EASTERN NECK NATIONAL WILDLIFE REFUGE
RT. 2, BOX 225
ROCK HALL, MARYLAND 21661

NARRATIVE REPORT 1979

EASTERN NECK NATIONAL WILDLIFE REFUGE

Rock Hall, Maryland

ANNUAL NARRATIVE REPORT
Calendar Year 1980

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

TABLE OF CONTENTS

Left to right: Steinhauer, Fletcher, Feiger, Elbourn

PERSONNEL

1. Phillip J. Feiger, Refuge Manager, GS-11, PFT
2. Kriste L. Steinhauer, Outdoor Recreation Planner, GS-7, PFT
3. Kenneth H. Fletcher, Maintenance Man, WG 7, PFT .
4. Mabel Lee Elbourn, Refuge Clerk, GS-5, PFT

REVIEW AND APPROVALS

Phillip J. Feiger 6/17/80
Submitted by — Date

Paul D. Daly 6/19/80
Area Office — Date

Eastern Neck NWR
Refuge

Howard D. Woon 6/24/80
Regional Office — Date

VIEW OF CHESAPEAKE BAY BRIDGE FROM REFUGE OFFICE

Eastern Neck Island is a major feeding and resting place for migratory and wintering waterfowl.

I. GENERAL

A. Introduction

Eastern Neck National Wildlife Refuge, located at the mouth of Chester River on the eastern side of Chesapeake Bay in Kent County Maryland, was established in December 1962. The island refuge contains 2,285 acres and is a major feeding and resting place for migratory and wintering waterfowl on Maryland's famed "Eastern Shore."

Eastern Neck, strategically located at the confluence of river and bay, has a long and varied history. The island was among the first settled areas in the New World. Here Major Joseph Wickes obtained a grant of 800 acres in 1650 and built "Wickliffe," one of the finest mansions of the time. Packet ships built on the mainland to carry goods and passengers across Chesapeake Bay made regular stops at Bogle's Wharf on the east side of the island from colonial days until 1924. Farming and waterfowl hunting were the most important land uses prior to the establishment of the refuge. The island was known as one of the best hunting grounds on the bay and was a favorite with gunning clubs.

It seems that constant turnover of the refuge staff is now normal rather than an unusual situation, but it still makes continuity of operations difficult. During the year, both the Assistant Manager and the Outdoor Recreation Planner transferred to new duty stations. The YACC program vacillated/oscillated/swayed/wavered from 23 enrollees with two group leaders (?) to zero enrollees and zero group leaders and then back to 8 enrollees and one group leader.

Somehow, with all the staff changes, we experienced a successful year which speaks well of the entire staff.

B. Climate and Habitat Conditions

Hot and cold, wet and dry pretty well describe the climatic conditions for the year.

Three periods of unusual weather conditions occurred. The first was in February when 2 feet of snow fell followed within two days by 3½ inches of rain, resulting in all refuge roads becoming impassable to all but 4-wheel drive vehicles. The second period was an unusually wet August and early September. Then, on September 5 Hurricane David paid us a visit. A

Hurricane David left us with severe bank erosion on the island's Chesapeake Bay shoreline, and destruction of the permanent duck trap in Cabin Cove.

three-foot tide plus high winds put wave action seven foot above normal high tide. Heavy bank action, flooding of lower areas, and destruction of the permanent duck trap resulted.

Total precipitation for the years was 49.93 inches, 12.16 inches above normal. Temperatures varied from 28° in February to 92° in July. Humidity ranged from very high (80%) to higher (99%), making an uncomfortable year.

With the exception of hardwood reproduction, which is held in check by the refuge deer herd, habitat conditions on the refuge were excellent throughout the year.

C. Land Acquisition

Nothing to report.

D. System Status

1. Objectives

The prime objectives at Eastern Neck National Wildlife Refuge fall into three categories; these include Endangered Species Maintenance (Delmarva Fox Squirrel), Waterfowl Maintenance (Black Duck Wintering and Migration Habitat), and Environmental Education and Interpretation.

With only a few exceptions, refuge objectives have not been updated since the original exercise in 1971. This is partly the result of good initial objective setting, a rapid turnover in managers (4 managers in 7 years), and lack of staff to accurately inventory what we have on the refuge. This station is scheduled for Master Planning in FY 82, and an intensive effort to update refuge objectives will be needed prior to that time.

2. Funding

In the past five years, this station's O&M Funding has increased from $58,000 to $108,000. During this same period, salary increases (with two additional PFT), and fixed expenses have increased to the point that the discretionary funds available for refuge development have decreased from approximately $18,000 in FY 76 to $6500 in FY 80. When inflation is considered this is not much of a resource with which to work.

The new metal maintenance building was finally completed in January 1979, courtesy of BLHP.

Funding Chart

	1210	1220	1240 (1500)	1400	Total	BLHP
FY 76	15K	1K	30K	12K	58K	
FY 77	30K	3K	25K	4K	62K	
FY 78	47K	3K	45K	4K	99K	23.8K
FY 79	53K	3K	47K	4K	107K	247.9K
FY 80	57K	3K	45K	3K	108K	

Only BLHP (discussed in Part II) and YACC have allowed us to make progress.

II. CONSTRUCTION AND MAINTENANCE

A. Construction

1. The new Metal Maintenance Building, constructed in FY 79 (J.O. 2821-B5), was officially accepted in January of 1979; 159 days after the contract completion date. The contractor was assessed over $8,000.00 in liquidated damages for overrun and promptly submitted an additional claim for approximately the same amount. He asked for additional expenses brought about by engineering making him work to the specifications. We are apparently headed for litigation in order to settle this problem. In the meantime, we do have a maintenance building.

The lesson to be learned from this is that the daily inspection log is more than a pain. In our case, it documents days-on-end that the contractor had no one on the job site.

2. Upper Durdin Creek Development (J.O. 50190-2821-897 PL). This BLHP project, funded in FY 79, is designed to create additional habitat for black ducks.

The original plans called for four green-tree reservoirs flooded by natural runoff, and one crop unit flooded by a combination of natural runoff and an irrigation well.

A topographical survey was completed in the spring and indicated that the flooded cropland unit would be unfeasible and that we could build five GTR's with a total acreage of 25.5 acres.

The decision to construct our green-tree reservoirs by force account and YACC, rather than contractor, allowed the purchase of the TD-8 International Dozer and GMC 5-ton Stake Dump, as well as other heavy equipment.

After reviewing construction techniques, the sensitivity of endangered species habitat within which the dikes will be built, and considering the small weight-limit bridge onto the island, we decided to do the work with a combination of force account and YACC labor. BLHP funds will provide equipment, materials, and expenses other than labor.

The decision to do the work ourselves rather than going to a contract will mean that these GTR's will not be constructed as quickly as we might like. It will also result in less habitat destruction since we are willing to work around trees rather than clearing a wide construction lane as a contractor would insist upon. In addition, after the work is completed, we will have one TD-8 dozer with hydraulic tilt and angle blade, one equipment trailer, and one 5-ton stake dump truck, one backhoe, and one road grader with which to work. This corresponds to the contractor's profit and we feel will be well-worth the extra work and hassle.

Delays in acquiring equipment and redesign of water control structures required to meet State permit requirements delayed construction until FY 80 with completion expected in FY 81.

For years, the one-mile entrance road turned into a quagmire every spring. Using funds provided by the Area Office, and dump trucks borrowed from Bombay Hook NWR and the Tinicum National Environmental Center, we applied 800 tons of crushed granite to the road bed. Now we have an entrance road which can be traveled without needing four-wheel drives.

3. Equipment. The increased staff and resulting increase in activities created a communications problem which was solved with the purchase of three mobile radios. For the first time, all employees have immediate assistance available when the need arises.

As mentioned in Section 2, the decision to accomplish the green-tree reservoir project by force account generated a need for additional equipment. In 1979, we received the TD-8 International dozer and the 5-ton stake dump ordered in FY 78, and submitted requisitions for a backhoe (awarded to International for $23,000) and a size 1 road grader (awarded to Gallion for $31,000). With the receipt of these items, expected early in 1980, we will not only be able to accomplish the BLHP project, but will also have the ability to do many things long delayed for lack of equipment. BLHP, hurrah!

The mechanic shop section of the new Metal Maintenance Building was designed without insulated walls or ceiling. Needless to say heating and working in this area was nearly impossible. A combination of force account and YACC labor was used to install a fire-proof insulated drop ceiling and styrofoam insulated plywood inner walls. Work benches and storage cabinets were also installed, and now for the first time the maintenance staff has a decent place to work equipped with the tools needed to get the job done.

The lack or high cost of energy is becoming one of the critical problems on refuges. Not only do we have a moral obligation to make the most efficient use of all of our energy resources, the economics of energy consumption dictates that we search for ways to use alternate sources of energy wherever we can. Towards this end, woodburning circulating heaters were installed in the refuge office, the maintenance building, and the residence.

The wood used to heat the office and maintenance building comes from trees which have fallen across roads and trails, or have to be removed due to danger to power lines or the visiting public. The clearing for the impoundment construction, timber stand improvement, and hedgerow rehabilitation also provides a continuing supply of energy producing material.

We do not claim that heating with wood is a free ride. Wood must be cut, split, stacked, and hauled to the heaters. Woodburners, as those who have them are well aware, also generate considerable ashes which must be removed and dust must be cleaned up.

We have reduced the consumption of petroleum fuel by 2/3 in the office and 1/3 in the maintenance building. This is reason enough for us to be willing to put up with the extra trouble. Incidentally, the office is more comfortable during cold weather than it has ever been.

B. Maintenance

Minor maintenance accomplished during the year involved the usual routine of mowing around buildings, road shoulders, and public-use areas. Vehicle maintenance, litter removal, removal of fallen and dangerous trees, replacement of stolen or destroyed signs, and other routine refuge maintenance was also accomplished. This maintenance effort was greatly aided by the YACC program.

The YCC Camp completely reposted the refuge boundary replacing missing or weathered signs.

An additional 200 feet of leachline was added to to the headquarters septic system to compensate for the poor permeability of the soils. This was accomplished using the YACC backhoe and a combination of station and YACC labor.

III. HABITAT MANAGEMENT

A. Croplands

In 1978, we planted 120 acres of corn and soybeans to provide a stable food source for the endangered Delmarva fox squirrel. (This planting was completely destroyed by the over-abundant deer on this island./ In early spring 1979, five plots, totaling 12½ acres, were fenced using treated 4"x4" posts and hogwire. These plots were treated with a combination of sutan and atrazine to control weeds and planted to corn. The first planting was much enjoyed by black birds and crows, and a complete replanting was necessary.

On the advice of Les Terry, ADC, Annapolis, we used the seed treatment mesural and replanted. Extreme care must be used when handling this chemical, but we had excellent results and produced 50-80 bushels of corn per acre.

The hogwire fencing completely excluded deer and the corn produced was heavily used by raccoons, birds, and squirrels.

A sixth food plot was fenced by the YCC camp and will be planted in 1980.

Needless to say, 12½ acres behind fences is far less expensive to cultivate than the 3-400 acres which would be needed without fencing to accomplish the same result.

B. Grasslands

Again this year, the only grasslands mowed were those areas considered to be of high fire danger and small areas of green browse to facilitate public observation of Canada geese.

Climatic and soil conditions are such that the natural succession in the refuge grasslands would eventually result in complete forest cover. While management for fox squirrels requires that we increase the woodland habitat, we must also provide habitat for other forms of wildlife. To accomplish this we will need to initiate a three to four

year rotation of mowing the grass fields we wish to maintain. The decision as to the grasslands in which to allow woody invasion to occur and which to retain will be based upon the needs of all wildlife. Providing endangered species habitat while at the same time encouraging maximum diversity of wildlife species is our goal.

The refuge lies within the Kent County noxious weed control district. Johnson grass is the culprit with which the district is most concerned and we have had a plentiful supply in the past.

For years, eradication of this undesirable exotic was attempted, but until the chemical herbicide "round-up" was made available very little success was achieved. 1979 was the third year this chemical was used and during this time we have made excellent progress. We now have this pest under control and are confident that within the next few years Johnson grass will be nearly eliminated from our fields.

For those who might consider using this herbicide, I will offer a few comments. "Round-up" is an extremely effective translocating herbicide which will give good results if used when rapid plant growth is occuring. Only a few drops per plant are needed for complete kill. A disadvantage of this chemical is that it is non-selective and every plant touched will die. This caused us some problems initially when we were using equipment that dispensed a large volume of spray at each application. Our treatment of Johnson grass often resulted in a large kill area around the target. Thistles invaded these barren areas causing a new weed problem.

In 1978 and 1979, we used a combination of small hand-operated sprayers and a hand-held spray nozzel on our field sprayer. By exercising reasonable care, we now lose only a small amount of non-target vegetation and no new thistle invasions have resulted from our control of Johnson grass.

The use of chemicals in our environment should be of concern to all of us. The residual affect of using large amounts of persistent chemicals is often overlooked in our haste to solve a problem the cheapeast way possible. At $56.00 to $60.00 per gallon, "round-up" is not cheap. The minimal amount needed for effective control, and the built-in property which causes it to breakdown into apparently harmless components as soon as it comes into contact with the soil, would make "round-up" appear to be one of the better and environmentally safer herbicides available at this time.

Sweet gum is about the only hardwood that regenerates heartily on the island, surviving extensive browsing by our deer herd, who apparently find it an undesirable species.

C. Wetlands

The work on our green-tree reservoirs was discussed in the Construction Section.

We have two freshwater ponds within which we have control of water levels. The 4-acre headquarters pond was formed when the road leading to the office was constructed across a low drainage area. The installation of a stop-log water control structure in 1978 finally gave us control of water levels and we can back water into adjacent woody bottom land when the trees are dormant in the fall. This creates excellent black duck habitat. In July, we broadcast presoaked Japanese millet seed over the upper end of this pond, and when the seed settled to the bottom we lowered the water level until the seed bed was exposed. This maneuver is used at the nearby Remington Farms management area with good success. The theory is that the millet gets a head start over other competing plants and no tilling is needed. While we had problems such as wind drifting the seeds before they could sink and an area of the pond which we could not drain completely, we did grow enough millet to attract 2-300 black ducks when the water level was raised. We know we can use millet to increase black duck use. Now we have to raise more millet.

The 3-acre Cedar Point pond was first constructed when private hunting groups owned the property. Water levels in this pond can be manipulated to provide excellent black duck habitat in the fall, again by flooding adjacent woodlands.

D. Forestlands

Approximately one-third of the refuge's 2,285 acres are forested. Primarily these are mature to old-age hardwoods with oak, hickory, sweet gum, tulip poplar and paw paw predominating.

The endangered Delmarva fox squirrels' success is closely tied to our continuing ability to provide nesting sites and a plentiful supply of mast. Successful management of our forest lands should provide a continuum of mixed hardwoods reaching maturity, thus insuring that there is always a place for squirrels to reproduce and food for them to eat.

Unfortunately, past attempts towards this end have met with little success. The island is blessed (cursed?) with a very healthy white-tail deer herd which loves to eat hardwood seedlings. Natural reproduction within the hardwoods is almost non-existent with the exception of sweet gum, one of the least desirable of the mast producers. Past plantings of hardwoods have been completely destroyed by deer and the use of repellants and electric fences have proven useless as a means of protecting the plantings. The YACC Camp is in the slow process of constructing two large deer-proof fences within which we will again plant hardwoods.

Sweet gum seedlings are rapidly invading the open fields on the refuge. While there are some areas where this is desirable for the most part this invasion will benefit gray squirrels more than Delmarvas. At the recommendation of the Delmarva Fox Squirrel Recovery Team, the sweet gum invasion are being controlled by periodic mowing and/or by tilling the land. Where additional sweet gum stands are desirable, such as around ponds from which we want to exclude Canada geese, selective cutting (TSI) is used to produce healthier more desirable trees.

Selective cutting will also be needed in the existing hard woods to improve quality and, in extreme cases, clear cutting, fencing, and planting of mast producing seedlings may be necessary.

E. Other Habitat

Nothing to report.

F. Wilderness and Special Areas

The refuge has one Research Natural Area and other than protecting from trespass no management was done.

On September 18th, a portion of a human skeleton was discovered protruding from an eroding bank in the Cedar Point area of the refuge. This find was very near a fire pit which had been salvaged during the Archeological Survey conducted in 1978.

The skeleton was being immediately threatened by high tides and wave action necessitating immediate action to prevent further damage.

These remains were excavated by a team from Catholic University headed by Tim Thompson, after part of the skull was seen protruding from the eroding Cedar Point Shoreline area of the refuge. Preliminary findings indicate remains are of a male Indian, about 24 years old, buried at least 300 years before discovery. Further surveys are pending to determine whether this is an historically significant site.

We were advised by the Regional Office to have one of the archeologists who had conducted the earlier survey visit the site and take whatever emergency action was deemed necessary.

Mr. Timothy Thompson, an archeology graduate student at Catholic University in Washington, D.C., visited the site and determined that due to the imminent danger of further erosion it would be best to remove and preserve the remains.

His preliminary finds were:

1. The remains were of an Indian male approximately 24 years of age.

2. The burial was of the type common for the Indians in the area, i.e., the bones had been picked clean of flesh and arranged in a manner typical of this type of burial.

3. The date of the burial was at least 300 years prior to discovery.

Under the Antiquities Act, discoveries of this type must be investigated to determine if a significant archeological site exists. Accordingly, the wheels have begun to turn to arrange for additional survey of this site. Should the survey indicate that this site meets the requirements for nomination to the National Register, the site will either have to be protected from further degradation or salvaged to prevent further loss of information.

To further complicate the issue, the publicity which resulted from this discovery (local L.E. agencies had to be advised of the discovery of human remains) has brought about interest from several groups. The local Historical Society wishes to have the skeleton displayed in the Rock Hall Municipal Museum (which is contrary to the Antiquities Act) and Indian cultural groups have become disturbed at what they see as degradation of ancestral remains which were interred with ceremony. What the final disposition of all this will be is anyone's guess, but rest assured that (1) it will be interesting, and (2) not everyone will be satisified.

G. Easements of Waterfowl Management

Nothing to report.

The first management priority of Eastern Neck is the endangered Delmarva Peninsula Fox Squirrel.

IV. WILDLIFE

A. Endangered Species

All three of the endangered species known to occur on the refuge were observed this year.

A lone peregrine falcon was seen on October 6. The bird flew low over a fourth grade environmental education class the manager was conducting. Noting that he was the only one even mildly excited by this rare occurrence, the manager launched into a dissertation on the reasons some critters become endangered. Afterwards, one youngster was heard to say, "Wish the darn bird had stayed away." - Tell you something, Phil?

Bald eagles, while not plentiful, do nest in Kent County and every month at least one bird is seen on the refuge. The eagles are usually seen perching in mature trees at the water's edge, and, fortunately for us, one of the favorite trees is within plain view of the office.

We keep hoping that one year a pair will find the refuge to their liking and will set up housekeeping.

The most common of our endangered species is the large salt and pepper colored Delmarva Peninsula fox squirrel. According to the Recovery Plan, approved this year, this squirrel is abundant only on Eastern Neck NWR. While our dense understory makes censusing very difficult, we estimate a population of 250 animals and indications are that our population is stable although below our expected carrying capacity.

As mentioned in the Forest Management Section, the high white-tailed deer population has prevented regeneration of all of the mast producing hardwood except sweet gum. With no apparent shortage of nesting cavities due to the abundance of old-age den trees and an additional 250 artifical nest boxes, we feel that only predation and/or the lack of reliable food source should keep the population from expanding.

Examination of prey remains at red fox dens have failed to reveal any evidence that the squirrels are taken in significant numbers by fox.

The extent of predation on nesting squirrels by black snakes and raccoon (both of which occur in high numbers) is unknown at this time but is certainly suspect.

A reliable food source can greatly influence litter size, therefore, as reported in the Croplands Section, five small food plots were planted to corn this year. By year's end, all five were being used by squirrels with those closest to the forest edge being used most heavily. We think that by planting corn within one/two acre exclosures, we can provide an abundant and reliable food source during the winter months when other food sources are the scarcest.

At the request of the Recovery Team biologists, we attempted to live trap squirrels to be relocated on the Remington Farms management area. For ten days in June we had 30 live traps set where we regularly saw bush tails - total score: 29 raccoons, 0 squirrels. During a brainstorming session with team biologist, it was learned that their most productive capture method was to visit nest boxes during winter snow storms. Reportedly, it is not uncommon to find three or four squirrels in the same box at such times. Using highly refined deductive reasoning methods learned after many years of AWPing, RPSing, ZBBing, and other similar training exercises, we concluded that (1) live traps were good for raccoons, and (2) we would wait for a snow storm. By year's end we were still waiting.

B. Migratory Birds

1. Waterfowl. Total waterfowl use-days increased by 29% this year; this after a 33% drop last year.

Some of the more notable changes in use-days were:

a.	Mute Swan	Up	33%
b.	Canada Geese	Up	24%
c.	Mallard	Down	23%
d.	Black Duck	Down	35%

The increase in Canada goose use-days during the first quarter of FY 80 and the extremely severe winter last year accounts for most of the increase in use-days.

The lack of ready access to much of the waterfowl habitat in the refuge marshes makes census difficult. At best, our data indicates trends from year to year.

2. Marsh & Water Birds. The mild fall weather kept marsh and water birds on the refuge longer in the fall and total use-days increased from 27,571 in 1978 to 43,736 in 1979. The recovery of the aquatic vegetation in the shallow water undoubtedly made a better feeding situation which led to an increase in use.

Hail Point, a research natural area composed of Loblolly Pines with an understory of holly, continues to provide a suitable rookery for great blue herons each spring.

The 2,285-acre refuge is estimated to support 86 deer per square mile. They eat us out of house and home, despite yearly hunts.

The Great Blue Heron rookery on Hail Point appears to be stable. The location of the rookery in the tops of loblolly pines makes any estimate of young produced nearly impossible. The young cannot be seen from below and the closest side view we can get is approximately 1/2 mile. Our only reliable census technique would be from the air and the expense is prohibitive at this time.

3. Shorebirds, Gulls, Terns, and Allied Species. No unusual sightings or occurrences were noted in CY 79. Use-days for this category were similar to CY 78.

4. Raptors. Six active osprey nests were located on the refuge. These birds provide many hours of enjoyment to refuge visitors who can watch them fish from quite closely.

C. Mammals and Non-migratory Birds.

1. Game Mammals. The muskrat population has continued to decline. The marsh is in good shape and no evidence of disease or unusual predation has been found. The only logical explanation we can come up with is that the extremely harsh winters of 1976-77 and 1977-78 when the marshes were completely frozen and heavy snow accumulations were recorded must have caused a high winter kill. The following figures indicate the extent of the decline:

Winter Count	Population Estimate
1975-76	2855 (last year trapped)
1976-77	2300
1977-78	Index count only
1978-79	No count
1979-80	1395

Since muskrat trapping is conducted to prevent loss of marsh, no trapping has occurred since 1976 and will not resume until the population reaches the 1976-1977 level.

Raccoon numbers are very high. The extremely dense marsh and understory vegetation makes censusing difficult and we have been using nighttime sightings to gather trend information. While attempting to live trap fox squirrels, we came to the conclusion that we must have one raccoon per square foot since these bandits found our traps no matter where we put them.

The white-tailed deer continue to be present in numbers greater than we would like. On the assumption that a sustained kill of 20% of a healthy herd is possible and our removals by hunting have averaged 60 per year, our minimum deer population is 300 animals or nearly 86 per square mile! This high population appears to be sustainable if we were not concerned about the lack of natural reproduction in our mast producing hardwoods. Our attempts to reduce herd size will be explained in the Public Use Section.

The refuge grey squirrel population is growing rapidly although no census figures are available. At this time, it is not known what if any affect this might have on the Delmarva fox squirrel.

2. Other Mammals. Allowing refuge grasslands to remain unmowed has made other mammals difficult to census, but red fox and woodchuck all appear to have stable populations.

3. Resident Birds. Bob-white quail have greatly increased as a result of the grassland management change. While no censusing is done, we estimate a fourfold increase since the grass-weed fields were left unmowed in 1978.

4. Other Animal Life. Nothing to report.

V. INTERPRETATION AND RECREATION

Thousands of visitors are attracted to the refuge throughout the year. Recreational opportunities include crabbing, fishing, deer hunting, wildlife photography, birdwatching, and general sightseeing. The shoal waters around the island have long been noted for their excellent crabbing.

Nearly 10 miles of roads and trails are open to public traffic most of the year. The Inglesïde Recreation Area, on the northwest side of the refuge, has facilities for crabbing and car-top boat launching from May 1 to October 1. On the east side of Bogle's Wharf are boat launching facilities. A wildlife trail, boardwalk, and observation tower are available for those wishing to observe the refuge environment on foot. Environmental Education programs are offered for the general public occasionally, and are more frequently arranged for school, scout, senior citizens, and other special groups. Visitors to these localities, and the refuge in general, are urged to observe and obey refuge signs and regulations in order to make their visit more pleasant.

The main emphasis in our I&R program this year was for us to become prepared. This refuge is within five hours' drive of 82 million people and our feeling is that we had better know what the affect of any new public program is going to be before implementation.

With this goal in mind, we first concentrated on the training of our Outdoor Recreation Planner Ms. Marian Johnson. Among the training Mrs. Johnson received were the Association of Interpretive Naturalists Conference in Minnesota, and Refuge Academy, Beckley, W.Va. She also successfully completed courses in Wildlife Management and Ornithology at Delaware State College. Ms. Johnson soon put her knowledge to work by preparing the station's Public Use Management Plan. Sections A (History) and B (Objectives) are attached as Appendix 1 and give an indepth view of our situation.

Our next step was the preparation of this station's first Sign Plan. Fortunately, we had a copy of the Draft of the new Sign Manual and were able to prepare this plan to fit the new procedure.

After completing these two essential first steps, Ms. Johnson was ready to get into the nitty-gritty of planning the further developments and programs needed if we are to meet our objectives in public use. As might be expected, Ms. Johnson was transferred to a new duty station (Mason Neck NWR, July 29) and her replacement did not arrive on board until the first of December.

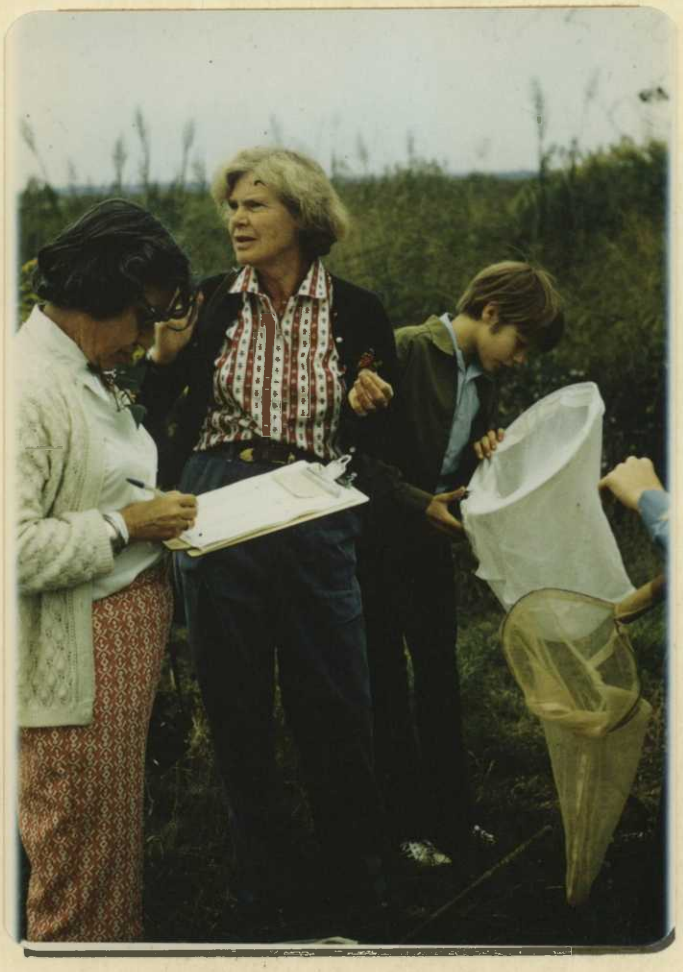
Kriste Steinhauer came from the Outdoor Recreation Planner position at the Great Dismal Swamp NWR, and has embarked on a schedule of training as mentioned above.

The absence of a staff specialist for one-third of the year prevented us from encouraging as many special program groups as in 1978. We were able to accommodate those who asked, but we did not go seeking new business. The total public use for the year was approximately 70,000 visits as compared to 77,000 in 1978. The gas crisis probably accounted for most of the decline.

A. Information and Interpretation

We continued the environmental education outreach activities begun in 1978 until Ms. Johnson left the station in July. Some of the activities conducted both on and off the refuge were:

Group	# Participants	Program
Kent County Parks	2	Multi-media Red Cross Training (with some EE thrown in-sneaky)



The Rock Hall Garden Club members assist refuge staff in attempting to provide quality environmental education experience to 200 Kent County fourth graders, who show up all in one week for a few hours each year.

Group	# Participants	Program
Maryland Ornithology Society Kent County Chapter	20	Great White Bird (Predatory Birds, Wading Birds)
Kent County Spec.Education	21	Shoreline Investigation
Senior Citizens Adult Ed.	10	Cemetery Study
Delaware State College Wildlife Mgmt.Students	10	Career Opportunities
Lambert Wickes Historical Society	25	History Brochure (Development and annual dedication of History Site)
Rock Hall Brownie Troop	10	Discovery Walk
Kent County Spec. Ed.	25	Overnight campout (Pioneer Study)
All Kent County		System 70 Display (2 wks per school)
YCC Camp	22	Orienteering and Pond Study
Millington 3rd Grade	35	Discovery Walks
Kent County 4th Grade	200	EE Week
Kent School, Inc.	20	EE Week
FWS Delmarva Personnel	35	All the blue crabs they could eat.

In addition:

The Refuge Bird List and Refuge Leaflet were rewritten. Participated in Remington Farms Hunting and Fishing Day celebration. Handled the normal (read daily) requests for information.

B. Recreation

1. Wildlife Oriented. The Ingleside Recreation Area was open to the public from May 1 to October 1. This area is administered by us on refuge lands and is maintained by the County through a Cooperative Agreement. It is one of the few places on the Eastern Shore of the Chesapeake Bay where a person can picnic in a natural non-commercialized setting, can wade in shallow water and catch blue crabs with a dip net, and can cook and eat said crabs in the above setting. This area is greatly appreciated, heavily used and not abused.

Many, many hundreds of bushels of crabs were taken from the bay at Ingleside and many hundred of hours of quality outdoor experience were enjoyed at a very low cost to the refuge.

Bogles Wharf is the only land owned and maintained by the County on the island. A small parking lot, boat ramp, pier, and bathroom facilities are located there. This facility is heavily used during summer months. Inadequate parking brings about congestion problems; as a result, an expanded parking area is in the planning stages.

As explained in the Wildlife Section, the refuge white-tailed deer population is much too large. In an effort to reduce the deer herd, while at the same time providing a high quality wildlife recreation experience, we have been conducting an annual deer hunt. The refuge is in an area where it is very difficult for private individuals to find hunting opportunities unless the hunter can afford to lease hunting rights.

To provide the largest number of individuals with the opportunity to hunt, we have a series of one day archery, muzzleloading, and shotgun hunts. Hunters are selected by random drawing in advance of the hunt and must pass a weapons qualification test to be eligible. Further information on refuge hunts and weapons qualification can be found in Appendix 2.

For hunter safety we limit the number of hunters to 150 per day during archery and 125 for firearms hunters. With 2000 acres of heavy cover in which to hunt this number is well within safe limits.

The last couple of years, we have had trouble getting enough applications for the hunts. We sent news releases concerning the public drawing to forty-two newspapers in 1979 and expected to be deluged with applications. As far as we can determine only six papers printed the articles and three of these printed the day before the deadline.

On the day of the drawing, we still had 300 archery permits and 200 muzzleloader permits available. To test our theory that there were plenty of hunters who just didn't get the word we reopened permit application on a first-come, first-serve basis and took applications over the phone. Our theory proved correct. The first four days after our announcement, both phone lines were constantly ringing and the manager's wife was pressed into duty to assist. When it was all over, we had (1) our permits filled, and (2) a clerk who said, "Never again."

Launching facilities at County-owned Bogle's Wharf do not currently meet the demand. Refuge roads are often congested or blocked due to overflow parking. A larger parking lot is being planned.

A self-guided wildlife trail, located directly off of the County road, is one of five public use areas on the refuge.

Our hunters demonstrated a very high level of sportsmanship and patience with us, and many compliments and expressions of appreciation were received. Somehow you forget all of the hassle and aggravation when visitors make the effort to say "thank you" for the fine time they had.

Currently we can offer the visiting public a boardwalk and observation tower, a short (0.6 mile) nature trail, and five miles of County roads within the refuge from which to enjoy the resources we have available. We hope that at some future date we will be able to provide additional facilities for wildlife-wildlands enjoyment.

2. Non-wildlife Oriented. With the exception of some nighttime use of County roads for beer drinking and/or parking we have no non-wildlife oriented recreation.

C. Enforcement

Considering the refuges proximity to masses of people we have very few law enforcement problems. Some minor vandalism occurs; it seems refuge boundary signs present a challenge to those who do not like a straight unblemished sign, and traffic counters infringe upon the rights of those who do not like to be counted, but as a whole we are very fortunate.

Our law enforcement effort is directed toward prevention rather than apprehension, and apparently at this station this is the right approach.

Irregular, unscheduled nighttime patrol has been handled by the refuge manager who lives on the refuge. Apparently never knowing when the law might appear is a deterrent. This method will only work if the patrol can be started with no advance warning and the officer can be on the "scene" quickly. With new policies prohibiting the manager from parking a government vehicle at the residence this impromptu patrol will not be possible and it will be interesting to see the result.

Recovery Team nest box inspections turned up more than Delmarva Peninsula Fox Squirrel.

VI. OTHER ITEMS

A. Field Investigations

The Delmarva Fox Squirrel Recovery Plan was approved, but, to date, we do not have a copy. Recovery team members continued twice-yearly nest box inspections and earmarked squirrels captured at this time.

The Migratory Bird & Habitat Research Lab., Laurel, Maryland, initiated the required paperwork needed for the approval of a study of the breeding woodcock population on the refuge.

The purpose of the study is an attempt to compare population estimates derived from singing ground surveys with actual members present to test the validity of singing ground surveys. Since the refuge has a closed population and is easily reached by MB&HR Lab personnel this is an excellent site for this study.

The study will be carried out in four stages each year.

1. Singing ground survey.
2. Capture all singing males using mist nets.
3. Capture hens with broods using pointing dogs.
4. Mist net summer population.

B. Cooperative Programs

1. YACC. Many changes occurred in this program in 1979. We started the year with approximately 20 enrollees and 2 group leaders. We say "approximately" 20 enrollees because we could never be sure how many would show up for work on any given day, nor how long they would stay. The "work" produced by this group was inferior in both quantity and quality. Our patience with the program was severely tested and finally expired when a crew from the Maps and Survey Section in the Regional Office came to do a topo survey of the green-tree reservoir sites. YACC enrollees were assigned to help cut survey lines through the heavy underbrush, and, by the second day, the enrollees refused to do this work. The job was completed through the efforts of the survey crew with the refuge manager and maintenanceman helping. Shortly thereafter a good portion of the YACC crew was seeking other employment.

Young Adult Conservation Corps

Left to right, front row: Gene Mullin, Group Leader (1979); Bobby Rhoades; Ron Marcum, Group Leader (1980); David Jones; Billy Fletcher.

Second row: Estella Montgomery; Robin Wood; Terry Bryden; Wanda Gorman.

Back row: James Barrett; Mike Peterson; James Kelly, Reggie Reed Joe Miller.

By June, the program was down to two group leaders and no enrollees; shortly thereafter the program was completely shut down.

A new group leader was hired in July and in September enrollees were slowly being brought on board. By the end of the year, there were 8 enrollees working and what a difference there was. Gene Mullin, the group leader, is a no-nonsense, hard-working individual who is not shy about putting his foot down when needed. Through his excellent leadership, the crew has high morale, takes pride in their work, and is an asset to the refuge. After two years, we now believe this program will finally be worth the effort.

We do not have the resources to allow YACC to undertake major projects, and we think this is a key to our prese success. In the beginning, we set our sights high and expected too much from chronically unemployable individuals. Now our projects are the type that require less skill and are more easily done successfully. Being able to do a job well has developed a can-do attitude within the crew, and both quality and quantity of work is improving noticeably.

Through the efforts of the YACC, we have been able to remove miles of old, rusty-woven wire fences from woodlots and hedgerows. They have also accomplished such projects as: (1) weekly trash handling; (2) periodic roadside cleanup; (3) cleared brush and trees from proposed dike locations; (4) assisted O.R.P., (5) helped in duck banding; and (6) kept office and shop supplied with firewood. In addition, they have worked on many of the little nagging jobs often neglected on refuges through lack of manpower.

2. YCC. In 1979, our YCC residential camp was reduced to six weeks. In an effort to reduce food costs, we installed a kitchen and hired a cook for the camp. This was a highly successful move. Food costs were reduced from $10,000 in 1978 to $5,000 in 1979 including the cook's salary. Our gain was in more than money savings. Each of the enrollees was given a tour of K.P. and because of the quality of the cook this was a positive experience.

Again, we experienced problems with the camp. Good camp directors have been hard to find because of our residential situation, and this year our luck was no better than last. Fortunately, as last year, other staff members picked up the slack and the enrollees as ever were a great bunch of kids.

The YACC program has taken on much of the work which might have been assigned to YCC, and it is getting harder to find good work projects each year. The work turned out by the camp was of top quality and some of the more notable projects were: (1) Johnson grass control; (2) fencing of a Delmarva fox squirrel food plot; (3) complete posting of the refuge boundary; (4) establishment of forest inventory transect plots; and (5) conversion of 22 kids into 22 young adults.

The 1980 camp will be non-residential and we hope that we will be able to find a quality camp director within the local community.

C. Items of Interest

1. Training. This will be known as the year of training and we hope we are better for the following:

Blair	Law Enforcement	January
Feiger	Freedom of Information &	"
Elbourn	Privacy Act	
Johnson	AIN Conference	February
Blair	Refuge Academy	"
Feiger	Fire Management	"
Johnson	Refuge Academy	"
Feiger	CPR	"
Blair		
Fletcher		
Elbourn		
Feiger	Area Manager Conference	"
Johnson	Wildlife Management and Ornithology	January thru March
Feiger	Area Manager Conf.	September
Blair		
Elbourn	EEO Self-study	December
Feiger	Manager's Role-EEO	December

2. Better late then ... O.R.P. Johnson and Maintenance Worker Fletcher each were awarded a Special Act Award ($200.00) for their efforts during the period in FY 78 when there was neither a refuge manager nor a refuge clerk at the station. This was much deserved and 18 months being processed!

3. Upward and Onward. Charles W. Blair, Assistant Refuge Manager was promoted to GS-7 in February and transferred to Bombay Hook NWR in October.

Marian Johnson, O.R.P., transferred to Mason Neck NWR in July. Kriste Steinhauer promoted to GS-7 and transferred from Great Dismal Swamp NWR in December.

4. Writing and writing and ... The paper blizzard has become an avalanche. Last year's special reports have now become this year's routine, and "new" special reports have started, presumably to become routine next year. Why don't we ever hear, "This report is no longer needed please discontinue"?

5. And writing ... Manager Feiger was given the honor of being chosen to contribute to the Wildlife Diversity chapter in the revised Refuge Manual.

6. And writing. Manager Feiger claims the credit (or gets the blame) for compiling this entire report. Poor planning led to his being the only person available to work it out. Lee Elbourn was able to type it in spite of Phil's poor writing.

D. Safety

Monthly Safety Meetings were held. Herb Riley conducted a safety inspection of YCC, YACC, and refuge operations. Only minor corrections were suggested and acted upon.

PUBLIC USE MANAGEMENT PLAN

A. History

The Eastern Neck National Wildlife Refuge is located in the Upper Chesapeake Bay approximately 18 miles southwest of Chestertown on the Eastern Shore of Maryland. The refuge was established in December, 1962, as an important feeding and resting area for migratory waterfowl of the Atlantic Flyway.

Much drainage and development is continuing to take place along the Chesapeake Bay and losses of waterfowl habitat are great. With this loss of habitat and the ever increasing pressure being placed upon the waterfowl by the local and metropolitan hunters, the Eastern Neck Refuge will be invaluable in the management of waterfowl of the Atlantic Flyway in future years.

The refuge is a 2,282.9 acre island which consists of approximately 38.5% cropland, 17.7% upland or timbered acres, 42.3% marsh, and 1.5% water. It offers much protection to the diving ducks and swan that concentrate in large numbers near the island during spring and fall migration, giving waterfowl enthusiasts and other visitors an opportunity to study and observe first-hand some of their natural surroundings. Waterfowl production on refuges is becoming increasingly important as hunting pressure increases and their northern nesting grounds diminish. The refuge also supports the endangered Delmarva Peninsula Fox Squirrel, and is becoming increasingly important to the protection and management of this species. Effective protection of this squirrel largely depends upon the public's recognition and knowledge of the squirrel and its habitat.

Other wildlife being offered protection by the refuge include herons, egrets, many species of shorebirds, osprey, and the bald eagle.

The numerous white-tailed deer present on the refuge provide enjoyment to many visitors through observations, photography and public hunting.

The topography and wildlife use of Eastern Neck Island is such that many multi-purpose programs can be provided effectively without conflicting. Such recreational activities as wildlife observations, photography, sight-seeing, environmental education and picnicking can be accomplished the year around without endangering any of the major management operations of the refuge if proper facilities can be provided. Consumptive usage such as fishing and crabbing will be limited to the providing of access areas to the traditional fishing and crabbing grounds surrounding the island during months in which waterfowl activity is negligible. Deer hunts will continue in the fall when appropriate to provide quality wildlife-oriented recreation.

Persons participating in any of the consumptive uses of the refuge should be limited in order to effectively manage the resources and insure the safety of the public and protection of wildlife habitat and government property.

Starting now, and in the future, public use will be geared more and more toward an environmental education (EE) experience. At present, EE programs are offered to groups, teacher workshops in EE occur twice a year, and hopefully during [illegible] EE workshops will be offered for the general public; for example, family weekends in EE, etc.

Access can be obtained to the refuge by land and water. Only one bridge connects the island with the mainland. The bridge, along with approximately 4 miles of road, is owned and maintained by Kent County. Unless the Bureau gains control of the road either by agreement or purchase, there can be little control of many of the uses of the area.

The Eastern Neck Refuge recreation program is designed to accommodate approximately 100,000 visitors annually.

As development of Eastern Neck progresses and people learn of its location, the refuge will undoubtedly have an exceedingly high public use demand. Within a one-hundred mile radius, considered in this report to be "day use", there are presently some 10,275,000 people. The population centers of this "day use" area include such cities as Washington, D.C.; Baltimore, Maryland; Wilmington, Delaware; and Philadelphia, Pennsylvania.

There are few accommodations available within a twenty mile radius of the refuge. Therefore, there will be few overnight or week-stays near the refuge. According to the Rand McNally Road Atlas, the estimated population within a 250 mile radius of the refuge is approximately 38,247,000 and that of a 500 mile radius is approximately 81,772,000.

Public use on Eastern Neck Refuge is at its greatest during Spring, Summer, and Fall. Most of this use centers around access areas to traditional crabbing and fishing areas. Public deer hunting is also an attraction in early Fall as is the Fall waterfowl migration. Until completion of the refuge acquisition in 1966, the Eastern Neck Island was under control of several private hunting clubs and offered limited opportunities for public use other than those activities that took place without the owner's consent.

When the refuge was established, the County maintained control of the Bogles Wharf area (boat launching, boat dock, and vehicle parking, and approximately four miles of hard surfaced road) By

a cooperative agreement, the Bogles Wharf area was enlarged and a pit toilet was constructed by the County. Commercial oystermen, fishermen, etc., use the waters around the wharf for their livelihood. Ingleside Recreation Area was opened to the public in 1967 for picnicking and crabbing. Tables and grills were installed. This area is owned by the refuge, but is under a cooperative agreement with the County which maintains the area during daylight hours from May 1 to October 1. A wildlife nature trail, boardwalk, and observation tower were completed and opened to the public in 1971.

Deer hunts started in 1966 and have continued each fall since then.

The Wickes Historic Site and Memorial was dedicated in 1975. At present, an historical sign, a memorial, and a brochure on history of the settlement of the island are available at the Historical Site.

A 1930's hunting lodge is now used as an EE Center during the school year and a YCC Camp during the summer.

These developments have the capacity to accommodate the potential public use without impairment of the inherent values and primary goals of this refuge. There is a possibility that interests in crabbing will reach such a point that access to the crabbing grounds would have to be limited to prevent destruction of the aquatic vegetation in the shoal waters. The summer crabbing activities take place on Eastern Neck Narrows where swan and other waterfowl concentrations exist in Winter. The destruction of this habitat could be possible with over-use by the public wading and dipping crabs found in aquatic vegetation.

Since Eastern Neck Island is a relatively small area, most recreational activities should consist of Environmental Education programs, wildlife observations and photography, with emphasis placed upon other non-consumptive uses by development of high quality interpretive programs and facilities.

Waterfowl hunting is and continues to be a highly commercialized activity on the Eastern Shore of Maryland demanding a greater need for the understanding of this resource which is abundant in this locality during the waterfowl seasons.

It is recommended that a maximum of 200,000 visitor-days be the optimum limit this refuge should accommodate during any one year. Since most of this activity would center around the Spring, Summer, and Fall seasons, it is felt that such a high public use would not conflict with the primary objectives of this refuge.

B. Objectives

(1) Preserve and improve valuable marsh and aquatic habitat.

(2) Preserve and increase the remnant population of the Delmarva Peninsula Fox Squirrel, an endangered species present on the island.

(3) Provide improved nesting habitat for black ducks and other waterfowl species.

(4) Provide migration and wintering habitat for geese, swan, puddle ducks and diving ducks for public enjoyment.

(5) Develop and manage the wildlife resources for public enjoyment, including hunting, if compatible with other objectives.

A comprehensive public use activity plan for Eastern Neck National Wildlife Refuge is developed to present guidelines for directing public use toward activities considered beneficial to the refuge. The following objectives must be kept in mind during development of the various refuge activities.

1. Development of public awareness and support of the mission of the Fish and Wildlife Service.

2. Development of public understanding and support for management; the creation and maintenance of suitable habitat for wildlife.

3. To develop a personal conservation ethic in individuals which includes the wise use of natural resources.

4. To provide the general public the opportunity of increasing their understanding of wildlife and wildlands through wildlife-wildlands observation and through interpretive media.

5. Provide sites and facilities where students and teachers can conduct activities that involve learning about brackish marshes and their relationships with human needs.

6. To provide outdoor recreational experiences to the general public that do not conflict with the wildlife needs of the area.

7. To ultimately integrate the philosophy of wildlife management into the long-range planning process of the local community.

UNITED STATES FISH AND WILDLIFE SERVICE
Department of the Interior
Eastern Neck National Wildlife Refuge
Route 2, Box 225, Rock Hall, Maryland 21661

QUALIFICATION FORM

_____
(Last Name) (First Name) (Middle Initial)

_____
(Street Address,Route or Box No.) (City) (State) (Zip Code)

Type of weapon used for qualification

Shotgun ☐

Muzzleloader ☐

Archery ☐

---

1. Shotgun: From offhand firing position, place three (3) out of three (3) rounds in a 12 inch bullseye at a distance of 30 yards. (minimum 20 gauge with pumpkin ball or rifled slug)

2. Muzzleloader: From offhand firing position, place three (3) of three (3) rounds in a 12 inch bullseye at a distance of 50 yards. (minimum .40 cal. with 60 grains black powder)

3. Archery: Placement of three (3) out of five (5) consecutive shots in a twelve (12) inch diameter circle in the chest area of a standard deer target or bullseye at varying distances from ten (10) to thirty (30) yards. (minimum 30 lbs. full draw bow with 7/8" broadhead)

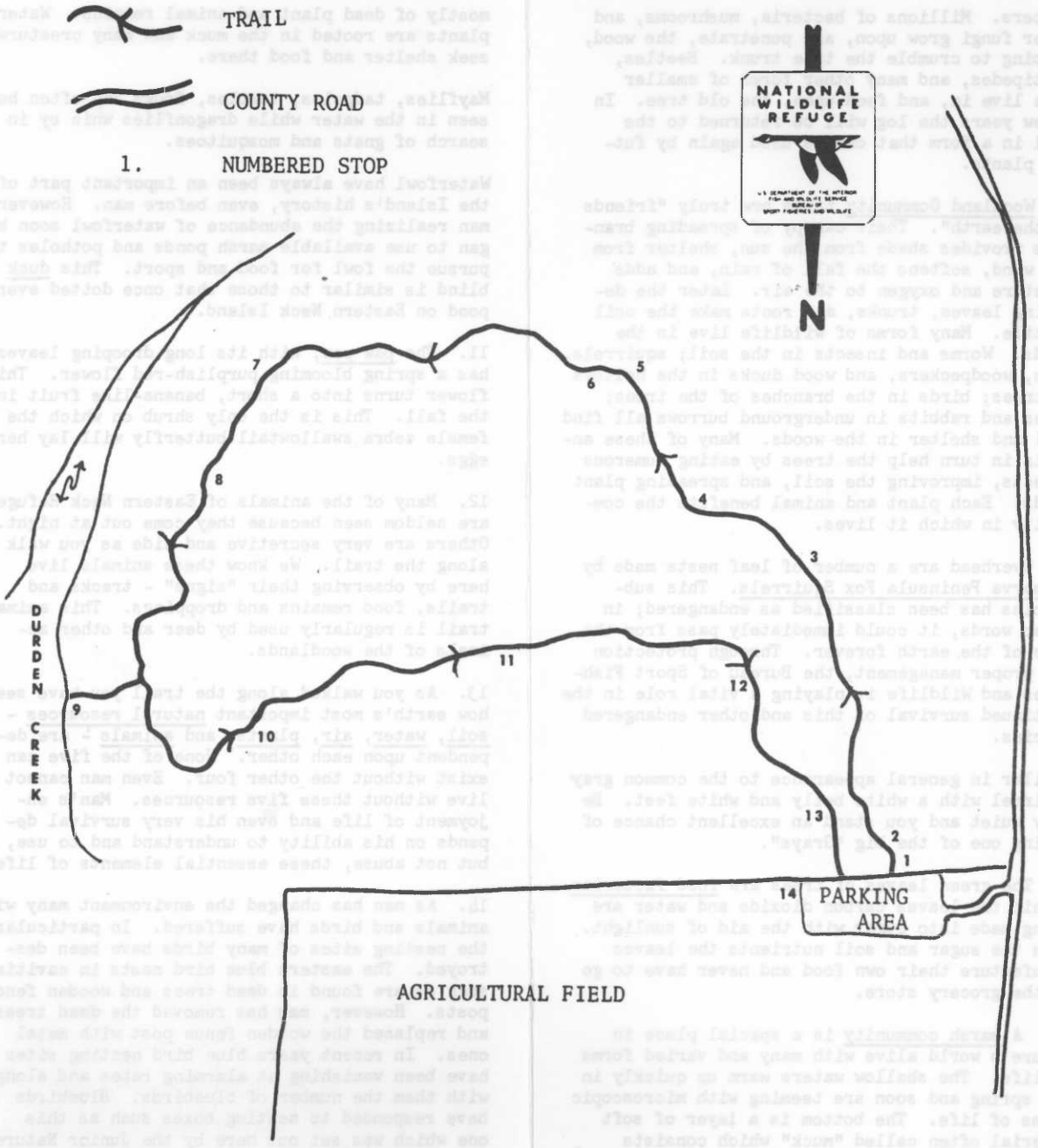
I certify that I witnessed the above named individual shoot a target and has met the qualification standards.

_____
Signature Date

Certifier: _____

Address : _____

_____



TRAIL OF LIFE

EASTERN NECK

National Wildlife Refuge

Delmarva Peninsula Fox Squirrel

Since 1962 the marshes, coves, ponds, fields, hedgerows, and woodlands of Eastern Neck National Wildlife Refuge have provided a haven for many kinds of wildlife. Here, the bounty of nature is evident and it is yours to see and enjoy. A small portion of this bounty will be revealed along this .6 mile long trail. Let nature speak to you as you take your journey along the "Trail of Life".

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

1. Borders between agricultural fields and woodlands are very valuable to wildlife. The two different habitats along these borders provide nesting sites, food, and escape cover.

2. The growths on these trees are called galls and are caused by a fungus. Although they rarely kill the tree, galls do make it worthless for use as lumber by causing a distortion of the wood grain. However, these hickory trees are still valuable to wildlife, providing food and cover for squirrels and other wildlife found on the refuge.

3. Not too many years ago, the leaves, twigs, and bark of spice bush or wild allspice were commonly used for making tea. The berries were some times dried and ground and used as a substitute for allspice. The bright scarlet, oval fruit contains one seed that is a favorite food of wood thrushes and other forms of wildlife.

4. This closed forest canopy, or overstory, is composed of tulip trees, sweetgums, maples, hickories, and oaks. The park-like condition of this forest is typical of an over mature timber stand. The dense shade restricts the growth of annual plants, herbs, and the reproduction of other trees. When this occurs, wild grapes, green briar, sassafras, and other favorite foods of wildlife are reduced to the point that only a small number of birds and mammals will live here.

5. Here the trail joins an old road probably used to harvest timber and to gain access to the marshes for hunting, fishing, and trapping. The remains of an old fence can be seen to the left. It probably marked an old property line and was used to control livestock.

6. This tree, like many others, has been toppled by a combination of factors brought on by man and nature. The base of the tree shows signs of fire at its trunk. This fire, man made or wild, damaged the tree allowing a disease to enter. This caused rot and decay of the lower trunk. Years later this weakened condition caused the tree to be toppled by high winds that are so common to the Chesapeake Bay Area.

Even though dead and lying on the ground, this tree's role in nature is not finished. It will return minerals to the soil that will be taken up and used by living trees. To return these minerals to the soil the dead tree needs many helpers. Millions of bacteria, mushrooms, and other fungi grow upon, and penetrate, the wood, helping to crumble the tree trunk. Beetles, centipedes, and many other forms of smaller life live in, and feed upon, the old tree. In a few years the log will be returned to the soil in a form that can be used again by future plants.

7. Woodland Community trees are truly "friends of the earth". Their canopy of spreading branches provides shade from the sun, shelter from the wind, softens the fall of rain, and adds moisture and oxygen to the air. Later the decaying leaves, trunks, and roots make the soil fertile. Many forms of wildlife live in the woods. Worms and insects in the soil; squirrels, owls, woodpeckers, and wood ducks in the hollows of trees; birds in the branches of the trees; foxes and rabbits in underground burrows all find food and shelter in the woods. Many of these animals in turn help the trees by eating numerous insects, improving the soil, and spreading plant seeds. Each plant and animal benefits the community in which it lives.

8. Overhead are a number of leaf nests made by Delmarva Peninsula Fox Squirrels. This subspecies has been classified as endangered; in other words, it could immediately pass from the face of the earth forever. Through protection and proper management, the Bureau of Sport Fisheries and Wildlife is playing a vital role in the continued survival of this and other endangered species.

Similar in general appearance to the common gray squirrel with a white belly and white feet. Be very quiet and you stand an excellent chance of seeing one of the big "Grays".

9. The green leaves of trees are food factories. Within the leaves carbon dioxide and water are being made into sugar with the aid of sunlight. From the sugar and soil nutrients the leaves manufacture their own food and never have to go to the grocery store.

10. A marsh community is a special place in nature's world alive with many and varied forms of life. The shallow waters warm up quickly in the spring and soon are teeming with microscopic forms of life. The bottom is a layer of soft material often called "muck" which consists mostly of dead plant and animal remains. Water plants are rooted in the muck and many creatures seek shelter and food there.

Mayflies, tadpoles, turtles, frogs can often be seen in the water while dragonflies whiz by in search of gnats and mosquitoes.

Waterfowl have always been an important part of the Island's history, even before man. However, man realizing the abundance of waterfowl soon began to use available marsh ponds and potholes to pursue the fowl for food and sport. This duck blind is similar to those that once dotted every pond on Eastern Neck Island.

11. The paw paw, with its long drooping leaves, has a spring blooming purplish-red flower. This flower turns into a short, banana-like fruit in the fall. This is the only shrub on which the female zebra swallowtail butterfly will lay her eggs.

12. Many of the animals of Eastern Neck Refuge are seldom seen because they come out at night. Others are very secretive and hide as you walk along the trail. We know these animals live here by observing their "signs" - tracks and trails, food remains and droppings. This animal trail is regularly used by deer and other animals of the woodlands.

13. As you walked along the trail you have seen how earth's most important natural resources - soil, water, air, plants, and animals - are dependent upon each other. None of the five can exist without the other four. Even man cannot live without these five resources. Man's enjoyment of life and even his very survival depends on his ability to understand and to use, but not abuse, these essential elements of life.

14. As man has changed the environment many wild animals and birds have suffered. In particular, the nesting sites of many birds have been destroyed. The eastern blue bird nests in cavities such as are found in dead trees and wooden fence posts. However, man has removed the dead trees and replaced the wooden fence post with metal ones. In recent years blue bird nesting sites have been vanishing at alarming rates and along with them the number of bluebirds. Bluebirds have responded to nesting boxes such as this one which was set out here by the Junior Nature Club of Kent County.

		s	S	F	W
___	Tufted Titmouse†	c	c	c	c
___	White-breasted Nuthatch†	u	u	u	u
___	Red-breasted Nuthatch	u		u	u
___	Brown Creeper	u		u	u
___	House Wren†	c	c	c	r
___	Winter Wren	u		u	u
___	Carolina Wren†	c	c	c	c
___	Marsh Wren†	c	c	c	r
___	Sedge Wren†	o	o	o	

MOCKINGBIRDS - THRUSHES - GNATCATCHERS and KINGLETS - WAXWINGS

___	Mockingbird†	c	c	c	c
___	Gray Catbird†	c	c	c	r
___	Brown Thrasher†	c	c	c	r
___	American Robin†	a	c	a	u
___	Wood Thrush†	c	c	c	
___	Hermit Thrush	u		u	u
___	Swainson's Thrush	c		c	
___	Gray-cheeked Thrush	u		u	
___	Veery	u		u	
___	Eastern Bluebird†	u	u	u	u
___	Blue-gray Gnatcatcher	u	r	u	
___	Golden-crowned Kinglet†	u		c	c
___	Ruby-crowned Kinglet	u		c	c
___	Water Pipit	r		r	r
___	Cedar Waxwing†	c	r	c	u

SHRIKES - VIREOS - WARBLERS - BLACKBIRDS - TANAGERS

___	Northern Shrike				c
___	Loggerhead Shrike	u		u	u
___	Starling†	c	c	a	c
___	White-eyed Vireo†	u	u	u	
___	Yellow-throated Vireo†	u	u	u	
___	Solitary Vireo	r		r	
___	Red-eyed Vireo†	c	u	c	
___	Warbling Vireo†	r	r	r	
___	Black-and-white Warbler†	c	u	c	
___	Prothonotary Warbler†	u	u	u	
___	Blue-winged Warbler	u	r	u	
___	*Orange-crowned Warbler*			o	
___	Nashville Warbler	r	r	r	
___	Northern Parula†	u	u	u	
___	Yellow Warbler†	u	c	u	
___	Magnolia Warbler	u	r	u	
___	Cape May Warbler	r	r	u	
___	Black-throated Blue Warbler	u	u	c	
___	Yellow-rumped Warbler	a		a	c
___	Black-throated Green Warbler	u	u	u	
___	Blackburnian Warbler	u	r	u	
___	Yellow-throated Warbler†	u	u	u	
___	Chestnut-sided Warbler	u	u	u	
___	Bay-breasted Warbler	u	r	u	
___	Blackpoll Warbler	u	r	u	
___	Pine Warbler†	u	u	u	r
___	Prairie Warbler†	u	u	u	
___	Palm Warbler	u		u	o
___	Ovenbird†	u	u	c	
___	Northern Waterthrush	u	u	u	
___	Louisiana Waterthrush†	u	r	u	
___	Kentucky Warbler†	u	u	u	
___	Common Yellowthroat†	c	a	c	o
___	Yellow-breasted Chat†	u	u	u	o
___	Wilson's Warbler	r		r	
___	Canada Warbler	u	u	u	
___	American Redstart	c	u	c	
___	House Sparrow†	c	c	c	c
___	Bobolink	u		c	
___	Eastern Meadowlark†	c	c	a	c
___	*Yellow-headed Blackbird*			u	
___	Red-winged Blackbird†	a	a	a	a
___	Orchard Oriole†	u	u	u	
___	Northern Oriole†	u	u	u	o
___	Rusty Blackbird	r		r	u
___	*Brewer's Blackbird*			u	u
___	Common Grackle†	c	a	a	c
___	Brown-headed Cowbird	c	c	c	c
___	Scarlet Tanager†	u	r	u	
___	Summer Tanager†	r	r	r	

GROSBEAKS, SPARROWS and BUNTINGS

___	Cardinal†	c	c	c	c
___	Rose-breasted Grosbeak	r		u	
___	Blue Grosbeak†	r	u	r	
___	Evening Grosbeak	u		u	u
___	Indigo Bunting†	c	c	c	
___	Purple Finch	u		u	u
___	House Finch	u	r	u	u
___	Pine Siskin	r		u	u
___	American Goldfinch†	c	u	c	c
___	Rufous-sided Towhee†	c	c	c	u
___	Savannah Sparrow	u		u	u
___	Grasshopper Sparrow†	u	u	u	
___	Henslow's Sparrow†	r	r	r	
___	Sharp-tailed Sparrow	r	r	r	
___	Seaside Sparrow†	u	u	r	
___	Vesper Sparrow	r		r	r
___	Dark-eyed Junco	a		a	a
___	Tree Sparrow	u		u	u
___	Chipping Sparrow†	c	c	c	o
___	Field Sparrow†	c	c	c	c
___	White-crowned Sparrow	u		u	u
___	White-throated Sparrow	a		a	a
___	Fox Sparrow	r		u	u
___	Swamp Sparrow	c		c	c
___	Song Sparrow†	a	c	a	c
___	*Lapland Longspur*				o
___	Snow Bunting				o

NOTES

Location _____

_____

Date _____ Total _____

Observers _____

_____

Weather _____ Wind _____

Time _____

_____

_____

_____

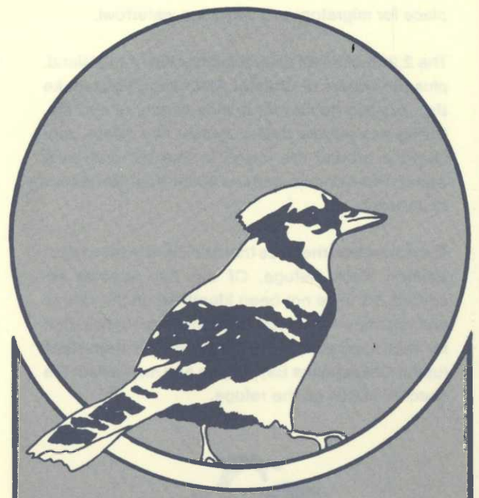
This list was prepared from the records of the Migratory Non-game Bird Section of the Wildlife Service's Patuxent Wildlife Research Center and updated in 1979 by the Maryland Ornithological Society, Kent County Chapter. It is subject to change as more birds are identified on the refuge.

Please report any sightings of birds not in agreement with this list to:

Refuge Manager
Eastern Neck National Wildlife Refuge
Route 2, Box 225
Rock Hall, Maryland 21661
Telephone: (301) 639-7056

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

RL 51590-2
September 1979



birds of eastern neck

national wildlife refuge

EASTERN NECK NATIONAL WILDLIFE REFUGE in Kent County on Maryland's Eastern Shore was established in 1962 to provide a feeding and resting place for migratory and wintering waterfowl.

The 2,285 acres of diversified habitat of the island, plus the waters of Chester River and Chesapeake Bay, provide habitat for a wide variety of bird life. Diving and puddle ducks, swans, and geese concentrate around the island in late fall and early winter. Peak concentrations occur from November to January.

This folder lists the birds that are found in the area of Eastern Neck Refuge. Of the 240 species recorded, 13 have not been identified on the refuge and are shown in italics. Seasonal abundance data for each species apply to the general Eastern Neck (upper Chesapeake Bay) region and may reflect the species' status on the refuge.

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

SEASON

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

† = *Nesting has occurred on the refuge*

RELATIVE ABUNDANCE

a – abundant	a species which is very numerous.
c – common	certain to be seen or heard in suitable habitat.
u – uncommon	present, but not certain to be seen.
o – occasional	seen only a few times during a season.
r – rare	seen at intervals of 2 to 5 years.

LOONS - GREBES - CORMORANTS - HERONS - IBISES

	s	S	F	W
___ Common Loon	u		c	
___ Horned Grebe	u		c	c
___ *Red Throated Loon*	u		u	u
___ Red-necked Grebe	r		r	r
___ Pied-billed Grebe†	u	r	c	c
___ Double-crested Cormorant	c		c	
___ Great Blue Heron†	c	c	c	u
___ Green Heron†	c	c	c	r
___ Little Blue Heron		r	r	
___ Cattle Egret	u	u	r	
___ Great Egret	r	r	u	
___ Snowy Egret	u	u	u	
___ Louisiana Heron	r	r	u	
___ Black-crowned Night Heron		u	u	r
___ *Yellow-crowned Night Heron*	u	u	u	
___ Least Bittern†		u	u	
___ American Bittern†	r	u	u	r
___ Glossy Ibis		r	r	

SWANS, GEESE and DUCKS

___ Mute Swan†	c	c	c	c
___ Whistling Swan	c		a	a
___ Canada Goose	a		a	a
___ White-fronted Goose			r	r
___ Snow Goose	u		u	u
___ Mallard†	a	a	a	a
___ Black Duck†	c	c	c	c
___ Gadwall	c	r	c	u
___ Pintail	c		c	c
___ Green-winged Teal	c		c	r
___ Blue-winged Teal†	c	r	c	r
___ American Wigeon	u		c	c
___ *European Wigeon*	u		u	u
___ Northern Shoveler	u		c	r
___ Wood Duck†	c	c	c	u
___ Redhead	u		u	u
___ Ring-necked Duck	u		u	u
___ Canvasback	c		c	c
___ Greater Scaup	u		u	c
___ Lesser Scaup	c		c	c
___ Common Goldeneye	c		c	c
___ Bufflehead	c		c	c
___ Oldsquaw	c		c	c
___ White-winged Scoter	u		u	c
___ Surf Scoter	u		u	u
___ Black Scoter	u		u	u
___ Ruddy Duck	c		c	c
___ Hooded Merganser	u		u	c
___ Common Merganser	r		r	u
___ Red-breasted Merganser	u		r	c

VULTURES - HAWKS - QUAIL - RAILS and COOTS

___ Turkey Vulture†	a	a	a	a
___ Black Vulture†	c	c	c	c
___ Sharp-shinned Hawk	u		c	u
___ Cooper's Hawk	r		r	r
___ Red-tailed Hawk†	c	c	c	c
___ Red-shouldered Hawk†	u	u	u	u
___ Broad-winged Hawk	r	u	c	
___ Rough-legged Hawk	r		r	r
___ Golden Eagle	r		r	r
___ Bald Eagle†	c	u	c	u
___ Marsh Hawk	c		c	c
___ Osprey†	a	a	c	
___ Merlin	r		r	r
___ American Kestrel†	a	u	a	a
___ Bobwhite†	a	a	a	a
___ *Turkey*	u	u	u	u
___ King Rail†	c	c	c	c
___ Clapper Rail	r	r	r	
___ Virginia Rail†	a	a	a	
___ Sora	r		r	
___ Common Gallinule	r	r	r	r
___ American Coot	c		c	c

PLOVERS, SNIPES and SANDPIPERS

___ Semipalmated Plover	u	u	u	
___ Killdeer†	c	c	c	u
___ Black-bellied Plover	u	u	u	
___ American Woodcock†	u	u	u	u
___ Common Snipe	u		u	u
___ Spotted Sandpiper†	c	u	c	
___ Solitary Sandpiper	u	u	u	
___ Greater Yellowlegs	c	c	r	
___ Lesser Yellowlegs	c	u	c	
___ Pectoral Sandpiper	u	u	u	
___ *Western Sandpiper*	u	u	u	u
___ Least Sandpiper	c	c	c	
___ White-rumped Sandpiper		u	u	
___ Dunlin	c	u	c	u
___ *Stilt Sandpiper*		u	u	
___ Semipalmated Sandpiper	c	c	c	
___ Short-billed Dowitcher	u	u	u	
___ *Glaucous Gull*				u
___ Great Black-backed Gull	u	u		
___ Herring Gull	c	u	c	c
___ Ring-billed Gull	a	r	a	c
___ Laughing Gull	c	u	c	r
___ Bonaparte's Gull	u		u	u
___ Forster's Tern	r	o	c	
___ Common Tern†	u	u	u	
___ Least Tern	r	u	u	
___ Royal Tern	r		u	
___ Caspian Tern	u		u	

GULLS and TERNS - DOVES CUCKOOS - OWLS - NIGHTHAWKS

___ Rock Dove†	u	u	u	u
___ Mourning Dove†	c	c	c	c
___ Yellow-billed Cuckoo†	u	u	u	
___ Black-billed Cuckoo†	u	u	u	
___ Barn Owl†	u	u	u	u
___ Screech Owl†	u	u	u	u
___ Great Horned Owl†	u	u	u	u
___ Snowy Owl			u	u
___ Barred Owl†	c	c	c	c
___ Short-eared Owl	u		u	u
___ *Saw-whet Owl*			o	o
___ Whip-poor-will†	u	u	u	
___ Common Nighthawk†	u	u	c	
___ Chimney Swift†	c	c	c	

HUMMINGBIRDS - KINGFISHERS - WOODPECKERS - FLYCATCHERS LARKS - SWALLOWS

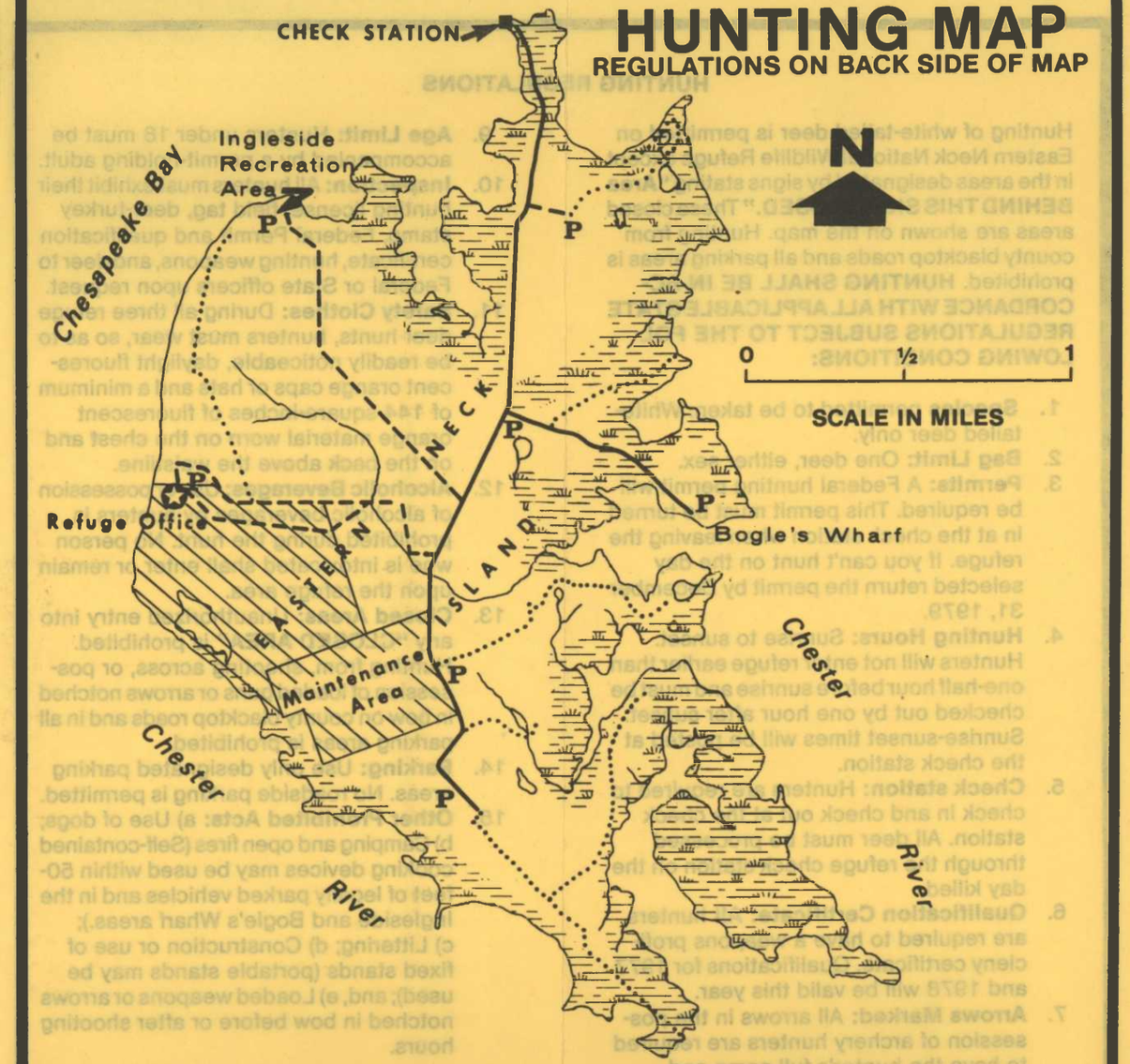
___ Ruby-throated Hummingbird†	u	u	u	
___ Belted Kingfisher†	u	u	u	u
___ Common Flicker†	c	c	c	c
___ Red-bellied Woodpecker†	c	c	c	c
___ Red-headed Woodpecker	r	r	r	r
___ Yellow-bellied Sapsucker	u		u	u
___ Hairy Woodpecker†	u	u	u	u
___ Downy Woodpecker†	c	c	c	c
___ Eastern Kingbird†	c	c	c	
___ Great Crested Flycatcher†	u	c	u	
___ Eastern Phoebe†	c	u	c	u
___ *Yellow-bellied Flycatcher*	o		o	
___ Acadian Flycatcher†	u	u	u	
___ Eastern Wood Pewee†	c	c	c	
___ Horned Lark†	c	c	u	u
___ Tree Swallow†	c	c	a	o
___ Bank Swallow†	u	c	c	
___ Rough-winged Swallow†	u	u	u	
___ Barn Swallow†	a	a	a	
___ Cliff Swallow	r		r	
___ Purple Martin†	u	c	u	

JAYS and CROWS - TITMICE NUTHATCHES - WRENS

___ Blue Jay†	u	u	a	c
___ Common Crow†	c	c	c	c
___ Fish Crow†	c	u	c	u
___ Black-capped Chickadee				o
___ Carolina Chickadee†	c	c	c	c

HUNTING MAP

REGULATIONS ON BACK SIDE OF MAP



PUBLIC DEER HUNT

EASTERN NECK

National Wildlife Refuge

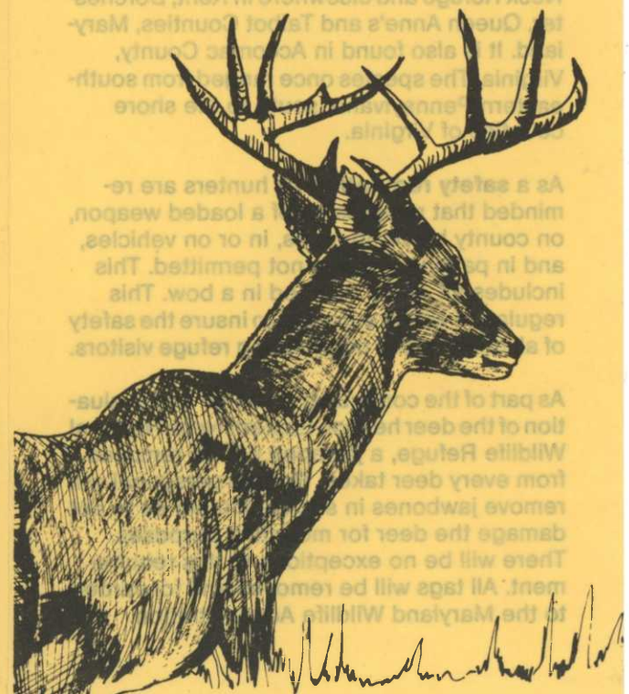
Rock Hall, Maryland

Hunting Seasons

Archery Hunts - October 6, 8, 10, 13, 1979

Muzzleloading Hunts - October 29, 31; November 3, 1979

Shotgun Hunts - November 19, 21, 24, 1979



GENERAL HUNTER INFORMATION

Eastern Neck National Wildlife Refuge is one of over 330 National Wildlife Refuges whose primary purpose is the protection, production, and management of migratory birds and other wildlife species. One of the necessary management techniques is the harvesting of surplus game in compliance with State and Federal hunting regulations. This management helps to keep wildlife populations in harmony with their environment and also provides recreational opportunities.

Hunters are reminded that the white-tailed deer is the **only legal species** that can be taken on the refuge. This is of particular importance on Eastern Neck National Wildlife Refuge since the Delmarva Peninsula Fox Squirrel is a year-round resident. The "Delmarva" is an endangered species and small isolated populations are now found on Eastern Neck Refuge and elsewhere in Kent, Dorchester, Queen Anne's and Talbot Counties, Maryland. It is also found in Accomac County, Virginia. The species once ranged from southeastern Pennsylvania south to the shore counties of Virginia.

As a **safety regulation** all hunters are reminded that possession of a loaded weapon, on county blacktop roads, in or on vehicles, and in parking areas is not permitted. This includes an arrow notched in a bow. This regulation will be enforced to insure the safety of all hunters and non-hunting refuge visitors.

As part of the continuing research and evaluation of the deer herd on Eastern Neck National Wildlife Refuge, a jawbone will be removed from every deer taken. Refuge personnel will remove jawbones in such a manner as to not damage the deer for mounting purposes. There will be no exceptions to this requirement. All tags will be removed and forwarded to the Maryland Wildlife Administration.

HUNTING REGULATIONS

Hunting of white-tailed deer is permitted on Eastern Neck National Wildlife Refuge except in the areas designated by signs stating **"Area BEHIND THIS SIGN CLOSED."** These closed areas are shown on the map. Hunting from county blacktop roads and all parking areas is prohibited. **HUNTING SHALL BE IN ACCORDANCE WITH ALL APPLICABLE STATE REGULATIONS SUBJECT TO THE FOLLOWING CONDITIONS:**

1. **Species** permitted to be taken: White-tailed deer only.
2. **Bag Limit:** One deer, either sex.
3. **Permits:** A Federal hunting permit will be required. This permit must be turned in at the check station when leaving the refuge. If you can't hunt on the day selected return the permit by December 31, 1979.
4. **Hunting Hours:** Sunrise to sunset. Hunters will not enter refuge earlier than one-half hour before sunrise and must be checked out by one hour after sunset. Sunrise-sunset times will be posted at the check station.
5. **Check station:** Hunters are required to check in and check out at the check station. All deer must be processed through the refuge check station on the day killed.
6. **Qualification Certificate: All** hunters are required to have a weapons proficieny certificate. Qualifications for 1977 and 1978 will be valid this year.
7. **Arrows Marked:** All arrows in the possession of archery hunters are required to have the hunter's full name and permanent address legibly etched or affixed permanently to the arrow shaft with indelible ink or paint. Mailing labels will not be accepted.
8. **Access:** All hunters must enter and leave the refuge by State Road 445. Entry by boat is prohibited.
9. **Age Limit:** Hunters under 18 must be accompanied by a permit-holding adult.
10. **Inspection:** All hunters must exhibit their hunting license, field tag, deer-turkey stamp, Federal Permit and qualification certificate, hunting weapons, and deer to Federal or State officers upon request.
11. **Safety Clothes:** During all three refuge deer hunts, hunters must wear, so as to be readily noticeable, daylight fluorescent orange caps or hats and a minimum of 144-square-inches of fluorescent orange material worn on the chest and on the back above the waistline.
12. **Alcoholic Beverages:** Use or possession of alcoholic beverages by hunters is prohibited during the hunt. No person who is intoxicated shall enter or remain upon the refuge area.
13. **Closed Areas:** Unauthorized entry into any **"CLOSED AREA"** is prohibited. Hunting from, shooting across, or possession of loaded guns or arrows notched in bow on county blacktop roads and in all parking areas is prohibited.
14. **Parking:** Use only designated parking areas. No roadside parking is permitted.
15. **Other Prohibited Acts:** a) Use of dogs; b) Camping and open fires (Self-contained cooking devices may be used within 50-feet of legally parked vehicles and in the Ingleside and Bogle's Wharf areas.); c) Littering; d) Construction or use of fixed stands (portable stands may be used); and, e) Loaded weapons or arrows notched in bow before or after shooting hours.

The above regulations supplement regulations which govern hunting on wildlife refuges generally which are set forth in Title 50, Code of Federal Regulations, Part 32.

Thousands of visitors are attracted to the refuge throughout the year. Recreational opportunities include crabbing, fishing, deer hunting, wildlife photography, birdwatching, and general sightseeing. The shoal waters around the island have long been noted for their excellent crabbing.

Nearly 10 miles of roads and trails are open to public traffic most of the year. The Ingleside Recreation Area on the northwest side of the refuge has facilities for crabbing and car top boat launching from May 1 to Oct. 1. On the east side of Bogle's Wharf are boat launching facilities. A wildlife trail, boardwalk, and observation tower are available for those wishing to observe the refuge environment on foot. Environmental Education programs are offered for the general public, and are also arranged for school, scout, senior citizens, and other special groups. Visitors to these localities, and the refuge in general, are urged to observe and obey refuge signs and regulations in order to make their visit more pleasant.

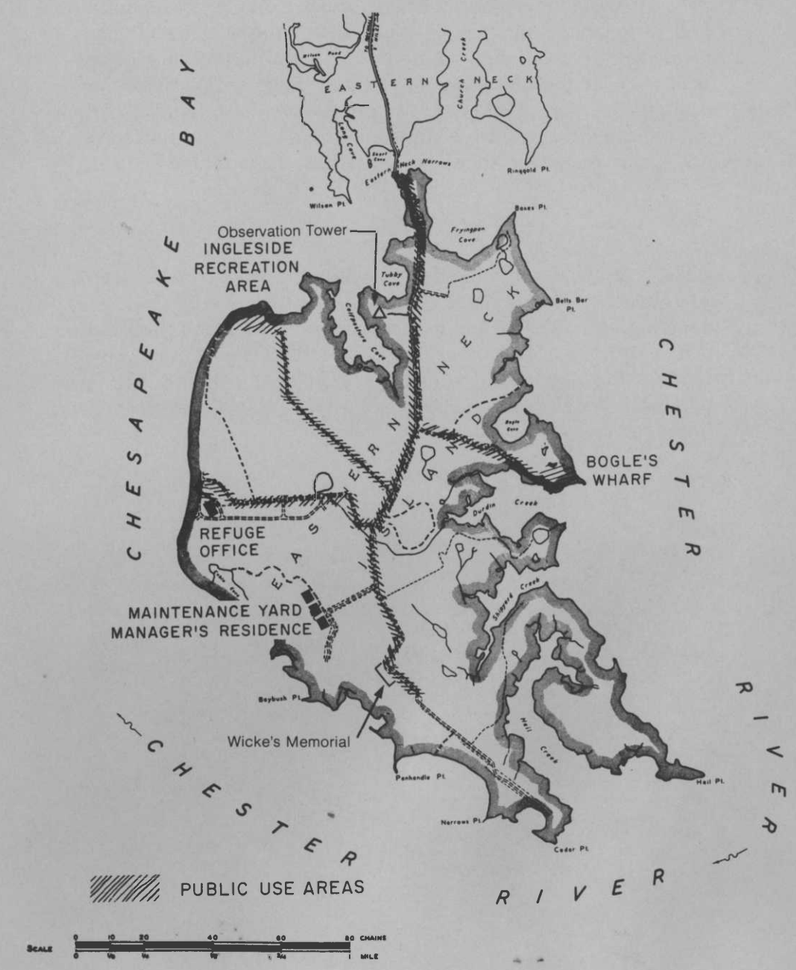
Additional information may be obtained at the refuge office from 7:30 a.m. to 4:00 p.m., Monday through Friday, or by writing:

Refuge Manager
Eastern Neck National Wildlife Refuge
Route 2, Box 225
Rock Hall, Maryland 21661
Telephone: (301)639-7056

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

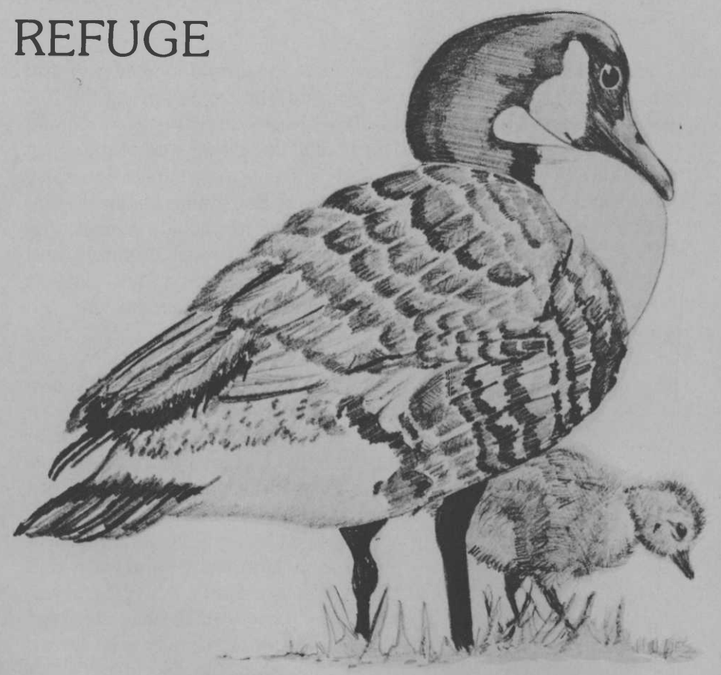
RL 51590-001
August 1978

EASTERN NECK NATIONAL WILDLIFE REFUGE
KENT COUNTY, MARYLAND



EASTERN NECK

NATIONAL WILDLIFE REFUGE

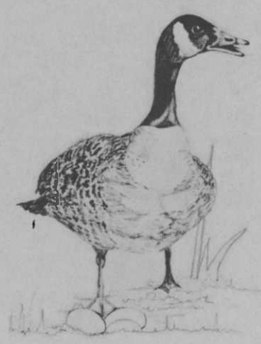


ROCK HALL, MARYLAND

EASTERN NECK
NATIONAL WILDLIFE REFUGE

Eastern Neck National Wildlife Refuge, located at the mouth of Chester River on the eastern side of Chesapeake Bay in Kent County, Maryland, was established in December 1962. This island refuge contains 2,285 acres and is a major feeding and resting place for migratory and wintering waterfowl on Maryland's famed "Eastern Shore."

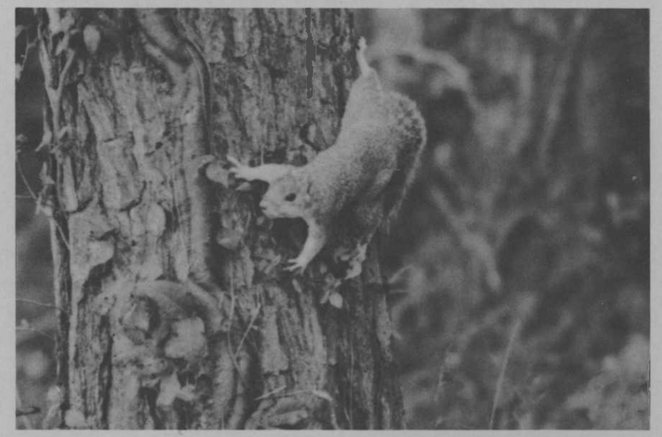
Eastern Neck, strategically located at the confluence of river and bay, has a long and varied history. The island was among the first settled areas in the New World. Here Major Joseph Wickes obtained a grant of 800 acres in 1650 and built "Wickliffe," one of the finest mansions of the time. Packet ships built on the mainland to carry goods and passengers across Chesapeake Bay made regular stops at Bogle's Wharf on the east side of the island from colonial days until 1924. Farming and waterfowl hunting were the most important land uses prior to the establishment of the refuge. The island was known as one of the best hunting grounds on the bay and was a favorite with gunning clubs.



The marshes, coves, ponds, and abundant aquatic vegetation in Chesapeake Bay and the Chester River made this a natural waterfowl habitat through the years. Both diving and puddle ducks have historically used the area. Swans also concentrate around the island by the thousands. In recent times, Canada geese have been attracted by ungleaned grain on farms. Geese can be readily observed in the refuge fields during the winter months. Fescue and other grasses have been planted in many fields to provide green browse for geese.

Most waterfowl begin arriving in early October. Their numbers reach a peak in November. Whistling swan, Canada goose, bufflehead, widgeon, pintail, mallard, black duck, canvasback, and scaup are the principal waterfowl using the refuge. The presence of sea ducks such as the oldsquaw and white-winged scoter makes the refuge more interesting. Most waterfowl leave the refuge by early April. Shorebirds, wading and marsh birds such as herons, egrets and rails, frequent the shores and marshes of the refuge all year.

The diversity of habitat, including the shoal waters, sand beaches, open fields, marshes, swamps, hedgerows, and woodlands provides for a wide variety of bird life. Upland game birds include bobwhite and mourning doves. Bald eagles and osprey frequent the region and sometimes nest on the island. Various woodpeckers, along with many song birds, can be seen in the timbered areas and hedgerows.



Delmarva Peninsula Fox Squirrel

Mammals are also an attraction on Eastern Neck. The most popular is the whitetail deer which lends itself to easy observation by the refuge visitor. In order to prevent an overabundance of deer, the Fish and Wildlife Service, in cooperation with the Maryland Wildlife Administration, conducts an annual hunt.

The Delmarva Peninsula fox squirrel, an endangered species, is commonly observed. Eastern Neck Island is one of the few remaining isolated habitats of these large squirrels. They often may be seen in hedgerows bordering roads on the island. Other mammals include the cottontail, raccoon, opossum, woodchuck,muskrat, and skunk.