

BLACKWATER NATIONAL WILDLIFE REFUGE  
Cambridge, Maryland  
Glen L. Martin NWR  
Susquehanna NWR

ANNUAL NARRATIVE REPORT  
Calendar Year 1980

NATIONAL WILDLIFE REFUGE SYSTEM  
Fish and Wildlife Service  
U.S. DEPARTMENT OF THE INTERIOR



To Cambridge

# BLACKWATER

## NATIONAL WILDLIFE REFUGE



SCALE

$\frac{1}{2}$  mi.

1 mi.

$\frac{1}{4}$ " = 1 MILE

TO  
WILDLIFE DRIVE  
 $1\frac{1}{2}$  MILES

VISITOR CENTER

To Cambridge  
via  
Egypt Rd.

WILDLIFE DRIVE  
ENTRANCE

Office

Woods  
Trail

Marsh  
Edge  
Trail

Observation Tower

N

### LEGEND

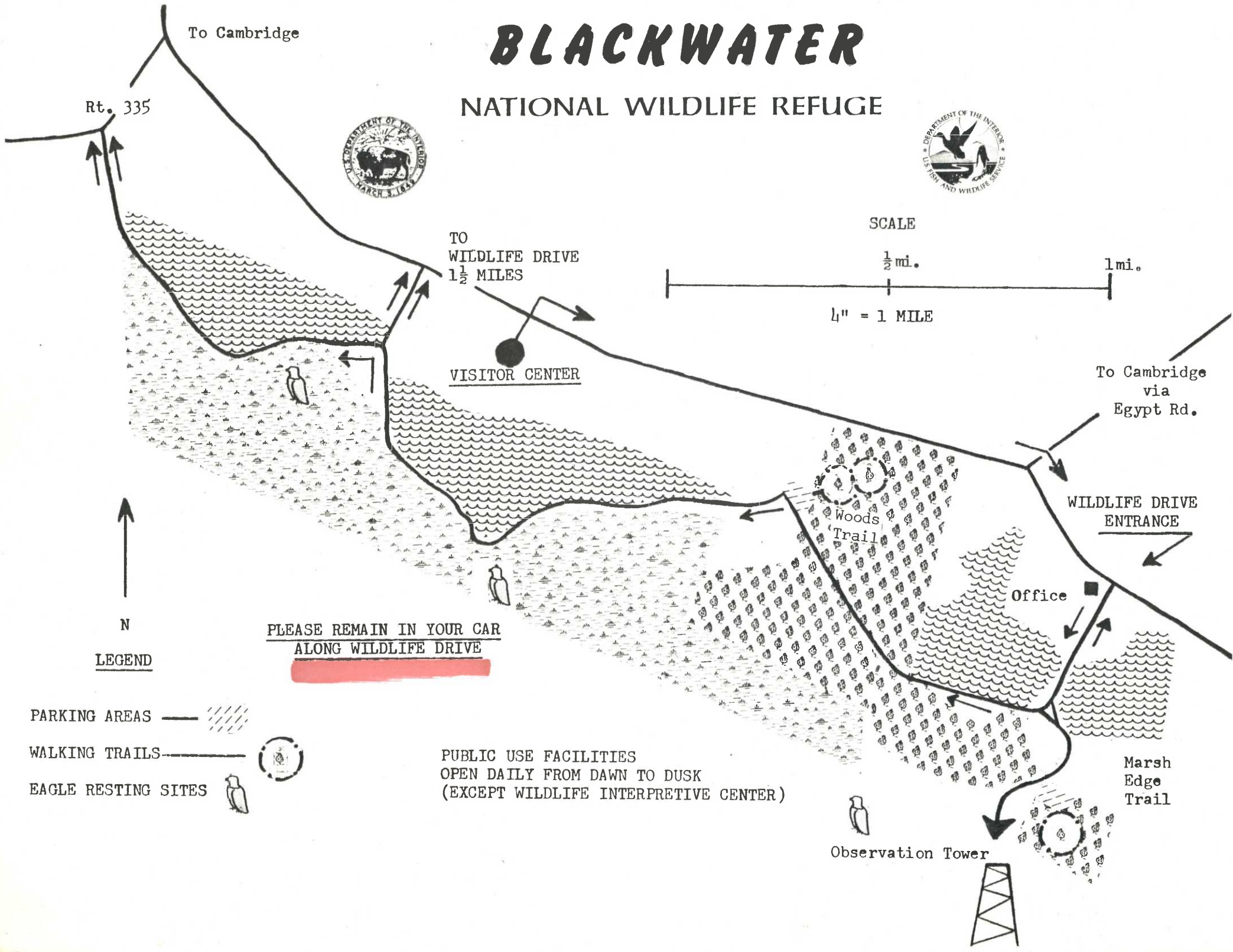
PARKING AREAS

WALKING TRAILS

EAGLE RESTING SITES

PLEASE REMAIN IN YOUR CAR  
ALONG WILDLIFE DRIVE

PUBLIC USE FACILITIES  
OPEN DAILY FROM DAWN TO DUSK  
(EXCEPT WILDLIFE INTERPRETIVE CENTER)

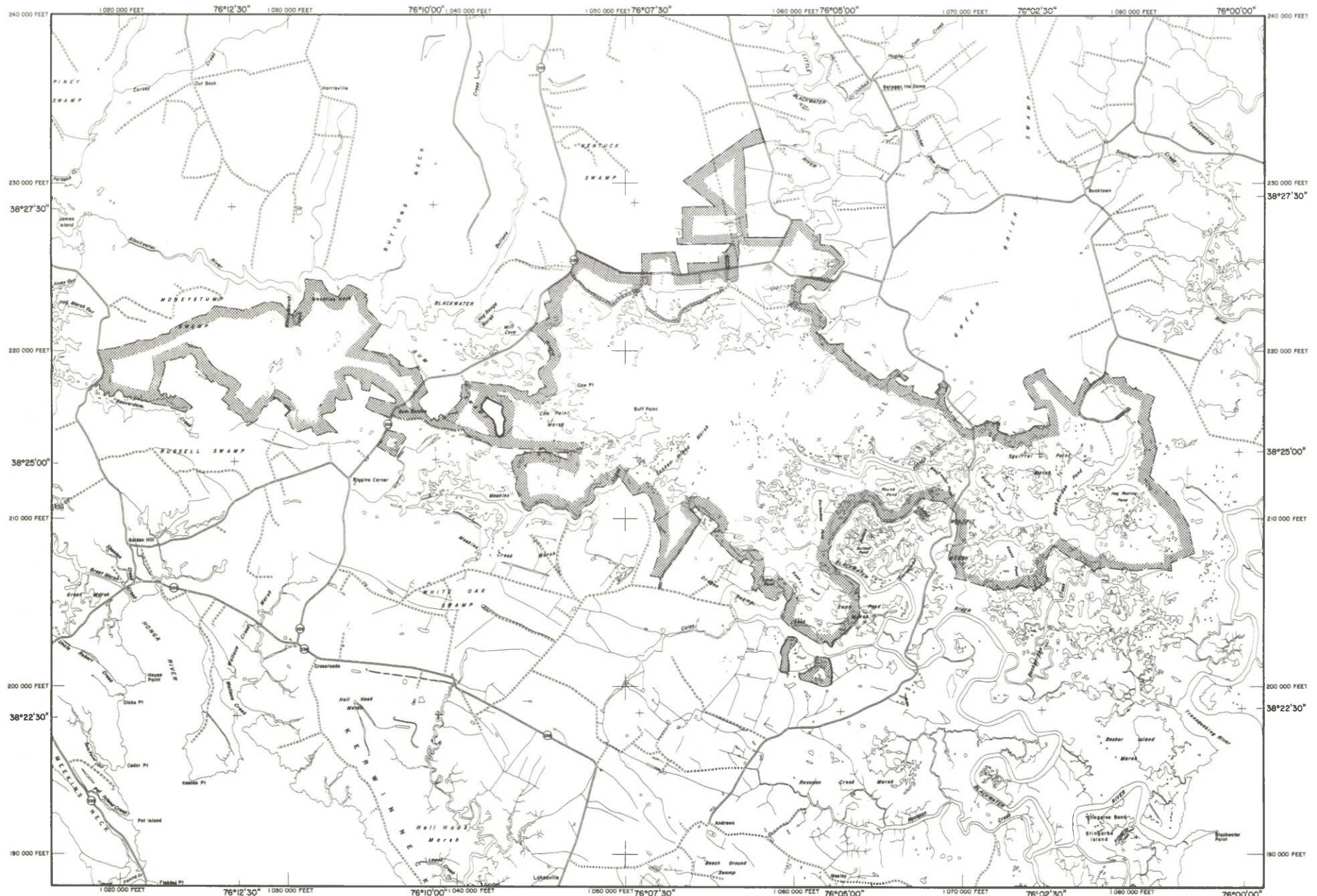


# BLACKWATER NATIONAL WILDLIFE REFUGE

UNITED STATES  
DEPARTMENT OF THE INTERIOR

DORCHESTER COUNTY, MARYLAND

UNITED STATES  
FISH AND WILDLIFE SERVICE



COMPILED IN THE OFFICE OF REALTY  
FROM SURVEYS BY U.S.G.S.

NEWTON CORNER, MASSACHUSETTS MAY, 1980







## PERSONNEL

	<u>NAME</u>	<u>TITLE</u>	<u>GRADE</u>	<u>EOD</u>	<u>STATUS</u>
1.	John D. Schroer	Refuge Manager	GS-12		PFT
2.	William Koch	Assistant Refuge Manager	GS-11		PFT
3.	Janet L. Quarve	Refuge Manager (Trainee)	GS-07		PFT
4.	Guy W. Willey	Biological Technician	GS-08		PFT
5.	William M. Giese	Biological Technician	GS-05		PFT
6.	Paul R. Schmidt	Outdoor Recreation Planner	GS-09	12-1-80	PFT
7.	Kathryn L. Kammeyer	Recreation Assistant	GS-05		Seasonal
8.	Kathleen Z. Zeamer	Interpretive Specialist	GS-07		PFT
	Transferred to Great Dismal Swamp NWR 6-6-80				
9.	Carole T. Henry	Administrative Clerk	GS-06		PFT
10.	Wanda T. Ciekot	Clerk (Typing)	GS-04		PPT
11.	Franklin A. Hughes	Automotive Mechanic	WG-10		PFT
12.	G. Wallace Stewart	Maintenanceman	WG-07		PFT
13.	Joseph H. Cornish	Laborer	WG-02		PFT
14.	Catherine Baptist	Recreation Assistant	GS-04	10-5-80	Temp.
15.	Larry Dail	Recreation Assistant	GS-04	10-5-80	Temp.
16.	John Lee	Janitor	WG-01	10-20-80	Temp.
17.	Patti Hall	Recreation Assistant	GS-04		
	Terminated 8-31-80				
18.	Sally A. Huston	Biological Technician	GS-05	3-30-80	Temp.
	Terminated 8-31-80				

YACC Staff

William Handley	Group Leader	GS-05	Schedule A
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YCC Staff

Barbara S. Burns	Camp Director	GS-09
Douglas P. Becker	Environmental Education	GS-05
	Instructor	
Danny O. Ellis	Group Aid	GS-04
Robert T. Remeto	Group Aid	GS-04



Review and Approvals

<u>John Schroer</u>	<u>3/9/81</u>	<u>Paul D. Daly</u>	<u>3/16/81</u>
Submitted by	Date	Area Office	Date

Blackwater National Wildlife Refuge  
Route 1, Box 121  
Cambridge, Maryland 21613

Refuge

<u>Howard D. Woon</u>	<u>3/18/81</u>
Regional Office	Date

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## I. GENERAL

### A. Introduction

Blackwater National Wildlife Refuge is located on the Eastern Shore of Maryland approximately ten miles south of Cambridge, Maryland in Dorchester County. Washington, D. C. is 100 miles northwest of the refuge. The refuge consists of approximately 14,279 acres of which over 10,000 acres are marsh and open water. The remainder of the refuge consists of five fresh water impoundments, agricultural land and woodlands.

The refuge was established on January 1, 1932 under the authority of the Migratory Bird Conservation Act to provide habitat for migrating and wintering waterfowl. Since establishment, the objectives of the refuge have broadened to include major emphasis on management for endangered species and regulated public use when such use is consistent with sound wildlife management practices. Both the southern bald eagle and Delmarva fox squirrel receive top priority with respect to any management plans.

### B. Climatic and Habitat Conditions

Total precipitation for 1980 amounted to 32.89 inches which is 10.76 inches below the normal of 43.65. Snowfall amounted to 16 inches which is near the normal of 15 for Blackwater. Drought conditions began in late June and continued throughout the remainder of 1980. The summer of 1980 was one of the hottest on record. For 60 days a temperature of 90 degrees or higher was recorded making this summer the warmest since 1911. A high of 103 degrees was recorded on July 20. The low for the year was 6 degrees on December 26.

The year began with NE winds resulting in extremely high tides during January and again in March. Several small snowfalls were recorded in January and February; however, the greatest amount of snow was 6 inches recorded on March 1 and 2.

Spring was normal with light amounts of rainfall during the planting season. Drought conditions began in the late summer and continued throughout the year. December was the driest on record with only 0.27 inches of precipitation. Along with most of the Atlantic Coast region from New York to South Carolina, Blackwater's fresh water marshes and impoundments dropped to low levels. Many of the fresh marshes showed low water levels at the end of December. Fresh water impoundments were about one-third the normal level desired for waterfowl use.



Only one severe storm was reported during the year. This was a thunderstorm recorded on June 4 when winds were estimated at 90 mph. Heavy damage resulted to farm crops and fallen trees adjacent to the refuge. Blackwater was on the edge of the storm and suffered light damage from wind and hail.

Three-square (*Scirpus olneyi*) marshes made excellent growth with a few of the areas (approximately five acres) which had disappeared during the past years recovering and showing some growth. This growth came late in August and September after the normal growing season of April and May. Therefore, these tender shoots were the first taken by the geese when they arrived in September. It will be of great interest to see if the root system was established enough for regrowth in 1981. The drought resulting in low water levels and low tides may have given the seed enough time to germinate. In normal or high water level conditions this growth may not have taken place.



80-T-24 Low water during the summer permitted the regrowth of some three-square marsh (new growth is green in picture). Photo by J. D. Schroer

Widgeon grass (Ruppia maritima) was the main submergent and found only downstream in tidal ponds or creeks. Some smartweeds, spikerushs, wild millet, cyperus, and panicum could be found in dewatered areas late in the summer.

The growing season was good and the low lands of the refuge produced above average yields of corn, soybeans, milo, and millet. Fescue growth in the early summer was poor; however, by top dressing good fall growth was made before the waterfowl arrived. Except for the lack of water in the fresh water impoundments and ponds needed for the fall migration, sufficient habitat and food was available on all areas of the refuge. In fact, the lack of water kept some millet and milo from being flooded early in the fall and food was available longer for the good population of ducks that were present throughout December.

### C. Land Acquisition

#### 1. Fee Title

Although no land was actually acquired in 1980, considerable time and effort was spent by the regional, area and refuge staffs in studying possible alternatives to increase management efforts for endangered species in the area. Of primary importance in this effort is the establishment of an approved acquisition boundary for the refuge. A proposed acquisition boundary has been formulated, and preliminary steps and the actual preparation of an environmental impact statement has progressed throughout the year. See map on following page for the proposed refuge boundary.

As the first stage in preparing the environmental impact statement on a new refuge acquisition boundary, an informal meeting was held on January 4 at the visitor center. In attendance at this meeting were Mr. William Wingate, President of Dorchester County Commissioners, Ms. Linda Kleinwachter and Mr. Frank Thorne, Dorchester County Planning and Zoning Office., Mr. Gary Taylor, Maryland Wildlife Administration, Mr. Paul Breidenbaugh, Maryland Wildlife Federation, Messrs. Steve Drown and Martin Lutsky of the RO realty staff, Messrs. Paul Daly and Andy Moser of the AO staff and Manager Schroer and Assistant Koch of the refuge staff. The proposals set forth at the meeting met with little opposition.

On June 9, 1980 a public meeting was held at the refuge visitor center to seek public involvement in the acquisition process. Seventy-nine attended the meeting from 7:30pm-10:30pm. Of the 25 property owners in the proposal area, 11 were represented and 5 made statements. An additional 15 persons also made statements. From the comments received the principle

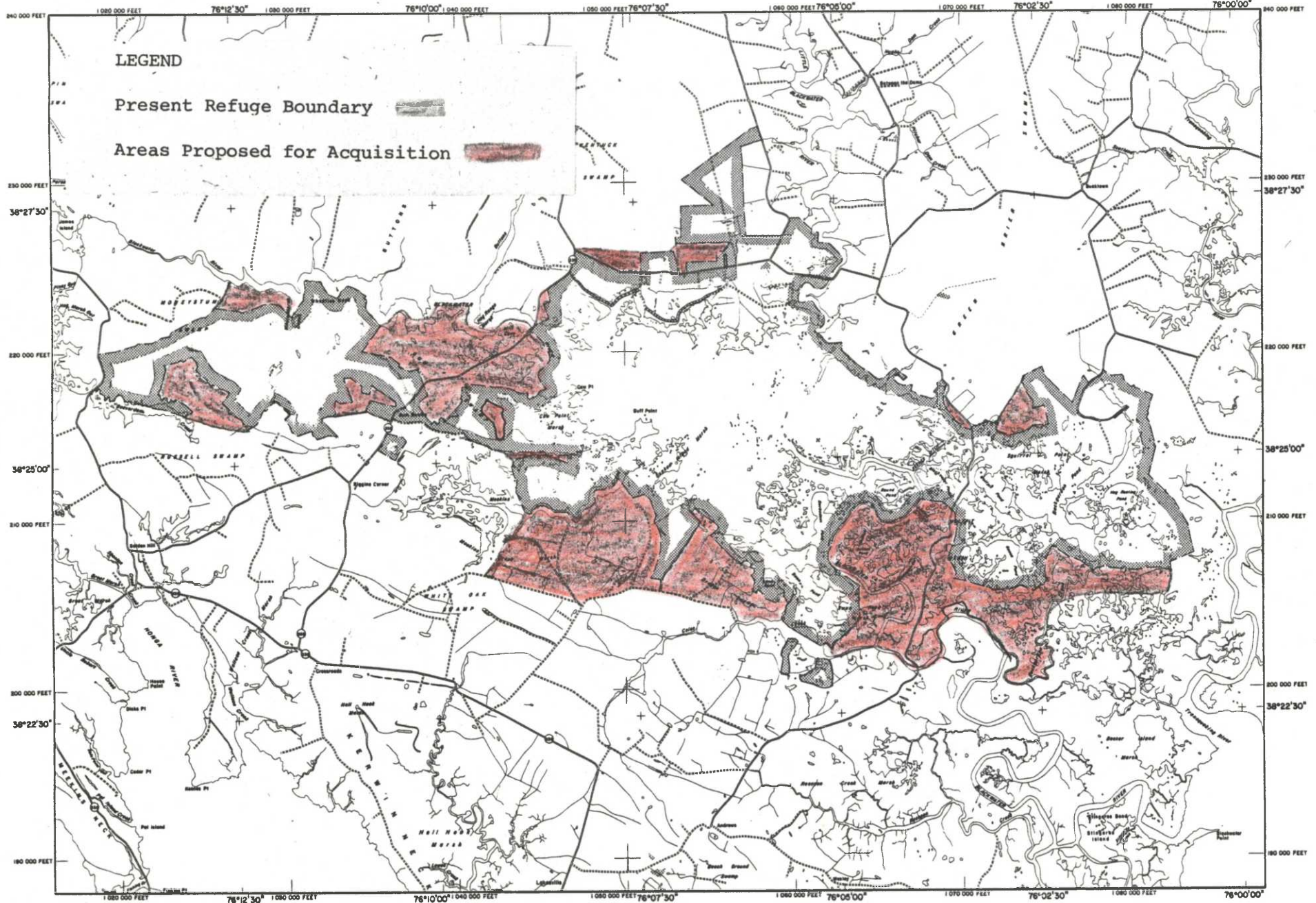


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MEAN  
DECLINATION  
1942

concerns seem to be:

A fear of condemnation.

A belief that the refuge is mismanaging it's currently owned lands.

Current private ownership of proposal area is adequate to protect wildlife resources.

Public land ownership in Dorchester County is already extensive.

It readily became apparent that many people were misinformed of refuge objectives and current management practices. Subsequent private discussions with individuals indicated a more favorable attitude when specific questions could be answered. Persons known to favor the proposal including affected landowners were either absent from the meeting or if present refrained from making a statement. The overall impression being that there was more support for the proposal than implied by the meeting.

The anticipated completion date for the draft environmental impact statement is in early 1981 with a subsequent public hearing.

2. Easements

Various types of easements are being explored in the land acquisition process. If easements prove to be feasible alternatives to fee acquisition, then they would be used.

3. Other

Nothing to report.

D. System Status

1. Objectives

The approved objectives for this station are in need of major quantitative revisions in most categories. Refuge objectives focus major management efforts in the areas of endangered species, migratory bird maintenance and public use, primarily interpretation and outdoor classroom activities. The following chart compares objective outputs with 1980 outputs for the most important objectives for this station:



<u>Output</u>	<u>1980</u>	<u>Objective Level</u>
Interpretation	55,691 ah	407,000 ah
Environmental Education	739 ah	53,000 ah
Wildlife/Wildlands Recreation	26,802 ah	31,000 ah
Threatened Species Maintenance	162,338 ud	933,000 ud
Waterfowl Maintenance	8,682,387 ud	17,400,000 ud
Other Migratory Bird Maintenance	1,309,244 ud	3,600,000 ud

A review of the present public use programs on the refuge and future plans in this area indicate that the objective levels for both interpretation and environmental education are extremely high, while the objective level for wildlife/wildland recreation is within reach. The fuel crisis which occurred after the objectives were initially set could have had a direct bearing on restricting the anticipated amount of public use. As public use facilities are upgraded and teacher EE workshops are conducted on a regular basis, the outputs in all phases of nonconsumptive wildlife oriented public use will increase, but they will not all realistically approach the objective levels.

The objective level for threatened species maintenance needs to be reduced to more accurately reflect the actual capacity of the present acreage. Even though the present objectives were formulated prior to the acquisition of the Jarrett tract, a 2,450 acre tract acquired primarily for endangered species, the present objective level is not feasible for this refuge. Two endangered species, the Delmarva fox squirrel and the bald eagle, regularly use the refuge. The majority of the endangered species outputs are produced by the fox squirrel. Management efforts have and will continue to be directed towards improving endangered species habitat and thereby increasing these outputs. In addition, the new proposed refuge boundary is aimed primarily at including property to benefit these endangered species.

As with the threatened species, objective levels for migratory birds need to be critically re-evaluated to determine if the carrying capacity of the present refuge will support these approved objective levels. These levels could probably be reduced due simply to the amount of marsh which has been lost since the objectives were established in 1970. At the present time, goose use on the refuge accounts for approximately twice as many use-days as do ducks; the approved objectives call for the reverse, i.e. more duck use than goose. For many years goose use on the refuge exceeded the objective level; however, in 1980 this use was approximately equal to the objective level. Duck use in 1980 was approximately 8,150,000 below the objective level, leaving the management challenge of

maintaining existing goose use while building up the duck population tremendously to meet objective levels. Planned management of primarily the impoundments is aimed at improving duck habitat; however, geese will also benefit to some extent.

## 2. Funding

As can be seen in the following breakdown of funds for the past 5 fiscal years, substantial increases occurred from FY 77 through FY 79. These increases can be misleading in regards to the total operation of the refuge in relation to present day inflation.

### Fiscal Year (1,000's)

<u>Activity</u>	<u>FY 77</u>	<u>FY 78</u>	<u>FY 79</u>	<u>FY 80</u>	<u>FY 81</u>
1210-MB	123.0	134.0	172.0	174.0	178.0
1220-MNMB	10.0	10.0	15.0	18.0	21.0
1240-IR	47.0	73.0	89.0	83.0	87.0
1400-SE	20.0	13.0	13.0	16.0	14.0
6810-MB	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>	<u>1.5</u>	<u>2.0</u>
Sub total	200.0	230.0	289.0	292.5	302.0
Revolving Rehab *			65.0	45.0	15.0
Total	200.0	230.0	354.00	337.5	317.0

\*Funds earmarked for certain projects, i.e. marsh loss study, riprap, not used for normal operations.

Increases brought about by BLHP in FY 77, improved O&M funding to the point that management efforts could progress normally. The funding increases between FY 77 and FY 79 were sufficient to cover inflation and have some left over to accomplish some of the much needed wildlife management activities.

Since FY 79, increases have not kept up with inflation. As with most refuges, salaries consume the majority of the annual budget. On this refuge annual cost-of-living raises increase the needed operating budget between \$11,000 and \$15,000 each year. This increase plus the \$10,000-\$15,000 needed to keep pace with annual inflation of over 10% to maintain existing management practices, is needed annually to maintain the status quo. The increase between FY 80 and FY 81 is only \$9,500 which is a far cry from the \$22,000-\$30,000 necessary to maintain existing facilities and management efforts. This station and others will be faced with severe funding shortages in future years if budget increases fall severely below inflation rates.

In FY 78, cyclic maintenance funds were made part of the refuge budget. These funds are shown in the following table and are included in the total funding table:

Cyclic Maintenance Funding  
Fiscal Year (1,000's)

<u>Activity</u>	<u>FY 78</u>	<u>FY 79</u>	<u>FY 80</u>	<u>FY 81</u>
1210-MB	11.0	42.0	41.0	38.0
1220-MNB	2.0	5.0	8.0	8.0
1240-IR	11.0	19.0	15.0	15.0
1400-SE	0.0	0.0	0.0	0.0

Although no new positions were established during the year, transfers left a number of positions vacant during much of the year. As in past years, the public use programs suffered most from the lack of maintaining a constant staff to carry out the numerous public use programs. If the present staffing pattern is maintained and if funding is provided, the migratory bird and interpretation and recreation programs can be operated at high standards.

## II. CONSTRUCTION AND MAINTENANCE

### A. Construction

Over the years the visitor center's concrete slab floor has settled up to 2½-3 inches in places. Under BLHP funding a contract for \$12,164 was awarded to remove old floor tiles, build up settled floor sections and lay down new tiles. On January 2 the center was closed to the public, and work commenced. Completion was expected in six to eight weeks. Due to non-compliance with contract specifications, a stop order was issued in February. After ten weeks work finally resumed, and the major construction was completed on May 19. On May 27 the center was finally reopened to the public; however, problems with tiles not adhering to the floor developed shortly. The job was not considered completed until September, and even since then minor problems continue to arise.

The visitor center's central air conditioning unit was in dire need of replacement. A contract for \$24,983 (BLHP) was awarded to the same contractor who "repaired" the floor. Work commenced in June and was completed in late July. The unit offered welcome relief to visitors and especially visitor center staff.

Three water control structures were constructed by contractor (\$50,999 BLHP) over the summer. Pool 2 (6 acres) drains into Pool 1 (30 acres) through an 18 inch culvert with no controls. A 24 inch concrete pipe and structure with stop-log control





79-L-11 Before of Pool 5 water control structure or lack of control. Photo by W. Koch



80-0-21 After BLHP was completed. Photo by J. D. Schroer

replaced this culvert. Construction was completed in May. The 42 inch corrugated metal pipe with flap gate connecting Pool 5 (60 acres) to the tidal marsh had been leaking and non-functional since 1977. This pipe was replaced with a 30 inch concrete pipe with screw and flap gates and stop-log capabilities. Construction was completed in June. Pool 4 (30 acres) also drained to the tidal marsh through a 42 inch corrugated pipe. This structure had been leaking and non-functional since 1978. A 30 inch concrete pipe with screw and flap gates and stop-log capabilities replaced this pipe. Construction was completed in August. The contractor did a fine job on all structures and this will enable the refuge to get back into the full swing of the water management business!

Upon completion of the new Pool 5 water control structure, the pool was drawn down to enable bulldozer cleaning of 3 acres of brush. Twelve acres of brush were also cleared in Pool 3. Work was done force account in July.

Two miles of Jarrett tract access road off Smithville Road were renovated. Bulldozer and operator were hired force account to level and grade the road. Two small culverts were also installed. With YACC assistance, refuge personnel "track spread" 240 tons of slag along these 2 miles and seeded the road bed and shoulders with fescue. Work was completed in August. This road will provide a fire break and access to the western side of the refuge. Work also began on a fire break access road into the eastern side of the Jarrett tract off Route 335 with the raising of a 1 mile section of old road by dragline.

To mitigate erosion, 370 tons of rock riprap were hand placed by the YACC along 300 yards of the Pool 3 dike on the tidal marsh side. The work was done in February when tidal marsh water levels remained low. This dike not only forms a waterfowl impoundment but also serves as a portion of the Wildlife Drive.

In September a contractor replaced the old tin roof on the mechanic shop and connected open bays with fiberglass shingles. Rain gutters, rotted beams and support struts on the open bay section were also replaced.

A much needed gravelled parking area/turn around was constructed at the boathouse boat ramp.

New water level gauges were installed at the following 8 locations: Inside impoundments at the control structures of Pools 1, 2, 3, 4 and 5; on the tidal marsh just outside Pool 4 structure; on the tidal marsh between Pool 3 and 5 structures; and on the bridge piling at Shorter's Wharf. Elevations were "shot" for future placement of gauges at the refuge boathouse and the Big Blackwater River bridge. The Soil Conservation Service was very cooperative in "shooting" site elevations.



80-C-8 YACC placing riprap. Photo by K. Kammeyer

On December 3 the Service's "mudcat" suction dredge was transferred from Montezuma National Wildlife Refuge to Blackwater NWR. The dredge will be used in the spring and summer of 1981 for some experimental marsh reclamation work in conjunction with the refuge's marsh loss study. Should the experimental work prove successful, larger scale reclamation operations will be planned. (See section "Field Investigation" for details on refuge marsh loss study.)

#### B. Maintenance

Drainage ditches were cleaned to facilitate refuge cooperative farming operations and water level management in Pools 1, 2 3 and 5. The county cleaned roadside ditches along Key Wallace Drive and Egypt Road while a contractor was hired for account to clean 1.7 miles of lateral cropland ditches.

Refuge and YACC personnel installed 14 "dead man" anchors along 125 feet of waterfront bulkheading by the refuge boathouse. Forty feet of tongue and groove bulkhead and several support pilings were also replaced under the boathouse.

Refuge and YACC personnel replaced the refuge headquarters roof with new fiberglass shingles. A contractor's formal bid for this job was \$6,000 and the refuge staff completed the job with some YACC assistance for \$2,500!



The entire brick exterior of the visitor center was scrubbed clean and sealed with a clear silicone sealer. This project was done to reduce the mildew and algal discoloration and cut down on dampness in the building. A work room and storage room were panelled, and all interior trim painted. Bus and handicapped parking designations were painted on the visitor center parking lot by a contractor. The center driveway borders were landscaped and seeded with YACC assistance.

In compliance with the updated sign manual "new style" recognition signs were put up on primary and secondary access routes along Key Wallace Drive and Egypt Road. The new Service emblem was placed on vehicles, equipment, buildings and signs.



81-E-34 With the proper frame the "new style" entrance signs look O. K. Photo by P. R. Schmidt

Nine new wood duck nest boxes were put up on the Jarrett tract bringing the total number of structures to 30.

A larger flammable storage cabinet was installed in the carpenter shop, and the two electric gasoline pumps were replaced. A wall unit air conditioner purchased last reporting period was installed in Quarters 2. A wood burning boiler was received for Quarters 1 but was not installed during the reporting period. This unit will substantially reduce the fuel oil consumption of Quarters 1.

A 20 foot aluminum flat bottom boat formerly stationed at Glen L. Martin Refuge was repaired and put into service at Blackwater. This boat was greatly needed for the marsh loss study.

A 65 hp Johnson outboard motor was purchased along with a jet foot. Since received late in the year, this equipment has not been used but should prove to be quite useful in navigating in the refuge's shallow water areas.

A tilting heavy equipment flat bed trailer was transferred from Bombay Hook NWR to Blackwater. For safer and easier loading, the trailer was modified by adding a "beaver tail".

Also transferred from Bombay Hook NWR to Blackwater was a 16 inch Crisifulli pump. This pump was used in the summer to draw down impoundments during periods of higher water on the outflow sides of control structures. Draw down was necessary to enable brush removal.

#### C. Wildfire

At 2:00 pm on October 22 the refuge staff was gathering at headquarters for its monthly safety meeting. The group no sooner got seated when Refuge Manager Schroer received a call that there was a fire on the refuge. The group immediately responded gathering up the fire jeep, hand tools, portable radios, etc. The fire jeep (with water tank and pump) was at the scene 10 minutes after the call was received. Fifteen minutes after the initial report the entire refuge crew was at the scene.

Upon arrival the surprised staff found the Maryland Forest Service with their fire equipment waiting. The small brush fire turned out to be drill staged by the Forest Service and coordinated by Biological Technician Guy Willey (safety committee chairman). Various aspects of fire control were explained by Maryland Forest Service personnel including a demonstration of their equipment. A few mistakes were made, and these were pointed out. Since the majority of the staff was completely unaware that the incident was staged, a lot was learned from the experience.

There were no wildfires on the refuge during the reporting period.

### III. HABITAT MANAGEMENT

#### A. Croplands

One cooperator, Blackwater Farms, farmed 289 acres in 1980. Eighty-five acres of corn, 171 acres of soybeans, and 33 acres of sorghum yielded 99, 34 and 55 bushels per acre, respectively. Six acres of corn and all of the sorghum were left standing. The refuge share of harvested corn was approximately 500 bushels. An invasion of spider mites hit area soybean fields in August. The refuge crop was no exception and 87 acres were sprayed with "Cygon".

Fifty acres of fescue were maintained by refuge personnel to provide browse for geese. All of this acreage was top dressed with ammonia nitrate and mowed twice during the summer. The 10 acre McGraws Island was planted in millet-fescue-orchard grass mixture and overseeded with ladina clover. Three acres near headquarters were planted in a buckwheat/ryegrass mixture.



81-A-1 Canada geese using fescue fields near refuge office.  
Photo by J. D. Schroer



B. Grasslands

Nothing to report.

C. Wetlands

There are 10,000 acres of fresh and brackish marsh and shallow open water on the refuge. The predominate marsh grass is Scirpus olneyi (three-square bulrush) with scattered pockets of Distichlis spicata, Spartina alterniflora, S. patens and S. cynosuroides.

Prescribed burning of 3,000 acres of marsh was accomplished in January. Through reversion of succession, this practice maintains healthy stands of Scirpus olneyi which provides valuable habitat for waterfowl and other marsh animals. Burning also opens areas of the marsh in winter allowing geese and other waterfowl to feed on shoots and roots thereby reducing depredations to winter grain crops on neighboring farms. Marsh burning facilitates muskrat trapping on the refuge, a management practice aimed at controlling numbers to prevent damage to the marsh, dikes, and roads.

Experiments designed to facilitate recovery of marsh in areas that have experienced loss to mud flats and open water have been initiated. Should these experiments yield beneficial results they may provide the basis for future management practices.

Five fresh water impoundments covering 250 acres of the refuge provide valuable feeding and resting habitat for waterfowl, shorebirds, and wading birds. Water levels were manipulated to allow growth of vegetation throughout the growing season so that when flooded in the fall and winter months the impoundments provided important feeding areas for waterfowl.

One hundred eight acres were planted in Japanese millet, 90 acres by refuge personnel and 18 by the cooperator. Eighty-three acres were fertilized with 10-10-10 prior to planting and 65 acres were top dressed with ammonia nitrate. The cooperator also planted 33 acres of sorghum. Despite the overall dry weather conditions which prevailed this season, rainfall at critical stages resulted in excellent growth and seed head development of an estimated average yield of 25 bushels per acre. Fall water levels in the impoundments were very low and only about 125 acres were flooded. Despite the dry conditions use of the millet by ducks and geese was heavy.



81-A-8 Waterfowl use of Pool 1 along the Wildlife Drive.  
Photo by J. D. Schroer

Encroachment of willows and other undesirable brush species has been a problem in the upland portions of Pools 3 and 5. During July 15 acres were cleared by a contractor using bulldozers and root rakes. Work was halted when nearly 4 inches of rain fell on July 22 and 23; the bulldozers were not able to get back into the bottoms to complete the clearing this summer. The remaining 10 acres are scheduled to be cleared next summer.

#### D. Forestlands

Some timber stand improvement was carried out under the YCC program in 1980. Underbrush was removed on approximately 20 acres of land in the Jarrett tract and 10 acres in the 52 acre woodland block on Egypt Road. This entire block has now been completed. This project was designed to enhance Delmarva fox squirrel habitat. Control burning was performed in pine timber along the marsh edge in several locations to reduce litter and retard the growth of perennial grasses and shrubs. This practice produces conditions suitable for legumes and annual weeds to become established, prevents invasion of hardwoods and reduces the chance of a devastating wildfire. Mature pine is a preferred Delmarva fox squirrel habitat and maintaining small stands of almost pure pine in or adjacent to hardwoods provides a diversified forest. An open understory favors the Delmarva fox squirrel over the grey squirrel.

E. Other Habitat

Nothing to report.

F. Wilderness and Special Areas

Nothing to report.

G. Easements for Waterfowl Management

Nothing to report.

#### IV. WILDLIFE

A. Endangered and Threatened Species

Two species listed by the US FWS as endangered or threatened utilized the refuge in 1980. These were the bald eagle (Haliaeetus leucocephalus) and Delmarva fox squirrel (Sciurus niger cinereus). The osprey, whose status is undetermined, is also included in this section.

The refuge eagle population ranged from 30-36 birds with a peak in July. Twenty-four bald eagles and one golden were counted in the mid-winter eagle survey on January 8. This year's Christmas bird count (December 31) tallied 35 bald eagles and 2 goldens in the area. Nesting activity usually starts in late December and early January. A new nest built at Wolfpit in December of 1979 was not used in 1980. During the 1980 nesting season only one out of six nesting pairs on the refuge produced young, with two being produced. Five nests adjacent to the refuge produced six young.

In May, refuge personnel assisted the National Wildlife Federation's bald eagle banding team in locating nests and banding the young. A check of the Barbadoes nest confirmed that a great horned owl used the nest this year. The state had reported this observation during an aerial survey, but due to continued eagle activity in the immediate area, this nest was checked by the banding team.

The table on the following page shows nesting data for the past three years.



## BALD EAGLE NESTING ON AND ADJACENT TO THE BLACKWATER NWR

	Number <u>Active Nests</u>			Number <u>Productive Nests</u>			Number <u>Young Produced</u>			
	<u>Year</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>
On Refuge		3	6	6	1	2	1	3	3	2
Adjacent to Refuge		4	3	5	4	3	5	7	6	6
Total		7	9	11	5	5	6	10	9	8

Nesting is predominately by the southern subspecies (Haliaeetus leucocephalus leucocephalus) while both southern and northern subspecies occur in the fall and winter.

An adult bald eagle was released on the refuge January 4 by personnel from Patuxent Research Center. The eagle had been harassing cranes and ducks at the facility.

Two commercial fishing permits were issued for the period of November-May. Permits require that rough fish be placed in designated locations for use as eagle food. This practice provides for a steady food source during the critical times of nesting activity. A total catch of approximately 10,330 pounds was reported for 1980.

The Delmarva fox squirrel population has remained fairly stable at an estimated 450, no change from 1979. Timber stand improvement (TSI) was performed by YCC personnel for the fox squirrel on 30 acres during the year. Mature loblolly pine (Pinus taeda) stands with a hardwood mixture (35%) of oaks and maples and a fairly open understory is desired. A five acre old field in the Jarrett tract was mowed in August to provide and maintain edge habitat for the fox squirrels. The field is adjacent to mature woodlands. In addition, approximately two acres of field edges and dikes were mowed in the Kuehnle tract in September, also to provide good edge habitat for Delmarvas.

The refuge cooperated with the Maryland Wildlife Administration in conducting a study on the refuge to determine population and ecological data. A February check of the 200 nest boxes showed 62% were used by squirrels of some specie (as determined by presence of nest material). Nineteen percent of the boxes were occupied when checked, but only 9% were occupied by Delmarvas with 22 squirrels in 18 boxes. Six of these were male, five female, and eleven escaped before being sexed. There were no litters.

Refuge personnel conducted a population survey on the 52 acre woodland block adjacent to Egypt Road in November and December. This activity is part of a continuing study on the fox squirrel population on this tract to determine population size and the effect of timber stand improvement on both fox and gray squirrels. The population, estimated at 27 fox and 4 gray squirrels, was calculated using the mark-recapture method. A total of 23 fox squirrels and 4 grays were captured during two 2 week periods. The fox squirrel population was estimated at 20 and the grays at 3 during the last survey in 1976. The significance of this difference has yet to be determined.



81-A-22 State Biologist Bob McKee and refuge staff trapping fox squirrel. New uniform jackets were hard to come by.  
Photo by J. D. Schroer

In cooperation with the Delmarva Fox Squirrel Recovery Team, refuge personnel trapped 12 squirrels in March and April and 11 squirrels in September on private land adjacent to the refuge for transplant to release sites in Cecil and Kent Counties, Maryland. Permission was granted from landowners to remove the squirrels from woodlands which were scheduled to be cut.

Although peregrine falcons are occasionally sighted on the refuge during migration periods, none were reported in 1980.

Two golden eagles were sighted on a regular basis during the winter and early spring, and then again in late fall.

The first osprey of the year were sighted on March 13, and the population built to a peak of 35 in July. Nine pairs initiated nesting, but a bad windstorm on June 4 blew eggs and young from five nests. Eight young were produced from the four remaining active nests. During 1979, out of nine active nests, eight nests yielded sixteen young.

## B. Migratory Birds

### 1. Waterfowl

Total use days for ducks, geese, swans, and coots totalled 8,682,387 during 1980. This use was up from 1979 which was a poor year. A summary of use for the past three years is as follows:

<u>Species</u>	<u>Use Days 1980</u>	<u>Use Days 1979</u>	<u>Use Days 1978</u>
Geese	5,771,865	4,250,880	6,029,190
Ducks	2,855,842	2,059,085	2,899,980
Swans	42,615	18,705	16,560
Coots	12,065	9,425	9,780
Total	8,682,387	6,338,095	8,955,510

The low numbers in 1979 were due to low peak populations during the fall migration when the entire northeast experienced unseasonably mild weather and waterfowl stayed to the north longer than normal.

At the start of 1980 there were 15,400 Canada geese, 1,000 snow geese, 380 whistling swans, and 3,896 ducks (including 2,800 mallards) using the refuge. Many birds moved to larger bodies of open water during the severe winter months when the refuge marshes and ponds froze over. Spring migration began in March with most of the birds departing during the month. By April the swan and most of the northward bound ducks had gone and only 800 Canada geese remained.





A large number of young snow geese arriving at the refuge was an indication of a good production year.  
Photo by J. D. Schroer



A peak of 60,000 Canada geese used the refuge during the year. Photo by J. D. Schroer

A small resident flock of 100 Canada geese produced 55 young compared to 60 produced by 200 birds in 1979. Approximately 1,300 ducks inhabited the refuge during the summer with production by species as follows: mallard 150, black duck 100, gadwall 50, blue-winged teal 100, and wood duck 200.

An influx of blue-winged teal beginning in mid-August marked the start of fall migration. Migrating Canada geese began arriving in late September and peaked in mid-November at 60,000, up from the 50,000 peak in 1979. Snow geese began arriving in October and peaked at 3,000. The 3,000 used the refuge from October 20 through the remainder of the year. Snow geese peaked at 3,000 last year also, but only 2,000 were present throughout November and December.

Swan began moving onto the refuge in late October and a peak population of 600 was recorded mid-November. The average population in November and December was 280.

Ducks also peaked in mid-November at 36,375, up from 24,375 in 1979. Included were large numbers of mallards (peaked at 7,500 in December), green-winged teal (12,000), American widgeon (10,000), and pintail (8,000 in October). The black duck population at 1,500 birds remained low but represented an increase of 500 over 1979 numbers. Heavy use of the millet in refuge impoundments was observed. The availability of food throughout the period may have held the birds on the refuge later than in previous years, contributing to the increase in use days reported. It may also have been responsible for the increase in the refuge black duck population.

In cooperation with the state of Maryland, the refuge banded 339 mallards and 115 black ducks in the 1980 post-season effort. The black duck reward band study continued during the year. This program was a joint effort between the U. S. Office of Migratory Bird Management and the Canadian Wildlife Service with all states and provinces cooperating. The quota of 75 black ducks was exceeded at Blackwater in an attempt to assist Glen L. Martin NWR personnel unable to meet their quota of 75 due to heavy ice conditions and gas restrictions. The refuge quota of mallards was 400. The state requested assistance in meeting their Canada goose quota (1,000) and 1 cannon net firing netted over 300 birds bringing the state's total to 1,043.

An attempt at preseason banding of 75 black ducks in August and September was unsuccessful at Blackwater; however, 52 birds were banded at Glen L. Martin. Fuel restrictions prevented an all out effort to meet the quota.

## 2. Marsh and Water Birds

Total use days for marsh and water birds was 195,680 compared to 161,255 in 1979. Great blue herons and great and snowy egrets were the most common with other herons, bitterns, ibis, loons, grebes, and cormorants also present at various times of the year. The average population of great blue herons was 160, great egrets averaged 300 during all but winter months, and snowy egrets numbered 500 during the summer. A flock of 200 double-crested cormorants were observed on the refuge for a few days in late April, an unusually large number of these birds for this area.



1-80 Great blue herons are a year around treat for visitors along the Wildlife Drive. Photo by T. McCabe SCS

Drawdown in Pool 1 was aided by extremely dry weather, and shallow water and concentration of fish and other aquatic organisms attracted large numbers of wading birds. As many as 50 great blue herons were observed feeding in the 30 acre impoundment in the mornings and evenings during July.



### 3. Shorebirds, Gulls, Terns, and Allied Species

Use days for these birds totalled 901,320 compared to 776,440 in 1979. Among the more numerous species were herring gulls (peak 3,000 in May), greater yellowlegs (peak 600 in fall), and various smaller shorebirds including large numbers of sanderling and dunlin. The average woodcock population was 325. The drawdown in Pool 1 also attracted large numbers and a variety of shorebirds, including two stilted sandpipers, uncommon in this area.

### 4. Raptors

The southern bald eagle and osprey are covered in Section IV, A. Endangered and Threatened Species.

Use days for other raptors was 116,244, down from 148,442 in 1979. Turkey vultures (average population 325), marsh hawks (peak 110 in winter), kestrel (average population 60), great horned owls (25), and red-tailed hawks (20) were numerous during different periods of the year depending on food availability.

### 5. Other Migratory Birds

The September mourning dove survey showed the population unchanged from last year at an estimated 800. The Christmas bird count turned up 118 species and 80,559 individuals on a cold day. A Lincoln sparrow was the only unusual species spotted.

## C. Mammals and Non-Migratory Birds and Others

### 1. Game Mammals

The whitetail deer population was estimated at 650, up from 600 in 1979, and sika deer remained stable at 500. To better monitor the refuge deer population, monthly road counts were initiated in December and will be conducted monthly during the winter.

The State of Maryland placed a three deer limit in Dorchester County for the 1980 deer season. This limit could include no more than one whitetail during the 1980 season. Deer kill was near 2,000, and this, along with road kills, keeps the deer herd on and adjacent to the refuge in good condition.

### 2. Other Mammals

a. Muskrat. The muskrat population was estimated at 16,250 during the November 1979 house count. A total of 7,177 were removed by 13 trappers during the season which ran from December 15 to March 15. The increase over the 3,996

removed in 1979 was due to an increase in population from 10,300 and good weather conditions for trapping. The refuge received a total of \$9,337.41 for the 1980 season trapping rights. This trapping program was accomplished by sealed bids on all trapping units.

The 1981 muskrat trapping season in Maryland began on December 15, 1980. The November house count indicated that the refuge had an estimated population of 16,125 muskrats. Trapping on the refuge also began December 15 as the 13 units yielded \$15,548.09 in revenues.

- b. Nutria. The nutria population was estimated at 500 with a total of 73 removed during the 1980 trapping season. The severe winter of 1976-77 dropped the population from 7,800 to less than 400 by late 1977 and early 1978. The population increased to 525 by late 1978 and early 1979.
- c. Other. The otter population was estimated at 30. No increase was noted in 1980 and no trapping was permitted. A total of 45 raccoons were removed from a population estimated at 1,000 during the trapping season. The red fox population was estimated at 130 and gray fox at 20 from track counts and daytime observations. Three red fox were removed by trappers. In the 1981 trapping season, trappers on the 13 units were permitted to begin removing predators beginning December 1. Both fox and raccoon populations keep waterfowl production at a low level, and it is hoped that trappers will make a greater effort to remove some of these animals during the two week period. The population of eastern gray squirrel was estimated at 500, opossum 200, striped skunk 50, and cottontail rabbit 600. The large red fox population helped keep the rabbits in check.

### 3. Resident Birds

The bobwhite quail population was estimated at 900 compared to 850 in 1979.

### 4. Other Animal Life

Various species of reptiles and amphibians inhabit the refuge. Among the more common are: diamondback terrapin, eastern painted, mud, eastern box, and snapping turtles; various frog species including bullfrog, treefrog, leopard frog, and American and Fowler's toads; and various snakes with the northern water snake being most common. Copperheads are spotted on occasion, our only poisonous snake.

## V. INTERPRETATION AND RECREATION

### A. Information and Interpretation

#### 1. On-Refuge

Total refuge visits during CY 80 were 96,084 which represented a 13% increase over CY 79 despite the visitor center being closed for renovation for four months in the winter. October, November, and December continued to be the months of highest public use with 13,124 visits in October, 22,726 visits in November, and 9,318 visits in December. The summer months of July and August were once again periods of low use. During these months the abundance of wildlife is in the form of insects that inhabit the marsh areas - you know the ones.

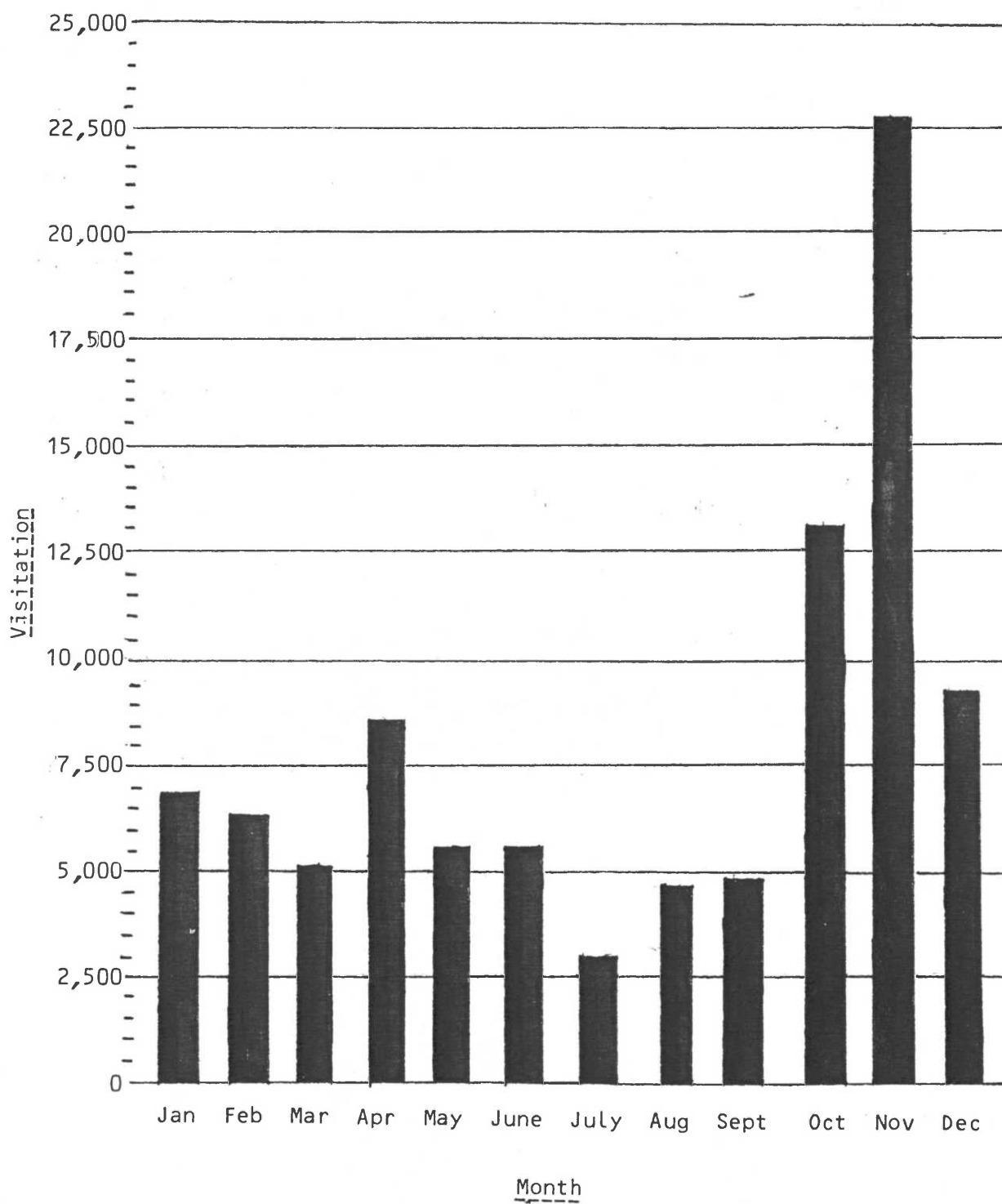
Public use was concentrated most heavily under the category of wildlife interpretation. The Wildlife Drive accounted for 79,086 visits, the visitor center 35,264 visits, and the wildlife foot trails 14,303 visits.

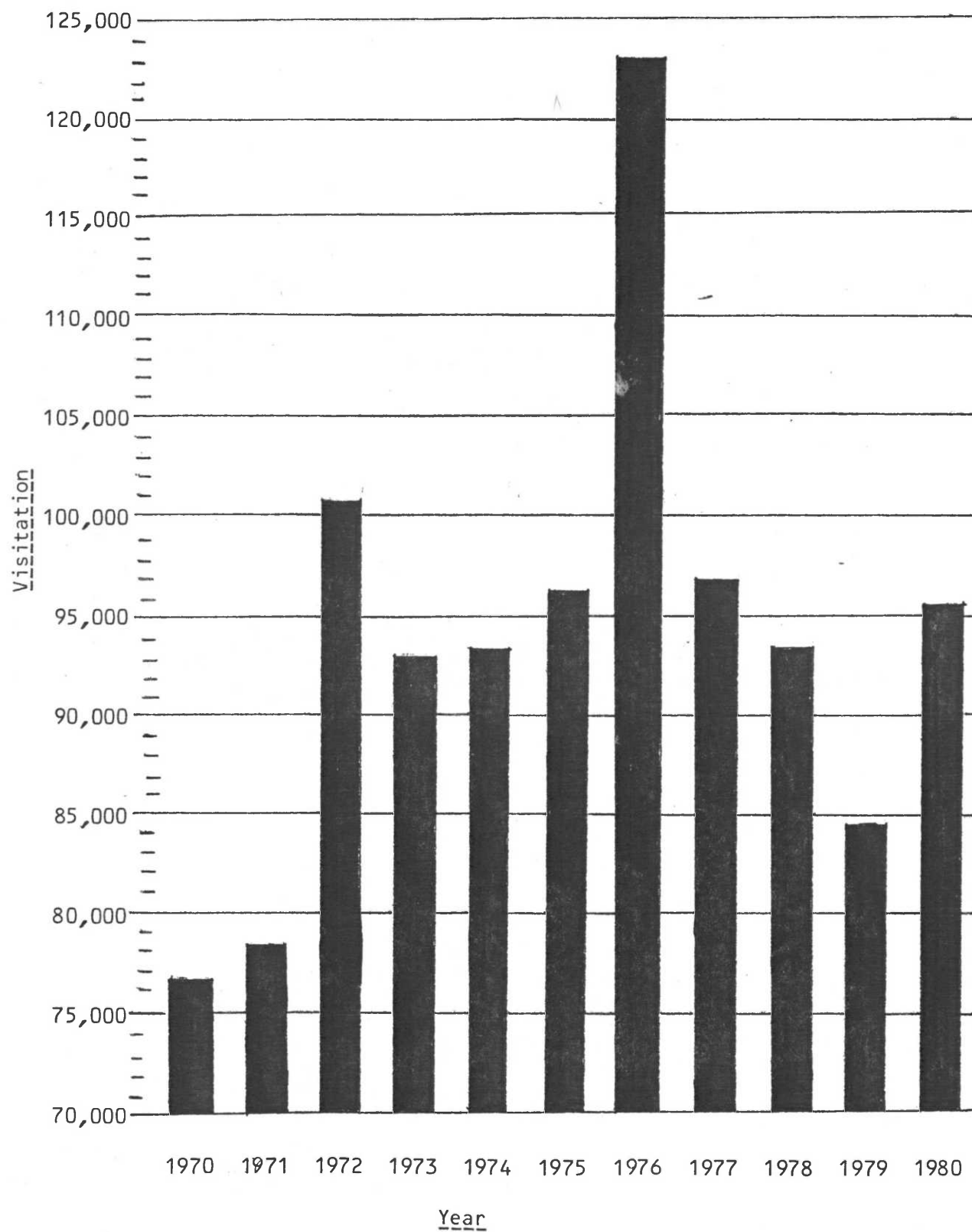
On-site programs and tours were presented to 104 scheduled groups totalling 4,259. These groups consisted primarily of school, civic, and professional organizations. Noteworthy groups included Rutgers University students, University of Maryland professors, members of Corps of Engineers taking a wetlands ecology course, Frostburg Wildlife Management class, St. Mary's College students, Smithsonian Resident Associates, and Fairfax County Park Authority.

General film and interpretive programs were presented to 6,838 visitors. Daily programs were presented Monday thru Friday at 10:30am and 2:30pm and every hour on the hour on Saturdays and Sundays.

The visitor center was closed from January 2 until May 27 for renovation as the floor was leveled and retiled. This accounts for some decline in refuge visitation for these months. The center was opened for week day visitation in the summer and then open every day from 7:30-4:00 beginning in September.



TOTAL VISITATION BY MONTH FOR 1980

TOTAL VISITATION 1970-1980

A large percentage of school group use was generated from the Baltimore-Washington area, a drive of approximately two hours. Due to the driving distance, groups usually have only two-three hours for an interpretive and/or outdoor classroom experience. Although interest in the outdoor classroom is increasing many teachers still prefer the visitor center programs and guided tours. Because of time limitations many groups are unable to participate in extended programs, and teachers often feel that a basic interpretive program to orient the students to the refuge and FWS is best. Most teachers are excited about environmental education; however, they seem to be very facility oriented and are more attracted to the Wildlife Drive, foot trails, observation tower, and visitor center than to environmental education. In addition, a growing trend in the education field is "back to basics" and teachers cannot always justify an outdoor classroom experience versus a long reading period. Environmental education is not a top priority in schools these days, and with the ever present gasoline problem and budget cuts, school bus trips are limited.

Most of the outdoor classroom activities take place at the woodland EE site - a four acre area composed primarily of mature hardwood forest. A cleared section in the middle of the site contains benches for meeting to organize and for discussion. This year a total of 285 students and 673 activity hours were recorded. Future plans include the development of several outdoor classroom sites for a variety of experiences.

Blackwater worked in conjunction with the Dorchester County school system to develop and carry out a teacher workshop on three separate dates in March, April and May. Two days were spent at Mace's Lane School and one at the refuge. Approximately 11 teachers participated in the last session on the refuge on May 10. Activities during the day included: group discussions concerning environmental education and the role of the Fish and Wildlife Service; the film "Let the Real World Work for You"; a cemetery study and an investigation of the marsh; and a basic orientation to Blackwater's facilities and programs.

There were improvements and additions to the exhibits at the visitor center during the year. YCC enrollees constructed a free standing display that was added to the center. The display is educational and allows the visitor to get involved. It provides for matching a picture of an animal with a name and if the match is correct a light appears.





80-J-33 Interpretive Specialist Zeamer conducting EE Teacher Workshop. Photo by K. Kammeyer



80-5-25 A "get involved" display constructed by YCC camp. Photo by K. Kammeyer

In conjunction with the reopening of the visitor center on May 27, two other new exhibits were installed. Mr. Dick Paul of East New Market, Maryland prepared mounts for a puddle duck display in the exhibit room and Mr. Doug McConnell of Cambridge, Maryland has several waterfowl photographs on display in the auditorium.



81-E-7 Photo by P. R. Schmidt

In December another photograph exhibit was displayed in the auditorium. This one was loaned by Mr. Bryan Allen of Reston, Virginia. In addition an age log was developed marking the rings of growth on a tree stump and keying that to some event in history particularly those pertaining to wildlife.

A contract to redesign the interior of the visitor center was let in September to Design and Production, Incorporated of Alexandria, Virginia. The contract calls for the redesign of the interpretive displays and laying out a more functional flow pattern. The new exhibits will provide more information to the public on the management at Blackwater and the role of refuges in the larger picture. The implementation of the design should take place sometime in CY 1981.

Blackwater continued its cooperative sales agreement with Eastern National Park and Monument Association, Philadelphia, Pennsylvania enabling the refuge to provide educational books for sale to the public. The total sales for this CY were \$3,264.95. The following titles were available for purchase: Beautiful Swimmers, Birds of North America, Blackwater, Chesapeake, Chesapeake Bay in Maryland-Atlas of Natural Resources, Field Guide to the Birds, Fifty Birds of Town and City, Golden Guide to Mammals, Golden Guide to Reptiles and Amphibians, Life and Death of the Salt Marsh, Migration of Birds, Guide to National Wildlife Refuges, Tidal Wetland Plants of Virginia, Trees of North America, Wildflowers of Delaware and the Eastern Shore, and A Woman Called Moses.

Leaflets available to the public included the general refuge brochure, Birds of Blackwater, Mammals of Blackwater, Reptiles and Amphibians of Blackwater, The Canada Goose at Blackwater, Endangered Species of Blackwater, and several public use maps. Two new trail guides, Wildlife Drive guide and a revised Blackwater leaflet will be printed in 1981.

The following special events, visits, projects, and tours took place during 1980:

Biological Technician Willey conducted a tour of the refuge for 16 wildlife students from the University of West Virginia.

Messrs. Hennesey and Truitt of The Nature Conservancy toured the public use facilities of the refuge on April 9.

The refuge bike route, which includes approximately 2½ miles of the Wildlife Drive, has been extended to permit refuge visitors to bike along the dike from April 1--August 31.

On Saturday, May 31, Hilario Moreno, from Paraguay, Mr. Curtis Freese of the WO FWS International Affairs Office, and Mr. Ken Thelen of the NPS in Washington visited the refuge.

On November 2, Refuge Manager Schroer conducted a tour of the refuge for Dr. John Harradine from Great Britain and Ireland, Mr. John Wilson from Ireland, Dr. Heribert Kalchreuper from West Germany, and Mr. John Tautin with the U. S. Fish and Wildlife Service in Laurel, Maryland.

## 2. Off-Refuge

Ten news releases were made during the year. Subjects included temporary closing of visitor center, biking, walking on the refuge, YCC, reopening of the last loop of the Wildlife Drive, visitor center schedule, public use on Martin Refuge, sale of Migratory Bird Hunting and Conservation stamps,



trapping on the refuge, and personnel changes. A number of seasonal stories about the refuge were also reported, along with several major stories about the proposed land acquisition.

On May 20 WMDT-TV Salisbury, Maryland videotaped a talk by Biological Technician Guy Willey on Delmarva fox squirrel management at Blackwater. "Sports Afield" filmed some scenes at Blackwater to go into a documentary on the Chesapeake Bay. The Chesapeake Bay Foundation filmed the bid opening for trapping on the refuge to be included in a documentary they are doing.

A total of seven off-site slide programs, films, and talks were conducted for groups such as senior citizens at Cambridge House, DAR, fourth graders at Sandy Hill Elementary School, Vienna Elementary School, Bucktown 4-H Club, and Mace's Lane Middle School.

Professional services were offered to Howard County Parks and Recreation Authority, North Dorchester Middle School, and the Ashland Nature Center.

The refuge participated in two off-site exhibits during the year. Manned displays were taken to the Outdoor Show in Cambridge in February and the Waterfowl Festival in Easton in November.



80-W-1 This exhibit was used at the Easton Waterfowl Festival in November. Photo by K. Kammeyer



## B. Recreation

### 1. Wildlife Oriented

Wildlife-wildlands observation and photography use totalled 47,891 visits. Most of this use was associated with the Wildlife Drive, foot trails, observation tower, and boating. Boating is permitted on the refuge during designated times of the year and although boat launching from the refuge is prohibited, a public launch ramp is located adjacent to the refuge at Shorter's Wharf. This launching area enables boaters to enter the refuge at the south end.

The refuge was closed to all hunting; however, sport fishing and crabbing were permitted from April 15-October 15. One thousand three hundred and seventy-four visits for sport fishing and 285 visits for crabbing were recorded during the year. Sport fishing increased by 280 visits from CY 1979, while the crabbing decreased by 536 visits.

### 2. Non-Wildlife Oriented

Nothing to report.

## C. Enforcement

In January Refuge Manager Schroer was contacted by an adjacent landowner to investigate one of the refuge trappers who was trapping illegally on the landowner's marsh. Since no refuge violations occurred, prosecution was left up to the landowner.

Four members of the refuge staff attended FLETC training sessions at Glynnco, Georgia during the year. Biological Technician Willey and Refuge Manager Schroer attended four weeks of basic LE training in February and March. Assistant Manager Koch attended for one week of refresher course in June and Assistant Manager Quarve attended nine weeks of basic training, September thru the first week of November.

Biological Technician Giese completed the semi-annual pistol qualification at Virginia Beach during July.

During clear cutting operations in woodlands adjacent to the refuge's Jarrett tract, the timber cutting crew was unable to find a boundary line and mistakenly cut twelve 10-18 inch loblolly pines on the refuge. Contact was made with the timbering company, and they agreed to supply the refuge with the equivalent board feet of logs; these will be used during marsh restoration work.

On November 16, Biological Technician Giese apprehended four individuals on a trespass violation at McGraws Island. To date, three of the persons have paid their \$50.00 fine, and one is still pending.

Three deer were found shot and left lying in refuge fields during the month of November, preceeding the state deer season. Refuge staff made periodic checks of the area during the period with no results; however, a local sheriff's deputy and a state warden did apprehend three individuals who were lighting the fields on and adjacent to the refuge. Refuge personnel patrolled the refuge during the deer season for night lighting but no violations were observed.

## VI. OTHER ITEMS

### A. Field Investigations

1. This refuge has experienced a 31% loss of marsh habitat during the period 1938-1972, and the marsh loss problem has continued at an accelerated rate since 1972. Over 2,000 acres of predominately three-square marsh on the refuge alone were replaced by shallow open water or mud flats. A study to determine the cause of loss was initiated in 1978. This study which continued through 1980 is a co-operative effort of the refuge, Maryland Department of Natural Resources, and the University of Maryland's Horn Point Environmental Laboratory.

During 1980, the marsh loss study centered around research by the University of Maryland and experimental management practices by the refuge. The University of Maryland involvement during the year included the following: analysis of data gathered from animal exclosure experiments conducted during 1979; comparison of burned versus unburned areas; productivity survey of selected Chesapeake Bay marshes; water sampling to determine herbicide content; determination of sediment accretion and decomposition rates; and analysis of fertilization and elevation experiments on the marsh. Results of the above experiments include:

1. Animal Exclosure Experiments - Two years of data indicated that no significant difference exists between the amount of vegetation inside versus outside the exclosures.
2. Burned Versus Unburned Areas - Results indicated that growth rates within the two areas are not significantly different; however, burned areas contain more living biomass since marsh growth starts sooner than in unburned areas.
3. Productivity of Chesapeake Bay Marshes - Marshes on Blackwater were about average in regards to productivity.

Other experiments are awaiting analysis. The University has also assisted in setting up monitoring techniques for the refuge's experimental management practices.

Experimental management practices conducted by refuge personnel included the use of log booms, sand fence, enclosures, plantings, and fertilization. Approximately 2,100 feet of log booms were placed at various locations where the marsh has disappeared. The booms serve as barriers to wind/wave action and also catch sediments. In a number of locations, vegetation has become established behind and in the vicinity of the booms. Two thousand feet of sand fence were put out at five locations with the idea that sediments would be trapped and the marsh elevated allowing vegetation to become established. Although this method will be a slow process, one area has responded favorably. Enclosures which elevated the marsh two, four and six inches were placed at four locations. Initial indications are that the elevated areas produce a better marsh. Certain area mud flats were also planted with various marsh plants such as cattails (Typha spp), cordgrass (Spartina spp), etc. The areas planted in cattails have shown considerable growth, revegetating some areas. Other species planted have shown limited success in becoming established. Fertilization of certain areas was begun late in the year due to high water levels: therefore, no significant effects have been noted. These practices will be monitored in 1981 to determine success after a winter.

Due to the study and experimental management practices pointing towards water levels as a key factor in marsh survival, plans for 1981 include the monitoring as mentioned earlier and expansion of the management practices. These practices would include additional plantings, log booms, and if permits can be obtained, areas within log booms and open mud flats would be filled using a small suction dredge. These would be done on a small area, one to two acres, to determine the feasibility of re-establishing the marsh.

2. In cooperation with the State of Maryland and the Delmarva Fox Squirrel Recovery Team, refuge personnel trapped 23 squirrels on private lands adjacent to the refuge for transplant to release sites in Cecil and Kent Counties, Maryland. Some of the squirrels were fitted with radio collars to monitor movement in an effort to re-establish this endangered species to parts of its former range. The squirrels appeared to adjust readily to their new environment.
3. The state, under direction of the recovery team, checked 200 nesting boxes on the refuge in February. See endangered species section for results.
4. Refuge personnel conducted a population survey of Delmarvas on the 52 acre woodland block adjacent to Egypt Road in November and December. This was part of a continuing study of the squirrel population and effects of TSI on this tract. See endangered species section for details.



80-T-28 Photo by J. D. Schroer

A portion of the marsh restoration project consisted of log booms (above) and plantings (below). The marsh seen behind the log booms grew on bare mud flats during the 1980 growing season.



80-J-8 Photo by K. Kammeyer



5. 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 federal agencies.

#### B. Cooperative Programs



80-Q-17 1980 YCC Camp Photo by B. Burns

1. The seventh season for the Youth Conservation Corps program at Blackwater began on June 23 and continued through August 15. The non-resident camp was funded \$29,000 with an enrollment of 20 Dorchester County youths and 4 staff members. The staff administering the camp consisted of a camp director, environmental education instructor, and two group leaders. Three of the staff members had previous YCC experience at Blackwater.

Accomplished work projects included: 8 hours of first aid training; 30 acres of timber stand improvement for the Delmarva fox squirrel; litter pick-up; seeding 10 acres of Japanese millet; painting refuge equipment, the YCC pavilion, tables and benches at the pavilion and trim at the visitor center; trimming vegetation along the trails and roads; renovating 10 squirrel crossing signs, cutting 3 acres of brush in Pool 5; disassembling an obsolete goose holding pen; repairing the large duck trap; maintenance at Quarters 1 and

of grounds and buildings; repair of the corn bins; rehabilitation of the brick posts at the entrance to the Wildlife Drive; and construction of 10 osprey nesting platforms, 10 wood duck boxes, a quiz box for use at the visitor center, 3 trash can enclosures, and several fly traps.



80-Q-32 Photo by B. Burns

YCC



80-Q-30 Photo by B. Burns

If you put enough effort on a rusty piece of equipment, the end product can be outstanding.

Environmental education related activities were conducted approximately ten hours per week and complemented most work projects when possible. Activities included investigation of food webs and characteristics relating to Delmarva fox squirrels, tree identification, pond characteristics and construction, bird migration, uses of open land, land purchases, construction of bird houses, scavenger hunts, and non-energy consuming activities. A trip was also made to Shad Landing State Park to compare swamp and marsh habitats.

#### 1980 YCC Enrollees

Sammy L. Beasley	Joseph H. Hughes
Gerald M. Bell, Jr.	George W. Hyde, III
Daniel C. Borga	Marsha J. Marsh
Darren W. Bromwell	Lisa A. Meekins
Eric D. Ferguson	Michael P. Meyer
Robert F. Foxwell	Linette C. Sampson
Marisa R. M. Garcia	Melanie D. Thompson
Imelda M. Garcia	Kevin D. Thompson
Diane D. Green	Robbie J. Willey
Chadocia B. Green	Richard E. Wongus

2. The YACC program began the year with 15 enrollees, 1 supervisor, no funding, and the same problems as in the preceeding year. The need for more enrollee supervision was apparent with this enrollee-supervisor ratio. Refuge funds were needed and used to procure materials for projects throughout the year. A four day work week with ten hour days was tried for eight months but was discontinued due to inability to coordinate refuge and YACC personnel on projects. Due to a hiring freeze, enrollee numbers had dwindled to three enrollees and one leader by the end of the period.

Work projects accomplished during the year included: construction of 20 wood duck nesting boxes; 1 mile of boundary posting on the Jarrett tract; placement of 370 tons of riprap along Wildlife Drive; boat maintenance; cutting channel marking poles; assisting in placement and baiting of squirrel traps during Delmarva fox squirrel transplant operations; assisting with marsh loss study, i.e. placement of log booms and sand fence and planting marsh grasses; assisting staff with visitor center reopening after floor repairs; tearing out old interior of Tyler house at Martin NWR for renovation; manning visitor center desk part time; boathouse maintenance, i.e. anchoring 125 feet of bulkheading with tiedowns and replacement of 40 feet of tongue and groove bulkheading and several support pilings; track spreading of 240 tons of slag on Jarrett



tract fire lane; assisting refuge staff with replacement of shingles on the refuge office roof; grounds and building maintenance; construction of 3 new guard rails on Wildlife Drive; riprapping water control structures at Pools 4 and 5; constructing fiberglass predator guards for wood duck nesting boxes; and assisting staff with controlled marsh burning operations.



81-E-36 Photo by B. Handley

YACC corpsmembers constructed and installed fiberglass predator guards for wood duck nesting boxes. These guards blend into the surroundings more so than the metal shields.



81-E-35 Photo by B. Handley



### C. Items of Interest

People were so busy being trained in one area or another there wasn't much time to think about transferring out, resigning or leaving for another position. There were a few however:

Sally Huston, a 700 hour intermittent Biological Technician, was hired March 30 and terminated August 31. Sally was hired in conjunction with the marsh loss study being carried out at Blackwater.

After working at Blackwater for four years, ORP Kathleen Z. Zeamer transferred to Great Dismal Swamp NWR in Suffolk, Virginia. She began work there June 15. Kathy contributed much to the public use program at Blackwater, and her talents have been missed. Outdoor Recreation Planner Paul Schmidt transferred from Back Bay on December 1 as a replacement for Kathy. Even though he did manage to arrive after the busiest part of the year, his arrival was welcomed knowing that the experience he brings to Blackwater will help expand and improve the I&R program.

Each year 700 hour intermittent appointments are made for Recreation Assistants to help out at the visitor center during the busy season. Patti Hall, Recreation Assistant under a 700 hour intermittent appointment starting September 1979, was terminated August 31, 1980. Catherine Baptist and Larry Dail were hired October 5 for the 1980 season.

The busy season at the visitor center also increases the daily maintenance needed to keep the building tidy; John Lee was hired October 20 a 700 hour intermittent janitorial position to do nightly cleaning.

Many days in 1980 were spent meeting mandatory training requirements by several members of the staff. The following personnel attended the listed training: two members of the staff completed EEO training during the year, Interpretive Specialist Zeamer attended training January 28 thru 30, and Manager Schroer on December 11 and 12. Manager Schroer also attended advanced supervisory training January 28 thru February 1.

Biological Technician Guy Willey spent the month of February (2-4 thru 2-29) in Glynnco, Georgia attending the Federal Law Enforcement Training Center. Manager Schroer attended the same training from February 25 thru March 21. Assistant Manager Koch attended a one week review session at FLETC from June 1 thru 6.

Assistant Manager (Trainee) Quarve attended the basic refuge manager academy at Beckley, West Virginia March 3 thru 28, and Assistant Manager Koch attended the advanced refuge manager academy from April 14 thru May 2.

Finally to cap law enforcement training off for the year, Assistant Manager Quarve started nine weeks of law enforcement training at Glynco on September 3, which she successfully completed November 5.

For those not attending mandatory training (and some who had) there were meetings, workshops and other training sessions to include most everyone sometime during the year. Following is a list of personnel attending and type of session:

In order to become certified Biological Technician William Giese took the chemical applicator's exam in Baltimore on January 18.

Assistant Manager Koch and Biological Technician Giese participated in the National Wildlife Federation's raptor short course in Annapolis January 30 and 31.

The annual administrative workshop was held the week of April 21, Administrative Clerk Henry and Clerk (Typing) Ciekot traveled to Virginia Beach, Virginia to attend.

With the introduction of performance standards a training session was held in Beltsville, Maryland May 12 and enthusiastically attended by Manager Schroer and Assistant Managers Koch and Quarve. The area programmatic meeting followed that meeting on May 13 and 14, and Schroer and Koch were attendees.

Camp Director Barbara Burns and Environmental Education Instructor Doug Becker attended the YCC training session May 12 thru 16.

Biological Technician Giese successfully completed the FWS semi-annual pistol qualification on July 22 which was hosted by Back Bay Refuge.

A waterfowl banding workshop was held September 8-10 at the Middle Creek State Management Area in Schafferstown, Pennsylvania and was attended by Biological Technician Giese.

Other items of interest occurring in 1980 include:

On November 4 Bettie Spencer and Lillie Burnham from the Office of Equal Opportunity conducted an EEO evaluation at Blackwater and talked to all members of the staff who were present.

Biological Technician Guy Willey continues to serve as a member of the Maryland Advisory Committee on trapping of furbearers. He also serves on the Delmarva Fox Squirrel Recovery Team.

This report was compiled by the majority of the refuge staff most of whom thoroughly enjoyed this opportunity to relax behind their desks. Recognition, praise and/or criticism for the content or layout of this document should be directed towards the following:

<u>Section</u>	<u>Responsible Person</u>
I	Manager Schroer, Biological Technician Willey
II	Assistant Koch
III	Manager Trainee Quarve
IV	Manager Trainee Quarve
V	Outdoor Recreation Planner Schmidt and Biological Technician Giese
VI	Manager Schroer, Manager Trainee Quarve, Recreation Assistant Kammeyer, Administrative Clerk Henry and Biological Technicians Willey and Giese

This report was edited by Manager Schroer, re-edited and typed by Administrative Clerk Henry.

#### D. Safety

Safety meetings were scheduled and held monthly and attended by all staff members present on the scheduled date. Some topics of safety included:

1. Proper and safe use of refuge vehicles and equipment.
2. First aid.
3. Household safety.
4. Presentation on artificial resuscitation.
5. The Maryland Forest Service assisted the refuge safety committee in a simulated refuge fire. This drill was most effective in pointing out the strong and weak reactions of the staff in such a situation. This was a very helpful exercise in what could be a serious matter.

6. Safety bulletins and memos and other routine articles from the RO were discussed.

Various safety projects were completed during the year and minor equipment was serviced or replaced as needed.

No lost time accidents occurred in this reporting period.



GLEN L. MARTIN NWR



PERSONNEL

<u>NAME</u>	<u>TITLE</u>	<u>GRADE</u>	<u>EOD</u>	<u>STATUS</u>
Michael K. Harrison	Maintenance Worker	WG-07	1-28-79	PPT

Review and Approvals

*John D. Schroer* 3/6/81  
Submitted by \_\_\_\_\_ Date \_\_\_\_\_  
*Martin Refuge*  
*Smith Island*  
*Ewell, Maryland 21824*

Refuge

Area Office \_\_\_\_\_ Date \_\_\_\_\_

Regional Office

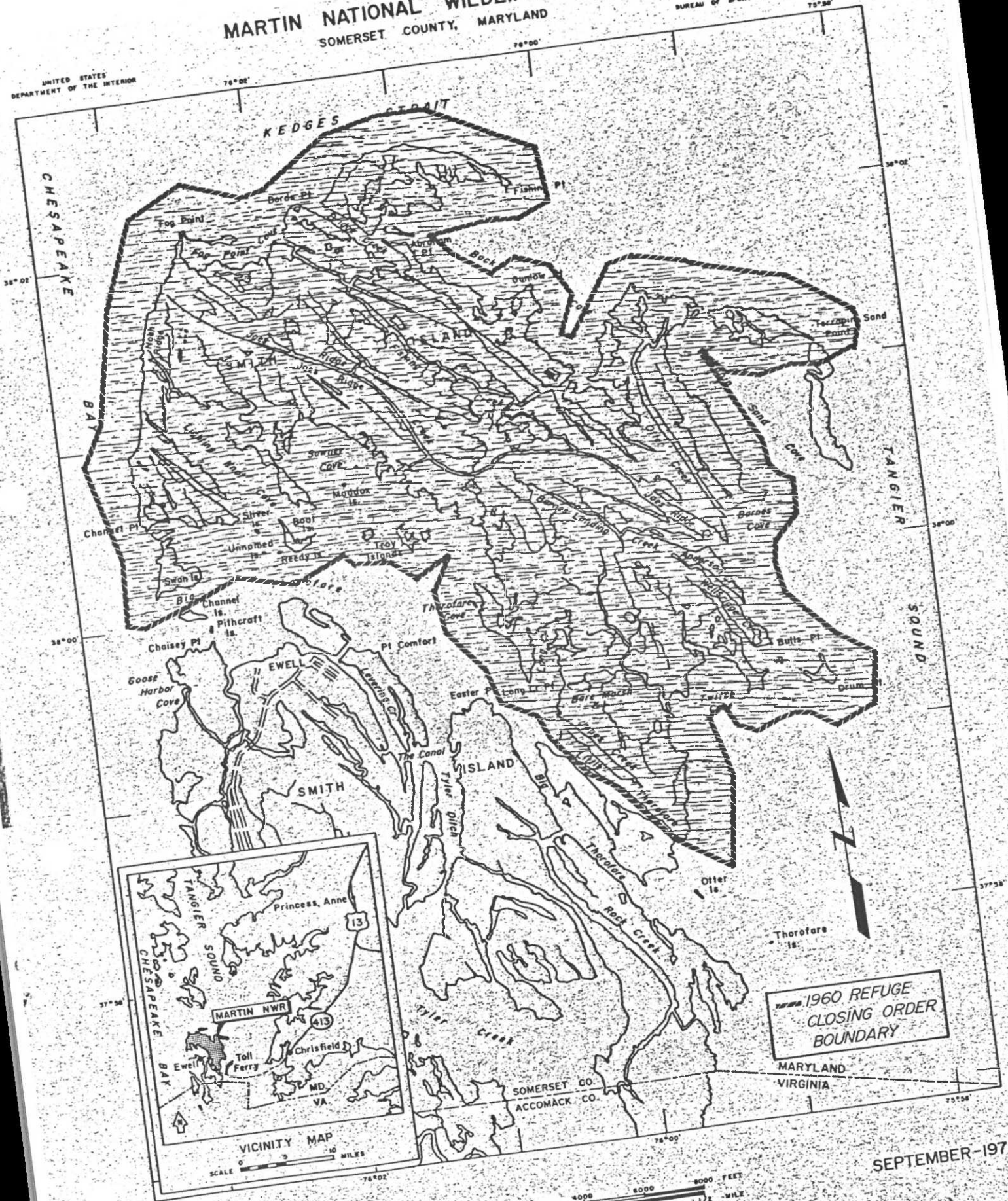
Date \_\_\_\_\_

# MARTIN NATIONAL WILDLIFE REFUGE

## SOMERSET COUNTY, MARYLAND

FISH AND WILDLIFE SERVICE  
BUREAU OF SPORT FISHERIES AND WILDLIFE

UNITED STATES  
DEPARTMENT OF THE INTERIOR



1960 REFUGE  
CLOSING ORDER  
BOUNDARY

SEPTEMBER-1971

Preliminary-Subject to Change

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## Glen L. Martin National Wildlife Refuge

### I. GENERAL

#### A. Introduction

Martin National Wildlife Refuge, the northern sector of Smith Island in Chesapeake Bay, is located in Somerset County, Maryland. The Federally owned land acreage, which totals 4,423 acres, extends to the mean high tide mark. The refuge was established in 1954 with the acceptance by the government of a 2,569.86 acre land gift from the late Glen L. Martin. Additional land purchases approved by the Migratory Bird Conservation Commission increased the size of the refuge to its present acreage. A 1960 Secretarial Closing Order provided the refuge with a 300 yard wide proclamation boundary inside which hunting is not permitted.

Primary objectives of the refuge include providing resting and feeding habitat for ducks and geese and providing nesting habitat for waterfowl, wading birds, shorebirds, and ospreys. The marsh and estuary of the refuge are also important in the production of crabs, oysters, and many other marine species.

Martin Refuge is administered from the Blackwater National Wildlife Refuge near Cambridge, Maryland. Travel to the refuge is restricted to boats traveling a distance of approximately 11 miles from Crisfield, Maryland.

#### B. Climatic and Habitat Conditions

The year 1980 was extremely dry throughout Delmarva and the East Coast. Martin Refuge total precipitation was 30.69 inches which is well below the 49 inches in an average year. Snowfall was approximately 12 inches and is near the normal average of 15 inches. Temperatures ranged well above normal in the summer months with one of the hottest summers on record. Highs of near 100 degrees were recorded on several days and a low of 6 degrees was recorded in late December.

Tides on the refuge were below normal during the winter and fall months. Only one extremely high tide was recorded for the year and this occurred in March. Normal tidal fluctuation affecting the refuge is approximately two feet with extremely low tides in winter and higher tides flooding the marsh in the summer.

Growth of needlerush (Juncus roemarianus) and saltmarsh bulrush (Scirpus robustus) was good during the year. Aquatic growth of widgeon and eel grass was the best reported since the late 60's. However, vegetation on the ridges was not as dense as in 1979 due to lack of precipitation. Sufficient cover was available for the heron and egret rookeries found on the refuge.

C. Land Acquisition

1. Fee Title

Nothing to report.

2. Easements

Nothing to report.

3. Other

Nothing to report.

D. System Status

1. Objectives

As with Blackwater's objectives, the ones for this station are in need of review and revisions. This refuge's objectives emphasize migratory bird maintenance. Black ducks, diving ducks, ospreys, and marsh/water birds are the principal species using the refuge. Although public use is not a high priority on this remote island refuge, plans to convert the Tyler house in Ewell to headquarters with public contact point will generate some public use outputs without harming the resource. The following chart compares 1980 output production with those of the objective levels:

<u>Output</u>	<u>1980</u>	<u>Objective Level</u>
Threatened Species Maintenance	19,231	44,000 ud
Waterfowl Maintenance	894,440	1,300,000 ud
Other MB Maintenance	3,865,605	2,400,000 ud

Future management, including protection, surveys, biological studies, and construction at Martin Refuge will be directed at increasing outputs toward the objective levels. Possible future management includes blasting potholes in the dense needlerush marsh to create small fresh to brackish water holes with small nesting areas for primarily the black duck.

2. Funding

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

<u>Activity</u>	<u>FY 77</u>	<u>FY 78</u>	<u>FY 79</u>	<u>FY 80</u>	<u>FY 81</u>
1210-MB	20,000	22,000	28,000	27,000	27,000
1220-MNB	1,000	1,000	1,000	1,000	1,000
Total	21,000	23,000	29,000	28,000	28,000

Prior to FY 79, funding was sufficient to cover salaries with very little left. The increase which occurred in FY 79 allowed the station to pick up some much needed small equipment. With the present rate of inflation, the decrease which came in FY 80 and no increase for FY 81, leaves this refuge with very little above salaries and fixed expenses for management programs.

Manpower on Martin Refuge during 1980 consisted of a temporary maintenance worker until August when Mike Harrison was appointed to a career seasonal part-time position, working 32 hours per week. Blackwater's personnel and YACC personnel assisted during the year with maintenance projects, surveys, etc.

## II. CONSTRUCTION AND MAINTENANCE

### A. Construction

In August refuge and YACC personnel started renovation of the Tyler house. The house will eventually serve as an office and visitor contact station with shop and overnight facilities for personnel on special details. The visitor facility will greatly enhance the Service's relationship with the local communities. Interior walls were removed in preparation for room modifications, insulation and rewiring. The final interior work will be done force account, but was not completed this year.

A contract was awarded in October with BLHP funds (\$39,139) to completely renovate the building's exterior. During November and December the contractor replaced the roof, installed new vinyl siding and installed all new windows and doors.



81-F-37 Tyler house with new siding and windows - future visitor contact point and crew quarters. Photo by W. Koch

B. Maintenance

On April 21 Maintenance Worker Mike Harrison piloted the refuge's new 32' diesel powered work boat from the builder in Trappe, Maryland to the refuge on Smith Island. The boat was a BLHP funded project of \$34,890. This boat is a useful piece of equipment for the remote island refuge and greatly enhances the safety aspects of transportation to and from the mainland. An electronic depth sounder was also installed.



81-F-36 New diesel work boat but no diesel allotment. Photo by J. D. Schroer



Routine maintenance was performed on boats, motors, the truck, and buildings. Blackwater's staff regularly provided assistance and support, and various hand tools and supplies were acquired.

A new boat trailer was brought to the island to allow removing the 20' runabout from the water for maintenance, repairs and during severe storms.

A 1970 cub cadet lawn tractor was transferred from Blackwater NWR to replace the old 1965 cub cadet. Blackwater also transferred a 35mm Pentax camera. A new portable air compressor and bench grinder were acquired.

Fifty-four osprey nesting platforms were serviced and boundary lines and boat channels were re-marked after winter ice damage.

A 1972 Dodge half-ton pick up truck was sold as excess property.

C. Wildfire

None to report.

### III. HABITAT MANAGEMENT

A. Croplands

None to report.

B. Grasslands

None to report.

C. Wetlands

Martin NWR consists mostly of needlerush marsh (Juncus roemarianus) with many small guts, creeks, and coves. A small ridge known as Cherry Island supports a marsh and waterbird rookery. Baccharis, honeysuckle, poison ivy and some woody shrubs densely cover most of the ridge. The only larger trees found are black locust, hackberry, red cedar, loblolly pine, and wild cherry. Several other small hammocks rise out of the needlerush and are covered mostly by baccharis and poison ivy. Marsh areas are flooded regularly with salt water tides. There are no man-made fresh water impoundments on the refuge and fresh water is very scarce in areas.



71-15-15 Typical view of Martin Refuge. Photo by W. Crews

D. Forestlands

None to report.

E. Other Habitat

None to report.

F. Wilderness and Special Areas

None to report.

G. Easements for Waterfowl Management

None to report.

#### IV. WILDLIFE

A. Endangered and Threatened Species

The first ospreys of the year were sighted on March 18. Nest construction began almost immediately after arrival and by early April 42 nests were active. Nesting activity peaked in June with 44 active nests out of the 59 nesting structures. This year's statistics as compared to 1979 are as follows:

	<u>No. Nesting Structures</u>	<u>Active Nests</u>	<u>Productive Nests</u>	<u>No. Eggs</u>	<u>Young Fledged</u>
1980	59	44	20	74	40
1979	54	42	39	40+	36

Forty young were banded on the refuge and 18 on adjacent land in June by personnel from the Patuxent Research Center with refuge personnel assistance.



71-15-13 Osprey production on the refuge is excellent. Photo by W. Crews  
The population peaked at 148 in July, and the last reported sighting was of two birds in October. The ospreys usually leave the refuge in October and return in March.

A bald eagle was sighted on Cherry Island December 18. Bald eagles are infrequent visitors to the island.

Use days for these birds totalled 19,231 in 1980.

#### B. Migratory Birds

##### 1. Waterfowl

Total waterfowl use days in 1980 were 894,440, up from 516,295 in 1979. The increase was largely due to weather conditions as the refuge was not iced in for long periods such as were experienced in 1979. Goose use days totalled 158,350, ducks 659,505, swans 75,980, and coots 605.

At the start of the year there were 460 swans, 600 Canada geese, and 3,075 ducks (half of these were sea ducks) using the refuge. Duck banding in February was hampered by fuel restrictions, unauthorized removal of ducks from traps, and predation by red fox. Twenty-six black ducks were banded, short of the quota of 75.

Geese and swan began their spring migration in March and by April were gone. Migrating ducks departed during April.

The refuge supported approximately 750 ducks May through July with numbers decreasing to 600 in August and 480 in September. Black duck declines accounted for this decrease as they apparently moved to neighboring areas. Production for 1980 was estimated at 180 with 30 mallards, 25 gadwall, 75 blacks, and 50 blue-winged teal, representing a three-fold increase over 1979. Fifty-two black ducks were banded during September in an attempt to fulfill Blackwater's preseason quota of 75. Fuel restrictions prevented an all out effort to meet the quota.

Fall migration through the refuge began in October when the first flock of Canada geese arrived along with a few swan, 600 black ducks, and a sprinkling of other ducks. Migration was in full swing in November with ducks increasing to 2,265 and geese to 1,390. Ducks, geese, and swan all peaked in December at 4,560, 2,200, and 1,575 respectively. The black duck population peaked at 970 compared to 675 in 1979 and only 300 in 1978. Numbers are still low, however, compared to previous peaks of 1,200 in 1974, 2,600 in 1972, and 3,600 in 1970.

## 2. Marsh and Water Birds

Use days of these birds was nearly the same as last year with 492,050 use days reported. Production in the heron and egret rookeries on Cherry Island was good again this year with 860 young produced. Dr. William Sladen of Johns Hopkins University banded eight great blue herons in the refuge rookery in June. The more common birds in this group include six species of herons, three species of egrets, glossy ibis, and double-crested cormorants. Peak numbers were reached in August with an estimated 2,250 individuals.





71-4-18 Cherry Island rookery. Photo by E. Prior

### 3. Shorebirds, Gulls, Terns, and Allied Species

These birds showed an increase with 3,367,355 use days compared to 2,412,640 in 1979. A gull rookery just outside the refuge on a channel dredging spoil site contributes a large number of the birds using the refuge. A number of different species use the refuge at various times of the year. Herring gulls are by far the largest group numbering around 3,000 during the winter and peaking at 9,000 in the summer. Three thousand young were produced on and adjacent to the refuge. Other species contributing large numbers to this group include dunlin, which average 1,200 in winter and 700 during other periods, laughing gulls at 1,800 during spring and summer, and least tern at 500 in summer and 1,200 in the fall. Limited production is reported for birds other than herring gulls in this group.

### 4. Raptors

Osprey are covered under Section IV, A. Endangered and Threatened Species.

Use days for other raptors totalled 6,200. Species using the refuge include marsh hawk (average population 20), American kestrel, merlin, barn owl, and turkey vulture.

5. Other Migratory Birds

Common species include mourning dove, red-wing blackbirds, robins, and marsh wrens.

C. Mammals and Non-Migratory Birds and Others

1. Game Animals

None to report.

2. Other Mammals

The muskrat population was estimated at 175 compared to 200 in 1979. The mink population held at 30 and appears to keep the muskrat population under control in the needle-rush marsh. River otters, found in creeks, guts, and the adjacent bay, number approximately 15. An estimated 10 red fox now inhabit the refuge. None were reported last year.

3. Resident Birds

None to report.

4. Other Animal Life

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. Peak population was estimated at 2,000, same as in 1979.

V. INTERPRETATION AND RECREATION

A. Information and Interpretation

1. On-Refuge

The majority of the refuge remains closed to public use due to limited upland areas, difficult access (the refuge must be reached by boat at high tide), and large heron rookeries which require undisturbed areas. However, in early September, a news release was sent out stating that a small section of Martin known as Swan Island would be opened to public use on a trial basis. Swan Island is a primitive area with no facilities available on the site. Activities to be encouraged include nature study, wildlife observation/interpretation and outdoor classroom activities. Arrangements must be made through the refuge staff prior to use. No requests were received during the year to use Swan Island.

Renovation of the Tyler house at Ewell was begun during CY 80. Plans include the development of one room as an interpretive area for exhibits and displays. The room will be of sufficient size to allow the showing of films and slide programs to small school groups, local citizens,

and visitors to the island. In addition, a visitor contact point is planned for the porch of the Tyler house which will include an interpretive display and leaflets about the refuge.

A draft sign plan was developed for the refuge and the final copy should be completed during 1981. An interpretive leaflet draft was developed and should be completed during 1981.

During the year, 40 public inquiries were received concerning this station.

2. Off-Refuge

Nothing to report.

B. Recreation

1. Wildlife Oriented

Nothing to report.

2. Non-Wildlife Oriented

Nothing to report.

C. Enforcement

No cases were made during 1980 on Glen L. Martin NWR. The lack of adequate personnel and of personnel with law enforcement authority prevents the proper patrol of the refuge. Blackwater staff provide support when law enforcement problems occur.

VI. OTHER ITEMS

A. Field Investigations

Nothing to report.

B. Cooperative Programs

Nothing to report.

C. Items of Interest

The maintenance worker position at Glen L. Martin NWR was filled August 10 with the permanent part-time, career seasonal appointment of Michael K. Harrison. Mike had been working under a temporary intermittent appointment since January 28, 1979. With Mike working as a permanent part-time employee some of the basic operations were resumed at this satellite refuge.

The majority of Blackwater's staff became involved in writing various sections of this report. All accepted the challenge with enthusiasm and a strong desire to work indoors.

<u>Section</u>	<u>Responsible Person</u>
I	Manager Schroer, Biological Technician Willey
II	Assistant Manager Koch
III	Manager Trainee Quarve
IV	Manager Trainee Quarve
V	Outdoor Recreation Planner Schmidt and Biological Technician Giese
VI	Manager Schroer, Manager Trainee Quarve, Recreation Assistant Kammeyer, Administrative Clerk Henry and Biological Technicians Willey and Giese

This report was edited by Manager Schroer, re-edited and typed by Administrative Clerk Henry.

#### D. Safety

One accident occurred during the year; no refuge personnel were involved. On December 4 one of the sub-contractor's workmen fell on a shovel handle cracking two ribs. Refuge Maintenance Worker Harrison witnessed the accident and saw to it that the workman received prompt medical aid. The workman was air lifted to Peninsula General Hospital in Salisbury, Maryland by State Police helicopter. The workman was involved in the exterior renovation of the Tyler house.





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I. GENERAL

Review and Approvals

John Oschoer 3/6/81  
Submitted by Date

Area Office Date

Susquehanna NWR  
Harford & Cecil Counties, Maryland  
Refuge

Regional Office Date

## SUSQUEHANNA NATIONAL WILDLIFE REFUGE

Harford and Cecil Counties, Maryland

Administered from Blackwater National Wildlife Refuge  
Cambridge, Maryland

## I. GENERAL

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.

Annual Real Property Reviews, September 1978, 1979 and 1980 recommended that Battery Island and the building be declared excess. In September 1980, Mr. Barclay Hayes of the regional appraisal office visited the refuge with Manager Schroer and Biological Technician Willey. The island was reappraised at this time.

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 canvas-back 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]

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, DEPART-  
MENT 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.

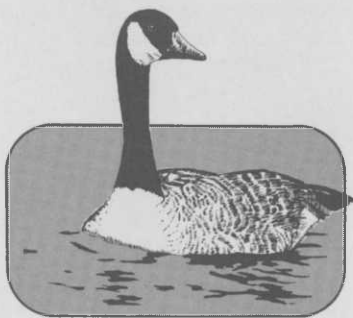
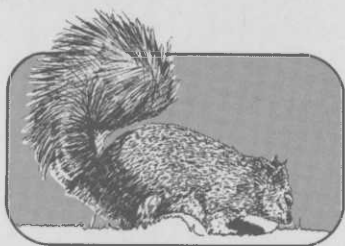




80-T-15 Entrance to Susquehanna National Wildlife  
Refuge - nearly the entire refuge is shown here.  
Photo by J. D. Schroer

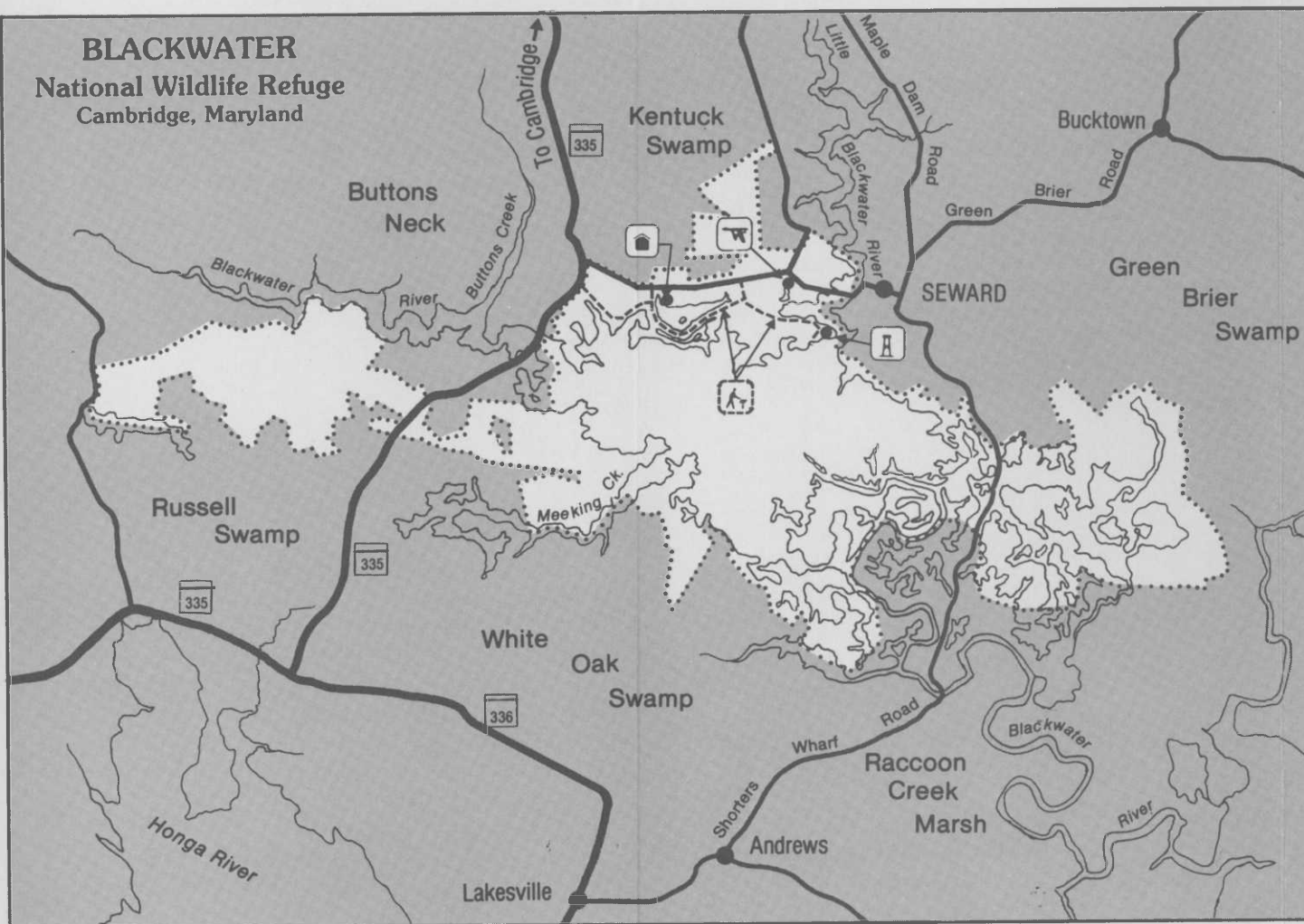
# BLACKWATER

NATIONAL  
WILDLIFE  
REFUGE



MARYLAND

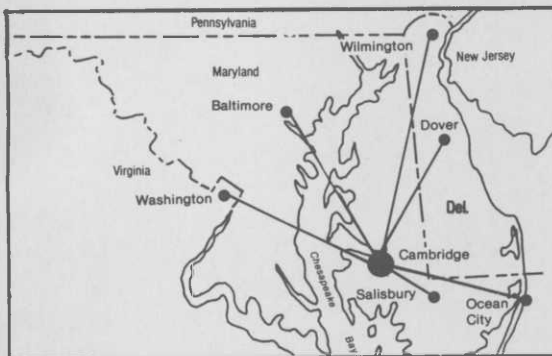
**BLACKWATER**  
National Wildlife Refuge  
Cambridge, Maryland



For further information contact:

Refuge Manager  
Blackwater National Wildlife Refuge  
Route 1, Box 121  
Cambridge, Maryland 21613  
Telephone: (301) 228-2677

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U. S. administration.



**LEGEND**

..... Refuge Boundary



Refuge Headquarters



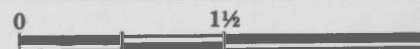
Walking Trails



Visitor Center



Observation Tower



SCALE IN MILES



**DEPARTMENT OF THE INTERIOR**

**U.S. FISH AND WILDLIFE SERVICE**

RL 51530-1  
March 1981



## VISITOR ACTIVITIES

**Visitor Center** - Exhibits and films for daily viewing and an auditorium for special, prescheduled programs.

**Wildlife Drive** - Five miles of all-weather road along fresh water ponds, woods, fields, and marsh. By remaining in your vehicle, disturbance will be minimal and other visitors will have better opportunities for seeing wildlife.

**Observation Tower** - This tower overlooks the junction of the Big and Little Blackwater Rivers and their marshlands.

**Walking Trails** - (Pets not permitted on trails, only on leash in parking areas.)

**Marsh Edge Trail** - Loops through and along the edge of the marsh for  $\frac{1}{3}$ -mile. An 80-foot boardwalk extends into the marsh. Located at parking turnoff before Observation Tower.

**Woods Trail** - Loops through pine and mixed hardwoods for  $\frac{1}{2}$ -mile. Located along Wildlife Drive.

**Bike Route** - Biking (non-motorized bikes only) permitted on limited portion of Wildlife Drive. Directions and regulations available at Visitor Center and Office Headquarters.

**Fishing/Boating** - Usually is permitted April 15 - October 15. Map of designated fishing and boating areas and other restrictions available at Visitor Center and Office Headquarters. Fishing is poor and there are no boat launching areas on the refuge. No hunting allowed on the refuge.

**Educational Opportunities** - Organized school, civic, and professional groups may reserve dates for slide talks, special movies, guided tours, and outdoor classroom activities. Write or call for additional information.

## HOURS

**Visitor Center** - Open 7:30 - 4:00, Daily. Closed Christmas Day, weekends during June, July and August, and Labor Day weekend.

**Wildlife Drive and outdoor facilities** - Open daily, dawn to dusk (year-round).



# WELCOME

Blackwater National Wildlife Refuge, located 12 miles south of Cambridge, Maryland, was established in 1932 as a refuge for migratory waterfowl. Most of its 14,263 acres is composed of rich, tidal marsh characterized by fluctuating water levels and variable salinity. Other habitat types include freshwater ponds, mixed woodlands, and a small amount of cropland.

Although originally established for ducks, Blackwater has become one of the chief wintering areas for Canada geese using the Atlantic Flyway. Geese number approximately 60,000 and ducks exceed 35,000 at the peak of fall migration, usually in November.

Blackwater is also haven for three of our nation's endangered species, and possibly a fourth. The resident bald eagle and Delmarva fox squirrel are regularly seen on the refuge as is the migrant peregrine falcon during certain periods of the year. It is possible that the red-cockaded woodpecker also occurs here though regular sightings have not been confirmed in recent years.

## HISTORY

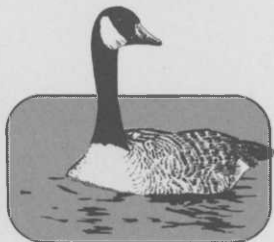
Before its designation as a refuge, most of the marshland along the lower Blackwater River was managed as a fur farm. At that time, muskrats were the primary species trapped. Most of the wooded lands, including the islands, have been cut over for timber. Drainage ditches and old furrows criss-cross in some existing woods indicating past agricultural use.

## WILDLIFE

The varied habitats of Blackwater — from open water to dense woodlands — produce a diversity of wildlife in a panorama that changes by numbers and species with the seasons.

### Birds

The best time for viewing waterfowl is between mid-October and mid-March. Wintering species include whistling swans, Canada and snow geese, and over

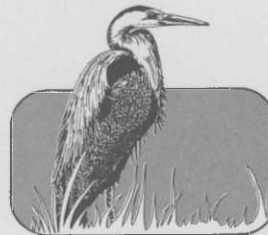


20 duck species. The most common ducks found here are mallards, black ducks, blue-winged teal, green-winged teal, wigeon, and pintails. Although most waterfowl migrate north in the spring, some remain through the summer, using the protected areas of the refuge to raise their young. These nesting waterfowl include Canada geese, mallards, black ducks, and blue-winged teal.

Other resident birds include the great blue heron and the bald eagle. Sightings of eagles are fairly common as Blackwater is the center of the greatest nesting density of bald eagles in the eastern United States north of Florida.

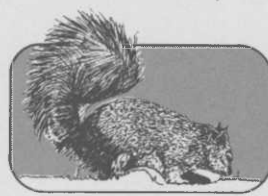
Numerous marsh and shore birds arrive in the spring, searching for food in the shallow waters. Ospreys, or "fish hawks," are common spring through fall and conspicuously use nesting platforms that have been placed throughout the marsh.

The refuge woodlands provide year-round homes for towhees, woodpeckers, brown-headed nuthatches, bobwhite, and woodcock. The warmer months invite warblers, vireos, orioles, flycatchers, and many others to this same habitat. A complete list of the birds has been published.



### Mammals

In addition to its extensive list of birds, Blackwater harbors a variety of mammals, including raccoons, otters, opossums, skunks, and the elusive red fox. Muskrats are common in the marsh, as is the larger nutria, a South American rodent introduced to this country in the 1930's. The nutria population, on the refuge, greatly fluctuates due to occasional severe winters. White-tailed deer can sometimes be seen in wooded areas and in fields along the forest edge. Asian sika deer, introduced to nearby James Island in 1916, prefer the wet woodlands and marsh. They are more nocturnal and, therefore, are less visible than the white-tails. Both gray squirrels and Delmarva fox squirrels inhabit the wooded areas.



## MANAGEMENT

### Waterfowl

Refuge programs specifically designed for waterfowl include: management of the brackish marsh to produce succulent natural foods, limited planting of crops to encourage waterfowl to use areas where they may be observed by visitors, and management of impoundments to provide fresh water habitat. Although waterfowl hunting is not permitted on the refuge, hunting is extensive on surrounding areas. A winter trapping program, regulated by the refuge and accomplished by trappers under special permit, provides protection for fragile marsh vegetation by lessening the impact of foraging furbearers. All management programs are carefully monitored to ensure the best interests of wildlife resources.

### Endangered Species

Endangered species (now protected by the 1973 Endangered Species Act) are a special responsibility at Blackwater. One of these species is the Delmarva fox squirrel which once ranged from southeastern Pennsylvania down through the Delmarva Peninsula. This large, light-gray squirrel now exists in only four counties along Maryland's Eastern Shore and at Chincoteague National Wildlife Refuge in Virginia. The loss of suitable woodlands (due primarily to the demands of a growing society) is a major factor in its decline. Forest management programs at Blackwater aim to simulate and restore the type of habitat required by this beleaguered squirrel.

Our national symbol, the bald eagle, is another endangered species found on the refuge. Like other birds of prey, the eagle's decline stems from causes endemic to our times — pesticides, pollution, irresponsible shooting, and human encroachment. The refuge offers constant protection for this diminished species.

Two other endangered species which might utilize the Blackwater area are the peregrine falcon which is occasionally seen during migration and the red-cockaded woodpecker which has been known to nest in the area.

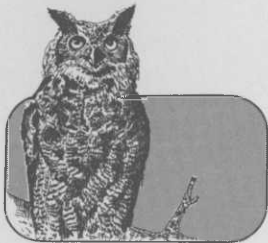


## WILDLIFE CALENDAR

Events may vary by one or two weeks depending on weather conditions.

### JANUARY

Geese, swans, and ducks remain in the marsh along with hawks, great blue herons, and a few species of shorebirds. Mid-winter observations are best during thaws. Eagles, both bald and golden, are sometimes conspicuous along the Wildlife Drive. Great horned owls are incubating eggs while bald eagles rebuild their nests high in loblolly pine trees.



### FEBRUARY

First northward-bound migrants appear late in February — killdeer, robins, and bluebirds. Eagles laying eggs late in the month.

### MARCH

Most migratory waterfowl departing for points north. Masses of red-winged blackbirds pass through; some stay to set up territories.

### APRIL

Resident ducks and geese incubating. Majority of migrant marsh birds return by mid-April. Blue-winged and green-winged teal passing through. (Blue-winged are latest in spring and earliest in fall.) Fox squirrels reproducing. Eaglets hatching.

### MAY

Migratory songbirds peak in late April and early May with warblers being most conspicuous and abundant. White-tail fawns (usually twins) begin to appear.

### JUNE

Ospreys hatching in early June. Muskrats (though seldom seen) repopulate the marsh with several litters a year. Eaglets fledge.



### JULY

Local goslings starting to fly. Large quantities of insects being consumed by swallows, kingbirds, and flycatchers. The conspicuous marsh hibiscus (mallow) begins to bloom along marsh edges at end of month.

### AUGUST

Shore and wading birds increase. Osprey young leaving the nest. Blue-winged teal from the north arrive on southward migration. Some bald eagles disperse northward after the breeding season.



### SEPTEMBER

Ospreys begin leaving the marsh (headed for South and Central America). Waterfowl numbers gradually increase. Egrets and herons accumulate until cold weather pushes them south. Tickseed sunflowers blooming; cattails going to seed. Songbird migration peaks in late September and early October. Toads abundant.

### OCTOBER - DECEMBER

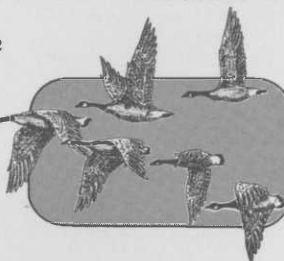
Autumn colors peak. Blackbirds are the last of the songbird migrants, peaking in October and November.

Numbers of ducks and geese gradually increase, then peak in late October or November. Whistling swans from NW Canada usually arrive in early November. Several hundred remain all winter.

Breeding season of white-tails is November -February.

Bald eagle numbers increase with the arrival of migrants from the north. Golden eagles also occasionally seen during winter. Waterfowl decrease — some remain all winter, others move south or disperse throughout the Delmarva Peninsula.

Burning of the marsh begins for regeneration of specific waterfowl food resources — preparation for another year.



**Note:** In summer, be prepared for large concentrations of flies and mosquitoes in the woods.