

**BLACKWATER NATIONAL WILDLIFE REFUGE**  
Cambridge, Maryland

Martin NWR  
Susquehanna NWR

**ANNUAL NARRATIVE REPORT**

Calendar Year 1997

U.S. Department of the Interior  
Fish and Wildlife Service

**NATIONAL WILDLIFE REFUGE SYSTEM**

REVIEW AND APPROVALS

BLACKWATER NATIONAL WILDLIFE REFUGE  
COMPLEX

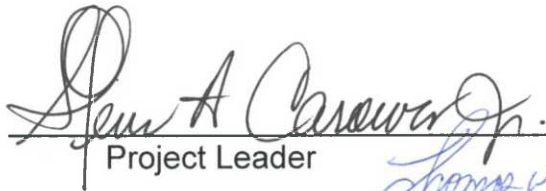
Blackwater National Wildlife Refuge

Susquehanna National Wildlife Refuge

Martin National Wildlife Refuge

ANNUAL NARRATIVE REPORT

Calendar Year 1997

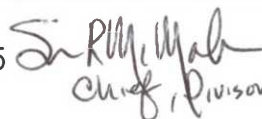
  
Project Leader

 Program Supervisor  
Date 8-13-99  
12/14/99

Assistant Regional Director  
Southern Geographic Area, Region 5

Date

Assistant Regional Director  
Refuges and Wildlife, Region 5

  
Chief, Division of RW

01/06/00  
Date

# **BLACKWATER NATIONAL WILDLIFE REFUGE COMPLEX**

Blackwater National Wildlife Refuge

Susquehanna National Wildlife Refuge

Martin National Wildlife Refuge

## **ANNUAL NARRATIVE REPORT**

Calendar Year 1997

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

BLACKWATER NWR

**BLACKWATER NATIONAL WILDLIFE REFUGE**  
Cambridge, Maryland

**ANNUAL NARRATIVE REPORT**

Calendar Year 1997

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

# TABLE OF CONTENTS

Introduction.....	i
Climate Data.....	1
1. Monitoring and Studies.....	2
a. Surveys and Censuses.....	2
1. Waterfowl	
2. Eagle	
3. DFS	
4. Deer	
5. Osprey	
6. Owl	
7. Wood Duck Box Checks	
8. Muskrat House Counts	
9. Breeding Bird Survey	
10. Water Quality Surveys	
11. Public Use Counts	
12. Habitat Classification: GIS	
b. Studies and Investigations.....	19
1. Vegetation - MSU	
2. Vegetation - Rx Burn Areas	
3. Other Research	
2. Habitat Restoration.....	24
a. Wetland Restoration: On-refuge.....	24
b. Upland Restoration: On-refuge.....	24
c. Wetland Restoration: Off-refuge.....	NTR
d. Upland Restoration: Off-refuge.....	NTR
3. Habitat Management.....	27
a. Manage Water Levels.....	27
b. Manage Moist Soil Units.....	27
c. Graze/Mow/Hay.....	NTR
d. Farming.....	29
1. Cropland Management Planning/Administration	
2. Farm Equipment Maintenance	
e. Forest Cutting.....	NTR
f. Prescribed Burning.....	32
1. Marshland Fuel Reduction	
2. Marsh Maintenance Burn	
3. Woodland Improvement Burn	
4. Waterfowl Impoundment Burn	
5. Agricultural Field Burn	
6. Debris Burning	

7. Fire Building Construction	
8. Dry Hydrant Installation	
9. Fire Evaluation Study	
10. Fire Administration	
11. Fire Training	
12. Fire Equipment Maintenance	
13. Fire Vehicle Maintenance	
14. Fire Building Maintenance	
g. Control Pest Plants.....	39
4. Fish and Wildlife Management.....	40
a. Bird Banding.....	40
b. Disease Monitoring and Treatment.....	NTR
c. Reintroductions.....	NTR
d. Provide Nest Structures.....	41
1. Structures Erected	
2. Structures Maintained	
e. Predator and Exotic Control.....	42
1. Trapping Program	
2. Exotic Species Removal	
3. Gypsy Moth Control	
5. Coordination Activities.....	48
a. Interagency Coordination.....	NTR
b. Tribal Coordination.....	NTR
c. Private Land Activities.....	NTR
d. Oil and Gas Activities.....	NTR
e. Cooperative/Friends Organizations.....	51
6. Resource Protection.....	69
a. Law Enforcement.....	69
1. LE - Training/Recertification	
2. Boundary Posting	
5. LE - Entrance Fee Compliance Checks	
b. Wildfire Preparedness.....	72
1. Wildfire Control	
2. Delmarva Coop. Agreement Support	
3. Wildfire Equipment Maintenance	
c. Land Acquisition.....	85
d. Contaminant Investigation and Cleanup.....	NTR
e. Manage Water Rights.....	NTR
f. Manage Cultural Resources.....	NTR
g. Federal Facility Compliance Act.....	NTR
h. Wilderness and Natural Areas.....	NTR
i. Threats and Conflicts.....	NTR

8. Public Education and Recreation.....	89
a. Provide Visitor services.....	89
1. Interpretation	
2. Education	
3. Volunteer Program	
4. Cooperative Association/FOB	
5. Entrance Fee Administration	
b. Outreach.....	126
1. Meetings	
2. Exhibits	
3. News Releases	
4. Radio/TV Spots	
9. Planning and Administration.....	131
a. Comprehensive Management Planning.....	131
b. General Administration.....	131
1. Personnel/Payroll	
2. Fiscal Management	
3. ADP Management	
4. Procurement	
5. Property Management	
6. Training/Development	

Feedback  
Appendix

## INTRODUCTION

Blackwater National Wildlife Refuge Complex is composed of three significant wildlife areas historically noted for providing important habitats for large concentrations of wintering waterfowl, several endangered species, and a wide variety of migratory birds.

The first and largest of these areas to be established as a National Wildlife Refuge (NWR) was **Blackwater NWR**. Originally authorized for establishment by the Migratory Bird Conservation Commission on December 3, 1931, and named "Blackwater Migratory Bird Refuge," the refuge's current 23,054 acres are a showplace for the U.S. Fish and Wildlife Service's Refuge System. The refuge's expansive marshes, dominated by three-square bulrush, its moist soil impoundments, and its variety of croplands form the favorable trichotomy of habitats which are most essential to thousands of migrating and wintering waterfowl. In addition to being an outstanding waterfowl area, the refuge has one of the few full scale refuge visitor centers in Region 5, and offers comprehensive and structured wildlife interpretive and public education/awareness programs to thousands of visitors annually. Due to the diversity of wildlife populations, including the endangered Delmarva fox squirrel and the threatened Southern bald eagle, the quality of refuge programs and facilities, and its proximity to Washington, D.C., the refuge is regularly used to demonstrate many of the Service's activities to Department of Interior representatives and foreign dignitaries.

**Susquehanna NWR**, the second area in the complex to be established as a refuge, was authorized by a series of Presidential Proclamations and Executive Orders dating back to August 25, 1939. These actions originally closed 13,363 acres of water in the upper part of the Chesapeake Bay, at the mouth of the Susquehanna River and on the famous Susquehanna Flats, to the hunting of migratory waterfowl. They also granted the Department fee title to the four-acre Battery Island. In 1978, the Presidential Proclamations were withdrawn, and the remaining Battery Island (now reduced in size to one acre by erosion) is of little use as part of the Service's Refuge System. The Battery Island Preservation Society is currently trying to have the island leased or transferred to them so that it can be properly maintained as a historic site.

The last of the complex's refuges is **Martin NWR**, a 4,548-acre refuge acquired largely through donations by Glenn L. Martin in 1954. Located on Smith Island, in the historic waterfowling area of Tangier Sound, the refuge lies in the heart of one of the largest waterfowl feeding grounds on the Chesapeake Bay. The surrounding marshes and waters are of major importance in meeting the feeding and resting requirements of a large segment of the diving duck population which migrates across the country from the Central and Mississippi Flyways through the Great Lakes region

to winter in the Chesapeake Bay area. The refuge is also used intensively by black ducks, pintails, mallards, and Canada geese, and is an important breeding area for osprey, peregrine falcons, and several species of waterbirds.

Two additional refuges, Eastern Neck NWR and Mason Neck NWR, were historically administered as part of the complex, but became independently operated in 1966 and 1973, respectively.

The three refuges of the Blackwater National Wildlife Refuge complex are in the States of Maryland and Virginia, and are widely distributed within the Chesapeake Bay from Havre de Grace in the north to Watts Island (Tangier Sound) in the south (Figure 1).

Blackwater NWR, the administrative center, is located in Dorchester County about 12 miles south of Cambridge. Susquehanna NWR, the northern-most refuge, is located on Edmondson's Island (Battery Island), at the mouth of the Susquehanna River, in Harford County, and at the upper reaches of the Chesapeake Bay. Martin NWR, the southernmost refuge, is headquartered in Somerset County on Smith Island, approximately 15 miles offshore from Crisfield .





## Climate Data

Table 1. 1997 weather data summarized from the FWS-11 fire weather station.

Month	Temperature (Avg. °F)	Relative Humidity	Precipitation duration	Precipitation inches
January	41°	59%	41	2.44"
February	47°	60%	62	2.74"
March	52°	57%	75	4.42"
April	58°	52%	71	3.32"
May	69°	46%	30	1.38"
June	73°	57%	18	1.18"
July	85°	54%	39	1.78"
August	81°	55%	30	5.05"
September	76°	56%	22	1.17"
October	65°	58%	61	2.24"
November	52°	63%	94	6.83"
December	51°	59%	78	2.54"
Avg. Temp = 63° Avg. Precipitation = 2.92" Total Precipitation = 35.09"				
30-year (1961-1990) Averages: Temperature 57°; Precipitation = 43.74"				
June based on 17 days; July based on 23 days				

## Monitoring and Studies

### a. Surveys and Censuses

#### Waterfowl

Aerial surveys were performed about once a month from January - April and bi-weekly from October - December. Weekly estimates of waterfowl numbers were also gathered during winter, spring, and fall.

Table 2. Maryland and Blackwater Waterfowl Count Comparisons 1992-1997

Maryland DNR Counts, Mid-Winter, January (first week)							
SPECIES	1992	1993	1994	1995	1996	5-year mean	1997
Canada geese	305,700	234,400	260,300	259,200	295,000	270,920	217,700
Snow geese	63,400	43,300	53,600	124,000	45,900	66,040	114,400
Dabblers	81,900	66,900	75,400	73,000	60,200	71,480	83,700
Tundra swan	23,000	18,200	18,800	15,600	16,300	18,380	12,200

Blackwater NWR Counts, Mid-Winter, January (first week)							
SPECIES	1992	1993	1994	1995	1996	5-year mean	1997
Canada geese	18,000	20,000	18,000	9,600	20,358	17,192	16,317
Snow geese	4,000	2,500	2,400	1,900	3,000	2,760	4,502
Dabblers	21,000	19,460	12,465	12,200	6,207	14,266	10,426
Tundra swan	2,000	400	600	300	393	739	35

Blackwater NWR Peak Counts 1992-1997							
SPECIES	1992	1993	1994	1995	1996	5-year mean	1997
Canada geese	20,000	20,000	23,000	18,000	32,000	22,600	28,000
Snow geese	2,700	4,000	4,000	6,000	6,000	5,000	7,000
Dabblers	13,300	12,300	12,675	13,400	16,395	13,614	14,850
Tundra swan	400	400	600	600	600	1,060	1,300



Photo 1. Bill Giese surveys waterfowl numbers while Jim Goldsberry pilots his twin-engine plane over Blackwater.

### **Duck Roost Counts**

Roost counts were conducted in the fall primarily to estimate relative numbers of wood ducks. Counts were conducted in the late evening at two locations on the upper Blackwater River and one location on the Little Blackwater River.

Table 3. Little Blackwater River, Duck Roost Counts

DATE	WOOD DUCK	MALLARD	CANADA GOOSE	BLUE-WINGED TEAL
9/23/97	1306	51	0	9
10/7/97	684	125	639	24
10/21/97	664	41	1715	2

Counts at the upper Blackwater River were conducted 9/24, 10/9, and 10/22. Wood duck counts were in the hundreds whereas counts in prior years exceeded one thousand.

## **Bald Eagle Surveys**

The Midwinter Bald Eagle Survey was conducted January 10, 1997. During the 30 minute count period, 17 observers sighted 88 bald eagles, down from a record 129 in 1996. A roost count at Jarrett West on December 12, 1997 yielded 35 total bald eagles.

Table 4. 1997 Bald Eagle Nest Status

<b>BLACKWATER NWR</b>	<b>NEST STATUS 4/25/97</b>
Barren Island	2 young
Bishop Head Pt	2 young
Barnes Landing/Unit H	2 young
Meekins Creek/Unit E/Spicer Tract	2 young
Meekins Creek/Unit E/Crist Tract	Failed
Meekins Creek/Unit A/Bull Pt	2 young (young may have been lost prior to fledging due to partial nest collapse)
Pool 5/Field 23	2 young
Pool 3/Gum Island	2 young
Pool 1/Wildlife Drive	2 young
Barbadoes Island	Failed
Cold Comfort Island	2 young
Big Island	2 young
Longfield/Pascal Tract	2 young
Longfield/Lack Tract	2 young
Total 14 nests	24 young
<b>MARTIN NWR</b>	
Cherry Island	1 + young

Table 5. 1997 Eagle Nest Status

ADJACENT TO BLACKWATER NWR - (2 miles)	NEST STATUS 4/25/97
Dorchester Lumber/Madison	2 young
Taylor's Is WMA	Failed (2 young lost)
Rodgers and Beasley/BLK River	2 young
Shorters Wharf	Failed
Meekins Creek/Spicers	3 young
Bettys Island/Bugg	2 young
Blackwater Farm's	2 young
Fred Malkus	2 young
Giese Farm	2 young
Insley	2 young
Hughes	2 young
Fishing Bay WMA/Mill Ditch	2 young
Tudor Farms	3 young
Brick House Landing/Willey	2 young
<b>TOTAL 14 nests</b>	26 young
Remainder of Dorchester Co 24 nests	42 young
Blackwater NWR 14 nests	24 young
Adjacent to Blackwater 14 nests	26 young
<b>TOTAL 52 nests</b>	92 young

Table 6. Eagle Roost Count, 1/23/97

Roost	# Eagles
Kuehnle	30
Kuehnle 2	25
J.D. Williams	4
Jarrett West	51
Dragon Swamp	5
Total	115



Photo 2. Electrocuted adult bald eagle found under a Refuge power line. The bird was banded as a chick in Dorchester County in 1984.



Photo 3. Bald eagle nest on Barren Island

## Delmarva Fox Squirrel

Since 1991 Blackwater NWR has focused on Delmarva fox squirrel (DFS) population monitoring, including mark-recapture studies in two benchmark sites, Jarrett and Egypt tracts.

The mark-recapture studies are conducted using nest box checks and live-trapping. The nest box checks were conducted on the Jarrett Tract on January 23 and on the Egypt Tract on January 30, 1997. Live-trapping was conducted on both tracts in April 1997.

Table 7. 1997 DFS Nest Box Checks and Live-trapping Results.

	NEST BOX CHECKS			LIVE TRAPPING		
	Recaptures	New	Unknown	Recaptures	New	Unknown
EGYPT TRACT	5	2	2	14	8	--
JARRETT TRACT	4	4	1	5	5	--

Recaptures = ear-tagged in previous years

New = captured for the first time

Unknown = escaped or would not come out of the box.

## Deer Survey

Monthly deer spotlight counts were conducted in most of the agricultural units of the refuge from October to March. Sika deer continue to outnumber white-tailed deer.

Table 8. Deer Census, Blackwater NWR, FY97

MONTH	WHITE-TAILED DEER	SIKA DEER	TOTAL
October	61	90	151
November	50	74	124
December	38	49	87
January	no survey conducted		
February	36	62	98
March	55	46	101
FY97 Total	240	321	561
FY97 Monthly Average	48	64	112

Table 9. Deer spotlight count, monthly averages for FY92-97

FISCAL YEAR	WHITE-TAILED DEER	SIKA DEER
FY97	48	64
FY96	48	65
FY95	38	62
FY94	32	92
FY93	29	68
FY92	27	65

### **Breeding Bird Survey**

The conservation of migratory birds is a primary purpose of the National Refuge System. The breeding bird survey is conducted to provide baseline information about the refuge's land bird community during the breeding season. This information is used to plan management activities and land acquisition that will contribute to the conservation of these species.

The second annual Breeding Bird Survey was completed at the Blackwater NWR Jarrett and Greenbrier tracts by Katie Eberhart, a M.S. candidate in wildlife at UMES, in July, 1997. The 45 Greenbrier tract sites were surveyed 5/29/97 - 6/10/97; the 49 Jarrett Tract sites were surveyed 6/9/97 - 7/17/97 but most were completed by 6/21/97. The data were entered into the CENSUS data base which provided Point Count Species Abundance and Frequency reports for each tract.

Of the 52 species observed in the Jarrett Tract, red-winged blackbird was the most abundant (38 observed) and tufted titmouse was the most frequently observed (recorded at 28 of the 49 points). Common grackle was the most abundant of the 51 species in the Greenbrier Tract (72 observed) and yellow-billed cuckoo the most frequently recorded with a presence at 22 of the 45 sites.

This survey is to be conducted for three more years to provide a record of forest bird abundance for a total of five consecutive years. After a five-year hiatus another five-year set of surveys will be conducted and comparisons made to identify trends in migratory land bird abundance and habitat use. BioTech Stone coordinated the survey and used GPS to locate observation sites.



Photo 4. Use of Global Positioning System (GPS) equipment was instrumental in streamlining many refuge tasks including location of Breeding Bird Survey points, boundary marking, and measurement of burned areas.

## **Water Quality Monitoring**

Biweekly water quality monitoring has been conducted since March 1996. Monitoring was coordinated by Trainee Paglione and BioTech Stone. Water temperature, salinity, and surface elevation are measured in the refuge impoundments. In addition, 8 river sites are monitored for tide stage, pH, dissolved oxygen, hydrogen sulfide, and salinity. Salinity is of particular interest at the river sites due to the impacts of salt water intrusion on marsh health.

The highest salinities were recorded in the fall of 1997 with a maximum of 19.1 parts per thousand (ppt) at the upper Blackwater River footbridge. Other high salinities, ranging from 14 - 19 ppt, were measured at James island Ditch and Stewarts Canal at the same time of year. Salinities of 0 ppt were recorded on the Little Blackwater River and Buttons Creek in the early months of 1997.



Photo 5. He's not exactly the Delmarva fox squirrel we were after during nest box checks, but he did pose nicely for us!

Table 10. Public Use Fee Collections, 1997

PASS	NUMBER	FEEES COLLECTED
Wildlife Drive Entrance Pass	8,219	\$ 23,440.20
Blackwater NWR Pass	18	216.00
Golden Eagle Passport	70	3,425.00
Golden Age Passport	141	1,410.00
Golden Access Passport	22	FREE
Duck Stamps	174	2,610.00
<b>TOTALS</b>		<b>\$ 31,101.20</b>

Table 11. Public Use Fee Collections 1988-1997

PASS	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Wildlife Drive	\$14,011.41	\$22,065.85	\$25,784.40	\$29,439.42	28,092.43	27,208.43	26,454.72	24,214.30	22,114.86	23,440.20
Blackwater NWR										216.00
Duck Stamps	\$3,150.00	2,262.50	3,187.50	3,850.00	3,555.00	2,880.00	2,835.00	1,635.00	1,890.00	2,610.00
Golden Eagle	125.00	1,725.00	1,700.00	2,575.00	3,700.00	3,500.00	4,000.00	3,175.00	2,975.00	3,425.00
Golden Age	FREE	FREE	FREE	FREE	FREE	FREE	1,290.00	1,050.00	1080.00	1,410.00
Golden Access	FREE	FREE	FREE	FREE	FREE	FREE	FREE	FREE	FREE	FREE
<b>Subtotal</b>	<b>\$17,286.41</b>	<b>\$26,032.35</b>	<b>\$30,674.90</b>	<b>\$36,014.42</b>	<b>\$35,347.43</b>	<b>\$34,579.72</b>	<b>\$33,588.43</b>	<b>30,074.30</b>	<b>28,059.86</b>	<b>\$31,101.20</b>
Gun Hunt Appl.	N/A	N/A	1,975.00	2,330.00	2,692.50	3,833.00	4,556.08	3,812.50	N/A	N/A
Archery Hunt	N/A	N/A	N/A	N/A	N/A	4,180.00	3,850.00	2,880.00	N/A	N/A
<b>TOTAL</b>	<b>\$17,286.41</b>	<b>\$26,032.35</b>	<b>\$32,649.90</b>	<b>\$38,344.42</b>	<b>\$38,039.93</b>	<b>\$41,601.43</b>	<b>\$42,985.80</b>	<b>\$36,766.80</b>	<b>\$28,059.86</b>	<b>\$31,101.20</b>

Table 12. Wildlife Drive Entrance Fees, 1988-1997.

Month	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Jan.	N/A	\$1,510.97	\$2,192.59	\$2,020.52	\$2,522.48	\$2,808.60	\$1,414.45	\$2,117.54	*\$742.15	\$1,604.89
Feb.	N/A	2,551.42	2,515.72	2,196.30	2,113.04	1,926.40	1,941.88	2,001.51	*1,473.94	1,847.66
Mar.	N/A	396.71	1,228.44	2,810.04	2,479.13	1,671.72	2,086.88	2,001.94	2238.61	2,194.03
Apr.	N/A	471.00	3,848.05	1,625.47	2,038.26	2,476.71	2,119.41	2,575.39	2051.43	1,925.18
May	N/A	670.96	968.65	1,904.19	1,986.40	1,986.40	1,771.61	1,890.89	1381.19	1,874.48
June	N/A	1,079.04	683.72	1,693.88	1,652.92	1,358.80	1,171.15	2,117.54	1568.61	1,660.61
July	N/A	1,828.15	1,452.86	1,646.95	1,597.85	1,604.60	1,419.80	1,511.68	1543.47	1,277.33
Aug.	744.95	721.16	1573.79	1,474.95	1,706.18	1,647.17	1,631.61	1,473.21	1608.03	2,245.73
Sept.	1,507.50	768.20	1,651.67	2,302.50	1,543.58	1,800.00	2,163.04	1,969.20	1882.11	1,737.17
Oct.	5,213.00	3,149.21	4,201.18	4,665.45	4,062.61	4,272.76	4,713.66	3,379.54	3320.57	2,739.22
Nov.	4637.00	7,291.86	6,242.04	5,784.71	5,071.58	4,340.93	4,385.47	3,272.21	**2,734.10	3,138.62
Dec.	918.91	1,411.01	2,657.18	2,250.00	1,400.61	1,314.84	1,635.79	634.42	1570.65	1,195.28
<b>TOTAL</b>	<b>\$13,021.36</b>	<b>\$21,849.78</b>	<b>\$28,247.24</b>	<b>\$29,439.42</b>	<b>\$28,092.43</b>	<b>\$27,208.43</b>	<b>\$26,454.72</b>	<b>\$24,214.30</b>	<b>\$22,114.86</b>	<b>\$23,440.20</b>

\* Refuge closed 5 days in January 1996 for Government shut down; also closed 8 days in January 1996 and 6 days in February 1996 because of ice and snow.

\*\* Refuge entrance fee box robbed of approximately \$1,000.

Table 13. Number of Entrance Passes Issued 1988-1997

PASS	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Entrance Passes	4,654	6,990	8,878	10,424	10,218	9,932	8,644	9,188	8,303	8,219
Blackwater Pass	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	18
Duck Stamps	315	181	255	219	237	192	189	109	126	174
Golden Eagle	5	69	68	103	148	140	160	127	119	70
Golden Age	947	795	676	667	656	564	129*	105	108	141
Golden Access	24	25	25	25	18	17	13	21	11	22
<b>SUBTOTALS</b>	<b>5,945</b>	<b>8,060</b>	<b>9,902</b>	<b>11,438</b>	<b>11,277</b>	<b>10,845</b>	<b>9,135</b>	<b>9,550</b>	<b>8,674</b>	
Archery Passes	N/A	N/A	N/A	N/A	N/A	418	385	303	N/A	N/A
Gun Hunt Applic.	279	333	399	470	544	667	921	772	N/A	N/A
<b>TOTALS</b>	<b>\$45,945</b>	<b>\$48,060</b>	<b>\$49,902</b>	<b>\$411,438</b>	<b>\$411,277</b>	<b>\$11,930</b>	<b>\$10,441</b>	<b>\$10,625</b>	<b>\$8,674</b>	<b>\$8,644</b>

\*Beginning 1994, a one-time fee of \$10.00 began for Golden Age passes

Table 14. Public Use Programs

Year	Total # Students	Dorchester County Programs		Out of County School Programs		Scouts, 4-H, Etc.		Environmental Education		Videos/Slide/Films Programs	
		#Schools	#Students	#Schools	# Students	# Groups	# Participants	# Groups	# Participants	Times shown	# Viewers=
1990	1,250	22		8							
1991	2,060	23	685	35	1,195					326	3,191
1992	2,103	16	735	35	1,036	12	332	4	40	555	4,325
1993	1,795	15	595	37	1,099	5	75	5	135	345	3,841
1994	1,784	10	452	31	1,072	10	260	18	663	351	3,278
1995	1,483	19	535	27	923	5	130	5	149	255	932
1996	1,197	9	210	24	773	6	83	9	196	240	2,120
1997	1,423	10	480	14	789	6	141	7	173	258	3,610

Table 15. Bus Tours On Wildlife Drive

Date	# Buses	# of participants	# Guided Bus Tours
1990	30	1,480	6
1991	45	2,36	5
1992	24	1,058	15
1993	19	900	11
1994	29	1,116	17
1995	16	744	12
1996	32	930	15
1997	18	662	

## **b. Studies and Investigations**

### **Other Research**

#### **Title: The Effect of Nutria (*Myocaster coypus*) on Marsh loss in the Lower Eastern Shore of Maryland: An Exclosure Study**

##### Progress Report Summary

Principal Investigator Michael Haramis of Patuxent Wildlife Research Center secured fencing on 19, 30m x 30m exclosures and completed subplot measurement of vegetative cover in each of the 57, 30m x 30m plots. The 342 subplots were permanently marked with reinforcing rods and each was measured in the spring and fall for percent total and percent of species vegetative cover. All plots were photographed in spring and fall from a helicopter to provide aerial documentation as to the percent cover and status of the plots over time.

Vegetative sampling over the first growing season has shown a trend toward declining vegetative cover in unprotected control plots and increasing cover within exclosures. Approximately 50% of subplots within exclosures increased in vegetative cover while 22% remained the same and 30% decreased. Within the unfenced control subplots the trend was reversed with 50% declining, 20% remaining the same, and 30% increasing. These documented changes provide preliminary evidence that nutria activity is contributing to marsh loss and that the marsh is capable of recovering in the absence of nutria. It is important to note that these changes have been documented prior to winter, the time of greatest marsh damage by herbivores. Therefore, spring 1998 measurements will likely show further vegetative decline.



Photo 6. The nutria enclosure project will also allow researchers to determine if nutria-damaged marsh will recover in the absence of nutria.



Photo 7. Twenty nutria enclosures located in the marsh are part of a study by Patuxent Wildlife Research Center to document the effects of nutria foraging activity on marsh vegetation.



Photo 8. FCO Bill Giese conducts prescribed burn within one of the nutria exclosures.

**Title: Impacts of a Modified Patch Clearcut on the Delmarva Fox Squirrel.  
January 1998 Progress Report Summary**

In 1996 Patuxent Wildlife Research Center initiated a study to investigate the impact of a modified patch clearcut on DFS populations. Principal investigators Carol Bocetti and Hank Pattee provided the following progress report.

Fragmentation of the Delmarva fox squirrel (DFS) preferred habitat, switching from saw timber to pulpwood production, and shifting from mixed-species forest management to monoculture pine plantations pose increasingly serious threats to the long-term stability of DFS populations.

Natural resource managers are seeking information and new methods that will produce and maintain an economically viable timber industry while providing suitable forest habitat for endangered species. It has been shown that clearcutting causes dispersal of fox squirrels to adjacent lands. The Chesapeake Bay Demonstration Forest provides an opportunity to study the effect of a modified patch clearcut on DFS.

Procedures: Three 40-acre treatment plots were placed in a mature forest of pine and mixed hardwood on the Chesapeake Bay Demonstration Forest, owned by The Conservation Fund. These sites were trapped for 5 days between April 23 and May 15, 1996. A modified patch clearcut is planned on these plots for the spring and summer of 1998.

Three, 30-acre reference plots were placed on similar habitat on adjacent Blackwater National Wildlife Refuge at Jarrett West, White Marsh, and Kuehnle. Trapping grids (approximately 50 traps placed 50 meters apart and 100 meters between lines) were established on each of the six plots.

In the fall of 1996 vegetation data were collected on the three treatment sites from one transect and five circular plots on each site. All six sites were trapped for 5 days with at least 5 days of baiting prior to trapping between October 7 and November 1, 1996.

In the spring of 1997, all six sites were again trapped for 5 days between March 17 and April 9, 1997. During that summer, treatment sites were intermittently trapped between June 9 and August 7, 1997 to attach radio transmitters to 11 adult fox squirrels. Locations of each squirrel were obtained 5 times a week through triangulation by compass bearing from points around the study site.

In the fall of 1997, vegetation data were collected from the three reference sites from one transect and 5 circular plots at each site. All six sites were trapped for 5 days between September 29 and October 24, 1997.

A total of 124 Delmarva fox squirrels have been handled 340 times, and a total of 83 gray squirrels have been handled 291 times. After 5 trapping sessions some

interesting trends have emerged, particularly on the Demonstration Forest. The fox squirrel turnover rates, over the last year and a half on the three treatment sites, are significantly different. Each site appears to support 6-8 fox squirrels at a time. Site 1 has nearly all of the original tagged squirrels still present on the site a year or more later, but sites 2 and 3 have practically none. It is not presently clear as to why this turnover rate is so high on sites 2 and 3, but the trend raises concerns about the potential for these sites to be habitat sinks. We do know that gray squirrel populations are greater on sites 2 and 3. Perhaps further investigation is warranted to clarify this possible explanation.

After 5 trapping sessions, we can now search for evidence of the influence of various environmental variables on trapping success. All evidence discussed is preliminary. We are beginning to document the diminishing returns of capture success after 3 days of trapping, but we will continue to trap for the full 5 days to quantify these trends. Fall sessions are, on average, less successful than spring sessions. Time of day does not seem to influence trapping success. Gray squirrel presence seems to have a striking influence on trapping success of Delmarva fox squirrels. Trap points that are successful in catching fox squirrels are nearly exclusive of those that capture gray squirrels.

## Habitat Restoration

### 2a. Wetland restoration: On-refuge

Equipment Operator Thurman completed initial construction of a cross-dike that when completed, will separate Pools 4b and 4c into two independently managed moist soil-management units, about 30 and 20 acres in size, respectively. Construction was performed with the John Deere excavator with a "V" bucket.

### 2b. Wetland restoration: Off-refuge

In late July, Equipment Operators Morris and Thurman completed a one week private lands project in lower Dorchester County on the property of Mr. Gibby Rowe. The 2-acre wetland restoration project involved use of refuge John Deere excavator, skid steer, and 550 B dozer. They expanded an existing 0.1-acre pond, constructed ditches and dikes, installed a 6" PVC elbow and pipe for flooding/drainage. The land owner seeded the impoundment with Japanese millet and reported excellent results in attracting waterfowl after flooding. Another satisfied customer and lots of happy ducks, shorebirds, and wading birds.



Photo 9. Keith Morris cuts the grade on a dike on an off-refuge wetland restoration project.



Photo 10. Keith Morris and Richard Thurman operate the pan and excavator while restoring this two-acre wetland area on private land in the lower part of the county.



Photo 11. Richard Thurman constructs a dike during off-refuge wetland restoration in lower Dorchester County.

## 3

### Habitat Management

#### 3a. Manage water levels

Water level management, as opposed to moist-soil management, involves relieving high waters due to heavy rains and subsequent runoff from Kentuck and Greenbriar Swamps. These actions are often complicated by high tides because we can not allow brackish water to enter the impoundment systems. If water levels can not be reduced through gravity flow, than pumps are employed. The refuge has two 16-inch Crisafulli pumps (PTO-driven by a Deutz diesel powerhead or tractor), an 8-inch gator portable (gas or PTO driven), an 8-inch gator stationary electric-powered, and a 6-inch Lombardini pump available for water level management. The typical periods that require flood relief are the mid-summer growing season to protect sprouting planted crops in impoundment bottoms, or moist-soil plants; and the winter, when flood waters threaten to flood Key Wallace Drive and water levels are too deep to provide proper conditions for dabbling ducks and other waterfowl.

#### 3b. Manage moist soil units

Moist soil management was again utilized in the refuge impoundments to provide proper feeding conditions for migratory waterfowl and shorebirds. Dewatering began in later March - mid-May. Flooding began in late August. Rainfall dependence often delays flooding of some impoundments until November, particularly in drought years such as 1997. Pools 1, 2, 4a, and Field 8 were managed as moist soil units. Vegetation in all pools was inventoried in mid-June. Depending on the percentage of weed species, such as cocklebur, and the amount of bare ground, decisions were made to either leave the areas in moist soil plants or supplement natural production with planted crops. Crops, mainly mil and Japanese millet, were planted in Pools 3a, 3b, 3d, 4b, 5a, 5b, and 5c in areas where moist soil plant production was poor to non-existent. When crops are planted in pool bottoms, no herbicides are used, and crops are planted on 36 inch centers to also allow natural vegetative production between the rows. Pool 4c was volunteer Japanese millet and moist soil plants.



Photo 12. Some pool bottoms were planted in 36" spaced rows of milo to provide a diverse and abundant seed source. Intensive use by ducks, geese, and tundra swans was documented in these areas when flooded.



Photo 13. A diversity of moist soil plants such as *Bidens*, *Cyperus*, and *Polygonum* flourished in refuge impoundments.

### 3c. Graze/mow/hay

### 3d. Farming

#### Croplands

Waterfowl, songbirds, resident game, and endangered species benefitted directly and indirectly from force account farming on the refuge. The refuge cropland management program provided a variety of foods for wildlife throughout the year, by natural or mechanical means, although the primary emphasis was to sustain overwintering migratory waterfowl. High protein cover crops of Ladino clover and buckwheat, over-seeded with wheat, received heavy waterfowl use for the entire winter, while sorghum and corn provided needed carbohydrates during the later winter period after the hunting season and during periods of extreme weather when food sources were generally unavailable. Waterfowl utilization of refuge crops was exceptional again this year, and the refuge's environmentally-sensitive farming practices continued to earn praise and support from local government officials, the general public, hunters, and adjacent landowners.

The Grand National Waterfowl Association supplemented refuge seed orders with a donation, procured through Pioneer Seed Company, of 34 bags of corn and 14 bags of sorghum.

During the 1997 farming season, 620 acres were incorporated in the refuge cropland management program:

83	acres of corn
320	acres ladino clover;
18	acres of buckwheat/wheat;
50	acres of sorghum;
44	acres of Japanese millet;
37	acres of wildlife browse/cover;
68	acres of wheat

Principal farming methods and results for each crop are described below.

**Buckwheat/Wheat** was planted in 18.0 acres in 1997. Buckwheat/wheat provides a seed crop, a green browse, and a cover crop. This mixture is second only to ladino clover in waterfowl utilization. Unfortunately, extremely wet conditions prevented planting until maturity became questionable. Wheat was substituted in order to provide some green browse in the remaining fields, totalling 68 acres.

**Corn** is grown on the refuge to provide a high energy food source for wintering and migratory geese and ducks during periods of nutritional stress. Corn was mown in late January to maximize availability and use. Use of corn by waterfowl was 100 percent. Eighty-three acres of corn were planted in 1997.

**Japanese millet** was planted in 44 acres of refuge fields, primarily along moist soil unit edges and low elevation fields where early flooding would occur.

**Ladino clover** is probably the most utilized crop planted on the refuge. After the plant is browsed down, re-sprouting occurs during warm periods and geese regularly feed on the succulent new shoots. Maintenance of the clover fields during the spring and summer consists of periodic mowing to control weed competition. In 1997, 320 acres of clover were maintained. Corn crops are rotated with two years of ladino clover at the refuge.

**Sorghum** was planted in 50 acres, primarily in Pools 3a, 4, and 5a. Water levels were available in late fall making it possible for both ducks and geese to take full advantage of the crops. Sorghum was planted on 36" rows making access easier, plus allowing moist soil plants to grow between the rows (morning glories were spot treated with chemical weed control).

**Wildlife browse/cover crops** comprised 37 acres of refuge fields in 1997. Several small fields were maintained by periodic mowing to prevent woody growth invasion.

The refuge's farming program uses Best Management Agricultural Practices (filter strips, cover crops, soil testing, etc.) to minimize the effects of agriculture on the Chesapeake Bay and its tributaries.



Photo 14. A beautiful stand of buckwheat in bloom in Field 45 on the Hog Range unit provided high protein forage for migrating Canada geese.

### **3f. Prescribed burning**

Late in 1997, work began on the revised Fire Management Plan (FMP) for the Blackwater Complex. Regional Fire Management Coordinator (RFMC) Allen Carter made several trips to the refuge, including a one-week stint to assist FCO Giese and Biologist Weaver in writing the FMP. The Environmental Assessment (EA) accompanying the FMP was started this year. The focus of the EA is the effects analysis for the Fire Review Panel's fire management alternatives developed following extensive NEPA activity. (See 1995 and 1996 ANR's). Assistant ZBS Wenonna Brown took the lead in fleshing out the document, and Biologist Weaver coordinated the effort and assisted in writing the technical review. Both the EA and FMP will be completed in 1998.

The 1997 Prescribed Fire Program, approved on December 12, 1996, addressed the prescribed burning of 2,000 acres of marshland, 150 acres of woodland, and 80 acres of agricultural fields.

A total of 3,043 acres of marshland and 75 acres of woodland were prescribed burned as habitat management and preparedness burns.

The fire crew assisted refuge staff with boundary posting; wildlife surveys; building, equipment and vehicle maintenance; and other maintenance projects.

An 18-foot aluminum jonboat with a 50-hp outboard was purchased for prescribed fire use.

Funding was received for a 30' x 85' fire building (\$70,000). Construction began in December with pouring of a concrete floor and installation of a septic system.

Refuge staff assisted Dismal Swamp NWR in conducting an aerial woodland burn in June.

A public meeting was held on January 31 at Dorchester County library to review plans for the future fire program at Blackwater.

FCO Giese and FF Brady attended Ignition Methods Techniques (RX-230) at Cape Cod National Seashore on June 9-13.

FY 1998 fire funding (1263) included a significant increase in staffing and funding in order to accommodate the increase in the refuge prescribed fire program which will now include Fishing Bay Wildlife Management Area and the Blackwater/Maryland Department of Natural Resources burn study area. Additional staff included two full-time term positions, four seasonal firefighter positions and a part-time clerk.



Photo 15. Prescribed burning of refuge marshland enhanced trapper's control of furbearers and promoted marsh growth.



Photo 16. Prescribed fire was an integral part of phragmites control.



Photo 17. Woodland prescribed burning entered its second year in 1997. Reducing encroachment of undesirable vegetation, encouraging a grassland component, and enhancing Delmarva fox squirrel habitat were key elements of the program.

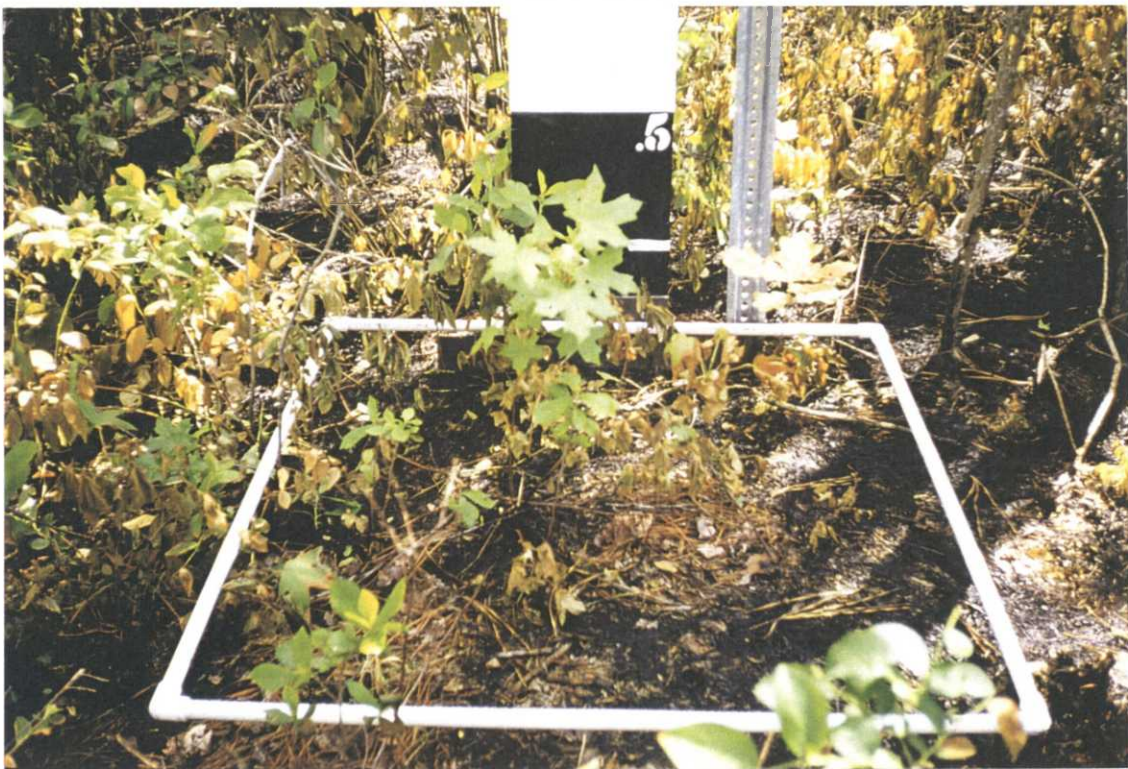


Photo 18. Woodland burn units allowed evaluation of vegetation responses to prescribed burning.



Photo 19. Blackwater hosts the largest population of wintering and nesting bald eagles in the eastern U.S. north of Florida. Prescribed burning to reduce hazardous fuel accumulations is an important method of protecting eagle nest trees from wildfire.



Photo 20. Habitat management at Blackwater is aimed at providing a diverse complex of wildlife habitat combining tidal, brackish and fresh marsh; agricultural and grassland areas; palustrine and upland forest lands.



Photo 21. Reduction of hazardous fuels - wildfire preparedness - is one goal of the woodland prescribed burning program.

### 3g. Control pest plants

Johnsongrass and Canadian thistle occurred in refuge fields and were spot-treated with Roundup. Control of these noxious weeds is required by Maryland law. A total of 12.5 acres was treated.

All herbicide treatments on the refuge were conducted under the direction of FCO Giese, a certified pesticide applicator. Maintenance Mechanic Webster and FCO Giese attended the required annual Pesticide Application Recertification course sponsored by the MD Department of Agriculture in February. No insecticides have been used since the force account farming program began in 1989.

Herbicides were applied during force account farming operations. The majority of herbicides used were to burn down clover prior to no-till corn planting.



Photo 22. To aid in phragmites control efforts, spray-killed reed thickets are burned to stimulate growth of desirable vegetation. About 60 acres of phragmites were sprayed on Blackwater in 1997.

## Fish and Wildlife Management

### a. Bird banding

Blackwater was assigned to band a total of 150 Canada geese as part of the Maryland quota for 1997. Rocket net shots on January 29 and February 11 captured 182 Canada geese. Mallards were also banded as part of a refuge effort to determine released RSA mallard use of the refuge. Of the 220 mallards captured, four percent were RSA mallards.

Table 16. Waterfowl Banded on 1/29 and 2/11/98

SPECIES	MALE			FEMALE			TOTAL
	ASY	AHY	SY	ASY	AHY	SY	
Canada goose	76		10	65		31	182
Mallard		43			57		100

As the resident Canada goose population continues to expand, impacts on early growth of crops planted for migratory waterfowl also increases. Drive fences and a catch pen were used to capture 113 Canada geese from Pool 5b. The birds were then banded, transported, and released at the Bishop's Head unit of Blackwater.

Wood duck banding was conducted in September and October by baiting portable swim-in traps with corn.

Table 17. Resident Canada Geese Banded, 7/1/97

SPECIES	MALE		FEMALE		TOTAL
	L	AHY	L	AHY	
Canada Goose	35	16	48	14	113

Table 18. Pre-season Duck Banding

SPECIES	MALE		FEMALE		UNKNOWN		TOTAL
	AHY	HY	AHY	HY	AHY	HY	
Wood Duck	52	35	24	34	--	--	145
Mallard	1	--	2	--	--	--	3
Blue-winged teal	15	63	12	53		1	144

#### d. Provide nest structures

##### Bluebird Nest Box Monitoring Program

This was the 13th year of the Bluebird Box Monitoring Program at Blackwater NWR. Program coordinator was Manager Trainee Paglione. Thirty boxes were monitored by volunteers Beverly Waggoner, Susan Grant, and Peter Kryszak. As in previous years, bluebirds continued to be the major species to utilize the boxes. Other species included house sparrow, tree swallow, Carolina chickadee, tufted titmouse, warbler, and wren. A total of 40 bluebirds and 41 other species (including 38 house sparrows) fledged from 30 boxes.

Half the boxes (15) were actively managed to control house sparrows by removing and killing all house sparrow eggs and birds. The other half of the boxes were not as actively managed (nests with eggs were removed; nests with hatchlings were left alone).

The active management of house sparrows proved to be the strategy most beneficial to bluebird production. A total of 27 bluebirds fledged from these boxes. In comparison, 13 bluebirds (and 38 sparrows) fledged from the remaining boxes.

Table 19. Bluebird Nest Box Production, 1989-1997

SPECIES	1989	1990	1991	1992	1993	1994	1995	1996	1997
Bluebirds fledged	145	120	69	120	88	104	N/A	91	40
Other birds	30	14	37	35	18	43	N/A	62	41

##### Osprey

Virtually all osprey nested on artificial nest structures provided for them. Of the 37 platforms available for nesting in 1997, 29 were active and produced 59 young (up from 52 young in 1996 and 49 in 1995).

The five active nests adjacent to Blackwater produced a total of 11 young.

##### Barn Owl

Of the 13 barn owl nest structures placed in marshes and grass fields on the refuge, 8 were used by barn owls in the spring to produce 35 young. (In 1996, 6 structures produced 29 young.) Of the spring cohort, 27 were found during the April 19 check and 8 were unexpectedly found during the June 27 check. Of the 13 nest structures, 5 produced 19 young in the fall (4 produced 14 young last year). The fall barn owl data were collected on October 21. Total production for the year was 53 young compared to 54 in 1996.

#### **e. Predator and exotic control**

Mute swans are exotic birds that are not protected under federal law, but are protected under a state law designed to protect wetland game birds, including swans. They are injurious to SAV beds and disrupt nesting of colonial waterbirds. Maryland DNR began controlling their numbers in 1993, and requested our assistance in 1995.

No mute swans were killed this year by Blackwater staff, however, one mute swan nesting female was killed on Barren Island by Maryland DNR biologists in the ongoing mute swan reduction program. The Atlantic Flyway Council adopted a policy recommending mute swan control (see below) on federal and state lands.

Recommendation:

That the Atlantic Flyway Council adopt a policy to control mute swans in the Atlantic Flyway. The policy would endorse the following actions:

1. State and provincial wildlife agencies, if they do not already have the authority, should seek to gain authority over the sale and possession of mute swans and their eggs.
2. The sale of mute swan adults, young or their eggs should be prohibited.
3. States should seek to eliminate all importing or exporting of mute swans without a special purpose permit issued by the state wildlife agency.
4. Mute swans captured due to nuisance complaints, sickness, or injury should be removed from the wild or be euthanized.
5. Egg addling programs where feasible should be encouraged.
6. Both state and federal wildlife agencies should institute programs to prevent the establishment and/or eliminate mute swans.
7. States and provinces should seek to make the mute swan an unprotected species if this is not already the case.
8. States should strive to manage mute swan populations at levels that will have minimal impacts on native wildlife species or habitats.

#### 4.e.1. Trapping

Local trappers bid a record \$9411.96 to trap 11,668 acres in eighteen units on the refuge from January 1 through March 15. Some units opened December 15, 1996 for nutria, raccoon, skunk, opossum, and fox.

Table 20. Furbearer Harvest, 1992-1997

<b>SPECIES</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>5-year average</b>	<b>1997</b>
Muskrat	4,300	3,528	4,681	4,199	3,778	4,097	5,721
Nutria	3,908	5,558	4,899	4,039	5,436	4,768	8,054
Raccoon	221	155	38	18	52	97	43
Opossum	89	36	13	2	16	31	12
Skunk	22	11	3	0	1	7	2
Fox	3	1	1	1	3	2	0

Trapping permittees were again offered a rebate of \$1.50 per nutria, up to the dollar amount of their bid payment. Most trappers participated in the rebate program. However, rebate funds remaining at the end of the season were made available to other permit holders for rebates over and above the amount of their bid payment. Therefore, the total bid amount was returned to the trappers in exchange for the harvest of 6275 nutria. An additional 898 nutria were killed by the trappers, and 881 by refuge staff for a total of 8,054 nutria.

Market values for furbearers were similar to 1997 prices: \$4.50 per muskrat pelt and \$2.00 for muskrat carcasses, \$7.50 per raccoon pelt, and \$15.00 per fox pelt.



Photo 23. For possible use in tagging and control efforts, environmental floating bait platforms were used to determine their suitability for attracting nutria.



Photo 24. Eighteen trapping units were leased to the highest bidder to control nutria and muskrat numbers and prevent damage to the marsh from excessive herbivory.

#### 4.e.2. Exotic Species Removal

Nutria continued to damage Blackwater's marshes. The nutria rebate program was again in effect for 1997. Refuge trappers were credited \$1.50/nutria tail reimbursable to their 1997 trapping bids.

During FY97, 7,173 nutria were taken by trappers under the rebate program. An additional 881 nutria were killed by refuge staff.

Table 21. Exotic, Injurious and Invasive Wildlife and Plants

	1993	1994	1995	1996	1997
<b>NUTRIA</b>					
# Taken by trappers	5558	4899	4039	5436	7173
# Taken by staff	710	431	547	697	881
<b>TOTAL</b>	6268	5330	4586	6133	8054
<b>MUTE SWAN</b>					
# Swans	0	0	10	1	1
Eggs	0	0	12	7	0
<b>PHRAGMITES</b>					
Acres sprayed	0	0	40 acres	60 acres	60 acres
<b>PURPLE LOOSE STRIFE</b>	---	---	---	first plants observed and pulled 35 plants	plants observed, not pulled
<b>GYPSY MOTH</b>					
Acres Sprayed	150 AC	1841.5 AC	2646 AC	896 AC	1381
Control Agent	Gypcek	BT	BT	BT	Gypcek
<b>NOXIOUS WEEDS</b>					
C. Thistle (ac)	Spot	Spot <5ac	Spot	12.5 ac	12.5 ac
Johnson grass (ac)	Spot	Spot	Spot	Spot	Spot
Control Agent	Roundup	Roundup	Roundup	Roundup	Roundup
<b>PINE BARK BEETLE</b>	Minor Infestation	Minor Infestation	Minor Infestation	Minor Infestation	Minor Infestation

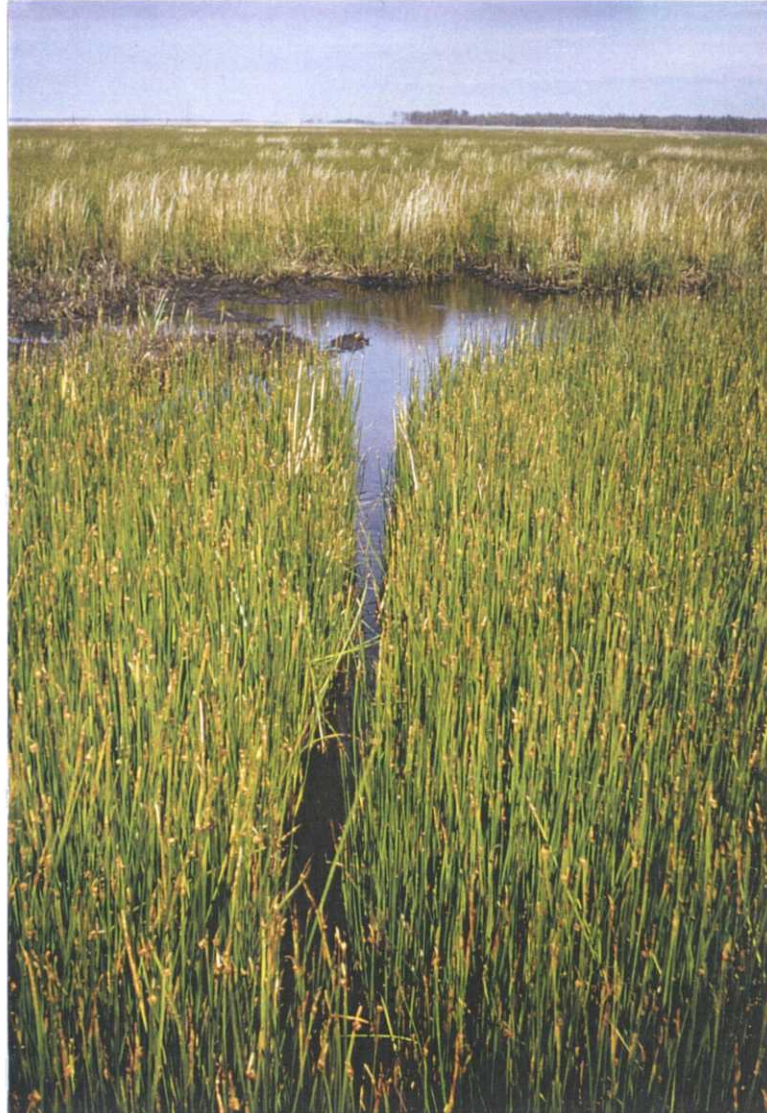


Photo 25. A nutria caused swim canal through three-square marsh leads to nutria digging - the beginning of an eat-out and marsh loss. These canals are also avenues for saltwater intrusion.



Photo 26. Bill Giese examines a mud flat caused by nutria foraging in the three-square marsh. This area will become open water in one year.



Photo 27. About 1,381 acres of Delmarva fox squirrel habitat were sprayed with Gypcheck to combat gypsy moth infestations.

## 5

### Coordination Activities

#### 5a. Interagency coordination

Refuge staff participated in the following coordination activities with our partners:

- Ducks Unlimited Citizens Advisory Committee
- Dorchester County Heritage Committee
- Nanticoke Watershed Alliance
- Natural Resources Conservation Service activities
- Nutria Eradication Planning (MD DNR and CBFO)
- Mute Swan Control (MD DNR)
- Hunter Safety Training (MD DNR and Dorchester County Extension Office)
- Audubon's ARK Program
- World Wildlife Fund's Refuge Initiative
- Refuge Academy Training
- Airlie Institute and Defenders of Wildlife: Trumpeter Swan reintroduction
- Refuge Advocacy Initiatives (Full Resources Committee and SubCommittee on Fisheries)
- National Fish and Wildlife Foundation's advocacy programs
- EPA's wetland restoration activities
- MD DNR in conducting mid-winter waterfowl and bald eagle surveys
- Forsyth/Bigantine NWR dike restoration
- provide input in development of Mitigation Policy
- Dorchester Soil Conservation District (Environthon)
- Delmarva Fire Management Group
- BRD/USGS Patuxent Wildlife Research Center/The Conservation Fund/MD Cooperative Fish & Wildlife Research Unit Delmarva fox squirrel and herpetological research on TCF Forest Demonstration Area
- University of Maryland Center for Environmental and Estuarine Studies
- GIS/GPS analysis of habitat and remote sensing seminars

#### Other Cooperative Programs

NADP/NTN: The refuge continued to assist the National Atmospheric Deposition Program/National Trends Network (NADP/NTN) in operating an atmospheric deposition collection site. The NADP/NTN is a cooperative undertaking of the state agricultural experiment stations, federal and state agencies, public and private universities and industry that began in 1978. The USDA CSRS National Research Support Project 3 and USGS Acid Rain Program provide the nucleus around which the NADP/NTN is formed. NADP/NTN's role is to assure that the nation has the unprecedented, uninterrupted record of precipitation chemistry that will be necessary to assess current trends, and to make high confidence determinations of needed changes in emissions coming from fossil fuel-based energy and manufacturing

enterprises. Our chemical climate must be watched carefully so we will know how and where it is changing and understand more clearly the signals received from this key indicator of environmental quality.

DEMONSTRATION FOREST: After three years of negotiations with TCF's attorneys and the U.S. Solicitor's office, the MOU with The Conservation Fund was approved by its Vice President, but hit another wall when it got to the Regional Office. The ES Division felt that the MOU would set a bad precedent for DFS recovery, even though the MOU was designed to evaluate/research effects of timber harvest on survival of DFS. The entire DFS recovery program was being escalated to new heights and 30-year-old procedures were being thrown out the window subsequent to the Service receiving two Notices of Violations of the Endangered Species Act on November 25, 1997. At year's end, a new MOU was being drafted, and an Intra-Service Consultation was being prepared for review by CBFO.

BioTech Stone attended the "Deer Management in Maryland" workshop on October 27, 1997.

Biolotist Weaver attended the Eastern Black Bear Workshop and Black Bear Conservation Committee in Vicksburg, LA.



Photo 28. Bill Giese provides technical assistance to University of Delaware researchers investigating use of remote sensing technology to monitor marsh loss.

## 5e. Cooperative/Friends Organizations

### Friends of Blackwater

- The Friends of Blackwater (FOB) donated \$2,583 for refuge purchases including an 35mm instamatic camera for the public use program, bird seed and sugar for the bird feeders, field guides for the Biological Program, membership in the Nanticoke Watershed Alliance, assistance for the Dorchester County Envirothon, radio advertising, Jr. Ranger materials for the Refuge Open House and refreshments for the Litter Clean-up Program. Dorchester County Maps to distribute in the Visitor Center, and a Canada goose and bald eagle costume for the Refuge float in the Cambridge Christmas parade.
- Purchased with a matching grant from the Washington Office a Dell Pentium II Computer System with Word Perfect Suite 8.0 for the Public Use Program.
- The Eagles Nest Bookstore grossed its highest sales ever with \$55,468.28.
- FOB managed the Refuge deer hunts, and hired a Hunt Coordinator, Tammy Fields to conduct the hunt program.
- Celebrated FOB Tenth Anniversary on 10/11.
- Held Annual Spring Fling on 5/3-5/4.
- Held Annual FOB Open House on 12/6-17.
- At the request of the Division of Refuges, the Association entered into a cooperative agreement where FOB produced and distributed nationally the Refuge systems's National Wildlife Refuge "Wild Things" T-shirts.
- FOB President Frank Wolff and Corresponding Secretary Arlene Wolff have been very active in the System-wide Friends Initiative aimed at vastly increasing the numbers of Friends groups associated with national wildlife refuges. They are a part of a mentoring team which assisted groups at Pee Dee NWR, and E.B. Forsythe NWR. They attended a training session for Refuge managers and Park superintendents held in July at Bloomington, MN where Frank was a speaker for the Conference of Cooperating Associations of the FWS and National Park Service.
- FOB assisted in the development of the newly formed Friends of Eastern Neck NWR.
- FOB played a big role in forming a loose confederation of Friends groups located on the Eastern Shore of Maryland, Virginia, and Delaware. Members attended the first joint meeting at Chincoteague NWR 4/26.
- FOB organized, staffed, and hosted two in-service training seminars for Friends group leaders and Refuge liaison persons. The first session was held 6/26 at Blackwater NWR with FOB board members Dennis Ewell and Ron Tillier conducting a program on bookkeeping. The second session was conducted on 8/28 at Eastern Neck NWR with FOB President Frank Wolff and Ann Haines of Friends of Minnesota Valley NWR presenting a program on how to write grants.
- FOB installed a rental trailer to use for an office and storage due to lack of space in the Visitor Center.
- FOB contributed 3,231 volunteer hours to the Refuge in 1997.

- FOB co-hosted and provided the main entre for the Volunteer Awards Dinner 5/22.
- Published and distributed 4 issues of the Blackwater Tidelines Newsletter mailing out to 400 members and 100 other Friends groups, conservation organizations, local libraries, schools and other educational institutions.



Photo 29. FOB President Frank Wolff presents retiring FOB Board Member Zeeger de Wilde with a plaque for all the hard work and effort he has donated to the Friends of Blackwater and the Refuge. Volunteers Ruth Gray and Madeline Parker offer their congratulations.



Photo 30. A curious student searches for insects to capture in one of the insect nets donated for environmental education programs by FOB.



Photo 31. FOB donated money to provide refreshments for several Refuge activities including the Volunteer Training Workshop.



Photo 32. Applications for the refuge deer hunts were administered by the Friends of Blackwater who hired Tammy Fields as the hunt coordinator.



Photo 33. FOB Board Members Bob Hammerton and Peggy Tillier assisted with the hunt lottery drawing.



Photo 34. FOB President Frank Wolff welcomed everyone to the Tenth Anniversary of FOB Celebration.



Photo 35. The FOB Spring Fling had a sunny weekend for numerous activities including the children's art with assistance from Barbara Benson from the Chesapeake Bay Field Office...

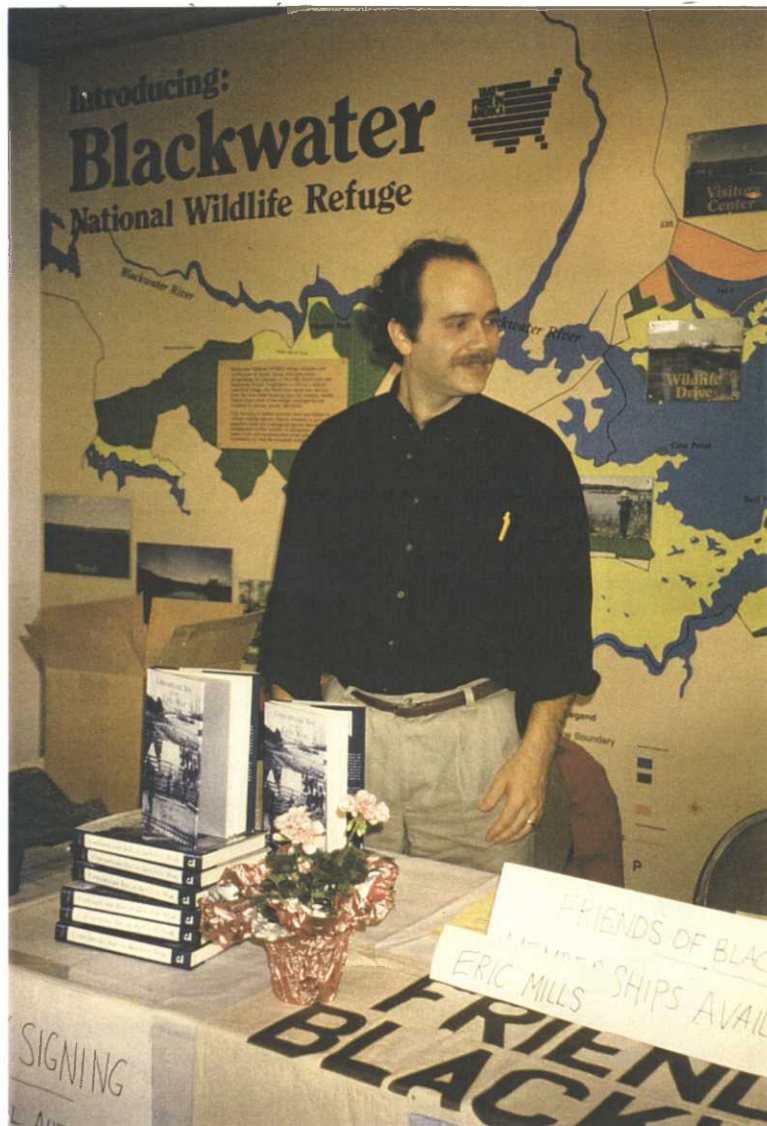


Photo 36. Authors like Eric Mills...



Photo 37. Buck tail tying with Chuck Phral...



Photo 38. Archery demonstration...



Photo 39. Tree boring demonstration with Volunteer Sam Bennett, and ...

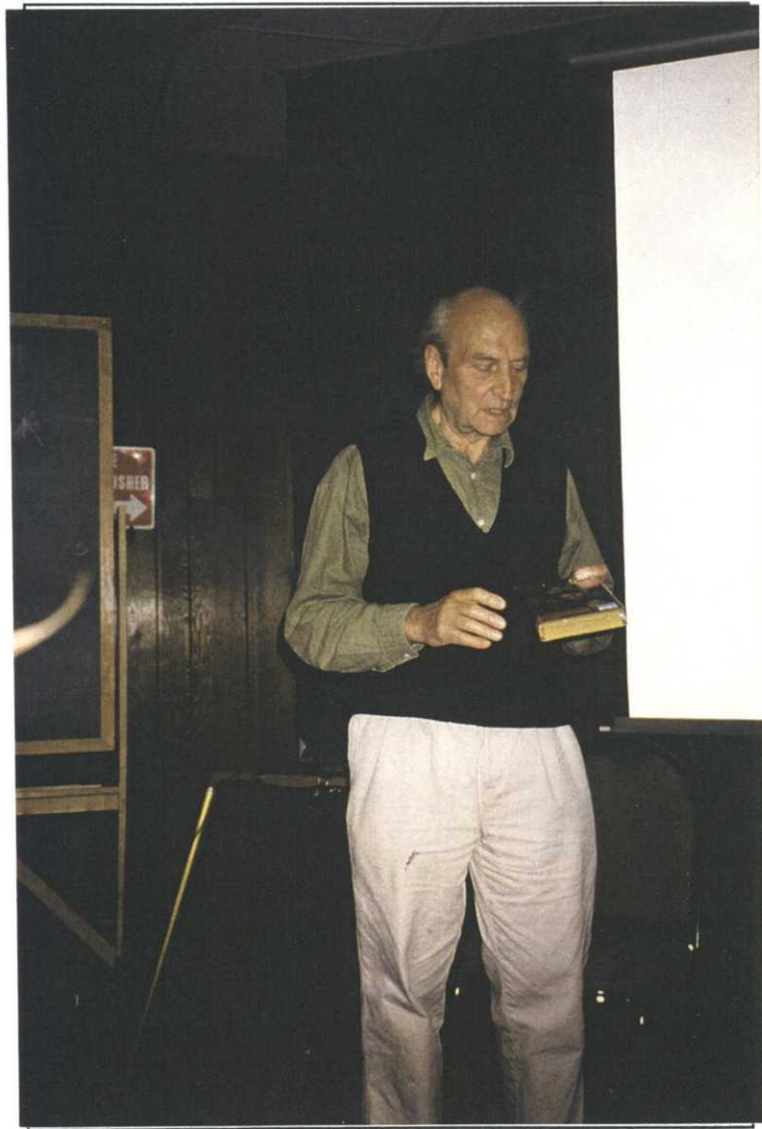


Photo 40. The Science Behind "Fly Away Home" Program with Dr. Bill Sladen.



Photo 41. But the highlight of the weekend that brought out all the visitors was the turtle race!



Photo 42. Members of FOB attended the first joint meeting of Delmarva Friends Groups held at Chincoteague, VA . Left to Right: ORP Maggie Briggs, Clara Evans, Arlene Wolff, Bob Evans, Frank Wolff, Erna and Bob Evans, Don and Catharine Wagner.

Table 22. FOB Donations FY Year

Year	Donation	Matched Grant
1989	\$180	
1990	\$640	
1992	\$1,250	\$1,250
1993	\$10,500	\$3,000
1994	\$603	
1995	\$11,840	\$8,500
1996	\$3,333	\$2,000
1997	\$3,778	\$13,307.15

# FOB Donations

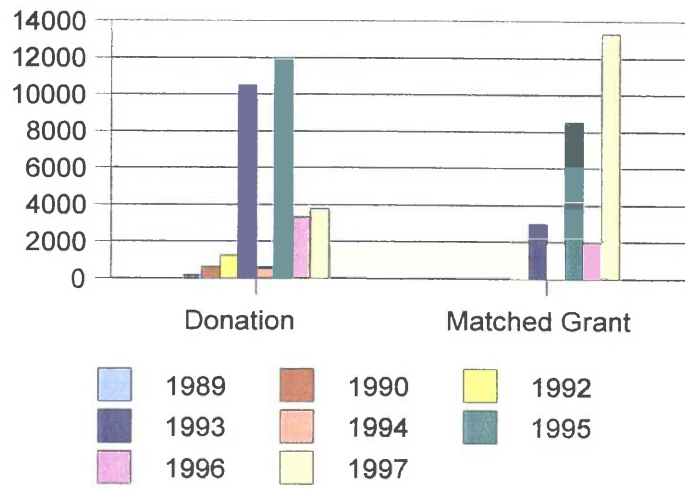


Table 23. Friends of Blackwater NWR, Inc. Sales, 1987 - 1997

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
<b>Jan</b>	N/A	\$6,32.33	\$4,52.41	\$6,51.21	\$828.17	\$2,443.00	\$2,774.46	\$1,905.36	\$2,397.32	\$1,215.15	\$3,329.27
<b>Feb</b>	N/A	474.82	248.51	836.65	2,221.63	2,839.53	2,275.49	2,666.94	2,282.17	1,857.83	3,320.48
<b>Mar</b>	N/A	422.17	383.49	381.66	1,539.11	2,409.67	2,416.67	3,490.74	2,742.10	2,830.85	3,769.73
<b>Apr</b>	N/A	634.37	783.02	470.72	1,584.04	2,605.69	3,241.06	3,930.54	3,798.85	2,972.53	3,839.25
<b>May</b>	N/A	512.90	492.88	616.97	1,067.63	1,961.40	3,195.16	3,582.90	3,234.91	4,201.00	6,291.82
<b>Jun</b>	N/A	\\\\\\\\	101.71	/////	509.11	835.29	1,889.90	1,710.48	1,342.14	2294.21	3,533.62
<b>JUL</b>	N/A	404.54	404.72	/////	580.28	1,208.03	1,190.23	1,133.65	1,493.53	2094.1	3,255.90
<b>Aug</b>	N/A	\\\\\\\\	\\\\\\\\	106.22	1,173.49	999.55	2,168.45	1,986.01	1,905.00	2155.66	3,530.71
<b>Sep</b>	N/A	351.99	402.39	776.69	2,323.13	1,914.63	3,046.51	3,022.84	3,547.72	4066.16	3,248.07
<b>Oct</b>	408.99	1,170.92	754.40	1,924.91	4,567.68	5,255.12	6,589.31	6,731.96	6,544.76	7832.11	8,036.64
<b>Nov</b>	1,332.04	1,332.04	1,339.0	1,447.30	6,509.95	6,572.57	6,928.06	6,572.57	4,872.28	7335.89	6,917.45
<b>Dec</b>	831.67	478.48	531.64	1,322.04	3,568.02	2,666.74	4,359.48	2,666.74	3,553.68	5965.94	6,395.34
<b>Total</b>	<b>\$2,572.70</b>	<b>\$6,441.59</b>	<b>\$6,000.47</b>	<b>\$10,431.00</b>	<b>\$26,472.24</b>	<b>\$31,711.22</b>	<b>\$40,074.78</b>	<b>\$40,916.01</b>	<b>\$37,714.46</b>	<b>\$4,481.43</b>	<b>\$55,468.28</b>
<b>///// Money added in next month's total</b>											
<b>\\\\\\\\ Money added in previous month's total</b>											



# FOB Spring Fling

Blackwater National Wildlife Refuge  
2145 Key Wallace Drive  
Cambridge, MD 21613  
410-228-2677



- |            |  |            |   |
|------------|--|------------|---|
| 10-4 pm    | Children's Arts & Crafts                       | 8:00 am    | Beginners Bird Walk                                   |
| 10:00 am   | Delmarva Fox Squirrel Program                  | 10:00 am   | Book Signing Helen Chapell                            |
| 10:00 am   | Book Signing Hal Roth                          | (to 1pm)   | Author <u>Oyster Back Tales</u>                       |
| (to 1pm)   | Author <u>Conversations in a Country Store</u> | 10:00 am   | Horn Point Touch Tank                                 |
|            |  | (to 4pm)   |   |
| 11:00 am   | Rocket Net Demonstration                       | 10:30 am   | Buck Tail Tying Demonstration                         |
| 11-3 pm    | Scales and Tales Exhibit                       | 11:00 am   | Children's Nature Walk                                |
| 11:30 am   | Bus Tour                                       | 11:30 am   | Bus Tour  |
| 12:00 noon | Tree Boring Demonstration                      | 12:00 noon | Book Signing Pat Vojetech                             |
| 12:30 pm   | Water Quality Demonstration                    | (to 2 pm)  | Author <u>Skipjacks of the Chesapeake</u>             |
|            |  | 12-4 pm    | Bird Seed Feeder Construction                         |
| 1:00 pm    | Turtle Races                                   | 1:00 pm    | "The Science Behind the Movie "Fly Away Home" Program |
| 1:00 pm    | Book Signing Eric Mills                        |            | Professor William Sladen                              |
| (to 3 pm)  | Author <u>Chesapeake and the Civil War</u>     |            |   |
| 2:00 pm    | Erosion Control Demonstration                  | 2:00 pm    | Wye Oak Tree Planting                                 |
|            |  | 2:15 pm    | Bus Tour  |
| 2:30 pm    | Bus Tour                                       | 2:30 pm    | Fly Tying Demonstration                               |
| 3:00 pm    | Urban Model Demonstration                      | 3:00 pm    | Archery Demonstration                                 |





# FOB Annual Eagle's Nest Open House 10-4 pm



NATIONAL WILDLIFE REFUGE

**Saturday, December 6, 1997**

10:00 - noon

Tom Horton Book Signing - Author of 5 books dealing with life on the Eastern Shore:

Bay Country

Water's Way

Swanfall

Turning the Tide

Island Out of Time

1:00 - 3:00 pm

Hal Roth Book Signing -

Conversations in a Country Store: Reminiscing on Maryland Eastern Shore

You Can't Get to Puckhm

Recycled Christmas ornament workshop - Helen Combes

Children's holiday greeting card construction - Barbara Benson

Pine cone & milk carton bird feeder construction - Eric Dedrick

Park Ranger Jennifer Podgurski - Waterfowl Wise Certificate of Achievement

Where are the Wetlands - Wetlands loss will be visualized and experienced

Goose Calls - Learn how a goose finds the family and mate by utilizing different calls.

**Sunday, December 7, 1997**

1:00 - 3 pm

Dr. Tom Flowers Book Signing -

A History of Dorchester County For Young People

Shore Folklore

Growing Up With Ghosts

Mary Hester Burkey Book Signing -

Blackwater History: The Refuge and Beyond

Recycled Christmas ornament workshop - Helen Combes

Pine cone & milk carton bird feeder construction - Eric Dedrick

Park Ranger Jennifer Podgurski - Waterfowl Wise Certificate of Achievement

Design A Duck - Learn about habitat, then design a duck to occupy it

Goose Calls - Learn how a goose finds the family and mate by utilizing different calls.

Silent Auction - matted, signed, and numbered Wildlife Prints by Nancy Howe

Free refreshments compliments of FOB

Eagles Nest Book Store and Gift Shop - new items and sale items

Wildlife Drive Entrance Fee Waived

## Resource Protection

### a. Law enforcement

Illegal trapping was investigated during the period January 15-24. Several near misses occurred but the lack of manpower caused the termination of the operation on January 24. Traps were seized and a message was left in a bottle to inform the trapper that we were watching.



Photo 43. Illegal trap found on the refuge. The trapper was apparently after raccoon.

The refuge was notified regarding three dead Delmarva fox squirrels on January 20. The squirrels had been discovered by an off-duty refuge employee; dumped underneath the stop sign on the corner of Shorters Wharf and Liners Road. All three squirrels had been shot. The squirrels, 2 females and one male, were sent to Ashland, OR for analysis. We have no known suspects.



Photo 44. Dead Delmarva fox squirrels dumped just off Shorter's Wharf Road.

Several spot lighters were apprehended by DNR officers during February thanks to "Spike" the mounted sika deer. The cases were successfully prosecuted in State Court.

In November 1996, after receiving permission from the Regional Office to drive a Service vehicle to and from his residence, FCO Giese assisted in providing first aid and emergency operations during a hunter accident/incident on an adjacent farm. The refuge vehicle was used to provide radio communications with emergency vehicles and also provided 4 x 4 access to the accident scene. A hunter was shot by a 16-year-old, and was hit with numerous (40-50) pellets in his thigh, leg, side, and eye, which resulted in permanent eye loss.

Refuge Officer Giese assisted Special Agents from the Cambridge LE office in investigating illegal waterfowl hunting during the 1997/1998 season. Baiting continued to be a chronic problem in Dorchester County.

Based on the number of trespass violations observed in 1996, Refuge Officer Giese made several spot checks of the refuge boundaries. On November 29, two

individuals were apprehended hunting on the refuge. Subjects were charged \$100 each, and paid their fines in federal court.

Two individuals were cited for blocking refuge gates during the refuge deer hunt, which has become an increasing problem. Signs were clearly visible. Subjects paid their fine in federal court.

During the Audubon Christmas bird count, three individuals were observed hunting on the refuge. Subjects were charged with trespass, attempting to take, and take of a protected species (Dunlin). The case is scheduled for federal court in the Spring of 1998.

## b. Wildfire preparedness

The 1997 Prescribed Fire Program was approved on December 12, 1996, and addressed preparedness burns on 1,000 acres of marshland.



Photo 45. Preparedness burns were accomplished along refuge roads, around eagle nests, and adjacent to private residences.



Photo 46. Protection and management of the forests along the Blackwater River help maintain a healthy watershed that will enhance the productivity of the Chesapeake Bay.



Photo 47. Pine islands often provide nest sites for bald eagles (as seen in the center of this photo). Preparedness burns help protect nests from wildfires.

In 1997, twelve wildfires burned a total of 115 acres. Most of these wildfires required little suppression action.

Dry hydrants were installed at Bestpitch Ferry Bridge, Shorters Wharf Bridge and Smithville Bridge.



Photo 48. Firefighter Kause applies finishing touches to a dry hydrant pipe prior to installation.

Four seasonal firefighters (Michael Brady, Kurt Kause, Scott Betts and Tod Adams) were funded under suppression 1261 funding for 10 pay periods.

FCO Giese and Equipment Operator Morris met with 7 local volunteer fire departments regarding the refuge's role in wildfire suppression in county.

An amphibious tracked vehicle (Marsh Master) with 100 gal pumper unit was delivered in February from Coastal Machinery of Baton Rouge, LA.



Photo 49. The long awaited Marsh Master.

Fire crew received training in tracked vehicle operation in February, and ATV training in November.

Three fire crew members (Brady, Adams, Kause) attended Portable Pumps and Water Use (S-211) during April.

Six arson fires in abandoned houses occurred in the vicinity of the refuge during July. Two arrests were made in December. The suspects were apparently burglarizing the houses prior to igniting them.

FCO Giese completed a wildfire investigation class in Boise, Idaho, June 2-6.

Drought conditions occurred throughout the area beginning in July and extending through September. The local conditions plus the Smithville fire prevented FCO Giese and Equipment Operator Morris from participating in a 21 day fire assignment at Sheldon-Hart NWR in Oregon.

Refuge staff assisted MD Forestry in suppressing wildfires on Fishing Bay WMA on July 15.

A 36-acre wildfire on the refuge and adjacent private land kept refuge and state forestry personnel occupied during the week of August 10-17. Extremely dry conditions and heavy logging slash made control of this fire difficult. This fire was caused by a tow truck operator dragging an abandoned car with a flat tire up the highway. The metal rim produced sparks causing 28 fires along a four-mile stretch of Smithville Road. The fires started at 5:00 p.m. on Sunday and were brought under control on Monday, August 13, 1997. The main fire was finally extinguished on August 18 when four inches of rain fell. The suppression cost of this fire was \$16,000 for the refuge and \$10,000 for MD Forestry. Legal action is underway to recover the cost of this fire from the tow truck operator.



Photo 50. Where it all started. Note the skid marks out of the driveway.



Photo 51. A tow truck pulling an abandoned car with a flat tire started a series of 28 fires...



Photo 52. along a four mile stretch of Smithville Road.



Photo 53. The fires were of varying sizes...



Photo 54. and intensities.



Photo 55. Most of the fires were off refuge. However, 0.1 acres of refuge burned before control was accomplished.



Photo 56. Initial attack occurred during the evening of August 10. The fire was controlled by pushing in plow lines. The lines were widened out on the 11th.



Photo 57. Mop-up was hampered...



Photo 58. Timbering debris.



Photo 59. Brush Piles



Photo 60. By ground fires



Photo 61. Lunch on the fire line. Refuge and state firefighters relax for a food break.



Photo 62. Delmarva Fox squirrel found in the fire line during August 7 suppression operations on the Smithville Fire.

Under the cooperative fire agreement between the refuge and MD DNR Forestry, a 2,000 gallon tanker truck and small pickup were transferred to the refuge from MD DNR for wildfire use.

An annual fire agreement was completed as required under the cooperative fire agreement with MD DNR.

Table 24. 1997 Prescribed Marsh Burning Activities, Blackwater NWR

UNIT	UNIT MARSH ACREAGE	ACRES MARSH BURNED	# WILD-FIRES	WILDFIRE ACREAGE BURNED	GROUND IGNITION ACREAGE	AERIAL IGNITION ACREAGE
A	480	210	1	30	210	--
B	293	140	--	--	140	--
C	180	33	--	--	33	--
D	60	35	--	--	35	--
E	200	100	--	--	100	--
F-I	225	130	1	5	130	--
G	530	220	--	--	220	--
H	500	285	3	27	285	--
J	525	180	--	--	180	--
K	380	270	--	--	270	--
L	760	295	--	--	295	--
M	200	100	--	--	100	--
N	607	290	--	--	290	--
O	560	410	3	4	410	--
P	300	180	2	30	180	--
Q	202	150	1	20	150	--
R	100	50	--	--	50	--
S	30	--	--	--	--	--
<b>TOTALS</b>	<b>6132</b>	<b>3078</b>	<b>11</b>	<b>116</b>	<b>3078</b>	<b>--</b>

Table 25. 1997 Prescribed Woodland Burning Activities, Blackwater NWR

AREA	WOODLAND ACREAGE	WOODLAND BURNED (ACRES)
1	10	10
2	10	5
3	40	40
4	10	10
5	10	5
6	5	--
7	40	--
8	5	6
9	20	15
10	10	--
11	20	--
<b>Total</b>	<b>180</b>	<b>91</b>

Table 26. Other Fire Activities

NAME	TYPE	LOCATION	ACREAGE	ACTION REQUIRED
Davenport Complex	Wildfire	Fishing Bay WMA	12	Eqpt. & personnel
Smithville	Wildfire	Blackwater NWR	36	Eqpt. & personnel
No Golf	Wildfire	Valliant Tract/Private	37	Engine & personnel
No Fishing	Wildfire	Dismal Swamp NWR	640	Engine & personnel
--	Prescribed Burn	Private Land	5	Personnel
Blackwater Hunt Club	Wildfire	Blackwater Hunt Club/Blackwater	0.1	Personnel

## 6c. Land acquisition

### 1. Fee Title

1997 was not a banner year for acquisition programs and associated activities on Blackwater Refuge Complex. Only 149 additional acres were added to the refuge. Efforts were concentrated on the following tracts:

**Lake and Pinder Tracts:** (See the 1996 ANR for more background.) While posting the properties that were acquired in July 1996, one of the family members, Mr. Monroe (Buddy) Pinder, introduced a claim of possession to approximately 30+ acres. Mr. Pinder claimed that the Lake Estate some years earlier deeded these lands on the south and west side of Bestpitch Road to his mother, who, upon her death, willed the property to him and his sister. It was not until the government acquired the Lake property that "Buddy" found out that his uncle had deceived him by never formally registering the transfer. In the best interest of the government's continuing and aggressive acquisition programs, the subject parcel remained unposted to allow Mr. Pinder's use (hunting) until the issue could be finally resolved between the respective attorneys. In August 1997, Mr. Pinder informed the refuge that he would no longer contest ownership, and thanked the government for its understanding in this matter.

**Elliott Tract:** Two parcels owned by Ms. Susanne Elliott, totalling 114 acres and located south of Blackwater Road, were evaluated for acquisition. Both

parcels are very important tracts that contain valuable migratory bird habitat. Accordingly, recommendations were made to RE to include these tracts in their on-going negotiations with Ms. Elliott. TCF assisted with negotiations during 1997. An offer of \$75,000 by the Fund was declined.

**Bradford:** Negotiations on the Bradford Tract continued to vacillate, with the lead being switched between RE and TCF. An offer of \$1091 per acre was made based on 95 acres. The offer was rejected. A reappraisal was ordered to see if there can be an upward adjustment in value. A new offer will likely be made in 1998.

**Williams:** The Williams Tract, totalling 149.726 acres, was acquired on December 15, 1997 for \$311,580. This key parcel was the only private tract remaining between the refuge and Fishing Bay Wildlife Management Area.

**Handley/Slacum Tract Problems:** Efforts to resolve the boundary dispute continued without much success. (See 1992, 1993, 1994, and 1995 narratives for background.)

**Burton Tract (Tract 103):** On December 8, 1997, we requested the Chief of RE to consider Mr. Burton's offer to sell the balance of the timber on Tract 103 for the bargain price of \$15,000. For a number of legitimate reasons, including, but not limited to directions from the refuge not to cut timber during wet weather, the two year timber harvest period contained in the original contract has been extended repeatedly (see the 1996 ANR). The latest approved extension to allow harvest in 1998, weather permitting, was authorized when the timber contractor's mill burned during the fall of 1997.

The refuge contracted for a timber cruise by Parker Forest Services, Inc. who valued the standing timber at \$34,480. We therefore strongly recommended that we pay Mr. Burton for the remaining timber (\$15,000) and return the \$5,000 held in escrow for clean-up and road repairs. Not only was this recommendation cost effective, but we would also realize more benefits to the resource (i.e. 20.5 acres of Delmarva fox squirrel habitat would be preserved, and the adjoining habitat that has regenerated nicely since the original harvests in 1992 and 1993 would not be adversely affected by skidders). A final decision was pending at year's end.

## **2. Other**

**Great Cypress Swamp:** Project Leader Carowan met repeatedly throughout the year with representatives from Delaware Wildlands, Inc. regarding the acquisition of the Great Cypress Swamp, located west of Frankford and Selbyville in Sussex County, Delaware and Worchester County, Maryland. Originally 50,000 acres, the swamp has been reduced to only 8,000 acres by

human activities over the past century. The swamp is the largest contiguous forest on the Delmarva Peninsula, and serves as some of the most important habitat for forest interior dwelling birds in Delaware. Species of particular importance include the worm-eating warbler, Swainson's warbler, hooded warbler, brown creeper, Kentucky warbler, black-and-white warbler, yellow-throated warbler, Louisiana waterthrush, black-billed cuckoo, summer tanager, yellow-throated vireo, and yellow-billed cuckoo.

Initial discussions focused on a bargain sale (half price) to the Service as an addition to Blackwater NWR Complex. After considerable debate, the decision was reached to delay any serious land acquisition activity until Blackwater completed its on-going, Comprehensive Conservation Plan.

## PLANNING & ADMINISTRATION

### 2. Management Plans

**Compatibility Recertification:** All secondary uses were recertified as being compatible with the purposes the refuge was established on August 26, 1997.

#### Other Planning

##### CHESAPEAKE BAY/SUSQUEHANNA ECOSYSTEM TEAM MEETINGS:

Staff from the Complex continued to participate in the subject ecosystem team meetings. The team made a real effort to function more as a "team." However, because of the continuing uncertainty of pending organizational change, the team wasn't as productive as it could otherwise have been. It was a time of great soul searching for everyone in the Service. A final decision on organizational structure and our roles in the ecosystem approach are expected in February 1998.

## Public Education and Recreation

### a. Provide visitor services

#### 1. Interpretation

Blackwater NWR provided the opportunity for over 194,900 visitors to learn about and view waterfowl, endangered species, and migratory birds on the refuge by providing talks, tours, etc. to explain the role the refuge plays in providing for the needs of wildlife species.

- Approximately 69,378 people received information and toured the Visitor Center.
- Approximately 97,253 visitors observed wildlife touring the Wildlife Drive and 20,107 visitors got a closer look walking on the hiking trails.
- Approximately 4,930 bikers took advantage of good weather to pedal Blackwater and view the scenery.
- Blackwater celebrated National Wildlife Refuge Week with an Open House and Headquarters Ground Breaking Ceremony on October 11. The Open House was followed by FOB's 10<sup>th</sup> Anniversary Celebration.
- The beautiful entrance sign purchased with FOB's matching grant through the Fish and Wildlife Foundation was installed at the entrance to the Visitor Center.
- Recreation Aid Darlene Heath and Park Ranger Jennifer Podgurski, helped tremendously with the backlog of public use projects.

# Refuge Visitation 1965-1997

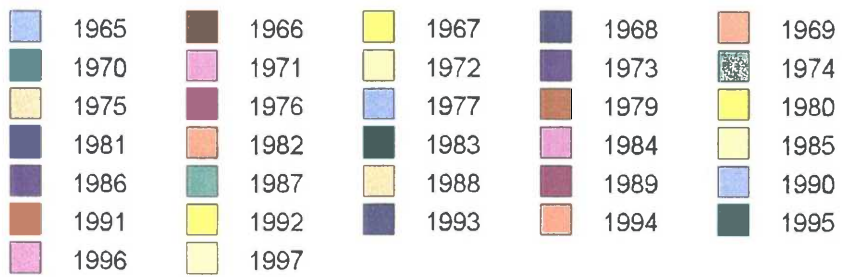
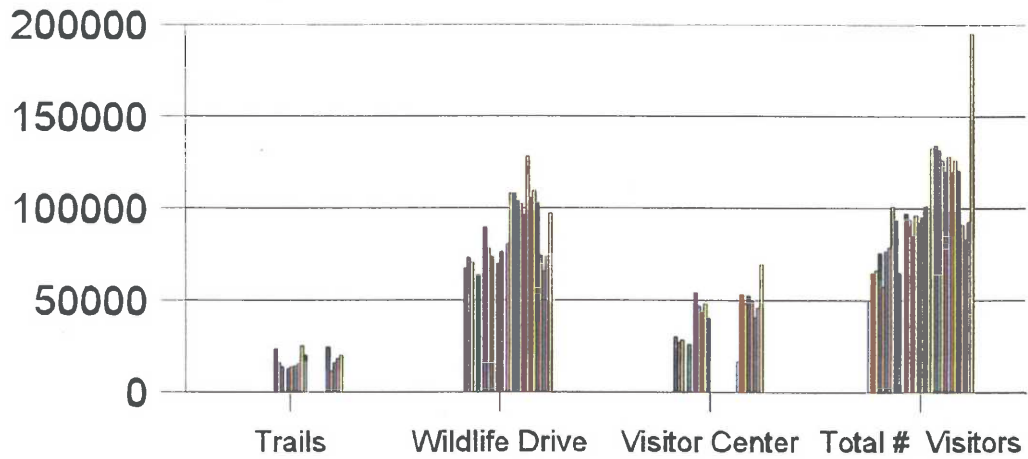


Table 27. Refuge Visitors

Date	Trails	Wildlife Drive	Visitor Center	Total # Visitors
1965				50,000
1966				64,500
1967				66,500
1968				75,600
1969				57,400
1970		67,393	30,259	76,758
1971		73,247	26,946	78,675
1972		70,523	28,299	100,747
1973				93,536
1974		63,583	25,902	64,953
1975				
1976	23,397	89,826	54,137	97,153
1977	15,707	78,247	46,807	93,777
1979	13,696	73,739	43,389	84,766
1980			47,891	96,084
1981	12,679	69,766	40,264	92,000
1982	13,912	76,300		95,055
1983	14,060	77,000		100,954
1984	15,425	80,475		
1985	25,192	108,128		132,771
1986	20,099	107,954		134,108
1987		103,735		131,613
1988		102,569		126,028
1989		96,130		119,898
1990		128,291	16,504	128,291
1991		105,805	53,065	119,543
1992		109,608	48,185	126,193
1993	24,814	102,703	52,406	120,638
1994	11,371	74,491	49,729	90,941
1995	15,758	65,835	40,464	82,863
1996	18,346	73,711	45,894	92,930
1997	20,107	97,253	69,378	194,904



# Blackwater NWR Open House Schedule

Entrance Fee Waived For the Day's Events

October 11, 1997

Except for the bird walk and bus tours, programs will run 30 - 45 minutes long.



**Bird Walk/Mist Net Demonstration - 8:00am at Visitor Center** - With leaders Levin and Ryan Willey, observe resident and migratory birds including eagles, peregrine falcons, Canada geese, ducks, herons, and song birds. Mary Stapleman, Biological Technician working with the US Geographical Survey - Biological Resources Division, will demonstrate how the Service captures small birds using fine mist nets, to obtain biological and survey information. Bring binoculars. Approximately 2 hours. Meet at the entrance to the Visitor Center.

**Blue Bird/Wood Duck/Barn Owl Box Program - 9:00am at Visitor Center** - Refuge Staff Richard Webster and Eric Dedrick will provide information regarding building nest boxes and the management of native birds. Learn first hand how these nest boxes should be constructed. Meet at the Visitor Center.

**Rocket Net/ Waterfowl Banding and Collaring Demonstration - 10:00am behind Visitor Center** - Refuge staff Roger Stone will launch a rocket net to show how waterfowl are captured and then how they are banded and/or collared. Meet at the window observation area in Visitor Center.

**Ground Breaking Ceremony - 11:00am in tent at Visitor Center** - Dedication of new Refuge headquarters office building with Senator Barbara Mikulski, Senator Paul Sarbanes, and Refuge Staff, followed by ground breaking at new headquarters site on Key Wallace Drive..

**Premier Viewing of Video "Blackwater - Challenges Met Promises Kept" - 11:30am at Visitor Center** - Debut of Blackwater NWR's new video film.

**Peregrine Falcon at Martin NWR Program - 12:00 noon at the Visitor Center** - Falconer Andrew Bullen and Martin NWR Manager Elaine Johnson will have a peregrine falcon to observe. Learn about this endangered species and how it is returning from near extinction and adapting to the changing environment. Meet at the Visitor Center.

**Prescribed Burning Program - 1:00pm at the Observation Site** - Refuge Staff, Bill Giese and Keith Morris, will show how and what equipment the Refuge uses to burn and explain benefits of certain refuge areas. Meet at the Observation Site where the observation tower used to be on the Wildlife Drive.

**Delmarva Fox Squirrel Program - 2:00pm at the Woods Trail** - Refuge Staff April Torres will demonstrate how the squirrels are trapped, ear tagged, radio collared, and followed using telemetry to obtain research and population information. Meet at the entrance to the Woods Trail on the Wildlife Drive.

**Nutria/Muskrat/Trapping Demonstration - 3:00pm at the Observation Site** - Trapper Guy Willey and refuge biologist Keith Weaver will not only explain why the Refuge allows trapping of these animals, but will demonstrate how it is done. Visitors will get a close up view of these animals and learn what major problems the nutria is causing on the Refuge and other wetland areas. Meet at the Observation Site where the observation tower used to be on the Wildlife Drive.

**Tours to Remote Areas of the Refuge leave from Headquarters Building Parking Lot - 1 ½ Hour Tours - Begin at 9:00am & 1:30pm**  
See areas of the Refuge normally not open to the public. Learn from staff what and how the Refuge manages for wildlife. Meet at the headquarters building parking lot at the intersection of the Wildlife Drive and Key Wallace Drive. Visitors must register at the Visitor Center.

**Food and Drinks - Friendship**

4-H Club and Town & Country 4-H Club.

**Eagles Nest Book Store Sales** - sales on various items. Operated used to support the Refuge. Join



**9:00am-5:00pm at the Visitor Center** - Special by the Friends of Blackwater, the proceeds are the Friends of Blackwater and/ or be a Volunteer.



# Blackwater NWR Open House Schedule



## Children's Activities

October 11, 1997

Youths 6 - 16 can participate in special activities during the day along with the other major activities occurring on the Refuge and earn a Jr. Refuge Manager certificate. They can earn this certificate by attending and participating in either the special children's activity or the major Refuge activity or both. Pick up your Junior Refuge Manager Handbook and Marsh Muckers Card at the Visitors Center .

**9:00am - 4:00 pm Horn Point Touch Tank** provided by the University of Maryland Education and Estuarine Center

**9:00am - 4:00pm Salisbury Zoo Reptile Exhibit** provided by the Salisbury Zoo Education Program

**9:00am - 3:00pm Scales and Tails Exhibit** provided by MD DNR and MD State Park Foundation

**9:00am - 4:00pm Live Waterfowl Exhibit** provided by Wildfowl Trust of North America

**9:30am - Bird Seed Feeder Construction** - Learn what birds like to eat, how to construct various bird seed feeders, and make a peanut butter bird seed feed.

**10:30am - Zoo Reptile Program** - Hold a snake and learn about the life of reptiles. Meet at the Salisbury Zoo Reptile Exhibit outside the Visitor Center.

**12:30am - Fun With Flight Program** - Learn about the wonders of flight and how birds have adapted to excel in gliding, long distance flying, and soaring. Test out these flight theories by making our own "duck" glider planes.

**1:30pm - Migration Madness Program** - Learn about animal migration as you try to successfully navigate our migration maze. Can you make it safely to the nesting ground? Join us and find out.

**2:30pm - Life in the waters of the Chesapeake Bay** - See first hand the life that lives in the waters of the Chesapeake Bay and Blackwater River . Meet at the Horn Point Touch Tank outside the Visitor Center.

**3:30pm - Birds and Worms** - Learn about camouflage and how important it is to animals and their survival in this fun game and talk.





Photo 63. The headquarters ground breaking ceremony and refuge open house drew a large crowd of spectators to the many demonstrations presented during the event including: Blue bird box building demonstration by Park Ranger Jennifer Podgurski, Intern Eric Dedrick, and Maintenance Mechanic Richard Webster....



Photo 64. Waterfowl banding demonstration with FCO Bill Giese preparing the crowd for the...



Photo 65. Rocket net explosion...



Photo 66. Prescribed burning demonstration with Engine Equipment Operator Keith Morris showing the crowd how to survive when caught in a fire...

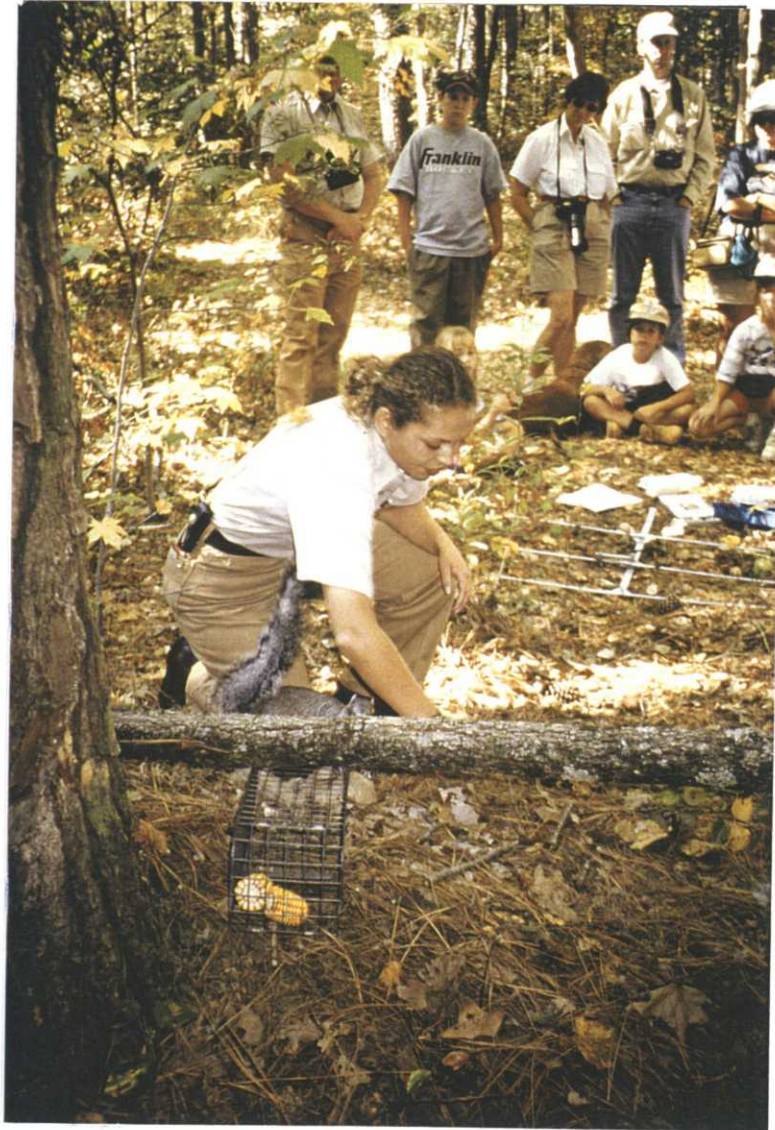


Photo 67. A Delmarva fox squirrel program with April Torres taking visitors to squirrel habitat where she shows spectators how she traps the squirrels...



Photo 68. A muskrat/nutria trapping demonstration with live nutria displayed by Biologist Keith Weaver.



Photo 69. Biologist Keith Weaver doubled as a tour guide for the visitor tours of the refuge.



Photo 70. Volunteer Helen Combes assisted children in constructing inexpensive peanut butter bird feeders during one of the many children's programs both inside...



Photo 71. and outside.



Photo 72. Exhibits from other organizations also attracted children with their parents such as the Horn Point touch tank...



Photo 73. The Salisbury Zoo reptile exhibit, and...



Photo 74. Wildfowl Trust live waterfowl exhibit.



Photo 75. The local Town and Country 4-H Club provided food and drinks for visitors.



Photo 76. Refuge staff, John Johnson, Richard Webster, Jim Halpin, and high school volunteer Robbie Horseman, installed a new interpretive sign...



Photo 77. ...at the entrance to the Visitor Center that was provided by a challenge grant supported by the Friends of Blackwater. Landscaping was provided by Volunteer Zeeger de Wilde. (MMB)



Photo 78. Volunteer Zeeger de Wilde also planted tulips and pansies again this year in front of the viewing windows.



Photo 79. Zeeger also re-landscaped the front of the Visitor Center after YCC workers removed the storm damaged yews.



Photo 80. Recreation Aid Darlene Heath assisted with the Public Use Program 3/2-7/19 after serving as FOB's Hunt Coordinator for six months.



Photo 81. Starting in June, temporary Park Ranger Jennifer Podgurski brought enthusiasm and experience to the Public Use Program.

## 2. Education

- Blackwater introduced 1,423 students to wildlife and Blackwater NWR habitat management. Ten Dorchester County schools with 480 students, 14 out-of-county schools with 789 students, and six scout groups with 141 students, received an orientation, video, and/or Wildlife Drive tour.
- Seven hands-on wetlands environmental education programs were given to 173 students.
- Blackwater hosted one day of the 1997 Dorchester County Envirothon on 5/2. Hands on training was held at Rick Abends farm on 4/17. One team from South Dorchester High School and 3 teams from North Dorchester High School entered the competition this year.
- Two Project Learning Tree Workshops, conducted by Maryland Forest Service State Forester, Dave Reinecke, were held 6/19 and 6/24 in the Visitor Center. The first workshop was on Fire Ecology.
- Seventeen bird walks were led by Volunteers Harry Armistead, Terry Allen, Levin and Ryan Willey.
- The Chesapeake Bay Foundation's Karen Noonan Environmental Education Center introduced approximately 574 students to the refuge through hiking and canoeing activities.
- Commercial bus tours decreased by 56%.

### Off-Site Programs

- FCO Bill Giese taught Hunter Safety to 64 young hunters 3/11-3/24.
- SCA Janine Cetera judged the Science Fair at South Dorchester K-8 School on 4/2. ORP Briggs and Biologist Weaver helped judge the Dorchester County Science Fair at North Dorchester High School on 4/24.
- ORP Briggs participated in the South Dorchester High School Career Fair on 4/29.
- Biologist Weaver participated in the Soil Conservation Service Land and Water Connection Program on 8/13.



Photo 82. ORP Maggie Briggs gave an orientation to the Refuge to most of the schools that requested programs during their visit.



Photo 83. In addition to the 10 Dorchester County school groups, 14 other school groups from other counties came to the Refuge including this Severna Park School with three buses of students.



Photo 84. Intern Jeff Smith gave a wetland environmental education program to one of the seven groups that requested hands-on activities shown here, using the new dip nets provided by the Friends of Blackwater.



Photo 85. Jeff also gave Wildlife Drive guided tours, and provided students with binoculars donated by the Friends of Blackwater.



Photo 86. Three North Dorchester High School teams and 1 Cambridge-South Dorchester High School team competed in the 1997 Envirothon hosted the second day at Blackwater NWR.



Photo 87. For the first time since the Dorchester County Envirothon began in 1991, a team from North Dorchester High School won the competition. Captain Miles Kondylus used knowledge gained while working at Blackwater to lead the team to victory.



Photo 88. During the Fire Ecology Project Learning Tree Workshop, participants observed the results of prescribed burning at Blackwater NWR.

### **3. Volunteer Program**

- Volunteers donated a total of 10,450 hours to the refuge.
- A Volunteer litter pick-up on the refuge was held on 4/19 to celebrate Earth Week.
- Volunteer training held 10/25 included presentations by staff members on each of the refuge programs. Volunteers encouraged the staff to continue including these presentations in future training.
- A bus tour of the refuge for Volunteers on 11/8 included visits to Loblolly Landings & Lodge and Wingate Manor Bed and Breakfast.
- Bob Hammerton and Ron Tillier were selected Volunteer of the Year at the Volunteer Award Dinner 5/22.
- A Volunteer canoe trip on the Blackwater River on 6/21 enabled Volunteers to see the refuge from a different view and enjoy a beautiful day!
- The Friends of Blackwater's efforts to assist the Volunteer Program with a Volunteer Coordinator were unsuccessful when Jackie Mickler, the Volunteer selected to fill the position with the Volunteer MD Program, resigned.
- Recent efforts to recruit capable and responsible Student Conservation Service Volunteers have been unsuccessful. After volunteering 208 hours, SCA Janine Cetera's Volunteer position ended early. It was decided to use

interns in the future.

- Intern Jeff Smith, graduating from McNeese State University, Lake Charles, LA, volunteered 488 hours 5/22-8/13.
- Intern Eric Dedrick, majoring in wildlife management at the State University of New York College of Agriculture & Technology, volunteered 648 hours 8/25-12/13.

Table 28. Monthly Summary of Volunteer Hours for 1997

Category	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
VC Staffing	410	397	422	365	399	353	342	319	325	330	390	390	4,442
Outreach			6	16	23					8	9		62
Off-Site		45		13		11							69
Interns			136	72	64	168	176	168	160	176	184	72	1,376
FOB Coop.As.	234	303	222	228	185	197	501	244	256	425	176	260	3,231
Train Vol.										203	102		305
Maintenance	112	39	56	77	54	21			25				384
Surveys	105	37	42	70	59	47	38	64	27	20	21	9	536
Studies	25									3			28
Banding							5		9				14
<b>TOTAL</b>	<b>886</b>	<b>821</b>	<b>884</b>	<b>841</b>	<b>784</b>	<b>797</b>	<b>1062</b>	<b>795</b>	<b>802</b>	<b>1,165</b>	<b>882</b>	<b>731</b>	<b>10,450</b>

Table 29. Yearly Summary of Volunteer Hours 1983-1997

Year	Total # Hours	# Hours Staffing VC	Total # Volunteers	# Volunteers Staffing VC	Volunteers Gained	Volunteers Lost
1983	?		1			
1984	717		37			
1985	1,184		42			
1986	1,121		38			
1987	1,801		37			
1988	2,417	1,608	58	49		
1989	3,008	1,788	55	48		
1990	2,759	1,416	58	58	+9	
1991	3,076	2,583	96	86	+48	-10
1992	5,106	2,901	119	77	+23	-26
1993	5,324	2,856	127	71	+28	-32
1994	5,418	2,983	123	82	+34	-26
1995	7,271	3,557	119	100	+22	-26
1996	9,334	4,426	128	94	+35	-22
1997	10,450	4,442	115	84	+19	-30



Photo 89. Volunteers Peggy Darling and Erna Hammerton continued the policy of staffing the Visitor Center information desk. Volunteers donated 10,450 hours in 1997.



Photo 90. Temporary Recreation Aid Darlene Heath organized and conducted a Volunteer Litter Pick-Up...



Photo 91. ...with numerous scout and 4-H groups on Key Wallace Drive.



Photo 92. Staff members assisted with Volunteer training by giving presentations of their programs.



Photo 93. Co-Volunteer of the Year Bob Hammerton has a drink and conversation with ORP Maggie Briggs and FOB President Frank Wolff at the Volunteer Awards Dinner 5/22.



Photo 94. Ron Tillier, Co-Volunteer of the Year, (in red-shirt) visits with Manager Carowan, FOB President Wolff, and past Volunteer of the Year deWilde.



Photo 95. Volunteer canoers and Staff pose for a photo while taking a break to rest and eat lunch. Left to right: Coop Student April Torres, Marilyn Stone, Elizabeth Ketchell, Newton Steely, FCO Bill Giese, Zeeger de Wilde, Paul Stone, Frannie Malley, ORP Maggie Briggs, and Arlene Wolff.



Photo 96. SCA Janine Cetera was the final argument for replacing SCA Volunteers with interns ...

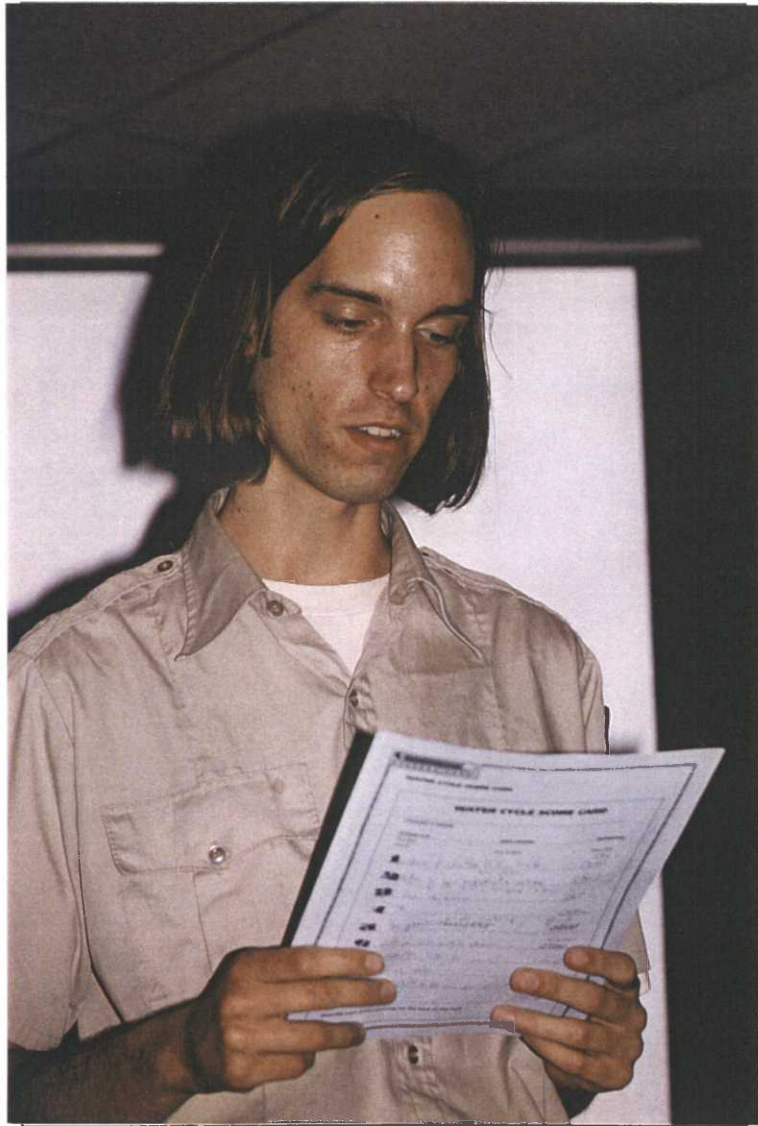


Photo 97. ...such as Jeff Smith from Louisiana who did a marvelous job assisting with the Public Use Program.



Photo 98. Eric Dedrick, our second intern, who video taped the Volunteer training workshop.

### 8.1.5.

#### Entrance Fees

- A new annual Blackwater NWR entrance pass costing \$12, valid 12 months from date of issue, was instituted in May, qualifying Blackwater NWR for the Recreation Fee Demonstration Program. Blackwater now receives 80% of the entrance fees to improve visitor services. 20% goes to Region 5 for distribution to field stations that don't have fee programs. (Previously Blackwater received only 30% of entrance fees and 70% went to the Migratory Bird Conservation Fund.)
- Total entrance fees collected in 1997 were \$31,101.20, a 10% increase over 1996.
- The number of golden eagle passes sold decreased by 41%, while the sale of duck stamp and golden age passes increased by 28% and 23%, respectively.
- Fees collected at the Wildlife Drive Entrance station were \$23,440.20; a 6% increase over 1996.
- A larger canister was installed to replace the old post office box and small canister that was inadequate for holding large numbers of entrance fee envelopes.

## 8.a.H.

### Hunting

In our continuing effort to better conduct refuge deer hunts, accomplish necessary deer management, and provide wildlife -dependent, compatible, recreation on the refuge, we revised the hunting program in 1997. As outlined in the 1997 Annual Hunt Program, a quota shotgun youth hunt was added in Area H on October 18, the Muzzleloader season was moved to the Friday and Saturday of the State is Early Muzzleloader Season, and two days were added to the Shotgun Hunt. An additional hunt area (L) was added, and Area A was expanded. The number of permits issued also increased.

7040 acres were available to the public for hunting. Muzzleloader, shotgun, and youth hunts were quota hunts. The archery hunt was non-quota.

The muzzleloader hunt was conducted on October 17 and 18 with scouting on October 12. A youth hunt was held for the first time on the refuge. It was conducted in Area H on October 18. A total of 57 deer were killed during the muzzleloader hunt (20 WT, 37 sika) and five during the youth hunt (2 WT, 3 sika). Of the 40 total sika taken, 28 were male and 12 female. Of the 22 WT, 14 were male and 8 female.

Two additional shotgun hunts were conducted in 1997. Shotgun hunts were conducted December 1, 5, 8, and 12 with scouting permitted on November 16 and 23. A total of 141 deer were killed. Of the 28 WT taken, 20 were male and 8 were female. The total shotgun sika harvest of 113 consisted of 37 male and 76 female deer.

The combined harvest from shotgun, muzzleloader, and youth hunts was 203 deer. Of the 50 total WT deer taken, 34 were male and 16 were female. Of the 153 total sika deer taken, 65 were male and 88 were female.

A split archery season was conducted October 1 - 15 and October 20 - November 8 with scouting permitted on September 30. A total of 14 deer were reported by the State as being taken at Blackwater NWR (2 WT, 12 sika).

Table 30. Overall Sex, Age, and Average Live Weights (pounds), by Species, for Harvested White-tailed and Sika Deer, 1997 Blackwater Muzzleloader, Youth, and Shotgun Hunts

AGE CLASS	Estimated Live Weight (Pounds)				Total (N)
	WHITE-TAILED DEER		SIKA DEER		
	♂ (N)	♀ (N)	♂ (N)	♀ (N)	
0.5	71 (12)	62 (2)	39 (15)	36 (25)	54
1.5	134 (17)	126 (4)	74 (28)	60 (9)	58
2.5	170 (4)	119 (4)	94 (19)	69 (33)	60
3.5+	219 (3)	140 (5)	99 (2)	72 (21)	31
Subtotal (N)	36	15	64	88	
Total (N)	51		152		203

Table 31. Antler Development of Harvested White-tailed and Sika Bucks  $\geq 2\frac{1}{2}$  Years Old During 1997 Blackwater Muzzleloader and Shotgun Hunts

POINTS	WHITE-TAILED DEER	SIKA DEER
2	0	1
3	2	5
4	0	4
5	0	10
6	0	13
7	1	0
8	3	0
9	2	0
12	1	0

Table 32. Blackwater NWR 1997 Muzzleloader and Youth Deer, Hunt Number of Hunters and Percent Kill

AREA	DAY 1					DAY 2					TOTAL				
	HUNTERS SELECTE D	HUNTERS PARTICI- PATING (%)	# DEER KILLED		% KILL	HUNTERS SELECTE D	HUNTERS PARTICI- PATING (%)	# DEER KILLED		% KILL	HUNTERS SELECTE D	HUNTERS PARTICI- PATING (%)	# DEER KILLED		% KILL
			W T	SK				W T	SK				W T	SK	
A	118	76 (64)	9	3	16	106	44 (42)	6	2	18	224	120(54)	15	5	17
B	32	19 (59)	3	1	21	30	12 (40)	0	0	0	62	31(50)	3	1	13
C	22	19 (86)	0	3	16	15	5 (33)	0	0	0	37	24(65)	0	3	13
D	25	15 (60)	0	3	20	27	17 (63)	0	3	18	52	32(62)	0	6	19
E	28	18 (64)	0	5	28	32	10 (31)	0	2	20	60	28(47)	0	7	25
J	18	13 (72)	0	3	23	15	8 (53)	0	2	25	33	21(64)	0	5	24
K	16	13 (81)	1	3	31	15	7 (47)	0	0	0	31	20(66)	1	3	20
L	30	21 (70)	1	4	24	25	13 (52)	0	3	23	55	34(62)	1	7	24
Muzz.Total	289	194 (67)	14	25	20	265	116 (44)	6	12	16	554	310(56)	20	37	18
H - Youth	-	-	-	-	-	20	13 (65)	2	3	38	20	13(65)	2	3	38
TOTAL	289	194 (67)	14	25	20	285	129 (45)	8	15	18	574	323(56)	22	40	19

Muzzleloader Day 1 - 10/17/97

Muzzleloader Day 2 - 10/18/97

Youth Hunt -10/18/97

Table 33. BLACKWATER NWR 1997 SHOTGUN HUNT

HUNTERS SELECTED VS. HUNTERS PARTICIPATING

AREA	DAY 1					DAY 2					DAY 3					DAY 4					TOTAL				
	HUNTERS SELECTED	HUNTERS PARTICIPATING (%)	# DEER KILLED		% KILL	HUNTERS SELECTED	HUNTERS PARTICIPATING (%)	# DEER KILLED		% KILL	HUNTERS SELECTED	HUNTERS PARTICIPATING (%)	# DEER KILLED		% KILL	HUNTERS SELECTED	HUNTERS PARTICIPATING (%)	# DEER KILLED		% KILL	HUNTERS SELECTED	HUNTERS PARTICIPATING (%)	# DEER KILLED		% KILL
			WT	SK				WT	SK				WT	SK				WT	SK				WT	SK	
A	105	71 (68)	20	6	37	35	15 (43)	0	0	0	23	12 (52)	2	0	7	40	15 (38)	1	0	7	203	113 (56)	23	6	26
B	31	20 (65)	2	1	15	8	7 (88)	0	0	0	4	2 (50)	0	0	0	15	8 (53)	0	0	0	58	37 (64)	2	1	8
C	15	10 (67)	0	6	60	11	7 (64)	0	0	0	5	2 (40)	0	2	40	0	0	0	0	0	31	19 (61)	0	8	42
D	25	19 (76)	0	14	74	25	17 (68)	0	5	29	25	11 (44)	0	3	12	27	17 (63)	0	7	41	102	64 (63)	0	29	45
E	25	17 (68)	0	6	35	24	14 (58)	0	2	14	24	13 (54)	0	2	8	27	12 (44)	0	1	8	100	56 (56)	0	11	19
F	18	14 (78)	0	3	21	12	11 (92)	0	0	0	1	0	0	0	0	0	0	0	0	0	31	25 (81)	0	3	12
G	17	13 (76)	3	2	38	7	6 (86)	0	0	0	5	4 (80)	0	0	0	8	3 (38)	0	0	0	37	26 (70)	3	2	19
H	18	14 (78)	1	0	7	18	9 (50)	0	2	22	18	12 (67)	0	0	0	15	9 (60)	0	0	0	69	44 (64)	1	2	7
J	15	13 (87)	0	9	69	13	11 (85)	0	6	55	15	5 (33)	0	2	13	3	3 (100)	0	1	33	46	32 (70)	0	18	56
K	15	7 (47)	0	4	57	11	4 (36)	0	0	0	2	2 (100)	0	0	0	0	0	0	0	0	28	13 (46)	0	4	31
L	32	23 (72)	0	12	52	27	22 (82)	0	4	18	28	23 (82)	0	4	14	24	13 (54)	0	8	62	111	81 (73)	0	28	35
TOTAL	316	221 (70)	26	63	40	191	123 (64)	0	19	15	150	86 (57)	2	13	17	159	80 (50)	1	17	22	816	510 (63)	29	11	28

Day 1 - 12/1/97  
 Day 2 - 12/5/97  
 Day 3 - 12/8/97  
 Day 4 - 12/12/97



Photo 99. Two firsts! A local teenager proudly displays his first trophy during the first Youth Hunt held on Blackwater. The National Wildlife Refuge System Improvement Act of 1997 sanctioned hunting as one of six priority uses of the System.



Photo 100. The refuge expanded its shotgun hunt program to four days. A record kill of 203 was achieved for the Youth, Muzzleloader and Shotgun hunts.



Photo 101. A nice sika stag taken during the shotgun hunt. The opportunity to bag a sika draws many hunters to Blackwater.

## 8b. Outreach

- The mobile table top exhibit was staffed at 6 major community events introducing Blackwater to approximately 10,250 people. These events included: National Outdoor Show, Shad Festival, Cambridge Water Sports Show, Seafood Feast-i-val, DNR National Hunting and Fishing Day, Pickering Creek Hoedown, and Dorchester County Dare Day Festival.
- Blackwater NWR entered a float in the Cambridge Christmas Parade.
- ORP Briggs gave off-site slide programs to the District Nurses Association, Hurlock Lions Club, and Izaak Walton League.
- Volunteer Ron Tillier and ORP Briggs were interviewed for the Refuge Open House on WAAI, WTDK, WCEM -AM, and WCEM-FM radio stations on 10/9 and 10/10.
- ORP Briggs was interviewed for a half hour session of Chesapeake Update on WCEM-FM on 11/30 discussing the FOB Open House and various aspects of Blackwater NWR programs and facilities.



Photo 102. ORP Maggie Briggs spoke to students on careers in wildlife at the Cambridge South Dorchester High School Career Fair.



Photo 103. The mobile exhibit introduced the public to Refuge activities at community events.



Photo 104. Intern Jeff Smith got a taste of Maryland cuisine, when he staffed the mobile exhibit at the Dorchester County Feast-i-val.



Photo 105. Refuge staff participated in the Cambridge Christmas Parade.



Photo 106. Refuge Manager Glenn Carowan, Maintenance Mechanic John Johnson, Cooperative Student April Torres, and Engine Equipment Operator Keith Morris dressed for the parade to participate in the parade.



Photo 107. Park Ranger Jennifer Podgurski and Office Automation Clerk Tammy Morris stole the show as "Gladys Goose" and "Estelle Eagle".

9

**Planning and Administration**

**9a. Comprehensive management planning**

**9b. General administration**

FY96 revenue sharing checks were delivered

Dorchester \$79,878 Blackwater NWR (23,053 acres)  
 Somerset \$4,663 Martin NWR (4,423 acres)  
 Harford \$217 Susquehanna NWR (3.74 acres)

FUNDING

Table 34. FY97 Funding

PROJECT	SUBACTIVITY	FY97 FUNDING
YCC	1261	16,700
Moist Soil Mgt./Croplands	1261	5,000
Challenge Grant Projects	1261	18,500
Refuge Operations	1261	607,700
Volunteer Program	1261	3,600
Wetlands Education	1261	2,000
Base Maintenance	1262	64,400
MMS	1262	113,000
Fire Management	9251/9252	201,800
Career Awareness	9400	3,000
TOTAL =		1,028,000

Table 35. FY97 Challenge Cost Share

Project	Primary Contributor	Funding
Refuge Exhibit	Friends of Blackwater	2500
Heindeman Pool	Ducks Unlimited	7000
ORP/Park Ranger	Friends of Blackwater	9000

## **9.b. Personnel**

Blackwater NWR held its first staff retreat February 19-20, 1997 at the Bishops Head Lodge. During the two-day meeting, staff developed a proposed organization chart, brainstormed improvements in Narrative reporting and staff morale problems, reviewed the cropland program, and formulated changes for the 1997 hunt. Friends of Blackwater NWR President Frank Wolff also attended both days' sessions.

The Biological Technician position, vacant since October 1995, was finally filled this year. Roger Stone transferred from the National Park Service to join Blackwater's staff on April 27.

April Torres began work as a cooperative education student in May to work with DFS research at Blackwater before returning to the University of Massachusetts to complete her undergraduate program.

A six-month Park Ranger position, funded by an FY97 challenge grant, was filled by Jennifer Podgurski on June 30. Recruitment for this position as a term appointment was initiated in November, and Podgurski, who was the highest ranking candidate, was selected in December.

Forestry Technician/Firefighter Michael Brady transferred to Stone Lakes NWR (CA). Mike had worked with Blackwater's fire program for two years, and as a volunteer.

Richard Thurman EOD'd as a permanent Engineering Equipment Operator (WG-5716-8). Richard had filled this position as a temporary employee from 1991-1994 assisting with impoundment development on the refuge.

Keith Morris became a permanent Engineering Equipment Operator for the fire management program at Blackwater. Keith has been with the Refuge in temporary and term appointments as Equipment Operator since 1990.

Maintenance Worker Dave Windsor transferred from Prime Hook NWR (DE) to Blackwater.

In September, Lisa Paglione, Refuge Manager Trainee, married Jorge Arroyo and transferred to Ecological Service's New Jersey Field Office. Lisa's work at Blackwater centered on research and management issues concerning the endangered Delmarva fox squirrel.

The number of firefighters for the 1997-98 season was doubled this year by adding two temporary and two term positions for fire suppression. Recruitment for all eight Forestry Technician/Firefighters (GS-0462-4/5) was initiated in October for the December-March fire season; however, a number of candidates accepting then declining positions set recruitment back significantly, so at year end only five of the eight firefighters were on board.

A second year's YCC program provided six youth to help with summer projects at the refuge. Scott Williams served as crew leader to Anthony Cornish, Elwood Jones, Carol Thompson, Elizabeth Vickers, and Ashley Windsor. The program ran from early June to mid-August.



Photo 108. Blackwater's 1997 YCC Crew.



Photo 109. staff photo (left to right) John Johnson, Richard Thurman, Roger Stone, Keith Weaver, Keith Morris, Richard Webster, Jim Halpin, Dave Windsor, Maggie Briggs, Bill Giese, Elaine Johnson, Jennifer Podgurski, Glenn Carowan



Photo 110. Left to right, Office Assistant Walkup, (Fire) Clerk Parks and Clerk Morris.



Photo 111. Firefighter photo (left to right) Bill Giese, Keith Morris, Scott Betts, Kurt Kause, Steve Stack, Tod Adams, Mike Comiskey.

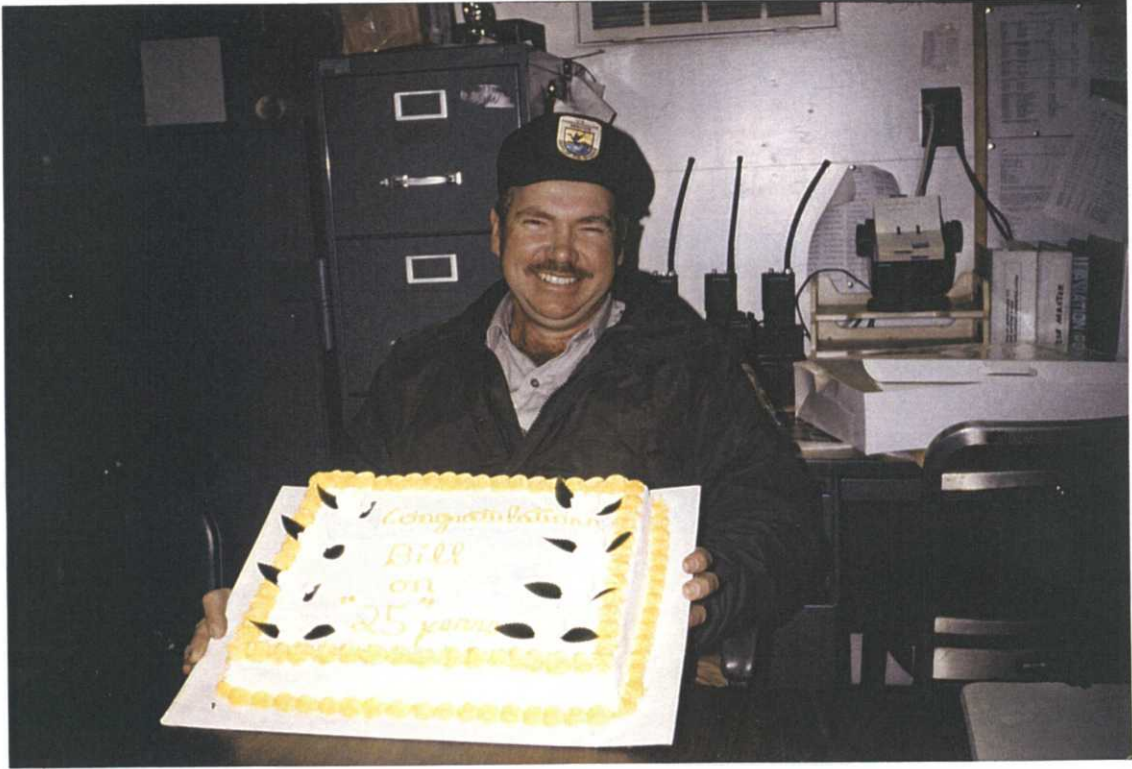


Photo 112. Bill Giese is congratulated for 25 years of dedicated service to Blackwater.

## Volunteer/Work Programs

The Career Awareness Institute sent Ms. Jennie Flores to work at Blackwater for eight weeks during the summer of '97. Jennie was involved with a variety of refuge projects including tracking Delmarva fox squirrels, banding osprey, rounding up resident geese, compiling information for a FOIA request, and performing various administrative activities.

Two Interns provided public use assistance in 1997: Jeff Smith and Eric Dedrick worked consecutive 12-week and 16-week details, respectively, helping at the Visitor Center from May 21 through December 13.



Photo 113. Intern Jennie Flores with Tammy Morris.

Table 36. Blackwater NWR Roster, 1997

NAME	TITLE	GRADE/SERIES	BLK EOD	APPT
Carowan, Jr., Glenn A.	Project Leader	GS-0485-13	6-05-89	PFT
Halpin, James P.	Deputy Project Leader	GS-0485-12	8-20-95	PFT
Johnson, Elaine E.	Refuge Operations Spec.	GS-0485-11	9-2-94	PFT
Weaver, Keith M.	Wildlife Biologist	GS-0486-11	10-2-94	PFT
Briggs, Maggie	Outdoor Recreation Planner	GS-0023-11	8-8-90	PFT
Giese, Jr., William M.	Fire Control Officer	GS-0462-9	8-26-71	PFT
Arroyo, Lisa	Refuge Manager Trainee (transferred to NJ ES 9/97)	GS-0485-7/9	6-26-94	PFT
Stone, Roger	Biological Technician	GS-0404-5	4-27-97	PFT
Torres, April	Coop. Student (Biol. Science)	GS-0499-4	5-25-97	TFT
Walkup, Meg	Office Assistant	GS-0303-6	4-14-87	PFT
Tammy Morris	Office Automation Clerk	GS-0326-4	10-31-93	PFT
Parks, Jamie	Office Automation Clerk (Student Temp. Employment Program)	GS-0326-3	11-9-96	TPT
Podgurski, Jennifer	Park Ranger	GS-0023-5	6-30-97	TFT
Heath, Darlene	Recreation Aide (position terminated 7/97)	GS-0326-3	8-26-94	TPT
Johnson, John	Automotive Mechanic	WG-5823-10	8-10-92	PFT
Webster, Richard	Maintenance Mechanic	WG-4607-9	6-13-83	PFT
Windsor, Dave	Maintenance Worker	WG-4749-07	8-3-97	PFT
Thurman, Richard	Engineering Equipment Operator	WG-5716-8	7-6-97	PFT
Morris, Keith	Engineering Equip. Op./Firefighter (converted to Permanent 7/97)	WG-5716-8	12-17-90	PFT
Brady, Michael	Forestry Technician/Firefighter (transferred 7/97)	GS-0462-5	12-18-95	TFT
Adams, Tod	Forestry Technician/Firefighter	GS-0462-4	12-8-97	TFT
Betts, Scott	Forestry Technician/Firefighter	GS-0462-4	12-8-97	TFT
Comiskey, Mike	Forestry Technician/Firefighter	GS-0462-5	12-8-97	TFT
Kause, Kurt	Forestry Technician/Firefighter	GS-0462-4	12-8-97	TFT
Stack, Steve	Forestry Technician/Firefighter	GS-0462-4	12-8-97	TFT

Table 37. 1997 Training: Blackwater NWR staff

Employee	Course Title	Location	Category	Date	Hrs.
ADAMS	S-211 Portable Pumps & Water Use S-212 Wildfire Power Saws	Triangle, VA	FIRE	4/97	40
	ATV	Cambridge, MD	SAFETY	12/97	4
	Defensive Driving (DDC-6)	Cambridge, MD	SAFETY	12/97	6
BETTS	ATV	Cambridge, MD	SAFETY	12/97	4
	Defensive Driving (DDC-6)	Cambridge, MD	SAFETY	12/97	6
BRADY	S-211 Portable Pumps & Water Use S-212 Wildfire Power Saws	Triangle, VA	FIRE	4/97	40
	Ignition Operations (RX-230)	Cape Cod, MA	FIRE	6/97	40
BRIGGS	Mid-Career Retirement Planning	Laurel, MD	ADMN	4/97	16
	CPR Refresher	Cambridge, MD	SAFETY	6/97	4
	Defensive Driving (DDC-6)	Cambridge, MD	SAFETY	12/97	6
CAROWAN	Planning for Retirement	Laurel, MD	ADMN	2/97	16
	LE In-Service	Laurel, MD	LE	4/97	40
	CPR refresher	Cambridge, MD	SAFETY	6/97	4
	Comprehensive Mgt. Planning	Hadley, MA	ADMN	9/97	32
	Defensive Driving (DDC-6)	Cambridge, MD	SAFETY	12/97	6
GIESE	MD Agric. Pesticide Application	Delmar, MD	SAFETY	2/97	8
	LE In-Service	Laurel, MD	LE	4/97	40
	Mid-Career Retirement Planning	Laurel, MD	ADMN	4/97	16
	CPR refresher	Cambridge, MD	SAFETY	6/97	4
	Natl. Wildfire Investigation (FLETC)	Boise, ID	FIRE	6/97	40
	Ignition Operations (RX-230)	Cape Cod, MA	FIRE	6/97	40
	Firearms semi-annual recertification	Cambridge, MD	LE	11/97	4
	Defensive Driving (DDC-6)	Cambridge, MD	SAFETY	12/97	6
HALPIN	LE In-Service	Laurel, MD	LE	4/97	40
	Comprehensive Management Planning	Denver, CO	ADMN	5/97	24
	CPR Refresher	Cambridge, MD	SAFETY	6/97	4
	Firearms semi-annual recertification	Cambridge, MD	LE	11/97	4
	Motorboat Operators Certification	Chincoteague, VA	SAFETY	10/97	24
	Negotiations Strategies & Techniques	Shepherdstown, WV	ADMN	12/97	16
	Defensive Driving (DDC-6)	Cambridge, MD	SAFETY	12/97	6
HARRISON	LE In-Service	Tupelo, MS	LE	4/97	40
	CPR Refresher	Cambridge, MD	SAFETY	6/97	4
	Firearms semi-annual recertification	Chincoteague, VA	LE	10/97	4
	Defensive Driving (DDC-6)	Cambridge, MD	SAFETY	12/97	6
JOHNSON, E.	LE In-Service	Laurel, MD	LE	4/97	40
	S-211 Pumps	Powellville, MD	FIRE	5/97	16
	CPR Refresher	Cambridge, MD	SAFETY	6/97	4
	Firearms semi-annual recertification	Cambridge	LE	11/97	4
	Motorboat Operators Certification	Chincoteague, VA	SAFETY	10/97	24

Employee	Course Title	Location	Category	Date	Hrs.
	ATV	Cambridge, MD	SAFETY	12/97	4
	Defensive Driving (DDC-6)	Cambridge, MD	SAFETY	12/97	6
JOHNSON, J.	Mid-Career Retirement Planning	Laurel, MD	ADMN	4/97	16
	CPR refresher	Cambridge, MD	SAFETY	6/97	4
	Motorboat Operators Certification	Chincoteague, VA	SAFETY	10/97	24
	Defensive Driving (DDC-6)	Cambridge, MD	SAFETY	12/97	6
KAUSE	ATV	Cambridge, MD	SAFETY	12/97	4
	Defensive Driving (DDC-6)	Cambridge, MD	SAFETY	12/97	6
MORRIS, K.	Heavy Equipment Operation	Cape Charles, VA	SAFETY	4/97	40
	ATV	Cambridge, MD	SAFETY	12/97	4
	Defensive Driving (DDC-6)	Cambridge, MD	SAFETY	12/97	6
MORRIS, T.	CPR refresher	Cambridge, MD	SAFETY	6/97	4
	Defensive Driving (DDC-6)	Cambridge, MD	SAFETY	12/97	6
PAGLIONE	CPR Refresher	Cambridge, MD	SAFETY	6/97	4
PODGURKSI	Defensive Driving (DDC-6)	Cambridge, MD	SAFETY	12/97	6
PARKS	CPR Refresher	Cambridge, MD	SAFETY	6/97	4
	Defensive Driving (DDC-6)	Cambridge, MD	SAFETY	12/97	6
STACK	ATV	Cambridge, MD	SAFETY	12/97	4
	Defensive Driving (DDC-6)	Cambridge, MD	SAFETY	12/97	6
STONE	Hvy. Equip: Farm Tractor Operation	Cape Charles, VA	SAFETY	5/97	8
	Transition Weapons	Oceanville, NJ	LE	7/97	16
	Motorboat Operators Certification	Chincoteague, VA	SAFETY	10/97	24
	ATV	Cambridge, MD	SAFETY	12/97	4
	Defensive Driving (DDC-6)	Cambridge, MD	SAFETY	12/97	6
TORRES	ATV	Cambridge, MD	SAFETY	12/97	4
	Defensive Driving (DDC-6)	Cambridge, MD	SAFETY	12/97	6
WALKUP	Computer Support for Field Stations-Adv.	Shepherdstown, WV	ADMN	11/97	40
WEAVER	Mid-Career Retirement Planning	Laurel, MD	ADMN	4/97	16
	CPR Refresher	Cambridge, MD	SAFETY	6/97	4
	Motorboat Operators Certification	Chincoteague, VA	SAFETY	10/97	24
	Defensive Driving (DDC-6)	Cambridge, MD	SAFETY	12/97	6
WEBSTER	MD Agric. Pesticide Application	Delmar, DE	SAFETY	2/97	8
	Mid-Career Retirement Planning	Laurel, MD	ADMN	4/97	16
	CPR Refresher	Cambridge, MD	SAFETY	6/97	4
	Motorboat Operators Certification	Chincoteague, VA	SAFETY	10/97	24
	ATV	Cambridge, MD	SAFETY	12/97	4
	Defensive Driving (DDC-6)	Cambridge, MD	SAFETY	12/97	6
WINDSOR	Defensive Driving (DDC-6)	Cambridge, MD	SAFETY	12/97	6
<b>TOTAL 1997 TRAINING HOURS</b>					<b>1068</b>

MARTIN NWR

**MARTIN NATIONAL WILDLIFE REFUGE**

Smith Island, Maryland

**ANNUAL NARRATIVE REPORT**

Calendar Year 1997

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

## TABLE OF CONTENTS

### Introduction

1.	Monitoring and Studies.....	1
	1a. Surveys and Censuses.....	1
	1b. Studies and Investigations.....	3
2.	Habitat	
	Restoration.....	NTR
	2a. Wetland restoration: On-refuge.....	NTR
	2b. Upland restoration: On-refuge.....	NTR
	2c. Wetland restoration: Off-refuge.....	NTR
	2d. Upland restoration: Off-refuge.....	NTR
3.	Habitat	
	Management.....	NTR
	3a. Manage water levels.....	NTR
	3b. Manage moist soil units.....	NTR
	3c. Graze/mow/hay.....	NTR
	3d. Farming.....	NTR
	3e. Forest cutting.....	NTR
	3f. Prescribed burning.....	NTR
	3g. Control pest plants.....	NTR
4.	Fish and Wildlife Management.....	4
	4a. Bird banding.....	NTR
	4b. Disease monitoring and treatment.....	NTR
	4c. Reintroductions.....	NTR
	4d. Provide nest structures.....	9
	4e. Predator and exotic control.....	9
5.	Coordination Activities.....	10
	5a. Interagency coordination.....	10
	5b. Tribal coordination.....	NTR
	5c. Private land activities.....	NTR
	5d. Oil and gas activities.....	NTR
	5e. Cooperative/Friends Organizations.....	NTR
6.	Resource Protection.....	11
	6a. Law enforcement.....	NTR
	6b. Wildfire preparedness.....	NTR
	6c. Manage permits and economic uses.....	NTR
	6d. Contaminant investigation and cleanup.....	NTR
	6e. Manage water rights.....	NTR
	6f. Manage cultural resources.....	11

6g. Federal Facility Compliance Act.....	NTR
6h. Land acquisition.....	NTR
6i. Wilderness and natural areas.....	NTR
6j. Threats and conflicts.....	NTR
7. Alaska Only.....	NTR
8. Public Education and Recreation.....	NTR
8a. Provide visitor services.....	NTR
8b. Outreach.....	NTR
9. Planning and Administration.....	15
9a. Comprehensive management planning.....	NTR
9b. General administration.....	15

Feedback  
Appendix

## INTRODUCTION

Martin National Wildlife Refuge was established as a result of the late Glenn L. Martin's gift to the United States of 2,482 acres (some later documents say 2,569.86 acres) of land in two deeds dated December 20, 1954 and January 11, 1955. This area represented Mr. Martin's private hunting preserve, which he donated to the Government because of his interest in wildlife conservation. At the time, he began negotiations to acquire certain remaining ownerships on the Island north of Smiths Thorofare. Unfortunately, he died prior to completion of this program, but had successfully negotiated for another 1,377 acres which his estate offered to the Government in May 1957 at the price of \$27.06 per acre. The Migratory Bird Conservation Commission, under the authority of the Migratory Bird Treaty Act, subsequently approved the acquisition of these and other lands, including the .65 acre Norman Tyler Tract (the Tyler House property - the house has since been renamed the Middleton House) in Ewell in 1964. This acquisition brought the refuge's total acreage to 4,423. In 1995, an additional 125 acres was added to Martin NWR through the donation of Watts Island by The Conservation Fund. Watts Island is located in Accomack County, Virginia, about 15 miles south of Smith Island. Currently, the refuge encompasses 4,548 acres.

A 1960 Secretarial Closing Order provided the refuge with a 300-yard wide proclamation boundary inside which waterfowl hunting was prohibited. On March 7, 1975, the Land Acquisition Advisory Committee met to consider Regional Director Griffith's recommendation to acquire an additional 3,000 acres. The proposed addition, known as South Marsh Islands, was to be acquired by The Nature Conservancy. However, after debating the issue, the Committee recommended that Service acquisition be deferred, and suggested that the Regional Director notify The Nature Conservancy that the Service recommended that the Maryland Department of Natural Resources acquire and manage this property.

Smith Island was named for Captain John Smith, who explored and charted this and nearby islands in 1608. The prolific marsh grasses attracted settlers who raised cattle on the Island. Two early settlers were John Evans and John Tyler. Evans and Tyler are still among the most common surnames of Smith Island residents. For more than 300 years, Smith Island watermen have been making a living from the sea. They began dredging oysters with skipjacks about 1850, and some 50 skipjacks were once based on the Island. Residents first harvested the well-known blue crab by sail, and later by power boats. Crab potting started about 1947. Today, the residents of the three villages on Smith Island -- Ewell, Tylerton, and Rhodes Point -- continue the Island tradition of harvesting oysters in the winter and crabs in the summer from the waters surrounding Martin Refuge.

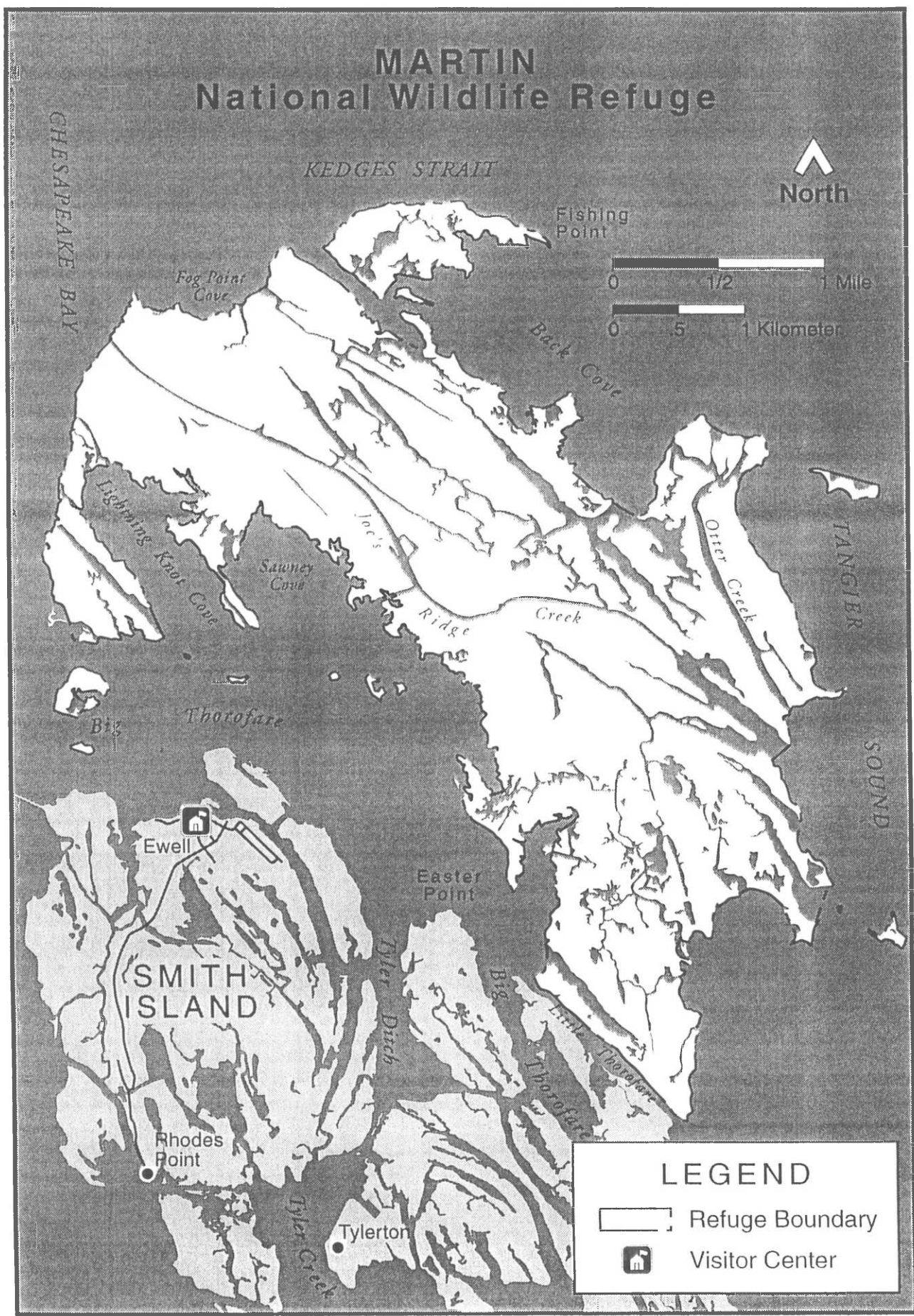
Very few opportunities exist at Martin for the type of active management that occurs on many refuges. The Service's role at Martin is primarily custodial: protecting the saltmarsh and monitoring the populations that occur there. With the exception of erosion loss, the saltmarsh has remained relatively stable over the years. Some erosion takes place each year on the west (Bay) side of the refuge, and this natural process may have been accelerated in recent years by the rise in sea level. With the ongoing loss of coastal habitats and increasing hunting pressure, the value of Martin NWR as a wildlife sanctuary will no doubt continue to increase.

The islands that form the refuge are practically all saltmarsh, dominated by black needlerush, salt bulrush, and *Spartina* spp. Located in the middle of the Chesapeake Bay, these wetlands are only slightly above sea level and are surrounded by shallow water areas where submerged aquatic grasses grow. A few sandy ridges occur along the western shoreline and are subject to substantial erosion. The marsh is broken by a maze of tidal creeks and coves, and freshwater potholes dug by the first settlers for their cattle. Several "ridges", only slightly higher than the surrounding marsh, support wetland shrubs and small red cedar and loblolly pine trees. The waterbird rookeries found on the refuge are located along these ridges. The number of ridges or hummocks that support more upland type vegetation are very limited, and therefore valuable.

Submerged aquatic vegetation (SAV) beds, particularly widgeon grass and eelgrass, which are vital to the health of the refuge estuaries, are still struggling to make a comeback after being nearly wiped out by Hurricane Agnes in the 1970s. Filling the shallow water flats around the refuge, these submerged aquatics made an excellent feeding substrate for waterfowl, as well as crabs, which are an important part of the local economy. SAV beds seem to have shifted from some historic locations to relatively new areas reaching from Swan Island to Troy Island.

Although the refuge is closed to the public to protect trust resources, there is a small visitor contact station in Ewell that is open April through November. The contact station contains exhibits that excite visitors on waterfowl, watersheds, aquatic life, and current research projects on the refuge. The contact station is located in the front part of the Middleton House. The back section of the house serves as the refuge office, and the upstairs is equipped with three bedroom to accommodate visiting refuge staff, researchers, and volunteers while conducting work on the refuge. Other structures on the grounds of the Middleton House include a shop/garage, hazardous material shed, and a nearby boat dock. A boat shed, boat dock, lookout tower, two peregrine falcon nest towers, and about 70 osprey nests are located on the refuge.

# MARTIN National Wildlife Refuge



## LEGEND

-  Refuge Boundary
-  Visitor Center

## **Monitoring and Studies**

### **1a. Surveys and Censuses**

A tri-colored heron was seen at the heronry adjacent to the boathouse in January. This is quite an unusual sighting for this time of year.

#### **Bald Eagles**

After several years of seeing bald eagles near and around Smith Island during the breeding season, the first recorded nesting of bald eagles on the refuge occurred this year on Captain Dan's Island. Surveys conducted by MD DNR revealed two young. During June and July, two immature eagles also were seen regularly in the area.

#### **Waterfowl**

Martin continued to overwinter substantial numbers of waterfowl. An estimated 2,000 ducks, 800 Canada geese, and 1,500 tundra swans were on the refuge in January. Martin is also an important area for breeding waterbirds, osprey, and black ducks.

Tundra swans and Canada geese were seen heading north in March and green-wing teal numbers began increasing.

Mid-winter waterfowl surveys were conducted in January, and the five-year trend data is illustrated in Table 1.

Table 1. Mid-winter aerial waterfowl survey data, 1992-1997, Martin NWR

SPECIES	1992	1993	1994	1995	1996	1997
Black duck	934	462	692	809	614	491
Bufflehead	631	932	699	589	1172	201
Canada goose	1460	1516	1192	686	873	452
Gadwall	5	48	2	90	0	0
Goldeneye	24	140	10	41	66	13
Mallard	85	6	6	45	5	128
Merganser, Common	0	0	0	6	29	38
Merganser, Hooded	18	12	22	68	16	0
Merganser, Red-breasted	0	3	0	0	5	0
Oldsquaw	22	27	32	100	18	9
Pintail	252	0	2	0	4	20
Ruddy	42	0	0	0	0	0
Scaup	0	0	79	0	0	900
Scoter, White-winged	0	45	4	0	0	0
Scoter, Surf	31	607	45	201	0	76
Scoter, Common	0	16	38	37	4	78
Swan, Mute	0	0	0	10	0	0
Swan, Tundra	1480	882	1456	1663	1699	1159
Teal, Green-wing	15	0	0	15	0	0
Wigeon	639	453	434	1418	80	305
0 indicates no birds were observed						

## **1b. Studies and Investigations**

### Effects of Red Foxes on Nest Site Selection of Black Ducks

The pilot study, initiated in 1996, was designed to determine the potential influences of foxes on black duck nesting success continued. However, data collection on potential foxes radio collared in 1996 was hampered when two of the four foxes, one female and one male, were found dead early in the year. Neither radio collar emitted a mortality signal, but after repeated locations at the same point, Mike began to get suspicious. The female was found in January in the Pines hammock (between Ewell and Tylerton). The body was too decomposed to salvage for necropsy. The male was found in a gut off Indian Creek between Ewell and Tylerton in January. Mike correctly deduced that the carcass might be underwater after recognizing a pattern of receiving a signal when tides were low and not receiving when tides were high. The fox was collected and sent to the MD Department of Agriculture Animal Health Lab in Salisbury for examination. Cause of death was uncertain as the animal had been dead for some time, but it was discovered that the bladder was ruptured, probably from a blocked urethra. Mike and refuge volunteer Carl Tyler continued to take readings throughout the year on the remaining two foxes. The remaining collared female was tracked to a location next to Anderson's hammock, where she dened and reared pups.

### Smith Island, MD Environmental Restoration and Protection Reconnaissance Study -

The Reconnaissance Study was completed in May and findings are being compiled by the COE. The purpose of the reconnaissance phase (the first of two parts) was to 1) determine whether the water resource problems fall within the authorities of the COE; 2) determine if there is a Federal interest based on a preliminary appraisal of the alternatives; 3) prepare a project study plan which defines the scope, cost, and schedule for a feasibility study; and 4) assess the level of interest and support from potential non-Federal sponsors in the solutions and cost-sharing of the feasibility study phase and construction.

The report will list several potential projects on Smith Island that would protect wetlands and restore submerged aquatic vegetation habitat, as well as aid in navigation and reduce erosion and flooding in inhabited areas. MD Department of Natural Resources, the MD Department of the Environment, and Somerset County have agreed to be project sponsors for the feasibility effort which is scheduled to begin in 1998.

### VA, MD, DE, PA, NJ - Egg Contaminant Concentrations, Egg Shell Thinning, and Reproductive success in the mid-Atlantic Peregrine Falcons

In June we received a proposal for review from the VA field office regarding

investigation of addled peregrine eggs for contaminants. Comments were sent to Cindy Kane for inclusion into the proposal. If funded, this project will begin in 1998.

4

## Fish and Wildlife Management

### 4a. Bird banding

Peregrine falcon fledglings from the nesting towers on the refuge were banded on May 22 by ROS Johnson, Craig Koppie of the Chesapeake Bay Field Office, and Russ Hill and Bill MacInterf of the Maryland Department of Natural Resources. Six young were banded this year; one in Tower 1 and five in Tower 2. The banding was filmed by Steve Dawson with WBOC in Salisbury to be aired on their weekly segment - *Delmarva Outdoors*. Because MW Harrison was out on sick leave, refuge volunteer Carl Tyler assisted the banding crew in getting to the towers without running aground in the shallow and intricate waterways of the island.



Photo 1. Five, yes, FIVE, peregrine chicks in the Anderson tower. This is the second time this peregrine pair fledged five young.

Table 2. Peregrine falcon tower nesting and banding success

YEAR	SINERS TOWER		ANDERSON TOWER	
	Eggs	Banded	Eggs	Banded
1986	4	3		
1987	4	4		
1988	4	4		
1989	4	2	structure built	--
1990	4	3	no nest	--
1991	4	3	--	--
1992	2	2	2	1
1993	4	4	4	3
1994	5	3	3	2
1995	5	2	5	5
1996	3	1	4	4
1997	3	1	5	5
TOTAL	46	32	23	20

An egg count was conducted in May by Blackwater staff with assistance from Dan Stotts with the Patuxent Wildlife Research Center. Of the 69 platforms on the refuge, 51 were used by osprey with 39 nests containing eggs. A total of 101 eggs were counted.



Photo 2. Bio Tech Roger Stone and ROS Lisa Paglione checking for eggs.



Photo 3. and this is what they saw!

On July 7 and 8, a total of 44 osprey nestlings were banded on the refuge by refuge personnel. Thirteen young were banded off the refuge.

Table 3. Osprey Reproductive Success On Martin National Wildlife Refuge

Year	Occupied Nest (1)	Active Nest (2)	Successful Nest (3)	Eggs	Fledglings	Fledglings/ Eggs
1980	44	35	26	86	50	0.58
1981	37	29	18	69	31	0.45
1982	44	32	26	87	45	0.52
1983	44	34	21	81	37	0.46
1984	49	30	16	77	31	0.40
1985	55	31	25	86	44	0.51
1986	56	34	18	90	36	0.40
1987	53	45	32	123	70	0.57
1988	55	48	30	134	50	0.37
1989*	53	-	4	-	6	-
1990	55	36	15	98	28	0.29
1991	58	21	15	53	30	0.57
1992*	49	8	7	14	9	0.64
1993	54	28	17	71	21	0.30
1994	56	41	33	114	60	0.53
1995	55	-	-	117	38	0.32
1996	-	-	-	-	67	-
1997	51	39	29	101	44	0.44

(1) Adults present

(2) Produced eggs

(3) Fledglings

(-) Information not available

(\*) Sever Spring storms with high winds contributed to low numbers



Photo 4. CAI student Jenny Flores and SCEP April Torres getting their first experience with osprey banding.

Prebaiting for annual black duck banding was initiated in July and trapping began on schedule in August. A total of 140 birds were banded; 110 black ducks, 28 mallards and 2 hybrids. Blackwater's YCC crew came down to Martin and assisted with building swim-in traps.



Photo 5. YCC crew leader Scott Williams and YCC crew members Beth Vickers, Ashley Windsor, Carol Thompson, and Anthony Cornish putting the finishing touches on one of several duck traps they helped build.

#### **4d. Provide nest structures**

After Mike's return to duty (see 9b), we were able to make some repairs to osprey nesting structures in August. A new roof was also put on the peregrine nesting box at the Anderson Tower.

#### **4e. Predator and exotic control**

Mute swans, which were first recorded on the refuge in 1978, have become increasingly more prominent on and around the refuge the last few years, and are now nesting on the refuge. Local residents have approached refuge personnel with concerns regarding the increased number of mute swan in the coves and waters of the Island and their possible effect on aquatic vegetation. These birds have also wandered into the town of Ewell and have frightened some residents by their aggressive behavior.

Control measures following guidelines established by the Atlantic Flyway Council and regional policies are currently being considered (see Blackwater's ANR).



Photo 6. ROS Paglione at one of several mute swan nests that were found on Martin NWR.

## 5

### Coordination Activities

#### 5a. Interagency coordination

Refuge staff coordinated with the following agencies and offices:

Corps of Engineers  
MD Department of Natural Resources  
Patuxent Wildlife Research Center  
MD Historical Trust  
Somerset County Sheriffs Office  
Friends of Blackwater National Wildlife Refuge

## 6

### Resource Protection

#### 6a. Law enforcement

Various patrols were conducted throughout the year, especially during waterfowl season, to ensure resource and property protection.

One of the entrance signs that was erected in April was replaced in August after it had been torn down by vandals. Word on the street was the stunt was committed by a couple of the locals who apparently had too much free time on their hands. Evidence was very circumstantial at best, no case was made.

Mike was unable to attend this year's LE Refresher due to an injury, but we were fortunate enough to be able to send him to a LE Refresher conducted by the National Park Service in September in Mississippi. After attending their refresher, Mike had nothing but praise for ours.

#### 6f. Manage cultural resources

We received the report in October regarding human remains found on the refuge in 1996. The bones were examined by Doug Owsley and Dana Kollmann at the Smithsonian Institute. Analysis determined the bones were from a black female between 35-44 years old. Preliminary analysis of the coffin nails by the Maryland Historical Trust suggests an early nineteenth century date for the burial. Both prehistoric and historic artifacts were found near the site. Further investigation of the site is expected in 1998.

## 8

### Public Education and Recreation

#### 8a. Provide visitor services

The visitor center was opened in April in time for the tourist season and was closed in November.

#### 8b. Outreach

Two new entrance signs, purchased with RO sign money, were erected in April by ROS Johnson and Blackwater firefighters Scott Betts and Kurt Kaue. The height of the signs and poor weather, including high winds, made the project a challenge. Signs

were placed where they would be most visible from boat traffic coming and going from Ewell.



Photo 7. Blackwater firefighters Scott Betts and Kurt Kause securing struts and preparing for the sign raising.

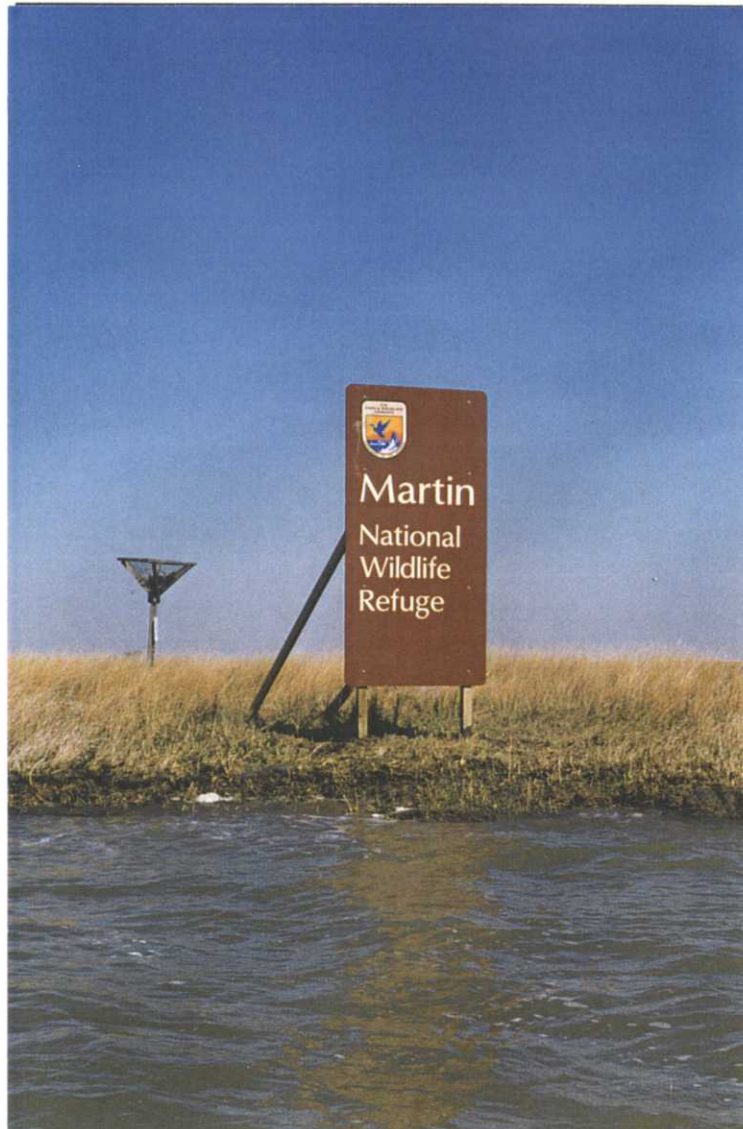


Photo 8. The new entrance sign located at Twitch Cove near the west side of the refuge.



Photo 9. ROS Johnson next to the sign near the east entrance to the refuge at Swan Island.

Blackwater's YCC crew traveled to Martin for a working field trip. The enrollees saw a variety of bird and marine life, assisted with building duck traps, viewed peregrine falcons and two nesting towers, and assisted with black duck trapping and banding.

The importance the marsh ecosystem plays in the food chain, endangered species, and the wading bird rookeries on the refuge were discussed.

As part of the Open House held at Blackwater in October, falconer Andrew Bullen exhibited his peregrine falcon (actually a peregrine/gyrfalcon cross) and talked about the falcons life history and biology, current status as an endangered species and some of the factors that lead to the species being listed, the potential for delisting, and the success of the nesting towers at Martin. His presentation drew quite a crowd.

Peregrine banding was filmed in May by Steve Dawson and osprey banding was filmed in July by Tod Nash, both with WBOC. The films were aired on WBOC's weekly segment, *Delmarva Outdoors*.

ROS Johnson presented a slide program on Martin NWR to refuge volunteers at a training session held at Blackwater in September. The training is designed to familiarize volunteers with the resources and programs at the refuges.

## 9

### Planning and Administration

#### 9b. General administration

After injuring his back in February while on the job (herniated disc that required surgery in May), Mike finally returned to full duty in July. A long awaited return for both Mike and the refuge!

Mike attended training in Columbus, OH to become one of the Region's Motorboat Operator Certification Course instructors. The Region's first certification course was held in Annapolis with Mike as one of the four instructors. A second training, attended by personnel from Blackwater, was held at Chincoteague NWR in October.

#### Maintenance

Martin NWR has one person stationed on-site. Because Mike was out for an extended period during a severe back injury, and equipment was not used as frequently, this year's maintenance expenditures were lower than usual. A "benefit" we just as soon have in the future!

After several years of being our top priority MMS project, and having funding sea-saw back and forth the last two years, replacement for the "Osprey" was finally funded. The project involved replacing the deteriorated plywood cabin with a larger fiberglass model. The contract was awarded to Evan's Boat Construction and Repairs in Crisfield for \$6250. The cabin was prepared in April by removing all but essential operating equipment and instruments, and the boat was driven to Crisfield. It took awhile, but we finally got the boat back in July. Mike reinstalled electrical equipment and various instruments, and we were back in business.

The refuge office was recarpeted by Mike in February, and it looks good! (and feels good too, especially on those cold winter mornings). Runners for the main traffic areas were purchased to reduce wear.

A Furnona radar was purchased from and installed by Midshore Electronics in July for \$2500. This piece of equipment will provide for safer travel during inclement weather - no more peering around the side of the cabin in those foggy trips across Tangier Sound!

SUSQUEHANNA NWR

# **SUSQUEHANNA NATIONAL WILDLIFE REFUGE**

Havre de Grace, Maryland

## **ANNUAL NARRATIVE REPORT**

Calendar Year 1997

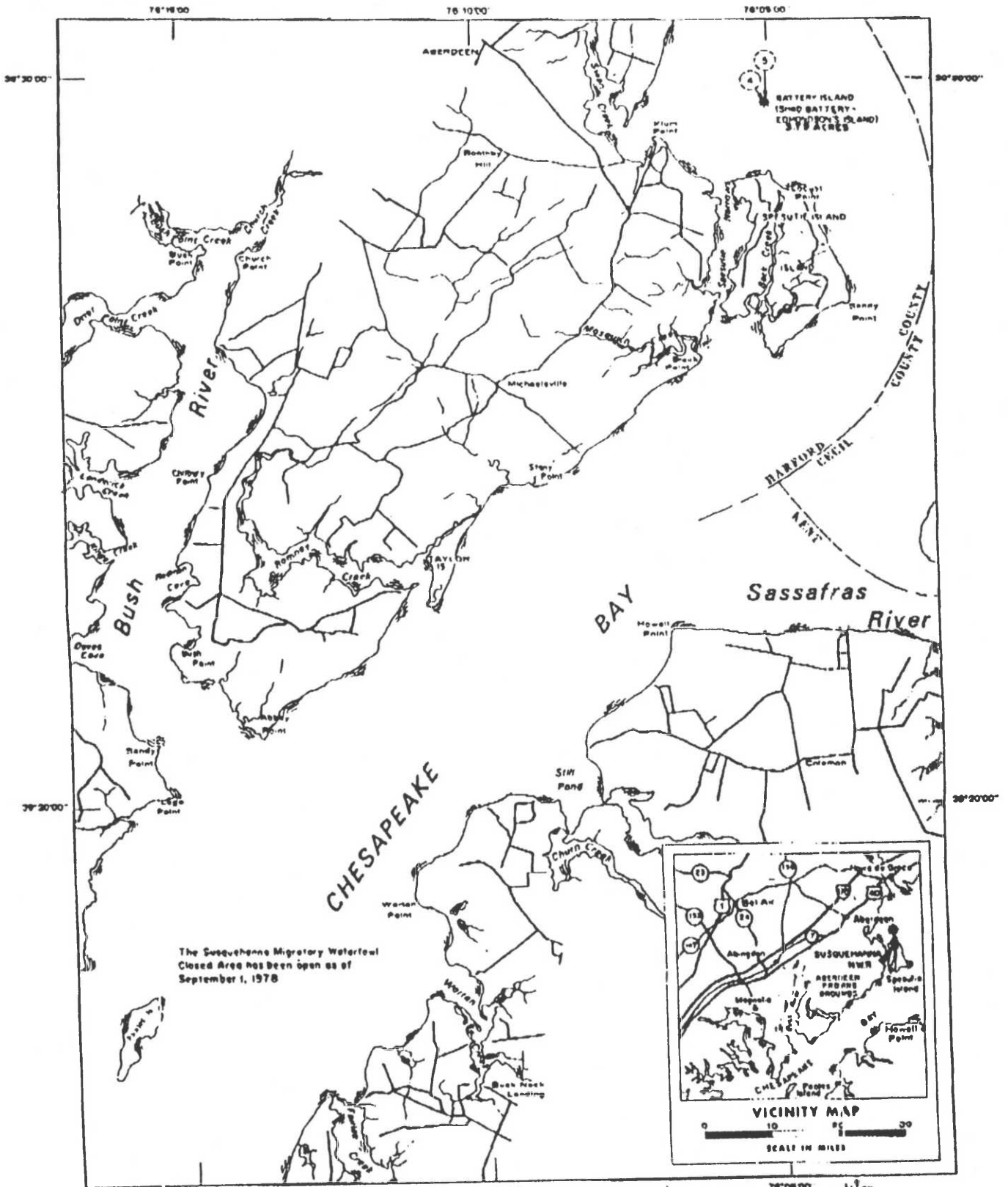
U.S. Department of the Interior  
Fish and Wildlife Service  
NATIONAL WILDLIFE REFUGE SYSTEM

# SUSQUEHANNA NATIONAL WILDLIFE REFUGE

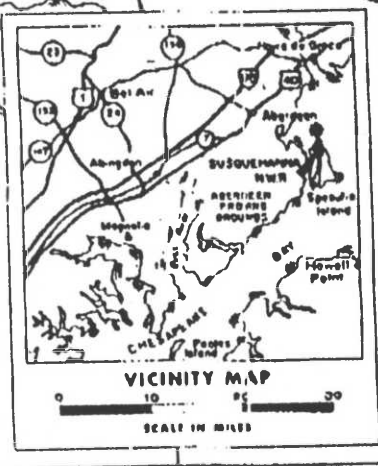
UNITED STATES  
DEPARTMENT OF THE INTERIOR

CECIL and HARFORD COUNTIES, MARYLAND

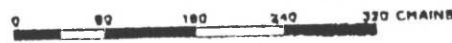
UNITED STATES  
FISH AND WILDLIFE SERVICE



The Susquehanna Migratory Waterfowl  
Closed Area has been open as of  
September 1, 1978



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



MEAN  
DECLINATION  
1960

BOSTON, MASS ICHUS8110 MARCH 1977

5R MD. 322

## INTRODUCTION

Long renowned for its outstanding habitat which concentrated large numbers of diving ducks, primarily canvasback ducks, portions of the Susquehanna Flats were closed to the "taking" of waterfowl by Presidential Order 2347 on August 24, 1939. President Franklin D. Roosevelt, by virtue of the authority vested by the Migratory Bird Treaty Act of July 3, 1918, thereby designated a certain part of the Chesapeake Bay as the "Susquehanna Migratory Waterfowl Closed Area." The area was increased in size, and subsequently amended by President Roosevelt on January 24, 1940 and December 6, 1941 (Presidential Orders 2383 and 2529, respectively [See Appendix I]) to further protect waterfowl and other migratory birds. On June 23, 1942, President Roosevelt issued Executive Order 9185 which declared that all waters and lands previously protected as part of the Susquehanna Migratory Waterfowl Closed Area would be reserved for use by the Department of the Interior as a "refuge and breeding ground for migratory birds and other wildlife." On June 9, 1978, the Service published changes in the Federal Register and in Title 50, Code of Federal Regulations, Part 32 which opened the Susquehanna Migratory Waterfowl Closed Area to the hunting of migratory waterfowl in accordance with annual hunting regulations. The Director had determined that the waterfowl food source had severely deteriorated, and that the attendant waterfowl use had declined to the extent that a closure was no longer necessary. This rulemaking, therefore, rescinded Presidential Orders No. 2383 and 2529, leaving only four acres of "Shad Battery" (Battery Island) as the refuge. The U.S. Coast Guard has maintained a lighthouse on Battery Island since the 1920's. This 45' x 45' reservation is detailed in Executive Order 9185.

Today, Susquehanna Refuge has been reduced by erosion to a mere 1.5 acres, and possesses little or no value to wildlife. The lighthouse, on the Coast Guard property, stands in a state of disrepair, is badly deteriorated, and has been vandalized.

The Battery Island Preservation Society seeks responsibility for the administration and management of the Island and the lighthouse keeper's quarters. At the direction of the Regional Office, this subject was the topic of much discussion during the Complex's Station Management Planning meeting in 1989, and it was mutually agreed that a cooperative agreement was the most appropriate mechanism to authorize the Society to rehabilitate and subsequently administer the structures. A final draft of the Cooperative Agreement was completed on March 21, 1990.

For the next ten months, the cooperative agreement kicked around the Regional and Washington offices with lots of discussion and input from a number of folks at all levels. Finally, Regional Solicitor Tony Conte advised that a cooperative agreement was undoubtedly the worst case scenario for dealing with the requests of the Battery Island Preservation Society since such an agreement would indicate that the Fish and

Wildlife Service owned the 45' X 45' area that has been determined to be owned by the U.S. Coast Guard. Obviously, the Service did not want to imply that it owned the lighthouse and lighthouse keeper's quarters when it didn't, and therefore the cooperative agreement was eliminated.

On October 16, 1990, Project Leader Carowan met with Ms. Susan Smith, Projects Director for U.S. Senator Mikulski, Lt. Tom Flynn from the 5th Coast Guard District, and representatives from the Battery Island Preservation Society to discuss the continuing problem of ownership of the lighthouse on Battery Island, Susquehanna National Wildlife Refuge, and the Preservation Society's desire to assume management of the historic lighthouse keeper's quarters.

Lt. Flynn contested Solicitor Conte's opinion that the U.S. Coast Guard owned the 45' x 45' parcel in question, stating that all of this parcel but the current 15' X 15' reservation for the light tower was turned over to the Service after Executive Order 9185 was signed. However, the only proof of this statement was the civil engineering design that was attached to the volume of literature that Lt. Flynn provided. More interesting for us, and certainly more supportive of the contrary, was a letter, dated October 24, 1966, from Captain Fisher to then Governor Joseph D. Tydings, which stated that the 45' x 45' parcel was under the control of the U.S. Coast Guard. A copy of this letter is contained in the station's files.

When this was brought to Lt. Flynn's attention, he agreed that he would have to take up the issue of ownership with his superiors once again. But after considerable discussion, Lt. Flynn and the other participants agreed that the most prudent and expedient way to handle the two issues was for the Coast Guard to claim ownership and then excess the property directly to the Preservation Society. Of course, Lt. Flynn recommended that an alternate solution was for the Service to claim ownership and to subsequently culminate a cooperative agreement with the Preservation Society.

With the mutual understanding that it would be in the best interest of all concerned if the Coast Guard would claim ownership, the meeting was ended in agreement on the following action items:

1. Lt. Flynn would seek confirmation of ownership by the Commander of the Coast Guard.
2. Lt. Flynn would investigate the requirements for excessing the property administratively rather than legislatively.
3. The Service would investigate the requirements for excessing the property through GSA and report same to Ms. Smith.
4. Meet again once a decision has been made by the Coast Guard.

On October 29, 1991, Senator Mikulski wrote a letter to Admiral J.W. Kime, Commandant, USCG, asking that the Coast Guard or DOI accept jurisdiction so that this property can be excessed and properly maintained. Senator Mikulski reiterated the difficulty she has in explaining to constituents that no agency claims jurisdiction over the property, and asks for support from the Coast Guard.

On January 27, 1992, Senator Mikulski sent a follow-up letter to the Coast Guard inquiring about the status of the jurisdiction. Finally, on February 3, 1992, the Coast Guard drafted the following response:

"The Coast Guard owns the skeleton tower and lighthouse structure at the Shad Battery site. The control and jurisdiction of the underlying land, a 45' x 45' parcel rests with the Department of the Interior. The Department of the Interior, however, cannot interfere with the Coast Guard's right to use the property for lighthouse purposes. The jurisdictional question has been discussed with the Department of the Interior and they are in agreement with this position. The Coast Guard has no objection to a third party (non-profit organization) using the lighthouse. It will make whatever arrangements necessary with the Department of the Interior to make the lighthouse available to a third party."

This recent correspondence paves the way for the Battery Island Preservation Society to perform needed maintenance and preservation on the deteriorating lighthouse and structure. However, it does little in relieving Blackwater Refuge from the burden of responsibility concerning the land. Furthermore, there are now three parties involved in the administration of a useless piece of eroding island less than 0.5 acres in area.

During 1993, the Coast Guard contacted Blackwater Refuge to inform us that they intended to demolish the old deteriorated lighthouse. Evidently, third-party interest in saving the lighthouse had dwindled. Blackwater informed the Coast Guard that we had no objection with them removing the lighthouse, since the FWS has no jurisdiction over the structure. We received no word on the outcome.

During 1997, as in the previous three years, there was no contact with the Coast Guard or the Battery Island Preservation Society.