

REVIEW AND APPROVAL

ALLIGATOR RIVER NATIONAL WILDLIFE REFUGE
PEA ISLAND NATIONAL WILDLIFE REFUGE

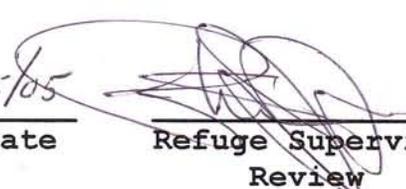
MANTEO, NORTH CAROLINA

ANNUAL NARRATIVE REPORT

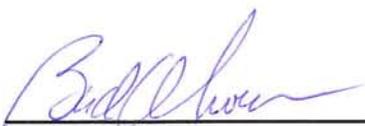
Calendar Year 2004

Mike Bryant
Refuge Manager

3/25/05
Date


Refuge Supervisor
Review

3/28/05
Date


Regional Office Approval

3/29/05
Date

ALLIGATOR RIVER NATIONAL WILDLIFE REFUGE

Manteo, North Carolina

ANNUAL NARRATIVE REPORT

Calendar Year 2004

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

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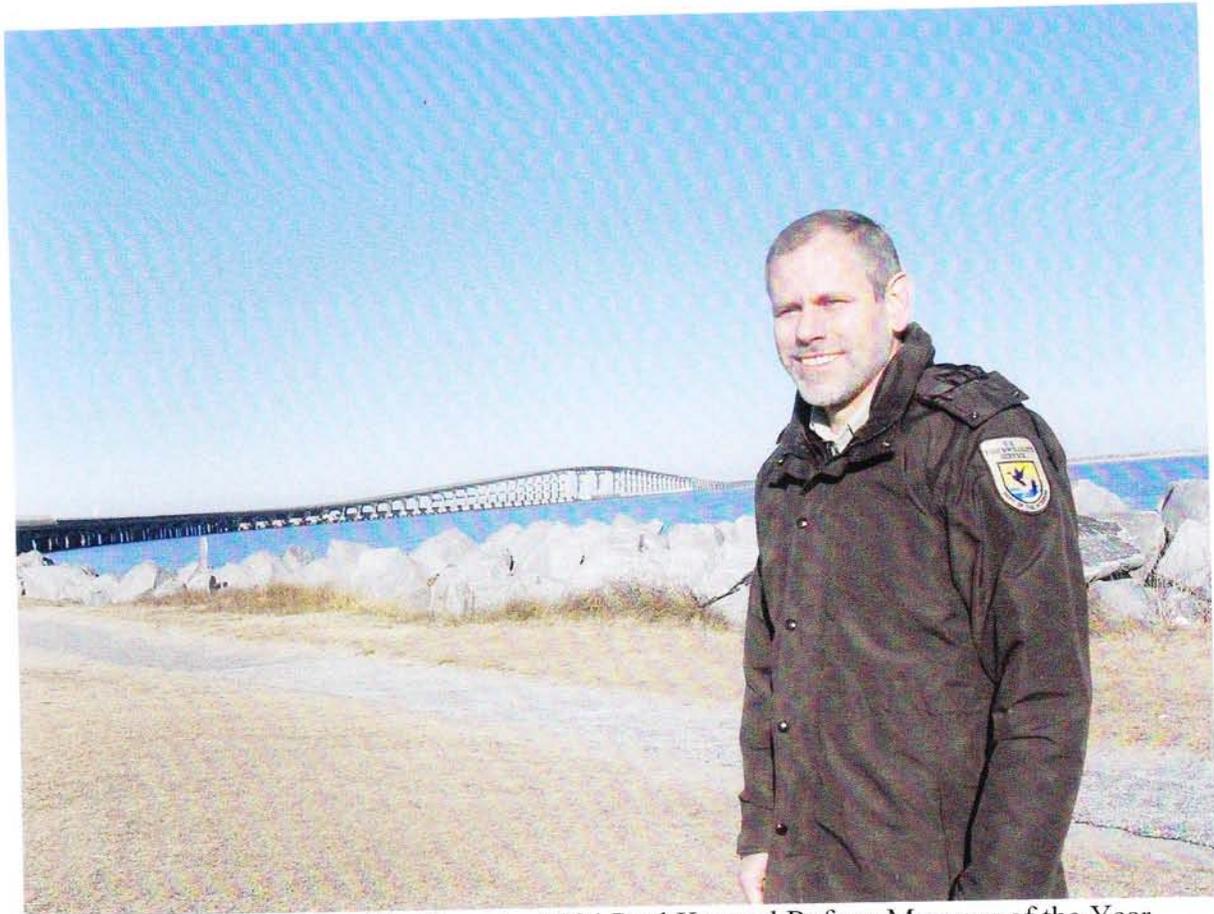
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K. FEEDBACK NTR

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

**MIKE BRYANT RECEIVES THE
2004 REFUGE MANAGER OF THE YEAR AWARD**

Refuge Manager Mike Bryant received the Paul Kroegel Refuge Manager of the Year Award for 2004. On March 16, he traveled with his wife, Janet, to Spokane, Washington to accept the award. The entire staff at Alligator River and Pea Island NWR's is very proud of the fact that Mike received this award and agree it was a very well deserved acknowledgement of his outstanding leadership, integrity, and commitment to the Service and the resources.



Project Leader Mike Bryant – 2004 Paul Kroegel Refuge Manager of the Year

KLW

A. HIGHLIGHTS

The remaining 331.88 acres of the 656.34 acre Taylor Tract was purchased in November 2004 from The Conservation Fund (TCF) for \$347,500. C.1.

The GIS Program is used extensively by all Refuge programs. D.6.

Refuge Manager Mike Bryant received the Paul Kroegel Refuge Manager of the Year Award. On March 16 he traveled to Spokane, Washington to accept the award. Pg. 1; E.1.

Bruce Creef received an Annual Regional Director's Honor Award. The award was presented to Bruce on July 14 at the Southeast Region's Awards Ceremony in Atlanta, Georgia. E.1.

The CWRS paid approximately \$51,000 towards the establishment of the new volunteer camper pad. Refuge Staff assisted with hauling and spreading fill material and gravel. E.4.

Forestry Technician Brian Van Druten became a certified ATV Instructor by the ATV Safety Institute. He taught a total of 51 students in 2004. E.6.

The on-going forest cover type mapping project for Alligator River made substantial progress in 2004. Ninety five percent of the delineation phase of the project was completed. F.3.

Fire Management personnel spent a great deal of time this year dealing with a new interagency system, Fire Program Analysis (FPA). F.9.

Efforts were made to document 2003 Hurricane Isabel damage to RCW clusters. G.2.

The ecosystem black bear study entered the fifth year. G.8.

Total visits to the Refuge in 2004 were estimated to be 42,318. H.1.

The Refuge exhibit located at the Aycock Brown Welcome Center in Kitty Hawk was viewed by 273,090 visitors during 2004. H.6.

Quail and rabbit hunting opportunities increased this year with the opening of the Laurel Bay Farm Unit to additional hunting activities. H.8.

Beginning this trapping season, the only species legal to trap on Alligator River NWR are beaver, muskrat, and nutria. H.10.

During the year, CWRS spent \$160,000+ on Refuge projects. H.18.

Refuge staff rehabilitated a boat launch area at Milltail Creek for use by canoes, kayaks and small boats. I.1.

The Refuge Operations Center restrooms and septic area was enlarged this year. I.2.

The legal mandate to convert to APCO 25 Standards (wide band analog communications to narrow band digital) was completed and became functional in 2004. I.5.

District 1 received \$37,231.84 in 9265 Rural Fire Assistance (RFA) Funding. This funding was allocated to nine cooperating fire departments that support five of the refuges in the district. J.1.

B. CLIMATIC CONDITIONS

Category 2 Hurricane Alex skirted the North Carolina coast on August 3rd bringing 60 mph winds and up to eight inches of rain to some portions of the Refuge. No major damage was reported.

The Outer Banks of North Carolina typically has warm, humid summers and cool, damp winters with an average annual precipitation of 51.30 inches. It is not uncommon to have 20-30 mph winds, especially during winter and spring. The table below summarizes the past year:

2004 ALLIGATOR RIVER NWR WEATHER DATA

Month	Maximum Temperature	Minimum Temperature	Total Rainfall
January	75.2	20.3	1.62
February	72.5	21.2	2.64
March	80.8	24.8	2.34
April	84.7	35.4	3.11
May	91.8	44.6	3.98
June	90.9	53.8	6.79
July	97.0	65.7	13.49
August	91.9	59.2	11.31
September	86.4	54.0	4.04
October	84.0	40.1	2.33
November	84.0	32.2	3.87
December	74.7	16.0	3.86
Total			59.38

C. LAND ACQUISITION

1. Fee Title

Taylor Tract

The remaining 331.88 acres of the 656.34 acre Taylor Tract was purchased in November 2004 from The Conservation Fund (TCF) for \$347,500. TCF acquired the land from Edmund P. Taylor in February 2002 for \$695,000 and the first half was acquired by the USFWS in 2003. 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.

Lux Farms

The owners of Lux Farms contacted the U.S. Fish & Wildlife Service to see if we were interested in acquiring their lands totaling approximately 9,000 acres. Maps of Lux Farms were developed showing location relative to the Refuge and land cover. The vast majority of this tract lies within our approved acquisition boundary to the south of the Refuge in Hyde County. Regional Office personnel worked with Progress Energy and TNC officials in reference to carbon sequestration potential for this tract. It is a very important area for the Red Wolf recovery effort.

2. Easements

During late 2003, representatives from Dare County and a private consulting firm approached the Refuge for input and requirements for a utility easement. The purpose of the easement would be to construct sewage collection lines across Refuge land for a wastewater treatment plant to be built on the Dare County Bombing Range to serve the community of Stumpy Point. They were advised of the processes involved for the Fish & Wildlife Service to issue a right-of-way permit, including NEPA, compatibility, Section 7, and the actual right-of-way permit. This project continued into 2004 and, because of various regulations at the state and federal level, the original plan was modified to locate the facility in an area with no direct impacts on the Refuge.

3. Other

Tracts desirable to purchase when funds become available:

White Columns Tract

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). 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: **Broad Creek Land Partners** (a.k.a. Arey Tract) (100 acres, second appraisal pending, first was unacceptable) at the southeast end of the Refuge bordering Gull Rock Gamelands; **Fran Harris Tract** (63.5 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.



The Broad Creek Land Partners 100 acre tract is very narrow, but is the only remaining private inholding on the southeast side of Hwy. 64. south of Stumpy Point. KLW

D. PLANNING

1. Master Plan

The Refuge staff and planning staff completed the Draft Comprehensive Conservation Plan and Environmental Assessment for Pea Island NWR and forwarded it to the Regional Office for editing. In 2005, they will present the draft Comprehensive Conservation Plan and Environment Assessment to the public.

The Refuge staff and planning staff completed the introduction and affected environment sections of the Draft Comprehensive Conservation Plan and Environmental Assessment for Alligator River NWR. In 2005, they will analyze alternatives for Alligator River and complete the writing of the draft plan for internal and public review.

With the departure of D.A. Brown from the Planning Office in Edenton, Brian Van Druen assisted with the creation and editing of GIS maps for the CCP's of Pea Island, Roanoke River, Mackay Island, and Currituck NWR's. All of the GIS data generated and stored by the Planning Office was backed up to Alligator River NWR.

5. Research and Investigations

Fish: 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 were expected in 2003. Due to personnel changes and reassignments, the data analysis and report preparation were not completed during 2003. However, a fisheries species list was developed and included in the Comprehensive Conservation Plan draft. Refuge staff used GIS software to digitize and compile the acreage of watersheds wherein fisheries surveys were conducted. The report was finalized during 2004.

Black Bear: A challenge cost share project designed to estimate the Refuge black bear population and monitor gene flow/genetic dispersal of bears in the ecosystem began. More information is provided in the wildlife section.

Geological History: 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.

National Fire Plan: Beginning in 2002, two collocated National Fire Plan studies were being conducted by the US Forest Service on Alligator River NWR to evaluate water quality after prescribed burning and to characterize down, dead, woody material and fuel loads through remote sensing. In January, Researcher Michael Gavazzi completed a post-Hurricane Isabel resample of the vegetation plots in hopes that the study area could be burnt before the end of the 2004 winter burn season. Burning conditions were not right and the study area could not be burned for a second year in a row and brought an end to the original research. Water quality conditions will continue to be monitored to complete a two-year data set of leaf area index and water table depth measurements that will be used to model changes in water table depth along coastal ecosystems.

Smoke Emissions Data: In March, the Joint Fire Science Program announced the winning proposals for funding, one of which will be conducted on Alligator River NWR and the Dare County Bomb Range over the next three years. The research will study fire behavior in pocosin fuel models including consumption rates in fuels, smoke emissions, and fire effects. New and existing smoke plume modeling systems are being evaluated during the study in order to develop better tools for use in prescribed fire in forested wetlands and marshes in the southeast. The study was developed and is being coordinated by Robert Mickler of ManTech, Inc. with support from the US Fish and Wildlife Service. Cooperating in this study are the Environmental Protection Agency (EPA), the US Forest Service Research Branch with representatives from the Southeast and West Coast, and North Carolina State University (see Fire Research).

Effects of Sea Level Rise: Duke University Graduate Student Ben Poulter began a study in 2003 on the response of estuarine forests to rising sea level on the Albemarle Peninsula. During the winter of 2004, he collected soil and vegetation data from plots in the Mashoes and Long Shoal marshes. Once a month from January to June, previously established well screens were monitored for groundwater table depth. In December, peat consumption and vegetation response were measured for two of the Mashoes plots that had been burned over during the May wildfire. Data analysis and thesis writing are scheduled for completion in May 2005.

6. Other

Highway 64 Expansion through Alligator River National Wildlife Refuge

The NCDOT is planning to four-lane the current two-lane highway through ARNWR in the next few years. In pre-planning efforts, Refuge and red wolf program staff met with state officials in regards to planning wildlife underpasses to provide a safer road crossing for wildlife. The Refuge will work closely with NCDOT to develop the best system possible to help ensure wildlife protection.



To facilitate future planning, Refuge and Red Wolf program officials inspect the underpasses being constructed west of ARNWR as part of the widening project for Hwy. 64. MM

GIS

Development of the Geographical Information System (GIS) for Alligator River began in the mid-1990's. Since that time, the Refuge has acquired and created data for all Refuge programs and all of the nine Refuges in eastern North Carolina. The Refuge maintains approximately 3,000 GIS files and four sets of aerial photography. We maintain a data sharing agreement with Dare County. Currently there is one staff member using GIS on a regular basis and three that use it occasionally. The majority of the GIS work is completed by Forestry Technician Brian VanDruten.

Program highlights and accomplishments for 2004 include: continued work on the vegetation/cover type map (see Section F.3. for more information); updated near-Refuge bear mortalities data layer; provided maps to Refuge and state law enforcement to assist in their operations; created maps to support four Refuge wildfires and prescribed burning operations on five northeastern North Carolina refuges; updated the video clip showing the migration of

Oregon Inlet to include data from 2003; participated in the National GIS Conference at NCTC; taught a session at the National GIS conference about fire program related mapping activities; modified Refuge burn units data layer; generated metadata; created maps for the Wildland-Urban Interface program; produced maps for firebreak maintenance contracts; participated on Southeast Region GIS committee; worked on a land ownership layer within the five county Red Wolf recovery are; and produced maps for a Level 1 Pre-acquisition Contaminants Survey.

Fire Program Analysis (FPA) created a major GIS work load at Alligator River in 2004. Products created include: fuels maps for all nine northeast North Carolina refuges totaling 378,752 acres, 20 year fire history plots for six refuges, and the creation of "Fire Planning units" for all 9 northeast North Carolina refuges. Work on FPA will continue in the upcoming years.

E. ADMINISTRATION

1. Personnel



Alligator River and Pea Island NWR's and Red Wolf Recovery Program personnel.



Alligator River NWR Fire Staff

KLW

Alligator River NWR Staff – 2004

NAME	POSITION	STATUS	EOD
1. Susan Ahlfeld	Park Ranger (Interp.), GS-0025-05/07	TERM	07/12/04
2. Jim Beasley	Forestry Tech. (Fire) GS-0462-07, Retired 03/31/04	PFT	05/26/85
3. Art Beyer*	Wildlife Biologist, GS-0486-09	PFT	12/02/90
4. Mike Bryant	Refuge Manager, GS-0485-14	PFT	04/14/96
5. Jeremy Bucher	Park Ranger (LE), GS-0025-09	PFT	03/09/03
6. Jerry Campbell	Maintenance Worker, WG-4749-05, 1040 appointment expired 01/02/04	1040	06/30/03
7. Eric Craddock	Eng. Equip. Operator, WG-5716-10	PFT	02/21/93
8. Bruce Creef	Eng. Equip. Op. Supv., WS-5716-09	PFT	04/21/71
9. Tom Crews	Fire Mgmt. Officer, (Fire)GS-0460-12	PFT	01/22/95
10. Alan Emery	Automotive Worker, WG-5823-08, Transferred to Blackwater NWR 07/11/04	PFT	05/22/88
11. Kris Fair	Bio. Science Tech., GS-0404-07	PFT	05/02/96
12. Buddy Fazio	Wildlife Biologist, GS-0486-13	PFT	04/22/01
13. Jonathan Gilbert	Bio. Science Tech., GS-0404-07	NTE 1 Yr.	07/11/04
14. Bobby Govan	Eng. Equip. Op., WG-5716-09	PFT	09/03/93
15. Donnie Harris	Forestry Tech., (Fire) GS-0462-08	PFT	01/11/96
Cont.			

16. Jenny Howard	Park Ranger (Interp.), GS-0025-05, Resigned 07/24/04	NTE 1 Yr	04/07/03
17. Caleb Jones	Forestry Technician, GS-0462-04, Resigned 08/13/04	NTE 1 Yr.	06/01/04
18. Bernice Kitts	Office Assistant, GS-0303-07	PPT	04/02/95
19. Janice Lane	Administrative Officer, GS-0341-09	PFT	03/25/90
20. Landon Loveall	SCEP Student, GS-0499-04	PFT	05/17/04
21. Chris Lucash*	Wildlife Biologist, GS-0486-11	PFT	12/02/98
22. Anicia Martinez	Secretary, GS-0318-05	TERM	08/15/99
23. Scott McLellan*	Bio. Science Tech., GS-0404-07 Resigned 11/27/04	PFT	12/29/98
24. Eric Meekins	Eng. Equip. Op., (Fire) WG-5716-08	PFT	10/25/93
25. Amy Midgett	Forestry Tech., (Fire) GS-0462-06	PFT	05/14/93
26. Mike Morse*	Wildlife Biologist, GS-0486-09	PFT	04/09/89
27. Jonathan Powers	Eng. Equip. Op., WG-5716-08	PFT	04/24/88
28. Anthony Ralph	Tractor Operator, WG-5705-06	TERM	07/30/00
29. Ann Marie Salewski	Park Ranger (Interp.), GS-0025-09	PFT	12/01/02
30. Leslie Schutte*	Wildlife Biologist, GS-0486-07	TERM	12/05/02
31 Daniel Sprague	Laborer, WG-3502-03, 1040 Appointment expired 02/06/04	1040	07/28/03
32. Dennis Stewart	Wildlife Biologist, GS-0486-12	PFT	12/27/91
33. Bonnie Strawser	Park Ranger (Interp.), GS-0025-12	PFT	12/31/80
34. Gregory Suszek	Prescribe Fire Specialist, (Fire)GS- 0401-07/09	PFT	11/29/04
35. Jeffrey Swain	Eng. Equip. Op., (Fire) WG-5716-08	PFT	02/10/02
36. Brian VanDruten	Forestry Tech., GS-0462-07	PFT	01/15/99
37. Kelley VanDruten	Fire Mgmt. Officer (WUI) , GS-0401-11	PFT	02/16/01
38. Cory Waters	Forestry Tech. (Fire), GS-0462-06	PFT	11/30/03
39. Kathy Whaley	Refuge Manager, GS-0485-13	PFT	12/28/02
40. Kathy Whidbee*	Office Assistant, GS-0303-07	TERM	06/03/01
41. Jim Wigginton	Refuge Manager, GS-0485-12	PFT	03/28/99

* Red Wolf Program employee

The following personnel actions occurred in 2004:

Jerry Campbell completed his appointment as a temporary (1040) Maintenance Worker, WG-4749-05 on January 2.

Daniel Sprague completed his 1040 appointment as a Laborer, WG-3502-03 on February 6.

On March 31, Forestry Technician (Dispatcher) Jim Beasley retired under the special Firefighter and Law Enforcement Officer Retirement Program. Jim retired after 30+ years of service.

Amy Midgett received a temporary promotion to fill our vacant Forestry Technician (Dispatcher), position (Vice Beasley). The action was effective March 7.

Temporary Park Ranger Jennifer Howard's appointment was extended for an additional year on April 6. On July 24, Jennifer resigned to accept a graduate assistantship to pursue her Master's Degree.

On May 15, as a result of a wage grade audit, Heavy Equipment Operator Eric Craddock received a promotion from a WG-8 to a WG-9. Term employee Anthony Ralph was promoted from a Maintenance Worker, WG-5 to a Tractor Operator, WG-6.

SCEP student J. Landon Loveall reported to duty on May 17. On August 13 he returned to school to complete the requirements of the SCEP.



SCEP Student Landon Loveall took (and passed!) his first pack test with the USFWS. KLW

Caleb Jones reported to work on June 1 as a NTE 1 year Forestry Technician. On August 13 he resigned to accept a permanent position with the N.C. Forest Service.

On July 27 a committee consisting of Ricky Campbell, Lou Hinds, Jim Nee, Rick Nehrling and Jackie Parrish reviewed the results of the wage grade audit for several wage grade employees. As a result of this review Eric Craddock, Bruce Creef and Bobby Govan received promotions. Eric was promoted to Engineering Equipment Operator, WG-5716-10. Bruce was promoted to Engineering Equipment Operator, WS-5716-09. Bobby Govan was promoted to Engineering Equipment Operator, WG-5716-09. These promotions were effective June 13.

Automotive Worker Alan Emery transferred to Blackwater NWR effective July 11. This position has been "suspended" indefinitely until the region meets budget goals.

Susan Ahlfeld arrived on duty July 12 in a two year term appointment as a Park Ranger, GS-0025-05/07.

Jonathan Gilbert was selected to fill a NTE 1 year Biological Science Technician, GS-0404-07 position. His official EOD date is 07/11/04. However, because of car problems he did not arrive for duty until July 19.

Anthony Ralph's term position as a Tractor Operator was extended for the fifth and final year on July 30 after approval was received from OPM.

On October 3 Susan Ahfeld received a temporary promotion to Park Ranger, GS-0025-07 to cover the duties of Ann Marie Salewski who was on maternity leave.

Biological Technician Scott McLellan resigned effective November 27. Scott accepted a position with the State of Maine as the Canada Lynx Field Coordinator.

Prescribe Fire Specialist Greg Suszek reported to work on November 29.

Activity-Based Cost/Management (ABC/M) was implemented effective January 5 for Region 4. This new time accounting system went into effect in pay period 0403.

The following employees received awards in 2004:

Refuge Manager Mike Bryant received the Paul Kroegel Refuge Manager of the Year Award. On March 16 he traveled to Spokane, Washington to accept the award.

Bruce Creef received the Annual Regional Director's Honor Award. The award was presented to Bruce on July 14 at the Southeast Region's Awards Ceremony in Atlanta, Georgia.

Donnie Harris and Bruce Creef received STAR Awards for their outstanding work as heavy equipment safety instructors for Region 4. They were nominated for the awards by Regional Office, IRM Chief, David Lucas.

On November 11 Cory Waters and Eric Meekins received STAR Awards for their work on a support team to control spread of invasive exotic plants on national wildlife refuges along the Atlantic Coast. They were nominated for the awards by RO staff.

The following staff received STAR Awards during the year: Bonnie Strawser, Landon Loveall, Eric Craddock, Scott McLellan, Brian Van Druten, Leslie Schutte, Janice Lane, Mike Morse, Art Beyer, Kathy Whidbee, Chris Lucash, Kelley Van Druten, Dennis Stewart,

Jeff Swain, Cory Waters, Eric Meekins, Amy Midgett, Bruce Creef, Jim Wigginton, Tom Crews, Bernice Kitts, Anicia Martinez, and Kris Fair

4. Volunteer Program

In 2004, 30,217 hours of service were contributed by 480 volunteers in the following areas: maintenance, 3,440; resource support, 11,250; and public use and outreach, 11,362. The hours were compiled from volunteers at both Alligator River and Pea Island National Wildlife Refuges; both Refuges are therefore reflected in this section. Interns, workcampers, local Refuge volunteers, and organized work groups are the four active groups which form the Refuge volunteer program.

College students and graduates seeking to gain experience in wildlife management, research, and public use continue to turn to the Refuges and the red wolf program for this knowledge. Interns are required to contribute a minimum of three months of volunteer service, during which they received \$90 per week (\$18 per work day) food stipend and were furnished free housing on the Refuge. All interns worked a 40-hour work week.

2004 Interns

<u>Name</u>	<u>Assignment</u>	<u>Time Period</u>
Tim Jessen	Telemetry Intern	Sept. 03 – Feb 04
Chris Crowe	Trapping/Field Intern	Nov. 03 – May 04
Adrienne Paoletta	Telemetry Intern	June 03 – Dec 03
Sarah Krueger	Outreach Intern	June 03 – Dec 03
Lisa Tomkosky	Caretaker Intern	Aug 03 – Dec 03
Richard Zane	Caretaker Intern	Jan 04 – April 04
Sara Cilles	Telemetry Intern	March 04 – June 04
William Pemberton	Caretaker Intern	May 04 – August 04
Tally Love	Telemetry Intern	June 04 – August 04
Crissa Cooley	Caretaker Intern	August 04 – Nov 04
Jennifer Adams	Telemetry Intern	Sept 04 – Dec 04
Elizabeth Allison	General Refuge Intern/PI	May 04 – August
Elizabeth Baldrige	General Refuge Intern/PI	June 04 – August
Anna Scesny	General Refuge Intern/PI	May 04 – August
Lauren Peele	General Refuge Intern/PI	May 04 – August
Scott Ward	General Refuge Intern/AR	May 04 – August
Gaia Meigs-Friend	General Refuge Intern/AR	July 04 – Sept 04
Blaik Pulley	6 Month Biological Intern	Mar 04 – Oct 04
Nick Baker	General Refuge Intern/AR	Aug 04 – Nov 04
Marisa Adler	General Refuge Intern/PI	Aug 04 – Sep 04
Jessica Leonard	General Refuge Intern/PI	Aug 04 – Nov 04
Emily Weiser	6 Month Biological Intern	Oct 04 – Mar 05
Christian Guerreri	Public Use/Fire Intern	Sept 04 - Nov 04

2004 Workamper Program

Workampers, who are also scheduled in 3-month blocks, were provided a pad for their RV at Pea Island and supplied with electricity, sewage disposal, and propane gas. During 2004, most workampers were couples and both members of the team worked on both Refuges. In every case, the workampers certainly surpassed the 24-hour per week per person required minimum.

<u>Workamper</u>	<u>Award/Hr. pins</u>	<u>Work Area</u>	<u>Service Period</u>
David Free	Certificate, 250 pin	Maintenance	March-May
Janet Free	Certificate, 250 pin	Public Use	March-May
Donna Mattingly	Certificate, 250 pin	Public Use	Feb-April
Len Mattingly	Certificate, 250 pin	Maintenance	Feb-April
Scott Lloyd-Jones	Certificate, 250 pin	Maintenance/VC	May-July
Virginia Lloyd-Jones	Certificate, 250 pin	Maintenance/VC	May-July
Georgia Griffiths	Certificate, 250 pin	Maintenance/Public Use	Aug-Dec
Rich Griffiths	Certificate, 250 pin	Maintenance/Public Use	Aug-Dec
Jim Bourke	Certificate, 250 pin	Public Use Survey/Maint	Sept-Jan 05

Plans are underway to complete a two pad work camper site at Alligator River NWR. A small cabin with a common area, shower, kitchen, and laundry facilities have been placed on the site. Coastal Wildlife Refuge Society has allotted \$51,000 towards the completion of this project, which should cover all expenses. During 2004, \$27,307.57 was spent on this project by the Coastal Wildlife Refuge Society.



The corner of a farm field in the Laurel Bay unit was selected as the site for a Workkamper pad due to its pleasant view and easy access for electrical connection.

KLW



The CWRS paid approximately \$51,000 towards the establishment of the new volunteer camper pad. Refuge Staff assisted with hauling and spreading fill material and gravel. JL

Several volunteer work groups donated their time during 2004:

-April 24 2004 - Episcopal Dioceses of East Carolina - 93 people donated 465 hours (beach clean-up on PI)

-July 2004 - Church of Our Saviour (Jacksonville, Florida) – 36 people donated 180 hours. (Beach clean up on PI)

July 2004 – Oregon Inlet public clean up – 24 people donated 96 hours.

-October 2004 - NC Big Sweep Annual Beach Clean up – 12 people donated 72 hours

Cumulative hours tallied through September 30, 2004 yielded awards which were presented at the annual Volunteer Awards Banquet in November. Awards were presented to interns and workcampers during the course of the year, since most are unavailable during the time of the banquet. Usually, interns reach the 500 hour “milestone” and receive a certificate (100 hours), a volunteer pin (250 hour) and a volunteer pin with a 500 hour rocker.

The Outstanding Volunteer for 2004 was Ruth Polnisch who volunteers at the Visitor Center every Thursday, rain or shine. Ruth was also featured in the most recent edition of the WINGS newsletter highlighting her accomplishments during the nine years she has volunteered for the refuges. Ruth’s name was

added to the plague that hangs in the visitor center and she was awarded with a plague and a "volunteer of the year" personalized sweatshirt.

Neither Alligator River nor Pea Island could sustain the current high-quality level of interpretive programs, visitor support, or threatened sea turtle monitoring without the consistent dedication of local Refuge volunteers. These volunteers continue to be the behind-the-scenes strength of not only the volunteer program, but the operation of the Refuges, especially Pea Island. During 2004, this devoted group provided more than 15,000 hours.

Several of the summer interns assisted the fire program on various projects including taking GPS coordinates of telephone junction boxes and other structures needing protection during burns, researching state records for fires on Refuge properties, assistance with a fire monitoring plan, and assistance with Stumpy Point Community Assessment.

Christian Guerreri served as Alligator River's first fire intern. Although Intern Guerreri only worked with the fire program for a couple of months before being offered a position with the NC Aquarium. Her assistance was greatly appreciated on projects such as writing news releases, researching communities for community-at-risk designations, and working on a monitoring reference book.

5. Funding

Refuge funding for FY 04 was as follows:

FUND	NAME OF FUND	FY01	FY02	FY03	FY04
1113	Red Wolf	914.1	896.5	906.0	982.3
1261	Operations	1125.3	1161.0	1211.1	1355.7
1262	Maintenance	337.4	267.6	653.8	422.5
29..	Storm Damage *	1747.9	1555.4	953.7	218.6
9251/9131	Fire Operations	541.2	592.0	690.0	1092.5**
9263	Rx Burns	150.0	370.0	106.1	189.0**
9264	WUI	216.6	80.0	166.4	286.0***
9265	Rural Fire Assist.	0	0	0	37.2
TOTAL		5032.5	4922.5	4687.1	4583.8

1261 funding was more than \$100,000 short of meeting salaries for this FY.

*Storm damage money carries over, so the amounts include carryover from previous year.

**Includes last minute fund additions in the amount of \$586.2 for purchase of equipment in 9131 and \$110.0 in 9263. Actual funding for fire operations was decreased from FY03 to \$506.3 and Rx burns was decreased from FY03 to \$79.0.

***Includes \$67.0 to pay settlement for legal action by a contractor.

Note that ½ of the salary for both Park Rangers Salewski and Howard/Ahlfeld is paid by the Coastal Wildlife Refuge Society.

6. Safety

FT Van Druten became a certified ATV Instructor by the ATV Safety Institute. He taught a total of 51 students in 2004, with 32 of them being staff members from four northeastern North Carolina refuges. The remaining students were Refuge volunteers and interns used mostly to assist with the Sea Turtle Nesting Program at Pea Island NWR.



Forestry Technician Brian Van Druten became certified as an instructor by the ATV Safety Institute and trained 51 people in 2004. K LW

Handbooks on how to deal with hazardous material, oil, and chemical spills on Refuge lands were redistributed to Refuge staff in 2004. This Refuge produced handbook contains protocol and 24-hr contact information for the responsible parties for response in event of a release.

Monthly safety meetings were held throughout the year. Topics varied: National Fire/Wise Program, Review of 2003 Accidents, Water Safety, ATV Safety, Hurricane Preparedness, First Aid Training, Vehicle Accident Reporting, Sun Safety (Skin and Eyes), Blood Pressure Check, Cholesterol Check, Hearing Protection, Eye Protection, Mower Safety, etc. Outside sources were also used for programs-representative from Blue Cross/Blue Shield of North Carolina gave a presentation on November 15, 2004 concerning Health Insurance and pending changes.

During 2004, there were six reportable accidents: insect bites, twisted ankle, broken thumb, vehicle accident (no personal injury). This was a significant decrease from previous years and can be attributed to increased awareness and training (MOCC, ATV, Equipment Escort, 1st Aid, Fire Management, Heavy Equipment, Load Securement, etc.).

Jim Wigginton serves as Station Safety Officer with a Safety Committee composed of staff from the various program/ activity areas. The 2004 Safety Committee members: Bernice Kitts(Administration), Eric Meekins(Fire Management), Brian Van Druten(Biological), Jon Powers(Maintenance), Jenny Howard(Public Use), Kathy Whidbee (Red Wolf Recovery).

Environmental Compliance

A Service environmental management team visited Alligator River and Pea Island NWR's during the week of April 19, 2004 to assist in implementing an Environmental Management System (EMS). An EMS is a comprehensive approach to environmental management, and is mandated by Executive Order 13148. The following comprised the implementation assistance team: V.A. Sridhar, Environmental Engineer, Environmental Facility Compliance, Division of Engineering, Lakewood, CO; Jim Poje, Region 4 Environmental Compliance Coordinator; Kurt Rausch, Prizim, Inc. (Consultant), Denver, CO.

An EMS is a collection of activities, practices, and operations that address environmental issues and associated management activities to ensure environmental goals are met. As part of the site visit an Environmental Facility Compliance Audit and Energy Management Review was conducted.

An Environmental Management Plan (EMP) was drafted for both stations. Recommendations were made for setting specific goals and improvement targets for waste management, pollution prevention, pesticide management, vehicle management, training, green procurement, recycling, energy conservation, and commercial visitor services. Most of these elements were already in place. Start up funding (\$5,000.00) was provided to enhance greening and pollution prevention activities at both stations through Environmental Facility Compliance, Denver, CO.

7. Technical Assistance

RM Bryant and Biologist Stewart worked with Mr. Robert Fisher of RESOLVE, a non-profit consensus building and dispute resolution organization, as part of a NPS/USACOE/FWS planning project. The purpose is to develop an EIS for the issuance of a 5-7 year Special Use Permit or MOA to maintain the Oregon Inlet navigation channel.

Refuge Biologist Stewart and DRM Whaley worked with Dare County officials and consulting firm Wooten and Associates to discuss a proposed sewer treatment facility for the Stumpy Point community. Currently, more than 60 homes have straight pipe discharge of sewer into a canal adjacent to Refuge lands that eventually dumps into Stumpy Point Bay. During 2004, Dare County made a decision to change the location of this project to an area with no direct impact on the Refuge.

During the course of the year, Refuge Biologist Stewart interacts with Tideland Electric, the N. C. Department of Transportation, and Dare County with regards to various maintenance projects within rights-of way or requiring permitting by the Refuge.

DRM Whaley served as the Region 4 alternate on the National Fire Outreach Team. WUI Specialist Kelley Van Druten also assisted with NFOT meetings and projects.

Fire Management Specialist Boyd Blihovde, a new WUI Specialist at Merritt Island NWR, requested assistance with a WUI display he needed for a show in the Florida Keys. WUIS Van Druten sent a display board with information on the wildland-urban interface and the Firewise program for WUIS Blihovde to use on February 14 and 15.

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: brackish marsh, pocosin, mixed-hardwood pine forest, non-alluvial hardwood forest, cypress-gum forest, and white cedar forest. Pocosin can be further divided into low shrub pocosin, high shrub pocosin, pond pine/shrub pocosin, and pond pine cane pocosin. 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 further fragmented 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.

Habitat Type	%	Approximate acreage		Total
		Dare County	Hyde County	
Freshwater pools, ponds, & lakes	0.8	754	398	1,152
Brackish marsh	16.5	22,162	3,100	25,262
Managed wetlands	1.2	1,800	0	1,800
Cropland	2.0	3,000	0	3,000
Cypress-gum forest	1.0	1,477	0	1,477
Atlantic white cedar forest	5.6	6,932	1,568	8,500
Mixed pine/hardwood forest	7.5	11,418	0	11,418
Non-alluvial hardwood forest	8.0	12,236	0	12,268
Pond pine shrub pocosin	25.3	33,154	5,512	38,666
Pond pine cane pocosin	20.0	28,300	2,100	30,400
High shrub pocosin	4.1	5,030	1,320	6,350
Low shrub pocosin	8.0	12,292	0	12,292
TOTAL	100%	138,197	13,998	152,585

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 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. Some attention will be diverted to maintenance of existing structures.

This year approximately 1,800 acres of moist soil were produced in prior converted farmland within the farm unit. Past experience has shown that fire and disking are the most efficient management tools for controlling undesirable vegetation and that planting some of the moist soil unit acreage with agricultural crops results in much higher waterfowl use. Also, it appears that intensive management practices are necessary on an annual basis to maintain the moist soil units in the most productive state.

3. Forests

The on-going forest cover type mapping project for Alligator River made substantial progress in 2004. Ninety five 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 five percent will have to be completed after field visits are made to determine where the stand breaks will have to be drawn. Ground truthing continued and 123,000 acres were classified by the end of 2004. This should be completed in 2005 for use in the CCP for Alligator River. Within this project, we are developing a fuels map for the Refuge. By year's end, the fuel model map was virtually complete.

4. Croplands

2004 was a transition year for the Refuge's Cooperative Farming Program. Based on the performance of the Refuge's three Cooperative Farmers during the 2003 Cropping Season, management decided it was time for a new course of action. Basically, there were no crops planted in 2003 and no maintenance of filter strips accomplished. The farmer's lack of performance was based on their perception that it was too wet. However, it should be noted that crops were planted and harvested on adjacent Dare County land which is lower in elevation.

Current Cooperative Farming Agreements were approved for the period of January 1, 1999 through December 31, 2010. The long term agreement allowed the farmers to take advantage of the USDA's-Natural Resource Conservation Service's (NRCS) CP-21 Filter Strip (393) Program. The 10 year program is beneficial if properly managed and monitored. Meetings were held with the three Cooperative Farmers collectively and individually to outline changes for the 2004 Cropping Season and the future of the farming program. A meeting was also held with NRCS personnel to get an overview of the Filter Strip Program and the legal and monetary parameters of the program. There are approximately 1500 acres of converted row crop acreage to filter strips under contract with the NRCS and the Refuge.

The meetings with the Cooperative Farmers focused on Filter Strip Program compliance and implementation of the recommendations from the December 2000 Biological Review of the Refuge. The 2000 Review recommendation were as follows: 1) Provide 50-100 acres of corn (hot food) for the period December-January, 2) Provide 300-350 acres of green browse for tundra swans and geese, 3) Plant grain sorghum (milo) if needed as a supplemental "hot food" 4) Reduce coop farming by 500 acres-convert to contract or force account operations, and 5) Address permanent water needs for various wildlife resources. All of the recommendations were implemented except #4-reduce coop acreage (convert to contract or force account). This is not physically or fiscally possible-lack of funding, manpower, and equipment.

Addendums to the current Cooperative Farming Agreements were completed, approved, and signed for the 2004 Cropping Season. New Special Conditions (attachment to Addendum) were formulated and applied. The major changes from previous seasons were a percentage of the crops would be left standing in fields for wildlife use, Filter Strips would be maintained

to NRCS specifications, and assigned equipment storage areas would reflect good housekeeping of government lands.

It was decided that 10% of the crops would be left standing in the fields as designated by management. For the transition period, this is a fair and equitable "rent", since the farmers must purchase fuel to operate the Refuge's pumps. The Laurel Bay and Creef Pump Station engines ran for a combined total of 3,875 hours during 2004. The Cooperative Farmers spent approximately \$15,200.00 for fuel to operate the pumps. The Refuge's water management program depends on the ability to flood and dewater at appropriate times. The pumping operations benefits the farmers, as well as the Refuge.

The transition period will continue through the 2005 Cropping Season. Evaluation of the 2004 season coupled with migratory bird response will dictate adjustments needed.

9. Fire Management

Fire Management spent the year dealing with a new interagency system, Fire Program Analysis (FPA), being designed in two phases to replace current fire management planning and budgeting tools for the five federal fire management agencies. The first phase, called FPA Preparedness Module (FPA-PM), includes initial attack and wildland fire use. It is anticipated that FPA-PM analysis run in 2006 will be used for allocation of FY 2008 budgets. Phase II will be designed and built over the next few years and will include extended attack, large fire support, prevention/education, hazardous fuels reduction, emergency stabilization, and burned area rehabilitation.

On July 22, the Southern Area Interagency FPA Team met with FMO Crews, WUIS Van Druten, FT Van Druten, and Pocosin Lakes Fire Management Officer Vince Carver to explain the data needs, timelines, and budgetary implications for the FPA-PM module. On August 17, a meeting was held with the District area Refuge managers to explain FPA, the data workload involved, and encourage line officer involvement.

Alligator River spent the rest of the year compiling data for the two software programs involved in running the module, FPA-PM and FPA-HA (Historical Analysis). A large portion of the data required use of the GIS system with support from FT Van Druten (see GIS). FMO Crews and WUIS Van Druten both attended training for FPA in the Fall.

Wildfire Preparedness:

Calendar year 2004 had a relatively low incidence of high fire danger initially, but as the end of the season progressed, fuels and organic soils began reaching critical dryness levels. The North Carolina Forest Service (NCFS) was fighting the 2800 acre Corapeake project fire on private lands and the Great Dismal Swamp National Wildlife Refuge about 70 miles to the north. This fire occurred in similar fuels and organic soils that are prevalent in the northeastern national wildlife refuges and required a substantial number of resources committed for an extended period of time. This reduced the numbers of resources available to assist the other refuges, including Alligator River NWR, which increased the preparedness

staffing levels on the home front. It was during this time that the Refuge began experiencing wildfires from both natural and human-caused ignitions. During the period from March to June, Alligator River experienced 35 days of Readiness Plan 4 and 5 staffing levels. Staffing levels are broken down by month as shown below (Readiness Plan 3 days have no extended overtime, but equipment is maintained at a high state of readiness.):

Staffing Class Days for Spring Fire Season 2004

(RP – Readiness Plan or Staffing Class)

Month	RP-5 (Very High)	RP-4 (High)	RP-3 (Moderate)
March	0	4	8
April	3	9	5
May	0	9	3
June	4	2	4

Dispatch Operations:

Wildfire suppression and prescribed fire operations for the entire district were coordinated out of the Fish and Wildlife Service Dispatch Center located at Alligator River NWR Operations Center utilizing the Alligator and Pocosin Lakes fire crews. The fire crews and collateral firefighters from the other refuges in NC and their cooperators provided additional support. Altogether in 2004, there were 20 wildland fires across District 1 (northeastern NC refuges) that totaled 553 acres. Dispatcher Jim Beasley retired in March, and Firefighter Amy Midgette was put into an interim dispatcher position. FF Midgette provided many other support functions for the District Fire program including updating the Fire Management Information System (FMIS) and implementing the transition to the new Interagency Qualifications Certification System (IQCS), as well as maintaining the Resource Ordering and Status System (ROSS), the five refuge ROSS stations, and the Weather Information Management System (WIMS). In addition, she assisted FCO Harris in preparedness and maintenance projects, such as maintaining and repairing equipment and mowing firebreaks.

Off-Station Dispatches:

A total of 17 Refuge staff from ARNWR and the other refuges in NC were dispatched to Florida to assist with Hurricane recovery efforts along with 4 pieces of equipment with lowboys. Nine personnel were dispatched to wildfires in Mississippi, South Carolina, and Washington State. Two 30-day detailers were sent from Alligator River NWR for helicopter support for the Exotic Plant Eradication Taskforce that covered the mid-Atlantic State coastal areas on up to New England. A total of 424 staff days were dispatched to off-station assignments during CY-2004 through the NC Refuges Central Dispatch Center at Alligator River. Positions filled were DIVS, HCWN, HECM, ENGB, SEC2, and FFT1 and FFT2.

Fire Organization:

Dispatcher Jim Beasley was offered and took firefighter retirement in March. The region could not re-fill a dispatcher position at 50% funding by fire for NC Refuges but allowed the Refuge to hire a Prescribed Fire Specialist. Greg Suszek was hired to fill that position and started in late November. Firefighter Cory Waters was selected to fill the GS-6 Senior Firefighter position vacated by Craig Scheibel who took an Engine Captain position for the

USFS in California. Firefighter Amy Midgette's position was moved from the Refuge to the District level to serve as "acting Fire Program Technician."

A reorganization of the District 1 Fire program was undertaken in 2004 with the objectives to take a fresh look at the priority needs across the District and making recommendations on improving the organization while staying within the constraints of the current budget. NC Refuges have been constrained to the same fire organization since 1998, with the lone addition of the Wildland/Urban Interface Specialist after the National Fire Plan took effect in 2001. As a result of the analysis, the District concept of fire management was recognized, with the need for a District Prescribed Fire Specialist and Fire Program Technician represented. Reallocation of Firefighter Equipment Operators between Pocosin Lakes and Alligator River National Wildlife Refuges was made by moving one operator from Pocosin to Alligator to allow three at each refuge. A stipulation was made to allow the filling of a Fire Program Technician only with the freeing up of half a Fire FTE from the Office Assistant position.

Communications:

The migration to narrowband digital radios was completed in 2004 at Alligator River NWR, the last of the 9 refuges in NC. Firefighter Cory Waters was assigned the role of Refuge Radio Coordinator, after Allen Emery transferred, and has done a superb job at reprogramming radios and coordinating frequencies. He has assisted the other refuges in District 1 in this capacity as well. This has taken a lot of his time from his regular duties as firefighter. Virtually all initial attack and transport equipment at Alligator River now has narrowband digital radios. All fire operations, however, still are conducted within the "analog" mode on the radios in order to allow for our cooperators to communicate with us using their high-band radios.

Wildfires at Alligator River National Wildlife Refuge:

- The Big John Fire occurred on Sunday, May 16. It burned about an acre and threatened the Creef Pump Station. The cause was undetermined.
- The Mashoes Road Fire was reported at ARNWR on May 19 on Mashoes Road approximately two miles north of Manns Harbor and two miles south of Mashoes. Within minutes, FCO Harris was on scene and reported that the head of the fire was burning out towards the sound, flanking to the north and south. Resources requested and deployed included a strike team of flextracked fire tractors consisting of one NCFS and two USFWS tractors, three wildland fire engines, a boat with ignition crew, National Park Service scout plane, and the North Carolina Forest Service helicopter. Manns Harbor VFD sent a Type 3 engine and crew of men to assist as well. FCO Harris acted as ICT4, and used an indirect attack suppression strategy to contain the fire between a ditch on the south boundary and a creek and man-made fire line to the north, with Mashoes Road west and Croatan Sound on the east. Once the firelines were burned in and secured, the interior burnout operation commenced with NCFS Helicopter 8. Before the burnout ignitions could take effect, ICT4 Harris had to pull all personnel off the fire and release the aircraft back to the safety of the

airport due to an incoming line of thunderstorms. Minutes after everyone was pulled off, the fire blew up and burned rapidly to the south, parallel to Mashoes Road until it ran into the area previously burned out along the ditch. The two-inch downpour that followed during the next thirty minutes put a quick end to the conflagration which burned a total of 240 acres of Refuge land.



Mashoes Road Fire blow-up being fanned by 30mph winds from thunderstorm downdraft.

TC

- Lightning storms on May 22 caused two fires the same day on May 23: The MI-10 fire at Mattamuskeet and the South Stumpy Point Fire at ARNWR. The MI-10 fire was contained at 1 acre that day with the Mattamuskeet Engine. A strike team of flextracks and the NCFS SEATS were deployed to the South Stumpy Point Fire which was contained within a four year rough left by a prescribed burn in 2000. This fire was contained at seven acres, but was not controlled until a week later after extensive operations to suppress the ground fire burning deeply into the duff and soils.
- On June 1, The Barge Canal '04 Fire was detected. The NCFS CL-215 air tanker, three SEATS and one helicopter responded, and dowsed the fire containing it to three acres. The terrain proved extremely difficult to operate in even for the lightest, most capable flextracked fire tractors. It took a day and a half to get into the fire and put adequate lines around it, with tractors constantly getting stuck and having to winch themselves out of the deep muck. FWS firefighters and a Job Corps Crew from the US Forest Service completed mop-up and monitoring, while other FWS personnel

resumed staffing for other wildfires. FWS tractors had to be extensively rehabilitated after this wildfire.

- The Old 64 Wildfire was discovered on June 21, 2004. It resulted from a lightning strike in the Quadrangle Unit 1 where a prescribed burn had been conducted back during the winter months. Because of the prior controlled burn, there were very few fuels available to sustain the fire spread. In spite of the brisk winds fanning the flames, it was contained at a half-acre in size by Refuge resources running a 200 yard engine hose lay into the woods to suppress the ground fire which was burning a foot deep into the duff and soil. FCO Harris was IC with FFEO Swain serving as ICT4 Trainee. This burn received accolades from the Washington Office as an example of one of the USFWS prescribed burn success stories.

Prescribed Burning:

Burning at Alligator River NWR was coordinated with other Refuge burning needs in District 1, with Cedar Island and Pocosin Lakes taking precedent over many burns at ARNWR. In all, 18,000 acres were burned in District 1 for the FY, with 39 separate burns conducted, including nearly 5000 acres at the remote Cedar Island National Wildlife Refuge near the wildland urban interface communities of Atlantic and Cedar Island. Dispatch operations for these burns were all coordinated out of the FWS Central Dispatch Office at East Lake, with the exception of those at Mackay Island NWR.

January, although it was relatively dry, saw very wet conditions in the woodlands, so burning efforts at Alligator River centered on farm fields and the large South Boundary Marsh at Alligator River. Later in January and February, a few burn windows came and went for the woodlands, but a chronic lack of helicopter availability became an issue that prevented burning. The FWS helicopter was unexpectedly transferred to Merritt Island Florida in early January, leaving a big void in the capability for NC Refuges. When a new vendor became available, Air Centers Helicopters, they were trained and assisted on several controlled burn projects. Their availability was only intermittent, and their promised 206 Long Ranger helicopter ended up arriving in Norfolk in April, well after the burn season was over. A helicopter was rented from Summit Helicopters in Roanoke, VA (3.5 hours flight time away), for burns at Alligator River and Pocosin Lakes and one burn at Cedar Island, and the Carolina Sandhills Helicopter assisted in another important burn at Cedar Island. The hurricane response to Florida Refuges prevented burning in early Fall of 2004. and once personnel returned to ARNWR, unavailability of local helicopters plagued burning efforts. Once a ship was obtained from Okefenokee NWR (5.5 hours flight time each way), it became too dry to burn at Alligator River and Pocosin Lakes and operations were moved to Cedar Island NWR with good success in burning a very wet pocosin block that had been unsuccessfully attempted numerous times before.

CY-2004 Rx Burn Projects - Alligator River NWR

Unit Name	Unit Number	Date	Acres	Fire #
ARNWR	Creef AG1	01/23/04	1874	41630-9263-D537
ARNWR	Twiford AG 1	01/30/04	550	41630-9263-D728
ARNWR	Twiford AG 2	02/11/04	130	41630-9263-D759
ARNWR	Laurel Bay AG 1	02/11/04	1103	41630-9263-D750
ARNWR	Little Fields 4.3.7	02/23/04	250	41630-9264-D801
ARNWR	S. Bdy marsh 2.5.1	02/19/04	1004	41630-9263-D578
ARNWR	Laurel Bay3.1	02/21/04	1336	41630-9264-D811
ARNWR	Creef Units 3.3	02/21/04	898	41630-9264-D815
ARNWR	Twiford3.2.12	03/08/04	72	41630-9263-D845
ARNWR	Twiford3.2.11	03/08/04	147	41630-9263-D853
ARNWR	Twiford3.2.3	03/08/04	81	41630-9263-D856
ARNWR	Twiford3.2.2	03/08/04	117	41630-9263-D85
ARNWR	Quad 1 (9264	02/22/04	594	41630-9264-D609
Total Acres			8,156	



Prescribed burning at Alligator River NWR in marsh habitat.

TC



Prescribed burning in eastern North Carolina pocosin habitat.

TC

Mechanical Hazardous Fuels Projects:

At the end of the 2004 fiscal year, a \$31,775 contract was awarded to Oliver's Landing Clearing for the 58-acre Stumpy Point Firebreak Rehab and Maintenance on September 27. Concerns were raised at the company's low bid, especially since they had not done a site visit. They came and looked at the area on September 30 and determined that they would not be able to complete the contract. After consultation with the Regional Office, the funding was converted to FY-2005 and the contract was awarded to the next lowest bid, Garcia Forest Service for \$71,280. A pre-work conference was held on October 25 and cutting began on November 15. By the end of December, the contractor had made significant progress, with an estimated 6 miles of the 8.8 mile contract completed. The contractor used a swimming excavator to cut the breaks, remove wind-thrown trees, and mulch woody debris. WUIS Van Druten performed as COR on the contract.

The US Air Force contracted the North Navy Firebreaks to be re-habilitated as well, but had contracting difficulties getting the work completed as planned before the year's end.

The District 1 GeoBoy was used to rehabilitate firebreaks at Canvass Back Road and around some of the Alligator River Agricultural Fields.

A walk-down line was put in on the Quadrangle Unit 5 firebreak with a flextracked fire tractor. Attempts were made to use the GeoBoy brush cutter on the Quad 3 firebreak, but ground conditions were too soft and wet to conduct this work.

The firebreaks at Parched Corn Bay and at the Roanoke Marshes Compartment (totaling around 15 miles) are in need of rehabilitation, but this work remains unfunded another year.

Cooperative Relations:

On February 24-26, WUIS Van Druten participated in the North Carolina Division of Forest Resources Firewise Conference in Winston-Salem. WUIS Van Druten assisted the state as a facilitator in breakout sessions on the second day (see Fire Outreach). Contacts made at this meeting have been very useful for coordinating WUI issues across the district.

The Alligator River Fire Crew has been working cooperatively with the other Refuge fire crews in Eastern NC and with the NCFS, Forestry staff from the US Marine Corp Air Station at Cherry Point, NC, The Nature Conservancy and the Cedar Island Volunteer Fire Department on a series of prescribed burns. Three cooperative, joint-jurisdictional prescribed burns conducted at Cedar Island NWR and Atlantic Outlying Landing Field for the second year in a row, as well as additional WUI Hazardous fuels projects around the communities of Atlantic and Cedar Island. All total, 5,700 acres were burned during two events in March, and one trip in November and included 4,800 acres on the Cedar Island National Wildlife Refuge, 800 acres of Atlantic OLF, and approximately 100 acres of private lands covered by agreements. The burns were conducted to protect several homes in the Atlantic and Cedar Island Communities, including the Lola Road area, as well as the multi-million dollar military electronic emitter sites located on Atlantic OLF.

Little Fields Unit 8 was burned in cooperation with the Seymour Johnson AFB's Dare County Bomb Range. This 250 acre unit was divided roughly in half by the DCBR boundary. Additional units were planned for burning, but not able to be completed this year.

The Research Burn for the Joint Fire Sciences Project and the Dare County Bomb Range Legacy project was planned in conjunction with the US Air Force, the US Environmental Protection Agency, and with US Forest Researchers Gary Achtemeier from Athens, Georgia and Miriam Rorig from Bellingham, WA. The principal researcher coordinating the project is Bob Mickler from ManTech, at the Research Triangle Park in Raleigh, NC. A Research Tech was hired to assist on the project by NC State University and is being headquartered at Alligator River National Wildlife Refuge. WUIS Van Druten is liaison for the project which is described in more detail under research.

MOUs:

WUIS Van Druten spent the first few months of the year trying to secure an agreement with NC DOT for permission to burn DOT property north of Manns Harbor in conjunction with the Refuge prescribed burning the Mashoes Fire Compartment. Once NC DOT consulted with CAMA, they agreed to the burning. Although an MOU was not secured, NC DOT submitted a letter of approval for burning that was received at the Refuge on April 10.

Fire Related Training:

Training Offered: Annual Firefighter Refresher, S-212 Wildland Powersaws, S-212 Refresher, D-110 Dispatcher Recorder (Co-sponsored with Pocosin Lakes NWR); S-130/S-190/I-100/L-180 (Basic Firefighter Training; co-sponsored with NPS).

Training attended: FMO Crews and WUIS Van Druten attended the R4 Fire Management Meeting in Savannah, GA. Fire Program Analysis training was attended by WUIS Van Druten and DFMO Crews, with follow-up training in Boise and Atlanta. WUIS Van Druten attended the Fire Effects Monitoring Workshop in McBee, SC. WUIS Van Druten attended the NCFS Strategy and Tactics training in Kinston and the Wildland/Urban Interface Education Conference: Backyards and Beyond in Denver, CO. FF Midgette, FCO Harris, FF Waters, Kitts, Ahlfield, Whidbee, Schutte, all attended D-110. FT Brian Van Druten, FMO Crews, FFEO Meekins, FT Waters, and FFEO Swain attended the S-212 refresher.

Taskbooks completed: FFEO Jeff Swain, ICT4; WUIS Kelley Van Druten FFT1 and RXB3; FFEO Eric Meekins TFLD; FCO Donnie Harris RXB2; and FT Cory Waters RXB3.

Fire-related Outreach:

DRM Whaley served on the National Fire Outreach Team to help develop and plan for execution of a program to educate various audiences about the role and importance of prescribed burning and wildfire preparedness. WUI Specialist Van Druten also assisted with team efforts.

On February 13-15, WUIS Van Druten attended the Southeastern Wildlife Exposition in Charleston, SC to display the Fire Exhibit on wildland/urban interface issues. The booth also included a wildland engine from Savannah NWR and some firefighting gear. Roughly 500 people stopped to ask questions about the exhibit or wildland firefighting with many more passing by as they toured the FWS tent. The fire booth was one of several FWS exhibits on Refuges in the southeast on display in one tent, including a booth from the Alligator River Red Wolf Program.

On February 24-26, WUIS Van Druten participated in the North Carolina Division of Forest Resources Firewise Conference in Winston-Salem. WUIS Van Druten had the Fire Display at the social/dinner hour with handouts on the first day and assisted the state as a facilitator in breakout sessions on the second day. Over 300 community leaders from across the state attended the conference including county commissioners, fire marshals, fire chiefs, builders, emergency management, and land management professionals. A snowstorm caused the second day of the conference to be shortened, but the Firewise message had been heard and many participants were receptive.

During the spring, the Fire Management Branch in Boise, ID was updating the national fire management website and requested up to ten photographs with a description from every Refuge highlighting their fire programs. These photographs will be used on the website's homepage and will cycle through a series of photos. Alligator River submitted ten photographs showing our unique equipment and methods of prescribed burning.

The Refuge's fire display was utilized at several festivals to highlight Firewise principles and prescribed burning: Engelhard Seafood Festival (May 15), Wildfest (September 18), and Aviation Day at the Manteo Airport (September 25). WUIS Van Druten gave a presentation on the fire triangle and the methods of heat transfer to approximately 300 students at the Cape Hatteras Elementary School Science Festival, April 7 and 8. On October 13, WUIS Van Druten showed the display and gave a slide presentation to the Dare County Association of Fire Chiefs about Firewise.

Alligator River fire staff submitted several news releases and articles to the Service's regional newsletter *Egrits* this year. Submission topics were the Firewise Conference, FY 2004 Cedar Island prescribed burns, Mashoes Road Wildfire, Highway 64 Wildfire, and Joint Fire Science Program Research Burn.

Equipment:

On February 18 the new district brush cutter tractor, a Geo-Boy with a Fecon cutterhead, was delivered to Pocosin Lakes NWR. This tractor replaces the Gyro-trac that burned up in 2002. During the summer, a fire suppression system was ordered for the Geo-boy. The system is a Tri-Max3 foam suppression that consists of a cylinder with air pressure bottle. FFEO Jeff Swain mounted the system to the machine. The burned gyro-trac was transferred to Savannah NWR to use for spare parts for other gyro-tracs in the region.

A new Flextracked fire tractor was ordered with available year-end surplus funding to replace the aging AX-2 tractor. A truck-tractor and lowboy transport trailer were also ordered for this tractor. Delivery is expected in February 2005.

A new truck was ordered for the Prescribed Fire Specialist at Alligator River.

Replacement vehicles arrived for the FMO and FCO trucks.

The FWS Region 4 helicopter was moved to Merritt Island NWR at Titusville, Florida. The Refuges in North Carolina became dependent on ARA's for Rx and wildfire suppression activities and once again had difficulty obtaining helicopters for prescribed burn activities within a reasonable distance. The Carolina Sandhills NWR helicopter was used for one set of burns at Cedar Island in March when local ships were not available. The Okefenokee NWR helicopter assisted on burns in November at Cedar Island as well. The NCFS helicopter was utilized on three wildfires at Alligator River in 2004, but our effective use of cooperator aircraft is limited due to their restricted use category.

Fire Research:

A smoke management meeting was held in July with the North Carolina Forest Service. A proposal was created to perform operational evaluation burns to evaluate V-smoke and other smoke modeling processes to be used in place of the current North Carolina Smoke Management Guidelines, with the intent of completely overhauling the current Guidelines. The FWS is taking a lead role in this cooperative research project.

FMO Crews met with Jim Reardon and Rick Stratton from the Missoula Fire Lab and looked at their Research Burn Unit at the Dare County Bombing Range. Hurricane Isabel has laid waste to all the data collections and compilation from this block due to the amount of disturbance the storm created in the area.

Regional Prescribed Fire Specialist Pete Kubiak toured the Eastern North Carolina Refuges during June 16-20. DFMO Crews hosted the tour.

In March, the Refuge learned that the Joint Fire Science Program (JFSP) proposal it sponsored was funded. The research is entitled *Development and demonstration of smoke plume, fire emissions, and pre- and post-prescribed fire fuel models on North Carolina Coastal Plain forest ecosystem* and will be conducted on Alligator River NWR and the Dare County Bombing Range over the next three years. The US Air Force Air Combat Command is also providing funding for the project. Primary researchers are R4 Fire Ecologist Dave Brownlie, Researcher Robert Mickler with ManTech Institute, and USFS Researchers Sue Ferguson and Gary Achtemier.

On September 21 to 23, the Refuge sponsored a kick-off meeting for the JFSP research burn. The meeting was held at Elizabethan Gardens with approximately 40 wildlife biologists, fire managers, refuge managers, and researchers. Day one laid out agency policies, research interests, and desired outcomes. Day two was a field day to tour ARNWR and DCBR looking at prescribed burn units and wildfire areas, fuel loading, bomb impacts, and endangered species management. Day three was a nuts-and-bolts meeting between the principal investigators and local fire managers to hammer out the details behind pulling the research off. It was determined that a three-day burn window would be required to allow for researcher notification, travel, and equipment set-up. Researchers will be traveling from Raleigh, NC; USDA Forest Service Pacific Northwest Research Station in Seattle, WA; and the USDA Forest Service Southern Research Station in Athens, GA.

As part of the research funding, a research technician was hired through Professor Heather Cheshire at North Carolina State University and will be provided office space at Alligator River NWR. Research Technician Dwight Otwell reported to the Refuge on November 8. When not directly involved with the JFSP research, he will be able to assist the Refuge with related projects.

10. Pest Control

Pest Plants

Generally, cooperative farmers use herbicides and insecticides for pest control on croplands. Pesticide Use Proposals and Chemical Use Reports are submitted on an annual basis in accordance with Service policy and guidelines.

Approximately \$30,000.00 was reprogrammed from the Everglades Restoration Project and made available to eastern North Carolina Wildlife Refuges for Phragmites control. In August approximately 60 acres of the invasive/exotic plant was treated by aerial spraying.

Regional Pilot Glen Cullingford with a two man ground support crew (fuel trailer, mixing tank) completed the spraying in one day. Spraying efforts concentrated on the area between the new Twiford Unit dike and Sawyer Lake Road/Dike. The area was heavily infested and will require follow up treatment in 2005.

An additional 15 acres were sprayed at Pea Island NWR. Five separate stands were treated during the operation. On September 18, 2004, Bob Glennon, General Biologist (Planner) inspected the sites as a follow up survey. Basically, he found the spraying to be very precise with little or no apparent damage to adjacent native marsh vegetation. He noted one stand with millet, giant bristle grass, rosemallow, smartweed, and flatsedge that received some damage. The millet and giant bristle grass are both annuals and had made seed prior to spraying. The smartweed, an annual, had not made seed, but there should be a good seed bank in the soil. The flatsedge and rosemallow are perennials and should have sufficient root reserves to come back during the next growing season.

Phragmites is a major invasive/exotic plant problem on both refuges. Continued monitoring and herbicide treatments will be necessary to gain any control.

Southern Pine Beetle

Trapping of southern pine beetles was done at 3 locations on the Refuge from late April through May. This is a cooperative effort with the North Carolina Division of Forest Resources with the Refuge's contribution being allocating time and staff to set and check the traps. Results for Refuge lands were 1.1 pine beetles per trap per day compared to 2.4 clerids (natural pine beetle predator) per trap per day. This correlated to a predicted static/low Southern Pine Beetle problem for 2004.

A flight was conducted by the US Forest Service Southern Research Station in the spring of 2004 to test some their new aerial mapping equipment and techniques. No new pine beetle spots were detected.

11. Water Rights

Mapping for eight eastern North Carolina Refuges was done in 2002 at Alligator River in support of the RTNCF Ecosystem Team's initiative to get more control in enforcing federal regulations on navigable waters located within the refuges. No further work was conducted in 2004.

G. WILDLIFE

1. Wildlife Diversity

The vast expanse of swamp forest and wetlands on the Refuge contains many important wildlife and ecological resources. Since much of the Pamlico/Albemarle peninsula was

developed by clear-cutting, peat mining, and agricultural conversion, 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. Preparation of species lists for the Comprehensive Conservation Plan revealed that, of the diverse assemblage of resident and transient wildlife, approximately 64 species are fish, 264 species are birds, 62 species are reptiles and amphibians, and 41 species are mammals. The Refuge supports wildlife species important from both a regional and a national standpoint. 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 to the American crocodile. There are no plans to manage specifically for or inventory the bald eagle at the current funding and staffing level. As opportunities present themselves, aerial nesting surveys will be conducted.

a. 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 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 2004 due to insufficient funding and staffing.

Bald eagle (Threatened): 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. Nesting did not occur in either of these nests during 2004.

Red-cockaded woodpecker (Endangered): Prior to Hurricane Isabel, trails were cut to previously tagged cavity trees south of Whipping Creek Road. Of the three known clusters on the Refuge, one produced a fledgling. None of the U. S. Highway 264 clusters were accessible during the 2004 nesting season.

Damage from Hurricane Isabel in September 2003 ranged from moderate to extensive in red-cockaded clusters. It appears that 50-70% or more of the cavity trees were blown down or broken off. It appears that most of these trees were considered as inactive trees. An assessment is being conducted to determine the need for artificial cavities. Some progress is being made as time allows to clear trails through pocosin to gain access to remaining clusters. This process is further complicated due to the fact that there is no funding or staffing allocated for such biological work on the Refuge.

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 2004 represents the 17th consecutive year of successful management. By spring 2004, the wild population had produced at least 387 wild pups, with a record 55 pups born in the wild in Fiscal Year 2004. The wild population of red wolves is currently composed of more than 100 wolves comprising 18 to 22 packs distributed across 1.7 million acres in five North Carolina counties.

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 2004, 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 2004, one third of the 1.7 million acre experimental population area has numerous red wolves and is managed as free of coyotes, while another third of the area has many wolves and any non-wolf, such as a coyote, is sterilized. This means the red wolf experimental population area is approximately two-thirds full of red wolves. 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 coordinator of the Red Wolf Species Survival Plan, Will Waddell, located at the Point Defiance Zoo and Aquarium in Tacoma, Washington. In 2004, approximately 150 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 maintained ten or more red wolves, including a red wolf family group (two to five) 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 two different owners of private land comprising 15,445 acres. These tracts of land are strategically selected to maximize monitoring of red wolves and other canids across a much larger surrounding land area in the northeastern North Carolina five county experimental population area.

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. Both Master's degree and continuing Ph.D work at the University of Idaho have identified 19 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 Trent University in Canada to model long-term survival and demographics of the red wolf population. Preliminary results from modeling show good survival rates (78% overall) among wild red wolves. This indicates the wild red wolf population will survive successfully with assistance from biologists in managing problem coyotes.

b. State Listed Endangered and/or Threatened Species

Of other species occurring on the Refuge and not federally listed, the State of North Carolina lists some as endangered, threatened, of special concern, or significantly rare. Although the Refuge is not managed for all of these species, present practices do provide benefits for many of them. Species occurring on the state list and Refuge are:

Least tern (Special Concern); **Common tern** (Special Concern); **Gull-billed tern** (Threatened); **Black skimmer** (Special Concern). These species are not likely to be seen on most of the Refuge. They may be observed flying over the waters of Pamlico Sound, Croatan Sound, Albemarle Sound, Alligator River, and creeks and lakes within the Refuge. There are no sites suitable for nesting on the Refuge.

Little blue heron (Special Concern); **Snowy egret** (Special Concern); **Tri-colored heron** (Special Concern). These species are found around canals and on creeks throughout the Refuge. Very little is known about numbers of birds on the Refuge. Nesting has not been documented on the Refuge.

Glossy ibis (Special Concern): The glossy ibis can be found in fields within the farm units. Very little is known about numbers of birds on the Refuge. Nesting has not been documented on the Refuge.

Peregrine falcon (Endangered): The Arctic peregrine, *Falco peregrinus tundrius* can be observed on the Refuge with some regularity. Nesting does not occur on the Refuge.

Timber rattlesnake (Special Concern): The timber rattlesnake is found throughout the Refuge and is common relative to other snakes. Little is known about the life history of this species on the Refuge.

Pygmy rattlesnake (Special Concern): The pygmy rattlesnake has not been documented on the Refuge, but has been found in Hyde County. Since the Refuge extends into Hyde County on the southern end, it is conceivable that the species could occur on Refuge land.

Carolina water snake (Special Concern): The Carolina water snake is found throughout the Refuge in canals, marsh, creeks, and other water bodies where there is an adequate food supply. Little is known about the life history of this species on the Refuge.

Diamondback terrapin (Special Concern): The diamondback terrapin is found along the estuarine borders of the Refuge. Little is known about the life history of this species on the Refuge.

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. A large number of waterfowl species can be found on the Alligator River and the associated sounds during winter months. The addition of the 5,100 acres of farmland in 1988 substantially increased opportunities for waterfowl management on the Refuge. 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 given in the table below. Except for coot, all species showed a decrease in use during the 2003-2004 survey period in comparison to the 2002-2003 survey period. Most species continue to show lower use in comparison to the 5-year and long-term averages. This trend is consistent with Pea Island NWR waterfowl data.

Composition of wintering waterfowl at Alligator River NWR during the 2003-2004 survey period in Dare and Hyde Counties, North Carolina.

SPECIES	PEAK PERIOD	<i>SURVEY</i> PEAK #	# USE DAYS 2003-04	% TOTAL USE DAYS 2003-04	USEDAYS % diff from 2002-03 avg	USEDAYS % diff from long-term avg
Tundra Swan	Jan	1,205	52,858	13.0	-25	+11
Snow goose	N/A	0	0	0	N/A	N/A
Canada goose	N/A	0	0	0	N/A	N/A
Mallard	Dec	218	10,829	2.7	-50	-76
Black duck	Dec	223	8,354	2.0	-5	-62
Gadwall	Jan	69	2,456	0.6	-1	-74
Wigeon	Jan	208	4,082	1.0	-42	-69
Pintail	Dec	6,397	182,599	44.8	-2	-19
GWT	Jan	3,589	131,388	32.2	-23	-30
BWT	Dec	2	53	0.0	N/A	-93
Shoveler	Feb	58	2,358	0.6	-51	-5
Wood duck	Dec	11	141	0.0	-95	-99
Ringneck	Jan	297	7,246	1.8	-23	-88
Redhead	N/A	0	0	0	N/A	N/A
Canvasback	N/A	0	0	0	N/A	N/A
Scaup	N/A	0	0	0	N/A	N/A
Unknown	Dec	140	5,140	1.3	+270	-76
Bufflehead	N/A	0	0	0	N/A	N/A
Ruddy	N/A	0	0	0	N/A	N/A
Merganser	Jan	4	55	0.0	-51	-35
Coot	Mar	24	322	0.1	+257	+24

In order to assess the quantity and quality of moist soil plants for waterfowl during the 2003-2004 wintering period it is necessary to examine vegetation data from the fall of 2003. Food production in the moist soil units was good to excellent as most units contained a frequency of occurrence of good to fair waterfowl plant species within an overall range of 67%. This frequency correlates well with the portions of farm fields that can be effectively managed for moist soil vegetation. Shaping of the farm fields for surface drainage resulted in about 1/3 of each field being too high and dry for cost-effective moist soil management.

The table below shows the frequency of occurrence for moist soil unit plant production during the 2003 growing season at Alligator River National Wildlife Refuge.

Alligator River National Wildlife Refuge				
Moist Soil Waterfowl Food Production (2003-2004)				
Moist Soil Unit	Frequency of occurrence (%)			
	Good	Fair	Non	Other
South Twiford Unit A	17.4	43.6	37.5	1.6
South Twiford Unit B	38.4	36.0	25.2	0.4
South Twiford Unit C	16.5	34.4	47.9	1.2
South Twiford Unit D	35.0	36.2	28.8	0
South Twiford Unit E	21.5	37.9	34.6	6.0
North Twiford Unit A	12.3	42.2	39.5	6.0
North Twiford Unit B	36.0	32.8	30.5	0.64
North Twiford Unit C	42.2	25.4	32.2	0.20
North Twiford Unit D	24.0	17.8	55.1	3.1
Creef A-1 North	29.8	39.8	16.1	14.4
Creef A-1 South	56.0	6.5	28.3	9.1
Creef A-2	41.9	31.2	12.8	14.1
Average =	29.7	37.3	25.2	7.8
Overall food production	67.0		33.0	

With regards to moist soil management, only 30%-50% of each unit can be flooded by gravity flow. Since there are no pump stations capable of pumping water into the units, the remaining increases in water level are due to rain. As the wintering period progresses it is

interesting to note that the higher elevation moist soil units gradually become flooded and waterfowl use shifts to these units. However, these units have considerably lower use overall when averaged over the season. If water becomes too deep in a moist soil unit, dabbling ducks either quit using it or just use it for resting and loafing. Since habitat conditions were good to excellent throughout the wintering period, it is not likely that food sources were limiting use.

Vegetation data were not collected during the fall of 2004 due to changes in management and management strategies.

Incorporation of filter strips on each side of each farm field during the 2000 growing season has been very beneficial for grassland birds and other wildlife. An unpredictable consequence of these filter strips (75 feet wide on each side of the field) is the effect they had on field use by tundra swans. These filter strips effectively reduced field width to half of the original 150 ft. width. Annual and perennial weeds growing in these filter strips attain heights that "enclose" the fields, making them too narrow for use by swans. Future management of these filter strips for shorter, grassland communities should solve this problem.

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. 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.

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 provided that water levels are kept at appropriate levels for dabbling ducks. 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. The anhinga has been observed on the Refuge on rare occasions. Although not documented for several years, anhinga nesting has been observed on at least one occasion within the southern portions of the Refuge. 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 are the red-tailed hawk, red-shouldered hawk, and northern harrier (marsh hawk). The kestrel and merlin are also common species. Owl species include great-horned owl, barred owl, short-eared owl, and screech owl. Peregrine falcons are known to move through the general area during migration. A few reports of peregrine falcons occurred during 2004. During late

2004 some preliminary effort went into establishing grassland bird and raptor surveys in the farm fields. An attempt will be made to finalize routes and protocols during 2005.

7. Other Migratory Birds

The Refuge is host for migratory species such as the mourning dove. Several species of rails are found in the moist soil units, and woodcock may be found throughout. In addition, the vast expanse of forested habitat on the Refuge provides for a wide range of neotropical migrant birds. There are plans to begin neotropical migrant bird surveys as soon as budgets and staffing permit.

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 they are providing sportsmen with considerable recreational opportunity. A study to estimate the Refuge population of black bears is underway and a management plan will be drafted in the coming year.

The ecosystem bear study entered the fifth year. Hair traps were constructed in late 2002 and early 2003. During the summer of 2003, 1,479 hair samples were collected from 71 traps over a period of 8 weeks. Sampling in the summer of 2004 over an 8-week period resulted in 1,807 hair samples from 70 traps. Following the 2004 hair collection season, genetic analysis will be done during the winter of 2004-05. A report with management recommendations will follow. Dr. Mike Vaughan of Virginia Tech is the principal investigator with graduate student Catherine Treddick conducting most of the field work.

10. Other Resident Wildlife

Wild turkeys were rarely observed during the spring and summer. However, in the fall and winter, flocks of 6-20 birds were observed in various locations. Other turkeys were observed over much of the northern half of the Refuge, even along roads transecting pocosin habitat. Group size varied from 1 to 6 birds. Turkey numbers appear to be stabilizing since the restoration project began in 1999 with the release of 16 birds.

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 issue. Beaver population management practices have been implemented and will most likely become a permanent component of Refuge management activities.

16. Marking and Banding

Brown Pelican banding, although not done on the Refuge, was supported at Oregon Inlet by Refuge staff and equipment. Trip leaders John Weske and Micou Brown have been banding pelicans throughout their range for numerous years. In June, 1,635 Brown Pelicans were banded and in July, 585 were banded. The banding consists mostly of juvenile birds with an average of 2 adults being captured and banded per trip. In addition 2 young Osprey were banded from a nest atop a channel marker in Oregon Inlet.

H. PUBLIC USE

1. General

Public use trends continue to move upward in the non-consumptive areas. Local groups including the Outer Banks Paddlers Club and the North Banks Bird Club use and promote the Refuge through a variety of means. The Milltail Creek Canoe/Kayak Trail system has been especially popular.

Total visits to the Refuge in 2004 were estimated to be 42,318. Administrative offices for the Refuge remain in the General Services Administration (GSA) leased office space in Manteo. A few visitors continue to locate the office, but most information is disseminated through web pages, telephone, correspondence, or the news media. During 2004, the Refuge continued to focus on providing a greater number of media contacts while keeping the messages short and simple. A total of 56 news releases were distributed; and multiple radio spots were done on NPR to promote Wings Over Water.

WIS Salewski and WIS Ahlfeld participated as members of the Roanoke-Tar-Neuse-Cape Fear (RTNCF) Ecosystem Outreach Committee, the Outer Banks Paddlers Club, the North Banks Bird Club, and the Cape Hatteras Bird Club. Their participation in these organizations goes a long way in promoting the refuges, and soliciting volunteer participation for Refuge projects.

2. Outdoor Classrooms – Students

Creef Cut Wildlife Trail and Sandy Ridge Wildlife Trail are used frequently by groups of students on the way to and from the Outer Banks from inland areas. Both trails are safe and accessible places where children can stretch their legs, work off some energy from a long bus ride, and learn something in the process. Some of these groups contact the Refuge to request a leader to work with their groups. As staff time allows, and as volunteers are available, these requests are usually met. A growing number of schools are also making the Refuge their ultimate destination, and are requesting a variety of programs. During 2004, 91 students from five schools were taught on-site at Alligator River 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 here are hounded constantly to attend such functions. For this reason, the Refuge has chosen to focus more on other educational needs rather than attempt to compete with other conservation agencies.

4. Interpretive Foot Trails

Sandy Ridge Wildlife Trail and Creef Cut Wildlife Trail continue to be used by 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. Refuge staff attempted to increase use of the trails by offering programs and guided hikes on these trails for special groups and the visiting public in 2004.



The Sandy Ridge Trail provides a nice creekside boardwalk through forested areas of the Refuge. Damage from Hurricane Isabel in 2003 is still evident.

KLW

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 a local business rented canoes or kayaks, use would increase dramatically. However, there is not a demand great enough to consider a concession for this purpose. Three local businesses were issued special

use permits (SUP) to conduct guided canoe or kayak tours on the Milltail Creek Canoe/Kayak Trail System during 2004. Approximately 10,614 visitors participated in guided tours provided by the holders of these SUP's.

Approximately 21,000 people used Alligator River NWR walking trails during 2004. It is anticipated that there will be a continued increase in trail use on the Refuge. Approximately 13,000 visitors used the paddling trails, and 26,250 used the Wildlife Drive.

6. Interpretive Exhibit/Demonstrations

Refuge staff manned displays and exhibits at various annual events around Dare County and eastern North Carolina. Interpretive Specialists and staff from the Red Wolf Program were able to participate in conservation-themed festivals, including the NC Aquarium's Earth Day event (400 visitors), South East Wildlife Expo (10,500 visitors), Engelhard Seafood Festival (2,000 visitors), Currituck Wildlife Art Show (750 visitors), New Bern Wildlife Art Show (10,000 visitors), Scuppernong Festival (10,000 visitors), Eastern North Carolina Wildlife Show (4,000 visitors), Dixie Deer (10,000 visitors), Walk for Wildlife (500), Fun and Safety Day (1,000), and the Manteo and Mann's Harbor Christmas parade. Specialists Ahlfeld and a Public Use Intern also participated in the FWS booth at the NC State Fair.



Refuge Secretary Anicia Martinez speaks to Wildfest attendees.

BS

In addition, as part of the Wings Over Water festivities, the Refuge hosted the annual Wildfest, held at Manteo Middle School. Wildfest had numerous exhibitors such as Outer Banks Birdwatchers, the Red Wolf Recovery Program, Pocosin Lakes National Wildlife

Refuge, Master Gardener's Club, and the Dare County Arts Council. Children's activities included a critter call contest, face painting, and the fire crew's relay race.



FMO Tom Crews uses his artistic ability to create a wildlife image on a young Wildfest participant. BS

The Refuge exhibit located at the Aycock Brown Welcome Center in Kitty Hawk were viewed by 273,090 visitors during 2004.

Regularly scheduled interpretive/educational programs for the Refuge during 2004 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 and fishing program were offered. Despite the best efforts of the public use staff and their interns, the fishing program did not attract any interest, while the bear program generated more interest than we could accommodate. Next year, WIS Ahlfeld will revamp the Alligator River program schedule to attempt to attract more people to the Refuge.

Alligator River NWR Public Use Programs

Program	No. Programs	No. Participants
Red Wolf Howlings	15	1,278
Canoe Tours	24	232
Bear Necessities	10	263

7. Other Interpretive Programs

Alligator River received very little interest from schools in 2004. In addition to the Turtle Talks during the Manteo Elementary science fair, WIS Howard presented a Careers talk to the Manteo High School Wildlife Club, upon their request. It seems as though in order to attract teachers' interests, Refuge staff must heavily promote Refuge programs to the schools (as was done in 2003).

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, during September and October, as open to all authorized uses except waterfowl hunting. Creef and Twiford Units 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 ratios of lands open to still hunting and lands open to chase dog hunting have remained approximately the same.

Quail and rabbit hunting opportunities increased this year with the opening of the Laurel Bay Farm Unit to additional hunting activities. This unit was opened for walk-in hunting year-round during seasons for legal species, with vehicles also allowed September-October 2004, and February 2005. A lot of new used was noticed with this opening. Small game hunting is primarily for raccoon, squirrel, quail, and rabbit.

For the thirteenth 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. During 2004, Specialist Strawser updated the hunting leaflet.

Special Use Permits were issued to two handicapped individuals this season to facilitate hunting access within the Twiford Farming Unit. A special lock was placed on the gate at River Road to allow them to pull their truck inside the gate and unload a four wheeler for use in specific areas.

White-tailed 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 cooperator 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 these figures, provided by the NCWRC, it was estimated that 50 deer were taken during the 2004 hunt.

This year was Dare County's fourteenth annual bear season since the NCWRC and County Commissioners reinstated a bear season. 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.

Archery season ran from September 13 to October 10. Muzzleloader season lasted October 11-17. Regular gun season began October 18 through January 1. 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 1-4, November 8-29, and December 13 – January 24. A limited amount of waterfowl hunting took place on the Refuge, but most occurred over open water in the sounds and in Milltail Creek. The farm fields were open to public use during October; however, the area was closed to waterfowl hunting.

Though the regional hunting policy for youths has been difficult to enforce, the fact that Dare County Schools already had 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 Cagel 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.

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.

Estimated public hunting activity appears below:

Activity	Visits
Waterfowl	4840
Big Game	821
Upland Game	127

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 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 2004, there were an estimated 3,861 fishing visits to the Refuge. Frog gigging is allowed on the Refuge by special use permit.

10. Trapping

In 2004, a review of the trapping program resulted in the realization of non-compliance with policy. A trapping plan has not been completed for the Refuge. After checking with FWS officials at the regional and national level and determining that outside of subsistence trapping in Alaska, only four NWR's allow trapping for purely recreational purposes. A letter was sent to the 2003 trapping permit holders to advise them of the change. Beginning this trapping season, the only species legal to trap on Alligator River NWR are beaver, muskrat, and nutria.

11. Wildlife Observation

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

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.

The following figures represent wildlife/wildlands observations during 2004:

Activity	Visits
Foot	21,000
Vehicle	26,250
Boat	13,000

17. Law Enforcement

During 2004, the last dual-function officer, Kelly Van Druten, gave up her federal law enforcement commission. Law enforcement was conducted on the Refuge by Refuge Officer Jeremy Bucher with occasional assistance from Refuge Officer Chris Smith of Mattamuskeet National Wildlife Refuge and Mark Cagle of the North Carolina Wildlife Resource Commission.

In March, a meeting was held between area Refuge management, law enforcement personnel, and the new Regional Chief of Refuge Law Enforcement. During this meeting, the long-standing conflict between the Division of Law Enforcement and Refuges regarding case management was resolved. Refuge Officers are now authorized to issue citations in the field for refuge violations, and oversee their cases throughout the prosecution process.

During the year, Officer Bucher attended various training programs including FLETC's Survival Shooting Training Program, and S130 / S190. Officer Bucher provided general firearms instruction during the regional in-service training and was the lead instructor for the Bushmaster M-4 Carbine transition course. Officer Bucher also developed the Region 4 remedial firearms training course.

As a member of the Region 4 SORT team, Officer Bucher was deployed for security and protection details during the G8 Summit in Savannah, Georgia and to Florida during Hurricane Frances. Officer Bucher also completed a security detail at Vieques NWR, Puerto Rico.

Throughout the year, Officer Bucher assisted local law enforcement agencies on numerous occasions. These activities included participating in a body recovery effort on the Albemarle Sound, translating for a Spanish speaking victim of an assault, and tracking a man suspected of possessing a stolen vehicle who fled into the Refuge's swamps.

The following figures represent the case breakdown for violations during 2004. This table does not include numerous verbal warnings that were given for minor infractions.

50 CFR Violation	Description	Number of Cases
50 CFR 28.31	Violate Rule, Provision or Sign	3
50 CFR 26.21	Trespassing	3
50 CFR 27.31	Vehicle Violations	5
50 CFR 27.42(b)	Transport Loaded Firearms	2
50 CFR 27.51(a)	Collecting an Animal on NWR	1
50 CFR 27.94(a)	Littering	2
50 CFR 27.41	Discharge Firearm on NWR	2
50 CFR 32	Hunting Violations	7

18. Cooperating Associations

FY 2004 for the Coastal Wildlife Refuge Society (CWRS) noted the following accomplishments:

During the year, CWRS spent \$160,000+ on Refuge projects, including the following:

- \$25,836 to the Service to fund an Interpretive Specialist position
- \$ 7,085 for outreach

- \$431 for Visitor Center projects
- \$482 for misc. materials and supplies for educational/interpretive programming
- \$1,686 for staff support
- \$29,061 for Wings Over Water support
- \$4,006 for a Ducks Unlimited project on Mackay Island NWR

The CWRS continued to hold \$90,000 of the original \$95,000 donation (i.e., 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 Society also continued to include in their budget a line item of \$120,000 for planning of the new Visitor Center on Roanoke Island.

The Sales Outlet located at the Pea Island visitor center grossed \$113,437 in sales during 2004. Other income sources were donations - \$6,684; interest - \$575 canoe fees - \$12,140; Wings Over Water - \$12,238; grants - \$5,000; and reimbursements - \$6,822 (includes \$4,716 reimbursement from Refuge for intern stipends).

Society Secretary Dru Ferrence and Refuge staff Bonnie Strawser traveled to Monroe, Louisiana in April for a regional Friends Conference at Black Bayou National Wildlife Refuge. Dru was invited to sit on a panel discussion representing mature and established Friends groups. Dru answered questions in regards to board recruiting and selection, start-up, legalities, and what sells in the book store.

Current membership remains constant at approximately 800 while the constituency is well over 5,000. The Society is represented in 49 states and at least 13 countries. During 2004, great strides were made in creating a membership database using Microsoft Access, which will help the Membership Chair in updating information.

I. EQUIPMENT AND FACILITIES

1. New Construction

Staff hauled, spread, shaped, graded and compacted material to construct a new work camper pad in the Laurel Bay Farm Unit. The pad includes parking as well as electrical, plumbing and sewage hookup facilities for three recreational vehicles. The site also includes a prefabricated "commons" area cabin that offers laundry and computer access functions for Refuge volunteers and interns.

Refuge staff rehabilitated a boat launch area at Milltail Creek for use by canoes, kayaks and small boats. The area provides access to the creek and Milltail Lake.

2. Rehabilitation

The Navy Shell and Milltail Creek bridge replacement projects were completed in March 2004. Both bridges allow for one lane of traffic use, and were built to provide safe transit of all Refuge vehicles and loads for all management activities. They also provide safe access to interior portions of the Refuge for the visiting public. Requests from the USAF to provide access to Refuge roads and bridges for commercial logging trucks has been denied due to impacts that would result from this use.

The Federal Highway Administration Project for Refuge road rehabilitation (from ERFO monies - 1999 storms) was completed in April 2004. A total of \$3,275,000.00 was approved for repairs to primary/arterial roads and designated as Disaster NC 2000-1-FWS. The Eastern Federal Lands Highway Division completed all designs and bid solicitations. In October 2002, funding was reduced to \$2.3 million and a contract was awarded to Aldridge Brothers, Inc. of Robbinsville, NC. Repairs included hauling, spreading, compacting and grading materials to elevate 23 miles of Refuge roads back to prior storm grades. The final six inch layer of compacted gravel aggregate now provides all weather use for public use and Refuge purposes. The width of applied aggregate varies from 16 – 24 ft., depending on the base width of the individual road. During the repairs of Milltail Road, a 90 foot section of the road (120 ft. NE of the new Milltail Creek bridge), collapsed and became impassable. Monies from the original contract were used to complete emergency repairs to the collapsed portion of the road. Negotiations with the Federal Highway Administration and our Regional Office resulted in funding (130K) to make the remaining two miles of road repairs on the original contract. An on-site meeting was held in March 2004 with Jo Ann Clark (Southeast Region Road Coordinator) and Dorothy Germain (ERFO Coordinator) to evaluate the need for repairs of the additional mileage (59.5 miles) identified in the initial inspection.

Refuge Operations Facility restroom / septic rehab project: The original maintenance (operations) facility restroom was designed to support six to eight employees. As Refuge operations expanded (Fire Management, Red Wolf Recovery, etc.) it became apparent that the "one-hole" unisex restroom was inadequate. Twenty to 25 employees use the facility on a daily basis. During major fire events and climatic events (hurricane recovery), the problem increases with the facilities becoming nonfunctional. Complete rehabilitation of the facility was funded through the Maintenance Management System (MMS) at \$55,500.00. Waldt Construction, Inc. of Point Harbor, NC was the successful bidder. The elevated drainfield, expanded septic tank system, and lift pump components were designed and permitted by the Dare County Health Department. The design for the expansion of the restroom facilities was completed by the Region's Division of Engineering. The Project was completed on time and meets specifications. The single, original restroom did not need rehabilitation. The old locker room, janitor's closet, and non-ADA compliant shower was converted to an additional restroom and storage room. An OSHA approved eye wash/dump shower was installed in the main maintenance area as part of the contract. The system is functioning as designed and the Operations Center staff is pleased with "his" and "hers" restrooms and not having to call the septic tank pumper on a monthly basis.

Dike rehabilitation project in South Twiford impoundment units C, D, E, and F: Unit E was divided into two units, creating Unit F. Total linear footage of dike constructed in the four units is estimated at 33,500 feet. Excavation of new dike material is completely excavated and shaped, but minor touch up and seeding remains to be done. A 48 inch diameter culvert (with flash board riser) was installed in each unit to allow for water level manipulation in each individual impoundment. All four units were shallow flooded (in conjunction with other management units) in October 2004 for the wintering waterfowl season). The shallow flooding was used to prevent any unnecessary erosion on the new dikes, as well as providing wintering waterfowl / shorebird / wading bird habitat. All units received very good usage. Approximately 4,000 linear feet of the pre-existing dike remains to be reverted back to field levels.

Reinstalled two newly rebuilt (Creef #1 & Laurel Bay #2) diesel pump engines.

Continued residual / ongoing clean up / tree removal efforts resulting from Hurricane Isabel (September 2003)

Upon completion of the Milltail Bridge and road projects, the Milltail Bridge boat access / launch area was rehabilitated to provide better parking and access for the visiting public as well as Refuge operations. About 350 cubic yards of fill material and 60 cubic yards of gravel were hauled, spread and compacted to complete the job.



The Milltail Creek boat launch site had become unusable before rehabilitation.
KLW



The improved site provides easy access for fishermen and paddlers.

JL

3. Major Maintenance

- Removed canal culvert from intersection of Grouse and Bear Roads.
- Removed / disposed of deteriorated Sandy Ridge Gut Bridge.
- Beaver dam at the intersection of Blueberry and Milltail Roads required clean out of the culvert at least once monthly, sometimes more often. The Caterpillar long reach excavator has to be moved and utilized in order to clean out each time.
- Installed newly rebuilt electric motor on shop air compressor.

4. Equipment Utilization and Replacement

- Received and put in service two Fire and four O&M vehicles.
- Hauled, spread and graded fill material (in holes, problem spots, etc) on: Deep Bay, Cypress, Bay, Cedar, Possum, Pump and Laurel Bay Roads. Other road maintenance included grading approximately 375 miles on Refuge roads, as well as seasonal mowing of all road shoulders. Additionally, boomaxe mowing of road shoulders was done based on need to have particular roads accessible for Refuge Operations as well as high public use areas.
- Service, maintenance or repairs to vehicles – 48.
- Service, maintenance or repairs to equipment – 57.
- Extensive amounts of rainfall contributed to a combined total of 3,875 hours of pumping on four pumps in the farm field management units. In the Creef management unit (pump station), engine 1 ran 1,077 hrs. and engine 2 ran 677 hrs. for a combined total of 1,754 hrs. In the Laurel Bay Unit, engine 1 ran 1,086 hrs. and engine 2 ran 1,035 hrs. for a combined total of 2,121 hrs. Routine service interval of

- each engine is every 250 hours. Each service costs about \$65.00 in materials alone. The average fuel consumption is 2.8 gallons/hour for these pumps.
- Disked approximately 250 acres of fields and mowed about 150 acres of field filter strips of the Twiford and Creef Management Unit farm fields, Utilized two 16 inch diameter trailer mounted water transfer pumps (and diesel engines) to shallow flood approximately 1200 acres of the Twiford and Creef Management Unit farm fields. Both exercises were an effort to enhance waterfowl / wading bird usage / habitat and provide access to "hot" (high protein) food supplies for the wintering population.
 - Mowed V-ditches, disked impoundments, and managed water levels in North Twiford, South Twiford, Creef A1 (north and south), and Creef A2 management units in preparation for annual waterfowl and shorebird migrations.
 - Traded dirt for gravel with Buxton maintenance (NPS), hauled and spread (approx. 100 ton) of gravel for entrance of Laurel Bay Road.

5. Communications Systems

The legal mandate to convert to APCO 25 Standards (wide band analog communications to narrow band digital) was completed and became functional in 2004. Originally, the project was funded through the Maintenance Management System (MMS) in FY02 at the \$344,700 level with \$36,700 going to the Denver Communications Center (DCC) for administrative overhead-design, support, contract compliance, etc. The project was complicated and time consuming with extensive intra-service and partner (NPS, USFS, USCG, USAF, USN, NCFS, etc.) coordination.

The initial planning meeting was held June 18, 2002 at the Manteo Administrative Office. Attendees included Alligator River NWR staff, staff from surrounding refuges, DCC personnel, and National Park Service staff. It was decided that initial purchases would be for system-wide infrastructure equipment: repeaters, base stations, antennas (towers), computer and software for programming, system-wide dispatch update, etc. VHF and UHF repeaters were installed at Cedar Island NWR; Engelhard, NC; Columbia, NC. These repeaters were linked together as a Wide Area Network (WAN). This linking of repeaters provided communication capabilities from Cedar Island NWR (70 miles south of Alligator River NWR) to Back Bay NWR in southeast Virginia. Base stations were installed at the Manteo Administrative Office, East Lake Operations Center, Red Wolf Recovery field station, Pea Island NWR operations facility, and the Pea Island NWR Visitor Center. Fourty five (45) foot towers with antennas were installed at each site. Solar panels were installed at the Red Wolf Recovery field site to provide power for operations. All installation was contracted to Motorola FGMA, Hanover, Maryland or their subcontractors.

After the infrastructure was in place, subscriber units (mobiles and portables) were purchased. Sixty (60) mobile units (Motorola Astro Spectra series) were installed in Refuge vehicles, watercraft, fire management vehicles and equipment, and Red Wolf Recovery vehicles. Twenty (20) portable units (Motorola XTS 5000 series with keypad/field programming option) were purchased. Digital Motorola Desktop Control Units (MC 3000 series) were installed at all office sites. UHF (450-474 Mhz) were purchased and installed in

designated law enforcement vehicles and watercraft. These units provide 24/7 communications with the Dare County Sheriff's Office and NPS law enforcement Rangers.

Programming of subscriber units was the next to last phase of the project. Basically, each unit was programmed to Five (5) Zones with capabilities of sixteen (16) frequencies in each zone. The zones were for Refuge operations, fire management, law enforcement (secure), Red Wolf Recovery, and wide area for use of linked repeaters. During this phase, a separate Fire Management frequency (162.2375 Mhz) was approved for Service use.

The last phase of the project focused on training of Refuge personnel and implemental use of the new system. Transition to the new equipment and capabilities took time for personnel to adjust, but expanded range and unmatched clarity of digital transmissions was well worth the time and effort(s).

Through most of the project, Automotive Worker Alan Emery served as Project Coordinator. His understanding/knowledge of ever changing technology was the key to having a functional system. After his transfer in 2004, Forestry Technician (Firefighter) Cory Waters was designated Alligator River NWR's Radio Coordinator.

Based on the objectives established at the onset of system-wide project (Employee Safety, Resource Protection, Visitor Safety, Operational Efficiency), the system is functioning as designed and meeting those objectives.

6. Computer Systems

Staff installed a "hard line" network system to link all computers in the Operations Facility. All permanent employees at Alligator River NWR have access to the internet and Lotus Notes e-mail.

8. Other

- Exchanged equipment (sometimes personnel) with Mattamuskeet, Pocosin Lakes, Roanoke River, Mackay Island, Carolina Sandhills Refuges, Navy Dare Bombing Range (DOD) and the National Park Service.
- All station Wage Grade employee position descriptions were reviewed by a contract personnel specialist as part of the Regional Wage Grade audit process. The end result of the audit / review was upgrades of four positions:
Work Supervisor Creef - WS 7 to WS 9
Engineering Equipment Operator Craddock - WG 8 to WG 10
Engineering Equipment Operator Govan - WG 8 to WG 9
Tractor Operator Ralph - WG 5 to WG 6
- EO Craddock and WS Creef assisted Regional MOCC Coordinator Richard Blackburn as instructors in a Regional MOICC training session held in Eufaula, Alabama. In this session, an additional 18 instructors were certified to be instructors in Region 4.
- EO Craddock instructed during a MOCC session at (hosted by) Alligator River NWR.

- WS Creef instructed in Regional Heavy Equipment training sessions; continued duties as National Wage Grade representative on the Leadership Development Council; continued duties on Southeast Region's WG Advisory Committee; assisted (as instructor) with Basic Refuge Manager Academies and with one session of WLD 5100 (Workshop for Maintenance Professionals) at NCTC.
- WS Creef instructed in two Heavy Equipment Training sessions – one at Alligator River NWR, one at Roanoke River NWR.
- Staff assisted in all aspects of the station's Fire Management Program, including the Big John and Barge Canal wildfires.
- WS Creef and ARM Wigginton assisted Mackay Island NWR with planning improvements in the Kitchen Impoundment.
- Staff assisted with Wings Over Water, Wildfest, Christmas parades, and Sierra Club activities.
- Staff completed annual Regional and National (RPI, MMS, RONS, Capitalized Property Management, Fleet Management, RCAR, OGM, Energy Conservation) data requests.
- Monitored Pea Island (North Pond) bulkhead project.
- EO Craddock and LE Officer Bucher assisted Tyrell County Sheriff's Department in Search and Rescue (Boat operation) efforts to locate a missing fisherman on the Albemarle Sound.
- Staff attended the annual Standards for Survival training at Pocosin Lakes NWR
- Staff attended CPR / First Aid training.
- Automotive Worker Alan Emery accepted a lateral transfer to Chesapeake Marshlands Complex in Region 5.
- EO Craddock, EO Govan, EO Powers, and Tractor Operator Ralph attended a NC State "escort vehicle" certification class in Elizabeth City, NC. This certification is required in order to meet other requirements to escort an oversize load on State Roads.
- EO Powers and Tractor Operator Ralph attended chainsaw training at Pocosin Lakes NWR.
- EO Powers and EO Govan traveled to Florida to assist with disaster (relief) recovery projects.
- WS Creef, EO Craddock and Tractor Operator Ralph attended ATV training .
- Staff monitored and maintained all Alligator River impoundment water levels.



Debris from the adjacent Dare County Construction Landfill is a constant issue with proper water flow through Refuge culverts. K LW

J. OTHER ITEMS

1. Cooperative Programs

Wildland-Urban Interface (WUI) Program

During the summer, WUIS Van Druten did a wildland/urban interface risk assessment for Stumpy Point, which is federally designated as a Community at Risk. A risk assessment is the first step in becoming a recognized Firewise Community. On September 28, WUIS Van Druten gave a presentation to the Stumpy Point Civic Club to convince Stumpy Point to participate in the Firewise Communities/USA Recognition Program. The meeting was not well attended, but a few people expressed interest in the program and follow-up efforts are in progress.

On August 4, the District learned that funding in the amount of \$154,000 for four WUI projects would be available in FY 2004. Alligator River was funded \$4,000 for a cooperative agreement with the Dare County Fire Marshal to develop and implement a Firewise workshop in Dare County and \$85,000 for the Stumpy Point Firebreak Rehabilitation and Maintenance project. The firebreak funding was shifted to FY 2005 funding because of contracting difficulties (see Fire Contracting). A district project was funded \$5,000 for a grant with the North Carolina Cooperative Extension Service to develop and print a landscaping pamphlet that will include a list of native North Carolina plants with wildlife and flammability attributes and information on Firewise landscaping. Mattamuskeet National

Wildlife Refuge was funded \$63,000 for a WUI Community Risk Assessment at Cedar Island National Wildlife Refuge. Project bids were much lower than anticipated and the final project was funded for \$21,762. Actual contracted WUI project funding came to \$30,762 for FY 2004 and \$71,280 to begin FY 2005.

In July WUIS Van Druten initiated an informal meeting between the North Carolina Forest Service Dare County Ranger Jamie Dunbar, Dare County Fire Marshal Doug Remaley, and National Park Service Forestry Technician Rich Kenner to discuss the formation of a local Wildland-Urban Interface Council in Dare County that would promote and coordinate education and outreach efforts on wildland-urban interface issues, prescribed burning, and fire prevention. The group, now called the Dare County Firewise Council, has been meeting monthly since August and has expanded to include local representatives from the North Carolina Cooperative Extension Service, The Nature Conservancy, Dare County Association of Fire Officers, Dare County Emergency Management, Albemarle Area Independent Professional Insurance Agents Association, and the Outer Banks Home Builders Association. On December 6, WUIS Van Druten gave a presentation to the Dare County Commissioners about the Dare County Firewise Council.

Rural Fire Assistance Program

District 1 received \$37,231.84 in 9265 Rural Fire Assistance (RFA) Funding. This funding was allocated to nine cooperating fire departments that support five of the refuges in the district. Stumpy Point Volunteer Fire Department (VFD) received \$2,531.84, bringing their total RFA since FY 2001 to \$12,031.84. The department utilized the funds to purchase two portable pumps and some additional PPE clothing.

In July, WUIS Van Druten met with the Stumpy Point VFD to discuss the Firewise Communities/USA Recognition Program and received their help to arrange a meeting with the Stumpy Point Civic Club.

Manns Harbor VFD is also a participant with Alligator River NWR in the RFA program. The department assisted the Refuge during the Mashoes Road Wildfire by providing an engine to protect power poles during burn out operations from the road.

Black Bear Study

The already described black bear study currently is the primary non-fire cooperative program on the Refuge. However, the Refuge Biologist frequently coordinates with the North Carolina Wildlife Resources Commission on various projects. For example we assist with collecting data from road-killed black bears and providing the data to the appropriate staff person. In addition, we are cooperating with a graduate student from N. C. State University who is studying the black bear mostly on private property bordering the Refuge on the southern boundary.

3. Items of Interest

Refuge staff met with State and Dare County Range officials regarding a proposed bear hunt on Dare County Game lands in fall of 2005.



Refuge Staff hosted a party to make Refuge Manager of the Year Mike Bryant Refuge King for a Day. The event was held in good spirits and enjoyed by all.
KLW



Lisa Mandell and daughter Marissa Mandell Donohue present a donation check from the heirs of Adele Gould Mathers (former Refuge Volunteer) to Tom White, Jr., President of the Coastal Wildlife Refuge Society and RM Mike Bryant. In addition to the funds donated by the family, seven-year-old Marissa had a yard sale and raised \$75 for the cause.

KLW

4. Credits

This Annual Narrative Report was compiled by DRM Whaley, edited by Park Ranger Ahlfeld, with a joint effort by the entire staff to provide data and information.

PEA ISLAND NATIONAL WILDLIFE REFUGE

Manteo, North Carolina

ANNUAL NARRATIVE REPORT

Calendar Year 2004

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

INTRODUCTION

Formally established as the Pea Island Migratory Waterfowl Refuge, the 5,915 acre area was designated "as a refuge and breeding ground for migratory birds and other wildlife ..." by Executive Order 7864 from President Franklin D. Roosevelt, dated April 8, 1938. Presidential Proclamation No. 2284 on May 11, 1938 also closed 25,700 acres of adjacent Pamlico Sound waters to all migratory waterfowl hunting.

Known today as Pea Island National Wildlife Refuge, the Refuge is situated on the north end of Hatteras Island and is part of a chain of islands known as the Outer Banks of North Carolina. These dynamic, ever-changing barrier islands are separated from the mainland by a series of marshes and sounds which range from very narrow to 25 miles wide. Officially unstaffed and unfunded, Pea Island is managed by staff from Alligator River NWR.

Pea Island's climate is generally moderated by the ocean making it cooler in the summer and warmer in the winter than the mainland. During summer, southwest winds bring warm, humid air followed by cool, damp northeast winds, frequently reaching 20-30 m.p.h., during fall and winter. Average minimum and maximum temperatures are 69 and 56 degrees, respectively. Tropical storms, hurricanes, and "nor'easters" are not uncommon.

Refuge habitat types include ocean beach, barrier dune, sand ridge, brush and grassland, salt marsh, and salt flats. Three impoundments covering 790 acres are managed for food production to provide forage for waterfowl and shorebirds. Prescribed burning is conducted in marshes and impoundments to enhance wildlife habitat and maintain a healthy ecosystem.

The diversity and abundance of birds on Pea Island has deemed it a "birders paradise" - a total of 315 species of birds has been spotted at Pea Island. The Refuge serves as an important wintering ground for tundra swans, snow geese, and more than 25 species of ducks. During spring and fall migration, shorebirds are abundant. Piping plovers use Refuge beaches for feeding, and less frequently for nesting. A fairly low number of loggerhead sea turtles lumber onto Refuge beaches during summer months for nesting as well. Other species of wildlife include a host mammals, fish, reptiles and crustaceans.

Public use at Pea Island is centered around the Visitor Center, North Pond Trail, and undeveloped beaches. Each of these provides opportunities for excellent wildlife viewing. More than 2 million people pass through the Refuge annually along NC Highway 12. The Coastal Wildlife Refuge Society (refuge support group) operates a sales area in the Visitor Center and provides critical financial support for interpretive and educational programs. The Refuge also has a very active Volunteer Program.

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A. HIGHLIGHTS

Hurricane Alex resulted in minor damage to Pea Island in August. B.

The ongoing effort to keep NC Highway 12 open for traffic continued in 2004. C.2.

Comprehensive Conservation Planning efforts continued this year. D.1.

Refuge staff attended numerous meetings during the year with NCDOT to discuss the Bonner Bridge Replacement Project. D.4.

USACOE dredging continued at Oregon Inlet. D.5.

Susan Ahlfeld was hired in a Term Appointment in July to replace Jenny Howard. E.1.

Volunteers continue to play a major role in daily Refuge operations. E.4.

Good food production was achieved in Refuge impoundments. F.2.

Only one sea turtle nested on Refuge beaches in 2004. G.2.

Two adult northern pintails were trapped and equipped with satellite transmitters. G.16.

Total Refuge visitation for 2004 was in excess of 2 million. H.1.

New signs and additional enforcement significantly reduced the number of nudists using Refuge beaches. H.17.

The bulkhead on the south and west sides of North Pond was replaced. I.2.



Refuge Manager Mike Bryant visited with Mr. William H. Walker and his sister, the son and daughter of Sam Walker who served at the first Refuge Manager of Pea Island NWR from 1937-1944. Mr. Walker provided the Refuge Staff with a brief record of his recollections of growing up on Pea Island NWR entitled "The Early Years of Pea Island Refuge". Sam Walker's wife became the "office typist" and both his wife and young son William helped with aerial waterfowl surveys in the late 1930's. A copy of the memoirs and photos was sent to the USFWS archives at NCTC.

KLW

B. CLIMATIC CONDITIONS

In August, Hurricane Alex removed shingles from the Visitor Center which resulted in water damage to interior walls. Insurance provided by the Coastal Wildlife Refuge Society (CWRS) covered most repair costs.

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

In August, the National Weather Service contacted refuge officials in reference to permission to install weather data collection devices on an existing tower at Pea Island NWR. Permission was given and we look forward to access to real-time data for fire operations and during storm events.

C. LAND ACQUISITION

2. Easements

The ongoing effort to keep NC Highway 12 open for traffic continued in 2004. 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. Although hurricanes caused few problems, northeasters and remnants of tropical systems caused ocean overwash on a number of occasions. Most of the post-Hurricane Isabel dunes were severely eroded and some had to be replaced by the end of the year. Overwash footprints from Hurricane Isabel remain as mostly bare sand, but are gradually undergoing succession into wetland and maritime grassland/shrub communities.

D. PLANNING

1. Master Plan

The Refuge staff and planning staff completed the Draft Comprehensive Conservation Plan and Environmental Assessment for Pea Island NWR and forwarded it to the Regional Office for editing. In 2005, they will present the draft Comprehensive Conservation Plan and Environment Assessment to the public.

4. Compliance with Environmental and Cultural Resource Mandates

NC Highway 12

Road work completed after storms was performed under environmental documentation by the NC Department of Transportation through provisions of the National Environmental Policy Act as well as terms and conditions of the Right-of-Way Permit. The refuge issued Special Use Permits for reinforcing dunes outside the right-of-way.

More than 40 years ago, NC Highway 12 and the Bonner Bridge were constructed through and onto the Refuge. Constant beach erosion, severe weather, and a high volume of traffic continually force NCDOT to protect the integrity of the road system. Over \$27 million was spent between 1988 and 1998 to repair and protect the Bridge and NC Highway 12 from the ocean. The ocean is moving 10-15 feet closer to the road annually, requiring NCDOT to create temporary dunes, remove sand, and relocate sections of the highway in a number of "hotspots" south of the Bridge; three "hotspots" are on Pea Island NWR.

In 1989, NCDOT requested permission from USFWS to install a terminal rock groin on the northern extremity of the Refuge to help protect the Bridge. A permit was issued with a stipulation that the groin must be removed if it was no longer required to serve its original purpose – to protect the Herbert C. Bonner Bridge.

Initially, NCDOT proposed building a new bridge a few hundred feet west of and parallel to the existing Bridge. This proposal was not likely to be found compatible and would not solve the problem of NC Highway 12 "hotspots." NCDOT had another problem: building a short bridge that could last 75 years to a highway that may not last 20 years. Subsequently, NCDOT presented four additional alternatives, which were narrowed to two alternatives in February 2003. Additional environmental analysis is currently being completed within these two potential corridors. Currently, the NEPA Merger team, including NCDOT, supports doing detailed studies on Alternative/Corridor 4 – the long bridge alternative.

Major opposition to the long bridge has come from Dare County Commissioners over concerns about future access to Pea Island NWR and the fate of the groin and an old abandoned Coast Guard Station. NCDOT, the Refuge Manager, and the Regional Chief of Refuges have met with the county to hear their concerns, answer their questions, and assure them we have been working with NCDOT and others to plan for access to Pea Island if the long bridge is built. They assured Dare County that NCDOT can retain the current NC Highway 12 ROW and that anyone can apply for a new permit for the groin and it would be evaluated.

Alternative/Corridor 1 would result in the shortest bridge construction – 6.2 miles in length: \$138 million. The bridge in this location would have the greatest impact on migratory bird habitat by crossing 1.2 miles of Refuge land. The "hotspots" would not be by-passed. Expensive maintenance on NC Highway 12 within the Refuge south of the bridge would still be required. Numerous times in the past, but prior to the 1997 NWRS Improvement Act, sections of NC Highway 12 were relocated on the Refuge. It is a certainty that in the future NCDOT will request a new ROW to relocate a section of NC Highway 12 and it may be difficult to find it compatible under the requirements of the 1997 Act.

Alternative/Corridor 4 proposes the longest bridge and would result in a bridge making landfall south of the Refuge – 17 miles in length: \$260 million. This alternative would bypass all three Refuge "hotspots" and would have the least impact on submerged aquatic vegetation (SAV) beds. With an elevated road on pilings deep into the Pamlico Sound, this structure would eliminate all maintenance of NC Highway 12 within the Refuge with an annual savings of at least \$300,000 to NCDOT; a single storm can cost a million or more dollars in highway repairs.

USFWS PERSPECTIVE: The USFWS is committed to maintaining the biological integrity of Pea Island NWR and ensuring long-term public access. While Alternative 1 would be the less expensive of the two alternatives initially, it has greater impact on migratory bird habitat and may materially detract from or interfere with the “wildlife first” mission of Pea Island NWR. A bridge in Corridor 1 would not address the major issue of maintaining NC Highway 12 through the Refuge long-term. It is not likely that this alternative would be found compatible with our mission, therefore making it unlikely that a permit would be issued.

Alternative 4 would reduce long-term maintenance costs, improve safety and reliability, and cause less environmental impact. While a bridge in Corridor 4 would initially cost more than a bridge in Corridor 1, this scenario would effectively eliminate the need for expensive maintenance on NC Highway 12 through the Refuge at a large cost savings to NCDOT over the long term. A bridge in Corridor 4 is the better long-term solution for the Refuge and the public.

The U.S. Fish and Wildlife Service supports a safe, long-term, reliable transportation corridor that would have the least impact on Refuge land. The NEPA Merger Team allows the Refuge Manager to be actively involved in the selection process. The U. S. Fish and Wildlife Service is committed to working with others to ensure public access to the Refuge and to evaluate permit applications for the groin.

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.

Maps generated by Refuge staff proved to be valuable aids when discussing Oregon Inlet and Bonner Bridge issues at various meetings. A Powerpoint presentation was developed to show inlet migration from 1852 through 2003. The presentation is available online at <http://nc-es.fws.gov/oregon/index.html>.

5. Research and Investigations

Oregon Inlet Dredging

Refuge staff continued data collection along Refuge beaches this year as part of the monitoring plan examining effects of USACE disposal of dredge material. The USACE 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 south of Oregon Inlet. Weeks Marine, Inc., one of the dredging contractors, deposited approximately 650,000 yd³ of material on the Refuge beach by pipeline dredging and an additional 150,000 yd³

of material was placed near-shore by a hopper dredge. B+B Dredging used the hopper dredge "Atchafalaya" to remove material from the Outer Ocean Bar portion of the navigation channel. This dredged material was deposited in 15-20 foot water depths parallel to the Refuge beach. Considerable time was required to prepare the Special Use Permit for the project. Project oversight and administration required significant additional time.

A new disposal technique was used to place sand on the refuge beach. Nodes were created by placing about 200,000 yd³ of sand along a section of beach 2,000 feet long. An inter-nodal area 2,000 feet in length was left undisturbed and a second node was created over a distance of 2,000 feet. It is believed that organisms in the inter-node area would be able to adapt to the natural movement of dredged sand along the beach and would be able to re-populate impacted areas more rapidly. Remnants of Hurricane Ivan moved southward as a low pressure system along the Atlantic coast and high tides over a period of several days moved much of the sand off the nodes. Sand moving into the inlet as a result of the storm was dredged and used to reconstruct the nodes to the original dimensions.

The monitoring plan, developed by the Refuge, was modified this year to cover 6 miles of beach for the pre-dredge disposal monitoring data and approximately 2 miles of beach for both the post-pipeline dredge data and the hopper dredge disposal data. This includes the disposal sites and areas north and south of the sites to serve as controls. Additional control sampling points were established just north of Rodanthe near the southern Refuge boundary and at Coquina Beach north of Oregon Inlet.

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 USACE transfer funds.

Coastal Research Associates continued to work under the 5-year contract as a professional representative for the Service on the NCDOT Groin Monitoring Team and for the purpose of monitoring impacts and recovery resulting from beach disposal of dredged material. Dr. Robert Dolan will continue to provide professional level technical direction to the monitoring program.

Refuge personnel collected sand compaction readings and 5 sand samples at each turtle crawl to develop baseline data for use in developing special conditions for SUP's issued to USACE and NCDOT for beach nourishment.

6. Other

Following each relatively minor storm ranging from northeasters to offshore tropical storms, NCDOT was issued authorization to make emergency repairs on sections of damaged dune lines where normal high tides were inundating sections of NC Highway 12. The Refuge authorized use of sand that accumulated in berms on the west side of the highway over time for dune

reconstruction. An advantage to using this material is that it contained root-stock, seeds, and rhizomes which would make re-vegetation quicker.

E. ADMINISTRATION

1. Personnel

Pea Island is officially unstaffed and unfunded. However, one PFT Park Ranger, one Term Appointment Park Ranger (funded by CWRS), and one Maintenance Worker (summer) are typically assigned to the Refuge.



Susan Ahlfeld was hired in a Term appointment in July.
USFWS

4. Volunteer Programs

As in past years, the day-to-day operation of Pea Island NWR depended heavily on local and visiting volunteers, both individuals and work groups. The volunteer Hosts and Hostesses of the Visitor Center (which receives over 60,000 visitors annually) continued to represent Pea Island proudly with friendly reception and helpful information.

During the year, a National Visitor Satisfaction Survey was conducted by Interpretive Specialists Strawser and Ahlfeld with the assistance of volunteers and workcampers at Pea Island. This nationwide questionnaire was conducted on several eastern NC national wildlife refuges to survey the general visitor's overall satisfaction of the facilities, infrastructure, interpretive programs, and services offered at the Refuge. This survey will give the Washington Office a glimpse into how the refuges are perceived and how the National Wildlife Refuge System can improve the visitor services program nationally.

Sea turtle monitoring, through the programs of Turtle Patrol and Turtle Watch, was made possible by numerous volunteers who donated more than 200 hours of their time.

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



Litter is a huge problem at the Bonner Bridge area. Bank fishermen tend to use the grounds as a dumpster a majority of the time. KLW



A team of volunteers joined efforts for three hours and removed trash from all areas surrounding Bonner Bridge. KLW



Refuge workcampers Scott and Virginia Lloyd-Jones assisted with many Refuge tasks. Here, storage shelves are being added to the security closet at the Refuge Headquarters in Manteo. KLW

7. Technical Assistance

Dare County conducted a property re-appraisal in 2004 which resulted in values for most properties in Dare County being double their 2003 value. We are uncertain how this will impact future revenue sharing payments made to the County.

F. HABITAT MANAGEMENT

1. General

Pea Island NWR, a section of a coastal barrier island, consists of several basic habitat types. 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.

The original acreage for Pea Island NWR was 5,915. Oregon Inlet dredging, Bonner Bridge, and NC Highway 12 maintenance and protection have influenced the loss of acreage by subduing and altering natural processes such as overwash.

Habitat Types and Land Use -2004

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

Wetland management on the Refuge focuses on three man-made impoundments. They are North Pond (397 acres), New Field Pond (320 acres), and South Pond (223 acres). These impoundments are managed primarily for submerged aquatic vegetation (SAV) production to provide high quality habitat for wintering waterfowl. Over time, management strategies have evolved to accommodate near optimum habitat conditions during peak migratory periods for shorebirds.

North Pond

Water management in North Pond was on target throughout most of the year. Average annual deviation from planned water level was 0.02 ft. Adhering this closely to the planned water level resulted in nearly ideal conditions for SAV and invertebrate production. Although there is no way to control salinity except through prudent holding and releasing water in conjunction with rainfall events, average annual salinity was near the desired level. Salinity varied from about 7.0

ppt in April to a high of 12.8 ppt in July. Winter salinity readings varied from about 8.0 -11.8 ppt.

To compare plant food production for the 2003-2004 waterfowl wintering period, it is necessary to examine the vegetation survey data for the fall of 2003. Plant 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 (40%) or plant species of no food value for waterfowl (3%). *Chara* spp. (30%) and widgeon grass (13%) dominated the "good" foods and the "fair" category was dominated by saltgrass (*Distichlis spicata*) (17%) and saltmeadow hay (*Spartina patens*) (8.2 %). Overall, data show relatively good submerged aquatic production. Of special concern is the occurrence of 40% of the sample points being considered "bare". Heavy feeding by resident Canada geese throughout the growing season is the most logical explanation for this high frequency of bare substrate.

For the fall of 2004 plant species rated as good or fair waterfowl food were found on 64% of the transect plots. The remaining plots consisted of plant species with little or no food value for waterfowl (39%). It is interesting to note that 34% of the non-food plots consisted of "bare ground". *Chara* spp. (23%), widgeon grass (*Ruppia maritima*) (14%), and sago pondweed (*Potamogeton pectinatus*) (11%) dominated the "good" foods and the "fair" category was dominated by saltgrass (*Distichlis spicata*) (3%) and saltmeadow hay (*Spartina patens*) (6 %). Overall, data show relatively good submerged aquatic production. Of special concern is the occurrence of 34% of the sample points being considered "bare". Heavy feeding by resident Canada geese throughout the growing season is the most logical explanation for this high frequency of bare substrate. Further support for this postulation is derived from the numerous depressions in the bottom substrate and observations of 300-400 resident Canada geese feeding in the pond during the growing season.

New Field Pond

New Field Pond water management was below target level throughout the year. Average annual deviation from planned water level was -0.15 ft. This deviation from the planned water level did not appear to have a significant impact on SAV or invertebrate production. Although there is no way to control salinity except through prudent holding and releasing water in conjunction with rainfall events, readings ranged from highs of around 20 ppt in June and July to lows of 9.8 ppt in March and April. Winter salinity readings varied 12.3 – 15.5 ppt.

To compare plant food production for the 2003-2004 waterfowl wintering period, it is necessary to examine the vegetation survey data for the fall of 2003. Plant species rated as good or fair waterfowl food were found on 54% of the transect plots. The remaining 46% of the plots consisted of bare ground (35%) or plant species of no food value for waterfowl (11%). *Chara* spp. (30%) and widgeon grass (13%) dominated the "good" foods and the "fair" category was dominated by saltgrass (*Distichlis spicata*) (11%) and saltmeadow hay (*Spartina patens*) (21 %). Overall, data show relatively good submerged aquatic production. As with North Pond, of special concern is the occurrence of 35% of the sample points being considered "bare". Heavy feeding by resident Canada geese throughout the growing season is the most logical explanation for this high frequency of bare substrate.

For the fall of 2004 plant species rated as good or fair waterfowl food were found on 53% of the transect plots. The remaining 47% of the plots consisted of plant species with little or no food value for waterfowl. It is interesting to note that 34% of the non-food plots consisted of "bare ground". Sago pondweed (13.1%) and widgeon grass (2%) dominated the "good" foods and the "fair" category was dominated by saltgrass (*Distichlis spicata*) (10.2%) and saltmeadow hay (19.6 %). Overall, data show relatively good submerged aquatic production. As with North Pond, of special concern is the occurrence of 41% of the sample points being considered "bare". Heavy feeding by resident Canada geese throughout the growing season is the most logical explanation for this high frequency of bare substrate. Further support for this postulation is derived from the numerous depressions in the bottom substrate and observations of 300 -400 resident Canada geese feeding in the pond during the growing season.

South Pond

Because South Pond has no water management capabilities, it is difficult to manage for SAV production as we are dependent upon rainfall and above average wind tide events. For most of the growing season South Pond remained dry due to insufficient rainfall to keep up with evaporation and below average or only "normal" wind tide events. Average annual water level was -0.86 ft lower than the desired level. Near the end of the growing season, water level had to be dropped as low as possible to modify the water control structure. This modification was done to allow use of a flap gate. After installing the flap gate water flowed into South Pond during normal and above average high tides. This water management scheme resulted in very poor SAV production.

To compare plant food production for the 2003-2004 waterfowl wintering period, it is necessary to examine the vegetation survey data for the fall of 2003. Although South Pond has no water management capabilities fair to good food value species were found on 77% of the sample plots during 2003. The remaining 23% of the plots consisted of bare ground (18%) and species having no food value (5%). *Chara* spp. (26%), widgeon grass (24%), and sago pondweed (15%) dominated the "good" foods and the "fair" category was dominated by saltmeadow hay (*Spartina patens*) (11%). Overall, SAV production in South Pond was best even without any water management capabilities. This is largely due to the frequent rain events for the entire year during 2003. A new water control structure was put in through the dike during the summer. In late summer boards in the new water control structure floated up and the pond nearly dewatered. The problem was identified in time to save the SAV production for the year. For some unexplainable reason, resident Canada geese were not observed using South Pond nearly as much as New Field and North Pond.

For the fall of 2004 plant species with a fair to good food value were found on 10% of the sample plots. The remaining 90% of the plots consisted of bare ground (84%) and species having little or no food value (16%). Of the sample points with vegetation, sago pondweed was dominant at 3.2%. The "fair" category was dominated by saltmeadow hay (4.2%). This relatively poor SAV production was expected given the lack of water management capabilities for most of the growing season and the need to drain the pond late in the growing season to install a flap gate. Based upon observations of water flow into the pond during tide events, it is expected that growing conditions will be far more conducive for SAV production during 2005.

Salt Flats

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 virginica*), sea oxeye (*Borrchia* spp.), black needlerush (*Juncus roemerianus*), salt marsh cordgrass (*Spartina alterniflora*), salt meadow hay, and salt grass. Overall, 64% of the plants in sample plots are ranked as "fair" or "good" waterfowl food. Of the plots sampled 20% were "bare" due to salt concentration in the soil or open water. However, these areas produce large numbers of invertebrates due to tidal flooding with suitable wind or spring tides.

Mitigation Ponds

The two small mitigation ponds located near the southern boundary that were created by NCDOT again produced good widgeon grass. The pond fringes also continued to produce stands of *Bacopa* spp., *Scirpus* spp., and *Cyperus* spp. Resident Canada geese consume most of the plant growth before migratory birds arrive. Migratory waterfowl use is light to moderate and appears to be decreasing, primarily due to resident Canada geese. Of waterfowl species observed northern pintails and green-winged teal were most common.

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 buildup from ocean overwash. Therefore, there is no cropland on the Refuge.

6. Other Habitat

In September 2003, Hurricane Isabel altered approximately 181 acres of dune and vegetated barrier island habitat to overwash fan. Restoration of the dune line to protect NC Highway 12 resulted in an overwash footprint without vegetation. Some of these areas recovered quickly into wetland and dune plant communities although vegetation is more sparse than would occur in the undisturbed state. Other areas have remained as wind blown sand largely devoid of vegetation. Depending upon location, there will be various successional stages ranging from bare overwash sand to maritime grassland/shrubs for several years to come. In many areas the reconstructed dunes have been severely eroded. Because of the nature of barrier ecosystems and due to the effects of rising sea level beach and dune habitat types can be expected to be continuously shifting along a habitat quality gradient.

9. Fire Management

Prescribed burns are held in marsh and impoundment areas of Pea Island NWR. See Section F.9 of the Alligator River NWR narrative for details.

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 2004. 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

a. Federally Listed and Endangered Species

American bald eagle (Endangered): Bald eagles, *Haliaeetus leucocephalus*, can sometimes be seen flying over the Refuge. There were reports of an occasional bald eagle during 2004. All of these birds were transient with none remaining in the area more than a few days.

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 2004, there were no piping plover nests on the north end of the Refuge. Although some nesting behavior was observed in early spring, no nests were observed. A range of one to sixteen plovers were consistently observed during fall migration or wintering on the north end of the Refuge.

Atlantic loggerhead sea turtle (Threatened): Pea Island has 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 2004 nesting season resulted in one nest and seven false crawls. Similar to 2003, this low level of turtle nesting activity is believed to be positively correlated with water temperatures much cooler than average.

Pea Island has a severe beach erosion problem resulting in a narrow beach and frequent overwash. 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. To assist with application of the nest relocation guidelines, new maps were generated to show areas of unfavorable coastal process conditions or dredge material disposal activity. In 2004, the one nest was relocated to the turtle safe zone at the widest stretch of beach. The relocated nest was overwashed on five occasions with the first from high tides associated with Hurricane Alex on August 3rd and 4th. In spite of the overwash, approximately 88 turtles hatched. Thirty-five unhatched eggs were found upon excavation of the nest.

Stranded turtles washed up on Pea Island's beaches in 2004 at average rates relative to most previous years. Most of the turtles were already moderately decomposed when found on the beach. The greater the level of decomposition the less likely markings or other evidence that

could be used to determine causes of death will be found. 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): The first green sea turtle (*Chelonia mydas*) known to nest on Pea Island was in 1993. The one nest on the Refuge during the 2004 nesting season was identified as a green turtle nest. (see above)

b. State Listed Endangered and/or Threatened Species

Of other species occurring on the Refuge and not federally listed, the State of North Carolina lists some as endangered, threatened, special concern or significantly rare. Although the Refuge is not managed for all of these species, present practices do provide benefits for many of them. Species occurring on the state list and Refuge are:

Least tern (Significantly Rare): Historically, least terns have nested 1.5 miles south of the Pea Island NWR Headquarters. During 2004 nesting colonies were observed at the Oregon Inlet terminal groin, approximately 3 miles south of the Refuge headquarters, and approximately 5.5 miles south of headquarters. Least tern numbers peaked at 526 in June.

Caspian tern (Significantly Rare): This species is not very common on the Refuge with numbers peaking in the fall, usually during October. The peak number during 2004 was 50 and the peak occurred in September. Nesting has not been documented.

Common tern (Significantly Rare): Common terns are found nesting with other terns. During 2004, nesting colonies were observed at the Oregon Inlet terminal groin, approximately 3 miles south of the Refuge headquarters, and approximately 5.5 miles south of headquarters. Common tern numbers peaked in August at 97.

Gull-billed tern (Significantly Rare): Gull-billed terns occur in the lowest numbers. During 2004 nesting birds were observed in the least tern and common tern colonies at the Oregon Inlet terminal groin. Gull-billed tern numbers peaked in May at 9.

Black skimmer (Significantly Rare): Although numbers were lower in 2004, black skimmers are observed along the oceanfront, sound, and impoundments on the Refuge. During 2004, nesting birds were observed adjacent to the least tern and common tern colonies at the Oregon Inlet terminal groin. Nesting bird numbers were considerably less than in previous years. Black skimmer numbers peaked in September at 44.

Little blue heron (Significantly Rare): The little blue heron is found mostly around the three impoundments or marsh edges. Numbers peaked at 76 in September. Nesting was not documented.

Snowy egret (Significantly Rare): The snowy egret is found mostly around the three impoundments or marsh edges. Numbers peaked at 79 in August. Nesting was not documented.

Tri-colored heron (Significantly Rare): The tri-colored heron is found mostly around the three impoundments or marsh edges. Numbers peaked at 99 in September. Nesting was not documented.

Black-necked stilt (Significantly Rare): The black-necked stilt is found mostly around the three impoundments. Numbers peaked at 28 in July. Nesting was not documented.

Peregrine falcon (Endangered): The Arctic peregrine, *Falco peregrinus tundrius* can be observed on the Refuge with some regularity during migratory periods. Nesting does not occur on the Refuge.

3. Waterfowl

Wintering waterfowl surveys were conducted from September through March. Waterfowl numbers peaked at 11,211 in mid-November and 10,206 in early January. Surprisingly, all species except for the tundra swan and northern pintail had decreases in use days from the 10-year average. However, the tundra swan, Canada goose, mallard, black duck, gadwall, Northern pintail, green-winged teal, blue-winged teal, ring-neck duck, bufflehead, ruddy duck, and mergansers showed increases in use over the 2002-2003 wintering period.

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. Breeding by the gadwall appears to be increasing on the Refuge.

Other interesting observations not reflected in the table included female common goldeneyes and Eurasian wigeon. Although a few Eurasian wigeon sightings occur annually, goldeneye observations are very rare on the Refuge. Also of interest five common eiders were observed in Oregon Inlet waters.

Composition of Wintering Waterfowl, Pea Island NWR 2003-2004

SPECIES	PEAK PERIOD	PEAK #	# USE DAYS 2003-04	% TOTAL USE DAYS 2003-04	USE DAYS % diff from 10 yr avg
Tundra swan	Nov	1122	72219	6.0	6
Snow goose	Jan	541	28088	2.3	-75
Canada goose	Jan	512	34870	2.9	-22
Mallard	Dec	56	5282	0.4	-53
Black duck	Nov	610	55393	4.6	-64

SPECIES	PEAK PERIOD	PEAK #	# USE DAYS 2003-04	% TOTAL USE DAYS 2003-04	USE DAYS % diff from 10 yr avg
Gadwall	Jan	637	70274	5.8	-68
American wigeon	Nov	1823	114881	9.6	-50
Northern pintail	Nov	5527	494470	41.1	54
Green-winged teal	Oct	1184	88487	7.4	-32
Blue-winged teal	Sep	460	8457	0.7	-61
Northern shoveler	Jan	752	58019	4.8	-54
Wood duck	N/A	0	N/A	N/A	N/A
Ring-necked duck	Feb	33	1079	0.1	-72
Redhead	Dec	563	2058	0.2	-86
Canvasback	Feb	3	58	0.0	-96
Scaup	Feb	500	27355	2.3	82
Bufflehead	Dec	1176	19270	1.6	65
Ruddy duck	Dec	248	16461	1.4	-51
Mergansers	Jan	491	23381	1.9	-3
Golden eye	Feb	5	78	0.0	N/A
Scoter	Dec	561	441	0.0	N/A
Coot	Jan	533	38799	3.2	-79
Unknown	Feb	2286	42374	3.5	-51

4. Marsh and Wading Birds

Marsh and wading birds were counted three times per month during regular bird surveys. Overall numbers increased to approximately 340 by mid-August and increased to 347 in September and remained at 343 until late October. Other commonly occurring species include great and snowy egrets, great blue heron, little blue heron, green heron, tri-colored heron, black-crowned night heron, yellow-crowned night heron, white and glossy ibises, double-crested cormorants, American bittern, and Virginia, 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 North Carolina and were rarely observed. A group of about 79

white pelicans was observed on the Refuge near the middle of November and remained until about mid-December. Overall, waterbird and seabird numbers have a minor peak in March at 1,377 and a major peak of 3,740 in November.

5. Shorebirds, Gulls, Terns, and Allied Species

Shorebird surveys were conducted three times per month during the year. Shorebird numbers peaked at approximately 11,675 in mid-to-late May and at about 1,839 in mid-November. The mid-May count reflects the effects of spring migration and counts during the period from mid-August through late November illustrates less definition of the fall migratory period. Some of the commonly occurring species include the semi-palmated and western sandpipers, semi-palmated plover, sanderling, whimbrel, American oystercatcher, black skimmer, various terns and gull species, dowitcher, marbled godwit, willet, dunlin, black-bellied plover, ruddy turnstone, American avocet, red knot, greater and lesser yellowlegs, and black skimmer.

Peak numbers for gulls occurred in January with a total of 4,778. This number was dominated by herring gulls (2,557) and ring-billed gulls (1,448).



Oystercatchers use Pea Island beaches for foraging.

Mike Halminski

Colonies of nesting black skimmers, common terns, least terns, and gull-billed terns were observed 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. Perimeters of the closed areas were recorded with a GPS unit and transferred to Refuge maps. The primary purpose for

SPECIES	PEAK PERIOD	Peak #	# USE DAYS 2004	% TOTAL USE DAYS 2004	USE DAYS % diff from longterm avg
Black-bellied plover	Feb	135	11541	1.17	101
Ruddy turnstone	May	121	3807	0.39	57
Semipalmated plover	Aug	457	17357	1.77	9
Piping plover	Aug	16	867	0.09	63
Snowy plover	N/A	0	0	0.00	N/A
Wilson's plover	Aug	28	294	0.03	405
Killdeer	Oct	5	198	0.02	43
Common snipe	Apr	2	39	0.00	700
Dowitcher	May	1591	38340	3.90	53
Red knot	Nov	101	2674	0.27	10
Marbled godwit	Oct	53	2311	0.24	38
Whimbrel	May	21	627	0.06	-38
Cont. Willet	Aug	221	26049	2.65	26
Yellowlegs	Jul	188	11122	1.13	-49
Sanderling	Aug	750	102315	10.41	5
Stilt sandpiper	Aug	9	114	0.01	414
Dunlin	May	1775	72135	7.34	-6
Purple sandpiper	Dec	8	60	0.01	493
Spotted sandpiper	Jul	17	527	0.05	80
Least sandpiper	Apr	70	2107	0.21	-90
Semipalmated sandpiper	May	6402	117406	11.94	26
Western sandpiper	May	242	6769	0.69	-15
Other shorebird species	May	842	12383	1.26	591
Unknown shorebirds	May	740	35070	3.57	72

6. Raptors

The Carolina Raptor Center operated a raptor banding and hawk watch station in early October for the second time since 1987. Mist nets, bow nets, and lure birds were used to capture and band four juvenile female peregrine falcons, three juvenile female and two juvenile male sharp-shinned hawks, and one juvenile female American kestrel were captured and banded. During the hawk watch, 155 raptors were observed. Observed species included osprey, bald eagle, northern harrier, sharp-shinned hawk, Cooper's hawk, red-tailed hawk, American kestrel, merlin, and peregrine falcon. The Center hopes to continue this work as an annual project.

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 songbirds 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, tracks, and scat have been observed with increasing frequency. In the past raccoons were incidentally captured in cat traps. The raccoon population has increased to the point that some will be removed during the upcoming year.

Presence of scat, tracks, and road kills indicate a continued presence of foxes and opossums. Based upon anecdotal observations, it appears that the raccoon population is increasing rapidly. 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, 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 herd is increasing.

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

9. Marine Mammals

During 2004, 6 stranded marine mammals were found on the Refuge beach. Appropriate National Marine Fisheries staff was contacted and they performed required necropsies and data collection. The six strandings consisted of bottle-nosed dolphin (2), harp seal (1), gray seal (1), harbor seal (1), and a marine mammal decomposed to the point that species could not be identified (1).

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. Three sightings were reported during 2004. However, it appears that the population has decreased to very low numbers.

The resident Canada goose population has become a significant problem with regards to growing food for migratory waterfowl. During the summer months approximately 300-400 resident geese constantly foraged on plant material in the impoundments. By the time migratory birds arrived, primary production in the three impoundments was largely consumed by resident Canada geese.

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. Mink, cat, and small canid tracks were observed along the terminal groin at Oregon Inlet during the summer. Non-native and other problem animals will be removed in the future.

16. Marking and Banding

Through a cooperative effort on behalf of the refuge and North Carolina Wildlife Resources Commission, Northern pintails were trapped and two adult hens were equipped with a satellite transmitter.

Every summer, Refuge volunteers and staff accompany John Weske to band brown pelicans, royal terns, Caspian terns, and sandwich terns on spoil islands located west of Oregon Inlet. This year 2,210 juvenile and a few adult brown pelicans, 467 royal tern chicks along with a few adults, and 5 sandwich terns were banded. Small numbers of chicks of other species such as herring gull, great black-back gull, and Caspian tern were banded. 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 (which continue to boggle the mind!), estimated visitation to Pea Island NWR during 2004 was 2,112,577. Volunteers from the Coastal Wildlife Refuge Society continue to staff the Visitor Center, which is now open daily throughout the year. 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 2004, Jennifer Howard left the GS-5 Interpretive Specialist position for graduate school, and Susie Ahlfeld from Patuxent NWR has aptly filled her shoes. Susie brings enthusiasm and a fresh perspective on the public use program that has already yielded positive results. She has added new products to the visitor center inventory, and made improvements to public access and facilities. Workcampers and volunteers (as well as refuge staff) appreciate Susie’s contributions to the refuge.

However, with Pocosin Lakes’ Susan Russo gone, Susie has spread her responsibilities to include the Pocosin Lakes’ public use program- which effectively pulls her away from her Pea Island duties on a weekly basis. It is still unclear what future involvement Susie will have at Pocosin Lakes.

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 Refuge continues to host an increasing number of school visits, with a corresponding demand for staff- and volunteer-led programs. Refuge staff accommodate every group, and experience the greatest need for environmental education programs during the months of May and October. Schools come from all over the state- and some as far away as Ohio and Pennsylvania- to explore the refuge. The most popular program is Soundside Discovery, with Turtle Talk a close second. Overall, approximately 36 schools with a total of 1,467 students participated in environmental education programs on-site at Pea Island.

3. Outdoor Classrooms – Teachers

There is currently not a demand for teacher training on Pea Island NWR. 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. During 2004, refuge staff worked cooperatively with other agencies to offer training and promote through local venues.

In particular, Interpretive Specialist Ann Marie Salewski worked with the North Carolina Coastal Reserve (NCRR) to offer coastal ecology training on-site at the refuge for environmental educators, and also helped the NCRR promote their EE programs.

4. Interpretive Foot Trails

Many visitors comment that North Pond Trail is the nicest trail they've used in the eastern United States. North Pond Wildlife Trail is universally accessible, offers 8 permanently mounted spotting scopes, and 5 major observation structures, terminating with a 25 foot observation tower, where you can have a view of the ocean, the sound, and two refuge impoundments. Approximately 1,328,470 visitors utilized North Pond Trail during 2004. Another trail, the Salt Flats Wildlife Trail is located in the north end of North Pond and runs about 1/8th of a mile. This is another fully accessible trail and offers another opportunity for visitors to observe and photograph wildlife.

6. Interpretive Exhibits/Demonstrations

The two interpretive kiosks, located at both the north and south ends of the refuge, 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. The Salt Flats kiosk continues to be a popular place for visitors to find information, and that kiosk design is currently being used as the refuge's template for future kiosks.

7. Other Interpretive Programs

Special programs presented off-refuge during 2004 are included in an Alligator River Narrative table. Most regularly scheduled on-site interpretive programs during 2004 were conducted at Pea Island NWR by Refuge volunteers and interns. Thursday bird walks were conducted year round. Beginning in May and running through October, bird walks were offered 3 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, one Turtle Talk, one Soundside Discovery, and one Wildlife in the Sky program were conducted each week. Wildlife in the Sky was a new interpretive program offered in 2004, and did not attract much attention outside of the *Coast* article that featured the program. Refuge staff began posting daily flyers on the visitor center door to promote the interpretive programs, which increased interest and participation. Special programs were also conducted for International Migratory Bird Day and Fishing and Boating Week.

Interpretive Specialists and workcampers participated in a two-day conservation festival at Cape Hatteras Elementary school where they presented Turtle Talks to over 300 students. They also presented Turtle Talks at the Manteo Elementary Science fair to over 600 students.

Pea Island entered an educational partnership with Festival Park, whereby a refuge representative went to the Park and delivered an interpretive program in the History Garden. This summer, refuge staff delivered three programs at the park to a total of 58 participants.

On-site Interpretative/Educational Programs

Program Type	No. Programs	No. Participants
Bird Walk	92	843
Soundside Discovery	8	130
Turtle Talk	9	121
Family Canoe Tour	17	195
Pamlico Sound Canoe Tour	14	130
Wildlife in the Sky	3	32

Note: Off-refuge programs included in Table 5 of Alligator River NWR narrative.

9. Fishing

Pedestrian surf fishing continued to be the major form of consumptive, wildlife-oriented recreation on Pea Island NWR during 2004. Bluefish, striped bass, red drum (especially during nighttime fishing), spot, pompano, croaker, and trout were the major fish caught. Nighttime fishing is allowed September 15-May 15 annually. Permits are distributed through the visitor center and local fishing and tackle stores.

Parking for the popular Bonner Bridge catwalk is located on the refuge. This is probably the most heavily fished area on the refuge. A total of 55,000 visits were spent fishing on Pea Island. The annual Crabbing/Fishing Rodeo was held the second Saturday in June with approximately 500 participants. During the summer, the NCDOT had to close the eastern catwalk for one week for repairs when a railing broke loose and a fisherman landed (unhurt) in Oregon Inlet.

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.



Park Ranger Ann Marie Salewski provides a birding tour to Pea Island NWR visitors. KLW

During spring and summer, great and snowy 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 2 impoundments, the needs of the public were seriously and diligently considered. There are many Refuge visitors who realize and support this policy.

12. Other Wildlife Oriented Recreation

The photo-blind, installed during 1995, continued to be utilized fully during 2004. An estimated 1,500 visitors used the photo blind. 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

The use of ORV's on Pea Island NWR is restricted to licensed vehicles on NC Highway 12 only. Occasionally, vehicles cross the dunes at Pea Island and drive on the beach. Officer Bucher with assistance from the NPS responds to as many of these calls as possible. The beach is also posted as closed to vehicles on the south end.

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, sunbathers, 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 continue to 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

During 2004, two dual-function officers, Kelly Van Druten and Mike Bryant, gave up their federal law enforcement commissions. Law enforcement was conducted on the refuge by Refuge Officer Jeremy Bucher with occasional assistance from Refuge Officer Chris Smith of Mattamuskeet National Wildlife Refuge, Mark Cagle of the North Carolina Wildlife Resource Commission and various National Park Service Rangers.

In March, a meeting was held between area refuge management, law enforcement personnel, and the new Regional Chief of Refuge Law Enforcement Rick Huffines. During this meeting, the long-standing conflict between the Division of Law Enforcement and Refuges regarding case management was resolved. Refuge Officers are now authorized to issue citations in the field for refuge violations, and oversee their cases throughout the prosecution process.

After coordination with the Assistant U.S. Attorney, the decision was made to more aggressively confront the growing issue of public nudity on Pea Island NWR. In June, new signs were put in place on the refuge citing public nudity as a prohibited act. Public notice was accomplished through several local media sources. In the following months, active enforcement of 50 CFR 28.31 (Violate any rule, provision or sign) resulted in a significant decrease in the number of nudists on the refuge's beaches. Three citations were issued early on with no offenders deciding to take the matter to court.

During the year, Officer Bucher attended various training programs including FLETC's Survival Shooting Training Program, and S130 / S190. Officer Bucher provided general firearms instruction during the regional in-service training and was the lead instructor for the Bushmaster M-4 Carbine transition course. Officer Bucher also developed the Region 4 remedial firearms training course.



Scenes such as this one where a 40 foot sailboat ended up on the Pea Island beach are not uncommon. In a typical year, two to three boats wash ashore on the Refuge.
KLW

As a member of the Region 4 SORT team, Officer Bucher was deployed for security and protection details during the G8 Summit in Savannah, Georgia and to Florida during Hurricane Frances. Officer Bucher also completed a security detail at Vieques NWR, Puerto Rico.

Throughout the year, Officer Bucher assisted the National Park Service and Dare County Sheriff's Office on numerous occasions. These activities included providing back-up for Park Rangers while dealing with visitor conflicts at the Oregon Inlet Campground and Oregon Inlet Fishing Center. Officer Bucher also backed up Sheriff's deputies during several vehicle stops including one that involved a felony drug warrant.

The following figures represent the case breakdown for violations during 2004. This table does not include numerous verbal warnings that were given for minor infractions.

50 CFR Violation	Description	Number of Cases
50 CFR 28.31	Violate Rule, Provision or Sign	18
50 CFR 26.21	Trespassing	2
50 CFR 27.31	Vehicle Violations	3
50 CFR 26.21(b)	Dog off Leash	2
50 CFR 27.94(a)	Littering	1
50 CFR 32	Fishing Violations	4

18. Cooperating Associations

The Coastal Wildlife Refuge Society is especially active at Pea Island National Wildlife Refuge by way of the Visitor Center.

For full details of CWRS activities for the year, see Section H.18. of the Alligator River NWR Narrative.

I. EQUIPMENT AND FACILITIES

2. Rehabilitation

Major accomplishments:

- Completed contract to replace damaged bulkhead protecting the south and west shoreline in the North Pond Impoundment. The contract was awarded in October 2003 to Entech Enterprises of Tallahassee, Florida. The contract included driving / jetting 10ft. long, vinyl interlocking bulkhead sheet pilings along the shoreline. Facial / side boards (salt treated 2X8's) are on either side of the vinyl sheet at the top edge, and capped with a salt treated 2X10. The contractor backfilled behind the bulkhead with material excavated from within the impoundment. The bulkhead extends from the service road behind the Visitor Center, to the pre-existing wingwall of the North Pond pump station. Total linear distance of the bulkhead is 5,010 ft. completed at a cost of \$320,926.60. Prior to the contract award, refuge staff had removed and disposed of the old, existing creosote bulkhead.
- Painted exterior trim of all buildings
- Storm events in 2003 and 2004 created several rehab projects which included:
 - a. replacing / repairing damaged shingles on Visitor Center.
 - b. clearing blown sand (result of vegetation loss from storm damage) from public boardwalk connecting Visitor Center parking with the adjoining interpretive trail.

- c. clearing blown sand (result of vegetation loss from storm damage) from north vehicle entrance of North Pond.
- d. repairing top of Salt Flats interpretive kiosk.
- e. relocating stored building materials from damaged South Pond pole shed.
- f. use of loader / backhoe to set new Refuge entrance signs on both (north and south) entrances to the Refuge.
- g. use of flex track crawler and backhoe / loader to set new osprey platform (and pole) in North Pond behind Visitor Center.
- h. removing and repairing spotting scopes on North Pond Observation tower.

3. Major Maintenance

- Serviced / maintained all ATV's, vehicles, mowers and other power tools and equipment for completion of volunteer and intern projects.
- High visitor usage in key areas required constant landscaping (mowing, weedeating, etc.). Most of the tasks were accomplished with interns and work campers, with maintenance staff providing logistical support.

4. Equipment Utilization and Replacement

- Used backhoe loader to assist with erection of four 20ft. pilings on the south beach boundary. Prior to setting the pilings, ocean washing / turbulence made it difficult to keep boundary signs posted.
- Mowed service roads around North Pond, New Field and South Pond impoundments with farm tractor and single wing bush hog mower. One mowing was in conjunction with the annual fishing / crabbing rodeo in North Pond.
- North Pond and New Field pumps were routinely used to maintain targeted impoundment water levels.

8. Other

- Assisted with annual Pea Island fishing and crabbing rodeo

J. OTHER ITEMS

1. Cooperative Programs

The Refuge continues to work 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. In addition, the refuge continues to work closely with the U. S. Geological Survey at Woods Hole, Massachusetts to monitor shoreline changes along the refuge beach.

3. Items of Interest



Refuge Manager Bryant, Biologist Stewart, and Planner Glennon provided a tour for Regional Chief Jon Andrew, Refuge Supervisor Cal Garnett, and Harold Gibbs to discuss CCP planning and other local topics of importance. K LW

4. Credits

The annual narrative was compiled by DRM Whaley, edited by Park Ranger Ahfeld, with individual sections being a joint effort by program supervisors.