

REVIEW AND APPROVAL

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

MANTEO, NORTH CAROLINA

ANNUAL NARRATIVE REPORT

Calendar Year 2008

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Refuge Manager	Date	Refuge Supervisor Review	Date
		<hr/>	<hr/>
		Regional Office Approval	Date

INTRODUCTION

Alligator River National Wildlife Refuge is approximately 154,000 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 supports 64 species of fish, 264 species of birds, 62 species of reptiles and amphibians and 41 species of mammals.

Alligator River National Wildlife Refuge was established on March 14, 1984, with an 118,000-acre land donation from Prudential Life Insurance Company in Dare and Tyrrell Counties. Eventually, the Tyrrell County land was transferred to Pocosin Lakes National Wildlife Refuge and additional land was acquired, some of which lay further south in Hyde County.

In 1988, the addition of 5,100 acres of farmland substantially increased opportunities for waterfowl management. Today, the farm units attract numerous tundra swans, pintails, mallards, widgeons, and a variety of other species. In combination with the 46,000-acre Dare County Bombing Range located near its center, the refuge represents approximately 200,000 acres of relatively undisturbed wetland habitat.

The vast expanse of undisturbed swamp forest and wetlands in 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, the refuge stands as one of the last remaining, most remote and diverse swamplands in eastern North Carolina.

Principal natural communities in the refuge include freshwater and salt marshes, as well as pocosins and broad expanses of non-riverine swamp forests. Its isolation and undisturbed quality add to the value of its rich wildlife habitats. The Alligator River area is part of the northern range border for the American alligator, and it remains one of the last strongholds for the black bear in North Carolina and the mid-Atlantic coast. The refuge also provides habitat for the endangered red-cockaded woodpecker.

Alligator River NWR is the center for the Red Wolf Recovery Program. The wild population of red wolves currently numbers more than 100. They live in nearly 20 family units, distributed across 1.7 million acres, throughout five counties in eastern North Carolina.

The refuge offers a wide variety of programs and activities for public recreation, including hunting, fishing, paddling, 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 2008

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

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A. HIGHLIGHTS

The Alligator River Comprehensive Conservation Plan Released. (Section D-1)

Refuge Volunteer Program tallied 16,446.7 hours with 228 volunteers. (Section E-4)

Ron Marchand was named Outstanding Volunteer of 2008. (Section E-4)

Firefighters from Alligator River assisted on the 42,000 acre Evans Road Wildfire. (Section F-9)

Refuge staff attacked phragmites, alligator weed, and Southern Pine Beetle. (Section F-10)

There were 17 Howling Safaris during 2008, reaching approximately 1000 participants. (Section G-2)

As a result of her caretaker report on the Red Wolf Recovery Program web site, Adele Douglass became the first caretaker to participate in a radio talk show. (Section G-2)

Tundra swan, pintails, and green-winged teal account for 85% of total waterfowl use. (Section G-3)

Alligator River NWR Takes First Place in Manteo Christmas Parade with Fire Safety Message. (Section H-6)

Junior Friends groups were formed at Columbia, Manteo, and Cape Hatteras Middle Schools. (Section H-18)

B. CLIMATIC CONDITIONS

The year started at nearly 20 inches below normal rainfall for the Refuge, with water levels somewhat below normal. The Piedmont and Mountain regions of the State were in an all-time drought during this time. As a result, the Governor put North Carolina into several “statewide” burn bans during the year, which prevented us from burning areas where water levels and fuel moisture were adequate. As a result, prescribed burning windows were narrowed down to a very brief period, and though we received near normal rainfall in the spring quarter, the residual drought gave us a busy summer fire season.

Rainfall totals are as follows:

2008 Rainfall Totals by Month (inches)

January	3.2
February	5.4
March	2.9
April	7.5
May	1.9
June	3.1
July	5.0
August	7.8
September	6.6
October	2.3
November	6.6
December	3.9
Total	56.2

Hurricanes and Tropical Weather:

The Atlantic hurricane season was relatively busy, however most of the storms stayed south or went out to sea. Two storms impacted the North Carolina Refuges. The first, TS Cristobal, formed off the south coast of South Carolina on July 19th and ran up just off-shore parallel to the coast line to Cape Hatteras and then continued northeasterly out to sea. It brought high winds and scattered rain along with high surf conditions. The second storm was Hurricane Hanna, which formed out in the east Atlantic on August 28th and meandered to the western Atlantic near the Bahamas over many days. It was only up to minimal hurricane strength for a short period of time and by the time it came ashore in early September along the NC/SC border and ran up the I-95 corridor through NC, it was a very fast moving storm that brought only low amounts of rainfall to Eastern NC, with less than an inch over the Evans Road Fire.

C. LAND ACQUISITION

1. Fee Title

The Refuge accepted title to the Balance Tract on the south boundary in Hyde County. This 80 acre tract was purchased with assistance from the Conservation Fund.

Thanks to the hard work of Realty Specialist Jeanette Harrison of the Region 4 Realty Branch, the Refuge is very close to accepting title to the Mashoes Road (391 acres) and ML Daniels Oil Company (1.4 acres) properties. Negotiations now center on removal of a commercial billboard from the ML Daniels tract. As of this date, the owner has been instructed to remove the billboard from the property. It is expected that the Service will accept title to the property once the billboard has been removed. Both tracts were purchased by NC DOT as mitigation for expansion of a 10 mile section of State Highway 64 near Manns Harbor, NC and were to be transferred to the refuge upon completion of the project. Permits for the highway project were issued in 1999 and the project was completed. However, NC DOT delayed transferring the properties to the Refuge.

2. Easements

There was no easement activity on the refuge during 2008.

3. Pre-Acquisition

FWB Brian Van Druten completed a Level 1 preacquisition contaminants survey for the acquisition of the approximately 80 acre Ballance Tract along the Barge Canal in the Hyde County portion of Alligator River NWR. The background searches indicated that there had been a previous release from an underground storage tank near the property. After consulting with Tom Augsperger from the Raleigh Field Office, it was determined that the impacts to the Ballance Tract were not enough to hold up acquisition of this tract.

FWB Van Druten initiated the Level 1 preacquisition contaminants survey for the Daniels Oil Tract to be transferred from NC Department of Transportation to Alligator River NWR. The Daniels Oil Tract is located at the intersection of US 64 and US 264 and is part of the mitigation for the widening of US 64 from Manns Harbor to the US 64/264 intersection. Work on this will continue into 2009.

FWB Van Druten assisted Currituck NWR with a Level 1 preacquisition contaminants survey for a right-of-way in Wild Horse Estates for access to Station Landing Marsh.

FWB Van Druten assisted Mackay Island NWR with a Level 1 preacquisition contaminants survey for the acquisition of the approximately 30 acre Simpson Tract along the north side of Knotts Island Road. There had been some fairly large trash piles on the property that were located and removed prior to the acquisition.

D. PLANNING

1. Master Plan

Though the Alligator River NWR CCP was officially signed on 6/8/2007, due to Compatibility Determination approvals (cross-region), the document was not printed and released until August, 2008.

FWB Van Druten assisted Mattamuskeet NWR and Swanquarter NWR with modifications to their maps for the Comprehensive Conservation Plan.

5. Research and Investigations

Black Bear & Red Wolf: A proposal designed to assess habitat use by the black bear and red wolf populations along the US 64 Highway corridor was completed and submitted to the NC Department of Transportation (NCDOT) in December, 2006. This research will begin 2 years prior to the construction start for upgrading the current highway from 2 lanes to a 4-lane system. NCDOT awarded contracts for the proposed work in late 2008 with data collection scheduled to begin in early 2009.

Climate Change - Effects of Sea Level Rise: RB Stewart continued coordination and planning sessions with The Nature Conservancy and the North Carolina Coastal Federation regarding pilot projects to increase habitat management options as an adaptation to rising sea level. Researchers from NC State University approached the refuge with a proposal to construct a carbon flux tower on the refuge and begin a long-term research effort designed to monitor carbon cycling in a swamp forest ecosystem.

Geological History: The Department of Geology at East Carolina University continued data collection from the refuge and report preparation 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 4000 GIS files and 9 sets of aerial photography. We maintain a data sharing agreement with many area counties. The majority of the GIS work is completed by FWB Brian Van Druten although there are 5 other employees that use GIS on a periodic basis.

Program highlights and accomplishments for 2008 include: created maps for road maintenance and upcoming road improvement projects; created a data layer showing the flow of water through the Alligator River NWR's farm units; FWB Van Druten attended the Regional GIS conference in Cookeville, TN (at which he was an instructor); updated near-Refuge bear mortalities data layer; provided maps to Refuge and state law enforcement to assist in their

operations; created data and maps for prescribed burning operations on five northeastern North Carolina refuges; generated metadata; collected post treatment data on invasive species control and produced maps; created data and maps for the Wildland-Urban Interface program; created maps for the Alligator River Fire Management Plan; participated on Southeast Region GIS committee; completed an analysis of Landfire Fuels versus the refuge generated fuels map; served as the Lead GISS on the Evans Road Wildfire for 29 days, provided technical support to area GIS users; attended RLGIS and Invasive Species mapping training; and produced maps for 4 Level 1 Pre-acquisition Contaminants Survey.

FMO Crews, FF Waters, and FWB Van Druten participated on 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 in 2005. 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. In 2006, the protocols, GIS data, example maps, and associated documents were placed online by Kurt Snider of the Cookeville Ecological Services office. http://www.fws.gov/southeast/gis/av_hazards.html.

E. ADMINISTRATION

1. Personnel

Alligator River NWR Staff – 2008

NAME	POSITION	STATUS	EOD
1. Mary Berrie*	Administrative Support Assist. GS-0303-05	PFT	10/12/08
2. Art Beyer*	Wildlife Biologist, GS-0486-11	PFT	12/02/90
3. Mike Bryant	Wildlife Refuge Manager, GS-0485-14	PFT	04/14/96
4. Eric Craddock	Eng. Equip. Operator, WG-5716-10	PFT	02/21/93
5. Bruce Creef	Eng. Equip. Op. Supv., WS-5716-10	PFT	04/21/71
6. Tom Crews	Fire Mgmt. Officer, (Fire) GS-0460-12	PFT	01/22/95
7. Helen Czernik	Fire Program Assist. (Fire) GS-0303-06	PFT	12/18/06
8. Jay Eddy	Refuge Law Enforcement Officer GS-0025-09	PFT	10/26/08
9. Kris Fair	Fish and Wildlife Biologist, GS-0401-09	PFT	05/02/96
10. Buddy Fazio*	Wildlife Biologist, GS-0486-13	PFT	04/22/01
11. Steven Foster	Forestry Tech. (Fire) GS-0462-04	PFT - left	05/14/06
12. Bobby Govan	Eng. Equip. Op., WG-5716-09	PFT	09/03/93
13. Donnie Harris	Supvy. Forestry Tech., (Fire) GS-0462-08	PFT	01/11/96
14. Cindy Heffley	Park Ranger (Visitor Services), GS-0025-09	PFT	05/25/08
15. Diane Hendry*	Outreach Specialist GS-1001-09	PFT	03/20/05
16. Scott Lanier	Wildlife Refuge Manager, GS-0485-13	PFT	02/19/06
17. Chris Lucash*	Wildlife Biologist, GS-0486-11	PFT	12/02/98
18. Ford Mauney*	Wildlife Biologist, GS-0486-09	PFT	05/15/05
19. Eric Meekins	Eng. Equip. Op., (Fire) WG-5716-09	PFT	10/25/93
20. Amy Midgette	Eng. Equip. Op., (Fire) WG-5716-09	PFT	05/14/93
21. Mike Morse*	Wildlife Biologist, GS-0486-09	PFT	04/09/89
22. Ryan Nordsven*	Biological Science Tech., GS-0404-07 Term	TERM	08/07/06
23. Jonathan Powers	Maint. Mechanic WG-4749-09	PFT	04/24/88
24. Abbey Reibel	Park Ranger (Visitor Services), GS-0025-05	TERM	10/12/08
25. Frank Simms	Park Ranger (LE), GS-0025-09	PFT - left	10/29/05
26. Dennis Stewart	Wildlife Biologist, GS-0486-12	PFT	12/27/91
27. Bonnie Strawser	Supvy. Park Ranger (Interp.), GS-0025-12	PFT	12/31/80
28. Gregory Suszek	Prescribed Fire Specialist, (Fire)GS-0401-09	PFT	11/29/04
29. Jeffrey Swain	Eng. Equip. Op., (Fire) WG-5716-09	PFT	02/10/02
30. Brian Van Druten	Forestry Tech., GS-0401-09	PFT	01/15/99
31. Kelley Van Druten	Fire Mgmt. Officer (Fire) (WUI),GS-0401-11	PFT	02/16/01
32. Cory Waters	Forestry Tech. (Fire), GS-0462-06	PFT	11/30/03
33. Kathy Whidbee	Administrative Officer, GS-0341-09	PFT	06/03/01

* Red Wolf Program employee

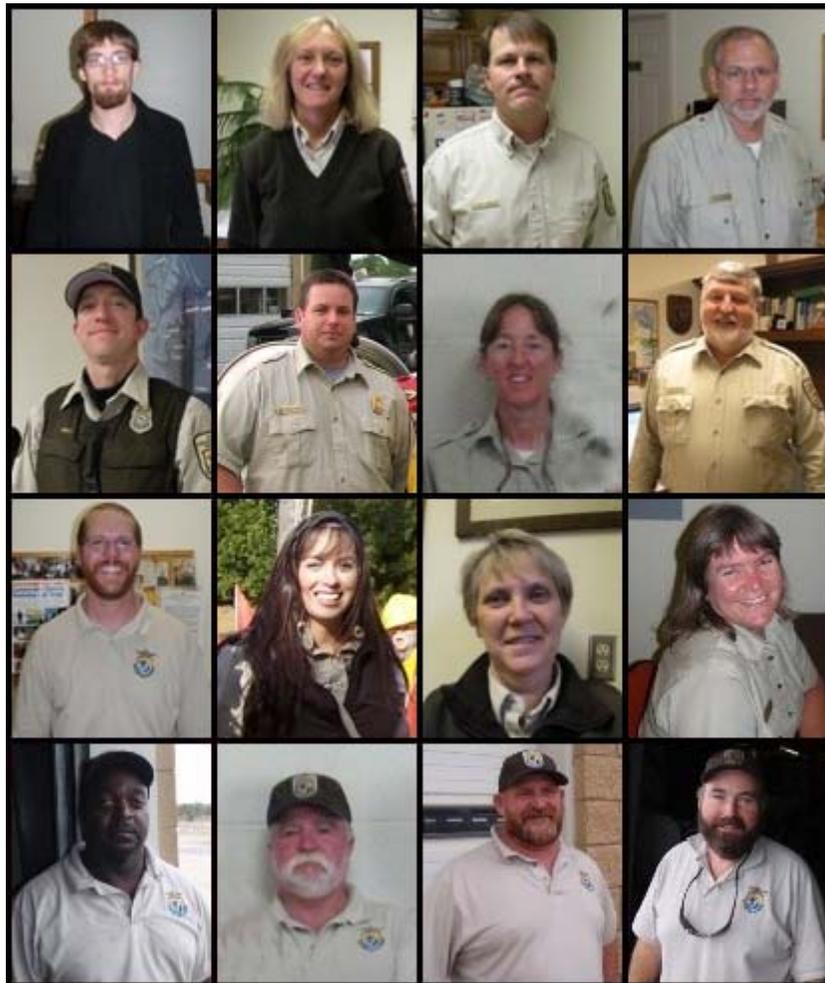
The following personnel actions occurred in 2008:

Administrative

WB Brian Van Druten was promoted from GS-0462-07 to GS-0401-09 on 06/08/08.

Abbey Reibel was hired as a Park Ranger (Visitor Services) GS-0025-05 for a NTE 4 Year Term Appointment on 10/12/08.

VSS Cindy Heffley transferred from Eastern Neck National Wildlife Refuge as a GS-0025-09 on 05/25/08.



Left to right:

Top: Adam Fauth, Kathy Whidbee, Scott Lanier, Mike Bryant

2nd Row: Jay Eddy, Frank Simms, Kris Fair, Dennis Stewart

3rd Row: Brian Van Druten, Abbey Reibel, Bonnie Strawser, Cindy Heffley

Bottom: Bobby Govan, Bruce Creef, Eric Craddock, Jonathan Powers

FWS

Law Enforcement:

RLEO Jay Eddy transferred from the Willapa National Wildlife Refuge Complex as a GS-0025-09 on 10/26/08.

RLEO Frank Simms transferred to Pocosin Lakes National Wildlife Refuge as a GS-0025-09 on 05/11/08.

Fire

Steve Foster moved from ARNWR to Texas Midcoast Refuges Complex in August of 2008.

OA Helen Czernik was promoted from GS-0303-05 to GS-0303-06 on 02/03/08.

Fire Intern Lisa Borel was hired as a Forestry Technician GS-0462-04 for a 30 day appointment on 09/22/08. On 10/22/08 this appointment was extended another 30 days. The appointment expired on 11/21/08.

EEO Amy Midgette was promoted from WG-5716-08 to WG-5716-09 on 10/26/08.

Donnie Harris received a Regional Star Award for his assistance in preparing Equipment Operator Taskbooks for the purpose of safely training equipment operators in the operation of various types of machinery.



Left to Right:

Top: Amy Midgette, Cory Waters, Donnie Harris, Eric Meekins, Greg Suszek

Bottom: Helen Czernik, Jeff Swain, Kelley Van Druten, Steven Foster, Tom Crews

FWS

Red Wolf

TERM Ryan Nordsven was promoted from GS-0404-06 to GS-0404-07 on 08/31/08.
TERM Ryan Nordsven's term appointment was extended for another year on 09/06/08.

Mary Berrie was hired as an Administrative Support Assistant GS-0303-05 on 10/12/08.



Left to Right:

Top: Art Beyer, Bud Fazio, Chris Lucash, Diane Hendry

Bottom: Ford Mauney, Mary Berrie, Michael Morse, Ryan Nordsven

FWS

Functional Titles

The following is a table defining functional title abbreviations as they appear in the Alligator River and Pea Island Annual Narrative Reports:

AA	Administrative Assistant
AFMO	Assistant Fire Management Officer
AO	Administrative Officer
DFMO	District Fire Management Officer
DRM	Deputy Refuge Manager
EEO	Engineering Equipment Operator
EEOS	Engineering Equipment Operator Supervisor
EO	Equipment Operator
FCO	Fire Control Officer
FF	Firefighter
FF/EO	Firefighter / Equipment Operator
FF/FT	Firefighter / Forestry Technician
FMO	Fire Management Officer
FMS	Fire Management Specialist
FPA	Fire Program Assistant
FT	Forestry Technician
FWB	Fish & Wildlife Biologist
MM	Maintenance Mechanic
MW	Maintenance Worker
OA	Office Assistant
OS	Outreach Specialist
PFS	Prescribed Fire Specialist
PL	Project Leader
RB	Refuge Biologist
RLEO	Refuge Law Enforcement Officer
RM	Refuge Manager
RV	Resident Volunteer
VSM	Visitor Services Manager
VSS	Visitor Services Specialist
WB	Wildlife Biologist
WS	Wage-Grade Supervisor
WUIS	Wildland Urban Interface Specialist

4. Volunteer Program

In 2008, 16,446.7 hours of service were contributed by 228 volunteers in the following areas:

Program Area:	Hours:
Maintenance	3,714.8
Wildlife / Habitat	5,225.5
Recreation	6,335.7
Environmental Education	446.7
Other	724.0
Total	16,446.7

The hours were compiled from volunteers at both Alligator River and Pea Island National Wildlife Refuges; both Refuges are therefore reflected in this section.

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

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. In 2008 interns were required to contribute a minimum of three months volunteer service, during which they received a \$100 a week food stipend and were furnished with free housing on the Refuge. All interns worked a 40-hour work week.

NAME	ASSIGNMENT	TIME
Jess Sutt	Red Wolf Caretaker	May-August
Wes Stalls	Red Wolf Caretaker	November-December
Lisa Borel	Fire Intern	March-Nov
William Thompson	General Refuge Intern/PI	March-Nov
James Wilson	General Refuge Intern/PI	May-August
Emily Martin	General Refuge Intern/PI	May-August
Lee Hamm	General Refuge Intern/PI	May-August
Calvin Wilson	General Refuge Intern/AR	May-August
Hollie Warren	General Refuge Intern/PI	September-November
Karen Callaway	General Refuge Intern/PI	September-December

Throughout the year, volunteer caretakers maintain the Sandy Ridge facility under the supervision of Chris Lucash, red wolf biologist. Caretaker duties include feeding wolves temporarily located in the pens, ground maintenance, assistance with red wolf howling safaris, supporting the work of red wolf wildlife biologists and other duties as assigned. There was one caretaker at Sandy Ridge during the 2008 calendar year with considerable assistance from the Red Wolf Coalition Executive Director.

2008 Resident Volunteer (RV's)

Resident Volunteers, who are also scheduled in 3-month blocks, were provided a pod for their RV at Pea Island or Alligator River and supplied with electricity, sewage disposal, washer, dryer, telephone hookup and internet. In exchange for the accommodations the volunteers donate 24 hours per week per couple, or 32 hours per week per single. They provide refuges with routine maintenance, interpretive programs, canoe tours, and visitor center operations.

The 2008 Resident Volunteers were:

Resident Volunteer	Award/hour pins	Work Area	Service
Carol and Russell Thompson	250 250	PI-Maintenance, VC, Public Use	March – April
Ann and Glenn Moore	250 Certificate (100)	PI-Maintenance, VC, Public Use	April – June
Bill Voegtli	1,000	AR-Maintenance	April – September
Ward and Pat New	500 500	PI-Maintenance, VC, Public Use	June – September
Gary and Diane Frable	250 250	PI-Maintenance, VC, Public Use	August – September
Gene and Diane Stone	2,500 2,000	AR-Maintenance, VC, Public Use	September – November
Carol and Russell Thompson	500 500	PI-Maintenance, VC, Public Use	December – January 09

2008 Volunteer Awards

Cumulative hours tallied for the 2008 year yielded awards which will be presented at the Annual Volunteer Awards Banquet in May, 2009. Awards were presented to interns and resident volunteers during the course of the year since most will be 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) - Bill Vancura, Rich Griffiths, Georgia Griffiths, Elizabeth Morey, Carol Bauer, Janice Lane, Heather Demerest, Glenn Moore.

250 Hour Pin - Waverly Reibel, Gary Frable, Diane Frable, Hollie Warren, Karen Calloway, Emily Martin, James Wilson, John Koltz, Carol Thompson, Russell Thompson, Ann Moore.

500 Hour Pin - Ron Scovell, Jay Ross, Lisa Borel, Diane Stone, Gene Stone, Lee Hamm, Pat New, Ward New, Calvin Wilson, Jess Sutt.

1000 Hour Pin - Laura Gilson, Ken Wynne, William Thompson, Bill Voegtli.

2500 Hour Pin - Ron Marchand, Neal Moore.

3,000 Hour Pin - Pat Moore.

7500 Hour Pin - Warren Davis.



RB Kris Fair (far left), VSS Abbey Reibel (2nd from left) and RM Mike Bryant (far right) recognize Ron Marchand (2nd from right) as the 2008 Outstanding Volunteer. FWS

The Outstanding volunteer for 2008 was Ron Marchand, a huge asset with the turtle program on Pea Island National Wildlife Refuge and Visitor Center operations. Bill Voegtli was also recognized as an outstanding volunteer in the fall after a 4 month stay at Alligator River NWR as a resident volunteer.

Ken Wynne was recognized for Highest Gross Sales at the Visitor Center in 2008 at Pea Island NWR.

Neither Alligator River nor Pea Island could sustain the current high level of interpretive programs, visitor support, or sea turtle monitoring without the consistent dedication of Refuge volunteers.



Ken Wynne (left) being recognized by RM Mike Bryant (right) for Highest Gross Sales at the Pea Island NWR Visitor Center for 2008. FWS

5. Funding

Refuge funding for FY 08 was as follows:

FUND	NAME OF FUND	FY04	FY05	FY06	FY07	FY08
1113	Red Wolf	982.3	946.8	1243.3	886.5	1008.9
1261	Operations	1355.7	1260.2	424.7	546.5	522.0
1262	Maintenance	422.5	107.0	665.7	523.7	792.2
1263	Public Use	N/A	N/A	343.0	317.3	361.7
1264	Law Enforcement	N/A	N/A	86.2	81.4	87.2
1281	Upper Milltail*****	N/A	N/A	N/A	10.0	N/A
1664	ISP	N/A	N/A	N/A	N/A	6.1
2821	PI Entrance Signs	N/A	N/A	N/A	N/A	31.0
29..	Storm Damage *	218.6	207.3*****	104.4	N/A	N/A
9131	Fire Operations	1092.5**	710.1**	622.4**	509.7**	508.0
9263	Rx Burns	189.0**	205.7**	235.6**	125.9**	132.1
9264	WUI	286.0****	425.7**	401.2**	520.0**	332.0
9265	Rural Fire Assist.	37.2	35.0	62.1	N/A	36.0
TOTAL		4583.8	3897.8	4188.6	3521.0	3817.2

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

**Includes last minute fund additions for fire equipment purchases.

***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 WIS Ahlfeld was paid by the Coastal Wildlife Refuge Society (CWRS). When Susan Ahlfeld resigned, CWRS decided to hire an employee without going through FWS. That employee functions in the same way, but is paid directly by CWRS.

6. Safety

Monthly Safety Meetings were held at the Mann's Harbor Community Center. Safety committee members consist of: Greg Suszek, Bonnie Strawser, Brian Van Druten, Frank Simms, Bruce Creef, John Powers, Diane Hendry, Amy Midgette and Tom Crews. Donnie Harris continues to serve as the Safety Committee Coordinator.

2008 Monthly Safety Topics included:

- High Blood Pressure
- Tire Safety
- MRSA
- Chain Saw Safety
- Fire Ants
- Winter Driving
- Tick Borne Diseases
- Occupational Health and Safety
- Defensive Driving,
- First Aid Refresher
- Hurricane Evacuation

Two ATV Safety Institute Ridercourse Classes were taught at Pea Island NWR on May 15 & 16, 2008. A total of 11 students were taught in 2008. The classes included employees from 2 refuges, volunteers, and interns used mostly to assist with the Sea Turtle Nesting Program on Pea Island NWR. FWB Brian Van Druten also attended the ATV Safety Institute's Professional Development Workshop on June 7, 2008 in Rocky Mount, NC. These PDW's are required every 2 years for instructors to stay current with the instruction of classes. A total of 100 students have been instructed since 2004 at either Alligator River or Pea Island NWR's.

7. Technical Assistance

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. In 2006, Dare County and the Wooten Company concluded that the preferred alternative for the treatment plant would be to locate the facility on county property beside US Highway 264 and north of Bayview Drive. Treated water would be discharged into Bayview Drive Canal. A 2.5 inch sewer collection line will be installed within an existing right-of-way along the shoulder of US Highway 264 for a distance of 3,175 feet, including an extension of the existing right-of-way by approximately 275 feet. There was little progress on this project during 2007. The contract was awarded in mid-2008 for this project and construction began shortly thereafter. The tertiary treatment plant will be constructed in 2009.

During the course of the year, RB Stewart interacted with Tideland Electric, the U. S. Army Corps of Engineers, the NC Department of Transportation, and Dare County with regards to various maintenance projects within rights-of-way or requiring permitting by the refuge. Some of these activities resulted in Special Use Permits being issued and some did not. One of the more notable projects involved use of the Stumpy Point Spoil Disposal Cell for sand dredged from the Stumpy Point Federal Navigation Channel and the NC Department of Transportation Emergency Ferry Channel. The disposal cell pre-dates the refuge and use is authorized on a case-by-case basis through a Special Use Permit. Dredging is done on an intermittent basis to ensure adequate depths for the emergency ferry system between the mainland and Outer Banks.

F. HABITAT MANAGEMENT

1. General

Generally, six categories of natural, vegetated habitat are found on Alligator River NWR: 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. Alligator River NWR contains some of the last remaining large tracts of pocosin-type habitat along the east coast. Although much of the refuge is relatively unaltered by humans, large portions have undergone changes in vegetation composition and hydrology caused by ditching and canal dredging for access and logging purposes. However, none of the wetlands have been drained by gravity to the extent that they would be classified as non-wetland. In more recent years, forested areas have been further fragmented with firebreaks to meet smoke management guidelines when conducting prescribed burns. The purchase of the Prudential farmlands in March of 1988 added agricultural land to the list of habitats. As the Comprehensive Conservation Plan developed, the six vegetative categories evolved into the twelve categories as shown in Table *F-3-1*. During 2008 the Balance/Barge Canal tract was added to the refuge through fee simple acquisition. The approximate 90 acre tract lies in Hyde County and fills in a portion of the refuges' southern boundary. This acquisition did not add any new habitat types to the refuge.

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. No new water control structures were installed during 2008.

Moist soil units were produced in prior converted farmland over a period of several years within the farm unit. In the 2007 growing season, which produces the food crop for the 2007-2008 wintering waterfowl season, most of the moist soil acreage was planted in corn, soy 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.

3. Forests

Table *F-3-I*: Habitat types and approximate acreage of land within the boundaries of Alligator River NWR 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	12,236
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%	138,555	13,998	152,553

4. Croplands

The 2008 Cropping Season produced a variety of foods for wintering waterfowl, as well as upland bird species. All three (3) farmers continued to operate under individual 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. One thousand, six hundred and sixty six (1,666) acres of cropland were converted to filter (field drainage filtration) strips. When maintained in an early succession stage, the filter strips provide beneficial habitat for a large diversity of wildlife species. Prescribed burning and seasonal mowing are used to maintain preferred habitat types. Addendums are used to compliment and support the current CFA's. The addendums are structured and approved on a yearly basis, depending on refuge management objectives.

During the 2008 crop season, the farmers reduced the amount of corn planted for their share due to the increased cost of planting corn. A total of 271 acres of corn, 1573 acres of soybeans, and 273 acres of lespedeza were planted. Corn production decreased with yields dropping to 75

bushels per acre. Soybean yields were at 23 bushels per acre. Wheat yielded 46 bushels per acre.

Based on the 2008 Addendums to the long term CFA's, the refuge share (un-harvested) for all of the crops planted by the farmers was 212 acres of corn, 10 acres of millet, 9 acres of sunflowers and 18 acres of green browse (wheat or oats). This figure was determined by taking 10% of the total acres farmed for each farmer primarily in corn, regardless of what crop the farmer may plant. Refuge staff also planted millet provided by cooperative farmer George Holmes in various areas throughout the farming unit. The 10% "equitable rent" is based on the requirement that the three cooperative farmers purchase all the fuel for the Laurel Bay and Creef Pump Stations. Fuel prices steadily increased during the year. Without the current CFA's in place, refuge water management objectives would not be achieved.

On August 12, DRM Lanier, RB Stewart, and WGS Creef participated in a Cropland Review with Assistant Area Supervisor Brett Hunter, Migratory Bird Biologist John Stanton, and Regional Cooperative Farming Coordinator Whit Lewis, along with the refuge cooperative farmers Ernie Wynne, George and Thomas Holmes and FSA Officer Wendy Modlin. Suggestions were made concerning increasing the refuge share from 10% to 25% and how to quantify the pumping costs paid by the farmers as part of the refuge share. To date no changes have been made.

9. FIRE MANAGEMENT:

Alligator River NWR continued to emphasize the district concept of fire management during 2008. District Fire Management Officer Tom Crews, the zone FMO, focused on looking after fire management needs and issues on all nine eastern North Carolina refuges in USFWS Region 4, Fire Management District 1. Pocosin Lakes NWR Fire Management Officer Vince Carver served as the District AFMO and training specialist. FMO Carver also served on the North Carolina Fire Environment Working Team, specializing in smoke management planning, and as prescribed fire planner for Pocosin Lakes NWR, assisting DFMO Crews in writing prescribed fire plans. Wildland Urban Interface Specialist Kelley Van Druten spent much of her time addressing planning needs within the District through Fire Program Analysis (FPA), and Refuge fire management plans. Prescribed Fire Specialist Greg Suszek spent most of his time planning burns at Mackay Island, Currituck and Mattamuskeet Refuges, while helping DFMO Crews and Fire Control Officer Donnie Harris update burn plans for Alligator River and Pea Island Refuges. DFMO Crews is the primary prescribed fire planner in the District for all RXB1 and RXB2 prescriptions, but he uses the expertise of his staff to do most of the preparatory work. Crews is RxB1 (Type 1 burn boss) qualified while Harris was the only Type 2 burn boss in NC Refuges until FFEO Meekins got qualified in April.

The Alligator River NWR hosted the Annual Fire Management Officer’s workshop at Kill Devil Hills, NC. It was attended by around 40 Fire Management Officers from around the Southeastern Region. A dinner party was held at Kelley’s Restaurant and Tavern following a tour of Wright Brother’s Monument by the National Park Service. Another evening was concluded with a sunset tour at Pea Island NWR where some saw a whale just off the beach near the visitor’s center. FCO Harris hosted the group with an Oyster roast at his home later that evening.

Wildfire Preparedness:

Staffing Class Days for 2008
(RP – Readiness Plan or Staffing Class)

Month	RP 5 (Very High)	RP 4 (High)	RP 3 (Moderate)
Number of days:	28	4	32
Number of wildfires			

Note: 4 wildfires occurred on RP 2 days.

Wildfires/acres:**Wildfires in NC Fire District 1, 2008**

Refuge	Fire Name	Start Date	End Date	Acres	Fire Number
AR	Alligator River Severity	10/15/2007	1/19/2008	0	D1MK
PL Assist	Mackeys Fire	1/6/2008	1/6/2008	1	D2X4
PL Assist	Pea Ridge	1/6/2008	1/6/2008	1	D2X3
PL Threat	Rocket Fire	1/15/2008	1/15/2008	1	D23J
AR Threat	Trailer Fire	2/4/2008	2/4/2008	1	D3KP
AR Threat	Food Lion Truck Fire	2/9/2008	2/9/2008	1	D3KR
AR Assist	Dillons Ridge	2/10/2008	2/15/2008	760	D3KT
PL Assist	Mackay Ferry	2/10/2008	2/10/2008	1	D3K3
PL Assist	B Canal Goose	3/15/2008	3/15/2008	1	D5FE
PL Assist	Columbia Goose	3/15/2008	3/15/2008	1	D5FD
PL Assist	Gus Town Road	3/15/2008	3/15/2008	1	D5F1
CI	Rumsley Marsh Flare	3/17/2008	3/17/2008	3	D4GS
AR Threat	Sheep Fire	3/17/2008	3/17/2008	0.5	D4D2
PL Assist	Rose Acres Fire	3/22/2008	3/22/2008	1	D4JF
AR Assist	Tillett Road Fire	3/27/2008	3/27/2008	1	D4QZ
MI	Wood Duck Fire	3/27/2008	3/27/2008	0.5	D4SV
PL	Smoking Gibbs	4/14/2008	4/14/2008	1	D5D1
PL	Evans Road Fire	6/2/2008	1/5/2009	41,060	D7L1
PL	Intracoastal Waterway	6/16/2008	6/17/2008	5	D78K
PL Assist	Alligator Fire	6/18/2008	6/19/2008	6	D8B5
PL Threat	South Boundary	6/19/2008	6/20/2008	5	D8GK
PL Assist	Backwoods #2	6/20/2008	6/21/2008	5	D8GL
PL Assist	Dike Fire	6/21/2008	6/21/2008	1	D8HG
AR	Callahan Creek Fire	6/22/2008	6/24/2008	10	D8RA
PL Assist	Combine Fire	6/25/2008	6/25/2008	1	EH32
AR Threat	Target 20 Fire	6/30/2008	6/30/2008	1	D9HX
AR Assist	Thompson fire	7/2/2008	7/2/2008	1	D9PK
AR Assist	Pain Fire	8/4/2008	8/4/2008	1	EE16
AR Assist	Ground Bee Fire	8/22/2008	8/22/2008	1	EHY2
AR	Backhoe Fire	9/29/2008	9/29/2008	1	EL82
PL	Lake Road Fire	11/24/2008	11/24/2008	5	EV0P
			Total Acres	41,879	

Evans Road Wildfire: (Fire in Three Dimensions). When the Evans Road Fire struck on June 1, firefighters from District 1, including all the Pocosin Lakes Fire Crew cooperated with the NC Forest Service to provide initial and extended attack on the fire. On June 3, it appeared that the fire was close to containment, when it spotted across the lines and took off towards the Lake Phelps Community. Firefighters from the FWS and NC Forest Service were able to stop

the fire on the Evans Road Firebreak, (which was refurbished earlier in the year) and prevent it from reaching the Lake Phelps Community. The fire, however, made a major run across the Pocosin Lakes NWR and onto private lands to the northeast of Lake Phelps where it was stopped in agricultural lands. The Evans Road Wildfire quickly became the largest fire in the nation eventually growing to 41,060 acres in size, taking all summer to control. The difficulty of suppressing this fire was primarily due to the depth it burned into the peat soils across the refuge and especially on private property where the soils were most severely drained. A nationally unprecedented large-scale water pumping effort was made to transport 2.2 billion gallons of water 37 miles across the landscape to suppress the deeply burning organic soils. As of December, the Evans Road Fire was declared controlled but not out.



Firefighters from Alligator River assisted on the 42,000 acre Evans Road Wildfire all during the summer of 2008, working in operations as firefighters on the line as these shown here, as well as helitack crew, equipment operators, logistics crew, resource advisors, agency representatives and many other jobs. Alligator River Dispatch assisted in the incident by dispatching personnel, serving as expanded dispatch for a while, and assisting in finance and plans. Over 40 "AD" firefighters were hired to assist on the fire and were provided support through ARNWR dispatch.

FWS

Other Wildfire Activity: Even while the Evans Road Wildfire was being fought at Pocosin Lakes NWR, other fires occurred on surrounding refuges. On June 7, the **South 1 Fire** started at Great Dismal Swamp NWR just 70 miles north of the Evans Road Wildfire. Although Great Dismal Swamp NWR is administered out of Region 5, they have historically turned to NC Refuges for firefighters and suppression equipment. NC Refuges provided helicopter support initially and sent firefighters with flextracked fire tractors, engines and a GeoBoy brushcutter to assist in the suppression efforts. Like the Evans Road Fire, the South 1 Fire was characterized by deeply burning organic soils (peat) with great difficulty in suppressing the fire. It lasted most of the summer as well, pouring out smoke across the landscape along with the Evans Road Fire.

Thirty two other fires occurred in 2008 in NC Refuges, including the Callahan Creek Fire at Alligator River NWR and the Intercoastal waterway fire at Pocosin Lakes NWR, which occurred during peak fire activity periods during the Evans Road and the South 1 Fires. Both fires which had potential to become large project fires were suppressed with assistance from a helicopter contracted by District 1 and stationed at Alligator River NWR. Refuge fire personnel are the first line of defense for Refuge lands in NC, but they also worked closely with interagency cooperators, particularly the North Carolina Division of Forest Resources, to protect both Refuge and other agency jurisdictional lands, particularly around the communities at risk.

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. Helen Czernik experienced her second full year managing the Dispatcher and Fire Program Administrative Assistant position.

Earlier in the year, the emphasis on Rx burning quickly gave way to wildfire preparedness as NC experienced the most severe drought in decades. Dispatch remained prepared by contacting local cooperators to know what equipment and personnel were available for Initial Attack. The Evans Road Fire that started on June 2, 2008 was the beginning of long days, long hours, and an adventure that would unfold many challenging opportunities. The district 1 dispatch ordered resources to assist with the fire that began on private land and spread to USFWS land. Once the Evans Road Fire escalated to a project fire and the ICP was established, the District 1 dispatch center continued to operate as expanded dispatch for the fire. The district dispatch office became a primary source of intelligence to the ICP for local information as well as assisting NCFS administrative personnel in Raleigh, NC with resource ordering. One critical role was the hiring of AD (Casual Firefighters), which the state Incident Management Team were not authorized to hire. Fifty-two casual hires were handled through the district 1 dispatch office. All paperwork for casual hire time and travel was initiated and completed over the course of the next six months through Alligator River Dispatch. In addition to the Evans Road Wildfire, the South 1 Fire at Great Dismal Swamp NWR occurred a week after the start of the Evans Road Fire, and D-1 Dispatch assisted in mobilizing local firefighters to this project fire. Dispatch remained diligent in knowing that due to the large wildfire other ignitions needed to be caught and extinguished quickly. In fact several wildfires were detected, attacked and suppressed during the ongoing Evans Road and South 1 Wildfires. One such fire occurred in the Roanoke Marshes which could have threatened the Manns Harbor Community had it not been quickly contained.

Fire Organization:

New employees: None.

Other Personnel Issues:

2008 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	Helen Czernik

Refuge Positions:

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

Auxiliary Firefighters:

Forestry Tech (GIS)	Brian Van Druten
O&M Engineering Equipment Operator	Bobbie Govan
O&M Maintenance Worker	Jonathan Powers
Wildlife Biologist (Red Wolf)	Ryan Nordsvan

Fire Intern:

Lisa Borel began a fire internship on February 11 and completed it on September 19 when she moved into a 30-day hire firefighter position for the refuge. Borel quickly integrated into the fire crew. Although we were unable to do much burning, Borel was able to pick up quite a bit of experience with prescribed fire details to refuges in South Carolina during the Spring and was here for the Evans Road Fire in the Summer.

John Koltz began his fire internship on September 2, but had to end it early on November 7 because of family obligations. Koltz helped with preparation of fire management plans and with equipment upkeep.

The fire internship program at Alligator River NWR is in its fifth year and has proven highly successful in providing excellent training and experience to a select field of interns, while providing much needed firefighters to the refuges. In the past year, we graduated Brett Idol from the program and obtained Lisa Borel and Jon Koltz. Koltz was the 6th intern at Alligator River NWR. The Alligator River fire internship program is the only one in the Southeastern Region at

this time, but is highly recommended to the other districts across the Region and nation. Not only does this program provide training and experience to personnel interested in making fire a career, but it has greatly enhanced the pool of highly qualified applicants to the vacant Forestry Technician firefighter positions for NC Refuges.

Hazardous Fuels Mitigation:

Approximately 50 prescribed fire burn units had to be updated and approved for burning in 2008 for 8 different refuges. Refuge Managers once again met with fire staff to help establish the year's priorities for prescribed burning. However, during the year, NC Refuges were under moderate to high fire danger conditions during the fall, winter and early spring in 2008. Firefighters around District 1 spent a lot of time staffing under Wildfire Severity conditions for much of this time and therefore had little opportunity for RX burning. They used much of this time to refurbish old firebreaks and cut new firebreaks, including the 7 mile long Evans Road Firebreak at Pocosin Lakes NWR. Eight of the nine NC Refuges had mechanical and chemical treatments to reduce hazardous fuels. A total of 97 projects were completed for a total of 1,832 acres of mechanical and chemical treatments. Part of this included the annual maintenance of 54 miles of firebreaks and 180 miles of roadside firebreak maintenance at Alligator River NWR.



Prescribed Fire Burn Boss Meekins briefing District FMO Crews and District WUIS Van Druten before RX burn at Pea Island NWR. FWS

In 2008, only 1909 acres of Rx burning were completed on all the refuges with only 186 at Alligator River NWR. FY-2008 was the first year that mechanical and chemical treatment acres almost equaled burned acres.

REFUGE NAME	PRESCRIBED BURNS		MECH/CHEM PROJECTS	
	# of TREATMENTS	ACRES	# of TREATMENTS	ACRES
Alligator River	3	186	38	262
Pea Island	4	1059	7	26
Pocosin Lakes	0	0	17	919
Mackay Island	0	0	8	424
Currituck	1	243	3	10
Cedar Island	0	0	13	68
Mattamuskeet	3	421	10	116
Swanquarter	0	0	1	7
TOTAL	11	1909	97	1832

**Total 2008 Hazardous Fuels Projects Accomplished by Refuge
Prescribed Burns at Alligator River/ Pea Island NWRs 2008**

PROJECT NAME	TOTAL ACRES	FIRE NUM
3.1.13 Laurel Bay FY08	12	9263 D194
3.2.14 Twiford Perm Pond	123	9263 D195
3.3.1 Creef Ag Field FY08	51	9263 D425
Total for AR	186	
8.1.4 Pea Island FY08	171	9264 4884
8.1.5 Pea Island FY08	565	9264 4885
8.1.6 Pea Island FY08	192	9264 4886
8.1.7 Pea Island FY08	131	9264 4894
Total for PI	1059	

Mechanical Fuel Projects (9264) at Alligator River NWR FY 2008

PROJECT NAME	COMPLETION DATE	ACRES
Blueberry Rd FY08	10/3/2007	6
Sawyer Lake Rd FY08	10/1/2007	5
Twiford Rd. FY08	10/1/2007	4
Butler Rd FY08	10/2/2007	4
Cedar Rd FY08	10/2/2007	4
Koehring Rd FY08	10/3/2007	7
Canvasback Firebreak FY08-A	10/4/2007	5
East of Borrow Pit Firebreak FY08	10/10/2007	7
Pollock Rd FY08	10/9/2007	3
Widgeon Rd. FY08	10/9/2007	4
Lake Worth South Firebreak FY08	10/10/2007	1
West Point Peter Firebreak FY08	10/12/2007	6
Point Peter Rd FY08	10/19/2007	6
S. Stumpy Point Firebreak FY08	11/1/2007	3
North Navy 3 Firebreak FY08	11/12/2007	5
North Navy 4 Firebreak FY08	11/12/2007	3
North Navy 1 Firebreak FY08	11/16/2007	5
North Navy 2 Firebreak FY08	11/16/2007	3
Quadrangle 3 Firebreak FY08	11/27/2007	5
Quadrangle 2 Firebreak FY08	11/29/2007	5
NCFS Stumpy Point Firebreak FY08	1/14/2008	1
Bay Rd FY08	5/30/2008	4
Bear Rd FY08	5/30/2008	7
Borrow Pit Rd FY08	5/30/2008	4
Eagle Rd FY08	5/30/2008	4
Little Fields Rd FY08	5/30/2008	5
Long Curve Rd FY08	5/30/2008	61
Milltail Rd FY08	5/30/2008	34
Storm Rd FY08	5/30/2008	5
Mashoes Firebreak	9/25/2008	0
Roanoke Marshes Firebreak FY08	8/26/2008	7
North Stumpy Point Firebreak A FY08	8/29/2008	17
Ed Sawyer Firebreak FY08	9/16/2008	10
Canvasback Firebreak FY08-B	9/17/2008	5
Total		255

Chemical Fuel Projects at Alligator River NWR 2008

<u>PROJECT NAME</u>	<u>COMPLETION DATE</u>	<u>ACRES</u>
2.1 Quadrangle Chem FY08	7/31/2008	1
3.2 Twiford Chem FY08	7/31/2008	5
3.3 Creef Chem FY08	7/31/2008	1
Total		7

The backlog of prescribed burn acres at Alligator River NWR at the end of the year totals 35,000 acres. The firebreaks in the Parched Corn Bay Compartment are in need of rehabilitation, but this work remains unfunded for another year. With the use of the new marshmaster II with mower purchased in 2007, along with the GeoBoy brush cutter tractor purchased in 2003, we are now better able to maintain our firebreak system on an annual basis. This eliminates the need for costly firebreak rehabilitation every 3 or 4 years.

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. However the past two years look good compared to funding and target allotment shortfalls during prior years. We are now depending on Aircraft Rental Agreement (ARA) helicopters that are providing the coverage needed during the burn season, though we sometimes have to take a more expensive type helicopter in order to conduct burns. Obviously we did not have this issue due to the burn bans and lack of good burn windows in 2008, but this is a consideration for future years when we are able to get back into normal burning mode. The key to increasing the burning at Alligator River NWR 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.

Fire Management Planning:

FPA:

Fire Management Planning and Fire Program Analysis took a huge amount of time during 2008. WUIS Van Druten was converted to Fire Management Planner for the upcoming two years of planning efforts. Work for the second phase of Fire Program Analysis (FPA) began early in the year with a large push late in the year and into early 2009 in time for the March 2009 deadline. As Technical Team Administrator for the North Carolina Coastal Fire Planning Unit (FPU), WUIS Van Druten is the main contact for the FPU and disseminates information to the other FPU members. The North Carolina Coastal Fire Planning Unit includes all nine refuges in eastern NC, Cape Hatteras and Cape Lookout National Seashores, and the Croatan National Forest.

WUIS Van Druten and Forestry Technician Brian Van Druten attended a LANDFIRE fuels calibration workshop on February 7 and 8. LANDFIRE is a national vegetation map that is being used as a base data layer in FPA and many other national programs. The data has many errors for our area that we will be allowed to help correct over the next couple of years. At February's meeting, we were able to successfully work with the LANDFIRE representatives to correct several inaccurate classifications of fuel models on refuges in NC. This is very important because the fuel models are used to establish fire behavior in the wildfire simulations that are part of the FPA computer modeling.

In March, the FPU held a meeting in Washington, NC for line officers and fire management staff so everyone could meet and to acquaint folks with the current module, FPU charter, trainings, and timelines. The NC Coastal FPU is one of the Early Adopter FPUs that will be first to work on the new FPA computer program. From Spring until July, WUIS Van Druten submitted information on fuel treatments and worked on correcting fire location data in FMIS. Beginning in July, WUIS Van Druten began to participate in weekly live meetings for early adopters and to coordinate with FPU members to provide feedback on the program. The FPU met again in September to review validation runs and discussed development of fuel and preparedness options in the computer program.

Fire Management Plans (FMP):

At the end of 2008, a new Pocosin Lakes NWR Fire Management Plan was in the Regional Office for signatures and the Alligator River and Pea Island NWRs Fire Management Plan was in the Regional Office for review. The current FMPs for these refuges were beyond their five year revision dates and also needed to be converted into an Interagency FMP format. Throughout the year, WUIS Van Druten coordinated the planning efforts between refuge and District fire staff for both plans. WUIS Van Druten primarily assisted Pocosin Lakes NWR FMO Carver and RB Wendy Stanton with edits and formatting of the plan and in the preparation and public review of the Environmental Assessment. WB Dennis Stewart reviewed the Alligator River and Pea Island NWR FMP and assisted WUIS Van Druten with the development of its Environmental Assessment.

A contractor converted the Mattamuskeet NWR Complex Fire Management Plan (which includes Swanquarter and Cedar Island NWRs) into the new interagency format, but very few updates have been made to the plan. WUIS Van Druten did meet with Mattamuskeet refuge management in November to discuss objectives, but the plan's revision will not be complete until 2009.

Local Fire Related Training:

Locally offered training included Annual Firefighter Refresher, Marshmaster Training, and Plastic Sphere Dispenser Operation (PSDO) training. Firefighters also attended S-212 Chainsaw training sponsored by the NPS at Fort Raleigh.

Wildland Urban Interface (WUI):

Every year the District has special WUI projects funded by the region that are in addition to regular project funding. Two such projects were funded during FY 2008. An 88 acre firebreak at Pocosin Lakes NWR will be cut in 2009 to aid in the protection of the Waterway Landing subdivision adjacent to the refuge and isolated along the Intracoastal Waterway. The second project was for a 3.4 acre firebreak to be cut along the Alligator River NWR boundary and private property near the Mashoes community. Work on the Mashoes Firebreak was started in November, but by late December the contractor was struggling after only completing 1 acre.

Rural Fire Assistance (RFA):

Two of six volunteer fire departments that applied for Rural Fire Assistance Funding received grants in 2008 for a total of \$24,210. Ponzer VFD and Roper VFD are both new cooperators for Pocosin Lakes NWR and proved to be good cooperators during the Evans Road Fire.

Cooperative Relations:

The development of the NC Interagency fire management agreement titled “Master Cooperative Wildland Fire Management and Stafford Act Response Agreement” between the BIA, USFWS, NPS, USFS and NC Division of Forest Resources was a high priority during the early months of 2008. The Master Agreement was complete and awaiting the final signatures when the Evans Road Fire broke which left FWS and NCDNR without an agreement or an Annual Operating Plan during the time we needed it most. This plan was quickly executed within the first half of June with the large fire ongoing.

The Evans Road Fire put the cooperative relations with NCDNR to the test, and it appeared during the fire reviews that relationships not only held up under the strain of this six month long siege, but both agencies came out of the ordeal with a better understanding and appreciation for one another.

During November, District fire staff began revising its Memoranda of Understanding for fire management operations with Seymour Johnson Air Force Base regarding the Dare County Bombing Range and Alligator River NWR, and the Cherry Point Marine Corps Air Station regarding Cedar Island NWR.

WUIS Van Druten attended the Second Annual North Carolina Prescribed Fire Council Meeting on January 16. WUIS Van Druten serves as Chair of the Education and Outreach Subcommittee which had a break out session during the meeting. The Council also gave out a Prescribed Burner of the Year Award to WUIS Van Druten for her work with the Subcommittee.

As part of the Dare County Firewise Council, WUIS Van Druten gave a presentation to the Flowers Ridge Homeowner Association in Buxton, NC on January 19. The area is interested in becoming a Firewise Community.

The Dare County Firewise Council had a meeting on January 23 with special guest Fletcher Willey, an independent insurance agent. The program discussed the role of insurance and Firewise, especially monetary savings versus intangible savings like time, heirlooms, emotional costs, and inconvenience.

The Dare County Firewise Council held a meeting on March 17 to discuss changes and improvements to the website.

Other:

- Refuge hosted a retirement party for NPS Pilot/Park Ranger Bob Trick on March 27 after fourteen years of Bob flying for the refuges in eastern North Carolina. Bob assisted in a wide variety of aerial missions including red wolf telemetry flights, fire aerial detection, prescribed burning, wildfire suppression, and pine park beetle surveys to name just a few. He was an excellent pilot that will be greatly missed. Cape Hatteras National Seashore has hired another pilot, so the refuges will be able to continue to utilize the NPS aircraft for various missions.



Deputy Refuge Manager Scott Lanier (left) presents Fire Control Officer Donnie Harris (right) with a Regional Star Award for his work with development of the new Equipment Operator Proficiency Taskbooks. CW

10. Pest Control

Phragmites

Phragmites, *Phragmites australis*, continues to be a problem on Alligator River NWR. An effort was put forth to spray Phragmites on Alligator River NWR's farm fields in 2008. A total of 5.7 acres were treated by ground application with glyphosate (Aquaneat), mostly from an ATV. Results were excellent. Aerial application was delayed in 2008 due to the effects of Tropical Storm Hanna (see below). This work will continue in 2009.

FWB Van Druten successfully applied for a Pulling Together Initiative grant through the National Fish and Wildlife Foundation to treat phragmites on federal, state, and private lands in northeastern North Carolina and southeastern Virginia. This grant pulls together 7 National Wildlife Refuges, 1 National Seashore, 1 State Park, 1 State DOT, 1 Electric Cooperative, 1 City Government, and various private landholders. Work on the Virginia portions of the grant was completed in 2008. Tropical Storm Hanna passed through eastern North Carolina on September 6, 2008 bringing winds of 40-60 mph with some higher gusts. These strong winds gave severe wind shake to our Phragmites. This severe wind shake created a rapid senescence of the *Phragmites* which was evident by September 10, 2008. We have seen similar effects post – tropical systems in eastern North Carolina in the past. This work will be continued in 2009.

Alligator Weed

Alligator weed, *Alternanthera philoxeroides*, 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 in these waterways. Reports have been coming in from local paddling enthusiasts about alligator weed appearing in area waterways for four years. Alligatorweed was not treated on the refuge this year due to equipment failure and staff being tied up on the Evans Road Wildfire.

Southern Pine Beetle

Trapping of southern pine beetles was done at 3 locations on the Refuge from April through early 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 3.1 pine beetles per trap per day compared to 6.1 clerids (natural pine beetle predator). This correlated to a predicted static/low Southern Pine Beetle problem for 2008. No survey flights were conducted by the refuge in 2008 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 the black bear. Also, the refuge harbors many species adapted to living in forested habitat as opposed to disturbed areas such as field edges. The refuge also provides habitat for the endangered red-cockaded woodpecker and migrating bald eagle and peregrine falcon. Alligator River NWR is at or near the northern limit of ranges for several vertebrate species, most notably, the American alligator.

2. Endangered and/or Threatened Species

Three 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. The bald eagle was de-listed in 2007.

a. Federally Listed Endangered and Threatened Species

American alligator (TSA): American alligators reach the northern extent of their range on the refuge and probably were never very numerous in the area. Although delisted, the alligator remains classified as threatened by similarity of appearance in North Carolina. The highest density alligator population is consistently found on Whipping Creek Lake. A few have been seen each year in the marshes, ponds, streams, and canals. Sightings of alligators throughout open areas of the refuge seem to be increasing. Alligator surveys were not conducted in 2008 due to insufficient funding and staffing.

Red-cockaded woodpecker (Endangered): Prior to Hurricane Isabel, trails were cut to previously marked 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 after Hurricane Isabel. 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. This will take special funding and additional staff. Due to the funding and staffing situation in 2008, no RCW work was done this year. A request to fund aerial surveys was submitted but funding was not provided.

Red wolf (Endangered):

Red Wolf Wild Population

The Red Wolf Recovery Program of the U.S. Fish and Wildlife Service, located in northeastern North Carolina, manages the world's only wild red wolf (*Canis rufus*) population. Fiscal Year 2008 represents the 21st consecutive year of successful management. By spring 2008, the wild population had produced over 450 wild pups, with 31 pups born in the wild in 2007. Figures for 2008 are not available at this writing since pup season is in April and May, annually. The wild population of red wolves is currently composed of more than 100 wolves comprising nearly 18-22 packs distributed across 1.7 million acres in five North Carolina counties: Dare, Tyrrell, Hyde, Beaufort and Washington. Population monitoring is done in a number of ways: trapping, scat sampling and tracking using ground and aerial telemetry.



April and May are pup season, when Red Wolf Recovery Program wildlife biologists spend many hours in the field, seven days a week, looking for hidden dens over the five counties of Dare, Tyrrell, Hyde, Washington and Beaufort. RN

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

restoration. Reviews by the Recovery Implementation Team show the Plan is effective in restoring the wild red wolf population and managing competitors (eastern coyotes). Since 1999, 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 the 5-county restoration area: Overall, the Red Wolf Adaptive Management Plan 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 40 captive facilities across the United States. The effort is overseen by the Red Wolf Recovery Program Team Leader, Bud Fazio, located at Alligator River NWR, and is coordinated daily by the Red Wolf Species Survival Plan Coordinator, Will Waddell, at the Point Defiance Zoo and Aquarium in Tacoma, Washington. As of December, 2008, the current total number of wolves in the captive population is 204 (this number changes frequently). Red wolves are held in captivity for a number of reasons including cooperative breeding, reproduction research and conservation genetics work. The breeding program maintains genetic diversity among red wolves and prepares a small number of red wolves for possible release into the wild.

Red Wolf Island Programs

The Red Wolf Recovery Program and Red Wolf Captive Breeding Program partner with two US Fish and Wildlife Service National Wildlife Refuges to raise red wolves in wild settings on islands. Young wolves growing up on these islands learn survival skills that prepare them for release into the wild red wolf population in northeastern North Carolina. The St. Vincent National Wildlife Refuge in Florida maintains a pair of red wolves for breeding in the wild. 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. & PhD)

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 PhD 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, important research on captive red wolves is conducted annually. 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.



A Captured Red Wolf models one of the telemetry collars used to track them.

FWS

Howling Safaris 2008

Approximately 1,000 participants

17 Programs (3 were cancelled due to weather)

Red wolf howlings have proven to be very popular programs on the Refuge. Because of overwhelming demand for howlings, a reservation system was instituted in 2003. The program continued to be free of charge through 2006. The Red Wolf Coalition is responsible for registrations and limits the capacity to 100 people per safari, however, the volume could easily have exceeded that number. Because of increasing registration requests, a \$5.00 administration fee was instituted in 2007. This nominal charge has not affect the number of participants.

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 2008, these presentations reached over 16,000 people through off-site programs. The eight-member red wolf staff participates in red wolf outreach and education as their schedules permit.

The “Far Traveler” teacher curriculum celebrated its 11th year in circulation and, with the original author’s assistance, was revised in 2007. Teacher workshops continued for 2008. Educators can select “Far Traveler” workshops to fulfill one of the requirements for North Carolina Environmental Education Certification. Also, 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. Discovery Boxes traveled to 15 different educational facilities in 2008 (including home schools), reaching approximately 1,500 students and adults.

Red Wolf Coalition

The Red Wolf Recovery Program continues to work closely with the Red Wolf Coalition (RWC), 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, California, Ohio and Washington DC. This non-profit organization co-sponsors howling safaris with the US Fish & Wildlife Service and participates in outreach events throughout the year. Kim Wheeler has been the Executive Director, with an office in Columbia, for 4 years.

Outreach Activities

A red wolf pelt and eastern coyote pelt were added to outreach educational materials, as well as a coyote skull replica. Other inventory items were replaced as well such as the howling CDs, “Recovering a Species” DVDs, red wolf activity tear sheets and the brochure is in its final draft stages.

A new education strategy is also in the draft stage and will be a partnership effort with the Red Wolf Coalition. Another partnership effort resulted in the printing and mailing of over 300 red wolf postcards to regional landowners, trappers, outfitters and hunters. Thanks to a grant from the Region 4 FWS office, additional postcards are available as event handouts.

The Red Wolf Recovery Program and the Red Wolf Coalition participated in the first annual Youth Scavenger Hunt at the Dixie Deer Classic, in Raleigh, NC. Over 100 students visited the red wolf booth at the fairgrounds and asked red wolf questions before moving on to the next station.

As a result of a caretaker report on the Red Wolf Recovery Program web site, a radio station was interested in interviewing the author of the article. Public Radio East did a live interview with Adele Douglass, the first caretaker to participate in a radio talk show.

Red Wolf Education and Health Care Facility

The facility contractor completed the building in February, 2007, and keys were exchanged for the Red Wolf Education and Health Care Facility, located in Columbia, NC, on Pocosin Lakes NWR. The facility has provided red wolf processing space for wildlife biologists. Eventually, red wolf enclosures are planned behind the building site. The Red Wolf Coalition is seeking grant funding to support the construction of red wolf enclosures. When staff is available, education programs will take place at the facility as well as providing tours for visitors by appointment.

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 Alligator River NWR because of its 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 Table **G-3-1** below. Tundra swan, pintails, and green-winged teal use accounted for over 85% of the total waterfowl use and are certainly the most common species found on the refuge during the wintering period. 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. Interestingly, a small flock (ranging from 11 – 30 individuals) of white-fronted geese were observed consistently throughout the 2007-2008 season in the farm units. Large numbers of wood ducks can be observed on the refuge, but they 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. There appears to be a slight decrease in usage of the refuge from 2006-2007 by most waterfowl, with the exception of tundra swan, wood ducks, green-wing teal, shovelers, mergansers and gadwall. Figures **G-3-1** and **G-3-2** illustrate seasonal shifts in numbers for each species.

Table **G-3-1**: Composition of wintering waterfowl at Alligator River NWR during the 2007-2008 survey period in Dare and Hyde Counties, North Carolina.

SPECIES	PEAK PERIOD	<i>SURVEY</i> PEAK #	# USE DAYS 2007-08	% TOTAL USE DAYS 2007-08	USEDAYS % diff from 2006-07 avg	USEDAYS % diff from long-term avg
Tundra Swan	Jan	6718	436566	25.7	304	471
Snow goose	N/A	0	0	0	0	-100
Canada goose	Jan	58	616	0	-69	-2
Mallard	Nov	285	18808	1.1	-49	-55
Black duck	Feb	248	13520	0.8	-37	-33
Gadwall	Jan	499	24142	1.4	43	135
Wigeon	Feb	809	18008	1.1	-8	42
Pintail	Jan	16612	744225	43.8	-12	160
GWT	Jan	12849	391309	23.0	55	100
BWT	Nov	7	118	0	-91	-82
Shoveler	Feb	228	10510	0.6	81	223
Wood duck	Dec	219	11494	0.7	275	-23
Ringneck	Jan	462	12101	0.7	-64	-76
Redhead	N/A	0	0	0.0	0	-100
Canvasback	N/A	0	0	0.0	0	-100
Scaup	Nov	2	14	0.0	-64	-88
Unknown	Feb	35	522	0.0	-81	-97
Bufflehead	Dec	4	39	0.0	-41	-57
Ruddy	N/A	0	0	0.0	-100	-100
Merganser	Dec	32	1093	0.1	57	529
Coot	Feb	265	14581	0.9	-61	70

It is not unusual for waterfowl to peak in early to mid-December, drop to relatively low numbers and then peak at a lower level from mid to late January. Dispersal to other suitable, natural or well managed habitat within the wintering area is the most logical explanation for such observations.

In order to assess the quantity and quality of moist soil plants for waterfowl during the 2007-2008 wintering period it is necessary to examine vegetation data from the fall of 2007. Vegetation transects were not done in moist soil units since all were planted in small grain crops in preparation for the 2007-2008 wintering waterfowl. With regards to moist soil management, 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 or by positioning portable pumps to targeted units. 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. Filter strips of some dimension are important, even in moist soil units, for good farming practices to protect water quality and for wildlife habitat, especially grassland birds. These grasslands become important marsh bird habitat as moist soil units or, in some cases, farm fields are flooded in the fall.

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, less than 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. However, marsh and shore bird numbers are relatively low resulting in data analysis that is not

very meaningful.

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. 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. No nests were confirmed during 2008. 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. Data collection continued throughout 2008. Results so far show the Northern harrier, turkey vulture and red-tailed hawk are the most common raptors. There was a notable increase in bald eagle numbers and a notable decrease in peregrine falcons. Late summer months are not very productive for data collection due to low raptor numbers. Table *G-6-1* presents the 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 2009 and an effort will be made to establish a more systematic sampling regime over the farm unit.

Table *G-6-1*: Summary of raptor data collected from farm units at Alligator River NWR during 2008. 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 for the entire farm unit.

Species	#	%	N_{\max}	Peak date
Bald eagle	54	9.0	14	1/11/2008
Sharp-shinned hawk	6	1.0	3	12/8/2008
Northern harrier	128	21.3	28	1/11/2008
Red-tailed hawk	82	13.6	13	2/27/2008
Red-shouldered hawk	2	0.3	1	3/21/2008
Rough-legged hawk	0	0.0	0	N/A
Broad-winged hawk	0	0.0	0	N/A
American kestrel	41	6.8	9	12/2/2008
Merlin	4	0.7	1	1/11/2008
Peregrine falcon	3	0.5	3	10/10/2008
Black vulture	1	0.2	1	12/2/2008
Turkey vulture	266	44.2	45	2/14/2008
Osprey	1	0.2	1	4/2/2008
Unknown raptor	14	2.3	3	10/22/2008

7. Other Migratory Birds

The refuge is host for migratory species such as the mourning dove and American woodcock. Several species of rails are found in the moist soil units when they are managed to maintain moist soil vegetated habitat, 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.

Other game mammals on the refuge include the gray squirrel, cottontail rabbit, and marsh rabbit. Although the black bear is abundant on the refuge, there is not a hunting season for the bear on the refuge at this time.

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 totaling over 30 birds. Other turkeys were observed over much of the refuge, even along roads transecting pocosin habitat. Turkey numbers appear to have leveled out at these numbers since the restoration project began in 1999 with the release of 16 birds.

15. Animal Control

Beaver numbers have leveled out after a series of population management efforts. Removing dams from culverts and canals is an occasional maintenance issue. Beaver population management practices 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 Paddling Trail system has been especially popular.

Total visits to the Refuge in 2008 were estimated to be 36,000. Administrative offices for the Refuge remain in the General Services Administration (GSA) leased office space in Manteo. A few visitors continue to locate the office, but most information is disseminated through web pages, telephone, correspondence, or the news media. During 2008, the Refuge continued to focus on providing a greater number of media contacts while keeping the messages short and simple.

Bear-proof trash receptacles were installed at Creef Cut and Sandy Ridge Trails.



Donation box (center) and bear-proof trash receptacle (middle right) installed at Alligator River NWR during 2008. FWS

2. Outdoor Classrooms – Students

Creef Cut Wildlife Trail and Sandy Ridge Wildlife Trail are used frequently by groups of students on the way to and from the Outer Banks from inland areas. Both trails are safe and accessible places where children can stretch their legs, work off some energy from a long bus ride, and learn something in the process. Some of these groups contact the refuge to request a leader to work with their groups. As staff time allows, and as volunteers are available, these requests are usually met. A growing number of schools are also making the Refuge their ultimate

destination, and are requesting a variety of programs.

3. Outdoor Classrooms – Teachers

“Far Traveler” teacher workshops are held semi-annually by the Red Wolf Recovery Program and focus on grades K-8. 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. New to the Discovery Boxes are a coyote pelt and skull, a “Far Traveler” teacher curriculum, literature packet and a laminated map of the recovery area.

4. Interpretive Foot Trails

Sandy Ridge Wildlife Trail, Milltail Overlook and Creef Cut Wildlife Trail continue to be used by individuals and groups. Interpretive signs allow visitors an opportunity to learn about the various plants and wildlife in the area.

Though not a foot trail, the Milltail Creek Paddling Trail System continues to be quite popular. On most days, there are several groups using the trail. If there were a local place to rent canoes or kayaks, use would increase dramatically. Three local businesses were issued special use permits (SUP) to conduct guided canoe or kayak tours on the Milltail Creek Paddling Trail System during 2008. Approximately 11,000 visitors participated in guided tours provided by the holders of these SUP's.

Approximately 3,500 people used Alligator River NWR walking trails during 2008.

5. Interpretive Tour Routes

Approximately 20,000 visitors used the paddling trails (including business-led tours), and 2,000 used the Wildlife Drive.

6. Interpretive Exhibit/Demonstrations

Refuge staff staffed displays and exhibits at various annual events around Dare County and eastern North Carolina. Interpretive Specialists, the fire program educator, and staff from the Red Wolf Program were able to participate in conservation-themed festivals including the Museum of the Albemarle’s Student Day on the River (1000), Fun, Safety and Education Day in Elizabeth City (3,000), and the Manteo and Stumpy Point Christmas parades.



Alligator River NWR Takes First Place in Manteo Christmas Parade with Fire Safety Message
TCT

The Creef 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.

Regularly scheduled interpretive/educational programs for the Refuge during 2008 are shown in Table **H-6-1**. Fall, summer, and spring guided canoe tours were scheduled for a \$35 fee.

In the summer, weekly black bear, Red Wolf telemetry (a new program) and Red Wolf howling programs were offered at Alligator River. Red wolf howlings have proven to be very popular programs on the Refuge. Because of overwhelming demand for howlings, a reservations system was instituted in 2003.

Table **H-6-1**. Alligator River NWR Public Use Programs

Program	#Participants
General Canoe	383
Bear Necessities	138
Wolf Telemetry	10
Red Wolf Howlings	1000

7. Other Interpretive Programs

The Junior Friends of the Refuge club program was expanded in 2008. (See Pea Island NWR ANR for additional information.) The refuge was the recipient of a regional technology grant which enabled the purchase of ten Nikon digital cameras and accessories.

The Red Wolf Recovery Program is contacted by a number of organizations, clubs and schools annually to give Red wolf presentations. During 2008, these presentations reached over 16,000 people through off-site programs.

The Refuge sponsored the twelfth annual Wings Over Water Wildlife Festival in 2008.

8. Hunting

Estimated public hunting activity appears below:

<u>Activity</u>	<u>Visits</u>
Waterfowl	400
Big	1487
Upland Game	200

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

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

9. Fishing

The heaviest recreational fishing effort in the vicinity 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 2008, there were an estimated 2,000 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 2008 trapping season, no special use permits were issued for Refuge trapping.

11. Wildlife Observation

Canoeists enjoyed paddling on Milltail Creek and Whipping Creek and observing an occasional alligator, wood duck brood, or other 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.

Refuge staff and volunteers participated in the 2008 Big Sit in October.



74 Species were spotted during the 2008 Big Sit at Pea Island and 32 at Alligator River.
FWS

The following figures represent wildlife/wild lands observations during 2008:

<u>Activity</u>	<u>Visits</u>
Foot	3,500
Vehicle	2,000
Boat	20,000



During 2008, 383 people participated in FWS guided Canoe Tours on Alligator River NWR.
FWS

17. Law Enforcement

The 2008 year saw the Refuge Law Enforcement Officer position vacant until the end of November. Refuge Officers Chris Smith of Lake Matamuskeet NWR and Frank Simms of Pocosin Lakes NWR provided coverage when possible. The main highlights are two trespassing violation notices and one public nudity violation notice issued on Pea Island NWR. Two fishing without state fishing license violation notices were issued on Alligator River NWR, as well as an enhanced patrol of the Swan Lake Road closure during the opening day of the state bear hunting season by Refuge Officers Chris Smith, Frank Simms, Howard Phillips and the newly hired Jay Eddy.

Refuge Officer Eddy transferred from Region 1, the Willapa National Wildlife Refuge Complex in coastal Washington -- including the Lewis and Clark National Wildlife Refuge in the Columbia River in Oregon and the Julia Butler Hansen National Wildlife Refuge in Washington. Refuge Officer Eddy was there for two years, and for four years before being hired by the Fish and Wildlife Service he was a Florida Fish and Wildlife Conservation Commission Law Enforcement Officer.

- Lack of further information for 2008 is due to previous Law Enforcement Officer Frank Simms' computer breaking – causing him to lose all of his case files.

18. Cooperating Associations

Coastal Wildlife Refuge Society

The Coastal Wildlife Refuge Society (CWRS) is the primary cooperating association and friends group for both Alligator River and Pea Island National Wildlife Refuges. The Society also provides guidance and support for other refuges in North Carolina and serves as a mentoring organization for the fledgling friends groups at Mackay Island and Pocosin Lakes.

Primary sources of income for CWRS are refuge canoe tours (both refuges) and the book store/gift shop at the Pea Island Visitor Center. For more information about income via retail sales, see Section H-18 in the Pea Island NWR ANR.

The Coastal Wildlife Refuge Society was extremely active during 2008- possibly having its most successful year to date. The new Board established a set of goals for 2008 which included organizing membership, directing funds and energy toward K-12 education and involvement on refuges, and supporting the refuge's plan to upgrade the Pea Island Visitor Center (See section I-1 in the Pea Island NWR ANR for more information). At year's end, giant strides had been made in each area.

Stanley Oliver championed the organization of the CWRS membership. The Society contracted with WordTech, Inc to formulate and test a new database with all the old files. A letter was written and mailed, plus emails were sent to addresses for which there were email addresses.

Bucket Taylor coordinated a new and exciting website for the organization (www.coastalwildliferefuge.org). A paypal account was set up through it which people could use to donate funds and/or join online.

Building on the success of the Junior Friends Group at First Flight Middle School, Junior Friends groups were formed at Columbia, Manteo, and Cape Hatteras Middle Schools.

In addition, the Society funded three special projects at Cape Hatteras Secondary School whereby students would take 26 field trips to the refuge, purchase motion-activated cameras with which to conduct wildlife surveys, produce guidebooks for refuge wildlife, bring lower grades to the refuge, etc.

Paula and Stanley Oliver attended the 2008 National Friends Conference in as representatives of CWRS. They also set up and manned a booth showing the Jr. Friends work at CHSS at the conference.

The refuges and CWRS continued to play a major leadership role in the annual Wings Over Water Wildlife Festival which occurred November 4-9, 2008. A total of 237 people registered for a total of 897 trips. Registration income totaled \$19,511.00. Severe thunderstorms during the first 2 days of the event resulted in a number of canceled trips and refunds, which were included in the above figures.

During 2008, CWRS received a total of \$12,379 in donations, \$19,074 in Wings Over Water Registration fees, \$14,671 in canoe fees, and \$125,940 in gross sales. There were \$79,753 in sales expenses, and the Society contributed \$52,104 to the refuge.



Renowned birder and author Pete Dunne taught a workshop during Wings Over Water on the art of Pishing – attracting different bird species by imitating their calls. FWS

I. EQUIPMENT AND FACILITIES

1. New Construction

- Completed construction of an earthen pad at the southeast corner of South Twiford Management Unit A. Construction provides staff access for mobilization, maintenance and fueling of portable pumps used for impoundment water management of the ninety acre unit. Using excavated material from the existing canal, the pad was elevated 4ft. above the previous field level.

2. Rehabilitation

- Nineteen (19) refuge roads, totaling 41.3 miles were rehabilitated by the Federal Highway Administration with ERFO funds. Rehabilitation was necessitated by hurricane and other storm events of recent years. Total cost for all road repair components equaled \$6,580,536.42.
- Continued efforts as needed to remove downed trees from Refuge Roads. Falling trees continue to be residual effects of previous hurricane and other wind events. Roads that had downed trees removed this year included: Hook, Long Curve and Osprey, Laurel Bay, Possum, Koehring, Alligator, and Whipping Creek. Clearing canal access to several popular public use waterways (Whipping Creek, Swan Lake and Laurel Bay Lake) remains to be fully completed.

3. Major Maintenance

Deferred Maintenance Projects:

- Completed SAMMS Deferred Maintenance project # 98102755 (rehabilitate primary canal system). Accumulated storm debris from several years of storm events had plugged the canals, restricting water flow and flooding areas, including portions of the East Lake community. Approximately 40 miles of refuge road canals were cleaned out.
- Completed SAMMS Deferred Maintenance project # 98102788 (rehabilitate refuge gate system). Approximately 15 pipe gates were rehabbed or constructed to provide more adequate access security to the refuge farm fields and several roads outside the farm units.
- Completed SAMMS Deferred Maintenance project # 98102788 (rehabilitate Creef Cut Trail). The existing boardwalk was modified and extended in length.
- Completed SAMMS Deferred Maintenance project # 98102788 (rehabilitate Milltail Creek Boat launch area). The existing boat launch was widened and a floating dock with aluminum walkway was installed.

Other Major Maintenance included:

- Repairs or service to a cumulative total of forty six (46) over the road vehicles and seventy three (73) pieces of equipment including: light and heavy duty mobile equipment, outboard motors, boats, mowers, ATV's, etc.
- Ongoing road maintenance:

1. Stockpiling of fill material for road repairs.
 2. Grading a cumulative total of two hundred ninety four (294) miles of refuge roadway.
 3. Hauling and spreading fill material on several refuge roads. Materials were also hauled and spread on dikes used for vehicular access around the four North Twiford Management Units.
 4. Mowing and / or boomaxing canal banks & road shoulders along: Bear, Blueberry, Bobcat, Borrow Pit, Brier Hall, Butler, Cedar, Creef, Deep Bay, Dry Ridge North, Gadwall, Grassy Patch, Grouse, H&B, Hook, Koehring, Laurel Bay, Link, Long Curve, Milltail, Peterson, Pollock, Possum, Pump, River, Sandy Ridge, Sassafras, Sawyer Lake, West Widgeon and Wynn Roads.
 5. Sixteen (16) logging mats were purchased & installed on Milltail Road for emergency road repairs during ERFO graveling
- Water management efforts included ongoing pumping of farm / management units to facilitate cooperative farming operations and meet other management objectives. Water management / pumping of the refuge management units is divided between two pumpstations. The Creef pumpstation pumps all farm fields, impoundments, wooded blocks and filter strips (inside the outer perimeter dikes) of the Creef Management Unit (east of Milltail Road), including the Dare County fields, for a total of **3,872** acres. The Laurel Bay pumpstation pumps all farm fields, impoundments, wooded blocks and filter strips (inside the outer perimeter dikes) of the Laurel Bay and Twiford Management Units (west of Milltail Road) for a total of **3,497** acres. Each of the two pumpstations are equipped with two 48” right angle gear driven pumps. CAT diesel engines provide the power to the pumps. In 2008, at the Creef pump station, Engine 1 ran 484 hours and Engine 2 ran 671 hours, totaling 1,155 hours. At the Laurel Bay pump station, Engine 1 ran 912 hours. Engine 2 ran 152 hours, for a combined total of 1,064 hrs. **2008 was an extremely dry year.**
 - Successful winter water levels in all thirteen (13) Alligator River NWR farm field impoundments was achieved with pumping and gravity flow / use of stop log structures.
 - Beaver dams in canals along refuge roads continue to be a problem. Clean out of the canals and culverts requires mobilization of an excavator each time.
 - Ongoing cleaning of debris from farm field water control structures and culverts is required to allow sufficient drainage and water control.
 - The twin flashboard WCS at intersection of Buffalo & Sawyer Lake Roads was coffer damned and dewatered to replace leaking boards in the structure. New tongue & groove boards were installed to provide for more efficient water control functions.
 - Dewatering of all AR impoundments was completed in preparation for spring cooperative farming operations.
 - Additional mowing and / or boomaxing was done on various field / impoundment V-ditches and field portions of corn & grasses left in impoundments for migratory bird and upland game use.

4. Equipment Utilization and Replacement

Fire Equipment:

New Equipment: A new IA Dozer (Catapillar D6K) was funded in 2007 and purchased. It was delivered in 2008. FCO Harris assisted Mackay Island NWR in ordering a new wildland fire engine from RKO Industries. This engine was delivered in 2008.

IA Taskforce: Alligator River NWR has the capability of fielding two flextracked fire tractors, a portable bridge and heavy dozer with which to set the bridge and one type 6 fire engine for Initial Action Response. A second engine can be put into service within minutes following a call-out.

Support Equipment: For prescribed burning and wildland fire support, we can field one marshmaster, one full-tracked fire tractor (Off-road tracked engine with terratorch), and numerous boats, however we do not have adequate staffing to field these support vehicles at the same time as the IA taskforce.

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 Drueten was assigned the task of IT point of contact for the station.

Time was spent in 2008 keeping Lotus Notes running on all the computers. Between new users, computer crashes, and lost/out of date passwords, this was done approximately 10 times in 2008. Various technical support was given to all program areas including: reinstalling operating systems, correcting password problems, keeping printers working, getting computers added to the network, installing software, keeping staff's Lotus Notes functioning, updating anti-virus software, dealing with computer crashes due to viruses, setting up new computers for users, and installing hardware.

In June of 2005, 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. In 2008 we also ran into capacity issues with the Manteo Office server. An 80 GB external hard drive was added but there still are issues due to the number of people backing up to this server. There was a larger external hard drive added in 2008.

The Skycasters satellite internet service at the Maintenance Facility has been plagued over capacity issues since 2007. They have been 'throttling' our usage (reducing speed) because we go over our monthly download limit. The cause of this appears to be heavier internet use for databases such as SAMMS. Cisco Systems was consulted in late 2008 and hopefully this can be solved in 2009.

8. Other

- Assisted with all relevant fire related activities, including prescribed burning efforts at Alligator River, Pea Island, Pocosin Lakes, Mackay Island and Cedar Island refuges.
- Completed all required (SAMMS, RONS, RCAR, RPI, OGM, Fleet Management, Capitalized Property, etc.) database input requests.
- Maintenance staff coordinated exchanges of equipment (& personnel as needed) with Mattamuskeet, Pocosin Lakes, Roanoke River, Mackay Island, Pee Dee Refuges, Navy Dare Bombing Range (DOD) and Cape Hatteras National Seashore (NPS).
- Participated in a series of Federal Highway Administration road assessments and planning processes.
- Staff and volunteers made appropriate preparations for hurricane season.
- Cleaned up around all facilities in preparation for and participated Regional Environmental & Safety audit.
- Began cleanup of Twiford boneyard in conjunction with Regional / GSA sale of excess equipment. Monies received (by the Region) from sale of excess equipment at Alligator River has exceeded 75K to date.
- Stockpiled road fill material in pit.
- Completed rehab / expansion of upper Milltail boat launch / parking area.
- Assisted with installation of floating dock at upper Milltail boat launch area.
- Completed canal storm debris project - approximately 27 linear miles of roadside canals.

J. OTHER ITEMS

1. Cooperative Programs

Black Bear Study

A proposal was submitted in December 2006 to the NC Department of Transportation for conducting research on the black bear and red wolf relative to the pending upgrade of US Highway 64 from a 2-lane system to a 4-lane system. The basic purpose of this study is to collect baseline data on populations and habitat use before project construction, provide database for incorporation of design features into the project design in the early planning phases, and monitor impacts to wildlife during and after construction. Because of the early stage of planning for this project, most of the activity for the upcoming year will be attending planning meetings. Other than attending Merger Team meetings during 2007 and meetings regarding the research proposal, little else was done on this project. Coordination continued through much of 2008 and contracts were awarded to Dr. Mike Vaughan of Virginia Tech and Dr. Reed Noss of the University of Central Florida in the latter half of the year. Dr. Vaughan is responsible for research on the refuge and for red wolf research on and off the refuge. Dr. Noss is responsible for research on the west side of Alligator River except for the red wolf.

The Refuge Biologist frequently coordinates with the North Carolina Wildlife Resources Commission (NCWRC) on various projects. For example we assist with collecting data from road-killed black bears and providing the data to the appropriate NCWRC staff person. Also, we coordinate waterfowl surveys.

Climate Change

Considerable time was expended on meetings and coordination with other government agencies, universities, and non-government conservation organizations planning for adaptive management on the refuge in the face of climate change manifested in rising sea level. While the rate of inundation due to rising sea level may be a constant, the rate of habitat change on the refuge appears to be faster than in other areas. This may be due to the interaction of higher salinity water and peat soils. By working with partners, the refuge is hoping to adaptively manage habitat under a strategic plan as sea level rises.

The Nature Conservancy received a substantial donation to fund the Alligator River NWR Point Peter Road Climate Change Project. A Steering Committee was formed for oversight. This project consists of constructing oyster reefs nearshore to abate shoreline erosion, installing water control structures with flapgates in the Point Peter Road Canal to slow the intrusion of salt water into interior portions of the refuge, plant tree species with a higher resistance to salinity to build resilience into the forested wetland systems, control invasive plants, and monitoring the effectiveness of all components.

Coordination and planning for placing a carbon flux tower in a swamp forest on the refuge by researchers from NC State University was initiated. Instruments attached on and adjacent to the tower will monitor the carbon flux from below the soil surface to above the tree canopy. The project is considered to be a long-term (at least 10 years) research project.

4. Credits

This Annual Narrative Report was a joint effort by the refuge staff, with compilation by OA Adam Fauth and editing by Volunteer Diane McFarlane and DRM Scott Lanier.

Photo Credits:

CW	Cory Waters
FWS	Fish & Wildlife Service
RN	Ryan Nordsven
TCT	The Coastland Times

INTRODUCTION

Pea Island National Wildlife Refuge is a 5,915-acre, ocean-bound tract at the northern end of Hatteras Island. It is part of a chain of islands known as the Outer Banks of North Carolina. Formerly established as the Pea Island Migratory Waterfowl Refuge, the area was designated “a refuge and breeding ground for migratory birds and other wildlife” by Executive Order 7864, signed by President Franklin D. Roosevelt on April 8, 1938. On May 11, 1938, Presidential Proclamation No. 2284 also granted federal protection to 25,700 acres of the adjacent Pamlico Sound, closing those waters to all hunting of migratory waterfowl.

Pea Island, and the other dynamic and ever-changing barrier islands of North Carolina, are separated from the mainland by a series of marshes and sounds which range from very narrow to 25 miles in width. Officially un-staffed 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 than the mainland in summer and warmer in winter. During summer, southwest winds bring warm, humid air followed by cool, damp northeast winds. These frequently reach 20-30 MPH during fall and winter. 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 made it a ‘birders’ paradise.’ A total of 365 bird species have been spotted on the refuge, which 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 the refuge beaches for feeding and, less frequently, for nesting. During summer months, a modest number of loggerhead sea turtles also lumber onto the beaches to begin their nesting rituals. 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 the island’s undeveloped beaches. Each of these areas provides opportunities for excellent wildlife viewing. More than two million people pass through the refuge annually, entering 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.

PEA ISLAND NATIONAL WILDLIFE REFUGE

Manteo, North Carolina

ANNUAL NARRATIVE REPORT

Calendar Year 2008

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

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A. HIGHLIGHTS

The Bonner Bridge Replacement Project is still unresolved. (Section D-4)

Severe winds from Tropical Storm Hanna created a rapid senescence of Phragmites. (Section F-10)

Twenty six (26) sea turtle nests produced 1,924 hatchlings. (Section G-2)

Total waterfowl numbers peaked at 24,083 in mid-December. (Section G-3)

1,374 brown pelican chicks, 2,018 royal tern chicks, and 268 sandwich tern chicks were banded. (Section G-16)

Total visitation to Pea Island in 2007 reached approximately 1.5 million. (Section H-1)

Upgrades were done to Pea Island Visitor Center, including a wildlife observation area. (Section I-1)

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 2008. Although there were no changes in the right-of-way easement, much effort went into working with the NC 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 and elsewhere along the refuge beach were severely eroded by a northeaster on May 5-6 and reconstruction efforts lasted through July. The Refuge began to encourage NCDOT to conduct maintenance actions within existing right-of-way as much as possible.

D. PLANNING

1. Master Plan

The Comprehensive Conservation Plan and Environment Assessment was completed in 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 Refuge issued Special Use Permits for reinforcing dunes outside the right-of-way. Dune reinforcement included rebuilding, use of sand fencing, and sprigging with native plant species.

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. The Biological Opinion for the Section 7 Endangered Species Consultation was finalized on July 10, 2008.

During 2008 the Pamlico Sound Bridge Corridor was dropped as an alternative and the Least Environmentally Damaging Practicable Alternative (LEDPA) as determined by NCDOT and FHWA was presented as the preferred alternative. The SDEIS was finalized into the project FEIS with the Parallel Bridge Corridor/Phased Approach Rodanthe Bridge as the preferred alternative.

NCDOT and FHWA planned the Bonner Bridge replacement under the assumption that the Terminal Groin would remain in place. FHWA informed NCDOT that the Terminal Groin Permit issue had to be resolved and the existing permit had to be extended or a new one issued before they would provide federal funding. Several meetings followed.

A solicitor's opinion established the need for issuing a new permit for allowing the Terminal Groin to remain in place after constructing a new bridge. In August 2008 an initial meeting was held to discuss permitting requirements for the new permit. Among the needs expressed by the refuge was establishing a panel of subject matter experts to evaluate the effects of the groin since construction and provide management recommendations for offsetting impacts.

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 US 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.

As with previous years, 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.

S-Curves Sandbags – The refuge issued a Special Use Permit authorizing NCDOT to place sandbags along an approximate 1000 ft section of refuge beach for protection of the NC Highway 12 roadbed. A Thanksgiving northeaster severely eroded the beach and a portion of the highway. This is viewed as a temporary measure until NCDOT can finalize plans for the Bonner Bridge replacement project which will provide a long-term solution to problems the highway is faced with in this area.

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 750,000 yd³ 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. Considerable time was required to prepare the Special Use Permit for the pipeline dredging project.

Sand and invertebrate sampling, along with beach slope, scarp formation, and faunal data were collected along transect lines as part of an ongoing monitoring program. In addition, sand compaction (psi) was 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 bypassing sand to the beach as well as recovery rates for the beach. All data and samples from the 2008 cycle 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 3-4 sand samples at each turtle crawl to develop baseline data for use in developing special conditions for SUP's issued to USACE and NCDOT for beach nourishment.

6. Other

Following each relatively minor storm ranging from northeasters to offshore tropical storms, NCDOT was issued authorization to make emergency repairs on sections of damaged dune lines where normal high tides were inundating sections of NC Highway 12. The Refuge authorized use of sand that accumulated in berms on the west side of the highway over time for dune reconstruction. An advantage to using this material is that it contained root-stock, seeds, and rhizomes which would make re-vegetation quicker. Permits authorized sand fencing to stabilize refurbished or reconstructed dunes along the highway

E. ADMINISTRATION

1. Personnel

See Alligator River NWR ANR.

4. Volunteer program

From year to year, the daily operation of Pea Island NWR depends 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 NWR proudly with friendly reception and helpful information.

Sea Turtle monitoring, through the programs of Turtle Patrol and Turtle Watch, was made possible by over 52 volunteers who donated more than 2,000 hours of their time.

Several coordinated work groups and individuals contributed to beach and roadside clean-ups, maintenance, biological assistance, and special events.

6. Safety

Two ATV Safety Institute Ridercourse Classes were taught at Pea Island NWR on May 15 & 16, 2008. A total of 11 students were taught in 2008. The classes included employees from 2 refuges, volunteers, and interns used mostly to assist with the Sea Turtle Nesting Program on Pea Island NWR. FWB Brian Van Druten also attended the ATV Safety Institute's Professional Development Workshop on June 7, 2008 in Rocky Mount, NC. These PDW's are required every 2 years for instructors to stay current with the instruction of classes. A total of 100 students have been instructed since 2004 at either Alligator River or Pea Island NWR's

7. Technical Assistance

GIS:

See the Alligator River NWR ANR Section D-6 for more information.

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

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 -2008

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

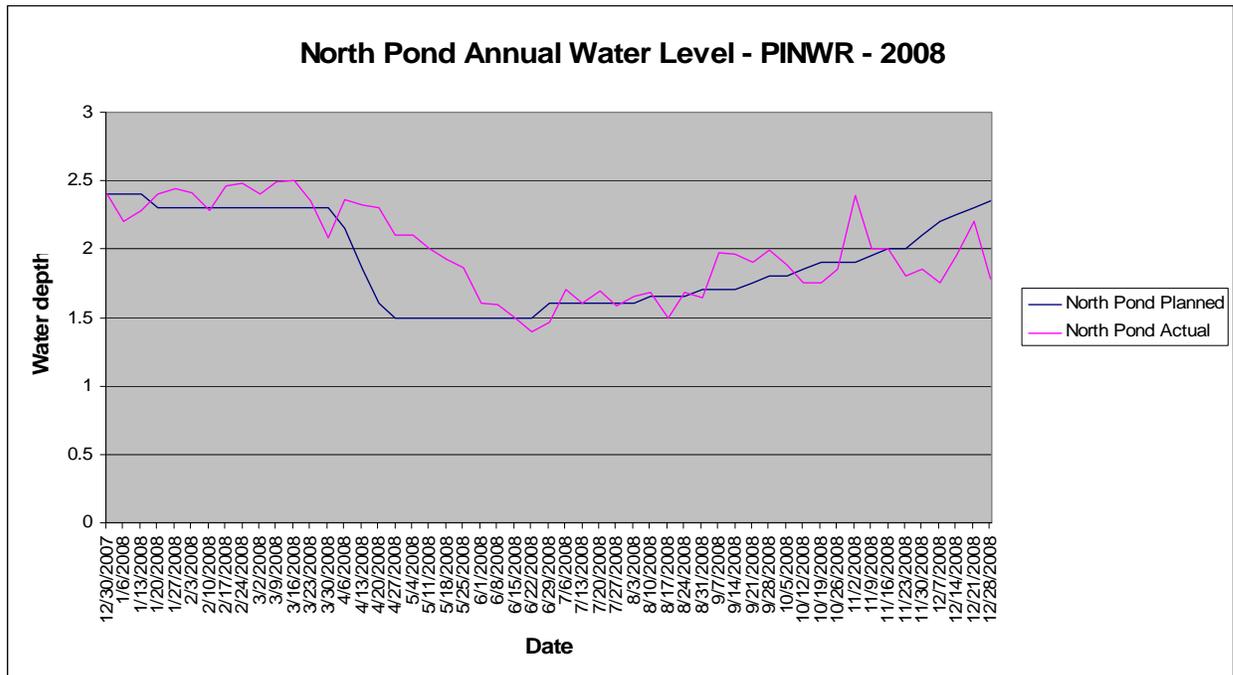
Wetland management on the refuge focuses on three man-made impoundments. They are North Pond (397 acres), New Field Pond (320 acres), and South Pond (223 acres). These impoundments are managed primarily for submerged aquatic vegetation (SAV) production to provide high quality habitat for wintering waterfowl.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

Most of North Carolina experienced a severe drought during the summer and fall of 2008 which impacted water management in the impoundments. The portable pump, purchased through a NAWCA grant for South Pond, was put in place which greatly improved water management capabilities. A great deal of pumping was done throughout the summer. Water available for pumping had a higher than normal salinity (20 – 30 ppt) due to the drought, which impacted salinity levels within the impoundments. A tradeoff between keeping the vegetation submerged versus having higher salinity levels was managed as well as possible, given the drought conditions.

North Pond

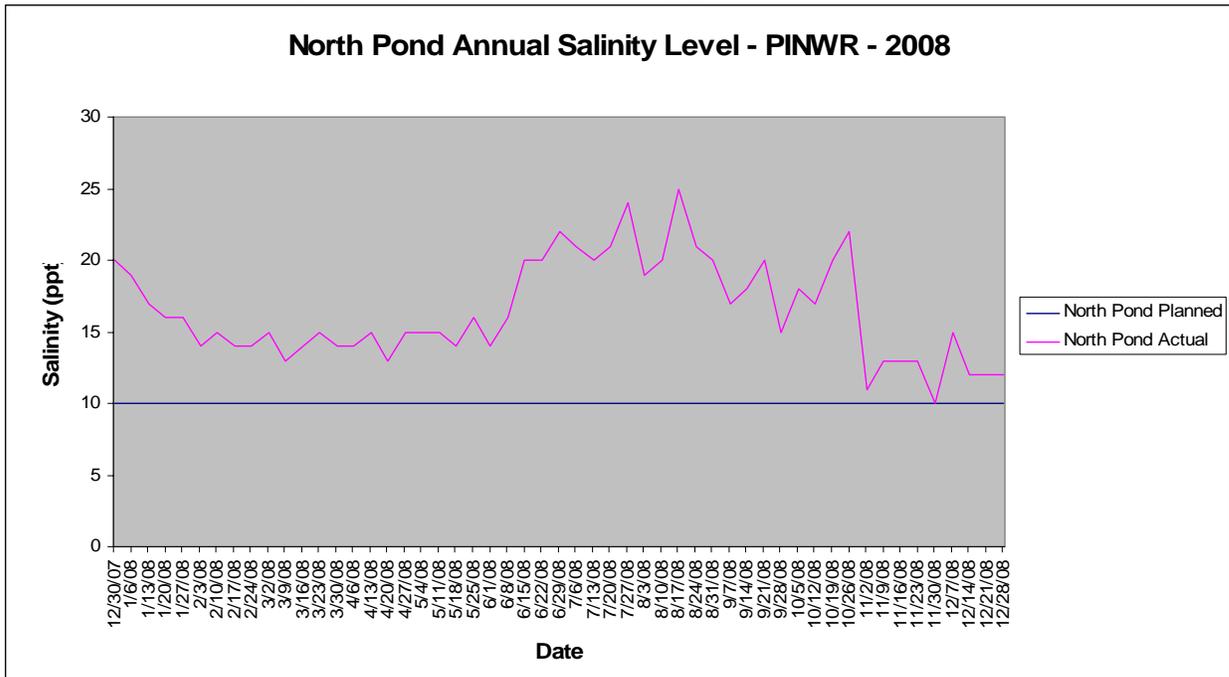
Water management in North Pond was on target throughout most of the year. Average annual deviation from planned water level was 0.07 ft. Adhering this closely to the planned water level resulted in nearly ideal conditions for SAV and invertebrate production. Figure *F-2-1* provides insight into water level variation during the course of the year.

Figure *F-2-1*: Seasonal fluctuations in water level in North Pond Impoundment at Pea Island National Wildlife Refuge during the 2008 monitoring period.



Although salinity cannot be controlled except through prudent holding and releasing water in conjunction with rainfall events, average annual salinity was 6.5 ppt above the desired level. Average monthly salinity varied from about 12.2 ppt in December to an average monthly high of 21.6 ppt in July. Fall and winter salinity readings varied from about 10 to 22 ppt. Figure F-2-2 illustrates variation in salinity during the course of the year. A goal of 10 ppt was arbitrarily chosen for reference purposes. It is evident from these figures that as water level drops due to evaporation, salinity increases.

Figure F-2-2: Seasonal fluctuations in salinity (ppt) in North Pond Impoundment at Pea Island National Wildlife Refuge during the 2008 monitoring period)



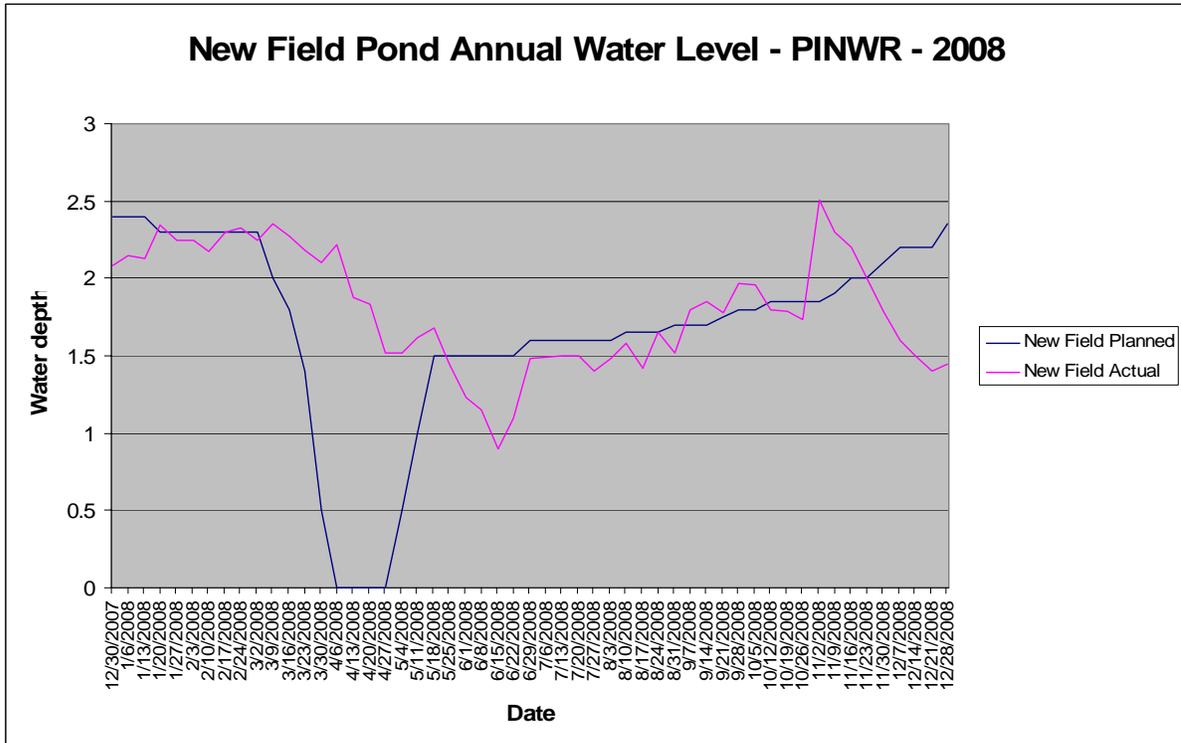
To compare plant food production for the 2007-2008 waterfowl wintering period, it is necessary to examine the vegetation survey data for the fall of 2007. Plant species rated as good or fair waterfowl food were found on 61% of the transect plots. The remaining 39% of the plots consisted of bare ground (33.8%) or plant species of no food value for waterfowl (5.1%). *Chara* spp. (35.6%), wigeon grass (*Ruppia maritima*) (2.7%), and sago pondweed (*Potamogeton pectinatus*) (7.3%) dominated the “good” foods and the “fair” category was dominated by saltmeadow hay (*Spartina patens*) (12.8%). Overall, data shows fair to good submerged aquatic production. There was a notable increase in “bare” plots (from 13.7% last year to 33.8% this year) and a notable increase in *Spartina patens* (from 7.7% last year to 12.8% this year).

New Field Pond

New Field Pond water management was on target throughout most of the year. Average annual deviation from planned water level was 0.13 ft. A complete draw-down of the impoundment was planned for April of this year. Due to repeated rain events, a drawdown was not

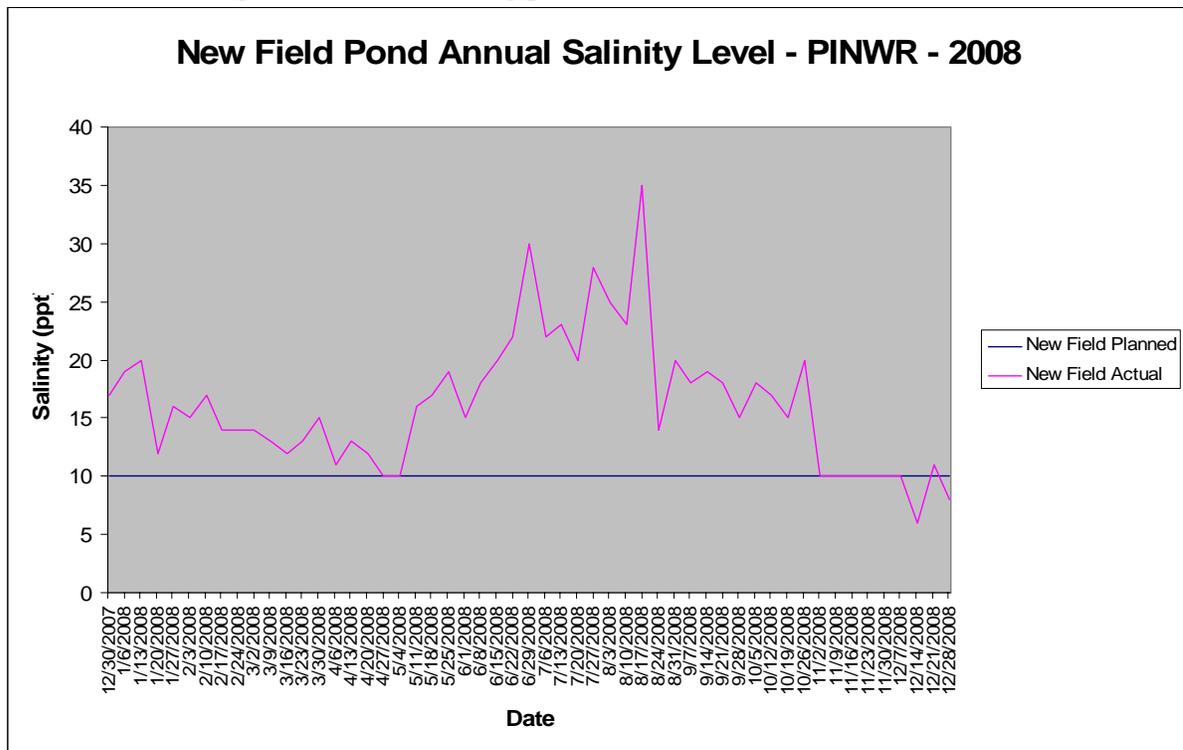
accomplished until the middle of June. Discing of the majority of the non-vegetated portions of the impoundments was accomplished over a period approximately 2 weeks. Water levels were then slowly returned to target levels. Discing should improve the distribution of available nutrients and seedbed stock for SAV production in the soil. Figure F-2-3 provides insight into water level variation during the course of the year.

Figure F-2-3: Seasonal fluctuations in water level in New Field Pond Impoundment at Pea Island NWR during the 2008 monitoring period.



Although salinity cannot be controlled except through prudent holding and releasing water in conjunction with rainfall events, readings ranged from average monthly highs of around 24.6 ppt in July to average monthly lows of 9.0 ppt in December. Fall and winter salinity readings varied from 6.0 to 20.0 ppt.

Figure F-2-4: Seasonal fluctuations in salinity (ppt) in New Field Pond Impoundment at Pea Island NWR during the 2008 monitoring period.



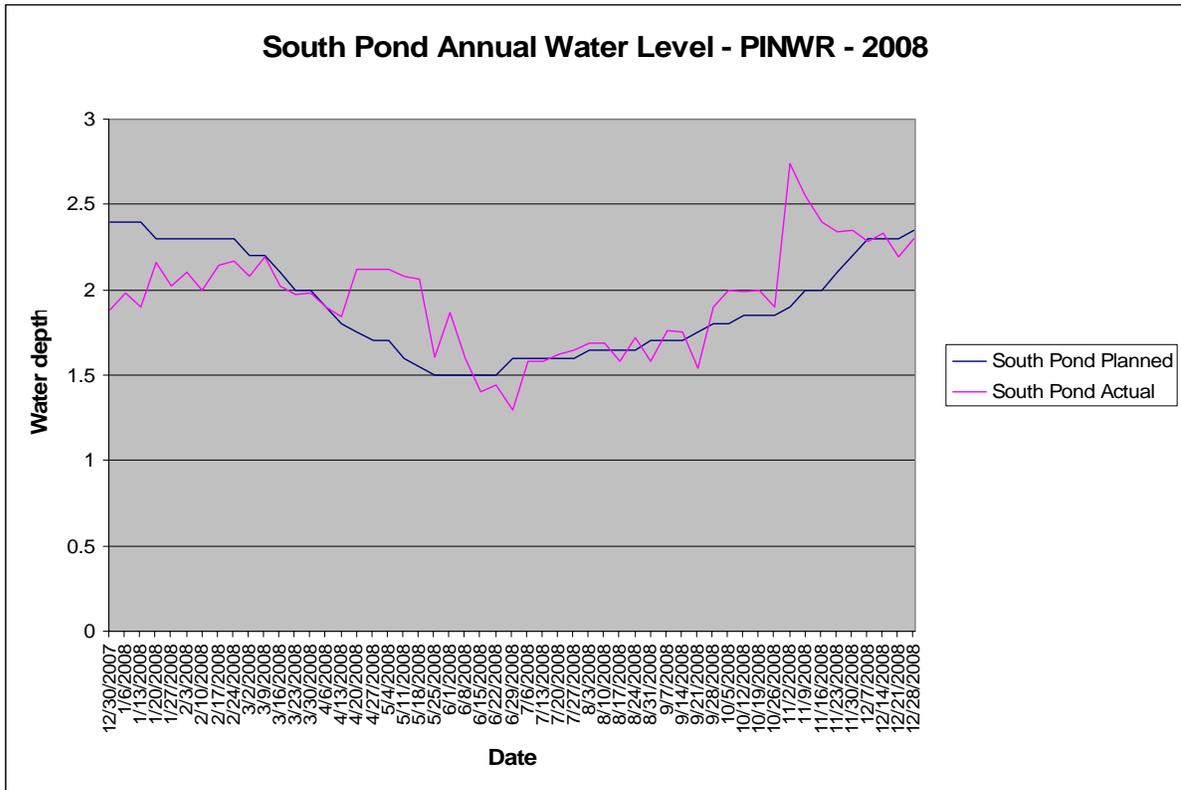
To compare plant food production for the 2007 - 2008 waterfowl wintering period, it is necessary to examine the vegetation survey data for the fall of 2007. Plant species rated as good or fair waterfowl food were found on 71.0% of the transect plots. The remaining 29.0% of the plots consisted of bare ground (21.6%) or plant species of no food value for waterfowl (7.4%). (*Chara* spp.) (25.8%), sago pondweed (*Potamogeton pectinatus*) (3.6%), wigeon grass (*Ruppia maritima*) (6.2%), and giant rush (*Scirpus robustus*) (3.4%) dominated the “good” foods and the “fair” category was dominated by saltmeadow hay (*Spartina patens*) (22.5%) and saltgrass (*Distichlis spicata*) (2.9%). There was a notable increase in “bare” plots (from 8.3% last year to 21.6% this year) and a notable decrease in *Chara* spp. (from 40.5% last year to 21.8% this year). This is not unexpected after having drawn down the impoundment in June for discing. Overall, data show relatively good submerged aquatic production considering the short window of time since discing.

South Pond

Because South Pond has limited 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. However, purchasing the portable pumping system enhanced our ability to maintain water levels in South Pond. As can be seen from Figure F-2-5, water

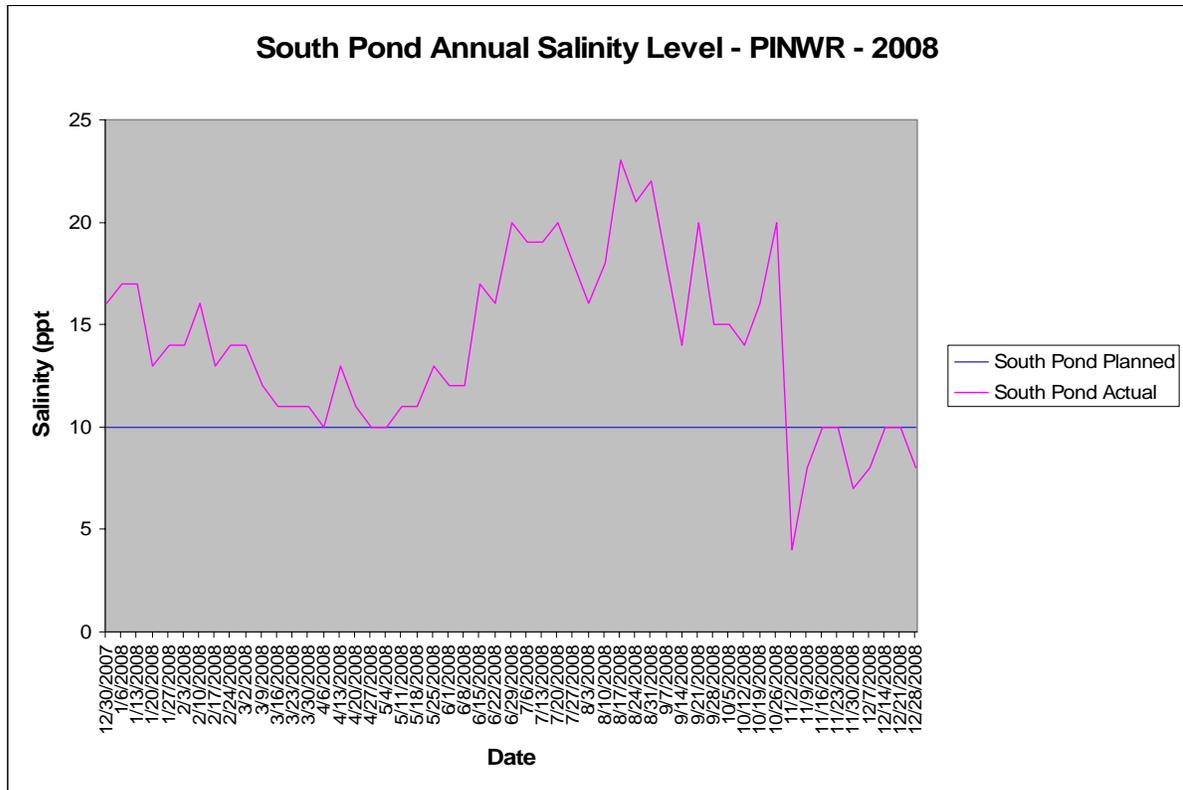
levels were maintained to within an annual average of 0.04 ft of the planned elevation. The water control structure which had developed significant leaks last year was replaced, therefore allowing for better water level management.

Figure **F-2-5**: Seasonal fluctuations in water level in South Pond Impoundment at Pea Island NWR during the 2008 monitoring period.



Although salinity cannot be controlled except through prudent holding and releasing of water in conjunction with rainfall events, readings ranged from average monthly highs of 19.5 ppt in August to average monthly lows of 8.0 ppt in November. Fall and winter salinity readings varied from 6.0 to 20.0 ppt.

Figure F-2-6: Seasonal fluctuations in salinity (ppt) in South Pond Impoundment at Pea Island NWR during the 2008 monitoring period.



To compare plant food production for the 2007-2008 waterfowl wintering period, it is necessary to examine the vegetation survey data for the fall of 2007. Plant species rated as good or fair waterfowl food were found on 67.4% of the transect plots. The remaining 32.6% of the plots consisted of bare ground (25.6%) or plant species of no food value for waterfowl (7.0%). *Chara* spp. (42.5%), wigeon grass (*Ruppia maritima*) (10.2%), sago pondweed (*Potamogeton pectinatus*) (4.8%), dominated the “good” foods and the “fair” category was dominated by saltmeadow hay (*Spartina patens*) (7.2%).

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 (*Spartina patens*), and salt grass (*Distichlis spicata*). Overall, 63.6% of the plants in sample plots are ranked as “fair” or “good” waterfowl food. Of the plots sampled 15.2% 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 some widgeon grass. The pond fringes also continued to produce stands of Bacopa spp., Scirpus spp., and Cyperus spp. Migratory waterfowl use is light to moderate. Of waterfowl species observed gadwall, black duck, and green-winged teal were most common. Resident Canada geese are often observed using the ponds.

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. By 2008 most of these areas were recovered back to a “normal condition”. Other areas have remained as wind blown sand largely devoid of vegetation while new areas are created by northeaster storms. 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. These successional changes continued throughout 2008 to the point that the “scars” from Hurricane Isabel are becoming less visible.

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 ANR for details.

10. Pest Control

Phragmites, *Phragmites australis*, continues to be a problem on Pea Island NWR. In 2005, 52 acres of Phragmites were found on the refuge. From July 24th to August 12th, 25.5 acres of phragmites were treated on Pea Island NWR with ground applications from Mattamuskeet NWR's marshmaster. Every known phragmites stand from the south boundary area north to Headquarters were treated. Some retreatment of regrowth from 2007's efforts occurred from Oregon Inlet to Headquarters. This will continue in 2009.

FWB Van Druten successfully applied for a Pulling Together Initiative grant through the National Fish and Wildlife Foundation to treat phragmites on federal, state, and private lands in

northeastern North Carolina and southeastern Virginia. This grant pulls together 7 National Wildlife Refuges, 1 National Seashore, 1 State Park, 1 State DOT, 1 Electric Cooperative, 1 City Government, and various private landholders. Work on the Virginia portions of the grant was completed in 2008. Tropical Storm Hanna passed through eastern North Carolina on September 6, 2008 bringing winds of 40-60 mph with some higher gusts. These strong winds gave severe wind shake to our Phragmites. This severe wind shake created a rapid senescence of the *Phragmites* which was evident by September 10, 2008. We have seen similar effects post – tropical systems in eastern North Carolina in the past. This work will be continued in 2009.

G. WILDLIFE

1. Wildlife Diversity

Pea Island NWR 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 NWR provided habitat for a wide variety of mammals, birds, fish, reptiles, amphibians, mollusks, and crustaceans during 2008. 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

Piping plover (Threatened): The Atlantic coast population of Piping plover, *Charadrius melodus*, was listed as a threatened species under the Endangered Species Act in January 1986. In 2008, there were no piping plover nests on the north end of the refuge. Although one bird was observed exhibiting behavior conducive to the presence of a nest in late May, no nests were observed. Based upon refuge surveys, a range of one to five plovers were consistently observed during 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 is no longer suitable nesting and foraging habitat.

Atlantic loggerhead sea turtle (Threatened): Pea Island has an average of 12-13 nests per year. The 1994 nesting season had a record high of 35 nests and 41 false crawls. The 2008 nesting season resulted in 26 sea turtle nests (20 loggerhead nests and 6 green nest) and 16 false crawls.

Pea Island NWR has a severe beach erosion problem resulting in a narrow beach and frequent over-wash. In 1994, refuge personnel determined that the best management strategy to optimize survival of turtle hatchlings was to move nests to a turtle safe zone. Subsequent to that decision, guidelines specific to 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 2008, 17 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. Twenty-two nests hatched successfully. Hatch rates ranged from 44.4% to 97.7%. The nest with the lowest hatch rate contained a high occurrence of infertile and ghost crab predated eggs. Altogether, 1,924 hatchlings entered the ocean as a result of many hours of effort by volunteers and staff.

During 2008, 10 stranded turtles washed up on Pea Island's beaches – 6 loggerheads, 3 greens, and 1 Kemp's ridley. Most of the turtles were already moderately decomposed when found on the beach. The usual missing flippers, cracked skulls, puncture wounds, and lacerations were observed. Measurements were collected and recorded and some tissue samples were taken from stranded turtles and sent to the North Carolina Sea Turtle Coordinator with the North Carolina Wildlife Resources Commission. One 5.62 kg green sea turtle was found live-stranded in December and was taken to a local veterinarian. Subsequently the turtle was rehabilitated at the NEST facility and later released with a clean bill of health.

Green sea turtles (Threatened): The first green sea turtle (*Chelonia mydas*) known to nest on Pea Island was in 1993. Six of the nests on the refuge during the 2008 nesting season were identified as green sea turtle nests.

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, 0.5 miles south, and 5.5 miles south of the Pea Island NWR Headquarters. During 2008, colonies were observed at the Oregon Inlet terminal groin, approximately 3.75 miles north of refuge headquarters, approximately 1.9 miles north of refuge headquarters, approximately 1.5 miles north of refuge headquarters, approximately 1.0 miles north of refuge headquarters, approximately 1.8 miles south of refuge headquarters, and approximately 5.5 miles south of headquarters. Least tern numbers peaked at 199 in late May.

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 2008 was 143 and the peak occurred in late September. Nesting on the refuge has not been documented.

Common tern (Significantly Rare): Common terns are found nesting with other terns. During 2008, four nests were observed at the least tern colony 3.75 miles north of refuge headquarters. Common tern numbers peaked in September at 65.

Gull-billed tern (Significantly Rare): Gull-billed terns occur in low numbers. During 2008, 1 nest was observed in the least tern colony 3.75 miles north of refuge headquarters. Gull-billed

tern numbers peaked in late June at 3.

Black skimmer (Significantly Rare): Black skimmers are observed along the oceanfront, sound, and impoundments on the refuge. During 2008, 15 nesting birds were observed at the tern closure 3.75 miles north of refuge headquarters. Black skimmer numbers peaked in early September at 251.

Little blue heron (Significantly Rare): The little blue heron is found mostly around the three impoundments or marsh edges. Numbers peaked at 52 in early August. 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 118 in early 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 148 in early August. 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 21 in late June. No nests were documented on the refuge this year.

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 and Results of this year's surveys are provided in Table **G-3-1**. Total waterfowl numbers peaked at 24,083 in mid-December. Snow geese and tundra swan numbers peaked in mid January. Canada geese are believed to be only resident birds. All species except for the tundra swan, northern pintail, Ring-neck duck, redhead, and bufflehead had decreases in use days from the 10-year average. Compared to the 2006-07 wintering period, the snow goose, Canada goose, mallard, American black duck, northern pintail, redhead, bufflehead, green-wing & blue-wing teal showed increases whereas all other species showed decreases in use. Figures **G-3-1** and **G-3-2** illustrate seasonal shifts in numbers for each species groups.

Anecdotal brood counts were conducted in conjunction with shorebird surveys but accurate records were not kept. A few black duck and gadwall broods were observed in all three impoundments. Although not supportable with data, gadwall nesting appears to be increasing on the refuge.

Other interesting observations not reflected in the table included a goldeneye pair and the presence of canvasbacks. Few goldeneye and canvasback sightings occur annually on the

refuge.

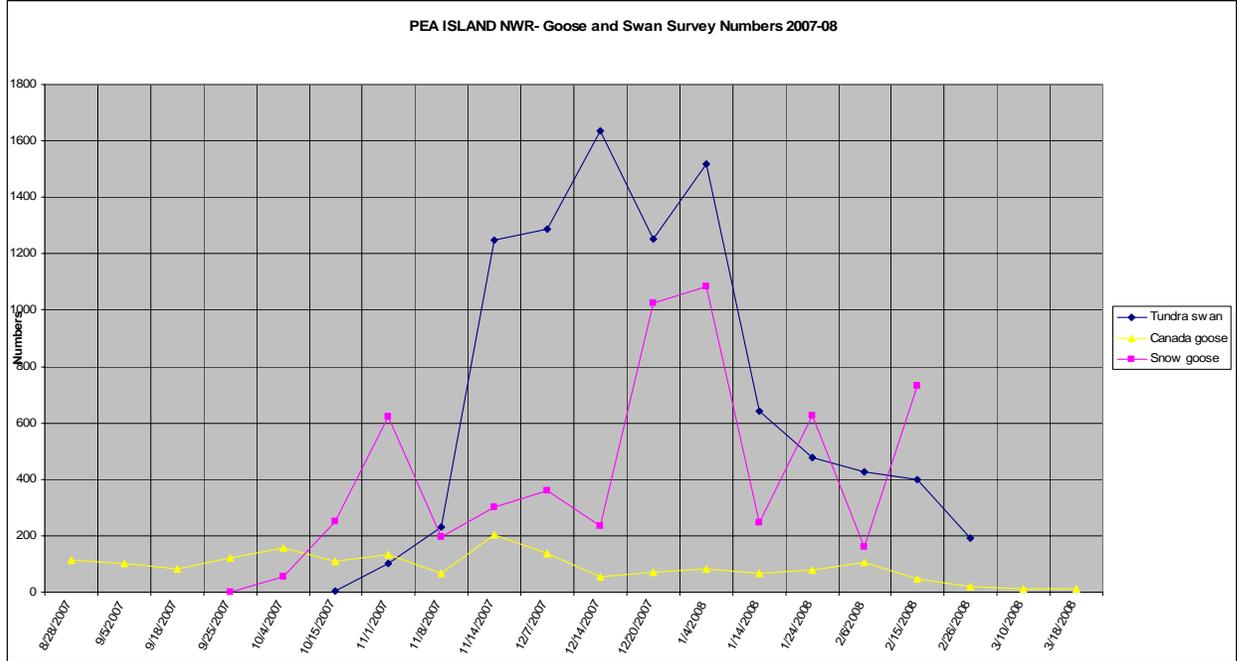
Table **G-3-1**: Composition of wintering waterfowl at Pea Island NWR during the 2007-2008 survey period in Dare County, North Carolina.

SPECIES	PEAK PERIOD	PEAK #	# USE DAYS 2007-08	% TOTAL USE DAYS	USE DAYS % diff from 10 yr avg
Tundra swan	Dec	1635	100862	5.4	46
Snow goose	Jan	1085	61826.5	3.3	-34
Canada goose	Nov	204	18144	1.0	-57
Mallard	Dec	96	7088	0.4	-26
Black duck	Nov	1090	109925.5	5.9	-25
Gadwall	Sept	1065	95726	5.1	-50
American wigeon	Dec	1991	148827.5	8.0	-19
Northern pintail	Sept	9224	637805.5	34.3	91
Green-winged teal	Oct	1173	65748	3.5	-45
Blue-winged teal	Sept	468	10535	0.6	-26
Northern shoveler	Dec	315	23718.5	1.3	-73
Wood duck	N/A	0	0	0.0	-100
Ring-necked duck	Jan	36	1978.5	0.1	95
Redhead	Dec	11464	293506.5	15.8	408
Canvasback	Feb	14	528	0.0	-60
Scaup	Dec	855	16235.5	0.9	-33
Bufflehead	Dec	1481	66347	3.6	234
Ruddy duck	Dec	587	23203	1.2	-4
Mergansers	Jan	290	15566.5	0.8	-28
Goldeneye	Dec	2	36	0.0	-80
Scoter	N/A	0	0	0.0	-100
Coot	Dec	1419	107134	3.0	-41
Unknown	Dec	874	54866.5	1.5	-21

Figure **G-3-1** illustrates changes in numbers of geese and the tundra swan over the wintering period. Canada geese represented in this database are believed to be resident birds only involved with local movements instead of migrant birds. There appear to be no migratory Atlantic Province migratory Canada geese using the refuge and few, if any, using waters within the

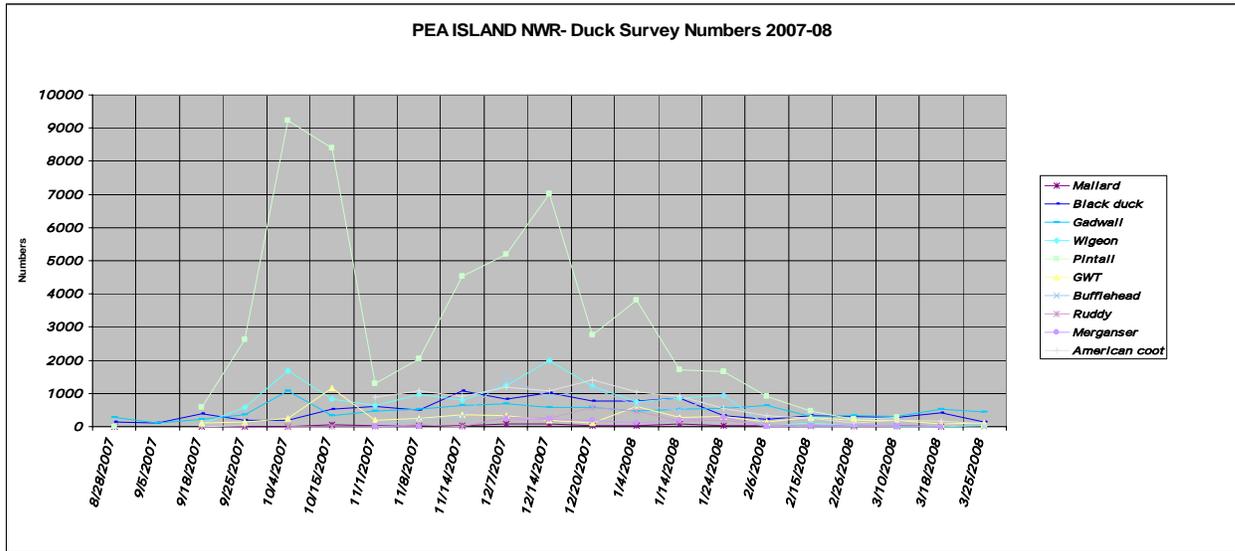
Proclamation Boundary in the Pamlico Sound.

Figure **G-3-1**: Number of geese and swans counted during the 2007-2008 wintering period surveys at Pea Island NWR in Dare County, North Carolina.



Although not as distinct as in years with higher wintering numbers of ducks, Figure **G-3-2** suggests that duck numbers begin increasing by late September and remain relatively high until mid-to-late February. The Northern pintail and, to a lesser extent, American widgeon, appear to arrive, move around to other wintering sites and then return to the refuge. It is not unusual for waterfowl to peak in early to mid-December, drop to relatively low numbers and then peak at a lower level from mid to late January. Dispersal to other suitable, natural or well managed habitat within the wintering area is the most logical explanation for such observations.

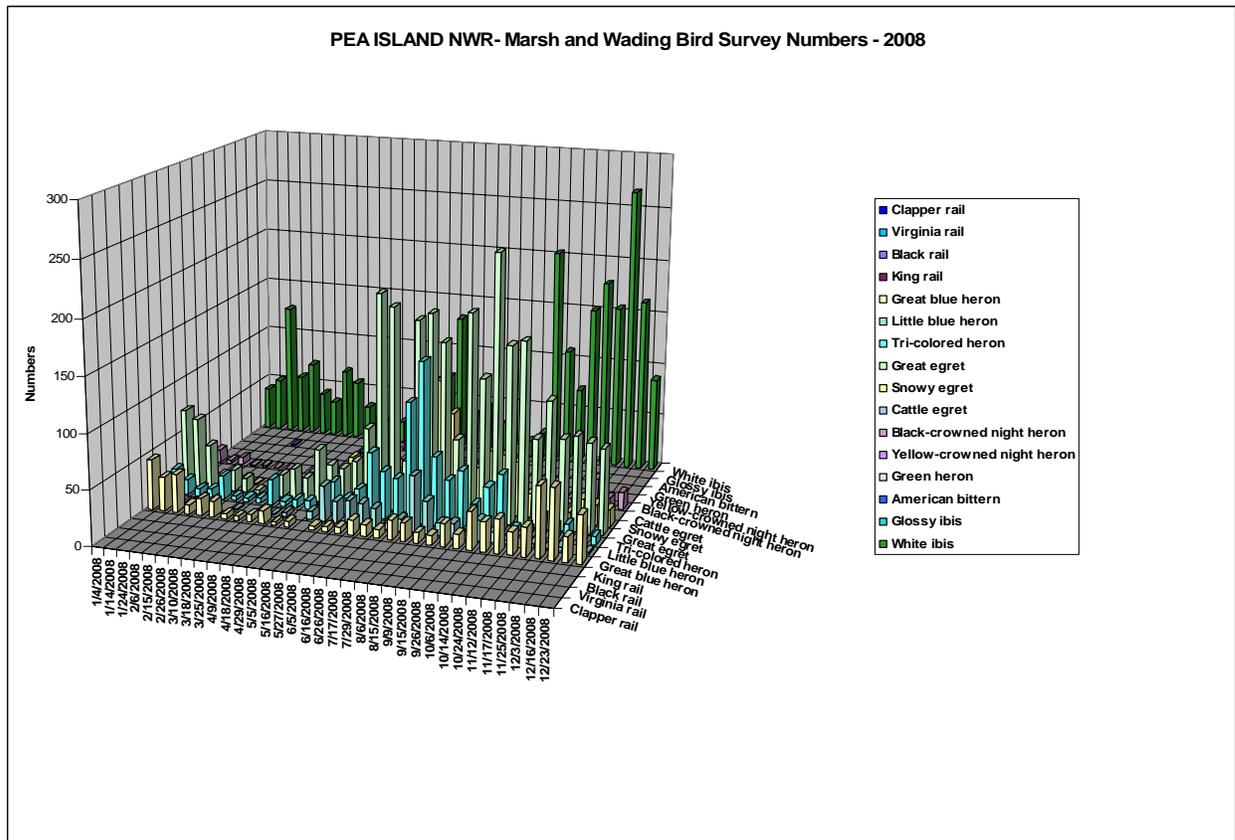
Figure G-3-2: Number of selected duck species counted during wintering surveys during the 2007-2008 wintering period at Pea Island NWR in Dare County, North Carolina.



4. Marsh, Water, and Wading Birds

Marsh and wading birds were counted three times per month during regular bird surveys. We do not conduct surveys specifically for marsh birds but those species are recorded as they are encountered. Overall numbers increased to a peak of 598 in early October. Figure G-4-1 provides some insight into the time of arrival by species as well as some indicator of relative abundance. Commonly occurring species include great and snowy egrets, great blue heron, little blue heron, green heron, tri-colored heron, black-crowned night heron, yellow-crowned night heron, white ibis, double-crested cormorants, and American bittern. Clapper, king, black, and yellow rails were not observed during the diurnal surveys. Rails are present on the refuge but survey techniques are not conducive for detection.

Figure G-4-1: Number of marsh and wading bird species counted during surveys conducted three times per month in 2008 at Pea Island NWR in Dare County, North Carolina.

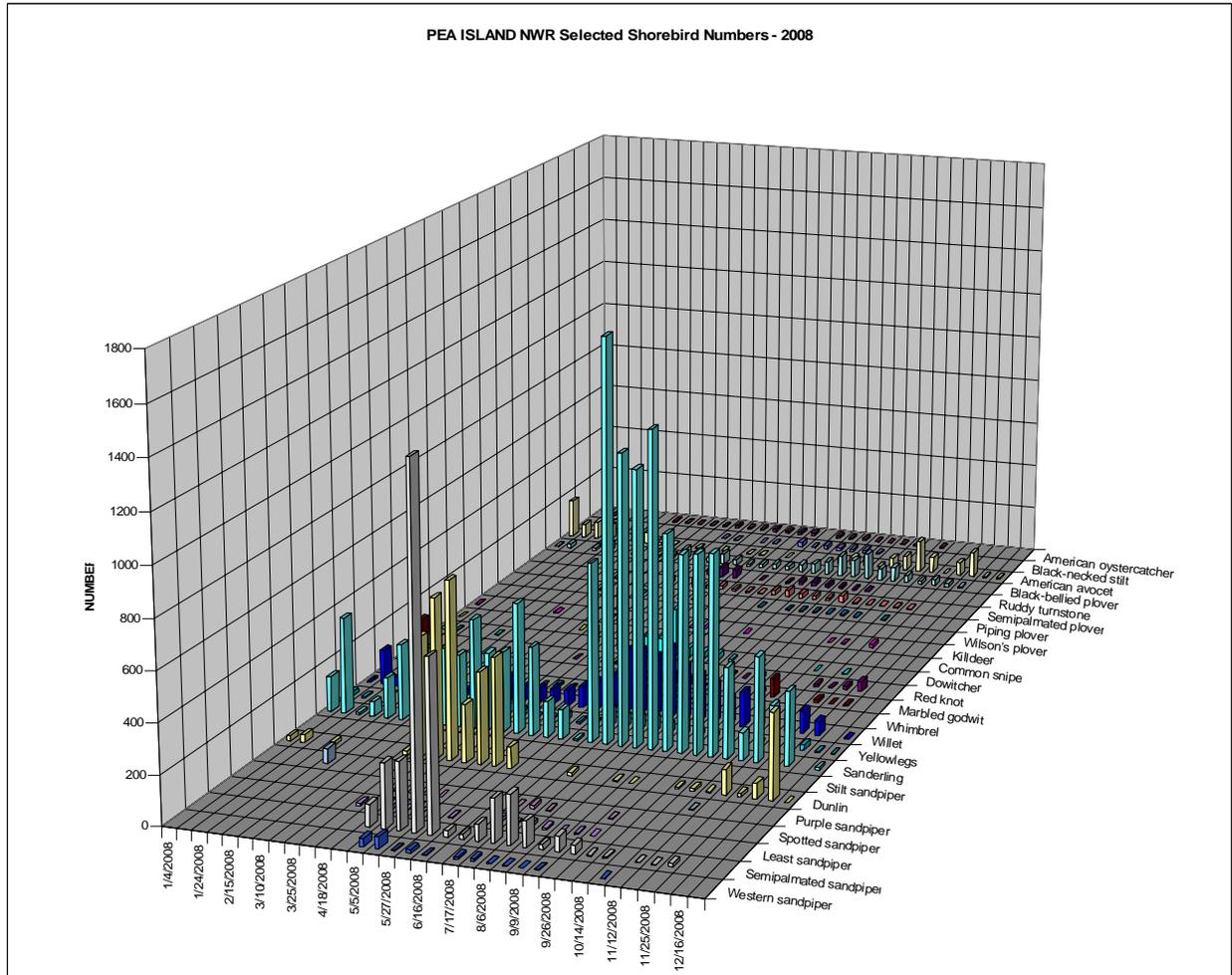


Brown pelican numbers have continued to increase over the past few years as the species has expanded northward into coastal North Carolina and Virginia. These birds were previously listed as a threatened species in North Carolina and were rarely observed. A group of about 54 white pelicans was observed on the refuge during the month of January and a smaller flock of 33 returned in December. The large, seasonal concentration of double-crested cormorants is indicative of the value of the Oregon Inlet and vicinity as a migration staging area.

5. Shorebirds, Gulls, Terns, and Allied Species

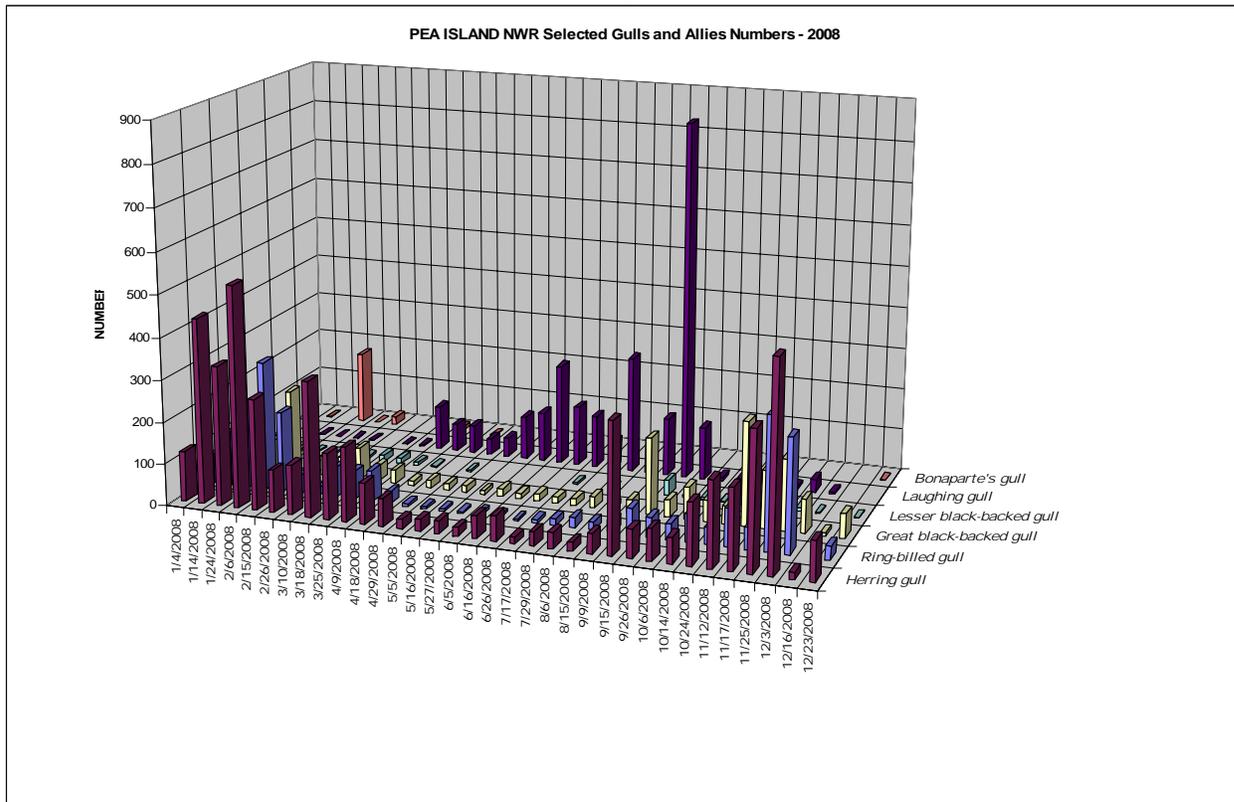
Shorebird surveys were conducted three times per month during the year. Shorebird numbers peaked at approximately 2,461 in late May, and at about 2,382 at the end of July with elevated numbers through September. The May counts reflect the effects of spring migration and counts during the period from late July through late November illustrate less definition of the fall migratory period. Some of the commonly occurring species include the semi-palmated and western sandpipers, semi-palmated plover, sanderling, whimbrel, American oystercatcher, black skimmer, various terns and gull species, dowitcher, marbled godwit, willet, dunlin, black-bellied plover, ruddy turnstone, American avocet, red knot, greater and lesser yellowlegs, and black skimmer. Figure G-5-1 provides some insight as to the numeric and seasonal distribution by species.

Figure G-5-1: Number of shorebird species counted during surveys conducted three times per month in 2008 at Pea Island NWR in Dare County, North Carolina.



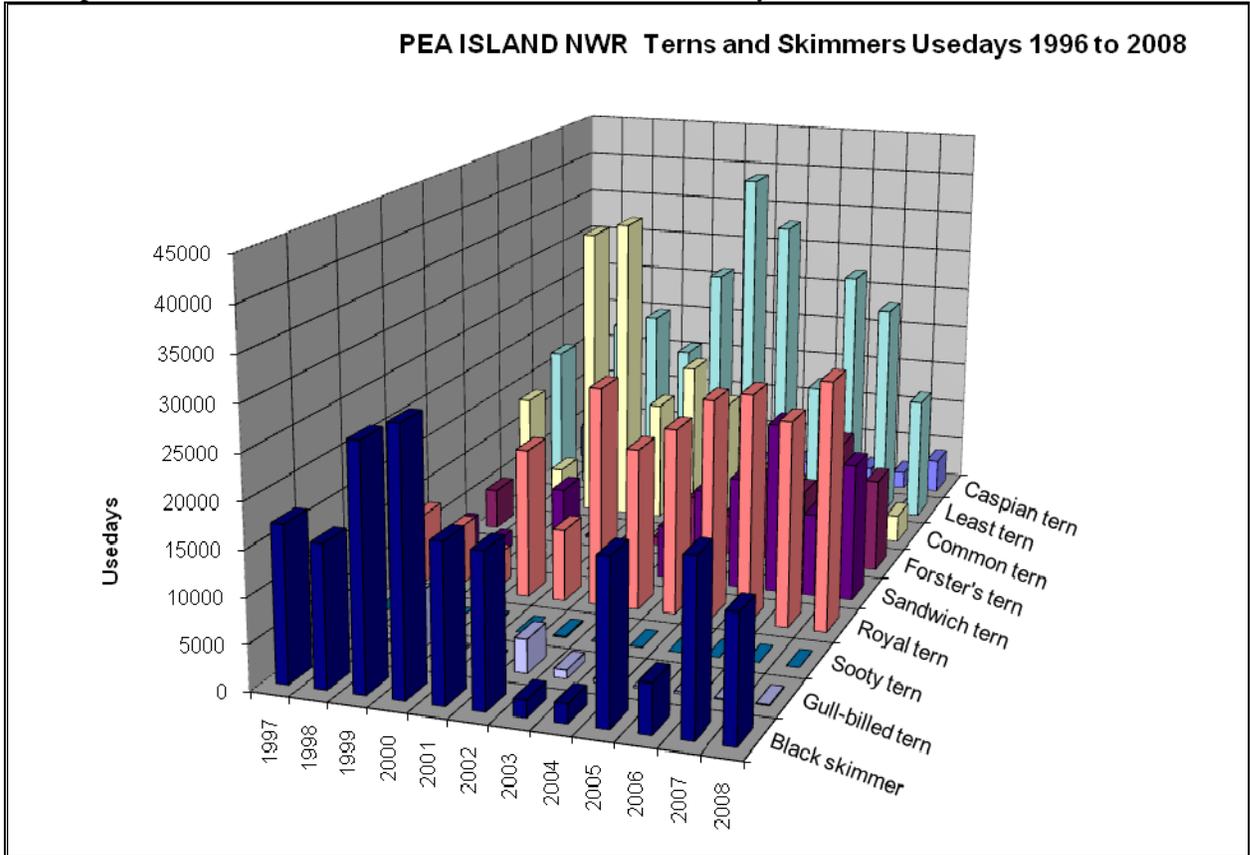
Peak numbers and dates for gulls varied by species. Based upon individual surveys the highest number of herring gulls occurred in February at 527. Great black-backed gulls peaked at 247 in mid November. The highest number of ring-billed gulls occurred in November at 315. The highest number of laughing gulls occurred in mid-September at 854. These species are of concern because of their predation on colonial nesting shorebirds. There was a significant decrease in the number of bonaparte's gulls during January and February compared to 2007. Figure G-5-2 provides some insight as to the numeric and seasonal distribution by species.

Figure G-5-2: Number of gulls by species counted during surveys conducted three times per month in 2008 at Pea Island NWR in Dare County, North Carolina.



Nesting by numerous least tern pairs and two pair of American oystercatchers was observed behind the terminal groin at Oregon Inlet. Approximately 15 pair of black skimmers, 1 pair of gull-billed terns, 4 pair of common terns, and numerous least terns nested in a closure near North Pond. Nesting by least terns was also observed on the beach in four locations between the North Pond kiosk and the southern boundary of the refuge and black skimmers nested in one other location. There were 5 American oystercatcher nests documented on the beach (1 nest was a re-nest) with a total of 9 eggs laid. The fate of many of the oystercatcher chicks was unknown. Most of the nests of all the colonial nesters and the oystercatchers were lost due to unknown cause. Most of the nests lost were in closures visible from the highway; closures not visible from the highway suffered fewer losses. Multiple strong storm and wind events may have negatively impacted the nests. All bird closures on the refuge were posted as closed to public access and a string with flagging was placed around the perimeter of the posted areas. Perimeters of the closed areas were recorded with a GPS unit and transferred to refuge maps. The primary purpose for mapping closed area perimeters was to determine total area closed and linear distance of closed beach. Figure G-5-3 provides some insight as to the numeric and seasonal distribution by species.

Figure G-5-3: Number of skimmer and tern species counted during surveys conducted three times per month in 2008 at Pea Island NWR in Dare County, North Carolina.



The concept of comparing shorebird, marsh bird and water bird use-days within and between seasons has not been done to any great extent on the refuge until the 2005 narrative. Although limitations to uses of the data are recognized, it is a useful method for monitoring change in use. Table G-5-1 provides a summary of the use-day analysis done at the end of 2008. The long-term average is derived from a 10-year database. Data based upon low observations in the column presenting the percent of total use-days are arbitrarily assigned a value of 0.01.

Table **G-5-1**: Composition of wintering waterfowl at Pea Island NWR during the 2008 survey period in Dare County, North Carolina.

SPECIES	PEAK PERIOD	Peak #	# USE DAYS 2008	% TOTAL USE DAYS 2008	USE DAYS % diff from longterm avg
Water Birds & Sea Birds					
Pied-billed grebe	Jan	179	153841	15.0	604
Common loon	Apr	1	21	0.0	-86
Double-crested cormorant	Mar	10599	1886414	18.4	101
White pelican	Jan	54	2080	0.2	116
Brown pelican	Sept	359	19026	1.9	11
Northern gannet	Feb	67	1838	0.2	1
Other Water/Sea bird	Apr	4	59	0.0	96
Unknown Water/Sea bird	N/A	0	0	00.0	-100
Marsh & Wading Birds					
Clapper rail	N/A	0	0	0.0	-100
Virginia rail	N/A	0	0	0.0	-100
Black rail	N/A	0	0	0.0	N/A
King rail	N/A	0	0	0.0	-100
Great blue heron	Nov	65	6712	0.7	57
Little blue heron	Aug	52	3357	0.3	-33
Tri-colored heron	Aug	148	10382	1.0	60
Great egret	Oct	244	32164	3.1	110
Snowy egret	Aug	118	9918	1.0	-3
Cattle egret	Nov	7	56	0.0	-63
Black-crowned night heron	Dec	26	1046	0.1	40
Yellow-crowned night heron	Oct	2	29	0.0	-77
Green heron	May	1	21	0.0	-35
American bittern	Feb	1	20	0.0	-41
Glossy ibis	May	1	47	0.0	-92
White ibis	Dec	266	25928	2.5	69
Other Marsh/Wading Species	N/A	0	0	0.0	-100

Unknown Marsh/Wading Birds	Aug	1	9	0.0	-98
Gulls & Allies					
Herring gull	Feb	527	51532	5.0	40
Ring-billed gull	Nov	315	23734	2.3	-32
Great black-backed gull	Nov	247	20573	2.0	-25
Lesser black-backed gull	Sept	37	1499	0.1	124
Laughing gull	Sept	854	28746	2.8	43
Bonaparte's gull	Feb	175	2301	0.2	33
Other gull species	N/A	0	0	0.0	-100
Unknown gull species	N/A	0	0	0.0	-100
Terns & Skimmers					
Caspian Tern	Sept	143	3953	0.4	130
Least tern	May	199	14466	1.4	-37
Common tern	Sept	65	3196	0.3	-77
Forster's tern	Sept	153	10649	1.0	99
Sandwich tern	Sept	599	15589	1.5	97
Royal tern	Sept	500	27852	2.7	60
Sooty tern	N/A	0	0	0.0	-100
Gull-billed tern	Jun	3	123	0.0	-92
Black skimmer	Sept	251	13615	1.3	-10
Other tern species	Sept	124	1487	0.1	126
Unknown tern/skimmer	Aug	23	1422	0.1	37
Shorebirds					
American oystercatcher	Jun	13	1425	0.1	-25
Black-necked stilt	Jun	21	1175	0.1	11
American avocet	Jan	168	12359	1.2	-25
Black-bellied plover	Sep	113	10659	1.0	45
Ruddy turnstone	May	41	1807	0.2	-27
Semi-palmated plover	May	39	2788	0.3	-80
Piping plover	Oct	5	282	0.0	-43
Snowy plover	N/A	0	0	0.0	-100

Wilson's plover	N/A	0	0	0.0	-100
Killdeer	Nov	14	229	0.0	43
Common snipe	Jan	1	18	0.0	9
Dowitcher	May	267	10235	1.0	-57
Red knot	Dec	42	1052	0.1	-60
Marbled godwit	Jan	163	4371	0.4	37
Whimbrel	May	10	299	0.0	-63
Willet	Aug	291	40112	3.9	48
Yellowlegs	Jul	70	7610	0.7	-61
Sanderling	Jul	1637	164073	16.0	37
Stilt sandpiper	N/A	0	0	0.0	-100
Dunlin	Apr	727	36045	3.5	-48
Purple sandpiper	Feb	62	632	0.1	124
Spotted sandpiper	Jul	14	239	0.0	-27
Least sandpiper	Jul	16	934	0.1	-94
Semi-palmated sandpiper	May	1426	34567	3.4	-61
Western sandpiper	May	46	1306	0.1	-83
Other shorebird species	Aug	66	1206	0.1	-79
Unknown shorebirds	Jun	303	14001	1.4	-30

6. Raptors

American bald eagle: Bald eagles, *Haliaeetus leucocephalus*, were de-listed during 2007. Bald eagles can sometimes be seen flying over the Refuge. There were reports of an occasional bald eagle during 2008. Although these birds appear to be transient some may be remaining in the area more than a few days. Nesting on the refuge in 2008 did not occur.

7. Other Migratory Birds

The diversity of bird life on Pea Island NWR 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 in 2005. Results from this data collection effort suggest a relatively low avian use in the habitat types at the refuge. Funding and staffing limitations did not permit surveys for other migrant birds during 2008.

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. Presence of scat, tracks, and road kills indicate a continued presence of limited numbers of foxes and opossums. Based upon anecdotal observations, it appears that the raccoon population has leveled out after a period of decline due to disease such as mange, distemper, and possibly rabies. The presence of these species as well as feral house cats may be one of the causes for the decline in pheasant populations.

Deer tracks have frequently been observed 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 2008, 6 stranded marine mammals were found on the refuge beach. Appropriate National Marine Fisheries staff were contacted and they performed required necropsies and data collection. The six strandings consisted of bottle-nosed dolphin (3), short-finned pilot whale (2), and a melon-headed whale (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 is becoming a significant problem with regards to growing food for migratory waterfowl. During the summer months approximately 100 -200 resident geese constantly foraged on plant material in the impoundments. By the time migratory birds arrive, primary production in the three impoundments is largely consumed by resident Canada geese. Efforts to manage the resident geese focused on oiling and addling eggs. Approximately 4 nests received treatment in 2008.

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.

Beach sampling is done on a regular basis. This is described in greater detail in Section D-5.

15. Animal Control

Feral cats continue to be found on the refuge. Periodic attempts were made to capture feral cats using Have-a-Heart traps – none were captured. Mink, raccoon, cat, and canid tracks were observed along the terminal groin at Oregon Inlet during the summer. Two mute swan nests were located in New Field impoundment - all eggs were addled and oiled. Mute swans did not reproduce on the refuge during the 2008 nesting season. Five mute swans were removed from the population while 3 remained. Several resident Canada goose nests were also oiled and addled at various locations on the refuge. 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 1,374 brown pelican chicks, 2,018 royal tern chicks, and 268 sandwich tern chicks were banded. None of this banding occurred on the refuge.

H. PUBLIC USE

1. General

Based on the NPS vehicle counter at Bodie Island, estimated visitation to Pea Island NWR during 2008 was 1,500,000 (calculated from multiplying the vehicles logged on the counter with an estimated 2 passengers per vehicle). Volunteers from the Coastal Wildlife Refuge Society continue to staff the Visitor Center, which is open daily year round. The Visitor Center is the perfect hub for the interpretive/ educational programs on this Refuge.

2. Outdoor Classrooms - Students

Refuge staff were able to accommodate every group that requested a refuge-led program, and experienced the greatest need for environmental education programs during the months of May and October. Overall, approximately 13 schools with a total of 950 students participated in environmental education programs on-site at Pea Island NWR.

Many teachers also opt to bring their students to the Refuge for hands-on experiences.



Visitor Services Specialist Heffley with Adaptations program materials.
WT

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 2008, refuge staff worked cooperatively with other agencies to offer and promote training through local venues.

4. Interpretive Foot Trails

North Pond Wildlife Trail is universally accessible, it 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.

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.

Approximately 650,000 visitors utilized North Pond and Salt Flats Wildlife Trails during 2008.

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. The Salt Flats kiosk features interpretive panels on shorebird migration and fire management; and a refuge orientation panel. The South Kiosk has an orientation panel, Refuge System panel, and wintering waterfowl interpretive panel; along with interpretive panels on barrier beach ecology, geology, and endangered species. This kiosk was the victim of vandalism by fire. 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.

7. Other Interpretive Programs

The Refuge sponsored the twelfth annual Wings Over Water Wildlife Festival in 2008.

Refuge outreach staff and interns presented off-site programs to local organizations and schools.

Museum of the Albemarle	450
Land of Beginnings	300
Cub Scouts Summer Camp	210
Festival Park	50
Virginia Dare Days	80
Wildfest	300
Manteo Christmas Parade	1000

Junior Friends of the Refuge Program

What started as a pilot program in 2007 at First Flight Middle School (FFMS) in Kill Devil Hills, NC has blossomed into an area-wide initiative to middle school students involved with North Carolina coastal refuges. Designed as a "Junior Refuge Friends" focus and co-sponsored by the Coastal Wildlife Refuge Society, this partnership involving the schools, the refuges, and the Society, offers students at four area schools the opportunity to witness and experience the wilds of eastern NC. This year, three other schools, Manteo Middle School (MMS) and Cape Hatteras Secondary School (CHSS) (both in Dare County) and Columbia Middle School (CMS) in Tyrrell County, have developed ways to make the partnership work- a club, a grade, or even the entire school is involved, depending on what worked best for the school.

Specific programs conducted by refuge staff in 2008 (CHSS is still in the planning stage)

FFMS Jr Friends	Intro to Refuge Bears AR Canoe Tour Adaptations
MMS Science Club	Intro to Refuge Bears Adaptations
CMS Science Club	Digital Photo Creef Cut Trail Bears



VSS Abbey Reibel (right) working with Junior Friends of the Refuge at First Flight Middle School. FWS

On-site Programs

Most regularly scheduled on-site interpretive programs during 2008 were conducted at Pea Island NWR by Refuge volunteers and interns. Bird walks were conducted year round. Guided Pamlico Sound canoe tours (3 hours) and family canoe tours (2 hours) were offered each week during the spring, summer, and fall months. Severe weather kept the number of canoe tours down compared to other years. Also during the summer, one Turtle Talk, one Sound side Discovery, and a new program called Adaptations were conducted each week. Refuge staff continued posting daily flyers on the visitor center door to promote the interpretive programs, which increased interest and participation.

Programs conducted on the refuge were given to 1191 visitors. This includes those programs conducted as part of the general and family canoe tours. Off-refuge programs were given to 1390 participants.

Pea Island NWR Public Use Programs

Bird Walk	475
Adaptations	77
Soundside Discovery	63
Turtle Talk	109
Family Canoe Tour	226
General Canoe Tour	241

9. Fishing

Pedestrian surf fishing continued to be the major form of consumptive, wildlife-oriented recreation on Pea Island NWR during 2008. 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 31.

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 51,500 visits were spent fishing on Pea Island NWR. The annual Crabbing/Fishing Rodeo was held the second Saturday in June with approximately 300 participants.

11. Wildlife Observation

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 two impoundments, the needs of the public were seriously and diligently considered. There are many Refuge visitors who realize and support this policy. Special permits are issued periodically for guided bird observation in the South Pond area.

2008 Wildlife Observation Visits

Foot	650,000
Boat	7,800
Vehicle	0

12. Other Wildlife Oriented Recreation

The photo-blind, installed during 1995, continued to be utilized fully during 2008. An estimated 1,500 visitors used the photo blind.

15. Off-Road Vehicles

Signs forbidding vehicle access to the beach and closed refuge roads are a deterrent for most visitors. Occasionally visitors make their way on the beach or closed management road. New signs are installed at various sites on the beach side as the need arises due to newly created openings.

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, NPS law enforcement is maintained regularly, though not constantly, on the refuge. The most common law enforcement problems are public nudity, littering and dogs off-the-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 occur within the refuge boundaries in the Pamlico Sound. These types of violations are difficult to detect and the violators are difficult to apprehend. For details on the law enforcement program, see section H-17 of the Alligator River NWR ANR.

18. Cooperating Associations

The Coastal Wildlife Refuge Society (CWRS) is the primary cooperating association and friends group for both Alligator River and Pea Island National Wildlife Refuges. The Society also provides guidance and support for other refuges in North Carolina and serves as a mentoring organization for the fledgling friends groups at Mackay Island and Pocosin Lakes.

CWRS operates a very popular book store/gift shop from the Pea Island Visitor Center. This retail sales unit is the primary source of revenue for the Society. In FY 2008, the sales unit grossed \$125,940. In addition, a majority of the \$6300+ received in donations was through donation boxes at Pea Island NWR.

During 2008, the refuges and CWRS continued to play a major leadership role in the annual Wings Over Water (WOW) event. For more details about Wings Over Water and other Coastal Wildlife Refuge Society activities, please see section H-18 of the Alligator River NWR ANR.

I. EQUIPMENT AND FACILITIES

1. New Construction

During 2008, the refuge and Coastal Wildlife Refuge Society partnered to upgrade the Pea Island Visitor Center and add a wildlife observation area on the west side overlooking North Pond. The Society contracted Ron Marchand for labor; materials were purchased with Fee Demo funds received from the Regional Office. In all, the following were accomplished:

- Construct multi-sided observation area with windows facing N, NW, W, SW, and S.
- Purchase two Zeis spotting scopes and tripods.
- Purchase 32" digital photo frame.
- Install bamboo flooring in the new area.
- Clean and refurbish carpet.
- Add fatigue mat to area behind counter.
- Create a "Friends Corner" with info about CWRS, CPN, etc. This area also has a donation box and membership info.

3. Major Maintenance

- Made mechanical repairs to North Pond and New Field pump engines.
- Built pump pad & removed MWI pump from South Pond (PI) & set up in New Field.
- Made dike repairs at South Pond, New Field and North Pond pump sites. Assisted with water management in all 3.

4. Equipment Utilization and Replacement

- Removed excess sand from the north entrance of North Pond Road. Extensive amounts of wind blown sand (from storm events) accumulates, closing off vehicular access at the entrance of the impoundment perimeter road.
- Mowed Pea Island impoundment dikes / roads and fire breaks.
- Pumped / maintained North Pond and New Field impoundments to target levels.
- Pumped into South Pond with (portable) MWI pump to maintain impoundment water levels.

6. Computer Systems

Pea Island NWR is still dealing with minor connectivity issues between the State and Federal servers since the State reconfigured their connection in 2007. Minor amounts of technical support were required to keep Pea Island NWR computers running in 2008.

8. Other

- Maintenance staff assisted with coordination of Pea Island NWR volunteer work projects.
- Assisted with all relevant fire related activities, including prescribed burning efforts at Alligator River, Pea Island, Pocosin Lakes, Mackay Island and Cedar Island refuges.
- Completed all required (SAMMS, RONS, RCAR, RPI, OGM, Fleet Management,

- Capitalized Property, etc.) database input requests.
- Coordinated exchanges of equipment (& personnel as needed) with Mattamuskeet, Pocosin Lakes, Roanoke River, Mackay Island, Pee Dee Refuges, Navy Dare Bombing Range (DOD) and Cape Hatteras National Seashore (NPS).
- Staff and volunteers made appropriate preparations for hurricane season.
- Cleaned up around all facilities in preparation for and participated Regional Environmental & Safety audit.

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

This Annual Narrative Report was a joint effort by the refuge staff, with compilation by OA Adam Fauth and editing by Volunteer Diane McFarlane and DRM Scott Lanier.

Photo Credits:

FWS	Fish & Wildlife Service
WT	Will Thompson