

REVIEW AND APPROVAL

ALLIGATOR RIVER NATIONAL WILDLIFE REFUGE
PEA ISLAND NATIONAL WILDLIFE REFUGE

MANTEO, NORTH CAROLINA

ANNUAL NARRATIVE REPORT

Calendar Year 2002

Mike Bryant
Refuge Manager

4/24/03
Date

Paul A. Gabriel
Refuge Supervisor
Review

Date

Bud Chovera
Regional Office Approval

5/6/03
Date

INTRODUCTION

Alligator River National Wildlife Refuge is approximately 152,000 acres in size and lies at the eastern end of a broad, flat, and swampy peninsula in northeastern North Carolina. Most of the Refuge is located in the mainland portion of Dare County, with some land reaching southward into Hyde County. The Refuge is part of a five-county region bounded on the north by the Albemarle Sound, on the east by Croatan and Pamlico Sounds, and on the south by Pamlico Sound and Pamlico River. The Refuge supports 145 species of birds, 48 fishes, 40 mammals, and 48 reptiles and amphibians.

Alligator River National Wildlife Refuge was established with a 118,000-acre land donation from Prudential Life Insurance Company in Dare and Tyrrell Counties on March 14, 1984. Eventually, the Tyrrell County land was transferred to Pocosin Lakes National Wildlife Refuge and additional land was acquired, some to the south in Hyde County. The addition of 5,100 acres of farmland in 1988 substantially increased opportunities for waterfowl management. Today, the farm units attract numerous tundra swans, pintails, mallards, wigeons, and a variety of other species. In combination with the 46,000-acre Dare County Bombing Range located near its center, this area represents approximately 200,000 acres of relatively undisturbed wetland habitat.

The vast expanse of undisturbed swamp forest and wetlands on the Refuge contains many important wildlife and ecological resources. Since most of the Pamlico peninsula has been developed by clear-cutting, peat mining, and agricultural conversion, this area remains as one of the most remote and diverse swamps in eastern North Carolina. Principal natural communities in the Refuge include broad expanses of non-riverine swamp forests, pocosins, freshwater and salt marshes. Its isolation and undisturbed quality add to the value of its rich wildlife habitats. The Alligator River area is part of the northern border of the American alligator's range and remains as one of the last strongholds of the black bear in North Carolina and the mid-Atlantic coast. The Refuge also provides habitat for the endangered red-cockaded woodpecker.

The Red Wolf Recovery Program is centered on Alligator River NWR. The wild population of red wolves is currently consists of approximately 100 wolves in 20 packs, distributed across 1.7 million acres in five eastern North Carolina Counties.

The Refuge offers a wide variety of programs and activities for public recreation ranging from hunting and fishing to paddling and wildlife observation and photography. The number of environmental education and interpretive programs is increasing each year, as Americans "discover" this treasure in eastern North Carolina.

ALLIGATOR RIVER NATIONAL WILDLIFE REFUGE

Manteo, North Carolina

ANNUAL NARRATIVE REPORT

Calendar Year 2002

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

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A. HIGHLIGHTS

- During 2002, 330 volunteers contributed 30,404 hours of service in the following areas: maintenance-10,000 hours; resource support-9,220 hours; and public use and outreach -11,584 hours. This section includes information for volunteers from both Alligator River and Pea Island National Wildlife Refuges. Karen Beck was selected as Volunteer of the Year. (Section E.4)
- The 581 acre Parched Corn Bay Wildfire started and ran for two and one-half weeks, with a cost of over \$700,000. (Section F.9)
- DFMO Crews and FCO Harris served as burn boss on 27 prescribed burns this year for a total of 13,588 acres. (Section F.9)
- During the year, the Coastal Wildlife Refuge Society spent \$137,644 on Refuge projects. (Section H.18)
- Replacement of Milltail Creek and Navy Shell bridges was initiated in October 2002. (Section I.2)



Refuge Manager Mike Bryant presents Volunteer of the Year Karen Beck with an appreciation award. To date, Karen, a veterinarian, has donated more than 6,800 hours to Alligator River NWR.

BS

B. CLIMATIC CONDITIONS

TABLE 1
2002 ALLIGATOR RIVER NWR WEATHER DATA

Month	Maximum Temperature	Minimum Temperature	Total Rainfall
January	80	24	4.18
February	78	23	2.00
March	85	20	9.50
April	91	30	2.95
May	88	38	1.78
June	95	49	2.09
July	97	57	8.54
August	100	56	8.32
September	90	53	5.26
October	89	60	4.63
November	82	21	4.53
December	72	22	2.65
Total	-	-	56.43 inches

The average annual rainfall for the area is 51.30 inches.

September 10, Tropical Storm Gustav came ashore near Pea Island NWR bringing high winds and heavy rain to the Alligator River NWR area, but resulting in no major damage.

C. LAND ACQUISITION2. Easements

The Red Wolf Recovery Program is partner to conservation and access agreements with different owners of private land comprising 34,000 acres. For 2002, these included:

Red Wolf Program Partners – 2002

Name	Acres	Location	Type	Status
Bluestone Farms	7,033	Washington County Hwy 64-Newlands Rd	Partner's Agreement \$1,500/yr	1998-2002
Holbert	1,000	Hyde Co., east of New Lake	Partner's Agreement \$200/yr	1999-2003
Mattamuskeet Ventures	14,445	Hyde Co., north Lake Mattamuskeet	Partner's Agreement \$2,000/yr	1999-2003
Mormon Church	8,500	Tyrrell County	Partner's Agreement \$1,500/yr	1998-2002
Joey Williams	3,000	Hyde County	Partner's Agreement \$1,200/yr	1997-2006

During 2002, no additional lands were added to the Refuge through easements.

A right-of-way easement along U. S. Highway 264 was granted to Dare County for the purpose of constructing a 6-inch water line in the shoulder of the highway. The water line is intended to provide the community of Stumpy Point with safe drinking water produced in a reverse osmosis treatment plant.

A private developer inquired with regards to an old utility easement in the Mashoes community. The original 10-foot wide easement was found to be valid and the developer ran an underground electric cable across the Refuge for about 0.75 mile to a private tract of land on the Croatan Sound. The landowner is rebuilding a house that burned to the ground many years ago.

3. Other

Taylor Tract

This 660 acre tract is located adjacent to the USAF-Dare County Bombing Range and is surrounded on three sides by Alligator River NWR. It is currently owned by The Conservation Fund (TCF) who purchased it from Edmund P. Taylor in February 2002, for \$695,000. The tract has significant potential as high quality, diverse habitat for the endangered red wolf, priority avian species, black bear, and Atlantic white cedar and cypress-gum habitat. A total of \$700,000 was in the President's Budget for the acquisition of this land in 2002, but was not supported in the Senate and House mark-up. Plans are being made to purchase the land from TCF out of RO inholding monies, hopefully beginning in 2003.

Silvers Tract

Progress was made on the purchase of this 65.44 acre tract for \$31,000. It is expected to be finalized in early 2003.

White Columns Tract

Efforts were made this year to locate funding to purchase a 5,010 acre tract located in Hyde County adjacent to Refuge lands. Acquisition of this parcel would basically complete the south end of the Refuge. The land is currently owned by White Columns Land and Timber Company, Inc. and is on the market for sale at \$495/acre (\$2.48 million). So far, no acquisition monies have been located. The area appears to have wildlife value for numerous species of neotropical migratory birds including hooded, prothonotary, black-throated green, and Swainson's warblers. The red-cockaded woodpecker is known to inhabit the property along the northern boundary. Red wolves likely also use the area as do black bears, white-tailed deer, and a host of other mammals, reptiles, and amphibians.

Other tracts that have been identified for possible acquisition include: Fran Harris Tract (63.5 acres); Pingleton Point (3,400 acres); Haulover Point (75 acres); Griffith Tract (110 acres); and Skinner Tract (112 acres). No funding sources have been identified for these tracts at this time.

D. PLANNING

1. Master Plan

Alternatives for the Alligator River Comprehensive Conservation Plan (CCP) were presented to the Regional Chief of Refuges in October 2001. The planning staff, under the direction of lead planner Bob Glennon, continued work on CCP's for Alligator River and Pea Island NWR's in addition to several other eastern North Carolina Refuges during 2002.

5. Research and Investigations

Avian Conservation

Dr. Brian Watts of the Center for Conservation Biology at the College of William and Mary conducted three investigations regarding use of specific habitat types on the Refuge by selected avian species. The first study was designed to assess the distribution, population status, and habitat requirements of the Wayne's black-throated green warbler, focusing on Refuge lands. The study found the species to be one of the earliest arriving and breeding neotropical migrants in the region. Forest species composition was a significant influence on the distribution of breeding sites. The frequency of classifying plots with pond pine, Atlantic white cedar, and bald cypress as breeding sites was higher than expected.

The second study was designed with the primary objective of investigating the community of avian species using early successional habitats within the Farm Unit. A secondary objective was to evaluate alternative management scenarios. Survey results show a preference by avian species observed for farmland filter strips with a grassland composition instead of a community dominated by dense forbs. Various cultural practices can be used to create and maintain the grass-dominated filter strips. Of particular interest is the number of raptors found using the filter strips. Seven species of diurnal raptors were detected, including an extraordinary population of northern harriers. Additional species included the red-tailed hawk, American kestrel, bald eagle, rough-legged hawk, merlin, Cooper's hawk, red-shouldered hawk, and sharp-shinned hawk. Short-eared owls were also frequently observed.

The third study focused on providing baseline data on presence, distribution, and abundance of marsh birds, especially rails in high marsh areas along the Albemarle-Pamlico peninsula. Surveys were conducted from late May through early July. This marsh bird callback survey resulted in detection of 150 individuals representing 11 species. The Chuck-will's-widow was the most common species with marsh wren being second. Four species of rail were detected with Virginia rail being the most common and clapper rails being second. Three black rails and one king rail were detected. Intensive, systematic surveys need to be conducted to adequately determine the distribution and abundance of marsh birds using the Refuge.

Fisheries

A survey to determine presence, diversity, and distribution of fish and aquatic species began during 2001 and the fieldwork was completed during 2002. Data analysis and report preparation are expected in early 2003.

Fire

Two fire research projects were initiated this year by Robert Mickler, a researcher with the USDA Forest Service Southern Global Change Program and North Carolina State University. One project is the development of digital vegetation and fire fuels databases using digital aerial photographs and ground truthing transects for determining the fuel loads on the Refuge. The other project seeks to develop a model for the effects of wildfire on sediment and nutrient loads by studying water quality before and after a prescribed burn. Mickler and several graduate students spent the summer installing water quality measuring devices and establishing and running vegetation transects in the selected project area. Water quality samples were collected every two weeks.

6. Other

In July, FMS Hays and others met with Regional GIS Coordinator, Jaymee Fojtik, and ES computer specialist Doug Newcomb in Manteo. The purpose of the meeting was to discuss how the Refuge uses GIS, what needs we have, and develop ideas for how to get there.

E. ADMINISTRATION

1. Personnel



L to R: 14, 7, 34, 33, 17, 31, 35, 30



L to R: 15, 3



L to R Back: Jerry Campbell(temp), 1, 26, 32, 21, 11, 8, 25, 37
L to R Front: 6, 18, 9, 22, intern Kathryn Wilkinson

Alligator River NWR Staff – 2002

NAME	POSITION	STATUS	EOD
1. Jim Beasley	Forestry Tech. (Fire) GS-0462-07	PFT	05/26/85
2. Art Beyer*	Wildlife Biologist, GS-0486-09	PFT	12/02/90
3. Mike Bryant	Refuge Manager, GS-0485-14	PFT	04/14/96
4. Jeremy Bucher	Park Ranger (LE), GS-0025-09	PFT	03/09/03
5. Eric Craddock	Eng. Equip. Operator, WG-5716-08	PFT	02/21/93
6. Bruce Creef	Eng. Equip. Op. Supv., WS-5716-07	PFT	04/21/71
7. Tom Crews	Fire Mgmt. Officer, GS-0460-12	PFT	01/22/95
8. Alan Emery	Automotive Worker, WG-5823-08	PFT	05/22/88
9. Kris Fair	Bio. Science Tech., GS-0404-07	PFT	05/02/96
10. Buddy Fazio*	Wildlife Biologist, GS-0486-13	PFT	04/22/01
11. Bobby Govan	Eng. Equip. Op., WG-5716-08	PFT	09/03/93
12. Donnie Harris	Forestry Tech., (Fire) GS-0462-08	PFT	01/11/96
13. Jenny Howard	Park Ranger, GS-0025-05	NTE 1 Yr	04/07/03
14. Bernice Kitts	Office Assistant, GS-0303-07	PPT	04/02/95
15. Janice Lane	Admin. Officer, GS-0341-09	PFT	03/25/90
16. Chris Lucash*	Wildlife Biologist, GS-0486-11	PFT	12/02/98
17. Anicia Martinez	Secretary, GS-0318-05	TERM	08/15/99
18. Jenny Marzluf	Bio. Science Tech., GS-0404-05	NTE 1 Yr	11/04/01

NAME	POSITION	STATUS	EOD
19. Charles Mathis	Student Intern, GS-0499-04	SCEP	08/13/00
20. Scott McLellan*	Bio. Science Tech., GS-0404-07	PFT	12/29/98
21. Eric Meekins	Eng. Equip. Op., (Fire) WG-5716-08	PFT	10/25/93
22. Amy Midgett	Forestry Tech., (Fire) GS-0462-06	PFT	05/14/93
23. Victor Miller	Maintenance Worker, WG-5716-05	NTE 1 Yr.	06/03/01
24. Mike Morse*	Wildlife Biologist, GS-0486-09	PFT	04/09/89
25. Jonathan Powers	Eng. Equip. Op., WG-5716-08	PFT	04/24/88
26. Anthony Ralph	Maintenance Worker, WG-4749-05	TERM	07/30/00
27. Ann Marie Salewski	Park Ranger (Inter.), GS-0025/09	PFT	12/01/02
28. Craig Scheibel	Forestry Tech., (Fire) GS-0462-06 Transferred to NFS 04/06/03	PFT	03/03/96
29. Leslie Schutte*	Wildlife Biologist, GS-0486-07	TERM	12/05/02
30. Dennis Stewart	Wildlife Biologist, GS-0486-12	PFT	12/27/91
31. Bonnie Straswer	Park Ranger (Inter.), GS-0025-12	PFT	12/31/80
32. Jeffrey Swain	Eng. Equip. Op., (Fire) WG-5716-08	PFT	02/10/02
33. Brian VanDruten	Forestry Tech., GS-0462-07	PFT	01/15/99
34. Kelley VanDruten	Fire Mgmt. Officer, GS-0401-11	PFT	02/16/01
35. Kathy Whaley	Refuge Manager, GS-0485-12	PFT	12/29/02
36. Kathy Whidbee*	Office Assistant, GS-0303-06	TERM	06/03/01
37. Jim Wigginton	Refuge Manager, GS-0485-12	PFT	03/28/99

* Red Wolf Program employee

Amy Midgett, received an On-The-Spot Award effective 01/13/02.

Amy Midgett and Craig Scheibel, Forestry Technicians (Firefighter), GS-0462-05, work schedules were changed from permanent-seasonal to permanent-full time, effective 02/10/02.

Brian Van Druten, Forestry Technician, GS-0462-05/1 was promoted (career ladder) to GS-0462-06/01 effective 02/24/02.

Biological Technician, Kristina Fair's work schedule changed from career-seasonal to permanent full-time effective 03/24/02.

Engineering Equipment Operator (Wage Supervisor) Bruce Creef received an On-The-Spot Award effective 04/07/02 for his work on the first ever Region IV Wage Grade Conference.

Michele Raphoon, Park Ranger, GS-0025-05, resigned her temporary, NTE 1 year position effective 05/04/02. Michele served one year in this temporary position.

Mike Martin reported to work on 05/15/02 as a temporary Park Ranger (to fill the vacancy left by Michele Raphoon). Mike is a contract hire through R.S. Staffing. He will work under

contract for us until this vacancy is filled by normal recruiting procedures by our Personnel Office.

Forestry Technician, Craig Scheibel received a STAR award effective 06/02/02.

Janice Lane was selected for our Administrative Officer, GS-0341-9/3 position. The promotion was effective 05/05/02.

Temporary Maintenance Worker Lester Sawyer died on 5/25/02.

Deputy Project Leader John Wallace transferred to Laguna Atascosa NWR, Rio Hondo, Texas effective 07/28/02.

Park Ranger Kim King-Wrenn transferred to Sevilleta NWR, Socorro, New Mexico effective 07/28/02.

Kathy Whaley, Wheeler NWR, did a temporary detail as Deputy Project Leader 8/19-23/02.

Forestry Technician, GS-0462-05, Craig Scheibel was approved for Special Firefighter Retirement (6C) for the period of 06/22/97 to present.

Marty Davis reported to duty on 09/09/02 as a temporary, NTE-1 year Park Ranger, GS-0025-05. He resigned on 10/20/02.

Craig Schiebel and Amy Midgett were selected to fill our vacant Forestry Technician, GS-0462-06 positions on 09/22/02. This was a promotion for both employees

Eric Craddock, Bruce Creef, Bernice Kitts, and Kathy Whidbee received STAR awards effective 9/22/02.

Art Beyer, Chris Lucash, Scott McLellan, and Mike Morse received STAR awards effective 10/06/02.

Firefighter Equipment Operator (FFEO) Bobby Govan transferred from the Fire program to Operations and Maintenance.

Jeff Swain, Seasonal FFEO at Pocosin Lakes, was hired to replace Bobby Govan as full-time FFEO.

Both Amy Midgette and Craig Scheibel were promoted to GS-6 Forestry Technician Firefighter in September.

4. Volunteer Program

During 2002, 330 volunteers contributed 30,404 hours of service in the following areas: maintenance-10,000 hours; resource support-9,220 hours; and public use and outreach - 11,584 hours. This section includes information for volunteers from both Alligator River and Pea Island National Wildlife Refuges.

The Refuge Volunteer Program consists of four separate programs: interns, workcampers, organized work groups, and local Refuge volunteers. The Refuge and red wolf intern programs continue to draw attention from college students and graduates who seek to gain experience in wildlife management, research, and public use. Basic guidelines for the intern program require that the interns contribute a minimum of three months of volunteer service. During their tenure, interns (except the red wolf caretaker intern) received a \$75 per week (\$15 per work day) food stipend and were furnished free housing on the Refuge. The red wolf caretaker intern received \$90 per week food stipend due to week-end residence requirements. All interns worked a 40 hour work week.

2002 Interns

Name	Assignment	Time Period
Shauna Baron	Red Wolf - Outreach	Feb – April
Verity Matthews	Red Wolf Telemetry	Nov 2001 – Feb 2002
Cari Ann Hayer	Red Wolf Telemetry	Nov 2001 – Mar 2002
Stephany Provinsky	Red Wolf Caretaker	Jan – May
Catherine Treddick	Red Wolf Telemetry	Mar – May
Jenny McCay	Red Wolf Telemetry	March
Jennifer Gregory	Red Wolf Telemetry	Mar – July
Karin Bailey	Red Wolf Caretaker	May – August
Joseph Hinton	Red Wolf Telemetry	May – Dec
Jeff Schultz	Red Wolf Telemetry	July – Nov
Maria Harvey	Red Wolf Caretaker	Sept – Dec
Alex Mettler	Red Wolf Telemetry	Oct – Dec
Brooke George	AR Refuge Intern	May – Aug
Brandon Joyner	AR LE Intern	Mar – May
Josh Copenhagen	AR Bio Intern	Mar – May
Leslie Risen	AR Refuge Intern	May – Aug
Sarah Koehn	AR Refuge Intern	May – Aug
Marsha Peterson	PI Refuge Intern	May – Aug
Jessica Shively	PI Refuge Intern	May – Aug
Michael Willaford	PI Refuge Intern	May – Aug
Kevin Allen	PI Refuge Intern	Aug – Nov
Carrie Banks	PI Refuge Intern	Aug – Nov

Workcampers were scheduled in minimum of three month blocks of time. They were provided a pad for their RV and supplied with electricity, sewage disposal, and propane gas. The Kampers are required to work 40 hours per week for the pad. During 2002, all workcampers were couples, both members of the team worked on the Refuge, and in each case worked far more hours than the required minimum.



Work Kamper pads at Pea Island NWR provide opportunity for volunteers to assist at both Pea Island and Alligator River NWR's. MS

2002 Workampers

Workamper	Award	Work Area	Service Period
Robert Dagnall	Certificate, 250 pin	Maintenance	Oct 2001 – Feb 2002 Oct 2002 – Feb 2003
Mary Dagnall	Certificate, 250 pin	Public Use	Oct 2001 – Feb 2002 Oct 2002 – Feb 2002
Bennett Napier	500 pin	Maintenance	July – Aug
Dick Roberts	Certificate	Maint/Bio/PU	May – Sept
Cay Roberts	Certificate	Mait/Bio/PU	May – Sept
Barbara McBride	Certificate	Public Use	Oct – Dec
Dick McBride	Certificate	Maintenance	Oct – Dec
Oscar Allison	1500 pin, 2000 pin, 3000 pin	Maintenance	Jan – April
Helen Allison	1000 pin	Public Use	Jan – April
Evelyn Subklew	Certificate, 250 pin, 500 pin	Public Use	May – Sept
Art Subklew	Certificate, 250 pin, 500 pin	Maintenance	May – Sept

Groups volunteering on the Refuge varied during 2002. For the 3rd year in a row, NC State University students (rallied by a summer intern) in the Leopold Wildlife Club assisted with the FWS booth at the NC State Fair in October. The Sierra Club work group came to

Alligator River and Pea Island again in October. A number of smaller projects were completed by small groups of scouts, church youth groups, and other short-time visitors to the area who wanted to "give something back" while they were visiting.

Local Refuge volunteers continued to be active primarily in four major programs: staffing the Visitor Center, conducting interpretive or educational programs, Turtle Patrol, or Turtle Watch. Though these volunteers usually take a lifetime to build up the number of hours earned by interns or workcampers in a few months, they are still a critical component of the volunteer program and the functioning of the Refuges, especially Pea Island.

Recruitment activities for 2002 were not major, but spontaneous efforts were made whenever the opportunity presented itself. One ad was placed in *Workamper News* and the entire year was booked through that one effort. Interns were recruited through the Refuge web pages or through word-of-mouth from past interns. Most new local volunteers continued to be recruited by current volunteers. During 2002, Refuge volunteers continued to work through our non-profit organization, the Coastal Wildlife Refuge Society (CWRS). For details of their accomplishments 2002, see Section H.18.

Cumulative hours tallied through September 30, 2002, yielded awards which were presented at the annual Volunteer Awards Banquet in November. Awards were presented to interns and workcampers. In addition, the following "milestone" awards were presented:

VOLUNTEER AWARDS

Certificate (100+ hours) – Sidney Maddock, Scott Larson

250 Hour Pin - Marie Reed, Neal Moore

500 Hour Pin - Susan Davis, Stew Whiddle, Mary Kay Newton

1000 Hour Pin - Ruth Polnisch, Dan Springer

1500 Hour Pin - Pat Moore, Bel Pitcher, Dan Springer, Dorothy Fink

4000 Hour Pin - Mary Marie Vansickle

5000 Hour Pin - Warren Davis, Karen Beck

6000 Hour Pin - Karen Beck

The Outstanding Volunteer for 2002 was Karen Beck who has a cumulative total of 6,808 hours. Karen is a Veterinarian and has worked full time for several years with red wolves. Her name was added to the permanent plaque in the office, and she received an individual plaque and an embroidered "Volunteer-of-the-Year" jacket.

In addition to the volunteer awards, Anthony Ralph, Craig Scheibel, and Mike Martin received staff awards for Outstanding Volunteer Support. Each was presented with an individual plaque and a monetary award funded by CWRS.

5. Funding

Refuge funding for FY 02 was as follows:

Sub-account	FY 02 Funding	Change from FY 01
1113 (Red Wolf)	\$ 896,500.00	+7,400.00
1261 (O & M)	1,164,000.00	+38,700.00
1262 (Maintenance)	267,600.00	-69,800.00
29XX (Storm Damage)	1,555,400.00*	-192,500.00*
9251 (Fire O & M)	592,000.00	+50,800.00
9263 (Rx Burning)	370,000.00	+220,000.00
9264 (WUI-Fire)	80,000.00	-60,000.00
TOTALS	\$4,925,500.00	

* Storm damage money that was appropriated over several years for various storm events. These funds carry over from year to year. FY02 was not a new appropriation, but a carryover from FY01 funding.

Funding for 1261 this FY did not cover salary costs. The Refuge was short more than \$100,000 and had to use storm damage and other money to cover salaries and other basic expenses.

Money was allocated in August of FY02 to hire a full time law enforcement officer, but due to the lateness of the budget add-on, the Refuge was not able to get a personnel action in place and the money was withdrawn by the Regional Office in September.

6. Safety

Monthly safety meetings were held following staff meetings. Topics varied from month to month as did presenters. Safety continued to be a top priority for all staff members.

8. Other

Administrative offices for Alligator River and Pea Island National Wildlife Refuges remained on Roanoke Island in space rented by GSA. The Migratory Bird Field Office and Red Wolf Recovery Program offices are also located within the GSA leased property. A tract of land totaling 35 acres has been purchased on the north end of Roanoke Island, just across from the National Park Service Headquarters on Highway 64. Future plans include the development of a Visitor Center/Office

F. HABITAT MANAGEMENT

1. General

Six categories of natural, vegetated habitat are found on ARNWR: marsh, pocosin, mixed-hardwood pine forest, non-alluvial hardwood forest, cypress – gum forest, and white cedar forest. These are classified as wetlands based on vegetation present, soil type, and hydro-period. ARNWR contains some of the last remaining large tracts of pocosin-type habitat along the east coast. Although much of the Refuge is relatively unaltered by humans, large portions have undergone changes in vegetation composition and hydrology caused by ditching and canal dredging for access and logging purposes. However, none of the wetlands have been drained by gravity to the extent that they would be classified as non-wetland. In more recent years, forested areas have been sub-divided with firebreaks to meet smoke management guidelines when conducting prescribed burns. The purchase of the Prudential farmlands in March of 1988 added agricultural land to the list of habitats.

2. Wetlands

Many areas on the Refuge have been impounded due to road construction for logging practices prior to the area becoming a Refuge. Problems associated with the artificially extended hydroperiod have been partially resolved through the installation of water control structures (WCS) to facilitate water movement on both sides of the road. As usual, efforts were limited due to equipment and inclement weather

This year approximately 1,800 acres of moist soil were produced in prior converted farmland within the farm unit. Cooperative farmers planted approximately 200 acres of the moist soil units in soybeans. After harvest these units were flooded. In addition to the “farmed” moist soil acreage, approximately 350 acres were disced, and the remaining acreage was burned and managed for moist soil. Agricultural crops were planted in an effort to control undesirable vegetation in the moist soil units. The effort was successful and waterfowl use in the flooded soybean stubble was excellent, exceeding use in other moist soil units with moist soil vegetation. Although plans have not been finalized for 2003, similar treatments for the moist soil units are anticipated. Thus far, it appears that fire and disking are excellent management tools. Also, it appears that intensive management practices are necessary on an annual basis to maintain the moist soil units in the most productive state.

Even though drought conditions persisted through much of the summer, overall production of desirable plants (wild millet, smartweed, fall panicum, switchgrass, foxtail, etc.) was much better than predicted. Moist soil units will receive similar treatment again in 2003, except those that were neither disced nor burned will be both burned and disced.

3. Forests

The table below presents acreage by vegetative community/land use currently under fee title ownership.

2002 Habitat Types on Alligator River NWR

Habitat Type	%	Approximate acreage		Total
		Dare County	Hyde County	
Freshwater pools, ponds, & lakes	0.76	754	398	1,152
Brackish marsh	16.56	22,104	3,100	25,204
Managed wetlands	1.18	1,800	0	1,800
Cropland	1.97	3,000	0	3,000
Cypress-gum forest	0.91	1,380	0	1,380
Atlantic white cedar forest	5.56	6,900	1,568	8,468
Mixed pine/hardwood forest	7.48	11,380	0	11,380
Non-alluvial hardwood forest	8.04	12,236	0	12,236
Pond pine shrub pocosin	25.32	33,021	5,512	38,533
Pond pine cane pocosin	19.97	28,300	2,100	30,400
High shrub pocosin	4.17	5,030	1,320	6,350
Low shrub pocosin	8.08	12,292	0	12,292
TOTAL	100%	138,197	13,998	152,195

Bids were solicited for restoring approximately 100 acres of bottomland hardwoods on mineral soils on the Refuge. A previous owner had converted these sites to loblolly pine plantations which were subsequently killed by the Southern pine beetle. A contractor K-G bladed and drum chopped the site in late 2001. Although the initial site preparation was to be followed with prescribed fire, the area was not burned. Approximately 55,000 mixed hardwood seedlings were planted in late March and early April. Species planted included cherrybark oak, swamp chestnut oak, overcup oak, white oak, Laurel oak, water oak, willow oak, persimmon, bald cypress, blackgum, yellow poplar, and dogwood. We will keep trying to restore this valuable habitat type to its former range on the Refuge as funding allows.

The on-going forest cover type mapping project for Alligator River made substantial progress in 2002. Ninety percent of the delineation phase of the project was completed. During this phase, Geographic Information System software was used to perform on-screen digitizing of polygons. These polygons represent the different forest stands that could be discerned from 1998 and 1999 aerial photographs. The remaining ten percent will have to be completed after field visits are made to determine where the stand breaks will have to be drawn. Ground truthing began and 30,000 acres were classified by the end of 2002.



Pond pine pocosin habitat creates a nice setting for a colorful sunset.

BS

4. Croplands

The acquisition of the 10,000 acre Prudential Farms inholding in March 1988 gave the Refuge even greater diversity of habitats and a great potential for managed habitat for waterfowl, shorebirds, and wading birds. The tract included 5,100 acres of cropland. Prudential had developed the area from forested wetlands by encircling it with dikes and constructing drainage ditches. The area is drained by five pumps located at two pump stations. Each pump removes 250,000 gallons of water per minute from the farm fields. Pumping is required to keep the area dry enough to farm.

Re-conversion of the area to a wetland habitat type is basically simple - don't pump the areas where plans call for permanent water or reduce pumping on moist soil areas. This action was accomplished by judicious placement of new dikes and flashboard risers in conjunction with existing dikes and building relatively small, permanent cross dikes. By the end of 2002, about 1,800 acres had been converted to moist soil units.

Refuge cooperative farmers realized poor production in 2002. Crop yields for soybeans varied from 8-18 bu/ac when 30 bu/ac is normal. Wheat and oat yields were near normal with yields of approximately 60-80 bu/ac. Soybeans planted behind winter cover had highest yields (20-25 bushels/acre). Drought conditions severely impacted agricultural production throughout the region. One of the cooperative farmers decided to experiment with planting

approximately 145 acres of corn. For the first time since the Farm Unit was purchased, a successful corn crop was produced. Timing of the planting and cooperative weather made it possible for the corn to get past the wireworm infestation in all fields. Even though bear depredation was significant, the farmer realized approximately 100 bu/ac. Low market prices severely affected the financial condition of the cooperative farmers again in 2002.

9. Fire Management

Wildfire Preparedness

Wildfire preparedness is a primary issue at Alligator River and nearby Pocosin Lakes NWR, not only because of the extremely dense and hazardous fuel conditions and large, unbroken expanses of inaccessible land, but also because of the potential impacts of severe ground fire when organic soils (peat) catch fire. Smoldering soils produce a thick, noxious smoke that impacts local and regional communities causing air quality issues and obscuring visibility. Peat fires can burn for weeks or even months and produce large amounts of smoke. Coastal area fog frequently occurs which enhances the effects of smoke, creating even more hazardous conditions. **A quick Initial Attack response to fires on dry organic soils is required to keep the impacted acres to a minimum.** For this reason, the Refuges are equipped with specialized fire tractors capable of effectively working in organic soils. The table below indicates non standard tour-of-duty staffing days required based on readiness prepared levels. The decision to staff is based on calculations from the National Fire Danger Rating System using refuge weather station data.

Fire Staffing Days for NC Refuges In 2002

	RP-4	RP-5	RP-6	RP-7	Total
January	0				0
February	4	3			7
March	4	5	1	1	11
April	6	1			7
May	8	3			11
June	7	1			8
July	1				1
August	6	3	19		28
September	0				0
October	0				0
November	0				0
December	0				0
Total	36	16	20	1	73

2002 Fire Season

The 2002 winter was very much a continuation of the 2001 summer and fall, being very dry with minimal rainfall. Although January provided some relief from the drought with four inches of rainfall early in the month, the water soaked in and fuels dried quickly. February had less than half the normal rainfall and fuels dried out quickly, but at every feasible opportunity, prescribed burning was conducted at Cedar Island, Swanquarter, Pocosin Lakes, Alligator River, and Pea Island Refuges.

The National Weather Service predictions for March were extremely dry with no relief in sight. Peat fires on nearby State lands continued to burn throughout the winter, and proved very difficult to suppress due to extremely dry soils and inadequate rainfall. At the annual Fire Cooperators meeting in February, there was much wringing of hands and expectations for the “mother of all fire seasons” come mid-March. The North Carolina Forest Service (NCFS) reported numerous air tanker flight missions on wildfires during February for the first time in their history. The US Forest Service announced plans to move a large air tanker to the Kinston Tanker Base to cover the eastern half of the state, including the Croatan National Forest and Refuges in Eastern NC. All the agencies involved in wildfire suppression were preparing for the worst of fire seasons, but nothing indicated what was about to happen.

Spring Fire Season

The rains came in abundance in March. Rainfall for the month was over eight inches at ARNWR, turning it into the rainiest March in many years. April was drier with less than half the normal monthly rainfall. By the end of the April, the fire crews at ARNWR and PLNWR were busy once again responding to fires on Refuges and adjacent state lands. Heavy tractor plows from Pocosin Lakes and Alligator River assisted in the containment of a 500 acre wildfire that originated from an escaped prescribed fire on the Croatan National Forest. May was even dryer than April. Fire crews took advantage of each rain event that moderated fire danger by burning the farm fields before conditions became unfavorable.



USFS 206 RW at the Fish House Urban Interface Fire.

Summer Fire Season

By June, it appeared a summer fire season was upon us with vegetation drying out in the summer heat. Fire crews were back at extended standby hours. July provided a week of intense rain, with almost all the monthly rainfall occurring in the third week. Two weeks later, on August 2, the **581 acre Parched Corn Bay Wildfire** started and ran for two and one-half weeks, with a cost of over \$700,000. This fire had the potential to escape and grow rapidly in the dry conditions across the Alligator River NWR. The fact that this fire started within two weeks of an eight inch rain event is a testament to the dry conditions on the Refuge at that time. This fire was followed by another week of fires at Pocosin Lakes. A major lightning event, with many ground ignitions, occurred the third week in August, but sudden unpredicted rains came one after the other which suppressed all ignitions. Rains kept falling through the month of September, with October through December getting at least normal rainfall, ending the year with near normal rainfall.



NCFS CL-215 at the Parched Corn Bay Fire. Photo by Ron Hollifield, NCFS.

Wildfires Responded to at ARNWR During 2002:

February 06	Collington	250 acres	State Assist, near Collington Community
March 28	Ron's Fire	0.2 acres	ARNWR/State, near Manns Harbor
June 6	Dakota	0.4	PINWR
June 6	Bowsertown	4	State Assist, Manteo WUI
June 6	Moon Tillett	3	State Assist, Wancheese WUI
August 3	Parched Corn	581	ARNWR
Aug 17	Dakota II	0.1	PINWR

Other Local Fires responded to by the ARNWR Fire Crew:

Feb 18	Gull Rock	300	NCFS State Wildlife Management Area
March 28	Bell Slop	1,500 acres	Swanquarter NWR (SQNWR)
April 9	Baptism	1	PLNWR
April 20	Croatan NF	800	Croatan National Forest
August 24	DeHoog	5	PLNWR
August 25	Ambrose Fire	100	PLNWR
August 27	Hay Stack	1	PLNWR

Other significant fire management events include:

- A new Type 6 wildland fire engine was delivered and put into service by the fire crew in March.
- A new \$180,000 brush cutting tractor called a “gyrotrac” capable of traversing wet soils was purchased and put into service summer 2001. The gyrotrac was used to grind up hazardous wildland fuels along several Refuge facilities during the summer, but caught fire and burned severely during ongoing work behind the Captive Wolf Breeding Facility. Damages were estimated at \$98,000, and replacement costs have escalated to \$230,000. A lawsuit against the Gyro-Trac company is pending.



The Refuge's Gyro Trac caught fire due to an apparent electrical shortage and was destroyed. TC

Training Sponsored by NC Refuges in 2002:

- Annual Spring Firefighter Refresher Training (2 days) Columbia, NC, March.
- S-271 Helicopter Crewperson Training (5 days), Manteo, NC, June.
- S-212 Wildland Fire Chainsaw Training (3 days), Columbia, NC, October.

S-131 Advanced Firefighter/Squad Boss Training (1 day), Columbia, NC, April.
S-211 Wildland Fire Portable Pumps, Columbia, NC, November.

Other

The South Stumpy Point Firebreaks (11 miles) were completed in 2002, but the contractor placed a claim for over \$110,000 over and above the \$99,800 contract price for "flagging" work.

The Parched Corn Bay Firebreaks (9 miles) were contracted in 2002.

The cooperative research burn at Ash and Waterfield Blocks on the Dare County Bombing Range was postponed due to dry conditions, as were all Refuge pocosin burns. Cooperating agencies with this research are USAF, USFS, USFWS, and NCFS.

USFWS Zone Dispatch Operations at East Lake Maintenance Facility at Alligator River NWR provided flight following services for all the Refuges in Eastern NC. A total of approximately 650 flight hours were logged by the Refuges in **CY-2002**. Daily weather and afternoon NFDRS readings were broadcast for the Refuges using the 5 Remote Automated Weather Stations maintained by the Refuges in NC. Dispatch serviced the Refuges for all Rx Burning and wildfire activity as well as routine wildfire preparedness and support for the interagency fire community at the local, state, regional and national levels.

Prescribed Burning

Alligator River conducted 12 prescribed burns with multiple ignitions for each burn in the agricultural farm fields in 2002 for a total of 2,590 acres. The woodlands at Alligator River were too dry to burn being reflective of high Keech Byrum Drought Index numbers. In fact, the burn crews had to suppress groundfire in any farm field that had organic soils, and had to abandon burning in any fields with streaks of histosols. Most of the winter, the fire crews burned at Swanquarter and Cedar Island Refuges along with Pea Island, and then only when conditions had moderated from high fire danger to moderate. The south end of Pea Island Burn units 4-7 were burned (with the exception of the NC DOT Mitigation Site) with excellent results, particularly on the south boundary near Rodanthe. A total of 958 acres were burned at Pea Island in the four units.

The fire crews at Alligator River and Pocosin Lakes National Wildlife Refuges burned eight units at Swanquarter for a total of 6,506 acres, and six units at Cedar Island for a total of 3,484 acres. Personnel were dispatched to assist Mackay Island in conducting two burns totaling 1,585 acres, and a 50 acre field was burned at Pocosin Lakes NWR. All total, there were 15,172 acres burned on the Eastern NC Refuges in 2002, in spite of a very dry year (see notes on Wildfire Preparedness

Rx Burns Conducted at ARNWR/PINWR for CY-2002: (Other NC Refuges Assisting)

Date	Unit	Acres	Refuge
April 3	Twiford Ag	500	ARNWR
April 4	Creef Ag	418	ARNWR
April 5	Creef 2	289	ARNWR
April 5	Twiford	230	ARNWR
April 6	Creef 3	250	ARNWR
April 7	S. PI 8.1.4,5	736	PINWR
April 8	S. PI 8.1.7	221	PINWR
June 7	Twiford 3.2.6	118	ARNWR
June 8	Twiford 3.2.5	155	ARNWR
June 17	Laurel 3.1.3	271	ARNWR
June 18	Laurel 3.1.6	100	ARNWR
June 18	Laurel 3.1.4	260	ARNWR
Total	12 burns	3,548 acres	

Off Refuge Burns conducted by ARNWR Fire Crew along with PLNWR, MMKNWR and MINWR assisting):

Feb 17	3.2.3	1,189	CINWR
Feb 17	3.2.4	172	CINWR
Feb 17	3.2.5	78	CINWR
Feb 17	3.2.6	29	CINWR
Feb 17	3.4.1	1,959	CINWR
Feb 17	3.4.2	57	CINWR
Feb 22	SQ Unit 9	670	SQNWR
Feb 23	SQ Unit 8	290	SQNWR
Feb 24	SQ Unit 7	864	SQNWR
Feb 24	SQ Unit 4	248	SQNWR
Feb 25	SQ Unit 3	1,382	SQNWR
Feb 25	SQ Unit 5	1,036	SQNWR
Feb 28	SQ Unit 6	816	SQNWR
Mar 05	Hank Har. Fe	50	PLNWR
Mar 28	SQ Unit 1	1,200	SQNWR
Total	12 burns	10,040 acres	



Firefighter Amy Midgett marshalling 296 RW on a prescribed burn. TC

DFMO Crews and FCO Harris served as burn boss on all the above 27 burns, for a total of 13,588 acres. Crews wrote the Rx Fire Plans for each of them. Mackay Island NWR burned an additional 1,585 acres, all independent of support from the ARNWR fire crew and the DFMO.

Wildland Urban Interface (WUI)

Alligator River NWR was selected for a site visit by a team conducting a National Fire Plan Review for acquisition and procurement. The five team members were from three different DOI agencies and the DOI Washington office. FMO Crews, WUI Hays, and OA Lane participated from Alligator River. Additional guests were Pocosin Lakes FMO Vince Carver, NPS Ranger Daniel Trexler from Ocracoke, and firebreak contractor Glen Garret. Meeting attendees discussed contracting accomplishments and difficulties in implementing funded WUI projects, and proposed improvements to the contracting and procurement process.

The Refuge received money for a Wildland Urban Interface (WUI) project to establish a firebreak to protect the community of Manns Harbor from wildfires. The best placement for this firebreak was determined to be on private property, since placing the break on the Refuge boundary would leave roughly a quarter mile of fuel between the firebreak and homes. FMS Hays sent letters to affected property owners inviting them to a meeting the following week to discuss the project. The meeting, held June 27 at the Manns Harbor Community Center, was attended by cosponsors Melissa Cummings from NCFS and the Manns Harbor Volunteer Fire Department represented by Clyde and Sherman Gard and Buddy Twiddy. Only two landowners attended the meeting to view the PowerPoint

presentations FMS Hays had prepared. FMO Crews was also at the meeting to answer questions. During the last two weeks of June and the first three weeks of July, FMS Hays was busily working on securing landowner agreements for a proposed firebreak through Memorandums of Understanding. On August 25, The Virginian Pilot published an article about the proposed firebreak to be cut on private land in Manns Harbor. Reporter Darren Freeman interviewed FMS Hays for the article. After several unsuccessful phone calls to Manns Harbor landowners trying to arrange face-to-face meetings, FMS Hays finally got some landowners to express their reservations about the agreements and why they would not sign. Three straight "no's" and one by omission were enough to reach a decision in late August to cancel the firebreak project.

The Refuge received funding for hazardous fuel reduction projects around the Buffalo City and Wolf Intern cabins, churches, and the community center along U.S. Highway 64. The project started in late July using the Refuge's gyro-trac. While cutting defensible space around the red wolf pens, AD Hux experienced an equipment fire on the gyro-trac. AD Hux was not hurt, but the gyro-trac was badly damaged. A gyro-trac was rented in late August to complete the projects.

A pre-work conference was held on November 5 with Garcia Forest Service who was awarded the Parched Corn Bay Firebreak Contract. FMS Van Druten served as the Contracting Officer's Representative. This contract called for use of an amphibious excavator with a cutter head to construct the firebreak. The contractor made good progress cutting the 8.2 miles of firebreak in November and December. By late December, about two-thirds of the firebreak was cut, although some areas needed to be touched up. Equipment failure resulted in no additional progress on the contract this year.

10. Pest Control

Pest Plants: Cooperative farmers used herbicides and insecticides for pest control on croplands. Pesticide Use Proposals and Chemical Use Reports were submitted in accordance with Service policy and guidelines. Extra efforts are required to control Phragmites communis in farm fields, moist soil units, and along roadsides. These efforts include herbicides, burning, and discing where possible. During 2002, staffing limitations and funding did not allow any Phragmites treatment except for that done by the cooperative farmers in active croplands.

Southern Pine Beetle: Refuge staff spent January through April administering a contract with Retention Pond Services for the cutting of a buffer around a southern pine beetle infestation northwest of Pamlico Road on the southern end of the Refuge. The buffer controlled three active heads that were threatening a potential red-cockaded woodpecker recruitment site. The 5-acre buffer protected 230 acres of mature pond pine/shrub pocosin.

Trapping of southern pine beetles was conducted at three locations on the Refuge as part of a cooperative effort with the North Carolina Division of Forest Resources. The Refuge's contribution included allocating time and staff to set and check the traps. Trap results showed 21% of all insects collected were southern pine beetles with 1.4 per trap day. High

numbers of clerid beetles, the natural predator of Southern Pine Beetles, with 5.1 per trap day were detected. These numbers were all below state averages, but did translate into a prediction of an increasing number of southern pine beetle spots.

During July, an aerial survey of infestations on the Refuge was completed. Seventy-eight individual heads were recorded with a GPS unit, with some of the heads being on the same spot. Most of these spots were in remote areas where accessibility was too difficult to consider control measures. From information provided to the Refuge, and unless new outbreaks reach proportions sufficient to justify suppression activities, funding will not be available during 2003.

G. WILDLIFE

1. Wildlife Diversity

The vast expanse of swamp forest and wetlands on the Refuge contains many important wildlife and ecological resources. Much of the Pamlico/Albemarle peninsula was developed by clear-cutting, peat mining, and agricultural conversion, yet this area remains one of the most remote and diverse swamps in eastern North Carolina.

Alligator River NWR and its surrounding waters support many species of resident and migratory fish and wildlife. Of these, 48 species are fish, 145 are birds, 48 are reptiles and amphibians, and 40 are mammals. The Refuge also supports wildlife species that are important from both a regional and a national perspective. Its large size and dense vegetation make the Refuge a haven for species such as the black bear. Also, the Refuge harbors many species adapted to living in forested habitat as opposed to disturbed areas such as field edges. The Refuge also provides habitat for the endangered red-cockaded woodpecker and migrating bald eagle and peregrine falcon. Alligator River NWR is at or near the northern limit of ranges for several vertebrate species, most notably, the American alligator.

2. Endangered and/or Threatened Species

Four endangered species have been documented on the Refuge. Management programs are in place for the red wolf and red-cockaded woodpecker. An inventory program, although inactive, is in place for the American alligator, which is considered threatened by similarity of appearance in North Carolina. There are no plans to manage specifically for or inventory the bald eagle at the current funding and staffing level. Aerial nesting surveys will be conducted as opportunities arise.

Federally Listed Endangered and Threatened Species

American alligator (TSA): American alligators reach the northern extent of their range on the Refuge and probably were never very numerous in the area. Although delisted, the alligator remains classified as threatened "by similarity of appearance" to the crocodile in North Carolina. The highest density alligator population is consistently found on Whipping Creek Lake. A few have been seen each year in the marshes, ponds, streams, and canals.

Sightings of alligators throughout open areas of the Refuge seem to be increasing. Alligator surveys were not conducted in 2002 due to insufficient funding and staffing.

Bald eagle (Endangered): During the course of the year, immature and adult eagles can be observed on the Refuge. Although eagle sightings are becoming more common, only two eagle nests have been confirmed on the Refuge as of this writing. Both nests produced hatchlings, but due to the remoteness of one of the nests, fledging success could not be determined. The other nest yielded one fledgling.

Peregrine falcon (delisted): Peregrine falcons are known to move through the general area during migration. One report of a peregrine falcon occurred during 2002.

Red-cockaded woodpecker (Endangered): Trails were cut to previously tagged cavity trees south of Whipping Creek Road. Trails to cavity trees north of U. S. Highway 264 were cleaned up and made passable. Of the three known clusters on the Refuge, one produced a fledgling. None of the U. S. Highway 264 clusters were active during the nesting season.

Red wolf (Endangered):

Red Wolf Wild Population

The Red Wolf Recovery Program of the U.S. Fish and Wildlife Service, located in northeastern North Carolina, manages the world's only wild red wolf (*Canis rufus*) population. Fiscal Year 2002 represents the 15th consecutive year of successful management. By Spring 2002, the wild population had produced at least 287 wild pups, with 35 pups born in the wild during Fiscal Year 2002 and 45 wild born pups in Fiscal Year 2001. The wild population of red wolves is currently composed of approximately 100 wolves comprising 20 packs distributed across 1.7 million acres in five North Carolina counties.



Red wolf pups. Photo courtesy of Greg Koch.



Red wolf male with pups. Photo courtesy of Greg Koch.

Red Wolf Adaptive Management Plan

The Red Wolf Adaptive Management Plan began in 1999 and is implemented by the Red Wolf Recovery Program field team headquartered at Alligator River NWR. An independent panel of scientists known as the Red Wolf Recovery Implementation Team meets twice per year to review pertinent field data, discuss red wolf and coyote management, and make recommendations to the Service regarding adaptive management and red wolf recovery. Reviews by the Implementation Team show the Plan is effective in restoring the wild red wolf population and managing competitors (eastern coyotes). In 2002, the number of red wolf breeding pairs (packs or family groups) and red wolf litters trends upward while the number of breeding coyotes or hybrid litters trends downward. By the end of calendar year 2002, one third of the 1.7 million acre experimental population area has numerous red wolves and is free of coyotes, while another third of the area has many wolves and is almost free of coyotes. The remaining third shows good progress in restoring red wolves and managing coyotes.

Red Wolf Captive Breeding Program

As part of the Red Wolf Recovery Program, the Red Wolf Captive Breeding Program is effectively implemented by almost 40 captive facilities across the United States. The effort is overseen by the Red Wolf Recovery Program Team Leader located at the Alligator River National Wildlife Refuge (currently Bud Fazio), and is coordinated by the Red Wolf Species

Survival Plan leader located at the Point Defiance Zoo and Aquarium in Tacoma, Washington. In 2002, approximately 160 red wolves were held in captivity for cooperative breeding, reproduction research, and conservation genetics work. This breeding program maintains genetic diversity among red wolves and prepares a small number of red wolves for possible release into the wild. This program leverages approximately \$400,000 of in-kind services contributed by the various partner facilities located across North America.

Red Wolf Island Programs

The Red Wolf Recovery Program and Red Wolf Captive Breeding Program partner with two U.S. Fish and Wildlife Service national wildlife Refuges to raise red wolves in wild settings on islands. Young wolves growing up on these islands learn survival skills that prepare them for release into the wild red wolf population in North Carolina in the vicinity of the Alligator River National Wildlife Refuge. The Cape Romain National Wildlife Refuge in South Carolina maintains ten or more red wolves, including a red wolf family group (2 to 5) on Bull Island that produces pups for eventual release in North Carolina. The Cape Romain Refuge educates approximately 200,000 people per year about red wolves. The St. Vincent Island National Wildlife Refuge in Florida maintains a pair of red wolves, also for breeding in the wild. These island programs play vital roles in the red wolf captive breeding program via education and producing wild-born red wolf pups for release.

Red Wolf Landowner Agreements

The Red Wolf Recovery Program is partner to conservation and access agreements with six different owners of private land comprising 34,000 acres (see Section C.2). These tracts of land are strategically selected to maximize monitoring of red wolves and other canids in the northeastern North Carolina five county experimental population area. In Fiscal 2001 and 2002, we entered into conservation agreements with two landowners while utilizing \$25,000 in Landowner Incentive Program funds. These two landowners oversee large game farms and believe red wolves are important in maintaining healthy game populations and an overall healthy landscape scale ecosystem.

Red Wolf Genetic ID Project (including M.S. & Ph.D)

The Red Wolf Recovery Program is working with wildlife genetics researchers to identify gene loci in red wolves and coyotes. This information allows biologists to more easily distinguish and manage red wolves versus other dog-like animals such as coyotes. This information also assists managers in deciding how best to ensure long-term survival of the red wolf species. Work at Trent University in Canada has led to the identification of gene loci unique to red wolves, and the work proposes relationships to Algonquin wolves located in eastern Canada. Both Master's degree and continuing Ph.D work at the University of Idaho has identified 18 gene loci in red wolves to date, making it easier to distinguish between red wolves and eastern coyotes.

Modeling the Wild Red Wolf Population

The Red Wolf Recovery Program is partnering with two Universities to model the North Carolina wild population of red wolves. Researchers from the University of Arizona are modeling coyote/red wolf gene introgression in one model and pathogen resistance in another

model. A researcher at Trent University in Canada is modeling survival and demographics of the red wolf population. Both the introgression model and the population demographic model show that the wild red wolf population will survive successfully with assistance from biologists in managing problem coyotes.

Red Wolf Captive Research Facility

In a joint effort between North Carolina State University and the Red Wolf Recovery Program, the first two holding pens of a six pen facility have been constructed to allow important research on captive red wolves. Research is being conducted on such topics as disease detection, physiological processes, food habits and behavior characteristics. Ultimately, information learned at the North Carolina facility will be very helpful in both the captive breeding effort and wild population management effort of the Red Wolf Recovery Program.

3. Waterfowl

Historically, large numbers of waterfowl did not use ARNWR because of the forested character, but the Refuge supports a substantial year-round population of wood ducks using the numerous ditches, canals, creeks, lakes, natural openings, and swamps. However, a large number of waterfowl species could historically be found on the Alligator River and the associated sounds. The addition of 5,100 acres of farmland in 1988 substantially increased opportunities for waterfowl management. This management has been achieved primarily by converting farm fields, classified as prior converted wetlands, to moist soil management units.

Results of this year's surveys are noted in the table below. The overall waterfowl use decreased substantially (approximately 85%) during the 2001-2002 survey period in comparison to the 2000-2001 survey period, as well as the 5-year and long-term averages. However, species such as the Tundra swan, northern shoveler, wood duck, and coot showed increases in use. Other species such as mallards, black ducks, gadwall, pintail, blue-winged teal, and ringneck duck showed decreases in use ranging from 41% to 99%. In spite of drought conditions during the growing season, food production in the moist soil units was good: most units contained 50-70% of good to fair waterfowl plant species.

**Composition of Wintering Waterfowl, Alligator River NWR
2001-2002**

SPECIES	PEAK PERIOD	Survey Peak #	# USE DAYS 2001-02	% TOTAL USE DAYS 2001-02	USEDAYS % diff from 10 yr. avg.
Tundra Swan	Dec	1,031	46,509	48.8	+1
Snow goose	N/A	0	0	0	0
Canada goose	N/A	0	0	0	0
Mallard	Jan	435	11,679	12.3	-76
Black	Dec	48	1,220	1.3	-95
Gadwall	Dec	5	103	0.1	-99
Wigeon	Dec	527	8,371	8.8	-41
Pintail	Dec	2,290	13,573	14.2	-94
GWT	Jan	278	9,162	9.6	-95
BWT	N/A	0	0	0	0
Shoveler	Jan	96	3,069	3.2	+96
Wood	Jan	21	357	0.4	+21
Ringneck	Feb	36	781	0.8	-99
Redhead	N/A	0	0	0	0
Canvasback	N/A	0	0	0	0
Scaup	N/A	0	0	0	0
Unknown	Feb	30	329	0.3	-99
Bufflehead	N/A	0	0	0	0
Ruddy	N/A	0	0	0	0
Merganser	Mar	3	50	0.1	-41
Coot	Mar	5	102	0.1	+5

The Wood Duck Nest Box Program was inactive. Since use of nest boxes has always been consistently low, checking the boxes is not a high priority at current funding and staffing levels. Traditionally, less than 2% of the nest boxes have ever shown any signs of wood

duck use. However, nest boxes are used by other species such as other birds and bees. At the last count, 39 boxes still remain throughout the Refuge. A decision will be made whether to remove these nest boxes and put them up somewhere else, or leave them in place for use by other wildlife.



Tundra swans frequently forage in moist soil units at Alligator River NWR.
USFWS

4. Marsh and Waterbirds

Although management of moist soil units is focused on waterfowl, numerous other marsh and waterbird species can be observed in these units. Herons, egrets, woodcock, snipe, and rails, appear to be most numerous. Killdeer and yellow legs are common. Kingfishers are often seen adjacent to canals with deeper, more permanent water. At the present time, there are no formal surveys for these species. They are counted while conducting winter waterfowl surveys.

6. Raptors

Many raptor species can be observed on the Refuge. Among the most common species are the red-tailed hawk, red-shouldered hawk, northern harrier (marsh hawk), kestrel, and merlin. Owl species include great-horned owl, barred owl, short-eared owl, and screech owl. Additional information regarding raptors can be found in the Research and Investigations section.

7. Other Migratory Birds

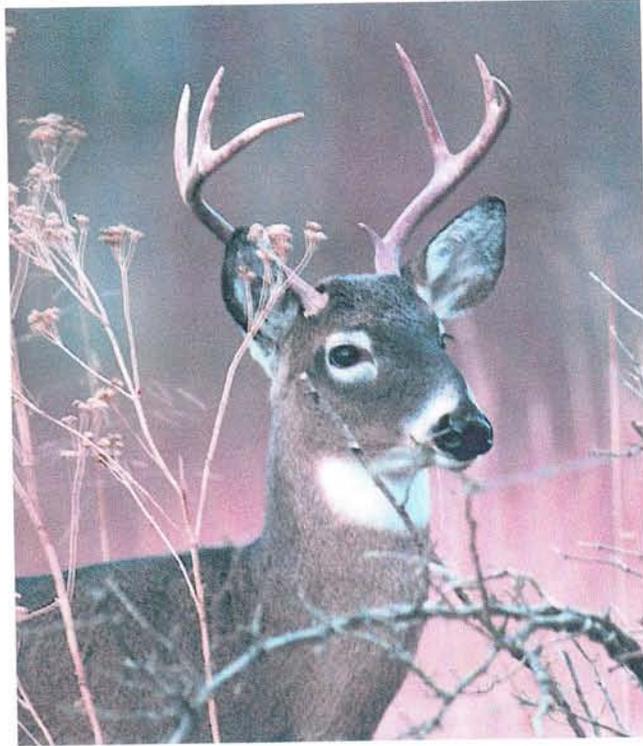
The Refuge is host for migratory species such as the mourning dove. In addition, the vast expanse of forested habitat provides for a wide range of neotropical migrant birds. There are tentative plans to begin neotropical migrant bird surveys as soon as budgets and staffing permit. Additional information regarding other migratory birds can be found in the Research and Investigations section.



An American redstart on Alligator River NWR. USFWS

8. Game Mammals

White-tailed deer are found on the Refuge. Although carrying capacity for pocosin habitat is considerably less than bottomland hardwoods, deer population size appears to be relatively constant and sportsmen are provided with considerable recreational opportunity.



White-tailed deer provide ample hunting opportunities on Alligator River NWR. USFWS

A study to estimate the Refuge population of black bears is underway and a management plan for this species will be drafted in the coming year. Hair traps have been constructed to collect samples for genetic analysis. Dr. Mike Vaughan of Virginia Tech is the principal investigator for this project.

10. Other Resident Wildlife

Wild turkeys were rarely observed during the spring and summer. However, in the fall, one flock of at least 20 birds was observed in the farm unit. Other turkeys were observed over much of the northern half of the Refuge, even along roads transecting pocosin habitat. Group size varied from one to six birds. This is the first year since the restoration project began in 1999 with the release of 16 birds that significant numbers of turkeys were observed on the Refuge.

15. Animal Control

Beaver numbers are rapidly increasing and so are all of the associated problems. Removing dams from culverts and canals is an ongoing maintenance problem. Beaver population management practices have been implemented and will most likely become a permanent component of Refuge management activities.

H. PUBLIC USE

1. General

The Refuge public use program remains primarily consumptive in nature, with the hunting program being the most active. Public use trends are moving upward in the non-consumptive areas; however, major non-consumptive use is not anticipated in the future. The Milltail Creek Canoe/Kayak Trail system has been very popular. The Refuge has experienced an increase in non-consumptive use since the trails were completed and word has spread!

Total visits to the Refuge in 2002 were estimated to be 41,899. Administrative offices for the Refuge remained in the General Services Administration (GSA) leased office space in Manteo. A few visitors continued to locate the office, but most information was disseminated by web pages, telephone, correspondence, or through the news media. During 2002, the Refuge continued to focus on providing a greater number of media contacts while keeping the messages short and simple. A total of 65 news releases and 25 radio/TV spots was produced.

WIS Strawser served as a member of the Roanoke-Tar-Neuse-Cape Fear (RTNCF) Ecosystem Outreach Committee, the NC Environmental Education Association, and the Region 4 Outreach Team. WIS King-Wrenn was an active leader in the Outer Banks Interpreter's Group.

2. Outdoor Classrooms – Students

Creef Cut Wildlife Trail and Sandy Ridge Wildlife Trail are being used more frequently by groups of students on the way to and from the Outer Banks from inland areas. Some of these groups contact the Refuge to request a teacher/leader to work with their groups. As staff time allows or volunteers are available, these requests are usually met. During 2002, 150 students were taught on-site by staff and volunteers as a part of an organized educational program.

3. Outdoor Classrooms – Teachers

Since Alligator River NWR and Pea Island NWR are located in an area rich in conservation education/interpretation agencies, these Refuges do not receive the requests common on other stations that are often the sole sources available. The North Carolina Aquarium, Jockey's Ridge State Park, Nags Head Woods Ecological Preserve, and Cape Hatteras National Seashore offer environmental education and teacher training activities. Teachers in this area receive numerous requests annually to attend such functions. For this reason, we have chosen to focus more on other educational needs rather than attempt to compete with other conservation agencies. WIS Kim King-Wrenn worked with the Outer Banks Interpreters Group throughout 2002, providing training for interns and seasonal employees of

many of these agencies to ensure our Refuge message is included in their programs where possible.

4. Interpretive Foot Trails

Sandy Ridge Wildlife Trail and Creef Cut Wildlife Trail continue to be used by many individuals and groups. With 2,300 feet of boardwalk, Sandy Ridge Trail is one of the best kept secrets on the Refuge! Full potential for use of these trails has not been reached.

Though not a foot trail, the Milltail Creek Canoe/Kayak Trail System continues to be quite popular. On most days, there are several groups using the trail. If there were a local place to rent canoes or kayaks, use would increase dramatically. However, there is not a demand great enough to consider a concession for this purpose. Four local businesses were issued special use permits (SUP) to conduct guided canoe or kayak tours on the Milltail Creek Canoe/Kayak Trail System during 2002. Approximately 6,000 visitors participated in guided tours provided by the holders of these SUP's.

Approximately 30,960 people used Alligator River NWR trails during 2002. It is anticipated that there will be a continued increase in trail use on this Refuge for some time to come. Approximately 7,022 visitors used the paddling trails, and 10,017 used the Wildlife Drive (which remained unsigned until October, 2002)

6. Interpretive Exhibit/Demonstrations

Refuge staff manned displays and exhibits at some of the usual annual events around Dare County and eastern North Carolina. Unfortunately, due to staff shortages, many requests were denied for this type of activity. Several staff participated in the FWS booth at the NC State Fair. The Refuge exhibits located at the Aycock Brown Welcome Center in Kitty Hawk were viewed by 500,000+ visitors during 2002.

Regularly scheduled interpretive/educational programs for the Refuge during 2002 are shown in the table below. Fall, summer, and spring guided canoe tours were scheduled for a \$30 fee. In the summer, a weekly black bear program and bi-weekly bicycle tours were scheduled.

2002 Visitor Programs

Program	No. of Programs	No. of Participants
Howling Safaris	12	860
Canoe Tours	22	236
Bear Necessities	11	36
Bicycle Tours	12	65

7. Other Interpretive Programs

Red wolf howlings have proven to be very popular programs on the Refuge. Because of overwhelming demand for howlings, a decision was made to schedule 10–12 howlings each year and decline requests from individual groups for this program.

At the Cape Hatteras Science Fest in April, fire personnel presented a program on “Fire on Public Lands.” The Powerpoint presentation described fire as a natural process, how fire works, how Refuges use fire, and what steps Refuges take to use fire safely. The audience included 16 elementary school classes, totaling approximately 350 children.

Refuge fire staff also participated in the Wings Over Water Wildfest at the Manteo Elementary School. The exhibit consisted of several movable, velcro pictures that related basic information on fire. Three large printed panels gave a more in depth coverage on the uses of prescribed fire and protection of homes for the parents. The kids also participated in two relay races to try on fire fighter PPE.



Refuge personnel and volunteers joined the Blue Goose in the Manteo Christmas Parade.

BS

8. Hunting

With approval of the Master Plan shortly after establishment, the Refuge was divided into three basic public use areas, with several additional safety or management zones closed to all hunting. As new areas have been acquired, they have been added to one of the three existing categories, or (in the case of the farm fields) put into a newly created category. The farm fields were designated as open to all authorized uses except waterfowl hunting during September and October annually. They are closed to public entry at all other times.

With additions and deletions of land in the Refuge, the ratio of land designated for hunting with chase dogs and land designated as closed to use of chase dogs has remained relatively constant (1:1). With reviews and changes of the Master Plan, some changes in hunting areas have occurred; however, the ratio of lands open to still hunting and lands open to chase dog hunting have remained approximately the same.

For the 11th season, Refuge hunting permits were required for all hunts. The permit system has been accepted readily by hunters. Again this year, the hunt leaflet contained the permit. Hunters acknowledged, by signing the permit, that they had read and understood the leaflet. This system has worked well on this Refuge and has reduced the effort required to change regulations significantly.

White-tail deer continue to be the most sought after game species on Refuge lands. Alligator River contains over 150,000 acres of habitat, traversed by more than 150 miles of unimproved roads. These factors make it difficult to establish effective hunter check stations. The North Carolina Wildlife Resources Commission (NCWRC) again required hunters to register hunter-killed deer with a local wildlife cooperater agent; however, they assume that an estimated 40% go unreported. In past years, the figures reported by the State have been used and extrapolated to provide more realistic estimates. Using the figures provided by the NCWRC, an estimated 30 deer were taken during the 2001-2002 hunt season.

This year was Dare County's 12th annual black bear season since the NCWRC and County Commissioners reinstated an open season on this species. Bear hunting is not allowed on the Refuge. Refuge officers and biologists monitor bear hunting activities adjacent to Refuge lands.

Most of the brochure boxes labeled with signs stating "Hunter Information" survived the winter and needed just a bit of sprucing up and stuffing. The new hunt leaflets arrived on time and were clear and correct. Again this year, extra effort was made throughout the seasons to ensure that leaflets were always available, since the brochure contained the required hunting permit. The effort was minimal, since routine patrols took Refuge Officers by the boxes frequently.

September 7, archery season began along with the usual weekend patrol assignments for Refuge Officers. Muzzle loader season started on October 5. Regular gun season began

October 12. As always, on November 1, the farm field gates were closed and locked. For the rest of the year this area was closed to all public entry.

Waterfowl seasons were October 3–5, November 25–30, and December 9–January 18. A limited amount of waterfowl hunting took place on the Refuge, but most occurred over open water in the sounds and in Milltail Creek.

Though the regional hunting policy for youths has been difficult to enforce, the fact that Dare County Schools already had a state Hunter Safety Course as a part of the seventh and eighth grade curriculum certainly helped. Since 1991, North Carolina has required all first-time hunters to successfully complete the Hunter Safety Course. In addition to the courses offered in the public schools, NCWRC Officer Mark Cagle and his associates conducted several extra classes to enable other youth/adults in the area to qualify to hunt on the Refuge. The Refuge staff has yet to hear of a person who has needed the course and was unable to find a class.

Estimated Public Hunting

Activity	Visits
Waterfowl	357
Big Game	821
Upland Game	127

Unfortunately, hunting visits are, at best, an educated guess on our part. With so many different entrances to the Refuge and so few officers, about the only way to estimate hunting activity is by anecdotal information and leaflets distributed.

There are very few places to quail or rabbit hunt on the Refuge. Small game hunting is primarily for raccoon, squirrel, and rabbit.

9. Fishing

The heaviest recreational fishing effort in the vicinity of the Refuge is in the surrounding sound system from October through April. Fishing pressure on the Refuge itself is relatively low and is a reflection of the isolation of the area and limited access rather than of low catch per unit of effort. Angling for bluegill, crappie, chain pickerel, channel catfish, flier, largemouth bass, and yellow and white perch is considered good. During 2002, there were an estimated 38,661 fishing visits to the Refuge. Frog gigging is allowed on the Refuge by special use permit.



Freshwater lakes on Alligator River NWR are frequented by paddlers and anglers alike. USFWS

10. Trapping

Since trapping is considered a commercial use of the Refuge, neither visits nor activity hours are normally recorded under public use. For the 2002 trapping season, no special use permits were issued for Refuge trapping.

11. Wildlife Observation

Canoeists enjoyed paddling on Milltail Creek and Whipping Creek and observing an occasional alligator, wood duck brood, or other area wildlife. The Milltail Creek Canoe/Kayak Trail has encouraged folks to come to the Refuge for wildlife observations.



Canoists get a guided tour of Alligator River NWR creeks to learn about wildlife and habitat. USFWS

Wildlife photographers used the Refuge to some extent for a chance at black bear, deer, or any number of birds and other animals. General habitat scenes were popular for an adventuresome few.

Wildlife/Wildlands Observation – 2002

Activity	Visits
By Foot	30,960
By Vehicle	10,017
By Boat	7,022

17. Law Enforcement

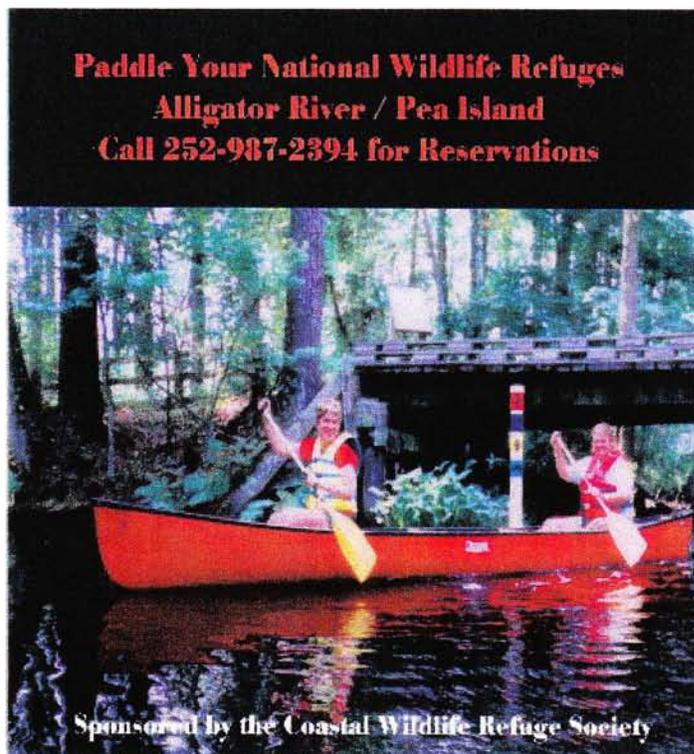
Refuge collateral duty officers numbered five at the start of the year. By hunting season, there were three. The officers were already under heavy work loads before the hunting season began. This situation made the Alligator River NWR season a long one and one predominantly monitored by NCWRC officers.

Officers Bryant, Strawser, Wallace, Wigginton, and Van Druten attended the annual Law Enforcement Refresher in Tallahassee, Florida. Bryant, Strawser, and Van Druten re-qualified with their firearms midyear.

18. Cooperating Associations

The Coastal Wildlife Refuge Society (CWRS), a non-profit group formed in 1989 to support eastern North Carolina NWR's, noted the following accomplishments for 2002:

- The primary focus for the 2002 fiscal year was a proposal for the Refuge Visitor Center on Roanoke Island. This Visitor Center is proposed to be a "gateway" to Refuges in eastern North Carolina. The Visitor Center was listed as one of the twenty highest ranked Visitor Centers in the FWS; however, as the FY 2003 budget was passed, no mention was made of the ARNWR Visitor Center.
- At the first annual National Refuge Friends Conference in January, CWRS was announced as the first ever "Friends Group of the Year" and presented an award by the National Fish and Wildlife Foundation and the National Wildlife Refuge Association.



The CWRS placed an add that resulted in many canoe trips to raise money for the Society. CWRS

During the year, CWRS spent \$137,644 on Refuge projects, including the following items:

- Half the cost of a 4-wheeler for Turtle Patrol;
- Contract and design for a revision of the Birds of the Outer Banks leaflet and the printing of 50,000 copies. The leaflet was done as a partners project with NPS and Eastern National Park and Monument Association.
- \$10,113 in volunteer support, including intern stipends for 22 interns;
- \$22,500 to the Service to fund an Interpretive Assistant position;
- almost \$15,000 for outreach;
- \$1,748 for Centennial materials;
- \$4,570 for trail maintenance;
- \$24,483 for Visitor Center projects, including the moving of the front door, construction of an additional deck and covered porch, and purchase and installation of additional interpretation for the VC exhibits;
- \$861 for materials and supplies for educational and interpretive programming;
- \$3,255 for staff support;
- \$55,878 for Wings Over Water support;
- The CWRS continued to hold \$90,000 of the original \$95,000 donation (a Right-of-Way fee from the NC Power Company) for Currituck NWR. It has also been instrumental in assisting other stations in the RTNCF Ecosystem and the Planning Office, as requested.
- The Book Store/Gift Shop grossed \$181,836 in sales during 2002. Other income sources were donations- \$12,672; interest - \$8,805; canoe fees - \$14,845; Wings Over Water - \$41,472; grants -\$5,040; and reimbursements - \$6,878.
- The CWRS and FWS signed a new MOA during 2002.
- A membership drive was done during 2002, bringing total membership to approximately 750 members.
- A complete financial report for FY 2002 is included in the materials in the back of the annual narrative.

I. EQUIPMENT AND FACILITIES

1. New Construction

New trash cans were installed at public use areas of Creef Cut Trail and Sandy Ridge Trail.

2. Rehabilitation

Bridge Replacement

Based on the USFWS Bridge Safety Program initiated in 1992, inspections of Milltail Creek and Navy Shell bridges were conducted in 1997, 1998, and 2000. Foothill Engineering Consultants, Inc., and Range Engineering of Denver, CO., performed inspections and provided recommendations for correction of deficiencies. Inspection summaries for both bridges were identical: 1) Structural Capacity: deficient; 2) Serviceability/Safety Features: deficient; 3) both bridges "functionally obsolete; 4) major rehabilitation/replacement needed.

Replacement bids were solicited during June and July 2002, with Sawyer Land Development Company of Belhaven, NC, being selected as contractor. Total cost to replace both bridges was \$850,000. Construction began in October 2002 and is expected to be complete by March 2003.



The bridge crossing Milltail Creek was replaced this year for safety reasons.

JW

Road Rehabilitation

After impacts from Hurricanes Dennis, Floyd, and Irene during 1999, the Refuge road system became eligible for funding from the Emergency Relief for Federally Owned Roads Program (EFRO) administered by the USDOT. A total of 81.5 miles (28 named roads) were initially identified for potential funding and \$3,275,000 was approved for repairs. The Eastern Federal Lands Highway Division completed all designs and bid solicitations. A contract was awarded to Aldridge Brothers, Inc., of Robbinsville, NC, to repair 22 miles of roads. Completion of this project is expected in March 2003.



Hurricanes in 1999 resulted in Federal funding of road repairs from ERFO. JW

Other Rehabilitation:

- Replaced Maintenance/Operations Facility water pump, flushed system, and installed chlorinator.
- Upgraded and replaced (as needed) fire extinguishers in all fleet vehicles
- Made improvements to the Sandy Ridge interpretive trail facility to allow for easier handicap accessibility.
- Primed and painted all farm field gates
- Provided technical and logistical support for Pea Island NWR Proclamation Boundary posting contract (see Pea Island narrative for details).

3. Major Maintenance

- The cooling system and transmission cooling system for the Terex D-6 dozer was overhauled
- On the John Deere 770 grader, the head gasket was replaced and the cylinder head machined.
- Graded approximately 310 miles of Refuge roads

4. Equipment Utilization and Replacement

- Received and put in service two O & M pickups, two Fire Program pickups, and a new truck tractor
- Received and put in service a new Caterpillar 420D IT front end loader/backhoe
- Received and put in service a new 21 foot Boston Whaler Justice boat with a 225hp Honda outboard
- Received a new John Deere single wide mower

5. Communication Systems

To meet the Narrowband Digital Radio legal mandate, Alligator River NWR received \$344,700 through the Maintenance Management System (MMS) funding process. The Denver Communications Center (DCC) reduced the fund target \$36,700 to cover their overhead (planning, site visit, administration, programming, etc.). Prior compliance efforts included a cooperative venture with the National Park Service (NPS), but different budget cycles eliminated this option.

A meeting was held at the Manteo Administrative Office on June 18th to begin the project. Mr. Nowell Newberg (DCC) attended, as well as staff representing various Refuge activities/programs-Endangered Species (Red Wolf Recovery), Fire Management, Public Use, overall resource management. Goals/priorities were established for the radio project: Employee Safety, Resource Protection, Visitor Safety, and Operations Efficiency. Initial purchases focused on Refuge-wide infrastructure: repeaters, base stations, support equipment (antennas, software, computers, safety items, etc.), and Area Dispatch Center update. Subscriber units (mobiles, portables) will be purchased once the infrastructure is installed and functioning.

VHF and UHF repeaters will be installed at three sites (Cedar Island NWR; Engelhard, NC; Columbia, NC) and linked together giving coverage throughout Eastern North Carolina and Southern Virginia. Base stations will be installed at Pea Island NWR, Manteo Administrative Office, East Lake Operations Center, and the Red Wolf Recovery Facility. The base station at the Red Wolf Facility will be solar powered.

UHF radios were purchased and installed in all designated Refuge law enforcement vehicles. This enables 24/7 contact with the Dare County Sheriff's Department central dispatch and the National Park Service. Infrastructure installation will be through a Department of the Interior contract in 2003.

8. Other

- Supervisory Engineering Equipment Operator Creef assisted with the selection process for Region 4's first heavy
- Equipment Coordinator position.
- Refuge staff assisted with the planning and construction of boardwalk and impoundment for the Pelican Island Centennial Project.
- Refuge staff participated in the planning and implementation of the first ever Regional Wage Grade workshop. All but one station Wage Grade personnel attended.
- Hosted and participated in Area 3 Wage Grade mini-workshop.
- All WG employees received basic computer and lotus notes training.

J. OTHER ITEMS

I. Cooperative Programs

A cooperative effort among the Refuge, South Atlantic Fisheries Resource Coordination Office, and Edenton National Fish Hatchery to conduct a fairly comprehensive fisheries survey was completed in during 2002. Data entry, analysis, and report preparation was incomplete at the end of 2002.

The Department of Geology at East Carolina University has collected some data from the Refuge for the purpose of learning more about the geological history of the area and using data to develop predictive models of landscape changes as sea level rises. Dr. Stan Riggs presented a Year two Progress Report that outlines interesting and potentially very significant changes in the barrier island ecosystem that has affected and will continue to affect both Alligator River and Pea Island NWR's dramatically.

Wildland/Urban Interface Assistant for the North Carolina Refuges, FMS Hays, spent the first part of the year traveling to several Refuges to review proposed WUI projects. She met with several Volunteer Fire Department Chiefs and NCFS County Rangers to discuss Rural Fire Assistance Grants that the VFDs had received and what further wildland firefighting needs they had. FMS Hays also attended a regular business meeting for each of the funded VFDs to introduce herself and learn more about each department. On May 31, FMS Hays submitted a Rural Fire Assistance Needs Assessment report to Regional Office requesting funds for 14 Rural/Volunteer Fire Departments cooperating with seven Refuges. On June 12, the Regional Office sent notification that all 14 fire departments had received RFA funding, eight new awards and six additions to previous awards. Meetings were held with the various VFDs and County Rangers throughout the fall to discuss ways of spending their grant money on wildland firefighting PPE and training.

4. Credits

This Narrative Report was a joint effort by the entire staff.

PEA ISLAND NATIONAL WILDLIFE REFUGE

Manteo, North Carolina

ANNUAL NARRATIVE REPORT

Calendar Year 2002

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

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A. HIGHLIGHTS

- Several pages of text could easily be written summarizing the activities/actions associated with Oregon Inlet Jetties, replacement of Bonner Bridge, dredged material disposal on the Refuge beach, dune reconstruction, and maintenance of NC Highway 12. Refuge staff participated in numerous meetings with USCOE, NCDOT, ES, other state agencies, and local officials over the course of the year. (Section D.4)
- Engineering maintenance and protection actions taken by USCOE and NCDOT over the past 40 years have affected the size and shape of the Refuge. (Section F.1)
- Based on the NPS vehicle counter at Bodie Island and adjusted according to new configurations from RMIS, estimated visitation to Pea Island NWR during 2002 was 2,649,935.

B. CLIMATIC CONDITIONS

Specific climatic data is not kept for Pea Island NWR. See Alligator River National Wildlife Refuge narrative section B for local data.

C. LAND ACQUISITION

2. Easements

During 2002, the Oregon Inlet Coast Guard Station re-entered into the picture. This 10 acre inholding and old station building was quit-claim deeded to the county in 1992. Early in 1993, a group of individuals claiming to be heirs of the original owner (who sold the land in 1878 to the Coast Guard) filed a deed to the property based upon a "reversionary clause" in the Coast Guard title, posted the site, and moved a caretaker into the building. After a lengthy process the court decision was that the land rightfully reverted to Dare County. Dare County relinquished their right to the property to the State of North Carolina. That part of the site that was Refuge property under easement to the Coast Guard has now reverted back to Refuge management. The State of North Carolina decided the property would be managed by the North Carolina Aquarium System as a satellite classroom facility. If this plan is fully implemented, easements for access and utilities will be required. The state made a substantial investment in weatherproofing the facility.

The ongoing effort to keep NC Highway 12 open for traffic continued in 2002. Although there were no changes in the right-of-way easement, much effort went into working with the N. C. Department of Transportation (NCDOT) to keep sand and water off the highway with each passing storm. During 2002, few storms approached or passed near enough to cause major problems. Minor overwash occurred several times as a result of nor-easters and to a small extent during Tropical Storm Gustav. The areas where dunes are the weakest (locally known as "hotspots") have been reinforced with sand fencing in some areas. Relatively large volumes of sand have accumulated around the sand fence areas. Additional sand fencing will be placed in early 2003. Sprigging with sea oats and beach grass will follow.

D. PLANNING

1. Master Plan

The planning staff, under the direction of lead planner Bob Glennon, continued work on CCP's for Pea Island and Alligator River NWR's in addition to several other eastern North Carolina Refuges during 2002.

3. Public Participation

Many volunteers participated in the turtle patrol and turtle watch programs. See Atlantic loggerhead sea turtle under section G. 2 for details.

4. Compliance with Environmental and Cultural Resource Mandates

Refuge staff attended numerous meetings during the year with NCDOT to discuss the Bonner Bridge Replacement Project. A merger team was formed to work with the NCDOT with regards to National Environmental Policy Act (NEPA) documentation and alternative selection. The merger team approach was developed for the purpose of building consensus during the NEPA documentation process as opposed to having everyone critique the project EIS after it was prepared. The overall concept is to make the NEPA process more efficient. Another driving force is the issue of compatibility if the proposed Bonner Bridge makes landfall on the Refuge outside of the existing right-of-way.



Replacement of the Herbert C. Bonner Bridge has consumed major staff time and efforts during the year. USFWS

The Refuge staff attended meetings and reviewed correspondence during the year with the U. S. Army Corps of Engineers (USCOE) pertaining to the Oregon Inlet Jetties. The jetties project underwent analysis from two government agencies. The Government Accounting Office (GAO) was commissioned to conduct an inquiry into the project, focusing on the economic analysis. In addition, the project was elevated to the Council of Environmental Quality for the purpose of determining adequacy of compliance with the National

Environmental Policy Act. The GAO report concluded that if the Corps of Engineers proceeded with the project they should reconsider the economic analysis and resolve environmental concerns.

Several pages of text could easily be written summarizing the activities/actions associated with Oregon Inlet Jetties, replacement of Bonner Bridge, dredged material disposal on the Refuge beach, dune reconstruction, and maintenance of NC Highway 12. Refuge staff participated in numerous meetings with USCOE, NCDOT, ES, other state agencies, and local officials over the course of the year.

These and other issues will continue due to the proximity of the Refuge to Oregon Inlet, the need to replace the existing Bonner Bridge, the presence of NC Highway 12 - the only road to seven villages south of Nags Head - and strong political clout by Outer Banks politicians.

5. Research and Investigation

Refuge staff continued data collection along Refuge beaches this year as part of the monitoring plan examining effects of USCOE disposal of dredge material. The USCOE planned to dredge 1,500,000 cubic yards of material from the Oregon Inlet Navigation Channel adjacent to and including the Bodie Island spit and the Outer Ocean Bar portion of the channel. The Bodie Island Spit dredging was done by pipeline dredge and material was hydraulically placed between miles 2 and 3 south of Oregon Inlet. The Great Lakes Dredging contractors deposited 604,773 cubic yards of material on the Refuge beach by pipeline dredging and an additional 128,079 cubic yards of material was placed near-shore by a hopper dredge. Considerable time was required to prepare the Compatibility Determination and Special Use Permit for the project. Project oversight and administration required significant additional time.

The hopper dredge was used to remove material from the Outer Ocean Bar portion of the navigation channel. This dredge material was deposited in 15 to 20 feet depths of water parallel to the Refuge beach. The monitoring plan, developed by the Refuge, was modified this year to cover six miles of beach for the pre-dredge disposal monitoring data and approximately two miles of beach for both the post-pipeline dredge data and the hopper dredge disposal data. This includes the disposal site and areas north and south of the site to serve as controls.

Sediment sampling, along with beach slope, scarp formation, and faunal data were collected along transect lines. In addition, sand compaction (psi) was measured with a cone penetrometer prior to and after dredge material disposal. Identifying environmental conditions that influence fauna numbers will assist in evaluating effects directly associated with nourishment as well as recovery rates for the beach. All data samples, etc., were delivered to Coastal Research Associates, UVA, for completing analysis and report writing. Coastal Research Associates was issued a contract for this project using USCOE transfer funds.

A new five year contract is planned to continue to have professional representation as the Service's technical representative on the NCDOT Groin Monitoring Team and for the purpose of monitoring impacts and recovery resulting from beach disposal for dredged material.

Refuge personnel collected sand compaction readings and five sand samples at each turtle crawl to develop baseline data for use in imposing special conditions on SUP's issued to USCOE and NCDOT for beach nourishment.

6. Other

Following each relatively minor storm ranging from nor-easters to offshore Tropical Storms, NCDOT was issued authorization to make emergency repairs on sections of damaged dune line. Normal high tides were inundating sections of Hwy. 12. The Refuge authorized use of sand that accumulated in berms on the west side of the highway over time. An advantage to using this material is that it contained root stock and rhizomes which would make re-vegetation quicker.

E. ADMINISTRATION

1. Personnel

Pea Island is officially unstaffed and unfunded. However, one PFT and two temporary employees are typically assigned to the Refuge.



Park Rangers Mike Martin (TFT) and Ann Marie Salewski. (PFT)

MS

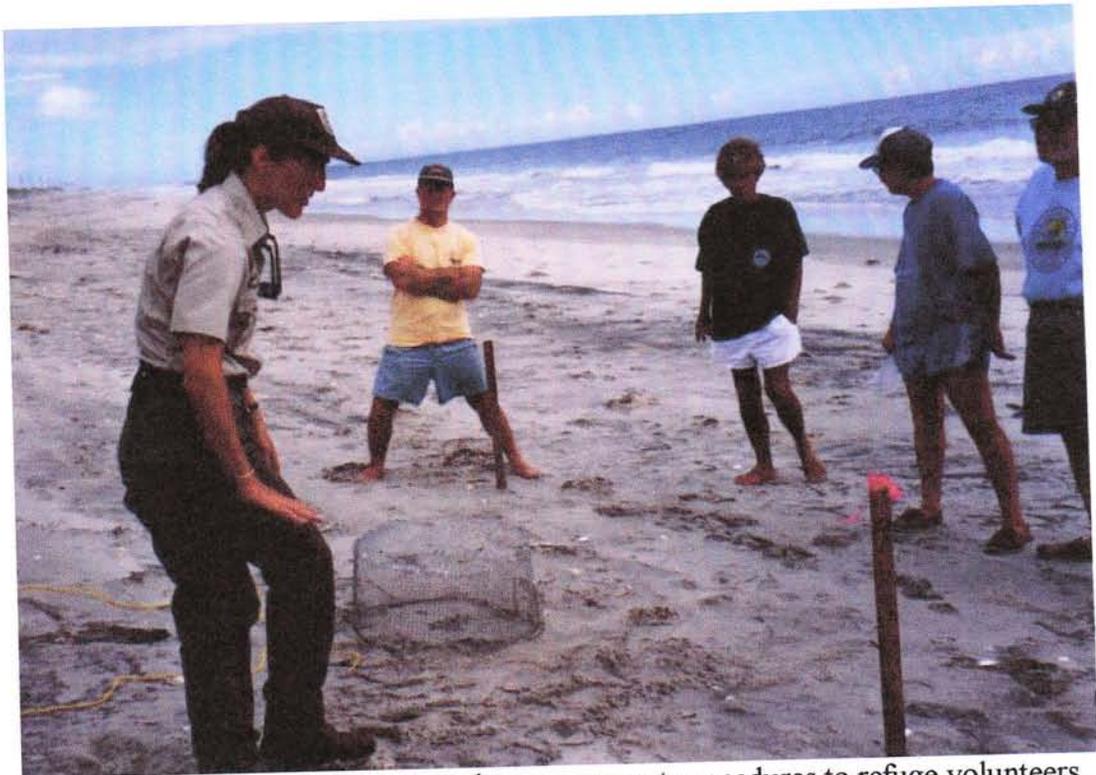
4. Volunteer Programs

During 2002, volunteers at Pea Island NWR formed the hub, in spirit, for the entire Alligator River Volunteer Program. The Host/Hostess Program continued year round. Since its beginning, this program has tapered off to four days a week during the winter months; however, since we had workcampers available to man the Visitor Center, during the 2002-2003 winter, the Visitor Center was open daily. For the 2001-2002 winter, from April through November, the Visitor Center was open from 9 to 4, seven days each week. During the remaining months, it was open 9 to 4 on Thursday - Sunday.

The bulk of volunteer hours at Pea Island NWR involved staffing the Visitor Center, conducting programs, and working with sea turtles (both Turtle Patrol and Turtle Watch).

One major beach clean up operation occurred during 2002 (the Big Sweep in September). A number of work groups completed projects on Pea Island during 2002.

For additional information about the Volunteer Program, see Section E.4. of the Alligator River NWR Narrative.



Bio-tech Kris Fair explains sea turtle management procedures to refuge volunteers.
Photo courtesy of Janice Lane.

F. HABITAT MANAGEMENT

1. General

Pea Island, a coastal barrier island, consists of several basic habitat types. When acquired in 1938, the Refuge was 5,915 acres in size. Engineering maintenance and protection actions taken by USCOE and NCDOT over the past 40 years have affected the size and shape of the Refuge. The table below presents results of the most recent mapping exercise with regards to habitat type/land use and acreages. This table is a result of preparing the Comprehensive Conservation Plan. Due to prescribed fire, some cover types are in a transitional stage between shrub and grassland/marsh. Beach and dune acreage changes from year to year.

**Habitat Types and Land Use – Pea Island NWR
2002**

Habitat Type/Land Use	Approximate Acreage
Impoundment	790
Ocean beach	220
Ocean overwash impact area	23
Mitigation site	27
Terminal groin & impact area	55
Dike	52
Transitional (fire)	50
Soundside islands	264
Estuarine ponds	41
Estuarine salt flats	136
Emergent marsh	1,373
Sand ridge	183
Maritime shrub	650
Palustrine marsh	184
Palustrine grassland	28
Barrier dune	448
Reconstructed dune	71
Parking lots & structures	8
NC 12 ROW and paved road	203
TOTAL	4,806
Open water (Proclamation area)	25,700

2. Wetlands

A lack of pumping capabilities made it difficult to maintain target water levels in South Pond, New Field, and North Pond resulting in low productivity during the 2002 growing season. In addition, water inflow into the impoundments by wind tides was restricted to strong southwest winds and high tides. Most of the winds throughout the spring and summer months were from the northeast and east directions. This pushed ocean water into the Pamlico Sound resulting in an increase in salinity levels, and limited the ability to flow water into the ponds.

The North Pond pump was operational during the first part of the growing season, but broke during the second half. Excellent submerged aquatic vegetation growth had become established by the time the pump broke. While the pump was broken, the pond dried up and most of the SAV production was lost. In North Pond species rated as good or fair waterfowl food were found on 57% of the transect plots. The remaining 43% of the plots consisted of bare ground or plant species of no food value for waterfowl. *Chara* spp. and wigeon grass dominated the “good” foods and the “fair” category was dominated by saltgrass (*Distichlis spicata*) and saltmeadow hay (*Spartina patens*). However, these data are misleading in that most of the “good” and “fair” species consisted of relatively new growth without seed heads near the end of the growing season.



Marsh mallow dots the landscape at Pea Island NWR. Photo courtesy of Janice Lane.

Although South Pond has no water management capabilities, fair to good food value species were found on 77% of the sample plots. The remaining 23% of the plots consisted of bare ground and species having no food value. *Chara* spp., wigeon grass, and sago pondweed dominated the “good” foods and the “fair” category was dominated by saltmeadow hay (*Spartina patens*). However, these data are again misleading in that most of the “good” and “fair” species consisted of relatively new growth without seed heads near the end of the

growing season. Overall, SAV production in South Pond was best even without any water management capabilities and during an extended hot, dry period. This is not readily explainable as South Pond was subjected to drier conditions over the growing season.

New Field Pond had pumping capabilities until about the middle of the-growing season, but loss of pumping capability during the latter part of the summer adversely affected submerged aquatic vegetation (SAV). In response to an extended period of hot, dry weather, without the ability to pump water into the impoundment, the lush SAV growth died as the water evaporated and salinity increased. Vegetation present on 54% of the plots in New Field consisted of fair to good food value for waterfowl and 46% of the plots consisted of species with no food value and bare ground. *Chara* spp. and wigeon grass dominated the "good" foods and the "fair" category was dominated by saltgrass (*Distichlis spicata*) and saltmeadow hay (*Spartina patens*). Once again, these data are misleading in that most of the "good" and "fair" species consisted of relatively new growth without seed heads near the end of the growing season.

Wetlands in the Salt Flats are flooded and dewatered by natural ebb and flow in wind/tides and by rainfall/runoff. Vegetation has remained relatively unchanged for many years in this area. The predominant vegetation is glass wort (*Salicornia* sp.), sea oxeye, and patens.

The two small mitigation ponds near the southern boundary created by NCDOT again produced good wigeon grass. The pond fringes also continued to produce stands of *Bacopa* sp., *Scirpus* sp., and *Cyperus* sp. Resident Canada geese consumed most of the plant growth before migratory birds arrived. Migratory waterfowl use was light to moderate and appears to be decreasing, primarily due to resident Canada geese.

4. Croplands

The area previously known as New Field was planted in permanent cover, and is no longer managed as cropland. This is due to the relocation of NC Highway 12 and salt build-up from ocean over-wash. Therefore, there is no cropland on the Refuge.

6. Other Habitat

Due to the extended period of very hot, dry weather, the NCDOT wetland mitigation site did not produce good quality wetland vegetation for waterfowl. Although drought conditions certainly had an impact, rain came in time to produce some food plants before the end of the growing season. Resident Canada geese and migratory birds such as the black duck and gadwall used the site. Snow geese were beginning to move into the area in December. Numerous shorebirds could be observed, especially after a rain or high wind tide.

9. Fire Management

See the Alligator River NWR narrative (Section F.9) for details on Fire Management at Pea Island NWR.



Wildlife Urban Interface burn at Pea Island NWR near Rodanthe. TC

G. WILDLIFE

1. Wildlife Diversity

Pea Island has a high natural diversity of habitat types. Habitat management practices, such as prescribed burning, moist soil management, brush removal, and mowing serve to enhance habitat quality and wildlife diversity. Pea Island provided habitat for a wide variety of mammals, birds, fish, reptiles, amphibians, mollusks, and crustaceans during 2002. This diversity was especially evident in birds as more than 315 species of birds have been identified in the area.

2. Endangered and Threatened Species

Federally Listed and Endangered Species

American bald eagle (Endangered): Bald eagles, *Haliaeetus leucocephalus*, can sometimes be seen flying over the Refuge. However, there were no reports of bald eagles during 2002.

Piping plover (Threatened): The Atlantic coast population of Piping plover, *Charadrius melodus*, was listed as a threatened species under the Endangered Species Act in January 1986. In 2002, there were two piping plover nests on the north end of the Refuge. Both nests produced hatchlings, but no birds fledged due to predation. The most likely source of predation was gulls and crows. Seven to ten plovers were consistently observed wintering on the north end of the Refuge. This number dropped to 0 during very cold weather in January and early February.

Atlantic loggerhead sea turtle (Threatened): Pea Island has had an average of 10-12 nests per year. The 1994 nesting season had a record high of 35 nests and 41 false crawls occurring on the Refuge. The 2002 nesting season resulted in 15 total nests with 14 of these being loggerhead nests and seven false crawls with six of these being loggerhead crawls occurring on the Refuge.

Pea Island has a severe beach erosion problem resulting in a narrow beach and frequent over-wash. In 1994, Refuge personnel determined that the best management strategy to optimize survival of turtle hatchlings was to move nests to a turtle safe zone. Subsequent to that decision, guidelines specific to conditions at the Refuge were developed to facilitate the process with regards to making informed decisions regarding relocation of turtle nests. In 2002, 10 nests were relocated to the turtle safe zone and five were left in place. This safe zone was the widest stretch of beach on Pea Island. Of five nests that appeared to have normal incubation and hatching, 88% of the eggs hatched. All other nests were affected by abnormal eggs, predation, or flooding. The most significant and frequent problem with eggs was primarily no discernible embryo which accounted for most of the hatch failure. Flooding and predation by ghost crabs plus a possible canid accounted for some egg loss. Arrested development and dessication accounted for some hatchling loss.

In 2002, ghost crabs continued to be the primary predator problem for hatchlings. In previous years, many turtles hatched out of nests, but never made it to the water. "Reinforcement" crabs actually formed a line along the uprush zone to capture the few turtles that had managed to crawl safely through a beach covered with hungry, hunting ghost crabs. A Turtle Watch Program was implemented in 1991 to reduce turtle hatchling predation via ghost crabs.

The Turtle Watch Program began on the 55th day of incubation. It involved placing landscape edging to create a "runway" from nests to the ocean. The "runway" minimized the hatchlings' visibility to ghost crabs and reduced hatchling disorientation from light pollution from a nearby amusement park. Volunteers arrived just before dusk to open predator guards and place the edging to create the "runway". To further reduce hatchling disorientation from light pollution, flashlights were used in a leap frog fashion to guide turtles down the trench.

Monitoring nests took an intensive effort by both staff and volunteers; however, it played a vital role in greatly increasing survival of hatchlings from nest to ocean. Observation in the past indicated that, on some nights, as many as 75-100% of hatchlings were lost to ghost crabs (prior to Turtle Watch). Survival rates to the ocean after Turtle Watch approach 100%. The fact that 942 hatchlings made it to the ocean across the Refuge beach is a testament to the success of the overall sea turtle program. Volunteers and staff made it possible to have a very successful year for the turtle program.

Stranded turtles washed up on Pea Island's beaches in 2002 at rates comparable to previous years. Approximately 21 dead loggerheads, three green, and two leatherback turtles were measured and recorded. Most of the turtles were already severely decomposed when found on the beach. The decomposition obliterated the majority of markings or evidence that could be used to determine causes of death. The usual missing flippers, cracked skulls, puncture wounds, and lacerations were observed. Measurements were collected and recorded for all stranded turtles and sent to the North Carolina Sea Turtle Coordinator.

Green sea turtles (Threatened): In 1993, the first Green Sea Turtle (*Chelonia mydas*) nested on Pea Island. One nest and one false crawl by green sea turtles occurred during 2002.

State Listed Endangered and/or Threatened Species

Of the other species that occur on the Refuge, the State of North Carolina lists seven as threatened and 26 as species of special concern. Although the Refuge is not managed for all these species, present practices do provide benefits for many of them. Species specifically managed for are:

Osprey (Special Concern): During 2002, three osprey nests were observed on the Refuge. All were on platforms. Although no formal monitoring was done, all appeared to produce fledglings.

Least tern (Special Concern): Historically, least terns have nested along beaches south of the Pea Island NWR Headquarters. During 2002, nesting colonies were observed at the Oregon Inlet terminal groin, approximately three miles south of the terminal groin, and at 1.7 miles south of headquarters. Least tern numbers peaked in late June at 447 and again in early August at 546.

3. Waterfowl

Waterfowl surveys were conducted three times per month from September through April. Waterfowl numbers peaked at 7,281 in mid-November, 7,787 in mid-December, and 7,768 in late January. Use Days percent difference in the table below compares use days by species for the 2001-2002 season versus the mean use days by species for the past 10 years. The Canada goose, gadwall, green-winged teal, and shoveler showed an increase in number of use days for the 2001-2002 season; all remaining species showed a decline. Resident Canada Geese numbers are increasing steadily and now include more than 100 birds.

Although no formal survey was conducted, informal brood counts were conducted in conjunction with shorebird surveys. A few black duck and gadwall broods were observed in all three impoundments.

Composition of Wintering Waterfowl, Pea Island NWR
2001-2002

SPECIES	PEAK PERIOD	Survey Peak #	# USE DAYS 2001-02	% TOTAL USE DAYS 2001-02	USEDAYS % diff from 10 yr avg
Tundra Swan	Dec	621	29012	1.9	-65
Snow goose	Jan	1414	63466	4.1	-47
Canada goose	Nov	327*	82887	5.3	+88*
Mallard	Nov	222	7930	0.5	-34
Black	Nov	465	103205	6.6	-37
Gadwall	Mar	324	258656	16.7	+18
Wigeon	Nov	1674	87971	5.7	-69
Pintail	Oct	3534	257809	16.6	-17
GWT	Dec	805	128629	8.3	+2
BWT	Sep	380	9037	0.6	-58
Shoveler	Jan	896	245239	15.8	+95
Wood	N/A	N/A	N/A	N/A	N/A
Ringneck	Dec	12	307	0.02	-96
Redhead	Jan	7	93	0.8	-99
Canvas	N/A	N/A	N/A	N/A	N/A
Scaup	Dec	46	637	0.04	-931
Unknown	Jan	4647	132786	8.6	+53
Bufflehead	Dec	23	823	0.05	-94
Ruddy	Nov	36	1681	0.1	-95
Merganser	Jan	317	23259	1.5	-9
Coot	Nov	242	106927	6.9	-45

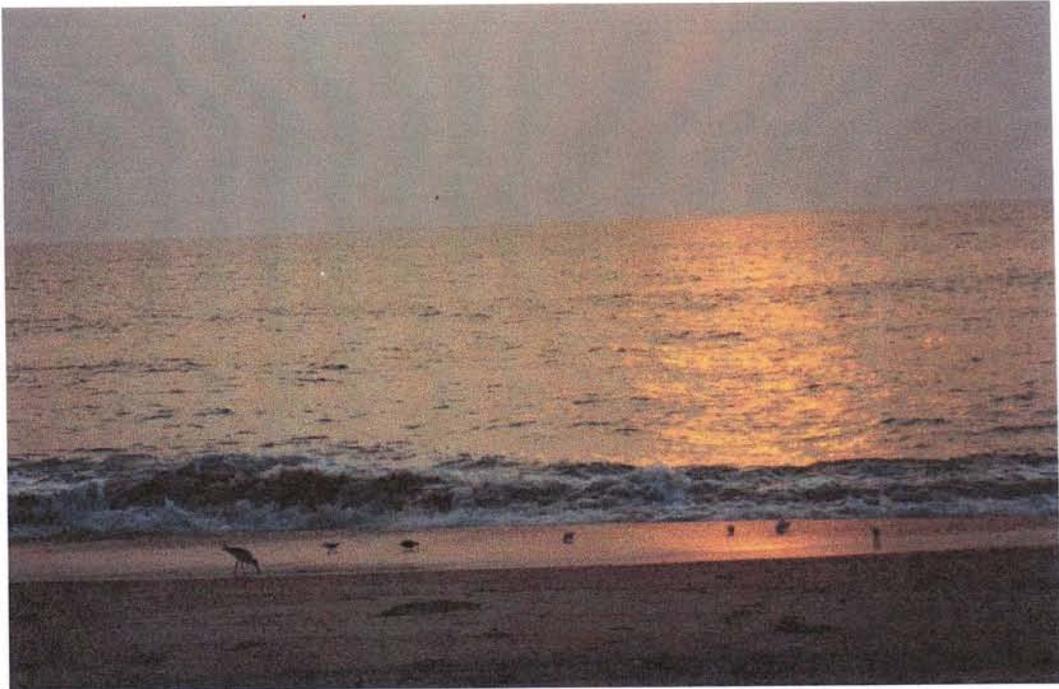
* Likely all resident birds.

4. Marsh and Wading Birds

Marsh and wading birds were counted three times per month during regular bird surveys. Numbers increased to over 500 by mid-June and remained at that level until late August with peak numbers at 933 during mid-August. Commonly occurring species include great and snowy egrets, various heron species, white and glossy ibises, double-crested cormorants, American bittern, and clapper and yellow rails.

Brown pelican numbers have continued to increase over the past few years as the species has expanded northward into coastal North Carolina and Virginia. These birds were previously listed as a threatened species in this state and were rarely observed. A group of 12 white pelicans was observed on the Refuge near the end of November and remained until about mid-December.

5. Shorebirds, Gulls, Terns, and Allied Species



Shorebirds foraging on Pea Island NWR beaches. Photo courtesy of Janice Lane.

Shorebird surveys were conducted three times per month during the year. Shorebird numbers peaked at 6,369 in mid-May and at 6,516 in mid-August. Some of the commonly occurring species include semi-palmated and western sandpipers, semipalmated plovers, sanderlings, whimbrels, American oystercatchers, Black skimmers, various terns and gull species, dowitchers, marbled and Hudsonian godwits, willets, dunlins, black-bellied plovers, ruddy turnstones, American avocets, red knots, greater and lesser yellowlegs, and black skimmers.

Colonies of nesting black skimmers, common terns, least terns, and gull-billed terns were observed at the fillet behind the terminal groin at Oregon Inlet and others were observed on the beach in three locations further to the south. All areas were posted as closed to public access and a string with flagging was placed around the perimeter of the posted area.

6. Raptors

Peregrine falcon (delisted): The Arctic peregrine, *Falco peregrinus tundrius*, is the subspecies of peregrines most often seen at Pea Island. Peregrine falcons were sighted on the Refuge during 2002. Nothing out of the ordinary was reported.

7. Other Migratory Birds

The diversity of bird life on Pea Island is so great that it is sometimes referred to as a "birder's paradise". This is especially true when considering the passerine species. Some 115 different species of song birds migrate through Pea Island. However, little is known about the use of Refuge habitat by neotropical and other migrant birds.

8. Game Mammals

Cottontail and marsh rabbits are fairly common on Pea Island. Declines in numbers from a few years ago seem to have reversed. Raccoons, raccoon tracks, and scat have been observed with increasing frequency. In the past raccoons were incidentally captured in cat traps.

Presence of scat, tracks, and road kills indicate a continued presence of foxes and opossums. The presence of these species as well as feral house cats may be one of the causes for the decline in pheasant populations.

Deer tracks have frequently been observed around North Pond, New Field, and South Pond, and in the Salt Flats. Staff members have seen both does and bucks on Pea Island. Although no formal surveys are being done, increasing observations of deer and number of tracks suggest that the very small herd is increasing.

River otters have been observed in the impoundments. Muskrats, nutria, and mink are also present on the Refuge.

9. Marine Mammals

In March, a juvenile, male humpback whale was found on the Pea Island beach. National Marine Fisheries was contacted and performed the required necropsy. The whale was severely decomposed. The cause of death was not determined. A dead Gervais' beaked whale was found on the Refuge beach in June. This species is rare and usually found only in deep ocean water. Unfortunately, the carcass was severely decomposed, and only the head and boney tissues were salvageable. All samples were collected by Vicki Thayer from National Marine Fisheries and transported to the Smithsonian Institute. During spring, two dead bottlenose dolphins were found on Pea Island. Although necropsies were not performed, various measurements were collected and recorded by Refuge personnel.

10. Other Resident Wildlife

In past years, ring-necked pheasants were occasionally observed in salt marsh, brushland, dunes, and in the Pea Island grain field. This population was descended from birds introduced in the 1920's and 1930's prior to the area becoming a Refuge. Sightings have decreased in recent years. Although no sightings were reported during 2002, the exact status of the pheasant population is unknown.

The resident Canada goose population has become a significant problem with regards to growing food for migratory waterfowl. During the summer months up to approximately 400 resident geese constantly foraged on plant material in the impoundments. By the time migratory birds arrived, the relatively low primary production in the three impoundments was consumed, mostly by resident birds.



Resident Canada geese currently number approximately 400 birds on Pea Island NWR.

USFWS

14. Scientific Collections

Tissue samples were collected from stranded sea turtles and given to the North Carolina Sea Turtle Coordinator. Tissue samples were collected from stranded marine mammals by the National Marine Fisheries Service Marine Mammal Stranding Network Coordinator.

15. Animal Control

Feral cats continued to be a problem with nesting birds, waterfowl, and turtles. Seven feral cats were trapped and removed near Oregon Inlet bridge in December. Mink, cat, and small canid tracks were observed along the terminal groin at Oregon Inlet during the summer.

Small canid tracks were found at the turtle safe zone and one nest was partially dug up. Non-native and other problem animals will be removed in the future.

16. Marking and Banding

There were no attempts to capture and mark or band any wildlife on the Refuge.

Every summer, Refuge volunteers and staff accompany John Weske to band brown pelicans, royal terns, and sandwich terns on spoil islands located west of Oregon Inlet. This year John and his crew banded 1,837 brown pelicans, 1,637 royal terns, and 403 sandwich terns. None of this banding occurred on the Refuge.

H. PUBLIC USE

1. General

Based on the NPS vehicle counter at Bodie Island and adjusted according to new configurations from RMIS, estimated visitation to Pea Island NWR during 2002 was 2,649,935. The Host/Hostess program continued to provide visitor information and operate the Coastal Wildlife Refuge Society's sales unit at the Visitor Center daily from April-November and week-ends during the winter months. New Visitor Center exhibit interpretation improved the quality of experience for Refuge visitors immensely during 2002. Refuge visitors continue to comment on the quality of exhibits, the "hominess" and "warmth" of the Visitor Center as a whole, and the friendliness of the folks who work there. The Visitor Center is the perfect hub for the interpretive/ educational programs of this Refuge. (See Section H.6. for details)

During 2002, as a result of a \$13,000 donation from the CWRS, a GS-5 Interpretive Assistant was hired to oversee Visitor Center operations and public interpretive and educational programs. Michelle Raphoon worked from May, 2001 until May, 2002. After Michelle resigned, Mike Martin was hired through RS Staffing to fill in until a replacement could be recruited and hired. At the close of 2002, the position remained vacant.

As in the past, public demand for beach access has increased and the amount of undeveloped beach frontage property locally available has decreased. Towns and villages in the area are supported almost entirely by the tourist industry, yet the burden to supply services for these visitors is thrust toward the federal government. At Pea Island NWR, public use efforts continue to be governed by the limits set up in the Master Plan, thus providing some relief from the constant demand for more and more access. Refuge efforts continue to aim toward a high quality visit, as opposed to more visits.

2. Outdoor Classrooms - Students

The emphasis on non-staff conducted activities continued during 2002. School groups, scouts, etc. were encouraged in the independent use of the Refuge for educational activities. Marsh investigation equipment (seines, mud sieves, etc.) was available for loan from the Visitor Center. Since no registration was required for the use of outdoor classrooms, the Refuge has no record of the actual number of such uses that occurred. On the whole, this type of use continues to increase on Pea Island NWR.

4. Interpretive Foot Trails

Many visitors comment that North Pond Trail is the nicest trail they have used in the eastern United States. During 2001, one additional overlook was added to the trail and one additional spotting scope was installed. North Pond Wildlife Trail now includes a new overlook, is universally accessible, offers eight permanently mounted spotting scopes, and five major observation structures. The Visitor Center at its trail head provides just the right opportunity to offer information to Refuge visitors and teach the message of the Service. Approximately 366,197 visitors utilized North Pond Trail during 2002.

6. Interpretive Exhibits/Demonstrations

Two interpretive kiosks provide valuable information on a 24 hour basis for Refuge visitors. Panels located on the front porch of the Visitor Center are also available round the clock.

7. Other Interpretive Programs

Most regularly scheduled interpretive programs during 2002 were conducted at Pea Island NWR by Refuge volunteers. Friday bird walks were conducted year round. Beginning in April and running through Thanksgiving, bird walks were offered three days each week (Wednesday, Thursday, Friday). Guided canoe tours (three-hours) and family canoe tours (2 hours) were offered once each week during the spring and fall and twice each per week during the summer months. Also during the summer, two "Turtle Talks", one Soundside Discovery, and two "Osprey Ogles" were conducted each week. Special programs were also conducted for International Migratory Bird Day, National Wildlife Refuge Week, and Earth Day.

On-Refuge Scheduled Programs

Program	# Programs	# Participants
Bird Walk	75	708
Soundside Discovery	18	212
Turtle Talk	36	230
Family Canoe Tour	44	260
Pamlico Sound Canoe Tour	20	82
Sunset Canoe Tour	12	54
Other Educational Canoe Tours	2	36

9. Fishing

Pedestrian surf fishing continued to be the major form of consumptive, wildlife-oriented recreation on Pea Island NWR during 2002. Bluefish, spot, pompano, croaker, and trout were the major fish caught. A total of 399,121 visits were spent fishing. The annual Crabbing/Fishing Rodeo was held the second Saturday in June with approximately 300 participants.

11. Wildlife Observation

Pea Island NWR continues to be a "birder's paradise". Though numbers of some species, waterfowl in particular, have declined in recent years, the rich diversity continues to draw crowds of bird watchers year-round.

Due to the location of NC Highway 12 through Pea Island NWR, it is difficult for a traveler to pass without observing wildlife. On most days of the year, the quality of observation is quite high. During fall and winter, greater snow geese frequently feed on the road shoulders.

During spring and summer, cattle egrets replace snow geese as the most easily observed wildlife. Various species of raptors utilize the dunes, power line poles, and sign posts for resting and hunting.

Refuge trails and other access points are located to make wildlife observation (on foot) easy and enjoyable. In choosing the North Pond area for a focal point for public use and closing the areas around the other two impoundments, the needs of the public were seriously and diligently considered. There are many Refuge visitors who realize and support this policy.

2002 Wildlife Observation Visits

Foot	366,197
Boat	8,600
Vehicle	779,374

12. Other Wildlife Oriented Recreation

The photo-blind, installed during 1995, received a facelift during 2001 by a Sierra Club work group and the same group built a boarded walkway during 2002. It continued to be utilized fully during 2002. However, it is still our contention that the best photographs at Pea Island NWR have resulted from being in the right place at the right time with a camera in hand.

15. Off-Road Vehicling

Public off-road vehicle use is not allowed on Pea Island NWR. However, with legal beach driving north of the Bonner Bridge and south of the Refuge in Rodanthe, some illegal ORV traffic continues to occur on the beach from both ends. This activity has decreased over the past few years, likely due to rapid erosion of the beach creating hazardous driving conditions. "No Vehicle" signs are posted at both ends, and in 2002, illegal beach driving was not a serious problem.

As public use of Outer Banks beaches continues to increase dramatically, the importance of the few remaining tracts of natural, relatively undisturbed beach habitat is becoming increasingly apparent for gulls, terns, shorebirds, and allied bird species. From weekly surveys conducted at Pea Island NWR and along other beaches in Dare County, including Cape Hatteras National Seashore, it appears that increasing human activity on beaches is adversely affecting bird use of this important habitat. The birds are simply avoiding areas of heavy to moderate human use and are concentrating on beaches where public access is limited and the numbers of swimmers, sun-bathers, surfers, and fishermen are low. Refuge beach areas that show any evidence of nesting activity are closed to public entry.

16. Other Non-Wildlife Oriented Recreation

Because Pea Island NWR is associated with the "beach scene", non-wildlife related recreational activities will always occur on the Refuge. Swimming, surfing, and sunbathing are major summer activities. The Refuge provides no facilities and few services for these activities.

17. Law Enforcement

Due to a Memorandum of Understanding (MOU) with Cape Hatteras National Seashore, the National Park Service (NPS) has the primary responsibility for non-wildlife related public use on Pea Island NWR. For this reason, a NPS law enforcement presence is maintained regularly, though not constantly, on the Refuge. The most common LE problems continued to be public nudity, littering, and dogs off a leash.

Again during 2002, there was no FWS LE presence on Pea Island NWR on a regular basis. During the year, two permanent staff (Interpretive Specialist and Maintenance Worker) and one temporary staff (Interpretive Specialist for Visitor Center) worked at Pea Island. The presence of FWS staff helped, since there were more eyes available to see violations and call the Park Rangers. However, the need for a FWS LE presence at Pea Island NWR continues to be evident.

There are minor poaching problems at Pea Island NWR; occasionally cars will stop and shots will be fired at waterfowl from the road. Poachers sometimes slip in from the Pamlico Sound to quickly shoot as many waterfowl as they can and then speed away. Some illegal hunting may take place within the Refuge boundaries in the Pamlico Sound. These types of violations are difficult to detect and the violators are difficult to apprehend. On the whole, however, there are no major LE problems on Pea Island NWR.

18. Cooperating Associations

Though the Coastal Wildlife Refuge Society is officially reported in the Alligator River Narrative, a great deal of its activity relates to Pea Island NWR. The sales unit at the Visitor Center continued its activity during 2002. Gross sales for 2002 totaled \$181,836. It is anticipated that sales at the Visitor Center will continue to increase. For full details of CWRS activities for the year, see Section H.18. of the Alligator River Narrative.

I. EQUIPMENT AND FACILITIES

2. Rehabilitation

The Pea Island Presidential Proclamation Boundary encompasses approximately 25,700 acres of the Pamlico Sound. The area is in relatively shallow water and offers good waterfowl feeding and resting habitat. It extends out (west) about 4 ½ miles from the north Refuge boundary, south about 12 miles, and out (west) from the south Refuge boundary for about 2 ½ miles. The north boundary crosses the main navigational channel coming through Oregon Inlet, from the Atlantic Ocean. The south end of the boundary is located within ½ mile of the channel going into the village of Rodanthe. After being surveyed and posted in the mid 1980's, the proclamation boundary went unattended for approximately 15 years. Over this time, natural weather events dislodged or broke off virtually all of the pilings marking the boundary. With MMS funding and assistance from the Regional Engineering Office, the contract project to replace pilings and appropriate signage began in late calendar year 2002. The pilings are to be jettied in and driven by a crane from a barge. This will include three pile dolphins at one mile intervals with single pile structures in between at ½ mile intervals. Completion of the project is expected early in calendar year 2003. A total of 19 piling sites (stations) have been identified and will be relayed to the US Coast Guard upon completion of the project. This will include GPS coordinates to be communicated in a "notice to mariners" to identify the exact location of each station.

Other activities:

- Replaced Visitor Center water pump
- Upgraded, replaced as needed fire extinguishers in all fleet vehicles
- Made improvements to facilitate handicap accessibility at North pond

J. OTHER ITEMS

1. Cooperative Programs

The Refuge is working with the Department of Geology at East Carolina University on a regional project designed to learn more about the origin and evolution of the Outer banks barrier island system. Information gained through this research will be used to model future conditions on the barrier islands as sea level continues to rise.

4. Credits

The annual narrative was a joint effort by all staff members.