

EASTERN SHORE OF VIRGINIA
NATIONAL WILDLIFE REFUGE
AND
FISHERMAN ISLAND NATIONAL
WILDLIFE REFUGE

Kiptopeke, Virginia

ANNUAL NARRATIVE REPORT

Calendar Year 1988

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

REVIEW AND APPROVALS

EASTERN SHORE OF VIRGINIA NATIONAL WILDLIFE REFUGE
KIPTOPEKE, VIRGINIA

ANNUAL NARRATIVE REPORT
Calendar Year 1988

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INTRODUCTION

Eastern Shore of Virginia National Wildlife Refuge is located on the southern tip of the Delmarva Peninsula in Northampton County, Virginia. Lying at the mouth of the Chesapeake Bay this area typifies the eastern coastal plain with gentle rising slopes reaching to 25 feet. Currently, the refuge consists of 656.6 acres of maritime forest, myrtle and bayberry thicket, grassland, cropland, fresh and brackish pond, tidal salt marsh and beach habitats. The refuge was administratively established in 1984 through a transfer of excess military land. It was established for the following purposes: (1) to conserve, manage and enhance the habitat for use by endangered and threatened species, migratory birds, and other species of fish and wildlife; (2) to encourage a natural diversity of habitat and associated fish and wildlife species; (3) to fulfill the international treaty obligations of the United States relating to fish and wildlife; and (4) to provide fish and wildlife-oriented recreation and education and assist the county and state meet their identified recreational needs for the Cape Charles area if in line with the goals of the refuge.

The importance of this area to avian species was little understood except by professional and amateur ornithologists. Now, it has been identified as one of the most important migratory bird habitats along the east coast, comparable to the better known Cape May, New Jersey. The reason for its importance is that the peninsula acts as a geographic "funnel" for migratory birds in the fall. At the tip, millions of these migrants "stage" until favorable winds blow to assist them in crossing the bay.

Written history of the "Shore" area dates back to the earliest colonial times when its natural diversity caught the eye of explorers. In the early 1600's, Captain John Smith described it as:

"...a faire Bay compassed but for the mouth with fruitful and delightsome land...Heaven and earth never agreed better to frame a place for man's habitation."

And so it was and still is, that the predominant occupations are either farming or working the water. Man's use of the land here is not solely tied to what he might harvest. The area's strategic location at the entrance to the Chesapeake Bay encouraged fortification throughout our nation's history. The land was privately owned until a few years before World War II. Through condemnation it became Fort John Custis and after the war it became Cape Charles Air Force Base. The base closed in 1980. Today the landscape is dotted with remnants of that history. Gun emplacements and bunkers rise on the land encompassed by the refuge. Many of the buildings associated with the base have been removed yet many still remain.

In the early 1980's the threat of development loomed over this area. Condominiums, town houses, and a marina were all part of a large scale construction project planned by a local corporation. The U. S. Fish and Wildlife Service (Service), learning of these plans, foresaw the habitat destruction and the associated problems of increased human activity. In response the Service established the Eastern Shore of Virginia National Wildlife Refuge with an approved acquisition boundary of approximately 1350 acres.

In 1984, 180 acres were transferred from the U. S. Air Force through the General Services Administration, creating the refuge; 174 of these acres made up the core of the refuge. In 1985, a 368.6 acre parcel of adjacent land, owned by the Chesapeake Bay Bridge Tunnel Authority, was acquired by The Nature Conservancy for \$2.6 million. The Service acquired this from The Nature Conservancy for \$2.5 million in 1986 for inclusion in the refuge. Then in 1986, Skidmore Island, a 108 acre privately owned parcel one mile east of the mainland, was purchased by The Nature Conservancy. The Service bought it from The Nature Conservancy in 1987 for \$325,000 for inclusion in the refuge. Also, in 1987, the National Fish and Wildlife Foundation (Foundation) leased to the Service 1,844 acres on Cedar Island in Accomack County. The Foundation owns 1,244 of the acres and holds the remaining 600 acres as a conservation easement. The refuge is administratively responsible for these lands. The Service is still involved in acquisition for the refuge.

The refuge's early development has been in constant flux. During the initial acquisition phase, authorizing legislation was introduced in 1984 (HR 6397) and again in 1985 (HR 1404). The bill was pocket vetoed in 1986 because it included the establishment of a national training center on the refuge. The refuge also went through a name change: initially named Cape Charles National Wildlife Refuge, it was renamed Eastern Shore of Virginia National Wildlife Refuge in 1985.

Fisherman Island National Wildlife Refuge was assigned to Eastern Shore of Virginia National Wildlife Refuge for management responsibilities in 1984. Fisherman Island National Wildlife Refuge is a 1,000 acre parcel on a 1,500 acre barrier island. Fisherman Island is located one half mile south of the mainland of the Eastern Shore of Virginia.

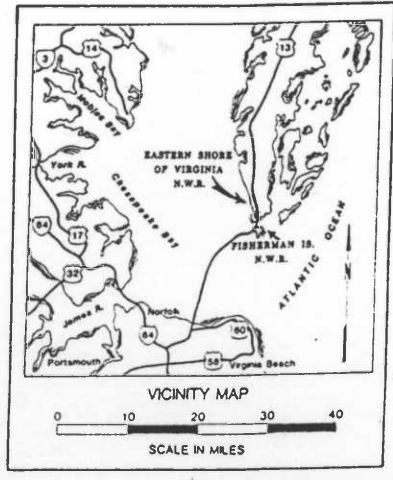
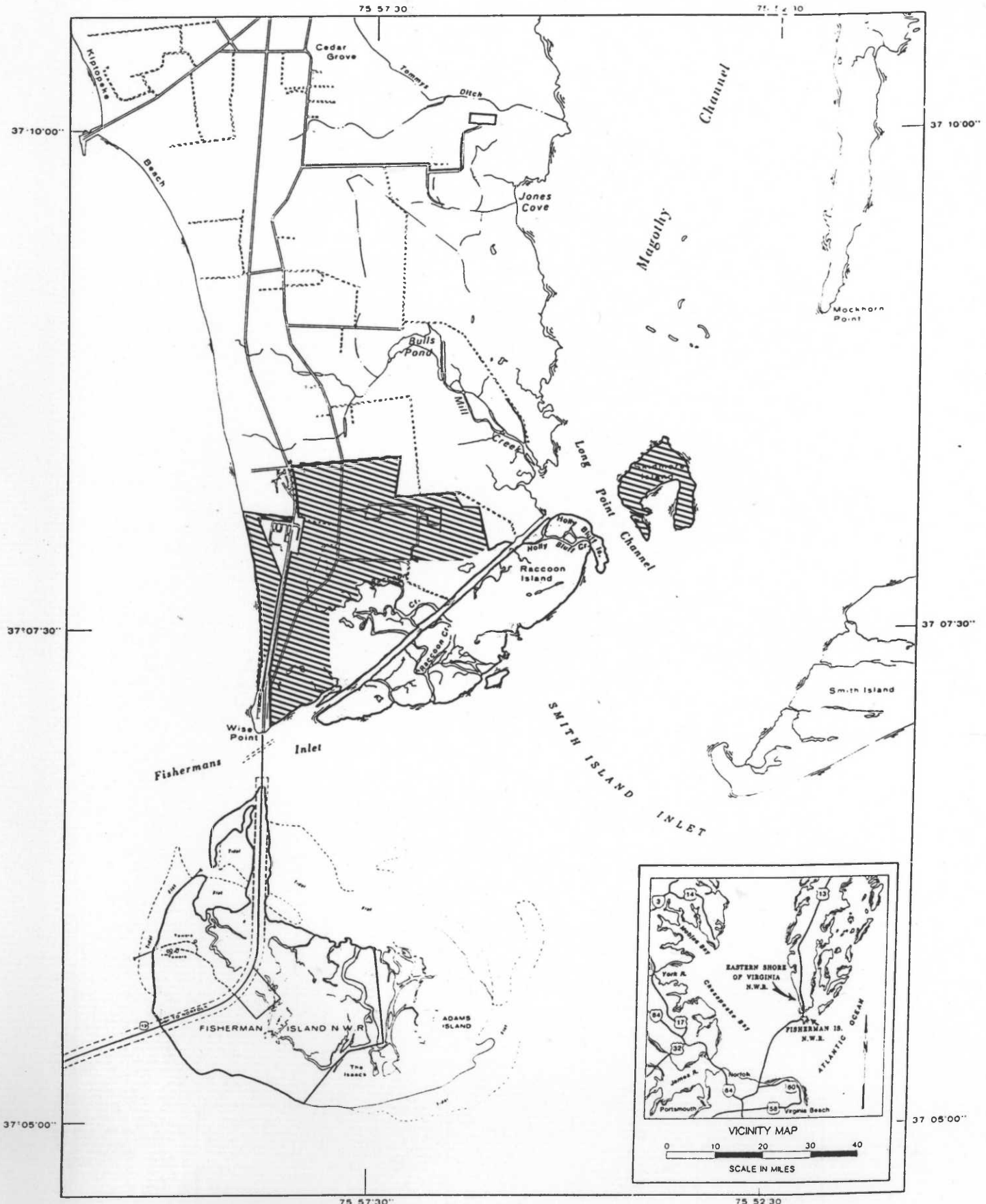
Together these two refuges provide critical habitat where migratory birds rest and feed before crossing the Chesapeake Bay. They also provide important habitat for wintering waterfowl, certain endangered species and upland game birds.

EASTERN SHORE OF VIRGINIA NATIONAL WILDLIFE REFUGE

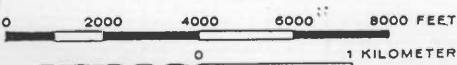
UNITED STATES
DEPARTMENT OF THE INTERIOR

NORTHAMPTON COUNTY, VIRGINIA

UNITED STATES
FISH AND WILDLIFE SERVICE



COMPILED IN THE DIVISION OF REALTY FROM
SURVEYS AND MAPS BY U.S.G.S. AND U.S.F.W.S.



MN GN
8° MEAN DECLINATION
1980

NEWTON CORNER, MASSACHUSETTS AUGUST 1984

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INTRODUCTION

TABLE OF CONTENTS

A. HIGHLIGHTS

B. CLIMATIC CONDITIONS.....

C. LAND ACQUISITION

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

D. PLANNING

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

E. ADMINISTRATION

- 1. Personnel.....Nothing to Report
- 2. Youth Programs.....
- 3. Other Manpower Programs.....
- 4. Volunteer Program.....
- 5. Funding.....
- 6. Safety.....
- 7. Technical Assistance.....Nothing to Report
- 8. Other.....

F. HABITAT MANAGEMENT

- 1. General.....
- 2. Wetlands.....
- 3. Forests.....
- 4. Croplands.....
- 5. Grasslands.....
- 6. Other Habitats.....Nothing to Report
- 7. Grazing.....Nothing to Report
- 8. Haying.....Nothing to Report
- 9. Fire Management.....Nothing to Report
- 10. Pest Control.....Nothing to Report
- 11. Water Rights.....Nothing to Report

- 12. Wilderness and Special Areas.....Nothing to Report
- 13. WPA Easement Monitoring.....Nothing to Report

G. WILDLIFE

- 1. Wildlife Diversity..... 21
- 2. Endangered and/or Threatened Species..... 22
- 3. Waterfowl..... 22
- 4. Marsh and Water Birds.....Nothing to Report
- 5. Shorebirds, Gulls, Terns and Allied Species..... 23
- 6. Raptors..... 24
- 7. Other Migratory Birds..... 25
- 8. Game Mammals..... 25
- 9. Marine Mammals.....Nothing to Report
- 10. Other Resident Wildlife..... 26
- 11. Fisheries Resources.....Nothing to Report
- 12. Wildlife Propagation and Stocking.....Nothing to Report
- 13. Surplus Animal Disposal.....Nothing to Report
- 14. Scientific Collections.....Nothing to Report
- 15. Animal Control.....Nothing to Report
- 16. Marking and Banding..... 26
- 17. Disease Prevention and Control.....Nothing to Report

H. PUBLIC USE

- 1. General..... 27
- 2. Outdoor Classrooms - Students..... 28
- 3. Outdoor Classrooms - Teachers.....Nothing to Report
- 4. Interpretive Foot Trails..... 29
- 5. Interpretive Tour Routes.....Nothing to Report
- 6. Interpretive Exhibits/Demonstrations..... 31
- 7. Other Interpretive Programs..... 32
- 8. Hunting.....Nothing to Report
- 9. Fishing.....Nothing to Report
- 10. Trapping.....Nothing to Report
- 11. Wildlife Observations.....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..... 32
- 18. Cooperating Associations.....Nothing to Report
- 19. Concessions.....Nothing to Report

I. EQUIPMENT AND FACILITIES

- 1. New Construction..... 33
- 2. Rehabilitation..... 34
- 3. Major Maintenance..... 37
- 4. Equipment Utilization and Replacement..... 38
- 5. Communications Systems..... 39
- 6. Computer Systems..... 39

- 7. Energy Conservation.....Nothing to Report
- 8. Other.....39

J. OTHER ITEMS

- 1. Cooperative Programs..... 48
- 2. Other Economic Uses.....Nothing to Report
- 3. Items of Interest..... 48
- 4. Credits..... 49

K. FEEDBACK..... 50

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

- 1. Bird List

A. HIGHLIGHTS

A major environmental restoration project funded by the Army Corps of Engineers was completed (Sections F.1 and I.8).

A high overlook for the nature trail was constructed (Sections H.4 and I.1).

Two ponds were constructed (Section F.2).

A pilot woodcock study began and 324 woodcock were banded in FY88 (Sections D.5 and G.16).

The new office construction began in October (Section I.1).

B. CLIMATIC CONDITIONS

A summary of 1988 precipitation and temperature data for the refuge follows.

<u>MONTH</u>	<u>PRECIPITATION</u> (inches)		<u>TEMPERATURE</u> (°F)		
	<u>Total</u>	<u>+/- normal</u>	<u>High</u>	<u>Low</u>	<u>\bar{x}</u>
JAN	3.12	- 0.34	60	15	33
FEB	2.62	- 0.78	69	18	41
MAR	2.72	- 1.49	70	25	48
APR	4.07	+ 0.89	76	40	57
MAY	4.34	+ 0.90	90	40	64
JUN	3.02	- 0.40	94	64	72
JUL	4.84	+ 0.52	97	60	79
AUG	6.25	+ 2.17	92	66	80
SEP	2.64	- 0.76	88	55	71
OCT	2.64	- 0.83	80	36	58
NOV	4.52	+ 1.34	77	35	54
DEC	<u>1.55</u>	- <u>1.67</u>	70	19	41
TOTALS	42.28	- 0.45			

In January hundreds of woodcock probed in the daytime along the exposures of woodland edges and buildings due to several weeks of sustained freezing weather. Also in January thousands of waterfowl, pushed by low temperatures and snow on the northern Delmarva Peninsula, moved onto the refuge and adjacent lands.

Cold, wet weather in April and May lent a touch of realism to the law enforcement and heavy equipment training sessions. Also, the staff mowed more in these 2 months because of above average rainfall.

The newly developed ponds had low water levels in September and October due to lower than normal rainfall.

Temperate weather conditions prevailed most of the year with no major storms hitting the refuge and with rainfall very near the 45 year average.

C. LAND ACQUISITION

3. Other

On Cedar Island, a barrier island in Accomack County, the National Fish and Wildlife Foundation (Foundation) owns 1,244 acres of land and the Foundation has a conservation easement on an additional 600 acres. These areas were leased to the Service. The refuge was to manage these lands for water birds and other wildlife resources. For many reasons, the only work done on these lands was to monitor them several times during the year. Considerable erosion was noted; as would be expected on a coastal barrier island.

In November the Service released for review and comment an Environmental Assessment (EA) for the proposed acquisition and establishment of Cedar Island National Wildlife Refuge. The Service's preferred alternative would have this area managed as a unit of Eastern Shore of Virginia National Wildlife Refuge.

The Background and Need sections of the EA note the importance of the area to waterfowl, colonial nesting birds, and other migratory birds including endangered and threatened species such as the peregrine falcon and the piping plover.

The EA documents the negative impacts of human activity on this dynamic and fragile environment. The EA states that development pressures threaten to reduce the area's utility as nesting habitat.

Cottages and summer homes have been built on Cedar Island since the 1950s but accelerated development has occurred over the past three years. In 1985 Cedar Island was subdivided and over 60 lots were sold for vacation home development. Nine new residences have been built at the north end of the island since that time. Activities associated with the new construction, such as the movement of construction vehicles and equipment across the dunes and in the intertidal zone as well as increased human use, has disrupted bird nesting activity.



An old cottage on Cedar Island which...

7/88 S.S.



...did not stand the test of time - if you 'sea'
what we mean.

7/88 S.S.



The future of this new home recently built on
Cedar Island may be brief considering...

7/88 S.S.



...the rate at which the front yard was
disappearing.

7/88 S.S.

D. PLANNING

2. Management Plan

A preliminary draft station management plan was completed in August. It was a result of meetings with refuge staff, Regional office staff and Ecological Services staff. The meat of the document contained a list of issues and objectives put in priority order. Strategies will be developed by Region 5 Resource Services early in 1989.

Since its establishment in 1984, the refuge operated without benefit of clearly defined objectives and with minimal capabilities to conduct resource management and support public use. During the planning meetings it became evident that a number of management issues were difficult to resolve because of their complexity. The nature of the refuge's development and changes in the reasons for its establishment have prolonged preparation of a workable plan.

4. Compliance with Environmental and Cultural Resource Mandates

From September 7 to 9 John Wilson, Region 5 Archeologist, conducted a familiarization tour with a contract archeologist prior to issuing a notice to proceed on an archeological survey of the refuge.

From November 14 to 19 archaeologists April Fehr, Colby Child and Leslie McFaden with R. Christopher Goodwin and Associates, Inc. performed a Phase I archeological investigation on the refuge under a contract with the Service. The work included investigation of previously recorded sites and a random survey of the refuge including Skidmore Island.

A final report of the potential for finding important archaeological sites will come in 1989.

On September 27 David Stillwell from the Ecological Services office in Gloucester, VA toured the refuge looking at potential contaminant sites. The refuge has potential for having several sites because of the abandoned military facilities.

5. Research and Investigation

Eastern Shore of Virginia NR88 - " A Pilot Study of Mortality, Movement and Habitat Use of Wintering American Woodcock (Scolopax minor) on Virginia's Eastern Shore" (51650 -01).

Singing ground surveys of American woodcock have indicated a 37.5% decrease in the eastern population since the late 1960s. The reason for this continuing decline is not clear. Habitat loss on the breeding and wintering grounds is considered a

primary factor, but very little is known about wintering woodcock, and, in particular, winter mortality rates and causes. Recent observations on, and adjacent to, the refuge have shown a high concentration of woodcock wintering on the lower end of the Delmarva peninsula. In the winter of 1987-88, 204 woodcock were trapped and banded on or near the refuge. Most of these woodcock were found foraging on lawns and around buildings, and were relatively easy to catch. Limited data on woodcock weights were quite low (104 g for males; 151 g for females) during mid-January, but increased towards the end of the month (173 g for males, 205 g for females) as weather conditions improved. Although no data on winter mortality was obtained, refuge personnel felt that the numerous woodcock on the area were severely nutritionally stressed. It was not known if this was a resident or transient population.

The refuge may be critical wintering habitat for a sizeable population of woodcock. More information on this population of wintering woodcock was badly needed to manage the refuge in the most optimal manner for wintering woodcock.

Several meetings organized by the refuge staff and the regional biologist initiated the management study process. A cooperative study between the state and the refuge was proposed. A final meeting was held with Roy Kirkpatrick and Mike Vaughn from Virginia Cooperative Wildlife Research Unit, Gary Norman and Steve Brock from the Virginia Commission of Game and Inland Fisheries (VCGIF), Rick Sodja, Regional Biologist, and Managers Stairs and Bryant in Charlottesville, VA on November 3. Preliminary details covering needs for initiating this cooperative project were discussed. As an outcome of the discussions preparations were made to hire people, to purchase equipment, and to get the necessary permits needed to start the project in December. Two people were hired, Peter Tango, U.S. Fish and Wildlife Service, and Kurt Buhlmann, VCGIF, to be the field personnel. Telemetry radios were purchased and receivers were borrowed. Permits, bands and other equipment were obtained and the proposal was submitted. The project got off the ground in early December aiming to achieve these objectives:

1. To determine woodcock habitat use in relation to availability.
2. To determine the extent of and factors influencing wintering mortality of woodcock.
3. To determine winter home range size and movements of woodcock.

Transects were established and flush counts made, 120 birds were color banded, 10 birds were collected for fat analysis and habitat mapping was accomplished. Telemetry work was delayed because the transmitter manufacturer, Wildlife Materials Inc,

delivered radios which did not meet specifications. The study will continue through February 1989.

E. ADMINISTRATION

1. Personnel



2. 6. 4. 3. 5. 1.

Personnel

1. Sherman W. Stairs, Refuge Manager, GS-485-12, EOD 12/23/84, PFT.
2. Michael R. Bryant, Assistant Refuge Manager, GS-485-11, EOD 9/11/88, PFT.
3. Irene G. Morris, Secretary, GS-318-4, EOD 12/23/84, PFT.
4. Robert W. Carpenter, Maintenance Worker, WG-4749-8, EOD 12/09/84, PFT.
5. Jerome C. Loomis, Maintenance Worker, WG-4749-8, EOD 12/09/84, PFT.
6. Maurice T. Blake, Tractor Operator, WG-5705-6, EOD 12/09/84, TFF.
7. Carlton T. Scott, Facilities Manager, GS-1640-11, retired 12/31/88.

8. Louis S. Hinds, Assistant Refuge Manager, GS-485-11, transferred 06/13/88 (not pictured).
9. Peter Tango, Biological Aide (Wildlife), GS-404-4 EOD 12/18/88, TFT-NTE 120 days (not pictured).

Louis S. Hinds, III, the refuge's first Primary Assistant, was transferred June 19 to the Budget and Finance Department in the Washington office. The last 3 months of his tour of duty were divided. He spent three days of each week in Washington, D.C.

Michael R. Bryant transferred from Arthur R. Marshall Loxahatchee National Wildlife Refuge in Florida.

Maurice T. Blake was rehired on April 1 after a six month absence.

Rick Sojda, Regional Biologist for Refuges South, transferred his office to Blackwater National Wildlife Refuge on November 6.

Jerome C. Loomis and Robert W. Carpenter, Maintenance Workers were both promoted from WG-7 to WG-8 on December 18.

Peter Tango was hired for a pilot woodcock study. He recently received a Masters in wildlife. He was selected for his experience in telemetry work.

Carlton T. Scott received a 30 year Government Service pin in December. He reached 30 years in October.

Michael R. Bryant received a performance award for achieving a level 4 on his performance appraisal from his last station.

Jerome C. Loomis received a Special Achievement Award of \$300.00 on November 9, for construction of the observation deck on the nature trail.

Carlton T. Scott, Facilities Manager GS-1640-11, retired effective December 31, after 30 years, 2 months government service. Mr. Scott was retained by the Service after the closure of Cape Charles Air Force Base because of his knowledge of the facilities. Through his efforts with excess property much of the equipment to help get this refuge started was acquired, as were equipment and supplies for other refuges and facilities. His understanding of the existing facilities made construction, rehabilitation and repair projects easier to accomplish. Mr. Scott's work in the past four years was valued and his knowledge and skills will be missed.



Carlton Scott retired after
30 years of government service.
10/88 M.B.

A summary of refuge staffing showing a five year comparison of on-board strength is shown below:

	<u>Permanent</u> Full-Time	Seasonal	Temporary	Total FTE
FY 88	6	1	1	8
FY 87	6	1	2	8
FY 86	6	0	3	9
FY 85	6	0	3	9

2. Youth Programs

The refuge hosted a non-residential YCC camp from June 27 to August 22. The 6 enrollees selected by lottery were recruited through news releases and local high school guidance offices. The enrollees' leaders were Edward C. Walsh, Work Leader, and Robert Lewis, Youth Leader. Mr. Walsh's tour of duty was from June 11 to August 30. Mr. Lewis had been an enrollee in 1987 at the refuge.

The enrollees worked on the these projects: boundary line clearing, posting boundaries with refuge signs, reconstructing the nature trail to accommodate the handicapped, making firing lanes on the firing range, landscaping, painting safety lines on steps and curbs, developing the library for use, cleaning and maintaining of equipment and buildings, and banding terns on Fisherman Island.

3. Other Manpower Programs

May through August, Eastern Shore of Virginia had the help of two Student Conversation Association (SCA) volunteers. Maureen Lannon, a graduate student from St. Joseph, Michigan worked from May 9 to July 16. Lynn Law, a junior in college from Minneapolis, Minnesota, worked from June 7 to August 9. They assisted in refuge resource management activities such as finishing the refuge bird list, surveying and monitoring piping plovers, bird banding, starting a refuge botanical list, giving educational tours, and helping with clerical activities.

4. Volunteer Program

The program had its ups and downs this year. At the beginning of the year, with a primary assistant on board, the program could be managed effectively, but when the primary assistant's time was divided between Washington and the station and then he transferred to Washington the program was put on hold until new staff was on board and the backlog of administrative duties was caught up.

Seventeen individuals volunteered their services. Most were local but several were avid birders and banders from out of state. They contributed 882 hours. They performed the following jobs: visitor contact station receptionist on weekends from 1:00 to 5:00 through the spring and early summer; trail development and maintenance; raptor and woodcock banding; clerical work; library development; and general maintenance.

5. Funding

A summary of Eastern Shore of Virginia National Wildlife Refuge funding is shown below for the fiscal years of 1985, 1986, 1987, 1988. The refuge was not funded prior to Fiscal Year 1985.

Type of Funding	Fiscal Year			
	1985	1986	1987	1988
Operations and Maintenance	339,000	277,100	271,735	511,377
Residence Maintenance	900	900	8,600	11,606
Construction/Rehabilitation/ ARMMS	95,999	21,918	62,300	40,600
Redirected ARMM		10,776		
Resource Management		20,000	4,000	
YCC		11,000	13,600	13,600

6. Safety

Regularly scheduled safety meetings were not held the first 5 months but every morning a 15 minute meeting was held and included safety at regular intervals. When YCC commenced, safety meetings were held each morning for the enrollees after jobs were assigned. These meetings were called for in the approved YCC Safety Plan. This plan was prepared and approved in the spring and utilized in the summer program.

In September a new safety meeting format was developed: Hazards noted from previous meetings were discussed and abatement progress was documented; new hazards were brought up, abatement was discussed and individuals were assigned the task of fixing the problems; and a main topic was presented. Also in September a station safety officer and safety committee were appointed.

Safety meeting accomplishments and topics:

1. Many small hazards and safety deficiencies were identified and corrected by the staff throughout the year. Deficiencies noted on the annual safety checklist were also addressed and abated. Everyone on the staff made positive suggestions and helped implement them; to mention a few, eye wash stations were purchased and installed, a battery service area was established, all the fire extinguishers were inspected and serviced, the numerous electrical panels were all labelled, ground fault interrupters were installed and a system of 'hazard-note' clip boards were placed in all the buildings.
2. The staff was certified in CPR in the summer and completed a defensive driving course in the fall.

There were no lost time accidents in CY88 - a small sentence but a large accomplishment.

8. Other

There were two 40 hour law enforcement refresher sessions held at the refuge: the first was April 11-16 and the second was April 25-29. Nearly 100 refuge officers took part in the annual training. As host, the refuge spent considerable time preparing for the sessions to ensure their success.



With a firearms range on station requalification during the law enforcement refresher sessions was handled efficiently.

4/88 L.H.

Heavy Equipment Training was from May 9-13. The instructors were Louis Hinds and Robert Carpenter, Eastern Shore of Virginia NWR, Steve Flanders, Montezuma NWR, and Edward Darlington, Harrison Lake National Fish Hatchery. The instructors were on hand one week before the training course to obtain the necessary equipment needed for instruction, prepare literature, classrooms and obstacle courses, determine course field work, and still have time to prepare the equipment so that each piece of equipment met the safety standards needed for operation. Lunch was prepared on the station for the 30 students. They were trained in farm tractors, front-end-loader/backhoes, crawler dozers and motor-graders. They helped breakup and bury house foundations and graded dirt roads.



Students get plenty of hands-on experience during heavy equipment training.

5/88 L.H.



While the students get the requisite 'seat time' the refuge benefits - here they buried an old foundation.

1988 L.H.

F. HABITAT MANAGEMENT

1. General

Habitat management objectives are to maintain diversity, to conserve the different types of habitat and to enhance those types utilized by fall migratory birds, endangered and threatened species, wintering waterfowl and American woodcock.

Most management efforts went toward restoration work via contracts funded and administered through the Army Corps of Engineers (COE). Numerous military structures and buildings were removed and the retrieved land was restored to a vegetated state (Sections F.5 and I.8). The contract stipulated an on-site borrow area for fill. The contractor was directed to take fill from two areas where management wanted to develop wetlands. Two shallow fresh water ponds were started by the contractor. Refuge staff using some refuge and some borrowed equipment, completed one pond and progressed on the other (Section F.2).



Contractors removed these large towers and buildings under a contract funded by the Army Corps of Engineers as an environmental restoration project.

1/88 L.H.

2. Wetlands

Refuge wetlands were divided between beaches, tidal salt marshes and fresh and brackish ponds. Management consisted of monitoring, posting and protecting the marshes and beaches. Additional pond development occurred.

There were 650 acres of beach and dune habitat administered by the refuge. Beach acreage, although dynamic by nature, did not change significantly through the year. Surveys, monitoring and pickup of debris were done at regular intervals. Occasionally, the remains of marine mammals, sea turtles and migratory birds were found and data was gathered (Sections G.2 and G.7).

There were 1,345 acres of tidal salt marsh administered by the refuge. Saltmarsh cordgrass (Spartina alterniflora) predominated in this habitat. Of the 1,325 acres: 1,244 were on Cedar Island in Accomack County which was managed under a lease agreement with the Foundation; 70 were on Skidmore Island, and 31 were contiguous with the refuge. No significant changes occurred in the quality or structure of these marshes. These marshes were fringed by infrequently inundated high marsh dominated by saltmeadow hay (S. patens) and black needlerush (Juncus roemerianus). This formed the perimeter of the uplands.

Two freshwater ponds were developed. Each pond was started by the contractor doing environmental restoration work for the Army Corps of Engineers. They were located in the old military compound in two low lying areas with natural drainage toward marsh habitat. Each pond was approximately one acre in size.

The south pond was completed in early September. Two small islands were incorporated in the design. The pond was tied into an existing drain for recharge capabilities and an overflow pipe was buried in the south end to allow drainage of excess water.



The newly developed south pond - a result of an environmental restoration project funded by the Army Corps of Engineers and work done by refuge staff and borrowed equipment.

9/88 M.B.

An existing water line truncated by the contractor was stubbed up with a hose bib giving the potential for a fresh water source in times of drought. In late September and early October pickerelweed (Pontederia cordata), burreed (Sparganium sp.), and nodding smartweed (Polygonum papathifolium) were planted in the pond. Top soil was spread on the banks and birdsfoot trefoil, buckwheat and annual rye were sowed. Water levels remained low through the remainder of the year. The planted aquatics grew very little. The birdsfoot trefoil and annual rye germinated and produced numerous seedlings before cold weather slowed their growth. Small numbers of gulls, wading birds, shorebirds and waterfowl used the pond.



Emergents were planted in the newly developed south pond.

9/88 M.B.

The north pond development was still in progress at year's end. This pond was broader and more shallow than the south pond and was closer to woodlands. It was used by small numbers of black ducks in November and December.

These ponds increased the acreage of fresh water pond habitat to 5.5 acres.

3. Forests

A number of habitat types are present with several successional stages occurring in each type. There are transitional shrub thickets, low open woodlands and maritime forests.

Shrub thickets were found landward of the dunal grasslands or high marshes. Dominant species were wax myrtle (Myrica cerifera), bayberry (M. pennsylvanica), groundsel tree (Baccharis halimifolia), and marsh elder (Iva frutescens). Within this community herbaceous vegetation includes saltmeadow hay and poison ivy (Rhus radicans).

There were 95 acres of shrub thicket habitat. This transitional community provided important cover for migratory birds when staging in the fall. Management included transect development, surveys and protection, and clearing a .5 acre plot to maintain the raptor banding site at Wise Point.

Shrub communities succeeded to low open woodlands of sassafras (Sassafras albidum) and black cherry (Prunus serotina) as elevations increased and exposure to flooding and salt spray decreased. These initial woodland colonizers were succeeded by a mixed evergreen deciduous community of eastern red cedar (Juniperus virginiana), red bay (Persea borbonia), persimmon (Diospyros virginiana), loblolly pine (Pinus taeda), and yaupon (Ilex vomitoria).

There were 120 acres of low open woodland. Boundary line clearing and posting, transect development, and surveys were done in these habitats.

Low open woodlands succeeded to loblolly pine-American holly (Ilex opaca) transitional communities. These were followed by the final successional stage, the traditional maritime forest, dominated by loblolly pine and oak (Quercus spp.). The maritime forest can actually be considered a disclimax, since the exposure of these coastal areas to tidal flooding and salt spray prevents the invasion of the less tolerant hardwood species that are found in the climax forests of the mainland.

There were 100 acres of maritime forest. Management consisted of boundary line clearing and posting, transect development, surveys, and protection.

A study was conducted by two Student Conservation Association (SCA) volunteers on a 61 acre woodland located north of the office/resident area. Lynne M. Law, SCA, was the principle investigator. Flora density and distribution patterns were determined using 14 randomly selected nested plots. Seventeen plant species were identified in three layers: The highest density species in the canopy were loblolly pine and American holly; in the understory American holly; and in the ground layer, partridge berry (Mitchella repens) and Japanese honeysuckle (Lonicera japonica). This work gave higher resolution to the habitat's description, providing better information for management decision making and base line data to compare against future changes or responses to management activities.

4. Croplands

There were 77 acres of croplands managed through an interim cooperative farming program. Completion of the cropland management plan was stalled when the primary assistant manager transferred. Fortunately, the cooperative farming permittee agreed with the interim cropland management objectives and worked in concert with the refuge staff.

There were three 22-acre fields, units W-1, W-2 and W-3, divided by 9 acres of filters strip and 2 acres of windbreaks. The windbreaks were planted with bicolor lespedeza (Lespedeza

bicolor), autumn olive (Elaeagnus commutata), red cedar, and loblolly pine.

Unit W-1 was in red clover from a fall 1987 planting. The permittee had no market for clover and no equipment to mow it. The refuge did not have manpower or proper equipment to quickly mow the pasture. Consequently, a lush spring growth appeared and flowered, but by late summer weed competition had diminished the rank growth. Numerous birds used the unit and adjacent filter strips to forage and roost, and deer browsed and rested there at night.



A lush growth of red clover on 22 acres of cooperatively farmed land.

4/88 S.S.

The permittee disced unit W-1 in September and planted it in annual rye in October. This green manure crop provided browse, good soil development, and allowed sequencing a rotation according to the interim plan.

Units W-2 and W-3 were planted in winter wheat late in 1987. These units received little use from geese from January to March. The wheat was harvested in July.



The cooperative farmer received average yields from the wheat crop.

7/88 S.S.

Farming unit W-2 was left fallow until fall. In October, the permittee disced unit W-2 and planted winter wheat. By year's end, a modest stand had developed. Short season soybeans were no-till planted in W-3 in July. Deer browsed heavily on the southern end of the field. The crop was harvested in early December and the field left fallow. Fair numbers of pods were left on the stubble. Use of this incidental food source by wildlife was not directly observed, but the number of pods diminished quickly; no doubt wildlife benefited. Some nocturnal woodcock use was observed in the fallow field.

The farming services provided by the permittee were: to plant, at his expense, three 2-acre wildlife food plots; FP-1, FP-3 and FP-4. FP-1, a plot near the office, was planted in millet in early summer. Early planting and heavy weed competition produced a sparse crop, but use by fall migrants and winter residents was often observed. FP-3, a plot in the grassland, was planted in a high oil variety of sunflower. It received heavy use by fall migrants. FP-4, a plot adjacent to the newly developed south pond, was planted in millet. The results were similar to FP-1.



A patchy crop of millet was produced on the two acre wildlife food plot planted by the farmer.

7/88 S.S.

5. Grasslands

The refuge had 115 acres of grassland. Management objectives were to increase the population of raptor prey species, to create more nocturnal habitat for woodcock and to produce more natural cover and forage for fall migrants and wintering birds. The strategies were to keep the areas in an early stage of old field succession and to mow strips and blocks in this cover in late summer. The strips and blocks increased diversity, helped raptor hunting success and increased nocturnal use by woodcock.

G. WILDLIFE

1. Wildlife Diversity

Strips and blocks mowed in grasslands, seed crops planted in food plots, crop rotations in three farming units, trees and shrubs planted for windbreaks between farming units, and ponds constructed in restored areas contributed to increased diversity and density of wildlife.

2. Endangered and Threatened Species

Bald eagles, mature and immature, were seen intermittently throughout the year. There were several active eagle nests within five miles of the refuge on the Delmarva Peninsula.

Peregrine falcons were seen during fall migration and 11 were banded (Section G.16).

Piping plover were seen on Cedar Island in Accomack County during the breeding season.

Least terns were seen occasionally in the fall.

Two dead loggerhead turtles were found on Wise Point's bayside beach. Data was taken and submitted.

3. Waterfowl

Small numbers of black ducks were observed in the marshes and ponds through the year. A few black ducks, blue-winged teal and gadwalls used the newly developed ponds in the fall and early winter.

In June a few black duck and gadwall broods were seen in the brackish ponds on the south end of the refuge.

Low temperatures and snow in January on the northern end of the Delmarva Peninsula pushed thousands of wintering waterfowl into Northampton County. One mixed flock of 1,500 snow geese, 1,000 black ducks, and 1,000 mallards, common pintails and green-winged teal arrived on adjacent land to feed and browse in a field of soybean stubble. A few of these birds used the refuge and many of them flew over moving to marshes south of the refuge.

A resident flock of 30 Canada geese was seen through the year flying over the refuge from Fisherman Island to adjacent land north of the refuge.

From October to December, groups of approximately 100 snow geese were seen flying over the refuge.

Hundreds of scoters, scaup, oldsquaw, bufflehead, and brant were regularly observed around Skidmore Island in the fall.

Twenty-seven species of waterfowl were observed in the marshes, ponds, and bays, on and around the refuge, during the Audubon Society Christmas Bird Count.

5. Shorebirds, Gulls, Terns and Allied Species

Woodcock survey, capture, recapture, and weight data gathered in January and February during the banding effort suggested the following:

1. Cold weather pushed the population down the peninsula to the terminus - one brief daytime survey on January 9 produced 88 birds. These were seen on lawns and around buildings and structures.
2. The population was stressed - weights during January were low and birds were seen probing in the daytime.
3. The population was remaining for five to six days - 40 recaptures out of 204 captures averaged a little over five days between the first and second capture and there were very few third captures.

Staff speculated that the population was migrating south across the Chesapeake Bay after a few days of feeding and resting.

Data gathered in December at the beginning of the pilot project (Section D.5) suggested the following:

1. The population, which increased through the month, was not turning over. The percentage of recapture to initial captures increased over time.
2. The population was not stressed. Weights were averaging those which literature considered normal and the birds were not seen probing during the day.
3. Habitat use alternated from mowed strips at night to wooded edges where the ground cover was dense and viney. Most birds were observed in these habitats at these times. The data came from flush counts along transects and surveys incidental to banding operations. The transects and survey routes traversed samples of most habitat types found on the refuge.

In March, based on January and February data, investigators speculated that a significant portion of the population was in migration, that the birds were resting and feeding for a few days before flying south across the Chesapeake Bay. Later, based on data taken in December, the investigators felt a significant portion of the population were winter residents. The population was characterized as predominantly hatch year birds which had migrated onto the Delmarva Peninsula in late fall and become a wintering population. As the weather becomes severe birds are stressed and move to the terminus of the peninsula. i.e., the

refuge. The refuge and adjacent lands are usually the last areas on the peninsula to freeze or become snow covered; thus providing critical habitat for the woodcock.



It appears the refuge may provide critical wintering habitat for the American woodcock.

1/88 L.H.

6. Raptors

Large numbers of raptors migrated through in September and October. Sharp-shinned hawks, merlins, and Cooper's hawks were the most abundant species. The numbers were down slightly from previous years based on banding results at the Wise Point banding site (Section G.16) located at the southern tip of the peninsula. It was operated by an employee of The College of William and Mary and funded by the Non-Game Division of the Virginia Commission of Game and Inland Fisheries. The employee, Rudy Cashwell, was also a refuge volunteer throughout the year.

Osprey were the most common raptor in the summer. They used the same nesting platforms used in previous years. There were four nests with eight young fledged.

There were three abandoned military towers on the refuge. The Army Corps of Engineers Restoration Project removed two of the towers. Owls had nested in them in past years. In anticipation of this nesting habitat loss, four owl boxes were put up in 1987. No use of the boxes by owls was recorded. However, barn owls again nested in the one remaining tower; an abandoned concrete

military observation post. The tower was in the middle of the grassland south of the office. In July, the staff banded five young in the nest (Section G.16).

Turkey vultures roosted on the top of a bunker where the high overlook for the nature trail was completed. Between 50 and 100 turkey vultures were seen throughout December.

Winter residents included numerous northern harriers, American kestrels and several red-tailed hawks. They searched for prey in the grasslands where strips and blocks had been mowed and used osprey nesting platforms, the old military observation tower and the power line poles in the grasslands for perches.

7. Other Migratory Birds

Millions of birds migrated through in early fall. The passerines used the grasslands, food plots, and woodland corridors for food and cover while staging. Banding data from the Kiptopeke banding station, three miles north of the refuge and from the Christmas Bird Count suggested species richness and total numbers were slightly down. As land is developed there will be less suitable migration habitat on the peninsula and the relative importance of the refuge as quality forage and roosting habitat will increase - the law of supply and demand.

8. Game Mammals

Staff members gathered data from twenty white-tailed deer censuses, seven harvested deer and six road killed deer. Censusing was done at night with a spotlight in conjunction with woodcock capture efforts. Harvested deer were taken on adjacent county lands and checked at the refuge, a state check station. Road kills were collected within one mile of the refuge.

The number of deer seen at night in grasslands, farming units, and woodlands increased between October and December. The number rose from eight to twenty-five seen in one evening.

Age, weight, and sex data were collected from harvested and road killed deer. General health was estimated. The sample was of fair to good health but had large tick loads. Hunting pressure was light to moderate on adjacent county land.

Small numbers of the Eastern cottontail rabbit (Sylvilagus floridanus) were seen frequently in edge habitat. Habitat management practices, such as mowing rotations and planting brush, have increased quality and amount of edge within grasslands and along woodlots. Rabbits have benefitted.

The Virginia Department of Game and Inland Fisheries was very interested in the status of the insular S. floridanus hitchensi

subspecies, the barrier island cottontail rabbit. Its status was undetermined. As a cooperator, the refuge was asked to preserve any rabbit carcasses found on the islands or the seaside mainland. The purpose was to determine the subspecies distribution to see if special protective measures needed to be instituted. None were collected.

Red fox were seen infrequently. One dead male was found in the fall during hunting season. Apparently it had been wounded, then it moved onto the refuge and died.

Opossum were seen as frequently as rabbits and in similar habitat.

Gray squirrels were seen infrequently in the woodlands.

Raccoons were rarely seen.

10. Other Resident Wildlife

The coyote population remained constant. Several adults were seen and heard in the spring and summer, but no sightings were confirmed in the fall or winter.

16. Marking and Banding

Raptors were banded at the banding station on Wise Point and in the abandoned military observation tower. Woodcock were banded and color banded as part of a pilot project (Section D.6).

The banding results were as follows:

<u>COMMON NAME</u>	<u>NUMBER BANDED 1988</u>							<u>TOTAL</u>
	<u>JAN</u>	<u>FEB</u>	<u>JUL</u>	<u>SEP</u>	<u>OCT</u>	<u>NOV</u>	<u>DEC</u>	
Sharp-shinned hawk				108		188		296
Cooper's hawk				10		37		47
Northern harrier				4		2		6
Red-tailed hawk				1		1		2
American kestrel				12		0		12
Merlin				141		47		188
Peregrine falcon (E)				7		4		11
Barn owl							5	5
RAPTOR TOTAL								<u>567</u>
American Woodcock	198	6					1 120	325

H. PUBLIC USE

1. General

The development of the public use program made modest progress. Changes in key Regional Office personnel and staff shortages at the refuge were impediments, but things were accomplished. A preliminary draft station management plan was prepared, a contract was let for development of a visitor center concept plan, a bird list was produced - the refuge's first official publication, an overlook was completed on the nature trail, and a new wheel chair accessible rock dust surface was applied to the nature trail.

The planning needs assessment process, which will culminate in a station management plan, should provide the direction needed for development of a public use program, a program with support from the Service and from the locality. Several meetings and much research and writing were required to produce the preliminary draft station management plan. The history of refuge public use achievements was documented in the process.

Two facilities without benefit of a plan were developed in the past. They were the visitor contact station and the nature trail. Development of the contact station was at the direction of the Service. Development of the nature trail was based on a modified proposed trail plan prepared by the Service.

A few years ago the Service offered to develop a facility to house a loaned decoy collection. The staff was directed to complete the task. It was done and the result was a beautiful visitor contact station/museum. The serious drawback with this initiative was a lack of staff to man the facility and to advertise its existence. A volunteer corp was developed to man the facility on weekends. Occasionally, local artisans displayed their decoy carvings and wildlife paintings. Modest numbers of visitors came. The preliminary draft station plan suggested the decoy collection might be better utilized elsewhere. The suggestion surprised and discouraged the staff. Their efforts seemed undermined by a fundamental change in the commitment to house the collection in an existing building on the refuge. The hope for the future: that a firm long term decision and commitment, based on the approved plan, will be made before the investment of staff and money.

Two years ago the nature trail was started. The trail was laid out; a landscape timber border, shells and wood chips were put down; two overlooks were completed; a parking area was established; and the trail surface was upgraded to make it wheel chair accessible. With a major visitor facility on the horizon, the trail should be completed before the visitor facility is opened. It needs to be interpreted and to complement the

facility. The staff hopes the station plan will resolve the issues, give a finite number of mutually agreeable objectives, and develop strategies that provide the mechanisms for their attainment. A public use plan will have to follow. Management recognized this need but additional staff will be needed to complete the task of preparation so a plan is in place before the visitor facility and trail are complete.

The refuge has always left a good impression on its visitors. All visitors contacted were pleased with the visitor facilities and the staff. Although the refuge was limited by a small staff and incomplete facilities, the visitors left with a favorable impression. This was a result of the positive and dedicated staff, however the secretary and maintenance people should not be asked to carry the program, and management cannot do it without neglecting resource management initiatives. So much more could be done if the refuge had one person devoting time to planning and implementing the soon to expand public use program. The trail should be finished and interpreted, refuge brochures need development, and the volunteer program needs to be activated, just to mention a few examples. With the visitor facility coming, a staff person needs to be in place before the ribbon is cut so the Service can present a first rate program to the public.

The initiative that will create a full blown public use program, the development of a visitor center near the highway, made progress. A number of meetings were held through the year. In the fall a contract was let to an architectural and engineering (A&E) firm to develop a concept plan.

Representatives of the A&E firm - Inside-Outside, Regional Office staff and the refuge manager met from December 5 to 9 to discuss all aspects of the concept plan. The plan will be complete early in 1989. The Service wants a facility that is self service, requiring as little staff as possible; is near U.S. Route 13; and is designed for expansion by phases.

2. Outdoor Classrooms - Students

Three schools used the refuge as an outdoor classroom. The Richmond Community High School brought two classes in May. The refuge SCA volunteer assisted the instructors. The topic was coastal biology. Activities utilized the tidal marsh and beach habitats.

Cape Charles Elementary School brought a fifth grade class in early June. The class was instructed in basic habitat management and participated in planting trees and shrubs to form a wind break.



Local students plant trees and shrubs to help increase diversity and cover.

5/88 L.H.

A gifted children marine education camp came to study ecology in late July. One of the refuge SCA volunteers assisted the instructors in activities held in the tidal marsh and beach habitats.

The local Girl Scout Troop used the Visitor Contact Center to learn about the wildlife and habitats on the refuge and about how the Service helps wildlife by enhancing the habitat. The Troop then used the refuge roads and nature trail for a two mile hike to gain hiking and nature experience for a merit badge.

4. Interpretive Foot Trails

The high overlook that was started in 1987 was completed in March. It is an integral part of the developing nature trail. The 69 step stairway goes to a deck on top of a bunker. The view from this point includes all the habitat types of the refuge.



The high overlook started as a brushed out path up a steep bunker.

10/87 L.H.



The high overlook - one more week and it was ready.
3/88 L.H.

There was additional progress made on the nature trail. The YCC, volunteers, and maintenance staff covered 80% of the trail in rock dust. This material makes the surface wheel chair accessible.

Staff estimated that 1,000 visitors used the nature trail with peak use in June and in September.

6. Interpretive Exhibits/Demonstrations

The refuge opened the visitor contact station/museum (VCS) from 1-5 P.M. the last Sunday in January, February and March. Volunteers manned the VCS. In January four local decoy carvers exhibited and demonstrated their craft; 60 visitors came. In February a wildlife water colorist exhibited and demonstrated her art; there were 30 visitors. In March there were 32 visitors.

Starting May 14 the VCS was opened 1-5 P.M. on weekends. Again, volunteers manned the VCS. Each weekend averaged 50 visitors. Volunteer interest waned with this number of visitors. The assistant manager transferred in June making volunteer coordination difficult. The weekend opening of the VCS was put on hold starting in mid-July.

The remainder of the year the VCS was opened on request to visitors and groups. An average of 50 visitors a month used the facility.

7. Other Interpretive Programs

Refuge staff and volunteers gave seven on-refuge programs and four off-refuge programs during the year.

Between March and December seven different staff members gave talks and slide shows to a total of 230 people covering refuge specific information and important Service initiatives such as the North American Waterfowl Management Plan.

17. Law Enforcement

Less patrol work was accomplished this year. The refuge normally has two collateral duty refuge officers but Assistant Manager Hinds transferred and before that he worked in Washington three days per week for several months. The refuge law enforcement capability was significantly diminished at a time when trespass violations usually peak. It was not until mid-September that the assistant manager's position was filled.

Enforcement efforts were aimed at prevention. Trespass had been a problem in the past. More boundary posting was accomplished and efforts at educating the using public were made.

The refuge had always been closed from dusk to dawn. Occasionally commercial fisherman had passed through the refuge at night to get to a private landing where their boats were moored. The Service owned the road and the right-of-way they traveled to get to the landing. To regulate access on the refuge but to avoid denying people access to their livelihood, a meeting was held in October with the commercial fisherman. Special Use Permits were given to each person needing access. The meeting and permits educated permittees and put them on notice that access would be regulated. Everyone attending the meeting was pleased with this approach, thus solving the potential problem.

When rail season opened in September, Special Agents utilized refuge facilities for storing equipment and as a staging area for enforcement activities. Maintenance personnel and equipment were utilized in a support function. The grass strip was mowed at the pilot's request.

I. EQUIPMENT AND FACILITIES

1. New Construction

In January the maintenance staff started clearing the site for the new office. They removed kudzu, logs, and abandoned utility poles. In May a contractor removed a small building and surface storage tank on the site (Section I.8). Bid invitations were let in August, an award made in September, and construction started in October. The contractor, Beach Construction Company, had the building framed and partially sheathed by the end of the year.



Work started on the new office in October.

10/88 M.B.

The stairway and deck to the high overlook on the nature trail were finished in March. This overlook was constructed on a bunker. Several months of work by Jerry Loomis, Maintenance Worker, went into the planning and construction of this important and attractive addition to the trail. There were 69 steps to the 12 foot x 36 foot deck. Mr. Loomis received a special achievement award for his work.

The maintenance staff made a wood and metal-working area in the new shop building. It required electrical wiring, framing and sheathing, anchoring power tools, constructing benches and installation of a vacuum system. Most of the power tools and materials and the vacuum system were acquired through the excess property program. The work was accomplished intermittently through the year.

2. Rehabilitation

The maintenance staff enclosed the carport on the office. The new room was finished off inside and wired. It was used as a conference room before the detail work was complete. It alleviated overcrowding in the old house which served as the office.



The carport on the office was made into a conference room.

6/88 S.S.

The maintenance staff made more office space by clearing and painting an old unused office in the motor pool. Carlton Scott, the Facilities Manager, moved to this space.

The maintenance staff enclosed the carport in quarters 211 for additional living space. A second bathroom was added and the existing bathroom's drains were repaired. At year's end most of the work was complete.

The old entrance into the water plant was deteriorated. Maintenance staff removed it and a new door and a removable wall section were installed.



The entry way to the water plant was replaced with a removable wall section so large water plant components could be removed in the future.

10/88 M.B.

A contractor replaced the garage doors on the vehicle garage and the metal maintenance building. He also installed an electric door opener on one of the doors.

A contractor removed asbestos from six buildings for \$47,000. The asbestos had to be removed and the building inspected and declared safe before the buildings could be either used or demolished.



A contractor removed asbestos from six buildings - better him than us but \$\$\$\$!

8/88 S.S.

Rock dust was added to most of the nature trail allowing wheel chair access. The trail was 80% complete at year's end. After completion of the facility, interpretive work will have to be done.

The firearms range was improved substantially. A contractor for the Army Corps of Engineers raised the earthen back and side walls. The YCC put in rock dust firing lanes. The maintenance staff made a wooden post and rope fence at the entrance and installed aluminum square tubing sleeves at each position on the 25 yard line. Now removable post barricades will be used instead of the old cumbersome platform-mounted ones.

3. Major Maintenance

On January 21, a crew working on the microwave tower for C & P Telephone Company accidentally dropped a wet rope across the high voltage electrical wires leading into the refuge. This caused two of the three electrical phases to short out and blow their fuses. The remaining phase did not blow its fuse and it continued to supply power to the transformer of the new shop. This caused the transformer to overheat and burn out. This was the second transformer to go since accepting the building six months earlier. Not a good track record. The insurance company for C & P Telephone is going to cover all damage costs incurred by the government concerning this incident.

The original transformers were the dry type. The subcontractor said they were the wrong type at the time of installation. This has proved to be the case. The oil-based type transformer was installed at the subcontractor's suggestion. There were no problems afterwards.

The conference room and kitchen facility were cleaned and made ready for two law enforcement refresher sessions. An automatic movie screen and mini-blinds were installed in the conference area to improve the audio-visual portion of the presentations.

In October, maintenance staff installed a new McDonnell-Miller valve assembly on the boiler for the conference/cafeteria building. This building was use often during the year; including the annual law enforcement refreshers.

In November, the maintenance staff painted the metal roof of the old vehicle storage building which had rusted and they tarred the roof of the visitor contact station because leaks had developed.

In December, a 6 inch water main broke. It was four feet in the ground, under a sidewalk, and paralleled with other underground utilities. With the backhoe the repair was accomplished in three hours; hooray for backhoes!

A diesel-powered five-ton truck, picked up as excess property from the Department of Defense, was given a safety check. After a few mechanical repairs, a paint job on the frame and bed, and new side rails were made it was ready for use. Approximately \$1,000 in labor and materials gave the refuge a \$40,000 truck at current prices.

From May to September one maintenance employee spent the majority of his time mowing and trimming. As more buildings are removed some areas requiring a high degree of lawn care will revert to old field. The lawn care requirements will diminish as a consequence.

4. Equipment Utilization and Maintenance

The Facilities Manager picked up a diesel-powered five-ton truck through excess property in March. The staff often used it for transport of materials and supplies.



Rick Sojda, Regional Biologist, Refuges-South, used the diesel-powered five-ton truck to move his office to Blackwater National Wildlife Refuge.

11/88 M.B.

In September, a fifth wheel tractor was also picked up through excess property.

A local mechanic, with the staff's help, made one good dump truck from two excess dump trucks. The subframe, the dump cylinder and hydraulic pump, the dump box and the tires from the gasoline powered truck were transferred to the diesel powered truck. Now the refuge has the truck it needs.

A dump truck acquired by the refuge through the excess program was transferred to Erie National Wildlife Refuge. The truck was loaded with kitchen equipment for the Iroquois Job Corp Center.

In June, a 1988 Dodge Dakota 4 x 4 pickup truck was received and a 1980 Chevrolet 4 x 4 pickup was declared excess as a trade-in.

In May, four heavy equipment instructors spent a week servicing and making minor repairs to four farm tractors, three mowers, two

backhoes, two crawler dozers, and a motorgrader. The equipment was prepared for the heavy equipment training course taught at the refuge.

During the summer the fill dirt borrow areas, created by the habitat restoration contract work funded by the Army Corps of Engineers, were expanded and turned into ponds by the staff using a borrowed crawler dozer and the refuge front end loader/backhoe.

5. Communications System

Two Motorola mobile radios were purchased and installed in vehicles. Four Bendix/King highband multi-channel radios were purchased; two portables and two mobile/base units. Several refuges in the area have gone to these radios with good results and considerably more versatility.

6. Computer Systems

The staff used the computer system heavily this year. By the end of FY 1988, management decided to purchase an additional personal computer because of the limited accessibility one station provides. A NEC Powermate-2 was purchased and set up. Rick Sojda, Regional Biologist, Refuges-South, gave considerable help in getting things going.

8. Other

This year the major activity on the refuge was the removal of old facilities. The Army Corps of Engineers undertook an environmental restoration project. They contracted for the removal of ten buildings and structures. In January four had been razed. By the end of May, the last six had been demolished. The large quantity of concrete coming from this work was placed on the back stop and wing walls of the firearms range. It was then covered with dirt.



This tower was cut at its base and...

2/88 S.S.



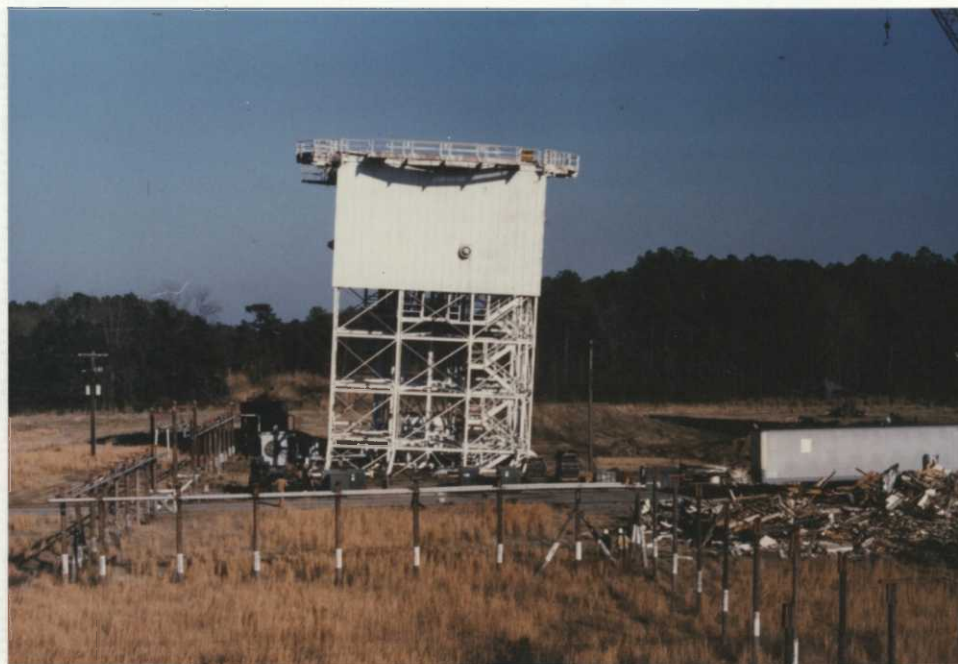
...toppled...

2/88 S.S.



...to the ground. Then it was cut up and hauled away.

2/88 S.S.



Next, this tower was brought down...

2/88 S.S.



...and it was cut and hauled away too.

2/88 S.S.



The abandoned Air Force Operations Building was demolished with a headache ball. The concrete was used to build up the firearms range walls.

3/88 S.S.



The abandoned power plant building was razed and the rubble used on the firearms range walls.

5/88 S.S.

As part of the restoration work the contractor dug up the underground fuel tanks associated with the buildings, cut them into pieces and removed them to a landfill.

One of the restoration work contractors was contracted by the refuge to raze a small building and cut up and remove a surface storage tank located on the future office site while he was mobilized for the Army Corps of Engineers project.



A 8 foot x 20 foot storage tank located on the future site of the new office was removed by a contractor.

2/88 L.H.



An abandoned Army building from the WWII Fort John Custis days located on the future site of the new office was razed and removed by a contractor. 2/88 L.H.

Refuge staff spent considerable time monitoring and lending administrative and logistical support to this restoration project. At the projects completion the areas were graded and seeded. A few transformers were left by the contractor and the staff was in contact with the COE representative to resolve this problem. The contract cost the COE approximately \$800,000.

On January 5, the U.S. Coast Guard used the refuge airstrip to land a helicopter that was used to ferry materials to the Smith Island Lighthouse for construction of a new generator station. Refuge maintenance staff used the excess concrete from this operation to build a ramp on the new flammable's storage building.



The U.S. Coast Guard ferried
concrete to Smith Island from
the refuge air strip.

3/88 S.S.



When opportunity knocks this staff listens!
Free concrete and a quick forming job put a
needed ramp on this building.

3/88 S.S.

Three former Air Force residences were sold through General Services Administration and removed by a contractor. The foundations were buried by refuge staff during heavy equipment training.

The refuge conference building was used for a total of eight days on two separate occasions by the Chesapeake Bay Bridge Tunnel Authority. Law enforcement and safety training sessions were conducted; only the space was provided, the refuge did not have to involve any staff in a support function for this activity.

The firearms range facility was used 47 times throughout the year by the Service and other agencies.

Al Robinson, a Region 5 contract electrical inspector, inspected the refuge's electrical system September 12-14. He documented the condition of the service lines and poles and the amount of service the refuge requires. He will prepare a report establishing requirements for underground service to meet anticipated demand. Facilities Manager Scott accompanied the inspector providing insight and a drawing of the existing electrical service.

Regional Engineer Emile Bishara helped complete the Maintenance Management System, Part 2, inspection reports for the refuge.

J. OTHER ITEMS

1. Cooperative Programs

The Chesapeake Bay Bridge Tunnel Authority Police, the U.S. Navy Seal Team, the U.S. Coast Guard and the Northampton County Sheriff's Department used the firearms range for qualifications. There is a minimal amount of refuge staff involvement, i.e., scheduling. Each of these agencies lends support to refuge operations at times.

In October, C & P Telephone Company engineers met with Managers Stairs and Bryant to discuss burial of a fiber optic cable to their tower, paralleling the existing cable.

3. Items of Interest

Glenn Kinser and Lillian Waters, both staff from Ecological Services in Annapolis, Maryland and Karen Mayne, Supervisor of the Ecological Services office in Gloucester Point, Virginia spent two days in March in the refuge office conference room to plan their next quarter's business.

Manager Stairs attended the Project Leader's meeting in Massachusetts August 1-5.

Associate Manager McAndrews visited the refuge October 3 and met with Manager Stairs to discuss a variety of topics.

Ray Fritz and Tim Hall from the Annapolis Ecological Services field office met with Managers Stairs and Bryant on October 4 to gather information for a document being prepared concerning federal facilities located on or by the Chesapeake Bay that may be potential bay contaminant sites.

On November 16, Manager Stairs went to Cobb Island with Assistant Regional Director of Refuges and Wildlife, Don Young; Regional Public Use Specialist, Libby Hopkins; Regional Engineer, David Washburn; John Hall and Barry Truitt from The Nature Conservancy; Congressman Bateman's Senior Staffer, John Rayfield; and Virginia Commission of Game and Inland Fisheries' Game Warden, Jim Gale. The purpose was to determine if a portion of the old coastal rescue station could be salvaged for use in the proposed Eastern Shore of Virginia visitor's center.

On November 22, Manager Stairs met with Chesapeake Bay Bridge Tunnel Authority staff to discuss the use of Wise Point as a staging area for repair work on the bridge span from Wise Point to Fisherman Island.



Jerry Loomis received an award for a job well done! (Section E.1) 9/88 M.B.

4. Credits

The narrative was written by Michael Bryant.

Editing the narrative was accomplished by Michael Bryant and Sherman Stairs.

The narrative was typed by Michael Bryant and Irene Morris.

Photography credits go to Michael Bryant (M.B.), Louis Hinds (L.H.) and Sherman Stairs (S.S.).

K. FEEDBACK

WRITING

Managing a National Wildlife Refuge is, at its best, satisfaction and frustration in alternate doses. My first feeling was not to write a feedback section; I already do enough writing. However, venting frustration usually equals satisfaction, so here we go.

ODE TO NEW REFUGES

There are a lot of hidden agendas when starting a new refuge that include but aren't limited to searching for funding, equipment, facilities and personnel. There will be a need to write management plans for all facets of the operation because none exist. You may or may not have "facilities" to work from - we had too many. You learn to live with used and reused equipment. Always ask for operation and parts manuals- they somehow get lost. Last, but certainly not the least, is to get a staff that can help attain early goals; expect the need to change size and work classifications in three to five years.

STAFFING CHANGES-CASES IN POINT

The Eastern Shore Of Virginia Refuge will begin attracting large numbers of visitors in the near future. A Visitor Center is in the design stage and is to be located adjacent to a major highway carrying in excess of two million vehicles per year. The need for an on site Outdoor Recreation Planner was recognized and requested over a year ago. We still do not have a person to begin working in this arena. Public Use Planning prior to being discovered by the public will insure compatible use while enhancing and maintaining wildlife habitat. It is not too early to have an Outdoor Recreational Planner prepare a station Public Use Plan, a station Sign Plan, assist in further development and interpretation of the nature trail[s], prepare leaflets and brochures, and work on a multitude of other things prior to the inevitable increase in public use.

Another point concerns situations where certain position classifications become outdated. On a new and developing refuge where things evolve rapidly, where changes in direction seem to be the norm, and where the refuge initially is partly staffed with government employees from the Department of Defense, it is just as difficult, and maybe more so, to eliminate the outdated positions as it is to add new ones. Why? The people we work with are affected by this kind of action.

PARTING THOUGHT

We always remember, that with dedicated staff we can accomplish anything and this staff is dedicated!

INTRODUCTION

Fisherman Island National Wildlife Refuge is a barrier island located in Northampton County, Virginia. It is situated one-half mile south of the tip of the Delmarva Peninsula at the mouth of the Chesapeake Bay. The refuge is 1,000 acres of the 1,500 acre island. The rest of the island is privately owned.

Prior to the 1940s it had been a refuge, but at our entry into WWII the U.S. Navy took the land and used the island as a submarine detection base. The Navy declared it excess property in 1969 and the land was transferred back to the U.S. Fish and Wildlife Service. It was managed as an unmanned satellite refuge of Back Bay National Wildlife Refuge until 1984 when management was turned over to the newly established Eastern Shore of Virginia National Wildlife Refuge. In the early 1960s the Chesapeake Bay Bridge-Tunnel was built and the bridge makes landfall on Fisherman Island. The road and right-of-way pass through the refuge.

Fisherman Island National Wildlife Refuge was re-established primarily to serve as a breeding ground and nursery for marsh and water birds, shorebirds, gulls, terns, and allied species. The rookeries with herons and egrets are active from late March until early September with black-crowned night herons, tri-colored herons, great egrets, and snowy egrets being the most abundant.

Thousands of royal terns, hundreds of common terns, herring gulls, laughing gulls and black skimmers nest on the island between May and mid-September.

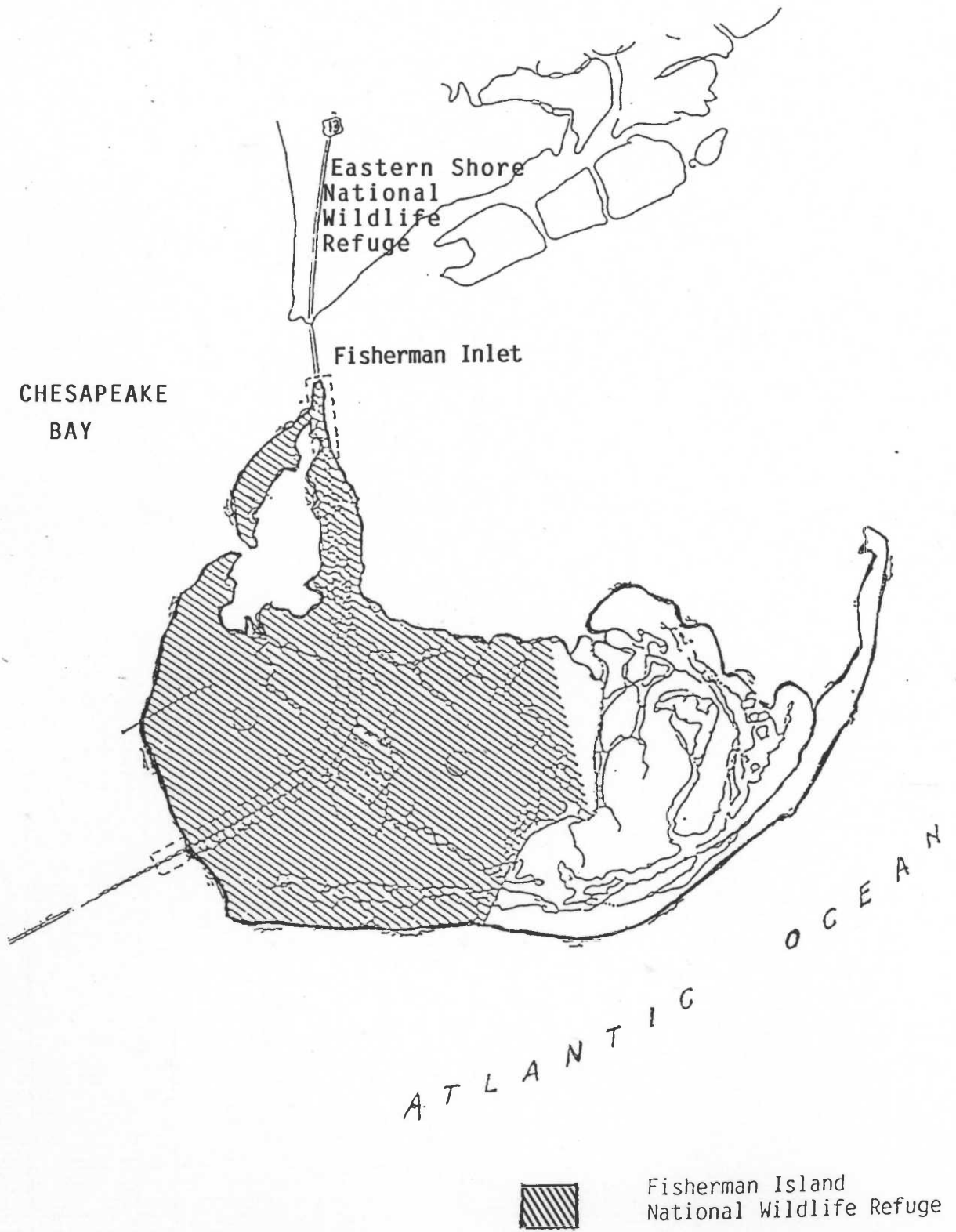
Piping plover have nested on the island and other threatened and endangered species like the brown pelican (endangered except on the Atlantic coast), the peregrine falcon and the bald eagle frequent the refuge.

During the fall migration, millions of birds stage on the island before the 18 mile flight across the mouth of the Chesapeake Bay. Most of them are passerines but in late September and early October the raptors are common over the island. They may include sharp-shinned hawks, Cooper's hawks, and red-tailed hawks. Some waterfowl species move through while others like black ducks and brant are common winter residents.

In March, the osprey, the island's harbinger of spring, arrive and begin nesting on the platforms on and around the refuge.

Due to the nesting activities on the refuge and the restrictions, for safety, the Chesapeake Bay Bridge Tunnel Authority put on motorists, public use was limited to staff-guided interpretive programs for organized groups. The refuge was closed to all public use from April to September to reduce disturbance on nesting birds.

FISHERMAN ISLAND NATIONAL WILDLIFE REFUGE



INTRODUCTION

TABLE OF CONTENTS

i

A. HIGHLIGHTS

1

B. CLIMATIC CONDITIONS.....

1

C. LAND ACQUISITION

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

D. PLANNING

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

E. ADMINISTRATION

- 1. Personnel..... 2
- 2. Youth Programs..... 2
- 3. Other Manpower Programs.....Nothing to Report
- 4. Volunteer Program..... 3
- 5. Funding..... 3
- 6. Safety.....Nothing to Report
- 7. Technical Assistance.....Nothing to Report
- 8. Other.....Nothing to Report

F. HABITAT MANAGEMENT

- 1. General..... 3
- 2. Wetlands.....Nothing to Report
- 3. Forests.....Nothing to Report
- 4. Croplands.....Nothing to Report
- 5. Grasslands.....Nothing to Report
- 6. Other Habitats.....Nothing to Report
- 7. Grazing.....Nothing to Report
- 8. Haying.....Nothing to Report
- 9. Fire Management.....Nothing to Report
- 10. Pest Control.....Nothing to Report
- 11. Water Rights.....Nothing to Report
- 12. Wilderness and Special Areas.....Nothing to Report
- 13. WPA Easement Monitoring.....Nothing to Report

G. WILDLIFE

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

H. PUBLIC USE

1.	General.....	13
2.	Outdoor Classrooms - Students.....Nothing to Report	
3.	Outdoor Classrooms - Teachers.....Nothing to Report	
4.	Interpretive Foot Trails.....Nothing to Report	
5.	Interpretive Tour Routes.....Nothing to Report	
6.	Interpretive Exhibits/Demonstrations...Nothing to Report	
7.	Other Interpretive Programs.....	13
8.	Hunting.....Nothing to Report	
9.	Fishing.....Nothing to Report	
10.	Trapping.....Nothing to Report	
11.	Wildlife Observations.....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.....	14
18.	Cooperating Associations.....Nothing to Report	
19.	Concessions.....Nothing to Report	

I. EQUIPMENT AND FACILITIES

1.	New Construction.....Nothing to Report	
2.	Rehabilitation.....Nothing to Report	
3.	Major Maintenance.....Nothing to Report	
4.	Equipment Utilization and Replacement..Nothing to Report	
5.	Communications Systems.....Nothing to Report	
6.	Computer Systems.....Nothing to Report	
7.	Energy Conservation.....Nothing to Report	
8.	Other.....	14

J. OTHER ITEMS

- 1. Cooperative Programs.....Nothing to Report
- 2. Other Economic Uses.....Nothing to Report
- 3. Items of Interest.....Nothing to Report
- 4. Credits..... 15

K. FEEDBACK.....Nothing to Report

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

- 1. Bird List

A. HIGHLIGHTS

In February and in October members of local chapters of conservation organizations picked up trash as a "Take Pride in America" initiative (Section E.4).

At least two, possibly up to six, piping plover were hatched (Section G.2).

B. CLIMATIC CONDITIONS

Climatic conditions were similar to Eastern Shore of Virginia National Wildlife Refuge. Storms and tides caused beach erosion for an ever changing shoreline.

A lightning storm on May 16 started a small fire 100 yards west of the Chesapeake Bridge Tunnel Authority (CBBTA) roadway. It was put out by CBBTA personnel.

D. PLANNING

5. Research and Investigations

Fisherman Island NR88 - "Field Studies in Marine and Estuarine Biology" 51651-40140.

Richard Hill, Professor with Michigan State University, led a group of students on September 11 to collect, preserve and classify specimens and gather ecological data. The specimens and a report were provided to the refuge.

Fisherman Island NR88 - "A survey of the rare species Amaranthus pumilus (Seabeach Pigweed)" 51651-40150.

Garrie Rouse, a botanist under contract with the Virginia Natural Heritage Program, conducted searches of potential habitat for A. pumilus. A. pumilus was being considered by the U.S. Fish and Wildlife Service for listing as a Federally threatened or endangered species.

E. ADMINISTRATION

1. Personnel

The refuge was an unstaffed satellite and was administered by Eastern Shore of Virginia National Wildlife Refuge.

2. Youth Programs

Six YCC enrollees participated in corralling and banding 2,000 royal and sandwich terns on July 8 (Section G.16).



The YCC helped band terns.
7/88 S.S.

4. Volunteer Program

On February 14, the Sierra Club and the Tidewater Appalachian Trail Club conducted a beach clean-up. They filled a five-ton stake-side truck and a pickup truck with 3,000 pounds of trash.

On September 10, the third annual "Take Pride in America" clean-up of the beach was held. Thirty-eight members of the Tidewater Chapter of the Sierra Club worked for four hours filling a five-ton stake-side truck with 2,500 pounds of trash.

Volunteers also helped monitor piping plover.

5. Funding

Funding for law enforcement, ARMMS maintenance, surveys and resource problems was included with Eastern Shore of Virginia National Wildlife Refuge budget.

F. HABITAT MANAGEMENT

1. General

Fisherman Island typified the successional stages that naturally occur on barrier beach islands in this area. Intertidal marshes developed on shallow flats where wave action was not severe. The predominant vegetation was saltmarsh cordgrass (Spartina alterniflora). Irregularly inundated marshes were found along the perimeter of the uplands and were dominated by saltmeadow hay (S. patens), salt grass (Distichlis spicata) and black needle-rush (Juncus roemerianus). Beaches were found along shorelines with high wave energy and backed by low dune systems vegetated with herbaceous plants that could withstand the erosive forces of wind and salt spray. The fore-dunes were dominated by sea rocket (Cakile eduntula), Russian thistle (Salsola kali), seabeach orach (Atriplex arenaria) and American beachgrass (Ammophila breviligulata). Landward of the primary dunes, the dominant vegetation depended upon the frequency of inundation and included herbs and grasses such as American beachgrass, panic grass (Panicum spp.), sea oats (Uniola paniculata), sedges and rushes.

Shrub thickets were transitional communities found landward of the dune grasslands or high marshes. Dominant species were wax myrtle (Myrica cerifera), bayberry (M. pennsylvanica), groundsel tree (Baccharis halimifolia) and marsh elder (Iva frutescens). Herbaceous vegetation within the shrub communities included saltmeadow hay and poison ivy (Rhus radicans).

As elevations increased and exposure to flooding and salt spray decreased, shrub communities succeeded to a low open woodland of

sassafras (Sassafras albidum) and black cherry (Prunus serotina).

The refuge consisted of approximately 40 acres of beaches, 290 acres of dunes, 90 acres of shrub thickets, 10 acres of low open woodland, 90 acres of tidal flats and brackish ponds, and 480 acres of tidal saltmarsh.

Habitat management included monitoring, law enforcement and some restoration work. The United States Navy assisted the refuge. From January 12 to 14, they finished demolishing a tower, work they started in 1987. The steel from the cut up tower was stacked by refuge staff and will be removed.

G. WILDLIFE

1. Wildlife Diversity

Fisherman Island was a growing barrier island. With this growth came a variety of resident and migratory wildlife, but there were no mammalian predators. These factors provide excellent habitat for a variety of birds to raise young. There are heron and egret rookeries and a large tern colony as a result.

The annual Christmas Bird Count (CBC) on December 27 tallied 150 species in the area encompassing Fisherman Island. This was the second lowest species total in 24 years. Potentially, it was fine habitat for a large number of birds, but, as the CBC shows, the problems were bigger than individual refuges could solve. The "table" was set but not as many came to "dine."

2. Endangered and/or Threatened Species

The staff increased efforts monitoring piping plover. On May 5, Karen Terwilliger, a non-game biologist with the Virginia Commission of Game and Inland Fisheries and a member of the piping plover recovery team, met with refuge managers and the regional biologist for refuges-south to discuss details of the annual piping plover survey. During the month of May refuge staff saw no piping plovers.

Throughout June, the staff saw two piping plovers on the south side of Fisherman Island. Nesting was not evident until June 24. At this time the refuge manager, the regional biologist for refuges-south, and two volunteers conducted a nest search. A nest was not located at this time, but both birds were observed behind the primary dune and one bird was faking a broken wing.

Throughout July, the staff observed five piping plovers. Also, early in the month two nesting sites were found. The first nest was located 1.2 miles east of the Chesapeake Bay Bridge Tunnel

bridge in the flat sand area. It was first sighted on July 11 with three eggs. From July 15 to 18, staff sighted two adults and one chick near the shore. The nest was then empty.

The second nest was located 1.3 miles east of the Chesapeake Bay Bridge Tunnel bridge in the beach area 30-40 feet from the edge of the primary dune. The nest was found on July 18 with three eggs in it. On July 23, two eggs were in the nest and one young chick was spotted near the shore. From July 25 to 31, only one egg was left in the nest.



The second piping plover nest was found.

7/88 S.S.



A close-up of the second piping plover nest.
7/88 S.S.



A close-up of the second piping plover nest later
in July.

7/88 S.S.

Throughout August, the staff observed two piping plovers on Fisherman Island. During the summer at least two and possibly six piping plover hatched on the refuge.

Peregrine falcons were seen through the year. There were two that seemed to be resident. In October, the bander manning the raptor banding station caught an injured peregrine falcon. It was taken to a rehabilitator. Five peregrine falcons were seen on the Christmas Bird Count (CBC): three adults and two juveniles.

Two immature bald eagles were seen in October. Participants on the CBC saw a total of eight bald eagles: three adults and five juveniles.

Several endangered species of sea turtles have been found on the refuge in the past. This year, five dead loggerhead turtles were found on the beaches. The staff took measurements and submitted reports.

3. Waterfowl

Management activities included survey work and law enforcement patrols. The refuge had always been closed to waterfowl hunting, but those portions of the island that were privately owned and the surrounding waters were hunted so it was important to make a presence felt. Very few hunters were seen and not surprisingly, very few waterfowl were seen.

During the winter an average of 100 black ducks were seen and during the spring, summer and fall an average of 25 black ducks were seen. Several black duck broods were seen in early summer.

There was a resident flock of 30 Canada geese frequenting the island throughout the year. Two families produced five and seven young respectively.

Twenty-seven species of waterfowl were seen on the Christmas Bird Count (CBC). Several hundred snow geese, 50 Canada geese, 1,000 brant, 90 black ducks, 120 gadwall, 180 American wigeon, a few northern shovelers and northern pintails, and several hundred bay and sea ducks were observed. A male Eurasian wigeon was seen on Fisherman Island. One had been seen on the island four out of the past five years during the CBC.

4. Marsh and Waterbirds

An important management function on Fisherman Island was to supply undisturbed habitat for herons, egrets and allied species. Estimates of breeding birds on two rookeries were as follows:

<u>Species</u>	<u>Number of Adults</u>
Black-crowned night heron	450
Yellow-crowned night heron	12
Tri-colored heron	220
Little blue heron	20
Cattle egret	80
Great egret	200
Snowy egret	180
Glossy ibis	150



Young in the nest at one of the heron/egret rookeries.

6/88 S.S.

5. Shorebirds, Gulls, Terns and Allied Species

Throughout the year, numerous shore birds used the extensive beach, tidal flats and brackish ponds on the island.



Just one example of the many shorebirds seen on the island - ruddy turnstone.

5/88 S.S.

Royal and sandwich terns again nested on the privately owned portion of Fisherman Island. In late May, the colony numbered between 2,700 and 3,000 birds with eggs. This year intense wave action washed over the sand spit where the birds nest. This reduced the amount of nesting habitat. Royal terns produced approximately 2,300 young and sandwich terns produced 11 young. This was approximately a 50% reduction in production from 1987.

The herring and great black-backed gull colony located on the privately owned portion of Fisherman Island continued to grow in size this year. Staff estimated 560 adult herring gulls and 12 great black-backed gulls raised an estimated 420 young. These numbers increased 5% from last year.

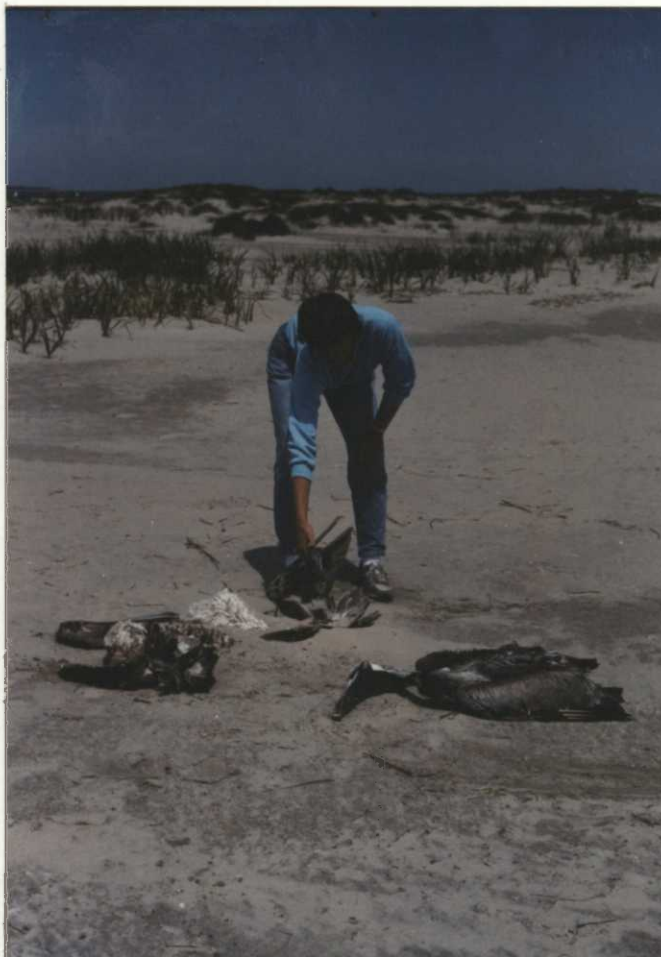
Limited predation of tern chicks by adult gulls was documented on Fisherman Island. If the gull colony continues to increase, it is expected that predation will increase. The situation will be monitored.



An SCA volunteer monitored the tern colony.
7/88 S.S.

Staff observed 250 common terns and 100 black skimmers colonizing the beach east of the royal tern colony.

The brown pelican, an endangered species except for the U.S. Atlantic coast, was seen on the refuge through the year. Three were found dead in the summer. One bird had a Pet spoon in its bill and the other two birds were tangled in the fishing line trailing from the lure. All apparently starved to death.



An SCA volunteer learns first hand about the effects of man's activities on wildlife populations.

6/88 S.S.

6. Raptors

Osprey were the predominant nesting species of raptor on the island. Staff saw 13 active nests in the spring. There were 20 young produced on these nests. This number is down by two from last year's estimate. The first osprey were seen March 12 and the last were seen in mid-November.

Large numbers of raptors migrated through, as they always have, in the fall. There was a raptor banding station on the island, as in years past. It was manned by William and Mary College banders. They banded 161 raptors representing seven species (Section G.16).

On November 12 and 14, a golden eagle landed on the lure pigeon at the raptor banding site.

7. Other Migratory Birds

Large numbers of passerines migrated through in the fall. From October 8 to 12 approximately 3 million tree swallows passed through. Banders at the raptor banding site saw thousands of yellow-rumped warblers and numerous flocks of robins, blue jays, black birds, sparrows and finches.

8. Game Mammals

The white-tailed deer post-fawning population estimate for 1987 was 40. There was no indication of change in 1988.

10. Other Resident Wildlife

The staff saw several northern diamondback terrapins on the beaches during the warmer parts of the year. This turtle species frequents saltmarsh and brackish-water habitat.



Northern diamondbacked terrapin were seen on the beaches in warm weather.

7/88 S.S.

16. Marking and Banding

On July 8, 2,000 royal terns were banded under the direction of John Weske. The refuge staff, the YCC, and SCA volunteers helped. On August 8, volunteer John Weske, refuge staff and SCA Lynne Law banded 222 royal terns.

The raptor banding results were as follows:

<u>COMMON NAME</u>	<u>NUMBER BANDED 1988</u>		
	<u>OCT</u>	<u>NOV</u>	<u>TOTAL</u>
Sharp-shinned hawk	56	6	62
Cooper's hawk	30	3	33
Northern harrier	5	3	8
Red-tailed hawk	28	24	52
American kestrel	1		1
Merlin	4		4
Red-shouldered hawk	1		1
TOTAL			161

H. PUBLIC USE

1. General

Public use on Fisherman Island had been prohibited while the lands were under the jurisdiction of the U.S. Navy. Since 1969, when the U.S. Fish and Wildlife Service acquired two-thirds of it as a refuge, Back Bay National Wildlife Refuge gave interpretive tours on the island.

In 1984, when the management of Fisherman Island National Wildlife Refuge was turned over to Eastern Shore National Wildlife Refuge, this refuge's staff continued the practice of giving interpretive tours.

The demand for access to the island has increased steadily and as local populations grow demand will continue to increase.

Twice during the year groups went on the island to clean up trash. The local chapter of the Sierra Club and the Tidewater Appalachian Trail Club did the work and received an interpretive tours (Section E.4).

7. Other Interpretive Programs

The staff gave interpretive tours between January 1 and March 31 and between October 1 and December 15. Groups were not taken on the island from April 1 to September 30 to avoid disturbing the rookeries and colonies of nesting birds. The guided walking

tours were usually scheduled on Saturday mornings. They lasted an average of four hours. Group size averaged 35 people. The groups vary from organized tours from local museums to collections of interested local people who sign up two and three at a time. A total of 370 people participated in 12 tours during the year.

17. Law Enforcement

Posting the island's actual boundary at mean low tide was a problem on the beach. For practical reasons it was not done because one good storm would remove them. So the signs were put high up on the beach. With boundary signs at that location many people interpreted it to mean the beach was open to use.

When warm weather arrived so did the boaters. Trespass was the only violation observed. Because of the positions of the signs and the fact that most of the people observed stayed seaward of the signs, only warnings were given. Another wrinkle in this area was the cost of the toll. It cost \$9.00 each time a refuge officer drove out to patrol or to respond to a call. Most of the time the refuge was notified of a trespass violation the information came from the Chesapeake Bay Bridge Tunnel Authority police.

Possible solutions:

1. Jet-in stout poles at the mean low tide line and put the signs on them. This might work but aesthetically it is not very appealing nor does the refuge have the equipment. Local commercial fisherman could do it at a cost.
2. Educate the boating public. This would require more staff and would probably not make a significant impact.
3. Increase the law enforcement patrols. Issue more warnings and give violation notices to repeat offenders. This would require more staff and money i.e., tolls.
4. Open the beach to access. This would require much more law enforcement.

I. EQUIPMENT AND FACILITIES

8. Other

Fisherman Island did not house refuge facilities or equipment. In the future a small storage building will be built on the island to house a vehicle and some equipment. It costs the refuge \$9.00 per trip to access the island and having some

equipment on the island will make the management and law enforcement activities less costly.

Current activity was limited to removing parts of old abandoned military structures.

J. OTHER ITEMS

3. Credits

This annual narrative was written by Mike Bryant, edited by Sherman Stairs and Mike Bryant and typed by Mike Bryant and Irene Morris.

Birds



Eastern Shore of Virginia
and Fisherman Island
National
Wildlife
Refuges

Virginia

	s	S	F	W
LOONS - GREBES				
— Red-throated Loon	u	u	u	
— Common Loon	c	o	c	c
— Pied-billed Grebe	u	o	u	u
— Horned Grebe	u	u	u	
— Red-necked Grebe		o		
STORM PETREL				
— Wilson's Storm-Petrel		r		
GANNET - PELICANS - CORMORANTS				
— Northern Gannet	o	o	u	
— Brown Pelican	o	c	c	r
— Great Cormorant		o	o	
— Double-crested Cormorant	c	u	c	o
BITTERNS - HERONS - IBISES				
— American Bittern	u	u	u	
— Least Bittern		o		
— Great Blue Heron	u	u	c	u
— Great Egret	u	c	c	u
— Snowy Egret	u	c	c	u
— Little Blue Heron	u	u	u	o
— Tricolored Heron	u	c	c	u
— Cattle Egret	u	u	c	
— Green-backed Heron	u	c	c	r
— Black-crowned Night-Heron	c	c	c	u
— Yellow-crowned Night-Heron	u	u	u	r
— White Ibis		r	r	
— Glossy Ibis	u	u	u	r
SWANS - GEESE - DUCKS				
— Tundra Swan	u	u	u	
— Snow Goose	u	u	u	
— Brant	u	u	c	
— Canada Goose	u	u	c	
— Wood Duck	o	o		
— Green-winged Teal	u	u	o	
— American Black Duck	c	u	c	c
— Mallard	c	u	c	c
— Northern Pintail	u	u	u	
— Blue-winged Teal	u	o	c	o
— Northern Shoveler	o	o	o	
— Gadwall	u	o	u	u
— Eurasian Wigeon		r		
— American Wigeon	u	u	u	
— Canvasback	o	o	o	
— Redhead	o	o	o	
— Ring-necked Duck	o	o	o	

	s	S	F	W
— Greater Scaup	u	u	u	
— Lesser Scaup	u	u	u	
— Common Eider		r		
— King Eider		r		
— Harlequin Duck		r		
— Oldsquaw	u	u	u	
— Black Scoter	u	u	c	
— Surf Scoter	c	c	c	
— White-winged Scoter	u	u	u	
— Common Goldeneye	u	u	u	
— Bufflehead	c	c	c	
— Red-breasted Merganser	c	c	c	
— Hooded Merganser	u	u	u	
— Common Merganser		o		
— Ruddy Duck	u	u	u	
VULTURES - HAWKS - FALCONS				
— Black Vulture	u	u	u	
— Turkey Vulture	c	u	c	c
— Osprey	c	a	c	r
— Bald Eagle	u	u	u	u
— Northern Harrier	u	o	c	c
— Sharp-shinned Hawk	u	a	u	
— Cooper's Hawk	u	u	u	
— Red-shouldered Hawk	u	u	u	
— Broad-winged Hawk	o	c		
— Swainson's Hawk		r		
— Red-tailed Hawk	u	u	c	c
— Rough-legged Hawk	o	o	o	
— Golden Eagle		r	r	
— American Kestrel	u	u	a	o
— Merlin	o	c	u	
— Peregrine Falcon	u	o	c	u
QUAIL				
— Northern Bobwhite	c	c	c	c
RAILS - CRANES				
— Yellow Rail		r		
— Black Rail		r		
— Clapper Rail	c	c	a	u
— King Rail	u	u	u	u
— Virginia Rail	u	u	u	u
— Sora	u	u	o	
— Common Moorhen	o	o	o	
— American Coot	u	u	u	
PLOVERS - SANDPIPERS				
— Black-bellied Plover	c	o	c	u

	s	S	F	W
— Lesser Golden-Plover	o	o		
— Semipalmated Plover	u	o	c	o
— Piping Plover	u	u	u	
— Killdeer	u	u	u	u
— American Oystercatcher	c	c	c	c
— Greater Yellowlegs	c	o	c	u
— Lesser Yellowlegs	c	o	c	u
— Solitary Sandpiper	u	u	u	
— Willet	c	c	c	u
— Spotted Sandpiper	u	u	c	r
— Upland Sandpiper	o	u	u	
— Whimbrel	u	u	u	o
— Marbled Godwit	o	o	o	
— Ruddy Turnstone	u	u	u	u
— Red Knot	o	o	o	
— Sanderling	u	u	u	u
— Semipalmated Sandpiper	c	u	u	
— Western Sandpiper	u	u	u	
— Least Sandpiper	u	u	o	
— White-rumped Sandpiper	u	u	u	
— Pectoral Sandpiper	u	u	u	
— Dunlin	c	o	c	c
— Stilt Sandpiper	r	u	u	
— Buff-breasted Sandpiper	o	o		
— Short-billed Dowitcher	c	u	c	o
— Long-billed Dowitcher	o	o	o	
— Common Snipe	u	u	u	
— American Woodcock	u	o	c	a
— Wilson's Phalarope	o	o		
GULLS - TERNS				
— Laughing Gull	a	a	a	o
— Bonaparte's Gull	u	u	u	
— Herring Gull	a	c	a	a
— Lesser Black-backed Gull	o	o		
— Great Black-backed Gull	c	u	u	c
— Gull-billed Tern	u	u	u	
— Caspian Tern	u	u	c	
— Royal Tern	a	a	c	
— Sandwich Tern	o	o	o	
— Common Tern	u	u	c	
— Forster's Tern	u	u	a	o
— Least Tern	u	u	o	
— Black Tern	o	o	u	
— Black Skimmer	c	c	c	

	s	S	F	W
DOVES - CUCKOOS - OWLS - SWIFTS -				
HUMMINGBIRD				
— Rock Dove	c	c	c	c
— Mourning Dove	c	c	c	c
— Black-billed Cuckoo		o		
— Yellow-billed Cuckoo	u	u	u	
— Common Barn-Owl	u	u	u	u
— Eastern Screech-Owl	c	c	c	c
— Great Horned Owl	c	c	c	c
— Long-eared Owl		o	o	
— Short-eared Owl	o	u	u	
— Northern Saw-whet Owl		o	o	
— Common Nighthawk	u	u	u	
— Chuck-will's-widow	c	c	o	
— Whip-poor-will	o	o		
— Chimney Swift	u	u	c	
— Ruby-throated Hummingbird	u	u	u	
— Belted Kingfisher	u	o	c	u
WOODPECKERS - FLYCATCHERS				
— Red-headed Woodpecker	o	o	u	o
— Red-bellied Woodpecker	u	u	u	u
— Yellow-bellied Sapsucker	o	u	u	
— Downy Woodpecker	c	c	c	o
— Hairy Woodpecker	u	u	u	u
— Northern Flicker	c	c	a	c
— Pileated Woodpecker	o	o	o	o
— Eastern Wood-Pee-wee	u	u	u	
— Yellow-bellied Flycatcher		u		
— Acadian Flycatcher	o	o	u	
— Alder Flycatcher		u		
— Willow Flycatcher		u		
— Least Flycatcher	o	u		
— Eastern Phoebe	o	c	o	
— Great Crested Flycatcher	u	u	u	
— Western Kingbird		o	r	
— Eastern Kingbird	c	c	a	
— Scissor-tailed Flycatcher		r		
LARKS - SWALLOWS - JAYS - CROWS				
— Horned Lark	u	u	u	
— Purple Martin	c	c	u	
— Tree Swallow	u	o	a	o
— Northern Rough-winged Swallow	u	u	u	
— Bank Swallow	u	u	c	
— Cliff Swallow	o	o	u	

A Stop Along the Flyway...

Sandwiched between Chesapeake Bay and the Atlantic Ocean, the tip of the Delmarva Peninsula is the Eastern Shore of Virginia and Fisherman Island National Wildlife Refuges. Their 1,850 acres are a mix of loblolly pine holly forest, shrub thickets, open fields, tidal salt marsh and barrier islands. The refuge was established in 1984 to protect habitats for migrating birds, including shorebirds, songbirds, raptors and waterfowl.

Because of its strategic location along the Atlantic Coast Flyway, the refuge is a major stop for land birds during their fall migration. Raptors and songbirds are particularly abundant. The combination of mild winters and diverse habitats makes the refuge a prime wintering area as well. The area has one of the highest Christmas Bird Counts (more than 150 species) north of Florida. Fisherman Island is noted for its large and diverse nesting colonies of waterbirds (terns, gulls, herons and ibis). Note: to protect nesting species and minimize disturbance to wildlife, this island is closed to the public except by special permit.

Birding is best from September through May. The refuge is open from dawn to dusk and visitors are welcome to enjoy bird-watching at the nature trail area.



This folder lists over 277 birds that have been identified on the refuge, and is in accordance with the Sixth American Ornithologists' Union Checklist.

Most birds are migratory, therefore their seasonal occurrence is coded as follows:

SEASON

s - Spring	March - May
S - Summer	June - August
F - Fall	September - November
W - Winter	December - February

- † - Nesting has occurred on the refuge within the past 5 years.
- * - A species which occurs and/or nests in only one or two locations in the refuge.

RELATIVE ABUNDANCE

a - abundant	a species which is very numerous
c - common	certain 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	seen at intervals of 2 to 5 years

	s	S	F	W
___ Barn Swallow	c	a	a	
___ Yellow Warbler	c	u	c	
___ Chestnut-sided Warbler	u	u		
___ Magnolia Warbler	u	c		
___ Cape May Warbler	u	c		
___ Black-throated Blue Warbler	u	c	r	
___ Yellow-rumped Warbler	c	u	a	a
___ Black-throated Green Warbler	u	u		
___ Blackburnian Warbler	o	u		
___ Yellow-throated Warbler	o	o		
___ Pine Warbler	c	c	u	
___ Prairie Warbler	u	u	c	r
___ Palm Warbler	o	c	u	
___ Bay-breasted Warbler	o	u		
___ Blackpoll Warbler	u	c		
___ Black-and-white Warbler	u	c	r	
___ American Redstart	u	a		
___ Prothonotary Warbler	o	o		
___ Worm-eating Warbler	o	u		
___ Ovenbird	u	o	a	r
___ Northern Waterthrush	u	c		
___ Louisiana Waterthrush	o	r		
___ Kentucky Warbler	o	o		
___ Connecticut Warbler	u			
___ Mourning Warbler	o	u		
___ Common Yellowthroat	c	c	a	u
___ Hooded Warbler	o	o		
___ Wilson's Warbler	u	u		
___ Canada Warbler	u	u		
___ Yellow-breasted Chat	u	u	u	o
TANAGERS - SPARROWS				
___ Summer Tanager	u	u		
___ Scarlet Tanager	u	u		
___ Northern Cardinal	c	c	c	c
___ Rose-breasted Grosbeak	o	u		
___ Blue Grosbeak	u	u		
___ Indigo Bunting	u	u	c	
___ Dickcissel	o			
___ Rufous-sided Towhee	u	u	a	c
___ American Tree Sparrow	r	r		
___ Clay-colored Sparrow	r			
___ Field Sparrow	u	u	c	u
___ Vesper Sparrow	o	u	u	
___ Lark Sparrow	r			
___ Savannah Sparrow	u	c	c	

	s	S	F	W
___ Grasshopper Sparrow	o	o	u	
___ Blue Jay	u	u	a	c
___ American Crow	c	c	c	c
___ Fish Crow	c	c	a	c
TITMICE - NUTHATCHES - WRENS				
___ Carolina Chickadee	c	c	c	c
___ Tufted Titmouse	u	u	u	u
___ Red-breasted Nuthatch	u	c	c	
___ White-breasted Nuthatch	u	u	u	u
___ Brown-headed Nuthatch	u	u	u	u
___ Brown Creeper	u	c	u	
___ Carolina Wren	c	c	c	c
___ House Wren	u	u	c	u
___ Winter Wren	u	u	u	
___ Sedge Wren	u	u	u	
___ Marsh Wren	u	u	c	c
KINGLETS - THRUSHES - THRASHERS				
___ Golden-crowned Kinglet	u	c	c	
___ Ruby-crowned Kinglet	u	a	c	
___ Blue-gray Gnatcatcher	u	o	u	r
___ Eastern Bluebird	u	c	u	
___ Veery	u	c		
___ Gray-cheeked Thrush	o	u		
___ Swainson's Thrush	u	c		
___ Hermit Thrush	u	c	u	
___ Wood Thrush	u	o	u	
___ American Robin	c	c	a	c
___ Brown Thrasher	u	u	c	u
WAXWINGS - SHRIKE - STARLING				
___ Water Pipit	u	c	u	
___ Cedar Waxwing	u	o	c	u
___ Loggerhead Shrike	o	o	o	
___ European Starling	a	a	a	a
VIREOS - WOOD WARBLERS				
___ White-eyed Vireo	u	u	c	r
___ Solitary Vireo	o	u	r	
___ Yellow-throated Vireo	r	r		
___ Warbling Vireo	r			
___ Philadelphia Vireo	r			
___ Red-eyed Vireo	u	u	c	
___ Blue-winged Warbler	o	u		
___ Golden-winged Warbler	r			
___ Tennessee Warbler	u	u		
___ Orange-crowned Warbler	o	o		
___ Nashville Warbler	u	u		

	s	S	F	W
___ Northern Parula	u	u		
___ Henslow's Sparrow	o			
___ Sharp-tailed Sparrow	o	o	u	u
___ Seaside Sparrow	u	u	a	u
___ Fox Sparrow	o	u	u	
___ Song Sparrow	c	u	c	a
___ Lincoln's Sparrow	c	u	c	a
___ Swamp Sparrow	u	a	c	
___ White-throated Sparrow	c	a	a	c
___ White-crowned Sparrow	o	u	u	
___ Dark-eyed Junco	u	u	u	
___ Lapland Longspur	o	o		
___ Snow Bunting	o	o		
BLACKBIRDS - FINCHES				
___ Bobolink	u	o	a	
___ Red-winged Blackbird	c	c	a	c
___ Eastern Meadowlark	u	u	c	c
___ Rusty Blackbird	o	c	u	
___ Brewer's Blackbird	r			
___ Boat-tailed Grackle	c	c	a	c
___ Common Grackle	a	c	c	c
___ Brown-headed Cowbird	u	u	c	u
___ Orchard Oriole	u	u	r	
___ Northern Oriole	u	c	r	
___ Purple Finch	o	u	u	
___ House Finch	u	u		
___ Red Crossbill	o	o		
___ White-winged Crossbill	r			
___ Common Redpoll	r			
___ Pine Siskin	o	c	c	
___ American Goldfinch	c	c	a	c
___ Evening Grosbeak	u	u		
___ House Sparrow	u	u		

NOTES

Date _____ Time _____

Observers _____

Weather _____

Tides _____

U.S. FISH AND WILDLIFE SERVICE

Eastern Shore of Virginia and Fisherman Island are two of more than 430 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 resource 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 or to report unusual sightings, please contact:

Refuge Manager
 Eastern Shore of Virginia
 National Wildlife Refuge
 RFD #1, Box 122B
 Cape Charles, Virginia 23310
 Telephone: (804) 331-2760

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**UNITED STATES
 DEPARTMENT OF THE INTERIOR
 FISH AND WILDLIFE SERVICE**