BLACKWATER NATIONAL WILDLIFE REFUGE
Cambridge, Maryland

Glen L. Martin NWR
Susquehanna NWR

ANNUAL NARRATIVE REPORT

Calendar Year 1983

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

BLACKWATER NATIONAL WILDLIFE REFUGE
Cambridge, Maryland

Glen L. Martin NWR
Susquehanna NWR

ANNUAL NARRATIVE REPORT
Calendar Year 1983

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

PERSONNEL 84-A-6 MC

	NAME	TITLE	GRADE	EOD	STATUS
1.	John D. Schroer	Refuge Manager	GS-12		
	Transferred to Okefenokee NWR 03-20-83 (Not Pictured)				
2.	William Koch	Assistant Refuge Manager	GS-11		PFT
3.	Janet L. Wheatley	Assistant Refuge Manager	GS-07		
	Resignation effective 07-10-83 (Not Pictured)				
4.	Michael D. Canada	Assistant Refuge Manager	GS-05	08-22-83	PFT
5.	Guy W. Willey	Biological Technician	GS-09		PFT
6.	William M. Giese	Biological Technician	GS-05		PFT
7.	Paul R. Schmidt	Outdoor Recreation Planner	GS-09		
	Transferred to Washington Office 08-22-83 (Not Pictured)				
8.	Vidal Martinez	Outdoor Recreation Planner	GS-09	08-22-83	PFT
9.	Kathryn L. Freeburger	Recreation Assistant	GS-05		
	Transferred to Eastern Neck NWR 06-27-83 (Not Pictured)				
10.	Heather L. Nicklas	Recreation Assistant	GS-05	07-11-83	PFT
11.	Carole T. Henry	Administrative Clerk	GS-06		PFT
12.	Wanda T. Ciekot	Clerk (Typing)	GS-04		PPT
13.	Franklin A. Hughes	Automotive Mechanic	WG-10		PFT
14.	Joseph H. Cornish	Laborer	WG-04		PFT
15.	Richard O. Webster	Maintenance Helper	WG-05	06-13-83	Temp.
16.	Lisa A. Bramble	Recreation Assistant	GS-04	10-02-83	Temp.
	Resignation effective 12-09-83 (Not Pictured)				

Review and Approvals

Don R. Perkuchin, 3/16/84 Edward L. Moss 4/15/84

Submitted By Date Refuge Supervisor Review Date

Suzanne Mayo 4-27-84

ARD-Wildlife Resources Review Date

TABLE OF CONTENTS

Page

G. WILDLIFE

H. PUBLIC USE

I. EQUIPMENT AND FACILITIES

Page

J. OTHER ITEMS

K. FEEDBACK

A. HIGHLIGHTS

A $292,000 Jobs Bill project was initiated for endangered species habitat improvement. (Section F.3)

Assistant Secretary of the Interior Raymond Arnett visited the refuge on November 15. (Section J.2)

On August 24 the State of Maryland contributed $5,000 to the refuge's marsh restoration project. (Section F.2 and J.2)

B. CLIMATIC CONDITIONS

The year 1983 began with above normal temperatures and near normal precipitation which prevailed through the month of March. Only 12 inches of snowfall were recorded during January and February. This is below the annual average of 15 inches. The lowest temperature during this period was only 12 degrees recorded in February. March's high temperature was 79 degrees.

April's rainfall amounted to a record 15.10 inches. This delayed spring planting of corn and soybeans until late May and early June. Drought conditions then prevailed from May--August during the major portion of the growing season. This drought resulted in one of the lowest yields on record for most of the corn crop throughout most of the Eastern Shore of Maryland. Rainfall in early September helped the millet, buckwheat, and sorghum planted in the low bottom lands.

Due to the lack of precipitation, water levels in all the freshwater impoundments dropped during the summer and remained low until heavy rainfall in December (7.98 inches) filled the impoundments to the desired levels.

Due to strong northeast winds, tides remained above normal throughout most of September and extremely high tides October 25-27 caused flooding of both Shorter's Wharf Road and Key Wallace Drive. Water remained over the roads for several days and tidal water filled many of the upper marshes which had been dewatered by the summer drought and also flooded much of the forested areas of the refuge. These same areas were flooded in mid-December by heavy rainfall, runoff, northeast winds, and tides.

The warm December weather with temperatures near 70 degrees gave way to an arctic air mass on December 24. A low of -2 degrees was recorded on the 25th. At the end of the year most of the water and marsh areas were covered with several inches of ice.

Month	Precipitation (inches)		Temperatures (°F)	
	Rainfall	Snowfall	High	Low
January	3.28	Trace	59	14
February	3.56	12.0	59	12
March	5.67		79	23
April	15.10		65	27
May	4.96		86	34
June	1.56		90	48
July	2.27		96	50
August	1.70		98	54
September	3.76		93	40
October	2.58		73	40
November	3.02		70	28
December	7.98		69	-2
Totals	55.44	Extremes	98	-2

C. LAND ACQUISITION

1. Fee Title

Although an acquisition boundary has not yet been approved, two properties -- Handley tract #58, 506 acres and Robbins tract #53, 857 acres were offered for sale to the FWS by their respective owners. Both properties have been identified as very high priority within the proposed acquisition boundary which includes approximately 5,000 acres. Aggressive action by the Regional Office towards acquiring these tracts was initiated. Refuge personnel, especially Biological Technician Willey, assisted RO personnel. These areas are adjacent to the refuge and have prime black duck, bald eagle, and Delmarva fox squirrel habitat. Acquisition of these areas in calendar year 1984 looks very promising.

D. PLANNING

2. Management Plan

The station Safety Plan was completed and updating the Cropland and Deer Hunt Plans was initiated.

4. Compliance with Environmental Mandates

A Section 7 consultation was prepared and approved for the timber stand improvement work involved in the $292,000 Jobs Bill project. (Section F.3) Work on an environmental assessment for the completion of the Pool 4 dike was initiated.

5. Research and Investigation

Blackwater NR 83 - "Blackwater Marsh Losses" 14-16-0005-79-9901

The University of Maryland was contracted for this study in 1979. Field work was done 1979-81 and the final report received in May 1983.

The study indicated that approximately 5,700 acres of brackish three-square bulrush marsh habitat on the refuge has been lost, i.e. become open water since 1938. This represents approximately 59% of the marsh on the 14,263 acre refuge; however, the University is presently adjusting this figure with a more accurate method of measuring aerial photographs since they feel a more precise acreage can be calculated. The following possible causes of marsh loss were examined: grazing by herbivores, including geese and muskrat; marsh burning; herbicides; water level and salinity changes; and the effect of a county road (Shorter's Wharf Road) constructed through the marsh. The study concluded that inorganic sediment starvation in combination with rising sea levels were the principal factors. Marsh burning, an historically common practice, in the area as well as on the refuge was suspect, but the study also concluded that losses of surface litter to vertical accretion from burning are probably compensated by the greater productivity of the burned areas.

Blackwater NR 83 - "Recent Vertical Accretion Rates at Blackwater NWR" 14-34-0001-2122

This follow-up study by the University of Maryland February-August 1983 involved analysis of 12 cores collected from three-square bulrush dominated marshes documented as having high rates of marsh loss. Both the up and down stream sides of Shorter's Wharf Road were sampled. The study suggests that the accretion rates of marshes in the sample area may not be keeping pace with sea level rise in the long term and particularly the upstream side of Shorter's Wharf Road (area of greatest loss) may be well below the local rate of sea level rise. The study also suggests that the marsh, which is a floating fibrous peat mat averaging 0.3 m thick underlain by 1-2 m of loose organic muck, has little structural integrity which greatly increases the potential for wave erosion, especially during storms.

E. ADMINISTRATION

1. Personnel

Refuge Manager John Schroer was selected as the new refuge manager of Okefenokee NWR which became effective March 20. The staff was happy for John's advancement but sorry to lose him as Blackwater's able manager. The manager position remained vacant during the rest of the year.

Blackwater experienced a serious staffing shortage in the spring and summer. Assistant Manager Lou Hinds was temporarily detailed from Parker River NWR from April 5 to May 13. Lou's assistance was greatly appreciated.

June 13 began a one year temporary appointment for Maintenance Helper Richard Webster. Richard filled a maintenance position which had been vacant for two and one-half years. Needless to say his presence was also greatly appreciated.

Recreation Assistant Kathy Freeburger returned from nine weeks of law enforcement training at Glynco on June 23, but stayed just long enough to sign a few papers before transferring to Eastern Neck NWR.

Heather Nicklas joined the Blackwater staff in July as a recreation assistant to replace Freeburger. Heather was not a new face in our midst since she had spent twelve weeks working at Blackwater as a coop student in 1981.

Assistant Manager Janet Wheatley resigned in July after having a baby and Outdoor Recreation Planner Paul Schmidt was promoted to outdoor recreation specialist and transferred to the Washington Office in August. Assistant Manager Michael Canada replaced Wheatley and Outdoor Recreation Planner Vidal Martinez replaced Schmidt. Both Canada and Martinez transferred from Harrison Lake NFH in August.

Acting Manager William Koch was selected as project leader at Great Swamp NWR in November but will not report until February 1984.

Recreation Assistant Cathy Baptist had been a Blackwater staff member under several 700 hour appointments during the past few years. A Certificate of Appreciation was presented to Cathy for her contribution to Blackwater's programs. Cathy resigned in June for employment elsewhere.

Recreation Assistant Lisa Bramble was hired under a part-time position October 2 to replace Baptist, but resigned December 9 to take a full-time position with the Department of Interior in Washington, D.C. Lisa also served as a YCC group leader this summer.

The following is a comparison of the on board strength for the last five fiscal years:

	Permanent			Temporary
	Full-Time	Part-Time	Seasonal	
FY 1984	10	1	0	2
FY 1983	10*	1	0	2
FY 1982	9**	1	1	1
FY 1981	10	1	1	3
FY 1980	10	1	1	3

* The career-seasonal position was converted to permanent full-time.

**When a PFT position became vacant during FY 1981, the PFT ceiling for the refuge was reduced by one; however, in January 1983 this position was given back. This position was then held vacant during the second quarter in anticipation of filling it with a national fish hatchery displacee. When this did not happen a temporary was quickly hired to compliment the long understaffed maintenance program.

2. Youth Programs

The 1983 YCC camp was a non-residential camp of twenty enrollees under the supervision of two group leaders. Enrollees worked a total of 6,485 hours. This years camp was funded independently from the refuge with a camp budget of $31,991. One group leader and one enrollee completed an advanced lifesaving course meeting the safety requirements for water projects. All enrollees and staff received eight hours of standard first aid training. The YCC program provided a valuable asset to refuge manpower this year since the refuge was understaffed for much of the summer. Under direct supervision by refuge staff, YCC provided most of the labor for the marsh restoration project which included hauling and placing approximately 1,000 straw bales for dredge fill impoundments, and transplanting approximately 5 acres of three-square bulrush into the dredged plots.

YCC clearing brush and limbs on Luthy Road 83-E-27 PRS

YCC enrollees performed maintenance duties to various refuge facilities and equipment including cleaning and painting of Quarters I; washing windows and cleaning floors in the shop buildings, office, and visitor center; washing and waxing refuge vehicles; replacing underground water lines at the pavilion area; applying masonary sealer on visitor center bricks; scraping and painting dump truck body, bush hog, YACC building interior walls, storage and shop building exteriors, flag poles, and Wildlife Drive guard rails.

Other projects included: hand seeding 7 acres of Japanese millet in Pools 1, 3, and 5; clearing 4 acres of underbrush along the woods edge of an agricultural field and the bicycle trail; placing wood chips on approximately 1 mile of walking trails; rehabilitating 2 permanent duck traps and constructing 3 portable traps; rehabing 15 osprey nesting structures; assisting staff in periodically mowing 5 acres of lawn; cutting brush along the Wildlife Drive pull-offs; cleaning debris from 1½ miles of woodland drainage ditches; cleaning up wood and metal structure remnants, from 1 acre of marsh; performing periodic litter pickup along 12 miles of refuge roads; and assisting refuge staff in marking woodlands for the Timber Stand Improvement Jobs Bill project.

This years YCC camp did an excellent job on all projects and morale of both staff and enrollees remained high despite strenuous work in high temperatures and sometimes unpleasant working conditions. Much of the program's success can be contributed to the dedicated efforts of group leaders Lisa Bramble and Mary Spellman. Refuge staff assisted these two able individuals as much as possible but with the refuge staffing shortage, most of the supervision was in their hands.

4. Volunteer Program

Barry Christenson, a biologist with Ecological Services in Annapolis, served as a volunteer at Blackwater during the year. He assisted in the operation of the visitor center and in data collection for the Maryland Breeding Bird Atlas project.

The refuge is working on expanding its volunteer program.

5. Funding

The following is a breakdown of funds for the past five fiscal years:

Fiscal Year ($1,000's)

Activity	FY 84	FY 83	FY 82	FY 81	FY 80
Wildlife Resources	450.7	340.5*	284.0	286.0	275.0
Revolving Rehab.	-	-	-	15.0	45.0
End. Species	3.0	7.0	7.0	14.0	16.0
Exp. for Sales	3.0	3.0	2.0	2.0	1.5
Qtrs. Main.	11.0	4.0	2.2	-	-
Contrib. Funds	5.0	-	-	-	-
Total	472.7	354.5	295.2	317.0	337.5
Jobs Bill	292.0				
Construction	164.0**				

* A sum of $2,500 was withdrawn for Regional Office use
**Controlled by Engineering

Funding over the past several years necessitated "tightening the station's belt," however, things are appearing to look up a little in FY 84 with the first Accelerated Refuge Maintenance Management (ARMM) dollars.

The Jobs Bill project is for endangered species habitat enhancement and was initiated in the summer of 1983. Funds will probably be entirely obligated in FY 84, but the project may not be completed until sometime in FY 85.

6. Safety

Blackwater continued its good safety record for 1983 with no time lost accidents. The last time lost accident occurred in June 1960.

Monthly meetings held by the safety committee promoted safety awareness throughout the year. Some of the topics of discussion and demonstrations included: first aid for specific injuries, rabies immunizations, respiratory emergencies, swimming and boating safety, lawn mower safety, lightning, operation of fire jeep and the new portable oxygen unit. Featured guest speakers presented programs on stress and electrical safety. Potential hazards noted during safety inspections or observed by employees were also discussed at the meetings and assigned for correction.

Committee members conducted the Annual Health and Safety Survey in February. On April 13 James McKnight, Regional Safety Officer, inspected Blackwater. Mr. McKnight reported no major deficiencies, however, he did make several recommendations.

Several safety projects were completed this year. Safety lights, emergency unit lights, slow moving triangles, and safety screens were installed on two tractors and a triangle on the fertilizer spreader. Trees and shrubs were trimmed along the Wildlife Drive to improve driving visibility. The observation tower was painted with non-skid paint and caution signs posted to alert visitors to watch their step.

YCC enrollees, group leaders, and several refuge staff members participated in the Red Cross multi-media first aid course. A Red Cross lifesaving course was also completed by a YCC group leader and enrollee. The only accidents for the year were minor, involving YCC enrollees, two were insect bites and the third was an eye injury caused by a wood chip.

7. Technical Assistance

Refuge personnel provided advice, recommendations, and guidance of a technical nature to the following in 1983:

On February 16 Biological Technician Willey (chairman) of the Maryland Advisory Trapping Committee attended a meeting in Annapolis, Maryland. This meeting was to review present fox trapping laws and conflicts with fox chasers.

Biological Technician Giese assisted the Maryland Department of Natural Resources personnel in an aerial check for active eagle nests in Dorchester County on March 14.

During the months of April and May, refuge personnel assisted the Maryland Wildlife Administration in trapping Delmarva fox squirrels on private lands in Dorchester County for transplanting to sites in other Maryland counties designated by the Delmarva Fox Squirrel Recovery Team.

In May, refuge personnel assisted the National Wildlife Federation in locating eagle nests in Dorchester County. Biological Technician Giese transported the banding crew by boat to nest sites on and adjacent to the refuge.

In September, personnel from NASA, Goddard Space Center, Beltsville, Maryland were assisted by refuge staff in ground truthing satellite photos of the Meekins Creek area adjacent to the refuge.

On November 21, Biological Technician Willey met with a private land owner near Drawbridge, Maryland regarding his concern about Delmarva fox squirrels living in an old building near his residence. The owner was worried about the possibility of rabies, but finally agreed to leave the squirrels alone and permitting the recovery team to transplant the animals if they become a nuisance.

Refuge personnel met with several land owners and gave advice on planting natural vegetation in ponds and fields for wildlife use.

8. Other Items

Refuge Manager Schroer attended a regional project leader's conference in Newton Corner, Massachusetts January 18 and 19.

Refuge Supervisor-South Ed Moses visited and inspected the refuge on February 24 and 25.

Assistant Manager Janet Wheatley gave birth to a daughter, Nicole Renee, May 11. This little bundle was too much for Janet to leave every day so she resigned as of July 11.

Task force members of a pilot maintenance management system met with Acting Manager Koch July 14 to review station facilities and property inventories. Members of the task force included Shaw Davis, Liz Cummings, Dennis Holland, and Jack Bowden.

A station evaluation was conducted August 1-3 by team leader Tom McAndrews (Refuge Supervisor-North), Roger Hogan (Biologist-Endangered Species), and Grady Hocutt (Refuge Manager-Montezuma NWR).

An incentive award was presented to Administrative Clerk Carole Henry in May for her suggestion in improving administrative operations efficiency. Carole also received her 10 year service pin in July.

To prepare for the special Atlantic Flyway goose study which began in October, Biological Technician Giese attended a banding workshop at Middle Creek Wildlife Management Area in Pennsylvania September 13 and 14.

F. HABITAT MANAGEMENT

2. Wetlands

The predominant marsh grass of the refuge is three-square bulrush. There are approximately 10,000 acres of marsh and open water on the refuge bordered in many areas by pine woods or adjacent to more of the same type of marsh in private or state ownership. The refuge lies approximately eight miles from the expanse of the Chesapeake Bay. Small loblolly pine islands are scattered throughout the marsh. This combination of marsh and woods edge with scattered islands provides ideal resting, nesting, and feeding areas for bald eagles while the expanses of marsh provide resting and feeding areas for migratory birds, especially fall migrants and wintering species. (Section G) The bulk of the marsh is brackish and tidally influenced with an average tide differential of one foot. Winds, however, have a greater influence on marsh water levels than stage of the tide. In the summer, (late June-September), predominant south-southwesterly winds blowing against the natural drainage flow can hold marsh water levels two-three feet above normal for days or weeks at a time, while during the rest of the year west-northwesterly winds do the opposite. Salinity will depend on the amount of bay water blown back into refuge marshes, precipitation, and the amount of runoff from the Little Blackwater and Blackwater Rivers.

Heavy rainfall and runoff in April lowered salinity allowing three-square bulrush to make excellent growth throughout the refuge marshes.

Approximately 3,000 acres of marsh were prescribed burned during the December through March burning season. Annual winter burning of marsh encourages rapid and vigorous regrowth of three-square bulrush in the spring and discourages the succession of less desirable species such as saltgrass, big cordgrass, saltmeadow cordgrass, saltmarsh cordgrass, cattail, phragmites, and groundsel tree. The root systems of the grass are not destroyed since prescribed burning is done when the ground is frozen and/or wet. Burned over marsh provides additional resting and feeding areas for wintering waterfowl, thus reducing feeding pressure on the water-vegetative interfaces which may be contributing to erosion and eventual loss of vegetated areas. Depredation to private agricultural lands is also reduced by the increased availability of natural foods on the refuge.

Approximately 5,700 acres of refuge marsh vegetation were lost between 1938 and 1979. A study by the University of Maryland to determine the reason for this loss along with experimental management practices conducted by the refuge indicated that water level is a critical factor in marsh survival. (Section D.5) Experimental dredging and transplanting proved successful in restoring a small portion of the marsh, so the operation was expanded.

Dredging with a Mudcat suction dredge continued for the third consecutive year. Material from the silted-in Little Blackwater River channel was pumped into straw bale containment barriers placed on formerly vegetated areas near the river channel. Plots are usually one--three acres in size and filled with an average of six inches of pumped fill. Plots are adjacent to one another and linked to patches of live three-square whenever possible. Once a plot was filled, three-square bulrush was transplanted to it. Three-square was dug from road side ditches, cut into one--four pound clumps, transported by boat and hand planted in the plots at a spacing of approximately four feet apart. YCC enrollees provided much of the "manpower" on this labor intensive project.

Emphasis was placed this year on transplanting vegetation to stabilize previously dredged plots. Five acres received transplanted vegetation this year bringing the project's three year total to eight acres. Five additional acres were also filled with dredged material this year as well as some topping off of plots started last year. A total of twenty acres over the past three years have been filled.

Pumping dredge material into straw bale containment barrier 82-F-15 KF

Dr. Sarah Taylor, Maryland Department of Natural Resources, and Maryland State Senator Fred Malkus were given an inspection tour of the marsh restoration project by Refuge Manager Schroer. They were so impressed with the operation that the State contributed $5,000 to continue the efforts.

In June James Brewer, a soil scientist with SCS, classified some refuge marsh soils and tested ph levels. His sampling included the dredged material on the restoration sites. Findings suggested that dredge fill sites not be raised to elevations that prevented regular tidal inundation. Because of the high sulfur content, extended oxidation would decrease surface ph to levels extremely low for any kind of plant growth. Our means of transplanting three-square bulrush involved taking a volume of soil with the plants and setting the roots to a depth of several inches where ph levels would be higher. The transported soil around each root mass served as an additional buffer which reduced plant stress and increased successful transplants.

Our findings also indicated that earlier transplants in April through early July were more successful than those done later in July and early August. Unfortunately our main labor force (YCC) is only available July--August!

Three-square transplanted in 1982 marsh restoration project
83-H-10 WK

Three-square transplanted in 1983 marsh restoration project
83-H-14 WK

Five freshwater impoundments makeup a total of 243 acres. These impoundments are adjacent to brackish marshes and refuge croplands providing excellent resting and feeding areas for waterfowl. Management consists of spring and summer draw downs to encourage growth of natural foods and enable planting of approximately 100 acres of supplemental foods such as Japanese millet, sorghum, and buckwheat. Reflooding starts in September by holding runoff and precipitation.

Waterfowl in milo in Pool 3 83-J-23 MC

Fall water levels in the impoundments were low when waterfowl began arriving in September and October; however, despite the dry conditions, use of the pools by ducks and geese was heavy and most of the food was consumed by the end of December. By late December all pools were at the desired levels due to the 7.98 inches of rain received throughout the month.

3. Forests

In early summer, defoliation by the European pine sawfly occurred in approximately 500 acres of loblolly pine for the second consecutive year. While defoliation appeared to be more severe than in 1982 the trees were able to put on a second growth of needles. Heavy spring rains provided moisture which mitigated the additional stress of the summer drought.

A $292,000 Jobs Bill project for endangered species habitat improvement was initiated this summer. Refuge staff designated treatment area perimeters in July and August. The professional services of Mid-Atlantic Forestry Services was contracted to selectively mark approximately 1,000 acres of forest for timber stand improvement (TSI) to benefit the Delmarva fox squirrel and bald eagle. Marking started in September and was completed in late October. Spicer Lumber Company was contracted to perform the actual TSI which commenced in December. Completion is anticipated by summer of 1984, however, only approximately 850 acres of the 1,000 acres marked will actually be treated due to limited funds. Efforts will be located in higher priority areas. A third contract was awarded to Keystone Construction Company to cut and remove timber on six miles of sixty foot wide clear cut strip openings. Extremely high tides in late October inundated much of the forested area preventing the start of this phase of the project. This phase is anticipated to start in early summer of 1984. The final aspect of the project will be to contract a dragline in 1984 to remove stumps and dig drainage ditches along the sixty foot clear cut strips. The refuge will eventually grade these openings and maintain them with perennial grasses.

Approximately 15 acres of loblolly pine forests were prescribed burned to reduce fuel accumulations and retard the growth of perennial grasses and shrubs. These areas are forest edges which border the marsh. Burning these areas every three years also enhances them for the endangered Delmarva fox squirrel which prefers a more open understory.

4. Croplands

A total of 332 acres of croplands on the refuge were planted under 2 cooperative farming agreements: 111 acres of corn, 125 acres of soybeans, 78 acres of sorghum, and 18 acres of millet. The refuge's share of 20 percent was converted to 6 acres of standing corn, 22 acres of standing sorghum, 18 acres of standing millet, 650 bushels of shelled and dryed corn, and 58 acres of millet seedbed preparation.

The six acres of corn were left standing in two three-acre plots adjacent to refuge woodlots for the Delmarva fox squirrel. Eight acres of sorghum were left adjacent to another woodlot for the squirrels also.

Refuge staff planted an additional 73 acres of millet in Pool 3 and 10 acres of buckwheat adjacent to the visitor center. YCC hand seeded 7 acres of millet in wet areas of Pools 1, 3, and 5. Drought conditions prevented millet planting in the slightly higher areas of Pool 5.

Because of the extremely hot and dry summer, refuge corn yielded only 60 bushels per acre. Soybeans and sorghum, which appear to be better able to withstand drought conditions, had average yields. Millet and buckwheat production was also average.

Fifty acres of fescue fields were maintained for goose browse. These fields were mowed in spring and top-dressed with 200 pounds per acre of 10-10-10 fertilizer and again in the fall with 200 pounds per acre of ammonia nitrate. This provided an excellent browse crop for geese in fall and winter.

Ten acres of ladino clover on McGraws Island were reseeded in late February, mowed and top-dressed with 200 pounds of 5-10-10 fertilizer in May resulting in good duck nesting cover. Summer drought conditions setback growth in July and August, however, fall rains produced good growth for goose browse.

Two small fields at the Luthy tract (10 acres) and the Jarrett tract (5 acres) were established as woodland openings or food plots for the Delmarva fox squirrel. The refuge staff worked up, limed, seeded in a grass mixture of orchard grass, fescue, lespedeza, and ladino clover with a buckwheat and millet nurse crop in July. These fields were fertilized and top-dressed in August resulting in excellent seed production with good grass growth.

Distribution of shelled corn to other stations for banding included:

Chincoteague NWR - 125 bushels
Maryland Department of Natural Resources - 60 bushels
Glen L. Martin NWR - 50 bushels
Tinicum Environmental Center - 20 bushels

9. Fire Management

A total of 3,236 acres of marshland were prescribed burned December 1982 through March 1983. Burning is carried out to maintain healthy stands of three-square bulrush and remove fuels from potential wildfires escaping from adjacent annually burned private and State owned marshes. Three loblolly pine margins totaling 15 acres were prescribed burned to reduce litter and prevent wildfire from spreading into woods not intended to be burned. Due to the excessive rainfall during the winter period woodland burns were only about 50% successful. However, most of the accumulated fuels near the marsh--woods edge were removed.

Burning was done when environmental conditions were suitable for a safe and thorough burn that would not damage the habitat. Cooperation with landowners was maintained to integrate burning activities on adjacent areas.

No wildfires were reported during the year.

10. Pest Control

Grass and broadleaf weed control on croplands was carried out by the two cooperative farmers. All pesticide applications on the refuge were monitored by Biological Technicians Willey and Giese, who are

certified applicators. The following selective herbicides were applied as crops were planted:

111 acres of corn - AAtrex (atrazine)
149 acres of soybeans - Dual and Lorox
40 acres of soybeans - Blazer and Bassagram
40 acres of sorghum - Dual and AAtrex (atrazine)

An application of Lorsban during planting for control of cutworms was made on 111 acres of corn.

Pramitol was applied in granular form by refuge personnel to control vegetation in refuge parking lots. Roundup was used for spot treatment of small areas of Johnson grass in refuge fields in accordance to Maryland laws. Roundup was also applied to the interior of the goose holding pen to control vines and small brush.

Muskrat, nutria, fox, and raccoon were trapped by permittees for population control to prevent serious damage to marsh, dikes, roads, ease predation on nesting waterfowl, and reduce disease potential. (Section G.8)

G. WILDLIFE

2. Endangered and/or Threatened Species

Three endangered species utilized the refuge this past year. The bald eagle (Haliaetus leucocephalus), a year round resident, nested on the refuge along with some wintering of northern birds. The Delmarva fox squirrel (Sciurus niger cinereus), a native species, maintained a healthy breeding population. The Arctic Peregrine falcon (Falco peregrinus tundrius), however, was no more than a transient, stopping off briefly during migration.

The annual mid-winter eagle survey conducted on January 7 totaled 16 bald eagles (12 adults and 4 immatures). Low numbers are attributed to poor viewing conditions. In May, the refuge staff assisted the National Wildlife Federation's eagle banding team in locating and getting to nests on the refuge and in the vicinity. Two eagle chicks were banded on the refuge and nine adjacent to the refuge. For comparison, the following table shows nesting success over the past five years:

Refuge/Adjacent to Refuge

	No. Active Nests	No. Productive Nests	No. Young
1983	2/8	1/6	2/11
1982	4/5	2/3	3/7
1981	4/6	1/4	2/7
1980	6/5	1/5	2/6
1979	6/3	2/3	3/6

Bald eagle off Wildlife Drive 80-I-35 JDS

The refuge population averaged 30-35 birds and peaked at 45 in late June. Total use-days were 13,040 compared to 13,250 last year.

On December 2 an injured adult bald eagle was recovered five miles north of the refuge and taken to the Patuxent Wildlife Research Center. It had a severely broken wing which had to be amputated. Lab investigation ruled out a gun shot wound, but the cause of injury remains unknown.

On December 14 Patuxent released a rehabilitated immature bald eagle on the refuge. This bird was suspect to secondary poisoning and is presently being investigated. The bird was originally found in Berlin, Maryland.

Three commercial fishing permits were issued in FY 1983 for November 1982 through May 1983 and three permits in FY 1984 for November 1983 through May 1984. Most of the fishing was done February--April. A total of 6,581 pounds of white perch, catfish, striped bass, eels, carp, and mud shad were harvested in FY 1983. Trash fish, such as carp and mud shad, were placed by the fishermen in designated areas on the marsh to provide a steady source of food for eagles during the nesting season.

Blackwater supports one of the largest remaining populations of the Delmarva fox squirrel which formerly ranged from southeastern Pennsylvania through the Delmarva Peninsula to Northampton County, Virginia. Presently, the squirrel is found in seven counties on Maryland's Eastern Shore (three counties were added in the past four years through recovery team transplants), Chincoteague NWR in Virginia (reintroduced in the late 60's), and state land in Northampton County, Virginia (summer 1982). The refuge population is presently estimated at 550.

Delmarva fox squirrel along Wildlife Drive 83-I-20 VM

Biological Technician Guy Willey served as a member of the Delmarva Fox Squirrel Recovery Team. He attended planning meetings and consulted with private landowners to provide management recommendations. In cooperation with the recovery program, the refuge assisted with live trapping ten squirrels from private lands adjacent to the refuge which were then transplanted to Kent County, Maryland.

A $292,000 Jobs Bill project was initiated for timber stand improvement on approximately 1,000 acres which will improve habitat for both the Delmarva fox squirrel and bald eagle. (See Section F.3)

In September two sightings of migrating Peregrine falcons were made. Although sightings are rare, they are usually an annual occurrence.

Although sightings of the red-cockaded woodpecker have not been confirmed since 1976, the refuge maintains suitable habitat for the species. In June, Biological Technician Willey and State Biologist Gary Taylor investigated recent reported sightings on and adjacent to the refuge. No woodpecker activity or sightings were confirmed.

3. Waterfowl

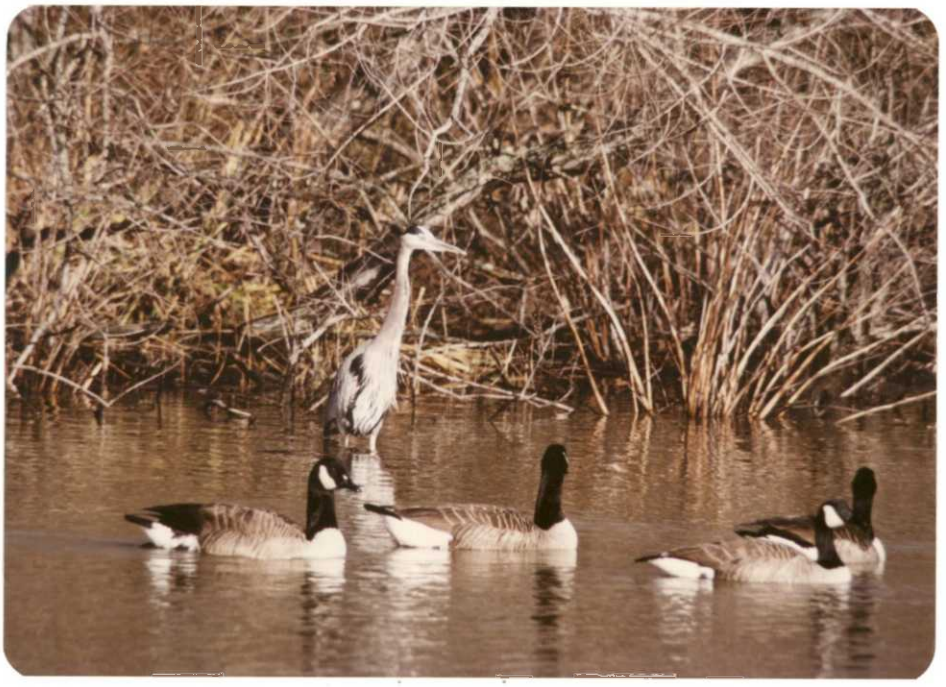
Total use-days in 1983 for ducks, geese, swans, and coots were 7,927,955. This is a decrease of 1,215,108 use-days from 1982, but 767,292 more than 1981.

	Use Days		
	1983	1982	1981
Ducks	2,244,291	2,779,110	1,952,835
Geese	5,629,589	6,320,340	5,164,235
Swans	50,400	40,330	39,165
Coots	3,675	3,285	4,430
Totals	7,927,955	9,143,065	7,160,665

Pintails in Pool 3 impoundment 82-0-13 JDS

Waterfowl populations generally start building in September, peak October through November, and drop-off to a wintering population in December. Numbers fluctuate some January through February depending on weather conditions and availability of open water. In March, spring migrants start adding diversity more than numbers to the inventory.

Early in January 25,000 Canada geese, 3,000 snow geese, 600 tundra swans, and 7,200 ducks (5,000 mallards, 800 pintails, 700 blacks, 200 green-winged teal, and 500 other various species), were wintering on the refuge. Spring migrants were noticed February through March as numbers increased and then dropped off later in March. Spring peaks included 30,000 Canada geese, 3,000 snow geese, 500 tundra swans, 8,000 mallards, 500 blacks, 2,000 pintails, 1,500 green-winged teal, 1,000 blue-winged teal, 500 widgeon, and 500 gadwall. By late April numbers stabilized to a small summer population.



Could you tell us how to get to Horicon? 83-C-4 JDS

A small flock of 250 resident Canada geese, made-up primarily of off-refuge hunting cripples and their mates, produced 15 young compared to 50 in 1982, 25 in 1981, and 55 in 1980. The flock averages 150-250 from year to year with 10-15 breeding pairs.

Approximately 1,700 (15 percent less) ducks inhabited the refuge during the summer compared to 2,000 last year. Total production was 22 percent below last year. Production for 1983 (1982) by species was: wood ducks 300 (400), black ducks 200 (175), mallards 100 (150), blue-winged teal 75 (100), and gadwalls 25 (75).

First arrival of Canada geese appeared in late September which was two--three weeks later than last year. They peaked at 60,000 in late October compared to a peak of 65,000 in late November 1982. Numbers began dropping in early December so by late December there were only 23,000. Lesser snow geese (60 percent blue phase) had a peak of 3,000 in January--February which was a carry-over from the previous fall. In early November a fall peak of 3,000 was also obtained. These birds were still on the refuge at the end of December. Four white-fronted geese were here in January and peaked at eight in February and three were seen in early November remaining through December. Tundra swan peaked at 600 in January and were gone by late March. In November 500 swan were counted and remained through December.

Like Canada geese, ducks also showed a decrease from last year with a peak of 21,000 in mid-October compared to 24,400 in mid-October 1982. Major species peaked as follows in 1983 (1982): mallards 8,500 (12,000), black ducks 1,000 (1,500), pintails 8,000 (8,000), widgeon 2,000 (3,000), green-winged teal 5,000 (5,000), blue-winged teal 3,000 (5,500), gadwalls 500 (1,500), and wood ducks 1,000 (1,200).

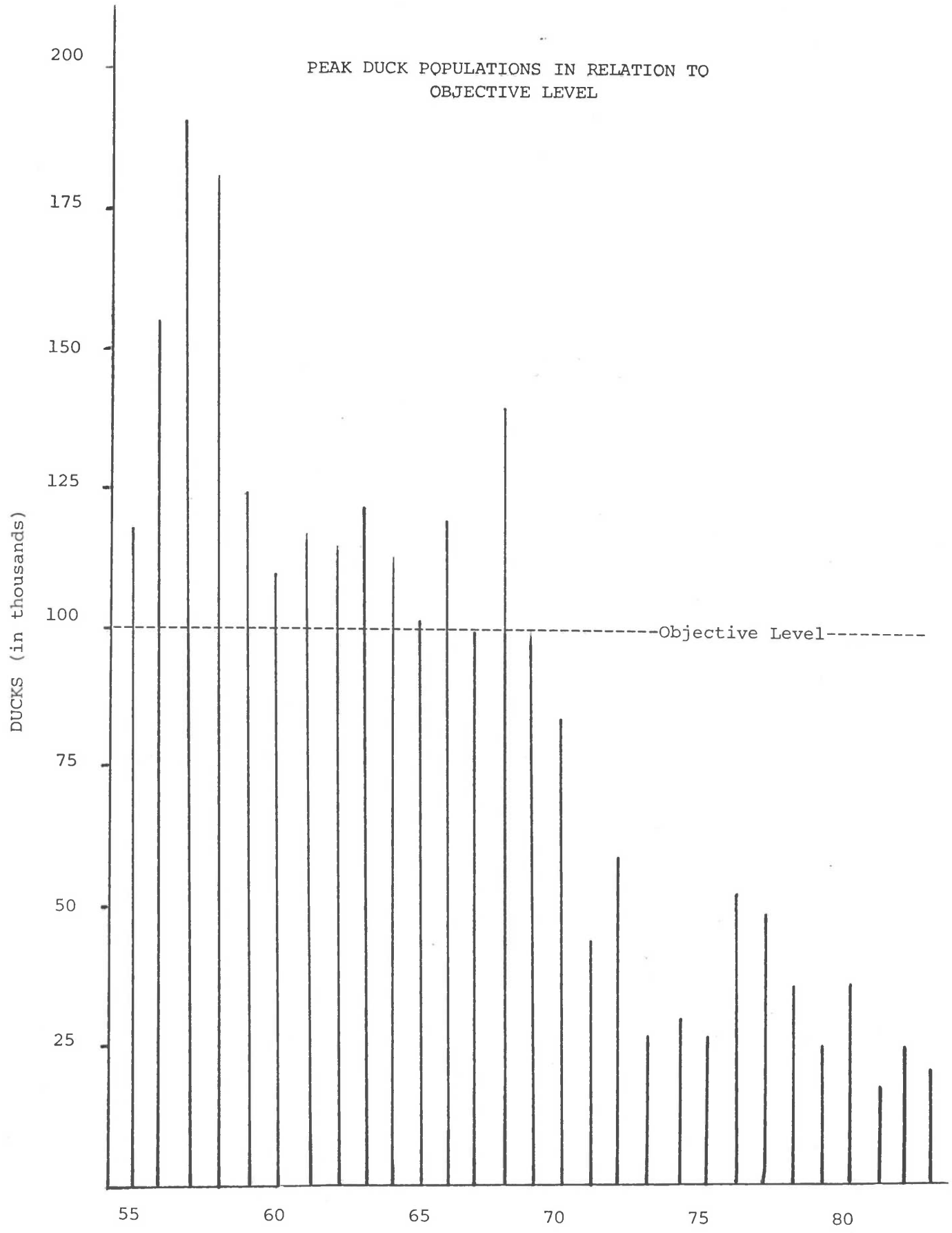
Although refuge impoundments were suffering from the fourth consecutive year of drought going into the fall, they were approximately half full and had a good abundance of supplemental foods such as millet, sorghum, and buckwheat. (Section F.2) This combination of food and water attracted up to 70 percent of the refuge waterfowl population in October. Birds eventually dispersed as food supplies depleted.

4. Marsh and Water Birds

With the scheduled summer draw down of impoundments, heavy use of shallow areas was made by herons and egrets providing some excellent viewing and photographic opportunities for refuge visitors.

Total annual use-days were 294,045 compared to last year's 218,455. The greatest abundance and variety of herons and egrets occurred in late August and September when young of the year from off-refuge rookeries moved onto the refuge. Peak numbers of the more abundant species were: great blue herons 300, great egrets 500, cattle egrets 300, snowy egrets 800, tricolored herons 100, green-backed herons 100, black-crowned night herons 50, glossy ibis 50, pied-billed grebe 75.

PEAK DUCK POPULATIONS IN RELATION TO OBJECTIVE LEVEL



Other species with a peak of less than 50 included: little blue herons, yellow crowned night herons, American bittern, and least bittern. Double crested cormorants peaked at 100 in April.

5. Shorebirds, Gulls, Terns, and Allied Species

The total use-days for 1983 were 2,374,240 compared to 1,703,700 in 1982. Increases were noted in shorebird, gull, and tern species. The increases were primarily attributed to the marsh restoration operation. (Section F.2) Dredge fill plots provided shallow impoundments teeming with small fish and invertebrates throughout the summer and fall. Lack of precipitation through much of the summer and fall also provided many shallow areas in refuge impoundments. With the mild fall weather many shorebirds remained in the area longer. Species occurring in the greatest numbers with their peak for this year were: herring gulls 800, laughing gulls 1,500, greater yellowlegs 1,000, lesser yellowlegs 500, ring-billed gulls 1,000, sanderlings 5,000, dunlins 5,000, least sandpipers 5,000, semipalmated sandpipers 300, pectoral sandpipers 600, short-billed dowitchers 400, common snipe 800, killdeer 300, woodcock 400, common terns 800, and least terns 1,000.

A least tern colony nested on the roof of the Cambridge South Dorchester High School, located 7 air miles from the refuge, with an estimated 600 adults produced 150 young compared to an estimated 1,000 adults producing 400 young in 1982.

6. Raptors

A total of 111,355 use-days were recorded compared to 126,730 for 1982. This figure does not include the bald eagle and Peregrine falcon. (Section G.2) Some of the more common species found on the refuge were osprey, northern harrier, American kestrel, great-horned owl, barred owl, screech owl, and turkey vulture. Sightings of an adult and immature golden eagle were made January through March and October through December.

The first osprey sighting of the year was on March 13 and the last in early September. These birds always arrive within several days of the same time each year. The population peaked at 50 birds in July compared to 45 in 1982. Out of 17 nests, 8 were successful producing 16 young compared to 14 young produced in 1982.

7. Other Migratory Birds

Mourning dove numbers were down this year. Peak population occurred in September with 800 birds and 73,000 use-days compared to a peak of 700 in December 1982 with 84,700 use-days.

Ospreys on platform 81-G12 KF

8. Game Mammals

Trapping furbearers on the refuge is done to protect the marsh, dikes, roads, and nesting waterfowl. Approximately 5,000 acres are divided into 13 units which were awarded to the highest bidders in November 1982 for the trapping season December 1, 1982 through March 15, 1983. The sum of $10,129.10 in bids was received compared to $12,678.72 the previous year. Only 10 trappers bid on units for the 83-84 season bringing in $7,257.97 in bids. Interest was lower than the previous year because of the predicted lower fur prices.

Of the animals trapped, muskrat was the most abundant and sought after species. November muskrat surveys produced the following population estimates:

	Muskrat	Nutria
November 1981	15,750	500
1982	14,300	500
1983	18,555	1,000

Reported harvests were:

	Muskrat	Nutria	Raccoon	Fox
December 1981 - March 1982	4,474	20	75	0
December 1982 - March 1983	4,135	13	109	7
December 1983 - March 1984	*	*	*	*

*Data not yet available

Otter, a species legally trapped throughout the state, was protected on the refuge. The population of 30 appears to be remaining stable.

An abundance of food and cover provided ideal conditions for eastern cottontail rabbits. A peak population of 700 was estimated.

The eastern gray squirrel population was estimated at 400 compared to 500 in 1982. TSI operations (see Section F.3) enhance squirrel habitat but favors more the Delmarva fox squirrel's habitat preferences.

The refuge white-tailed and sika deer populations were estimated at 550 and 650 respectively. These estimates were reported for 1982 and 1981 with 1980 estimates of 650 white-tailed and 500 sika. Observations, refuge deer counts, and off-refuge kill data continue to confirm increasing sikas in areas where only white-tailed were formerly found. Areas being taken over by sikas tend to be the lower, wet marsh and swamp habitats; however, sika habitat seems to be expanding also into more upland areas.

10. Other Resident Wildlife

Bobwhite quail were estimated at 1,000 birds in September compared to 900 last year. In quail habitat, food and cover were abundant.

Although no sightings were reported, evidence of small numbers of wild turkeys were found adjacent to the refuge. These birds are suspected to be a vestige of a stocking effort in 1967.

Five special use permits were issued for the removal of snapping turtles from impoundments and the open marsh to ease predation on waterfowl. Five trappers removed 128 turtles totaling 1,114 pounds. Other turtle species, such as diamondback terrapins, painted turtles, and red-bellied turtles, were occasionally caught, but released.

13. Surplus Animal Disposal

Furbearers were trapped on 13 units by permittees. (Section G.8)

15. Animal Control

Control of furbearers and snapping turtles are discussed in other sections. (Section G.8 and G.10)

16. Marking and Banding

The refuge had no pre-season banding quota; however post-season quotas on mallards and black ducks were assigned. Banding operations started on the last week of January and ran through February. The mallard quota was exceeded but warm weather prevented meeting the quota on black ducks. Trapping success was as follows:

Species	Quota	Banded	Totals
Mallard	200 male	339	643
	200 female	304	
Black duck	75	57	57
Green-winged teal	--	6	6
Pintail	--	95	95
Total			801

The refuge had no quota on Canada geese for the 1983 post-season banding, however, the Maryland Department of Natural Resources requested asssistance with their quota. A single rocket net shot was made on February 24 in the Pool 1 area netting a total of 221 birds (99 males and 122 females).

Biological Technician Giese assisted Mason Neck NWR personnel in setting up a rocket net on a Mason Neck marsh for use in a black duck trapping operation on March 5.

In May and June, refuge personnel assisted the National Wildlife Federation's bald eagle banding team in locating, obtaining private landowner permission, and getting to nests on and adjacent to the refuge. The team banded two eaglets on the refuge and nine from nests adjacent to the refuge.

During November and December, refuge personnel rocket netted, leg banded, and neck collared 450 Canada geese under the special Atlantic Flyway Canada goose study.

17. Disease Prevention and Control

Muskrat, nutria, and raccoon trapping is conducted on the refuge to protect the marsh, dikes, roads, and nesting waterfowl. (Section G.8) This annual harvest also maintains populations at healthier levels helping to ensure against disease outbreaks.

In cooperation with the National Wildlife Health Lab's DVE study, oral and cloacol swabs were taken from 150 mallards and black ducks.

Frank Hughes applies neck collar to Canada goose in the collaring/ banding goose study
83-G-25 WK

Neck collared Canada goose 84-A-1 MC

H. PUBLIC USE

1. General

Total use for calendar year 1983 was 100,954 visits which represents a 6 percent increase over 1982. This increase in public use is likely due to the increase in publicity and the unusually warm temperatures during the fall. The peak public use months are usually October, November, and December due to the attraction of waterfowl concentrations.

The graphs on the following pages compare total visitation over the last 10 years and total visitation by month for 1983.

2. Outdoor Classrooms - Students

The peak months for visits by schools are October, November, May, and June. This year a total of 2,089 students used the refuge for a total of 2,648 activity hours. This figure represents an 18 percent increase over 1982.

Since its establishment in 1982, the Environmental Education Committee (EE) of Dorchester County has demonstrated progress in its concern for environmental education. The multi-agency committee, in which Blackwater plays an active role, supplied a collection of EE materials for a group of teachers in Dorchester County. An overall integrated environmental education plan was developed by these teachers for the county school district. With the approval of the committee members, Blackwater was designated as the study site for outdoor classroom activities. Specifically, programs for the fourth and seventh grades were identified on the refuge. During this fall, several schools in the district visited the refuge utilizing the various EE activities developed in the plan. This organized push for outdoor classrooms has been a long time in coming, but it appears to be worth the wait.

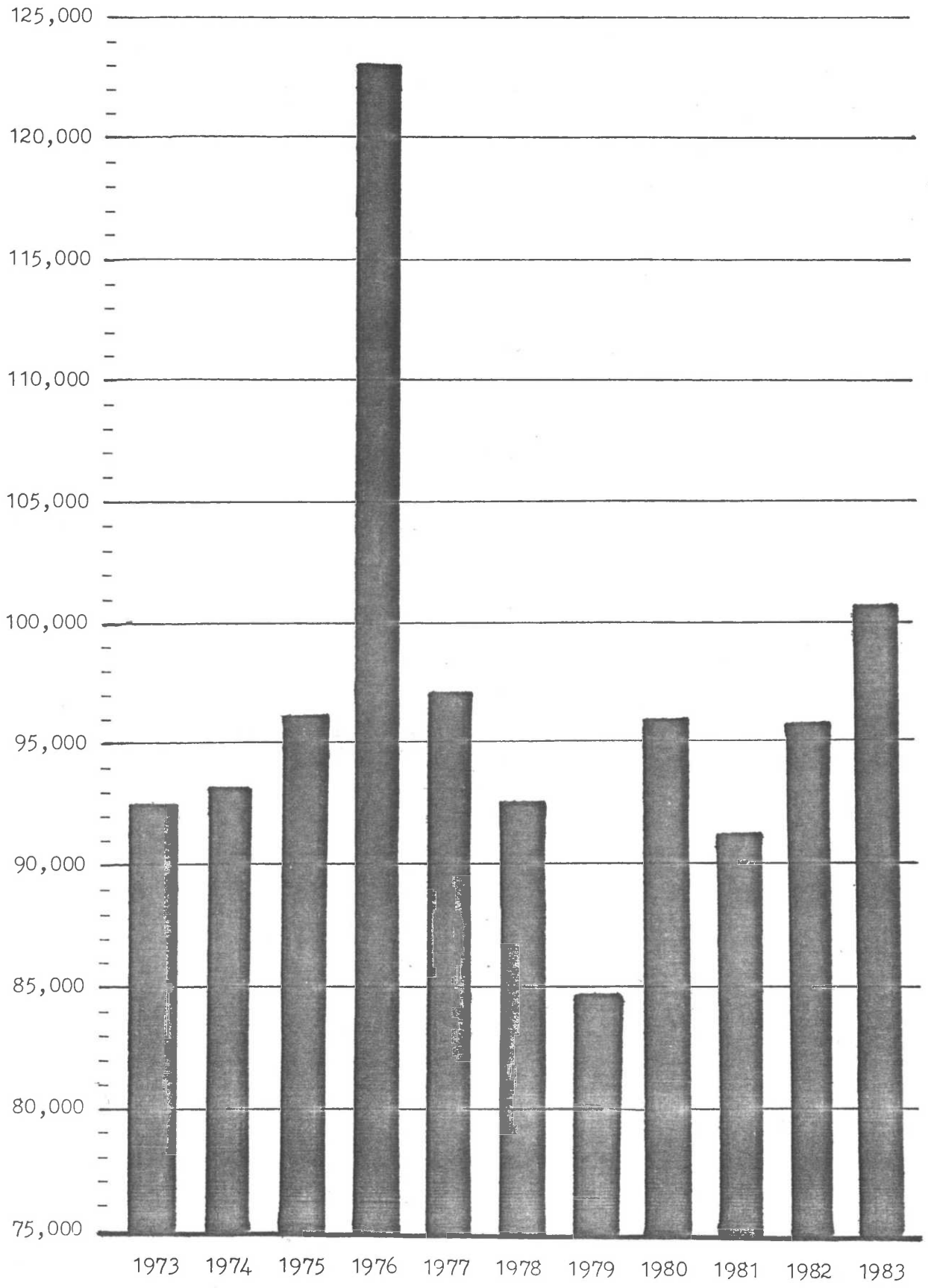
Regular committee meetings have been scheduled in order to continue the promotion of environmental education in the community and to recommend EE programs to the Board of Education and other agencies.

3. Outdoor Classrooms - Teachers

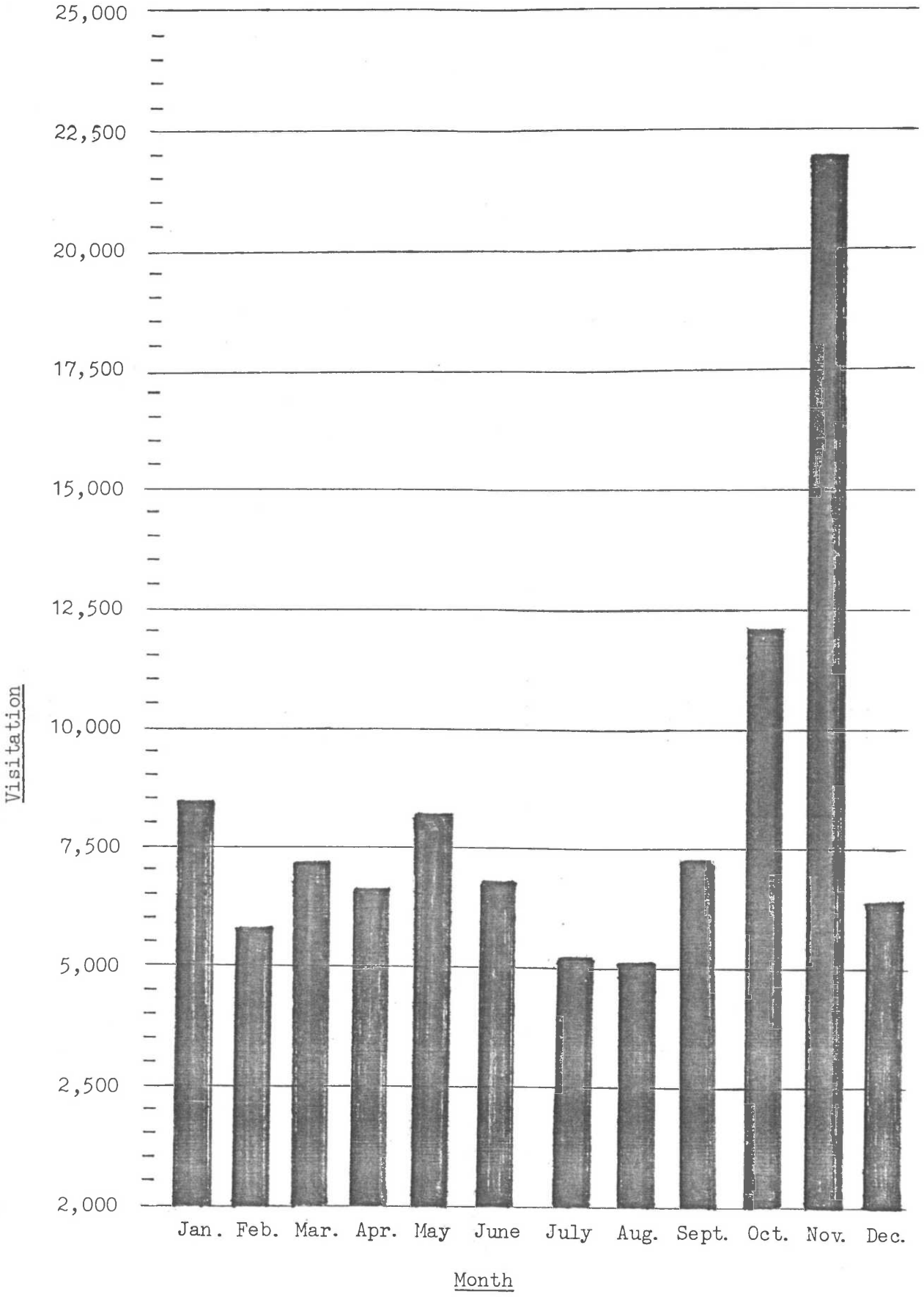
Two environmental education workshops were held at Blackwater this year. A total of 16 teachers participated accounting for 90 activity hours. Although this figure is considerably low compared to last year, interest to participate in future workshops has been expressed by the Dorchester County Board of Education.

A relatively new environmental education program, 'Project Wild,' was developed for wildlife educators. Project Wild provides the use of a free learning guide for teachers, conservationists, and other environmental educators. The guide contains a variety of environmental education activities meeting curriculum needs, learning skills, and are grade specific. Although affiliated with state wildlife agencies, Service personnel who attend a Project Wild workshop become certified as

TOTAL VISITATION 1973-1983



TOTAL VISITATION BY MONTH FOR 1983



"facilitators," which entitled them to free use of EE materials supplied by the program.

Recreation Assistant Heather Nicklas attended a Project Wild workshop in Fairfax, Virginia September 26, 27, 1983. A teacher workshop is planned for the coming year.

4. Interpretive Foot Trails

Blackwater offered the use of two foot trails, the Marsh Edge Trail (one-third mile) and the Woods Trail (one-half mile). Both trails provide an excellent opportunity for visitors to explore areas of the refuge by foot. A total of 14,800 visitors walked the trails on their own and 625 were given guided walks. Compared to last year, these figures show a 7 percent increase in usage by visitors and a 42 percent increase in guided walks.

5. Interpretive Tour Routes

A five mile Wildlife Drive offered visitors views of woodland, fresh and brackish marsh, fields, and croplands. Visitor use peaked in the fall with the concentrations of waterfowl making the Wildlife Drive a main attraction. It provided an excellent opportunity for viewing and photographing wildlife. A total of 80,475 people drove around the facility which is a 4 percent increase over last year. Of this total, 1,895 were given guided tours.

6. Interpretive Exhibits/Demonstrations

This year a collection of new photographic exhibits were arranged in the visitor center auditorium. The displays were wildlife oriented and appropriate to the Blackwater area. Every six months the displays were rotated so that participation by new photographers was possible.

During the year, refuge personnel continued their involvement with a variety of community programs and Service related functions.

In Salisbury, Maryland exhibits were set up for Annual Zoo Appreciation Day and the Waterfowl Carving Festival sponsored by the Ward Foundation. A System 70 FWS exhibit and a modified photographic section of Blackwater were on display during these two events.

The annual Easton Waterfowl Festival was held during November 11-13, 1983 in Easton, Maryland. A combined exhibit representing the U.S. Fish and Wildlife Service and BLM was setup by Washington personnel and tended by Blackwater personnel. 'Wetlands for Waterfowl' was the overall theme and nearly 3,000 people viewed the exhibit.

Vidal Martinez provides information to interested passers-by during Salisbury Annual Zoo Appreciation Day 83-I-15 VM

'Waterfowl for Tomorrow' was a part of the overall theme, 'Wetlands for Waterfowl,' exhibited at the annual Easton Waterfowl Festival 83-G-26 VM

On December 6, 7, and 8 Service personnel from Blackwater, Bombay Hook, and Mason Neck Refuges attended a governor's conference in Fairfax, Virginia. The conference pertained to a five year study of the Chesapeake Bay region. Individuals from these refuges served as information personnel with exhibits setup by the U.S. Fish and Wildlife Service at George Mason University.

7. Other Interpretive Programs

A total of 7,580 people were shown wildlife films in the visitor center auditorium. This figure is a 3 percent increase over last year. The films shown were So Little Time, At the Crossroads, America's Wetlands, and The Predators. Each film was shown twice on a daily basis and was also shown to scheduled groups.

Off-refuge appearances totaled 22 for the year. These programs generally took the form of slide/talk presentations to local schools and organizations.

National Wildlife Week was celebrated during March 21-25 and programs were presented to almost 2,200 students and teachers in Dorchester County.

A series of 12 40-minute classes on wildlife conservation with 2 classes per week were presented in the spring and again in the fall at South Dorchester school.

8. Hunting

The last refuge deer hunt was in 1972. A revised and updated deer hunt plan was initiated and will be submitted early in calendar year 1984.

9. Fishing

Interest in recreational fishing increased on the refuge this year. Approximately 7,200 activity hours were spent on sport fishing and 1,115 hours on crabbing. These figures indicate an increase of 20 percent and 10 percent respectively from last year's figures.

The refuge waters were open to boating between April 15 and October 15. A popular location for crabbing and fishing was the Little Blackwater River bridge. Fish caught included catfish, white perch, largemouth bass, crappie, pickerel, striped bass, and bluefish.

11. Wildlife Observation

Wildlife observation is the primary goal for the majority of the refuge's visitors. While many of the visitors stop at the visitor center, their eagerness to continue on to get a little closer to wildlife attests to the use of the foot trails and observation tower.

Total refuge visits for wildlife observation by foot, car, and boat were 53,700 which is a 7 percent increase over 1982. These visits took the form of walking on the trails, using the observation tower, and photography (see Section H.5).

17. Law Enforcement

Refuge enforcement personnel made periodic patrols during the year to curtail violations such as littering, poaching, trespass in closed area, and to enforce provisions of special use permits. Littering and vandalism of refuge signs continued to be a problem during the year.

Biological Technician Giese assisted FWS special agents with Migratory Bird Treaty Act enforcement during the 1983 waterfowl season in Maryland, Virginia, and Delaware.

Biological Technicians Willey and Giese assisted Eastern Neck personnel on November 12, 14, and 17 with management of the shotgun deer hunt and several cases were made.

Refuge personnel conducted night patrols prior to and during the Maryland firearms deer season in November. Three individuals were apprehended by Biological Technician Giese and Special Agents Kuncir and Ricker for spotlighting refuge fields with a firearm in possession. The case was processed through State court and was heard on December 15 with 3 individuals being found guilty and fined $250.00, 5 days community service, 2 years active probation, 2 years no hunting each, and forfeiture of a rifle, shotgun, ammunition, and spotlight.

Biological Technician Giese assisted Maryland Natural Resources officers periodically during the fall with night lighting cases adjacent to the refuge.

Biological Technician Giese carried out periodic patrols during waterfowl season in areas adjacent to the refuge boundary. Several baited areas were noted and turned over to special agents of the Cambridge office. The following violations were cited:

Violation	Number	Disposition
Unplugged gun	1	Pending
Take ducks in closed season	1	Pending
Take black duck in closed season	1	Pending
Take waterfowl with 00 buckshot	1	Pending

All refuge law enforcement personnel completed the 40 hour refresher law enforcement training at either Montezuma NWR or in Richmond, Virginia.

Refuge law enforcement personnel completed the semi-annual pistol qualification on May 25 using the Cambridge City Police range and again during refresher law enforcement training sessions.

Recreation Assistant Kathryn Freeburger attended the nine week law enforcement class at Glynco, Georgia April 21 through June 22.

18. Cooperating Associations

A cooperative association agreement was signed June 1979 with the Eastern National Park and Monument Association (ENPMA). The book sales outlet is located in the visitor center and has been in operation since October 7, 1979.

New items were introduced during the year and sold very well. Included in these items were wildlife prints of a bald eagle, white-tailed doe, great horned owl, and a cottontail rabbit. A total of 971 books and 350 prints were sold producing $5,673.46 in gross sales. This total was an increase of approximately 35 percent compared to last year's figure.

Donations this year totaled $500.00 from ENPMA. This donation paid the cost for the re-printing of the Wildlife Drive Guide leaflet.

To enhance visitor service and provide a more accurate means for handling all cash transactions, ENPMA intends to install a small cash register at the sales outlet. A small safe will also be provided to ensure greater security.

I. EQUIPMENT AND FACILITIES

3. Major Maintenance

Two miles of roads/fire lanes were graded with the Eastern Neck NWR road grader.

Ten thousand dollars worth of crushed stone was purchased late in FY 1983 for top-dressing service roads and fire lanes.

4. Equipment Utilization and Replacement

The mudcat dredge was lifted to dry-dock at the refuge boathouse with a rented crane where it was scraped of barnacles, sandblasted, and re-painted with anti-fouling paint. Other maintenance and repairs were also completed before the machine was put back in the water and moved back to the marsh restoration work site.

A new 12 foot disk was purchased for use in the farming program.

A replacement station wagon was requisitioned, but delivery was not made during the year.

5. Communications Systems

During early September lightning struck the radio antenna at headquarters causing extensive damage to the base station and antenna. The base was repaired and a new antenna installed. Measures were also taken to protect the system from a future lightning strike.

6. Energy Conservation

At the headquarters building, 3-M plastic storm window kits were applied over the drafty and cold aluminum framed storm windows.

Two vertical air circulators were installed at headquarters since cold concrete floors and ceiling heat vents are a poor combination for staffers sitting at a steel desk below the thermocline! A savings in heating fuel and employee productivity should be noted.

Two large ceiling fans were installed on high ceilings of Quarters I to improve heating efficiency.

J. OTHER ITEMS

1. Cooperative Programs

The refuge staff was involved with the Delmarva Fox Squirrel Recovery Team by assisting with squirrel transplant operations. Biological Technician Willey served as a member of the team and assisted with locating areas suitable for transplanting squirrels and obtaining landowner's permission to trap squirrels from their land.

Refuge personnel assisted in aerial eagle nest surveys and banding of eaglets on and adjacent to the refuge as part of a cooperative effort between the National Wildlife Federation, State, and FWS.

In cooperation with the State of Maryland, Biological Technician Willey served as chairman of the Maryland Trapping Advisory Committee in 1983. A meeting was held in February in Annapolis, Maryland. At this time, the committee reveiwed proposed new laws and regulations regarding trapping and hunting of furbearers and had a discussion on rabies in Maryland and possible methods for control. The committee recommended a regulation to stop movement of live animals both in and out of state which the Department of Natural Resources adopted later in the year.

Blackwater, in cooperation with the U.S. Forest Service, placed 10 gypsy moth traps over the refuge in June. A small number of gypsy moths were found when the traps were collected in early September. No egg masses have yet been found on the refuge. Monitoring will continue next year.

2. Items of Interest

On January 14, Refuge Manager Schroer conducted a refuge tour for Mr. Craig Potter, Deputy Assistant Secretary of Fish and Wildlife and Parks, Ms. Susan Recce, Special Assistant to the Assistant Secretary of Fish and Wildlife and Parks, Mr. Robert Gilmore, Deputy Associate Director of Refuges, and Mr. Gene Steffen, Chief of Aviation Management.

Mr. Noel Groves, a writer for National Geographic, is working on a book entitled Wildlands for Wildlife. Refuge Manager Schroer gave Mr. Groves a refuge tour March 9 providing him with background information.

Former Manager Schroer and Acting Manager Koch conducted a tour for members of the advanced refuge manager's training class on April 2.

Blackwater hosted six county school superintendents on April 8 for their monthly business meeting. The superintendents were impressed as they toured the visitor center and Wildlife Drive with what Blackwater had to offer to the school systems.

Outdoor Recreation Planner Schmidt and Recreation Assistant Freeburger oriented Stefanie Sagebiel, a science officer for the U.S. Embassy to Cairo, Egypt, and Larry Mason, Chief of International Affairs, on April 14. This tour was given to assist Ms. Sagebiel in gathering information about refuges for the Egyptian government to establish a similar system.

Throughout the year Blackwater received many visitors from various geographic locations. One area represented on June 17 was the Peoples Republic of China when six members of the embassy toured the refuge. Acting Manager Koch conducted this two hour tour. Steve Kohl of FWS International Affairs accompanied the group and served as an interpreter.

The fall attracts not only the amateur photographer to Blackwater, but professional film crews and producers also come seeking footage for television specials and movies. The following visited this past year:

The U.S. Fish and Wildlife Service, WO Public Affairs, contracted the making of a public information film on bald eagles. On March 26 Deputy Director of the Division of Fish, Game, and Shell Fisheries of New Jersey, Paul D. McLain, visited Blackwater to begin filming.

Filming for a national news segment on the Migratory Bird Hunting and Conservation Stamp contest was done by Roger Caras, ABC TV, on November 8. World News Tonight aired the film on national television November 9 at 7:00 p.m. and 11:00 p.m.

The FWS has contracted the making of a film honoring the 50th anniversary of the "Duck Stamp." Segments of the film were shot at Blackwater. The film is expected to be available in March-April 1984.

On November 21 and 22, Caroline DiDiego and Leslaw Kuzia obtained film footage on the refuge for a monograph on the Canada goose and for Marty Stouffer's Public TV series, Wild America. The footage will be entitled Wild Refuges.

Belgium, Finland, Great Britain, the Netherlands, Japan, Luxembourg, and Switzerland were represented by seven science attaches and two wives who visited the refuge November 2. Larry Mason, Chief of International Affairs, and Christina Ritsch from the Deputy Director's office, accompanied these representatives. Biological Technician Willey conducted a tour for the entire group.

Acting Manager Koch gave a tour on November 9 for Nick Timenes, Deputy Director of Budget and Josephine Motter, Program Analyst of Policy from the Assistant Secretary's Office of Policy and Budget.

The first Annual Grand National Waterfowl Hunt with associated festivities and business meetings was held during November 13-15. The hunt is intended to promote Dorchester County, Maryland and was considered successful by its sponsors. Celebrities such as motion picture star Dale Robertson; Admiral Thomas H. Moorer (former Chief of Staff of the Navy); Raymond Arnett, Assistant Secretary of the Interior; Congressman John Breavx of Louisiana; John Harrington of President Reagan's staff; former New York Yankee player, Roger Maris; former Washington Redskins player, Chris Hanburger; sports writer, Gene Hill; Robert Mitchum (had to decline but will attend next year); Maryland state treasurer; the presidents of: Ducks Unlimited; National Rifle Association; Grand Ol' Opry; Navy Arms Company; Stephens, Incorporated; Calspan, Incorporated; J. P. Andrews, Incorporated; Trojan Yacht Corporation; vice president of Baretta Arms Company; Airpax board chairman; retired president of Western Publishing Company; an industrialist; and an independent oil producer. The actual hunt was conducted on private property near and adjacent to the refuge. On November 15 Acting Manager Koch welcomed the group and presented a slide talk at the refuge visitor center. Outdoor Recreation Planner Martinez conducted a tour for the wives. Local TV WBOC interviewed Mr. Arnett and some of the celebrities at the visitor center.

Assistant Secretary of the Interior G. Ray Arnett viewed exhibits at the visitor center while in Dorchester County for the first Annual Grand National Waterfowl Hunt 83-J-7 VM

On August 24, Dr. Sarah Taylor of the Maryland Tidewater Administration presented a $5,000.00 check to Acting Refuge Manager Koch as a State contribution to the refuge marsh restoration project.

3. Credits

Once again most of the staff had a contribution to the writing of this document. The following people offered their best in the sections for which they were responsible:

Section	Responsible Person(s)
A	Acting Manager Koch
B	Biological Technician Willey
C,D	Acting Manager Koch
E	Acting Manager Koch, Biological Technician Willey, Biological Technician Giese, Outdoor Recreation Planner Martinez, Administrative Clerk Henry, Recreation Assistant Nicklas
F	Acting Manager Koch, Biological Technician Willey, Biological Technician Giese
G	Assistant Manager Canada, Biological Technician Giese
H	Outdoor Recreation Planner Martinez, Biological Technician Giese
I	Assistant Manager Canada
J	Biological Technician Willey, Administrative Clerk Henry

This narrative was edited by Acting Manager Koch, re-edited and typed by Administrative Clerk Henry. Clerk (Typist) Ciekot was the final proofreader.

GLEN L. MARTIN

Personnel 83-G-21 WK

Name	Title	Grade	Status
Michael K. Harrison	Maintenance Worker	WG-07	PPT

Review and Approvals

Don R. Perbuchin, 3/16/84
Submitted By Date

Edward L. Moses 4/15/84
Refuge Supervisor Review Date

Suzanne Mayo 4-27-84
ARD-Wildlife Resources Review Date

TABLE OF CONTENTS

Page

G. WILDLIFE

H. PUBLIC USE

I. EQUIPMENT AND FACILITIES

Page

J. OTHER ITEMS

K. FEEDBACK

A. HIGHLIGHTS

A visitor contact area with exhibits and displays was opened to the public. (Section H.6 and I.2)

B. CLIMATIC CONDITIONS

The location of this 4,423 acre refuge on Smith Island in the lower Chesapeake Bay is largely responsible for its weather conditions. For the fourth year in succession, drought conditions prevailed during parts of the year. Precipitation amounted to approximately 55 inches which is above the normal of 49 inches. Drought conditions prevailed during the period May through August and appeared to have no major effect on the shrubby vegetation on the ridges that rise above the marsh. However, the heavy influx of saltwater caused by lack of sufficient freshwater runoff into the bay and its tributaries could affect growth in future years if similar conditions prevail over the next two to three years. Snowfall for the year was 12 inches which is about normal for the refuge. A high of 98 degrees was recorded in August and a low of -2 degrees in December.

There were three extremely high tides during the year which occurred in March, October, and December.

E. ADMINISTRATION

1. Personnel

Only one employee, a permanent part-time maintenance worker, is assigned to Martin Refuge. Administrative and supervisory support is provided by personnel stationed at Blackwater Refuge.

The following is a breakdown in personnel strength at this station for the past five fiscal years:

	Permanent		Temporary
	Full-Time	Part-Time	
FY 1984		1	
FY 1983		1	
FY 1982		1	
FY 1981		1	
FY 1980		1	

4. Volunteer Program

This year a new volunteer program was started at Glen L. Martin NWR. Captain Gordon Gerald Evans served as an information person in the exhibit room of the Tyler house. According to a signed agreement, Captain Evans provided information to scheduled and unscheduled visitors who stopped

in the refuge facility. Since there is only one refuge employee, who has many responsibilities, the use of volunteers has helped make the facility available to a greater number of visitors.

5. Funding

Funding for the past 5 fiscal years is presented in the following table:

	Fiscal Year				
Activity	1984	1983	1982	1981	1980
Wildlife Resource	61,277*	25,000	28,000	28,000	28,000

*A $19,000 job order was requested for a pothole blasting contract.

Administrative support is provided by Blackwater and has usually been funded by Blackwater. The significant increase in FY 1984 funding will pay for this support as well as enable some needed maintenance.

6. Safety

Safety inspections were conducted periodically throughout the year in conjunction with visits by Acting Manager Koch. Harrison informed Blackwater of potential hazards and safety needs when necessary.

8. Other Items

On March 10 Refuge Manager Schroer, Assistant Manager Koch, and Administrative Clerk Henry met with Maintenance Worker Harrison to review Tyler house rehabilitation, plan additional projects, and conduct the annual real property inventory.

Acting Manager Koch and Assistant Manager Canada visited the refuge October 18. Besides being an orientation trip for Assistant Canada, Harrison's performance appraisal was reviewed, supplies delivered, and the refuge inspected.

F. HABITAT MANAGEMENT

1. General

A marked increase in eelgrass and widgeon grass again this year was the only significant change in habitat conditions. The grasses continued to put out new growth in the fall, something which has not occurred in recent years. These submerged aquatic plants, which provide valuable waterfowl food, nearly disappeared in the early 1970's. If the aquatic plants continue to increase, some of the diving ducks which used the area in large numbers in the 1960's should return, especially the canvasback and redhead.

Several areas were undercut and upheaved by ice 83-G-23 WK

2. Wetlands

Glen L. Martin NWR is primarily a wetland environment only slightly above sea level in the Chesapeake Bay. Vegetation consists mostly of needlerush marsh with a maze of small guts, creeks, and coves. A small "ridge" known as Cherry Island supports a heron and egret rookery. Marsh areas are flooded regularly with saltwater tides and freshwater is generally scarce. Low sand dunes rim part of the shoreline, particularly that bordering the Chesapeake Bay.

Growth of needlerush and saltmarsh bulrush was good this year. Submerged aquatic vegetation in the waters around the refuge also improved. Widgeon grass and eelgrass was more abundant in 1983 than in past years since it nearly disappeared completely in the early 1970's.

Pothole blasting is planned for 1984 to improve the habitat for black duck use.

Broken marsh habitat with Cherry Island rookery in the background 83-G-22 WK

G. WILDLIFE

2. Endangered and/or Threatened Species

Peregrine falcons have been sighted throughout the year with two different birds accounted for in November. The State of Maryland has hacked 12 young from 1980-1982 on South Marsh Island located approximately 6 miles north of the refuge. This year a pair successfully fledged two young on South Marsh and refuge sightings were probably of these birds.

Peregrine falcon - 'If I wasn't so rare, I might let you get a little closer.' 83-G-24 WK

3. Waterfowl

Total waterfowl use-days in 1983 were 1,379,917 which is up from 975,470 in 1982, 1,085,399 in 1981, 894,440 in 1980, and 516,295 in 1979. Canada goose use-days totaled 260,722, Tundra swan 116,648, and ducks 1,002,547, all showing significant increases over 1982.

Waterfowl numbers present in January and February of 1983 were similar to 1981, but significantly higher than in 1982. The major difference was in the black duck population with 1,800 in 1983 and only 600 in 1982.

The refuge supported approximately 1,300 ducks through the summer, which is up 300 from the previous year. Production was also up from approximately 230 in 1982 to 300.

Fall migration through the refuge began late in October. Migration of Canada geese was in full swing in November when 1,500 arrived. Ducks and swans increased gradually through December. Ducks averaged 6,000 compared to 4,700 in December 1982. Ducks and swans peaked later in December at 6,700 and 1,600 respectively. Canada geese peaked in January at 2,500 with a fall peak of 2,200 in November.

The greatest change in waterfowl trends over the years at Martin occurred in the mid-1970's when the large numbers of canvasbacks that once rafted up in the bay around the island disappeared. These rafts of canvasbacks fed on the abundant aquatic vegetation, such as widgeon grass and eelgrass, and when the grasses disappeared, the ducks moved to other areas of the bay. The grasses appear to be coming back slowly, as more have been observed in the last four years; this comeback may result in a return of the divers.

4. Marsh and Water Birds

Use-days were down again this year at 501,780 compared to 550,820 in 1982 and 556,335 in 1981. Production in 1983 was down with only 595 young fledged, compared to 1,050 in 1982 and 1,500 in 1981. Peak numbers were reached in August after the breeding season with an estimated 3,216. Most of these birds leave the refuge during the winter months. The more common birds in this group include the great blue heron, little blue heron, green-backed heron, black-crowned night heron, yellow-crowned night heron, tricolored heron, great egret, snowy egret, and cattle egret.

5. Shorebirds, Gulls, Terns, and Allied Species

Use-days for these birds totaled 3,638,715 which is down from last year's 4,137,815. Use by this group has, however, increased in the past few years from 1,222,455 in 1976. A tremendous increase in the herring gull population is largely responsible for this increase.

Approximately 30 different species used the refuge at various times of the year, but herring gulls were by far the most abundant numbering around 5,500 in winter and peaking at 10,000 in the summer compared to 3,500 and 12,500 respectively in 1982. Three thousand young were produced on and adjacent to the refuge again in 1983.

6. Raptors

The first ospreys of the year arrived in March and began nest construction almost immediately. Nesting activity peaked in May with 44 active nests out of the 62 nesting structures. This year's statistics compared to 1982 are as follows:

	No. Nesting Structures	Active Nests	Productive Nests	No. Eggs	Young Fledged
1983	62	44	21	81	37
1982	62	45	25	88	45

The osprey population peaked at 117 in July, which is about average. Their numbers fluctuate from year to year with the 1982 peak being somewhat higher at 140. Ospreys usually leave the refuge in October and return in March.

Other species using the refuge in small numbers included northern harriers, American Kestrels, barn owls, and turkey vultures.

8. Game Mammals

In the past, muskrat populations were based on general observations. This year house counts were conducted on scattered two acre sample transects and the results correlated with an aerial house count of the entire refuge conducted by a state biologist and a FWS pilot. Muskrat populations by this method were estimated at 2,150 compared to the old method estimates of 200-300.

The mink population held at 30 and appears to keep the muskrat population under control in the needlerush marsh. River otters, found in creeks, guts, and the adjacent bay, still numbered approximately 20. An estimated 10 red foxes inhabited the refuge again this year.

10. Other Resident Wildlife

The northern diamondback terrapin, common in the saltwaters of the Chesapeake Bay, can be found on the refuge in tidal guts and using the small islands for nesting. The population was estimated at 2,000.

16. Marking and Banding

A post-season quota of 75 black ducks was exceeded by Maintenance Worker Harrison with 121 banded (46 females, 70 males). Seven mallards were also banded.

Craig Gorsuch of North Carolina State University, assisted by Maintenance Worker Harrison, banded 29 osprey nestlings during July.

High tides and hot weather made pre-season black duck banding difficult, however, 102 blacks were eventually banded. Sixty females and 42 males were banded narrowly missing the 50 female and 50 male quota. Six mallards, 3 blue-winged teal, and 1 green-winged teal were also banded.

H. PUBLIC USE

1. General

Due to difficult access, limited upland areas, and a large heron rookery, the majority of the refuge remained closed to the public.

Swan Island, the only area generally open to public use, is a primitive area with no facilities available on-site. Activities encouraged are nature study, wildlife observation/interpretation, and outdoor classroom activities. Arrangements must be made through the refuge staff prior to use.

2. Outdoor Classroom - Students

A total of 20 students and 3 teachers participated in 138 activity hours on Martin Refuge in 1983. A special use permit was issued for this marsh ecology study group.

6. Interpretive Exhibits/Demonstrations

Some more renovation of the Tyler house was completed this year with the development of the front room as a visitor contact area with exhibits and displays. Exhibits include: a map of the refuge, two push button light boxes of animals found at Martin Refuge, and displays of banding, waterfowl, and marsh grasses.

17. Law Enforcement

Maintenance Worker Harrison completed the semi-annual pistol qualification on May 25 with the Blackwater NWR enforcement staff.

I. EQUIPMENT AND FACILITIES

2. Rehabilitation

Renovation of the interior of the Tyler house was an ongoing process throughout the year. The house will eventually serve as an office and visitor contact station with shop and overnight facilities for personnel on special details. The work is being done force account by Maintenance Worker Harrison with limited assistance from Blackwater staff. Major 1983 accomplishments included completion of the visitor contact area and opening it to the public, and staining and placement of door, window, ceiling, and floor trim throughout the first floor rooms. Rehabilitation of the first floor is expected to be completed by spring of 1984.

3. Major Maintenance

Damaged osprey structures were repaired/replaced following the nesting season.

4. Equipment Utilization and Replacement

The bottom of the 32 foot diesel work boat was scraped and painted with anti-fouling paint.

6. Energy Conservation

Measures instituted in 1980 to reduce energy consumption were continued in 1983.

J. OTHER ITEMS

3. Credits

Personnel contributing to the writing of this report:

Section	Responsible Person(s)
A	Acting Manager Koch
B	Biological Technician Willey
E	Acting Manager Koch, Biological Technician Willey, Administrative Clerk Henry, Recreation Assistant Nicklas
F	Biological Technician Willey
G	Assistant Manager Canada, Biological Technician Giese
H	Outdoor Recreation Planner Martinez, Biological Technician Giese
I	Assistant Manager Canada
J	Administrative Clerk Henry

Acting Manager Koch provided the finishing touches through editing, Clerk (Typist) Wanda Ciekot performed the final proofreading and typing was done by Administrative Clerk Henry.

SUSQUEHANNA

Review and Approvals

Don R. Pertucchin 3/16/84 Edward L. Moses 4/15/84

Submitted By Date Refuge Supervisor Review Date

Suzanne Mayne 4-27-84

ARD-Wildlife Resources Review Date

SUSQUEHANNA NATIONAL WILDLIFE REFUGE

Harford and Cecil Counties, Maryland

Administered from Blackwater National Wildlife Refuge
Cambridge, Maryland

Susquehanna National Wildlife Refuge was established by Presidential Proclamations 2347 (8/24/39), 2383 (1/24/41), 2529 (12/6/41) and Executive Order 9185 (6/23/42). These actions closed 13,363 acres of water in the upper part of the Chesapeake Bay to the hunting of migratory waterfowl and granted the Department fee title to the four acre Battery Island.

The problems with Susquehanna have been enumerated in the last several Narrative Reports. Summarized they include:

1. Lack of recent waterfowl use and poor potential for future use.
2. Only 2,900 of the 12,363 watery acres were posted.
3. The potential tort claims associated with the docks and use of Battery Island.
4. FWS lack of funding to maintain the old building.

The final rule concerning the withdrawal of Presidential Proclamations No. 2383 and 2529 was published in the Federal Register, Volume 43, No. 117, June 16, 1978. A copy is on the following page.

Past annual real property reviews have recommended that Battery Island and the building be declared excess. No action has been taken on this to date.

FEDERAL REGISTER, VOL. 43, NO. 117—
—FRIDAY, JUNE 16, 1978

[4310-55]

Title 50—Wildlife and Fisheries

CHAPTER I—UNITED STATES FISH AND WILDLIFE SERVICE, DEPARTMENT OF THE INTERIOR

PART 32—HUNTING

Susquehanna National Wildlife Refuge, Md.

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: This rulemaking opens the Susquehanna Migratory Waterfowl Closed Area, in the upper Chesapeake Bay, to the hunting of migratory waterfowl in accordance with annual hunting regulations. The Director has determined that the waterfowl food source has deteriorated to the extent that the attendant waterfowl use, particularly diving ducks, has declined so that a closure is no longer necessary. The effect of this rulemaking would be to rescind the regulations closing the area to hunting that were promulgated by Presidential Proclamations No. 2383 and 2529.

DATE: Effective September 1, 1978.

FOR FURTHER INFORMATION CONTACT:

Donald G. Young, Division of National Wildlife Refuges, U.S. Fish and Wildlife Service, Washington, D.C. 20240, telephone 202-343-4307.

SUPPLEMENTARY INFORMATION: Donald G. Young is also the principal author of this document. On March 9, 1978, there was published (43 FR 9629) a notice of proposed rulemaking opening the Susquehanna Migratory Waterfowl Closed Area to the hunting of waterfowl.

The public was provided a 31-day comment period, and as a result, one favorable comment was received.

Approximately 13,363 acres of water in the Chesapeake Bay, including part of Susquehanna Flats, were closed to hunting by Presidential Proclamation No. 2383, January 24, 1940, and Presidential Proclamation No. 2529, December 6, 1941; the area was designated as the Susquehanna Migratory Waterfowl Closed Area. The proclamations specifically prohibited "pursuing, hunting, taking, capturing, killing, or attempting to take, capture, or kill migratory birds." At the time the area was closed, there was an abundance of wild celery and other waterfowl foods that attracted a large number of diving ducks. The closure was established to provide a resting and feeding sanctuary for the great concentrations of waterfowl, particularly the canvasback duck, that occurred there during the waterfowl hunting season.

In the last 37 years, significant ecological changes have taken place in this area. The extent of aquatic vegetation declined through the 1960's and early 1970's, and the remaining vegetation was drastically reduced by Hurricane Agnes in 1972. Bottom substrates of Susquehanna Flats also were changed by siltation and wave action. Consequently, the waterfowl food supply has declined to the point where few waterfowl are attracted to the area.

Since the waterfowl food source has deteriorated and the waterfowl use has declined on Susquehanna Flats, the protection afforded by closure proclamation is no longer necessary. Annual hunting regulations will provide adequate protection for migratory bird management purposes.

Within the Susquehanna Migratory Waterfowl Closed Area is Battery Island (Shad Battery—Edmondson's Island) which was designated as the Susquehanna National Wildlife Refuge by Executive Order 9185 on June 23, 1942. This regulation, which would open areas adjacent to the refuge to hunting, does not apply to the Susquehanna National Wildlife Refuge.

Accordingly, Presidential Proclamation No. 2383, January 24, 1940, and Proclamation No. 2529, December 6, 1941, are rescinded and 50 CFR 32.4 is amended by deleting the above proclamations.

Dated: June 9, 1978.

LYNN A. GREENWALT,
Director, U.S. Fish and Wildlife Service.

[FR Doc. 78-16754 Filed 6-15-78; 8:45 am]