REVIEW AND APPROVALS

ROANOKE RIVER NATIONAL WILDLIFE REFUGE

Windsor, North Carolina

ANNUAL NARRATIVE REPORT

Calendar Year 1995

Refuge Manager — Date: 7/3/97

District Manager Review — Date: 7-31-97

Regional Office Approval — Date: 8/1/97

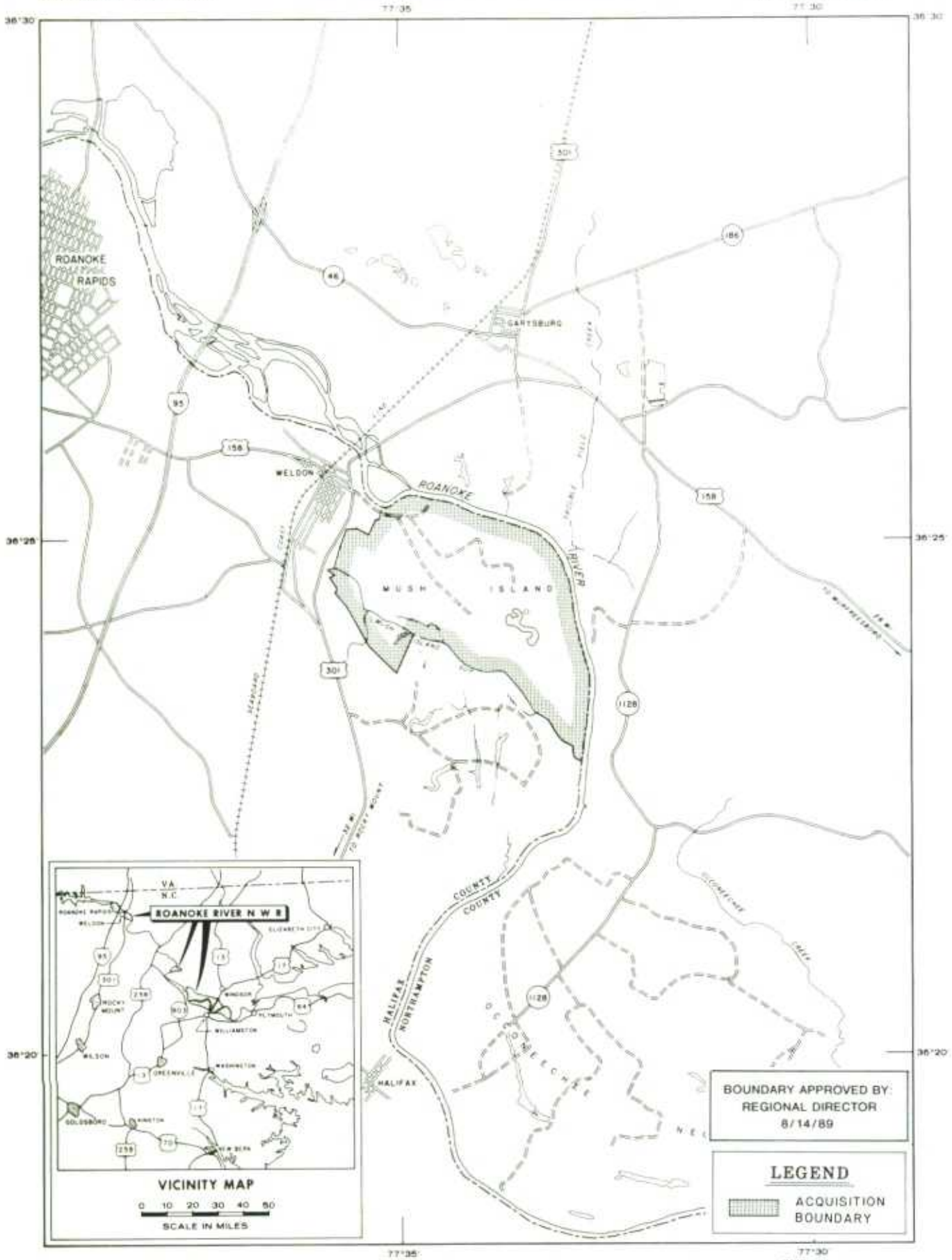
GARD, Area 2 — Date: 8/5/97

ROANOKE RIVER NATIONAL WILDLIFE REFUGE

BERTIE, HALIFAX AND MARTIN COUNTIES, NORTH CAROLINA

UNITED STATES
DEPARTMENT OF THE INTERIOR

UNITED STATES
FISH AND WILDLIFE SERVICE



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FROM SURVEYS BY USGS

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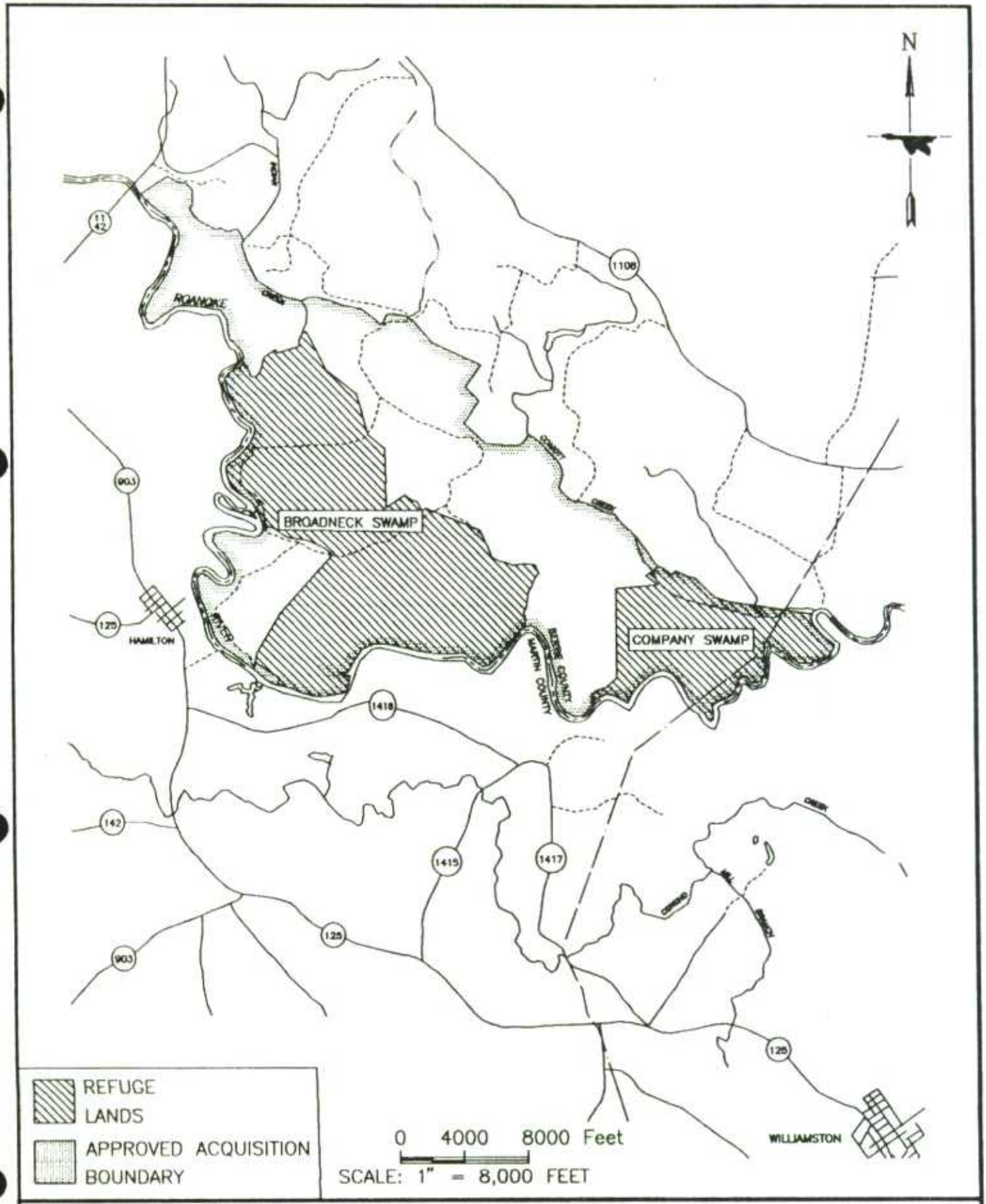
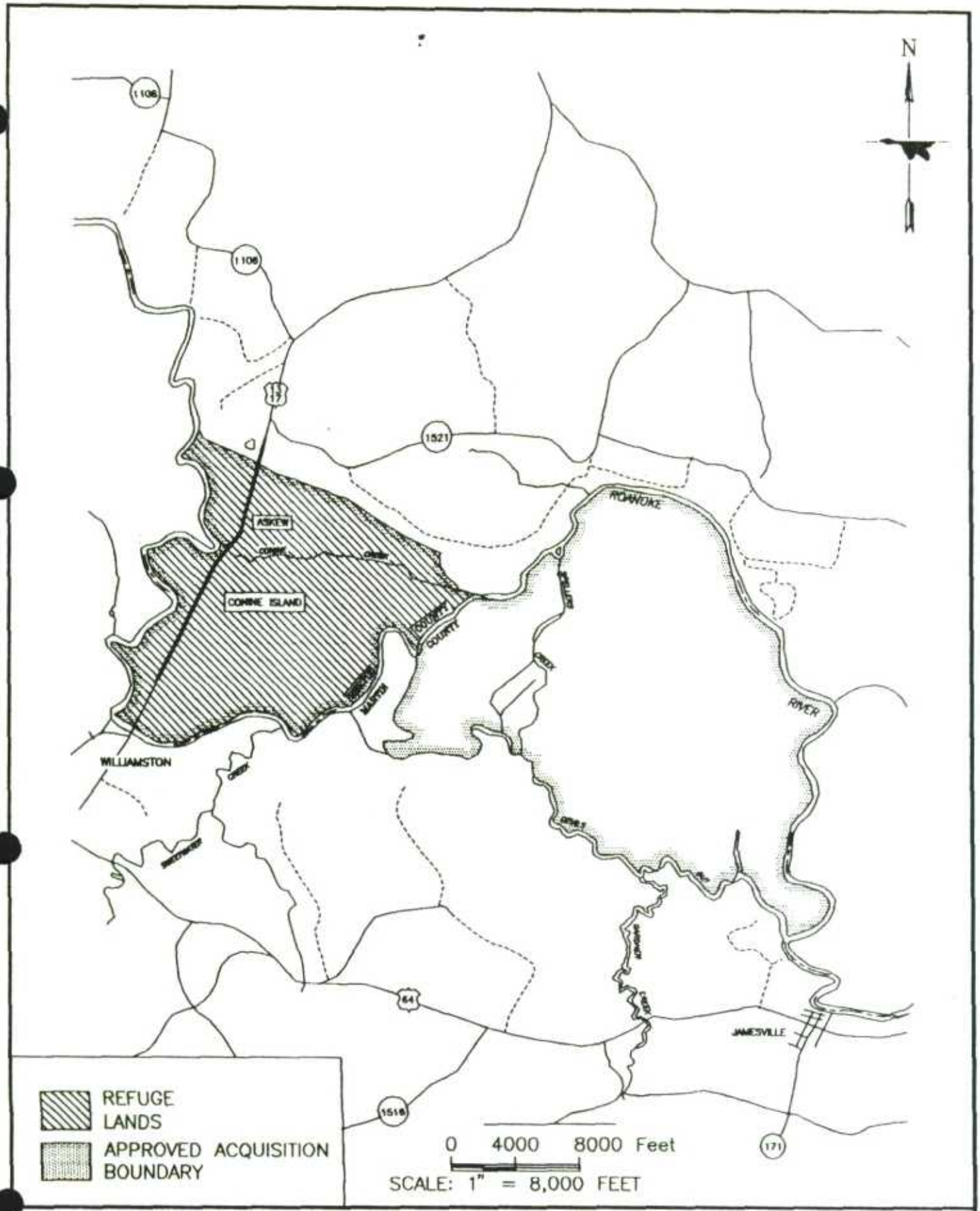


ROANOKE RIVER NATIONAL WILDLIFE REFUGE
BROADNECK/COMPANY SWAMP UNITS

DRAWN BY: MDC

UNITED STATES FISH AND WILDLIFE SERVICE

JANUARY 1994



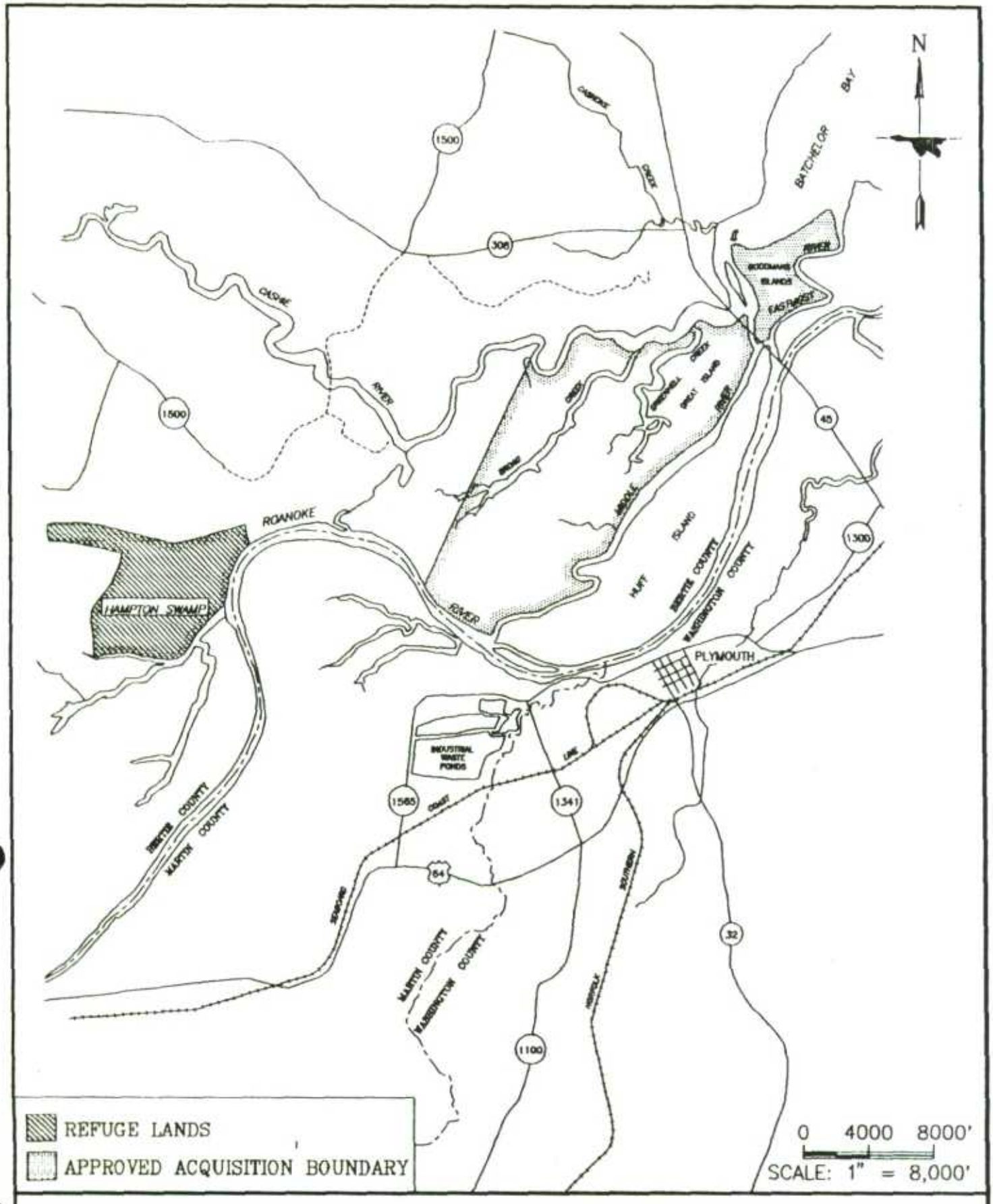
ROANOKE RIVER NATIONAL WILDLIFE REFUGE

CONINE ISLAND/ASKEW UNIT

DRAWN BY: MDC

UNITED STATES FISH AND WILDLIFE SERVICE

JANUARY 1994



ROANOKE RIVER NATIONAL WILDLIFE REFUGE
HAMPTON SWAMP TRACT

DRAWN BY: MDC

UNITED STATES FISH AND WILDLIFE SERVICE

SEPTEMBER 1996

INTRODUCTION

The Roanoke River National Wildlife Refuge (refuge) was established August 10, 1989, to protect and enhance wooded wetlands consisting of bottomland hardwoods and swamps with high waterfowl value along the Roanoke River (river). The refuge acquisition boundary involves wetlands in a 130 mile section of the river from the fall line in Weldon, downstream to the Albemarle Sound near Plymouth, North Carolina. This area of floodplain encompasses approximately 150,000 acres (235 square miles) of which 33,000 acres are in the refuge acquisition boundary. Current refuge acreage totals 12,500. North Carolina Wildlife Resources Commission (Commission) acquisitions total approximately 14,000 acres. Both agencies lands are managed as a joint venture between the U. S. Fish and Wildlife Service (Service) and the Commission. Lands in Halifax, Bertie, and Martin Counties are included. The refuge office is located in the Town of Windsor in Bertie County, North Carolina.

The refuge includes part of an extensive wetland ecosystem that contains excellent examples of a number of southeastern plant communities. These are grouped into three natural community types: levee forest, cypress-gum swamp, and bottomland hardwoods.

The Roanoke River floodplain is relatively narrow from Weldon to Scotland Neck, at times only a mile in width, with natural levees and ridges alternating with sloughs and backswamps in rapid succession. Current refuge acreage does not include lands in this river section. In the middle reaches of the river, the floodplain becomes flatter and broader, commonly reaching a width of two to three miles, with cypress-gum backswamps increasing in size. The continued presence of levees and ridges make this stretch of the floodplain the most diverse and productive. The 12,500 acres of refuge lands are in this middle river reach. Below Jamesville the river is essentially at sea level and broad expanses of cypress-gum swamp, as much as five miles across, predominate. In addition to the major vegetative communities described above, occasional oxbow lakes, beaver ponds, and blackwater streams are located throughout and add to the rich mosaic of habitat types in the river's floodplain. Together, these habitats support a rich array of diverse and abundant wildlife species. A total of approximately 4,500 acres in this river reach are in the refuge acquisition boundary.

The river floodplain includes some of the more valuable wetlands for fish and wildlife, especially waterfowl. Fourteen species of waterfowl regularly utilize the floodplain's wetlands. Wood ducks, mallards, and wigeon are the most abundant. Other frequently observed species are black duck, pintail, gadwall, green-winged teal, blue-winged teal, ring-necked duck, hooded merganser, shoveler,

bufflehead, Canada goose, and tundra swan.

At least 214 species of birds, including 88 breeding resident species, utilize the river's floodplain. The area supports the highest density of nesting birds, especially songbirds, anywhere in North Carolina. The project area has at least five rookeries that contain great blue herons and great egrets.

The river, its tributaries, and associated floodplain wetlands provide critical habitat for a diversity of fish species, including anadromous fish. Anadromous fish utilizing the system are striped bass, blueback herring, alewife, hickory shad, and American shad. The status of the endangered short-nose sturgeon is unknown.

The river's floodplain also has a high density of white-tailed deer. A remnant population of black bear exists along the lower river. Gray squirrels and marsh rabbits are abundant. Resident furbearers include raccoon, mink, muskrat, otter, fox, bobcat, beaver, and opossum.

The river's bottomland hardwood habitat supports one of the largest natural wild turkey populations in North Carolina. The prime bottomland hardwood trees on the ancient river ridges and terraces provide excellent food and cover for feeding and nesting turkeys. Limited woodcock and bobwhite quail also occur along the river.

Historical economical uses have been commercial fishing and logging. Logging operations were aimed primarily toward harvesting cypress and green ash. Some cypress-tupelo swamps have been changed to mainly tupelo with a few scattered cypress. Some areas have only small quantities of the ash component. Recreational uses are primarily hunting and fishing.

INTRODUCTION

Page

TABLE OF CONTENTS i

Page

HABITAT MANAGEMENT (Cont.)

G. WILDLIFE

H. PUBLIC USE

Page

H. PUBLIC USE (Cont.)

I. EQUIPMENT AND FACILITIES

J. OTHER ITEMS

A. HIGHLIGHTS

--Initiation of studies to determine flood plain utilization by anadromous clupeids

--Acquisition of cost-sharing funds from N.C. Power to assist with refuge habitat utilization study

--July 30 - August 2 fish kill

B. CLIMATIC CONDITIONS

Temperatures were relatively normal, when compared with the 30 yr. average, with the exception of November and December. Although rainfall for the year was two inches below normal, June was extremely wet, as was the fall.

The Roanoke River reached flow stage in early June and remained there until July 30.

Table 1. 1995 temperature and precipitation data was recorded at the Agriculture Peanut Research Station, Lewiston, NC, approximately 5 miles from the refuge.

Temperature							Precipitation	
	1995		1995 ave.		30 yr. ave.			
Month	Min.	Max.	Min.	Max.	Min.	Max.	1995	44 yr. ave
January	15	75	37	52	28	52	2.39	3.89
February	14	71	34	50	30	55	4.53	3.76
March	28	79	41	64	37	63	2.93	4.11
April	32	91	48	73	46	74	1.55	3.21
May	43	91	57	78	54	80	2.70	4.11
June	52	91	65	84	61	86	8.24	4.20
July	65	96	72	91	66	89	3.56	6.06
August	60	94	69	89	65	88	3.23	5.31
September	51	89	62	81	59	84	5.61	4.34
October	36	86	54	75	47	74	4.92	3.34
November	28	77	39	58	38	65	4.50	2.81
December	21	73	31	49	31	55	2.12	3.36
Total							46.28	48.50

C. LAND ACQUISITION

1. Fee Title

The acquisition program, since refuge establishment, has involved the Service, the North Carolina Wildlife Resources Commission (Commission), and The North Carolina Nature Conservancy (TNC). In a Memorandum of Understanding between the Service and the State of North Carolina, the Service agreed to exclude from its acquisition all lands in Martin County except the tract known as Devils Gut. The Service will eventually acquire all Commission lands in Bertie County. Proceeds from acquisitions to date have been used by TNC to acquire replacement lands for the Commission, in Martin and Halifax Counties. All land transfers between the Service and Commission through TNC have been, as planned, on a basis of "like kind" and "like value."

Acquisition continued in 1995 with the purchase of the Hampton Swamp Tract 12h. This tract contains 1122.4 acres and was purchased for $245,000. The addition of this tract brings total refuge acres to 12,500. This is the last of several Bertie County tracts, eventually acquired by the Service, initially purchased from Georgia Pacific by TNC.

4. Farmers Home Administration Conservation Easements

Forty-two conservation easements were transferred to Roanoke River NWR from Pee Dee NWR in September 1995. These easements are in the Roanoke-Tar-Neuse-Cape Fear (RTNCF) ecosystem and were transferred to consolidate them within one ecosystem administrative office. The easements are located in nine counties and bring the total number to 87 in 17 counties now administered by this station. One Sampson County fee title tract of 129 acres was also transferred. Several recommended easements are still awaiting transfer.

ROANOKE RIVER NATIONAL WILDLIFE REFUGE
FARM SERVICES AGENCY CONSERVATION EASEMENTS
AS OF DECEMBER 31, 1995

COUNTY	TRACT NUMBER	CONVEYANCE DATE	ACRES
Bertie	10C,1	03/28/90	43.40
	10C,2	03/28/90	6.92
Edgecombe	10C	05/25/90	45.52
	11C	12/06/91	15.15
Franklin	10C	08/30/89	14.50
	11C	01/18/90	44.92
	12C	07/31/91	60.38
Gates	10C	05/30/89	82.20
Halifax	10C	09/07/89	10.10
	11C	05/18/93	33.96
	12C,1	06/03/94	14.50
	12C,2	06/03/94	6.00
	12C,3	06/03/94	6.23
Hertford	10C	01/23/90	130.72
Martin	10C	05/10/90	26.93
Nash	10C,1	08/30/89	7.80
	10C,2	08/30/89	16.61
	11C	10/06/89	5.42
	11C,1	10/06/89	4.03
	11C,2	10/06/89	3.35
	11C,3	10/06/89	7.81
	12C	12/22/89	8.92
	12C,1	12/22/89	13.51
	12C,2	12/22/89	7.83
	12C,3	12/22/89	1.21
	13C	12/27/92**	19.52
	13C,1	12/27/92**	13.53
	13C,2	12/27/92**	71.44
	14-Fee	03/17/92	44.90
	15C	03/17/94	35.37
	16C	04/18/94	33.94
Northampton	10C	01/10/90	26.89
	10C,1	01/10/90	16.93
	11C	01/10/90	16.22
	12C	01/10/92	21.89
Wilson	10C	09/07/89	11.94

Bladen	11C	04/15/91	37.96
Caswell	10C 12C	04/16/90 12/18/89	35.91 48.77
Cumberland	10C 11C 12C	07/31/89 07/24/89 12/22/89	14.33 121.80 4.85
Harnett	10C,1 10C,2	02/02/90	23.21 18.84
Rockingham	10C	10/06/89	74.73
Sampson	10C 11C,1 11C,2 12C,1 12C,4 12C,5 13C 14C,1 14C,2 15C 16C 17C 18C,1 18C,2 19C,1 19C,2 20C,1 20C,2 21C 22C,1 22C,1 23C 24-FEE 25C 26C 27C 28C	05/03/89 08/09/89 08/09/89 08/08/89 08/08/89 08/08/89 08/08/89 08/09/89 08/09/89 08/08/89 08/08/89 08/08/89 08/08/89 08/08/89 08/08/89 08/08/89 08/17/89 08/17/89 08/18/89 09/06/89 09/06/89 09/07/89 04/26/91 12/12/90 03/31/89 03/21/90 01/22/93	14.00 9.02 38.74 12.36 38.49 3.00 47.00 24.00 7.40 17.05 8.47 17.78 70.00 30.13 20.51 11.90 25.47 11.00 49.70 14.09 33.16 30.07 128.96 346.20 4.63 36.33 2.50
Wake	10C	03/05/93	17.00

D. PLANNING

5. Research and Investigations

Roanoke River NWR NR95 - "Effects of dioxin on non-game species at Roanoke River NWR" (40131-91-01) The study was conducted by Dr. W. James Fleming, Leader, the North Carolina

Cooperative Fish and Wildlife Research Unit at North Carolina State University. The objectives were: (1) determine extent of dioxin contamination in great blue heron eggs, and (2) determine colony and nest productivity of heron rookeries from which eggs are sampled for dioxin analysis.

Analysis of the embryo's from eggs collected in 1993 were conducted in 1994. Results and a final report are expected in early 1996.

Roanoke River NWR NR95 - "Determining the Mechanisms Responsible for Zonation Observed in Floodplain Systems" (93-42630-02) This study was conducted by Michael Lefsky, Ph.D. candidate, University of Virginia, Department of Environmental Sciences, Charlottsville, Virginia (see the 1993 narrative for a description). At year's end refuge staff had been unsuccessful in obtaining a report. Mr. Lefsky is alive and well and is registered in Thesis Preparation at UVA, but has been unable to produce a required report.

Roanoke River NWR NR95 - "Time Lapse Photographic-Hydrologic Studies" (95-42630-01) TNC initiated a time lapse photographic study to visually illustrate the Broadneck Swamp's seasonal hydrograph. A report was not available to incorporate in this annual narrative.

Roanoke River NWR NR95 - "Floodplain Plant Community Survey of the Roanoke River National Wildlife Refuge" (95-42630-02) This plant survey was initiated by Dr. Steve Walsh, Department of Geography, CB 3220, UNC, Chapel Hill, NC. A report of 1995 activities was not timely received to incorporate in this 1995 Annual Narrative.

Roanoke River NWR NR95 - "Population Dynamics and Habitat Associations of Breeding Birds in Bottomland Hardwood Forests" (95-42630-03) This study is being conducted by Jim Lyons, Department of Biology, Virginia Polytechnic Institute and State University, Blacksburg, VA through the National Biological Survey's Fish and Wildlife Coop Unit, NC State University, Raleigh, NC.

This study has two overall goals: one, identify critical inter- and intraspecific interactions influencing songbird population dynamics in bottomland hardwood forests; and two, evaluate bird-habitat relationships effecting fitness of individuals breeding in a naturally fragmented system. Listed below are the specific objectives of the research for the 1995 breeding season.

(1) Monitor local population abundance of Neotropical migrants and residents on nest plots using point counts.

(2) Collect reproductive success data from as many species as possible in wide and narrow levees, and evaluate edge effects on productivity.

(3) Assess the possibility that the Roanoke River basin contains "source" populations.

(4) Survey vegetation on structure and composition at all active nests and investigate habitat relationships (species diversity, stem density, aspect, canopy cover, etc.) associated with successful reproduction.

(5) Survey vegetation structure and composition at all point count stations and evaluate within-patch habitat associations; relate bird density to habitat features important to conservation and management of bird populations.

(6) Begin detailed demographic study of Prothonotary Warblers: establish a marked population, determine densities using spot-map method, evaluate population age structure, pairing rates, and reproductive success at edge and interior locations.

Results from 1995 field work

Bird Census-- The first round of point counts were conducted during May 9-12, the second round during May 25-26 and the third round during June 29-30. Mean number of individuals per station was similar to previous years for most species. This season was the fourth consecutive year of population monitoring at these plots (some plots were used in a previous study, 92-42630-01); thus providing a substantial database on relative abundance of each species and habitat associations. The database allows for evaluation of annual variation in population numbers. Some species, Eastern Wood-pewee for example, show a range of densities during the study period; others, like the American Redstart, appear to be more consistent from year to year.

Nesting Success and Productivity-- A total of 163 nests were located and monitored during the 1995 breeding season. This sample included 19 species, 13 migrants and six permanent residents; the majority of the nests were of Arcadian Flycatcher, Prothonotary Warbler and Northern Cardinal. For many of these species, sample sizes are not large enough to allow statistical comparisons between interior and edge sites

or with other studies. For these species plans are to combine nests located in 1994 and 1995 to evaluate nesting success in the Roanoke River System; these analyses are on going.

For both Prothonotary Warblers and Arcadian Flycatchers, preliminary results indicate that on the Roanoke River, in contrast to other ecosystems, nest success in edge habitats is as high as in interior habitats. There were no significant differences in daily probability of nest survival between edge and interior locations for either species. The edges in this study included the river channel edge and the levee forest-swamp forest edge. Clearly, the ecological effects manifested within an ecosystem are influenced by the types of edges and ecotones present.

Habitat Analyses;-- Vegetation surveys were based on a systematic random sample design to characterize vegetation at the plot level and to examine any vegetation gradients found within plots. The systematic random design called for 480 vegetation surveys. Flood conditions on the study plots in late June and early July limited the number of surveys completed in 1995. A total of 175 surveys were completed and plans are to complete the surveys in 1996 because little change in vegetation composition and structure is expected between seasons.

Prothonotary Warbler Demographic Study--A total of 51 warblers were captured and banded during the 1995 breeding season. Territorial males were spot mapped on four wide levee and three narrow levee plots. Mating status, initial nest attempts and renesting of each male was monitored. Based on these banding totals and the spot map results, it appears that densities of breeding males is much greater on narrow levees than wide levees. Nest site availability was similar on the two types of levees. Bird census work in previous years in cypress-gum swamps and levees indicates that Prothonotary Warbles are a "swamp specialist." The preference for narrow levees over wide may be because narrow levees are by definition closer to swamp habitats and may contain standing water more often during the breeding season than wide levees. Analyses of these data are ongoing and this demographic study will be significantly expanded in 1996.

<u>Roanoke River NWR NR95 "Osprey Productivity Assessment" (93-42630-03)</u> Staff of the Roanoke River NWR and the Raleigh office of Ecological Services cooperated on a third year of assessing the productivity of ospreys breeding at the mouth of the Roanoke River and western Albemarle Sound. The assessment was initiated in 1993 to determine the productivity of piscivorous migrator birds feeding and nesting downstream of a

large pulp and paper mill which has resulted in local contamination of fish and sediments.

In previous years, biologists gathered productivity data (number of occupied nests, active nests, clutch size, hatching success and fledgling success) by climbing trees and channel markers containing nests. In 1995, these data were collected by use of a micro video camera, which enabled nest inspection from a boat and limited climbing of trees and channel markers.

Nests were checked periodically between April 27, 1995, and June 28, 1995. We used 20 nests which had complete data (i.e., nest checked at least twice - once in early to mid May to determine clutch size/hatching success, and again near fledgling to determine fledgling success). Productivity statistics appear in Table 3.

Five eggs were collected from separate nests on April 27, 1995. These and a sixth egg collected on June 1, 1995, were analyzed for mercury, dioxins and furans. The results will be reported in 1996.

Osprey productivity work continued. Hickory Shad are frequently present, in osprey nests with chicks as in this Channel Marker No. 6 nest. 95-05-19 JLH

We can add carp to their diet as evidenced by its presence in this Albemarle Beach nest No. 29 approximately 2 miles east of the Roanoke River's junction with the western Albemarle Sound.

95-06-03 JLH

Table 3. Osprey productivity summary statistics for the mouth of the Roanoke River and western Albemarle Sound - 1993[1], 1994[2] & 1995[3]

Year	Clutch Size 0 1 2 3 4	Total to Fledge	Occupied Nests	Active Nests	Successful Nests	Production per Occupied Nest	Production per Active Nest	Production per Successful Nest
1993	2 2 2 7 2 Average = 2.33	16	15	13	9	1.07	1.23	1.78
1994	0 0 1 14 0 Average = 2.93	23	15	15	12	1.53	1.53	1.92
1995	1 0 6 12 1 Average = 2.60	23	20	19	12	1.15	1.21	1.92

[1] From a total of 15 nests which were surveyed. Total number of nests identified within approximately 3.7 km radius of the mouth of the Roanoke River = 29 of which 26 were active.

[2] From a total of 15 nests which were surveyed. Total number of nests identified within approximately 3.7 km radius of the mouth of the Roanoke River = 30 of which 29 were active.

[3] From a total of 20 nests which were surveyed. Total number of nests identified within approximately 5 km radius of the mouth of the Roanoke = 54 of which 49 were occupied.

Roanoke River NWR NR95 "Utilization by river herring of Roanoke River natural and man-made tributaries" (95-42630-04)

This survey was conducted by refuge staff under the Challenge Cost Share Agreement Project number C414 with Foster Wheeler Environmental Corporation on behalf of North Carolina Power. It was a preliminary or reconnaissance level survey to document river herring utilization of natural and man-made tributaries and to determine site specific problems that would have to be accommodated when designing a larger study. Reproductive activity of river herring (*Alosa aestivalis* and *Alosa pseudoharengus*) was investigated from late March to early May of 1995. Sampling for adults and ichthyoplankton was conducted in four tributaries of the Roanoke River near Hamilton, NC. These tributaries connect the river to the adjacent Broadneck and Company Swamps, potentially important floodplain spawning habitats. No adult river herring were captured. River herring and hickory shad (*Alosa mediocris*) prolarvae and *Alosa* postlarvae were captured at three of the four sites. Numbers of larvae captured and dissolved oxygen were lowest in the natural tributaries, Coniott Creek and Black Gut. Numbers of larvae and dissolved oxygen levels were higher in Broadneck #1 and highest in Broadneck #3, both man-made river levee breaches.

This survey was inconclusive with regard to adult Alosa movement into the tributaries surveyed. Additional surveys will be conducted in 1996. A copy of the final report for this study is in the refuge files.

The Reconnaissance Level Fish Survey included four (4) stations: (1) Coniott Creek; (2) Black Gut (above); (3) Broadneck No. 1 (below); and (4) Broadneck No. 3. 95-03-22 JLH

Broadneck No. 1 has approximately 400 linear feet of wide, relatively deep, mouth. 95-03-19 JLH

The Broadneck Swamp No. 1 man-made canal severed a few shallow drains that have historically drained the backslope of the natural river levee to the adjacent cypress-tupelo backswamp. 95-03-20 JLH

The canal's depth, here approximately eight (8) feet, allows rapid flushing and draining of the adjacent cypress-tupelo backswamp. 95-03-21 JLH

Broadneck No. 3 (above), No. 2 and No. 1 are man-made canals that breach the Roanoke River's natural levee. Black Gut and Coniott creek are natural streams. 95-03-07 JLH

Approximately 150 yards inside the mouth, Broadneck No. 3 has apparently silted closed or has a several hundred foot plug that separates the outlet from the backswamp. Hence, during moderate flows, river water exits to the North from this westward canal to enter the backswamp. 95-03-04 JLH

These two black Gut stations, 2-300 yards from the river, were destined to become so low that only travel by foot was possible by late April.

95-03-23 JLH

95-03-24 JLH

6. Other

Ecosystem Planning The refuge is part of the Roanoke-Tar-Neuse-Cape Fear Rivers Ecosystem. Ecosystem team meetings were held quarterly and ecosystem projects were submitted. The projects dealt with anadromous fish, habitat restoration and neotropical migratory birds.

Highway Maintenance Planning Coordination RM Holloman continued coordination through Ecological Services, Raleigh Field Office, responding to a request from N.C. Department of Transportation (NCDOT) for comments on a proposed US Hwy 13/17 bridge replacement. Refuge concerns were addressed in a final NCDOT Categorical Exclusion. A moratorium on construction from Jan 1 - May 15 was included due to waterfowl and fishery resource needs. Construction is scheduled for 1997. NCDOT is requesting a 10 foot temporary construction easement from the refuge. Discussions with NCDOT included activities planned for the easement or what would occur within the easement. On site meetings were also held with NC Division of Marine Fisheries to discuss their concerns.

E. ADMINISTRATION

1. Personnel

1. Jerry L. Holloman, Refuge Manager, GS-12, EOD 04/12/90, PFT

2. Michael D. Canada, Asst. Ref. Mgr., GS-11, EOD 08/12/90, PFT

3. Bernice D. Kitts, Office Asst., GS-06, EOD 11/29/92, PPT Transferred to Alligator River NWR 04/02/95

4. Sherrie Jager, Office Asst., GS-04, EOD 08/20/95, PPT

5. John Alexander, Bio. Aid., GS-04, EOD 05/08/95, TPT, Terminated 06/30/95

6. Mildred Hayman, Bio. Tech., GS-05, EOD 05/01/95, TPT, Terminated 06/30/95

Office Assistant Kitts transferred to Alligator River NWR effective April 2, 1995. She continued to work at Roanoke River two days a week until the vacancy was filled in August.

Office Assistant Jager transferred from ES, Asheville Field Office, effective 08/20/95.

Two temporary positions, one bio-aid and one bio-tech, were filled during the spring to help with osprey and anadromous fish studies.

Government shut downs occurred twice (Nov 14-18 and Dec 12-31). Staff work schedules were altered to provide only security and safety. All public use and administrative services were canceled during the lock out.

4. Volunteer Program

Volunteer Joe Morgan provided two weeks of service in February. He assisted in boundary rehabilitation and litter removal. He also assisted Pocosin Lake NWR with swan banding.

Mildred Hayman and John Alexander volunteered their services before being appointed. They also volunteered, after their temporary appointments expired, to assist with the final phases of their respective surveys. Three additional volunteers assisted with the gill netting portion of the anadromous fish study.

Pete Kornegay, Fishery Biologist, NCWRC, provided 8 hrs. fishery tech training to one volunteer to assist with the anadromous fish study.

5. Funding

Table 5. Funding Allocations by Sub-Activity - FY 92-96.

Sub-activity	Description	FY-92	FY-93	FY-94	FY-95	FY-96
1261	Operations	88.3	85.7	101.0	102.5	228.0
1261 (4042)	Contaminant	0.8	---	15.4	28.3	---
1261	Special Operations	39.0	---	---	---	---
1261	Volunteer program	0.1	0.1	---	0.5	---
1261 (4045)	Challenge Cost Share - Ward Farms	---	6.0	---	---	---
1261	Watchable Wildlife	---	---	5.0	---	---
1262	Maintenance	38.0	35.1	36.3	37.5	---
1120	Farm Bill	23.0	---	---	---	---
1121	Farm Bill	---	5.0	---	12.0	13.0
3210	Land Acquisition -	15.0	---	---	---	---
7208	Contributed Funds	---	---	---	4.0	15.0
8421	Land Acquisition	---	15.0	---	---	---
9120	Presuppression	2.0	2.0	3.0	---	---
9110	NUS, Maintenance	---	---	---	3.0	1.5
Total		206.2	148.9	160.7	187.8	257.5

6. Safety

Informal safety meetings were held through the year. Staff were encouraged to report and correct any safety problems encountered. No accidents occurred in 1995.

RM Canada and OA Kitts attended AIDS awareness training at Alligator River NWR Feb 28.

RM Canada attended a two day course " Managing a Search and Rescue" at Martin Community College.

RMs Holloman and Canada were certified in CPR.

7. Technical Assistance

RM Holloman participated in several Georgia Pacific (GP) Roanoke Environmental Plan meetings during the year. Discussions focused on the GP natural regeneration experimental plots on Devil's Gut Island. RM Holloman lobbied, to no avail, for studies to include invertebrate and waterfowl responses to the different types of cutting.

RM Holloman attended several meeting with NC Power pertaining to their relicensing of hydro projects on the Roanoke River (FERC Project No. 2009-000-NC). Some of the issues discussed concerned effects of flows on terrestrial and aquatic habitats in the lower Roanoke River System.

The refuge assisted TNC with the placement of a time-lapse camera near the end of one of the man-made drainage canals in Broadneck Swamp. The camera was set to take a picture every twenty-four hours to document changes in water level in the backswamp in response to river flows (see D.5, 95-42630-02).

8. Other

RM Holloman presented revenue sharing checks to Bertie and Nash Counties for $47,859.00 and $65.00, respectively.

RM Holloman attended the May 22-27 Project Leaders Conference.

RM Holloman was recognized in a North Carolina Chapter Nature Conservancy ceremony as having contributed to stewardship of the Roanoke River Ecosystem. A beautiful framed forested wetland scene was presented.

F. HABITAT MANAGEMENT

1. General

The habitat types of the refuge can be grouped into three natural community types: levee forest, cypress-gum swamp and bottomland hardwoods.

The levee forest occurs along the natural levee that developed parallel to the river during flood stages. The dominant trees are sugarberry, sycamore, and green ash. Others include cherry bark oak, eastern cottonwood, swamp cottonwood, water hickory, black walnut, American elm and sweet gum.

The cypress-gum swamps are areas of low elevation where seasonal floodwaters can become trapped for long periods. The process has been altered in many locations by silviculture canals. The canals are believed to drastically increase the rate of backswamp flooding and dewatering during changing river levels. These backswamps are landward of the natural levees, in sloughs, and in lower parts of the ridge and swale system. The water table in some of these areas normally remains at or near the surface year-round. The extent of water table alteration by silviculture canals is unknown but believed considerable. The backswamps are dominated by bald cypress and tupelo gum with a shrub layer of Carolina water ash. There is very little ground cover in most.

The bottomland hardwood communities occur on slightly higher ridges formed through the years by the migrating river channel. They are often found on parallel ridges interspersed with fingers of cypress-gum sloughs. These seldom-flooded ridges are dominated by a variety of oaks, including laurel and willow, swamp chestnut and cherry bark. Other hardwood species include hickory, ash and sweet gum. The highest ridges include beech and white oak. The understory includes ironwood, American Holly and deciduous holly. Shrubs include dogwood, ironwood, blueberry and gallberry.

The nearest thing to a refuge wildfire occurred April 3 when picnicking fishers abandoned an out-of-control fire on Union Camp property adjacent to the refuge's Broadneck Tract. 95-04-23 JLH

2. Wetlands

Limited staff, funds and site specific data continue to delay wetland habitat management; however, the COE and Mother Nature helped in 1995. Up river water releases by the COE flooded the refuge wetlands early. Thousands of acres of potential waterfowl habitat were flooded. Rapid backswamp filling inundated potential food sources on the lower elevations much quicker than positive water control would have accommodated. Flooding of the backswamps occurred again in early June through July which contributed to a massive late July fish kill. Excellent December waterfowl habitat was created when the area was partially flooded by up river water releases.

Anybody still wondering what cypress knees look like underground? 95-03-05 JLH

14. FmHA Conservation Easements

Compliance checks, either by air and/or ground, were made on most easements with emphasis on the easements transferred from Pee Dee NWR. A few violations were documented. Depending on the violation, the landowners were given either a verbal or written warning. One Notice of Violation was issued for mowing/disking in Nash Co.

G. WILDLIFE

1. Wildlife Diversity

Refuge habitats support a rich array of diverse and abundant wildlife species including waterfowl, neotropical and temperate migrants, upland migratory gamebirds, herons, egrets, deer, turkeys, furbearers, reptiles, anadromous fish and amphibians.

2. Endangered and Threatened Species

An active bald eagle nest is located off the refuge near the mouth of the Roanoke River. Several eagle sightings (mature and immature), from the mouth of the river to river mile 70, were made during the year (refuge lands extend to approximately river mile 67). Observations of three to five eagles were not uncommon on the river in late December.

Bald eagles in the Roanoke River System are increasing. 95-02-07 JLH

3. Waterfowl

The refuge and the lower Roanoke River basin support a substantial population of wintering waterfowl, primarily mallards, wood ducks, wigeon and black ducks.

Flooded conditions in January and February inundated thousands of acres of backswamps and hardwood flats and some adjacent, private cropland. The flooding dispersed waterfowl over a large area. Water levels were low during the fall and early winter which limited the amount of available habitat. The Conine/Askew Tract continued to support a large number of waterfowl as it provided some of the best habitat in the lower Roanoke River Basin.

On January 2, approximately 1,500 ducks (mallard, black duck, wigeon, green-winged teal and wood ducks) were observed on the Askew tract. When the big freeze occurred mid January, approximately 5,000 ducks were observed along a 3 mile stretch of the Roanoke River.

Limited staff and large, remote, hard-to-get-to use areas preclude meaningful waterfowl survey/census work. Cursory surveys are the best we have accomplished to-date.

Wood duck brood on the river April 6, 1995. How many do you count? 95-05-13 JLH

4. Marsh and Water Birds

The refuge supports four egret and heron rookeries. The largest inland heronry in North Carolina, located on Conine Island, contained approximately 1,600 great egret and great blue heron nests. The majority are great egrets.

An additional rookery, or loose colony, of yellow-crowned night herons was discovered in May on the Rainbow Tract of Broadneck Swamp. At least 12 pairs were involved. No productivity data was collected.

6. Raptors

The refuge supports several species of hawks and owls, including the red-tailed and red-shouldered hawks and the great-horned, barred, and common screech owls. These species occur in abundance throughout the refuge.

7. Other Migratory Birds

The refuge supports the highest density of nesting birds, especially neotropical birds (44 species), in North Carolina. At least 214 species of birds, including 88 breeding resident species, utilize the Roanoke River floodplain. Of the 214, 191 have been identified on or near the refuge. In the spring, one can stand in one place and identify at least 30 different species in just a few minutes. Survey studies were conducted in 1995 and will continue in 1996.

Studies relating to the effects of long duration spring flooding on ground or near ground nesting and/or foraging species is a critical need. Refuge staff continue to promote such studies.

8. Game Mammals

The refuge has a high density of white-tailed deer. A remnant population of black bear exists on the lower project area (see Unit 4 Map). Grey squirrels and marsh rabbits are abundant. Resident furbearers include raccoon, mink, muskrat, otter, fox, bobcat, beaver and opossum.

10. Other Resident Wildlife

Bottomland hardwood habitats support one of the largest natural wild turkey populations in North Carolina. Turkeys were observed on numerous occasions in 1995. Long duration spring floods have been shown to have a devastating effect on turkey reproduction. Studies indicate that birds dispersed by high water do not return after water recedes.

What can I say? I know we have previously included turkey pictures. At least this hen's clutch, if she nested, hopefully hatched before the mid-June to mid-Aug flood. 95-04-12 JLH

11. Fisheries Resources

The Roanoke River and its tributaries provide critical habitat for a diversity of fish species, including several that are anadromous. Anadromous fish utilizing the river are striped bass, blueback herring, alewife, hickory and American shad. A preliminary study to document backswamp utilization by several anadromous species was initiated in 1995 (see Sec. D-5).

A significant fish kill, including large numbers of striped bass, occurred on the Roanoke River July 29 - August 2, 1995. Discharges from John H. Kerr Dam had been unusually high during late June through late July (up to 27,000 cfs). The U.S. Army Corp of Engineers (USACOE) rapidly lowered the upriver Kerr Reservoir after experiencing heavy rainfall. The

high reservoir discharges filled the downriver backswamps during a prolonged period with day time temperatures in excess of 90 degrees F.

Subsequent rapid drainage of low DO backswamp waters when river flow was rapidly reduced to less than 1,000 cfs, was cited as causing the fish kill. Accelerated backswamp drainage is facilitated by silvicultural canals that were constructed by timber companies expressly for such drainage to facilitate logging activities. However, refuge staff documented dead fish at the high water line; fish died before the local river level dropped appreciably. Evidence indicated that other factors, such as lypolimnetic discharges from the upstream hydropower facilities could have been a major factor. After all, the first signs of a fish kill, dead fish, occurred at the base of the dam.

An estimated 6,000 to 8,000 striped bass were killed in the river between Norfleet (river mile 94) and Jamesville (river mile 18) based on estimates from the NC Wildlife Resources Commission and NC Division of Marine Fisheries. The total weight of striped bass killed (estimated 33,200 to 41,200 pounds) exceeded the allowable recreational harvest quota for the entire Roanoke River (29,000 lbs.), and might have constituted 10 percent or more of the spawning stock biomass for the population, based on estimates from a recently completed virtual population analysis. If the fish killed were part of a nonmigratory stock component, or a genetically distinct riverine race, then the proportion of spawning stock biomass removed may be much higher.

Approximately 23,000 fish were killed in the river, including catfish, suckers, American eels, largemouth bass, sunfishes and others. Of this total, striped bass constituted 36 to 45 percent.

The Service (Ecological Services, Fisheries and Refuges) met with NC Wildlife Resources Commission and other Federal and State agencies in August to discuss our concerns. We worked to develop a protocol for release of floodwater during summer high temperature periods which we hope will avoid future fish kills.

16. Marking and Banding

The refuge had a pre-season banding quota of 125 wood ducks. Refuge staff began pre-baiting in May. Banding efforts began in July and continued through August. A total of 68 wood ducks were banded. Asynchronous river flows hampered banding

efforts by flooding thousands of acres of habitat causing erratic banding site water levels and, apparently, bird dispersal.

H. PUBLIC USE

1. General

RM Holloman presented a program on wildlife in North Carolina to a class at Roanoke High School in Martin County on May 31.

RM Holloman presented a program on endangered species and wetland loss in North Carolina to the Windsor Rotary Club.

ARM Canada participated in the August 7-11 Blackbeard District Cub Scout Day Camp program. He taught environmental education to eighty cub scouts.

The refuge celebrated National Wildlife Refuge Week on October 14, 1995. Participants viewed a private lands project, were briefed on public opportunities on the refuge and enjoyed a North Carolina style pig-pickin.

The refuge's October 14 National Wildlife Refuge Week Celebration (pig-picking) was attended by Bertie County residents, county commissioners and North Carolina Wildlife Commission Officers. Commission Chairman Jasper Bazemore and wife Hazel, lower-left, represented Bertie County.
95-06-15 JLH

8. Hunting

Several hunts were conducted in 1995: (1) four 3-day turkey hunts; (2) September 11 - October 7 archery/deer hunt; (3) October 9-14 muzzle loader/deer hunt; (4) five 3-day gun/deer hunts; (5) ten ½ day waterfowl hunts; and (6) several small game hunts (when not deer hunting during state small game season). The last gun/deer hunt and three waterfowl hunts were canceled due to the Government shutdown. The canceled deer hunt was rescheduled in December.

Approximately 50% of the permitted hunters participated in the spring turkey hunt. A total of five birds were known to have been harvested.

Hunting activity during the archery season was light. Approximately 30 hunter-days were recorded. No harvested deer were reported.

Approximately 106 hunter-days were recorded during the muzzle loader hunt. At least twenty-two deer were harvested (recorded).

During the gun hunts, 216 hunter-days were recorded and an estimated 25 deer taken. Hunter participation was approximately 50% of that recorded in 1994.

Participation in the waterfowl hunts was down from last year with the last three hunts canceled. The late December and early January hunts are more popular than November and early December hunts. Success ranged from harvesting daily bag limits to zero birds harvested.

The small game hunts resulted in only approximately 15 hunter-days of use. Success varied. At least one hunter harvested several daily limits.

13. Camping

Primitive camping was permitted in conjunction with the refuge hunts. Refuge access was limited primarily to hunters with boats. Safety factors are involved with river navigation in the dark. Consequently, Refuge Deer Hunt Permittees are allowed to camp. Primitive camping was allowed within 100 yards of the river. Permitted hunters camped approximately 250 camp-days during the 1995 hunts.

17. Law Enforcement

Law enforcement efforts on the refuge in 1995 were again minimal due to staff constraints. Efforts were mainly focused on preventive law enforcement and checking permit hunters. Special Agent Baker assisted the refuge staff when his schedule allowed.

Several violation notices and letters of warning were issued. Verbal warnings were given on some minor violations.

Two individuals were apprehended on January 14, 1995 while duck hunting near the refuge. There were eleven violations for which NOVs were issued. They were: unplugged gun (2), baiting (2), lead shot (2), no federal duck stamp (2), no state duck stamp (2), and overlimit (2). One individual paid $1,450 and the other $900.

RM Holloman and ARM Canada attended the 40-hr L.E. refresher March 6-10 and March 20-24, respectfully, in Tallahassee, Florida.

RM Holloman and ARM Canada requalified with firearms on October 25 at Pocosin Lakes NWR.

Table 6. Violation Notices Issued - 1995.

FEDERAL COURT - VIOLATION NUMBER	FINES	
Take waterfowl w/o duck stamp (16 USC 718a)	2	$150 ea.
Take migratory game birds with shotgun capable of holding more than three (3) shells (50 CFR 20.21(b))	2	$100 ea.
Take waterfowl in violation of state law, no state stamp (50 CFR 20.72)	2	$150 ea.
Take migratory game birds by the aid of bait or on or over baited area. (50 CFR 20.21(I)).	1 1	$450 ea. $300 ea.
Take overlimit waterfowl (50 CFR 20.24)	1	$400 ea.
Take waterfowl with lead shot (50 CFR 20.21j)	2	$200 ea.
Hunt deer over bait on a NWR (50 CFR 32.2(h))	1	$200 ea. Pending
Disturbing, injuring, and/or damaging plants or animals on a NWR (50 CFR 27.51)	1	$150 ea.
Entering a closed area on a NWR (50 CFR 25.21)	1	$100 ea.

I. EQUIPMENT AND FACILITIES

3. Major Maintenance

Pocosin Lakes NWR again provided a dozer and operator to clear refuge roads of debris from recent storms. Approximately 9 miles of road were cleared. They also mowed approximately 4 miles of roads. This type of cooperation between northeastern North Carolina refuges is critical.

5. Communications

The refuge purchased a cellular phone to give employees communications with the office.

J. OTHER ITEMS

1. Cooperative Programs

RM Holloman and ARM Canada met with NCWRC personnel on February 25 to discuss and set Joint Venture hunts for the 95-96 hunting season. No major changes were made.

Partnership for the Sounds, an organization to promote Ecotourism in the Albemarle-Pamlico region of North Carolina, continued to plan for a refuge office/environmental center. Several locations were reviewed. Four regional environmental centers are planned, one which will emphasize forested wetlands of the Roanoke River. Several meetings were held to discuss agency responsibilities, types of exhibits and types of groups and individuals that are expected to use the centers. The city of Windsor has replaced Bertie County on the Board and is rapidly moving towards establishment of an environmental center in Windsor.

3. Items of Interest

We thought silvicultural canals were relics of the past. Not so! Sometime during early May, 1995, a neighboring landowner contracted the construction of a Martin County drainage canal that breached the natural river levee. Subsequent meetings, following a report by the local wildlife officer (NCWRC), revealed that a NC Division of Coastal Management employee had blessed the canal. No public notices were issued. The USACOE indicated none were needed; no federal action was involved! The chairman of the Environmental Commission, Dr. David Moreau, was visited by RM Holloman to exhibit video evidence. Dr. Moreau was unaware that such activity was apparently possible due to a loop-hole that he recommended be closed. The local USACOE Permitting Office staff (Mr. Henry Wicker) found that he was powerless to step-in and require an

after-the-fact permit. Indications at year's end were that the landowners had agreed to voluntarily plug the canal with a water control structure. Perhaps that was the "method to their madness!"

4. Credits

This report was drafted by ARM Canada. RM Holloman edited the draft and prepared photo captions. The report was typed, proofread and assembled by OA Sherrie Jager.

We didn't have a spectacular year but some sunsets were. 95-01-03 JLH

K. FEEDBACK

The proclamation that we, the employees, are the Service's most important resource is not validated by reorganizing geographically in the face of reorganizing on an ecosystem basis while being downsized in the face of the Government Performance Results Act! Results are hurting, employees are hurting, and morale is on a downhill slide.

After having three years to consider the potential, I am convinced that satelliting all of N.E. North Carolina refuges is not the answer. It is not going to improve the moral of supervisory employees accustomed to successfully directing their own ship(s), especially those accustomed to doing so for 25 years. Why strive for 30 years to develop independence of thought and action, to remove yourself from having your supervisor looking over your shoulder, only to have the process reversed during your most experienced years? I suggest rethinking a plan that reduces the accountability of several, while increasing the responsibilities of one or two. Where is the gain for the Service to drastically reduce the moral of 2-3 25+ year veterans while increasing the grade of what will become another mid-level administrator?