

REVIEW AND APPROVAL

**ALLIGATOR RIVER NATIONAL WILDLIFE REFUGE
PEA ISLAND NATIONAL WILDLIFE REFUGE**

MANTEO, NORTH CAROLINA

ANNUAL NARRATIVE REPORT

Calendar Year 2005

Mike Bryant

Refuge Manager

6/16/06

Date

Refuge Supervisor
Review

Date

Regional Office Approval

Date

INTRODUCTION

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

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

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

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

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

ALLIGATOR RIVER NATIONAL WILDLIFE REFUGE

Manteo, North Carolina

ANNUAL NARRATIVE REPORT

Calendar Year 2005

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

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A. HIGHLIGHTS

Neal Moore named Outstanding Volunteer for 2005. Section E. 4



Neal Moore, 2005 Volunteer of the Year.

BWS

Volunteers Pat Moore and Warren Davis receive Southeast Region Honor Awards. Section E. 4



Refuge Volunteer Patricia Moore, with Refuge Manager Mike Bryant,
receives the 2005 RD Honor Award.

BWS



Warren Davis, flanked by family members and Refuge Manager Mike Bryant, receives 2005 RD Honor Award.

BWS

Refuge burned 4051 acres in prescribed fires in 19 ignitions on 7 burn units. Nine wildfires were responded to and held to a total of 180.9 acres during 2005. [Section F. 9](#)

In February, a temporary closure of the Bulls Island Red Wolf Propagation Project was announced. [Section G. 2](#)

Spring Wings was held in May, as a second “annual” wildlife festival. It proved to require too much effort and was not scheduled again for 2006. [Section H.1](#)

The first-ever Refuge Open House was held on May 7, sponsored by the Coastal Wildlife Refuge Society. [Section H.18](#)

B. CLIMATIC CONDITIONS

Total precipitation was slightly lower than normal for January and February; however, we had many days that were damp and cool during the period. There were several days with snow flurries but no accumulation. Spring started out being dry with a few days of higher fire danger, but overall became wetter and cooler than normal, with the wetness continuing on into summer. The refuge exhibited very wet conditions during this time, with many areas being flooded on into July.

Over half the annual rainfall for 2005 came during the months of March - July, however August started a drying trend that lasted for two months that erased much of the surplus of rainfall from the spring and early summer. The Keetch-Byrum Drought Index hit a second all-time high during the month of September at around 610 out of a possible 800, indicating critically dry conditions. October started out dry, but several heavy rainfall events during the second half of the month gave

October the highest rainfall of the year, with a total of 8.58 inches. November and December averaged out to near normal rainfall amounts, with most of the rain falling in December. Total rainfall amounts were 57.8 inches, about 5 inches higher than average.

Hurricane Ophelia arrived in September and only contributed a small amount of rainfall, which helped mitigate for the otherwise very dry weather being experienced. Only gale force winds were recorded on the Outer Banks, but had little effect on Alligator River NWR other than dislodging trees partially felled by Hurricane Isabelle in 2004.

2005 Rainfall Totals by Month (inches)

January	2.69
February	2.62
March	3.46
April	4.97
May	6.94
June	7.48
July	7.62
August	3.39
September	1.52
October	8.58
November	2.92
December	5.61
Total	57.8

C. LAND ACQUISITION

1. Fee Title

An offer was made to the owners of the Broad Creek Partners Tract (100 ac) in 2005. The offer was not accepted. The Tract is bordered by the refuge to the North and West, Croatan Sound to the East and Gull Rock Game Lands (North Carolina Wildlife Resources Commission) to the South. The Tract contains an unimproved road, offering access for prescribed burning and wildfire suppression.

Hopefully, efforts/negotiation will continue to secure the land Fee Title during 2006.

In 1999, a Right-of-Way Permit was issued to the North Carolina Department of Transportation (NCDOT) for the purpose of constructing and maintaining a section of US Highway 64/264 through the refuge. As outlined in the Permit, NCDOT agreed to transfer the Mashoes Road Mitigation Site (391.2 ac) to the Service. The transfer was scheduled to occur in accordance with provisions of the Section 404 Clean Water Act Permit issued by the United States Army Corps of Engineers (COE). The Permit required the tract be transferred to the Service on or before May 31, 2005. The NCDOT also agreed the transfer would be unencumbered and the site would be certified clear of toxic or hazardous materials. Another condition of the ROW Permit required the acquisition and donation of the M. L. Daniels Oil Company Tract (1.4 ac) to the Service. The entire tract would be conveyed fee-simple title with the only encumbrance being the 120 foot section used for construction and

maintenance. Also, NCDOT was required to provide certification that the parcel was free and clear of contamination – surface, below surface, and ground.

NCDOT did not meet the “terms and conditions” of the ROW Permit or the COE’s 404 Permit. Contact continues with NCDOT and hopefully, the two (2) tracts will be transferred to the Service in 2006.

There was also assistance given to Cedar Island NWR with regards to a potential acquisition of 270 acres on the northwest side of the refuge on Western Point. There has been some discussion regarding the amount of uplands versus wetlands in the appraisal value of the property. GIS maps were generated for refuge staff so that these questions could be answered.

2. Easements

FT Van Druten assisted Currituck NWR with a Level 1 Pre-acquisition Contaminants Survey for an easement through Wild Horse Estates for access to the Station Landing Marsh Unit in early 2005. The subject easement is 15' wide by 221.07' long and will provide access from Station Landing Marsh Unit of CNWR to Wild Horse Lane. Wild Horse Lane ties into Ocean Pearl Rd which will lead to the beach. The beach serves as the main north/south transportation corridor to the paved road in Corolla and points south.

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. During 2005 some discussions arose regarding permitting requirements for a treated wastewater discharge line crossing the refuge. The discussions did not initiate any actions by the refuge.

D. PLANNING

1. Master Plan

During 2005, Refuge staff and planning staff analyzed alternatives for Alligator River and completed the writing of the draft Comprehensive Conservation Plan and Environmental Assessment for internal and public review. In November, internal review comments were evaluated and incorporated into the draft plan, as deemed appropriate. As 2005 came to a close, the Draft CCP was in the process of being edited. The next step, expected early in 2006, will be the printing and release of the Draft CCP/EA for public review and comment.

At the end of December, 2005, the NC Refuges Planning Office was closed. After being presented with a directive to move to Charleston, SC before the end of the fiscal year, Glennon sought and found employment in DC with the Department of Agriculture. He did an incredible job of organizing and packaging the NC Refuges CCP’s and their progress to-date for ‘handing-off’ to the Refuge

staff. Bob did a great job in planning, and he was a tremendous asset to the FWS in eastern NC. He will be greatly missed.

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 reassessments, 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. Revisions were made to the report in 2005, and the North Carolina Wildlife Resources Commission did some limited sampling in several locations. Results were very similar to the refuge results. At this writing, we have not received the final report.

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 was completed and a final report submitted. More information is provided in the wildlife section.

Effects of Sea Level Rise: Duke University research student Ben Poulter completed his dissertation on his study regarding the effects of rising sea-level on pocosin wetlands and estuarine marsh. RB Stewart coordinated planning sessions with The Nature Conservancy for a climate change workshop to address issues regarding management options for adapting to rising sea level. The workshop will be held in early 2006.

Geological History: The Department of Geology at East Carolina University continued data collection 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.

6. Other (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 3,200 GIS files and five 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 FT Brian VanDruten.

Program highlights and accomplishments for 2005 include: virtual completion of the vegetation/cover type map (see Section F.3. for more information); completed draft maps for all nine northeastern North Carolina refuges' Comprehensive Conservation Plans; hosted an introduction to ArcGIS class; assisted the region by suggesting updates to the Corporate Master Table where refuge point locations did not correspond to their landmass in the Southeast Region; 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; generated metadata; created maps for the Wildland-Urban Interface program; produced maps for firebreak maintenance contracts; participated on Southeast

Region GIS committee; obtained 2 new sets of aerial photography through data sharing agreements; and produced maps for a Level 1 Pre-acquisition Contaminants Survey.

FMO Crews, FF Waters, and FT Van Druten participated in a Federal inter-agency committee (USFWS, NPS, & USFS) to create a set of protocols for the Southern Area on creating Aviation Hazard Maps for flight safety. These protocols included style, size, and necessary contents of the map while limiting other information that may clutter such an important map. Both the USFS and USFWS have adopted these as the mapping standards for their respective areas in the southeast. The protocols, GIS data, example maps, and associated documents will be hosted by the USFS on the Southern Area Coordination Center's website for downloading. Work on this will continue into 2006 as FT Van Druten obtains the raw aerial obstruction data from the FAA and creates GIS layers by state for distribution.

Fire Program Analysis (FPA) created a major GIS work load at Alligator River in 2005 with Refuge staff providing the necessary data for nearly all the refuges in Northeastern North Carolina. Products created include: Fire Management Unit maps for all refuges, data layers for all 12 attributes defined by the North Carolina Coastal Fire Planning Unit, burnable acres determination for seven refuges. Since the FPA work began in 2004, FT Van Druten has generated approximately 150 GIS data layers for our FPU. Work on FPA will continue in the upcoming years.

E. ADMINISTRATION

1. Personnel

Alligator River NWR Staff – 2005

NAME	POSITION	STATUS	EOD
1. Susan Ahlfeld	Park Ranger (Interp.), GS-0025-05/07	TERM	07/12/04
2. Art Beyer*	Wildlife Biologist, GS-0486-11	PFT	12/02/90
3. Mike Bryant	Refuge Manager, GS-0485-14	PFT	04/14/96
4. Jeremy Bucher	Park Ranger (LE), GS-0025-09 Transferred 05/29/05	PFT	03/09/03
5. Eric Craddock	Eng. Equip. Operator, WG-5716-10	PFT	02/21/93
6. Bruce Creef	Eng. Equip. Op. Supv., WS-5716-09	PFT	04/21/71
7. Tom Crews	Fire Mgmt. Officer, (Fire)GS-0460-12	PFT	01/22/95
8. Kris Fair	Bio. Science Tech., GS-0404-07	PFT	05/02/96
9. Buddy Fazio	Wildlife Biologist, GS-0486-13	PFT	04/22/01
10. Jonathan Gilbert	Bio. Science Tech., GS-0404-07 Resigned 06/24/05	NTE 1 Yr.	07/11/04
11. Bobby Govan	Eng. Equip. Op., WG-5716-09	PFT	09/03/93
12. Donnie Harris	Forestry Tech., (Fire) GS-0462-08	PFT	01/11/96
13. Diane Hendry*	Outreach Specialist GS-4005-09	PFT	03/20/05
14. Bernice Kitts	Office Assistant, GS-0303-07 Transferred to Mattamuskeet 03/20/05	PPT	04/02/95
15. Janice Lane	Administrative Officer, GS-0341-09	PFT	03/25/90
16. Chris Lucash*	Wildlife Biologist, GS-0486-11	PFT	12/02/98

17. Anicia Martinez	Secretary, GS-0318-05 Term Ended 07/28/05	TERM	08/15/99
18. Ford Mauney*	Wildlife Biologist, GS-0486-09	PFT	05/15/05
19. Eric Meekins	Eng. Equip. Op., (Fire) WG-5716-08	PFT	10/25/93
20. Amy Midgett	Eng. Equip. Op., (Fire) WG-5716-08	PFT	05/14/93
26. Mike Morse*	Wildlife Biologist, GS-0486-09	PFT	04/09/89
27. Terrie Oatman	Fire Prog. Asst.(OA) GS-5001-05	PFT	10/29/05
27. Jonathan Powers	Eng. Equip. Op., WG-5716-08	PFT	04/24/88
28. Anthony Ralph	Tractor Operator, WG-5705-06 Resigned 01/22/05	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. Joe Sharbaugh	Forestry Technician, GS-0462-04	NTE 1 Yr.	11/27/05
32. Frank Simms	Park Ranger (LE), GS-0025-09	PFT	10/29/05
33. Dennis Stewart	Wildlife Biologist, GS-0486-12	PFT	12/27/91
34. Bonnie Strawser	Park Ranger (Interp.), GS-0025-12	PFT	12/31/80
35. Gregory Suszek	Prescribed Fire Specialist, (Fire)GS-0401-07/09	PFT	11/29/04
36. Jeffrey Swain	Eng. Equip. Op., (Fire) WG-5716-08	PFT	02/10/02
37. Brian VanDruten	Forestry Tech., GS-0462-07	PFT	01/15/99
38. Kelley VanDruten	Fire Mgmt. Officer(WUI),GS-0401-11	PFT	02/16/01
39. Cory Waters	Forestry Tech. (Fire), GS-0462-06	PFT	11/30/03
40. Kathy Whaley	Refuge Manager, GS-0485-13 Trans. To Lower Suwannee 04/03/05	PFT	12/28/02
41. Kathy Whidbee*	Office Assistant, GS-0303-07	TERM	06/03/01
42. Jim Wigginton	Refuge Manager, GS-0485-12	PFT	03/28/99

* Red Wolf Program employee



2005 Alligator River NWR Staff

Left to Right: Bud Fazio, Kathy Whidbee, Mike Bryant, Mike Morse (back), Chris Lucash, Jim Wigginton, Bruce Creef, Leslie Schutte, Greg Suszek, Ann Marie Salewski, Brian Van Druten, Susie Ahlfeld, Bonnie Strawser, Anicia Martinez, Bobby Govan, Janice Lane, Bernice Kitts, Kris Fair, Jonathan Powers, John Gilbert, Kathy Whaley, Eric Craddock, Dennis Stewart

FWS



2005 Alligator River NWR Fire Crew

Left to Right: Tom Crews, Kori Waters, Amy Midgett, Eric Meekins, Kelley
Van Druten, Donnie Harris, Jeff Swain

BWS

The following personnel actions occurred in 2005:

Administrative

Office Assistant Bernice Kitts, who had been at Alligator River for 10 years, transferred 3/20/05 with a promotion to Mattamuskeet NWR when their OA retired. This position has been “suspended” indefinitely until the region meets budget goals.

The same suspension was in effect when Deputy Project Leader Kathy Whaley received a promotion and transferred to Lower Suwannee NWR as Project Leader on 4/3/05. Permission to fill this position was received late in 2005.

Anicia Martinez, Secretary, had been on a temporary, then term position for 5 years. Her 4 year term came up for renewal for a 5th year and Washington Office made the decision not to extend the appointment (giving her a 1 day notice). Her termination date was 7/28/05.

With the above 3 jobs unfilled, the main administrative office for Alligator River and Pea Island in Manteo became somewhat of a ghost town, with only AO Janice Lane and PL Mike Bryant the sole inhabitants of the front office.

Biological

Kristina Fair was reassigned on 3/20/05 from a Biological Science Technician to a Biologist, both grade level GS-07.

Jonathan Gilbert resigned as a temporary Biological Science Technician, GS-0404-07 position to accept another position with the US Air Force on 6/24/05. This position is unable to be filled due to budget restrictions.

CCP/Planner's Office

Bob Glennon, the last person left on the CCP staff, accepted a promotion and transfer to USDA in Washington, DC. His departure date was 12/24/05. The CCP office in Edenton is officially closed with his departure.

Fire

Due to the retirement of Dispatcher Jim Beasley last year, the Fire Program needed to fill that position, as well as having someone to assist with their increasing administrative workload. Regional Office approved the establishment of a Fire Program Assistant (OA) position, which was filled by Terrie Oatman on 10/29/05. Terrie had prior civil service experience working with the Veterans Administration.

Joe Sharbaugh was selected and reported for duty on 11/27/05 as a 1040 appointment Forestry Technician GS-04.

Law Enforcement

Park Ranger (LE) Jeremy Bucher transferred to Cabeza Prieta NWR in May of 2005. Jeremy is originally from that area and wanted to return to be closer to family and friends.

Authorization was given to fill the vacant LE position, and Frank Simms was selected and reported for duty on 10/29/05. Frank transferred from Kodiak NWR.



Frank Simms, Refuge Law Enforcement Officer

BWS

Maintenance

Anthony Ralph, term Tractor Operator, resigned to accept a PFT job with the US Air Force on the Dare County Bombing Range as an equipment operator on 1/22/05.

Public Use

Park Ranger (Interpretative) Susan Ahlfeld received a career ladder promotion from GS-5 to GS-7 on 7/10/05.

Red Wolf

Art Beyer, Red Wolf Wildlife Biologist, was promoted from GS-9 to GS-11 and became responsible for field crew operations on 1/23/05.

After being vacant for several years, the position of Outreach Specialist (Red Wolf Program) was filled by Diane Hendry on 3/20/05. She transferred to Alligator River from BLM in Nevada.

The Red Wolf Program was also able to fill a GS-09 Biologist position that had been vacant for several months. Ford Mauney worked with the Red Wolf Program several years ago, left to go back to school and get his Master's Degree, and now rejoins the crew with many new skills to offer, most importantly new GIS capabilities.

Kathy Whidbee, Office Assistant, received an extension of her term appointment for 1 additional year on 6/1/05.

4. Volunteer Program



Critter costumes provide lots of volunteer opportunities at outreach events!

BWS

In 2005, 23516 hours of service were contributed by 170 volunteers in the following areas: maintenance - 5800 hrs; wildlife/habitat - 8750 hrs; recreation - 7540 hrs; environmental education - 375 hrs; and other - 1050 hrs. The hours were compiled from volunteers at both Alligator River and Pea Island National Wildlife Refuges; both Refuges are therefore reflected in this section. Of the totals, 11,076 hours were contributed to Alligator River Refuge by 95 volunteers.

Interns, resident volunteers (RVs), local Refuge volunteers, and organized work groups are the four active groups which form the Refuge volunteer program.

Volunteers through the Coastal Wildlife Refuge Society became more active in 2005, holding monthly meetings at the headquarters office in Manteo. These monthly "work team" meetings, allowed locals to get more involved in volunteering on the refuges, by meeting with refuge staff, discussing refuge needs, and planning and coordinating projects for the refuges. Two of the most successful projects that were planned through the CWRS Work Teams were Open Houses on

Alligator River (May) and Pea Island (Nov). These two outreach events reached over 400 visitors total. Another exciting project is the Junior Friends of the Refuge club – a partnership with First Flight Middle School. This club, coordinated by WIS Ahlfeld, Amy Redford and Andrea Criss (FFMS teachers), will meet monthly at the middle school, plan weekend trips to the refuge, and construct a schoolyard habitat of native vegetation in the courtyard of the school. Listed below are other projects completed by the CWRS Work Teams:

- Construction and installation of a kiosk on North Pond Trail (PI)
- Installation of new interpretive signs on North Pond Trail Tower (PI)
- Installation of Wildlife Drive signs (AR)
- Landscaping the Volunteer Pod (AR)
- Construction of deck for Volunteer Pod Cabin (AR)
- Development of a CWRS rack card publication

2005 Interns

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.

<u>Name</u>	<u>Assignment</u>	<u>Time Period</u>
Maili Page	Red Wolf Caretaker Intern	Nov 04 – Mar 05
Julia Lysobey	Red Wolf Telemetry Intern	Feb – May
Wendy Russell	Red Wolf Caretaker Intern	April – July
Joseph Hinton	Red Wolf Telemetry Intern	June – Sep
Lesley Hanson	Red Wolf Caretaker Intern	July – Oct
Ryan Nordsven	Red Wolf Caretaker Intern	Oct - Dec
Jeremy Waldrup	Fire Intern	Feb - May
Anthony Davis	Fire Intern	May - Aug
Shelley Meador	General Refuge Intern/PI	May – August
Alicia Weisman	General Refuge Intern/PI	May – August
Allen Bridgman	General Refuge Intern/PI	May – Nov
Patrick Duggan	General Refuge Intern/PI	July - Oct
Chad Beemiller	General Refuge Intern/AR	April – Nov
Andy Heisey	General Refuge Intern/AR	April - Nov
Amy Geddie	6 Month Biological Intern	May – Aug (shortened to 3 months)

2005 Resident Volunteers (RVs)

Resident Volunteers, who are also scheduled in 3-month blocks, were provided a pad for their RV at Pea Island or Alligator River and supplied with electricity, sewage disposal, washer/dryer, telephone hook up, and internet. During 2005, Alligator River had their first resident volunteers at the Volunteer Pod located off of Buffalo City Road. The Pod is equipped with 4 hook up sites, one of

which has a permanent cabin on it which contains a small living area, 2 washers/2 dryers, 2 bathrooms, and a small kitchenette. This luxurious volunteer site is also designed to have volunteer groups camp at the site while doing work projects on the refuge. One volunteer work group from UNC Chapel Hill camped for one night at the Volunteer Pod in October.

<u>Resident Volunteer</u>	<u>Award/Hr. pins</u>	<u>Work Area</u>	<u>Service Period</u>
Don and Mary Seager (AR)	Certificate, 250 pin	Maintenance/PU Survey	January 31 – May
Doug Gronski (AR)	Certificate, 250 pin	Public Use Survey	April – May
Joyce Sheridan	Certificate, 250 pin	Public Use	March - June
Ray Herrington	Certificate, 250 pin	Maintenance	April – June
Tom and Roxy Colomb	Certificate, 250 pin	VC/Public Use	May 30 - July
Bud and Joan Aguiar	Certificate, 250 pin	Maintenance/VC	May – August
John and Marsha Coates (AR)	Certificate, 250 pin	Maintenance/Public Use	July – Oct
Paul and Dottie Stumbo	Certificate, 250 pin	Maintenance/Public Use	Sept - Nov
Jim and Jane Gilbert	Certificate, 250 pin	Maintenance/Public Use	Oct - Dec

Several volunteer work groups donated their time during 2005 (see above list for CWRS Work Team projects):

Big Sweep October 2005 – 12 volunteers donated 48 hours (PI beach clean up)

October 2005 – APPLES/UNC service learning alternative fall break group – 14 people donated 84 hours (Invasive plant removal – AR)

Cumulative hours tallied through September 30, 2005 yielded awards which were presented at the annual Volunteer Awards Banquet in November. Awards were presented to interns and resident volunteers 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. Resident volunteer awards vary. In addition, the following volunteers were presented “milestone” awards:

Certificate (100+ hours) – James Fauth, Jane Gilbert, Jim Gilbert, Jeff Lewis, Ron Scovell, Dottie Stumbo, Paul Stumbo, Heather Young, and Myia Young

250 Hour Pin – Jay Ross

500 Hour Pin – Dee Hardham, Ron Marchand, Marie Reed, Neal Moore

1000 Hour Pin – Bill Ackiss, Guy Newton

2000 Hour Pin – Ruth Polnisch, Stew Whittle

6000 Hour Pin – Warren Davis

Outstanding Sales – Stew Whittle

The Outstanding Volunteer for 2005 was Neal Moore. Neal has a cumulative total of over 500 hours. Neal and his wife Pat are dedicated refuge volunteers; leading bird walks every Friday morning, even during January and February. They are also active in assisting with events on Pea Island,

conducting special bird trips for International Migratory Bird Day, National Wildlife Refuge Week, Wings Over Water and the Coastal Wildlife Refuge Society's Open House. Neal has a passion for wildlife and the refuge and he enjoys sharing his passion with visitors of all ages. You can often find him just "hanging around" the Visitor Center greeting people and teaching them about the birds in the impoundments.

Both Pat Moore and Warren Davis received 2005 Regional Director's Honor Awards.

Neither Alligator River nor Pea Island could sustain the current high-quality level of interpretive programs, visitor support, or 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 2005, this devoted group provided more than 1300 hours.

5. Funding

Refuge funding for FY 05 was as follows:

FUND	NAME OF FUND	FY02	FY03	FY04	FY05
1113	Red Wolf	896.5	906.0	982.3	946.8
1261	Operations	1161.0	1211.1	1355.7	1260.2
1262	Maintenance	267.6	653.8	422.5	107.0
29..	Storm Damage *	1555.4	953.7	218.6	207.3****
9251/9131	Fire Operations	592.0	690.0	1092.5**	710.1
9263	Rx Burns	370.0	106.1	189.0**	205.7
9264	WUI	80.0	166.4	286.0***	425.7
9265	Rural Fire Assist.	0	0	37.2	35.0
TOTAL		4922.5	4687.1	4583.8	3897.8

*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.

****Approximately \$67.0 of initial allocation was taken and reprogrammed by RO with no notice.

1261 funding has been inadequate to meet salaries for the past several fiscal years.

Note the salary for Park Ranger Ahlfeld is paid by the Coastal Wildlife Refuge Society.

6. Safety

Staff safety meetings were held monthly. A Safety Committee was selected from the funded Program Areas (1260, 1113, 92XX). The 2005 Safety Committee consisted of Janice Lane, Eric Craddock, Amy Midgett, Jon Gilbert, Susan Ahlfeld, and Art Beyer. Jim Wigginton continued to serve as the station's Collateral Duty Safety Officer. 2005 Monthly Safety Topics included: review of 2005 Safety/OWCP incidents, Automated External Defibrillator (AED) training, stress management, ATV safety, water/watercraft safety, Hurricane Preparedness, West Nile Virus, Safe Motor Vehicle Operation (2hr Regional Safety Stand Down), stinging critters – bees, wasps, spiders, hearing safety, and health insurance update.

Mr. Owen Moe, Regional Safety Specialist, conducted a Safety and Health Evaluation at Alligator River and Pea Island NWR's April 27-28, 2005. There were three areas identified needing correction beyond the capabilities of the refuges and need funding and support at the Regional level:

- 1) Approximately seven (7) miles of dirt road on the Wildlife Drive are in poor condition. Major repairs are needed to make the roadways safe for the visiting public, employees, and volunteers.
VIOLATIONS: 240 FW 1.3 (Policy and General Provisions)
- 2) Compliance with OSHA and National Fire Protection Association (NFPA) standards such as Laboratory Safety and Life Safety Codes are non-existent at the Red Wolf Recovery Laboratory (Manteo Administrative Office – garage). Tasks within the laboratory include: administration of anesthesia, drawing blood samples, lab analysis, and surgery on red wolves. The laboratory stores chemicals and controlled drugs, large quantity of syringes, intravenous solutions, and catheters. The safety and health violations, together with the physical security concerns for the laboratory operations require a new facility. These conditions were also noted during the 2004 Environmental Compliance Audit. A project addressing the issue has been included in MMS since 2002 as a high priority. VIOLATIONS: 29CFR1910.1450 (Laboratory Safety Standards), NFPA Articles 45 (Standard on Fire Protection for Laboratories Using Chemicals) and 101 (Life Safety Codes), 432 FW 1.2 (Physical Security in Service Facilities).
- 3) The fuel storage tanks at Pea Island NWR are in critical need of replacement. The exterior of the tanks are pitted and all metal hardware and fittings are badly corroded. Potential safety and environmental concerns from equipment failure were documented. VIOLATIONS: 29 CFR 1910.106 (Flammable and Combustible Liquids), NFPA Article 30 (Flammable and Combustible Liquids). This area was addressed during 2005 – see Pea Island NWR, I. Equipment and Facilities – 2. Rehabilitation.

Two ATV Safety Institute Ridercourse Classes were taught at Pea Island NWR on May 24 and 25, 2005 by refuge instructor FT Van Druten. A total of 13 students were taught in 2005. The classes included employees from 3 refuges and interns used mostly to assist with the Sea Turtle Nesting Program on Pea Island NWR. A total of 45 students have been instructed since 2004 at either Alligator River or Pea Island NWR's.

FT Van Druten participated in the on-going dialogue within the USFWS in 2005 to come up with a national policy for ATV operation. This should continue into 2006.

7. Technical Assistance

RM Bryant and RB Stewart continued working with Mr. Robert Fisher and others 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.

RB Stewart continued working with Dare County and North Carolina officials and the 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 sewage 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. Little additional information came forth in 2005 except that project proponents are discussing the possibility of a treated effluent discharge pipe traversing the refuge and discharging into the Lake Worth Canal.

During the course of the year, RB Stewart interacted with Tideland Electric, the NC Department of Transportation, and Dare County with regards to various maintenance projects within rights-of way or requiring permitting by the refuge. Planning efforts with regards to the upgrading of U. S. Highway 64 across the refuge began in late 2005.

F. HABITAT MANAGEMENT

1. General

Generally, 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, firebreaks have been added to assist with prescribed burning efforts. The purchase of the Prudential farmlands in March of 1988 added agricultural land to the list of habitats. As the Comprehensive Conservation Plan developed, the six vegetative categories evolved into the twelve categories as shown in table below.

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 100 acres of moist soil were produced in prior converted farmland within the farm unit. The remaining approximate 1700 acres in the moist soil units were planted in corn, beans, millet, or winter wheat. 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.



Eric Craddock disking a moist soil unit.

JBC

3. Forests

Habitat types and approximate acreage of land within the boundaries of Alligator River National Wildlife Refuge located in Dare and Hyde Counties, North Carolina.

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

The on-going forest cover type mapping project for Alligator River made substantial progress in 2005. The project was virtually completed, with slivers, overlaps, and holes yet to be filtered out. Acreages were passed to Bob Glennon for use in the Alligator River CCP and the data was incorporated into a map for the CCP also. The fuels map was also completed as a result of this project. The cleaning of the data and updating of the database will continue in 2006.



White-tailed deer in pocosins.

SR

4. Croplands

The 2005 Cropping Season saw a significant increase in productivity by the three (3) farmers under Cooperative Farming Agreements (CFA). Current CFA's are valid through December 31, 2010. The long term agreements allow the farmers to take advantage of the USDA's – Natural Resource Conservation Services (NRCS) CP-21 Filter Strip (393) Program. The filter strips when maintained in an early successional stage provides beneficial wildlife habitat. Approximately 1500 acres of croplands were converted to filter strips in 2000. Prescribed burning and seasonal mowing helps maintain the preferred habitat type desired.

During 2005, 984 acres of corn, 1244 acres of soybeans and 400 acres of winter wheat were planted by the cooperative farmers. Production was good with corn yielding 120 bushels per acre and

base camp to assist emergency workers. Workers were from nine different agencies, including 80 from the International Red Cross and 50 from the Federal Emergency Management Association (FEMA).

The district and refuge fire management staff spent much of the year working with the interagency fire budgetary system Fire Program Analysis (FPA). WUIS Van Druten became the leader and subject matter expert on this system that is being designed in two phases to replace current fire management 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. The FPA-PM analysis to be submitted in February 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. It is hoped that FPA will bring budgeting parity within the agencies and within the refuge system across the Region.

The country is divided into Fire Planning Units (FPU). WUIS Van Druten was assigned as Technical Team Administrator for the North Carolina Coast FPU and entered most of the data for refuges into the program. She also acted as coordinator for the FPU to keep the National Park Service and the US Forest Service informed on deadlines and data requirements. FT Brian Van Druten and Pocosin Lakes FMO Vince Carver assisted in data gathering, providing expertise and information with GIS, fuel models, and weather. In April, line officers, fire staff, and other representatives from the three agencies met to establish a charter document and begin interagency planning.



Dry conditions and a hot motor could have added up to a disastrous wildfire when this vehicle became stuck on Borrow Pit Road. Refuge Manager Mike Bryant advised everyone to be especially alert to conditions that could cause a fire... including driving motorized vehicles in areas with dry vegetation.

Wildfire Preparedness:

The fire weather was relatively mild during the 2005 spring fire season. January – March was a little drier than normal for eastern North Carolina, bringing prescribed burning to a screeching halt. Frequent rainfall during April and May held fire staffing to a minimum during this time, keeping the number of staffing days relatively low.

Staffing Class Days for Spring Fire Season 2005

(RP – Readiness Plan or Staffing Class)

Month	RP 5 (Very High)	RP 4 (High)	RP 3 (Moderate)
March - May	0	17	45

Late summer rainfall stopped rather abruptly during August with no significant accumulation through October. The Keetch-Byrum Drought Index (KBDI) peaked out at the second highest level in 10 years (over 600) in September and early October. Many of the refuge fire resources were away responding to Hurricanes Katrina and Rita during this time. North Carolina Forest Service personnel helped shore up the gap for staffing during this critical time. Two fires were experienced during this critical period and contained by refuge staff and cooperators. A series of large rainstorms in late October ended this dry period.

Wildfires at Alligator River National Wildlife Refuge 2005

Fire Name	Date	Acres	Fire Number
Mashoes 05	7-Jan	0.5	41630-9141-BJ2A
64+ old 64 Roadside	16-Mar	0.5	41630-9141-BLV9
Memorial Eve Fire	29-May	177	41630-9141-BS3G
264 False Alarm	1-Jul	0	41630-9141-BOW4
Point Peter Rd Fire	1-Jul	1.0	41630-9141-By2Z
East Lake Threat	25-Aug	0.1	41630-9141-B46L
Bodie Island False Alarm	25-Aug	0	41630-9141-B46R
UGAR FIRE	6-Sep	0.3	41630-9141-B51N
Mashoes Powerline	13-Sep	1.5	41630-9141-B6HP
Total 180.9			



Fire Equipment Operator Amy Midgett, Smokey, and Hannah (Amy's daughter) teach about fire prevention.

MES

Dispatch Operations:

Wildfire suppression and prescribed fire operations for District 1 were coordinated out of the Fish and Wildlife Service Dispatch Center located at East Lake, NC. In 2005 there were 25 wildland fires across District 1, totaling 224 acres: 10 suppressed by refuge fire personnel, 10 suppressed by cooperators, 2 false alarms and 3 natural out fires. Forestry Technician Amy Midgette held an interim dispatcher/fire program technician position that kept the dispatch office running during the year while Alligator River advertised and filled a new Fire Program Administrative Assistant

position. Terrie Oatman, was hired in this position and came in during the last quarter of the year. She began learning dispatch functions and several programs, including Fire Management Information System (FMIS), Interagency Qualifications Certification System (IQCS), Resource Ordering and Status System (ROSS), and the Weather Information Management System (WIMS).

Off-Station Dispatches:

Fifteen people from the refuges in District 1 were dispatched to hurricane response assignments along with 4 pieces of equipment with lowboys. The longest assignment was Hurricane Katrina which lasted from August 28 – September 30 with many staff extending for a full 21 days. District 1 refuge personnel provided 315 staff days (3780 hours) to four off-station hurricane responses. In addition, staff responded locally in September to Hurricane Ophelia which caused severe beach erosion, but no extensive damage to the refuges or neighboring communities.

Wildfire dispatches totaled 14 assignments for 183 days (2196 hours). Personnel were dispatched to wildfires in Mississippi, South Carolina, Utah, Arizona, Nevada, and Washington. A total of 498 staff days (almost 6000 hours) were dispatched to off-station assignments during CY 2005 through the Fish and Wildlife Service Dispatch Center at Alligator River. Positions filled were ICT3, DIVS, TFLD, HCWN, HECM, ENGB, SEC1, FFT1, FFT2, FALB, DOZ1, and technical specialist positions.

Fire Organization:

Terrie Oatman was hired to fill the Fire Program Administrative Assistant position at Alligator River. Joe Sharbaugh was hired in the temporary GS-4 FFT2 position. A selection was made for the GS-4 permanent FFT2 position, but the selected individual later declined to take the position and the selection was extended into 2006. Amy Midgette was selected to fill the new Firefighter Equipment Operator Position.

Current Fire Personnel Stationed at Alligator River National Wildlife Refuge

District or Zone Personnel:

District Fire Management Officer	Tom Crews
District Wildland Urban Interface Specialist	Kelley Van Druten
District Prescribed Fire Specialist	Greg Suszek
District Fire Program Administrative Assistant	Terrie Oatman

Refuge positions:

Refuge Fire Control Officer	Donnie Harris
Senior Firefighter/ Forestry Tech	Cory Waters
Firefighter/Forestry Tech	Vacant
Firefighter/Forestry Tech (seasonal)	Joseph Sharbaugh
Firefighter Equipment Operator	Eric Meekins
Firefighter Equipment Operator	Jeff Swain
Firefighter Equipment Operator	Amy Midgett

Auxiliary Firefighters:

Forestry Tech (GIS)	Brian Van Druten
Biological Technician	Leslie Shutte
Public Use Specialist	Susie Ahlfeld

Fire Interns (See Section E. 4):

Alligator River had two fire interns this year. The interns assisted with equipment maintenance, local community wildland urban interface assessments, ground truthing for fuels mapping, FPA data entry, monitoring, GIS digitizing, firewise outreach and other aspects of the fire program. Jeremy Walthrop was hired outside his volunteer hours as an AD (administrative hire) for several prescribed burns in the District which rounded out his intern experience. Anthony Davis was able to go out of district on one wildfire assignment during his stay. Their assistance was invaluable on several projects throughout the year. Jeremy left when he obtained a position with the North Carolina Forest Service near his home in Asheville, NC. Anthony left to go back and complete his degree at Western Carolina University.

Communications:

The migration to narrowband digital radios was completed in 2004 at Alligator River NWR and was tested during the season. Adjustments were made in radio frequency programming, which was coordinated with other refuges, to create a common frequency list. FT Waters assumed the role of Refuge Radio Coordinator for District 1, and did a superb job in this position. Most fire operations are conducted in the "analog" mode on the radios in order to allow our cooperators to communicate with us using their non-digital high-band radios.

Prescribed Burning:

PFS Suszek assisted Mackay Island and Mattamuskeet Refuges in updating or writing new prescribed fire plans, including those for Cedar Island and Swanquarter NWRs. Over 100 burn units were prepared for implementation on eight different refuges. Burning was coordinated at a district level, with Cedar Island and Pocosin Lakes Refuges taking precedent over many burns at Alligator River. Refuge Managers met with fire staff to help establish this year's priorities for prescribed burning.

Cool and damp weather during the winter-spring season followed by a fall that was too dry and then too wet limited opportunities for prescribed burn during the year. District 1 burned 14,872 acres for the year with 31 separate burns conducted. Dispatch operations for these burns were all coordinated out of the Fish and Wildlife Service Dispatch Office at East Lake, with the exception of those at Mackay Island Refuge which were dispatched from their headquarters. There were several narrow windows of opportunity missed due to a lack of availability of suitable fire-carded helicopters during this time.

Most of the burning attempted at Alligator River was centered on the agricultural fields and large marshes down at Long Shoal River. The large West Marsh at Cedar Island NWR was burned by FCO Harris as RXB2 in April as an operational evaluation research burn (OERB). This designation allowed the 4,900 acre unit to be burned using an alternative smoke modeling system to the State Smoke Management Guidelines. NCFS Research Forester Gary Curcio was present to assist in the implementation of the OERB that went very well and allowed researchers to study the huge plume resulting from the burn. FCO Harris served as RXB2 for a key prescribed burn in the Peat Plant Block pocosin unit on the southwest side of the Pocosin Lakes NWR.

Research burns for the Joint Fire Sciences Program and the Dare County Bomb Range Legacy project were planned in conjunction with the US Air Force, the US Environmental Protection Agency, and US Forest Service Researchers Gary Achteemeier from Athens, Georgia and Miriam Rorig from Bellingham, WA. The principal researcher coordinating the project was Bob Mickler from ManTech, at the Research Triangle Park in Raleigh, NC. Research Technician Dwight Otwell 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.

The North Navy research burn appeared ready to implement in February when an unpredicted light snowfall started closing the weather window. An attempt was made to burn anyway since researchers had already been called in and assembled based on the weather forecast earlier in the week. Unfortunately, the burn was very marginal and was called off after trying to ignite one unit unsuccessfully. No additional windows opened during the year for this important burn until after the spring wildfire season was underway and the NCFS requested that we not continue to burn.

Hazardous fuels were reduced during 2005 using both prescribed fire and mechanical clearing. Project details are shown in the tables below:

Hazardous Fuels Projects Accomplished on Alligator River National Wildlife Refuge 2005

Prescribed Burns (Unit)	Date	Acres	Fire Number
2.5.5.Long Shoal River	28-Jan	1696	41630-9263-4429
2.5.6.Long Shoal River	28-Jan	1400	41630-9263-4299
North Navy	20-Feb	20	41630-9264-4502
Laurel Bay	10-Mar	220	41630-9263-4553
Creef Ag	11-Mar	361	41630-9263-4554
Laurel Bay2	11-Mar	145	41630-9263-4563
Creef Ag 2	21-Mar	209	41630-9263-4596
Total			4051

Mechanical Projects	Completion Date	Acres
Stumpy Point FB	17-Jan	58
Canvasback FB	30-Jan	10
South Boundary Rd FB	31-Jan	7
North Navy Fire Breaks	10-Feb	10
West Point Peter FB	26-Feb	6
Point Peter FB	24-May	11
Pamlico Rd FB	11-Jul	11
Quadrangle 5	11-Nov	15
Quadrangle 4	11-Nov	5
Quadrangle 1	11-Nov	8
Quadrangle 2	11-Nov	5
Quadrangle 3	11-Nov	5

We are a long way from meeting our ten-year goals in hazardous fuel reduction at Alligator River as stated in the 1998 Fire Management Plan. Funding and target allotment short falls from past years is looking better during the second half of 2005. We are now realizing that depending on Aircraft Rental Agreement (ARA) helicopters is not providing the coverage needed. The key to increasing the burning at Alligator River is going to hinge on our ability to take advantage of intermittent burn windows and expand our burning season on into the spring fire season (March and April) when appropriate.

Wildland Urban Interface (WUI):

Three FY 2004 WUI projects administered by WUIS Van Druten were completed during CY 2005.

1. In January, Garcia Forest Service completed the maintenance cutting for 58 acres of firebreak in the North Stumpy Point Fire Compartment. Primarily done with an amphibious excavator, the firebreaks are now clear of the downed trees from 2003 Hurricane Isabel.
2. The final report for the Cedar Island WUI Assessment contract was accepted in April providing an assessment of the wildland fire hazards for the communities around Cedar Island NWR.
3. In mid-summer, the refuge received 5,000 of 18,000 pamphlets entitled "Firewise Landscaping in North Carolina" that were created and printed through a WUI grant with the North Carolina Extension Service. The remaining pamphlets are with the Extension Service and the North Carolina Forest Service for distribution in the state. The pamphlet will also be available on-line at each of the partner's websites.

In August, the District received \$90,000 in WUI funding for six projects. Alligator River was able to contract two projects with Garcia Forest Service to cut 18 acres of firebreak in the North Navy and Quadrangle Fire Compartments. The contractor cut an additional 3 acres of firebreak in the North Navy compartment through a U.S Air Force contract. The other projects were a firebreak and an access road improvement project at Mackay Island NWR, a firebreak at Pocosin Lakes NWR, and geo-boy support funding.

District 1 is behind in developing risk assessments and wildfire mitigation plans for most of the communities surrounding the nine eastern North Carolina refuges that will be linked to funding and prioritization of projects. Much of the backlog can be attributed to the workload caused by FPA.

Rural Fire Assistance (RFA):

WUIS Van Druten continued to work with the fourteen cooperating Volunteer Fire Departments in District 1 to purchase wildland fire fighting PPE and some equipment with their RFA grants. A few of the departments were able to arrange basic wildland fire training through the North Carolina Forest Service. In FY 2005, seven departments received additional RFA funding for a total of \$35,000. Alligator River NWR is supported by Stumpy Point VFD that received \$6,500 in additional funding this year.

Cooperative Relations:

Relations with the North Carolina Division of Natural Resources, State Forest Service continue to be excellent. There have been significant changes in personnel, with changes in fire positions in Districts 13, 7, and 4. Other cooperative programs include cooperatively burning the North Navy Compartment on Alligator River NWR and the USAF Seymour Johnson Air Force Base Dare County Bomb Range and participation in the Joint Fire Sciences Program (JFSP). The JFSP involves cooperative prescribed burning research with several researchers and agencies including the USFS Athens Fire Lab, USFS Northwest Fire Lab, the USAF, US Environmental Protection Agency, North Carolina State University, and ManTech Environmental Technology Inc.

Fire Related Training:

Locally offered training included Annual Firefighter Refresher, Terratorch Operator Training, Marshmaster training, and Plastic Sphere Dispenser Operation (PSDO) training.

Aviation Management:

Currently the refuges in eastern North Carolina are dependent on ARA helicopters rather than an exclusive use contract (funded from 1992-1999) or agency helicopters (from 2000 to 2004). We have been working with two vendors in Virginia who have been available only intermittently when requested.

Helicopter use at Alligator River was reduced significantly during 2005 due to a lack of helicopter availability and the wet wildland fire and prescribed burn seasons. There were two fires where we had to use direct attack suppression strategies that could have better been managed with indirect attack suppression strategies or monitoring; however, unavailability of helicopters (and fixed wing aircraft) limited our ability to scout the fires and make better decisions. Having an aerial ignition platform would have given us additional options for managing at least one of those fires. Helicopters were utilized for 14.5 flight hours at Alligator River during the year. This is approximately 1/3 the flight hours normally used in an average year for just aerial ignition work.

The National Park Service aircraft (32PS) flown by National Park Service Pilot Bob Trick was used more frequently during 2005. This fixed wing aircraft was used primarily for red wolf radio tracking, but also for aerial detection and reconnaissance planning hazardous fuel treatments. This ship and other fixed wing aircraft were used for 235 flight hours during 2005 with 15 hours for aerial detection and 220 for wolf flights. These hours do not include the waterfowl flights made with Region 5 aircraft.

Alligator River hosted the Regional Interagency Flight Hazard Map Design Team in Manteo for a meeting in March to develop a template and guidelines for flight hazard mapping. FT Van Druten, DFMO Crews, and FT Waters represented the USFWS on this team.

10. Pest Control

Pest Plants

Phragmites continues to be a problem on Alligator River NWR. In July 2005, WB Stewart and FT Van Druten took a survey flight with NPS pilot Bob Trick to decide which areas to concentrate our aerial herbicide applications. The two areas of focus were the dredge disposal area south of Stumpy Point and the Creel Cut Trail, totaling approximately 80 acres. Ground spraying along the roadways of Alligator River was also a priority, with many stands appearing along the Wildlife Drive. Aerial spraying was to have taken place in late August and early September, with ground spraying to follow after. When the Southeast Region helicopter arrived from spraying in the Northeast Region in late August, high winds kept us from spraying upon arrival. Before the winds subsided, the helicopter was moved to the Gulf Coast to assist with recovery efforts associated with Hurricane Katrina. The refuge also sent a significant portion of the staff and equipment to assist with recovery operations, limiting what was available for spraying. By the time we had the necessary resources in place, the plants had browned to the point where herbicide uptake by the plants would have been minimal. Spraying was scrapped until 2006, which will include some experimentation with herbicide applications at various times of the growing season to gauge effectiveness. Work has also been initiated with the North Carolina Department of Transportation to get them to spray those areas within their right-of-way in 2006.

Also in 2005, 100 gallons of Aquaneat (a glyphosate herbicide) and 100 gallons of surfactant were purchased through UAP Timberlands in Virginia for use in the control of phragmites. Five area suppliers were contacted for bids, with UAP Timberlands providing the best pricing for delivered product. This should give the refuge enough herbicide to spray both Alligator River and Pea Island NWR's in 2006.

Alligator weed is a growing problem on Alligator River NWR. Alligator weed will totally obstruct narrow waterways, which are prevalent throughout the refuge. Not only does this impede passage along these waterways, it restricts the flow of water. Reports have been coming in from local paddling enthusiasts about alligator weed appearing in area waterways for two years. In July 2005, WB Stewart and FT Van Druten took a survey flight with NPS pilot Bob Trick to evaluate the alligator weed situation. At this time, alligator weed can be found in the canal north of Highway 64, in pockets along the Alligator River, and the waters leading to and around Laurel Bay Lake. Since alligator weed control is relatively new to the refuge, research was done to find what the optimum times and methods were for control. A relatively new, yet expensive, herbicide called Habitat was the suggested tool for control. Five area suppliers were contacted for bids, with UAP Timberlands providing the best pricing for delivered product. Ten gallons were purchased as was the appropriate surfactant. The refuge plans on concentrating on the waters leading to and around Laurel Bay Lake for spraying in 2006. Through our research, boats will have to be used for herbicide application. Work has also been initiated with the North Carolina Department of Transportation to get them to spray those areas within their right-of-way in 2006.

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 3.3 pine beetles per trap per day compared to 9.0 clerids (natural pine beetle predator). This correlated to a predicted static/low Southern Pine Beetle problem for 2005. No survey flights were conducted in 2005 due to a lack of funding.

G. WILDLIFE

1. Wildlife Diversity

The vast expanse of swamp-forest and marsh 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 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 in North Carolina. There are no specific plans to manage 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 to the American crocodile. 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 2005 due to insufficient funding and staffing.



Ours are certainly not Florida 'gators, but our visitor can observe 'gators on occasion, especially if they're paddling.

LC

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 2005.

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. It was not possible to assess nesting activity during 2005 as the cavity tree in the only accessible active cluster was dead and leaning at a 45° angle.

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. However, most of these trees were considered as inactive trees. An attempt to conduct an assessment was made to determine the need for artificial cavities. Basically, the post-Isabel pocosin is inaccessible from the ground. This process is seriously complicated due to the fact that there is no funding or staffing allocated for such biological work on the refuge. The basic conclusion from the 2005 RCW efforts is that the refuge needs to start over with regards to locating active clusters and cavity trees by helicopter.

Red wolf (Endangered):

Red Wolf Wild Population

The Red Wolf Recovery Program of the U.S. Fish and Wildlife Service manages the world's only wild red wolf (*Canis rufus*) population. FY 2005 represents the 18th consecutive year of successful management. By spring 2005, the wild population had produced over 400 wild pups, with at least 41 pups born in the wild in 2005. The wild population of red wolves is currently composed of approximately 100 wolves comprising 17 packs distributed across 1.7 million acres in five North Carolina counties. Population monitoring is done in a number of ways: trapping, scat sampling, and tracking using ground and aerial telemetry.

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 population dynamics, and make recommendations to the Service regarding adaptive management and red wolf recovery. Reviews by the Recovery Implementation Team show the Plan is effective in restoring the wild red wolf population and managing competitors (eastern coyotes). In 2005, 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. The Adaptive Management Plan utilizes a 3-zone approach over a 5-county area: Dare, Tyrrell, Hyde, Beaufort, and Washington Counties and encompassing 1.7 million acres. Beginning with the eastern most Zone 1 and moving west, by the end of 2005, the experimental population has numerous red wolves and is managed as free of coyotes. Zone 2 also has a healthy red wolf population and is nearly free of coyotes. Zone 3 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 over 30 captive facilities across the United States. The effort is overseen by the Red Wolf Recovery Program Team Leader, Bud Fazio, located at the Alligator River National Wildlife Refuge, and is coordinated by the Red Wolf Species Survival Plan Leader, Will Waddell, who is located at the Point Defiance Zoo and Aquarium in Tacoma, Washington. In 2005, approximately 153 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.



Visitors do sometimes get a glimpse of a red wolf in the wild.

Red Wolf Island Programs (See Section H for details)

The Red Wolf Recovery Program and Red Wolf Captive Breeding Program partner with two 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 northeastern North Carolina. The St.Vincent National Wildlife Refuge in Florida maintains a pair of red wolves for breeding in the wild. The pair did have pups in 2005. Bulls Island is part of the Cape Romain National Wildlife Refuge in South Carolina and currently has no red wolves on site. There is a breeding pair and pups on Cape Romain's mainland property at the Sewee Visitor Center. The Cape Romain Refuge educates approximately 200,000 people per year about red wolves. 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 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 provides red wolf biologists with data to distinguish and manage red wolves and other canids such as coyotes in the recovery area. Genetic analysis provides invaluable statistics on which to base sound management decisions that will ensure the success of the red wolf reintroduction effort and the long-term survival of the species. Both Master's degree and continuing Ph.D work at the University of Idaho have identified 18 gene loci in red wolves to date, making it easier to distinguish between red wolves and eastern coyotes.

Modeling the Wild Red Wolf Population

The Red Wolf Recovery Program is partnering with researchers from Trent University in Canada who are modeling survival and demographics of the North Carolina wild red wolf population. The population demographic model shows that the wild red wolf population will survive successfully with assistance from biologists in managing problem coyotes.

Red Wolf Captive Research Facility at North Carolina State University

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

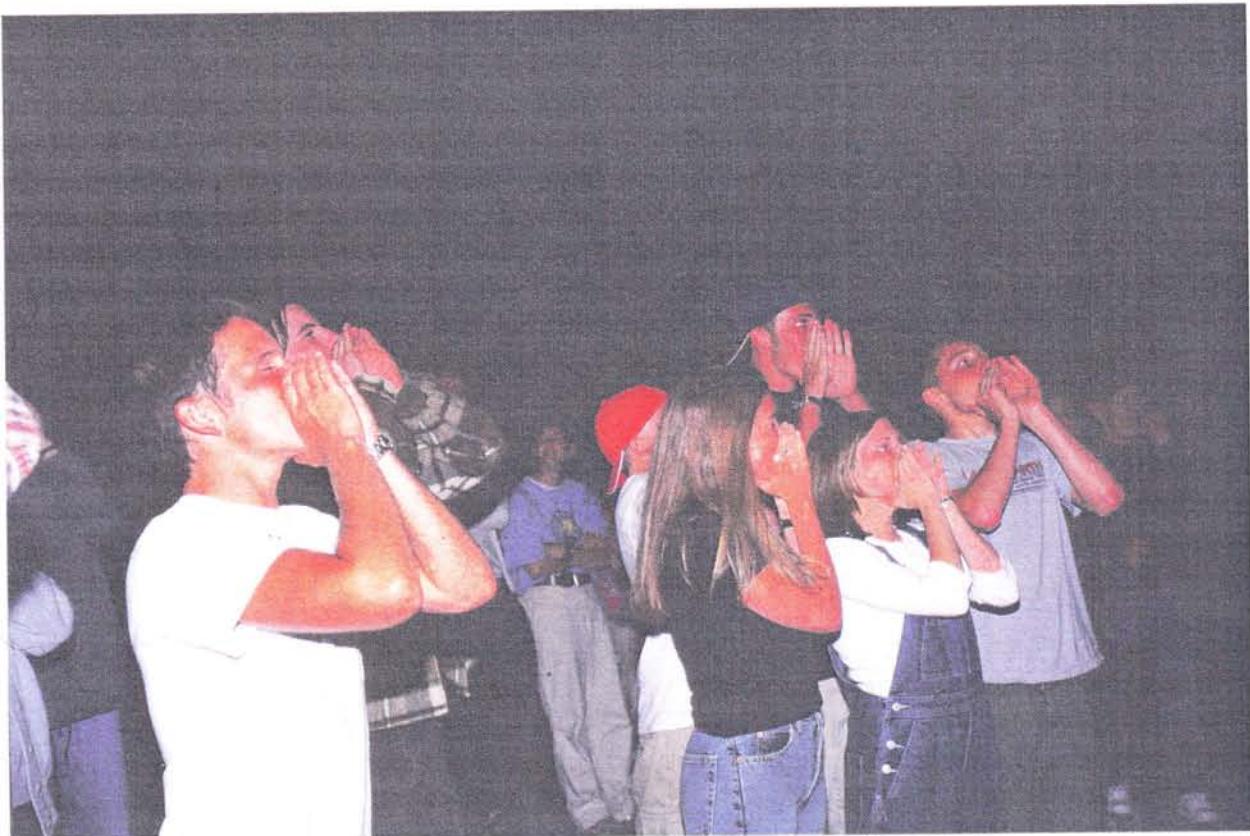
Red Wolf Program Presentations

The Red Wolf Recovery Program is contacted by a number of organizations, clubs and schools annually to give red wolf presentations. During 2005, these presentations reached 5,500 people through off-site programs.

Far Traveler teacher workshops are held semi-annually and focus on grades K-8. Ten educators attended the workshop held in March. As part of red wolf educational outreach, Discovery Boxes are circulated among educators. A Discovery Box contains red wolf teaching tools such as a red wolf pelt, collar, track cast, "Recovering A Species" video, howling cassette and informational materials. An additional Discovery Box was put together in 2005, bringing the total number of boxes in circulation to three.

Red Wolf Coalition

The Red Wolf Recovery Program continues to work closely with the Red Wolf Coalition, a citizen-support organization whose mission is to educate and promote community awareness for the red wolf. Its Board of Directors consists of 12 members from various locations in North Carolina, Virginia and Washington DC. They co-sponsor howling safaris with the Service and participate in outreach events throughout the year.



Red Wolf Howlings continue to be among the most popular refuge programs.

JR

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 during migratory periods. 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. During 2004-05 most species showed either a substantial increase or decrease in use of the refuge. Black duck and Green-winged teal use showed the least change. Use data for Canada geese and snow geese is not measurable because of the very low numbers. Historically, the refuge has never been used by either the snow goose or the Canada goose. Profound changes in use such as that shown for the wood duck are likely to be artifacts due to our timing of surveys and the fact that we are only surveying flooded crop lands. Large numbers of wood ducks can be observed on the refuge, but the use the flooded farm fields mostly for roosting and our surveys are done through the day. Wood ducks are most common in the moist soil units when cold weather causes the sloughs and swamps to freeze while the open fields with full exposure to sunshine thaw sooner. Substantial changes such as those shown for the redhead and coot are indicative of sporadic use by such species. The number of northern shovelers and mergansers is increasing each year. The northern pintail and green-winged teal are the most common wintering ducks on the refuge.

Composition of wintering waterfowl at Alligator River NWR during the 2004-2005 survey period in Dare and Hyde Counties, North Carolina.

SPECIES	PEAK PERIOD	SURVEY PEAK #	# USE DAYS 2004-05	% TOTAL USE DAYS 2004-05	USEDAYS % diff from 2003-04 avg	USEDAYS % diff from long-term avg
Tundra Swan	Dec	2150	121025	17.1	129	132
Snow goose	Dec	1	19	0.001	0	134
Canada goose	Dec	3	29	0.001	0	-95
Mallard	Feb	558	32531	4.6	200	-26
Black duck	Feb	185	8268	1.2	-1	-60
Gadwall	Feb	151	4610	0.7	88	-50
Wigeon	Feb	154	2793	0.4	-32	-78
Pintail	Dec	6544	337731	47.6	85	45
GWT	Feb	3756	163555	23.1	24	-12
BWT	Mar	6	21	0.001	-60	-97
Shoveler	Feb	231	4398	0.6	86	68
Wood duck	Dec	934	13369	1.9	9381	-19
Ringneck	Feb	385	15525	2.2	114	-72
Redhead	Nov	2020	140	0.001	0	855
Canvasback	N/A	N/A	0	0	0	0

Scaup	N/A	N/A	0	0	0	0
Unknown	Dec	248	2997	0.4	-42	-85
Bufflehead	Nov	2	47	0.001	0	-24
Ruddy	Dec	7	123	0.001	0	11
Merganser	Mar	6	109	0.001	98	27
Coot	Dec	60	2321	0.3	621	-60

In order to assess the quantity and quality of moist soil plants for waterfowl during the 2004-2005 wintering period it is necessary to examine vegetation data from the fall of 2004. Vegetation data were not collected during the fall of 2004 due to changes in management and management strategies.

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 roosting, resting, and loafing. All is not lost if water levels do not cover each field entirely within the moist soil units. First, there is no evidence that waterfowl have ever completely eaten moist soil production with fields partially flooded. Second, the un-flooded portion of the moist soil unit provides valuable habitat for marsh birds, especially rails, as well as grassland birds along with numerous other wildlife species, including the prey base for the red wolf and large numbers of raptors. Completely flooding the entire moist soil unit acreage eliminates valuable habitat for other wildlife.

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, bats, 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. No reports of peregrine falcons occurred during 2005. During late 2004 some preliminary effort went into establishing grassland bird and diurnal raptor surveys in the farm fields. Routes and protocols for raptor surveys were established during 2005 and data collection began. Early results show that Northern harriers are the most common raptor and late summer months are not very productive for data collection due to low raptor numbers. The table below represents the first year of data for the raptor survey. Interpretation of the data is limited due to the fact that surveys are limited in number and do not represent a uniform effort over the entire year. The survey will be continued in 2006 and an effort will be made to establish a more systematic sampling regime over the farm unit.

Summary of raptor data collected from farm units at Alligator River NWR during 2005. The total number counted for the year is shown in the # column; the % column is the percent of total birds counted; and the N_{max} column is the maximum number counted on any survey.

Species	#	%	N _{max}	Peak date
Bald eagle	11	1.7	8	2/3/05
Sharp-shinned hawk	2	0.3	1	2/3/05
Northern harrier	352	53.6	89	2/3/05
Red-tailed hawk	74	11.3	18	2/3/05
Rough-legged hawk	4	0.6	2	3/7/05
American kestrel	15	2.3	4	2/17/05
Merlin	0	0	0	2/3/05
Peregrine falcon	1	0.2	1	2/3/05
Black vulture	1	0.2	1	3/16/05
Turkey vulture	178	27.1	45	2/3/05
Osprey	11	1.7	8	5/20/05
Unknown raptor	8	1.2	3	3/7/05

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 other habitat types such as 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 was completed. The ecosystem bear study began with hair trap construction 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. Results clearly demonstrate a very high density black bear population on the refuge and Dare County Bombing Range. Dr. Mike Vaughan of Virginia Tech was the principal investigator with graduate student Catherine Treddick conducting most of the field work and earning her Master of Science degree.

10. Other Resident Wildlife

Wild turkeys are observed frequently during the spring and summer. During the fall and winter, flocks of 6-20 birds were observed in various locations. Other turkeys were observed over much of the refuge, even along roads transecting pocosin habitat. Turkey numbers appear to be increasing 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.

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. Local groups also sponsored an Open House event in May on the Refuge to highlight some of these uses to the public. Approximately 150 refuge visitors took advantage of the free canoe tours, nature hikes, and light refreshments.

Approximately 2,250 people used Alligator River NWR walking trails during 2005. It is anticipated that there will be a continued increase in trail use on this refuge for some time to come. Approximately 13,650 visitors used the paddling trails, and 1,500 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, the Wildland Urban Interface Specialist (fire program), and staff from the Red Wolf Program were able to participate in conservation-themed festivals, including the NC Aquarium's Earth Day event (300 visitors), Engelhard Seafood Festival (100 visitors), Currituck Wildlife Art Show (750 visitors), New Bern Wildlife Art Show (1,500 visitors), Forest Festival (3,000), Eastern North Carolina Wildlife Show (1,500 visitors), Coastal Gardening Festival (250), Palmetto-Pearlree Preserve Grand Opening (50), Dixie Deer (2,500 visitors), Outer Banks Association of Home Builders Event (500), Kitty Hawk Heritage Day (500), Fun and Safety Day (3,800), Purple Martin Festival (612) and the Manteo and Mann's Harbor Christmas parade. Alligator River and Pea Island interns also participated in the FWS booth at the NC State Fair (80,000).

Fire-related Outreach:

The Dare County Firewise Council (DCFC) is a local interagency, interdisciplinary committee working on establishing outreach efforts in firewise to the citizens of Dare County and Ocracoke Village in Hyde County. WUIS Van Druten serves as the informal chairperson for the group, which meets about every 6 weeks. Accomplishments this year included presentations on the Dare County Firewise Council to the Duck, Kitty Hawk, Nags Head, and Kill Devil Hills Town Councils, an exhibit at the Vendor Display Night for the Outer Banks Association of Home Builders, a display at the May Coastal Gardening Festival in Kill Devil Hills, and a video presentation on Firewise and the DCFC that aired on the local cable channel.



Participant in "Fire Crew Relay"
at Wildfest

BWS

WUIS Van Druten gave a Firewise Presentation to the Outer Bank Master Gardeners meeting on February 17. The refuge Firewise display was exhibited at the following events:

- April 16, Earth Day at the North Carolina Aquarium in Manteo – staffed by NCFS
- April 23, The Nature Conservancy Palmetto-Pearlree Preserve opening
- May 21 - Engelhard Seafood Festival
- May 21 - Plymouth Forestry Festival – staffed by Pocosin Lakes firefighters
- August 1- History Garden at Festival Park

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 Dare County Master Gardeners, the Purple Martin Project, and Carolina Raptor Center. Some exhibitors were not able to attend the event due to the change in date because of the looming Hurricane Ophelia. Children's activities included a critter call contest, sea turtle crafts, build-a-bird-feeder, and face painting. An estimated 400 people attended the festival, which was much higher than last year's attendance.

The Creel Cut parking area and Kuralt Trail kiosks continue to orient and educate visitors about the Refuge. Refuge visitors can also pick up hunt leaflets and refuge maps from brochure boxes posted near the kiosks and at each entrance to a refuge road from Highways 64 and 264. Staff ordered and replaced the Creel Cut Parking Area sign to help visitors locate this central meeting location.

The refuge exhibits located at the Aycock Brown Welcome Center in Kitty Hawk were viewed by 349,253 visitors during 2005.

Regularly scheduled interpretive/educational programs for the Refuge during 2005 are shown in the table below. Fall, summer, and spring guided canoe tours were scheduled for a \$30 fee. Refuge staff sponsored a coupon ad in a local publication to encourage visitor participation in the Alligator River and Pea Island three hour canoe tours. Each time a visitor registered for a canoe tour, staff recorded where the visitor heard about the tour. Although some visitors reported the coupon ad, the majority of refuge visitors heard about the canoe tours through the internet and online sources. Staff have decided to discontinue publishing the coupon ad and concentrate more on internet promotion.

In the summer, weekly black bear and red wolf howling programs were offered at Alligator River. Refuge volunteer Alisa Esposito initiated a Purple Martin Madness program that showcased the large martin roost under the Old Manns Harbor Bridge, while encouraging purple martin conservation efforts.

Alligator River NWR Public Use Programs

Program	#Programs	#Participants
Red Wolf Howlings	16	853
Canoe Tours	29	285
Bear Necessities	13	329

7. Other Interpretive Programs

Alligator River received very little interest from schools in 2005. Off-site interpretive programs were slightly more successful than in 2004.

WIS Salewski developed and presented a Migratory Birds program to 10 local teachers as part of the College of the Albemarle Marine Sciences workshop series.

WIS Salewski also presented an off-site Owl Adaptations program for 60 students at Kitty Hawk Elementary; and a Bear Necessities program for 25 college students at the College of the Albemarle. WIS Ahlfeld presented an Alligator program at the Tyrell County library for approximately 30 children and their parents.

For the third year, WIS Salewski continued an outreach initiative in cooperation with Festival Park. She presented Bear Necessities and Fish Printing programs at the Park for a total of 55 visitors. The programs were well-received by visitors and park staff alike.

WIS Salewski, WIS Ahlfeld, FT Van Druten, and WB Fair participated as judges for the First Flight Middle School Science Fair. The staff spent the day judging 7th and 8th grade science fair projects in categories ranging from technology to biology.

Alligator River receives significantly less media attention than Pea Island. WIS Salewski did provide a guided canoe tour for one New York writer and her husband upon request from the Outer Banks Visitors Bureau.

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. They are closed to public entry at all other times.

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

For the fourteenth 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 2005, WIS Strawser updated the hunting leaflet.

White-tail deer continues 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 112 deer were taken during the 2005 hunt.

This year was Dare County's fifteenth 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. For the first time, a bear was permitted on the adjacent USAF Dare County Bombing Range.

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 10 to October 7, along with the usual weekend patrol assignments for Refuge Officers. Muzzleloader season lasted October 8-14. Regular gun season began October 15 through January 2. As always, on November 1, the farm field gates were closed and locked. For the rest of the year (and through September, 2005), this area was closed to all public entry.

Waterfowl seasons were October 5-8, November 12- December 3, and December 17 – January 28. 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 youth 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, North Carolina Wildlife Resources Commission 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.

Estimated public hunting activity appears below:

<u>Activity</u>	<u>Visits</u>
Waterfowl	800
Big Game	1530
Upland Game	140

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

There are very few places to quail or rabbit hunt on the Refuge. However, for the 2005-2006 hunting seasons, the refuge opened the Laurel Bay Lake unit during the month of February, primarily to allow quail hunting. Prior to Laurel Bay's February opening, small game hunting is primarily for raccoon, squirrel, and rabbit.

9. Fishing

The heaviest recreational fishing effort in the vicinity on 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 2005, there were an estimated 1,860 fishing visits to the Refuge. Frog gigging is allowed on the Refuge by special use permit.

10. Trapping

Since trapping is considered a commercial use of the Refuge, neither visits nor activity hours are normally recorded under public use. For the 2005 trapping season, no special use permits were issued for Refuge trapping.

11. Wildlife Observation

Canoeists enjoyed paddling on Milltail Creek and Sawyer Lake 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.



Most of the time, the great pictures are a result of being at the right place at the right time.

SR

The following figures represent wildlife/wildlands observations during 2005:

<u>Activity</u>	<u>Visits</u>
Foot	2,250
Vehicle	1,500
Boat	13,650

17. Law Enforcement

During 2005, law enforcement was conducted on the refuge by Refuge Officer Jeremy Bucher and Refuge Officer Frank Simms, with occasional assistance from Refuge Officer Chris Smith of Mattamuskeet National Wildlife Refuge and Mark Cagle of the North Carolina Wildlife Resource Commission.

Officer Bucher transferred out of state during the middle of the year. Between that time and November, when Officer Simms arrived, patrols were mainly conducted by Refuge Officer Chris Smith and Officer Mark Cagle of the North Carolina Wildlife Resource Commission.

Officer Simms, who entered on duty in November, has established a good rapport with state and local law enforcement agencies and has had the opportunity to travel to many of the National Wildlife Refuge's in North Carolina gaining vital knowledge from resident Refuge Officers.

Officer Simms assisted local law enforcement agencies on several occasions. These activities included traffic accident investigations and investigation of illegal take of black bears on Pocosin National Wildlife Refuge.

The following figures represent the case breakdown for violations during 2005. This table does not include numerous written and 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	1
50 CFR 27.31	Vehicle Violations	2
50 CFR 27.51(a)	Collecting an Animal on NWR	0
50 CFR 27.94(a)	Littering	2
50 CFR 32	Hunting Violations	2

18. Cooperating Associations

FY 2005 for the Coastal Wildlife Refuge Society (CWRS) noted the following accomplishments:

During the year, CWRS spent \$271,000+ on Refuge projects, including the following:

- \$37,401 to the Service to fund an Interpretive Specialist position;
- \$ 8,210.57 for outreach;
- \$16,722.30 for intern expenses;
- \$105,583.55 for misc. materials and supplies for educational programming;
- \$999.77 for staff support;
- \$6,837.75 for Wings Over Water support;

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 Book Store located at the Pea Island visitor center grossed \$105,832.17 in sales during 2005. Other income sources were donations - \$9,204.79; interest - \$1,725.60 canoe fees - \$18,490.90; Wings Over Water - \$20,044.35; grants - \$40,000; and reimbursements - \$16,967.99.

Society President Tom White, Secretary Dru Ferrence, Membership Chair Bill Ackiss, WIS Susan Ahlfeld, Refuge Manager Mike Bryant, and Deputy Refuge Manager Kathy Whaley attended the

Friends in Action conference in February in Washington DC. This 3 day conference is designed to educate Friends groups about different aspects of starting and maintaining an active Friends group while also getting an insight into the Conservation in Action Summit, budget issues, and the future of the National Wildlife Refuge System. The conclusion of the conference involved CWRS board members visiting the offices of Senator Elizabeth Dole, Senator Richard Burr, and U.S. Congressman Walter Jones to discuss the issues of the OLF, the Bonner Bridge replacement and the increased threats to the refuges due to decreased federal funds over the past three years.



CWRS work teams built wooden Blue Goose puzzles to sell in the Visitor Center Gift Shop!

AMS

Current CWRS 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.

I. EQUIPMENT and FACILITIES

1. New Construction

Staff constructed an earthen pad (above existing field level) in the southeast corner of South Twiford Management Unit A. This construction was necessary to provide staff access for installation, maintenance and fueling of portable pumps used for impoundment flooding operations. The pad was elevated 6ft. above the previous field level using fill material from an existing canal and is 50ft. long X 50ft. wide, with an access road 15ft. wide, 3ft. high and 85ft. long.

2. Rehabilitation

Staff completed the South Twiford impoundment dike rehab project in units C, D, E, and F. The project had been ongoing for several years. Total linear footage of dike reconstructed in the four units is estimated at 33,500 feet. The new dikes are completely excavated and shaped, with some minor touch up remaining to be done. A 48" X 40' water control structure, with 8' riser, was installed in each unit to allow for water level manipulation in each individual impoundment. All units were shallow flooded (in conjunction with other management units) in October 2005 to prepare for the wintering waterfowl season. The shallow flooding was implemented to prevent unnecessary erosion on the new dikes, as well as to provide wintering waterfowl, shorebird, and wading bird habitat. All units have received very good fall and winter usage to date. The 4,000 linear feet of the old / pre-existing dike has been completely reverted back to previous field levels.

Installed 3 (48" X 40') water control structures (with 8' riser) in lateral dikes (connecting water flow) between North Twiford Management Units A, B, C, and D. Prior to this project, the entire Twiford Road canal (3.18 mile long, 15' wide and 8' deep) had to be flooded in order to get water into the 4 individual impoundments. Once the impoundments flooded, the canal then had to be dewatered (pumped) outside the farm management unit to prevent damage to roads. Now completed, this project provides for better water management within the individual impoundments. It's proving to be much more efficient and a direct cost savings for operation (reduced fuel consumption and pump/engine maintenance) of the Laurel Bay pump station. The Twiford canal no longer has to be flooded, all water pumped in is diverted directly into the impoundments.

Efforts continue with residual and ongoing clean up and tree removal projects resulting from Hurricane Isabel (September 2003). Refuge roads that had downed trees removed this year included: Hook, Long Curve and Osprey, Laurel Bay, Possum, Koehring, Alligator, and Whipping Creek Roads. Clearing access to several popular public use waterways (Whipping Creek, Swan Lake and Laurel Bay Lake) remains to be accomplished.

Rehabilitated Refuge roads by hauling, spreading and grading fill material in holes on: Osprey, Laurel Bay, Pump, Bay, Hickory, Creef, Peterson, Cedar, Possum, North Twiford, Deep Bay, Brier Hall, Twiford, Point Peter, Sawyer Lake, Bear, Link, Sandy Ridge (wolf pen road). Similar efforts were required for rehab of the Laurel Bay Resident Volunteer (RV) pad and several Creef and Laurel Bay Management Units dikes.

Attempted to make emergency repairs on North Twiford primary perimeter dike (near Milltail Rd. separating field units from outside water source) that provided containment for North Twiford Management Units A & B. The original perimeter containment dike had a section about 75 ft. in length that had settled / collapsed due to organic materials rotting out (allowing excessive amounts of water to flow into units). Attempts to repair the dike were abandoned due to logistics of hauling and excavating quality material to effectively complete repairs. An existing secondary dike (surrounding a wooded block within the original perimeter dike) was converted to provide primary containment. Staff elevated and widened approximately 150 linear ft. of the secondary dike.

Rehabilitated 300 acres of agricultural fields that had become overgrown with invasive and undesirable vegetation. Shelf areas outside existing North and South Twiford Management Unit perimeter dikes were mowed and disked in an effort to inhibit undesirable plant growth and to provide for growth of early succession grasses (cover & browse for small game, deer and waterfowl). Results have been good to date.

3. Major Maintenance

A new flextrack fire tractor was ordered with available FY 2004 year-end surplus funding to replace the aging AX-2 tractor. A truck-tractor and a lowboy transport trailer were also ordered for this tractor. Delivery was made in February 2005. FFEOs Meekins and Swain quickly made some excellent modifications to the tractor. These included: compartment access doors to facilitate maintenance, a track retention bar, a new front bumper/push bar to better protect the cab and allow the tractor to cross v-ditches without getting the front end stuck below the opposite bank, and shielding for winch and hydraulic hose fittings to prevent breakage from limbs and shrubs. Radios were installed and numbers painted onto the tractor. It was field tested and sent back to the manufacturer in Canada to have the radiator and hydraulic system overhauled. Once all modifications were made and problems solved, we ended up with an outstanding initial attack fire tractor. It was later used on the Memorial Day Eve Wildfire with excellent results. Beaver problems at the intersection of Blueberry and Milltail Roads continue to require clean out of the underlying culvert at least once monthly, sometimes more often. The Cat long reach excavator has to be moved and utilized in order to clean out the structure out each time.

- Continued routine pumping operations of all farm units to facilitate cooperative farming operations and Refuge water management objectives.
- Serviced Maintenance Facility emergency generator
- Replaced culvert at intersection of Dipper and Deep Bay Roads
- Repaired 2 leaking water control structures: 1) at intersection of Milltail and Twiford Roads
2) Creef A1 impoundment
- Cleaned up woody debris and remnants of old water control structures in farm fields
- Replaced entrance doors on Creef and Laurel Bay pump house buildings
- Made repairs to Alligator River shop water system
- Replaced shop ice machine
- Replaced Refuge entrance sign at east end of Alligator River bridge on NC Highway 64 – entering Refuge from the west
- Replaced Refuge entrance sign at south end of Refuge in Hyde County on NC Highway 264 - entering Refuge from the south

- Assisted fire crew cutting trees and mowing on Ed Sawyer Road / firebreak

4. Equipment Utilization and Replacement

Received new and put in service:

- Mack truck tractor and Kaylyn Siebert equipment trailer. Truck and trailer will be used primarily for fire initial attack capabilities.
- MWI water pump, maintenance staff attended training from factory representative. The portable pump will be utilized to assist with water management operations at Pea Island and Alligator River Refuges.
- 2 Sterling F650 maintenance service trucks. One will be used for day to day maintenance operations and one for day to day fire management operations.

Road maintenance efforts included routine grading operations on Refuge roads cumulatively totaling about 307 miles graded. Additional seasonal road mowing boom axe mowing of road shoulders was done as needed to provide for public use opportunities and staff access for Refuge Operations.

Performed routine service, maintenance or corrective repairs to 49 vehicles.

Performed routine service, maintenance or corrective repairs to 71 various pieces of equipment including: light and heavy duty mobile equipment, boats, mowers, chainsaws, ATV's, etc.

Yearly rainfall amounts dictated a combined total of 4,865 hours of pumping at the Creef and Laurel Bay pump stations. At the Creef pump station, Engine 1 ran 1,183 hours and Engine 2 ran 822 hours, totaling 2005 hours. At the Laurel Bay pump station, Engine 1 ran 1,426 hours and Engine 2 ran 1,434 hours, totaling 2,860 hours. Each diesel engine/pump has averaged near 1000 hours during the past 5 years. Routine service interval of each engine is every 250 hours. Each service costs about \$85.00 for materials alone.

One hundred and five (105) acres of V-ditches and agricultural fields (in Creef Management Units A1 North & South and South Twiford Unit A) were mowed, disked (several times) and planted with Japanese millet. The fields/impoundments were being overtaken by vegetation of minimal (or no) wildlife benefit. Millet production was very good and as a result, waterfowl, wading bird, and shore bird use has been very good since flooding these units. After being dewatered, the rehabilitated fields will also provide better food sources for upland game as they re-vegetate during the spring and summer.

Staff repaired (approx. 40) major water leaks under and through Sawyer Lake Road. Original road construction (approx. 1964) was accomplished by placing excavated fill material on top of felled trees and vegetation in the construction right of way. As underlying trees and vegetation decompose, the process allows excessive amounts of water from outside sources to penetrate the road and dike and flood interior portions of our management units. The water then has to be pumped back outside the management unit perimeters. Repairing the leaks entailed coring (digging out) approximately 1600 linear feet of the road (2-3' wide with excavator) deep, remove and dislodge rotting trees and vegetation, and fill back in with clean and compacted material.

Staff routinely excavates fill material from our borrow pit. This material provides a quality compacted material for continuous repairs on refuge roads and dikes. The material is also routinely used during installation of water control structures. The material is of such good quality (a rarity in the area) that commercial interests (contractors) have made numerous attempts to acquire it from us.

6. Computer Systems

In 2005, Alligator River saw a change in IT support. Office of Migratory Birds employee Buddy Jones took a new position which reduced the support he could supply our office. FT Van Druten was assigned the task of IT point of contact for the station.

Significant time was spent in 2005 migrating all Lotus Notes users to Version 6.5 and the correct servers in Denver. Also Windows XP was updated and/or installed on all but 3 of the refuge's 40 plus computers. All battery back-ups for computers in the Manteo Office were checked for operation and most had their batteries replaced. Various technical support was given to all program areas including: reinstalling operating systems, correcting password problems, getting computers added to the network, installing software, teaching staff how to back up their computers, keeping staff's Lotus Notes functioning, keeping the DSL connection active for the Manteo Office, updating anti-virus software, setting up new computers for users, and installing hardware.

In June, new servers were installed for both the Red Wolf Recovery Program and the Manteo Office. This provided additional capacity for back-ups and data storage. The Red Wolf Recovery Program server was used to provide automatic updates of Symantec Anti-Virus to all computers in the Manteo Office. This was working great until that server crashed in mid-September. By the end of 2005, this server was still not operational. In 2006 we hope to have that server functioning again, to have our computers on the network able to automatically back up, and Symantec updates again being done automatically.

At the Operations Center, a new multifunctional printer, scanner, copier, and fax machine was installed after much difficulty with Hewlett-Packard's technical support. Now those working in the field have the much needed ability to scan photos.

8. Other

- Maintenance staff 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.
- EEO Craddock and WS Creef assisted Regional MOCC Coordinator Richard Blackburn as instructors in a Regional MOCC training session held at Santee NWR
- EEO Craddock instructed in a MOCC session at (hosted by) Alligator River NWR.
- WS Creef & FCO Harris instructed a Marsh Master Training session at Mackay Island NWR.
- Maintenance staff assisted in all aspects of the station's Fire Management Program
- Completed annual Regional and National (RPI, Capitalized Property Management, Fleet Management, RCAR, OGM, Energy Conservation) data requests.

- Maintenance staff attended the annual Standards for Survival fire training at Pocosin Lakes NWR
- Maintenance staff managed all Alligator River impoundment/farm field water levels
- Transferred burned Gyro Trac and it's transport trailer (with license tags) to Savannah Coastal Refuges on a DI 104 dated 4/18/05
- Tractor Operator Anthony Ralph resigned – accepted new job with Navy Dare Bombing Range
- EEO Powers underwent gastric bypass surgery
- EEO Craddock attended (NPS) Hazwopper training
- ARM Wigginton, EEO Powers and EEO Govan took and passed refresher MOCC course
- WS Creef & FCO Harris attended the Regional Heavy Equipment Instructor's meeting in Grenada, Miss.
- WS Creef assisted Regional team with draft business rules template for implementation of SAMMS
- Maintenance staff participated with Regional Safety Officer (Owen Moe) on safety inspection of Pea Island and Alligator River facilities and equipment
- Maintenance staff completed IT Security training
- Maintenance staff completed whistle blower course
- EEO Powers assisted with Pea Island crabbing / fishing rodeo
- EEO Govan and EEO Powers attended ATV training
- Maintenance staff assisted NC Wildlife Resources Commission with equipment repairs
- Made preparations as appropriate for all hurricanes

J. OTHER ITEMS

1. Cooperative Programs

Refuge staff serves in an advisory capacity to the Dare County Bomb Range Advisory Council (DBRAC). The DBRAC is comprised of representatives from the US Air Force (USAF), US Navy (USN), Dare County Commissioners, Dare County Regional Airport Manager, and civilian representatives from the communities of Manns Harbor and Stumpy Point plus one representative at-large. The "advisory" group is comprised of representatives from the North Carolina Wildlife Resources Commission (NCWRC), Air Force Installation forester and biologist and the Dare County Public Relations Coordinator. During 2005, Jim W Wigginton represented refuge management and Wildlife Biologist Michael Morse represented the Red Wolf Recovery Program.

The Council meets quarterly (planned), but in reality it is usually twice per year. The DBRAC was formed to offer locals a forum to express concerns, especially hunting issues. The Advisors offer input concerning refuge issues, NCWRC Game Lands operations, forest management and range biological issues. Meetings are official only if a Dare County Commissioner attends – not the norm.

The biggest issue of 2005 was the proposed Black Bear Hunt on the 45,149 acre bombing range. Based on discussions with all partners/cooperators (FWS, USAF, USN, NCWRC) and a series of public meetings, a four day (2 – still hunts, 2 – dog hunts) quota hunt was approved. Military training/operations and perceived hunting pressure were the biggest issues addressed prior to approval. The refuge provided information concerning hunts (no bear hunts) and the Red Wolf Recovery Program to the NCWRC to be included in permit packets for the selected hunters. Ten

(10) permits per day for the still hunts were issued with a 70% utilization. Twenty (20) permits were issued for each dog hunt with a 43% utilization. The dog hunters could apply for party hunts – 2 parties per hunt with 5 – 10 permits per party. The limit was one bear per still hunter and five bears per party during the dog hunts. A total of 720 hunters applied for the quota hunt. One (1) bear was taken during the four days of hunting. The NCWRC is recommending the same hunt structure and permit numbers for the 2006 – 07 season.

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. A final report for this project should be available in 2006.

4. Credits

The annual narrative was compiled by WIS Ahlfeld with individual sections being a joint effort by program supervisors and staff. Photo credits: Unknown staff or volunteers (FWS), Bonnie Strawser (BWS), Refuge Volunteer Linds Craney (LC), Refuge Volunteer Sean Russell (SR), Manteo Elementary School (MES), Jamie Dunbar (NC Forest Service, JD), Jamie Richie (JR), and Ann Marie Salewski (AMS).

PEA ISLAND NATIONAL WILDLIFE REFUGE

Manteo, North Carolina

ANNUAL NARRATIVE REPORT

Calendar Year 2005

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 have 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 of 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

The ongoing effort to keep NC Highway 12 open for traffic continued in 2005. C.2.

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

The NCDOT/FHWA Supplemental Draft EIS for the Bonner Bridge Replacement Project was out for public comment late in the year. D.4.

USACOE dredging continued at Oregon Inlet. D.5.

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

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

Twelve sea turtles nested on Refuge beaches in 2005. G.2.

Total Refuge visitation for 2005 was in excess of 2 million. H.1.

Pea Island debuted its first eField Trip, reaching thousands of students around the world. H.7.

The South Pole Shed, damaged by Hurricane Isabel in 2003, was razed and removed. I.2.



South Pole Shed – before Hurricane Isabel... now only a memory!

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B. CLIMATIC CONDITIONS

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

C. LAND ACQUISITION

2. Easements

The ongoing effort to keep NC Highway 12 open for traffic continued in 2005. 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 few occasions. Most of the post-Hurricane Isabel dunes in the Canal Zone Hotspot were severely eroded by a northeaster on May 5-6 and reconstruction efforts lasted through July. Most of the work was permitted outside of the right-of-way.



The Nor'easter of May 6th, 2005 transformed the two-lane highway of Route 12 into a harrowing one lane road buffeted by high winds and migrating sand dunes. Storm events such as this are all too-common on Pea Island National Wildlife Refuge.

AMS 5/05

D. PLANNING

1. Master Plan

The 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. The draft Comprehensive Conservation Plan and Environment Assessment is scheduled to be presented to the public in early 2006.

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 issued Special Use Permits were for reinforcing dunes outside the right-of-way.

Bonner Bridge

RM Bryant continued meeting with NCDOT and various other state and federal agencies as well as non-government organizations to discuss alternatives for maintaining Hwy 12 through Pea Island NWR if a short bridge were built to replace the Bonner Bridge over Oregon Inlet. The NCDOT released a Supplemental Draft Environmental Impact Statement (SDEIS) in the fall of 2006.

Alternatives evaluated in the SDEIS included (1) road-at-grade within the existing ROW with beach nourishment to mitigate for erosion; (2) a combination of additional short bridges and road-at-grade through the refuge west of the existing ROW; and (3) a combination of bridging on the northern end of the refuge and a road west of the existing alignment on the southern end of the refuge except for the Rodanthe area. All of the short (parallel) bridge alternatives included an approximate 3-mile road relocation and bridge at Rodanthe. NCDOT was compelled to study in detail these alternatives to address concerns about access brought to them by elected and appointed officials from Dare County. After completion of the NEPA review, State Senator Marc Basnight and his staff prepared an additional alternative, locally referred to as the "Balanced Approach Alternative". The alternative proposes to build a parallel (short) bridge over Oregon Inlet and stay within existing right-of-way. Bridging over the hot spots would occur in the future on an "as needed" basis and temporary detours would be constructed while the hot spot bridges are under construction. The balanced approach alternative was not subjected to a cost analysis and compared to other alternatives nor was it a part of the NEPA review.

USFWS PERSPECTIVE: The USFWS is committed to maintaining the ecological integrity of Pea Island NWR and ensuring long-term public access. All short bridge alternatives, including various combinations, have far greater impact on habitat for migratory birds and other wildlife and will materially detract from or interfere with the "wildlife first" mission of Pea Island NWR. A short bridge alone would not address the major issue of maintaining NC Highway 12 through the refuge on a long-term basis. It is not likely that any of the short bridge alternatives would be found compatible with our mission, therefore making it unlikely that a permit would be issued for right-of-way modifications or new right-of-way.

The Pamlico Sound Bridge Alternative (Long Bridge) would reduce long-term maintenance costs, improve safety and reliability, and cause less environmental impact. While the long bridge may initially cost more than a short bridge, the long bridge 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 Pamlico Sound 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 replacement of Bonner Bridge, dredged material disposal on the refuge beach, and dune reconstruction and maintenance of NC Highway 12. Refuge staff participated in numerous meetings with USCOE, NCDOT, ES, other state agencies, and local officials over the course of the year. These and other issues will continue due to the proximity of the refuge to Oregon Inlet, the need to replace the existing Bonner Bridge, the presence of NC Highway 12 (the only road to seven villages south of Nags Head), and strong political clout by Outer Banks politicians.

5. Research and 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. However, funding did not permit dredging the Bodie Island Spit by pipeline dredge and hydraulically placing the material south of Oregon Inlet on the refuge beach. Approximately 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.

Even in the absence of sand bypassing in 2005, sediment sampling, along with beach slope, scarp formation, and faunal data will continue to be collected along transect lines. In addition, sand compaction (psi) will be measured with a cone penetrometer prior to and after dredge material disposal. Identifying environmental conditions that influence faunal numbers will assist in evaluating effects directly associated with nourishment as well as recovery rates for the beach. All data and samples from the 2004 sampling cycle, 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 (including GIS)

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.

Fire Program Analysis data needs for Pea Island NWR generated approximately 20 new GIS data layers for the refuge. See the Alligator River NWR Section D. 6. for more information.

FT Van Druten completed all GIS maps for the Pea Island CCP in 2005.

Refuge staff used GPS units to collect the perimeters of all bird closures, turtle closures, and turtle nest sites. All data was used in the refuge GIS to generate maps showing the locations of the turtle nests and maps showing the closures. An analysis was completed comparing the total number of acres closed each year since 2002.

Prescribed burning maps for the south end (south of headquarters) of Pea Island NWR were updated in 2005.

E. ADMINISTRATION

1. Personnel

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

4. Volunteer Program

As in past years, the day-to-day operation of Pea Island 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.

Sea turtle monitoring, through the programs of Turtle Patrol and Turtle Watch, was made possible by 42 volunteers who donated more than 1300 hours of their time.

Several coordinated work groups and individuals contributed to beach cleanups, maintenance, biological assistance, and special events as well as the volunteer efforts of the Coastal Wildlife Refuge Society Work Teams.

Of the complex total, 12,430 hours were contributed to Pea Island National Wildlife Refuge by 75 volunteers. 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

5. Safety

See Alligator River Report

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 0.14 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. Average monthly salinity varied from about 9.3 ppt in the spring and early summer to a high of 19.3 ppt in September. Fall and winter salinity readings varied from about 9.3 -19.3 ppt.

To compare plant food production for the 2004-2005 waterfowl wintering period, it is necessary to examine the vegetation survey data for the fall of 2004. Plant species rated as good or fair waterfowl food were found on 61% of the transect plots. The remaining 39% of the plots consisted of bare ground (34%) or plant species of no food value for waterfowl (5%). *Chara* spp. (23.3%) and wigeon grass (*Ruppia maritima*) (14.2%) and sago pondweed (*Potamogeton pectinatus*) (11.4%) dominated the “good” foods and the “fair” category was dominated by saltgrass (*Distichlis spicata*) (2.7%) and saltmeadow hay (*Spartina patens*) (5.8 %). 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 on target throughout most of the year. Average annual deviation from planned water level was -0.03 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, readings ranged from average monthly highs of around 31.7 ppt in September to average monthly lows of 10.7 ppt in early summer. Average monthly fall and winter salinity readings varied 11.3 – 31.7 ppt.

To compare plant food production for the 2004-2005 waterfowl wintering period, it is necessary to examine the vegetation survey data 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 bare ground (41%) or plant species of no food value for waterfowl (6%). Although *Chara* spp. (1%) was not very common, sago pondweed (*Potamogeton pectinatus*) (13.1%) and wigeon grass (2%) dominated the “good” foods and the “fair” category was dominated by saltgrass (*Distichlis spicata*) (10.2%) and saltmeadow hay (*Spartina patens*) (19.6%). It is interesting to note that while none of the species rated as good or fair occurred in high proportions, the food categories had high species diversity. There were 20 species identified in

the “Good” category and 8 species identified in the “Fair” category. 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 input into the system. 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 -0.85 ft lower than the desired level.

To compare plant food production for the 2004-2005 waterfowl wintering period, it is necessary to examine the vegetation survey data for the fall of 2004. Because South Pond has no water management capabilities fair to good food value species were found on only 10.3% of the sample plots during 2004. The remaining 89.7% of the plots consisted of bare ground (84.1%) and species having no food value (5.3%). Sago pondweed (*Potamogeton pectinatus*) (3.2%) dominated the “good” foods and the “fair” category was dominated by saltmeadow hay (*Spartina patens*) (4.2%). Overall, SAV production in South Pond was poor at best due to the lack of water management capabilities. 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 repair the water control structure. Wind tides were not sufficient for the new water control structure installed in 2003 to input adequate water at critical times during the growing season. . As with North Pond and New Field, of special concern is the occurrence of 84.1% of the sample points being considered “bare”. Some of this is due to the drier than average conditions in the pond. Heavy feeding by resident Canada geese throughout the growing season is the most logical explanation for most of 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.

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 (*Borrichia* 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 2005. 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 2005. 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 melanotos*, was listed as a threatened species under the Endangered Species Act in January 1986. In 2005, there were no piping plover nests on the north end of the refuge. Although limited nesting behavior by one bird was observed in early spring, no nests were observed. A range of one to sixteen plovers were consistently observed during fall migration or wintering in the vicinity of Oregon Inlet and on the north end of the refuge. However, habitat behind the Terminal Groin has undergone succession due to wind and water-borne sand to the point that it was not suitable nesting and foraging habitat in 2005. A research project by Virginia Tech in late 2005 revealed use by the endangered Great Lakes birds (1-7) for roosting and very limited foraging.

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. The 2005 nesting season resulted in 12 nests and 4 false crawls. Unlike the 2004 season, this level of turtle nesting more closely approximates the long-term average.

Pea Island has a severe beach erosion problem resulting in a narrow beach and frequent overwash. In 2004, 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 coastal processes and 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 2005, ten nests had to be relocated to the turtle safe zone at the widest stretch of beach. These nests failed to meet the conditions necessary to have a reasonable probability of success during the incubation period. All but the last 4 nests hatched successfully. Of the 4 nests that did not hatch, 3 of them were overwashed for extended periods and the eggs appeared to have drowned. The last nest was deposited late in the season and it is believed that soil temperatures dropped before the nest had adequate time to incubate. Of the nests that exhibited hatching, hatch rates ranged from 94.4 % down to 49.5%. The nest with the lowest hatch rate contained a high occurrence of infertile eggs. Altogether, 773 hatchlings entered the ocean as a result of many hours of effort by volunteers and staff.

Approximately nine stranded turtles washed up on Pea Island's beaches in 2005 which is about an average rate 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 and tissue samples were taken for all stranded turtles and sent to the North Carolina Sea Turtle Coordinator with the North Carolina Wildlife Resources Commission.

Green sea turtles (Threatened): The first green sea turtle (*Chelonia mydas*) known to nest on Pea Island was in 1993. One of the nests on the refuge during the 2005 nesting season was identified as a green turtle nest.

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 2.0 miles north, 1.5 miles south, and 5.5 miles south of the Pea Island NWR Headquarters. During 2005 nesting colonies were not observed at the Oregon Inlet terminal groin, but nesting birds were observed approximately 3 miles south of the refuge headquarters, and approximately 5.5 miles south of headquarters. Least tern numbers peaked at 228 in July.

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 2005 was 82 and the peak occurred in October. Nesting on the refuge has not been documented.

Common tern (Significantly Rare): Common terns are found nesting with other terns. During 2005, nesting colonies were not observed at the Oregon Inlet terminal groin, but were observed approximately 2 miles north of refuge headquarters, about 3 miles south of refuge headquarters, and approximately 5.5 miles south of headquarters. Common tern numbers peaked in April at 160.

Gull-billed tern (Significantly Rare): Gull-billed terns occur in low numbers. During 2005 nesting birds were not observed on the refuge. Gull-billed tern numbers peaked in May at 9.

Black skimmer (Significantly Rare): Black skimmers are observed along the oceanfront, sound, and impoundments on the refuge. During 2005, nesting birds were not observed at the Oregon Inlet terminal groin. Black skimmer numbers peaked in October at 333.

Little blue heron (Significantly Rare): The little blue heron is found mostly around the three impoundments or marsh edges. Numbers peaked at 80 in July. Nesting on the refuge was not documented.

Snowy egret (Significantly Rare): The snowy egret is found mostly around the three impoundments or marsh edges. Numbers peaked at 186 in August. Nesting on the refuge 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 189 in September. Nesting on the refuge was not documented.

Black-necked stilt (Significantly Rare): The black-necked stilt is found mostly around the three impoundments. Numbers peaked at 31 in July. Nesting on the refuge 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 10,083 in late November, dropped to 3,237 in early-to-mid-January, and peaked again at 6,813 in late January. All species except for the mallard had decreases in use days from the 10-year average. Compared to the 2003-04 wintering period, the snow goose, mallard, and black duck showed increases, whereas all other species showed declines in use ranging from 1% up to 100%.

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 a pair of common goldeneye and Eurasian wigeon. Although a few Eurasian wigeon sightings occur annually, goldeneye observations are very rare on the refuge. Also of interest two common eiders were observed in Oregon Inlet waters.

Composition of Wintering Waterfowl, Pea Island NWR 2004-2005

SPECIES	PEAK PERIOD	PEAK #	# USE DAYS 2004-05	% TOTAL USE DAYS	USE DAYS % diff from 10 yr avg
Tundra swan	Nov	436	35785	4.6	-44
Snow goose	Jan	1580	95099	12.3	-11
Canada goose *	Feb	294	34340	4.5	-25
Mallard	Oct	296	20350	2.6	70
Black duck	Oct	1522	79460	10.3	-50
Gadwall	Feb	979	69340	9.0	-68
American wigeon	Nov	1683	67530	8.8	-68
Northern pintail	Oct	2456	143973	18.7	-54
Green-winged teal	Nov	981	66341	8.6	-51
Blue-winged teal	Sep	71	2763	0.4	-86

Common loon	Feb	6	405	0.03	130
Double-crested cormorant	Jan	8631	220608	19.03	137
White pelican	Nov	35	1525	0.13	152
Brown pelican	Jan	359	23574	2.03	44
Northern gannet	Apr	502	5891	0.51	180
Other Water/Sea bird	N/A	N/A	N/A	N/A	N/A
Unknown Water/Sea bird	Feb	12	132	0.01	731
Marsh & Wading Birds					
Clapper rail	N/A	N/A	N/A	N/A	N/A
Virginia rail	N/A	N/A	N/A	N/A	N/A
Black rail	N/A	N/A	N/A	N/A	N/A
King rail	N/A	N/A	N/A	N/A	N/A
Great blue heron	Sep	42	5726	0.49	42
Little blue heron	Jul	80	4383	0.38	-22
Tri-colored heron	Aug	189	10601	0.91	82
Great egret	Aug	280	20636	1.78	65
Snowy egret	Aug	186	14951	1.29	45
Cattle egret	Nov	1	10	0.01	-95
Black-crowned night heron	Jan	8	997	0.09	38
Yellow-crowned night heron	Jan	1	18	0.01	-89
Green heron	Apr	1	23	0.01	-42
American bittern	Oct	1	21	0.01	-22
Glossy ibis	N/A	N/A	N/A	N/A	N/A
White ibis	Aug	241	18790	1.62	50
Other Marsh/Wading Species	N/A	N/A	N/A	N/A	N/A
Unknown Marsh/Wading Birds	Aug	24	295	0.03	-42
Gulls & Allies					
Herring gull	Jan	614	59254	5.1	77
Ring-billed gull	Dec	1080	45307	3.9	27
Great black-backed gull	Dec	358	36217	3.1	24

Lesser black-backed gull	Nov	6	403	0.03	-13
Laughing gull	Jul	462	38809	3.35	136
Bonaparte's gull	Feb	116	2224	0.19	136
Other gull species	Aug	1	8	0.01	-39
Unknown gull species	Jan	60	800	0.07	182
Terns & Skimmers					
Caspian Tern	Oct	82	3483	0.30	148
Least tern	Jul	228	15134	1.31	-34
Common tern	Apr	160	5692	0.49	-66
Forster's tern	Jan	351	9690	0.84	186
Sandwich tern	Aug	296	12704	1.10	126
Royal tern	Sep	256	24647	2.13	67
Sooty tern	N/A	N/A	N/A	N/A	N/A
Gull-billed tern	May	9	243	0.02	-88
Black skimmer	Oct	333	17673	1.52	11
Other tern species	Sep	20	694	0.06	16
Unknown tern/skimmer	Sep	128	4075	0.35	381
Shorebirds					
American oystercatcher	Aug	13	1427	0.12	-26
Black-necked stilt	Jul	31	1690	0.15	54
American avocet	Nov	328	20583	1.78	22
Black-bellied plover	Sep	128	11091	0.96	75
Ruddy turnstone	May	129	3772	0.33	47
Semi-palmated plover	Sep	315	18133	1.56	12
Piping plover	Aug	12	652	0.06	20
Snowy plover	N/A	N/A	N/A	N/A	N/A
Wilson's plover	N/A	N/A	N/A	N/A	N/A
Killdeer	Mar	8	436	0.04	154
Common snipe	Jan	1	73	0.01	485
Dowitcher	May	840	25325	2.19	1

Red knot	Jun	36	2612	0.23	6
Marbled godwit	Sep	248	6676	0.58	200
Whimbrel	May	13	585	0.05	-39
Willet	Sep	318	27547	2.38	28
Yellowlegs	Jul	232	21014	1.81	-4
Sanderling	Oct	970	114942	9.92	16
Stilt sandpiper	Sep	1	11	0.01	-47
Dunlin	May	1369	65793	5.68	-13
Purple sandpiper	Jan	199	2232	0.19	781
Spotted sandpiper	Jul	26	813	0.07	132
Least sandpiper	Jul	198	5319	0.46	-71
Semi-palmated sandpiper	Jul	2957	164539	14.20	63
Western sandpiper	Aug	274	7746	0.67	-2
Other shorebird species	Sep	1645	39673	3.42	562
Unknown shorebirds	May	96	4899	0.42	-74

6. Raptors

The Carolina Raptor Center operated a raptor banding and hawk watch station in early October, 2004 for the second time since 1987. Mist nets, bow nets, and lure birds were used to capture and band peregrine falcons, sharp-shinned hawks, and American kestrel. During the hawk watch, 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 was issued a Special Use Permit to continue this work in 2005. Because of unforeseeable circumstances, the Center was unable to conduct the survey in 2005. They hope to continue the work in 2006.

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 are believed to migrate through the refuge. However, little is known about the use of refuge habitat by neotropical and other migrant birds. A limited, preliminary survey of passerine bird use in various habitat types was initiated. As shown in the table *below*, preliminary results suggest a relatively low avian use in the habitat types surveyed on an annual basis. Most sites are vegetated with low tree/high shrub communities with canopy heights of up to 4 m. Site 5 would be characterized as marsh grassland vegetated with *Spartina patens*, *Juncus spp.* interspersed with

shrubs about 1m in height. Given the habitat types surveyed, it is not surprising that the yellow-rumped warbler is the most common species observed.

Summary of passerine bird species observed on Pea Island NWR by habitat type during the 2005 survey period.

Species	Total Count						
	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Total
Carolina wren	1	0	0	1	0	0	2
Ruby-crowned kinglet	0	0	0	1	0	0	1
American robin	0	0	2	0	70	1	73
Gray catbird	10	1	8	1	0	0	20
Northern mockingbird	1	0	0	0	0	2	3
Cedar waxwing	0	24	0	0	0	0	24
Yellow-rumped warbler	26	17	53	47	28	27	198
Eastern towhee	1	1	1	1	0	0	4
Song sparrow	7	3	5	4	4	3	26
White-crowned sparrow	1	0	0	0	0	0	1
Eastern meadowlark	0	0	0	0	1	0	1
Brown-headed cowbird	2	1	0	0	0	1	4
Red-winged blackbird	2	0	3	1	4	1	11
Common grackle	3	0	4	0	0	1	8
Boat-tailed grackle	0	0	0	0	1	0	1
House finch	0	1	0	0	0	0	1
Brown thrasher	0	1	0	0	0	0	1
American goldfinch	0	2	0	0	0	0	2
Mourning dove	0	0	0	3	0	0	3
Common yellowthroat	1	1	0	1	0	0	3
Barn swallow	1	0	0	0	0	0	1
Eastern kingbird	1	0	0	0	0	1	2
Northern cardinal	0	0	0	1	0	0	1
Unknown warbler	0	1	0	2	0	0	3
Unknown passerine	6	2	3	5	2	7	25
TOTAL	63	55	79	68	110	44	419

8. Game Mammals

Cottontail and marsh rabbits are fairly common on the refuge. Declines in numbers from a few years ago seem to have reversed. Raccoon 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 because of overpopulation and the threat to ground nesting birds.

Presence of scat, tracks, and road kills indicate a continued presence of limited numbers of foxes and opossums. The presence of these species as well as feral house cats may be one of the causes for the decline in pheasant populations along with it being marginal habitat for this non-native game bird.

Deer tracks have frequently been observed throughout the refuge. Staff members have seen both does and bucks on the refuge. Although no formal surveys are being done, increasing observations of deer, number of tracks, and increasing road-killed deer suggest that the herd is increasing and may need to be managed.

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

9. Marine Mammals

During 2005, 8 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 eight strandings consisted of bottle-nosed dolphin (2), harbor porpoise (1), Atlantic whit-sided dolphin (1), pilot whale (2), striped dolphin (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 refuge 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. Four sightings were reported during 2005. 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. Effort was expended to conduct a roundup and removal of resident geese. The roundup and removal did not occur because administrative procedures were not completed until after the molt. The roundup and removal will be planned again for 2006.

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 continue to be found on the refuge. 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

Every summer, refuge volunteers and certain staff accompany John Weske and Micou Brown to band brown pelicans, royal terns, Caspian terns, and sandwich terns on spoil islands located west of Oregon Inlet. This year 675 brown pelican chicks, 922 royal tern chicks, and 25 sandwich tern chicks were banded. None of this banding occurred on the refuge.



Refuge volunteers, interns, and staff band Brown Pelican chicks during the summer months. JS

H. PUBLIC USE

1. General

Based on the NPS vehicle counter at Bodie Island, estimated visitation to Pea Island NWR during 2005 was 1,100,000. Volunteers from the Coastal Wildlife Refuge Society continue to staff the Visitor Center, which is open daily through the spring, summer, and fall months; and open weekends during the winter. The Center is bright and cheerful – just right to match the folks who work there! 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 on this Refuge. (See Section H.6. for details)

The Society also expanded its outreach efforts this year by sponsoring an Open House day on the Refuge in November. The Society organized and offered free canoe tours, nature hikes, and light refreshments. Approximately 100 refuge visitors had the opportunity to learn more about the Society and the habitat values of the Refuge.

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 a higher quantity of 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 26 schools with a total of 1,000 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 2005, refuge staff worked cooperatively with other agencies to offer training and promote through local venues.

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 650,000 visitors utilized North Pond Trail during 2005. 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.



North Pond Trail offers several wildlife observation opportunities for refuge visitors throughout the year.

MH

6. Interpretive Exhibits/Demonstrations

The three interpretive kiosks- located at the Salt Flats parking area and both the north and south ends of the refuge- provide valuable information on a 24 hour basis for Refuge visitors. All three kiosk waysides had new panels installed in 2005. The Salt Flats kiosk now features interpretive panels on shorebird migration and fire management; and a refuge orientation panel. The South Kiosk has a new orientation panel, Refuge System panel, and wintering waterfowl interpretive panel; along with interpretive panels on barrier beach ecology, geology, and endangered species. The South Kiosk also got a fresh coat of paint in 2005. The North Kiosk has a refuge orientation panel, Refuge System panel, and wintering waterfowl interpretive panel.

Panels located on the front porch of the Visitor Center are also available round the clock. In 2005, a Coastal Wildlife Refuge Society volunteer developed a Power Point presentation that plays on a computer terminal visible to refuge visitors 24 hours a day. The presentation interweaves images of refuge scenery and active volunteers, along with information about the Society. WIS Ahlfeld has plans to install a secure donation box in the vicinity of the presentation.

7. Other Interpretive Programs

Pea Island débuted its first eFieldTrip in 2005. This virtual visit brought the Refuge into classrooms around the world and taught students about the importance of sea turtle conservation. With the assistance of Distance Learning Integrators, Inc. and seaturtle.org, WIS Salewski assembled a descriptive narrative and correlating visual images that detailed the life cycle of a sea turtle, threats to sea turtle populations, conservation efforts underway at Pea Island, and what students can do to support sea turtle conservation efforts. To date, over 6,000 students from 46 states and 2 countries had logged on to the eFieldTrip, making this outreach effort the most successful in the Refuge's history. Refuge staff plan to rebroadcast the eFieldTrip in 2006.

The Refuge sponsored the ninth annual Wings Over Water festival in 2005. This year's event was very successful, in that the weather was beautiful; participation was higher than the previous two years; and everything seemed to run smoothly. The event had 211 registered participants; and offered 71 field trip opportunities.

Refuge staff also expanded the Wings Over Water festival into May, for a weekend Spring Wings festival. The festival attracted approximately 150 participants and leaders; but overall, took away precious planning time from the fall festival. The steering committee decided to put Spring Wings on hold for future years until developing a larger fall festival base.

For National Wildlife Refuge Week, WIS Salewski and intern Allen Bridgman visited local libraries in Hatteras, Manteo and Kill Devil Hills with wildlife story books and a host of wildlife pelts, skulls, and recordings. WIS Salewski conducted the weekly story time alongside Allen the Alligator, and brought the wildlife conservation message to 100 children and their parents.



Allen the Alligator and Wildlife Interpretive Specialist Ann Marie Salewski visited libraries in Hatteras, Manteo and Kill Devil Hills in celebration of National Wildlife Refuge Week.

ETT

WIS Salewski continued to expand outreach efforts to local and regional organizations throughout 2005. For the third year, WIS Salewski continued an outreach initiative in cooperation with Festival Park. She presented a Turtle Talk program at the Park for a total of 14 visitors. Additional programs on Bears and Fish Printing were presented on behalf of Alligator River NWR. The programs were well-received by visitors and park staff alike.

New for 2005, WIS Salewski developed an outreach relationship with the Outer Banks Beach Club. Beginning in June, she spoke to weekly time share residents Monday mornings about Pea Island and Alligator River; and the interpretive programs offered at each. She spoke to approximately 1,005 people at 15 meetings. This outreach effort continued through Wings Over Water. During the winter months, WIS Salewski began offering a weekly Turtle Talk at the Club.

Representatives from the North Carolina Department of Health and Human Services came out to the Refuge to evaluate the Refuge's accessibility for refuge visitors who are deaf and/or hard of hearing. WIS Strawser, Salewski and Ahlfeld met with the representatives and incorporated their suggestions into the interpretive program publication, the audio driving tour, and interpretive programs. Refuge staff also pursued the purchase of a personal FM System to facilitate refuge program for hard of hearing individuals.



Representatives from the North Carolina Department of Health and Human Services demonstrate several modes of communication employed by visitors who are deaf and/or hard of hearing.

BWS

WIS Salewski and WIS Ahlfeld both presented off-site programs to local organizations. WIS Ahlfeld presented a bird program to 30 members of the Soundsports Club. WIS Salewski presented a Turtle Talk for 30 members of the Southern Shores Boat Club and a general refuge talk for 30 members of the Kiwanis Club. Based on an article promoting Deaf Awareness Week and WIS Salewski's program, the Kiwanis Club decided to donate \$250 toward the purchase of a personal FM System to facilitate refuge visits of deaf and hearing impaired visitors.

For the first year, WIS Salewski presented Turtle Talks at the Students Day on the River festival in Elizabeth City. This successful event attracted a diverse student body of approximately 375 from local area schools.

In celebration of the release of Suzanne Tate's newest book, *Johnny Longlegs*, the Pea Island Visitor Center hosted a book signing with author Tate and illustrator James Melvin. Approximately 250 refuge visitors came to the Center to take advantage of the signing and book reading. WIS Salewski conducted a bird walk following the signing for 10 individuals.

WIS Salewski conducted two general refuge tours on request of the Outer Banks Visitor Bureau for a total of 13 media representatives.

Most regularly scheduled on-site interpretive programs during 2005 were conducted at Pea Island NWR by Refuge volunteers and interns. Friday bird walks were conducted year round. Beginning in May and running through October, bird walks expanded to 3 days each week (Wednesday, Thursday, and Friday). Guided Pamlico Sound canoe tours (3 hours) and family canoe tours (2 hours) were offered once each week during the spring and fall months and twice each per week during the summer months. Also during the summer, one Turtle Talk, one Soundside Discovery, and one Watchable Wildlife program were conducted each week. Watchable Wildlife was a new interpretive program offered in 2005, and did not attract much attention. Refuge staff continued posting daily flyers on the visitor center door to promote the interpretive programs, which increased interest and participation.

On-site Interpretative/Educational Programs

Program Type	No. Programs	No. Participants
Bird Walk	90	897
Soundside Discovery	12	167
Turtle Talk	14	174
Family Canoe Tour	22	375
Pamlico Sound Canoe Tour	24	177
Watchable Wildlife	4	21
Beach Geology	14	65

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



Paddling continues to be a popular activity on Pea Island. BWS

9. Fishing

Pedestrian surf fishing continued to be the major form of consumptive, wildlife-oriented recreation on Pea Island NWR during 2005. Bluefish, striped bass, red drum (especially during nighttime fishing), spot, pompano, croaker, and trout were the major fish caught. Nighttime fishing permits are distributed through the visitor center and local fishing and tackle stores September 15 through May 15.

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 27,000 visits were spent fishing on Pea Island. The annual Crabbing/Fishing Rodeo was held the second Saturday in June with approximately 600 participants.



The most popular event on the Refuge, the Fishing and Crabbing Rodeo brings out hundreds of refuge visitors every year. Some tourists plan their vacations on the date of the festival!

AB

11. Wildlife Observation

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

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

During spring and summer, 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.

2005 Wildlife Observation Visits

Foot-	650,000
Boat	7,715
Vehicle	0

12. Other Wildlife Oriented Recreation

The photo-blind, installed during 1995, continued to be utilized fully during 2005. 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 NC Highway 12. Illegal ORV traffic continues to plague the Refuge; however, probably due to rapid erosion of the beach and repeated ocean overwash of NC 12 on Pea Island NWR. As long as there is a physical way for vehicles to reach the beach, there will always be some problems with ORV traffic there.

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

16. Other Non-Wildlife Oriented Recreation

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

17. Law Enforcement

Due to a Memorandum of Understanding (MOU) with Cape Hatteras National Seashore, the National Park Service (NPS) has the primary responsibility for non-wildlife related public use on Pea Island NWR. For this reason, a NPS law enforcement presence is maintained regularly, though not constantly, on the Refuge.

Again during 2005, there was no FWS LE presence on Pea Island NWR on a regular basis. During the year, one permanent staff (Interpretive Specialist) and one temporary staff (Interpretive Specialist for Visitor Center) worked at Pea Island. The presence of FWS staff helped, since there were more eyes available to see violations and call the Park Rangers. However, the need for a FWS LE presence at Pea Island NWR continues to be evident.

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

Statistics on Pea Island law enforcement activities can be found in H.17 of the Alligator River NWR narrative.

18. Cooperating Associations

The Coastal Wildlife Refuge Society is especially active at Pea Island National Wildlife Refuge by way of the Visitor Center. The bookstore, operated by the Society, offers a wide selection of environmental and interpretive products. One new product for 2005, conceptualized by WIS Ahlfeld, was a blue goose puzzle. WIS Ahlfeld mobilized a volunteer work crew to create a supply of puzzles to sell in the Visitor Center.



Interns Allen Bridgman and Alicia Wiseman carefully maneuver a circular saw in creating a new blue goose puzzle.

AMS

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

The following previously reported structural damages resulting from Hurricane Isabel (2003) were repaired with supplemental funding:

- The Northeastern Garage Door Co., Elizabeth City, NC replaced three damaged overhead (10'2" X 9') garage doors at the Office/Maintenance Building; one damaged (9' X 7') overhead door at the ATV storage building; and one damaged (9' X 7') overhead at the residence building. The total cost for replacement of all doors was \$8,650.00.
- Gallop Roofs, Inc., of Wanchese, replaced shingles and repaired damaged roof supports on the Refuge Office/Maintenance Building (2812 sq. ft.) and the adjacent Storage Building (1668 sq. ft.). Total cost of repairs was \$8,680.00.
- The South Pond Pump Building was repaired by Force Account. Repairs included replacing exterior walls, roofing tin and damaged interior framing. Total cost for repairs was \$3,800.00.

- The South Pole Shed was razed and all debris removed. The structure received extensive roof damage and side walls had been destroyed during the Hurricane.
- The two (2) 1,000 gallon fuel tanks at the Refuge Office/Maintenance Building had deteriorated, were non-functional and posed a safety hazard. They were replaced with a 1,000 gallon duel system tank (750 gal. gasoline, 250 gal. diesel) with stainless steel fittings from Core Engineering Solutions Inc. The tank is similar to the Convault design, with concrete exterior, double inner liners and stainless steel hardware. Shipping and installation of the tank cost \$17,335.00. An additional \$11,215.00 was used to remove, transport and properly dispose of the old tanks, complying with EPA Specifications and NCDOT/VADOT Regulations.

3. Major Maintenance

- Maintenance staff made mechanical repairs to North Pond Pump engine.

4. Equipment Utilization and Replacement

- Washout from run off water had created a safety hazard for the visiting public.
- Washout from run off water had created a safety hazard for the visiting public at the New Inlet boat launch area. Maintenance staff hauled and spread fill material at the washout.
- Excessive amounts of blowing sand from storm events had accumulated at the north entrance of North Pond Road, closing off vehicular access at the entrance of the impoundment perimeter road. Staff removed excess sand to open access to the area.
- Staff attempted to make emergency repairs to the primary (Pea Island) South Pond water control structure. The attempt was abandoned when the structure was uncovered and it became apparent that the damage was more extensive than expected. Further attempts to complete repairs would have disrupted compaction and the vegetation root mat across the entire width of the 120ft. wide dike. That would have drastically increased the potential for damaging erosion (or blowout) from hurricanes or other storm events. The structure will be repaired or replaced when funding and weather conditions permit.
- Staff mowed Pea Island impoundment dikes, roads and fire breaks.
- Throughout the year, refuge staff pumped and maintained North Pond and New Field impoundments to target levels.
- Refuge staff set up new (portable) MWI water pump in South Pond for demonstration purposes.



Refuge Manager Mike Bryant and Maintenance Supervisor Bruce Creef inspect the mobile water pump at South Pond.

AB

6. Computer Systems

Significant time was spent in 2005 migrating all Lotus Notes users to Version 6.5 and the correct servers in Denver. Also Windows XP was updated and/or installed on all of the refuge's computers.

Three new computers were installed at Pea Island NWR during 2005 as was a new network printer.

A severe virus problem resulted in the loss of the DSL connection through the State of North Carolina in late September and early October. All the computers on the network had Symmantec Anti-Virus uninstalled, re-installed, and updated. Subsequent scans of the computers found viruses on all but one of the computers on the network. The viruses were cleaned from the computers and the DSL connection was restored.

8. Other

- Staff participated with Regional Safety Officer (Owen Moe) on safety inspection of Pea Island facilities and equipment
- Maintenance staff assisted with coordination of Pea Island volunteer work projects

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.

4. Credits

The annual narrative was compiled by WIS Salewski with individual sections being a joint effort by program supervisors. Photo credits: Ann Marie Salewski (AMS), Bonnie Strawser (BWS), Allen Bridgeman (AB), Kathy Whaley (KLW), Michael Halminski (MH), Eve Turek (ETT), and Joyce Sheridan (JS).