

POCOSIN LAKES NATIONAL WILDLIFE REFUGE  
CRESWELL, NORTH CAROLINA

ANNUAL NARRATIVE REPORT  
Calendar Year 1990

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

REVIEWS AND APPROVALS

POCOSIN LAKES NATIONAL WILDLIFE REFUGE

Creswell, North Carolina

ANNUAL NARRATIVE REPORT

Calendar Year 1990

Jim Saveny 10-4-91  
Refuge Manager Date

Karen S. Cartledge 10/11/91  
Refuge Supervisor Date

Ronald W Benson 10/25/91  
Regional Office Approval Date

## INTRODUCTION

In July, 1989, the Conservation Fund, in conjunction with the Richard King Mellon Foundation purchased more than 104,000 acres of wetlands in northeastern North Carolina, between Albemarle and Pamlico Sounds. On June 26, 1990, the Conservation Fund donated over 93,000 acres of this land to the U.S. Fish and Wildlife Service. This led to the establishment of the Pocosin Lakes National Wildlife Refuge, which includes this donated land and the adjacent 12,000+ acre Pungo National Wildlife Refuge. In the near future, 6,000 acres of the Alligator River National Wildlife Refuge will be added to Pocosin Lakes to form a single refuge of over 111,000 acres. The refuge also includes Pungo Lake (2,000+ acres), most of New Lake (4,100+ acres), and will include the Frying Pan Lake (2,000+ acres). The refuge is adjacent to the 16,000+ acre Lake Phelps and borders, or includes the Scuppernong and Alligator Rivers. The refuge is divided between three counties, Washington (20,024 acres), Tyrrell (55,841 acres), and Hyde (35,609 acres). The nearest major towns are Plymouth, Creswell, and Columbia.

Pocosin Lakes NWR was acquired under the Fish and Wildlife Act of 1956. The purpose of the acquisition is for the development, advancement, management, conservation, and protection of fish and wildlife resources; for the benefit of the United States Fish and Wildlife Service in performing its activities and services.

The predominant vegetation type of the area is southeastern shrub bog, which is also known as pocosin. This ecosystem is characterized by a very dense growth of mostly broadleaf evergreen shrubs and scattered pond pine. Most of the 2,175 acres on or near the Scuppernong River or its tributaries consist of bottomland hardwood forest, a few stands of loblolly pine, and at least one Atlantic white cedar stand. The dominant species of the bottomland hardwood forest are blackgum and Carolina ash, with smaller components of red maple, water tupelo, loblolly pine, and bald cypress.

There is also significant acreage of bottomland hardwoods along the northwestern fork of the Alligator River, the Alligator River itself, Frying Pan Lake, and the north side of Pungo Lake. There are also over 400 acres of marsh along the Alligator River. This is part of a 971 acre marsh dominated by cattail which was identified as an important natural area by the North Carolina Natural Heritage Program. The natural area was named the Upper Alligator River Marsh. There are also approximately 4,020 acres of open water and mud flats on New Lake.

Organic soils, commonly called peat, occur on the majority of the refuge. These normally waterlogged soils exceed 4 feet in depth on much of the area while a large acreage has depths in excess of 8 feet. A significant percentage of the soil volume consists of buried roots, stumps, and logs that persisted as the organic soil accumulated. Most of these organic soils have been subjected to some degree of drainage and will burn when dry.

Due to the volatility of the natural vegetation, the organic soils, the drained condition of the land, and the limited accessibility, the area is one of the most hazardous areas for destructive wildfires in the eastern United States. The most recent large wildfires occurred in 1981 and 1985. Surface elevations were reduced by as much as three feet in parts of the area due to combustion of the peat. The fire also destroyed 25 houses and other structures on lots adjacent to the area.

During the past 40 years, approximately 19,790 acres of the area were cleared for agriculture or pasture. Only a portion of this acreage, however, was actually used for those purposes for a significant length of time. During 1978-81 the improved pasture remained available for grazing, but no cattle were put on the area.

During the period 1978-83, an experimental peat mining project was conducted on 150 acres of the previously cleared land. By 1986, this project had been discontinued. All of the land that was cleared for agriculture or pasture is now in various stages of regrowth.

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## A. Highlights

- Public Use Plan submitted to Regional Office (Section D.2).
- Pocosin Lakes National Wildlife Refuge established on June 26 (Section D.3).
- Tom Barnes departed to Washington, D.C. for Upper Level Management Development Program (Section E.1).
- Fire crew expanded (Section F.9).

## B. CLIMATIC CONDITIONS

Rainfall on the refuge averages 53 inches per year. During dry years, however, precipitation may be as low as 35 inches and in wet years as high as 79 inches. Peaks usually occur in July and August and the lowest rainfall occurs in April and October. The average January temperature is between 43 degrees and 46 degrees Fahrenheit and seldom falls below 10 degrees F. Summers are characterized by hot, humid days with an average daytime temperature above 90 degrees in July and August (See Pungo Section for detailed temperature and precipitation).

## C. LAND ACQUISITION

### 3. Other

Pocosin Lakes NWR was acquired under authority of the Fish and Wildlife Act of 1956 (16 USC 742a-742); Stat. 1119, as amended). Under this Act, the refuge was acquired for the development, advancement, management, conservation, and protection of fish and wildlife resources.

## D. PLANNING

### 2. Management Plan

A draft public use plan was completed and submitted to the Regional Office for review. It discussed several proposed trails and information kiosks to be located on the narrow strip of land along Lake Phelps.

### 3. Public Participation

The Notice of Availability of the Draft Environmental Assessment for the Proposed Pocosin Lakes National Wildlife Refuge was published in the Federal Register on April 9, 1990. It gave a summary of the proposal, invited comments, and stated pertinent dates and persons to contact for copies of the document and other information. A national press release, dated April 12, 1990, announced the Service's proposal to establish the refuge and the availability of the environmental assessment. It stated that requests for copies of the assessment and for further information should be sent to the Service's offices in Atlanta, Georgia, or Creswell, North Carolina. It also stated that comments or recommendations concerning the proposal were welcomed and should be directed to the Service's offices in Atlanta or Creswell by May 11, 1990.

Approximately 285 copies of the draft environmental assessment were distributed to local, State and Federal agencies; community leaders; legislators; concerned individuals; landowners; and environmental organizations. The official public comment period began on April 9, 1990, and ended on May 11, 1990. Additional comments were received after May 11, and were considered in the review and evaluation of the environmental assessment.

There were 111 written responses received on the draft environmental assessment.

These included the following:

- 38 respondents favored the establishment of a refuge as proposed, in concept, with qualifications.
- 31 respondents opposed the establishment of a refuge.
- 42 respondents only discussed specific issues and did not select an alternative.

### 4. Compliance with Environmental and Cultural Resource Mandates

The Final Environmental Assessment, Finding of No Significant Impact, Section 7 Endangered Species Evaluation, and the Coastal Zone Management consistency statement all were prepared and submitted for approval to establish the new refuge. The state of North Carolina requested more information be provided concerning their consistency determination. This information will be prepared in January 1991.

E. ADMINISTRATION1. Personnel

8, 3, 2, 4, 7, 5, 6

1. Thomas W. Barnes, Refuge Manager, GS-12, PFT, 06/26/90-08/09/90 (not pictured), departed to attend Upper Level Management Development Program
2. Elton E. (Jim) Savery, Refuge Manager, GS-12, PFT, EOD 01/07/91
3. David R. Kitts, Refuge Manager, GS-11, PFT
4. Howard E. Clayton, Jr., Tractor Operator, WG-7, PFT
5. Harry L. Gibbs, Engineering Equipment Operator, WG-8, PFT (Fire)
6. John A. Myers, Crane Operator, WG-9, PFT
7. Harold R. Sheppard, Crane Operator, WG-9, PFT
8. Bernice D. Kitts, Clerk Typist, GS-4, PPT (Mattamuskeet)

Refuge Manager leadership changed in June when Pungo NWR was shifted from Mattamuskeet to Pocosin Lakes. Tom W. Barnes, Pocosin Lakes' first manager departed on August 9 for Washington, D.C. and the Upper Level Management Development Program. David Kitts became Acting Refuge Manager for the remainder of the year.

Howard E. Clayton was promoted to WG-7 Tractor Operator on 10/07/90 and David Kitts was promoted to Supervisory Refuge Operations Specialist GS-11 on 09/23/90.

When Pungo's administrative workload was shifted to Pocosin Lakes, Bernice Kitts began working 2 days a week at Pocosin Lakes and 3 days a week at Mattamuskeet. The schedule later changed to 3 days a week at Pocosin and 2 at Mattamuskeet.

Pungo's six person fire crew was enlarged to Pocosin Lakes' 17 person fire crew. At years end the crew consisted of four Equipment Operators, nine Motor Vehicle Operators, and one Tower Operator.

Recruitment actions were begun to convert the three temporary (fire) Engineering Equipment Operators to permanent full-time positions.



12, 1, 8, 9, 2, 4, 5, 11, 7, 10

1. Lowe, William L., Engineering Equipment Operator, WG-8, FT Seasonal
2. Patrick, David, Engineering Equipment Operator, WG-8, FT Seasonal
3. Sawyer, Alfred, Engineering Equipment Operator Leader, WL-8, FT Seasonal, Resigned 02/22/91
4. Beckwith, Linwood, Motor Vehicle Operator, WG-5, FT Seasonal
5. Fisher, Chad A., Motor Vehicle Operator, WG-5, FT Seasonal, Resigned 01/12/91
6. Guthrie, Melton C., Motor Vehicle Operator, WG-5, FT Seasonal
7. Linton, Rita M., Motor Vehicle Operator, WG-5, FT Seasonal
8. Midyette, Milica M., Motor Vehicle Operator, WG-5, FT Seasonal
9. Parrish, Jerry L., Motor Vehicle Operator, WG-5, FT Seasonal
10. Rawls, Shepherd B., Motor Vehicle Operator, WG-5, FT Seasonal
11. Stewart, John D., Motor Vehicle Operator, WG-5, FT Seasonal
12. Williams, Edward M., Motor Vehicle Operator, WG-5, FT Seasonal
13. Hudson, Terry, Forestry Technician (Tower Operator), GS-5, FT Seasonal, Resigned 01/12/91

5. Funding

	1261	1262	9120	1221	Total
FY 1991	155.4	78.6	881.6	1.5	1,117.1K

Much of the 9120 dollars were used for heavy equipment purchase for wildfire protection.

8. Other

The office for Pocosin Lakes and Pungo was established in the old First Colony Farms headquarters. At one time this was the hunting and fishing lodge for Malcolm McLean Trucking Corporation.



Pocosin Lakes new office, a 5 bedroom converted residence. Plenty of space waiting for the staff to fill it.

## F. HABITAT MANAGEMENT

### 9. Fire Management

Due to the deep peat soils and volatile pocosin vegetation, Pocosin Lakes Refuge has one of the highest fire hazards in the eastern United States. The lands that comprise the refuge also have a destructive wildfire history.

The refuge was allocated 12 seasonal firefighter positions, 1 seasonal tower operator position, and 4 full time permanent equipment operator positions. These are all dedicated to fire prevention.

The equipment operators spend considerable time and effort to provide Pocosin Lakes with some fire protection. The road system (100 miles) which had deteriorated before acquisition, needs complete renovation. Access was improved with grading, pushing (dozers) and ditch bank mowing. Dozers and plows began construction and/or rehabilitation to major firebreaks.

### I. EQUIPMENT AND FACILITIES

#### 1. New Construction

Firebreak construction was begun on the new Pocosin Lakes property. The breaks were constructed next to existing roads using D-6 bulldozers and heavy duty off set plows. Approximately 25 miles of breaks were plowed. The breaks will not stop a wildfire but will allow firefighters a chance to backfire ahead of a wildfire with a reasonable chance to constrain the backfire.

#### 4. Equipment Utilization and Replacement

One of the D6D's used for firebreak construction rolled over when operator plowed beside a pond that he could not see (on new property). The dozer was submerged in water for 24 hours. There was no personal injury and very slight damage, but all oils were changed and much time expended to dry and clean dozer components.



It's right side up now but it turned over when operator found this hole. Brush (as pictured on far side) completely hid the hole which was found while plowing firebreaks.

#### J. OTHER ITEMS

##### 4. Credits

Jim Savery - Introduction; Section A, B, C, D, E.5

David Kitts - Section E.1, 8; F; I

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CRESWELL, NORTH CAROLINA

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Fish and Wildlife Service  
NATIONAL WILDLIFE REFUGE SYSTEM

## INTRODUCTION

Pungo Refuge is located in Washington and Hyde Counties of Eastern North Carolina.

Pungo was established in 1963 to provide a resting and feeding area for wintering waterfowl on the coastal plain. Pungo's 12,350 acres are a mixture of farmland, brushland, timber and freshwater marsh. Pungo Lake (2,800 acres) is the main topographic feature.

Refuge lands are flat with elevation ranging from 5 to 16 feet above sea level. The soils are poorly drained with an organic surface layer over mineral layers of sand and clay. Drainage is by surface flow and numerous man-made canals leading into the Pungo River.

During prehistoric times the predominant plant association in the lower coastal plain was cypress and white cedar. Land clearing and drainage activities by white settlers as early as the 18th century aggravated the problem of uncontrolled periodic wildfires. As a result, the forest was replaced by farmland and a shrub complex of bay, gallberry, other shrubs, and pond pine. Several isolated stands of second growth pines and hardwoods remain. Pungo Lake was probably created as a result of a fire that destroyed the trees and burned out the peat deposits to depths of up to five feet. Cypress trees reaching four feet in diameter have been found in the lakebed.

Following World War II, timber and land development companies purchased several hundred acres of land, which were considered worthless by local people, and began drainage and development activities. They spent enormous sums of money on agricultural clearing. When farming began grain crops were often left in the fields because it was too wet to use harvest equipment. The unharvested crops became a haven for migratory waterfowl, and it was evident that a national wildlife refuge would provide for the continued well-being of the resource.

Pungo Refuge remains an oasis for wildlife. It is surrounded by hundreds of thousands of acres of corn, soybeans and small grain croplands. Drainage of the area is so extensive that the ground water table was dropped several feet, leaving the lake management areas and canals as the only surface water in the area.

Pungo Refuge and 93,000 acres of land donated to the U.S. Fish and Wildlife Service from the Conservation Fund became Pocosin Lakes National Wildlife Refuge on June 26, 1990.

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

A. HIGHLIGHTS

- Pungo becomes a part of Pocosin Lakes NWR.
- Wood duck banding second highest on record.
- Deer hunt second highest take since refuge hunts began.
- Rehabilitated 18 fish ponds at Edenton National Fish Hatchery.
- Snow goose use topped 1 million use days.

B. CLIMATIC CONDITIONS

Table 1. 1990 Temperature and Rainfall

Month	Precipitation Inches	Maximum Temperature	Minimum Temperature
January	4.02	78	22
February	1.89	88	20
March	4.90	89	29
April	3.25	94	33
May	7.87	90	48
June	2.74	97	51
July	2.88	99	54
August	9.66	96	52
September	2.75	95	43
October	4.02	90	34
November	2.13	81	29
December	3.13	79	26
	49.24		

Total precipitation was about normal (50"). The nine inches of rain in August stopped or slowed several habitat projects and filled ditches and impoundments.

An extremely mild winter coincided with low Canada goose and duck numbers.

The many factors which make up fire weather were conducive to a very calm fire season.

#### D. PLANNING

All future planning will be incorporated with Pocosin Lakes NWR.

##### 5. Research and Investigations

###### Pungo NR 90 - Population Dynamics of Resident and Migrant Canada Geese in the Atlantic Flyway (42535-1)

Dr. Jay Hestbeck, Patuxent Wildlife Research Center, is the project leader on this multi-year study involving banding, neck collaring, and observation of migrant and resident Canada geese in fifteen states.

###### Objectives:

1. To compare distribution, abundance, migration patterns and survival rates of migrant and resident Canada geese.
2. To examine the relationship between harvest regulations, recovery rates, and survival over the harvest period for migrant and resident geese.
3. To estimate interstate movements of resident and migrant geese during the harvest period.

E. ADMINISTRATION1. Personnel (Permanent)

9, 4, 3, 5, 8, 6, 7

1. Donald E. Temple, Refuge Manager, GS-12, PFT, 12/03/89-06/26/90 (not pictured)
2. Thomas W. Barnes, Refuge Manager, GS-12, PFT, 06/26/90-08/09/90 (not pictured), departed to attend Upper Level Management Development Program
3. Elton E. (Jim) Savery, Refuge Manager, GS-12, PFT, EOD 01/07/91
4. David R. Kitts, Refuge Manager, GS-11, PFT
5. Howard E. Clayton, Jr., Tractor Operator, WG-7, PFT
6. Harry L. Gibbs, Engineering Equipment Operator, WG-8, PFT (Fire)
7. John A. Myers, Crane Operator, WG-9, PFT
8. Harold R. Sheppard, Crane Operator, WG-9, PFT
9. Bernice D. Kitts, Clerk Typist, GS-4, PPT (Mattamuskeet)

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Howard E. Clayton was promoted to WG-7 Tractor Operator on 10/07/90 and David Kitts was promoted to Supervisory Refuge Operations Specialist GS-11 on 09/23/90.

When Pungo's administrative workload was shifted to Pocosin Lakes, Bernice Kitts began working 2 days a week at Pocosin Lakes and 3 days a week at Mattamuskeet. The schedule later changed to 3 days a week at Pocosin and 2 at Mattamuskeet.

Harry Gibbs became Pungo's first full-time "fire" Engineering Equipment Operator on 06/17/90.

Pungo's six person fire crew was enlarged to Pocosin Lakes' 17 person fire crew. At years end the crew consisted of four Equipment Operators, nine Motor Vehicle Operators, and one Tower Operator.

Recruitment actions were begun to convert the three temporary (fire) Engineering Equipment Operators to permanent full-time positions.

Table 2. Personnel - Pungo/Pocosin Lakes

Year	Permanent		Temporary	Total FTE
	Full-Time	Part-Time		
1986	4	0	6	4
1987	4	0	6	4
1988	4	0	6	4
1989	4	0	6	4
1990	6	0	14	9

Personnel (Temporary)

12, 1, 8, 9, 2, 4, 5, 11, 7, 10

1. Lowe, William L., Engineering Equipment Operator, WG-8, FT Seasonal
2. Patrick, David, Engineering Equipment Operator, WG-8, FT Seasonal
3. Sawyer, Alfred, Engineering Equipment Operator Leader, WL-8, FT Seasonal, Resigned 02/22/91
4. Beckwith, Linwood, Motor Vehicle Operator, WG-5, FT Seasonal
5. Fisher, Chad A., Motor Vehicle Operator, WG-5, FT Seasonal, Resigned 01/12/91
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8. Midyette, Milica M., Motor Vehicle Operator, WG-5, FT Seasonal
9. Parrish, Jerry L., Motor Vehicle Operator, WG-5, FT Seasonal
10. Rawls, Shepherd B., Motor Vehicle Operator, WG-5, FT Seasonal
11. Stewart, John D., Motor Vehicle Operator, WG-5, FT Seasonal
12. Williams, Edward M., Motor Vehicle Operator, WG-5, FT Seasonal
13. Hudson, Terry, Forestry Technician (Tower Operator), GS-5, FT Seasonal, Resigned 01/12/91

#### 4. Volunteer Program

Seven volunteers donated 600 hours of assistance with wood duck banding, wood duck box maintenance, Canada goose banding and wildlife census.

#### 5. Funding

Pungo's funding which had been combined and included as part of Mattamuskeet's funding for FY 90 was included under Pocosin Lakes' funding for FY 91.

#### 6. Safety

While administered under Mattamuskeet, Pungo personnel attended all scheduled safety meetings at Mattamuskeet. Money collected from Kangaroo Court fines was utilized to fund a hamburger/hot dog cook-out at the last joint safety meeting.

All permanent employees received their yearly audiometric tests. A station safety inspection was completed.

Two temporary fire crew members sustained injuries during the year. One equipment operator was getting a tool from a tractor tool box when a wind blown piece of rust got in his eye. One Equipment Operator was cleaning a tractor window when he slipped and fell, catching himself with hand and arm (shoulder sprain).

#### 8. Other

In July, 1989, the Conservation Fund, in conjunction with the Richard King Mellon Foundation purchased more than 104,000 acres of wetlands in northeastern North Carolina. On June 26, 1990, the Conservation Fund donated over 93,000 acres of this land to the U.S. Fish and Wildlife Service. This led to the establishment of the Pocosin Lakes National Wildlife Refuge, which includes this donated land and Pungo National Wildlife Refuge. In the near future, 6,000 acres of Alligator River National Wildlife Refuge will be added to Pocosin Lakes to form a single refuge of over 111,000 acres.

Pungo Refuge was complexed and administered under Mattamuskeet Refuge since 1984. The refuge office was moved to the shore of Lake Phelps on August 20.



Pungo's new office - a 5 bedroom converted residence. Plenty of space waiting for the staff to fill it.

#### F. HABITAT MANAGEMENT

##### 1. General

Pungo's 12,350 acres consist of Pungo Lake (2,800 acres), croplands (1,200 acres), managed impoundments (700 acres), freshwater marsh (300 acres), forests (1,000 acres) and pocosin brushlands (6,000 acres).

Approved refuge objectives can be summarized as follows:

Mission Statement: Manage to provide optimum habitat for wintering migratory waterfowl.

Required Management Programs: Intensive management of native moist soil plants, water level manipulation and supplemental food production through agricultural crop production.

Specific Objectives:	Waterfowl maintenance	7,500,000 use days
	Swans	1,000,000 use days
	Geese	2,500,000 use days
	Ducks	4,000,000 use days

## 2. Wetlands

### a. Pungo Lake

Pungo Lake is shallow (average depth 2') with very poor water quality. Lake water has a ph of 4.9 and is very darkly stained by tannic acid and suspended organic particles. There is virtually no light penetration and, consequently, there are no aquatic plants in the lake. When the lake level is lowered the exposed shoreline produces some natural foods including rushes, crabgrass, flat sedge, wild millet, chickweed, panic grasses, threesquare, and smartweed. The exposed shoreline has also produced stands of black willow and phragmites.

The lake level was not manipulated but fluctuated from a low of approximately MSL + 9.2' in July to a high of MSL + 10.8' in August.

The high water level throughout the spring and summer resulted in virtually no plant growth on the lake shore edges. The natural marshes on the east and west ends of the lake produced excellent stands of natural foods including flat sedges, smartweeds, rice cutgrass, and switchgrass. There was water standing in the marshes when the first migrant birds arrived in the fall (this is a very infrequent occurrence).

### b. Jones Pond

This 150 acre area is one of the most heavily utilized duck areas on the refuge. The northern quarter, which was dominated by woolgrass and brush, was plowed in November 1988. The area was laden with wild millet and fall panicum. The northern middle quarter is an area dominated by tall willows and other brush interspersed with natural and created openings dominated by smartweeds and grasses. The south middle quarter was dominated by switchcane until about 8 years ago when a three part series (5-10 acres each) of cane control was established. The switchcane was double plowed in late summer/early fall and resulted in a 90% elimination of the cane which was replaced by smartweeds, wild millet, fall panicum, and rice cutgrass. In these areas switchcane has been replaced by woolgrass as the main non-food pest plant. However, this year woolgrass appeared dominant with ample patches of millet, fall panicum and smartweeds present. The south quarter of the pond is dominated by brush, bracken fern and interspersed switchgrass.



Food and water waiting for the ducks that never came.

Dike construction which was begun in 1989 continued in 1990 but completion was delayed in August by 10 inches of rain and was stopped in October.

Waterfowl use of this area in recent years has had peaks of over 30,000 ducks. This year's peak of 15,000 was indicative of the refuges low duck numbers. Mallards were the primary duck user followed by black ducks and pintails.

c. Smartweed Impoundment

This 100 acre area located between D-Canal Road and West Lake Drive, includes two 20 acre moist soil areas separated by 20 acres of brush, primarily willow, maple and gum. The area has been flooded annually since 1977 when dikes were constructed on the west and south sides of the impoundment. Fifteen acres were in agricultural production from 1969 to 1978. In 1978 an excellent stand of natural foods including a very large stand of smartweed was observed and the area converted to a moist soil impoundment. The moist soil areas are plowed at 2-5 year intervals to restore the desirable species (smartweed, millet, panic grasses and other grasses) that are replaced by willow, gum, woolgrass, cattail and ribboncane.

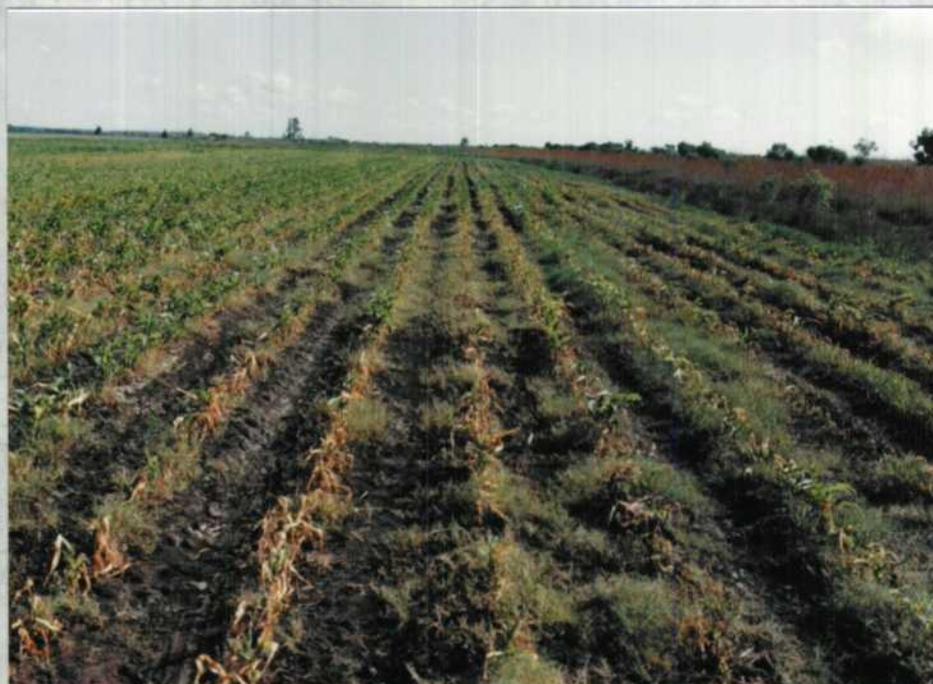
A dike was constructed in 1988 to completely impound the area and provide independent water management. The impoundment was dewatered in May and water held at ditch-top level throughout the summer. The area was flooded in October. The moist soil areas

were dominated by fall panicum and buttonweed with good stands of smartweeds (3 species), wild millet, flat sedges (3 species) and spikerush (4 species). An estimated 85% of the vegetation was waterfowl food species.

This impoundment which has had usage of 10,000 ducks peaked at only 2,500 ducks primarily mallards and green-winged teal with black ducks and wigeon also present.

d. Hyde Park Pond

The 30 acre unit consists of a 25 acre farm unit and 5 acres of moist soil plants. The farm acreage is on a corn and moist soil plant rotation with half the field planted to corn each year and half left fallow. The corn crop was a total failure due to high water combined with poor farming. The fallow portion was dominated by fall panicum and crabgrass with lesser quantities of foxtail, paspalum, smartweed and dog fennel. The northern 5 acres were dominated by switchgrass.



The end result was as bad as pictured.

This impoundment which is traditionally one of the highest duck use areas on the refuge had virtually no use. Peak (duck) numbers counted on this impoundment was only 500, primarily mallards.

e. Marsh A

Marsh A, constructed in 1971, is 100 acres in size. The land elevation is too high to permit flooding in any but extremely wet years. The area was periodically burned until prescribed burning

was eliminated in 1981. The area which had become overgrown with willows, brush and ribboncane was double plowed in November 1988. Half of the unit responded to the plowing and produced smartweeds, fall panicum, switchgrass, wild millet, rice cutgrass and flat sedges. The other half has an abundance of undesirables, primarily ribboncane. Partial flooding occurred in August and water was present throughout the waterfowl season.

A prescribe burn of this unit was planned for December but canceled first due to wet conditions and later to avoid ground fires at the start of fire season.

Waterfowl use of this impoundment included 800 mallards and 200 black ducks.

f. Marsh C

Marsh C was created in 1971 and is approximately 150 acres in size. The land elevation is too high to permit complete flooding but periodic fires created potholes which hold water during wet periods. No water manipulation or management has been accomplished recently and the area has some large willow, gum and maple trees. All available rainfall was held throughout the year to maintain moist soil conditions and provide water for potholes.

g. Van's Pond

This four year old, 10 acre blade scooped area was dominated by the undesirable perennials goldenrod and broomsedge. The fair food switchgrass was also abundant. The area flooded in December.

The area received minimal waterfowl use but 10-50 ducks (primarily mallards) used the area as a roosting/feeding area.

h. Duinens Pond

The initial work for this impoundment was accomplished in 1988. The area was expanded to fifteen acres with the additional clearing of 5 acres. Clearing involved the removal of surface vegetation by a K-G blade D-6 dozer. Flooding of the area was sporadic and fluctuated with the amount of rainfall. The area was completely flooded during December and January but had only isolated pools during November and February. Since the dikes controlling water are existing roads it has a very narrow range of water level manipulation. The area was dominated by switchgrass and also had two species of flat sedges.

Waterfowl usage was sporadic (with fluctuating water) but peaked at 100 mallards.

3. Forests

Five plantings of Atlantic white cedar seedlings were accomplished between 1978 and 1984. Fire and drought wiped out four but the

fifth one, on the D-Canal road dike, has several 20' tall trees. The plantings were an attempt to try to reestablish a native species.

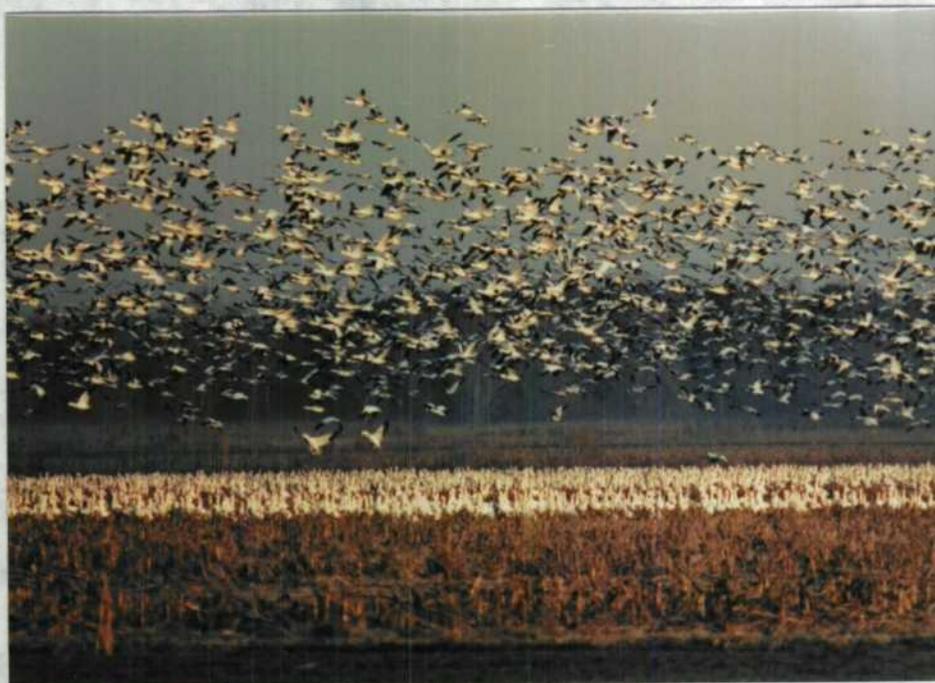
There is a 40 acre woods by the refuge shop with oaks, hickories, and cherries, a 40 acre woods of mixed hardwoods with oak, maples, and gum in the west central portion of the refuge, and 350 acres of mixed hardwoods containing tulip poplar, maple and gum north of Pungo Lake.

No forest management work was conducted.

#### 4. Croplands

There were 1,252 acres of refuge lands in cultivation by 5 cooperative farmers on an 80:20 ratio with double crop wheat on a 85:15 ratio. Corn yields averaged 100 bushels/acre. The wheat crop provided green browse but was a total seed failure and not harvested.

Virtually every species of waterfowl used the agricultural lands and daily concentrations of 40,000 birds were observed during January and early February. Peak waterfowl use included 16,000 snow geese, 1,000 Canada geese, 20,000 tundra swans and 20,000 ducks.



A daily occurrence during January was snow geese feeding in croplands.

Table 3. Farm Acreages for 1990.

Crop	Total Acres	Cooperator's Share	Refuge Share
Corn	627	403	224
Soybeans	625	625	0
Wheat (double cropped)	44	44	0
Moist Soil Plants	12	0	12
TOTAL	1308	1072	236

Approximately 2% of the standing corn was mowed in the fall in conjunction with ditch bank mowing.

Standing corn was mowed following the close of waterfowl season. The dry land fields received peak usage following mowing. Mallards, pintails, blacks and wood ducks used the fields at sunset while the geese and swans utilized the fields throughout the day.

The refuge planted 80 acres of winter wheat for use as a green browse.

#### 6. Other Habitat

Pocosin (brushlands) composed of gallberry, wax myrtle, blueberry, blackberry, bays, sweet gum, and swamp cyrilla comprises approximately 6,400 acres of Pungo's land area. Under normal rainfall conditions several hundred acres are flooded and used by mallards, black ducks and wood ducks.

#### 9. Fire Management

Pungo's six person fire crew was expanded to a sixteen person fire crew with the additional responsibility of all Pocosin Lakes' 111,000 acres. At year's end the crew consisted of 4 Engineering Equipment Operators, one Tower Operator, 9 Motor Vehicle Operators and two vacant positions.

During periods of high fire danger the crew works seven days a week, operates a fire tower just off the northeast corner of the refuge, has a fire tractor and transport standing by, and run constant patrols with an engine (pumper truck). The crew also maintains a 150' firebreak around the refuge perimeter. Plans are to expand the break around the refuge to 300'. The extremely wet spring resulted in another calm season. There were no wildfires on the refuge but there was a small (1 acre) lightning strike fire on Pocosin Lakes that the crew responded to. The fire was suppressed by the N.C. Forest Service. Since this portion of North Carolina burns approximately every 5-10 years and the last fire was in 1985 it is only a matter of time until the next fire.



Pungo's dozer strike team preparing for fire season. Initial attack plans call for 2 tractor plow units working together.

Seven fire crew members were dispatched to Okefenokee on the Short Fire. The crew also assisted with prescribed burns at Mattamuskeet and Cedar Island Refuges.

The last prescribed burn was conducted on Pungo in December 1980. A prescribed burn plan was submitted and approved at the Regional Office to burn marsh A and the triangle unit which includes Jones Pond. A request to change Pungo's prescribed burning criteria was also submitted and approved. The current criteria for initiating a prescribed fire on Pungo is:

(1) Prescribed burning will only be conducted when ground water is high enough to minimize the potential for subsurface fire and water levels in adjacent canals are high enough to provide sufficient water to attack ground fires should they occur.

(2) The North Carolina Forest Service will be notified prior to (usually 24 hours) the prescribed burn operation and the appropriate approvals and/or permits obtained in accordance with any existing cooperative agreements between the two agencies.

(3) If subsurface fire occurs during a prescribed burn, action must be taken to extinguish it as soon as practicable after detection.

The planned prescribed burn was postponed first due to wet conditions and then to avoid having ground fire at the start of fire season. The burn will be rescheduled for next year.

#### 10. Pest Control

The only control was accomplished by cooperative farmers in croplands. Pesticides were approved by the ARD-Environment.

There is a need to begin trying to control phragmites which is encroaching on the Pungo lakeshore and in some fields. Special funding has been requested.

#### 12. Wilderness and Special Areas

Twelve hundred and fifty acres of pocosin have been designated by the State as a natural area. That land stretches north to south on the east shore of Pungo Lake. Pocosins are unique to the southeast and are being eliminated by drainage and development. Pocosin wetlands are composed of a fire tolerant complex of pond pine, bay, maple and brush.

### G. WILDLIFE

#### 2. Endangered Species

A bald eagle was observed along D-Canal Road and on the north shore of Pungo Lake in January.

#### 3. Waterfowl

Wintering waterfowl populations are being reported on a seasonal basis. Overall waterfowl usage declined by 19% (1,098,777 use days). Since water and food were readily available it appears the extremely mild winter allowed many birds to winter further north. Tables 4 and 5 list waterfowl peak and use day figures for the last 10 years. Population estimates were obtained from aerial surveys and ground counts. This was also the least counted year in the last 10 years; but, the decline in numbers was a definite decline in birds.



The poor waterfowl season had at least one bright spot.

a. Canada Geese

Canada goose use decreased 73% (291,301 use days) and the peak decreased by 8,564. Both the peak and use day figures were record lows. Declining Canada goose numbers correspond with the declining North Caroling goose flock which also experienced record lows.

b. Tundra Swan

Though tundra swan use declined 14% (239,036 use days) it was still the third highest in the last ten years. Swan use has been increasing as the birds have moved inland to feed on winter wheat, waste corn and soybean stubble.

c. Snow Geese

Snow goose use days topped the 1 million mark for the first time. The peak population figure of 16,000 was the second highest on record. As with the tundra swans, snow goose numbers have been increasing and the birds are utilizing refuge and adjacent croplands while resting and roosting on Pungo Lake. The 16,000 snow geese could be seen daily in the corn field north of the refuge shop during January.

TABLE 4  
 WATERFOWL USE DAYS AND PEAK POPULATIONS  
 PUNGO NWR

Year	Ducks		Canada Geese		Snow Geese		Swans		Coots	
	Peak	Use Days	Peak	Use Days	Peak	Use Days	Peak	Use Days	Peak	Use Days
80-81	46,610	2,842,812	13,000	1,145,760	10,000	459,914	16,000	1,341,375	10	140
81-82	57,600	3,846,367	26,000	1,453,130	10,000	481,376	22,000	1,285,375	8	56
82-83	62,860	3,687,831	14,500	1,003,900	13,000	675,710	19,000	1,381,975	100	1,302
83-84	54,000	2,788,394	18,000	1,160,250	12,000	483,084	24,000	1,314,754	25	385
84-85	52,080	3,680,306	9,800	778,960	10,000	526,120	24,000	1,454,075	5	168
85-86	43,370	3,135,762	8,500	541,387	15,000	618,394	20,000	1,573,355	100	7,420
86-87	31,250	2,235,548	8,400	488,845	7,500	519,421	18,000	1,107,400	300	15,575
87-88	62,150	2,841,894	8,350	427,930	13,000	700,750	25,200	1,065,525	200	4,580
88-89	35,000	2,632,162	4,500	230,401	15,000	924,800	30,000	1,248,621	20	2,460
89-90	60,000	2,907,846	10,000	398,290	17,000	848,800	34,000	1,716,550	30	1,795
90-91	26,290	1,876,346	1,436	106,989	16,000	1,313,500	20,000	1,477,514	5	155

TABLE 5  
WATERFOWL USE DAYS AND PEAK POPULATIONS BY SPECIES  
PUNGO NWR

Year	Mallard		Pintail		Black Duck		Wood Duck		Ruddy Duck		Wigeon		G.W. Teal		Ring-necked		Others	
	Peak	Use Days	Peak	Use Days	Peak	Use Days	Peak	Use Days	Peak	Use Days	Peak	Use Days	Peak	Use Days	Peak	Use Days	Peak	Use Days
80-81	21,000	1,279,075	22,000	1,229,795	2,000	140,525	700	70,175	NONE		600	47,075	600	53,900	15	910	501	21,357
81-82	30,000	2,281,209	20,000	1,041,145	3,000	236,000	2,000	142,975	NONE		2,000	70,910	1,000	62,125	75	2,135	422	9,828
82-83	36,000	2,124,150	20,000	999,950	5,000	249,725	2,000	171,150	500	13,650	500	28,250	1,500	86,905	10	504	1,092	14,021
83-84	35,000	1,659,000	16,000	449,750	3,500	180,250	5,000	286,300	500	15,050	2,000	95,725	2,000	96,775	10	336	202	5,208
84-85	24,000	1,982,750	20,000	973,455	4,000	287,525	1,200	137,200	NONE		1,500	137,270	2,000	144,025	20	280	314	17,801
85-86	25,000	1,958,600	15,000	700,000	2,500	171,115	1,000	136,850	800	10,500	1,000	34,720	5,500	109,970	300	4,340	327	9,667
86-87	15,000	1,066,870	8,000	378,280	6,000	232,190	750	61,250	4,000	318,500	500	27,475	2,500	143,255	50	2,170	230	5,558
87-88	25,500	1,435,105	25,000	768,740	5,000	218,281	5,000	182,490	5,000	173,775	500	20,055	5,000	161,805	500	5,705	180	4,480
88-89	18,000	1,316,945	8,400	363,825	2,800	127,610	1,000	58,030	3,000	84,000	650	30,730	1,500	80,640	100	1,470	1,465	20,370
89-90	32,400	1,428,000	10,500	849,460	10,200	282,974	5,050	231,460	400	14,325	1,000	15,360	1,700	77,100	140	8,035	32	1,132
90-91	16,000	1,183,603	13,000	172,016	4,000	263,709	1,000	113,366	800	22,400	400	7,544	1,050	107,149	100	6,269	42	290

TABLE 5  
WATERFOWL USE DAYS AND PEAK POPULATIONS BY SPECIES  
PUNGO NWR

Year	Mallard		Pintail		Black Duck		Wood Duck		Ruddy Duck		Wigeon		G.W. Teal		Ring-necked		Others	
	Peak	Use Days	Peak	Use Days	Peak	Use Days	Peak	Use Days	Peak	Use Days	Peak	Use Days	Peak	Use Days	Peak	Use Days	Peak	Use Days
80-81	21,000	1,279,075	22,000	1,229,795	2,000	140,525	700	70,175	NONE		600	47,075	600	53,900	15	910	501	21,357
81-82	30,000	2,281,209	20,000	1,041,145	3,000	236,000	2,000	142,975	NONE		2,000	70,910	1,000	62,125	75	2,135	422	9,828
82-83	36,000	2,124,150	20,000	999,950	5,000	249,725	2,000	171,150	500	13,650	500	28,250	1,500	86,905	10	504	1,092	14,021
83-84	35,000	1,659,000	16,000	449,750	3,500	180,250	5,000	286,300	500	15,050	2,000	95,725	2,000	96,775	10	336	202	5,208
84-85	24,000	1,982,750	20,000	973,455	4,000	287,525	1,200	137,200	NONE		1,500	137,270	2,000	144,025	20	280	314	17,801
85-86	25,000	1,958,600	15,000	700,000	2,500	171,115	1,000	136,850	800	10,500	1,000	34,720	5,500	109,970	300	4,340	327	9,667
86-87	15,000	1,066,870	8,000	378,280	6,000	232,190	750	61,250	4,000	318,500	500	27,475	2,500	143,255	50	2,170	230	5,558
87-88	25,500	1,435,105	25,000	768,740	5,000	218,281	5,000	182,490	5,000	173,775	500	20,055	5,000	161,805	500	5,705	180	4,480
88-89	18,000	1,316,945	8,400	363,825	2,800	127,610	1,000	58,030	3,000	84,000	650	30,730	1,500	80,640	100	1,470	1,465	20,370
89-90	32,400	1,428,000	10,500	849,460	10,200	282,974	5,050	231,460	400	14,325	1,000	15,360	1,700	77,100	140	8,035	32	1,132
90-91	16,000	1,183,603	13,000	172,016	4,000	263,709	1,000	113,366	800	22,400	400	7,544	1,050	107,149	100	6,269	42	290



Record usage and second highest peak.

d. Ducks

Both the peak and usage were the lowest since 1975-1976. The peak declined by 56% (33,710 birds) and use days declined by 35% (1,031,500).

Mallards (1,183,603 use days) accounted for 63% of total duck usage. Peak and usage figures were the second lowest in the past 10 years.

Black ducks were the second most numerous duck species and accounted for 14% of total duck usage. The 263,709 use days were the third highest in the past ten years.

Pintail usage declined from over 1 million use days in 1981-82 to 172,016. The peak and use days figures are record lows. Pintails were Pungo's most numerous duck species from 1966-67 to 1979-80 but their numbers have fallen drastically since then.

Wigeon numbers were also 10 year lows with a peak of 400 and use days of 7,544.

FORM B  
WOOD DUCK PRODUCTION

REFUGE: Pungo NWR  
NESTING YEAR: 1990

	<u>NUMBER</u>	<u>PERCENT</u>
Total Usable Boxes	<u>146</u>	
Estimated Boxes Used By Wood Ducks	<u>72</u>	<u>57</u>
Estimated Boxes Used By Other Ducks	<u>0</u>	
Estimated Boxes Used By Other Wildlife	<u>12</u>	<u>21</u>
Estimated Wood Duck Broods Produced	<u>58</u>	
Estimated Wood Ducks Surviving to Flight Stage*	<u>203</u>	<u>50</u>
Total Wood Duck Production On Refuge	<u>403</u>	

Plans for next year (indicated number):

                   more boxes

                   fewer boxes

  X                   no change

Remarks: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\* = number of broods multiplied by 3.5

8. Game Mammals

Not too bad!

Either sex deer hunting was permitted for the twenty-first consecutive year. For the second straight year the yearling take (112) exceeded the fawn take (111). Take of 3 1/2 and 4 1/2 age classes were the lowest on record while the 5 1/2+ age class was highest in the past seven years but still only comprised 5.0%. The sex ratio of the harvest (and herd) continues at a favorable even ratio.

Table 6 lists average live weight and antler point averages by age classes. Weights were up slightly while antler development was somewhat lower. The largest deer to come off the refuge was an estimated 216 pound (163 dressed weight) 4 1/2 year old 11 point taken during the archery season.

Table 6 - Average Live Weights and Antler Point Averages by Age.

Ages	Bucks		Does		No. of Points	
	1989	1990	1989	1990	1989	1990
1/2	57	58	54	55	--	--
1 1/2	105	105	88	93	2.7	2.2
2 1/2	144	139	102	99	6.5	4.8
3 1/2	152	184	101	103	6.8	8.0
4 1/2	147	159	108	NS	8.0*	5.3
5 1/2+	NS	149	77	99	NS	8.0
Comparative Averages	121	129	84	90	6.0	5.1

\*single samples only

#### b. Black Bear

Black bear numbers and sightings continue to increase. The refuge corn field north of Pungo Lake was an excellent viewing area. Virtually every deer hunter who hunted near that field saw bear.



Bear numbers and sightings have increased in recent years.

### 15. Animal Control

Since tundra swan use around Pungo has increased many local farmers feel swans feeding on winter wheat reduce yields. Swan damage complaints, though frequently received, were less than in years past.

North Carolina opened the hunting season on tundra swans issuing 1,000 permits in 1984 and 6,000 from 1985-90.

### 16. Marking and Banding

Wood duck banding (preseason) success was the second highest on record as 750 woodies were banded. The wood ducks were caught on Pungo Lake with a rocket net. Net shots were attempted once a week from May - September shooting over a minimum of 20.



A bird in the hand is worth ?? on the lake.

As part of Jay Hestbeck's Population Dynamics of Resident and Migrant Canada Geese study the refuge received a Canada goose quota of as many as possible. The first successful net shot resulted in 38 Canadas being captured, banded and collared. However, only 8 more were caught before the birds departed. Pungo's goose numbers were the lowest on record with a peak of only 1,436.

The Chesapeake Wildlife Heritage, formerly associated with Johns Hopkins University, sent a research team for their annual tundra swan banding visit in February. The refuge staff captured the swans and provided assistance with banding, collaring, weighing, sexing and measuring the birds. Approximately 80 volunteers showed up to watch and/or assist with the banding. The rocket net shot resulted in the capture of 192 tundra swans.

#### H. PUBLIC USE

##### 1. General

The bulk of refuge visitation occurred in conjunction with the deer hunt and wildlife observation on the auto tour route. Peak wildlife observation occurred following winter corn mowing when spectacular concentrations of waterfowl were observed in the farm fields.



In addition to waterfowl, deer, bear, and bobcats, foxes are also observed along the tour route.

##### 7. Other Interpretive Programs

Biology classes from Enloe High School and Jacksonville High School visited the refuge for swan banding.

## 8. Hunting

The 1990 deer hunt consisted of a 24 day either-sex archery hunt and a 7 day either-sex shotgun and primitive weapons hunt. The gun hunts were limited to 200 permittees per day; no permits were required for the archery hunt. There were 2,304 hunter visits totalling 18,432 hours of hunting activity.

The archery harvest of 82 deer was the highest on record while the success ratio of 1 deer per 18.3 hunter days was second to the 1988 ratio of 1 per 16.7 hunters.

The gun hunt kill of 246 was the fifth highest on record and the success ratio of 1 deer per 3.3 hunters tied the second highest.

Table 7. Deer Hunt Results on Pungo NWR

Hunt Type	Hunt Days	Bucks	Does	Total Take	Hunter-Days	Hunter-Hours	HD per Deer	HH per Deer	HH per HD
Bow Either-sex #1	24	41	41	82	1,500	12,000	18.3	146	8.0
Gun Either-sex #2	1	22	23	45	164	1,312	3.6	29	8.0
Gun Either-sex #3	1	29	28	57	167	1,336	2.9	23	8.0
Gun Either-sex #4	1	16	14	30	126	1,008	4.2	34	8.0
Gun Either-sex #5	1	19	18	37	98	784	2.6	21	8.0
Gun Either-sex #6	1	5	4	9	36	288	4.0	32	8.0
Gun Either-sex #7	1	21	23	44	76	608	1.7	14	8.0
Gun Totals	7	124	122	246	804	6,432	3.3	26	8.0
1990 Totals	24B 7G	165	163	328	2,304	18,432	7.0	56	8.0
1989 Totals	24B 6G	143	144	287	2,516	20,128	8.8	70	8.0

## 17. Law Enforcement

Most law enforcement problems and violations occurred during the regular State hunting season. Special agents Ted Curtis and Jack Baker along with N.C. Wildlife Resources Commission offices Bill Lawrence and Jimmy Bales provided many hours of assistance throughout the year.

Table 8. 1990 Violations

Failure to wear 500 sq. in. fluorescent orange - 1 @ 50.00	\$50.00
Possession of untagged deer - 4 @ 50.00 ea.	200.00
Possession of loaded firearm in vehicle - 2 @ 50.00 ea.	100.00
Possession of lead shot in a steel shot zone - 1 @ 50.00	50.00
Hunting from vehicle - not guilty	
Possession of loaded firearm in vehicle - not guilty	
Shooting after hours - 1 @ 60.00	<u>60.00</u>
TOTAL	\$460.00

I. EQUIPMENT AND FACILITIES1. New Construction

Construction of the Jones Pond Dike begun in 1989 continued but was again stopped due to high water and wet conditions. Approximately 1 1/4 miles of dike was completed leaving 1/2 mile for next year.



Construction continued on Jones Pond Dike to completely impound a major waterfowl area.

## 2. Rehabilitation

The Hyde Park Canal cleanout begun in 1989 was completed.

Trees were removed from the canal bank along D-Canal Road.

The refuge roads which are a peat, sand and clay consistency are either muddy or dusty depending on that day's weather. Since they are also used as firebreaks they require constant work to keep them functional and passable. The 150' firebreak around the refuge perimeter was disked in the fall. Virtually every canal bank was mowed with the exception of those with trees too large to mow.

A tremendous amount of time and effort was expended on road maintenance on the new Pocosin Lakes property. The road system which had been allowed to deteriorate for 5 years required extensive work. Every road (over 100 miles) required ditch bank mowing, reshaping and grading.



Ditch bank and road shoulder mowing was begun on the new Pocosin Lakes property. Keeping them running was a challenge.

Many roads required a bulldozer to work ahead of the motor grader to open the road enough for grader access. Approximately 45 miles were improved by year's end. All these roads are constructed on organic soil and will require constant attention to keep them passable.



Roads and dikes on organic soils are often soft and have no bottom.

#### 4. Equipment Utilization and Replacement

Two underground gasoline and diesel fuel storage tanks were removed.

The D-6C acquired with the Pocosin Lakes properties required extensive undercarriage repairs. Replacement of rails, sprockets, idlers and rollers was accomplished.

A surplus low-boy trailer was rehabilitated to provide a second dozer and plow (fire) transport trailer. Repairs included redecking, construction of ramps, and installation of hydraulic tank, hoses and fittings.

A surplus engine and transmission was installed in the Huber motor grader.

The mowers, boomaxes and graders are all old and need to be replaced. They required almost daily repairs to keep them running.

## 5. Communication System

The initial plans to upgrade our radio system from low to high band was supposedly completed in April with the installation of the repeater at Engelhard, North Carolina. The repeater serves Mattamuskeet and Alligator Rivers Refuges. Pungo is the farthest station from the repeater and has the worst communications. Though the radios are newer communications have not improved at all.

Pungo still uses low band radios for joint fire fighting efforts with the N.C. Forest Service. The bulk of these radios are old and require maintenance to keep them working. When working we have better low band communications than with the high band system.

## 7. Energy Conservation

The following chart depicts energy use for the past four years.

<u>Energy</u>	1990	1989	1988	1987
Electricity (KWH)	21,573	15,020	10,620	12,140
LPG/Propane (Gal.)	879	1,065	1,115	920
Gasoline (Gal.)	8,551	5,597	4,956	3,643
Diesel Fuel (Gal.)	12,365	10,018	10,085	7,503

The only LPG use is to heat the refuge shop and bathrooms. This did not change with acquisition of Pocosin Lakes lands.

When Pungo was combined with Pocosin Lakes additional electricity usage resulted from the refuge office which has electric heat and air conditioning. Increases in gasoline consumption resulted from an increased staff as well as administering and working on 111,000 acres as opposed to 12,000. Diesel fuel consumption increased due to heavy equipment usage on Pocosin Lakes. Firebreak and road maintenance was accomplished with 2 dozers, 2 motor graders, 2 boomaxes and 3 mowers.

## J. OTHER ITEMS

### 1. Cooperative Programs

#### a. Edenton Fish Hatchery

The refuge provided a D6D bulldozer and operator to begin rehabilitation of 36 fish ponds on Edenton National Fish Hatchery. The hatchery paid for fuel and overtime.

Pond repairs included removal of 1/3 of all side material, reshaping bottoms and sides, and sloping and packing sides. Eighteen of the 26 ponds were completed.



A major undertaking was begun to rehabilitate all of Edenton's fish ponds. Eighteen were completed.

b. Tundra Swan

The Chesapeake Wildlife Heritage has been sending a research team to Pungo annually. The refuge catches tundra swans for the project. The rocket netted swans are banded, measured, weighed, sexed and released. The marked swans are tracked from the North Carolina wintering area to the nesting grounds in the Alaskan and Canadian tundra. Refuge personnel caught and assisted with the banding, collaring and information gathering on 215 tundra swans.



Swan banding waiting line. After awhile the birds are heavy and volunteers tired.

c. Gypsy Moth

In cooperation with a U.S. Forest Service study on gypsy moths, five traps were placed around the refuge. No gypsy moths were caught.

3. Items of Interest

Kitts, Clayton, Sawyer and Gibbs completed the N.C. Forest Service Tractor and Plow Safety Course given at Mattamuskeet NWR.

Clayton, Sawyer, Lowe and Patrick completed the Fire Fighter Equipment Operator Course presented by the N.C. Forest Service in Kinston, N.C.

The fire crew received S-130 and S-190 and attended the N.C. Forest Service Cooperators Meeting.

Kitts met with N.C. District Forester Dan Smith on several occasions to discuss: the Grassy Ridge Fire Prevention Plan, firebreak construction and maintenance, prescribed burning, fire manning and preparedness levels.

Kitts and Clayton attended the water control structure inspection and maintenance workshop in Washington, N.C.

David and Bernice Kitts represented the U.S. Fish and Wildlife Service, Pocosin Lakes NWR at the Columbia Boardwalk Festival.

Kitts attended the baiting workshop at Southern Pines, N.C.; the Canada goose banding status meeting in Atlanta, Georgia; Aircraft Safety training in Manteo; terra-torch training at Mackey Island NWR; Eastern Carolina coordination meetings; and a N.C. refuges meeting on the N.C. Forest Service cooperative agreement. He also completed the law enforcement refresher training and requalified with the Service revolver on two occasions. He was also interviewed on refuge compatibility.

Gibbs attended the regional orientation training for new employees in Atlanta, GA.

Gibbs and Clayton completed equipment certification training for endloader, backhoe and motor grader. Clayton also completed certification training on utility tractor and crawler dozer.

#### 4. Credits

This report was written by David Kitts, typed, assembled and edited by Bernice Kitts.

K. FEEDBACK

For Pungo Refuge 1990 was a year of change. Changes in managers brings about certain changes and Pungo's manager changed from Don Temple, briefly to Tom Barnes and then was vacant awaiting the arrival of Jim Savery. The fire program expanded in staff to include 4 equipment operators and 12 motor vehicle operators. The office changed from Mattamuskeet to Pocosin Lakes. The area of responsibility went from 12,000 acres to 111,000. The new lands required a tremendous amount of road maintenance and firebreak work to just have a chance at fighting a wildfire should it occur. All this in addition to habitat work and normal refuge activities. The Pungo crew should be commended for working long and hard to make improvements, keep equipment operating and to make the transitions easier.

Administratively the workload also appeared insurmountable with the start-up of a new refuge including establishing an imprest fund, BPAs, purchasing, setting up the computer, obtaining contract warrant, establishing files, procuring manuals, setting up property records on donated property (the list could go on and on). This was added to Pungo's workload that already included T&A preparation on 17 people, administering Pungo's permit only deer hunt, the paperwork to try and hire 13 seasonals and convert 3 seasonals to full-time as well as normal reports and correspondence. Bernice did an exceptional job working 3 days a week (in this office) to keep us afloat in the sea of paperwork. Bernice, in almost every case, had to teach herself T&A's, purchase orders, imprest voucher preparations, etc; since she had not been trained or given those duties previously. She was given them here and excelled in the added duties and responsibilities. She should be commended for a job done exceptionally well.

Though I strongly believe it's better to have too many Indians, it would have been nice to have had an additional chief.

REVIEWS AND APPROVALS

POCOSIN LAKES NATIONAL WILDLIFE REFUGE

Creswell, North Carolina

ANNUAL NARRATIVE REPORT

Calendar Year 1990

<u>Jim Savery</u>	<u>Oct 4, 1991</u>	<u>Karen S. Cartledge</u>	<u>10/11/91</u>
Refuge Manager	Date	Refuge Supervisor	Date
<u>Donald W. Benson</u>	<u>10/25/91</u>		
Regional Office Approval	Date		