

REVIEW AND APPROVAL

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

MANTEO, NORTH CAROLINA

ANNUAL NARRATIVE REPORT

Calendar Year 1999, 2000, 2001

Michael R. Bryant
Refuge Manager

11-12-04
Date

C. J. St.
**Refuge Supervisor
Review**

11/18/04
Date

Bad Olvera
Regional Office Approval

1/19/05
Date

A. HIGHLIGHTS

On April 27, 2001 Alligator River NWR lost one of its own, Murphy Peterson, in a tragic vehicle accident. Special Section

Several Tropical Storms and Hurricanes impacted the area in 1999. Section B.

The Comprehensive Conservation Planning process was initiated in 2000. Section D.

Bernice Kitts received a Regional Director's Honor Award in 1999. Section E.

In 2000, 27 wildfires burned more than 1,700 acres. Section F.

A wild turkey restoration project was established on the Refuge in early 1999. Section G.

Volunteer hours for Alligator River and Pea Island NWR's totaled almost 27,000 hours in 2000 and 2001. Section H.

Film producer Jack Hannah visited the Refuge in 1999 to film some footage for the television show *Wild America*. Section H.

On October 8, 1999, a Charles Kuralt Trail Dedication was held at the Creef Cut Wildlife Trail on Alligator River NWR. Section H.

The Coastal Wildlife Society received the Governor's Award as Conservation Organization of the Year for 2000. They continue to provide valuable support to Refuge programs. Section H.



Murphy (Murph) G. Peterson

February 15, 1940 – April 27, 2001

On April 27, 2001 Alligator River NWR lost one of its own in a tragic vehicle accident. At approximately 10:45 a.m., Murph Peterson was killed in a single vehicle accident on U.S. Highway 64 near the intersection of Brakewood Drive about two miles north of Manteo. Murph was hauling a large, all-terrain forklift on a Refuge truck-tractor and lowboy unit back to the Alligator River Refuge maintenance facility when he had to brake suddenly in traffic. The 17 ton forklift broke loose from its bindings and rolled forward, crushing the cab of the truck. Murph was very proud of his job with the Service. He started his career with the U.S. Fish and Wildlife Service at Alligator River NWR on May 22, 1990 as a Tractor Operator. On June 14, 1992 he was promoted to an Engineering Equipment Operator position.

The following is an excerpt from the eulogy prepared by Refuge Manager Mike Bryant:

To Ms. Eileen, friends, and co-workerswe grieve over the loss of Murphy Peterson. And on behalf of the United States Fish and Wildlife Service and the National Wildlife Refuge System family of Murph's co-workers I extend our sympathies to you.

For 11 years, on a very young Alligator River National Wildlife Refuge, Mr. Murphy G. Peterson Sr., made significant contributions-they are his legacy. Alligator River Refuge is a very big place full of life and promise....these qualities matched Murphy's. And we find the imprint of Murph's large, strong hands everywhere we turn. He helped fix a hundred miles of roads... that were wornout, rutted logging paths to the fine roads they are today. Now, they are roads that his co-workers can safely fight fire from and roads that the public can use to go enjoy hunting and fishing. In winter, when a thousand ducks fly up from our waterfowl impoundments or anytime a storm threatens to flood the

Refuge.... Murph's hands are there....reminding us to tend the pumps. He helped teach..... with a broad, shining smile, a full voice, and a laugh that could rattle windows..... At our wildlife festival he helped little kids build their own birdhouses.....taking hammer blows to his thumbs... all the time grinning at children and giving them encouragement.....telling them they can finish it! If you went to the Laurel Bay Pumps in the spring he'd show you how to run and care for them AND he'd show you HIS alligator, but he'd tell you they had a long distance friendship.....he said if that gator looks at us we're gettin in the truck!

Murph has handed the work to us. We have the good fortune to be stewards of a piece of creation. We won't fail him because he would not let us fail when he was here. He is missed. And for many tomorrows he will be missed. When we have to fix a road or move water we'll want Murph.....we'll take that deep breath.....we'll remember his strength and his smile and they will be powerful remedies to counteract our fears and concerns. With time, our grief will mellow..... BUT.... Our memories of Murphy Peterson - when we see his strong hands and broad smile in the land and on the water at every turn in our wildlife Refuge - will lift our spirits and nourish our souls and give us the resolve to do the work we have been given to do. Farewell Murph.

We'll see you across the river... And God's peace to all of us.

B. CLIMATIC CONDITIONS**1999 ALLIGATOR RIVER NWR WEATHER DATA**

Month	Maximum Temperature	Minimum Temperature	Total Rainfall
January	80	18	4.35
February	74	25	2.22
March	81	23	3.13
April	91	34	1.56
May	94	50	4.71
June	95	54	6.46
July	97	49	3.37
August	100	59	8.88
September	86	49	10.34
October	85	39	4.93
November	79	31	1.22
December	76	20	1.71
Total	-	-	53.61 inches

The average annual rainfall for the area is 51.30 inches.

1999 was a very active tropical year with one tropical storm and two hurricanes affecting the Outer Banks area. September 4, TS Dennis passed through the area bringing heavy rains and 70 mph winds.

Beginning September 15, 1999, Hurricane Floyd blew across eastern North Carolina causing widespread flooding and devastating farms, livestock, homes, and businesses. More than 55,000 homes were flooded with 15,000 of them becoming uninhabitable and 8,000 being completely destroyed. Torrential rains and 105 mph winds impacted Refuge resources.

October 18, Category 1 Hurricane Irene with 90 mph winds was also recorded. Damage from these storms included numerous trees down and minor facility damage.

2000 ALLIGATOR RIVER NWR WEATHER DATA

Month	Maximum Temperature	Minimum Temperature	Total Rainfall
January	75	21	6.36
February	77	25	2.15
March	84	32	1.60
April	82	32	4.09
May	94	42	4.95
June	95	50	8.99
July	94	59	7.87
August	93	55	7.61
September	88	50	7.88
October	86	36	0.35
November	78	23	3.44
December	75	20	4.69
Total	-	-	59.90 inches

Tropical Storm Helene grazed the area in late September 2000 with 50 mph winds. No significant damage was recorded on the refuge.

2001 ALLIGATOR RIVER NWR WEATHER DATA

Month	Maximum Temperature	Minimum Temperature	Total Rainfall
January	75	16	1.39
February	80	19	1.99
March	80	23	2.83
April	89	29	1.28
May	96	67	1.51
June	93	57	6.72
July	94	55	3.14
August	96	59	3.70
September	89	48	2.11
October	87	30	1.69
November	82	25	0.35
December	79	21	0.88
Total	-	-	27.59 inches

The remnants of Tropical Storm Allison passed by the area on June 15 with no major damage.

C. LAND ACQUISITION

2. Easements

The red wolf recovery program is partner to conservation and access agreements with various private land owners. The current agreements and effective dates are shown below.

Red Wolf Program Partners

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

D. PLANNING

1. Master Plan

Comprehensive Conservation Planning (CCP)

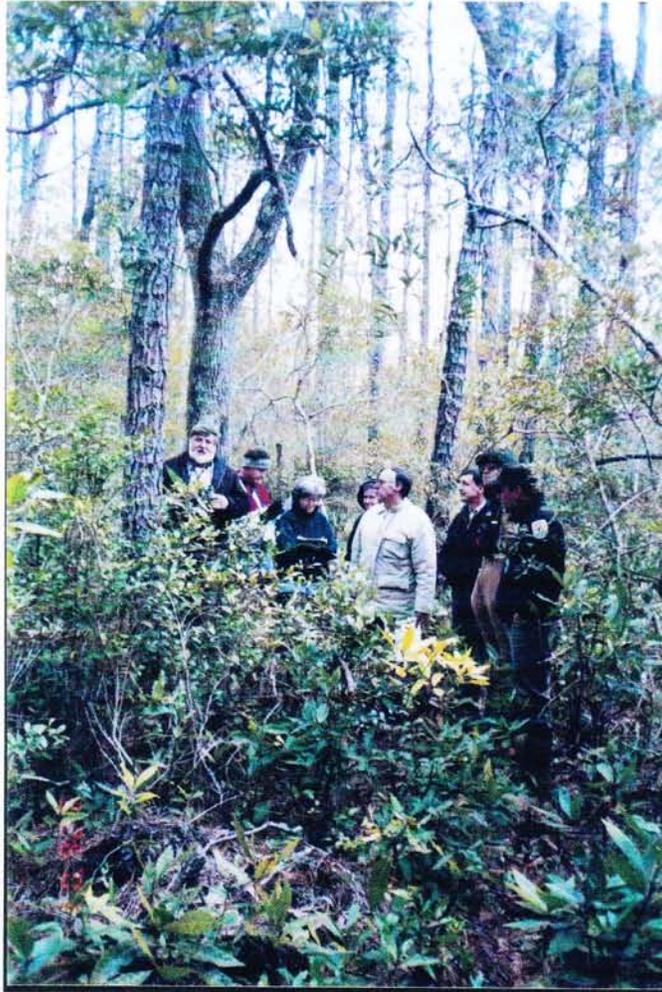
The CCP process was initiated in 2000. At initial planning meetings, the Refuge and planning staff discussed strategies for completing the plan, identified their issues and concerns, and compiled a mailing list of likely interested government agencies, non-government organizations, businesses, and individual citizens. The Service invited these agencies, organizations, businesses, and citizens to participate in four public scoping meetings on June 26 and 27, 2000 in Rodanthe and Manteo, North Carolina. The staff introduced them to the Refuge and its planning process and asked them to identify their issues and concerns. The staff published announcements giving the location, date, and time for the public meetings in the Federal Register and legal notices in local newspapers. The staff also sent the announcements as press releases to local newspapers and as public service announcements to television and radio stations. The planning staff placed fifty posters announcing the meeting in local post offices, local government buildings, and stores.

The Service expanded the planning team's identified issues and concerns to include those generated by the agencies, organizations, businesses, and citizens from the local community. These issues and concerns formed the basis for the development and comparison of the objectives in the different alternatives described in this environmental assessment.

The alternatives were subjects of discussion at a second round of four public meetings on September 25 and 26, 2000 in Rodanthe and Manteo, North Carolina. The planning staff again published announcements giving the location, date, and time for the public meeting as legal notices in local newspapers. They also sent press releases to local newspapers and as public service announcements to television and radio stations. The staff placed seventy-five posters announcing the meeting in local post offices, local government buildings, and stores.

At the second round of public meeting, members of the public expressed concern that the three alternatives being considered did not represent a wide enough range of alternatives. The Refuge staff developed alternatives 4 and 5 in response to those concerns. Alternative 4 assumes that natural forces will dominate the landscape from the north end of North Pond to Oregon Inlet. Alternative 5 assumes that, except for the impoundments and administrative sites (buildings and their parking lots), natural forces will dominate throughout the Refuge.

A Wilderness Review as part of CCP Planning for Alligator River National Wildlife Refuge was conducted in 2001. No recommendations for wilderness designations were made.



A wilderness review was conducted in 2001 as part of the CCP initiative.
USFWS

E. ADMINISTRATION

1. Personnel - 1999-2000

NAME	POSITION	STATUS	EOD
1. Jim Beasley	Forestry Tech. (Fire) GS-0462-07	PFT	05/26/85
2. Art Beyer	Wildlife Biologist, GS-0486-09	PFT	12/02/90
3. Ben Bryant	Police Officer, GS-0083-05 – transferred to NPS in New Orleans 04/09/00	NTE 1 Yr	01/17/99
4. Mike Bryant	Refuge Manager, GS-0485-14	PFT	04/14/96
5. Eric Craddock	Eng. Equip. Operator, WG-5716-08	PFT	02/21/93
6. Bruce Creef	Eng. Equip. Op. Supv., WS-5716-07	PFT	04/21/71
Cont.			

7. Rhonda Clay	Student Trainee, GS-0499-04 – transferred to D'Arbonne NWR	PFT	06/08/98
8. Tom Crews	Fire Mgmt. Officer, GS-0460-12	PFT	01/22/95
		JJJ	01/22/93
9. Thomas Eagle	Forester, GS-0460-07 – transferred to Blackwater NWR 08/17/98	TERM	04/30/95
10. Alan Emery	Automotive Worker, WG-5823-08	PFT	05/22/88
11. Kris Fair	Biological Tech., GS-0404-06/07	Seasonal	09/27/98
12. Joseph Folta	Biological Tech, GS-0404-05 – resigned 04/25/99	NTE 1 Yr	07/20/97
13. Elizabeth Fritsch	Refuge Op. Specialist, GS-0485-09 – transferred to NCTC 01/16/00	PFT	01/12/92
14. Daniel Fritsch	Biological Tech., GS-0404-4 – appt. 01/18/88	NTE 1 Yr	07/20/97

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year Office Automation Assistant, GS-0725-05 vacancy effective 03/14/99. The appointment was extended for an additional year on 03/14/00.

Ben Bryant was hired in a NTE 1 year Police Officer, GS-0083-05 position effective 01/17/99. The appointment was extended for an additional year 001/17/00. Mr. Bryant

resigned on 04/09/00 to accept a position as a full-time Park Ranger (LE) with the National Park Service in New Orleans.

Scott McLellan was selected to fill a permanent, full-time Biological Technician (Red Wolf Program), GS-0404-05 vacancy effective 02/28/99. He received a career-ladder promotion to a GS-6 on 02/27/00.

Coop Student Rhonda Clay returned to school on 02/29/99. On 03/12/00 Rhonda was transferred to D'Arbonne NWR.

Temporary (1040) Forestry Technicians (Firefighter) Patrick Haltigan and John Houchins' appointments were extended for 1 additional year effective 03/15/99. Mr. Haltigan resigned effective 03/14/00. Mr. Houchins resigned effective 08/14/99.

Jim Wigginton transferred to Alligator River NWR on 03/28/99 as an Assistant Refuge Manager, GS-0485-12.

Biological Technician, GS-0404-05 Ford Mauney transferred to Alligator River NWR on 03/28/99. He resigned on 07/04/99.

John Wallace received a career-ladder promotion to Deputy Refuge Manager, GS-0485-13 effective 04/11/99.

Temporary Biological Technician Joe Folta resigned on 04/25/99.

Cathy Sprague, temporary Park Ranger, resigned effective 06/06/99.

Biological Technician Brain Van Druten's temporary NTE 1 year appointment was extended for 1 additional year effective 06/07/99. The appointment was terminated 06/06/00. On 06/19/00 he was selected for a 30 day emergency appointment as a Forestry Technician (Firefighter), GS-0462-05. The appointment was extended for an additional 30 days on 07/19/00 and terminated 08/17/00.

Victor Miller was selected for a temporary, NTE 1 year Biological Technician, GS-0404-05 position effective 06/18/00.

Temporary NTE 1 year Biological Technician Dan Fritsch's appointment was terminated on 07/18/99.

Career-seasonal Forestry Technicians (Firefighter) Craig Scheibel and Amy Midgette were promoted to GS-5's on 08/01/99.

Jerry Campbell was hired in a 30 day emergency appointment as a Maintenance Worker, WG-4749-05 effective 08/02/99. The appointment was extended for an additional 30 days on 08/31/99 and terminated 09/30/99.

Anicia Martinez was selected to fill a temporary, NTE 1 year Secretary, GS-0318-05 vacancy effective 08/15/99. The appointment was extended for an additional year on 08/15/00.

Anthony Ralph was hired in a 2 year term appointment as a Maintenance Worker, WG-4749-05 position effective 08/30/99.

Engineering Equipment Operator (Fire) Bobby Govan's position was changed from career-seasonal to full-time effective 09/26/99.

Biological Technician Kris Fair received a career-ladder promotion to a GS-6 effective 10/24/99 and to a GS-7 on 10/22/00.

Mike Martin was selected for a NTE 1 year Biological Technician, GS-0404-05 position effective 11/07/99. The appointment was extended on 11/07/00.

Bonnie Strawser received a promotion to Park Ranger (Interpretive Specialist), GS-0025-12 effective 11/21/99.

Dennis Stewart received a promotion to Wildlife Biologist, GS-0486-12 effective 01/05/00.

Refuge Operations Specialist Elizabeth Fritsch transferred to the National Conservation Training Center on 01/16/00.

Wildlife Biologist (Red Wolf Program) Brian Kelly transferred to Albuquerque, New Mexico effective 04/23/00.

Andrew Kurtz was selected in a career-seasonal Forestry Technician (Firefighter) position on 05/07/00. He resigned on 12/17/00.

Leslie Schutte was hired to fill a 30 day emergency appointment as a Biological Technician, GS-0404-04 effective 05/08/00. The appointment was extended on 06/07/00 and terminated 07/06/00. On 08/27/00 Leslie was selected to fill a temporary, NTE 1 year Biological Technician, GS-0404-05 vacancy.

Anna Kroyer was hired in a 30 day emergency appointment as a Park Ranger, GS-0025-03 effective 05/22/00. The appointment was extended on 06/21/00 and terminated 07/20/00.

Wildlife Biologist (Red Wolf Program) Jennifer Gilbreath resigned effective 07/02/00.

Park Ranger Kim King-Wrenn received a career-ladder promotion to a GS-7 effective 07/16/00.

Forestry Tech (Fire) Eric Meekins was promoted to an Engineering Equipment Operator (Fire), WG-5716-08 career seasonal position effective 07/16/00.

Tracey Hunt was hired in a 30 day emergency appointment as a Biological Technician, GS-0404-05 effective 10/23/00. The appointment was extended on 11/23/00 and terminated 12/22/00.

SCEP Student Charles Mathis entered on duty as a Student Trainee (Wildlife) on 08/13/00. He returned to school on 12/03/00.

2001 PERSONNEL

NAME	POSITION	STATUS	EOD
1. Jim Beasley	Forestry Tech. (Fire) GS-0462-07	PFT	05/26/85
2. Art Beyer	Wildlife Biologist, GS-0486-09	PFT	12/02/90
3. Mike Bryant	Refuge Manager, GS-0485-14	PFT	04/14/96
4. Eric Craddock	Eng. Equip. Operator, WG-5716-08	PFT	02/21/93
5. Bruce Creef	Eng. Equip. Op. Supv., WS-5716-07	PFT	04/21/71
6. Tom Crews	Fire Mgmt. Officer, GS-0460-12	PFT	01/22/95
7. Alan Emery	Automotive Worker, WG-5823-08	PFT	05/22/88
8. Kris Fair	Biological Tech., GS-0404-07	Seasonal	09/27/98
9. Buddy Fazio	Wildlife Biologist, GS-0486-13	PFT	04/22/01
10. Bobby Govan	Eng. Equip. Op., WG-5716-08	PFT	09/03/93
11. Donnie Harris	Forestry Tech. (FCO), GS-0462-08	PFT	01/11/96
12. Kelley Hays	Fire Mgmt. Officer, WUI, GS-0401-11	PFT	12/16/01
13. Travis Hux	Forestry Tech. (Fire), GS-0462-04	1040	07/01/01
14. Kim King-Wrenn	Park Ranger, GS-0025-07	Seasonal	08/02/98
15. Bernice Kitts	Office Assistant, GS-0303-07	PPT	04/02/95
16. Janice Lane	Office Assistant, GS-0303-07	PFT	03/25/90
17. Chris Lucash	Wildlife Biologist, GS-0486-11	PFT	12/02/98
18. Mike Martin	Biological Tech., GS-0404-05	NTE 1 Yr	11/07/99
19. Anicia Martinez	Secretary, GS-0318-05	TERM	07/29/01
20. Jennifer Marzluf	Biological Tech., GS-0404-05	NTE 1 Yr	11/04/01
21. Charles Mathis	Student Trainee (WL), GS-0049-04	PFT	08/13/00
22. Scott McLellan	Biological Tech., GS-0404-07	PFT	02/28/99
23. Eric Meekins	Eng. Equip. Op. (Fire) WG-5716-08	PFT	10/25/93
24. Amy Midgett	Forestry Tech., (Fire) GS-0462-05	Seasonal	05/14/93
25. Victor Miller	Maintenance Worker, WG-4749-05	NTE 1 Yr	06/03/01
26. Mike Morse	Wildlife Biologist, GS-0486-09	PFT	04/09/89
27. Jonathan Powers	Eng. Equip. Op., WG-5716-08	PFT	04/24/88
28. Anthony Ralph	Maintenance Worker, WG-4749-05	TERM	08/30/99
29. Michele Raphoon	Park Ranger, GS-0025-05	NTE 1 Yr	04/22/01
30. Lester Sawyer	Maintenance Worker, WG-4749-05	NTE 1 Yr	12/21/01
31. Craig Scheibel	Forestry Tech., (Fire) GS-0462-05	Seasonal	03/03/96
32. Leslie Schutte	Biological Tech., GS-0404-5	NTE 1 Yr	08/27/01
33. Dennis Stewart	Wildlife Biologist, GS-0486-12	PFT	12/27/91
34. Bonnie Strawser	Park Ranger (Inter.), GS-0025-12	PFT	12/31/80

35. Glen Stratton	Forestry Tech. (FCO), GS-0462-08, transferred to Merritt Island NWR 03/11/01	PFT	09/01/96
36. Brian Van Druten	Forestry Tech., GS-0462-05	PFT	02/25/01
37. John Wallace	Deputy Project Leader, GS-0485-13	PFT	02/15/98
38. Kathy Whidbee	Office Assistant, GS-0303-05	TERM	06/03/01
39. Jim Wigginton	Refuge Manager, GS-0485-12	PFT	03/28/99

The following employees received awards during 2001:

On-The-Spot Award

Leslie Schutte (01/01/01, 08/27/01, 10/21/01); Mike Morse (02/11/01, 08/27/01, 10/21/01); Chris Lucash (01/01/01, 08/27/01, 10/21/01); Alan Emery; Art Beyer (08/27/01, 10/21/01); Scott McLellan; Kathy Whidbee (08/27/01, 10/21/01); Mike Martin; Eric Craddock; Jonathan Powers

STAR Award

Bernice Kitts; Art Beyer; Donnie Harris; Anthony Ralph; Michele Raphoon;

Quality Step Increase

Scott McLellan; Bernice Kitts; Kim King-Wrenn; Mike Bryant; Chris Lucash

Following is a list of the various personnel changes that took place in 2001:

On 02/25/01 Brian Van Druten was selected for our permanent, full-time Forestry Technician, GS-0462-05 vacancy.

Biological Technician Scott McLellan received a career-ladder promotion to a GS-7 effective 02/25/01.

Gabriela Gonzalez and Amy Matusz were hired in 30 day emergency appointments as Biological Technicians, GS-0404-05 effective 02/26/01. The appointments were extended for an additional 30 days on 03/28/01 and terminated 04/26/01.

Forestry Technician Glen Stratton transferred to Merritt Island NWR effective 03/11/01.

Buddy Fazio arrived on duty on 04/22/01 as the new supervisor (Wildlife Biologist, GS-0486-13) for the Red Wolf Recovery Program.

Michele Raphoon was selected as a temporary, NTE 1 year Park Ranger, GS-0025-05 effective 04/22/01.

On 04/27/01 Engineering Equipment Operator Murphy Peterson was killed in a single vehicle accident while hauling heavy equipment between Pea Island and Alligator River Refuges.

SCEP student Charles Mathis returned to duty on 05/20/01. He returned to school on 08/26/01. On 10/22/01 he was called to active duty with the military and his status with us was changed to LWOP - US Operation Enduring Freedom.

Kathy Whidbee was selected for a 4 year term appointment as an Office Assistant, GS-0303-05 for the Red Wolf Recovery Program effective 06/03/01.

Victor Miller was hired in a temporary, NTE 1 year Maintenance Worker, WG-4749-05 position effective 06/03/01.

Travis Hux was selected for a 1040, Forestry Technician (Firefighter), GS-0462-04 position on 07/01/01.

Anicia Martinez was selected for a 4 year term appointment as a Secretary, GS-0318-05 effective 07/29/01.

Biological Technician Leslie Schutte's NTE 1 year position was extended for 1 additional year effective 08/27/01.

Engineering Equipment Operator Donnie Harris was selected for our vacant Forestry Technician (FCO), GS-0462-08 vacancy (VICE Stratton) effective 09/23/01.

Engineering Equipment Operator (Fire) Eric Meekins' position was changed from career-seasonal to permanent, full-time.

Engineering Equipment Operator (Fire) Bobby Govan was selected for our vacant Engineering Equipment Operator (O&M - VICE Peterson) position effective 10/07/01.

Jennifer Marzluf was selected as a temporary, NTE 1 year Biological Technician, GS-0404-05 effective 11/04/01.

Temporary Biological Technician Mike Martin's temporary appointment ended on 11/06/01.

Lester Sawyer was selected as a temporary, NTE 1 year Maintenance Worker, WG-4749-05 effective 12/21/01.

Kelley Hays was selected to fill our vacant Fire Management Officer (WUI), GS-0401-11 vacancy on 12/16/01.

4. Volunteer Program

This section includes information for volunteers from both Alligator River and Pea Island National Wildlife Refuges. During 1999, volunteers contributed 23,068 hours, in 2000, 26,803 hours, and in 2001, 26,759 hours. The majority of the work was for maintenance, resource support, and public use and outreach. The volunteer of the year was Pat Moore for 1999, Bob Burrell for 2000, and Dru Ferrence for 2001.

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

A workcamper program was initiated in 2000 when two trailer pads were installed at Pea Island near the Refuge office. The campers are provided free electric, gas, and phone hook-ups in exchange for volunteer hours. The following people served as workcampers during 2000 and 2001.

Helen & Oscar Allison
 John & Sara Gilmore
 Alice Robinson & John Pope
 Paul & Gayle Kite
 Mark & Marybeth Sheinbaum
 Sara & Dick Donaldson
 Vida & Donald Heckerman
 Muriel and Jimmy Smith

The following students served as interns:

1999: May-Aug: Chris Farrell, Jane Bailey, Michael Schmans, Michelle Cienek, Mike Carlo, Sherame Haugh, Sydney Flowers
 2000 Sept - new! RW Telemetry Intern program –Chris Crow
 2000 - Lisa Leonard, Erin Bowers, Amanda Bullington, Michelle Mancinelli, Paul Williams, Tori Clancy, Tracey Hunt – May – August
 Gabriela Gonsales, Vincent Slabe – October – December
 2001 May-Aug PINWR: Tina Walthers and Andy Winz
 March PINWR: Anne Mechard
 May-Sept PINWR: Kim Klosterman
 May-Aug ARNWR: Greg Queens and Eli Golfer
 May-Sept ARNWR: Adrienne Paoletta and Eric Forbes
 Matt Martin, Derek Meier, Tray Biasioli, Brian Meador,
 Rachel Partington, Tony Beurskens, Amy Matusz
 Sept-Nov Lukas Baumgaertel

Red Wolf Interns:

1999 Anne Casey, Rebekah McCune, Dr. Scott Larsen
 2000 Krista Noel, Will Pettit, Amy Mateusz, Michelle McPherson, William Metcalf, Dr. Gladys Kalema, Dr. Scott Larsen, Brian Melor

2001 Derek Meier, Tray Biasiollii, Kim Klosterman, Andy VonDuke, Laurie Bass, Matt Martin, Caryl Woolley, Jenny McKay, Ben Bellows

5. Funding

<u>Fund</u>	<u>Name of Fund</u>	<u>FY99</u>	<u>FY00</u>	<u>FY01</u>
1113	Red Wolf	525.0	684.4	914.1**
1230	Migratory Birds	1.5	1.5	0
1261	Refuge Operations	818.0	879.8	1125.3***
1262	Maintenance	225.0	204.2	337.4
29..	Storm Damage*	300.8	453.6	1747.9
8555	Federal Roads	0	0	45.0
8550	Pest (So.Pine Btl)	140.3	70.0	80.0
9251	Fire Operations	385.7	403.3	541.2
9263	RX Burns	0	188.3	150.0
9264	WUI	0	0	216.6
TOTAL		2396.3	2885.1	5237.5

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

**Asheville FO position moved to Alligator River; additional funding is for salary and red wolf breeding facility in Tacoma, WA.

***Increase of 233.0 is due to addition of CCP office to Alligator River funding code.

6. Safety

Monthly safety meeting were attended by all staff members throughout the period.

F. HABITAT MANAGEMENT

1. General

Five categories of natural, vegetated habitat are found on ARNWR: marsh, pocosin, mixed-hardwood pine swamp, hardwood swamp, and white cedar swamp. These are classified as wetlands based on vegetation present, soil type, and hydro-period. ARNWR contains some of the last remaining large tracts of pocosin-type habitat along the east coast. Although much of the refuge is relatively unaltered by humans, large portions have undergone changes in

vegetation composition and hydrology caused by ditching and canal dredging for access and logging purposes. The purchase of the Prudential farmlands in March of 1988 added agricultural land to the list of habitats.

2. Wetlands

During 1999 - 2001 approximately 1,800 acres of moist soil were produced in prior converted farmland on the farm unit. Approximately 250 acres were planted in soybeans by cooperative farmers in 1999; 90 acres in 2000 and 690 acres in 2001. After harvest these units were flooded. In addition, in 2001 cooperative farmers planted approximately 270 acres of millet and milo in moist soil units. Approximately 900 acres were burned, disced, and managed for moist soil. Remaining acreage was just managed for moist soil. Agricultural crops were planted in an effort to control undesirable vegetation in the moist soil units. The effort was successful and waterfowl use in the flooded soybean stubble was excellent. Additional acres will be planted in crop during 2002, but crop rotations will be planned as a means for controlling undesirable plant species. From the evidence thus far, it appears that fire and discing are excellent management tools. It appears that intensive management practices are necessary to maintain the moist soil units in the most productive state.

In units that were disced before the end of June, overall production of desirable plants (wild millet, smartweed, fall panicum, switchgrass, foxtail, etc.) was greatly improved over previous years. Discing in July typically results in stands of foxtail and paspalum. Discing in late July and August is good for creating a mud flat but produces little to no food because of the need to flood units or first frost before seeds can mature.

For those units that were burned and disced, overall production of desirable plants (wild millet, smartweed, fall panicum, switchgrass, foxtail, etc.) was greatly improved over previous years. Moist soil units will receive similar treatment again in 2002, except those that were neither disced nor burned will be burned and disced.

3. Forests

Atlantic white cedar: The Atlantic White Cedar Project was initiated in 1992 to assess the status of existing Atlantic white cedar (AWC) stands on the refuge and regeneration of white cedar stands that were clear-cut prior to or immediately after the refuge was established. This project represented a collaborative effort between the refuge, N. C. State University, Dare County Bombing Range, and the N. C. Division of Forest Resources. All logging of white cedar after establishing the refuge was done through provisions of timber sales prior to Refuge ownership of the land. Extensive regeneration surveys involved 3,000 acres of land owned by the U. S. Air Force and the U. S. Fish & Wildlife Service from 1995 through 1997.

The project final report was completed in February 2000. The report includes data collected from 1995 through 1997 and management recommendations. FT Brian Van Druten gave a 15-minute presentation on the report at the Atlantic White Cedar Symposium in May at Christopher Newport University in Newport News, Virginia. Data analysis revealed high

variability within and between stands with regards to AWC stocking and competition for the 45 clear-cuts surveyed between 1995 and 1997. Twelve remnant, mature stands were visited in 1998. Overall, 35 (78%) of the stands appear to have adequate stocking for natural regeneration. Competition, mostly from shrub species appeared to be affecting growth in 34 of the 35 stands. Another factor affecting regeneration and growth appears to be the alterations in hydrologic regime as a result of road construction and skid trail ruts. Chemical release in some of these stands may be explored as a future management action, depending upon how the young cedars respond to competition.

In 1999 Refuge staff assisted the Dare County Bombing Range with a chemical release project using Arsenal on about 343 acres in 5 stands on U. S. Air Force property. The project was delayed until early November because of several tropical systems.

Cone collection in 1999 resulted in 19 pounds of cones being collected and transferred to the N. C. Division of Forest Resources Goldsboro Nursery. The poor cone crop was attributed to Hurricanes Dennis, Floyd, and Irene.

The table below presents acreage by vegetative community/land use currently under fee title ownership. See previous narratives for in-depth descriptions of the various forest/vegetative types.

**Habitat types and approximate acreages for Alligator River National Wildlife Refuge,
Dare and Hyde Counties, North Carolina**

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

4. Croplands

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

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

1999: Refuge cooperative farmers realized very poor production in 1999. One farmer harvested wheat at a rate of about 35 bu/ac. The other two farmers did not have any wheat planted. Soybeans production was almost totally eliminated because of storm damage and salt aerosol as a result of Hurricane Dennis. Yields varied from about 4 bu/ac up to about 9 bu/ac. Low prices severely affected the financial condition of the cooperative farmers. Price projections for winter wheat or other small grains planted in the fall of 1999 were so low that farmers were not willing to gamble on losing more money. Therefore, they did not plant any winter crops for harvest in 2000. Farmers disced approximately 100 acres in Refuge moist soil units.

Because of excessive rainfall from Hurricane Dennis water had to be retained in moist soil units in an effort to help cooperative farmers salvage crops. Continued rainfall resulted in moist soil units being flooded for an extended period which killed the vegetation. Subsequent decay of green vegetation rotted most of the see crop for wintering waterfowl. It was not possible to collect vegetation data because of water depths.

2000: Refuge cooperative farmers had moderate production in 2000. Soybeans had low to moderate yields of about 25 bushels/acre. One of the cooperative farmers did not get any land planted because of wet conditions during the planting window. Two farmers were unable to harvest oats and lespedeza because of very wet conditions at the time of harvest. Low prices severely affected the financial condition of the cooperative farmers. Price projections for winter wheat or other small grains planted in the fall of 2000 were so low that farmers were not willing to gamble on losing more money. Therefore, they did not plant any winter crops for harvest in the spring of 2001. Farmers planted approximately 190 acres of millet and milo in moist soil units and about 35 acres of purple hull field peas in farm field headland food plots.

The experimental plantings for corn were not continued, partly due to wet conditions during the planting window and partly because there were not any new pesticides for controlling wireworms in the soil types found on the refuge. So, our conclusion is, under present

conditions, it is definitely not feasible for farmers to grow corn on the Refuge for wildlife or economic benefit.

Overall in 2000, food production in the moist soil units was good to excellent as most units contained a frequency of occurrence of good to fair waterfowl plant species within an overall range of about 65%. This frequency correlates well with the portions of farm fields that can be effectively managed for moist soil vegetation. Shaping of the farm fields for surface drainage during land clearing resulted in about 1/3 of each field being too high and dry for cost-effective moist soil management

The "Other" column in the table is primarily for the purpose of recording data points that are barren of any vegetation. The percentage of the sample considered to be bare points (2.8%) is reasonable. The relatively high frequency of bare points in South Twiford Unit B and North Twiford Unit B was due to discing and planting late (late July) in the growing season.

Alligator River National Wildlife Refuge				
Moist Soil Waterfowl Food Production - 2000				
	Frequency of occurrence (%)			
Moist Soil Unit	Good	Fair	Non	Other
South Twiford Unit A	25.2	30.5	44.3	0
South Twiford Unit B	35.5	28.6	35.9	15.6
South Twiford Unit C	40.1	23.1	36.8	0.1
South Twiford Unit D	36.4	23.4	40.2	0
South Twiford Unit E	18.5	41.7	39.8	0
North Twiford Unit A	28.9	30.3	35.9	0
North Twiford Unit B	43.3	31.0	25.7	8.1
North Twiford Unit C	34.6	36.9	28.5	3.2
North Twiford Unit D	33.2	22.7	44.1	4
Creef A-1 North	36.3	34.4	30.0	0
Creef A-1 South	43.6	23.4	32.7	7
Creef A-2	48.9	22.1	29.8	1

2001: Refuge cooperative farmers realized poor production in 2001. Soybeans planted early without double cropping had yields of 32 bushels/acre, whereas double cropped soybeans returned yields of 19 bushels/acre. Oats averaged a rate of 76 bushels/acre and wheat was harvested at 42 bushels/acre. One farmer produced 1,000 lbs of millet seed on 20 acres, but

the crop was severely damaged by wind. The same farmer was unable to harvest lespedeza because of a frost/freeze. Low prices severely affected the financial condition of the cooperative farmers. Price projections for winter wheat or other small grains planted in the fall of 2001 were so low that farmers were not willing to gamble on losing more money. Therefore, very few acres of winter crops were planted for harvest in 2002.

Again, the experimental plantings for corn were not continued, partly due to wet conditions during the planting window and partly because there are no new pesticides for controlling wireworms in the soil types found on the refuge. At best planting untreated corn provides for nothing more than a healthy wireworm population.

Food production in the moist soil units was good to excellent in 2001 as most units contained a frequency of occurrence of good to fair waterfowl plant species within an overall range of about 64%.

The table below shows percentages of plant species based upon a relative value as waterfowl food.

Alligator River National Wildlife Refuge				
Moist Soil Waterfowl Food Production - 2001				
	Frequency of occurrence (%)			
	Good	Fair	Non	Other
South Twiford Unit A	25.2	30.5	44.3	0
South Twiford Unit B	47.9	19.9	32.2	15.6
South Twiford Unit C	31.6	24.8	43.7	0.1
South Twiford Unit D	21.9	6.1	72.2	0
South Twiford Unit E	31.5	25.5	43.1	0
North Twiford Unit A	22.6	21.4	43.8	0
North Twiford Unit B	48.7	23.6	27.8	8.1
North Twiford Unit C	58.8	23.0	18.2	3.2
North Twiford Unit D	32.1	15.0	52.9	0.5
Creef A-1 North	48.7	30.8	20.5	0
Creef A-1 South	60.0	7.5	29.8	2.8
Creef A-2	62.4	15.7	21.7	0.2
Average =	43	21	36	2.5
Overall food/non-food production =	64		36	2.5

9. Fire Management**1999-2001 Wildfires**

Year	# Fires	Total Acres
1999	11	73
2000	27	1,705
2001	11	460

Fire Management Program Overview:

By 1999, the ARNWR fire crew had evolved to consist of one FMO (shared as a District Resource), a Fire Control Officer (FCO), three Firefighter Equipment Operators (FFEO's) – two permanent and one career seasonal, and four firefighters (FF's), two career seasonal and two temporary. The Zone Dispatcher, servicing FWS R-4, District 1, was 50% funded out of fire as was one of the two office assistants, for a total of 8.5 FTE's.

In late 1998, a limited amount of burning was able to take place and Alligator River NWR was poised to hit it hard in 1999, however the weather was fairly uncooperative with Hurricanes Dennis and Floyd hitting during the late summer, leaving a wake of very wet conditions. As conditions improved into October, Tony Wilder and Ray Farinetti came to Alligator River and assisted FMO crews in achieving some training as RXB2. The Spencer's Creek marsh was burned just south of Manns Harbor, NC which was a key factor in protecting the community of Manns Harbor during the Roanoke Marshes wildfire the next summer (May 2000). Pete Kubiak from OAS came up to conduct helitorch training at ARNWR, and the Bureau of Land Management Helicopter was obtained by the region to assist the Refuge in conducting prescribed burning operations. Still, the weather remained fairly uncooperative, however, some landmark pocosin burns were completed at Long Shoal River at ARNWR during a week-long window of opportunity in mid-November in which over 5000 acres were completed in this area never before burned.

1999 Prescribed Burns

Farm Fields	500
Creef A1	30
PI 8.1.5	250
Creefwood	150
N. Twiford Dike	25
LSR 2.5.3	731
LSR 2.5.6	2,810
LSR #1	350
Laurel Bay	450
Quad 2.1.5	400
Laurel WHT	126
PI 8.1.4	100
Spencer 1	1,200
Twiford 1	168
Twiford Ag	100
Total	7,390

2000 Prescribed Burning

With the initial prescribed burning successes in the Fall of 1999 at Spencer's Creek and the Long Shoal River Fire Compartment (5,600 acres), fire crews on Eastern NC were looking forward to burning additional pocosins at ARNWR. A wet winter that lingered into mid-February frustrated continued efforts at burning. With the Bureau of Outdoor Reclamation helicopter (Bell 206 BIII Jet ranger), NPS pilot Bob Trick available, and all the firefighters and equipment operators itching to get started, the pocosin fuels remained damp and unavailable. Burns did occur at Pea Island. Otherwise, the time was utilized to prepare other areas for burning. Finally, our break came in mid-February as time was beginning to run out for Rx Burning due to our needs to prepare for the Spring wildfire season. The Little Fields Burn Units (228 acres and 324 acres) were burned, as were Quadrangle Units 1,2,3 and 5. This was the fourth attempt to burn at the Quadrangle 1 units. The last ignitions were after the March 1 date that we had earlier decided not to exceed due to wildland fire season considerations. In fact, on March 1, the "Test Fire" resulted in an escape from the attempt to burn the South Stumpy Point Burn Unit, and again, on March 3, the "Quad 5" wildfire resulted from the prescribed fire in this Rx Burn unit igniting the duff under the openings in the tree canopies. The "openings" were a result of our attempts during the previous fall to use head firing techniques in order to "force" the burning window for this unit when it was otherwise too wet to burn. All total, there were 15 Prescribed Burn Units treated with 27 separate ignitions in CY-2000.

2000 Prescribed Burns

Farm Fields	150
Quad 2.1.2	1,006
Laurel Bay Ag	200
2.5.4A LSR	550
PI 5&6	760
LF 4.3.8A	228
Quad 2.1.5	560
PI 8.1.4	171
LF 4.3.8B	324
Creef Ag	125
Quad 2.1.1	649
4.2.8	10
Quad 2.1.3	339
PI 8.1.7	200
Total	5,272

Wildfires:

A record number of wildfires were documented at ARNWR in CY-2000 – 27 fires for 1,705 total acres. The smallest fire suppressed was 1/10th acre and the largest was 1,552 acres. There were an unusual number of machine-caused wildfires at ARNWR in CY-2000 (19 separate fires). These were primarily a result of road construction activities. Both highways that traverse through the ARNWR, US-64 and US-264, were repaved and guard rails were installed during the year. The machine that heats up the asphalt and lays down a "rumble

strip” along the edge of the roadside caused the majority of the fires. All of these fires were suppressed by either Refuge fire personnel or VFD’s from Manns Harbor and Stumpy Point before they escaped the highway. The Quad 5 wildfire (90 acres), mentioned in the previous paragraph, required an extended attack fire organization with outside resources including a USFS Type 3 (Job Corps) hand crew to augment local and regional fire personnel. As the Spring Fire season went into April, ARNWR received an abundance of rainfall and most of the fire crew was dispatched to wildfires in Texas, Florida, Wisconsin and other locations. However, at the end of April, an ignition along the sound in the Roanoke Marshes Fire Compartment resulted in a large extended attack wildfire. This fire, the Roanoke Marshes Wildfire (1,552 acres), could have had disastrous consequences if not for the Spencer’s Creek prescribed burn (Fall of 1999) that separated the wildfire from the community of Manns Harbor. The fire was suppressed with 5 flextracked tractors, three CL-215 air tankers, a heavy air tanker from Asheville, and two medium helicopters by the end of the second burning period.

Other Significant Events:

- A career seasonal FFE0 position was created to augment the two existing permanent FFE0 positions at ARNWR. FF Eric Meekins was hired to fill the FFE0 position.
- Travis Hux was hired to fill the vacant temporary firefighter position at ARNWR.

2001 Regional Fire Management Review

Regional Fire Management Coordinator Roger Boykin and his staff conducted a Fire Management Review of the Refuges in Eastern NC in October 2001. Attending with Boykin were Wildfire Specialist Howard Poitevint, Fire Ecologist Dave Brownlie, Rx Fire Specialist Howard McCullough, and former National Fire Coordinator Frank Cole (now serving as a volunteer consultant). The team noted the overall progress that had been made on the refuges in wildfire preparedness and prescribed fire applications in keeping with the Refuge Fire Management Plans. The high level of cooperation between the refuges and cooperative relations with the North Carolina Forest Service (NCFS) was highlighted. The review yielded a list of recommendations to the Refuge Managers that is currently being used to guide the fire management programs on the refuges.

Prescribed Burning – Winter and Spring:

Although the winter and spring months of 2001 showed an overall shortfall in rainfall, there were frequent “moisture events” that kept the vegetation and potential fuels damp for most of this time. In fact, the Refuge staff had difficulty in implementing prescribed burns in the pocosins because of the frequency of the light rain and fog events prevented the fuels from reaching adequate dryness for burning. In fact, fuel sticks were only down to 14 and 15% levels only three or four times during the winter quarter when the Refuge traditionally conducts most of the pocosin burns and then only for a day or so at a time. Without having a helicopter available on the Refuge, it was determined that it was not cost effective to contract a helicopter for burning unless we could schedule several days in a row. This was due to the five hour flight time each way that a ship would have to travel (from Atlanta, GA or Charleston, SC) and then having to pay a minimum of three hours flight time for a daily availability for each day the helicopter was contracted, whether it flew or not.



From 1999-2001, 17,907 acres of Alligator River and Pea Island NWR's were prescribe burned. USFWS

The Refuge was able to conduct the Wildland Urban Interface hazardous fuels mitigation prescribed burn at Mashoes, NC (1,407 acres) on a combination of Refuge and private lands. We were also able to return to Stumpy Point and successfully burn the South Stumpy Point Unit. Located just south of Stumpy Point Bay and to the east of highway 264, an escaped test fire had aborted the first attempt at burning this unit the previous year. This was the first time any lands had been prescribed burned in these areas, near these communities. Community support was excellent for both projects. Residents from both communities have since expressed an interest in seeing more burning in the future. A reported wildfire at Cedar Island required the use of the helicopter to assist the Carteret County Ranger which knocked out an additional days burning during this time and no additional pocosins were burned at Alligator River NWR in 2001, though burning was performed in the farm field units and at Pea Island. All total, there were 11 ignitions resulting in 5,474 acres being burned at ARNWR for the year.

2001 Prescribed Burns

PI 8.1.1-3	1,501
1.1.3 Mashoes	1,407
NW Twiford	800
Creef A1A2	180
Creef Field	300
NE Twiford	266
Stump 2.4.1	591
S. Twiford1	200
Total	5,245

2001 Spring and Summer Fire Seasons:

Normally, Spring fire seasons have the highest potential for large wildland fires at ARNWR, due to the seasonally dry and windy conditions and relatively low live and dead fuel moisture usually experienced. Ironically, many of our fires occur in the summertime, due to lightning activity and seasonally low soil moisture in the pocosins. As Spring progressed in 2001, however, the frequent light rain events continued to keep the wildland fuels dampened, delaying the overall effect of the rainfall deficit being experienced. On several occasions, however, we had dry and windy conditions that provided some high fire danger periods. We had four wildfires responded to on the Refuge and assisted the NC Forest Service on four off-refuge fires. Overall, it was a fairly lackluster fire season.

With above average rainfall for June, summer began with little fire activity showing for the year, however, July and August showed a return of deficit rainfall. Water levels in the canals at nearby Pocosin Lakes NWR started dropping rapidly as did and the lake level at Mattamuskeet NWR. Salinity levels in Croatan Sound at Alligator River reached extremely high levels, and many of the primary canals at Alligator River NWR were literally down to sea level. A critical water shortage was in effect throughout the Carolinas by the end of the summer season. Fall of 2001 was to be one of the driest on record for Eastern North Carolina.

Western fires, particularly in the Northwest and in the Great Basin areas, caused the Nation to reach National Preparedness Level 5 early in the summer of 2001. ARNWR sent personnel to fires in Washington State, Wyoming, Colorado and other parts of the west.

2001 Fall Fire Season

By late October, the refuges were in a very high preparedness level and were staffing at a Readiness Level 4 or 5 almost daily. Drought indices were in the very high ranges and the NCFS resources were being drained by project wildfires on peat soils in Currituck County and in Brunswick County that burned for months costing hundreds of thousands of dollars in suppression costs. Smoke from the peat fires affected visibility and degradation of air quality in nearby towns and cities causing traffic accidents (some fatal) and smog alerts.

The cumulative effects of dry fuels and very low groundwater was indeed a very serious threat to Alligator River and Pocosin Lakes Refuges, the largest refuges in the country with almost exclusively peat soils. Fires at Pocosin Lakes threatened to repeat the problems experienced on the State fires, but were stopped by a combination of FWS and State resources, including the State CL-215 and single engine air tankers. Although the fires resulted in deep penetrating ground fire in the very dry peat soils, the quick responses held them to smaller areas so that the ground fires were suppressed over a period of about 10 days. Water had to be trucked in to the fires from nearby lakes and wells because nearby canals were dry.

A severity situation was declared for the refuges in Eastern NC and resulting funding allowed for the ordering of outside resources to assist local resources to beef up preparedness on the refuges. NPS Pilot Bob Trick and the Service helicopter 206RW and NPS Cessna, 32PS turned out to be invaluable aviation resources in the quick detection and suppression of wildfires on all the refuges, particularly because NCFS air resources were already stretched thin. Throughout the fall, NC refuges hosted over 75 detailers that assisted with preparedness and suppression

activities during the months of October, November and December. At years end, the total rainfall deficit was 30 inches for CY-2001. Farmers were saying that the land was the driest they had seen in 40 years.

Other Important Events

- A Bell 206B3 (Jet Ranger III) numbered 206 RW was put into service at the Manteo (NC) airport in early October, 2001. Its primary purpose is to assist in prescribed burning and wildfire suppression in the Southeast. It was stationed at Alligator River, and flown by NPS pilot Bob Trick. It was used extensively during the Fall wildfire season.
- South Stumpy Point Firebreaks (11 miles) were contracted in 2001, but remained incomplete at years end with approximately one more mile of construction remaining.
- Roanoke Marshes Compartment Firebreaks (9 miles) were completed by Retention Pond Services.
- FCO Glen Stratton, after four years of proactive and dedicated service at ARNWR, transferred back to Merritt Island NWR. Glen left behind a legacy of equipment and personnel development, an accelerated prescribed burning program and a much improved fire program. Among his many other achievements, Glen was responsible for pioneering the first wetland firebreaks at ARNWR which opened the door to an expanded prescribed burning program.
- FFE0 Donnie Harris was promoted to FCO, taking the place of Glen Stratton. Eric Meekins was hired to fill this vacancy.
- FFE0 Bobby Govan left the ARNWR fire crew to take a position on the maintenance crew. Jeff Swain was hired from Pocosin Lakes to take his place.
- Grants totaling around \$9,000 were provided for the Manns Harbor and Stumpy Point Volunteer Fire Departments from the newly developed National Fire Plan Rural Fire Assistance Program to begin training firefighters in wildland fire tactics and outfitting them with personal protective equipment.

10. Pest Control

a. Pest Plants: Cooperative farmers use herbicides and insecticides for pest control on croplands. Pesticide Use Proposals and Pesticide Use Reports are submitted on an annual basis in accordance with Service policy and guidelines. Extra efforts are required to control Phragmites communis in farm fields, moist soil units and along roadsides. These efforts include herbicides, burning, and discing where possible. During 1999, approximately 30 acres of Phragmites were treated with RODEO in moist soil units by cooperative farmers. This was in addition to the treatment they did in active farm land. Outside of the spraying done on active farm land by cooperative farmers, *Phragmites* was not treated on the Refuge during 2000 or 2001.

b. Southern Pine Beetle: Aerial surveys were conducted in 1999 to detect each active southern pine beetle (SPB) infestation. Two contracts were prepared and awarded for controlling these spots.

A 4-hour aerial survey conducted in July 2000 revealed 10 active spots on the Refuge. It was not possible to fly sooner because of the late allocation of funding. Each location was marked with a GPS unit and data were incorporated into the Refuge GIS database. The previously established goal of 100% control north of the Dare County Bombing Range was achieved. Inactivity in these spots is attributable to cutting buffers around active heads and natural declines in the pest population. A training session on southern pine beetle biology was conducted in July for interns and staff. A contract was awarded for controlling active spots on the southern end of the Refuge.

On April 5, 2001 Refuge staff joined staff from the NC Division of Forest Resources to learn how to set Southern pine beetle (SPB) traps on the Refuge. This is a cooperative effort to monitor the SPB level in North Carolina as part of the project by the Texas Forest Service to monitor SPB populations in the southeastern United States. Traps were checked weekly and left in place for one month. Results showed that Dare County was well below the state averages and our population was rated as static/low

Flights were conducted in May, July, and August, 2001. All active spots were marked with a GPS unit and included in the Refuge GIS database. Only one new spot was found in May and none were found in July. However, five new spots were found in August on the southern end of the Refuge. A contract was prepared and awarded for controlling these spots. Numerous difficulties with implementing the contract occurred. Among the difficulties were a late start, numerous mechanical breakdowns, slow felling of trees, and the equipment operator's inability to operate a GPS unit. The contract was not fully completed during 2001 and continued into 2002

Fall 1999 Hand Felling Contract: This \$11,976 contract was awarded to Bobby Tripp of East Carolina Tree Service from Ayden, NC. The primary objective of this contract was to clean up some "sloper" spots from previous mechanical felling contracts and required cutting approximately 1,200 trees. The contractor's outstanding work controlled 4 infestations totaling 3.9 acres. Total buffer cut amounted to 6.2 acres.

Fall 1999 Mechanical Felling Contract: This \$30,000 contract was awarded to Big Beaver Wood of Manteo, NC. Through this action, 9 infestations totaling 34.6 acres were controlled and an additional 45.6 acres of buffer was cut. In 2000, 5 of the 10 known active infestations were controlled. This work focused on the area south of Stumpy Point and east of U.S. Highway 264.

By the fall of 1999, a cumulative total of approximately 2,585 acres of Refuge timber had been impacted by SPB. Through cutting 138.5 acres of buffers nearly 25% of all SPB infestations were controlled. Best estimates suggest approximately 340 acres of SPB infestations remain as candidates for suppression.

G. WILDLIFE

1. Wildlife Diversity

The vast expanse of undisturbed swamp forest and wetlands on the Refuge contains many important wildlife and ecological resources. Since much of the Pamlico peninsula has been 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. Of these, 48 species are fish, 145 are birds, 48 are reptiles and amphibians, and 40 are mammals. The Refuge supports wildlife species which are 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 also lies at or near the northern limit of ranges for several vertebrate species, most notably, the American alligator.

2. Endangered and/or Threatened Species

Five endangered species have been documented on the Refuge. Management programs are in place for the red wolf and red-cockaded woodpecker. An inventory program is in place for the American alligator. There are no plans to manage specifically for or inventory bald eagles or peregrine falcons.

a. Federally Listed Endangered and Threatened Species

American alligator (Threatened by Similarity of Appearance): American alligators reach the northern extent of their range on the Refuge and probably were never very numerous in the area. 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. Alligator surveys were not conducted in 1998 due to insufficient funding and staffing.

Bald eagle (Endangered): During the course of the year immature and adult eagles have been observed on the Refuge. Although eagle sightings are becoming more common, no eagle nests have been confirmed on the Refuge as of this writing.

Peregrine falcon (Endangered): Peregrine falcons are known to move through the Refuge during migration. No reports of peregrine falcons occurred during 1998, 1999 or 2000.

Red-cockaded woodpecker (Endangered): Trails were cut to previously tagged cavity trees south of Whipping Creek Road. Rapidly spreading infestations of Southern pine beetle are threatening cluster sites and foraging habitat. Attempts to control the Southern pine beetle outbreak will continue.

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. In Fiscal Years 1999-2001, the average population of wild red wolves within the recovery area was 90-100 animals within an average of 14 packs.

Red Wolf Captive Breeding Program

As part of the Red Wolf Recovery Program, the Red Wolf Captive Breeding Program is effectively implemented by 33 captive facilities across the United States. In Fiscal Year 2001, there were 153 red wolves in the captive population. The captive breeding effort is coordinated by the Red Wolf Species Survival Plan leader located at the Point Defiance Zoo and Aquarium in Tacoma, Washington. This breeding program maintains genetic diversity among red wolves and prepares a small number of red wolves for possible release into the wild. In 2001, two female pups (out of a litter of seven) born at the Brevard Zoo in Melbourne, FL were fostered to a captive litter (only one male pup in litter) born at the Beardsley Zoo, Bridgeport, CT.

Red Wolf Island Programs

The Red Wolf Recovery Program and Red Wolf Captive Breeding Program partner with two U.S. Fish and Wildlife Service national wildlife Refuges to raise red wolves in wild settings on islands. Young wolves growing up on these islands learn survival skills that prepare them for release into the wild red wolf population in North Carolina in the vicinity of the Alligator River National Wildlife Refuge. The Cape Romain National Wildlife Refuge in South Carolina maintains a red wolf family group (2 to 5) on Bull Island that produces pups for eventual release in North Carolina. The St. Vincent Island National Wildlife Refuge in Florida maintains a pair of red wolves, also for breeding in the wild.

Red Wolf Adaptive Management Plan

During April 1999, a workshop was conducted by the Conservation Breeding Specialist Group (CBSG) of the IUCN's Species Survival Commission. The purpose of this workshop was to gather together experts who had studied wolves, coyotes, genetics, modeling and canid population biology to discuss the biological and ecological issues facing red wolf recovery. Four subject areas were identified to be the focus of the workshop: (1) red wolf population monitoring, (2) red wolf hybridization with coyotes, (3) selection of additional release site, and (4) the role of the captive breeding program.

After reviewing the data, the attendees of this workshop concluded that the proportion of hybrid litters from red wolf/coyote interbreeding was alarmingly high, and recommended that the workshop focus solely on issues surrounding red wolf/coyote hybridization. The result was a work plan that details an adaptive management approach to these issues that is based on the recommendation from the CBSG workshop. The goal of this adaptive plan is to reduce hybridization between red wolves and coyotes to a level that does not threaten the long term genetic integrity of the red wolf in the wild. The following tasks were implemented under this plan: (1) Attempt to control coyotes by pro-actively and opportunistically removing them from the population, (2) capture, sterilize, and release

coyotes until wolves take their place, (3) examine and refine the genetic techniques used to identify and differentiate red wolves, coyotes and hybrids.

Red Wolf Landowner Agreements

The Red Wolf Recovery Program is partner to conservation and access agreements with owners of private land. These tracts of land are strategically selected to maximize monitoring of red wolves and other canids in the northeastern North Carolina five county experimental population area. In Fiscal Years 1999-2001, we entered into agreements with a total of six land owners, utilizing \$20,700 in Landowner Incentive Funds.

EASTERN NORTH CAROLINA PRIVATE LAND AGREEMENTS – RED WOLF Partners Agreements

1999			
<u>OWNER</u>	<u>COUNTY</u>	<u>ACREAGE</u>	<u>COST</u>
Agri-East	Washington	6,500	\$1,500
Bluestone Farms	Washington	7,000	\$1,500
Holbert	Hyde	1,000	\$200
Mattamuskeet Ventures	Hyde	18,000	\$2,000
Mormon Church	Tyrrell	8,500	\$1,500
Williams	Hyde	3,000	\$1,200
TOTAL		44,000	\$7,900
Cost/Acre: .18			

2000			
<u>OWNER</u>	<u>COUNTY</u>	<u>ACREAGE</u>	<u>COST</u>
Bluestone Farms	Washington	7,000	\$1,500
Holbert	Hyde	1,000	\$200
Mattamuskeet Ventures	Hyde	18,000	\$2,000
Mormon Church	Tyrrell	8,500	\$1,500
Williams	Hyde	3,000	\$1,200
TOTAL		37,500	\$6,400
Cost/Acre: .17			

2001			
<u>OWNER</u>	<u>COUNTY</u>	<u>ACREAGE</u>	<u>COST</u>
Bluestone Farms	Washington	7,000	\$1,500
Holbert	Hyde	1,000	\$200
Mattamuskeet Ventures	Hyde	18,000	\$2,000
Mormon Church	Tyrrell	8,500	\$1,500
Williams	Hyde	3,000	\$1,200
TOTAL		37,500	\$6,400
Cost/Acre: .17			

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:

Caspian tern (Special Concern): Caspian terns 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.

Roseate tern (Endangered): Roseate terns 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.

Gull-billed tern (Threatened): Gull-billed terns 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.

Black skimmer (Special Concern): Black skimmers 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.

Black-necked stilt (Special Concern): Black-necked stilts 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.

Other species such as mallard, black duck, coot, and ring-neck duck showed decreases in use. The Canada goose numbers are indicative of resident geese as the Refuge moist soil units are not used by either the migrant Canada goose or snow goose.



Refuge and State personnel band tundra swans in the Creef Farm Unit at Alligator River NWR.
USFWS

5,633 pintails, 4,458 green-winged teals, 305 wood ducks, and 576 ring-necked ducks during the 1999-00 season. It is interesting to note that Tundra swan peak use has steadily increased from 448 in 93-94, 488 in 94-95, 1,100 in 95-96, 1,113 in 96-97, 2,046 in 97-98, 3,209 in 98-99, 1,519 in 99-00, and 1,733 in the 2000-01 season. The decrease in swan numbers from the 98-99 high may be partially attributable to the installation of filter strips 75 feet wide on each side of the farm fields. As vegetation grew up on the filter strips, the section of field remaining (75 feet wide) became unsuitable for swans.

**Composition of wintering waterfowl at Alligator River NWR
during the 2000-2001 survey period.**

SPECIES	PEAK PERIOD	Survey Peak #	# USEDAYS 2000-01	% TOTAL USEDAYS 2000-01	USEDAYS % diff from 1999-00 avg	USEDAYS % diff from long-term avg
Tundra swan	Dec	1733	65161	9.5	-27	+42
Snow goose	*	0	*	0	*	*
Canada goose	Jan	2	20	0.01	+33	-97
Mallard	Jan	392	24679	3.6	-39	-52
Black	Feb	216	15901	2.3	-45	-37
Gadwall	Dec	149	7171	1.0	-53	-37
Wigeon	Dec	536	20631	3.0	-1	+40
Pintail	Dec	6050	273208	39.7	+22	+10
GWT	Dec	4206	228791	33.2	-18	+11
BWT	Dec	3	59	0.01	-99	-93
Shoveler	Dec	195	8748	1.3	+95	+286
Wood	Nov	339	4669	0.7	-29	-77
Ring-necked	Dec	660	28118	4.1	+68	-60
Redhead	n/a	0	0	0	*	*
Canvasback	n/a	0	0	0	*	*
Scaup	Jan	3	58	0.01	-83	*
Unknown	Dec	218	6361	0.9	+161	-75
Bufflehead	Nov	12	72	0.01	-88	*
Ruddy	Dec	21	426	0.1	+33	*
Merganser	Nov	6	58	0.01	-66	-33
Coot	Jan	75	4785	0.7	-4	-37



Green winged teal were the second most commonly seen duck species on the Refuge this season. USFWS

In 1999, the Wood Duck Nest Box Program was inactive until mid summer due to insufficient funding and staffing. Nest box sites were revisited, checked for use, cleaned, and repaired. Boxes that were damaged beyond repair were removed. Twenty-seven boxes still remain throughout the Refuge. The Program was inactive during 2000 and 2001. Currently, the Wood Duck Nest Box Program is being re-evaluated.

4. Marsh and Waterbirds

Although management of moist soil units is focused on waterfowl, numerous other marsh and waterbird species can be observed in these units. Herons, egrets, and rails, appear to be most numerous. Killdeer, woodcock, and snipe are common. Kingfishers are often seen adjacent to canals with deeper, more permanent water. At the present time, there are no formal surveys for these species. In 2001, Dr. Brian Watts of the Center for Conservation Biology at the College of William and Mary began a study designed to provide some preliminary information about marsh birds using callback surveys. A report is expected in 2002.

6. Raptors

Many raptor species can be observed on the Refuge. Among the most common species 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. In 2001, Dr. Brian Watts of the Center for Conservation Biology at the College of William and Mary began a study designed to provide some preliminary information regarding grassland bird diversity, density, and habitat use within

the farm unit on the Refuge. Although the study will not specifically target raptors, observations and activities will be recorded. A report is expected in 2002.

7. Other Migratory Birds

The Refuge is host for migratory species such as the mourning dove. In addition, the vast expanse of relatively unfragmented forested habitat on the Refuge provides for a wide range of neotropical migrant birds. There are tentative plans to begin neotropical migrant bird surveys as soon as budgets and staffing permit. In 2001, Dr. Brian Watts of the Center for Conservation Biology at the College of William and Mary began a study designed to provide some preliminary information regarding grassland bird diversity, density, and habitat use on the Refuge. This will be done by the transect method in different cover types in the farm unit. In addition, Dr. Watts will investigate the distribution, population status, and habitat requirements of the Wayne's black-throated green warbler. Reports are expected in 2002

8. Game Mammals

White-tailed deer are relatively common on the Refuge. Although carrying capacity for pocosin habitat is considerably less than bottomland hardwoods or several other habitat types, deer populations appear to be doing satisfactory. During the 1998-1999 season, doe harvest was greatly reduced through a modified season. During the 1999-2000 season, doe harvest was reduced to three days. Impacts of doe harvest in pocosin habitat was and will continue to be discussed with the state district biologist.

10. Other Resident Wildlife

A wild turkey restoration project was established on the Refuge in early 1999. By February 25, 1999 sixteen wild turkeys from various trap sites across the state were released on the Refuge. Several sightings were reported in various locations during the remainder of 1999. There were no reports of broods during 1999. In 2000 and 2001, although no broods were observed during the year, several adult turkey sightings were reported in various locations.

15. Animal Control

Beaver numbers are rapidly increasing and so are all of the associated problems. Beaver population management practices have been implemented and will most likely become a permanent component of Refuge management activities.

16. Marking and Banding

Wood duck banding was not done due to lack of a suitable trapping site. Altogether 219 tundra swans were banded in 1999 in the Refuge farm unit; 21 were banded in 2000; and 129 in one shot in 2001 (10 of these were recaptures). The banding was post-season.

H. PUBLIC USE

1. General

Total visits to the Refuge in were 28,705 in 1999, 33,254 in 2000, and 39,904 in 2001. 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 1999-2001, the Refuge continued to focus on providing a greater number of media contacts while keeping the messages short and simple. A total of 98 news releases and 23 radio/TV spots were done. One particular release entitled "Don't Feed the Bears" was prepared in 1999 by intern Colby Mecham in response to reports of visitors feeding bears on Miltail Road and reports that bears in the area were acting "tame."

Film producer Jack Hannah visited the Refuge in 1999 to film some footage for the television show *Wild America*. Biotech Kris Fair, Interpretive Specialist Strawser, and Maintenance Supervisor Bruce Creef spent time with Mr. Hannah and his film crew showing them different areas of the Refuge.

WIS Strawser participated as a member of the Roanoke-Tar-Neuse-Cape Fear (RTNCF) Ecosystem Outreach Committee, the NC Environmental Education Association, and the Region 4 Outreach Team.

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 teacher/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 Refuges their ultimate destination, and are requesting a variety of programs.

3. Outdoor Classrooms – Teachers

Since Alligator River NWR and Pea Island NWR are located in an area rich in conservation education/interpretation agencies, these Refuges do not receive the requests common on other stations that are often the sole sources available. The North Carolina Aquarium, Jockey's Ridge State Park, Nags Head Woods Ecological Preserve, and Cape Hatteras National Seashore offer environmental education and teacher training activities. Teachers here are hounded constantly to attend such functions. For this reason, the Refuge has chosen to focus more on other educational needs rather than attempt to compete with other conservation agencies.

4. Interpretive Foot Trails

On October 8, 1999, a Charles Kuralt Trail Dedication was held at the Creef Cut Wildlife Trail on Alligator River NWR. The trail consists of 12 stops at various NWR's and a fish hatchery in southeast Virginia and eastern North Carolina. The trail was established to help people enjoy these wild lands and to recognize the broadcast journalist who shared the delights and wonders of out-of-the-way places like these. During the dedication ceremony, Regional Director Sam Hamilton spoke, a bald eagle was released, there was a Navy jet flyover, and an opportunity to meet members of the family of the late Charles Kuralt who passed away in 1997.



Regional Refuge Supervisor Bill Grabill spoke at the Charles Kuralt Trail dedication.

BS



Tropical Storm Dennis left numerous trees across the new Boardwalk on the Sandy Ridge Trail. USFWS

Though not a foot trail, the Milltail Creek Canoe/Kayak Trail System continues to be quite popular. On most days, there are several groups using the trail. If there were a local place to rent canoes or kayaks, use would increase dramatically. However, there is not a demand great enough to consider a concession for this purpose. Four local businesses were issued special use permits (SUP) to conduct guided canoe or kayak tours on the Milltail Creek Canoe/Kayak Trail System during 1999-2001. Approximately 6,000 visitors participated annually in guided tours provided by the holders of these SUP's.

In 1999, a ribbon cutting ceremony for Sandy Ridge Trail was delayed in due to inaccessibility for disabled visitors. A \$42,000 grant was submitted to the National Trails Program, and if approved, this grant will provide the needed work and materials to make all public use facilities at both Refuges fully accessible to the mobility impaired. Full potential for use of these trails has not been reached.



A black bear made a snack out of the corner of the new Sandy Ridge Trail sign.

USFWS

A guided auto tour CD/tape was created in 1999 for both Refuges by Jerry and Elle Shore who visited the Refuges to gather information. Once produced, this tape will be made available for sale in the Pea Island visitor center and will also be used as a training tool for new volunteers and workcampers.

6. Interpretive Exhibit/Demonstrations

Refuge staff manned displays and exhibits at some of the usual annual events around Dare County and eastern North Carolina including the NC Aquarium at Roanoke Island's Earth Day event, and the Manteo and Manns Harbor Christmas parades. Refuge staff also participated in the FWS booth at the NC State Fair.

The Refuge exhibits located at the Aycock Brown Welcome Center in Kitty Hawk were viewed by 410,151 visitors during 1999, 465,170 in 2000, and 592,596 in 2001.

Regularly scheduled interpretive/educational programs for the Refuge during 1999-2001 include howling safaris, red wolf programs, canoe tours, bird walks mammal tracking, and Refuge at night programs.

7. Other Interpretive Programs

Wings Over Water held its third, fourth and fifth successful years of celebrating wildlife and wildlife habitat on the Outer Banks. Together with the Coastal Wildlife Refuge Society, the Dare County Tourist Bureau, the National Park Service the Outer Banks Chamber of Commerce, and Dare County; the event was successful with approximately 300 participants.

8. Hunting

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

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

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

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

Dare County allowed a bear season for 1999-2001. Bear hunting is not allowed on the Refuge. Refuge officers and biologists monitor bear hunting activities adjacent to Refuge lands.

Archery, muzzle loader, and gun seasons for deer were held within state regulations. There are very few places to quail or rabbit hunt on the Refuge. Small game hunting is primarily for raccoon, squirrel, and rabbit. A waterfowl seasons was also held.

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

9. Fishing

The heaviest recreational fishing effort in the vicinity of the Refuge is in the surrounding sound system from October through April. Fishing pressure on the Refuge is relatively low and is a reflection of the isolation of the area and limited access rather than of low catch per unit of effort. Angling for bluegill, crappie, chain pickerel, channel catfish, flier, largemouth bass, and yellow and white perch is considered good. 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 1999, 2000, and 2001 trapping seasons, only one permit was issued for the 1998-99 season 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.

17. Law Enforcement

Because of staff shortages, in general, the officers were already under heavy work loads before the hunting season began. This situation made the Alligator River NWR season a long one and one predominantly monitored by NCWRC officers.

18. Cooperating Associations

The Coastal Wildlife Refuge Society (CWRS), a non-profit group formed in 1989 to support eastern North Carolina NWR's, noted the following accomplishments for 1999-2001:

- Received the Governor's Award as Conservation Organization of the Year for 2000
- Expenditures for Refuge: 1999 = \$73,441; 2000 = \$83,892; 2001 = \$80,802
- CWRS was a major contributor to the Wings Over Water Festival all years
- Continued to support the Kuralt Trail project
- Funded an addition and other improvements to the Buffalo City intern cabin (1999)
- Assisted with the creation of auto tour tapes of Pea Island and Alligator River NWR's (1999)
- Provided funding for renovation and disabled ramps for the Salt Flats Wildlife Trail at the north end of North Pond (2001)

- Provided funds to construct a new overlook on North Pond Trail in memory of Murphy Peterson (2001)
- Support for interns and work kampers
- Purchased a blue goose costume for outreach (2001)

I. EQUIPMENT AND FACILITIES

1. New Construction

- Completed parking area / compound extension at Alligator River Operations Facility
- Constructed facility emergency generator house, installed 10KW generator unit to supply power to entire Operations Facility
- Maintenance staff assisted with planning, construction, completion and dedication of Sandy Ridge Interpretive Trail, Kuralt Trail at Alligator River and Pea Island Refuges



An extra fenced parking compound was leased by FWS beginning March 2000 for Service vehicles. It is located just north of and behind the office facility in Manteo.
USFWS

2. Rehabilitation

- Prepared for / cleaned up after Tropical Storm Dennis and Hurricanes Irene and Floyd. Cleanup included extensive road rehab - clearing and disposing of downed trees, hauling, spreading and grading fill material on 100 miles of Refuge roads

- Completed facility structural repairs after three hurricanes. Repairs included: replacing a portion of the maintenance shop roof, siding and door repairs to the vehicle storage building, and Red Shed storage building, and lighting fixture replacement in two equipment pole sheds
- Began planning process for Navy Shell and Milltail Bridge replacement projects
- Began planning process for ERFO road projects
- Painted shop walls
- Made structural repairs to Buffalo City cabin
- Assisted with rehab of Ed Sawyer fire break
- Graded $\frac{3}{4}$ mile of Sandy Ridge Road to provide better access to red wolf pens
- Completed electrical rewiring of Red Shed storage building



The addition of a four bunk bedroom area and two bathrooms with showers will allow the Buffalo City cabin to accommodate more interns.

BS



Hurricane Floyd left his mark on the maintenance shop roof at Alligator River NWR. USFWS

3. Major Maintenance

- Extensive pumping of Farm Fields / Management Units, monitored and maintained impoundment levels at Alligator River and Pea Island Refuges
- Maintenance, management, reporting activities of 55 Refuge vehicles, 19 pieces of heavy equipment, 7 pieces of light duty equipment, 5 boats and outboard motors, 11 ATVs, chainsaws, pumps, discs, plows, mowers, shop and hand tools, etc.
- Stockpiling road fill material

4. Equipment Utilization and Replacement

- Extensive mowing and grading of Refuge roads
- Received new Dresser TD 12 Dozer
- Received new Ford 8160 boomaxe mowing tractor
- Received new (Pea Island) John Deere LX 178 riding mower
- Prepared and planted approximately 20 acres of wildlife food (plots) near adjoining cooperative farming management units
- Designed, fabricated, and outfitted Regional Helicopter fuel trailer
- Assisted Eco-team planners with Wilderness Area survey
- Provided equipment, vehicles and fill material to National Park Service to assist in Cape Hatteras Lighthouse relocation project
- Received new 5 Cu. Yd. Chevy 4X4 dump truck
- Received 10 new light duty vehicles, sold / exchanged trade-in vehicles
- Picked up Champion 710 grader and Terex D7 dozer on excess property

- Replaced 1978 Caterpillar dozer with new 2001 Cat D3
- Assisted US Air Force with installation of 5 water control structures and associated road maintenance on Dare County Bombing Range

8. Other

- Hosted and participated in several Heavy Equipment and MOCC training sessions
- Maintenance personnel attended several other training sessions including: Defensive Driving, CPR, (annual) Standards for Survival, Ambassador training, Aviation Survival and Helitorch Safety and use
- Completed annual data calls: Capitalized Property, MMS, RPI, RONS, Fleet Management, RCAR
- Participated in Fire Program activities (several wildfires and prescribed burns) locally and nationally by providing personnel and/or equipment
- Traded equipment, services and personnel with cooperating Refuges and Agencies: Department of Defense (Navy and Air Force Ranges), US Coast Guard, Edenton NFH, Mattamuskeet NWR, Pocosin Lakes NWR, Roanoke River NWR, Mackay Island NWR, Dismal Swamp NWR, Cedar Island NWR, National Park Service, NC Forest Service
- Assisted other Refuge activity areas with shorebird, wading bird, and waterfowl banding operations, Sierra Club work projects, Southern Pine Beetle (infestation) project
- Organized and scheduled national work crews and participated on work crews for upcoming Pelican Island Centennial Celebration events
- Completed Station Oil Spill Hazard Plan – stocked pump stations with spill response supplies
- WS Creef assisted with development and implementation of: Region 4 Wage Grade Workshop and Advisory Committee, Wage Grade training course and workshop at NCTC, Region 4 Heavy Equipment Training Programs and instructed in several sessions of the Basic Refuge Manager's Academy at NCTC
- WS Creef attended: Procurement Procedures, Computer Support for Field Stations, Property Management and Contract Officer Representative training sessions
- Maintenance employees Craddock, Powers, Peterson, Emery and Ralph attended Caterpillar Systems Components training
- Engineering Equipment Operator Craddock assisted as instructor in grader training session for NC Forest Service
- WS Creef assisted Film Producer Jack Hanna in obtaining footage for his TV show "Wild America"
- Assisted with annual fishing / crabbing events at Pea Island, Wings Over Water events

PEA ISLAND NATIONAL WILDLIFE REFUGE

Manteo, North Carolina

ANNUAL NARRATIVE REPORT

Calendar Year 1999, 2000, and 2001

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

INTRODUCTION

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

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

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

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

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

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

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A. HIGHLIGHTS

Several Tropical Storms and Hurricanes impacted the area in 1999. Section B. Also see Alligator River NWR narrative.

USCOE dredged 250,000 cubic yards of sand for near shore disposal. Section C.

Comprehensive Conservation Planning was initiated in June 2000. Section D.

NC Highway 12 maintenance coordination continued to require a significant amount of staff time. Section F.

A total of six prescribed burns were held for a total of almost 3,000 acres. Section F.

Visitation continues to increase with an estimate 2.4 million visitors in 2001. Section H.

October 8, 1999, a Charles Kuralt Trail Dedication was held at the Creef Cut Wildlife Trail on Alligator River NWR. Section H.

The "Peterson Overlook" located along North Pond Trail was dedicated in 2001 in memory of Murph Peterson. Section H.



Pea Island National Wildlife Refuge

B. CLIMATIC CONDITIONS

September 1999, Tropical Storm Dennis left a path of destruction at Pea Island NWR. Heavy flooding washed out a pump station at South Pond and left much of NC 12 under sand and water. Hurricanes Irene and Floyd also impacted the area in 1999.



In September 1999, Tropical Storm Dennis demolished the pump at South Pond.
USFWS



At the south end of Pea Island NWR, heavy rains and ocean overwash from Dennis left NC 12 impassable for passenger vehicles. Refuge staff accessed the area with a piece of tracked fire equipment.
USFWS

See the Alligator River National Wildlife Refuge narrative for additional weather details.

C. LAND ACQUISITION

2. Easements

For almost 100 years, the U.S. Coast Guard operated a life saving station on a 10 acre tract inholding on the north end of Pea Island NWR. In 1990, the Coast Guard abandoned use of the property and in 1992 it was quit claim deeded to Dare County by the Coast Guard. Following an unsuccessful attempt by heirs of the Etheridge family to make claims on the property from 1990-1996, Dare County decided to deed the 10 acres to the State of North Carolina who remain the owners.

D. PLANNING

3. Public Participation

Comprehensive Conservation Planning (CCP) for Pea Island was initiated in June 2000. Four public scoping meetings were held on June 26 and 27 in Rodanthe and Manteo. The staff introduced citizens to the Refuge and its planning process and asked them to identify their issues and concerns.

Three identified alternatives for the CCP were subjects of discussion at a second round of four public meetings on September 25 and 26, 2000, also in Rodanthe and Manteo. At these meetings, members of the public expressed concern that the three alternatives being considered did not represent a wide enough range of alternatives. Refuge staff developed alternatives 4 and 5 in response to those concerns which assumes that more natural forces will dominate the landscape.

4. Compliance with Environmental and Cultural Resource Mandates

Development of a monitoring plan for the Oregon Inlet ocean bar dredging and near shore disposal was completed in July. Based on USACOE surveys, approximately 250,000 cubic yards of sand was dredged from the ocean bar and disposed of near shore during September

E. ADMINISTRATION

1. Personnel

See Alligator River National Wildlife Refuge narrative for details.

F. HABITAT MANAGEMENT

1. General

Pea Island, a coastal barrier island, consists of seven basic habitat types. The most recent survey revealed 456 acres of ocean beach; 518 acres of barrier dune; 630 acres of sand ridge, brush, and grassland; 3,024 acres of irregularly flooded salt marsh; 328 acres of salt flat; and 3 brackish water impoundments totaling 940 acres. Beach and dune acreages change from year to year.

Dredged material disposal monitoring continued as a result of dredging Oregon Inlet by the Corps of Engineers. It appears that we will learn some interesting facts about indicator species, impacts of beach disposal, and management of dredged materials disposed of on the beach.

Working with the North Carolina Department of Transportation to maintain Highway 12 continued to require significant amounts of time. In 1999 extensive coordination was required to recover from Hurricane Dennis. Large volumes of sand and ocean water had to be removed from NC 12 over a period of several days. This effort was followed by extensive dune reconstruction, re-vegetation, and sand fence installation to protect NC 12.

2. Wetlands

1999: Some difficulty in maintaining target water levels in North Pond due to high salinity sound water resulted in lower than desired productivity during the 1999 growing season. In addition, damage due to ocean overwash and salt water as a result of five days of Tropical Storm Dennis eliminated most of the submerged aquatic vegetation (SAV) production for the growing season. Remaining SAV was determined to be too sparse to justify sampling. Unanticipated pump breakdowns are the primary reason for not being able to maintain proper water levels at critical times. Resident Canada geese are another significant factor in providing adequate food for wintering migratory birds. Simply stated, resident Canada geese eat the SAV production as fast as it grows in all management areas. Vegetation sampling was not done during 1999 mostly due to the effects of Hurricane Dennis.

Wetlands in the Salt Flats are flooded and dewatered by natural ebb and flow in wind/tides and by rainfall/runoff. Although sampling was not done in 1999, observations suggest that vegetation has remained relatively unchanged for many years in this area. The predominant vegetation is glasswort (*Salicornia* spp.), sea oxeye and salt meadow cordgrass. The two small mitigation ponds near the southern boundary created by NCDOT again produced good widgeon grass. Pond fringes also continued to produce stands of *Bacopa* spp., *Scirpus* spp., and *Cyperus* spp. Waterfowl use is moderate and appears to be increasing

2000: Sago pondweed and widgeon grass occurred in 24.7% of the sample points in 2000. The table below shows that an average of 73.6% of plant species present are rated as good to fair for waterfowl food in the three impoundments. Of concern is high incidence (mean=21.7%) of bare sample points. North Pond had bare points at the rate of 16.9% and New Field Pond was bare

on 29.4% of the sample points. Bare points in South Pond at a rate of 18.9% and the Salt Flats were found to be 23.0% bare. Due to a different management strategy, enough water was retained in South Pond to maintain better than average SAV growth rates for that unit.

Impoundment vegetation summary from transect line sampling Pea Island NWR, 2000

Pea Island National Wildlife Refuge							
Impoundment Vegetation (SAV) Summary – 2000							
Waterfowl Food Plant Species Frequency of Occurrence (%)							
Unit	Good	Fair	Total Food		Non-food	Bare	Total
North Pond	26.7	51.5	78.2		21.9	16.9	100
New Field Pond	14.4	50.3	64.7		35.3	29.4	100
South Pond	16.8	61.1	77.9		22.2	18.9	100
AVERAGE	19.3	54.3	73.6		26.5	21.7	100
Salt Flats	20.1	39.1	59.2		40.8	23.0	100

North Pond produced sago pondweed at a frequency of 21.7% in 2000. Although plant species considered as good occurred at lower than desired rates, the overall production of good and fair waterfowl food species was good to excellent (78.2%). In general, water levels were lower and salinity was higher than desired levels thereby affecting the ability to produce higher frequencies of “good” waterfowl food species.

New Field impoundment produced sago pondweed at a rate of 6.8%. Salinity remained higher and water level remained lower than desired. A non-functional pump during critical times complicated water management and waterfowl food production. However, good and fair plant food species rated as good and fair occurred with a combined frequency of 64.7%.

South Pond SAV production was remained at a relatively good level for a unit with no pumping capability. Overall occurrence of plant species rated as good or fair was 77.9% with wigeon grass at 8.6% and *Chara spp.* At 53.3%. Receiving adequate rain helped to keep low-salinity water in the impoundment for a portion of the growing season. Since this impoundment has no pumping capability, the management strategy is to trap and hold as much water as possible throughout the growing season. For this reason, there are no deliberate drawdowns in South Pond.

2001: Once again in 2001 difficulty in maintaining target water levels in North Pond due to high salinity sound water and equipment failure resulted in lower than desired productivity during the 2001 growing season. The table below shows that an average of 27.6% of plant species present are rated as good to fair for waterfowl food in the three impoundments. Of concern is high incidence (mean=26.0%) of bare sample points. North Pond had bare points at the rate of 70.8% and New Field Pond was bare on 42.7% of the sample points. Lack of water management capabilities combined with a dry year resulted in bare points in South Pond at a rate of 84.2% and the Salt Flats were found to be 65.9% bare.

Impoundment vegetation summary from transect line sampling Pea Island NWR, 2001

Pea Island National Wildlife Refuge							
Impoundment Vegetation (SAV) Summary – 2001							
Waterfowl Food Plant Species Frequency of Occurrence (%)							
Unit	Good	Fair	Total Food		Non-food	Bare	Total
North Pond	10.3	15.5	25.8		74.4	70.8	100.2
New Field Pond	10.5	32.5	43		56.9	42.7	99.9
South Pond	9.3	4.8	14.1		85.7	84.2	99.8
AVERAGE	10.0	17.6	27.6		72.3	65.9	99.9
Salt Flats	18.5	38.8	57.3		42.7	26.0	100

North Pond produced sago pondweed and wigeon grass at a combined frequency of 4.5%. Chara spp. Contributed an additional 2.3%. An overall production of good and fair waterfowl food species 25.8% is much lower than desired. In general, water levels were lower and salinity was higher than desired levels thereby affecting the ability to produce higher frequencies of “good” waterfowl food species.

New Field impoundment produced sago pondweed at a rate of 3.1%. Other good and fair plant species brought the total frequency of occurrence up to 43%. Salinity remained higher and water level remained lower than desired. A non-functional pump during critical times complicated water management and waterfowl food production. Overall, wintering waterfowl food production was lower than desired, but better in New Field Pond than North Pond or South Pond.

South Pond SAV production occurred at a relatively poor level as would be expected in a dry growing season for a unit with very limited water management capability. Overall occurrence of plant species rated as good or fair was 14.1% with wigeon grass at 0.6%, sago pondweed at 1.9%, and three-square at 3.4%. Insufficient wind-tides and lower than normal rainfall during critical periods combined to prevent water in the impoundment at sufficient levels for promoting SAV growth. Since this impoundment has no pumping capability, the management strategy is to trap and hold as much water as possible throughout the growing season. For this reason, there are no deliberate drawdowns in South Pond.

4. Croplands

Much of the plantable area of New Field has been affected by sand deposited by ocean overwash and salt concentration. No crops have been planted in the plantable areas since the relocation of NC 12 in 1996.

9. Fire Management

The following prescribed burns were held at Pea Island NWR.

Year	Burn Unit	Acres
1999	8.1.5	250
	8.1.4	100
2000	5 & 6	760
	8.1.4	171
	8.1.7	200
2001	8.1.1-3	1,501

See Alligator River National Wildlife Refuge narrative for additional details.

G. WILDLIFE

1. Wildlife Diversity

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



Ghost crabs are abundant on Pea Island NWR beaches. US FWS

2. Endangered and Threatened Species

a. Federally Listed and Endangered Species

American bald eagle (Endangered): Bald eagles, *Haliaeetus leucocephalus*, often pass over Pea Island. Since there is no suitable nesting habitat for eagles, there are no nests on the refuge.

Peregrine falcon (Threatened): The Arctic peregrine, *Falco peregrinus tundrius*, is the subspecies of peregrines most often seen at Pea Island. Peregrine falcons were sighted on several occasions on the refuge.

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. There was one nesting attempt on the refuge during the summer of 2001 but the success of this attempt is unknown as no fledglings were observed.

Atlantic loggerhead sea turtle (Threatened):

1999: The loggerhead sea turtle (*Caretta caretta*) nesting season of 1999 on Pea Island National Wildlife Refuge was average. The refuge has experienced an average of 14 nests with the highest number occurring in 1994 which was 35 nests and 41 false crawls. This year 14 nests were deposited on the refuge and there were 10 false crawls. Since dune and beach erosion and ocean overwash continued to be major problems, a section of beach was designated "safe" for relocation purposes. Twelve nests were relocated to the safe area and two were left in place. Of the two left in place, one of these hatched 98 turtles with 105 egg shells found upon excavation before Hurricane Dennis and the other was washed away by Hurricane Dennis. Five nests relocated to the safe area hatched prior to Hurricane Dennis with an approximate 89% hatch rate. All nests remaining at the time of Hurricane Dennis were washed away by high tides.

Although the overall hatch rate was approximately 89%, a continuing problem this year was ghost crab predation - these crabs were the number one enemy of hatchlings. In previous years, many turtles hatched out of nests but never made it to the water. "Reinforcement" crabs actually formed a line along the uprush zone to capture the few turtles that had managed to crawl safely through a beach covered with hungry, hunting ghost crabs.

2000: The sea turtle nesting season of 2000 on Pea Island National Wildlife Refuge was slightly higher than average. During the 2000 nesting season, 14 nests were deposited on Pea Island and there were 13 false crawls. Of these nests, three were identified as green sea turtle nests. Six nests were relocated to a safe area and eight were left in place. Of the 8 left in place, four of these met the criteria for leaving a nest in place and four failed the criteria and should have been moved.

The overall hatch rate for nests that were relocated was approximately 68%. This hatch rate is lower than average because late nests were subjected to cold incubation temperatures late in the season. It is not possible to determine accurate hatch rates for nests that were not

relocated because eggs are not counted at the onset of incubation. A big problem this year (as in previous years) was ghost crab predation - these crabs were the number one enemy of hatchlings. In previous years, many turtles hatched out of nests but never made it to the water. "Reinforcement" crabs actually formed a line along the uprush zone to capture the few turtles that had managed to crawl safely through a beach covered with hungry, hunting ghost crabs.

2001: The loggerhead sea turtle nesting season of 2001 on Pea Island National Wildlife Refuge was considerably lower than average. During the 2001 nesting season 6 nests were deposited on Pea Island and there were no false crawls. Six nests were relocated to a safe area and none were left in place. Three of the 6 nests underwent "normal" incubation without inundation by storm tides. These nests had an average hatching rate of 90%. Nest four had 48 out of 114 (42%) hatchlings emerge from the nest prior to prolonged inundation from storm tides. Remaining eggs drowned after three days of flooding. All eggs in Nests 5 and 6 were lost due to the inundation. None of these nests would have survived if they had been left in place.

An overall hatch rate of 90% for nests 1-3 was excellent. Altogether 361 hatchling turtles made it to the ocean out of 4 nests before storm tides drowned the remaining eggs. Once again ghost crab predation was a big problem - these crabs were the number one enemy of hatchlings.

The Turtle Watch Program was implemented to provide a safer passage of hatchlings from the nest to the ocean. It entailed digging a 10" deep by 10" wide trench from each nest to the ocean. Volunteers started watching each nest at day 55. They arrived just before dusk and swept the trench smooth; wire cones were placed around the nest with a "sliding board" emptying into the crab free trench. Turtles followed flashlights (which volunteers leap-frogged) to the end of the trench and arrived safely at the ocean. It was necessary to "steer" turtles because of light pollution, primarily from an amusement park at Rodanthe, approximately five miles south of the safe area. Monitoring nests took an intensive effort on both staff and volunteers; however, it played a vital role in greatly increasing survival of hatchlings from nest to ocean.

The Turtle Watch Program also greatly increased the number of hatchlings reaching the ocean. Observations in past years indicated that, on some nights, as many as 75% of hatchlings were lost to ghost crabs (prior to trenching). Survival rates from the nest to the ocean have increased to over 91% with the Turtle Watch Program.

Several stranded turtles washed up on Pea Island's beaches in 1999. Data were collected from all that were discovered. All data regarding stranded turtles was forwarded to the North Carolina Wildlife Resources Commission.

Numerous dead sea turtles washed up on Pea Island's beaches in 2000. Data were collected from all that were discovered. Approximately 290 turtles were involved with a mass stranding during the spring. Of this number, 70 turtles were discovered on the refuge beach. Four additional turtles were discovered during the remainder of the year for a total of 74

during 2000. The mass stranding was later attributed to the monk fishing industry just offshore.

In 2001 eleven dead sea turtles washed up on Pea Island's beaches. Data were collected from all that were discovered. Data sheets were sent to the North Carolina Wildlife Resources Commission.

Green sea turtle (Threatened): In 1993, the first Green Sea Turtle (*Chelonia mydas*) nested on Pea Island. None were reported for 1999, 2000, or 2001.

b. State Listed Species

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

Osprey (Special Concern): Two osprey (*Pandion haliaetus*) platform nests at Pea Island were known to have produced fledglings. Numerous sightings of adult ospreys were recorded during 1999, 2000 and 2001. In 2001 two platform nests at Pea Island were known to have produced fledglings.

Least tern (Special Concern): Historically, least terns (*Sterna antillarum*) have nested 1.5 miles south of the Pea Island NWR Headquarters. Nesting colonies were observed at the South Pond sandbars and at Oregon Inlet. Least tern numbers peaked at 228 during early August, 1999. In 2000 least tern numbers peaked at 424 in late June. In late July 2001, least tern numbers peaked at 425.

3. Waterfowl

1999

Waterfowl surveys were conducted from October through January. Waterfowl numbers peaked at 12,869 during November 1999. The table below compares use days by species for the 1998-1999 season with the mean use days for the previous season and for the past five years. As illustrated by the table, many species showed an increase in number of use days from the 5-year average although there may have been a decrease from the 1997-98 season. As would be expected, snow goose activity increased in the salt flats following the December prescribed burn.

Composition of Wintering Waterfowl, Pea Island NWR 1998-1999

SPECIES	PEAK PERIOD	PEAK #	% TOTAL USE DAYS	# USE DAYS 1998-99	# USE DAYS 1997-98	MEAN # USE DAYS (5 yr av.)	% DIFF (5-yr av)
Tundra swan	Nov	452	2.2	90155	21323	76047	+15
Snow goose	Feb	2270	2.5	102154	158638	117573	-11
Canada goose	Jan	556	3.1	126512	28128	26510	+193
Mallard	Sep	55	0.3	12535	16453	14223	-10
Black duck	Oct	705	18.6	756623	79725	94097	+270
Gadwall	Mar	516	16.9	688508	65367	131866	+206
Wigeon	Oct	2590	19.6	799284	55584	218862	+153
Pintail	Oct	2394	12.9	523708	142541	268285	+68
G.W. teal	Jan	775	5.0	205547	51994	52434	+164
B.W. teal	Sep	903	2.3	95041	2655	16694	+219
Shoveler	Dec	246	6.0	242468	56597	108450	+85
Ring-neck	n/a	0	0	0	3329	9780	n/a
Redhead	Jan	532	0.4	14991	25328	20336	-23
Canvasback	n/a	0	0	0	37	122	n/a
Scaup	Jan	93	0.1	4011	11056	16309	-72
Unknown ducks	Oct	1341	8.9	362361	623	50728	+253
Bufflehead	Dec	26	0.1	3885	29851	21525	-79
Ruddy duck	Feb	5	0	244	44541	49114	-99
Merganser	Jan	660	0.9	37984	11246	21435	+57
Coot	Oct	164	0.1	6064	46745	160485	-95

Ground brood count surveys were not conducted on the refuge. However, black duck, gadwall, and Canada goose broods were observed in New Field Pond, North Pond, and South Pond.

2000

Waterfowl numbers peaked at 5,069 in mid-January. The table below compares use days by species for the 1999-2000 season with the mean use days for the previous season and for the past 5 years. All species except the green-winged teal, ruddy duck, bufflehead, and coot showed a decrease in number of use days for the 1999-2000 season. The green-winged teal remained about the same as the previous year, showing a 1% increase.

Composition of Wintering Waterfowl, Pea Island NWR 1999-2000

SPECIES	PEAK PERIOD	PEAK #	% TOTAL USE DAYS	# USE DAYS 1999-00	# USE DAYS 1998-99	MEAN # USE DAYS (5 yr av.)	% DIFF (5-yr av)
Tundra swan	Feb	464	8.8	49856	90155	59198	-16
Snow goose	Oct	462	5.3	29910	102154	99331	-70
Canada goose	Feb	130	2.0	11178	126512	43684	-74
Mallard	Jan	18	0.2	1326	12535	12025	-89
Black duck	Mar	229	3.7	20809	756623	226337	-91
Gadwall	Feb	476	6.5	36943	688508	237183	-84
Wigeon	Oct	797	4.8	27331	799284	284188	-90
Pintail	Jan	2353	25.8	145423	523708	310383	-53
G.W. teal	Oct	1525	20.0	112711	205547	111938	+1
B.W. teal	Oct	5	0.01	75	95041	30403	-100
Shoveler	Jan	326	4.9	27863	242468	131260	-79
Ring-neck	na	0	0	0	0	5406	na
Redhead	Jan	1	0.01	15	14991	23327	-100
Canvasback	na	0	0	0	0	67	na
Scaup	Jan	11	0.2	850	4011	15737	-95
Unknown ducks	Oct	954	2.0	11304	362361	120221	-91
Bufflehead	Jan	204	2.4	13651	3885	14356	-5
Ruddy duck	Jan	528	6.1	34476	244	43958	-22
Merganser	Jan	359	3.2	18143	37984	24091	-25
Coot	Feb	187	3.6	20534	6064	128727	-84

Ground brood count surveys were not conducted on the refuge. However, black duck, gadwall, and Canada goose broods were observed in New Field Pond, North Pond, and South Pond.

2001

Waterfowl numbers peaked at 26,118 in mid-December. The table below compares use days by species for the 2000-2001 season with the mean use days for the previous season and for the past five years. Several species showed substantial increases in usedays compared to the five year average. Some species have dramatic increases (canvasback +361%) or decreases (blue winged teal -70%) from the five year average. Examination of usedays or peak numbers shows that many of these species do not show up in significant numbers for the increase or decrease index to be very meaningful.

Composition of Wintering Waterfowl, Pea Island NWR – 2000-2001.

SPECIES	PEAK PERIOD	PEAK #	% TOTAL USE DAYS	# USE DAYS 2000-01	# USE DAYS 1999-00	MEAN # USE DAYS (5 yr av.)	% DIFF (5-yr av)
Tundra swan	Dec	1819	7.5	142898	49856	82893	+72
Snow goose	Jan	2830	8.8	168825	29910	111094	+52
Canada goose	Sep	694	1.8	35208	11178	38181	-8
Mallard	Sep	288	0.5	8749	1326	11727	-25
Black duck	Jan	694	2.6	49210	20809	162141	-70
Gadwall	Dec	732	2.6	48956	36943	179217	-73
Wigeon	Jan	7018	13.5	259003	27331	272491	-5
Pintail	Dec	9929	27.6	529211	145423	317471	+67
G.W. teal	Oct	1857	5.3	100622	112711	85131	+18
B.W. teal	Oct	279	0.4	6978	75	23195	-70
Shoveler	Dec	1209	4.5	85859	27863	112305	-24
Ringneck	Oct	69	0.1	1663	0	6321	-74
Redhead	Dec	492	0.6	11134	15	15977	-30
Canvasback	Dec	37	0.01	825	0	179	+361
Scaup	Jan	257	0.3	6460	850	11608	-44
Unknown ducks	Nov	894	1.7	32334	11304	82455	-61
Bufflehead	Dec	587	0.3	5210	13651	16296	-68
Ruddy duck	Feb	393	1.3	23945	34476	38029	-37
Merganser	Nov	1439	2.1	39523	18143	25353	+56
Coot	Dec	8700	18.7	357178	20534	148275	+141

Ground brood count surveys were not conducted on the refuge. However, black duck, gadwall, and Canada goose broods were observed in New Field Pond, North Pond, and South Pond

4. Shorebirds, Gulls, Terns, and Allied Species

Due to staff changes, shorebird surveys were conducted on an irregular basis during 1999. In 2000 and 2001 shorebird surveys were conducted three times per month. Shorebird numbers peaked at 7,079 in early August 1999; 5,019 in late May 2000; and 9,930 in mid-May 2001. A large colony of nesting black skimmers was observed on the beach about 1.5 miles south of refuge headquarters and at the terminal groin at Oregon Inlet. A large nesting tern colony occurred at the pan that formed behind the rock revetment at Oregon Inlet. Both areas were posted as closed to public access.

Peak numbers of shorebirds surveyed from April through October 1999 at Pea Island NWR.

Survey Date	APR	MAY	JUN	JULY	AUG	SEP	OCT
Peak number	1644	5159	*ns	1890	7079	*ns	1108
Average #	1602	*	*ns	*	5688	*ns	656

- only one survey for the month



Sanderlings forage in the surf on Pea Island NWR.

Michael Halminski

**Peak numbers of shorebirds surveyed from April through
October 2000 at Pea Island NWR.**

Survey Date	APR	MAY	JUN	JULY	AUG	SEP	OCT
Peak number	2619	5019	1955	2166	3239	1971	1646
Average #	1792	2896	1460	1876	2599	1361	1002

* only one survey for the month

**Peak numbers of shorebirds surveyed from April through
October 2001 at Pea Island NWR**

Survey Date	APR	MAY	JUN	JULY	AUG	SEP	OCT
Peak number	4627	9930	2172	3123	3142	4471	2710
Average #	2518	6579	1773	2626	2241	3183	2046

5. Marsh and Wading Birds

Marsh and wading bird surveys were conducted from June through October in 1999; and June through October in 2000 and 2001. Bird numbers peaked at 687 during mid August 1999; 399 during August 2000; and 384 during September 2001.

Brown pelican numbers have continued to increase over the past few years as the species has expanded northward into coastal North Carolina and Virginia. These birds were previously listed as a threatened species in this state and were rarely observed.

**Peak numbers of marsh and wading birds surveyed from April
through October 1999 at Pea Island NWR.**

Survey Date	APR	MAY	JUN	JULY	AUG	SEP	OCT
Peak number	53	51	*ns	3	687	*ns	226
Average #	39	**	*ns	**	518	*ns	215

*ns= not surveyed

** only one survey for the month

**Peak numbers of marsh and wading birds surveyed from April through
October 2000 at Pea Island NWR.**

Survey Date	APR	MAY	JUN	JULY	AUG	SEP	OCT
Peak number	130	68	135	280	399	196	179
Average #	46	38	112	268	323	99	125

*ns= not surveyed

** only one survey for the month

Unknown Marsh/Wading Species	0	0.0	0	NA
subtotal	2700	49.4	688	
Gulls & Allies				
Herring gull	1885	34.5	405	3/18/04
Ring-billed gull	2555	46.8	484	1/7/99
Great black-backed gull	2346	42.9	344	4/1/99
Lesser black-backed gull	268	4.9	268	1/7/99
Laughing gull	472	8.6	85	7/21/99
Bonaparte's gull	60	1.1	50	3/4/99
Other gull species	0	0.0	0	NA
Unknown gull species	0	0.0	0	NA
subtotal	7586	138.8	1100	1/7/99
Terns & Skimmers				
Caspian tern	6	0.1	6	8/16/99
Least tern	686	12.6	228	8/2/99
Common tern	1242	22.7	507	8/2/99
Forster's tern	77	1.4	51	8/16/99
Sandwich tern	148	2.7	100	8/2/99
Royal tern	149	2.7	51	8/16/99
Sooty tern	0	0.0	0	NA
Gull-billed tern	188	3.4	137	8/16/99
Black skimmer	735	13.4	465	8/16/99
Other species	0	0.0	0	NA
Unknown Tern/Skimmer	0	0.0	0	NA
subtotal	3231	59.1	1251	
Shore Birds				
American oystercatcher	115	2.1	23	8/2/99
Black-necked stilt	30	0.5	16	10/27/99
American avocet	994	18.2	198	12/21/99
Black-bellied plover	276	5.1	59	3/18/04
Ruddy turnstone	65	1.2	47	8/16/99
Semipalmated plover	768	14.1	285	5/10/99
Piping plover	24	0.4	9	3/18/04
Snowy plover	0	0.0	0	NA
Wilson's plover	1	0.0	1	7/21/99
Killdeer	12	0.2	4	1/7/99
Common snipe	0	0.0	0	NA
Dowitcher	218	4.0	175	5/10/99
Red knot	123	2.3	44	8/2/99
Marbled godwit	143	2.6	40	10/13/99
Whimbrel	65	1.2	29	10/27/99
Willet	1153	21.1	424	10/27/99
Yellowlegs	3388	62.0	2964	8/2/99
Sanderling	6463	118.3	1974	8/2/99
Stilt sandpiper	0	0.0	0	NA

Dunlin	1030	18.8	371	5/10/99
Purple sandpiper	1	0.0	1	8/2/99
Spotted sandpiper	30	0.5	19	8/16/99
Least sandpiper	515	9.4	180	7/21/99
Semipalmated sandpiper	4105	75.1	3254	5/10/99
Western sandpiper	175	3.2	75	1/20/99
Other species	3	0.1	3	1/20/99
Unknown shorebird	124	2.3	32	10/27/99
subtotal	19821	362.7	5846	
TOTAL	36103	100	7406	

Peak numbers and peak survey days of shore and water birds surveyed at Pea Island National Wildlife Refuge by species 2000.

2000			MAX	SURVEY
Water Birds & Sea Birds	Total	%	NUMBER	Peak Day
Pied-billed grebe	849	9.4	139	11/28/00
Common loon	8	0.1	1	3/30/00
Double-crested cormorant	3934	43.5	1023	3/31/00
White pelican	0	0.0	0	NA
Brown pelican	903	10.0	154	10/11/00
Northern gannet	0	0.0	0	NA
Other Water/Sea bird	0	0.0	0	NA
Unknown Water/Sea bird	0	0.0	0	NA
Subtotal	5694	62.9	1023	
Marsh & Wading Birds				
Clapper rail	0	0.0	0	NA
Virginia rail	1	0.0	1	2/23/00
Black rail	0	0.0	0	NA
King rail	0	0.0	0	NA
Great blue heron	368	4.1	50	12/5/00
Little blue heron	360	4.0	66	8/25/00
Tri-colored heron	215	2.4	25	7/27/00
Great egret	936	10.3	124	9/14/00
Snowy egret	723	8.0	112	8/25/00
Cattle egret	5	0.1	2	8/25/00
Black-crowned night heron	48	0.5	17	12/5/00
Yellow-crowned night heron	15	0.2	4	1/0/00
Green heron	3	0.0	2	7/27/00
American bittern	3	0.0	1	2/4/00
Glossy ibis	12	0.1	11	9/14/00
White ibis	604	6.7	89	12/5/00
Other Marsh/Wading Species	1	0.0	1	6/27/00
Unknown Marsh/Wading Species	65	0.7	65	3/31/00
Subtotal	3359	37.1	399	

Gulls & Allies				
Herring gull	3579	39.5	534	12/20/00
Ring-billed gull	4154	45.9	739	12/14/00
Great black-backed gull	3605	39.8	1197	12/20/00
Lesser black-backed gull	5	0.1	5	11/28/00
Laughing gull	1050	11.6	209	8/15/00
Bonaparte's gull	0	0.0	0	NA
Other gull species	1	0.0	1	1/0/00
Unknown gull species	0	0.0	0	NA
Subtotal	12028	132.9	2458	
Terns & Skimmers				
Caspian tern	5	0.1	3	9/15/00
Least tern	1834	20.3	424	7/7/00
Common tern	3151	34.8	509	6/27/00
Forster's tern	20	0.2	12	8/7/00
Sandwich tern	739	8.2	348	8/7/00
Royal tern	1707	18.9	356	4/20/00
Sooty tern	13	0.1	5	8/15/00
Gull-billed tern	20	0.2	12	7/27/00
Black skimmer	2426	26.8	350	6/27/00
Other species	2	0.0	2	4/20/00
Unknown Tern/Skimmer	0	0.0	0	NA
Subtotal	9917	109.5	1302	
Shore Birds				
American oystercatcher	297	3.3	28	6/27/00
Black-necked stilt	21	0.2	11	7/27/00
American avocet	1874	20.7	515	12/5/00
Black-bellied plover	447	4.9	69	4/28/00
Ruddy turnstone	261	2.9	78	6/8/00
Semipalmated plover	445	4.9	193	5/24/00
Piping plover	21	0.2	8	4/28/00
Snowy plover	0	0.0	0	NA
Wilson's plover	0	0.0	0	NA
Killdeer	24	0.3	21	2/4/00
Common snipe	0	0.0	0	NA
Dowitcher	317	3.5	176	5/24/00
Red knot	196	2.2	56	9/15/00
Marbled godwit	147	1.6	61	12/20/00
Whimbrel	329	3.6	233	9/15/00
Willet	1923	21.2	293	8/7/00
Yellowlegs	1015	11.2	236	3/31/00
Sanderling	9741	107.6	1173	9/14/00
Stilt sandpiper	0	0.0	0	NA
Dunlin	5488	60.6	1470	4/7/00
Purple sandpiper	1	0.0	1	12/14/00

Spotted sandpiper	7	0.1	5	6/8/00
Least sandpiper	25	0.3	12	9/15/00
Semipalmated sandpiper	3558	39.3	2832	6/8/00
Western sandpiper	2	0.0	2	9/14/00
Other species	2	0.0	2	9/14/00
Unknown shorebird	1611	17.8	484	5/24/00
Subtotal	27752	306.6	4366	
TOTAL	58856	100.0	5445	

Peak numbers and peak survey days of shore and water birds surveyed at Pea Island National Wildlife Refuge by species 2001.

2001			MAX	SURVEY
Water Birds & Sea Birds	Total	%	NUMBER	Peak Day
Pied-billed grebe	1151	1.2	95	2/5/01
Common loon	27	0.0	27	8/15/01
Double-crested cormorant	12581	13.6	7949	3/26/01
White pelican	0	0.0	0	
Brown pelican	1113	1.2	220	10/5/01
Northern gannet	0	0.0	0	NA
Other Water/Sea bird	0	0.0	0	NA
Unknown Water/Sea bird	0	0.0	0	NA
Subtotal	14872	16.0	7973	
Marsh & Wading Birds				
Clapper rail	0	0.0	0	NA
Virginia rail	1	0.0	1	1/5/01
Black rail	0	0.0	0	NA
King rail	0	0.0	0	NA
Great blue heron	460	0.5	44	10/25/01
Little blue heron	420	0.5	90	7/24/01
Tri-colored heron	552	0.6	86	7/24/01
Great egret	1043	1.1	114	8/7/01
Snowy egret	951	1.0	217	9/25/01
Cattle egret	275	0.0	21	8/7/01
Black-crowned night heron	28	0.0	7	9/25/01
Yellow-crowned night heron	23	0.0	5	1/26/01
Green heron	2	0.0	1	5/30/01
American bittern	1	0.0	1	1/18/01
Glossy ibis	0	0.0	0	NA
White ibis	840	0.9	120	7/17/01
Other Marsh/Wading Species	0	0.0	0	NA
Unknown Marsh/Wading Species	0	0.0	0	NA
Subtotal	4347	4.7	384	
Gulls & Allies				
Herring gull	4351	4.7	883	3/16/01

Ring-billed gull	4132	4.5	588	2/5/01
Great black-backed gull	3427	3.7	417	1/18/01
Lesser black-backed gull	15	0.0	9	12/14/01
Laughing gull	1940	2.1	214	8/7/01
Bonaparte's gull	1	0.0	1	3/16/01
Other gull species	0	0.0	0	NA
Unknown gull species	0	0.0	0	NA
Subtotal	13866	14.9	1626	
Terns & Skimmers				
Caspian tern	2	0.0	2	4/18/01
Least tern	1868	2.0	425	7/24/01
Common tern	2255	2.4	302	7/24/01
Forster's tern	0	0.0	0	NA
Sandwich tern	20	0.0	15	8/7/00
Royal tern	2325	2.5	332	9/25/01
Sooty tern	0	0	0	NA
Gull-billed tern	23	0.0	23	7/24/01
Black skimmer	2321	2.5	333	5/30/01
Other species	15	0.0	5	8/7/01
Unknown Tern/Skimmer	0	0.0	0	NA
Subtotal	8829	9.5	1173	
Shore Birds				
American oystercatcher	208	0.2	28	12/14/01
Black-necked stilt	14	0.0	4	6/6/01
American avocet	3639	3.9	803	11/27/01
Black-bellied plover	769	0.8	110	11/5/01
Ruddy turnstone	166	0.2	84	5/30/01
Semipalmated plover	1537	1.7	277	9/14/01
Piping plover	45	0.0	12	12/5/01
Snowy plover	0	0.0	0	NA
Wilson's plover	4	0.0	2	9/14/01
Killdeer	11	0.0	10	3/26/01
Common snipe	0	0.0	0	NA
Dowitcher	3171	3.4	788	5/30/01
Red knot	120	0.1	74	10/5/01
Marbled godwit	722	0.8	165	9/25/01
Whimbrel	70	0.1	14	4/6/01
Willet	1772	1.9	247	7/17/01
Yellowlegs	1010	1.1	98	7/24/01
Sanderling	10288	11.1	1272	12/5/01
Stilt sandpiper	0	0.0	0	NA
Dunlin	11299	12.2	6482	5/15/01
Purple sandpiper	0	0.0	0	NA
Spotted sandpiper	23	0.0	5	5/15/01
Least sandpiper	625	0.7	192	11/27/01

Semipalmated sandpiper	13707	14.8	4829	5/30/01
Western sandpiper	0	0.0	0	NA
Other species	0	0.0	0	NA
Unknown shorebird	1666	1.8	481	11/5/01
Subtotal	50866	54.8	9743	5/15/01
TOTAL	92780	100.0	10100	5/15/01

6. Raptors

See Section G.2. for information on peregrine falcons and bald eagles.

7. Other Migratory Birds

The diversity of bird life on Pea Island is so great that it is sometimes referred to as a "birder's paradise". This is especially true when considering the passerine species. Some 115 different species of song birds migrate through Pea Island.

8. Game Mammals

Cottontail and marsh rabbits are fairly common on Pea Island. Declines in numbers from a few years ago seem to have reversed. Raccoon tracks have been observed with increasing frequency. In the past raccoons were incidentally captured in traps set for feral cats.

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

Deer tracks have frequently been observed around North Pond, New Field, and South Pond, and in the Salt Flats. Staff members have seen both does and bucks on Pea Island.

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

9. Marine Mammals

Several marine mammal strandings occurred on the refuge during this period. All detected strandings were reported to the National Marine Fisheries Service.

10. Other Resident Wildlife

In past years, ring-necked pheasants were occasionally observed in salt marsh, brushland, dunes, and in the Pea Island farm field. Sightings have decreased in recent years. The exact status of pheasant population is unknown. There were no reported pheasant sightings in 1999, 2000 or 2001.

15. Animal Control

Feral cats continued to be a problem with nesting birds, waterfowl, and turtles. Cat tracks were found from the beach to the sound. Cats were not actively trapped this year.

16. Marking and Banding

Due to work load and staff changes, the Gypsy Moth Pheromone Trapping Program was not monitored at Pea Island.

H. PUBLIC USE

1. General

Based on the NPS vehicle counter at Bodie Island and adjusted according to new configurations from RMIS (which continue to boggle the mind!), estimated visitation to Pea Island NWR during 1999 was 2,247,143; 2000 was 2,050,019, and 2001 was 2,460,022. Volunteers from the Coastal Wildlife Refuge Society continue to staff the Visitor Center, which is now open daily throughout the year. The Visitor Center is the perfect hub for the interpretive/ educational programs of this Refuge. (See Section H.6. for details)

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

2. Outdoor Classrooms - Students

The emphasis on non-staff conducted activities continued during the 1999-2001 period. School groups, scouts, etc. were encouraged in the independent use of the Refuge for educational activities. Marsh investigation equipment (seines, mud sieves, etc.) was available for loan from the Visitor Center. Since no registration was required for the use of outdoor classrooms, the Refuge has no record of the actual number of such uses that occurred. On the whole, this type of use continues to increase on Pea Island NWR.

4. Interpretive Foot Trails

Many visitors comment on the high quality of North Pond Trail, especially in relation to bird watching. North Pond Wildlife Trail is universally accessible, offers eight permanently mounted spotting scopes, and five major observation structures. Trail use was as follows: 361,161 in 1999; 283,287 in 2000; and 421,115 in 2001.

6. Interpretive Exhibits/Demonstrations

The two interpretive kiosks, located at both the north and south ends of the refuge, provide valuable information on a 24 hour basis for Refuge visitors. Panels located on the front porch of the Visitor Center are also available round the clock.

October 8, 1999, a Charles Kuralt Trail Dedication was held at the Creef Cut Wildlife Trail on Alligator River NWR. Mr. Kuralt passed away in 1997. The trail consists of 12 stops at various NWR's and a fish hatchery in southeast Virginia and eastern North Carolina. The trail was established to help people enjoy these wild lands and to recognize the broadcast journalist who shared the delights and wonders of out-of-the-way places like these.



Pea Island NWR is one stop along the Charles Kuralt Trail.

BS

7. Other Interpretive Programs

On-site and off-site special programs were presented during 1999-2001. Most regularly scheduled on-site interpretive programs during 2000 were conducted at Pea Island NWR by Refuge volunteers and interns.

Interpretive Programs

Year	# Programs	# Participants
1999	105	1,040
2000	52	681
2001	164	1,917

9. Fishing

Pedestrian surf fishing continued to be the major form of consumptive, wildlife-oriented recreation on Pea Island NWR during the period. Bluefish, spot, flounder, pompano, croaker, and trout were the major fish caught. The annual Crabbing/Fishing Rodeo was held the second Saturday each June with approximately 300-400 participants.

11. Wildlife Observation



The "Peterson Overlook" located along North Pond Trail was dedicated in 2001 in memory of Murph Peterson. His family is shown with Refuge Manager Mike Bryant.
USFWS

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

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

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

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

1999-2001 Wildlife Observation Visits

	1999	2000	2001
Foot	361,161	283,287	339,944
Boat	6,881	5,903	7,984
Vehicle	695,186	602,933	723,519

12. Other Wildlife Oriented Recreation

The photo-blind, installed during 1995, continued to be utilized fully during 1999-2001. However, it is still our contention that the best photographs at Pea Island NWR have resulted from being in the right place at the right time with a camera in hand.

15. Off-Road Vehicling

The use of ORV's on Pea Island NWR is restricted to NC Highway 12. Illegal ORV traffic continues to plague the Refuge; however, probably due to rapid erosion of the beach and repeated ocean overwash of NC 12 on Pea Island NWR. As long as there is a physical way for vehicles to reach the beach, there will always be some problems with ORV traffic there.

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

16. Other Non-Wildlife Oriented Recreation

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

17. Law Enforcement

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

The most common LE problems continued to be public nudity, littering, and dogs off a leash. There are minor poaching problems at Pea Island NWR; occasionally cars will stop and shots will be fired at waterfowl from the road. Poachers sometimes slip in from Pamlico Sound to quickly shoot as many waterfowl as they can and then speed away. Some illegal hunting may take place within the Refuge boundaries in the Pamlico Sound. These types of violations are difficult to detect and the violators are difficult to apprehend.

I. EQUIPMENT AND FACILITIES

1. New Construction

An accessible observation platform was constructed in 2000 at the north end of North Pond. A small parking lot was built that will eventually provide interpretative panels for the area.

An additional overlook (Peterson Overlook) was constructed in 2001 on North Pond Trail that provides a view of New Field Pond.

2. Rehabilitation

Prepared for and cleaned up after Tropical Storm Dennis and Hurricanes Irene and Floyd in 1999.

3. Major Maintenance

For several years after acquisition of Alligator River, routine maintenance of all associated facilities at Pea Island was inadvertently neglected, resulting in rapid deterioration. This was due to the fact that most of our resources were focused on development and management of the "new" Refuge. Temporary Refuge Biotech Dan Fritsch saw the need to reverse the negative trend. During his years of employment at Pea Island, he initiated and worked very hard towards restoration of:

- Facility maintenance (including buildings, pump stations, kiosks, impoundment overlooks, pole shed, gates, etc.) - he coordinated / performed major clean up and where appropriate, painted or replaced parts of structures and maintained them in good condition
- Trail and road maintenance - maintained trails and impoundment roads with mowing, disking, weedeating, hauling and spreading fill material

- Water management - maintained pumps and engines, water control structures, impoundment water levels, and (replaced as authorized) associated bulkheads. Assisted with installation of new North Pond pump station facilities
- Sign maintenance - repairing and replacing as needed
- Vehicle / equipment maintenance - serviced, maintained, repaired: vehicles, mowers, weed eaters, chainsaws, mowing tractors and ATVs

J. OTHER ITEMS

3. Items of Interest

The 56 foot fishing vessel “Lollipop” from Manteo, NC, took a “minor licking” after washing up on the Pea Island NWR beach. Fortunately no environmental damage was done and the boat was ungrounded and floated back to sea with minimal damage.



Although “Lollipop” grounded on the Pea Island beach, no serious damage was done to the environment or the vessel.

USFWS



Tropical activity in 1999 resulted in major beach erosion and increased threats to NC 12. USFWS

4. Credits

This Narrative Report was a joint effort by the entire staff in 2004.