmans River, was sent to the Bureau of Fisheries - NYSDEC - at their request. The State is seeking to document all the fish communities associated with the Carmans River.

Information on waterfowl abundance in the Atlantic Flyway and New York State during the past thirty years was provided to the USFWS Law Enforcement Office - Lawrence, New York - at their request.

ARM Bill Kolodnicki accompanied Congressman Ackerman; Army Corps of Engineers staff; the Supervisors of Nassau County, Suffolk County, Huntington, Oyster Bay and various other officials on a boat tour on Long Island Sound. The tour focused on proposed Army Corps projects to prevent coastal flooding in Bayville and Asharoken. Both areas are near the Oyster Bay and Target Rock NWRs.

PL Tom Stewart provided general information on the positive aspects of recreational hunting to Congressman's Hocbrueckner's office.

The 1993 Annual Burn Plan for the Wertheim NWR and information on great reed burns was forwarded to the Virginia Department of Natural Resources (DNR) at their request. The DNR is planning a prescribed burn of great reed and is seeking pertinent materials regarding such burns.

The Long Island Chapter of the Nature Conservancy contacted the Complex in November regarding their prescribed burn program. The Conservancy was interested in obtaining Complex assistance for staffing their burns. The Region 5 Fire Management Coordinator was contacted regarding this matter and the Complex was informed that the Region was working on a Cooperative Agreement with the Conservancy to facilitate mutual assistance.

8. Other

JANUARY

Complex personnel met with Town of Oyster Bay officials to discuss the status of their harbor management plan.

Complex Biologist R. W. Parris toured the saltmarshes of the West Shore Road section of the Oyster Bay NWR with two biologists from the NYSDEC Tidal Wetlands Regulatory Affairs Division to gauge if any wetland damage resulted from the recent road and seawall repairs under taken by the Nassau County Department of Public Works. The repairs had been conducted due to winter storm damage along the road which borders the Oyster Bay NWR.

Complex Biologist R. W. Parris met with personnel from the NYSDEC Tidal Wetland Regulatory Affairs Division to discuss a permit application by a private landowner to clean out a drainage ditch leading to Mill Neck Creek, part of the Oyster Bay NWR. The project under review is considered minor and will have no impact on the Refuge.

Complex Biologist R. W. Parris met with the NYSDEC Forest Ranger to discuss the planned prescribed burn at the Wertheim NWR. The burn, to remove great reed from the Big Fish Creek Impoundment, is scheduled for late winter/early spring. After the meeting, the Ranger issued the required State Burn permit to conduct the activity.

ARM Kathryn Jahn attended the annual Partners for Wildlife Meeting held at the Regional Office.

PL Tom Stewart and ARM Bill Kolodnicki travelled to the Regional Office for a meeting concerning the denial of a special use permit for a dock on the Oyster Bay NWR.

ARM Bill Kolodnicki presented a program on the Oyster Bay NWR to the sportsmen' group - the Oyster Bay Anglers.

The Complex's bulldozer was loaned to the Stewart B. McKinney NWR during this month to assist in the construction of their maintenance complex.

FEBRUARY

ARM Kathryn Jahn attended Basic Refuge Management Training Academy in Charleston, South Carolina for three weeks.

ARM Bill Kolodnicki completed Refuge Officers Training at FLETC.

ARM Bill Kolodnicki met with Ms. Louise Harrison of the New York Department of State. Ms. Harrison is with the Long Island Sound Coastal Management Program and is preparing management plans for areas such as Oyster Bay. The Oyster Bay NWR's programs and management needs were discussed. The state expressed a desire to work with the Complex in resolving any state related coastal programs.

Complex staff prepared briefing statements for the Regional Director concerning winter storm damage to the Complex, potential acquisition of the Southaven parcel, and the upcoming prescribed burn at the Wertheim Refuge.

ARM Bill Kolodnicki met with Friends of the Bay to review general issues concerning the Oyster Bay NWR.

MARCH

PL Tom Stewart graduated from the Executive Potential Training Program and returned to his duties at the Complex.

ARM Bill Kolodnicki and Biologist R. W. Parris completed basic fire fighting training at Wallops Island, Va.

Engineering Equipment Operator Bruce Marto spent several days at the Patuxent NWR working on the planning committee for the Region 5 Maintenance Workshop.

ARM Bill Kolodnicki met with Cashin Associates and staff from the Town of Oyster Bay to discuss the town's Harbor Management Plan and draft Memorandum of Understanding (MOU).

Complex Biologist R. W. Parris met with the Chief Forest Ranger of the NYSDEC on Long Island. The purpose of the meeting was to finalize the burn plans for the prescribed burn of great reed at the Wertheim NWR.

APRIL

The Captain-of-the-Port reported the tanker Maryknoll aground to the Complex. The information was passed to the Oil Spill Coordinator.

PL Tom Stewart, ARM Bill Kolodnicki and EEO Bruce Marto attended Law Enforcement Refresher at Patuxent NWR.

PL Tom Stewart along with New York Field Office PL Len Corin and Northeast Estuary PL Joe Dowhan attended the opening ceremonies for the newly established Peconic Estuary Program. PL Tom Stewart also met later with the two project leaders to discuss joint space utilization and additional topics of mutual interest.

Complex staff hosted Stan Skutek and Tom Comish from the Regional Office for the Station Evaluation of the Long Island NWR Complex. All nine of the Complex's units were inspected.

EEO Bruce Marto, Maintenance Worker Jim Bowden and Laborer Bob Woerner attended the Region 5 maintenance workshop held at Patuxent NWR.

MAY

ARM Bill Kolodnicki gave a presentation on piping plovers to over 200 students at

Herricks High School as part of an Earth Day Celebration.

PL Tom Stewart met with Congressman Hochbrueckner's staff in Washington, DC to discuss numerous issues of concern to the Congressman.

PL Tom Stewart hosted a visit from Ms. Rina Maguel of Congressman Hochbrueckner's Washington Office. A tour of Wertheim, Morton, Conscience Point and Amagansett NWRs was provided. Numerous questions on staffing, funding and public use were answered.

PL Tom Stewart became a member of the TQM Complexing Team for Region 5.

Complex staff hosted Ms. Dawn Comish and Ms. Crystal Cutler of the Regional Office for a portion of the Station Evaluation of the Long Island NWR Complex.

Complex staff met with the Brookhaven Fire Department to discuss the Cooperative Fire Agreement between the Service and the Department.

Biologist R. W. Parris was presented an award for his work cover typing the Wertheim NWR.

JUNE

Complex Biologist R. W. Parris successfully completed the course S-205 Wildfire in the Urban Interface held at Virginia Beach.

Complex staff met with personnel from the Suffolk County Summer Youth Employment and Training Program to discuss the use of a youth crew at the Wertheim NWR.

An update disk for the Regional Project Planning System for the Complex was submitted to the Regional Office. Data on over one hundred projects were reviewed and edited; new projects for FY94 were also added to the system.

PL Tom Stewart attended the Northern Zone Project Leaders meeting in Turner Falls, Massachusetts.

PL Tom Stewart participated this month in two Regional Teams which are addressing issues of Complexing and Ecosystem Management.

Briefing statements were prepared for Refuges, Washington, D.C. on the demolition of the Eberstadt Manion at Target Rock NWR and the volunteer clean-up of storm debris at Target Rock.

Executive summaries were prepared for Refuges-North on waterfowl hunting in the Oyster Bay NWR, piers and structures in the Oyster Bay NWR, various cooperative programs and a number of other Complex issues.

EEO Bruce Marto and Laborer Bob Woerner successfully completed fire courses on chain saws and pumpers held at Great Dismal Swamp NWR.

JULY

A boat and operator were provided to the Ecological Services - Long Island Field Station for contaminant sampling at Morton and Conscience Point NWRs. A freezer was also moved by Complex staff from the Wertheim NWR to the Field Station at the Seatuck NWR for Ecological Service's contaminants program.

Mr. Charles Pelizza, Central Zone Biologist, visited the Complex early in the month as part of the Station Evaluation by the Regional Office.

Information on career goals for Complex employees, and the priority of filling vacant positions at the Complex was forwarded to the Regional Office.

End-of-year performance appraisals were completed for all eligible Complex employees and forwarded to the Regional Office.

EEO Bruce Marto was given an Achievement Award from the Regional Director for his contribution to the Region 5 Maintenance Management Workshop.

ARM Bill Kolodnicki was presented an award for his coordination of volunteers for the Target Rock NWR beach cleanup.

An education survey on Windows of the Wild, a program prepared by the World Wildlife Fund, was completed and returned.

An update on the progress in the resolution of compatibility issues facing the Complex was sent to the Regional Office.

A status report on the planned and funded improvements to the fishing access site at the Wertheim NWR was provided to Mr. Ron Howey, Fisheries and Federal Aid (RO).

AUGUST

The End of Year Accomplishment Report was prepared and forwarded to the Regional Office.

Region 5 Contracting and General Services was provided with comments on the Challenge Grant Cost-Share Program Guidance.

The Associate Manager, Refuges North (RO) Don Frickie was provided with comments on the 1994 draft "Blue Book".

The FY94 Fire Budget Planning and Accounting Schedule was prepared and forwarded to the Regional Fire Management Coordinator.

SEPTEMBER

Recruitment packages for the Deputy Project Leader and Outdoor Recreation Planner positions at the Complex were completed and forwarded to the Regional Office.

A response to the Station Evaluation for the Complex's biological program was provided to the Region 5 Associate Manager - North Don Frickie.

The Fire Facilities Needs Survey was completed and forwarded to the Regional Fire Management Coordinator. Two needs were identified: enclosure of the existing pole barn into a shop; and, installation of heating/water/sewer systems in the existing Maintenance Shop. These projects would provide improved storage space for firefighting equipment, including pumpers, and better working conditions for the Complex staff.

The Regional Fire Management Coordinator was provided information on fire vehicles presently at the Complex.

International Tracking System data sheets were prepared for the final quarter of FY93 and forwarded to the Regional Office.

OCTOBER

Complex staff and representatives from the New York State DEC and Suffolk County Vector Control met to discuss upcoming private wetland restoration projects on Long Island.

PL Tom Stewart gave a presentation on white tailed deer management and status of the Seatuck NWR's herd at a meeting of the Old Islip Civic Association. The Association requested a presentation on the Refuge's herd because they wanted an opportunity to voice their concerns over deer damage and the herd's size.

NOVEMBER

&2Information on the Complex's management efforts for piping plover was forwarded to the Regional Office at their request.

Maintenance Worker Jim Bowden passed his New York State dump truck test.

Complex Biologist R. W. Parris and Laborer Bob Woerner each served on jury duty for a week.

Congressman's Rich Lazio's office was provided information on the Sayville NWR.

Information on water use and water rights for the Complex was forwarded to the Regional Office at their request.

A report on the square footage of Complex buildings which are using energy was sent to Region 5 Engineering at their request.

DECEMBER

Laborer Bob Woerner received an award for his efforts on handling a distressed person on the railroad tracks adjacent to the Wertheim NWR.

The CY93 Pesticide Use Report and CY94 Pesticide Use Proposals were forwarded to the Regional Office.

Mr. Rick Kanaski from the Regional Office visited the Wellington facility at the Wertheim Refuge to provide an evaluation for proposed engineering projects.

The Complex's bulldozer was loaned to the Forsyth NWR at the end of the month to assist in the completion of their subimpoundment dike.

PL Tom Stewart and ARM Bill Kolodnicki participated in a management training seminar.

A get together for the Complex's volunteers was held at the Wellington facility at the Wertheim NWR to thank the volunteers for their assistance this past year.

9. North American Waterfowl Management Plan

Continued progress was made towards undertaking wetland restoration along the south shore of Long Island pursuant to the South Shore Mainland Marshes Focus Area (SSMMFA) Plan. These wetlands have been degraded primarily by the disposal of dredged spoil, by ditching and drainage for mosquito control, and by adjacent development which has isolated them from tidal exchange.

Additional work was done on a wetland restoration project begun in July 1992 at Lyman Marsh, a 22-acre coastal wetland owned by the New York State Department of Environmental Conservation. In May 1993 Engineering Equipment Operator Bruce Marto used the Complex's backhoe to install a 24" diameter culvert at the site; the Complex also supplied two 36" diameter culverts that were installed at the site by Suffolk County Vector Control (SCVC). Additionally, Open Marsh Water Management (OMWM) alterations were undertaken at the site in May 1993 by SCVC using FY-92 monies set aside in the Cooperative Agreement between the Service and SCVC. SCVC was reimbursed $7572.03 for these OMWM activities.

Meetings were held throughout the year with potential partners in the wetland restoration efforts on Long Island and with landowners. Meetings were held with the Town of Brookhaven, the Town of Islip, the National Audubon Society, Ducks Unlimited, the Post-Morrow Foundation, the Great South Bay Audubon Society, the U.S. Coast Guard Group Moriches, and Waterfowl USA. A meeting was held with a group of private landowners at Brushy Neck Creek in the Town of Westhampton, New York, and a landowner adjacent to NYSDEC's Pickman-Remmer property in Oakdale, New York.

The Town of Islip remains a partner in the wetland restoration program on Long Island. The Town has expressed support for wetland restoration and pledged to provide engineering and construction assistance at several sites in the Town. A Memorandum of Agreement between the Town of Islip and the Service for restoration of several coastal wetlands within the Town was signed by the Town and the Service this year to formalize the working relationship between these two parties.

The Complex received $30,000 in North American Waterfowl Management Plan monies for restoration of a 30-acre tidal wetland at the National Audubon Society's Scully Sanctuary in Islip. The Town of Islip will provide $60,000 worth of in-kind engineering and construction services as a match for the money. This money was obligated in 1993 in a Cooperative Agreement with the Town of Islip. A monitoring plan was prepared by the Complex for the site. Monitoring of the site will be done by the National Audubon Society (Great South Bay chapter). Construction is planned for 1994.

To expedite the permitting process for wetland restoration projects on Long Island, in June 1992 the Complex submitted an application to the U.S. Army Corps of Engineers, New York District, for a Programmatic General Permit for wetland restoration and enhancement activities along the south shore of Long Island. This permit will authorize a variety of activities associated with wetland restoration and/or enhancement at about 50 sites along the south shore of Long Island. Much coordination with the Corps and other agencies was conducted during this year, and this General Permit is close to issuance by the Corps to the Complex.

International Tracking System (ITS) data sheets for the NWR/Joint Venture and Private Lands Program accomplishments of the Complex were provided to the Regional ITS Database Manager.

A Habitat Restoration Plan for the Private Lands Program on Long Island was submitted to Regional Office Ecological Services.

The Complex, in cooperation with the Town of East Hampton and Suffolk County Cornell Cooperative Extension, restored 145 acres of coastal wetlands at four project sites in the Town. The Complex provided about $3500 worth of materials for the four projects, and authorized payment of $1341.26 to Suffolk County Vector Control (SCVC) under the Cooperative Agreement with SCVC for OMWM alterations performed by SCVC at the sites. The goals of these projects are: Phragmites control, wildlife habitat improvement, and water quality improvements in adjacent shellfish areas. To expedite work on future projects with the Town a Cooperative Agreement was signed between the Town and the Service obligating the Service to provide the Town with up to $15,000 for mutually agreed upon wetland restoration and/or enhancement projects.

F. HABITAT MANAGEMENT

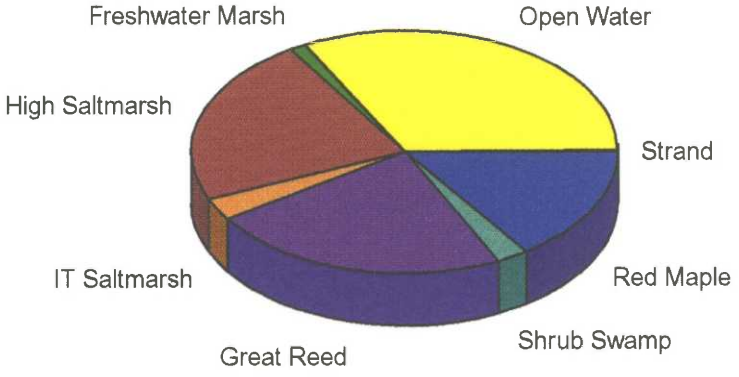
1. General

The Wertheim NWR is 2,400 acres and one of the largest refuges or parks on Long Island. Habitats contained within Wertheim vary from marine bay to freshwater pond, intertidal saltmarsh to freshwater shrub swamp, and mixed oak forest to pine barren. The figure on the following page provides a breakdown of the aquatic and upland habitats at Wertheim.

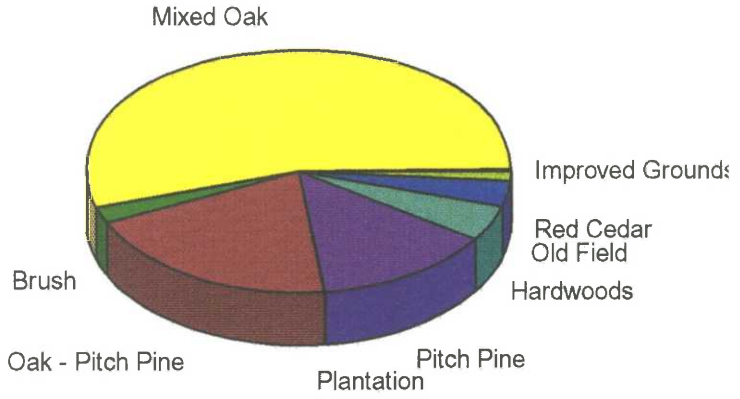
Significant progress was made in completing the base and cover type map of the Refuge. The purpose of cover typing was to facilitate Refuge planning activities, provide storage capability for select natural resource databases, and to provide a baseline for monitoring changes. Wertheim was cover typed by employing New York State aerial photos used for tidal wetland mapping (scale 1:2400) and other aerial photos of the area. Stands were delineated from the photos and than ground truthed. Stand boundaries and designations were modified if the ground check indicated a discrepancy. A total of 650 stands were delineated on the Refuge map - an average of 3.6 acres per stand. Lands adjacent to the Refuge were also cover typed - approximately 100 stands. A stand was defined as a homogenous unit based on vegetation - both by species composition and growth stage. Stand size varied from 0.01 to 40 acres. Large blocks of homogenous vegetation, particularly oak and oak-pitch pine stands, were artificially divided into smaller units to facilitate planned management activities and habitat monitoring

WERTHEIM NWR

AQUATIC COVER TYPES
1337.1 Acres



UPLAND COVER TYPES
1062.9 Acres



considerations. The cover type map was input with a digitizing tablet into a vector based GIS program for personal computers - MapInfo.

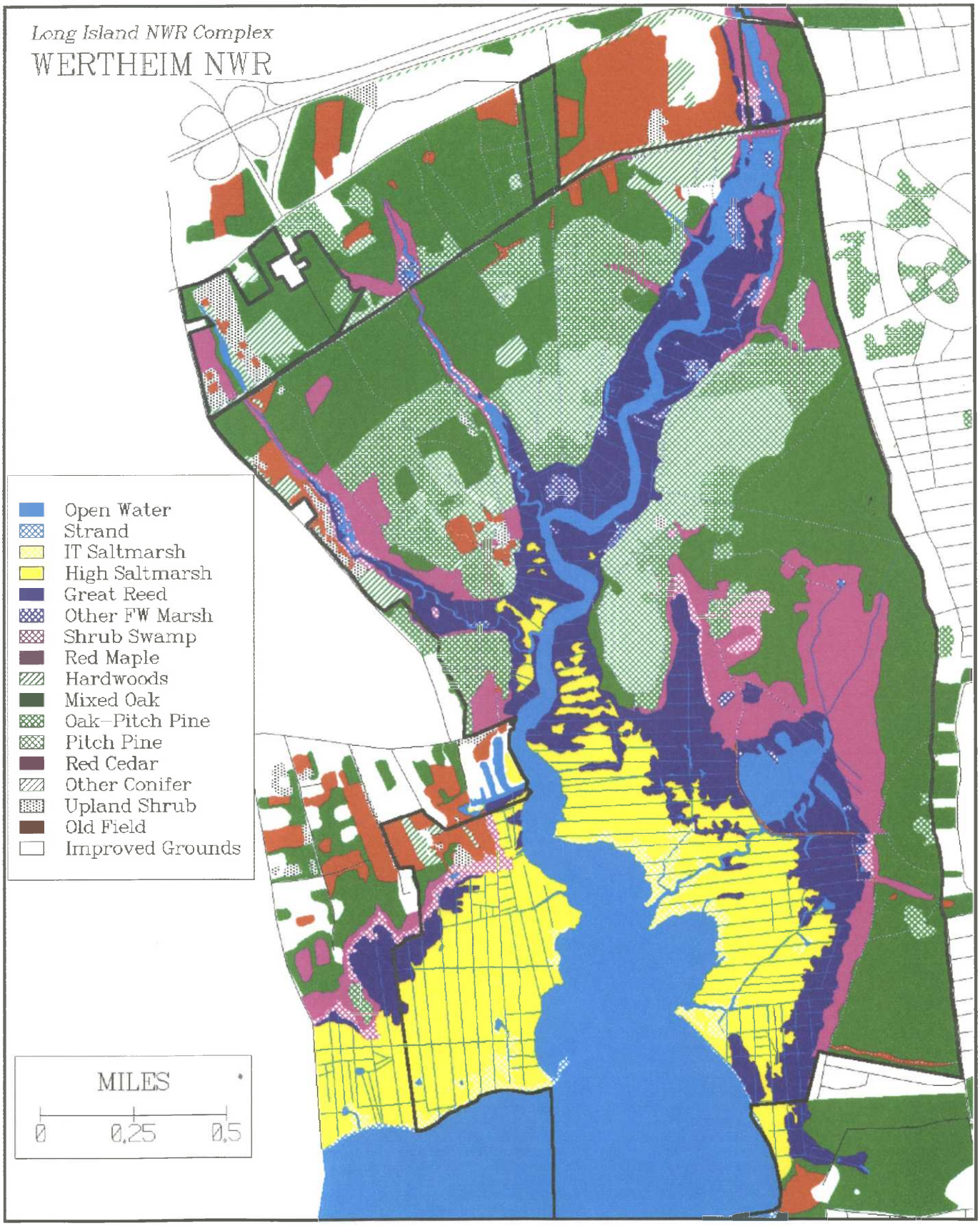
The figure on the following page illustrates the general cover type map for Wertheim. Aside from the general cover type other information stored and retrievable on the system are vegetative growth stages, fuel model classifications, and soils. Because the forest inventory was completed at the same time as the cover typing we were also able to add to the system the following information for each stand: basal area, oak basal area, pine basal area, large tree density, tree density, hard mast basal area, soft mast basal area, snag density, understory woody density, and robustness of the field layer. The information developed from the forest inventory also generated USFWS HEP model values for each stand for the following upland species: black capped chickadee, ovenbird, downy woodpecker, gray squirrel, field sparrow and pine warbler. Linear geographic features employed on the system included roads, trails, small streams and all drainage ditches. The following point files were also added to the system: location of fire starts, Refuge gates, Refuge buildings, wood duck nest boxes, large owl nest boxes, and osprey nests. Other wildlife related information entered included telemetry data on mud turtles, all wild turkey sightings, American woodcock singing sites, and the locations of rare or unusual species such as least bittern, bald eagle, harrier, peregrine falcon, etc.

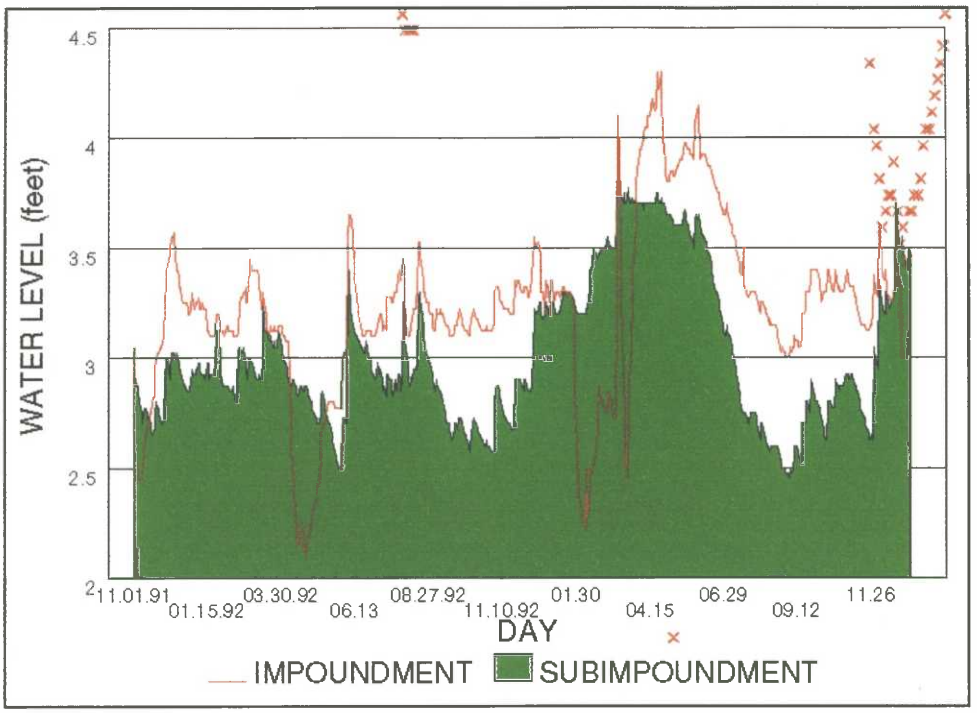
2. Wetlands

Approximately half of the Wertheim Refuge consists of aquatic habitats. Of these habitats, forty percent consist of saltmarsh and marine waters situated principally along the lower Carmans River and Bellport Bay. Another forty percent consists of freshwater and brackish rivers, streams and marshes. Swamps and shrub swamps make up the remaining twenty percent.

A meeting was held with Suffolk County Vector Control (SCVC) in October regarding open marsh water management at the Refuge. Wertheim has over thirty miles of drainage ditches which had been put in by SCVC during the 1950s as a mosquito control measure. These ditches were put in salt and brackish marshes and destroyed pannes and backwater habitats. Discussions will be held with SCVC in early 1994 about the feasibility of restoring pannes at Wertheim by employing ditch-plugs.

The Refuge has five impoundments with some degree of water level control - Big Fish Creek Impoundment, Subimpoundment, Pine Pond, Little Neck Run Pond and Owl Pond. Four of these are relatively small (less than ten acres) and three have fixed pipes which maintain a constant water level with the exception of certain periods in summer. Big Fish Creek Impoundment and the Subimpoundment have water control structures with flash boards. The following figure provides the daily water levels for both impoundments for the previous two and a half years.


Long Island NWR Complex
WERTHEIM NWR
Open Water
Strand
IT Saltmarsh
High Saltmarsh
Great Reed
Other FW Marsh
Shrub Swamp
Red Maple
Hardwoods
Mixed Oak
Oak–Pitch Pine
Pitch Pine
Red Cedar
Other Conifer
Upland Shrub
Old Field
Improved Grounds
MILES
0
0.25
0.5



Water levels at the Big Fish Creek Impoundment and the Subimpoundment.

The Subimpoundment, which is located adjacent to the Big Fish Creek Impoundment, is seven acres in size and was constructed in 1989. This impoundment since construction has never held water well largely due to flash boards which were poorly fit and problems with leakage at the control structure. In December of 1992, new boards were constructed specifically for that structure and leaks at the control structure plugged. After fitting the boards, it became apparent that water level integrity could be maintained. It was decided to hold the water level higher this year to inhibit the spread of great reed. Unfortunately during the warmer months, due to this summer's drought, we could not maintain the desired water level. The water level finally started to rise again in mid-autumn. This impoundment was cover typed again this year. It consists of 36 percent forested wetland, 32 percent shrub swamp, 18 percent robust emergent (divided between cattail and great reed), 10 percent open water and 4 percent other types.

The Big Fish Creek Impoundment is forty acres in size and located centrally on the Refuge. Approximately half the impoundment consists of open water with associated submerged aquatic vegetation and the other half robust emergent mainly great reed. It had been initially decided to draw down the impoundment in late winter and early spring in preparation for a prescribed burn of 15 acres of great reed. After the burn, the water level would be maintained

high to inhibit great reed regeneration.

In February, a partial drawdown was initiated at the impoundment in preparation for the prescribed burn scheduled for late winter/early spring. Unfortunately, a storm tide caused an extreme high tide which breached the dike and filled the drawndown impoundment a week before the burn. However, the burn was executed anyway in late March without difficulties (see F.9). Approximately nine of the planned fifteen acres of great reed were burned. The areas that were not burned were too wet and could not sustain a flame. After the burn, stop boards were put in the water control structure and the water level was allowed to rise approximately one foot above the previous year's level. Although we were able to maintain high water during most of spring, this summer's drought reduced the level below the desired amount. Water levels did not start to increase again until mid autumn.

Maintaining the high water level in the impoundment this spring also demonstrated the impact of water level management at the impoundment to a surrounding seventy acre red maple and shrub swamp to the northeast. Holding water high in the impoundment increased the water level in this adjoining swamp through spring. Over sixty drake wood ducks were observed in this swamp with high water. It would be preferable if the water level regimes of the impoundment and this swamp could be managed independently.

Vandalism at the impoundment's water control structure was a continuing problem. Four times this year, vandals removed the flashboards from the structure. In order for the vandals, to remove these boards they first must cut a lock and then remove wooden wedges securing the boards. Fortunately, routine patrolling by staff always detected the vandalism early and rectified the problem.

It was apparent by the end of May that the prescribed burn had only caused a partial kill of the great reed. In 1987, a burn was conducted in another portion of the impoundment which resulted in an effective kill of the rhizomes. This year's burn, most likely due to the storm tide which refilled the impoundment ten days prior to the burn, did not produce a significant kill of the rhizomes. Approximately two acres of the burn area failed to produce significant reed shoots, the remaining area produced reed albeit at lesser density, by approximately seventy percent, than the existing stands.

Early in spring, it became evident that the Complex would have the opportunity to monitor the response of great reed to a variety of control techniques at the Big Fish Creek Impoundment. Between the prescribed burn, flooding the impoundment and cutting firebreaks it was possible to monitor the effects of several control methods and combinations. These methods included no action; burning; flooding; crushing; burning and flooding; crushing and flooding; crushing, burning and flooding; and burning, flooding and covering. A total of 304 (5' by 5') plots were marked with stakes. Flooding comprised keeping on average 1.5 feet of water on the site. Burning involved the late winter prescribed burn at the impoundment.

Portion of impoundment where prescribed burn occurred - note the great reed shoots emerging. RWP - 93.

Crushing involved moving a small bull dozer (blade up) over the site and covering consisted of putting an impervious plastic sheet over the site. For each of the control methods or combined techniques mentioned we also mechanically cut stems at different seasons (no cut, spring cut, summer cut and monthly cut) at separate plots. Mechanical cutting consisted of cutting each shoot three inches below the waterline or as close to the ground as possible.

In September, reed development at all plots was documented. Measurements were made on stem density, shoot height, seed head density, and shoot biomass. Biomass was estimated by measuring a random sample of shoot basal diameters in each plot and employing an established formula relating shoot basal diameter and biomass.

The variables shoot biomass, shoot density and seed head density were all highly correlated (see figure on following page), if one variable had a high value the others also did. The results for the first growing season are provided in the following table which compares shoot biomass across all treatments; other shoot variables exhibited a similar pattern. The most effective treatment to reduce great reed, excluding the plots with seasonal mechanical cutting, were the multiple control techniques particularly the last three listed in the table which all reduced

shoot biomass by over ninety-five percent. The burning and flooding option while preferable to any single method was not as effective as the other multiple methods only reducing shoot biomass by seventy percent. Single methods tended to be less effective than the multiple techniques only reducing reed biomass by half and flooding alone produced no change in biomass from the control plots.

Mechanical cutting combined with the other treatments described further reduced reed biomass. Monthly cutting of stems and a single summer cut produced essentially equivalent results. A single spring cut for most treatments was not as effective in reducing biomass.

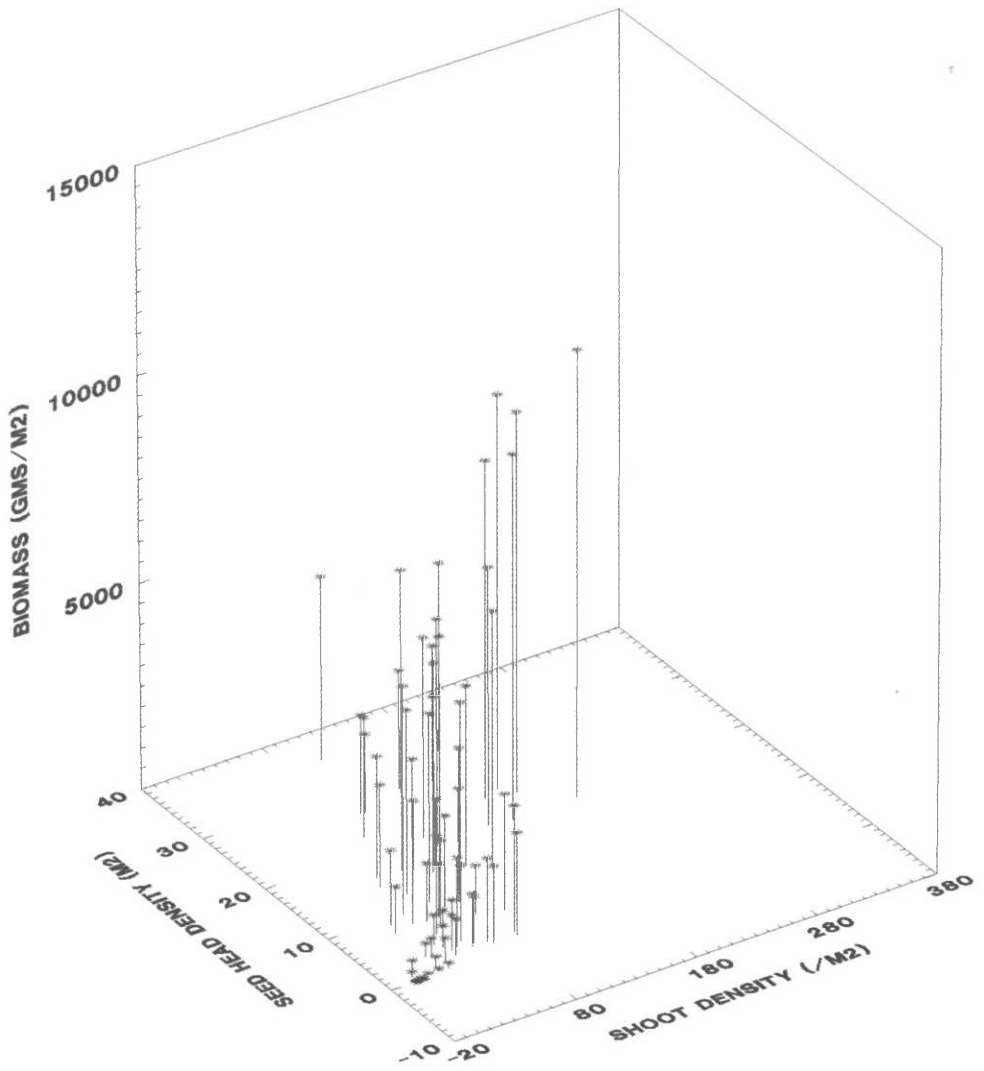
TABLE. Great reed biomass response to a variety of control methods at the Big Fish Creek Impoundment during 1993.

PERCENT OF CONTROL'S SHOOT BIOMASS				
CONTROL METHOD	NO CUT	SPRING CUT	SUMMER CUT	MONTHLY CUT
No Action	100.00	48.27	0.67	0.51
Burn	46.44	16.11	16.11	7.02
Flood	100.00	5.73	1.28	1.57
Crush	58.41	37.32	0.68	1.34
Burn & Flood	27.36	2.47	7.40	1.22
Crush & Flood	0.90	1.59	1.23	0.39
Burn, Flood & Crush	4.10	0.38	0.90	0.41
Burn, Flood & Cover	0.00	-	-	

Caution should be used in examining the results from these various control methods for great reed. For instance burning and flooding which was only partially successful this year was completely successfully five years ago at an adjacent site when conditions were drier. Likewise technique modifications, application timing and edaphic factors could all influence the response of great reed. Treatment plots will be monitored again in the upcoming year to gauge any treatment effectiveness during a second growing season.

Other routine wetland monitoring at Wertheim included measuring low and high tides on the Carmans River several times a month. The tidal flux on the river averages over two feet and fluctuates little on a monthly basis. Daily water level measurements are taken on the Big Fish Creek Impoundment and Subimpoundment and semi-monthly on Woods Hole Pond.

GREAT REED CHARACTERISTICS



Wood duck nest box on Little Neck Run. Wertheim had over 130 available nest compartments this year. RWP - 93.

Salinity and water temperature measurements are taken monthly at thirteen locales at Wertheim. These include most of the impoundments, Yaphank Creek, Little Neck Run, Bellport Bay and several points on the Carmans River. Both Yaphank Creek and Little Neck Run have water temperatures in winter noticeably higher than other Refuge sites and are the

last to form ice. Measurements of such water parameters as hardness, alkalinity, acidity, pH, nitrite, and ammonia are obtained semi-annually at the same thirteen locations. This information is being used to gauge wetland values and for management planning.

Twelve waterfowl nest baskets including mounting pole and predator guard were constructed and installed on the Refuge in autumn. The baskets were placed at the impoundment and subimpoundment and will be monitored for waterfowl nesting activity next year.

Over one hundred and thirty wood duck nest box compartments were maintained this year. All nest box repairs and the changing of cedar chips is performed in late summer and early autumn. However, this past year due to storm tides, additional repairs had to be made on damaged boxes during early spring. Six nest boxes were moved in early autumn to provide greater visual isolation from other boxes. In addition, another ten single nest boxes were constructed this autumn to replace severely damaged or worn boxes. A supply of red cedar cut from fields, managed for woodcock, was saved to serve as mounting poles for nest boxes.

To better monitor wood duck box use and manage the program, additional information besides use information was collected for each box when checking for use and repairs in late summer. Information collected on each box included box, pole and guard type; box height and habitat type; visual isolation; potential for human disturbance; and distance from nearest water, wetland, forest, nest box and successfully used nest box. This information will be used to determine the most suitable characteristics of box attributes and placement for wood duck use at Wertheim.

Several small stands of purple loosestrife, an exotic nuisance species, were mechanically cut during late summer from Little Neck Pond. This is the second consecutive year, loosestrife has been removed from the pond. All areas are routinely checked for purple loosestrife and if found are marked for removal in summer. No large stands exist at Wertheim, however some sizable stands exist at nearby wetlands.

3. Forests

Forested lands comprise over ninety percent of Wertheim's uplands. The most common forest types include mixed oak, oak-pitch pine, pitch pine, red maple, red cedar, black cherry and black locust. The Refuge is located on the periphery of Long Island's pine barrens - one of the rarer major forest types in the State.

The forest and upland inventory was completed this year. This inventory was conducted to facilitate upland planning and serve as a baseline for future monitoring. The inventory consisted of measuring vegetation characteristics in all delineated stands except in emergent marshes, salt marshes and open water. Overstory vegetation (dbh > 1") was identified and measured in a 40' by 100' plot. Small stands were sampled with a single plot and larger stands

were sampled with multiple plots. All overstory stems were identified to species and the diameter measured at breast height. Timber volumes were quantified using the international method. Understory woody vegetation (dbh < 1") was identified and quantified using plotless methods - the point quarter. Understory height was also measured. The most common components of the herb layer were described and this layer's density was subjectively ranked as sparse, moderate or robust. Field data was summarized by stand and stored in Lotus 123 files. Portions of the data was also into the station's GIS program.

Overstory species composition of the major forest types at Wertheim are listed in the following table. Mixed oak is the most common forest type at Wertheim occurring on over six hundred acres. Canopy dominants include black, white and red oaks. The majority of stands have all three oak species present as well as hickory. The woody understory is composed of several blueberry species and black huckleberry although briar and black cherry are common. The pitch pine forest type occurs on one hundred and fifty acres and is principally located on sand soil types. The woody understory of mature pitch pine stands is the sparsest of any forest type at Wertheim. The oak - pitch pine type is an intermediate between the previous two types and has an understory similar to the mixed oak type. The red maple type occurs on over two hundred acres and is mainly associated with wetlands. Dominants of this type include red maple and tupelo and the understory is the most robust of any forest type. Other forest types at Wertheim include red cedar, conifer plantations, black locust and black cherry.

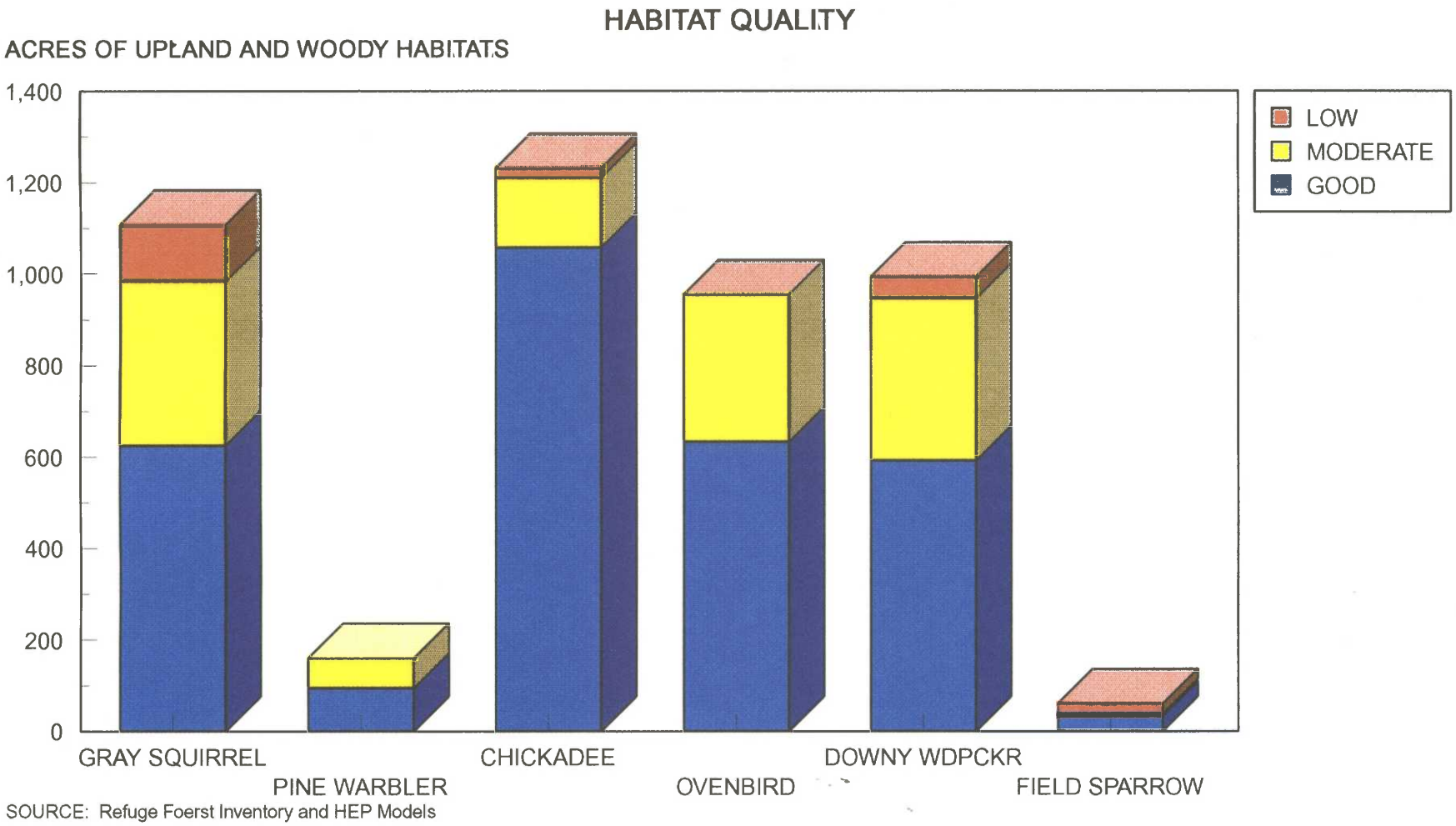
Most forest stands at the Refuge have an average or low stocking density. Timber quality of forest stands on Long Island's south shore is generally poor due to the sandy soil types and the average timber volume at Wertheim is approximately thirteen cords per acre. Hard mast overstory species predominate in the Refuge's forest and soft mast species dominate the understory. Snag density at most stands tends to be high due to past mortality from gypsy moth.

Information from the forest inventory was also used in a number of USFWS HEP (Habitat Evaluation Procedures) models for common upland wildlife species to gauge the general quality of the Refuge's uplands for forest wildlife. Six models were employed including those for black capped chickadee, gray squirrel, pine warbler, ovenbird, downy woodpecker and field sparrow. The results are provided on the following page. As expected, the results indicated that habitat was available on the Refuge for all six species. Habitat quality was best for the chickadee largely because of the bird's generalist nature - being able to use a variety of forest types and growth stages. Habitat quality was approximately equal for the gray squirrel, ovenbird and downy woodpecker all which require more mature forest growth stages although for different reasons. The squirrel's model was heavily dependent on factors influencing hard mast production and stand age, the ovenbird's model on the degree of canopy closure and stand age, and the woodpecker's largely on snag densities. Wertheim's forest has been heavily impacted by gypsy moth such that many formerly closed canopy stands are open due to tree

TABLE. Overstory composition (percent basal area) of forest types at the Wertheim Refuge.

OVERSTORY SPECIES	Mixed Oak	Oak - Pine	Pitch Pine	Red Maple	Hard-woods	Red Cedar	Other Conifer
Black Oak	16.66	12.88	4.32	4.07	6.95	1.98	0.00
White Oak	11.59	5.85	2.87	3.77	2.54	0.35	0.00
Red Oak	38.43	24.22	6.77	6.15	10.86	3.07	0.00
Post Oak	0.01	0.03	0.00	0.00	0.00	0.00	0.00
Bear Oak	0.00	0.12	0.01	0.00	0.00	0.00	0.00
Scarlet Oak	0.07	0.00	0.00	0.00	0.00	0.00	0.00
Hickory	7.43	0.27	0.00	0.13	8.46	3.56	0.00
Sassafras	0.93	0.16	0.54	0.13	3.79	0.26	0.00
Black Cherry	1.61	0.31	0.11	0.44	31.29	5.96	0.00
Red Maple	2.64	0.96	0.60	40.86	3.17	1.06	0.00
Tupelo	0.26	0.49	0.10	30.65	0.94	0.09	0.00
Black Locust	0.45	0.01	0.07	0.00	6.25	2.29	0.00
Shadbush	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Willow	0.00	0.00	0.00	2.21	0.00	0.00	0.00
Gray Birch	0.01	0.00	0.00	0.09	2.13	0.00	0.00
Dogwood	0.00	0.01	0.00	0.00	0.00	0.00	0.00
Mulberry	0.00	0.00	0.03	0.01	0.16	0.00	0.00
Black Walnut	0.00	0.00	0.00	0.00	0.94	0.00	0.00
Apple	0.05	0.00	0.00	0.00	0.66	0.00	0.00
Red Cedar	0.33	0.51	0.47	0.10	2.23	76.48	0.64
Norway Spruce	0.00	0.00	0.00	0.00	0.00	0.00	5.78
White Pine	0.01	0.00	0.00	0.00	2.34	0.00	83.95
Pitch Pine	3.87	33.77	69.13	1.59	0.76	4.41	0.00
Other Species	0.04	0.00	0.00	0.00	1.31	0.00	0.00
Snag	15.61	20.42	14.95	9.80	15.20	0.48	9.63

WERTHEIM NWR



SOURCE: Refuge Foerst Inventory and HEP Models

mortality and oaks, in particular white oaks, suffered disproportionate mortality. It is expected that over the next two decades, the habitat quality of the Refuge's forest will increase for these three species and others that require mature woodlands. The models for the pine warbler and field sparrow indicated there was considerably less habitat available for these species compared to the others. Both are habitat specialists; one requiring mature pitch pine stands and the other a complex of field and brush habitats.

Stand of pitch pine - the Refuge's forest inventory was completed this year. RWP - 93

The edges of over fourteen miles of fire trails were cut back using hand tools by the YCC crew. The resulting woody debris were consolidated into separate brush piles located back from the forest edge along several sections of trails. The brush piles will serve as a habitat component for several select forest wildlife species.

ARM Kolodnicki by one of over twenty brush piles built by the Suffolk County YCC crew this summer. RWP - 93.

Hard mast production this year was the highest in the last four years. Acorns and hickory nuts were abundant throughout the Refuge. The high production this year was a surprise considering the late spring and summer drought.

An important habitat component for many forest wildlife species is permanent herbaceous openings. Many of these openings at Wertheim were not maintained over the last twenty years and few non-woody dominated sites remained. An effort was initiated in 1992 to restore and create these herbaceous openings specifically to provide singing and roosting fields for American woodcock, nesting habitat for bobwhite quail, brood habitat for gallinaceous birds, herbaceous forage for white tailed deer and assorted grazers, eastern bluebird habitat, nesting habitat for waterfowl (in some cases), nesting habitat for select turtle species, and to maintain the diversity of Wertheim's upland habitats.

During the spring of 1992, twelve fields ranging in size from 0.2 to 1.5 acres had their woody vegetation removed either by brush hog or cutting with chain saws. Most of these sites were located on the northern and western portion of the Refuge. Eight of these fields were also disked, limed and planted with either a cool season grass mixture or a legume cover.

Vegetation establishment was successful at all eight fields.

Maintenance worker Bowden disking, before seeding, one of two green strips at Wertheim. RWP - 93.

During 1993, an additional eleven fields were either restored or created. In the spring, five fields ranging in size from 0.3 to 2.5 acres were disked and planted with a cool season grass mixture. Two of these fields were long and linear green strips. In late summer and early autumn an additional six fields were restored or created - these were located at sites where forest openings were lacking. Two of the fields were brush hogged to remove woody vegetation and four were cleared using chain saws. Two of the fields were disked and seeded with a cool season grass mixture in late summer - both developed suitable grass swards. The remaining four areas will be seeded in early spring next year. In early autumn, all forest openings were brush hogged if needed to control woody vegetation.

A total of twenty-three openings totaling twenty acres have been developed or are now being maintained at Wertheim. The wildlife use of these forest openings was as expected. White tailed deer and bobwhite quail use of all fields was high particularly in the legume dominated fields. Thirteen out of seventeen available fields this spring were used as singing grounds by American woodcock. Wild turkeys including a brood made use of six openings. Four of the

fields were used by Canada goose broods. Two of these fields supported nesting bluebirds. In June and early July, eastern box turtles used the openings extensively. During spring and autumn passage, sharp-shinned hawk and Cooper's hawk were frequently observed on the edges of these openings.

A volunteer installed predator guards on most of the thirty-five songbird nest boxes at the Wertheim NWR and maintained the boxes and purple martin houses. The volunteer also donated nine new bluebird boxes to the Refuge. All owl nest boxes were checked and repaired if needed this autumn and an additional barn owl nest box and mounting pole was constructed and erected in the east salt marsh.

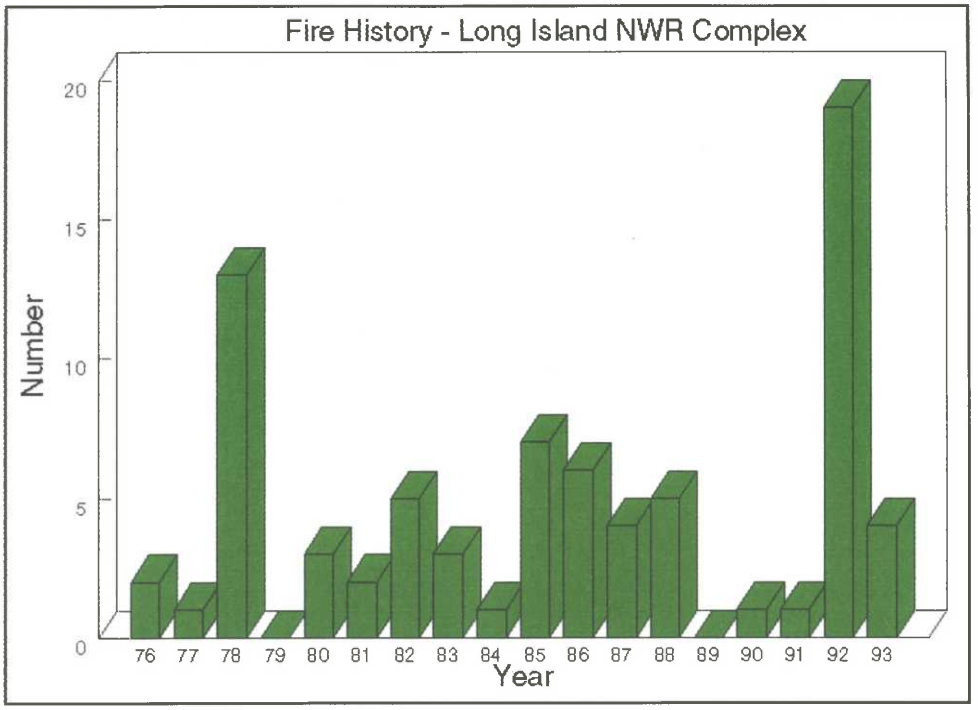
Gypsy moth problems while not occurring recently at Wertheim were a major problem in the late 1970s and early 1980s. It was estimated at that time, that a third of the oaks were killed. In December, Complex staff contacted the Soil Conservation Service to obtain guidance for implementing a gypsy moth surveillance program on the Refuge.

9. Fire Management

The Long Island NWR Complex, in particular the Wertheim Refuge has had a history of wildfires (see following figure). Most of these fires have been arson related largely as a result of the urban/suburban setting of most of the Refuges. During 1992 - a record nineteen fires occurred on the Complex - fourteen at Wertheim and five at Target Rock. The Suffolk County Arson Squad made two arrests for one of the fires at Wertheim last year (see section H.17). This year, although conditions were more suitable than last to sustain fire only four fires (three at Wertheim and one at Target Rock) occurred on the Complex and one was a prescribed burn. The high temperatures and lack of rain from May through August created a serious fire hazard on the Long Island Refuges.

In January an illegal campfire was found at Target Rock - no damage occurred. At the end of March an illegal campfire was discovered on the Wertheim NWR. The fire did minimal damage and was in the same location as several campfires documented last year. In June, a fire was set in an oak-pine stand on the eastern boundary of the Refuge. The fire only burned the ground layer and Town of Brookhaven firefighters responded. Complex staff provided mop-up at the site. The fire burned a total of 0.25 acres. Although fires were numerous on the south shore of Long Island this summer, no other fires occurred at Wertheim.

Activities conducted this year to curtail fire activity included increased patrols during the fire season and maintaining fire trails and equipment.



Fire history at the Long Island NWR Complex.

Weekend patrolling along with other duties was initiated in early May by the Forest Technicians and continued until the end of September. Refuge Officers also made a presence on weekends during the fire season. In typical years, the fire season occurs from the end of March through June and to a lesser extent in late August though October. In dry years, the season also includes the summer months. No fires occurred during any weekends when patrols occurred.

As part of presuppression activities, all internal Refuge roads were brush-hogged in May and September to improve their effectiveness as firebreaks. Portions of the railroad fire road, which provides access to all the roads west of the Carmans River, were widened using the bulldozer and by hand clearing. The YCC crew together with the Complex staff, through the summer, cleared vegetation from the sides of fourteen miles of fire roads - making vehicle access easier and creating a more effective firebreak.

Two Forest Technicians were employed this year on the Complex. Technician salaries are from Regional fire monies. Their major duties include fire presuppression activities on the Complex, such as firebreak and equipment maintenance and patrolling, and maintaining readiness for project fires as part of a regional team. Fire equipment was maintained by the Forest Technicians and all pumpers were kept in a ready status. Slip on pumpers during the fire season were checked for operation on a weekly basis. The Complex's fire cache was

inventoried by the Forest Technicians and a computer database to track equipment was developed.

Several purchases from fire monies of needed equipment were made this year. Nomex fire gear was obtained to outfit all Complex staff which did not have a complete set of personal protective gear. All staff are now equipped with fire gear.

A floating-pump was also purchased this year through Regional fire monies. The pump was found to be useful for filling the tanks of the slip on pumpers in the field and for use in areas where a source of water is available. The floating pump was used on this year's prescribed burn. During the fire season, the pump is started and checked on a weekly basis.

Coupled with the forest and upland habitat inventory completed this year, staff were also able to assign fuel models to all stands. Guides to fuel models for this Region were provided by the Regional Fire Management Coordinator and these were used to assign appropriate models to all stands based on species composition and growth stage. The models make predictions regarding fire behavior and intensity. This information has been included on stand data stored in Lotus 123 files and on the Complex's mapping software so that a fuel model map is available for Wertheim.

Prescribed burn at the Big Fish Creek Impoundment halfway through the burn. RWP - 93.

During the winter of 1987/88, a prescribed burn was used on half of the forty acre Big Fish Creek Impoundment to control great reed. The impoundment had been completely drawdown before the burn. That burn essentially provided complete control of great reed and approximately half the impoundment was maintained as open water with submerged aquatic vegetation (principally sago pondweed) and the other half was essentially great reed. Waterfowl and waterbird use of the impoundment increased in the years after the burn. Original plans called for burning the remaining great reed at the impoundment the following winter. Unfortunately, New York State by that time had stopped issuing permits for prescribed burns. During the next five years, the Complex attempted to obtain the necessary permits to conduct the burn.

The permits to conduct the burn were obtained the previous winter. These permits included NYSDEC Tidal Wetlands Permit, NYSDEC Freshwater Wetlands Permit, NYSDEC Wild and Scenic River Permit, NYSDEC Burn Permit and Town of Brookhaven Wetland Permit. As part of this process, a public hearing was held at Brookhaven's Town Hall on the burn with Complex personnel present to explain and answer questions. Additional time was expended getting all the involved regulatory agencies to waive their application fees.

Preparations were made for the burn during the winter of 1992/93. Final permits were obtained, firelines were cut, the water level lowered and fire equipment checked. Firelines were prepared both by mechanical and hand cutting of lines. Primary firelines were placed around the proposed burn site and secondary firelines were put in at a distance to provide additional control lines if the fire escaped from the primaries.

The window for the burn was from January through the end of March. On 23 March, the decision was made to conduct the burn. Nine separate agencies were contacted that morning to notify them of the impending burn. Fire suppression equipment was loaded and prepped for the morning and the fire crew was notified and asked to assemble at the Wertheim office. Equipment staged at the site included two slip on pumpers, floating pump, bulldozer, john boat, canoe, three trucks, additional hose, radios and hand equipment. The pre-burn briefing occurred at 0930 hrs and all individuals were assigned to teams and procedures to be followed were outlined. All individuals were checked to make sure all their personal protective gear was in order before proceeding to the site. A total of fourteen individuals participated in the burn. Aside from Complex staff, other participants included three NYSDEC Forest Rangers, two NYSDEC Bureau of Wildlife employees, and two individuals from the National Park Service.

Staff were divided into a crew for the south dike, crew for the west dike, an ignition crew, a lookout to the north to check for smoke dispersion, and staff at the office to handle phones and public inquiries. At 1115 hrs, the test burn was conducted on a section of reed in the southwest corner of the impoundment. Ignition was by drip torch. The test burn was used

to determine burning conditions and smoke dispersion patterns. The test burn indicated that ground moisture was high and that fire spread laterally or backing would be slow to non-existent and a head fire would be slower than expected. The test burn also indicated that the lowest elevation sites at the impoundment would not burn.

Starting at 1140 hrs, the four other sections of the planned burn area were ignited. Rate of the most rapid fire spread was in the direction of open water - one of the planned fire breaks. Flame lengths tended to be from ten to twenty feet although flare ups were considerably longer. Smoke dispersion was away from residential areas. Flames from the burn ended at 1300 hrs however several unburned patches were burned for the next hour. At 1400 hrs, the burn site was checked for smoke and any flaming activity - none were found. The site was examined again for any burn activity at 1500 and 1800 hrs. At 1500 hrs, the fire was officially declared out.

Towards the end of the burn. Note the flame length as compared to the height of the two individuals in the lower right. RWP - 93.

At the end of the burn, flashboards were installed in the water control structure to start filling the impoundment. Great reed was burned from nine of the planned fifteen acres at the impoundment. Staff stationed at the Office indicated that no complaints from other agencies

or the public were received during or after the burn. From the Complex's view, the prescribed burn was executed as planned and no untoward incidents occurred. The fire remained at all times within the established control lines, no spotting occurred, equipment and staff functioned as expected, and smoke dispersion was away from residential areas. Hopefully this successful and safe prescribed burn will facilitate the process on using fire as a management tool on Long Island both by the Complex and other natural resource agencies.

An AFT fire weather station, purchased for the Complex through Regional Fire Monies, was set up and tested this autumn. The wind sensors, requiring suitable height above surrounding vegetation, were located forty feet above ground on the roof of Quarters 1 (Q1) and to protect the rest of the weather station from any potential vandalism the remaining sensors and recorder were situated in the fenced yard of Q1. Since that testing, the station has been online and weather data is routinely downloaded from the station to the Complex's 386 personal computer by a direct line. By the end of this year, three and a half months of weather data has been collected and stored for the Refuge. The weather station has sensors for temperature, relative humidity, wind direction, wind speed, fuel moisture, and precipitation. Information from the station will be used for the fire management program and in the biological program. The nearby Fire Island National Seashore has a similar weather station and we are able to obtain data from their station by computer link.

10. Pest Control

Weekly sampling of mosquito larvae in the salt marshes at Wertheim were conducted by staff between May and September. Information is maintained on larvae age and number and stored for Refuge use and provided to Suffolk County Vector Control (SCVC). If mosquito breeding is considered widespread than SCVC is given permission to spray BTI to control mosquito larvae.

This year, 15,000 lbs of BTI was sprayed over six weeks on the Refuge. BTI application this season remained fifty percent below the mean amount used during the 1980s. Mean larval abundance was the highest for the past three years however there were only four weeks of major hatching and adult abundance only reached extreme nuisance levels for three weeks. The high larval abundance was surprising considering the drought conditions experienced during the warmer months. Major hatches usually coincided with an extreme high tide or one of the rare rainfalls this summer.

A special use permit was issued to SCVC this summer to sample adult mosquitos in the forests at Wertheim. SCVC was specifically looking for the presence of breeding tiger mosquitos - none were found.

Pesticide applications to reduce deer tick numbers around the office area and residences was also performed. Damminax was applied around offices and residences in spring. Damminax

consists of a cardboard tube containing insecticide impregnated cotton balls. Mice, an important intermediate host of deer ticks, remove the cotton balls and use them for their nests where the insecticide acts on ticks associated with the mice or their nests. A second application in autumn was not conducted because of budget restrictions.

G. WILDLIFE

1. Wildlife Diversity

The diverse habitats at the Wertheim NWR support the majority of vertebrate species known to occur on Long Island. Two hundred and forty-seven avian species have been documented at the Refuge including over one hundred species known to nest. Most species of mammals, reptiles and amphibians which occur on Long Island have also been documented at the Refuge.

Efforts continued this year to create and maintain computer files for all natural resource data on the Complex including those on wildlife inventory. Principal software packages used to store files include Lotus 123, DBase IV and MapInfo. Packages used for analyses include Lotus 123, MapInfo, Systat and Population Simulation. The computer files provide easier access to information as well as for performing analysis; this effort facilitates natural resource planning and management at the Complex.

Complex Biologist R. W. Parris participated in the Central Suffolk Breeding Bird Census by surveying the Wertheim Refuge. The area covered is the same as during the Christmas Bird Count. A total of ninety-two species were documented at Wertheim for the count. Of special interest to the count from the Refuge was the forest interior songbirds, pied billed grebe, least bittern, blue winged teal, the high numbers of wood ducks, clapper rail, whippoorwill, eastern bluebird, and scarlet tanager. This is the twentieth year the breeding bird survey has been conducted.

Complex Biologist R. W. Parris and ARM Bill Kolodnicki participated in the 40th Central Suffolk County Christmas Bird Count on 27 December by surveying the Wertheim NWR. A total of 4697 individuals representing 62 species were documented. The most common species encountered in order of abundance were red winged blackbird, black duck, herring gull, gadwall, great black backed gull, hooded merganser, mallard and common merganser. Species of special interest to the count for their scarcity included red necked grebe, wood duck, bald eagle, Cooper's hawk, Virginia rail, barn owl, fish crow, and rufous sided towhee. Species of interest due to their abundance at Wertheim included black duck, gadwall, hooded merganser, common merganser, coot, and red winged blackbird.

All incidental sightings at the Complex of rare and other wildlife including birds, mammals, reptiles and amphibians are recorded and maintained in a computer database because standard wildlife census and survey techniques at the Complex do not document or detect all species which are present. To date, 6,894 observations representing over 200,000 individual animals have been input into the database; this information is used for planning and management purposes.

2. Endangered and/or Threatened Species

The Wertheim NWR provides habitat for a number of Federal and State listed endangered and threatened species.

The Carmans River at Wertheim has a long history of supporting nesting osprey, a NYS designated threatened species. Three pairs of osprey nested at the Refuge this spring. Two of the three pairs were successful and fledged a total of three young. Two of the nests are located on poles specifically put up to attract nesting osprey; the remaining nest is on a topped pine. During mid and late summer, it was also noted that a pair of osprey started building a nest on a snag along Yaphank Creek.

The Woods Hole Pond at the Wertheim NWR was checked for tiger salamander (NYS designated endangered species) use. No adults or egg masses were observed. It is possible that the cold weather in March has delayed mole salamander breeding activity.

An eastern mud turtle was discovered on the eastern side of the Wertheim NWR during the middle of June. The mud turtle is a state designated threatened species. Less than ten populations exist in New York State and the Refuge is considered to have the largest population. The known population occurs on the western side of the Carmans River close to Yaphank Creek. This individual was located approximately half a mile from the known population. The State is considering upgrading the status of this turtle from threatened to endangered.

Five bald eagle sightings were documented this year at Wertheim all along the Carmans River. In November, an adult plumaged eagle was seen on the Refuge and in December, four observations were made of an immature bird - probably the same individual.

Common terns and least terns, New York State designated threatened and endangered species respectively, were observed at the Refuge from May through September. Least terns forage in Bellport Bay, the Carmans River and the Big Fish Creek Impoundment. Common terns forage in Bellport Bay and only the southern portion of the Carmans River.

Northern harriers, a New York State threatened species, are commonly observed each month at Wertheim. Harriers are particularly conspicuous in the winter months. During the

summer months of 1992 and 1993, it was obvious that harriers were not as common as in 1991. Harriers forage in the Refuge's wetland habitats.

Eastern mud turtle - New York State designated threatened species. This individual was found in a locale a half mile distant from the known population on the Refuge. RWP - 93.

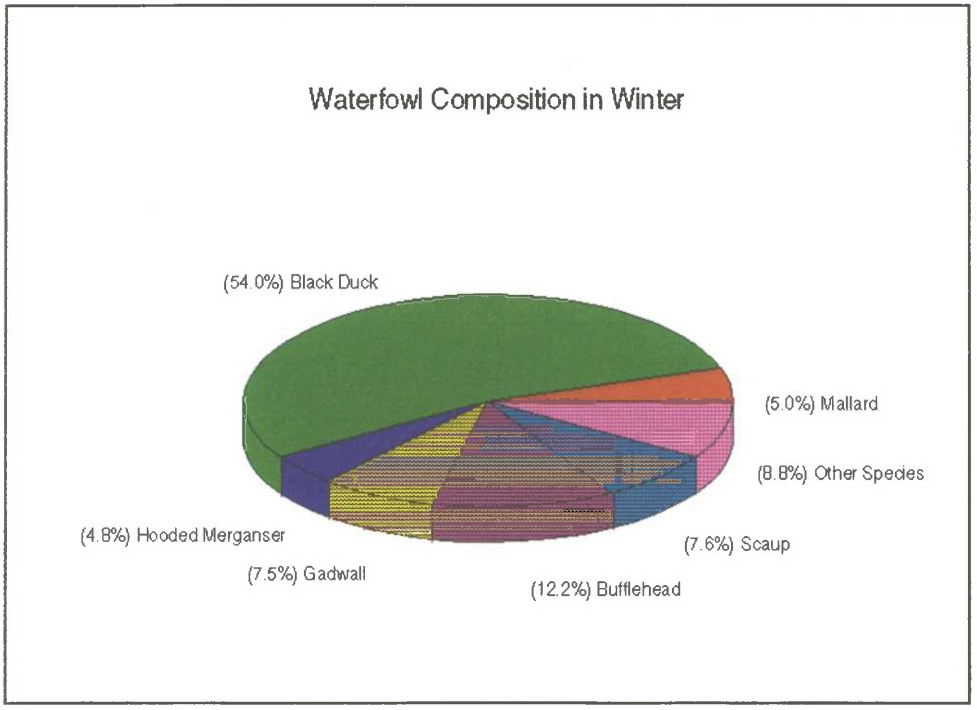
During the spring and autumn, six peregrine falcons, a federal designated endangered species, were observed at Wertheim. Falcons were seen on the Carmans River, Big Fish Creek Impoundment and the Bellport Bay salt marshes.

3. Waterfowl

The Wertheim NWR provides important wintering habitat for waterfowl, particularly black ducks, on Long Island's south shore. The Refuge consists of a wetland complex at the eastern end of Great South Bay, the largest bay on the south shore. In addition, the Carmans River through Wertheim takes on importance as habitat during the periodic winter cold spells because it is one of the last water bodies to freeze on Long Island.

Waterfowl surveys are conducted twice a month at the Wertheim NWR. This year, twenty-

two species of ducks, geese and swans were documented although only about a dozen are common. The figure below breaks down the 1993 winter waterfowl composition by species. The most abundant is the black duck which makes up more than half the total. Other common species include bufflehead, greater scaup, gadwall, mallard and hooded merganser. During the summer months, the most common species include wood duck, mallard, black duck and gadwall. Swans and geese make up only a small component of the waterfowl using Wertheim.

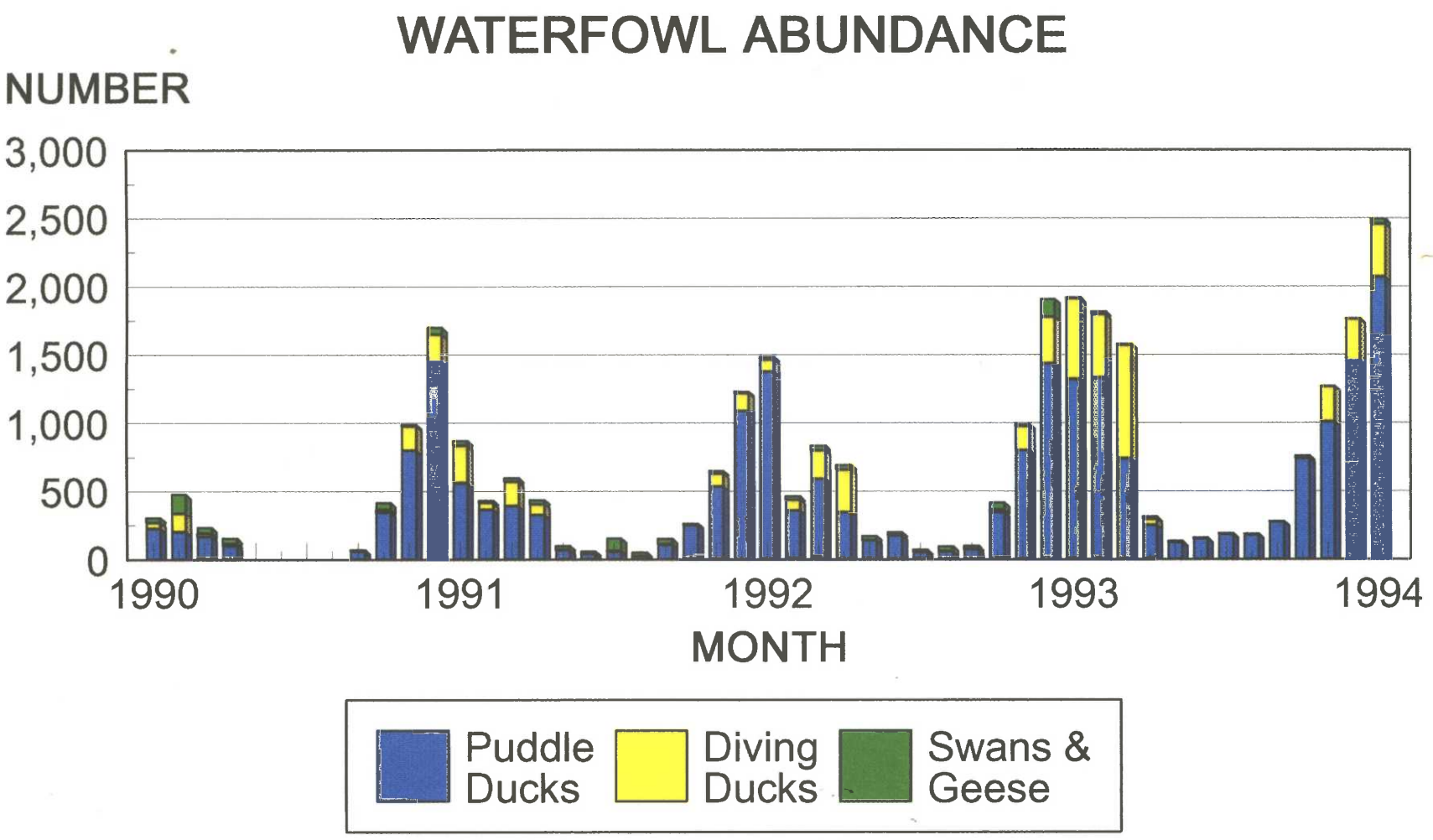


Species composition of the winter waterfowl community at the Wertheim NWR.

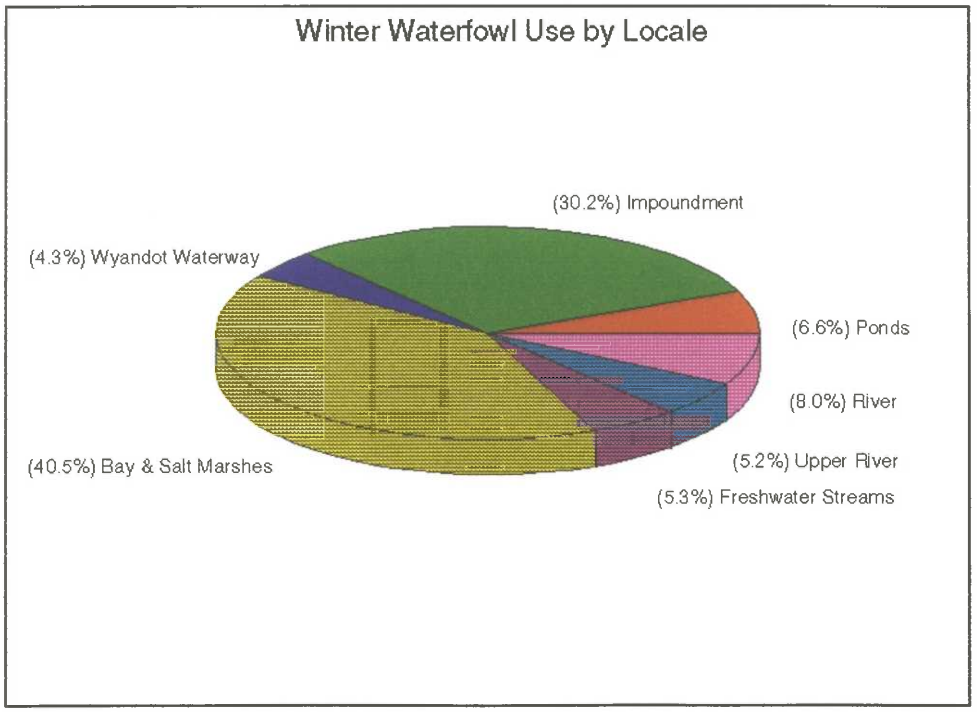
The figure on the following page indicates waterfowl abundance at the Refuge for the past five winters. The general seasonal pattern is for relatively low numbers from May through September. Waterfowl numbers are intermediate in April and October and numbers tend to peak and remain high from November through March. Winter waterfowl numbers in the last few years have tended to increase, we believe the change is due in part to increased patrolling reducing disturbance particularly at the impoundments. During 1993, peak waterfowl abundance occurred in January with close to 2,000 birds. During the winter of 1993/94, the January total was close to 2,500 waterfowl principally black ducks.

The semimonthly waterfowl survey is also divided into sections so that total waterfowl numbers can be analyzed as well as the waterfowl use of specific areas on the Refuge. The

WERTHEIM NWR



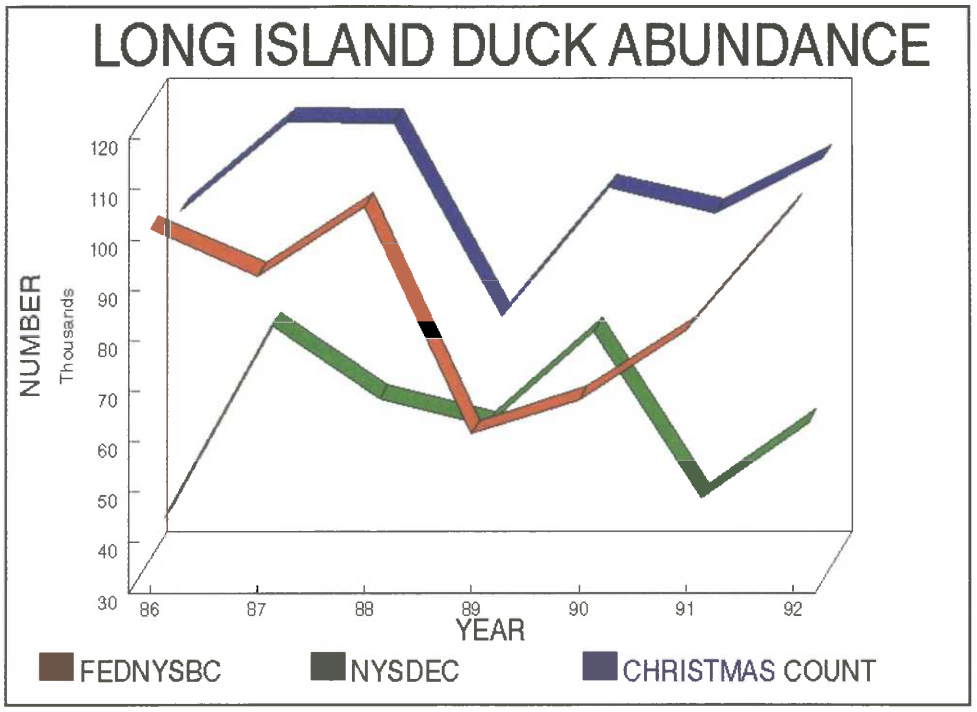
following figure breaks down winter waterfowl use by locale. Approximately one third of the use occurs in the bay and salt marshes. Black ducks use the salt marshes extensively. The bay also receives increased use by divers particularly bufflehead, greater scaup and red breasted merganser. Another third of the use occurs in the Carmans River and its tributaries. The river particularly gets high use when the bay is frozen. Common species on the Carmans River include black duck, mallard, gadwall, hooded merganser and common merganser. Yaphank Creek and Little Neck Run are most heavily used by black ducks, gadwall, mallard and green winged teal. The remaining third of waterfowl use occurs on the Big Fish Creek Impoundment. This impoundment is approximately half open water and half robust emergents. The most common winter species at the impoundment include black duck, gadwall and hooded merganser. Up to 800 ducks (chiefly blacks) have been documented on the impoundment. Considering that the impoundment is only forty acres in size it receives heavy waterfowl use.



Winter waterfowl use by locale at the Wertheim NWR.

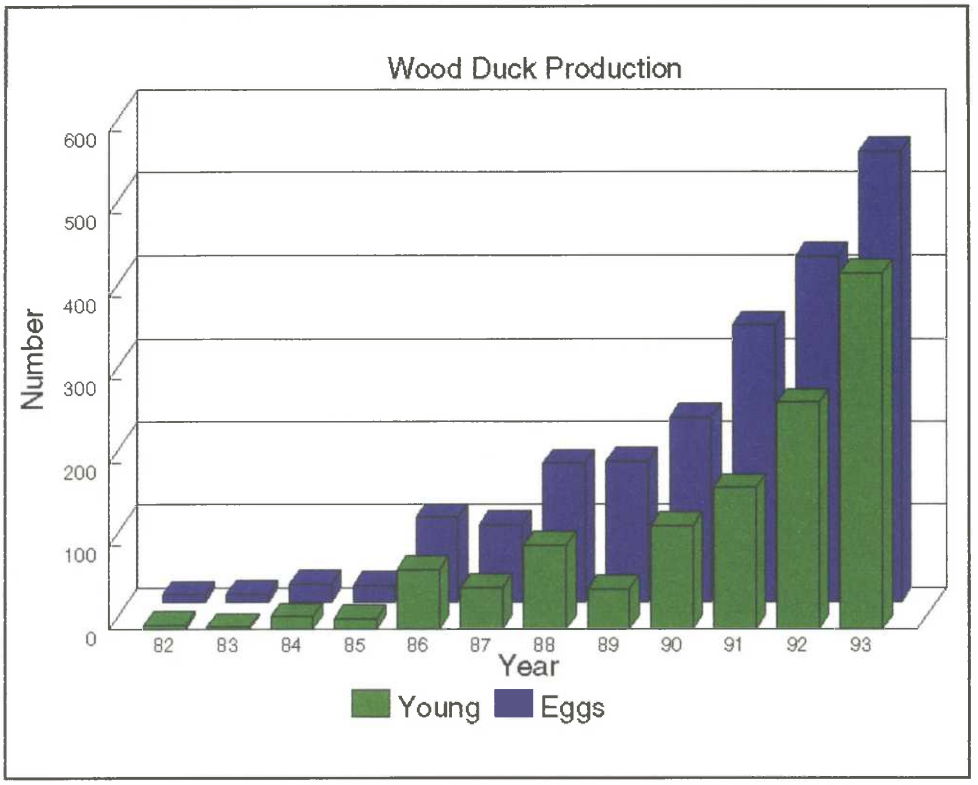
Information on Long Island wide winter waterfowl surveys is also being maintained on computer file at the Complex. This information proves useful when making comparisons of waterfowl numbers as well as for comparison with annual waterfowl trends at the Complex. The winter waterfowl surveys which are used include the Federation of New York State Bird Clubs mid-winter count, the New York State DEC mid-winter aerial survey, and Audubon's Christmas Bird Count (ten counts for Long Island). As can be seen from the following figure

the results from these surveys do not always indicate the same patterns although they are all conducted within a one month period in mid-winter.



Duck abundance on Long Island for the past seven winters from three different winter waterfowl surveys.

Two Bennett brood surveys were completed between 13 and 16 June and 17 and 20 July. The survey is conducted to obtain an estimate of waterfowl production at Wertheim and consists of the intensive monitoring for broods at sixteen aquatic areas on the Refuge. The survey has been performed for the past six years. The survey indicated an estimate of 138 waterfowl broods produced at Wertheim this past breeding season with an estimated 741 ducks fledging (the mean size of the older broods was used to estimate fledged ducks). This is the highest brood estimate at Wertheim for the past six years although only slightly higher than last year's estimate. The most common broods in order of abundance were wood duck, mallard, black duck, Canada goose, gadwall, widgeon and mute swan. For the second consecutive year, wood duck broods were the most common. In previous years, mallards were the most common brood but the increase in wood duck nesting boxes over the past three years has substantially increased the breeding population. Mallard broods exhibited a decline this year, black ducks and Canada geese increased, gadwalls remained similar to last year, and mute swans had the worst year on record. As in past years, areas with the greatest number of broods included the Big Fish Creek Impoundement, Little Neck Run, and the upper and mid sections of the Carmans River.



Wood duck production from nest boxes at the Wertheim NWR.

The Refuge's wood duck nest boxes were checked for use in August and early September. A total of 137 nest compartments were available for use this season - this number includes some double boxes and plastic boxes which typically are not used. Fifty three nest starts occurred in the boxes, a 25 percent increase over last year. This year eighty percent of the nests were successful in hatching at least one duckling, eighty percent of all eggs hatched and each successful nest hatched a mean of 10.2 ducklings. This is the best nesting success, hatching success and mean brood size for the Refuge in the past fifteen years (see preceding figure). There has been in the last two years a three hundred percent increase in wood duck production over the fifteen year mean. Dump nesting which in 1991 comprised a quarter of all nest starts this year comprised only five percent of the nest starts. The increase in the number of available boxes over the past two years appears to have decreased dump nesting while increasing the number of nesting hens and productivity. Areas with the heaviest wood duck nest box use include Little Neck Run, Yaphank Creek, Big Fish Creek Impoundment, the upper Carmans River and most of the small ponds with boxes. Areas with some box use but to a lesser extent include the middle and downstream sections of the Carmans River, Wyandot Waterway and the subimpoundment.

4. Marsh and Waterbirds

During the semimonthly waterfowl survey all waterbirds encountered are also recorded. Birds dependent on aquatic resources which are recorded include loons, grebes, cormorants, rails, ibis, herons, gulls, terns, plovers, sandpipers, select raptor species and kingfishers.

Wading birds are conspicuous at Wertheim's wetlands. Long legged wading bird peak in the warmer months when several species are present including great blue herons, green backed herons, black crowned night herons, yellow crowned night herons, glossy ibis, snowy egrets, great egrets, little blue herons, American and least bitterns. In winter, only two species are observed with regularity: great blue heron and American bittern. Least bitterns, a species of special concern in Region 5, have been detected for the past three years at Wertheim in three separate locales - the Big Fish Creek impoundment, Yaphank Creek and Little Neck Run. A young-of-the-year least bittern was observed at the impoundment in July - breeding had been suspected for this species for the last few years.

Double crested cormorants are conspicuous on the Refuge year round, numbers peak in spring and autumn when over one hundred birds have been documented. Other diving waterbirds observed include pied billed, horned and red necked grebes. In addition, a pied billed grebe pair successfully fledged a brood of five at the impoundment during summer. This species is rare as a breeder on Long Island and there has been local concern regarding the decline of pied bills on the Island. Pied-bills are also a species of special concern in Region 5.

Both clapper and Virginia rails breed and are present year round on the Refuge. Rail surveys were conducted at Wertheim in June using a playback tape and recording all responses by rails within three minutes of tape playing at 21 stations for clapper rails and 23 stations for Virginia rails. Five percent of stations had clappers responding which was similar to last year's results and thirteen percent had Virginias responding, an increase over last year. Aside from clappers and Virginias, four other species of rails occur at Wertheim. American coots are the most easily observed and are common during the winter, particularly along portions of the Carmans River. Moorhens are rare and none were observed this past year. King and sora rail sightings are sporadic although soras are common during autumn passage.

Waterbirds are routinely counted during waterfowl surveys at all Long Island Refuges. To detect seasonal patterns of abundance among the seventy common waterbird and waterfowl species on Long Island a cluster analysis (SYSTAT, linkage method, Pearson product moment correlation) was performed on three years of monthly survey data (after standardizing the data by species) from the Complex. The purpose of the analysis was to group species with similar seasonal abundance patterns. Patterns detected from such an analysis are useful in determining seasonal use by the waterbird community and potential species assemblages. The results of the analysis are provided in the following table and indicate eleven major seasonal groupings and a few species which did not fit into any of the generated groups. Groups tended to be

TABLE. Waterbird species grouped by similarities in seasonal abundance. Cluster analysis was used to group species from monthly surveys conducted at the Long Island NWR Complex.

GROUP BY SEASON(S) OF PEAK ABUNDANCE	*WATERBIRD SPECIES*
Winter Peak (October - March) - Sustained	Canada Goose, Black Duck, Mallard, Gadwall, Pintail, Canvasback, Greater Scaup, White Winged Scoter, Oldsquaw, Goldeneye, Bufflehead, Common Merganser, Hooded Merganser, American Coot, Northern Harrier, Bonaparte's Gull and Herring Gull
Early Winter Peak (November - December)	Red Throated Loon, Common Loon, Horned Grebe, Widgeon, Red Breasted Merganser, Bald Eagle, Dunlin, Common Snipe and Ring Billed Gull
Spring Peak (March - April) with Lesser Peak (November - December)	Great Cormorant, Northern Shoveler and Ring Necked Duck
Spring Peak (April)	Glossy Ibis and Blue Winged Teal
Spring (April) and Autumn Peaks (October)	Atlantic Brant, Surf Scoter and Black Backed Gull
Spring - Summer Peak (May - July)	Willet, Ruddy Turnstone, Common Tern, Roseate Tern and Least Tern
Summer Peak (July)	Piping Plover, Lesser Yellowlegs, Pectoral Sandpiper and Dowitcher
Late Summer Peak (July - August)	Great Egret, Snowy Egret, Green Backed Heron, Osprey, Semipalmated Plover, Spotted Sandpiper, Semipalmated Sandpiper, Royal Tern, Western Sandpiper, Least Sandpiper and Laughing Gull
Early Autumn Peak (August - September) Lesser Spring Peak (May)	Double Crested Cormorant, Greater Yellowlegs and Wood Duck
Autumn Peak (September - October)	Pied Billed Grebe, Forster's Tern and Black Crowned Night Heron
Late Autumn Peak (October - December)	American Bittern, Great Blue Heron, Green Winged Teal, Black Scoter, Sanderling and Belted Kingfisher
No Clear Abundance Pattern	Mute Swan, Ruddy Duck, Black Bellied Plover and Killdeer

categorized as peaking in winter, summer or both spring and autumn.

Approximately forty percent of all the waterbird species had their greatest abundance during the cold season. Two groups had abundance patterns which peaked during winter. The largest group delineated comprised the most common waterfowl species on the Complex (both puddle and diving duck species), northern harrier, coot, herring gull and Bonaparte's gull. These waterbirds essential wintered at the Complex. Peak abundance for these waterbirds occurred throughout the colder months (October through March) with for the most part little fluctuation in their peak numbers from November through March. A second group also peaked in numbers during winter but only for a couple of months (November and December) and than had reduced numbers during the remainder of the winter season. These species included red throated loon, common loon, horned grebe, widgeon, red breasted merganser, dunlin, snipe, ring billed gull and bald eagle. These species appeared to stage during early winter before moving to other locales.

Three groups exhibited peak abundance in spring with two also exhibiting secondary peaks in autumn. Approximately ten percent of the species examined had their highest numbers during spring. The group which only peaked in spring (April) included blue winged teal and glossy ibis. Species which peaked in spring and to a lesser degree in autumn included great cormorant, brant, shoveler, ring necked duck, surf scoter and black backed gull. This group was further subdivided into those that peaked in early spring (March - April) and late autumn (November - December) and those that peaked in mid-spring (April) and mid-autumn (October). Although some of these waterbirds also wintered on the Complex, in some cases in large numbers, for the most part the Long Island Refuges served as migratory stopover for their peak numbers during passage.

Waterbirds whose numbers were greatest during summer were divided into three subgroups - species which peaked in early, mid or late summer. Thirty percent of all waterbirds had their highest numbers during the summer months. Waterbirds with their highest numbers in early summer included turnstone, willet and the common tern species. Common and roseate terns were particularly noticeable as staging on the Complex before moving to breeding colonies. Species which peaked in mid-summer included piping plover, lesser yellowlegs, pectoral sandpiper and dowitcher. Peak numbers for species in late summer included almost all the long-legged wading birds, semipalmated plover, spotted sandpiper, laughing gull, royal tern and the common 'peep' sandpipers.

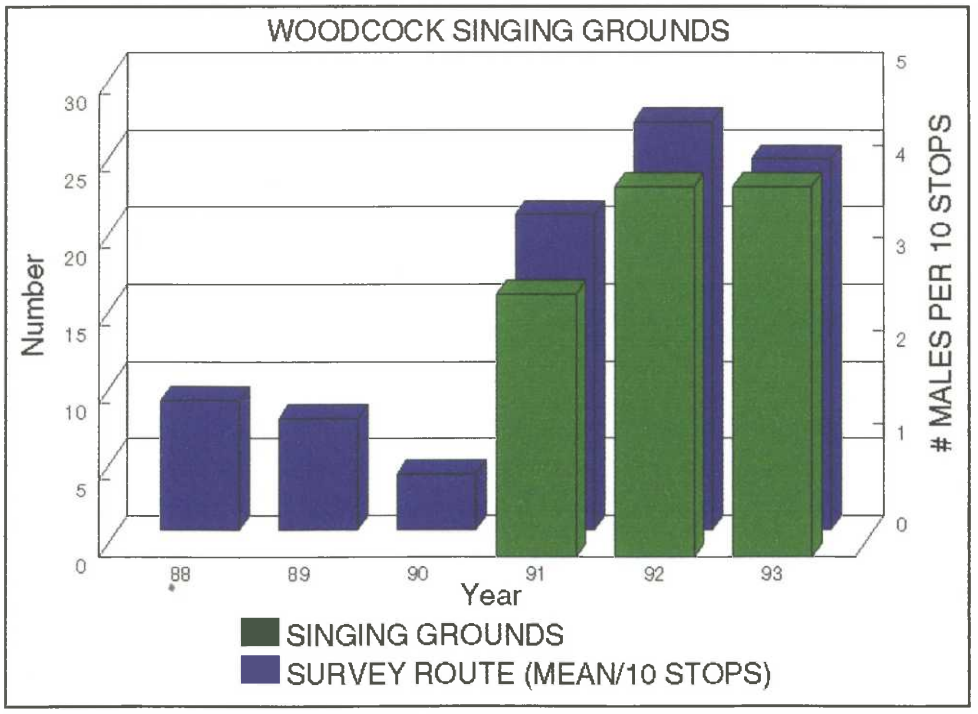
Twenty percent of all waterbirds exhibited their greatest abundance during autumn. This group was subdivided into three groups; those that peaked in mid-autumn, late autumn, and autumn with a secondary spring peak. The majority of these species typically occurred during all seasons on the Complex. Species which exhibited autumn peaks included pied billed grebe, bittern, great blue heron, night heron, green winged teal, black scoter, sanderling, Forster's tern and belted kingfisher. Some of these waterbirds (such as the grebe, tern and night heron)

peaked in September and October while the remainder exhibited peaks from October through December. Species which peaked in autumn and to a lesser extent in spring included double crested cormorant, greater yellowlegs and wood duck. These three species also tended to be abundant during the summer months.

5. Shorebirds, Gulls and Allied Species

Aside from woodcock, twelve species of sandpipers and plovers were observed this year at Wertheim. Numbers were highest in late summer and early autumn. Because waterfowl surveys are principally conducted by boat at Wertheim it is felt that shorebird numbers from the surveys severely underestimate shorebird use at the Refuge. The most common species include snipe, greater yellowlegs, black bellied plover, spotted sandpiper, least sandpiper and willet.

The woodcock singing ground survey was conducted in late April. The survey consists of fifty separate sampling points where all "peenting" birds heard are recorded. An average of 4.0 woodcock were detected per ten sampling stations (see figure above). This year's survey results are slightly down from last year but significantly higher than previous years. Aside from conducting the survey, each year all woodcock singing sites are checked for occupancy. This year, twenty-four sites were used - the same as last year although only 75 percent of the sites were used both years. The recent increase in woodcock use at Wertheim is principally due to the restoration and creation of forest openings during the last two years.

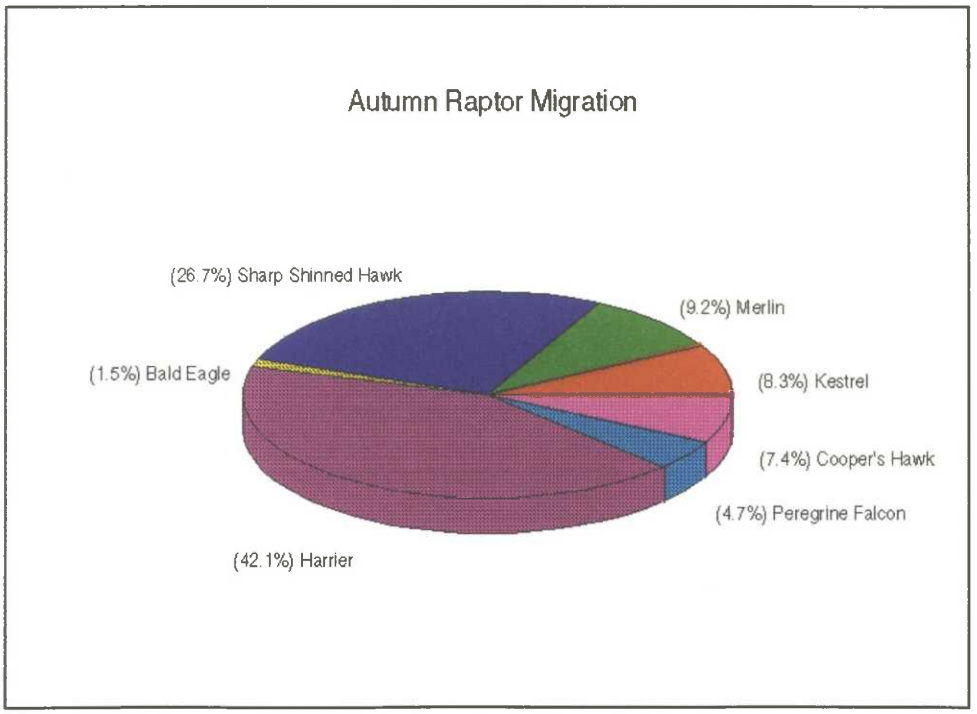


Singing ground use by American woodcock at the Wertheim Refuge.

Gulls are conspicuous at Wertheim. Numbers peak in winter when up to 1,200 have been counted and decline in the summer to under 150 birds. Herring and great black backed gulls are the most common species. Ring billed gulls are present year round but in low numbers and laughing and Bonaparte's gulls are occasionally documented in summer and winter respectively. This year, like last, gull numbers particularly herring gulls were reduced from levels in 1990 and 1991. Perhaps some of the recent closings of landfills are impacting gull numbers. Common and least terns are routinely observed in the warmer months; their numbers usually peak during May.

6. Raptors

Raptors which nest or are commonly observed year round at Wertheim include osprey, northern harrier, red tailed hawk, great horned owl, barn owl and screech owl. During migration and winter, the following species were observed: broad winged hawk, rough legged hawk, sharp shinned hawk, Cooper's hawk, short eared owl, American kestrel, merlin, peregrine falcon and bald eagle.



Autumn species composition of migrating raptors at the Wertheim NWR.

The beaches and shorelines of Long Island are known as good raptor watching areas particularly during autumn migration. Several permanent raptor migration stations have been established on the Island to track patterns. Although at Wertheim, no systematic attempt is

made to count migrating raptors, we record all incidental sightings of raptors on the Refuge. The preceding figure is a breakdown of these incidental raptor sightings during autumn migration (September through December) on the Refuge. The three most common raptors which total three quarters of all sightings are northern harrier, sharp shinned hawk and Cooper's hawk. Surprisingly, falcons are not uncommon during migration - merlins and kestrels tend to be early season migrants and in recent years merlin numbers have increased while kestrels have declined. Bald eagle, the rarest of the common Refuge raptors, is being observed at Wertheim with greater frequency than in past years.

A pair of Cooper's hawks nested at Wertheim this past year. Cooper's hawks were not recorded as a breeding species on Long Island during New York State's breeding bird atlas period. The Atlas conjectured that the species was missing as a breeder on Long Island due to the lack of large contiguous forested land. The most recent breeding records for Cooper's hawks on Long Island were in 1920 and 1921. Seventy-two years later, this pair which nested in a red oak over a small pond successfully fledged two young by the end of July. Hopefully the pair will continue to nest at Wertheim.

Cooper's hawk nestling at Wertheim - the last Cooper's hawk nest on Long Island occurred over seventy years ago. RWP - 93.

Barn owl nest boxes were erected at two locales last year. Barn owls are a species of special concern in Region 5. One box had been placed in an old silo where owls had been seen and the other erected over a brackish marsh. During the winter of 1992/93, barn owls had been detected roosting in both. During spring, a barn owl pair nested in the marsh box and produced six eggs. Unfortunately the nest was either abandoned by the pair or the eggs were damaged by a predator. To correct the problem an additional predator guard was added to the mounting pole. Late this year, a third barn owl nest box was constructed and placed in the east salt marsh. The two screech owl boxes were not used for nesting this year but one was used during winter as a roost site.

7. Other Migratory Birds

The Refuge's breeding bird survey was completed in June. The survey consists of recording all avian species detected in three minutes at each of 113 sampling stations. All major habitat types at the Refuge were included in the survey. This is the third consecutive year the survey has been completed. A total of eighty-three species were documented. The species with the highest frequency of occurrence were catbird, yellowthroat, rufous sided towhee, ovenbird, mourning dove, robin, great crested flycatcher, blue jay, tufted titmouse, bobwhite, red eyed vireo and yellow warbler. Birds present in older forest stands (i.e., light pole and older growth stages) included such interior species as ovenbird, wood thrush, veery, eastern wood peewee, black and white warbler, great crested flycatcher, American redstart, red eyed vireo and scarlet tanager. Songbird communities in salt marshes were dominated by sharp tailed sparrows, seaside sparrows and long billed marsh wrens. Results from this year's survey were similar to the two previous years.

A prothonotary warbler was observed during migration on the upper Carmans River in early autumn. The species is considered rare on Long Island and few breeding records have been documented.

A whippoorwill survey was conducted in late April in conjunction with the woodcock survey route. Whippoorwills have declined as a breeder during the last two decades on Long Island and the survey is performed to monitor abundance. The results indicated a two fold increase over last year's results. This increase might be partially due to a late spring movement due to unseasonable cold weather during the early part of the month.

Two eastern bluebird pairs, a New York State designated species of special concern, nested at Wertheim during April and May. The species has not been documented as nesting on the Refuge for the past three years. Both pairs made use of songbird nest boxes placed in fields managed for American woodcock.

After an absence as a breeder for three years, two paris of eastern bluebirds nested at Wertheim. JB - 93.

Sixty-five percent of the Refuge's songbird nest boxes were used by songbirds this year. Besides the two pairs of bluebirds, the principal nesting species included tree swallow and house wren. Percent use of the nest boxes was similar to the previous year. One of the purple martin houses at Wertheim was used by ten nesting pairs.

The mourning dove survey was completed in June. A total of fifty-eight stations were sampled. Doves were documented at close to half of all stations which was slightly greater than the survey results from the two prior years. Complex wide, the dove index was up by twenty percent.

10. Other Resident Wildlife

The NYSDEC Bureau of Wildlife embarked on a plan to reintroduce the wild turkey on Long Island this year. The wild turkey has been absent for the past two hundred years from the Island with the exception of some domestic introductions. The birds used in the transplant came from upstate New York and followed the state's established procedures for this trap and transplant program.

New York State Biologist Mark Lowery with wild turkey about to be released at Southaven Park - located directly north of the Wertheim Refuge. RWP - 93.

The plan originally called for releasing 26 birds in East Hampton and 24 birds at Shelter Island. However during the public comment period, Shelter Island residents indicated their disapproval of the program and the Bureau then decided on a more western site in the Town of Brookhaven. Two adjacent sites were considered for the release in the Town of

Brookhaven - the Wertheim NWR and Southaven County Park. The Bureau decided on Southaven Park largely because the Park provides greater recreational opportunities, both consumptive and nonconsumptive, to the public.

Turkey and poults at Wertheim NWR - part of New York State's effort to establish turkeys on Long Island after an absence of 200 years. RWP - 93.

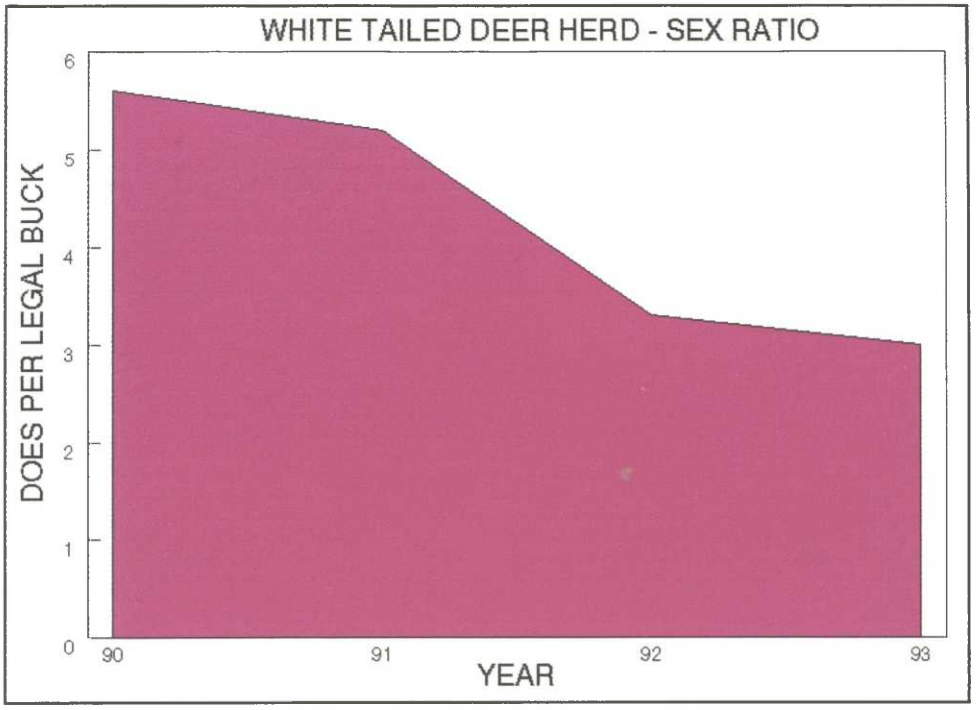
Wild turkeys were released at both East Hampton and Southaven Park in mid-March. By the

end of March, turkeys were being observed at the Refuge. The birds to get to the Refuge has to cross a four lane major highway followed by a two lane highway. Four separate turkeys were observed that spring on both sides of the Carmans River. Observations were made most frequently at the Refuge's established forest openings and along trail edges.

In June, a turkey brood was discovered on the western portion of the Refuge. The brood consisted of an adult hen and eight poults. Observations of this brood throughout the summer indicated that the birds were mainly foraging in a complex of six fields being maintained as woodcock habitat. At the time, this was the first turkey brood on Long Island reported from this transplant effort. Subsequently, the NYSDEC found evidence of a brood to the north of the Southaven Park transplant site and one at the East Hampton site.

In January of 1994, the NYSDEC conducted an additional stocking of turkeys at the East Hampton site (24 birds) and the Southaven Park site (21 birds). However, unlike the first stocking the birds for Southaven Park were stocked on the Robinson Duck Farm parcel, immediately adjacent to Wertheim unlike Southaven Park proper which is separated from the Refuge by two major roads. It appears that of this second stocking almost all of the 21 stocked birds moved onto the Refuge. The Complex sends the NYSDEC periodic reports of all its wild turkey observations at the Wertheim Refuge.

The white tailed deer herd at Wertheim is monitored by track counts in winter and by observations on production and sex composition. Observations of the herd consists of recording each deer observed between fawn drop (late May) and antler drop (end of December) into the categories of fawn, doe or buck. All staff record these observations while engaged in their duties on the Refuge. The sex ratio and fawn production based on these observations has been fairly consistent over the past four years. Fawns made up more than thirty percent of the herd, bucks comprised sixteen percent and does forty-eight percent. Although recreational hunting is not permitted at Wertheim, sport hunting of deer does occur on neighboring lands. The Refuge herd has characteristics of an exploited herd - high production and a skewed sex ratio in favor of does. However in the last two years, there has been the trend towards less of a disparity between the percent of bucks and does. The figure below indicates the number of does per legal buck for the past four years - the last two years exhibit a definite decrease in this ratio. It is thought that this change in ratio is either due to a decrease in recreational sport hunting in the area or that increased staff patrolling has reduced poaching on the Refuge or both.



Ratio of does to legal bucks for the past four years at the Wertheim Refuge.

Track counts were conducted at the Wertheim NWR during December when snow conditions were suitable. The data is used to monitor the abundance of white tailed deer and other mammals. All tracks are counted on a 9.5 mile route in the Refuge. The survey has been conducted for deer for the past six years and for all mammals the last three. The track count was conducted at the end of December for the winter of 1993/94. The results of the track count during the 1990s has indicated a slow but steady increase in deer abundance. Track count indices for deer in the 1990s are noticeably higher than those performed in the 1980s. Other species counted at Wertheim include red fox, gray squirrel, cottontail, mink and long tailed weasel.

Distemper caused major mortality among raccoons on Long Island this year. The last major outbreak of distemper on the Island was approximately a decade ago. Several raccoons were found at Wertheim in a stupor or dead with a discharge from the nose and or eyes. Several calls were received by the Refuge, and responses made, regarding sick raccoons in neighboring communities. Although the Complex does not conduct a suitable survey to track raccoon numbers it is expected that the local population has significantly declined due to this distemper outbreak.

Typical yearling spike buck. The Refuge is in the initial planning stage of developing a deer management program. RWP - 93.

The bobwhite quail survey was completed in June and was conducted in conjunction with the mourning dove survey. A total of fifty-eight stations were checked for quail presence. Quail were documented at thirty-five percent of the sites similar to the last year's results. Complex wide the quail index declined by twenty percent from last year.

The second year of a marking program of adult eastern box turtles at Wertheim was completed. The program is modeled after one being conducted by the National Park Service at the nearby William Floyd Estate. Box turtles are still relatively common on Long Island but the NYSDEC is considering listing them as a species of special concern which usually is a precursor before listing as threatened or endangered. The Refuge program consists of marking all adult turtles captured (and returning them to the capture site), measuring numerous shell characteristics and other features, and checking for injuries/disease or previous marking. This activity is being conducted to determine population size, recruitment rate, mortality, habitat use and movement behavior. Turtles are captured by staff while engaged in other duties - turtles were captured between April and October but the majority were found from June through August. Sixty-six turtles were captured in 1992 and this year 119 were marked. Turtles are marked on the marginal scutes. A Peterson mark-recapture estimate for

adult box turtles based on the data gathered to date is 1,554 adult individuals (SE=272).

Eastern box turtle - a conspicuous species at Wertheim. J. Hollingsworth - 1993

Members of the Long Island Botanical Society during a field trip to the Refuge in August provided the Complex the results of a butterfly count. A total of 74 butterflies were counted including fourteen species. The most common species included the cabbage white, spicebush swallowtail, eastern tailed blue, pearl crescent, red spotted purple, common wood nymph, monarch, broad winged skipper and Peck's skipper.

11. Fisheries Resources

In the previous two years, the fish communities of the Carmans River, Yaphank Creek, Little Neck Run and Big Fish Creek Impoundment were sampled by either seining or electro-shocking. Species documented at the Refuge include three diadromous species, fifteen marine species, seven estuarine species and twenty-one freshwater species. The fish community of the Carmans River is dominated by American eel and striped bass. Other species of interest include a viable population of brook trout (one of the few such populations on Long Island) and pirate perch which will probably be listed as a threatened species next year by the State of New York.

12. Propagation and Stocking

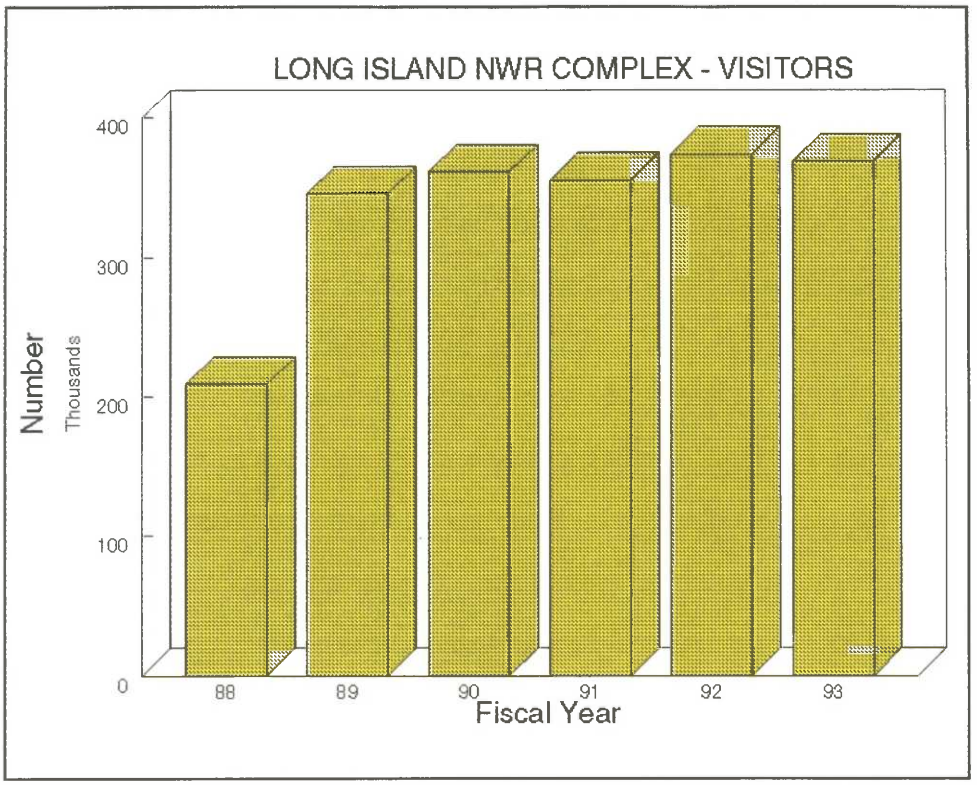
The State of New York stocked 2500 trout in the upper Carmans River, at the northern edge of the Refuge, in April. Fifteen hundred were rainbow trout and the remainder brown trout. The trout were stocked as part of a put and take fishery for recreational anglers.

H. PUBLIC USE

1. General

The Long Island National Wildlife Refuge Complex consists of nine units providing various degrees of public access. Wertheim NWR is open to limited public use. The majority of use at Wertheim NWR is canoeing and boating on the Carmans River which runs through the center of the Refuge. A parking area with portage trail is open daily for the public to park and launch canoes at the Carmans River on the Refuge. The one mile long Indian Landing Nature Trail, open to the public, is accessible only from the Carmans River via watercraft. Visitors may also park at the Refuge Office and walk along the entrance road during weekdays; a visitor's kiosk is present. The Wertheim Refuge, typically receives over 20,000 visitors a year the majority of which canoe the Carmans River.

Other Refuges in the Complex which are open to the public include Target Rock NWR, Morton NWR, Oyster Bay NWR, and Amagansett NWR. Morton and Target Rock NWRs have walking trails, both upland and beach, and informational kiosks. The beach at Amagansett NWR is open to the public; the dune area is closed. The Oyster Bay NWR largely consists of subtidal habitats and is open to boating. Lido Beach WMA is open for environmental education activities conducted by the SEALINK program. Refuges which are closed to the public without prior explicit permission from the Refuge Manager are Conscience Point NWR, Seatuck NWR, and Sayville NWR. Access to Seatuck and Conscience Point NWRs was permitted during 1993 for environmental education activities, and for Audubon Christmas Bird Counts and bird walks. The Complex as a whole during FY93 had 368,811 visitors. Visitation decreased slightly from last year's level largely as a result of the closing of the Target Rock NWR for six months due to storm damage. A review of the guest register sheets at the Wertheim NWR office desk has shown that while most visitors are from New York State we also had visitors from all over the United States as well as Europe and Asia.

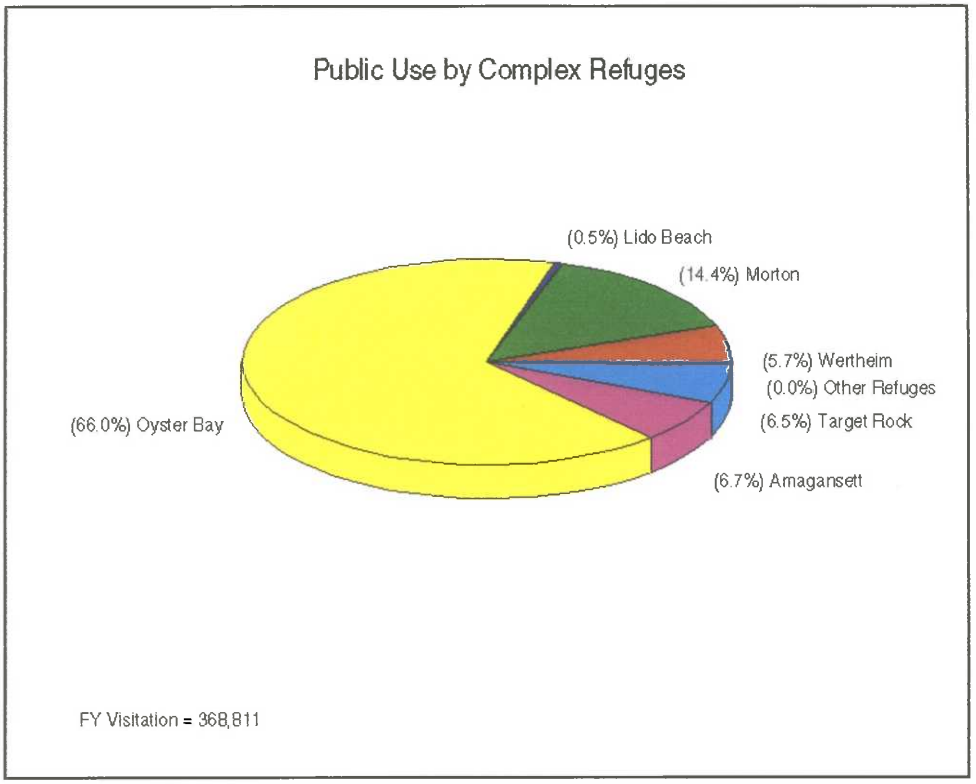


Annual public use at the Long Island NWR Complex.

The FY-93 Public Use report was prepared and submitted to the Regional Office. In FY-93 the Complex received a total of 368,811 visitors who are estimated to have spent a total of 830,363 hours at the Complex. Visitor counts broken down by Refuge for FY-93 are as follows: Target Rock, 24,100 visitors; Wertheim NWR, 21,056 visitors; Amagansett NWR, 24,878 visitors; Oyster Bay NWR, 243,586 visitors; Conscience Point NWR, 22 visitors; Seatuck NWR, 120 visitor; Morton NWR, 53,044 visitors; and, Lido Beach, 2,005 visitors. The most common activities pursued on the Complex were boating, wildlife observation on foot, and self-interpreted trails.

Other reports submitted to the Regional Office during the year included: semi-annual 504 Report; annual Duck Stamp Report (July); annual Fee Access Program Report. Updated IPWs for disabled access were provided to the Regional Office. Information on museum property staffing and funding needs for the Complex were provided to Public Use Specialist Mr. Tom Comish of the Regional Office in February. In June, the semiannual report on federally conducted programs at the Complex was provided to the Regional Office of Human Resources. Printouts on the status of the handicapped accessibility of the Complex were

revised and updated. In August, a response was forwarded to the Regional Office regarding Refuge newsletters. The Complex presently publishes no newsletters.



Public use on the Complex by Refuge in FY93.

Queries to a survey regarding the Complex's Public Use Plan were provided to Mr. Tom McFadden of the Great Swamp NWR in February.

During the year, Complex staff gave several informational presentations on the Long Island NWR Complex and its programs, and participated in several exhibitions. Complex Biologist R. W. Parris gave a presentation on the Wertheim NWR to the Yaphank Historical Society. Thirty members, including a Suffolk County Legislator, attended. ARM Bill Kolodnicki provided a presentation to the Oyster Bay Anglers. ARM Bill Kolodnicki talked on piping plovers to students at Herricks High School. PL Tom Stewart and ARM Bill Kolodnicki respectively gave presentations to the Old Islip Civic Association and Brookhaven Village Association.

Complex Biologist R. W. Parris was interviewed by Ms. Lois Schmidt who is authoring a children's book on careers with wildlife.

The Long Island Nature Conservancy held a meeting at the Wellington Dormitory in October for their staff. Executive Director Sara Davidson expressed the Conservancy's thanks.

Promotion of the proposed Environmental Education Center continued, but was constrained by limited staff and other priorities.

Five news releases were issued in 1993. Two news releases were issued in January - one concerning the closing of the Target Rock NWR to the public due to storm damage and the other to notify the public concerning the upcoming prescribed burn at the Wertheim NWR. In March, a news release was issued regarding the seasonal closure of the beach at the Morton NWR to protect piping plover and other beach using species. During July, two releases were issued - one announcing the opening of the Target Rock NWR to the public and the other regarding the removal of trash receptacles at the Morton and Target Rock NWRs.

With New York City just an hours drive away, the Complex receives considerable media attention. The following are a few of the newspaper articles which appeared this year in the local press.

Newsday - January - "Census is for the Waterbirds"

Long Island Advance - January - "Move to Save Wetlands, Groups Seek to Save South Haven Parcel from Development"

Long Island Advance - January - "Firefighters Charged with Arson"

Newsday - January - "Closed for Repairs: Nor'Easter Hurt Refuge for Wildlife"

Suffolk Life - January - "Storm Damage Closes Refuge"

Long Island Advance - February - "Feds Plan Burn for Birds"

South Shore Press - February - "Feds to Set Fire in Shirley"

Newsday - February - "East End Going Wild - for Turkeys"

Islip News - February - "Nesting Osprey Have a New Home in Islip"

New York Times - March - "Where Have All the Skunks Gone?"

Newsday - June - "Ransom Beach a Hostage?"

Newsday - August - "Refuges New Policy, Carry Out Your Trash"

Enterprise Pilot - November - "Oyster Bay Hosts Long Island Fish and Wildlife Service"

Enterprise Pilot - November - "Doc Wants Dock on Bay Law Says Nay"

New York Times - December - "Acorn Bonanza Sends Wildlife into Ecstasy"

New York Times - December - "Deer, They May Be Cute, But They Can Also Be Pests"

In August, NBC Television News - New York covered the story on the removal of trash receptacles on the Long Island Complex. ARM Bill Kolodnicki was interviewed and provided the rationale for the removal.

2. Outdoor Classrooms - Students

An estimated 4,000 students used the Complex during 1993. Generally, staffing limitations precluded providing school groups visiting the Complex with an orientation. Environmental education activities took place at the following refuges: Wertheim, Seatuck, Target Rock, Morton, and Lido Beach.

Refuge staff participated in several environmental education programs for students at the Complex this year. Twenty students from the State University of New York, Cobleskill went on a field trip to the Wertheim NWR as part of an aquatic biology course in October. As part of the course, students sampled and identified benthos, fish and vegetation from the Carmans River.

3. Outdoor Classrooms - Teachers

Due to the lack of an Outdoor Recreation Planner, no teacher workshops were held this year at the Complex. Information regarding the Complex and wetlands education was provided to a teacher from the DeLuca School in North Babylon in response to his request.

4. Interpretive Foot Trails

An estimated 5.000 people walked the Indian Landing Trail at Wertheim NWR. Access to this trail is via boat, generally canoe. The trail consists of a one mile loop through pitch pine and oak forests. A portion of the trail was closed to public use during the spring and summer due to an active osprey nest at this location.

7. Other Interpretive Programs

Complex staff provided a presentation on the Wertheim NWR followed by a nature walk to members of the Long Island Botanical Society.

9. Fishing

Recreational angling at the Wertheim NWR is permitted from boat in the Carmans River and Bellport Bay. The principal species taken are rainbow trout, brown trout, white perch, American eel, blue claw crab as well as others. Trout and white perch are caught mainly at the upper portions of the River. Eels are taken throughout the River and Bay. Blue claw crabs are taken in the Bay and the lower half of the Carmans River.

Funding was provided this year for making handicap accessible the Refuge's canoe launching and fishing access site. This public use area is open seven days a week and receives heavy public use. Ms. Ruth Raphael, a Landscape Architect from the Regional Office, inspected sites for a handicap accessible fishing area at the Carmans River during March. In June, ARM Bill Kolodnicki and Laborer Bob Woerner met with Fisheries Biologist from New York State to discuss the fishing site and handicap access. It became obvious during the planning stage that permits from a variety of agencies would be needed for the project due to the sensitive nature of the fishing access site. During September, information was provided to the US Army Corps of Engineers, the New York State Department of Environmental Conservation, and the Town of Brookhaven (Division of Environmental Protection) in regard to the Complex's applications with these three agencies for permits regarding improvements to the fishing access site. The Suffolk County Department of Handicapped Services was also contacted for input on the project. Once the necessary permits are received, work will commence on this project.

11. Wildlife Observations

The majority of public use at Wertheim is canoeing which presents a unique opportunity for viewing wildlife other than through use of a nature trail. Canoeing occurs year round on the Carmans River and most waterbirds can be observed from canoe. The Carmans River is bordered to a great degree by emergent marshes but in some areas forest stands border the River permitting the viewing of more terrestrial species. The one mile long Indian Landing Trail also allows canoeists to stretch their legs and the opportunity for viewing forest dependent wildlife.

Information on bird watching at the Complex was provided to Mr. David Pratt in response to a request from the Regional Office. Mr. Pratt is preparing a publication entitled Birders Directory that lists resources and opportunities for bird watchers in the United States.

17. Law Enforcement

There were over 308 LE incidents this year Complex wide. A great majority of the incidents were trespass: by foot, snowmobile, cross country skis and all terrain vehicles (A.T.V.). There was one attempted suicide, suspected poaching and three D.W.I.'s which were given over to local police. Other violations concerned unauthorized parking, boating, swimming, arson and

vandalism.

All Refuge Officers successfully completed mandatory physicals at the beginning of the year.

The closure of Target Rock NWR in January because of hazardous storm debris on the beach created many trespass and parking problems despite sign posting and barrier placements at all entry points. Illegal parking at the Refuge's entrance has resulted in the issuance of nine Notice of Violations (NOVs) and two NOVs for trespass. The problem improved by February through continued LE patrols.

During April, Refuge Officers handled two abandoned vehicles, in addition to other incidents, at Wertheim NWR which is a common problem.

In May, the Complex Biologist began keeping data on the number, type and location of Complex LE incidents on the computer. This helped quantified our program and assisted in documenting our efforts.

Laborer Bob Woerner in December observed a young woman on the Long Island Railroad tracks which are adjacent to the Wertheim NWR. Laborer Woerner was returning from an errand in town and went to investigate the situation. Mr. Woerner contacted headquarters by radio requesting assistance. The Suffolk County and Long Island Railroad Police responded along with Refuge Officer Bill Kolodnicki. The woman was transported by the Long Island Railroad Police to Stony Brook Hospital, Stony Brook, N.Y. for evaluation. Laborer Woerner was rewarded for his professional behavior. A young woman had committed suicide two months before on this section of track.

ARM Bill Kolodnicki met with Chief Ranger Don Wier , National Park Service, Fire Island National Seashore to begin the planning for the Complex Law Enforcement Plan.

A new Radio Frequency Agreement between the Complex and the Suffolk County Police Department was signed this year.

Project Leader Tom Stewart cooperated with the Suffolk County Probation Department in the sentencing of the individual responsible for the 3/31/92 arson on Old Stump Road (Wertheim NWR).

The Law Enforcement Office at Lawrence used the Morton NWR facilities during the waterfowl hunting season to assist in their activities on the east end of Long Island.

Forestry Technician Mike Glova detected a theft of road materials during a routine Refuge and fire patrol. Officer Bruce Marto was able to investigate and accomplish restitution for the stolen materials.

Officers Bill Kolodnicki and Bruce Marto attended Pepper Mace training at Fire Island National Seashore as a courtesy of the National Park Service.

Deer poaching at Wertheim continues to be a problem: gut pile from doe found in April, two pairs of surgical gloves were found nearby. RWP - 93

20. Other Programs

Through the Fire Management Coordinator of Region 5 the Complex received fire prevention/wildlife/forest posters, brochures, and other materials. These items are being used in the Complex's kiosks and are being distributed to environmental education classes on request.

21. Take Pride

Take Pride/Mark Trail coloring books were distributed to classes conducting environmental education activities at Long Island Refuges as well as to visitors with young children.

I. EQUIPMENT AND FACILITIES

1. New Construction

In preparation for the installation of the water line to the Wellington Dormitory and Cottage, a check was made in September for underground wires and lines. In October, the maintenance staff used the backhoe to dig the trench for the water hook-up. After the trench was dug and the line was inspected and approved by the Suffolk County Water Authority the County installed vaults and the system went online.

Maintenance Worker Bowden checking out trench for water line. J Hollingsworth - 1993.

Complex staff also set up the new weather station at Wertheim. Wind sensors and a lightning arrestor were mounted forty feet above ground on the roof of quarters Q1. The rest or the weather station was erected in the quarters' fenced yard. The backhoe was used to dig a trench to contain the underground wires connecting the station to an office computer.

Complex staff gathered information for Region 5 Engineering on construction projects planned

for FY94 and 95 on the Long Island Refuges. Information was provided on the Morton NWR's bathroom and parking lot, the Target Rock NWR's parking lot and for the installation of heat in the Wertheim NWR's shop.

In October, several new barriers were constructed and installed at the Wertheim NWR. The barriers were placed in problem areas for vehicle trespass.

2. Rehabilitation

Considerable time was spent by the maintenance staff cleaning up after the winter storms.

A summary of all needed quarters repairs was prepared by the maintenance staff for the Project Leader. Estimates were obtained for repairs to quarters at the Complex including replacement of refrigerators, installation of carpet and roof repairs.

Early in the year, the bulldozer and backhoe were used to cover an old well on the southern portion of the Refuge.

In May, new gates were installed at the Wellington tract of the Refuge to prevent trespass.

In July, routine maintenance was performed on the dozer, back-hoe and vehicle fleet.

Heavy equipment was used throughout the warmer months to widen and cut the Refuge's fire trails and repair the road surfaces. The bulldozer was also used at select fields to remove stumps.

The Complex's tractors were used during the warmer months to cut woody vegetation from forest openings and fire trails, to plow and/or disk select fields and for liming and seeding fields.

Hazard trees were removed during the year from public use areas (i.e., Indian Landing Trail and the public fishing access site), office area, Wellington facility and the fire trails.

The 25' Whaler was pulled from Oyster Bay NWR in August and sent for routine maintenance to a local boat yard.

During September, several gates to fire roads were improved and barriers were added to several Refuge boundary areas where trespass has become a problem.

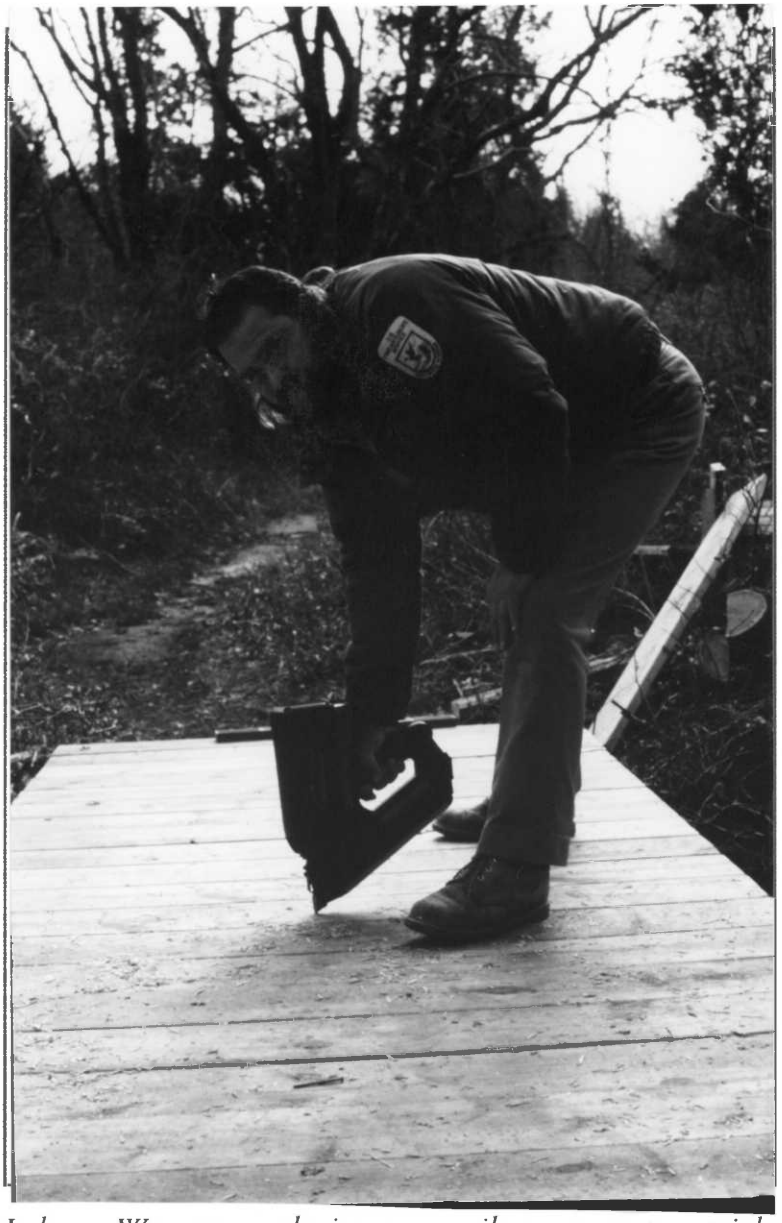
Forest technician Glova felling hazard tree from office area. RWP - 93

3. Equipment Utilization and Replacement

Considerable staff time, effort and funds were expended in the maintenance and repair of the Complex's fleet of twelve vehicles and our heavy equipment. Several station vehicles were taken for New York State vehicle inspections to facilitate upkeep. All station vehicles were winterized in October.

Our aging GMC 6000 dump truck went for extensive repairs and service early in the year as well as in late summer. Also in summer, to meet New York State vehicle requirements, a cover was purchased for the dump truck. In December, the air brake line of our heavy equipment trailer was repaired.

Repairs were made on both the Complex's John Deere tractors this year. These tractors are used in creating forest openings and for grassland management at Wertheim, Morton, Conscience Point and Seatuck NWRs.



Laborer Woerner employing new nail gun on nature trial bridge. RWP - 93

Safety guards were installed to protect back windows of all the Complex's pickup trucks.

New hedge trimmers and brushcutters were purchased this summer. Both are used for trail maintenance, creating firebreaks and landscaping.

To more effectively manage the station's equipment, Engineer Equipment Operator Bruce Marto prepared a weekly maintenance check sheet for heavy equipment and boats.

A new sickle bar arrived and was tested in October. The bar will be used to maintain trails and roads. In the last few years, clearing that the bar will be used for was frequently done by hand.

A new IBM typewriter was purchased in July to replace the Complex's only typewriter which quit working earlier in the month. A second typewriter was also purchased for the office at the Target Rock NWR. Both the 25' and 16' Boston Whalers went in for service and repairs at the end of summer. A dinghy was also purchased to enable staff to reach the larger whaler's mooring. Both boats are used for law enforcement, wildlife surveys and maintenance activities.

The Jeep Cherokee which is used for law enforcement activities was fitted with a siren, flashing lights, and portable emergency lights.

Other purchases this year included a new light pole for the Target Rock NWR's parking lot, a sand tank filter to remove excess iron from the water supply at the Morton NWR, a new water pump for the office and shop at the Wertheim NWR, a sump pump for the Wellington Dormitory, and repairs to the electric gate at the Seatuck NWR. Two replacement refrigerators were acquired for quarters at the Target Rock and Seatuck Refuges. An oil tank housing to cover the outside tank was purchased for the office at the Wertheim NWR. A cordless framing nailer was also acquired to assist in construction of bridges, walkways and various structures on the Complex.

5. Communication Systems

Three Hayes modems were purchased to be used at Wertheim, Seatuck and Target Rock NWRs. The modem at Wertheim was immediately used in conjunction with the Complex's weather station to download data. The Complex started using CCmail, the USFWS's electronic mail, in October. Assistance provided by the Denver Finance Center was timely in getting the system up and running.

Two cellular telephones were purchased this year. One was a portable unit and the other mobile phone was installed in the Jeep Cherokee. These mobile phones will provide our law enforcement personnel with a faster and more dependable communications capability with local law enforcement services.

6. Computer Systems

A much needed upgrade of the Complex's aging personal computers was completed this year. The station's computers had been acquired over a number of years resulting in many different versions of and types of DOS (i.e., Compaq), as well as different configurations and software, different type drives, and varying backup systems.

The Complex's aging machines experienced a number of difficulties this year. The PC Unlimited '286' and the HP portable both broke down and could not be repaired at reasonable expense. The University System '386' personal computer was sent to a local vendor for replacement of a defective floppy drive and for additional RAM memory. The batteries in the University System '286' personal computer at the Target Rock NWR were replaced during summer which eliminated the problem of faulty booting.

In the summer, two Zeos 486 machines were purchased - one for biologist R. W. Parris and the other for ARM Bill Kolodnicki when working at Wertheim. Another two identical machines were purchased at the end of the fiscal year. One machine replaced the Compaq '286' at the Seatuck NWR and the other was installed at the Target Rock NWR. All four have identical systems and configurations as well as tape drives which will facilitate the exchange of information between offices and personnel.

The Complex also purchased an HP laserjet IV printer for the office at Wertheim. Three computers share this printer. The HP laserjet II which had been at Wertheim was set up at the Seatuck Office which had no printer for its computer. An HP Deskjet 1200 color printer was also obtained for the Wertheim office. The color printer will be used for the Complex's biological and public use programs.

8. Other

Maintenance planning meetings were held semiweekly to facilitate scheduling of work, priorities, and big projects.

The annual personal property inventory was completed and forwarded to the Regional Office. Maintenance staff devoted significant time to this inventory.

J. OTHER ITEMS

4. Credits

The Introduction, sections A though G (except E.9) and I.6 were prepared by Wildlife Biologist R.W. Parris, Ph.D.

Section E.9 was written by ARM Kathryn Jahn.

Section H (except H.17) was written by ARM Kathryn Jahn and Biologist R.W. Parris, Ph.D.

Section H.17 and section I (except I.4 - 6) was written by ARM Bill Kolodnicki.

Section I.4 and 5 was written by Office Assistant Esther Hernandez.

Section K was prepared by the entire Complex staff.

Biologist R.W. Parris formated the narrative and together with SCA Volunteer Thomas Roberts and Forest Technician Dennis Fiore assembled the narrative.

The entire Long Island NWR Complex annual narrative was edited by acting PL Paul Casey.

K. FEEDBACK

During 1993 and early 1994, the Complex had several vacancies, some in key positions, both from the previous year and from recent transfers. The remaining staff was left to handle an identical workload but with less people. The staff was able to cope with the situation thanks to the help and efforts of several individuals within Region 5. The Complex staff would like to thank the following individuals for their assistance to the Long Island NWR Complex during the past twelve months: Don Frickie and Stan Skutek of Refuges-North, ARM Pat Martinkovic of Parker River NWR and ARM Paul Casey of McKinney NWR.

MORTON NATIONAL WILDLIFE REFUGE

Sag Harbor, New York

ANNUAL NARRATIVE REPORT

Calendar Year 1993

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

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INTRODUCTION

The Morton National Wildlife Refuge is a 187 acre peninsula located on the north shore of Long Island's south fork in Southampton Township. It was acquired in 1954 as a gift from Elizabeth Morton. This one and one-half mile long peninsula, known by the local residents as Jessup's Neck, separates Little Peconic Bay from Noyac Bay.

Morton is a seasonally staffed Refuge of the Long Island Refuge Complex. The Complex headquarters is located forty miles to the west in Shirley. Morton has been staffed from late spring through the middle of summer for the last four years by a volunteer from the Student Conservation Association. Although this year, a college intern was used to staff the Refuge.

Three miles of narrow undeveloped shoreline consisting of sand and small stones outline the Refuge. The tip of the Neck has steep and heavily eroded bluffs approaching fifty feet in height. The USFWS Northeast Estuary Program lists the Refuge as a significant coastal habitat and the beach area has been designated as critical habitat for piping plover. The north-south axis of the peninsula between Long Island's two forks also makes the Refuge an important migration corridor for a variety of terrestrial avian species. Morton also contains upland deciduous forest, a small freshwater pond, a brackish pond, kettle holes, tidal flats, salt marsh, freshwater marsh, and old fields.

The most picturesque of the Long Island Refuges, Morton also provides habitat to several state and federal endangered and threatened species, including piping plover, roseate tern, common tern, least tern, osprey, peregrine falcon, Kemp's ridley sea turtle, and loggerhead sea turtle. Wading and shore birds are common in the warmer months and waterfowl, particularly sea ducks, are common in winter.

The Refuge is open to the public year round and features both an upland and beach nature trail. Recreational opportunities available include wildlife viewing, photography, hiking, environmental education, nature study and surf fishing.

Autumn view of the beach at the Morton Refuge. J. Hollingsworth-93

A. HIGHLIGHTS

Beach nourishment project at the Refuge beach is completed by the Suffolk County Department of Public Works (F.2).

Piping plovers for the third consecutive year successfully fledged young with the aid of a nest exclosure (F.2 and G.2).

Roseate tern use of the Morton beach peaked at over one hundred birds (G.2).

A breeding colony of least terns used the Refuge beach (G.2).

Two osprey nesting pairs successfully fledged five young (G.2).

Major renovations were made on the upland nature trail (I.2).

B. CLIMATIC CONDITIONS

Conditions were similar to the Wertheim NWR.

D. PLANNING

4. Compliance with Environmental and Cultural Resource Mandates

In April, Complex staff provided a tour of the Morton NWR to personnel from the Long Island Field Office of Ecological Services. The Refuge was slated for sampling this year as part of the contaminant study of the Complex. During July, the Complex provided a boat and operator to the Long Island Ecological Services Office to facilitate their contaminant sampling at Morton. Intern Tanguay also assisted personnel from Ecological Services in obtaining sediment/soil samples from the beach and upland areas. Initial results from this activity are expected in early 1994.

E. ADMINISTRATION

1. Personnel

The Morton NWR is a satellite of the Long Island Complex. No staff are permanently stationed at Morton but staff visits are made weekly and often at greater frequency during the busy public use season during the warmer months. In the past few years, Student Conservation Association Volunteers were stationed at the Refuge during spring and summer. Unfortunately this year, funding was unavailable from the Regional Office for this program and instead a volunteer was sought.

4. Volunteer Program

Volunteers provided much needed support for the Refuge throughout the year. Volunteers worked on public use projects, safety issues, trail maintenance, and monitoring wildlife. Fred and Susan Zeller, long time volunteers, again provided support throughout the year

particularly on weekends. The Zellers were particularly helpful during the March blizzard when the Refuge had to be temporarily closed for safety reasons to the public. Calvin Smith, a more recent volunteer, also provided much needed assistance in trail maintenance. Ann and Charles Meinhold, as usual, monitored and maintained songbird nest boxes at Morton. Others provided assistance to the Morton intern in monitoring plover and waterbird use during the warmer months while other volunteers devoted their time to a variety of Refuge projects.

Intern Adrien Tanguay was stationed at Morton for ten weeks. RWP - 93.

Mr. Adrien Tanguay was accepted for a ten week tenure as tern and plover intern this summer at the Morton NWR. The intern is permanently stationed at the Morton Refuge. Housing, the Morton trailer, was provided gratis to the intern. Adrien started his duties in late May and finished by the beginning of August. Adrien was also able to receive college credit from Colorado State University for his internship. The intern's duties included monitoring piping plover activities, conducting daily waterbird surveys, conducting dove and quail surveys, measuring habitat characteristics, conducting select public use activities, and assisting the maintenance staff with a variety of projects.

F. HABITAT

1. General

The 187 acre Refuge consists of the Jessup's Neck peninsula and adjacent lands. The juxtaposition of the bays to the Refuge makes Morton an extremely valuable habitat component for a variety of waterbirds. The north-south axis of the peninsula between Long Island's two forks also makes the Refuge an important migration corridor for a variety of terrestrial avian species. The peninsula consists of three miles of undeveloped shoreline - one of the few shorelines without bulkheading or development remaining in the area. The beach area has been designated as critical habitat for the piping plover by the USFWS. Habitats present are varied and include sand beach, salt marsh, freshwater marsh, brackish and freshwater ponds, lagoon, tidal flats, old fields and oak and cedar forests.

2. Wetlands

Changes to the Refuge's shoreline occur with regularity due to sediment buildup and effects of storms. The apex of the Jessup's Neck peninsula, which consists of a sand and gravel bar, continues to expand toward Long Island's north fork. The bar is a favorite loafing spot for gulls, terns and cormorants.

A special use permit was issued to the Suffolk County Department of Public Works to place sand spoil from Noyac Creek on the Refuge's southern most beach. Sediment frequently blocks the entrance of Noyac Creek into Noyac Bay. The Department of Public Works wanted to remove sediment from Noyac Creek so that recreational boats could pass into the Bay. This dredging was last done by the Suffolk County in 1988 and the sand was deposited as beach nourishment to the Refuge's southern beach. By the winter of 1990/91, no sand deposits from the beach nourishment remained on the Refuge beach.

The Suffolk County Department of Public Works started their dredging, using a suction dredge, of Noyac Creek in mid-January and finished by the end of the month. The sand resulting from this activity was deposited on a small portion of the Morton NWR's beach as part of a beach nourishment program. During the actual dredging operation, numerous gulls were attracted to the outfall pipe.

The spoil from the dredging operation covered 0.4 acres of the Refuge beach and did not intrude on the beach vegetation zone. Complex staff measured the dimensions of the spoil material using a laser level in early autumn. The spoil was roughly in the shape of a linear rectangle measuring 280' by 80'. The spoil averaged 3.6' height above grade with a

maximum height of 5.5'. The spoil deposited consisted of an estimated 80,382 cubic feet of sand. A sample of the spoil was taken by the USFWS Ecological Service's Long Island Office to check for any potential contaminant burden. The spoil will be measured annually to track its loss.

Suffolk County's suction dredge in Noyac Creek and outfall pipe crossing the Refuge. RWP-93

The spoil area of the beach was used intensively by both piping plovers and least terns. A least tern colony was established this year immediately adjacent to the spoil area and a piping plover pair and young spent considerable time in that section of the beach.

Intern Tanguay measured habitat attributes of the Refuge beach. The beach was divided into twelve segments and characteristics of the intertidal zone, berm and dune areas were quantified. This information was put on a computer file and will be compared with models of piping plover habitat developed at other beaches. Measurements taken at each beach segment included the width of the intertidal zone, berm and open vegetation zone along five transects for each segment. The substrate characteristics were also measured separately in the intertidal zone and berm for each segment.

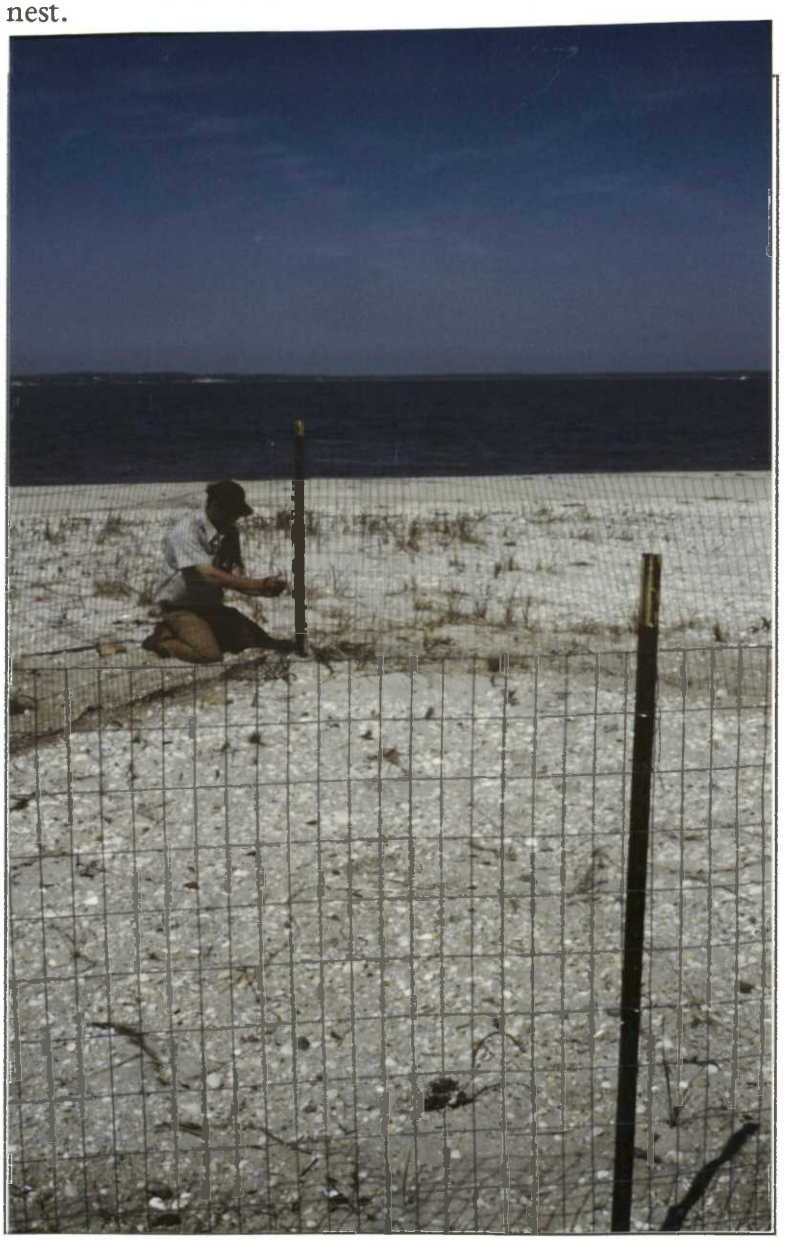
Sediment, largely sand, being deposited from the dredge's outfall pipe on a portion of the Refuge beach. RWP-93

The northern three quarters of the Jessup's Neck peninsula was closed to the public from 1 April until 30 August, as in past years, to reduce disturbance to nesting birds, specifically piping plover, terns and osprey. The closed portion of the peninsula was cordoned off with snow fence to prevent public access. Area closed signs were posted at the site and information on beach nesting birds was made available to the public at the Refuge kiosk. No landing of boat signs were also prominently displayed along the peninsula. The area was also monitored by the intern stationed at the Refuge, who educated the public about the plight of these beach-nesting species and assisted in keeping the public from entering the closed area.

At least one piping plover pair, federal designated threatened species, has been present on Morton for the last two decades. Unfortunately, the nesting success of the plovers has been traditionally poor - from 1980 through 1990 only twenty percent of the nests have been successful. During that period, the last successful nest was in 1989, when one chick fledged, and before that in 1982. This low productivity is in part due to the location of the beach and dune area the plovers prefer - this section of beach connects the Jessup's Neck peninsula to the mainland and as such acts as a constricting travel corridor for both

red fox and raccoon traveling between the peninsula and mainland. Red fox are easily observed in the early morning on the Refuge beach.

Nest exclosures for piping plover were first used on Long Island in 1991 - both at the Morton Refuge and at several other locales by the Nature Conservancy. In 1991 and 1992, nest exclosures were used on piping plover nests at Morton and in all cases were successful in protecting the nest.



Forest Technician Glova making final adjustments to exclosure protecting piping plover nest. RWP-93

This year, a nest exclosure was built around the piping plover nest found during May on the Refuge beach. The triangular exclosure consisted of ninety feet of welded wire fence (2" by 4" mesh). The top of the exclosure was strung with high test fishing line and the bottom of the fence has an additional predator skirt buried around the perimeter. This is the third year a nest exclosure has been used at Morton resulting in a hundred percent hatching rate since implementation. Prior to the use of exclosures only twenty percent of plover nests survived to hatching.

The exclosure at Morton was built around the nest in thirty minutes and an incubating plover returned to the nest within ten minutes of construction. Regular nest exchanges between the adult plovers were observed during the incubation period. Periodic checking of the exclosure from a distance indicated no mammals attempted to dig under the fence or birds entering through the exclosure's top.

On the last day of May, all four eggs hatched and the adult and chicks left the exclosure. The nest exclosure was removed in late July and stored for future use. The Refuge keeps two individual exclosures on hand.

Measurements of select water parameters were obtained from various water bodies on the Refuge. Salinity and water temperature are monitored monthly for the bay, brackish pond, lagoon, and freshwater pond. Other water parameters such as hardness, alkalinity, reaction, acidity, ammonia and nitrite are being monitored semiannually at these sites.

Water level measurements were taken semimonthly at the brackish pond to better monitor filling and drying patterns. In most years, the pond fluctuates throughout the year. However due to the drought this year, the pond held considerably less water from June through September.

Eleven songbird nest boxes, three screech owl boxes and two wood duck nest boxes were checked during late summer and repaired as needed by Complex staff.

Additional snow fencing was added to the section of the public use trail where it merges with the beach. Over the last few years, individuals were walking through beach grass areas causing damage and the loss of vegetation. The snow fencing reduced the problem and the damaged areas appeared to be responding to the reduction in the trampling.

3. Forest

Upland areas at the Refuge consist of upland brush, old fields and forest stands composed of mixed oak, red maple, pioneer and red cedar types.

Field recently brush hogged it was later disked and seeded with a cool season grass mixture. RWP - 93.

The three fields totaling 3.7 acres at Morton were brush-hogged the previous winter to remove encroaching woody vegetation. Two of the fields were still dominated by grass, the third had become a shrub stand with little herbaceous vegetation in the field layer. This field was disked and planted with a cool season grass/legume mixture. The field developed a grassy sward however this year's drought limited its growth.

9. Fire Management

A Fire Suppression Cooperative Agreement is maintained between the Fish and Wildlife Service and the Sag Harbor Volunteer Fire Department. The fire access roads, equipment and volunteers are adequate for any wildfire response on the mainland portion of the Refuge. The peninsula portion of the Refuge (Jessup's Neck) has no access road, and because of the loose sandy beach, access is limited to four-wheel drive vehicles, boats and by foot. Firefighting would be limited to the use of backpack sprayers and portable pumpers. Initial attack for wildfires will be carried out by the Sag Harbor Fire Department and Refuge staff. No fires occurred at the Refuge this year.

10. Pest Control

Damminix, a tick control agent, was applied to areas adjacent to the parking lot, office, restroom, kiosk and initial trail area of the Refuge in April. The early autumn application was canceled due to a lack of funds.

G. WILDLIFE

1. Wildlife Diversity

Over 230 species of birds, of which over 75 have been documented as breeders, and at least 20 species of mammals have been observed at the Morton Refuge. The waters surrounding the Refuge are also used by marine turtles and a diversity of fish.

Refuge staff participated in the Orient Point Christmas Bird Count during early January by surveying the Morton NWR. A total of 1,826 birds comprising forty species were documented. The most common included oldsquaw, goldeneye, white winged scoter, black duck, herring gull, horned grebe, greater black backed gull, red breasted merganser, and common loon. Of species interest to the count because of scarity were the sightings of sharp shinned hawk, catbird, cedar waxwing, rufous sided towhee and swamp sparrow.

2. Endangered and/or Threatened Species

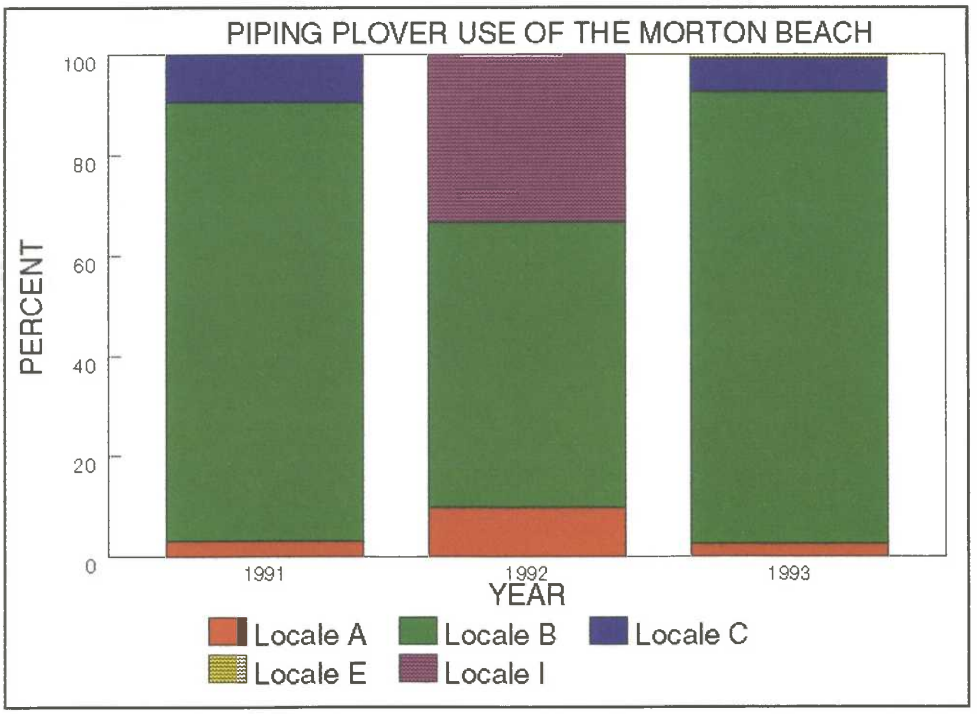
The Jessup's Neck portion of the Refuge has historically been used by rare wildlife species including piping plover, roseate tern, least tern and osprey. Even though the majority of the Jessup's Neck peninsula is closed to the public during the breeding season, all these species can be observed by the public from that portion of beach which remains open.

Piping plovers, a federal designated threatened species, arrived at the Morton Refuge during early April. A plover nest was discovered on the beach - close to beach grass - during the second week of May. The nest contained four eggs and both adults were observed in the nest's vicinity. The clutch hatched out four chicks on the last day of May. The date of nest initiation, back calculated from the hatching date, was 4 May - the earliest known Refuge plover nest by almost three weeks for the past three years.

Three of the four chicks disappeared during the first three days after hatching. It was thought that a heavy rainstorm might have accounted for two of these deaths and a predator the third. During the past three years, all chick mortality has occurred within the

first ten days. The fourth chick fledged at the end of June. This is the third consecutive year that plovers have fledged from the Morton NWR. On Long Island, the average nest success rate and fledgling rate respectively per successful nest is approximately 50 percent and 1.0; for the Morton NWR the comparative figures for the last three years are 100 percent and 1.7 respectively.

An additional pair of plovers was observed on the Refuge beach during the middle of June but no nesting activity occurred. Adults from the nesting pair displayed aggressive behavior towards this pair.

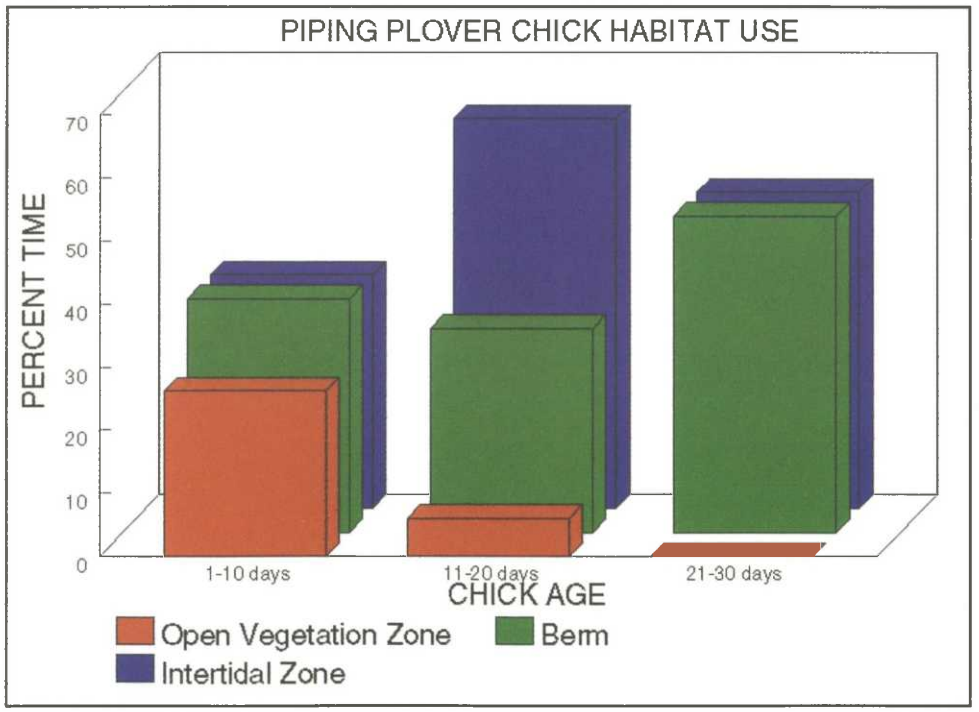


Piping plover use of the Morton NWR's beach by area.

To better monitor the piping plover use of the three miles of Morton beach, Intern Tanguay surveyed plovers five days a week from the last week of May through the beginning of August. The Morton beach is divided into twelve individual segments and all plover locations were recorded by date and location. The most plovers observed at one time was eight birds. The figure below indicates piping plover use of various portions of the Refuge beach for the last three years. As in past years, plovers tended to use the southwestern beach segments the heaviest (segment b, c and a). This year's nest was also located in this area. In all three years, plovers have tended to use the beach segments that were the widest and bordered by a zone of beach vegetation (i.e., beach grass and other

species). The plovers avoid beach segments which lack this zone and instead are bordered by bluffs.

Intern Tanguay also made diurnal observations of piping plover chick habitat use and behavioral observations. Observations, from a distance with a spotting scope, were taken on plover chicks in ten second intervals for two minute periods where behavior and habitat use were recorded. Habitat use based on chick age is provided in the figure below. Chicks under the age of ten days made equal use of the intertidal zone, berm and the open vegetation zone. Older chicks tended to use the more open beach habitats, intertidal zone and berm, and avoid the open vegetation zone. Younger chicks spent approximately half their time foraging and twenty percent resting; older chicks spent one third of their time foraging and another third resting. The chicks at Morton exhibited similar beach habitat use and behavior as reported in similar investigations from Long Island.



Piping plover chick use of beach habitats at the Morton Refuge.

The osprey, a New York State threatened species, is a highly visible raptor at Morton - one to two pairs have nested on the Refuge for the last two decades. This year, two pairs successfully fledged five young. The tall nesting platform at the lagoon was used by one pair and the younger pair used a natural nest site in a snag close to the tip of Jessup's Neck.

Marine turtles, including the endangered loggerhead and the endangered Kemp's ridley, feed in the waters off the Morton peninsula. Occasionally in the autumn and winter months, as the waters cool and the animals have not yet migrated south, a cold-stunned turtle will wash ashore on Long Island beaches. In conjunction with the Okeanos Ocean Research Foundation, which runs a stranding network, Refuge staff patrol the beaches usually coupled with other duties such as wildlife surveys or maintenance. In 1990, a Kemp's ridley was stranded at the Morton beach and was delivered to the Okeanos headquarters for necropsy. In 1991, five loggerheads, ranging from twenty to eighty pounds in weight, were captured adjacent to the Refuge and marked for recognition by the Okeanos staff. Also in 1991, a dead forty pound loggerhead washed up on the Morton beach - the turtle was provided to Okeanos for necropsy. During both 1992 and 1993, no sea turtles were captured or washed ashore on Morton.

Two pairs of osprey successfully fledged five young at Morton. RWP - 93.

Terns are highly visible species at the Refuge during late spring and early summer. The most common species include common tern (NYS designated threatened species), least tern (NYS designated endangered species), and roseate tern (federally designated endangered species). The peninsula at Morton is a favorite loafing site and the surrounding bays provide foraging habitat for terns during this time of year. The Refuge acts as a local

staging area for many terns before the breeding season.

The Morton intern monitored daily tern use at the Morton beach from May through early August. Peak tern use usually occurs for three to five weeks starting either the third or fourth week of May. This year, peak numbers occurred during the third week of May. Highest counts were 453, 116, and 52 respectively for common tern, roseate tern and least tern. It was also noted for the second year in a row that all roseate terns were leg banded.

Peak numbers of tern species at the Morton NWR for the past three years.

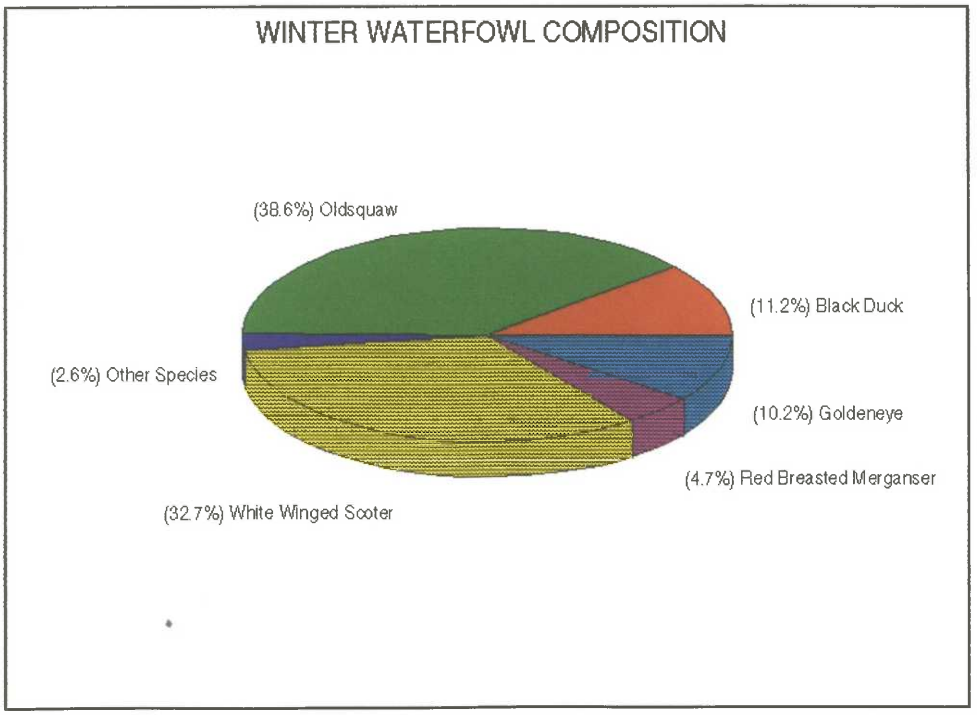
TERN SPECIES	1991	1992	1993
Common Tern	80	194	453
Roseate Tern	10	127	116
Least Tern	7	42	52

Least tern nest, one of eleven, on the Refuge beach. RWP-93

Least terns after an absence of three years, initiated nesting at the Morton beach during the last week of May. The tern colony was located adjacent to the sand pile from the beach nourishment project. By the end of May, a maximum of seven pairs were observed and egg laying had begun. The colony at its maximum consisted of eleven nests - some nests were destroyed during June by storm tides. By early July, at least four chicks were present and three successfully fledged by the end of the month.

3. Waterfowl

Waterfowl use of the Morton NWR is highest during the winter months. Numbers are lowest in the summer and start to increase in October, peak in January or February, and decline in May. Common waterfowl in winter include oldsquaw, white winged scoter, black duck, goldeneye and red breasted merganser (see following figure). The Morton Refuge, unlike the other Long Island Refuges, has a winter waterfowl community dominated by sea ducks. The tip of the Jessup's Neck peninsula receives the greatest use by sea ducks particularly white winged scoter and goldeneye. Oldsquaw are found somewhat uniformly around the peninsula and black ducks use the lagoon and brackish pond. Although waterfowl numbers are low during summer, black ducks, wood ducks and mallards can be observed and a few red breasted mergansers are usually present in the bays.



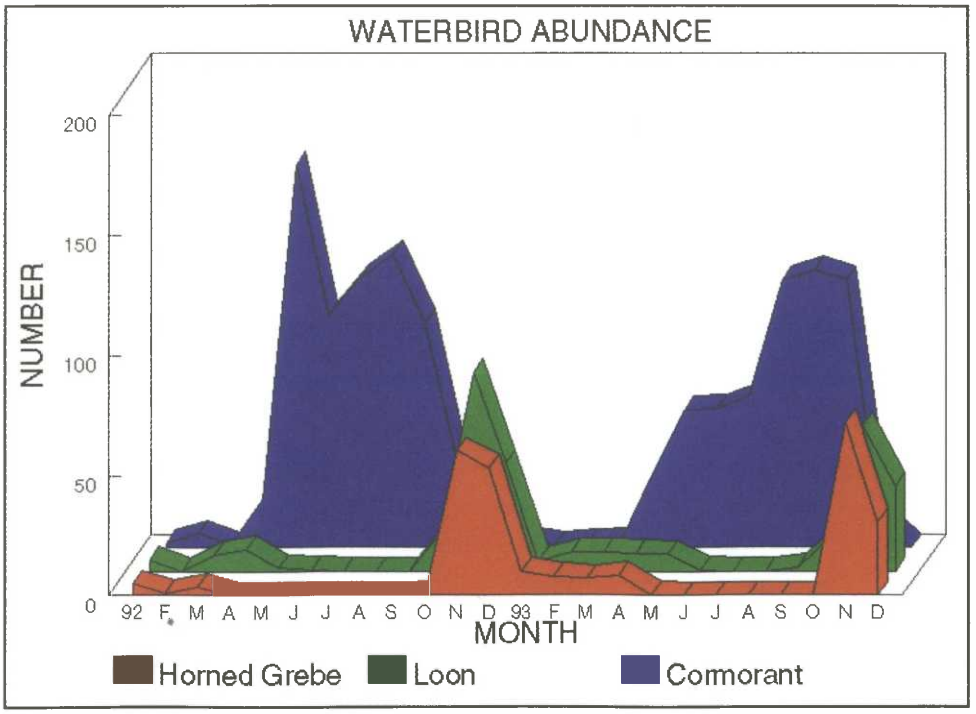
Winter waterfowl composition at the Morton Refuge.

Waterfowl are counted semimonthly at the Refuge. The figure on the following page indicates waterfowl use of the Refuge for the past five winters. Waterfowl numbers were somewhat similar in the winters of 1990 through 1992. Numbers during the past two winters were similar and a sizable increase over the previous years. Approximately eight hundred ducks are wintering at Morton. The increase is largely due to the increase in the number of sea ducks; puddle and bay ducks remained fairly constant over the past five years. Winter waterfowl surveys which cover all of Long Island have not detected any similar Island wide increase for sea ducks. The reason for the sudden increase in sea duck use at Morton is unknown.

One of the two wood duck nest boxes on the freshwater pond was used by a hen unsuccessfully this year. The door latch and door opened on the box being used and the hen deserted before the clutch hatched. Repairs were made to the box in late summer.

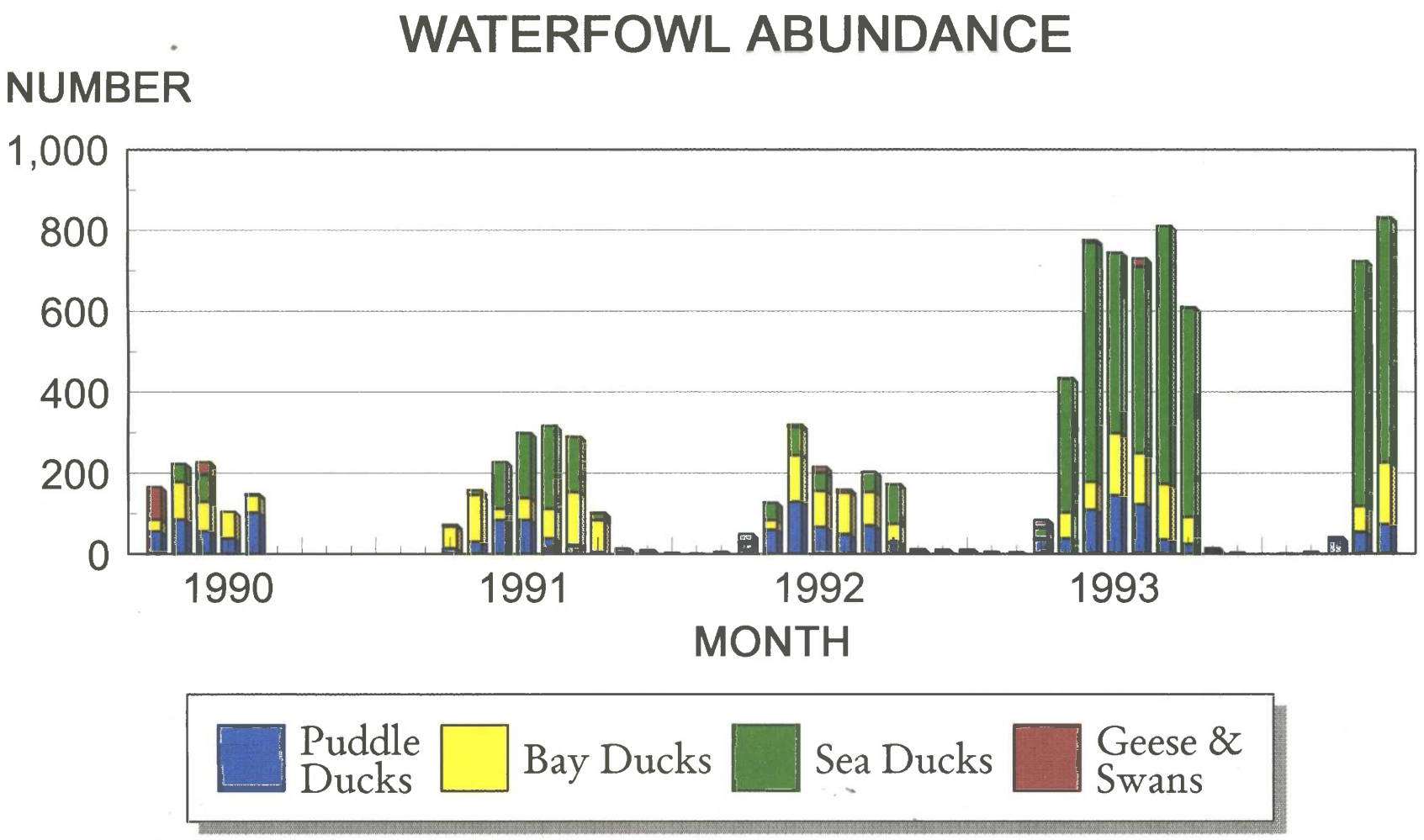
4. Marsh and Waterbirds

All marsh and waterbirds encountered on the standard Morton NWR waterfowl survey are also recorded. The most common waterbirds detected include double crested cormorant, common loon and horned grebe (see following figure).



Common waterbird abundance at the Morton NWR for the past two years.

MORTON NWR


WATERFOWL ABUNDANCE
NUMBER
1,000
800
600
400
200
0
1990
1991
1992
1993
MONTH
Puddle Ducks
Bay Ducks
Sea Ducks
Geese & Swans

Double crested cormorants were encountered year round at the Refuge but peaked in numbers during spring and autumn when up to two hundred birds were counted. Double crested cormorants feed in the bays adjacent to the Refuge and loaf on the Jessup's Neck peninsula and adjacent pilings. Great cormorants are only sporadically encountered - chiefly in winter. Common loons and horned grebes occur at the Refuge from September/October through May. However, peak numbers usually occur in November and December close to one hundred individuals of each species have been documented.

Snowy egrets, great blue herons, great egrets, and green-backed herons are common at Morton, usually on the lagoon and brackish pond.

5. Shorebirds, Gulls, Terns and Allied Species

Excluding woodcock, sixteen species of shorebirds and plovers were observed at the Morton NWR this year. Ruddy turnstone, black bellied plover and greater yellowlegs were the most common species encountered during the warmer months. Sanderlings can be found on the beach every month of the year but are most common during autumn and winter. American oystercatchers, uncommon on Peconic Bay, were observed several times at the Refuge during May.

The Refuge was checked for woodcock courtship activity in April. Unlike last year, no activity was detected.

Gulls are conspicuous at the Refuge. Their numbers are lowest during summer and higher during the rest of the year. Approximately 250 gulls routinely loaf on the beach - this year about half were herring gulls and the remainder great black backed gulls. Ring billed gulls are found in low numbers and laughing gulls are occasionally observed during late summer. Aside from the tern species mentioned in a previous section, royal and arctic terns were also observed at Morton in late summer and early autumn.

6. Raptors

Raptors observed during migration and winter include sharp shinned hawk, Cooper's hawk, American kestrel, merlin and rough legged hawk. Sharp shinned hawks are particularly common as they move up and down the peninsula. Permanent residents and breeders include great horned owl, screech owl, red tailed hawk, broad winged hawk and osprey. Screech owls roost in the wood duck nest boxes on the freshwater pond and are easily viewed by the public. One of the three owl nest boxes was successfully used by a screech owl this year. Northern harriers are only sporadically observed through the year.

7. Other Migratory Birds

Bank swallows again nested at the western bluffs on Jessup's Neck. The intern counted over 130 burrows at the site but the estimated colony size was forty pair - an increase over last year's estimate.

The intern and other volunteers monitored the use of songbird nest boxes this spring and summer. Nine of the eleven boxes were used; seven by tree swallows and the remainder by house wrens. A great crested flycatcher for the third consecutive year nested in a screech owl next box.

A breeding bird survey was conducted at the Refuge in June. The survey consisted of thirty-six sampling stations where all avian species detected in three minutes were recorded. This is the third consecutive year the survey has been performed. The survey encompasses all major habitats at Morton. Survey results are used to monitor the breeding songbird community. A total of forty-nine species were detected. The most common include catbird, common yellowthroat, yellow warbler, Carolina wren, robin, mourning dove, song sparrow, common grackle, blue jay, northern cardinal, red winged blackbird and American redstart. Forest interior species, such as ovenbird, redstart and wood thrush were detected on this survey even through the Refuge only has a relatively small acreage of mature forest.

The mourning dove survey was conducted by the intern during late May. Thirty-seven percent of the stations had dove present - survey results were similar to 1992 but decreased from levels in 1991.

10. Other Resident Wildlife

A winter track count was conducted in January 1994 at the Refuge. This is the third consecutive year the count was performed. Results were similar to last year with the highest track counts for white tailed deer and red fox. The white tailed deer count was equivalent to the two year mean; the red fox count was down from previous years' results. Both eastern cottontail and gray squirrel numbers increased.

Observations were also recorded on fawn production and the sex composition of the deer herd from fawn drop until antler drop. Fawns comprised twenty-two percent and legal bucks twenty-three percent of the Refuge herd. The herd composition has been similar for the past four years. Morton's herd characteristics (i.e., fawn production and sex ratio) is intermediate between those of the Wertheim and Seatuck herds.

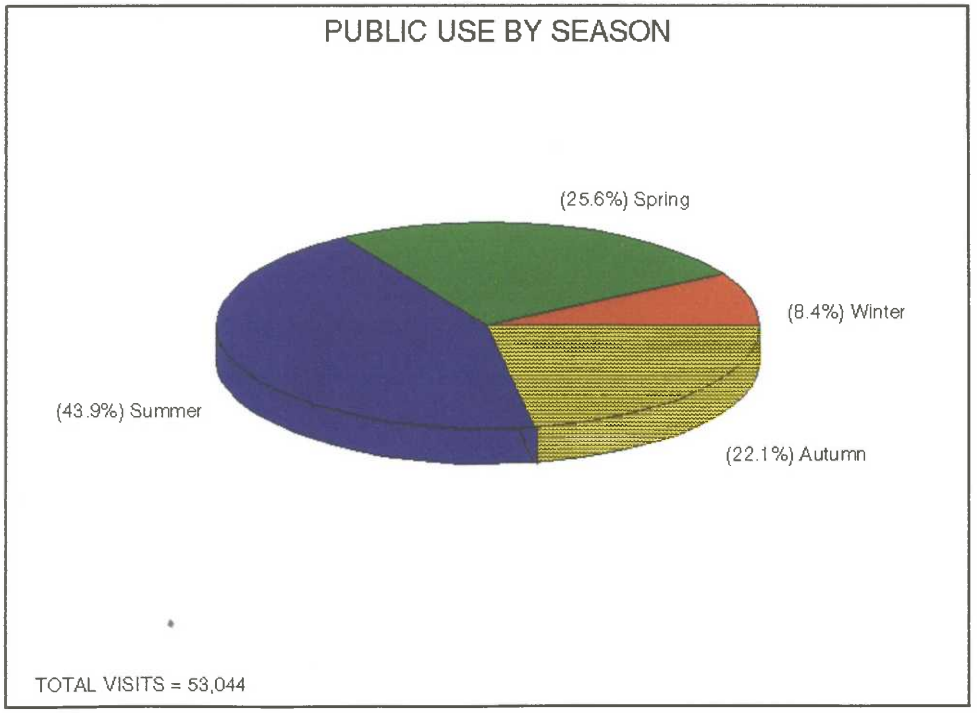
The bobwhite quail survey was conducted during May. Bobwhites declined for the second straight year - quail were detected at only five percent of the stations. This survey will be

conducted in future years to monitor quail abundance.

H. PUBLIC USE

1. General

The Morton NWR has always had popular appeal to Long Islanders. The upland and beach nature trails receive heavy use and the songbirds visible along these trails are a major attraction particularly for children. A kiosk provides information to the public about the Refuge and Complex as well as other USFWS programs. The number of visitors at Morton this fiscal year was 53,055. Use was similar to last year and visitation during the 1990s is running approximately twenty-five percent higher than during the 1980s. Public use numbers at the Refuge are based on statistics from a traffic counter. Although use is year round, the heaviest visitation occurs in the warmer months (see figure below). The principal public activities at Morton are wildlife viewing and hiking.



Public use by season at the Morton NWR.

The Morton NWR was closed to the public from 13 through 18 March due to a blizzard and resulting icy conditions in the parking lot and trails.

A press release was issued in March regarding the closing of the beach at the Morton NWR from 1 April through 31 August to protect piping plovers and other beach using wildlife. The closure has been ongoing for the past five years. Several local newspapers carried the release. The beach was reopened to the public on the first of September. A press release was also issued in July regarding the removal of trash receptacles from the Refuge.

Forest Technicians Glova and Seifert by new piping plover interpretive sign. RWP - 93.

2. Outdoor Classrooms-Students

Numerous school groups, particularly from primary schools, visited the Refuge this past year. Most visit in spring and early summer. The absence of an Outdoor Recreation Planner limits the Complex's ability to outreach many school groups which visit the Refuge. In March, an environmental education class of thirty students from Suffolk County Community College toured the Refuge. During July, 160 students from the Seatauket Three Village School District visited the Morton Refuge.

4. Interpretive Foot Trails

Two principal trail systems are available to visitors at the Morton NWR. The most heavily used is the upland trail system which winds through a variety of habitats including red maple swamp, freshwater pond, upland shrub, old field, oak forest and cedar stand. The beach trail which consists of the three miles of beach on the Jessup's Neck peninsula is open from September through March.

A new interpretive sign on piping plovers was received in the autumn of 1992. The sign was erected at the head of the beach trail in March and left up until the end of August. Due to its prominent location, all beach users were exposed to its message. This interpretive sign weathered well but to prolong its life we are only using it from March through August and storing it indoors during the rest of the year.

Blue jay - one of many resident songbird species. Songbirds are a big attraction to the public on Morton's upland trail. J. Hollingsworth - 93.

9. Fishing

A small percentage of Refuge visitors surf cast off the Refuge's beach. Gamefish sought include striped bass, bluefish and weakfish.

11. Wildlife Observations

Approximately ninety percent of all Refuge visitors were estimated to engage in wildlife viewing. The upland trail attracts visitors interested in viewing songbirds and deer. Wildlife which can be observed in summer from the beach trail, even though most of the trail is closed to the public at that time, include piping plover, roseate tern, least tern, common tern, osprey and numerous wading birds, gulls and shorebirds. The beach trail during winter is an excellent place to view sea ducks, loons and grebes.

14. Picnicking

Though no picnic facilities are present at the Refuge, there were an estimated 2,000 picnickers. Most picnic activity occurs by the information kiosk and the beach.

16. Other Non-Wildlife Oriented Recreation

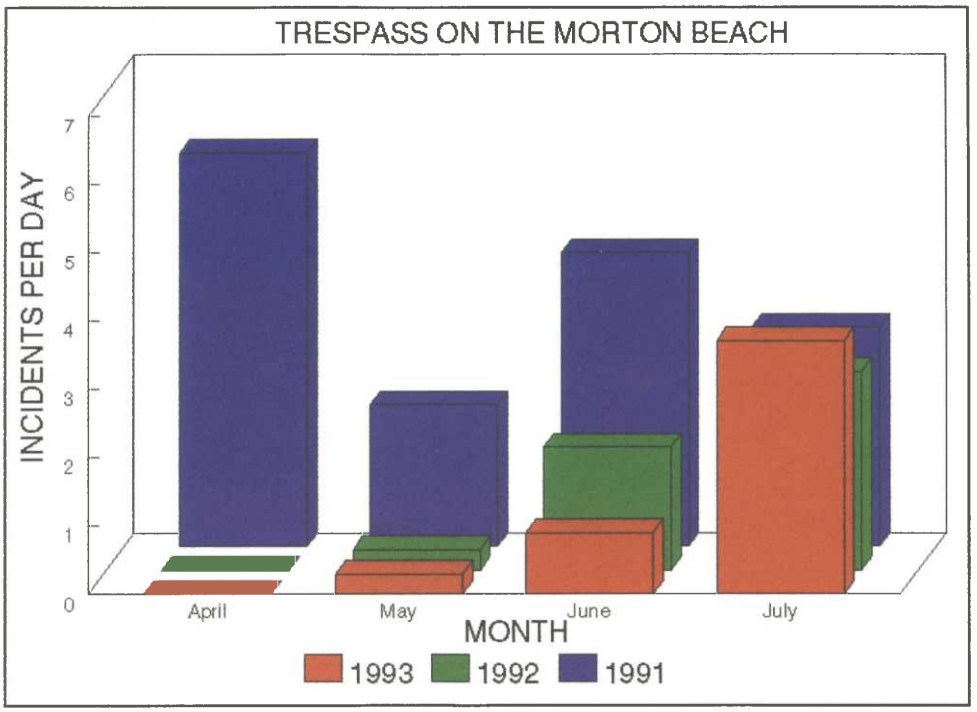
A response was provided to a Ms. Stillwell-Sneok of Sag Harbor, New York regarding the Complex's policy on swimming at the Morton NWR. She was advised that the "no swimming" signs were posted at the Refuge to advise the public that swimming is not advisable at the beach due to the lack of safety provisions.

17. Law Enforcement

Weekend patrols were conducted at the Refuge by Officers Kolodnicki and Marto starting in April to protect breeding piping plovers and least terns as well as to protect other beach using species. Special Agent Gale of the Lawrence Office also visited Morton during the spring and offered assistance to Refuge Officers during weekends. During June and July, Intern Tanguay worked weekends to further reduce incidents of public trespass into the closed beach area. The beach area closed to the public was blocked with snow fence and a large sign indicated the reason for the closure and penalties for a trespass conviction. Other smaller closed area signs were also posted and numerous no landing of boat signs were also placed strategically along the peninsula. Information of the beach closure and on piping plovers and terns was also displayed in the Refuge's information kiosk.

As in past year, the intern monitored and recorded trespass incidents of the public entering the closed beach area in order to determine the magnitude of the problem and possible solutions (see following figure). As expected, more incidents occurred on weekends, when public use is higher, than on weekdays. Trespass levels also increased as the season progressed; trespass was low in April and May but increased during the summer months.

As in past years, most but not all of the beach trespass was due to boat landings. Trespass this year was slightly less than last year's level and considerably down from trespass incidents in 1991. Increased patrolling, public contacts and use of signs is slowly decreasing this problem.



Trespass into the closed beach at the Morton NWR.

At midnight on 24 July, intern Tanguay was awakened by the Southampton Bay Constable who needed to get to the tip of the Jessup's Neck peninsula for a distress call. The intern accompanied the Bay Constable in his vehicle and guided him past the tern colony without incident. At the peninsula, there was a large boat that had run aground in the shallows and severely damaged its engines. The Coast Guard was at the scene in one of their watercraft. The Bay Constable escorted one of the two individuals from the scene off of the Refuge. The next morning, a marine salvage firm removed the stranded and damaged boat.

During November, Law Enforcement Special Agents from the Lawrence Office checked the Morton Refuge for the presence of waterfowl hunters. None were detected.

I. EQUIPMENT AND FACILITIES

1. New Construction

The Morton Refuge has four miles of public trails, seven miles of posted boundary, five structures (office, seasonal quarters, public restroom, information kiosk and barn), a quarter mile entrance road, and public parking area. The heavy public use of the trails, parking area and restroom necessitate constant attention by the maintenance staff to ensure safe and enjoyable facilities for the public.

2. Rehabilitation

Storm tides this past winter increased the level of erosion on the bluffs along the Jessup's Neck peninsula. KJ - 93.

A major northeast storm hit the Morton NWR in December of 1992. Strong winds, high tides and rain caused numerous problems. Damage to the bluffs on Jessup's Neck was evident with numerous trees and shrubs eroded from the bluff. Most of the Refuge signs

and their posts on the beach were snapped and carried away by the tides; the majority of the large "no landing of boats" signs were also taken by the storm. All the songbird nest boxes on the peninsula were also destroyed. Several large trees also came down on the upland nature trail. One of the information kiosk panels was also destroyed by the storm. The March 1993 blizzard further exacerbated these problems.

All downed trees were removed immediately from public use areas. In late March, the maintenance staff reposted the peninsula with boundary signs and "no landing of boat" signs. Because of a shortage of the "no landing of boat" signs and funds for their purchase, several were made by staff from plywood.

The kiosk was also repaired by the staff with materials provided via donation from a Refuge supporter.

In February, Complex staff spent considerable time fixing plumbing problems at the public restroom.

The exterior wood screens on the Refuge public restrooms were rebuilt by Laborer Woerner early in the year.

In April, the maintenance staff cleaned out a ditch culvert under the upland trail. The culvert had become heavily clogged with rocks, leaves and debris causing the ditch to overflow on the trail even after light rains. After cleaning, no further drainage problem occurred with the culvert.

In April, the maintenance staff prepared the trailer for occupancy by the Intern.

During May, the Forest Technicians cleared brush and overhanging snags along the Refuge's southwestern boundary. The brush was impacting a boundary fence of a local property association.

A new sand filter tank was installed at the Refuge to reduce iron content in the drinking water.

During July, Complex staff and the Suffolk County YCC crew cleared the upland and beach trails of all encroaching vegetation.

In September, a downed tree cut telephone service to the Refuge. New York Telephone provided prompt service in replacing the line and restoring service.

The office boiler shut down in early December causing a loss of heat. Gifford Oil replaced a worn element and corrected the problem quickly.

In December, the maintenance staff started demolishing the old trailer, which had not been usable for a number of years, and removing it from the Refuge. The work should be completed by the spring of 1994.

Bid documents for the public restroom renovation at the Refuge were issued by the Regional Office in early August and the sealed bidding process was slated to end the beginning of September. The contract was not awarded from this effort and attempts will be made in early 1994 to have the contract awarded.

A major effort was made this year to renovate the upland nature trail. The trail is used by close to 50,000 people annually and the renovation of boardwalks and bridges removes a potential hazard and makes the trail more accessible and enjoyable for the public. Maintenance staff and other personnel all had input on trail deficiencies to be rectified. Laborer Woerner took a leading role in the design and construction of all boardwalks and bridges. As part of this effort, a small bridge on the trail had been refurbished by volunteer efforts the previous year.

Laborer Woerner and EEO Marto confer during construction of a new bridge on the upland nature trail. RWP - 93.

In January, the staff rebuilt forty-five feet of boardwalk and removed the old lumber. During the autumn months, the maintenance staff built a sixteen foot bridge complete with hand rails over a ditch on the trail to replace the old structure. The staff also built a twenty-four and ninety foot section of boardwalk. The longer boardwalk was also fitted with handrails. These new boardwalk sections are much wider than the previous structures and ground ramps were also added to the new walks. The old boardwalks are in the process of being removed but the severe winter conditions have delayed their complete removal. The staff also removed an old osprey nesting pole, which had never been used, from along the nature trail.

Items that still need to be completed for the upland trail are the complete removal of any old boardwalks left, the addition of handrails on some walks, constructing a new boardwalk from the parking area to the information kiosk, removal of an old observation blind, constructing a new observation blind overlooking a field, and refurbishing benches. Funding will also be sought in the coming fiscal year for an upland nature trail guide.

3. Major Maintenance

A review of all maintenance needs at the Refuge was conducted on site by the maintenance and biological staff in September.

A contractor repaired several sections and replaced missing shingles where necessary of the barn roof in August. The repaired roof should create better storage facilities for the Refuge.

J. OTHER ITEMS

4. Credits

This section was prepared by Complex Biologist R.W. Parris, PhD.

SEATUCK NATIONAL WILDLIFE REFUGE

Islip, New York

ANNUAL NARRATIVE REPORT

Calendar Year 1993

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

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INTRODUCTION

Seatuck National Wildlife Refuge is located in Islip, New York on Long Island's south shore. The Refuge borders the Audubon Scully Sanctuary on the west, suburban development on the north, Champlin Creek on the east, and Great South Bay on the south. The 196-acre Refuge was acquired in 1968 via donation from the Peter's family under the Migratory Bird Conservation Act "...for use as an inviolate sanctuary, or for any other management purposes, for migratory birds." The USFWS gave the Refuge the Indian name Seatuck which denotes the mouth of a river or tidal creek. A relative of the donor retains a life estate on an approximately 5 acre portion of the property.

About half of the Refuge is saltmarsh consisting largely of salt hay with scattered stands of great reed. The Refuge is the site of a recent saltmarsh restoration project to improve tidal flow, restore panne habitats and reduce the prevalance of great reed. This project entailed the construction of a tidal channel in the spring of 1992 to increase the tidal exchange with Great South Bay. The remainder of the Refuge consists of freshwater wetlands and ponds, old field, brush and woodland habitats. In their 1992 Project Report, the USFWS Northeast Estuary Office classified the Seatuck NWR, as part of the larger Great South Bay, a significant coastal habitat.

Diverse populations of wildlife are present at the Seatuck NWR. The Refuge is essentially an island surrounded by suburban development and as such attracts numerous migratory species, particularly raptors. Over 210 avian species have been documented at the Refuge. Ospreys, New York State threatened species, nest on the Refuge. Peregrine falcon have been observed at the Refuge. Waterfowl, including black ducks, are present year round but are most common during winter. Wading birds and shorebirds are conspicuous at the Refuge. During the breeding season, songbirds are found in various upland areas. The Refuge supports the western-most herd of white-tailed deer on Long Island. This herd has adversely impacted the uplands by inhibiting the regeneration of forests as well as impacting the vegetative composition of fields at the Refuge.

Saltmarsh panne with long-legged wading birds. RWP '93

A. HIGHLIGHTS

A Determination of Eligibility for the National Register of Historic Places was received from the National Park Service for the Seatuck NWR. (Section D.4).

Osprey, a New York State designated threatened species, nested at the Seatuck NWR for the eleventh consecutive year. This year marked a continuation of the increased nesting first observed in 1991 compared to previous years. (Section G.2).

Monitoring of the salt marsh to provide data on the Seatuck Saltmarsh Restoration Project continued. This monitoring indicates that the tidal channel is continuing to have a beneficial impact on the wetland and wildlife utilizing it. (Section F.2).

B. CLIMATIC CONDITIONS

Climatic conditions at Seatuck NWR are similar to those at Wertheim NWR.

C. LAND ACQUISITIONS

3. Other

A boundary inspection of the Seatuck NWR was conducted in August and September 1993 by Forestry Technicians Philip Siefert and Michael Glova. A number of boundary markers which had not been found during the previous inspection in August 1989 were located. A report on the inspection was forwarded to the Regional Office in September 1993.

D. PLANNING

4. Compliance with Environmental and Cultural Resource Mandates

In 1992 the Regional Office prepared a National Register of Historic Places Eligibility Opinion for the complex of farm buildings, residences and structures originally associated with "Windholme", a 331-acre country estate and farm that was developed by Samuel T. Peters and his wife between 1889 and 1902 on the west bank of Champlin Creek, a portion of which subsequently became the Seatuck NWR. This opinion concluded that because of changes to the Peters' estate Windholme does not appear to be eligible for the National Register of Historic Places, although one building - the old Cow Barn - may possibly be eligible for the National Register of Historic Places.

On January 6, 1993 the Service was notified by the New York State Office of Parks, Recreation and Historic Preservation that the State Historic Preservation Office was maintaining its previous determination that the Webster-Peter's Estate is eligible for listing on the National Register of Historic Places.

Information on these conflicting determinations was forwarded to the Keeper of the National Register of Historic Places in Washington, DC. A Determination of Eligibility for the National Register of Historic Places was subsequently received from the National Park Service for the Seatuck NWR / Peters-Webster Estate. The determination notes that the Secretary of the Interior has determined that the majority of resources on the former Webster-Peters Estate do not meet the criteria for listing in the National Register; the sole eligible building is the early twentieth-century Cow Barn designed by Alfred Hopkins. This determination affirms the findings of the Service and is in opposition to the findings of the New York State Office

of Parks, Recreation, and Historic Preservation. The Cow Barn, having been extensively renovated in the past, is presently used as office space by USFWS Ecological Services' Long Island Field Office.

The Cow Barn which is eligible for listing on the National Register of Historic Places KJ '91

5. Research and Investigation

A draft report by Ms. Alex Kravitz on the small mammal community at Seatuck NWR was received by the Complex. The study reports an impoverished small mammal community at the Refuge and suggests possible causes.

The Seatuck Foundation, an independent non-profit research organization with a focus on suburban wildlife, maintains an office in a building at the Seatuck NWR. This organization had undergone extensive personnel changes in 1991 and in November 1992 hired a new Director, Dr. Margery L. Oldfield, for the Seatuck Research Program which it governs.

The Seatuck Research Program continued its involvement in the Long Island Colonial Waterbird and Piping Plover Survey. This survey was initiated in 1983 by the Seatuck Research Program (then affiliated with the Cornell University Laboratory of Ornithology) in cooperation with the New York State Department of Environmental Conservation and other groups to provide a systematic method for monitoring the population status of Long Island's colonial waterbirds. The survey utilizes volunteers to survey the marine coastlines of Long Island for colonial nesting waterbirds.

The Seatuck Foundation had two other ongoing research projects in 1993. One is a contract initiated May 30, 1993 with the Center for Disease Control on "Reducing the Risk of Lyme Disease: An Ecological Approach"; the Principal Investigator on this project is Dr. David C. Duffy. The second research project is a 3-year contract initiated September 1, 1993 with the New York State Department of Environmental Conservation on "Inventories and Integrated Management of the Natural Diversity of Long Island and New York City"; the Principal Investigator on this project is Dr. Margery Oldfield.

Four recent publications and scientific reports by the Seatuck Foundation are as follows:

Litwin, T.S., A. Ducey-Ortiz, R.A. Lent, and C.E. Liebelt, eds. 1993. 1990-1991 Long Island Colonial Waterbirds and Piping Plover Survey. Research Report of the NYS Department of Environmental Conservation and the Seatuck Foundation. Vol. I & Vol. II. NYSDEC, Stony Brook, NY.

Mather, T.N., D.C. Duffy, and S.R. Campbell. 1993. An unexpected result from burning vegetation to reduce Lyme disease transmission risks. Journal of Medical Entomology 30(3):642-645.

Nettleship, D.N. and D.C. Duffy, eds. 1992. Special Session 4: Seabird Populations. Pages 523-632 in: D.R. McCullough and R.H. Barrett (eds.), **Wildlife 2001: Populations**. Elsevier Applied Science, NY.

Duffy, D.C., S.R. Campbell, T.N. Mather, and D. Clark. 1993. "Reducing the risk of Lyme disease: An ecological approach." CDC Final Report, Year 2: June 1992 - May 1993. Seatuck Foundation, Lyme Disease Research Project, Shelter Island.

E. ADMINISTRATION

1. Personnel

Kathryn Jahn continued as Assistant Refuge Manager for Seatuck NWR. The Seatuck NWR office also administers Sayville NWR and Lido Beach WMA.

2. Youth Programs

ARM Jahn and Dr. Margery Oldfield of the Seatuck Foundation participated in Islip High School's Career Day on April 16th. They hosted five students at the Seatuck NWR, and discussed with them career opportunities in the environmental sciences. The students were provided an introduction to saltmarsh restoration by ARM Jahn, and to forest ecology by Dr. Oldfield.

4. Volunteer Program

Anne and Charles Meinhold maintained and monitored bluebird and swallow nesting boxes at the Seatuck NWR.

5. Funding

There are no separate funds for the Seatuck NWR. Funds to operate the Refuge are derived from the budget for the Wertheim NWR.

The Seatuck Foundation is funded by the private Peters-Webster Trust.

6. Safety

Safety and health deficiencies at the Seatuck NWR identified during the September 1992 Health/Safety Inspection of the Refuge Complex were remedied, including: installation of smoke detectors in the Canary Cottage and Captain's Quarters office; removal of vines and other vegetation from the Canary Cottage; and, installation of smoke detectors, fire extinguishers, and lighted exit signs in the Ecological Services' office. The cooperation of USFWS Ecological Services, the Seatuck Foundation, and USFWS Law Enforcement was enlisted in correcting deficiencies in buildings these entities occupy.

7. Technical Assistance

Both the Long Island NWR Complex Refuge Manager and the Assistant Regional Director for Refuges and Wildlife serve on the Board of Directors of the Seatuck Foundation.

Complex staff inspected wetlands at sites in Manorhaven, Oakdale, Brookhaven, East Hampton, and Westhampton for the Partners for Wildlife Program.

F. HABITAT MANAGEMENT

1. General

The Long Island Lighting Company (LILCO) donated and erected a forty foot telephone pole to be used as an osprey nesting platform at the Seatuck NWR. Refuge maintenance staff built and installed the actual nest platform before the pole was erected by LILCO. LILCO also straightened a leaning osprey nest pole at the Refuge, and drilled a hole in an old field for the pole of a second purple martin house.

Long Island Lighting Company personnel erecting an osprey nesting platform at the Seatuck NWR KJ '93

Songbird nest boxes and purple martin houses at the Refuge were repaired during the year.

2. Wetlands

Seatuck NWR is the site of the Seatuck Saltmarsh Restoration Project conducted in March 1992. The project entailed construction of a tidal channel from Champlin Creek to the existing main ditch of the Seatuck saltmarsh to provide an enhanced connection between Great South Bay and the marsh.

Dike along new tidal channel which has been stabilized with various grass species planted from seed RWP '93

The Refuge's saltmarsh due to the placement of spoil from past dredging projects had reduced tidal flow, lowered salinity and a loss of panne habitat. The lowered salinity and tidal flow allowed the significant establishment of great reed in the marsh. The purpose of the restoration activity was to improve tidal exchange, increase salinity, decrease great reed abundance and increase the amount of panne habitat.

Complex staff performed additional work in 1993 to complete the tidal channel project and ensure the effectiveness of the channel in promoting tidal exchange.

The spoil pile resulting from channel excavation, and the dike by the new channel were limed, fertilized, and seeded with coastal panic grass and sheep fescue. Brush was also placed on the spoil pile and dike to minimize erosion. In 1992, Complex staff and volunteers had planted plugs of smooth cordgrass, Spartina alterniflora, in the intertidal zone of the new channel to stabilize and revegetate the shoreline. While some of the Spartina alterniflora plugs died during 1992, growth of the remaining plugs was encouraging, and a replanting effort was undertaken in May 1993. New plugs were obtained from one of the saltmarshes at Seatuck NWR and the channel was completely replanted to eliminate gaps in the shoreline cover.

Spartina alterniflora plugs along the tidal channel showing vigorous growth KJ '93

The goal of the Seatuck Saltmarsh Restoration Project is to reduce the spread of great reed (Phragmites), increase the number of pannes, and increase salinity and tidal flow in the saltmarsh, enhancing its value to waterfowl and waterbirds. In 1991 in anticipation of commencement of this project, monitoring of various vegetative and water quality parameters of the Seatuck saltmarsh was initiated. This pre-project monitoring was to provide baseline data on the project, and allow an assessment of the success of the project in diminishing the extent and density of great reed, and in promoting hydrophytic species more beneficial to wildlife. Monitoring begun in 1992 was continued in 1993 to determine the success of the project in achieving its goals.

The east and west saltmarshes were covertyped in August and September by the Refuge Biologist R.W. Parris and Forestry Technicians Glova and Siefert. This is the third year that nine fixed transects have been used to covertype the area, and to determine the frequency of occurrence of wetland plants, and great reed densities in the marsh.

This covertyping reveals that there were continued changes in the saltmarsh in 1993 compared with 1992 and 1991 (see figure on following page). The major change in cover types which has occurred since the project was initiated has been the increase in the panne cover type.

The percent covertype of panne/ditch in the Seatuck NWR saltmarsh has increased steadily since 1991. In 1991 panne/ditch comprised 7.23% of the saltmarsh; in 1992 it increased to 11.22%; and in 1993 a further increase to 18.65% was recorded.

The percent covertype of great reed in the Seatuck NWR saltmarsh has declined steadily since 1991. In 1991 great reed occupied 27.61% of the saltmarsh; in 1992 it declined to 26.04%; and in 1993 a further decrease to 21.08% was recorded.

In the saltmarsh as a whole there was little change in the density of great reed in 1993 compared with either 1992 or 1991. However, in 1993 in great reed stands the density of great reed increased slightly to 77.63 shoots/m2 compared with an average of 66.62 shoots/m2 in 1992 and 1991. In certain areas of the marsh it was apparent however that the great reed was dying back. As an experiment, portions of dead great reed were cut in September 1993; regrowth of vegetation in these areas will be studied in the coming year.

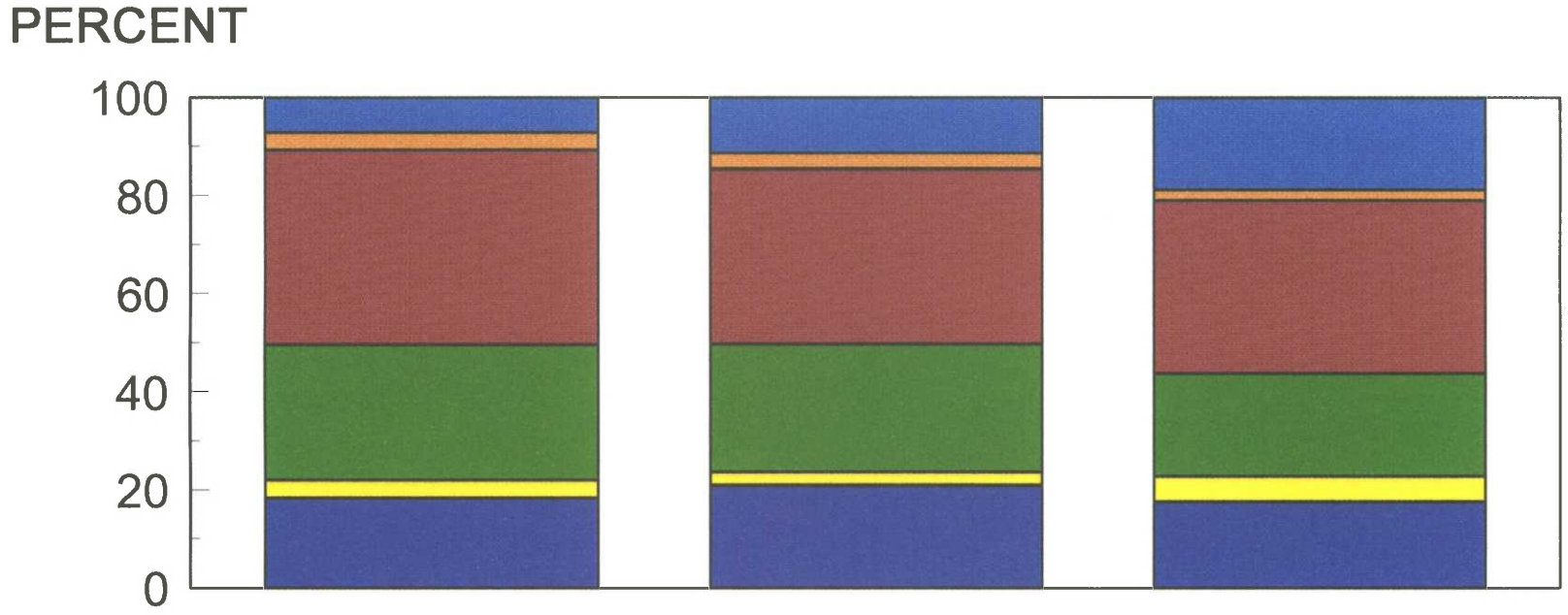
Other than the increase in panne/ditch and the decrease in great reed, there was little change in other covertypes in 1993.

Salinity monitoring was conducted monthly at a total of nineteen stations on the Refuge. Seventeen sampling stations are located in the marsh, a single station is located in Champlin Creek, and another single station is located in Great South Bay.

Prior to construction of the tidal channel, salinity of the saltmarsh averaged 3.95 parts per thousand (ppt). Following channel construction in 1992, salinity averaged 11.14 ppt. In 1993

SEATUCK NWR

MARSH COVER TYPING



YEAR	1991	1992	1993
Upland	18.32	20.91	17.57
SM Shrub	3.74	2.77	5.14
Great Reed	27.61	26.04	21.08
High Saltmarsh	39.61	35.73	35.27
IT Saltmarsh	3.61	3.32	2.16
Panne/Ditch	7.23	11.22	18.65

salinity averaged 12.43 ppt.

A saltmarsh panne with a fringe of dead Phragmites RWP '93

Water temperature monitoring was also performed. Quarterly sampling of additional water quality parameter was conducted. These additional parameters measured are ammonia, alkalinity, hardness, nitrite, pH. This sampling was done at five locations on Seatuck NWR.

A water level gauge is located in a main ditch of the west marsh. Refuge staff periodically record daily high and low water levels. This provides an indication of tidal inundation and fluctuation in the saltmarsh.

Prior to construction of the tidal channel, tidal flux averaged 0.19 feet. Following channel construction in 1992, tidal flux averaged 0.85 feet. In 1993 tidal flux averaged 1.04 feet. Aside from changes in tidal flux due to the project, the water level at high tide has also significantly increased in the marsh. since the channel was put in.

Although channel construction has enhanced salinities and tidal flux in the Seatuck saltmarsh, tidal flow to these same wetlands has been adversely affected by the rehabilitation of the Town of Islip beach facility adjacent to Seatuck NWR. The removal of an old bulkhead at the site in 1992 appears to have increased the periodic clogging of a culvert at the end of South Bay

Avenue. This culvert, other than the new tidal channel, is the only tidal connection between the Seatuck saltmarsh and Great South Bay. An open culvert at this location is essential to promoting greater salinity in the saltmarsh and helping to control the spread of great reed.

Because of concerns about this culvert, a Memorandum of Understanding (MOU) between the Town of Islip and the Service was signed in 1992. This MOU requires the Town, when notified by the Service concerning a reduction of tidal flow in the culvert, to clean the culvert completely. The culvert which is the subject of this MOU clogged in mid-November 1992. In April 1993, after no action had been taken by the Town despite repeated requests from the Service, Refuge staff opened the culvert in July 1993 using a floating pump to force accumulated sand out of the culvert. The culvert was discovered reclogged in August 1993 and remained clogged until November 1993 as the Town was unable to schedule work on it until that date. The salinity of the marsh dramatically increased in November over previous months due to the reopening of the culvert. The Town and the Service held several discussions during the year regarding the Town's responsibilities with regard to the culvert. In 1994 the Town and Service will attempt to find a solution to this continuing problem to preclude adverse impacts to the saltmarsh.

5. Grasslands

A half acre field was disked, fertilized, limed and planted with grass as a test plot to determine if cool season grass species would develop at the Refuge's grasslands. The planting was successful however it was felt that instead of cool season species the grasslands should be restored with native species.

Fifteen fields comprising approximately fifteen acres, representing about twenty five percent of the old field habitat at the Refuge, were brushhogged to control woody vegetation. Grasslands at the Seatuck NWR are cut on a three year rotation.

10. Pest Control

Deer ticks are present at Seatuck NWR. Damminix, a tick control agent, was applied by Refuge personnel in the Spring and Fall in office areas and by residents' quarters.

Suffolk County Vector Control (SCVC) was granted a Special Use Permit to apply BTI larvicide by hand spray, by truck mounted high pressure pumper unit and aerially by helicopter for mosquito control at the Seatuck NWR. BTI is a bacterial agent that kills mosquito larvae without the residual effects of a chemical pesticide.

Weekly sampling of mosquito larvae was conducted at the Seatuck NWR by the Forestry Technicians from April through September. The results were conveyed to SCVC which was advised by Refuge Biologist R.W. Parris whether or not SCVC would be allowed to treat the Seatuck saltmarsh with BTI larvicide. This is a change from previous years in which the

sampling was performed by SCVC employees; having the sampling done by Refuge employees gives the Project Leader greater control in determining the frequency and extent of spraying on the Refuge.

BTI granules were applied to Seatuck NWR at the rate of 10 pounds per acre. BTI applications were made on up to 70 acres of the Refuge nine times during the 17 week mosquito breeding season. A total of 5,840 pounds of BTI was applied to Seatuck NWR. For the three previous years (1990, 1991, and 1992) an average of 11,267 pounds of BTI was applied each year. This represents a nearly fifty percent reduction in the pounds of BTI applied in 1993 compared to the three previous years. Additionally, in the three previous years there had been seventeen treatments of BTI each year whereas in 1993 there were only nine such treatments.

Larval abundance at the Seatuck NWR in 1993 was 1.14 larvae per dip. During 1983 and 1984, the only other two years for which larval abundance data is available, there was an average of 4.2 larvae per dip. Additionally, during 1993 a high larval abundance was found during only 4 weeks of the 17 week breeding season. Adult mosquito abundance was high only during 5 weeks.

G. WILDLIFE

1. Wildlife Diversity

Seatuck NWR is essentially an island surrounded by suburban development, and as such provides valuable habitat for wildlife. Over 210 avian species have been documented at the Refuge. Mammals, including white tailed deer, raccoon and red fox are common.

2. Endangered and/or Threatened Species

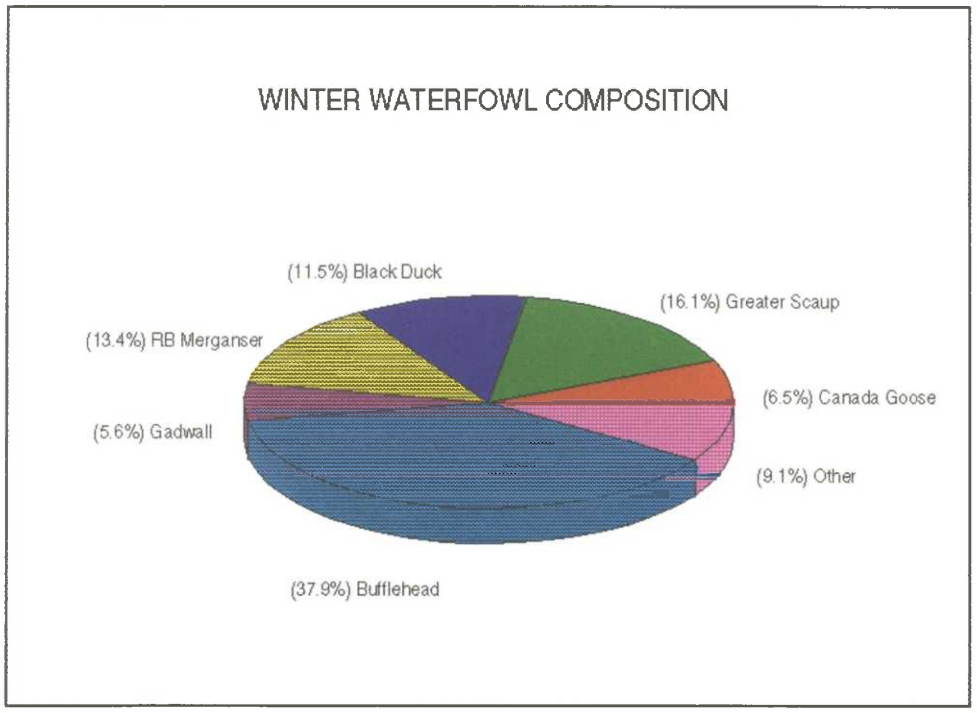
Ospreys, a New York State threatened species, made their first appearance of the year at the Seatuck NWR on February 18th, setting the earliest spring record at the Complex for osprey.

Osprey have nested at the Seatuck Refuge since 1983, with a noted increase in the number of nests at the Refuge in 1991. In 1993 three pairs of osprey nested on the Refuge, and fledged a total of five chicks. All pairs nested on poles installed at the Refuge in past years. No osprey nested on the new pole installed this year.

Common terns and least terns, New York State threatened or endangered species, were observed during May and July.

3. Waterfowl

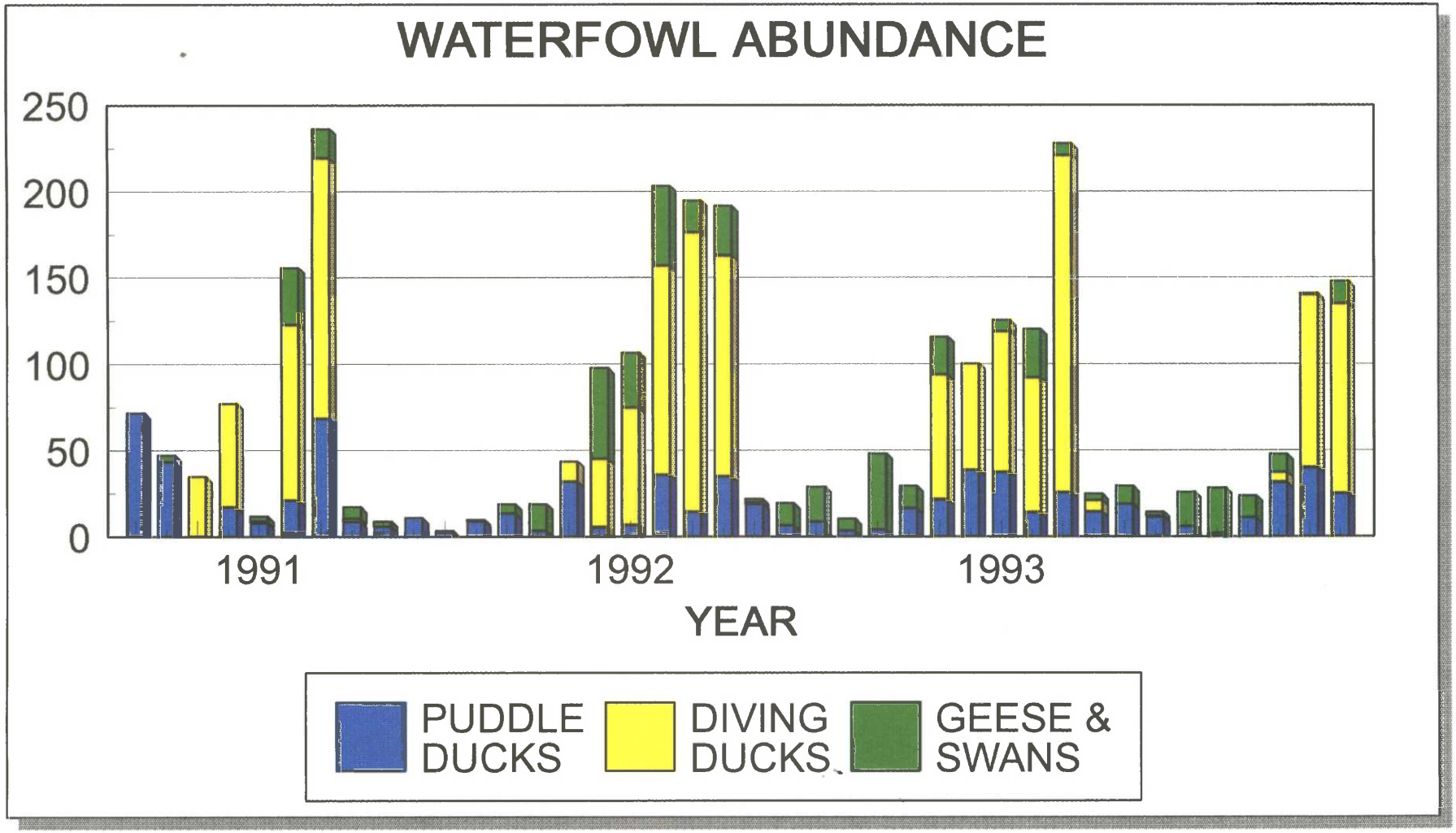
Waterfowl surveys were conducted at Seatuck NWR twice monthly during the year. Seventeen species of waterfowl were observed during these surveys. Waterfowl species present in greatest number in 1993 were bufflehead, Canada goose, greater scaup, black duck, and red breasted merganser. Canada geese were the only species observed year round. Canvasback were observed during February. Oldsquaw were observed during January and April. Black duck, greater scaup, bufflehead, and red breasted merganser were present in the greatest numbers during late fall and during winter. Green winged teal were fairly common in the autumn.



Species composition of waterfowl during winter 1992-1993 at the Seatuck NWR

Sixteen waterfowl nesting baskets were installed in the saltmarsh in 1992 because of perceived problems with nest predators, including raccoons, foxes, and feral cats. In 1993 a mallard hen utilized a nest basket to lay eight eggs, all of which hatched.

SEATUCK NWR


WATERFOWL ABUNDANCE
250
200
150
100
50
0
1991
1992
1993
YEAR
PUDDLE DUCKS
DIVING DUCKS
GEESE & SWANS

Hen mallard in a waterfowl nesting basket at the Seatuck NWR RWP '93

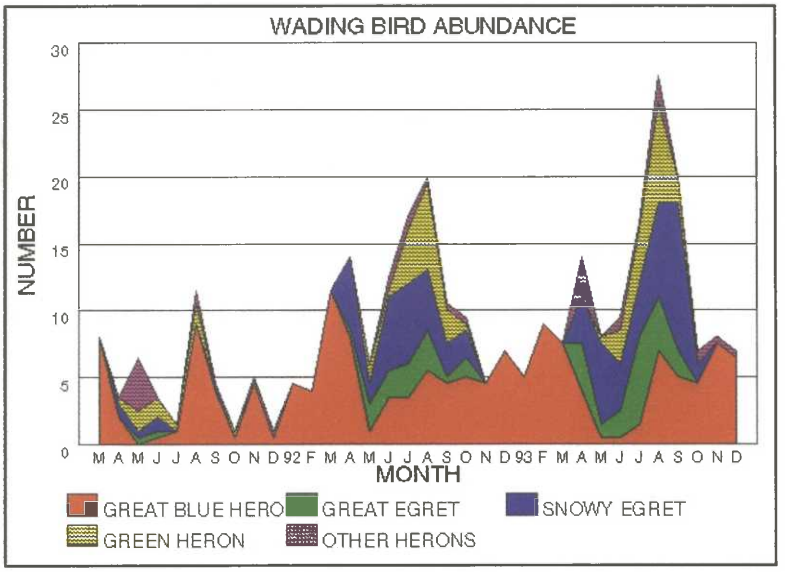
A waterfowl breeding pair survey was done at the end of May. Twenty pairs of breeding waterfowl were counted. This represents a two-fold increase over 1991 when eight pairs of breeding waterfowl were counted. Breeding pairs observed in 1992 consisted of mallard, Canada goose, black duck, gadwall, and blue winged teal.

A wood duck nest box is located on the freshwater pond at the Seatuck NWR. In 1993 this nest box was used by a wood duck to lay fourteen eggs, ten of which hatched. A second nest box will be installed on this pond in 1994.

4. Marsh and Waterbirds

Waterbird surveys were conducted twice monthly concurrent with the waterfowl surveys. Seven species of herons, egrets and ibises were observed during the waterbirds surveys. Great blue heron, snowy egret, green backed heron, glossy ibis, great egret, black crowned night heron, and American bittern were observed during these surveys. Great blue heron, great egret, snowy egret, and green backed heron were most common. Great blue heron were present year round; green backed heron were present from May through September; snowy egret were present from April through October; and, great egret were present from April through September. The number of long legged wading birds peaked in August; there was also a smaller peak earlier in April.

Other marsh and waterbird species observed during the surveys include double crested cormorant, common loon, horned grebe, pied billed grebe, common snipe, osprey, belted kingfisher, and northern harrier.



Abundance of wading birds at the Seatuck NWR from March 1991 through December 1993

5. Shorebirds, Gulls, Terns and Allied Species

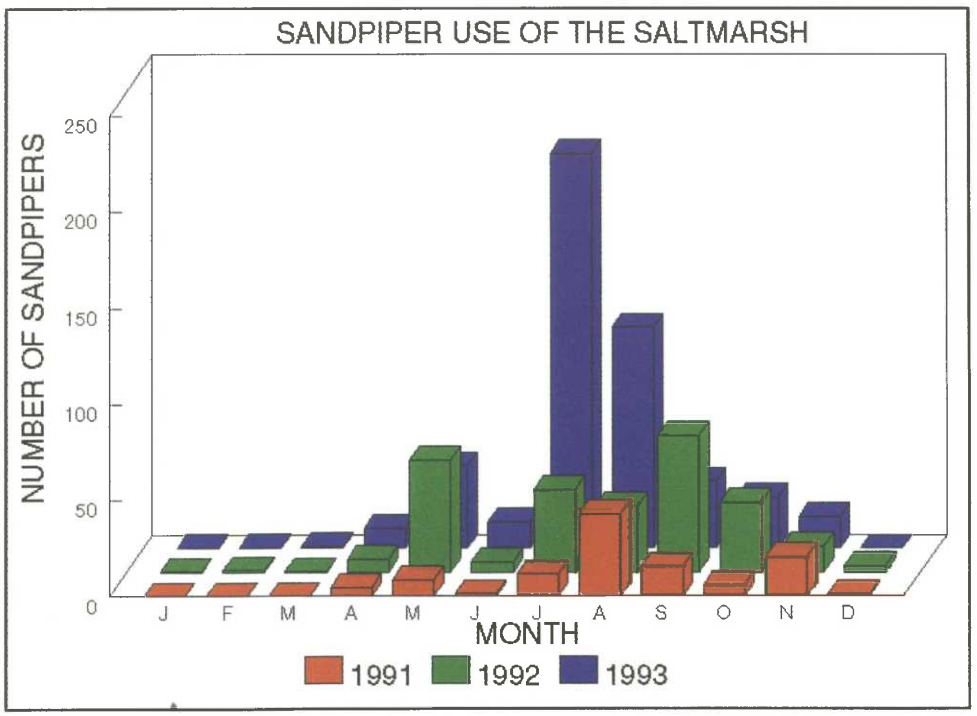
Seatuck NWR was checked for woodcock activity in April; although woodcocks routinely use this Refuge during passage, no woodcock were detected displaying during breeding season.

Sightings of shorebirds, gulls, terns and allied species were recorded during the twice monthly waterbird surveys.

Three species of gulls - herring, greater black backed, and ring billed - were observed during these surveys. Herring gulls were the most common and are present year round. Greater black backed gull were the second most common species. Two species of terns - least and common - were observed during these surveys. Both were observed in May and July.

Other shorebirds observed during the surveys included greater yellowlegs, least sandpiper, black bellied plover, killdeer, spotted sandpiper, lesser yellowlegs, semipalmated sandpiper, pectoral sandpiper, dunlin, and willet. Shorebird numbers peaked in July, with continued high levels in August.

The numbers of long-legged waders and shorebirds using Seatuck NWR had increased dramatically in 1992 following construction of the tidal channel; this increase continued in 1993. In 1991 an average of 6.30 long-legged waders were observed during each survey; in 1992 this increased to 12.90 birds per survey; and, in 1993 it further increased to 15.90 long-legged waders per survey. Sandpiper numbers also showed a dramatic increase pre- and post-channel construction. In 1991 an average of 19.60 sandpipers were observed per survey; in 1992 this increased to 53.90 per survey; in 1993 there was a further increase to 102.90 sandpipers per survey.



Use of the Seatuck NWR saltmarsh by sandpipers during 1991 through 1993

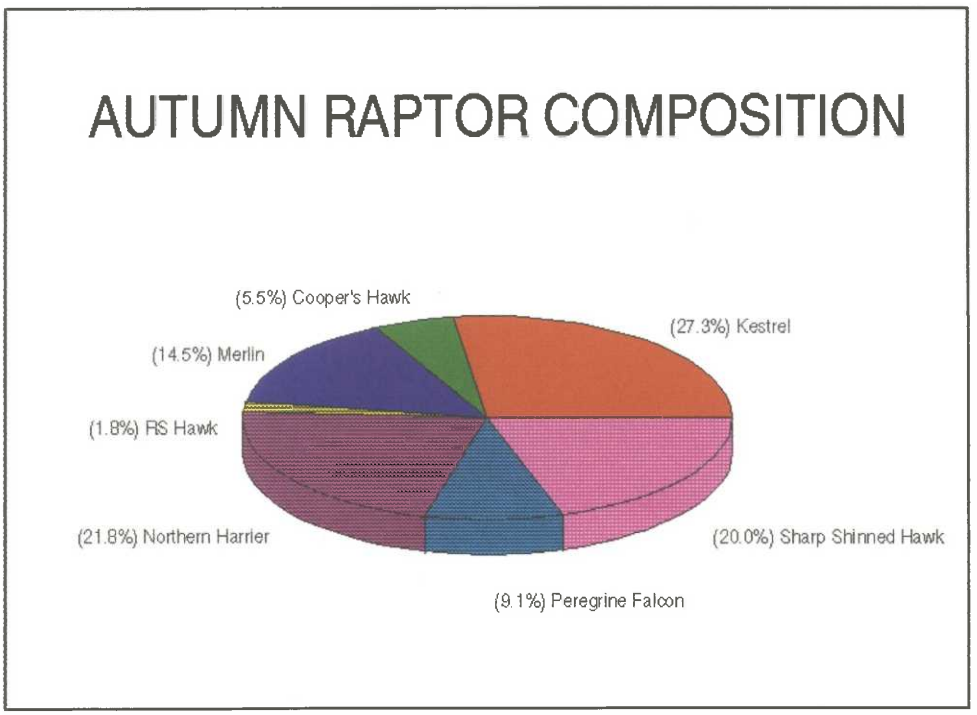
It is believed that these increases in long-legged wader and shorebird use are due to the increase in the areal extent of pannes on the saltmarsh this year and the increased number of fish in

the ditches at the Refuge this year. These changes can be attributed to the Seatuck Saltmarsh Restoration Project.

6. Raptors

Seatuck NWR provides important habitat for raptors moving along the coast of Long Island. Raptors were commonly observed at the Refuge during spring and autumn migrations.

Raptor species present at Seatuck NWR included red tailed hawk, American kestrel, merlin, northern harrier, red shouldered hawk, and sharp shinned hawk. American kestrel, northern harrier and sharp shinned hawk were the most common. Six kestrel were observed on September 22. The following figure indicates the raptor species composition during the past three autumns at the Refuge.



Composition of autumn raptors during 1991 through 1993 at the Seatuck NWR

In addition, screech and great horned owls were observed at the Refuge.

7. Other Migratory Birds

A breeding bird survey was conducted in June utilizing 46 sampling stations. Forty-seven species of birds were detected during the survey. Species utilizing the forest edge, shrubs and wetlands were most prevalent. Forest interior avian species were missing reflecting the lack

of such habitat at Seatuck NWR. In the Refuge as a whole, the most common birds and the percentage of sampling stations at which they were detected were: red winged blackbird (58.7% of stations); yellowthroat (47.8% of stations); catbird (43.5% of stations); song sparrow (34.8% of stations); tree swallow (34.8% of stations); marsh wren (28.3% of stations); mourning dove (26.1% of stations); and, common crow (26.1% of stations).

In the saltmarsh the most common birds and their frequency of occurrence were: red winged blackbird (91.3%); marsh wren (54.0%); and tree swallow (50.0%).

Surveys of mourning dove and rail were also conducted at the Seatuck NWR. The mourning dove survey was conducted in June and used 25 sampling points with an observation period of three minutes at each station. There were 1.20 mourning doves detected per station. The rail survey was conducted in May and used 23 sampling points with an observation period of three minutes following the playing of a recording of a clapper rail. No rail were detected.

During 1993 thirty four nesting boxes for eastern bluebird were maintained and checked for activity. This work was done by volunteers Anne and Charlie Meinhold. Fifty six percent of these boxes were used for nesting by birds. House wrens nested in 50.0% of the boxes. Two boxes were used by house sparrows. No eastern bluebirds nested in the boxes. The overall percentage of bird nesting boxes used in 1993 (56%) was similar to the mean for the past three years (61.8%).

Two 12-compartment purple martin houses are located at Seatuck NWR in a field adjacent to Champlin Creek. Purple martins were successful at nesting this year at Seatuck NWR; ten of the twenty-four compartments in these houses had a nest. A third purple martin house is located on the life-estate of Mr. Charles Webster, the donor of the Seatuck NWR. This house has eighteen compartments; martins were observed using this house. The purple martin nesting at the Seatuck NWR is significant since there are presently less than ten active purple martin colonies on Long Island.

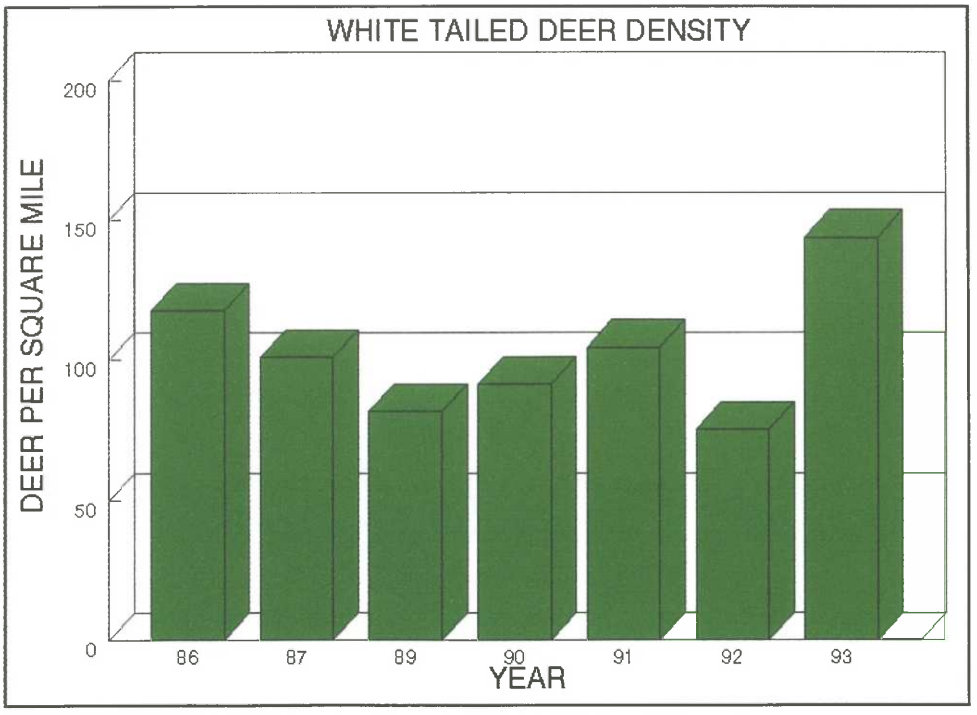
8. Game Animals

White tailed deer are one of the most conspicuous and controversial wildlife species at the Seatuck Refuge. The herd has a high density and complaints are frequently voiced by neighbors concerned about their gardens and landscape plantings. Concerns regarding the potential for deer-vehicle collisions and the incidence of Lyme disease are also heard.

A deer drive was held in December to provide an estimate of the deer density at the Refuge. This is the seventh year that the drive has been performed. The drive has two components. The first part of the drive consists of moving all the deer out of the saltmarsh located on the southern part of the Refuge, and into the uplands. Once the deer are moved by a line of drivers into the uplands, then a line of spotters is formed across the central portion of the Refuge. A line of drivers then moves the deer from the northern portion of the Refuge south

past the spotters who record the sex and age class of each deer. The drive is an effective means of measuring the herd size because the Refuge is bordered on all sides by either fences or waterbodies which, for the most part, preclude deer from evading the spotters.

This year the drive produced a herd estimate of slightly over 140 deer per square mile (see figure below). This is the highest estimate of herd density ever obtained for the Seatuck Refuge. This density is approximately two to three times the desired herd size for the Refuge. On Long Island and in nearby areas, densities of from 20 to 40 deer per square mile are typical for herds subject to recreational harvest. Caution should be applied when viewing the Refuge herd estimates because they vary due both to annual variations in herd size, and also on how many deer are off the Refuge during the time the drive is conducted. Although we refer to the deer as the Seatuck herd, in actuality the deer use the Refuge, a neighboring Audubon sanctuary, the suburban yards of neighbors, and possibly additional undeveloped lands east of Champlin Creek. Thus, how many deer are off-Refuge when the drive is conducted influences the Refuge's annual estimate. The Refuge's estimate should be considered a minimum level estimate for the herd.

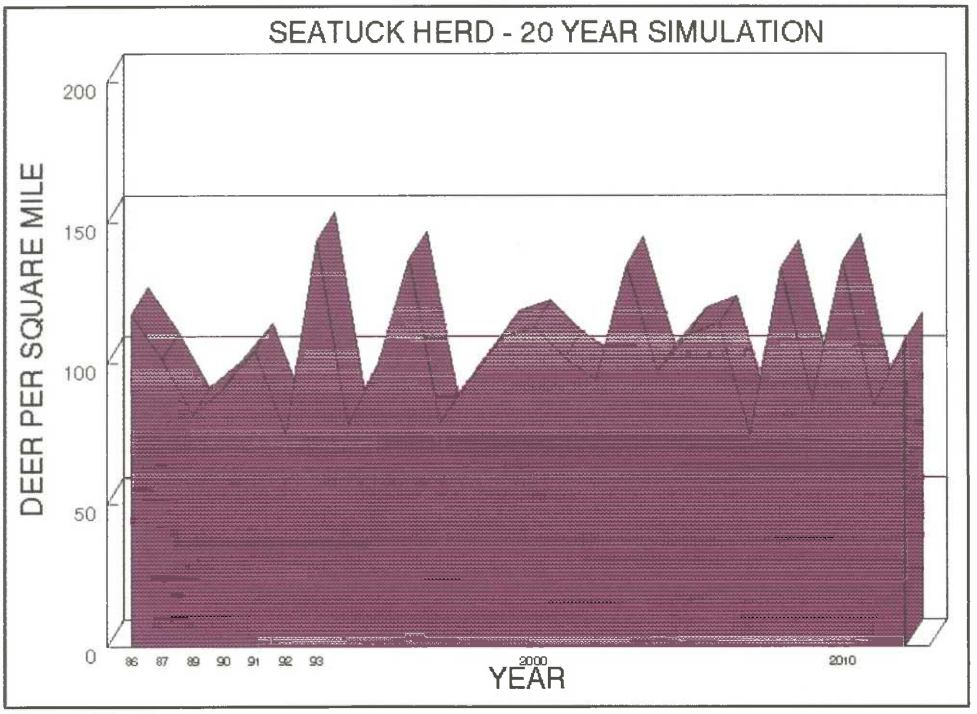


Estimates of white tailed deer herd densities for the Seatuck NWR for 1986 through 1993

Aside from the drive, deer observation made between fawn drop and antler drop are also maintained to provide an estimate of the herd's production and sex ratio. The production and sex ratio of the Seatuck herd in 1993 was similar to past years. Approximately sixteen percent of the herd was composed of fawns - a low figure when compared to the Wertheim NWR's

production. The sex ratio was essentially equal with the herd consisting of 42.8 percent legal bucks and 41.4 percent does.

A twenty year population simulation was also performed on the Seatuck herd to obtain a general prediction of its trend through time (see figure below). The simulation was based on the logistic model where the rate of increase and other parameters are estimated from previous population surveys; a random variable was also added to the model. The model for the Seatuck herd indicated a mean response time and variance of approximately one year - which essentially means herd density cycles around the population mean rapidly. The simulation indicated that the Seatuck herd, while being at a high density, is stable and will remain in that condition assuming that other environmental factors, such as no habitat degradation, remain constant.



Twenty year population simulation of the white tailed deer herd at the Seatuck NWR

The Seatuck herd is at a high density but stable. Its equal sex ratio and low recruitment indicates it is not subject to recreational harvest and has low mortality. While not increasing, the herd's high density is a reason for concern. Many studies have indicated deer densities at which forest regeneration is precluded. The Seatuck herd is far above those levels. A browse line is apparent at the Refuge, fields are not regenerating to forest vegetation, field species composition is impacted, and the forest understory has been affected.

Red cedars at the Seatuck NWR showing browse line from white tailed deer RWP '93

10. Other Resident Wildlife

A track count was conducted in February. This count provides annual indices of the abundance of white-tailed deer, canids, mustelids, gray squirrel and cottontail rabbit. Squirrel leaf nests were also counted.

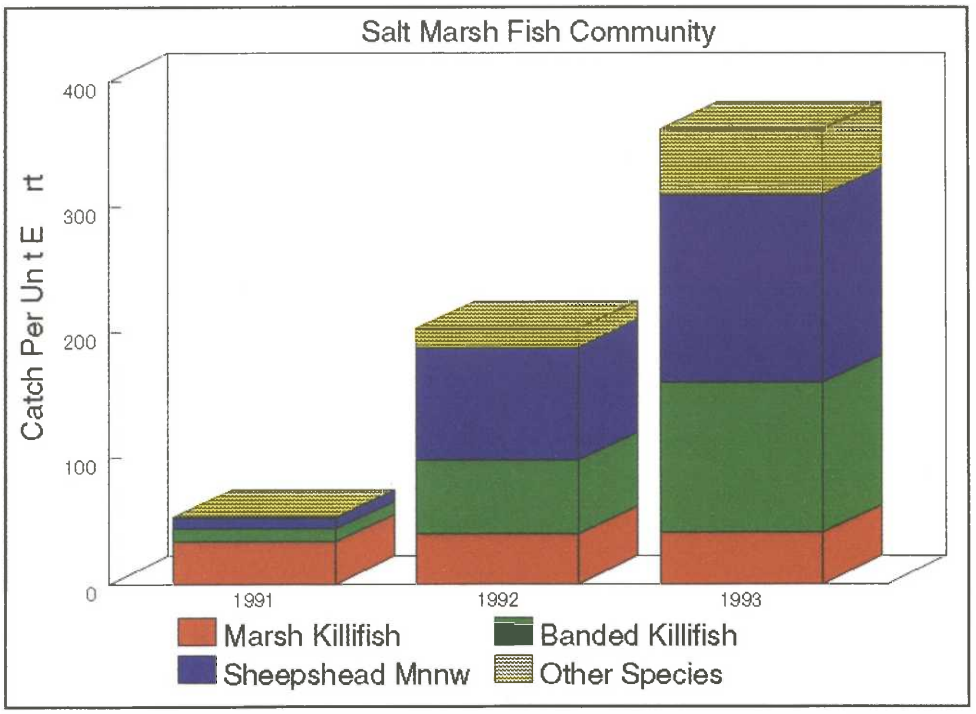
The following track counts were collected at Seatuck NWR: white tailed deer, 75.73 tracks

per mile; gray squirrel, 14.56 tracks per mile; microtine mammals, 11.65 tracks per mile; eastern cottontail rabbit, 11.65 tracks per mile; domestic dog, 7.77 tracks per mile; red fox, 2.91 tracks per mile; raccoon, 2.91 tracks per mile, and feral cat, 1.94 tracks per mile. There were 4.85 squirrel nests per linear mile.

A bobwhite quail survey was conducted in May and used 25 sampling points with an observation period of three minutes at each station. No bobwhite quail were detected.

11. Fisheries Resources

Fish seining was conducted by Refuge staff in August and September in the drainage channels of the upper saltmarsh. This work is part of the monitoring program for the Seatuck Saltmarsh Restoration Project. Several passes, each 50 feet long, were made with a seine net in a ditch in the upper saltmarsh.



Abundance of fish species in the Seatuck NWR saltmarsh during 1991 through 1993

Following tidal channel construction in 1992, there was a dramatic increase in fish abundance. This trend continued in 1993. Specifically, fish abundance in 1993 increased by a factor of seven over the sampling results from 1991. In 1991 each pass had collected an average of 52.82 fish; in 1992 that number increased to 203.00 fish; in 1993 the number increased further to 361.00 fish. In 1993 the most common species collected were sheepshead minnow (41%),

banded killifish (33%), and marsh killifish (11%). Other species collected were American silverside, American eel, mosquitofish, menhaden, stickleback, and striped killifish.

Species exhibiting the greatest increase since tidal flow was restored to the saltmarsh included sheepshead minnow and banded killifish. Numbers of marsh killifish have remained relatively stable during the past three years.

Mysid shrimp also exhibited a continued increase over last year's results. No mysid shrimp were collected in 1991; in 1992 each pass collected an average of 75 mysid shrimp; in 1993 this number increased to 80.50 mysid shrimp collected in each pass.

It is likely that the increased water on the salt marsh due to the restoration project has enhanced the shallow water habitat for marsh fish species.

H. PUBLIC USE

1. General

Seatuck NWR is not open to the public, however interpretive and educational activities are generally permitted upon request. During 1993 such requests were received from a teacher from Brentwood High School, the Seatuck Foundation, and the Great South Bay Audubon Society; all were granted permission and issued Special Use Permits subject to special conditions to minimize the disturbance to wildlife from the proposed activities.

In response to a request from the Old South Islip Civic Association, Project Leader Thomas Stewart presented a program on deer management, specifically addressing the deer herd at the Seatuck NWR, at the Islip Library on September 29. The program was attended by about 60 persons.

2. Outdoor Classrooms - Students

A teacher from Brentwood High School conducted an environmental education program at the Seatuck NWR beach in July for a class of marine biology students. They were issued a Special Use Permit.

11. Wildlife Observation

Maryann Meier, an intern with the Seatuck Foundation, was issued a Special Use Permit to conduct ornithological surveys on the Refuge several times each month. The permit requires twice-yearly reports from the Foundation on the data collected.

The Seatuck Foundation conducted several education programs at the Seatuck NWR for its membership. Adult ornithology nature walks were held at the Seatuck NWR on October 10, 16 and 23. A children's program entitled "The World of Birds" was presented by the Seatuck Foundation (in cooperation with the Theodore Roosevelt Sanctuary) at the Seatuck NWR on October 2 and 16.

The Great South Bay Audubon Society conducted an owl walk at the Refuge. A Special Use Permit was issued to Frank Meszik to perform owl observations and conduct owl walks for the Audubon Society.

The Great South Bay Audubon Society was issued a Special Use Permit to conduct a bird survey at the Seatuck NWR in December for the Captree Christmas Bird Count.

I. EQUIPMENT AND FACILITIES

2. Rehabilitation

Carpeting was installed by Pat's Carpet Outlet, an outside contractor, in a living room of quarters at the Seatuck NWR. A new refrigerator was received for quarters at the Seatuck NWR. A new roof was installed by Ed Murray Roofing, Inc., an outside contractor, over a portion of one of the quarters at the Seatuck NWR.

Law Enforcement staff occupy two apartments in the Canary Cottage at Seatuck NWR. Upkeep on these quarters was performed in 1993.

8. Other

Sections of the Refuge boundary lacking boundary signs were posted to minimize trespassing. Fences along the boundary were repaired on several occasions to discourage trespassing and prevent deer from readily gaining access to residential neighborhoods adjacent to Seatuck NWR. Refuge boundary and 'Area closed' signs were replaced at the end of South Bay Avenue where the Refuge adjoins a popular Town swimming beach.

J. OTHER ITEMS

1. Cooperative Programs

The Seatuck Foundation, in cooperation with the Service, sponsored a public seminar series at the Seatuck NWR during Spring 1993. On March 4th Dr. Richard Lent of Harvard

University presented a program on the ecology of the catbird and other songbirds at the Seatuck NWR; on March 18th Dr. Mark Wilson of the Yale University School of Medicine presented a program on the role of white-tailed deer in determining the distribution and number of deer ticks; on April 1st ARM Kathryn Jahn presented a program on coastal wetland restoration undertaken at the Seatuck NWR and on the south shore of Long Island; on April 18th the series concluded with a presentation by Dr. Margery Oldfield of the Seatuck Foundation on the biological diversity of Long Island.

The Seatuck Foundation Board of Directors met once during the year. Meeting attendees included Assistant Refuge Manager Kathryn Jahn. Items discussed included: election of new officers; selection of new board members; formation of new committees; ongoing and proposed research projects of the Foundation; and, programs to be held at the Seatuck NWR.

The Cooperative Agreement between the Seatuck Foundation and the Service, signed in September 1992, continued in effect this year. This agreement expresses the desire of both the Foundation and the Service to cooperate in the development and execution of projects to advance their mutual interests with the following two objectives: to evaluate and develop ecologically based management techniques for the maintenance and enhancement of wildlife and associated habitats with the U.S. Fish and Wildlife Refuge System; and, to provide biological and technical input to the U.S. Fish and Wildlife Service for the purpose of establishing viable habitat/wildlife management programs. Through this Cooperative Agreement the Service grants to the Foundation the non-exclusive use of the Long Island National Wildlife Refuge Complex as a research area, and gives the Foundation exclusive use of the 'Lovering House' at Seatuck NWR to meet the Foundation's administrative, scientific and housing needs.

During 1993 housing at the Seatuck NWR was provided for six months at no charge to Ms. Susan Elias-Gerken, a doctoral candidate at the Virginia Polytechnic Institute and State University, Blacksburg, Virginia, who is studying the piping plover habitat suitability of the central barrier islands of Long Island.

4. Credits

The introduction, sections A-E and H-J were authored by ARM Kathryn Jahn.

Sections F and G were written by ARM Kathryn Jahn and Refuge Biologist R.W. Parris, PhD.

TARGET ROCK NATIONAL WILDLIFE REFUGE

Huntington, New York

ANNUAL NARRATIVE REPORT

Calendar Year 1993

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

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INTRODUCTION

The Target Rock National Wildlife Refuge is located on the north shore of Long Island in western Suffolk County. The Refuge is in the Village of Lloyd Harbor, Town of Huntington and is 25 miles east of New York City (five miles east of the Oyster Bay NWR).

The 80-acre Refuge consists of mixed upland forest (in varying stages of succession), a 1/2 mile rocky beach on Huntington Bay, a brackish pond and several vernal ponds. The chestnut oak/mountain laurel association and oak hardwood forest offer good food and cover for migrating neotropical birds. The sand ridge areas have juniper trees which provide habitat for olive-sided hairstreak butterflies. The prickly pear cactus which is a New York State protected species is found in the sand ridge areas of the beach.

Excellent marine invertebrate populations in the offshore, beach and pond habitats provide foraging areas for piping plovers, migrating shorebirds, wintering waterfowl and fish species. These habitats are also used by the New York State listed species - least tern and common tern.

Over 203 species of birds have been documented at the Refuge, with 51 breeding species. Marine wildlife particularly the harbor seal and marine turtles (leatherback and ridley) use the coastline for feeding and loafing.

The Refuge usually has over 50,000 visits a year. Visitors come for walking, bird watching and fishing.

A. HIGHLIGHTS

Target Rock NWR was closed to the public from January 7 until July 10 1993 due to extensive storm damage. More than 165 yards of hazardous debris washed up on the Refuge's beach during the December 11-12 nor'easter and the coastal storm on March 13-14 (F.1). Over 220 volunteers assisted by Refuge staff cleaned the beach in order to make it safe and restore wildlife habitat (J.1.). The Regional Director issued letters and certificates of appreciation to all the corporations that participated. The closing of this Refuge brought attention by way of phone calls and letters from the public, media and Congressional Representatives.

The Refuge was visited by Under Secretary of the Interior James Hayden on January 14, 1994. Governor Hayden concurred with the Project Leader's decision to close the beach for public safety (D.3).

ARM Kolodnicki standing by staging area for storm-deposited debris being removed from the Target Rock NWR's beach.

C. LAND ACQUISITION

3. Other

The boundary inspection was completed for the Target Rock NWR. The final report will be submitted after the compatibility reports are completed. A request for technical assistance with the mean high water boundary of Target Rock NWR beach was made to Realty. Senior Surveyor Drummond responded with a field visit and indicated the complexity involved in locating the mean high water boundary.

D. PLANNING

3. Public Participation

Assistant Refuge Manager (ARM) Bill Kolodnicki attended a meeting of the Lloyd Harbor Conservation Board to coordinate coastal planning in the vicinity of Target Rock and Oyster Bay NWRs. ARM Kolodnicki gave a presentation to the Town of Huntington Conservation Board on the status of colonial nesting waterbirds in the vicinity of Target Rock NWR and the volunteer clean-up project that took place at the Refuge earlier in the year.

The Refuge was visited by Under Secretary of the Interior James Hayden on January 14, 1994. The Governor was given a tour of the Refuge and discussed problems and issues of Refuges located in urban settings. Governor Hayden concurred with the Project Leader's decision to close the beach for public safety due to the recent storm damage.

4. Compliance with Environmental and Cultural Resource Mandates

A Determination of Eligibility for the National Register of Historic Places was received from the National Park Service for the Target Rock NWR/Eberstadt Estate. The determination notes that the Secretary of the Interior has determined that the property is not eligible for listing. Among other items, the determination notes that the Eberstadt estate's resources, including important landscape features, have been extensively altered through remodelings and deterioration. This determination affirms the findings of the Service and is in opposition to the findings of the New York State Office of Parks,

Recreation, and Historic Preservation (NYSOPRHP). This is the second step of the plan to demolish the mansion on site now that the asbestos has been removed. Complex staff began to apply for necessary permits from other agencies.

E. ADMINISTRATION

1. Personnel

Assistant Refuge Manager Bill Kolodnicki continued to administer the programs at the Target Rock NWR. PL Tom Stewart continued to maintain an office at the Refuge.

2. Youth Programs

Jamie Kennsie received his Eagle Scout honor for constructing a fishing information kiosk at the Target Rock NWR. The kiosk was largely constructed from debris from the coastal storms.

4. Volunteers

Ms. Marion Rappelt started her duties as an intern at the Target Rock and Oyster Bay NWRs. Marion's internship is being sponsored through Long Island University, C.W. Post Campus. She developed a draft nature trial guide for Target Rock NWR which was published, assisted in Refuge operations, the volunteer clean up at Target Rock NWR and studied public use at both Refuges.

F. HABITAT MANAGEMENT

1. General

An intense Northeast storm struck Long Island on December 11-12. The storm caused extensive shoreline and bluff erosion on the Refuge. The maintenance staff estimated that there were over 300 cubic yards of debris on the beach. Debris consisted of parts of large wooden docks, demolished boats and general construction materials. A good portion of the wood was over 30 feet in length and had spikes and nails protruding. In addition, all

area closed signs, snow fence, boundary signs and sections of beach vegetation were destroyed by the storm. The bluff trail was completely destroyed in some sections. A second major storm occurred on March 13-14 which brought winds of 100mph, ice, snow, rain and high tides to Target Rock NWR. The bluff erosion increased and at least 20 percent more debris found its way to the beaches.

Routine quarterly measurements were taken on select water parameters at the Target Rock NWR (similar to work at the Wertheim NWR, F.2). Salinity and temperature measurements of the brackish pond and the Sound were also taken monthly.

Several hundred feet of Refuge beach were closed, in late spring and summer, by the use of signs and snow fence to protect nesting bank swallows, belted kingfishers, and to provide undisturbed piping plover habitat from spring to early autumn.

9. Fire Management

Several small illegal fires were discovered at the Target Rock NWR in late winter and spring (see Wertheim F. 9.).

10. Pest Control

Damminix tick control tubes were applied around the offices and living quarters in May and September. Deer and dog ticks remain a problem at certain portions of the Refuge.

G. WILDLIFE

1. Wildlife Diversity

Over two hundred avian species have been documented at the Target Rock NWR of which over fifty have been recorded as breeders. The Refuge provides suitable habitat for many forest, wetland, and beach dependent species and is an important stopover for many migrants. A variety of marine wildlife use the waters adjacent to the Target Rock NWR and the shoreline supports a marine rocky intertidal community.

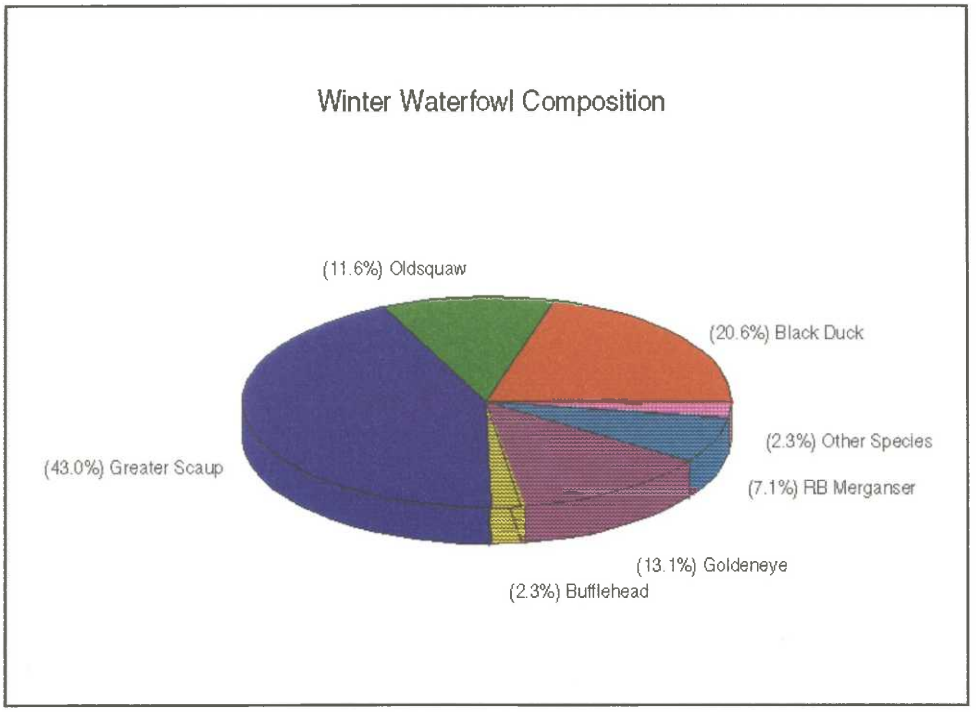
2. Endangered and Threatened Species

The beach and neighboring beach were not used by piping plover this year although there were, like last year, at least five plover pairs not more than a mile away. The New York State endangered least tern and threatened common tern foraged along the Refuge's shore. There were nesting colonies of these birds along with piping plovers directly across from

the Refuge at Eaton's Neck, Northport and at Caumsett State Park, Lloyd Harbor. The closing of additional Refuge beach areas is being considered for next year.

3. Waterfowl

Waterfowl are censused semimonthly at the Target Rock NWR. Waterfowl use occurs at the brackish pond and the rocky shoreline. Peak numbers occur in winter. Puddle ducks comprise about a third of the ducks using the Refuge and black ducks are by far the dominant puddle duck. Black ducks use both the brackish pond and the rocky shoreline. The most common diving ducks include goldeneye, oldsquaw, bufflehead, red-breasted merganser and greater scaup.



Winter waterfowl composition at the Target Rock NWR.

4. Marsh and Waterbirds

Common loons and horned grebes are common in winter off the beach. During the summer, double-crested cormorants are easily observed. In 1993, seven species of long legged waders were documented with great blue herons and green-backed herons the most common. Little blue herons and American bitterns, both uncommon on Long Island, were observed at Target Rock NWR.

5. Shorebirds, Gulls, Terns and Allied Species

Four species of gulls are present on the Refuge; the most common is the herring gull. Numerous sandpipers also make use of the rocky beach and brackish pond; the most common include greater yellowlegs, black-bellied plover, semipalmated plover, spotted sandpiper and willet.

6. Raptors

The most common raptors observed at the Target Rock NWR include red-tailed hawk, great horned owl, screech owl, osprey, American kestrel, merlin, sharp-shinned hawk and Cooper's hawk. Screech owls are abundant and easily detected on the Refuge.

7. Other Migratory Birds

A breeding bird survey was conducted for the third consecutive year at the Target Rock NWR. The survey consists of recording all birds detected at twenty-four sampling stations. The most common birds recorded were catbird, northern flicker, northern cardinal, house finch, mourning dove, red bellied woodpecker, Carolina wren, tufted titmouse, mockingbird and rufous sided towhee. Although the forested area at the Refuge is small, several forest interior species have been previously documented on the survey including wood thrush, eastern wood peewee, black and white warbler, American redstart, red eyed vireo, scarlet tanager, and rose breasted grosbeak.

The sand bluffs above the Refuge's beach provide specialized nesting habitat for several avian species. Belted kingfisher and bank swallows normally nest. Although some bank swallow nesting activity was observed this year, no young were fledged.

A mourning dove survey was conducted for the third consecutive year at the Refuge. Approximately half of the stations sampled had doves present; this is a similar level to other Long Island Refuges.

The songbird nest boxes and two screech owl boxes were cleaned early in the year in preparation for the breeding season.

9. Marine Mammals

Harbor seals were periodically observed off of the Refuge's beach either swimming or hauled out on some of the offshore rocks.

10. Other Resident Wildlife

A snow track count was conducted during the winter to monitor the abundance of larger mammals on the Refuge. The most common species detected included red fox, gray squirrel and cottontail.

A bobwhite quail survey was conducted for the third consecutive year at the Refuge. No quail were detected at any of the twenty-four stations sampled. Target Rock NWR is the only Long Island Refuge where quail were not detected.

H. PUBLIC USE

1. General

The Target Rock NWR in past years, has usually averaged 50-60,000 visitors annually. Most of the public use involves the use of nature trails, bird watching, environmental education, and fishing. This year only 24,100 visitors used the Refuge due to its closing for a good portion of the year because of to storm damage.

A fee access program was initiated at the Refuge in August of 1992. During the Refuge closing, because of storm damage, the fee access program was suspended. Once the Refuge reopened in summer after the cleanup, fee access was again suspended for the remainder of the year by Project Leader Stewart because of staff shortages.

Press releases and articles were sent out concerning the Target Rock NWR closure due to storm damage, closure of the beach during breeding and migration seasons and the removal of trash cans. Trash cans were removed because of lack of staff, landfill costs, and trash overflow attracting predators. The trash can removal drew the attention of press inquires and even local television.

9. Fishing

Recreational angling is a popular activity at the Refuge. The most common species sought are blackfish, bluefish and striped bass.

11. Wildlife Observation

Wildlife observation is the most frequent activity engaged in by the Refuge's visitors.

17. Law Enforcement

The closure of the Target Rock NWR due to storm damage created trespass and parking problem despite sign posting and barrier placements at all entry points. Illegal parking at the Refuge entrance resulted in issuance of nine N.O.V.s for parking and two for trespass.

I. EQUIPMENT AND FACILITIES

2. Rehabilitation

Repairs to bathrooms and electrical systems of quarters at Target Rock NWR were performed. The maintenance crew and forestry technicians spent time preparing the Refuge for the volunteer clean up.

6. Computer Systems

A new 486 personal computer was set-up at the Refuge in October.

J. OTHER ITEMS

1. Cooperative Programs

A total of $359,000 emergency construction funds was requested for the clean up and the rehabilitation of the Target Rock NWR and other Complex coastal refuges as a result of the severe coastal storm season. The requests were denied and the Refuge anticipated that it would be at least a year before Target Rock NWR alone could be cleaned and rehabilitated with existing funds and staff.

Complex staff coordinated a volunteer clean-up of the Target Rock NWR beach with Joan Imhoff of the Long Island Volunteer Enterprise (L.I.V.E.). The Sierra Club, Huntington Audubon Society , the Mill River Rod and Gun Club and the Water Pollution Control Federation offered to assist, but, their numbers were too small to effectively deal with the debris. IBM coordinated the L.I.V.E. effort and over 230 volunteers from IBM, Grumman Aviation, Newsday, WALK Radio, Estee Lauder, Olympus and Millmax Corporation cleaned over 165 yards of debris from the beach between June 5 and June 12, 1993. The volunteers were assisted by Refuge staff and equipment. Equipment Operator Marto, Maintenance Worker Bowden, Laborer Woerner, Biologist Parris, Assistant Refuge Manager Kolodnicki, Forestry Technicians Glova and Siefert assisted with all available Complex equipment and trucks. The radio station covered the event from the beach. This

volunteer effort saved the government 100,000 dollars in staff time alone. The debris was hauled to the front of the Eberstadt Mansion. Only a few broken windows and no serious accidents made this an exceptional Complex event. Additional funds of over $3,000 will be needed to remove this debris from the Refuge.

During the year the Long Island Greenbelt Conference, Boys Scouts and the Sierra Club used some of the wood for hiking trail restoration.

4. Credits

All sections except F and G were written by ARM William Kolodnicki.

Sections F and G were prepared by Refuge Biologist R.W. Parris, PhD.

OYSTER BAY

OYSTER BAY NATIONAL WILDLIFE REFUGE

Oyster Bay, New York

ANNUAL NARRATIVE REPORT

Calendar Year 1993

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

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I. EQUIPMENT AND FACILITIES

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INTRODUCTION

Oyster Bay National Wildlife Refuge is located on the north shore of Long Island in eastern Nassau County. It is twenty miles east of New York City and five miles to the west of the Target Rock NWR. The waters and marshes of Oyster Bay NWR surround Sagamore Hill National Historic Site, home of the Theodore Roosevelt, founder of the first National Wildlife Refuge.

The Refuge was established in 1968 for migratory birds, particularly waterfowl. It consists of 3,209 acres of bay bottom and salt marsh, plus a small fresh water wetlands area. The major part of the Refuge is abundant with marine invertebrates, finfish and shellfish. The excellent water quality provides habitat for finfish and marine flora. The forage fishery attracts colonial nesting waterbirds, marine turtles and mammals (harbor and gray seals). Kemp's ridley, loggerheads, and an unusually high number of diamondback terrapins use the Refuge.

Over 126 bird species have been documented at the Refuge including 23 species of waterfowl. Peak waterfowl numbers of over 20,000 can be found, with over 3,000 black duck, 800 canvasback and frequently over 15,000 greater scaup in winter. The Mill Neck Creek and Frost Creek areas provide excellent breeding areas for black duck, clapper rail and osprey.

The Refuge receives heavy use from recreational boaters from May through September, numbering three thousand boats on peak weekends and a thousand boats a day during the week. Annual visits are estimated at 235,000. The only remaining commercial oyster farm/aquaculture operation on Long Island operates on the Refuge. It provides 90% of New York State's oysters.

Greater scaup in flight - the most common duck in winter at Oyster Bay NWR. RWP-1993.

A. HIGHLIGHTS

A town meeting was held with over 100 participants to discuss the Oyster Bay NWR and local concerns and issues (D.3).

The Refuge was visited by Under Secretary of the Interior Hayden on January 14th (D.3).

A tidal survey was completed at the Refuge by the National Ocean Service to delineate the Refuge's boundary - mean high water (D.4 and E.7).

Docks and various land use issues continue to be major concerns at the Refuge (D.4 and H.1). The Refuge continued to see many repairs to damaged docks and shoreline from the Nor'easter of December 1992 and experienced another severe Nor'easter in March 1993 (H.1.).

Waterfowl numbers peaked at over 12,000 ducks this December (G.3).

C. LAND ACQUISITION

3. Other

There was an effort this year to resolve the compatibility issues at the Stehli and Ransom beach tracts by promoting a land exchange between the Town of Oyster Bay and the Service.

PL Stewart and ARM Kolodnicki met with Supervisor Yevoli of the Town of Oyster Bay, NYSDEC, and U.S. Army Corps of Engineers (COE) to discuss renourishment of the Stehli and Ransom beach tracts of the Oyster Bay NWR. These beaches were damaged by the December 1992 and March 1993 storms. PL Stewart denied the Town's request to renourish the Refuge areas for recreational swimming and encouraged the Town to submit a letter of intent to give suitable wildlife habitat adjacent to the Oyster Bay NWR in exchange for these beaches. The issue was reported in the press and covered on television. Many local merchants were upset that the beaches are closed because of diminished business. The Town of Oyster Bay is concerned that the reverter clause in the Oyster Bay NWR deed between the Town and the Service will prohibit the exchange. Preliminary discussions with the Solicitor's Office did not indicate that to be true. The COE and the Service finally granted a permit to the Town only after they promised to pursue the land exchange. They have submitted a letter requesting a Solicitor's opinion on the reverter clause.

In addition, the issue became heated when political elements charged that the Service was penalizing the people of Oyster Bay by denying them use of their beaches. Senator D'Amato and Congressman Gary Ackerman made inquires into the issue. The issue is not resolved.

D. PLANNING

2. Management Plans

Complex staff met with representative of the Town of Oyster Bay to discuss the Town's Harbor Management Plan. Discussions were also conducted with the New York State Department of Environmental Conservation concerning its proposed management of Oyster Bay Harbor.

3. Public Participation

Project Leader Tom Stewart, Biologist R.W. Parris and ARM Bill Kolodnicki presented a program on the Oyster Bay NWR to over 100 participants in the Oyster Bay High School. The meeting was sponsored by Friends of the Bay. There were representatives from the Town of Oyster Bay, New York State, and Congressman's Ackerman's office. A general overview of the Complex's programs and issues such as compatibility were discussed. There was local press coverage and good audience participation.

The Refuge was visited by Under Secretary of the Interior Hayden on January 14th. Governor Hayden toured the Refuge by boat with Project Leader Tom Stewart to view the excellent winter waterfowl resources and discuss incompatibility problems.

4. Compliance with Cultural and Resource Mandates

Information was provided to Don Voroh's office in Washington D.C. on Oyster Bay compatibility problems.

Docks and other structures on the Refuge continue to be a major issue. RWP-1993

Project Leader Tom Stewart and ARM Bill Kolodnicki travelled to the Regional Office on several occasions to discuss Special Use Permit applications for dock construction at Oyster Bay NWR which had been denied by the Refuge. On several occasions the applicant failed to make the meetings in Hadley, Mass. because of poor weather.

Eighteen applications for Special Use Permits for dock and seawall construction and repair and dredging were received this past year. Terracciano Engineering received a permit to place a telecommunications cable under the Bayville Bridge. This high number of requests was due to coastal storm damage and the estimated repair cost on the Refuge level was $30,000 for 1993.

The Regional Director gave his final denial to an application to maintain a dock which had been constructed in 1986 without a Special Use Permit on Mill Neck Creek. The Service recommended the case to the U.S. Attorneys office for removal of the illegal structure maintained on the Refuge. The regional office survey team was very supportive with field visits and advice.

Section of groin put in by the Nassau County Department of Public Works to shore up damaged areas of West Shore Road on the border of the Refuge. RWP-1993

The Refuge was notified that legal action against the Department of the Interior had taken place for the denial of an application for a Special Use Permit to construct a dock on the Refuge. Project Leader Stewart and Assistant Regional Director Young gave depositions with the U.S. Attorney. Staff time was devoted to gathering information to support our defence. The staff also worked on removing another illegal dock.

Time was spent inspecting storm repairs and clean-up accomplished by the Town of Oyster Bay and Nassau County at the Refuge. Repairs were conducted along an approximate one mile border with the Refuge. Three site visits were conducted to evaluate storm repairs as well as a visit to Frost Creek to evaluate a breach to Long Island Sound caused by the winter storms.

ARM Kolodnicki met with the New York State Department of Conservation (NYSDEC) concerning the Jakcobson's Ship Yard N.Y.S. consent order Work Plan. Jakcobson's Ship Yard is located adjacent to the Oyster Bay and has some known contaminant problems. The Service remained for the meeting between Jakcobson's Shipyard and NYSDEC as an observer. The Cortland office of USFWS Ecological Services was briefed on the meeting. Refuge staff also attended an information meeting on the subject presented by NYSDEC in Oyster Bay. The public demanded better water quality testing during the remediation process which was the Cortland Field Office's recommendation.

A tidal survey was conducted on the Oyster Bay NWR by the National Ocean Service this past year. Refuge staff assisted in gathering information for the survey. The purpose of the survey was to document mean high water which is the legal definition of a large portion of the Refuge's border. The survey was completed and the results will allow the Refuge to better delineate the boundary in disputes with neighbors.

E. ADMINISTRATION

1. Personnel

ARM Bill Kolodnicki was appointed Acting Deputy Project Leader for three months with the departure of Deputy Barbara Pardo. The Target Rock and Oyster Bay NWRs office at Target Rock NWR was not staffed with an assistant manager during this time and for most of 1993. Administrative work for Oyster Bay NWR was largely handled out of the Wertheim NWR office by Manger Kolodnicki.

2. Youth Programs

ARM Bill Kolodnicki gave a presentation on piping plovers to over 200 students at Herricks High School, Herricks, N.Y., as part of an Earth Day Program.

5. Funding

Challenge grant proposals were received from the Town of Oyster Bay for the publication of a booklet entitled "The Bay Book and You" and an Ecopod Demonstration Project which will capture coliform, nitrogen and other pollutants carried by storm runoff into Oyster Bay Harbor. These projects were considered to mutually enhance the Oyster Bay NWR.

7. Technical Assistance

Refuge staff met with Louise Harrison of the New York Department of State. Ms. Harrison is with the Long Island Sound Coastal Management Program and is preparing management plans for areas such as Oyster Bay Harbor. The Oyster Bay NWR's programs and management plans were discussed. The state expressed a desire to work with the Refuge in resolving any state related coastal problems.

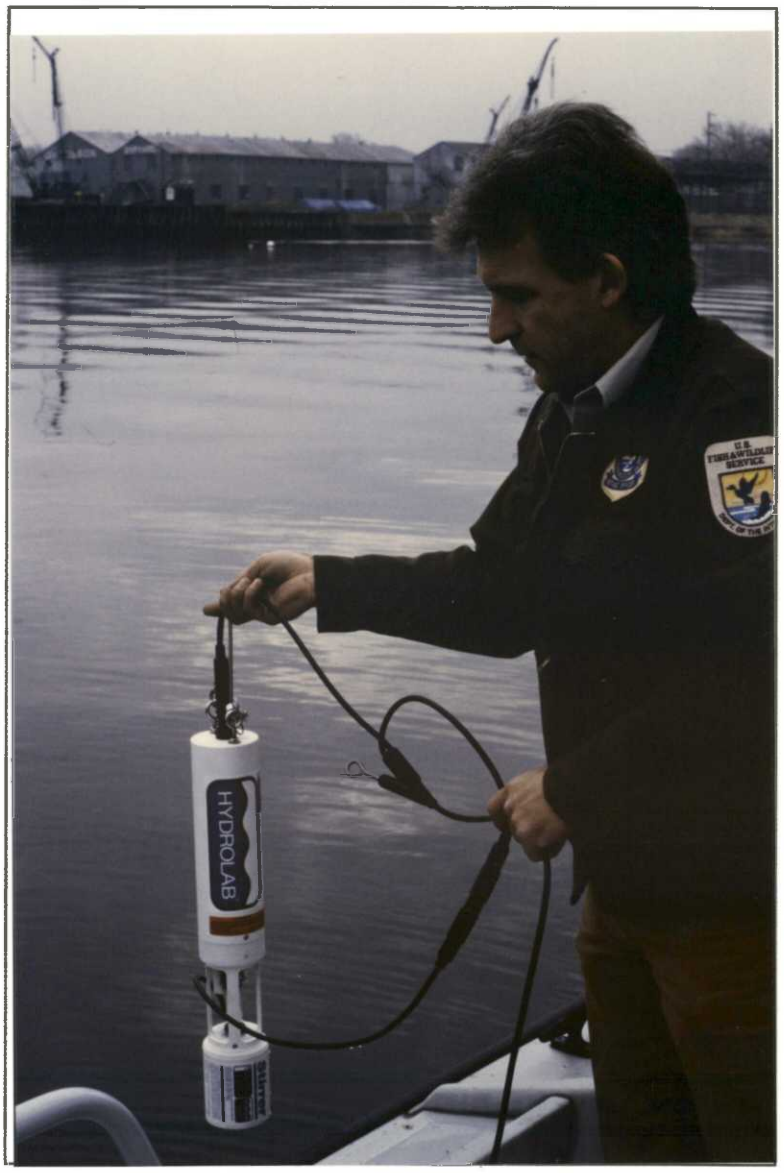
Acting Deputy Project Leader Bill Kolodnicki met with Cashin Associates and staff from the Town of Oyster Bay to discuss the Habor Management Plan and the Draft Memorandum of Understanding (M.O.U.). The entire MOU was reviewed and Cashin was given data on legal docks in Oyster Bay NWR.

Bill Drummond (Senior Surveyor), two National Ocean Service staff and Refuge staff installed, maintained and monitored eleven tide gauges to determine mean high water in the Refuge. The NOS report was published in November 1993. The mean high water demarcation assists in dock litigations and the Special Use Permit Process for dock repair.

ARM Bill Kolodnicki accompanied Congressman Ackerman, the Army Corp of Engineers staff, the Supervisors of Nassau County, Suffolk County, Huntington, Oyster Bay and various other officials on a boat tour of Long Island's north shore. The tour focused on proposed Army Corp projects to prevent coastal flooding in Bayville and Asharoken. The areas are near the Oyster Bay and Target Rock NWRs.

5. Research and Investigations

The Refuge is still awaiting the results from the 1992 field season for the contaminant study being conducted by the New York Ecological Service Field Office. Biological samples collected for contaminant survey during that field season included silversides and blue mussel.



EEO Marto using Hydrolab probe to measure various water parameters at the Refuge. RWP-1993

F. HABITAT MANAGEMENT

1. General

The Oyster Bay NWR is over three thousand acres in size and the largest Refuge on Long Island. The Refuge largely consists of subtidal habitats (2 to 9 m in depth) and linear stands on intertidal saltmarsh. High saltmarsh and freshwater wetlands occur on the Refuge but to a lesser extent. The Refuge is located off of Long Island Sound; the sheltered nature of the bay makes it extremely attractive as winter habitat for a variety of waterfowl species in particularly diving ducks. The bay also serves as an important nursery area for a variety of sport finfish and shellfish.

The Refuge this past year has been surveying select water parameters on a monthly basis at the Refuge. Fourteen separate stations were sampled with a Hydrolab for dissolved oxygen levels, salinity, conductance, pH and water temperature. This survey was initiated in part due to the known problems with anoxic conditions in western Long Island Sound.

Oldsquaw - the most common sea duck at Oyster Bay. RWP-1993

G. WILDLIFE

1. Wildlife Diversity

Over one hundred species of birds, principally those dependent on aquatic habitats, have been documented on the Oyster Bay NWR. The Refuge supports a diversity and an abundance of waterfowl during the winter months. The most conspicuous wildlife using the Refuge during the winter months is waterfowl. Aside from birds, Oyster Bay supports numerous marine species.

2. Endangered and/or Threatened Species

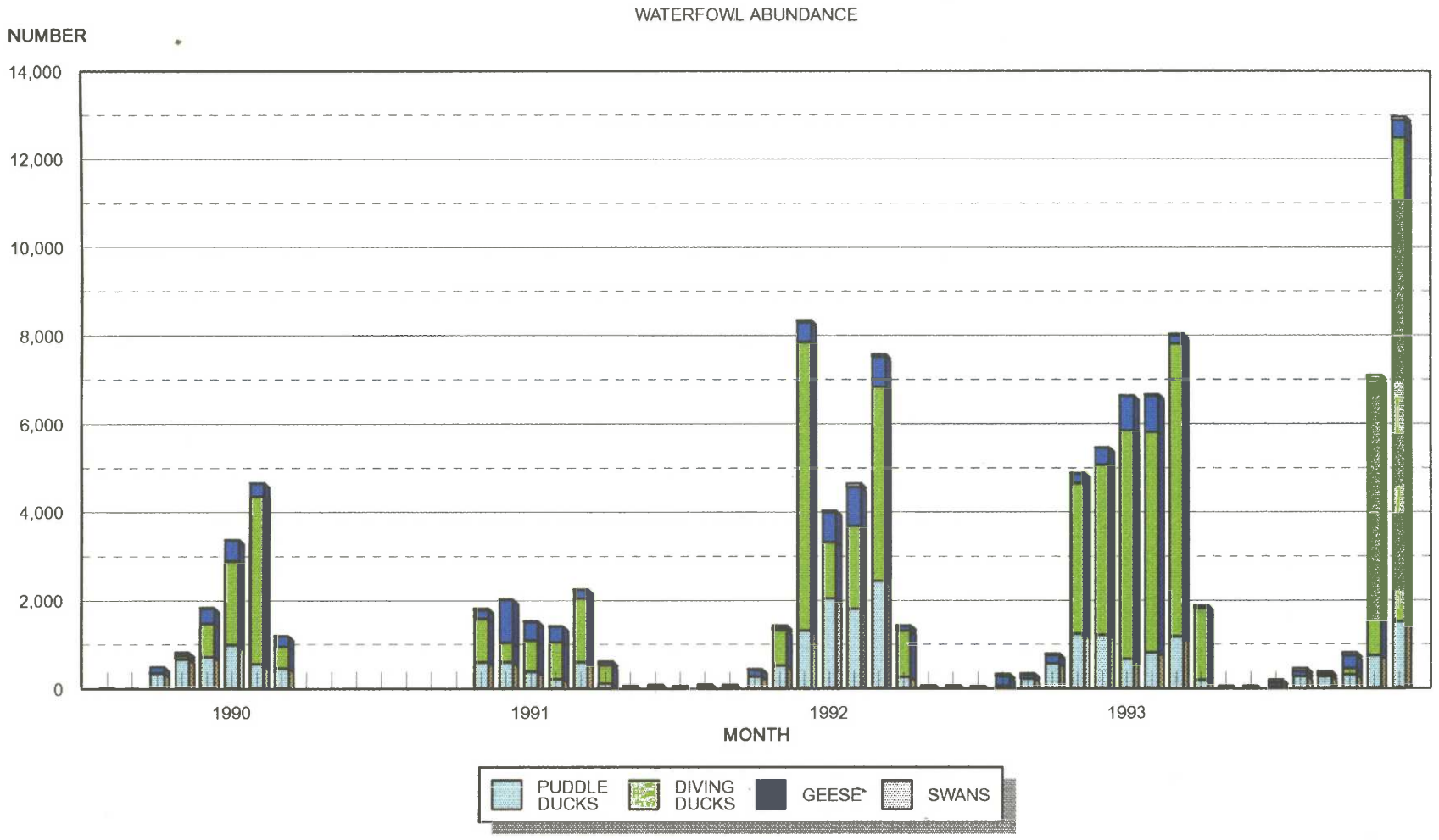
Federal and State designated endangered and threatened species known to use Oyster Bay NWR include the bald eagle, peregrine falcon, osprey, northern harriers, least tern, common tern, Kemp's ridley sea turtle and the loggerhead sea turtle. In 1992, aside from osprey and the tern species, none of these species were encountered on the Refuge. Peregrine falcons typically are encountered on Oyster Bay NWR during the autumn through spring and bald eagles sporadically visit the Refuge in winter. Osprey nested on the Refuge again this year and fledged three young. Northern harriers were periodically observed during spring and autumn passage at the Refuge. Sea turtles are difficult to detect on Oyster Bay unless victims of injury or cold stun.

3. Waterfowl

Waterfowl surveys are conducted semimonthly at the Oyster Bay NWR. The survey is typically conducted from a boat but can also be performed from ground observation points. For survey purposes the Refuge is divided into fourteen separate areas to facilitate record keeping and for separate analyses of species distribution and abundance.

Oyster Bay NWR has the heaviest winter waterfowl use of any of the Long Island NWRs. The numbers of waterfowl using Oyster Bay are lowest from May through August and starts to increase in September and October. Puddle ducks exhibit this early autumn increase and divers start increasing in November. Waterfowl numbers peak and remain high from December through March. Numbers decline in April. The figure on the following page indicates the monthly waterfowl use of the Refuge for the past five winters. Waterfowl numbers during the past three winters has greatly exceeded levels from the two earliest winters. The change is mainly due to the increase in both puddle and diving duck species; swans and geese have exhibited little change over this five year period. Peak waterfowl numbers this past year occurred in December when close to 13,000 waterfowl were detected using the Refuge. The New York State Department of State in their recent

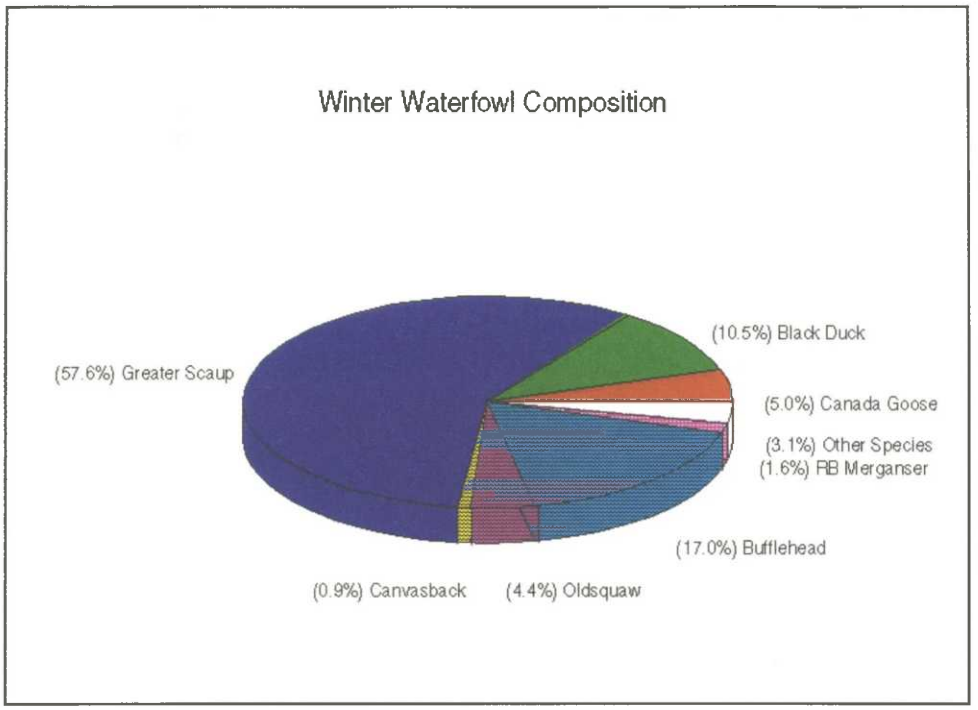
OYSTER BAY NWR



comprehensive coastal resource plan for Long Island Sound has singled out the Oyster Bay NWR as having the greatest waterfowl concentration on Long Island's north shore.

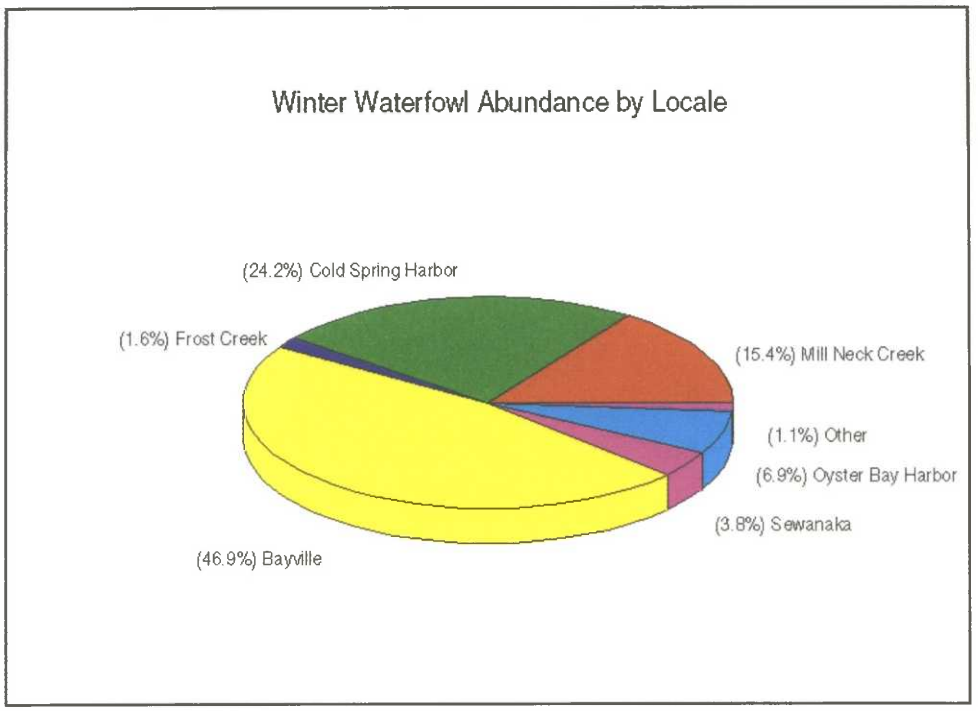
Flock of greater scaup on the wing at Oyster Bay. RWP-1993

Over twenty species of waterfowl use the Refuge. The most common species using the Refuge in winter include greater scaup, bufflehead and black duck. These three species comprise approximately eighty-five percent of all ducks using the Refuge. Greater scaup comprise more than half of all ducks using the Refuge, bufflehead make up close to twenty percent, and black duck - the most common puddle duck species - close to ten percent. Peak numbers in 1993 for these common species include 1500 for black duck, 2000 for bufflehead and 9000 for greater scaup. Canvasback peaked at six hundred birds. Other conspicuous species at the Refuge include oldsquaw, widgeon, gadwall, green winged teal, red breasted merganser, goldeneye, Canada goose and mute swan. Only one species, greater scaup, tended to occur in large flocks (> 1000 birds) on the Refuge. Species which occurred in intermediate sized flocks (between 100 and 1000 birds) included canvasback, black duck and Canada goose. Common species which occurred in small flocks (< 100 birds) included bufflehead, oldsquaw, red breasted merganser, and goldeneye.



Winter waterfowl composition at the Oyster Bay Refuge.

Waterfowl use was not uniform across the Refuge. The following figure indicates waterfowl use by major Refuge area. The areas of the Refuge which supported the most waterfowl use included Bayville, Cold Spring Harbor, Mill Neck Creek, Oyster Bay Harbor, Seawanaka and Frost Creek. The highest use area was the Bayville section of the Refuge - close to fifty percent of the waterfowl were documented at that portion of the Refuge. Species which dominated the use at Bayville included greater scaup, bufflehead, black duck, oldsquaw and red breasted merganser. The majority of the greater scaup on the Refuge used the Bayville section. The Bayville section also had the greatest use by bufflehead. The Cold Spring Harbor section had the second heaviest use at the Refuge. The principal species present included greater scaup, oldsquaw, bufflehead, black duck and goldeneye. Mill Neck Creek had the next greatest use and was dominated by greater scaup, black duck, canvasback and bufflehead. The Mill Neck Creek section had the greatest use by black duck and canvasback. The Oyster Bay Harbor and Seawanaka sections had together approximately eleven percent of the waterfowl use; dominant species included bufflehead, oldsquaw, greater scaup and red breasted merganser. The Frost Creek section of the Refuge principally supported black duck and widgeon use.



Waterfowl abundance by locale in winter at the Oyster Bay Refuge.

A waterfowl pair survey was conducted at the Frost Creek section of Oyster in May. The most common species detected in order of abundance were black duck, mallard and mute swan.

The four wood duck nest boxes at Mill pond and swamp were examined for use in August. One nest box was successfully used.

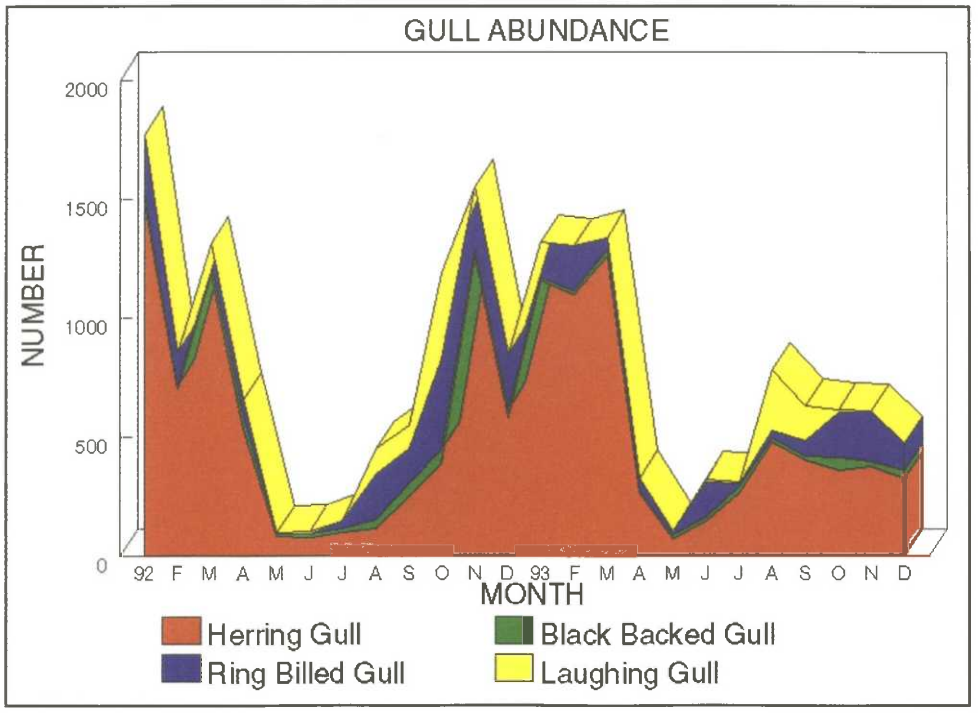
4. Marsh and Waterbirds

All waterbirds are counted during the semimonthly waterfowl surveys at Oyster Bay. The most common waterbird is the double crested cormorant; over one hundred and fifty were documented in the autumn. Although cormorants occur year round on the Refuge, their numbers are highest from April through October. Great cormorants occur at a low level during the winter months. Other waterbirds which use the Refuge include common loon, red throated loon, horned grebe, pied billed grebe, American coot, belted kingfisher, great blue heron, black crowned night heron, green backed heron, great egret and snowy egret. Heron numbers peaked in August when over one hundred and thirty were documented on the Refuge.

A clapper rail survey, using a playback tape, was conducted for the third consecutive year at the Frost Creek and Mill Neck Creek sections of Oyster Bay. A quarter of all sampling stations had clapper rails responding - a slight increase from last year.

5. Shorebirds, Gulls, Terns and Allied Species

Gulls are common on the Refuge. The town of Oyster Bay uses a herring gull as the town emblem. Gulls normally reach a maximum of approximately 1500 birds during the winter months - see following figure. Herring gulls are the most common in winter and decline during the warmer months. Great black backed gulls are also present year round but at much lower numbers than herring gulls. Ring-billed gulls exhibit a pattern similar to herring gulls but at a lower level. Laughing gulls and Bonaparte's gulls also use the Refuge, in summer and winter respectively. Laughing gull use has increased in the last few years, during the summer of 1993 close to 250 gulls were on the Refuge.



Gull abundance at the Oyster Bay NWR.

Tern use of Oyster Bay NWR occurs from May through October. Common and least tern use is heaviest from May through August. Forster's tern were present on the Refuge in good numbers in September and October.

Forster's tern - the most common tern in autumn at Oyster Bay. RWP-1993

Seven species of shorebirds were detected this year at the Refuge. The most common included black bellied plover, dunlin, greater yellowlegs, least sandpiper and spotted sandpiper.

6. Raptors

A nesting pair of osprey, a New York State designated threatened species, at Mill Neck Creek fledged three young. Other raptor species observed at Oyster Bay in 1993 included northern harrier, red-tailed hawk, American kestrel, merlin and sharp-shinned hawk.

7. Other Migratory Birds

A breeding songbird survey was not conducted at the Refuge this year unlike most other Complex Refuges. A survey will likely be performed in the saltmarshes of the Frost Creek section in 1994.

9. Marine Mammals

Harbor seals were observed twice on the Oyster Bay Refuge during March. Seal (harbor and grey) use of Long Island has been increasing in the past few years.

10. Other Resident Wildlife

The northern subspecies of the diamondback terrapin is common at the Oyster Bay Refuge particularly in the Frost Creek and Mill Neck Creek sections. The Refuge is considered to have one the largest terrapin populations on Long Island.

Although Oyster Bay is noted for its concentration of greater scaup and black ducks other waterfowl also make use of the Refuge. RWP-1993

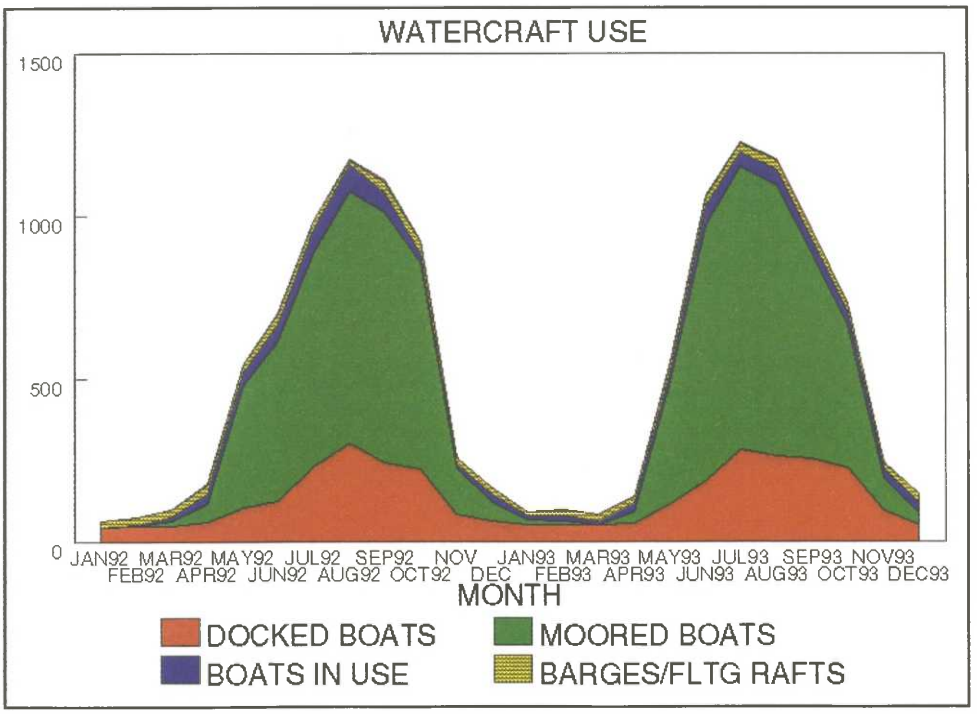
H. PUBLIC USE

1. General

The Oyster Bay NWR receives the highest public use on any of the Long Island Refuges.

An estimate of approximately 250,000 people visited Oyster Bay during the past year. Most of the use involves boating, fishing and water-related recreational activities. As in past years, most use occurs during the warmer months.

Similar to last year, information was collected on the number of moored boats, docked boats, boats in use on the water, and barges on the Refuge. The Refuge because of its sheltered nature off of Long Island Sound is a popular location for boating activity. The information was collected during weekdays once a month during low use times. The following figure indicates watercraft use of the Oyster Bay Refuge during the past two years. Both years exhibited similar use and seasonal patterns of watercraft use. Heaviest use occurred from May through October with a peak from July to September. This information is collected because of perceived wildlife disturbance problems with watercraft.



Monthly watercraft use of the Oyster Bay NWR.

17. Law Enforcement

Law enforcement patrols are typically conducted during the semimonthly waterbird surveys at the Oyster Bay NWR but also occur when specifically requested by other agencies or members of the public.

20. Other Programs

ARM Bill Kolodnicki presented a program on the Refuge to fifty members of the Oyster Bay Anglers. There was much interest in the Service's involvement in the harbor and the status of winter flounder. The anglers expressed concern that oyster and clam harvesting accomplished by large suction dredges was impacting the winter flounder.

25' Whaler used for biological surveys and patrols at the Refuge. EEO (Captain) Marto looks for his crew. RWP-1993

I. EQUIPMENT AND FACILITIES

4. Equipment Utilization and Replacement

The Maintenance staff spent time on the upkeep of both the 25' and 18' Boston whalers both of which are used on the Oyster Bay NWR.

The Town of Oyster Bay once again gave the Service courtesy mooring and docking privileges at the Roosevelt Marina. This assists the Service considerably in having a vessel ready for emergency response on the North Shore of Long Island. At the end of the year it was necessary to dry dock the 25 foot whaler because of the low number of staff available to provide the needed winter maintenance to the vessel. The vessel will probably go into the water in April 1994. A smaller 18' Whaler was used during the dry docking period.

J. OTHER ITEMS

4. Credits

This report, except for sections F and G, was written by Refuge Operations Specialist William J. Kolodnicki.

Sections F and G were prepared by Wildlife Biologist R.W. Parris, Ph.D.

AMAGANSETT

AMAGANSETT NATIONAL WILDLIFE REFUGE

East Hampton, New York

ANNUAL NARRATIVE REPORT

Calendar Year 1993

U.S. Department of Interior
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NATIONAL WILDLIFE REFUGE SYSTEM

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I. EQUIPMENT AND FACILITIES

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L. INFORMATION PACKET - - (inside back cover)

INTRODUCTION

The Amagansett National Wildlife Refuge is situated on the Atlantic Ocean on the south fork of Long Island, Town of East Hampton. The Refuge is the eastern most Refuge of the Complex and is located thirteen miles from the Morton NWR. Amagansett was acquired in 1968 via transfer from the US Coast Guard; the area had been used as a lifeboat station. The Refuge consists of 36 acres of barrier beach and primary dune habitat situated in a unique double dune barrier beach area. Several species of plants indigenous to the barrier beaches of the mid-Atlantic coast are found at the Refuge in their natural environment. The area is bordered to the west by undeveloped land owned by the Nature Conservancy. Low density housing occupies the remainder of land surrounding the Refuge. Amagansett is of special significance in the protection and management of a fragile shore habitat and its associated wildlife.

Storm damage to primary dune at the Refuge. RWP-93

B. CLIMATIC CONDITIONS

The climatic conditions were the same as those reported for the Wertheim NWR.

E. ADMINISTRATION

1. General

No Refuge staff are permanently stationed at Amagansett NWR. Refuge staff usually visit the Refuge monthly coupled with visits to other eastern Refuges such as Morton and Conscience Point NWRs.

4. Volunteer Program

This year, there was no volunteer activity at Amagansett. Because Amagansett is distant from other Refuges it frequently receives only sporadic visits and attention from Complex staff. Many activities such as vegetation surveys, covertyping, wildlife surveys including autumn raptor counts, and public use programs could be conducted using the volunteer program. In 1994, greater efforts will be expended to attract and use volunteers, particularly from local schools, to monitor and enhance the Refuge.

F. HABITAT MANAGEMENT

21. General

The Refuge consists of a marine beach, primary dunes, a secondary dune/swale complex and scrub oak vegetation. Amagansett totals 36 acres, including a 1,342 foot stretch of ocean beach. The Amagansett Refuge is one segment in a 25 mile continuous barrier beach extending from Georgia Pond to Montauk Point, much of which has been developed into public and private bathing beaches. The Refuge beach is a typical straight barrier beach formed against gradually rising uplands. The primary dune line averages ten to fifteen feet in height and is largely intact. Beach grass dominates on these dunes. Species present on the secondary dunes include beach grass, beach pea, dusty miller, beach goldenrod and extensive

areas of false heather. Also behind the foredunes are areas of poison ivy, beach plum, bayberry and wild rose. This area grades into several small bogs which support cranberry, sundew, sedges, and various grasses. The most inland portion of the Refuge consists of scrub oak, choke cherry, bayberry, beach plum, wild rose, green briar, red cedar and bearberry.

During 1991, a major storm during Halloween caused damage to the base of the primary dune line by removing a sizable amount of sand but did not cause any major break in the dune line. In 1992, the December northeast storm damaged the primary dune line to an even greater extent by removal of sand and beach grass. During this storm, the ocean crested the dune line and filled the swales in the secondary dune area. Although no blowouts have occurred, the dune line has been significantly eroded.

Japanese knotweed, an exotic weed, grows along Bluff Road bordering the northern boundary of Amagansett. Several patches of Japanese knotweed are also present at the secondary dunes on the Refuge. Control of this nuisance species, which frequently forms large monotypic stands, by physical removal may be required in the near future.

9. Fire Management

A Fire Control Cooperative Agreement between the Service and the Amagansett Fire District is maintained. No fires occurred this year at the Refuge.

G. WILDLIFE

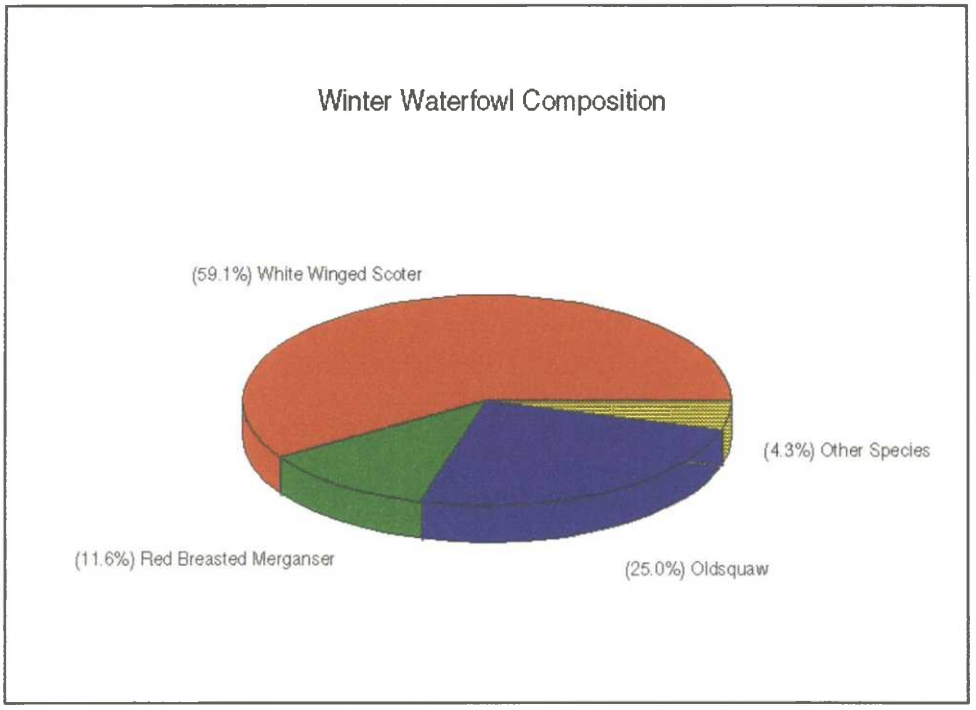
1. Wildlife Diversity

The Refuge serves an important function for raptors which migrate along the coast. Kestrels, merlins, peregrine falcons, sharp-shinned hawks, and Cooper's hawks have been documented at Amagansett during migration. Up to 100 American kestrels in one hour have been observed during the peak of autumn passage. Snowy owl and rough-legged hawk have also been documented during the winter months. The marine beach and swales provide habitat for a variety of sandpipers, plovers, gulls and terns. This Refuge offers little habitat value to waterfowl and larger waders due to its lack of emergent marshes. Breeding and wintering songbirds are typical of those using undisturbed grass/shrub habitats on Long Island. Ipswich sparrows have been documented in winter on the Refuge and at adjacent lands.

3. Waterfowl

During the final months of 1992, a monthly waterbird survey off the Refuge's beach was initiated, this survey was continued throughout 1993. The most common species detected

included oldsquaw, white winged scoter, surf scoter and red breasted merganser.



Winter waterfowl composition at the Amagansett NWR.

5. Shorebirds, Gulls, Terns and Allied Species

Herring gull, great black backed gull, and ring billed gull are common year round at Amagansett. Northern gannets can be frequently observed from the Refuge's beach in winter.

7. Other Migratory Birds

A breeding bird survey was conducted in June to document the songbird community at Amagansett. Twenty-one stations were sampled for three minute intervals and all birds detected were recorded. This is the third consecutive year the survey was done. A total of twenty-three species were documented; the low number of species is due to the Refuge's small size and habitat uniformity. The most common species included rufous sided towhee, mockingbird, robin, mourning dove, common grackle, common yellowthroat, prairie warbler, song sparrow, red winged blackbird, and bobwhite quail.

Mourning doves were surveyed in early June by a call count. Approximately half of all stations sampled had doves present.

10. Other Resident Wildlife

A bobwhite quail call count was performed in June in conjunction with the dove survey. A fourth of all stations sampled had quail present - a slight decrease from last year's results.

Several eastern hognose snakes were observed at Amagansett by Refuge staff. The hognose snake, once abundant on Long Island beaches is steadily declining in numbers.

H. PUBLIC USE

1. General

The Refuge's beach is open to the public. The estimated public use of Amagansett was estimated at approximately 25,000 visits annually. Most of the public use at Amagansett involves beach-oriented recreation such as swimming, sunbathing, picnicking and hiking.

7. Other Interpretive Programs

The Nature Conservancy uses the Refuge periodically to conduct environmental education programs.

17. Law Enforcement

The beach portion of Amagansett is open to the public but the dune area is closed to use. Occasionally, inappropriate public use occurs in the fragile dune area. This year no untoward incidents were reported.

J. OTHER ITEMS

4. Credits

This report was prepared by Wildlife Biologist R.W. Parris, Ph.D.

CONSCIENCE POINT NATIONAL WILDLIFE REFUGE

North Sea, New York

ANNUAL NARRATIVE REPORT

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U.S. Department of Interior
Fish and Wildlife Service
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INTRODUCTION

The Conscience Point National Wildlife Refuge is situated near North Sea, Suffolk County, New York. The Refuge is located on the north shore of Long Island's south fork and is approximately five miles west of the Morton National Wildlife Refuge. Conscience Point together with other wetlands in the area are collectively known by local residents as the Cow Neck Complex. The Refuge is sixty acres in size and consists of grasslands, oak-beech forest in a large pole growth stage, shrub habitats, kettle holes, freshwater marsh and salt marsh. Approximately one third of the Refuge is wetland, the remainder consists of uplands. The salt marsh consists of intertidal and high marsh and no significant stands of great reed occur. Conscience Point and surrounding wetlands support a high winter density of black ducks. Upland areas consist of mature forest and a maritime grassland, the latter a habitat of regional significance. The Refuge supports a considerable diversity of wildlife considering its size. The Refuge is bordered by other salt marshes of the Cow Neck Complex, low density housing, agricultural lands, and private game lands.

Autumn view of Conscience Point. Maritime grassland in immediate foreground and salt marsh in background. J. Hollingsworth - 93.

B. CLIMATIC CONDITIONS

The climatic conditions were the same as those reported for the Wertheim NWR.

C. LAND ACQUISITION

3. Other

A meeting was held in December at the Wertheim NWR between the Complex and various natural resource groups to facilitate land acquisition for the Complex. The participating groups decided to form the "Friends of the Long Island NWR Complex" whose purpose is to provide assistance in obtaining land acquisitions on Long Island. At the meeting, the acquisition of the Cow Neck marshes adjacent to the Conscience Point NWR was considered one of the priority acquisitions.

D. PLANNING

4. Compliance with Environmental and Cultural Resource Mandates

Staff from the Long Island Field Office - Ecological Services visited the Conscience Point NWR several times during the summer months to obtain water, sediment and biological specimens for contaminant analyses. This is part of the larger effort of completing the contaminant study of the Long Island NWR Complex.

E. ADMINISTRATION

1. General

No Complex staff are permanently stationed at the Conscience Point NWR. Personnel from the Complex headquarters at Wertheim usually visit the Refuge weekly in conjunction with visits to the Morton NWR.

F. HABITAT MANAGEMENT

1. General

The sixty acre Conscience Point Refuge consists of salt marsh, deciduous forest and grassland. Approximately one third of the Refuge is wetland and the other two thirds upland habitats. The salt marsh, which is adjacent to North Sea Harbor (an outpocketing of Little Peconic Bay) consists of intertidal and high marsh. This salt marsh is a segment of the larger Cow Neck Complex which is considered to be regionally significant for black ducks, both as breeding and wintering habitat - wintering black duck densities are among the highest for Long Island. The marshes and adjacent bays of the Refuge also serve as habitat for a variety of other waterfowl and waterbirds. The fields at Conscience Point are maritime grasslands - a regionally significant plant community found on outwash plains near the oceans or bays. Few such grasslands remain on Long Island. Dominant vegetation include little bluestem, common hairgrass, and poverty grass; prickly pear cactus is also common. Two species of regional endemic vegetation occur in Long Island's maritime grasslands - they include bush rockrose and Nantucket serviceberry, the latter a candidate for listing under the US Endangered Species Act.

Prickly pear cactus, a common component of the Refuge's grassland. RWP - 93.

2. Wetlands

Wetland aerial photographs from the New York State Department of Environmental Conservation delineating tidal and freshwater wetlands were acquired last year for the Refuge. These photographs will be used in the cover typing of the Refuge and on the Complex's mapping software.

The topography of several upland areas at the Refuge have the potential to be developed into waterfowl ponds by the use of low earthen dikes. These areas will be surveyed in the coming year to determine the feasibility of this project.

All songbird and other nest boxes in the marsh and upland areas were maintained by volunteers and Complex staff.

4. Grasslands

The Nature Conservancy established baseline sampling sites in 1989 to document the unique character of the Refuge's maritime grassland. The Conservancy is planning to use the data for one of their habitat fact sheets about maritime grasslands. The information obtained from this activity will be summarized in the coming year. Conscience Point has one of the largest maritime grasslands remaining on Long Island.

The rarity of the maritime grassland habitat type on Long Island is partly due to the rapidity which they develop into maritime shrubland and the lack of disturbance factors to reduce the woody vegetation. The Nature Conservancy is planning a prescribed burn at the Montauk Downs - another maritime grassland. This area is already well past the grassland stage and is largely shrubland. The area also supports the endangered plant - sandplain gerardia, which is believed to prefer maritime grasslands. The Complex will obtain information from the Conservancy on their burn and its effectiveness in restoring this grassland type and its suitability for maintaining the grasslands at Conscience Point.

Complex staff brush hogged a one acre section of the Refuge's grassland to reduce the amount of woody vegetation. This area will be monitored to gauge the impact of mowing on maintaining this grassland type.

EEO Marto brush hogging a portion of the Refuge's grassland. MG - 93.

9. Fire Management

A Fire Suppression Cooperative Agreement is maintained between the Fish and Wildlife Service and the North Sea Volunteer Fire Department. Initial attack for wildfires will be carried out by the North Sea Department and Refuge staff. No fires occurred this year at the Refuge.

G. WILDLIFE

1. Wildlife Diversity

Over one hundred and fifty species of birds and twenty mammalian species have the potential to occur at Conscience Point. The Refuge only supports a limited number of breeding bird species largely due to its small size and lack of forest cover but it does

support a variety of avian species dependent on grasslands, shrub and edge habitats, and salt marsh.

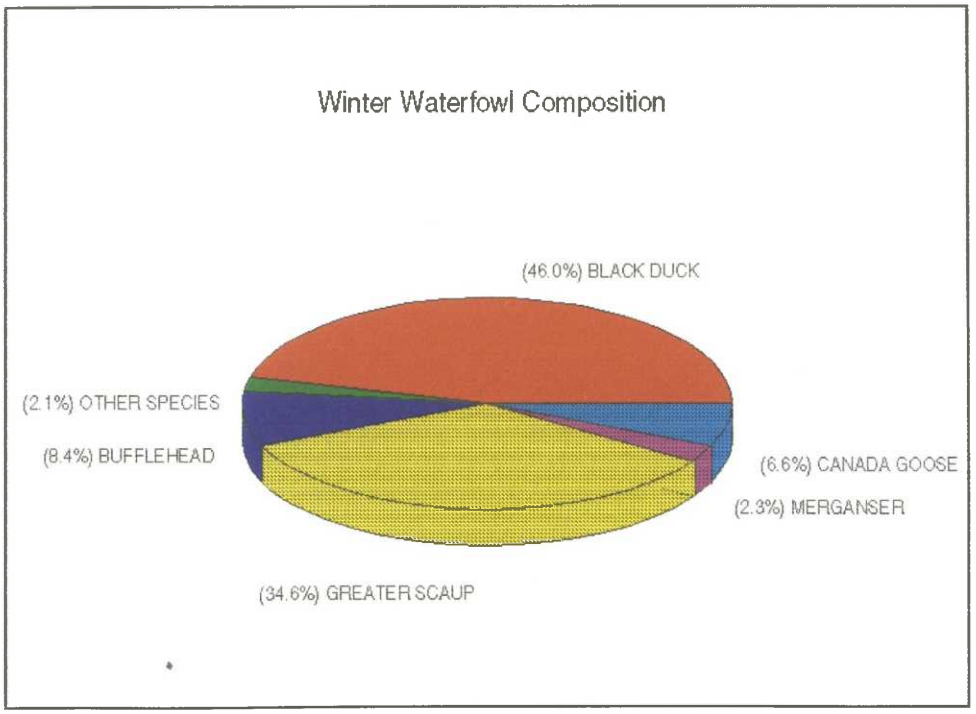
2. Endangered and/or Threatened Species

Least terns and common terns, New York State designated endangered and threatened species respectively, were frequently observed foraging at the Refuge's aquatic habitats. Peak numbers occurred in May.

Ospreys, a New York State designated threatened species, were commonly observed from March through August roosting in trees and foraging at aquatic habitats on the Refuge. Several areas on the Refuge would probably be suitable for the placement of a nesting platform.

Northern harriers, a New York State designated threatened species, were observed infrequently foraging at the Refuge's grasslands and marshes.

3. Waterfowl



Waterfowl composition during winter at the Conscience Point NWR.

Waterfowl surveys were conducted for the third consecutive year at the Refuge. Although these surveys have been performed in previous years they were done sporadically. The Cow Neck Area where Conscience Point is located is known for its high concentration of black ducks. Waterfowl numbers are highest during the colder months and decline during the warmer months. Black ducks by far were the predominant waterfowl species using the Refuge (see following figure). Other common species using Conscience Point include bufflehead, greater scaup, Canada goose, red breasted merganser, and mallard.

4. Marsh and Waterbirds

All marsh and waterbird species encountered during the semimonthly waterfowl surveys at the Refuge were also recorded this year. Double crested cormorants and horned grebes were the most common waterbird species encountered.

A clapper rail survey was conducted at the Refuge in June by using a playback tape. Eight stations were sampled and no rails were detected for the third straight year. This was surprising since the Conscience Point salt marsh has an abundant population of fiddler crabs.

The most common long legged waders at the Refuge are snowy egrets, great blue herons, great egrets and green-backed herons.

5. Shorebirds, Gulls, Terns and Allied Species

Gulls and terns are frequently observed at the Refuge. Herring and great black backed gulls are the most common gull species and least terns the most common tern.

Potential singing grounds for American woodcock at the Refuge were checked for occupancy in April. No woodcock were detected.

6. Raptors

Species of raptors observed at Conscience Point include osprey, red tailed hawk, American kestrel, screech owl, great horned owl, sharp shinned hawk, northern harrier and rough legged hawk.

7. Other Migratory Birds

The mourning dove survey was completed in early June. The survey consists of recording all doves detected at twenty-four points on the Refuge. Doves were documented at forty-six percent of the sites. Doves have exhibited a steady increase in numbers at Conscience Point for the past three years.

A breeding bird survey was conducted at Conscience Point for the third year. The survey consists of twenty-four stations and all birds detected within three minutes are recorded for each station. The birds with the highest frequency of occurrence at the Refuge include tree swallow, bobwhite, red winged blackbird, prairie warbler, yellow warbler, yellowthroat, robin, catbird, tufted titmouse, barn swallow, grackle, house finch and sharp tailed sparrow.

Seven of the eight available songbird nest boxes were used by tree swallows this summer.

10. Other Resident Wildlife

A track count was conducted in mid-winter to monitor the abundance of select species of mammals. The most common species detected in order of abundance were white tailed deer, gray squirrel, eastern cottontail and red fox. The number of tracks for deer were similar to results from previous years and the highest for any Long Island Refuge.

Refuge Biologist by red cedar heavily browsed by deer. J. Hollingsworth-93.

Bobwhite quail were detected at thirty-eight percent of the stations on the survey route - the highest frequency for any Refuge this year.

H. PUBLIC USE

1. General

Public use of the Refuge is allowed, with a special use permit, by school and conservation groups involved in wildlife oriented activities. However, the nearby town-owned Conscience Point Scenic Outlook affords the public a magnificent vista across North Sea Harbor of the Refuge's maritime grassland and salt marsh. The scenic outlook is an excellent location for viewing white-tailed deer in the Refuge's grasslands and waterfowl and waterbirds entering and exiting the marsh. Public activities at Conscience Point this year were limited to Audubon Christmas and breeding bird counts.

17. Law Enforcement

Aside from some isolated incidents of trespass there were no major law enforcement incidents at Conscience Point this year.

I. EQUIPMENT AND FACILITIES

3. Major Maintenance

The extreme high tides of the northeast storm in December 1992 deposited approximately thirty tons of debris on Conscience Point's salt marsh. The debris consisted of broken boats, propane tanks, floating docks, hunting blinds, patio furniture, marine lumber and plastic debris. During this year, rather than removing all the debris at once the material was removed one truck load at a time beginning during the warmer months. Starting in late autumn, large items were cut up using chain saws and hauled from the site. Although the majority of debris has been removed from the Refuge additional work remains to be completed in 1994.

Access to Conscience Point is provided by an improved dirt road on the Refuge which

intersects with the County Road - North Sea Road. A pipe gate was finally added to this improved dirt road to control unauthorized access. Although trespass and other untoward incidents are uncommon at this Refuge, the new gate will minimize such activities.

J. OTHER ITEMS

4. Credits

This report was prepared by Biologist R.W. Parris, Ph.D.

LIDO BEACH

LIDO BEACH WILDLIFE MANAGEMENT AREA

Hempstead, New York

ANNUAL NARRATIVE REPORT

Calendar Year 1993

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L. INFORMATION PACKET - - (inside back cover)

INTRODUCTION

Lido Beach Wildlife Management Area (WMA) is located on the south shore of Long Island in the Town of Hempstead, Nassau County, New York. The Wildlife Management Area is situated approximately 20 miles east of New York City. Lido Beach WMA is situated in the vicinity of dense residential development. South of the Management Area is a public bathing beach, to the west is a golf course, to the north is Hempstead Bay, and to the east is the SEALINK Environmental Education Center.

Lido Beach WMA consists of 22 acres of salt marsh and shrub thickets on the bay side of Long Beach, a barrier island of Long Island. Lido Beach WMA is part of the Hempstead estuary which is important for waterfowl, colonial nesting wading birds, raptors and shorebirds. Lido Beach WMA, as part of the much larger Hempstead Bay, is considered a significant coastal habitat by the USFWS Northeast Estuary Program. The Estuary Program has suggested that the entire Hempstead Bay be considered for inclusion in the USFWS National Refuge System.

The Wildlife Management Area was obtained in 1969 in a transfer of federal property from the Department of the Army which recognized the area's "particular value in carrying out the national migratory bird management program".

Hempstead Bay shoreline of the Lido Beach WMA saltmarsh KJ '93

A. HIGHLIGHTS

Monthly surveys of waterfowl, marsh and waterbirds, shorebirds, gulls, terns and allied species were initiated at the Refuge (Section G.3, G.4, G.5).

B. CLIMATIC CONDITIONS

Climatic conditions at Lido Beach NWR are similar to those at Wertheim NWR.

D. PLANNING

4. Compliance with Environmental and Cultural Resource Mandates

USFWS Ecological Services - Long Island Field Office conducted sampling at the Lido Beach WMA as part of a contaminants study for the Long Island NWR Complex.

Environmental Contaminants Specialist Charles Merckel inspecting the Lido Beach WMA as part of Ecological Service's sampling of the area. KJ '93

E. ADMINISTRATION

1. Personnel

Lido Beach Wildlife Management Area is administered out of the Seatuck NWR which is located approximately 25 miles to the east. Kathryn Jahn is the Assistant Refuge Manager for the Seatuck NWR.

5. Funding

There are no separate funds for Lido Beach WMA. Funds to operate the Management Area are derived from the budget for Wertheim NWR.

G. WILDLIFE

1. Wildlife Diversity

Hempstead Bay, of which Lido Beach WMA is a part, is one of the largest undeveloped coastal wetland ecosystems in New York. The Bay is noted for its impressive concentrations of waterfowl,long-legged waders, terns and shorebirds. Lido Beach WMA, though small in size and only a modest portion of the Bay, provides important habitat for wetland dependent wildlife.

The saltmarsh of Lido Beach WMA consists of intertidal and high marsh, and mud flats. The saltmarsh and adjacent bay provide habitat for a diversity of waterfowl, wading birds and shorebirds. The shrub thickets of Lido Beach WMA consist of mulberry, groundsel, bayberry and great reed. The shrub thickets provide roosting habitat for a variety of long-legged wading birds, particularly black crowned night herons.

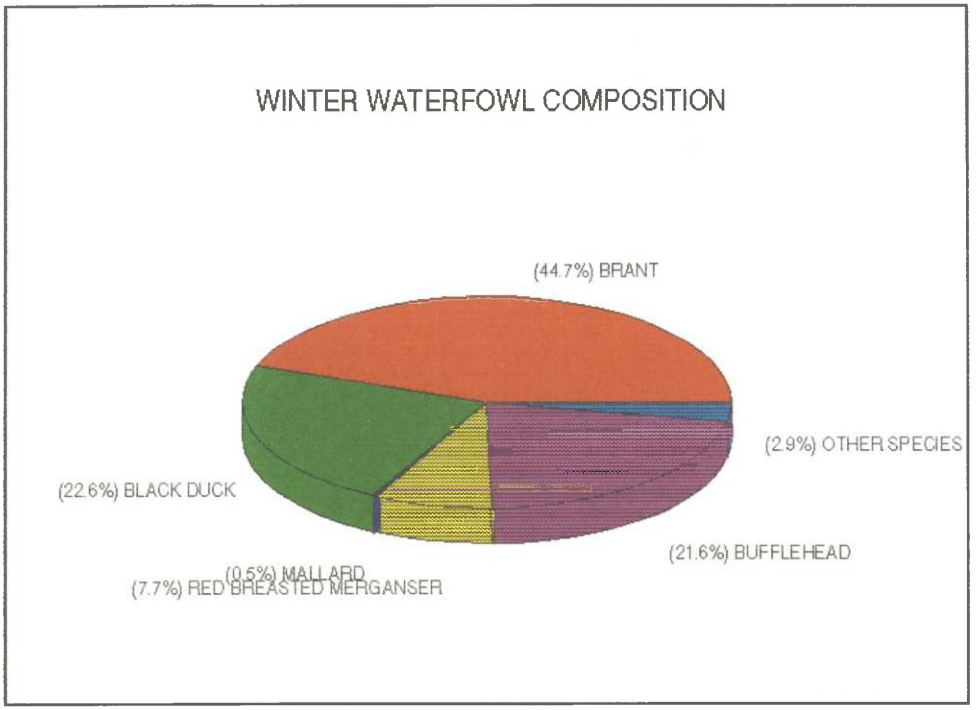
2. Endangered and/or Threatened Species

Common tern and least tern, New York State threatened or endangered species, were observed during May, June, and July. Osprey, a New York State threatened species were observed in August. Northern harrier were documented at Lido Beach WMA in December.

3. Waterfowl

Monthly waterfowl and waterbird surveys of Lido Beach WMA were initiated in April 1993.

Three species of ducks and two species of geese were observed during these surveys. Waterfowl species present in greatest number in 1993 were Canada goose, brant, and black duck.



4. Marsh and Waterbirds

Monthly surveys of marsh and waterbirds at Lido Beach WMA were initiated in April 1993. Eight species of herons, egrets and ibises were observed during the waterbird surveys. Black crowned night heron, snowy egret, glossy ibis, great egret, green backed heron, great blue heron, little blue heron, and American bittern were observed during these surveys. Black crowned night heron, snowy egret, and glossy ibis were most common. On the August and September surveys a total of twelve and ten black crowned night herons were observed respectively. Fourteen glossy ibis were observed during the May survey. Snowy egret were present May through September. Other marsh and waterbird species observed during the surveys included double crested cormorant, great cormorant, osprey, northern harrier and belted kingfisher.

5. Shorebirds, Gulls, Terns and Allied Species

Monthly surveys of shorebirds, gull, terns, and allied species at Lido Beach WMA were

initiated in April 1993. The Hempstead Harbor area is known for its concentrations of shorebirds during migration.

Egrets foraging in saltmarsh panne. KJ 93

Twelve species of plovers and sandpipers were observed during the surveys: greater yellowlegs, least sandpiper, willet, black-bellied plover, killdeer, lesser yellowlegs, ruddy turnstone, dunlin, semipalmated plover, spotted sandpiper, American oystercatcher, and semipalmated sandpiper.

Four species of gulls - herring, ring-billed, greater black-backed, and laughing were observed during these surveys. Herring gulls were the most common.

Three species of terns - common, least and royal - were observed during the surveys. Royal terns were observed during July; common and least terns were observed during May, June, and July.

6. Raptors

Harrier were observed at Lido Beach WMA in December. Osprey were observed in August.

H. PUBLIC USE

1. General

The public use of the Management Area is primarily through SEALINK Environmental Education Center and is not open to use, except by special use permit, by the general public.

2. Outdoor Classrooms - Students

The Long Beach School District uses the Lido Beach WMA for environmental education activities.

J. OTHER ITEMS

4. Credits

This section on Lido Beach WMA was authored by ARM Kathryn Jahn.

SAYVILLE NATIONAL WILDLIFE REFUGE

West Sayville, New York

ANNUAL NARRATIVE REPORT

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

I. EQUIPMENT AND FACILITIES

J. OTHER ITEMS

K. FEEDBACK

L. INFORMATION PACKET - - (inside back cover)

INTRODUCTION

Sayville National Wildlife Refuge is located in West Sayville, New York about four miles inland from Great South Bay.

Sayville NWR originated in 1992 when a 25.9 acre parcel of vacant land was transferred to the U.S. Fish and Wildlife Service from the General Services Administration (GSA). GSA had previously received the property from the Connetquot Central School District Board of Education. This parcel is bordered on the north by an elementary school and small industry, by residential development on the east, by BOCES property on the south, and by athletic fields on the west.

This 25 acre parcel is upland consisting primarily of pitch pine and scrub oak stands with interspersed fields. The parcel is adjacent to one of only ten known populations of the endangered plant - sandplain gerardia. It is felt that the 25 acre Refuge has excellent potential to be managed for this endangered plant.

The transfer of this 25 acre parcel was pursuant to Public Law 537 for wildlife purposes and Public Law 100-478, the Endangered Species Act.

B. CLIMATIC CONDITIONS

Climatic conditions at Sayville NWR are similar to those at Wertheim NWR.

C. LAND ACQUISITION

3. Other

The 25.947 acre parcel of vacant land acquired in 1992 is in close proximity to, and was once a part of, a 101 acre site owned by the Federal Aviation Administration (FAA) which contains the globally endangered sandplain gerardia. The 25 acre site is a potential transplant site for the sandplain gerardia. This land is referred to as Tract 20 in the Sayville National Wildlife Refuge.

The 101 acre site noted above remains under consideration for addition to the National Wildlife Refuge System. Congressman Hochbrueckner has been active in seeking to have the FAA remove the abandoned buildings on the site before that tract is conveyed to the Service. Some portions of the property contain PCB contaminated soil. The FAA has been advised by the Service that no transfer of the property will occur until all contaminants are identified and removed.

D. PLANNING

4. Compliance with Environmental and Cultural Resource Mandates

USFWS Ecological Services - Long Island Field Office conducted sampling at the Sayville NWR as part of a contaminant study for the Long Island NWR Complex.

E. ADMINISTRATION

1. Personnel

Sayville NWR is administered out of Seatuck NWR which is located about 10 miles to the west. Kathryn Jahn is the Assistant Refuge Manager for Seatuck NWR.

5. Funding

There are no separate funds for Sayville NWR. Funds to operate the Refuge are derived from the budget for Wertheim NWR.

G. WILDLIFE

2. Endangered and/or Threatened Species

The sandplain gerardia, Agalinas acuta, was listed as an endangered species under the provisions of the Endangered Species Act of 1973, as amended, on September 7, 1988. This plant is known to occur at two sites on Cape Cod; six sites on Long Island; one site in Baltimore County, Maryland; and, one site in Washington County, Rhode Island. The overall plant population has declined from 49 historical records to the ten populations remaining today. The population decline of this species can be attributed to the loss and degradation of suitable habitat, caused by increased development, vegetative succession, and changing historical disturbance regimes.

One site at which the sandplain gerardia is found on Long Island is the 101 acre site proposed for addition to Sayville NWR. The 25 acre parcel acquired in 1992 is a possible transplant site for the sandplain gerardia.

H. PUBLIC USE

1. General

Sayville NWR is not open to the public.

J. OTHER ITEMS

4. Credits

This section on Sayville NWR was authored by ARM Kathryn Jahn.

U.S. Fish and Wildlife Service

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

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

For further information please contact:

Refuge Manager
Wertheim National Wildlife Refuge
P.O. Box 21
Shirley, New York 11967
(516) 286-0485

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

The Long Island National Wildlife Refuge Complex

New York

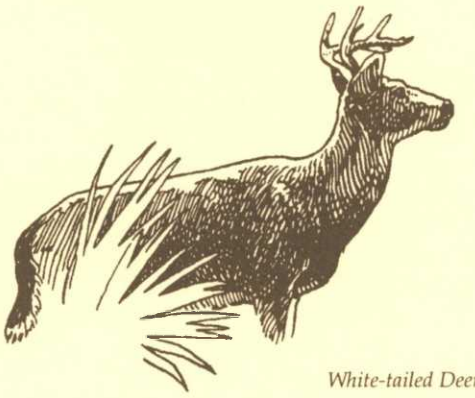
Welcome...

...to the Long Island National Wildlife Refuge Complex, U.S. Fish and Wildlife Service. The Complex is comprised of seven National Wildlife Refuges and one Wildlife Management Area. These eight units represent many of the habitat types found on Long Island which are important to migratory birds and other wildlife. Long Island's strategic location in the Atlantic Flyway provides important nesting, wintering, and migratory stop-over areas for hundreds of bird species, particularly those dependent on aquatic habitats. Each area of the Complex is unique and offers a diversity of habitats and wildlife.

Public access to the Refuges is limited. Wildlife-oriented activities such as environmental education, hiking, wildlife observation, photography, painting, fishing, and canoeing are encouraged on those Refuges which permit it. The accessibility of each Refuge is listed within. Inquiries regarding access by Special Use Permits may be made to the Refuge Manager.

As part of the National Wildlife Refuge System, the Long Island National Wildlife Refuge Complex is committed to the primary goal of managing the nation's wildlife. We do provide for public use when it does not interfere with our primary goal. We need your support in accomplishing this critical goal. Take Pride in America and YOUR nation's wildlife.

Visitors can expect to see wildlife at any time, but viewing is best during early morning and evening hours while taking a quiet, observant walk or boat trip. Remember, these animals are wild and shy. For the best chance to see them, bring binoculars and have patience.



White-tailed Deer

General Public Use Regulations

You are responsible for knowing the Complex regulations. Inquire at the Complex Headquarters (Wertheim Refuge) for activities not listed that you are considering, or for general information concerning the Long Island National Wildlife Refuge Complex.

- Visiting hours are from one-half hour before sunrise to one-half hour after sunset, daily.
- Access is limited to designated trails, parking and recreation areas; motor vehicles and bicycles (considered as vehicles) are allowed on designated roadways and parking lots only.
- Snowshoeing and cross country skiing are permitted on designated trails.

CAUTION: Deer ticks carrying Lyme disease are found on the Refuges. Proper precautions are suggested. Wear light-colored clothing, use insect repellent, and tuck pant legs in your socks.

Piping Plover

TO PROTECT YOU AND THE ENVIRONMENT THE FOLLOWING ARE PROHIBITED:

- Fires, including portable grills.
- Littering.
- Firearms, unless dismantled or cased and unloaded and they must not be removed from vehicle.
- Fireworks.
- Pets.
- Collecting and/or disturbing wildlife, plants, or minerals.

Wertheim National Wildlife Refuge
Shirley, New York

DESCRIPTION: Wertheim National Wildlife Refuge consists of 2,400 acres on the south shore of Long Island, including the Carmans River, one of the largest undeveloped estuaries on Long Island. The Refuge has a wide diversity of habitats, including oak-pine woodland, fields, ponds, a river, streams, bay, and fresh, brackish and saltwater wetlands. These habitats attract and support a remarkable diversity and abundance of wildlife. The Refuge is a haven for most species of wildlife found on Long Island, including waterfowl, deer, muskrats, fox, weasels, other small mammals, reptiles, amphibians, shorebirds, raptors, songbirds, and aquatic wildlife, including game fish.

HISTORY: The first inhabitants were the Unkechaug Indian tribe. They utilized the river for fishing, shellfishing, and for access to Fire Island and the Atlantic Ocean for fishing and whaling. Europeans later utilized the area to harvest firewood and salt hay. After acquisition by Cecile and Maurice Wertheim, much of the property was maintained in a natural state, but portions were managed to improve wildlife production and waterfowl hunting. The Wertheims donated 1800 acres in 1947 to begin what is today the Wertheim National Wildlife Refuge. The Refuge size has been increased with additional donations and a purchase with duck stamp funds.

MANAGEMENT: The Refuge is managed to protect the Carmans River estuary for use by migratory waterfowl, (particularly black ducks, mallards, wood ducks, and gadwalls) and other waterbirds. Other parts of the Refuge are managed to increase habitat diversity and wildlife productivity. Impoundments are managed to enhance wetland habitat, and forests openings are maintained to increase the variety of plant species utilized as wildlife foods. Grassland areas are improved to provide nesting cover for waterfowl and other wildlife. Nest boxes are maintained for a sizable population of wood ducks.

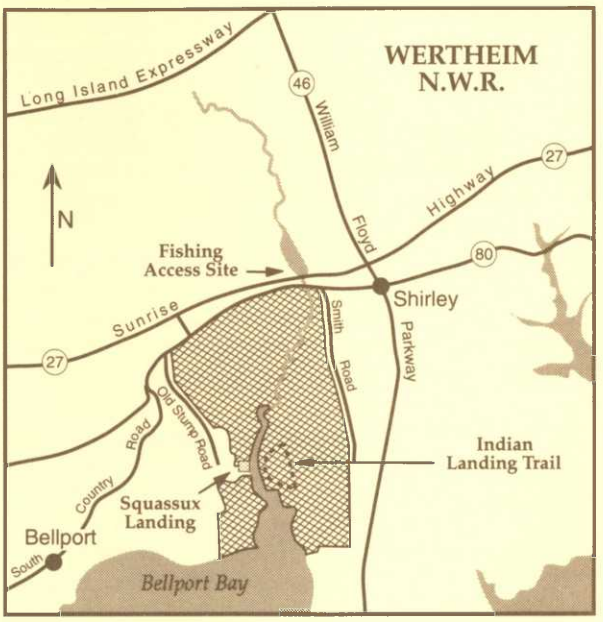
PUBLIC USE ACTIVITIES: Visitors may park at the office and walk along the entrance road (open Monday - Friday, 8 a.m. - 4:30 p.m.). The one mile Indian Landing Nature Trail is accessible from the river only and provides access through the interior of the forest.

Access for the wheelchair visitor is available from the parking lot to the office and interpretive kiosk.

Canoes and boats may be carried in and launched into the Carmans River at Beaver Dam Road and at the Fishing Access Site off Montauk Highway, which is cooperatively maintained with the New York State Department of Environmental Conservation.

Boats are permitted to land only at Indian Landing, the Fishing Access Site, and Beaver Dam Road (except for emergencies).

Fishing from the shore is permitted between the Sunrise and Montauk Highways and at the end of Beaver Dam Road. Wading while fishing is permitted from Sunrise Highway to the railroad bridge. Fishing from a boat is permitted anywhere except on the Big Fish Creek Impoundment. State regulations apply. Fishing from the Refuge bridge is prohibited.



DIRECTIONS: From Route 27A (Montauk Highway), turn south onto Smith Road, just east of the Carmans River. Go 1/3 mile and the entrance is on the right.

Wertheim NWR
P.O. Box 21
Shirley, New York 11967
(516) 286-0485

Scaup

Amagansett National Wildlife Refuge

DESCRIPTION: The Refuge was established in 1968 and is one of the few undeveloped coastal barrier beaches remaining on the Island. It provides habitat for shorebirds, songbirds (including the Ipswich sparrow), and raptors (including peregrine falcons) during migration. The 36-acre Refuge is primarily a double dune system containing hollows, swales, and beach. Several small bogs also are present. The flora is representative of a natural dune/beach environment.

MANAGEMENT: The Refuge is managed to protect beach and dune habitat in a natural state and the wildlife it supports.

PUBLIC USE ACTIVITIES: Entrance is by Special Use Permit only, except for the ocean beach, which is open to the general public.

DIRECTIONS: The Refuge is adjacent to Atlantic Avenue, off Route 27 in Amagansett.

Oyster Bay National Wildlife Refuge

DESCRIPTION: The 3,117-acre Refuge was established in 1968 and consists principally of marine habitats and includes tidal bottom up to mean high tide (bay), salt marsh, and a fresh water pond. Most species of Long Island's waterbirds have been document on this Refuge. During winter months, numerous waterfowl species can be observed at this Refuge. Up to seven thousand ducks have been reported for one survey during peak use. The most common waterfowl species include black duck, scaup, Canada goose, canvasback, bufflehead, mallard, goldeneye and merganser.

PUBLIC USE ACTIVITIES: The bay is used for wildlife observation, fishing, boating, swimming and shellfishing. Mill Pond also is open for fishing.

DIRECTIONS: Access to the Refuge is limited to private boats or rentals. Residents outside of Oyster Bay may enter the Refuge by boat from Long Island Sound. Visitors in vehicles may travel local roads adjacent to the Refuge. The Refuge does not provide parking.

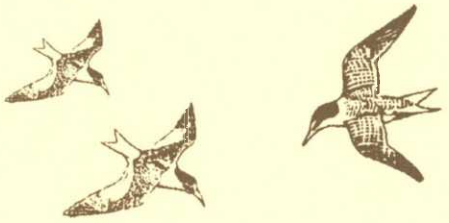
Mill Pond is located off W. Main Street. Onsite parking is not available.

Lido Beach Wildlife Management Area

DESCRIPTION: The area was established in 1969 and is almost exclusively a salt marsh that harbors waterfowl, shorebirds and wading birds.

MANAGEMENT: The area is maintained in a natural state to preserve wetlands and bay areas for migratory birds, especially waterfowl. It is managed cooperatively with the town of Hempstead.

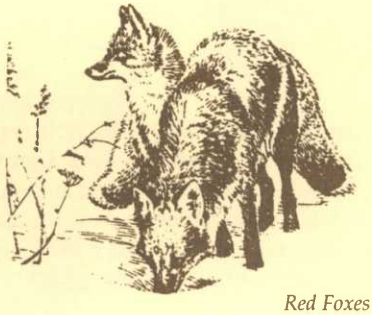
PUBLIC USE ACTIVITIES: The area is used for environmental education by the Long Beach School District.



Least Terns

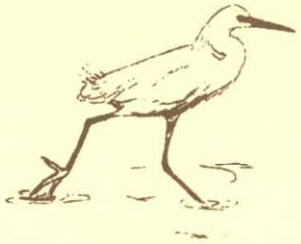
Morton National Wildlife Refuge
Sag Harbor, New York

DESCRIPTION: This 187-acre Refuge includes Jessups Neck and contains exceptionally diverse habitats. Sandy, gravel, and rocky beaches fringe the peninsula, and the wooded bluffs of Jessups Neck overlook the Peconic and Noyack Bays. The remainder of the Refuge is upland forest, brackish and freshwater ponds, saltmarsh, a lagoon and open fields. After years of agriculture and occasional fires, the land is reverting to a natural state. These habitats provide for a diversity of wildlife including deer, fox and other common mammals, reptiles, songbirds, waterbirds and raptors. Bay and sea ducks are common during winter and wading birds and shorebirds are easily observed in the warmer months. The adjacent bays are used by marine turtles.



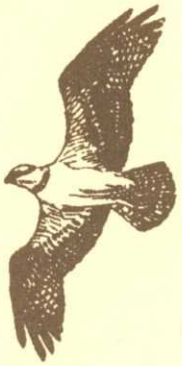
Red Foxes

HISTORY: Of the 13 principal Indian tribes on Long Island, the Montauks and the Shinnecocks once occupied what is now the Morton National Wildlife Refuge. In 1640, John Farrington, John Jessup, and other settlers from Lynn, Massachusetts founded the colony of South Hampton. The peninsula was named Jessups Neck when the land was deeded to John Jessup in 1679. Ownership of the area passed through two other families until it was donated to the U.S. Fish and Wildlife Service in 1954 by Elizabeth Morton.



Snowy Egret

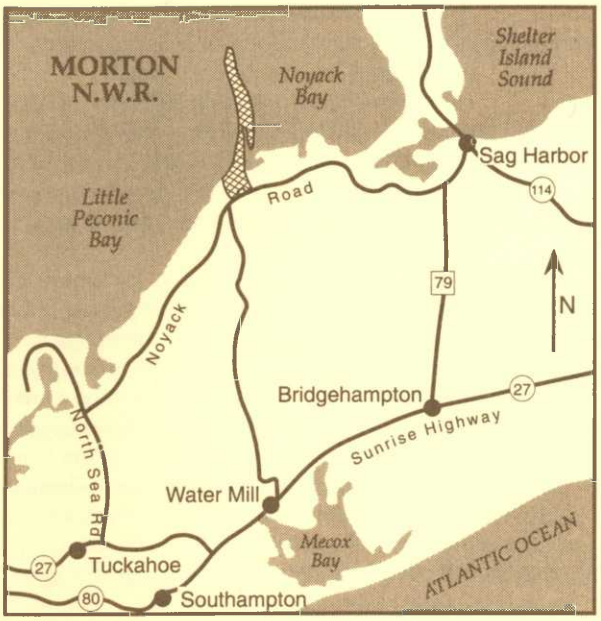
MANAGEMENT: The Refuge is managed to protect a unique natural area for migratory birds. Endangered and threatened species such as piping plovers, least terns, roseate terns, and osprey use the Refuge for nesting, brood rearing, feeding and/or resting. Loss of habitat and human disturbance have caused their populations to decline. All receive protection under the law. During the breeding season (April through August), public access to the peninsula is prohibited to protect the nesting and brood rearing habitat of these species. Avian nesting structures, including platforms, exclosures and nest boxes, are used to increase the productivity of these species. The ponds are managed for waterfowl use. Fields are mowed to maintain habitat diversity.



Osprey

PUBLIC USE ACTIVITIES: Wildlife-oriented activities such as environmental education, nature study, bird watching, hiking and photography are encouraged on the Refuge. A nature trail passes through upland forest, adjacent to wetlands, through a field, and onto a bay beach. The peninsula is 1-3/4 miles long and contains upland trails and a brackish pond. An information kiosk and public restrooms are located at the headquarters area. Fishing from the beach is permitted. Watercraft are not permitted to land on the Refuge.

Access for wheelchair visitors is moderately difficult from the parking lot to the beginning of the nature trail. The interpretive kiosk is wheelchair accessible.



DIRECTIONS: From Route 27, north at Exit 9 onto North Sea Road (Route 38), to North Sea/Noyack. Continue onto Noyack Road (Route 38); Refuge is 5 miles on the left.

Address inquiries to Refuge Manager at Wertheim Refuge; Morton Refuge office: (516) 725-2270 (summers only).

Great Blue Heron

Target Rock National Wildlife Refuge
Lloyd Harbor, New York

ENTRANCE FEE: An entrance fee is required and is payable at the Refuge on the day of your visit. Annual passes are available by purchasing a Duck Stamp or a Golden Eagle Passport. Organized groups conducting wildlife-oriented environmental education programs may be exempt. Visitors who are 62 years of age and older may acquire a free Golden Age Passport, and visitors with a disability may acquire a free Golden Access Passport. These passes are only distributed in person at either Target Rock or Wertheim Refuges. For further information, consult the Refuge Manager at Wertheim NWR, P.O. Box 21, Shirley, NY 11967, or call Monday through Friday, 8:00 a.m. to 4:30 p.m., (516) 286-0485.

Revenue generated from the sale of Duck Stamps is designated for the purchase of wetland habitat. Also, 30% of the revenue from daily entrance fees is designated for Refuge operations and maintenance. The remaining 70% is put into the Migratory Bird Conservation Fund.

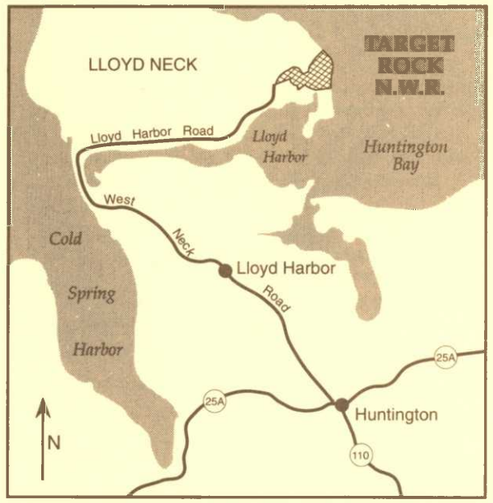
DESCRIPTION: Target Rock National Wildlife Refuge consists of 80 acres on the Lloyd Neck peninsula on Long Island's north shore. The Refuge is comprised of mature upland forest and a half mile of rocky beach. The Refuge supports a variety of songbirds, mammals, shorebirds, game fish, and reptiles. During the colder months, diving ducks are common offshore and harbor seals are occasionally observed. A plantation of Norway spruce, white pine, and eastern red cedar are interspersed with the mature mixed oak forest on the Refuge. Many flowering plants are also found.

HISTORY: The Refuge was originally used by the Mantiecock Indian tribe. They used this area for hunting, gathering, fishing, shellfishing, and farming. The area was donated by Ferdinand Eberstadt in 1967. The area was the family's summer estate. A point of interest is the large rock in the bay for which the Refuge is named. The British Royal Navy reportedly used it for target practice during the War for Independence. At that time the rock was imbedded in the bluff, long since eroded away.

MANAGEMENT: The Refuge is managed to provide habitat for migratory birds. During the spring breeding season, a segment of the beach is closed to public use to provide undisturbed nesting habitat for bank swallows that utilize the bluffs. Hopefully, this undisturbed habitat will entice threatened piping plovers to also nest here.

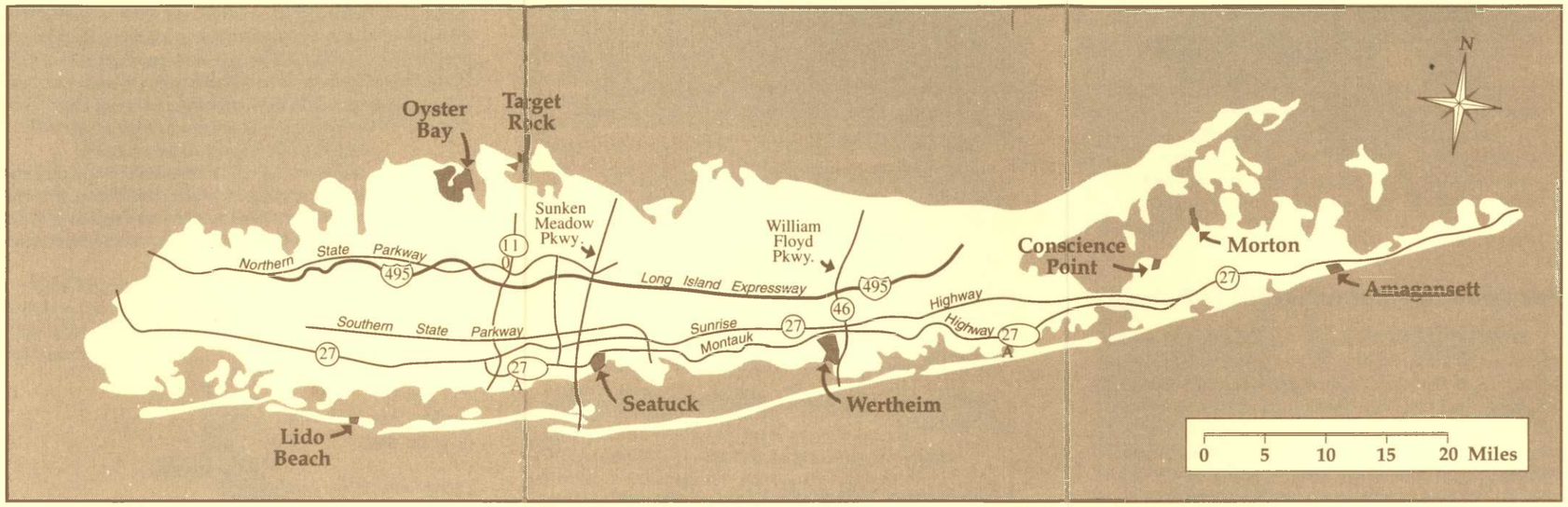
PUBLIC USE ACTIVITIES: Wildlife-oriented activities such as environmental education, nature study, photography, walking, and fishing are encouraged. A nature trail passes through hardwood forest, past seasonal ponds, and along the shore of Huntington Bay. Fishing in the Bay from shore is permitted. An information kiosk and public restrooms are available.

Access for wheelchair visitors is moderately difficult from the parking lot to a segment of accessible trail.



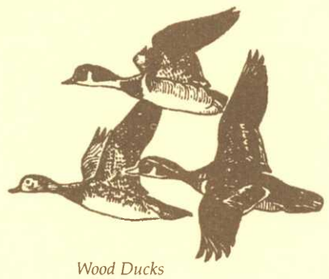
DIRECTIONS: From Huntington, Route 25A (Main Street) west one-quarter mile, then north on West Neck Road for 5 miles. Follow onto Lloyd Harbor Road past Caumsett State Park. Entrance is at the end of the road on the right.

Long Island Refuges



Other Refuges

The Long Island National Wildlife Refuge Complex includes five other units. Public access to these areas is restricted; contact the Refuge Manager for additional information.



Wood Ducks

Seatuck National Wildlife Refuge

DESCRIPTION: The Refuge was established in 1968 through a private donation from Charles and Natalie Webster. This 196-acre Refuge consists of grasslands, woodlands, and salt and freshwater wetlands bordering Champlain Creek and Great South Bay. Over 200 species of birds have been documented at the Refuge. White-tailed deer and red fox are conspicuous here.

MANAGEMENT: The Refuge is actively managed for migratory birds, particularly for nesting osprey, and to maintain habitat diversity.

PUBLIC USE ACTIVITIES: The Refuge is available for environmental education activities by reservation.

Conscience Point National Wildlife Refuge

DESCRIPTION: Established in 1971, the 60-acre Refuge is primarily a mix of woodlands, grasslands, and salt marsh. This Refuge contains a maritime grassland community; one of the few on Long Island. Wading birds and osprey are commonly observed in spring and summer; waterfowl, particularly black ducks, are abundant in winter. Entrance is by Special Use Permit only.

MANAGEMENT: The Refuge is managed for migratory birds and wintering waterfowl and to maintain habitat diversity.

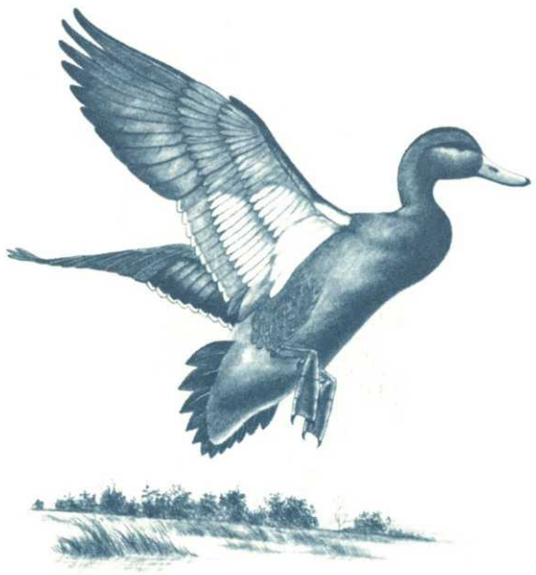
NOTES

Date _____ Time _____

Observers _____

Weather _____

Tides _____



U.S. Fish and Wildlife Service

Wertheim, Target Rock and Morton are three of more than 470 refuges in the National Wildlife Refuge System administered by the U.S. Fish and Wildlife Service. The National Wildlife Refuge System is a network of lands and waters managed specifically for the protection of wildlife and wildlife habitat and represents the most comprehensive wildlife management program in the world. Units of the system stretch across the United States from northern Alaska to the Florida Keys and include small islands in the Caribbean and South Pacific. The character of the Refuges is as diverse as the nation itself.

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

For further information, contact:

Refuge Manager
Wertheim National Wildlife Refuge
Box 21
Shirley, New York 11967
Telephone: (516) 286-0485

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

June 1992

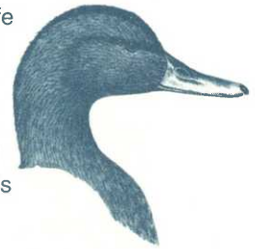
Birds of Wertheim Target Rock Morton

National Wildlife Refuges

Long Island, New York

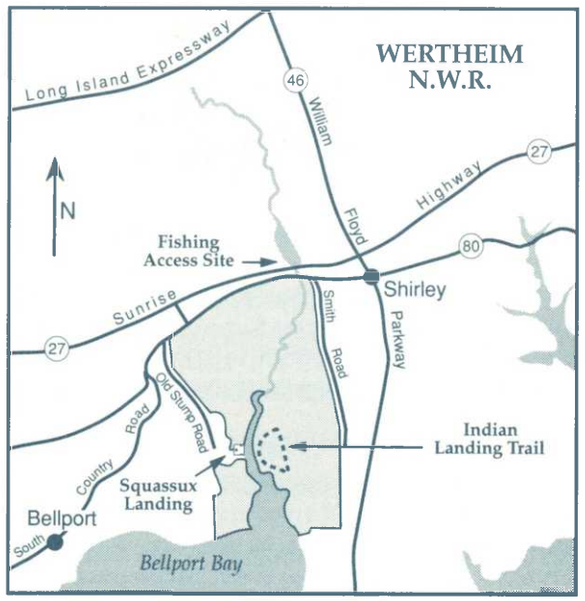
Welcome

to the Long Island National Wildlife Refuge Complex. The Complex is composed of eight separate units. Three of these refuges, Wertheim, Target Rock and Morton, are managed to provide opportunities for bird watching. Access to each Refuge is listed below.



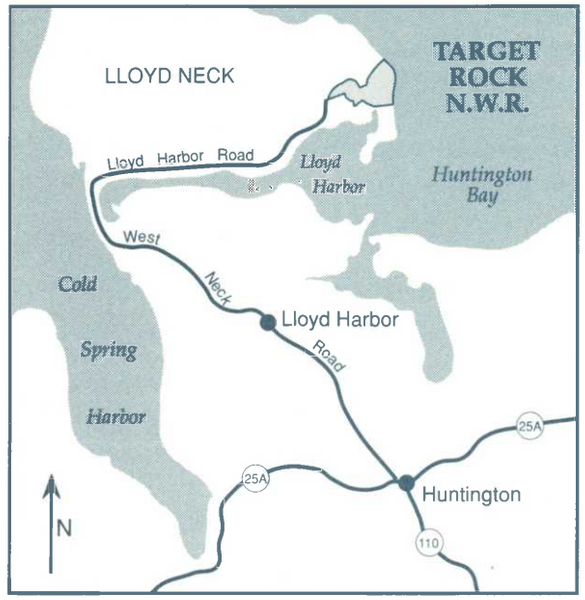
Wertheim Refuge protects 2,400 acres on the south shore of Long Island including the Carmans River, one of the last and largest undeveloped estuaries on Long Island. The Refuge has a wide diversity of habitats including oak-pine woodland, fields, ponds, river, streams, bay and fresh, brackish and saltwater marshes. These habitats attract and support a remarkable diversity and abundance of wildlife including birds. The primary importance of the Refuge is protection of the Carmans River estuary for use by migratory waterfowl, particularly black ducks, mallards, wood ducks and gadwall. Access is available by foot at the fishing access site or by boat to the Indian Landing Trail. Carry-in boat launching is available at the fishing access site or at Squassux Landing. Access is available daily, 1/2 hour before sunrise to 1/2 hour after sunset.

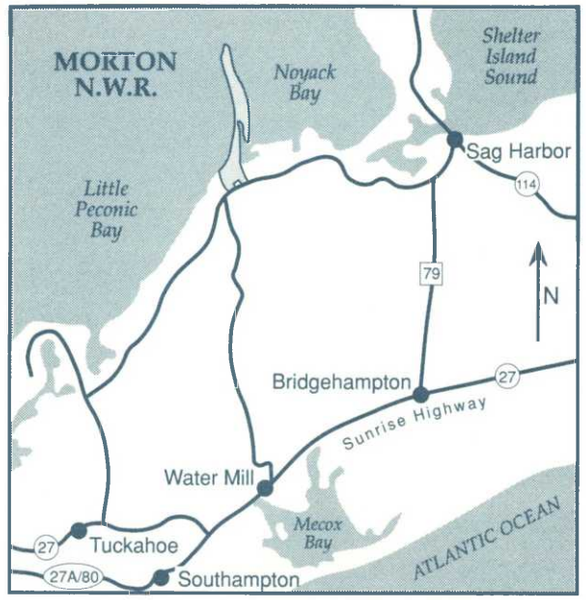
DIRECTIONS: From Route 27A/80 (Montauk Highway), turn south onto Smith Road, just east of the Carmans River. Go 1/4 mile and the entrance to the office is on the right. Office hours are Monday-Friday, 8 a.m. to 4:30 p.m.



Target Rock Refuge is 80 acres on a peninsula on the north shore of Long Island. The Refuge is comprised of mostly upland forest and a half mile of bay beach. This Refuge has a variety of songbirds, waterfowl, bank swallows, shorebirds, and an occasional raptor. Access is available daily, 1/2 hour before sunrise to 1/2 hour after sunset. An entrance fee is charged.

DIRECTIONS: From Route 110 in Huntington, Route 25A west one-quarter mile, then north on West Neck Road. Follow onto Lloyd Harbor Road. Entrance is at the end of the road on the right.



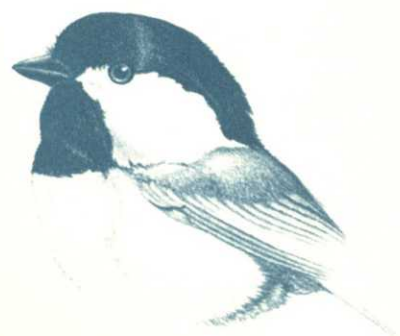


DIRECTIONS: From Route 27 at Exit 9, north on North Sea Road (38) for North Sea. Straight at traffic light, bear right onto Noyack Road, Refuge 5 miles on left.

Morton Refuge consists of 187 acres including Jessups Neck and contains exceptionally diverse habitats. Sandy, gravel, and rocky beaches fringe the peninsula, and the wooded bluffs of Jessups Neck overlook Peconic and Noyack Bays. The remainder is upland forest, brackish and fresh water ponds, a lagoon and open fields. The Refuge was set aside to protect a unique natural area for migratory birds. Endangered and threatened species such as piping plovers, least terns and osprey use the beach area for nesting. A loss of habitat and human disturbance have caused their populations to decline throughout their range. They are protected by law. During the nesting season (April to August), public access to the peninsula is prohibited to protect the nest sites. Access is available daily, 1/2 hour before sunrise to 1/2 hour after sunset.

Visitors can expect to see wildlife at any time, but viewing is best during early morning and evening hours while taking a quiet, observant walk or boat trip. Remember, these animals are wild and shy. For the best chance to see them, bring binoculars and have patience.

As part of the National Wildlife Refuge System, the Long Island National Wildlife Refuge Complex is committed to the primary goal of protecting the nation's wildlife. We do provide for public use when it does not interfere with our primary goal. We need your support in accomplishing this. Take Pride in America and help protect YOUR nation's wildlife.



Most birds are migratory, therefore, their seasonal occurrence is coded as follows:

SEASON:

s - Spring March - May
S - Summer June - August
F - Fall September - November
W - Winter December - February

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

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

	Wertheim				Morton				Target Rock			
	s	S	F	W	s	S	F	W	s	S	F	W
LOONS - GREBES												
Red-throated Loon			r		o		o	o	o		o	o
Common Loon	o	r	o	o	u	r	u	u	o			
Pied-billed Grebe	u	r	u	u	u		u	u	o			
Horned Grebe			r		c	r	c	c	c		c	c
Red-necked Grebe					r		r					
Great Cormorant	r	r	r		o	o	o	o	u	u	u	o
Double-crested Cormorant	c	c	c	u	a	a	a	c	c	c	c	u
BITTERNS - HERONS - IBISES												
American Bittern	†	u	o	u	o		o	o	r		r	
Least Bittern	†	o	o	o	u		u		r		r	
Great Blue Heron	c	c	c	c	u	u	u	u	c	c	c	o
Great Egret	c	c	c	r	c	c	c	r	c	c	c	r
Snowy Egret	c	c	c		c	c	c	r	c	c	c	
Little Blue Heron		r			u	u			r			
Tricolored Heron		r			r	r						
Cattle Egret	r	r	r		r	r	r		r	r	r	
Green-backed Heron	†	c	c	r	†	c	c	r	†	u	u	u
Black-crowned Night-Heron	u	u	u	o	u	u	u	o	c	c	c	r
Yellow-crowned Night-Heron	r	r			r	r			†	r	r	r
Glossy Ibis	o	u	o		u	u	u			o		
SWANS - GEESE - DUCKS												
Tundra Swan			r									
Mute Swan	†	c	c	c	†	c	c	c	u	u	u	u
Snow Goose	o		o	o	u		u	u	r		r	
Brant		o	o			u	u		o	o	o	
Canada Goose	†	c	c	c	†	c	u	u	c	o	o	o
Wood Duck	†	c	c	o	†	u	u	u	o			
Green-winged Teal	c	o	c	u	u		u		o		o	r
American Black Duck	†	c	c	a	†	c	c	a	†	c	c	a
Mallard	†	c	c	c	†	u	u	u	†	c	c	c
Northern Pintail			r	r	u		u	u	r		r	
Blue-winged Teal	u		u		u		u		r		r	
Northern Shoveler	o		o	u								
Gadwall	†	c	u	c	†	o	r	o	o		o	o
American Wigeon	†	r	r	r	u		u	u	o		o	o
Canvasback	o		o	o	o		o	u	o		o	o
Redhead			o		o		o	u				
Ring-necked Duck	o		o	o							r	r
Greater Scaup	u	r	u	c	u		u	u	c		o	c
Lesser Scaup	o	r	o	u	u		u	u	r		r	c
Common Eider												r
Harlequin Duck											r	
Oldsquaw			r		c		c	c	c		u	c
Black Scoter					u		u	u	r		u	u
Surf Scoter					u		u	u	u		u	u
White-winged Scoter					c		u	a	u		u	u
Common Goldeneye			r		c		c	o				c
Bufflehead	c	r	c	o	c		c	a	c	r	c	c
Hooded Merganser	o	r	o	u	r		u		r		r	
Common Merganser	u	r	u	c			u	u			u	u
Red-breasted Merganser	†	c	u	c	c		u	c	a	c		c
Ruddy Duck	r	r	u	u	r		r	r	r		r	
VULTURES - HAWKS - FALCONS												
Turkey Vulture	r	r							r			
Osprey	†	c	c	o	†	c	c	c	c	c	c	
Bald Eagle	r	r	r	r	r		r	r				r
Northern Harrier	†	u	u	u	o		o	o			r	
Sharp-shinned Hawk	†	u	o	u	o	u		u	o	u		u
Cooper's Hawk	†	o	o	o	r	r	r	r	u		u	
Northern Goshawk	r		r	r			r	r	o		o	
Red-shouldered Hawk	r	r	r									r

	Wertheim				Morton				Target Rock			
	s	S	F	W	s	S	F	W	s	S	F	W
HAWKS - FALCONS (Cont.)												
Broad-winged Hawk		o	o	o		u	u	u		o		o
Red-tailed Hawk	†	c	c	c	c	c	c	c	†	c	c	c
Rough-legged Hawk			u				r	r			r	
Golden Eagle			r									
American Kestrel	†	u	u	u	†	u	u	u	†	u	u	u
Merlin	o		o	o	o		o	o			r	
Peregrine Falcon	r		o	r	r		r	r	r		r	r
PHEASANT - GROUSE - QUAIL												
Ring-necked Pheasant	†	u	u	u	†	u	u	u	†	c	c	c
Ruffed Grouse	†	r	r	r	†	r	r	r				
Northern Bobwhite	†	a	a	a	†	c	c	c	†	o	o	o
RAILS - COOTS												
Clapper Rail	†	u	u	u	o		o	o				
King Rail		r	r	r								
Virginia Rail	†	u	u	u	u		u	u				
Sora		r	r	r	u		u	u				
American Coot	†	u	o	u	o		o		r			
Common Gallinule		r	r	r								
PLOVERS - SANDPIPERS												
Black-bellied Plover	o		o	o	u		u	u	r		u	c
Lesser Golden-Plover					r		r		r		r	r
Wilson's Plover					r							
Semipalmated Plover		o	o	o	u		u	u	r		r	r
Piping Plover					†		u	u		o		
Killdeer	†	u	u	u	†	u	u	u	r		r	r
American Oystercatcher					r							
Greater Yellowlegs		u	u	u	c		u	u	u		u	u
Lesser Yellowlegs		u	u	u	u		u	u	r		r	r
Solitary Sandpiper		o	o	o	o		o		r		r	
Willet		u	u	u			u	u	r		r	r
Spotted Sandpiper	†	u	u	u	†	u	u	u	r		r	u
Whimbrel					r		r					
Ruddy Turnstone					c		c	r	o		o	o
Red Knot					u		u	u	r		r	
Sanderling		u	u	u	u		u	c	u		r	r
Semipalmated Sandpiper		o		o	u		u	u				
Western Sandpiper		o		o			u					
Least Sandpiper		u	u	u	o		o	o	r		r	r
White-rumped Sandpiper					u		u					
Pectoral Sandpiper			r		u		u					
Purple Sandpiper								r				
Dunlin	r		o	r			r	r				
Stilt Sandpiper						r	r					
Short-billed Dowitcher		o	o		u	u	u					
Common Snipe	u	u	u	u	u		u	u	r		r	
American Woodcock	†	u	u	o	†	u	u	r	u		r	r
JAEGERS - TERNS - SKIMMERS												
Parasitic Jaeger										r	r	
Laughing Gull	o	o	o	r	u	u	u	r	c	c	u	
Bonaparte's Gull			r		o		o	o			r	
Ring-billed Gull	c	u	c	c	c	u	c	c	u	u	c	c
Herring Gull	a	a	a	a	a	a	a	a	a	a	a	a
Iceland Gull			r			r						
Lesser Black-backed Gull			r									
Glaucous Gull			r				r	r				
Great Black-backed Gull	a	a	a	a	a	c	a	a	c	c	c	c
Royal Tern		r				u	r					
Roseate Tern					u	u	u					
Common Tern	c	c	c		†	c	c		a	a	a	
Forster's Tern					u	u	u					

	Wertheim				Morton				Target Rock			
	s	S	F	W	s	S	F	W	s	S	F	W
TERNS - SKIMMERS (Cont.)												
Least Tern	c	c	c		†	c	c	c		c	c	c
Black Tern		r			u				r			
Black Skimmer	u	u	u			u	r			r		
DOVES - KINGFISHERS												
Rock Dove	†	u	u	u	u		o	o	o		o	o
Mourning Dove	†	a	a	a	†	c	c	c	†	c	c	a
Black-billed Cuckoo	†	u	u	u	†	u	u	u	†	r	r	
Yellow-billed Cuckoo	†	u	u	u	†	u	u	u	†	r	r	
Barn Owl	†	o	o	o	u	u	u	u				
Eastern Screech-Owl	†	c	c	c	†	u	u	u	†	u	u	u
Great Horned Owl	†	u	u	u	†	u	u	u	o		o	o
Snowy Owl			r				r				r	
Long-eared Owl	o	o	o	o			r		r	r	r	
Short-eared Owl	o		o	o	u		u	u	r			
Northern Saw-whet Owl	r		r	r	u		u					
Common Nighthawk	o	u	u		u		u		o	o	o	
Whip-poor-will	†	c	c	c	u	u	u		r	r	r	
Chimney Swift	u	u	u		u	u	u					
Ruby-throated Hummingbird	†	u	u	u	†	o	o	o	r	r	r	
Belted Kingfisher	†	c	c	o	†	c	c	u	†	c	u	u
WOODPECKERS - FLYCATCHERS												
Red-headed Woodpecker		r	r	r					†	r	r	r
Red-bellied Woodpecker	†	c	c	c	†	u	u	u	†	c	c	c
Yellow-bellied Sapsucker	u		u		u		u		r		r	
Downy Woodpecker	†	c	c	c	†	c	c	c	†	c	c	c
Hairy Woodpecker	†	u	u	u	†	u	u	u	†	c	u	u
Northern Flicker	†	c	c	u	†	c	c	u	†	c	c	u
Olive-sided Flycatcher		r	r									
Eastern Wood-Pewee	†	c	c	c	†	u	u	u	†	o	o	o
Yellow-bellied Flycatcher		o										
Willow Flycatcher	†	o	o	o								
Least Flycatcher	†	u	r	u					u		u	
Eastern Phoebe	†	c	c	c	†	u	u	u	†	o	o	o
Great Crested Flycatcher	†	u	u	u	†	u	u	u	†	u	u	u
Eastern Kingbird	†	c	o	c	†	u	u	u		c	o	u
LARKS - SWALLOWS - CROWS												
Horned Lark			o	o	†	u	u	u	u			u
Purple Martin	†	u	u	u		r						
Tree Swallow	†	c	c	c	r	†	u	u	u		u	u
Northern Rough-winged Swallow		r	r	r		u	u		o			
Bank Swallow					†	c	c	c	†	c	c	c
Barn Swallow	†	c	c	o	†	u	u	u	†	c	o	u
Cliff Swallow		r			r							
Blue Jay	†	c	c	c	†	c	c	c	†	c	c	c
American Crow	†	c	c	c	†	u	u	u	†	c	c	c
Fish Crow	†	c	c	c	u	u	u	u	c	c	c	c
TITMICE - NUTHATCHES - WRENS												
Black-capped Chickadee	†	c	c	c	†	c	c	c	†	c	c	c
Tufted Titmouse	†	c	c	c	†	c	c	c	†	c	c	c
Red-breasted Nuthatch		u	u	u	u		u	u	r		r	r
White-breasted Nuthatch	†	c	c	c	†	c	c	c	†	c	c	c
Brown Creeper	†	u	u	u	u		u	u	r		r	r
Carolina Wren	†	c	c	c	†	c	c	c	†	c	c	c
House Wren	†	c	c	c	†	c	c	c	†	c	c	c
Winter Wren			u		u		u	u			r	
Sedge Wren			r									
Marsh Wren	†	c	c	o	u		u	u				
KINGLETS - THRASHERS												
Golden-crowned Kinglet	u		u	u	u		u	u	u		u	u
Ruby-crowned Kinglet	u		u	u	u		u	u	u		u	u
Blue-gray Gnatcatcher	u	u	o						r		r	
Eastern Bluebird	†	u	u	u	r	r			r		r	r

	Wertheim				Morton				Target Rock			
	s	S	F	W	s	S	F	W	s	S	F	W
KINGLETS - THRASHERS (Cont.)												
Veery	†	u	u	u		u		u	r		r	
Gray-cheeked Thrush			u			u		u	r		r	
Swainson's Thrush	u		u		u		u		u		c	
Hermit Thrush	†	u	u	u	†	u	u	o	u		u	r
Wood Thrush	†	c	c	c	†	u	u	u	†	u	u	u
American Robin	†	a	a	a	†	c	c	u	†	c	a	u
Gray Catbird	†	c	c	u	†	c	c	u	†	c	a	u
Northern Mockingbird	†	a	a	a	†	c	c	c	†	c	c	c
Brown Thrasher	†	u	u	u	†	u	u	u	†	u	u	r
PIPITS - SHRIKES - STARLINGS												
American Pipit		r		r		u		u				
Cedar Waxwing	u	u	u	u	u	r	u	u	u		u	
Northern Shrike			r	r			r	r				
Loggerhead Shrike			r	r		r		r				
European Starling	†	a	a	a	†	c	c	c	†	c	c	c
VIREOS - WOOD WARBLERS												
White-eyed Vireo	†	u	u	u	†	u	u	u				
Solitary Vireo		o		o		u		u		r		r
Yellow-throated Vireo		r				u						
Warbling Vireo		r										
Philadelphia Vireo		u		u								
Red-eyed Vireo	†	u	u	u	†	u	u	u	†	o	o	o
Blue-winged Warbler	†	c	c	c	†	u	u	u		o	o	o
Golden-winged Warbler		r				r						
Tennessee Warbler		u		u		u		u				
Orange-crowned Warbler			u									
Nashville Warbler		o		o								
Northern Parula		c		c		o		u		u		r
Yellow Warbler	†	c	c	c	†	c	c	u		c	c	u
Chestnut-sided Warbler		u	r	u		u		u	†	u	r	u
Magnolia Warbler		u		u		u		u		u		u
Cape May Warbler		u		u		u		u		o		o
Black-throated Blue Warbler		u		u		u		u		r		r
Yellow-rumped Warbler		c	r	o		o		o		u	r	c
Black-throated Green Warbler		u		u		u		u		o		o
Blackburnian Warbler		u		u		u		u		o		o
Pine Warbler	†	u	u	u		o	o	o				
Prairie Warbler	†	u	u	u	†	u	u	u		r		r
Palm Warbler		u		u	r		u	u		o		o
Bay-breasted Warbler		u		u		u		u		o		o
Blackpoll Warbler		u		u		u		u		u		o
Black-and-white Warbler	†	c	o	c		u	u	u		u	u	u
American Redstart	†	c	c	c	†	c	c	u	†	c	c	u
Prothonotary Warbler		r	r	r		r		r		r		r
Worm-eating Warbler					r							
Ovenbird	†	c	c	c	†	u	u	u	†	c	u	u
Northern Waterthrush		u		u		u		u		r		r
Louisiana Waterthrush		r		r			u			r		r
Kentucky Warbler		o		o								
Connecticut Warbler		o		o			u			o		o
Mourning Warbler		o		o			u			o		o
Common Yellowthroat	†	c	c	c	†	c	c	c		u	u	u
Hooded Warbler		u		u								
Wilson's Warbler		u		u		u		u		o		o
Canada Warbler		u	o	u						o	o	o
Yellow-breasted Chat		r	r	r		u	u	u		r	r	r
TANAGERS - SPARROWS												
Summer Tanager		r	r	r			r		o			
Scarlet Tanager	†	u	u	u	†	u	u	u		o	o	
Northern Cardinal	†	c	c	c	c	†	c	c	c	†	c	c
Rose-breasted Grosbeak	†	u	u	u	†	u	u	u		u	r	r
Indigo Bunting	†	u	u	u		r				o	o	

	Wertheim				Morton				Target Rock			
	s	S	F	W	s	S	F	W	s	S	F	W
TANAGERS - SPARROWS (Cont.)												
Dickcissel			o						r		r	
Rufous-sided Towhee	†	c	c	c	o	†	c	c	c	u		
American Tree Sparrow			c				u				o	
Chipping Sparrow	†	c	c	c		†	u	u	u	u	†	c
Field Sparrow	†	u	u	u	u	†	u	u	r		u	u
Savannah Sparrow	o	o	o	o		u	u	u	u		r	r
Grasshopper Sparrow	†	o	o	r								
Sharp-tailed Sparrow	†	c	c	c	r	†	u	u	u		r	
Seaside Sparrow	†	u	u	u		†	o	o				
Fox Sparrow			u	u		u		u	u		u	u
Song Sparrow	†	c	c	c	c	†	c	c	c	†	c	c
Lincoln's Sparrow			o	o								
Swamp Sparrow	†	c	c	c	u		u	u	u		o	o
White-throated Sparrow		c		c	c		c	c	c		c	c
White-crowned Sparrow		r		r	r		r		r		r	
Dark-eyed Junco		c		c	c		c	c	c		c	c
Snow Bunting			o	o		u		u				o
BLACKBIRDS - FINCHES												
Bobolink		o		o		r		r		r		r
Red-winged Blackbird	†	a	a	a	u	†	c	c	u	†	a	a
Eastern Meadowlark	†	u	u	u	u		u	u	u		r	r
Rusty Blackbird		o		o	o		u	u			r	
Brewer's Blackbird			r									
Common Grackle	†	c	c	c	c	†	c	c	c	†	c	a
Brown-headed Cowbird	†	u	c	u	o	†	u	u	u		u	u
Orchard Oriole	†	o	o			†	o	o	o		r	
Northern Oriole	†	c	c	c		†	c	u	c	†	u	u
Purple Finch	†	o	o	o	o	†	o	u	u			r
House Finch	†	c	c	c	c	†	c	c	c	†	c	c
Red Crossbill			r									
White-winged Crossbill			r									
Common Redpoll			r			u		u				
Pine Siskin			r	r			u	u			r	r
American Goldfinch	†	u	u	u	u	†	u	u	u	†	u	u
Evening Grosbeak			o			u	u	u				
House Sparrow	†	c	c	c	c	†	c	c	c	†	c	c

Trail Guide

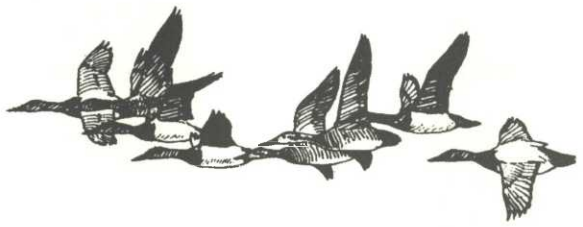
TARGET ROCK
National Wildlife Refuge

Lloyd Harbor, New York

Welcome

Welcome to Target Rock National Wildlife Refuge. This 80-acre refuge was once the estate of Ferdinand and Mary Eberstadt. The Eberstadts donated this land to the U.S. Fish and Wildlife Service in 1967 for use as a wildlife refuge and as a site for environmental education. Target Rock is one of nine refuges comprising the Long Island National Wildlife Refuge Complex.

The primary purpose of the national wildlife refuge system is to provide habitat for migratory birds, endangered species and other wildlife in order to preserve the nation's biodiversity. The properties of the Long Island National Wildlife Refuge Complex are within the Atlantic Flyway, one of four major bird migration paths in North America. Numerous species of waterfowl and other birds use these refuges for nesting, wintering and migratory stopovers.



National wildlife refuges are opened to the public only when visitors and wildlife can coexist. Access is often limited to protect the wildlife resource. As such, it is imperative that visitors remain on the designated trails and do not collect or disturb wildlife and plants.

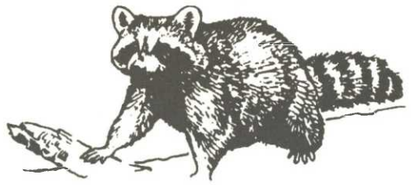
The Target Rock trail is a mile long and takes about one hour to walk. Marked posts match the text in this guide. Please take precautions to guard against ticks and poison ivy - information about both may be found at the kiosk.

Forest

1 Before you is a mixed oak forest stand; the typical forest type of Long Island's North Shore. This forest has reached its climax stage of development. After the last glacier retreated about ten thousand years ago, this area was little more than rock and barren soil. Plants began to colonize the land, beginning with lichens and mosses, followed by grasses, a succession of brush, and then pioneer tree species such as pine, birch and aspen. The final stage in this process of ecological succession is the oak and hickory trees of this forest.

Forest Canopy

2 The top sections of the forest's tallest trees form the canopy. The canopy of hickory, white, red and black oaks is of high value to wildlife. The hickory's nuts and the oak's acorns provide food for gray squirrels, chipmunks, blue jays, grackles, mice and raccoons. Most species of hickory and oak require 20-35 years before they are mature enough to bear fruit, and may require an additional 20 years before they begin to produce abundant crops. The insect community associated with the canopy supports a variety of insectivorous birds.

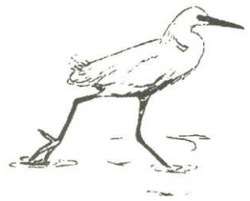


Below the Canopy

3 The red maple saplings seen here are part of the forest understory, the vegetation layer below the canopy. Plants within the understory and the still lower shrub layer and forest floor must be shade tolerant, as the canopy intercepts most of the sun's rays. In many portions of the forest, the understory is composed primarily of dogwood and sassafras; the shrub layer contains laurel. Decaying logs, leaf litter, mosses, ferns, poison ivy, Virginia creeper, and several wildflower species cover the forest floor.

Formal Gardens

4 This area was once part of the Eberstadt estate's formal gardens and was called the wild garden. Robust stands of azaleas and rhododendrons provide cover for a variety of songbirds such as catbirds, cardinals, common yellowthroats, and Carolina wrens. Mayapples, of which almost all parts are poisonous, wood ferns, Solomon's seal and ivy carpet the ground. Twenty different varieties of ivy were planted at the estate. Further down the trail, other ornamental plantings such as spruce, redwood, ginkgo and others may be seen.

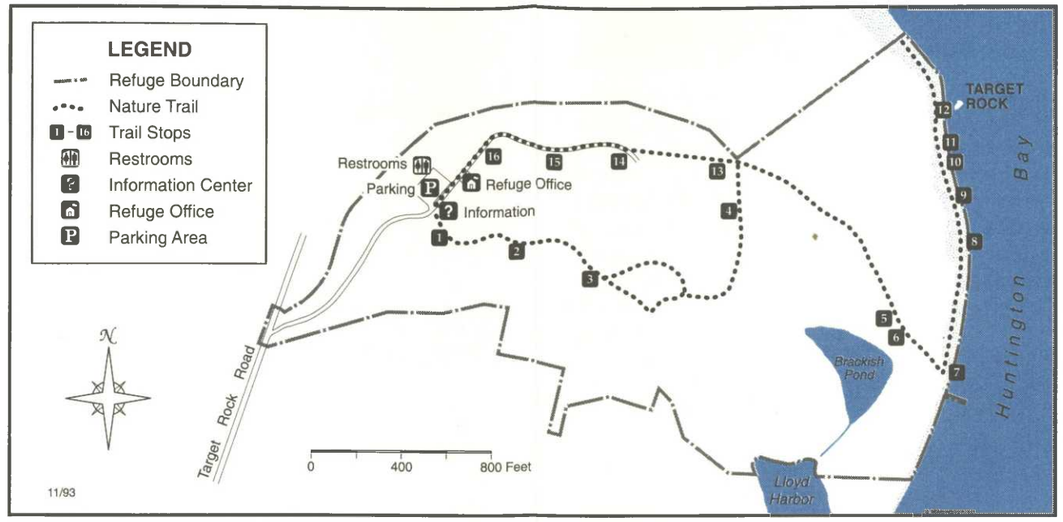


Brackish Pond - Wildlife

5 Please move quietly–you are approaching a brackish pond. Tidal saltwater from the Bay floods this pond on a daily basis and mixes with fresh water from the surrounding watershed, resulting in a pond with a salinity lower than that of the Bay. Microscopic plants and animals such as copepods, isopods and mosquito larvae inhabit the pond and serve as food for other invertebrates and for small fish. Black ducks and other puddle ducks feed on the invertebrates and aquatic vegetation. Herons and egrets stalk the water's edge and prey on fish.

Brackish Pond - Vegetation

6 Lining the pond is a ring of smooth cordgrass. This grass was once used by colonists to thatch their roofs. The roots of cordgrass are adapted to filter out salt from absorbed water and, like other marine grasses, can secrete excess salt water through leaf pores. As the land becomes drier, cordgrass gives way to high tide bush, a woody plant which produces distinctive white flowers in early autumn. Red cedar, an evergreen, borders the upland edge of the pond. This cedar is a sun-loving species whose bluish berries provide food for robins, catbirds, mockingbirds, pheasants and others.



Red Cedar

7 This stand of eastern red cedar serves as home to one of Long Island's larger populations of Olive Hairstreak butterflies. The Olive Hairstreak is recognized by the bright green color and white and red-brown markings on its bottom wings. Adults lay their eggs on the cedars, and the hatched caterpillars feed on and are protected by these trees. There are two age classes of adults that take flight each year: one in mid-May, the other in mid-July to early August. Olive Hairstreaks can often be seen in early morning resting on the damp sand of the beach.

Upper Beach

8 Observe the plant life that is found on the upper beach, or foredune area, flanking the path to the water. Many of these plants lie low to the ground in response to the constant wind and have thick, leather-like leaves to resist desiccation. Some of these hardy seashore residents are beach grass, seaside goldenrod, dusty miller, winged sumac and prickly pear cactus. More sheltered areas further inland support the salt spray rose which produces pink or white blooms throughout the summer. Note also the dense system of string-like roots extending from the dune plants that serves to secure the sand and minimize beach erosion.

Intertidal Zone

9 The area of the beach alternately covered by high tide and exposed at low tide is called the intertidal zone. Organisms living within this zone must be adapted to withstand rapid changes in temperature, wave action, alternate wetting and drying, and exposure to predators. Residents of the intertidal zone include smooth periwinkles, barnacles, blue mussels, isopods, and marine worms. Other organisms normally found elsewhere but which occasionally wash ashore include spider crabs, lady and other crabs, oysters, clams, and slipper shells. The most common algae or seaweed found in this area include sea lettuce, the air-bladder laden rockweed or sea wrack, and the red algae - Irish moss.

Geology

10 As you gaze upon this rocky beach, the waters of Huntington Bay, and the hills of Eaton's Neck to the east, you are witnessing remnants of glacial action. Four different glacial ice masses visited the area. The last glacier - the Wisconsonian - formed most of the features that characterize Long Island today. The band of hills stretching along the North Shore of Long Island was formed when the glacier came to a stop and deposited a load of sand, gravel and boulders in a formation known as a terminal moraine. The rocky beaches of the North Shore are the result of glacial deposits, as are the large boulders dotting this beach. These boulders, called erratics, often have grooves and scratches etched into their sides as a result of abrasion by glaciers.

Bank Swallows and Piping Plovers

11 The high exposed bank is nesting habitat for belted kingfishers and frequently a colony of the smallest of swallows - the bank swallow. A bank swallow uses its feet and bill to excavate a two to three foot tunnel into the bank and lines the end with grass to form a nest. The beach serves as nesting habitat for piping plovers, a federally designated threatened species. Less than five thousand pairs of this species are estimated to remain in North America. Plovers dig shallow nests called scrapes in the sand, and often ring them with shells and other materials. Parents attempt to lead intruders away from the scrapes by focusing attention on themselves by pretending to-be injured.

To protect piping plovers, bank swallows and other wildlife at Target Rock, this area is closed to public access from April through August.

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Target Rock

12 Legend has it that this fourteen-foot high rock was used for target practice by the British Royal Navy during the Revolutionary War and during the War of 1812. The U.S. Navy allegedly also got its "shot" at the rock in 1879, when a captain moored his ship in the Bay and used the rock to demonstrate his crew's marksmanship for a Fourth of July celebration.

Target Rock, once embedded in the bluff, now serves as the resting place for masses of barnacles and serves as a convenient roost for gulls, cormorants and shorebirds.

Vernal Pond

13 Near here are two vernal ponds. Vernal ponds form during spring runoff, when water collects in depressions. Generally, these ponds only last through the spring, however, the pond before you has been dammed in order to extend its life.

Vernal ponds are important habitat for many animals. Thrushes, warblers and doves drink pond water and feed on the many insects that breed and congregate near these shallow waters. Raccoons may also scour the waters looking for food. Vernal ponds are often selected as breeding sites by spring peepers. Listen for shrill croaking to confirm the presence of frogs such as peepers in the spring.

Spruce

14 This stand of Norway spruce was planted by the Eberstadt family. This non-native tree is easily distinguished by its drooping branches and branchlets. Note its dense canopy which results in the absence of a woody understory. A thick carpet of ferns dominates the ground layer. The leaves, twigs and seeds of spruce provide forage for rabbits, squirrels, chipmunks and seed-eating birds. Insectivorous birds feed among the foliage and along the bark. Like many conifer stands, this stand provides good winter cover for several species of wildlife. A great horned owl can occasionally be observed in the upper canopy during the colder months.

Vegetable Garden

15 This area was once the Eberstadt Family's vegetable and cutting garden. Many of the plants seen along this road and the beach trail may be escapees from this garden. For example, the wisteria vine climbing in the trees to the west of this area is a likely descendant of the garden's former inhabitants. Now overgrown with briars and brambles, the garden serves as an example of old field succession. If left undisturbed, an oak and hickory forest will eventually become established here.

Farmhouse

16 This building once was the home of the Eberstadt family. The family purchased Target Rock Farm in 1928 and this farmhouse was built and occupied a year later. In 1937, the Eberstadt family moved to a mansion on the property which was designed by the noted architect William Adams Delano. In 1952, a portion of the farmhouse was removed to construct Pebble Cottage, the building behind you. Pebble Cottage and Paddock Cottage (near the refuge's entrance), both residences, were designed for the Eberstadt's children. The dog kennel and the cow barn that lie to the west of the farmhouse were constructed during the 1930s.

U.S. Fish and Wildlife Service

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

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

For further information, contact:

Refuge Manager
Long Island National Wildlife Refuge Complex
P.O. Box 21
Shirley, New York 11967
(516) 286-0485

Deaf or hard-of-hearing visitors may contact the New York Relay Center at (800) 421-1220 (Voice) or (800) 662-1220 (TDD)

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