

**BLACKBEARD ISLAND NATIONAL WILDLIFE REFUGE
ANNUAL NARRATIVE**

**Townsend, Georgia
Calendar Year 1999**

**U.S. Department of the Interior
Fish and Wildlife Service**

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View from the "Bone Yard" on Blackbeard Island National Wildlife Refuge
(99-BLB1-SG)

INTRODUCTION

Blackbeard Island National Wildlife Refuge is one of seven refuges within the Savannah Coastal Refuges (SCR) Complex and is one of the oldest refuges in the country. The 5,618 acre refuge is located approximately 18 miles off the coast of McIntosh County, Georgia. The island refuge has been in continuous federal ownership since 1800 when the island was acquired by the Navy Department at public auction for the sum of \$15,000. The Navy did a limited amount of harvesting of live oaks on the island for ship building.

Between the years of 1880-1910, the island served as the South Atlantic Quarantine station for yellow fever. In addition to housing for medical personnel, a wharf with disinfecting tanks, a hospital and associated buildings were constructed on the island. As crews disembarked from ships, those that were sick were hospitalized, while the healthy were housed separately and examined daily for yellow fever symptoms. Once disinfected, the ships were allowed to continue to their destination. Sulphur dioxide gas was used to disinfect the ships. Located on the north end of the island is a structure referred to as the "crematorium." Although documentation does not exist to confirm the structure was ever used for body incineration, it stands as one of the few reminders of that era.

Blackbeard Island was named for Edward Teach, alias Blackbeard the Pirate. Legend tells of his murderous and plundering activities along the coast and his periodic retreats to the island for "banking" purposes. Rumors of Blackbeard's buried treasure still flourish but no evidence of his fortune has ever been discovered.

The island's history as a refuge began on February 5, 1924 when Blackbeard was placed under the jurisdiction of the Bureau of Biological Survey to be maintained as a preserve and breeding ground for native wildlife and migratory birds. In 1940, by Presidential Proclamation, Blackbeard Island was designated as a National Wildlife Refuge.

The island comprises interconnecting linear dunes thickly covered by oak/palmetto vegetation. Between these ridges are numerous ponds and savannas. The savannas, as a rule, are narrow, although some cover several hundred acres. Protected from tides by dikes and dunes, these savannas are filled by seasonal rains and are utilized by waterfowl and wading birds. The southern end of the refuge was established as a wilderness area in 1975 by Public Law 93-632. The designated area encompasses 3,000 acres which include approximately 2,500 acres of salt marsh, 50 acres of white sand beach, and a 450-acre Research Natural Area consisting of 100 acres of virgin slash pine.

Approximately one-half of the island's habitat types include open freshwater or freshwater marsh (1,163 acres) and regularly flooded salt marsh (2,000 acres). Waterfowl, wading birds, (including the endangered wood stork,) and American alligator are common in and around these areas. Island habitat types also include approximately 340 acres of sand beach. These areas provide nesting or feeding areas for the threatened loggerhead sea turtle, endangered piping plover, and numerous species of shorebirds, gulls, and terns. The remainder of the habitat found on the island primarily consists of noncommercial forest (2,115

acres). The island's forests range from maritime live oak forest on the north end, mixed live oak/pine forests in the middle of the island, to predominantly slash pine on the south end. These forests are used by numerous species of resident and migrant songbirds, hawks, and owls.

HIGHLIGHTS

- * Two congressional aids of Republican Congressman Jack Kingston's office were given a tour of Blackbeard Island (8b-other).
- * The Savannah fire crew helped tractor operator Gilje in dismantling the condemned 12'X60' mobile home trailer and the 12'X20' turtle supply storage shed the first week of March (3f, 8b-Equipment/facilities).
- * The Brunswick Job Corps painting crew began prep work of the main residence to be painted (5a, 8b-Equipment/facilities).
- * Melissa Walker and Bill Wharf of Wilderness Watch visited Blackbeard Island during the month of April to evaluate the area and the refuge's wilderness management activities (8b-Other).
- * The Brunswick Job Corps Center carpentry trade students began rehabilitation work on the information kiosk (5a, 8b-Equipment/facilities).
- * District Manager Bill Grabill visited Blackbeard in May to see first hand ongoing refuge projects (8b-Other).
- * Assistant Regional Director Dale Hall visited Blackbeard Island on June 14 and 15 to see first hand ongoing refuge projects (8b-Other).
- * Tractor Operator Gilje converted to Assistant Refuge Manager of Blackbeard Island (8b-Personnel).
- * Assistant Fish and Wildlife Director Dan Ash, visits Blackbeard Island (8b-Other).
- * The refuge is closed September 14-20 due to Hurricane Floyd (Climatological Review, 8b-Equipment/facilities).
- * Clean coast members pick up trash on Blackbeard in celebration of National Wildlife Refuge Week (7a, 7b).

Climatological Review - 1999

The 30-year precipitation average for the state of Georgia is 56 inches. However, the southeast coasts of Georgia averages approximately 64 inches each year (National Weather Service). Temperatures during the year were normal, but rainfall was well below normal as the state is in it's third year of a severe drought.

Month	Rainfall (inches)	High Temp.	Low Temp.
January	3.44	76°	22°
February	2.60	81°	30°
March	0.74	80°	36°
April	1.54	97°	40°
May	0.46	92°	49°
June	5.11	92°	46°
July	5.40	102°	70°
August	0.97	106°	69°
September	10.45	96°	57°
October	3.86	87°	45°
November	0.75	80°	36°
December	1.09	75°	27°
Total	36.41		

Temperature data was taken from the Savannah NWR station and rain data from the Georgia Forestry Commission office in McIntosh County due to mechanical problems with the Blackbeard Island weather station.

Refuge staff spent two days preparing for the coming Hurricane Floyd by boarding up the windows on the main residence, moving vehicles to high ground, and securing small items that may become a flying hazard. The refuge was closed on September 14-16 for the hurricane. The refuge stayed closed September 17-20 for cleanup purposes. No structural damage occurred, only downed trees littered the roads.

1

Monitoring and Studies

1a. Surveys and Censuses

The midwinter bald eagle survey was conducted on January 8, 1999. One eagle was observed in the nest on the north end of the island. The Blackbeard breeding pair raised one chick to flight stage during the 1999 season.

On January 8, the midwinter waterfowl survey was conducted on Blackbeard Island. A total of 56 ducks were observed, almost 5100 less than last years count.

A Partners in Flight midwinter shorebird survey was conducted on January 22, 1999. A total of 13 species and 2,123 birds were observed. No piping plovers were recorded during the survey.

In cooperation with Manomet Bird Observatory, Blackbeard Island staff participated in the Western Hemisphere Shorebird Reserve Network (WHSRN) shorebird surveys. The surveys were conducted every ten days from April 1 through June 10 and from July 11 through October 31, to coincide with the spring and fall migrations. This was the third year the refuge was a participant in WHSRN's internationally coordinated surveys. The count peaked on May 21 with 989 birds observed. Species diversity peaked on August 10 with 14 species represented in the survey. Three to 12 piping plovers were recorded during each sample period from August 10 through October 26 and six were recorded during the April 16 survey.

Volunteer, John Metz, conducted point count surveys at 50 different stations in May 1999. John is in the process of adding this years data to our data base. This will provide us with four years of data (1996-1999).

During the wood stork nesting season, an estimate of 57 wood stork nests were recorded on the small island in Flag Pond by aerial observation. Production was estimated at slightly less than one fledgling per nest, well below normal production of 2.5 birds per nest. The severe drought conditions have most likely impacted production. Water levels within the nesting colony on Flag Pond have continually dropped throughout the year.

1b. Studies and Investigations

To coincide with the sea turtle nesting season, Dr. Yoshimasa Matsuzawa placed temperature data loggers in the sand dunes on Blackbeard Island. Dr. Matsuzawa is a sea turtle biologist from Japan working jointly with the University of Florida. The data loggers will measure sand temperature during the nesting season and were retrieved on October 12. The information

will be compared to other data loggers that he has placed throughout the world where sea turtles are known to nest.

The loggerhead sea turtle (Caretta caretta) is a threatened species, protected under the provisions of the Endangered Species Act. The Blackbeard Island sea turtle project began in 1965 and represents one of the longest sea turtle nest study/protection programs in the world. During the 1999 nesting season, 193 sea turtle nests were laid on Blackbeard beaches, 15 more than last year. A majority of these nests (58%) were relocated to safe areas to protect them from tidal wash. This season far fewer nests were relocated (112) than last season (148 - 83%). Eighty-one nests were left in situ. Hatching success for relocated nests was 80%. Hatching success was 75% for in situ nests, with total hatching success being 78%. A total of 16,902 hatchlings emerged from nests and 16,867 made it to the ocean. Hatchling success (total eggs/total hatchlings making it to the ocean) for the 1999 season was 74%. A total of 29 nests were completely predated by raccoons resulting in 744 known eggs lost. Thirty-five hatchlings were predated by raccoons and ghost crabs. The total number of sea turtles stranded on Blackbeard was 11.

Table 1: 1999 Blackbeard Island N.W.R. loggerhead turtle nesting summary

Total # Crawls	321
Total # Nests	193
Total # False Crawls	128
Total # In Situ Nests	81
Total # Relocated Nests	112
Mean Clutch Size	117.69
Total # Eggs	22,714
Total # Eggs Hatched	17,703
Total # Eggs Unhatched	5,011
Total # Hatchlings Emerged	16,902
Total # Hatchlings Making it to Water	16,867
Total # Eggs Known Depredated	744
Total # Missing Eggs	76
Total # Broken Eggs	11
Total # Hatchlings Depredated	35
Total # Nests Failed (0% Success)	9
Total # Nests Predated	34
Overall Hatching Success	77.9%
In Situ Hatching Success	74.9%
Relocated Hatching Success	80.0%
Overall Emergence Success	74.4%
Mean # Days to Emerge	56
# Females Tagged	0
# Females Measured	26
# Females With Other Project Tags	6 *
# Females With Multiple Nests	N/A
Total # Sea Turtles Stranded	11

* 2 turtles were tagged on Blackbeard during the 1993 or 1994 season, and 4 turtles were from unknown location

Paul Sykes of the U.S. Geological Service, is conducting a five year study to determine the annual survival of painted buntings using banded birds from the bunting's coastal breeding range (north Florida - southern North Carolina). The study will involve capture and banding of buntings using mist nets and bird feeders to attract the birds. Blackbeard Island was selected as one of 24 study sites on Federal, State, and private lands. In March, Mr. Sykes visited the island and selected three locations to place the bird feeders. The feeders were baited by refuge staff for approximately one month prior to banding efforts in August. A total of 68 birds were captured, banded, and released.



Paul Sykes with a painted bunting (99-BLB2-MJ)

3

Habitat Management

3a. Water Level Management

Wetland habitat on Blackbeard Island includes four diked impoundments (800 acres), 2,000 acres of salt marsh, and a series of irregularly flooded savannas (363 acres). At one time, a large aquifer supplied the impoundments on the refuge with freshwater via artesian wells. Unfortunately, industrial growth placed such a demand on the aquifer that water no longer flows from the wells. Therefore, the sole source of impoundment freshwater replenishment is rainfall.

Managing water levels is restricted to a few old culverts with flashboard risers that remain functional, however, through the years earthen dikes have replaced culverts and risers that have failed. This provides a means to hold rain water, yet without a means to control water levels.

3b. Moist Soil Management

Management of moist soil units is minimal and dependent on prevailing weather during the year. The inability to release water in some of the moist soil areas prevents disking, bush-hogging, and limits burning to extreme dry years. Minimal soil and vegetation disturbance has been possible since the refuge began depending on rainfall for its water source. Water levels did not recede enough during 1999 to permit soil and vegetation disturbance, but if the state continues to stay in severe drought conditions that will be possible in FY 2000.

3c. Graze/mow/hay

Approximately 20 acres of road edges, levees, and small openings were mowed to promote habitat diversity on the island. Mowing is directed at maintaining established early successional plants, which primarily consist of grass species, and maintaining access routes.

3f. Fire Management

Prescribed burning

Four prescribed burns were completed in 1999 totaling 430 acres. These burns achieved excellent results in reducing the hazardous fuel accumulation on the island and knocking back the brush encroachment on Toar Savannah.

Prescribed Burns – 1999

Date	Unit	Acres	Type	Fire #
1/21	Toar Savannah	325.0	aerial	4150
3/3	Campground	5.0	hand	4307
3/4	Pile #1	0.2	hand	4308
3/5	North Trail	100.0	hand	4309
Totals		430.2		

Wildfire activity

Two small wildfires occurred on the island in 1999. Both were quickly spotted and suppressed. The first fire occurred while the fire crew was on the island assisting with project work. The second fire was spotted at dusk by Bio. Tech. Deb Barnard. The refuge staff and fire crew quickly mobilized to the island and the fire was suppressed that evening. The KBDI (drought index) for the refuge maintained over the 625 level (extreme fire danger) during May, June, August and September.

Wildfires -- 1999

Date	Fire name	Acres	Cause	KBDI	Fire #
8/11	Johnson	0.25	Lightning	631	4598
9/7	Barnard #1	0.3	Lightning	750	4628
Totals		0.55			

Other Activities

A cleanup of the fire cache was completed with some minor repairs to the 500-gallon pumper. The fire crew assisted with a number of refuge projects including working the hunts, tearing down the old staff trailer, repairs of the refuge dock, maintenance and refuge/facilities cleanup.



Firefighters and ROS Gilje dismantle the old staff trailer. (99-BLB3-SG)

4

Fish and Wildlife Management

4d. Nest Structures

High tides associated with forceful northeastern winds caused significant erosion to the primary dunes on Blackbeard in late May. The event occurred just as the loggerhead sea turtle nesting season was getting underway. Impacts were readily apparent as cliffed dunes posed an impassible barrier for turtles seeking suitable sites for egg laying. Until new sand deposits accumulated, a temporary solution was devised for turtles to bridge the barrier. Small sections of the cliffed dunes were knocked down with a tractor creating the resemblance of a "loading ramp." These "ramps" were concentrated along the primary nesting areas of the beach every few meters. The approach was successful as turtles located the slope areas and proceeded to excavate nests.

4e. Predator and Exotic Control

Approximately 80 raccoons were removed from beach areas on Blackbeard Island by refuge personnel during 1999. These activities were conducted prior to, and during, the sea turtle nesting season in an effort to decrease egg and hatchling predation.

For many years, the island has been void of feral hogs and the destructive habitat impacts that result from their presence. However, a growing population on nearby Sapelo Island, a state

owned island managed by the Georgia Department of Natural Resources (DNR), appears to have become a source for hog dispersal to Blackbeard Island. During 1999, some of the animals were harvested during two three-day archery hunts. Other methods such as using soured corn as bait, trapping, and stalking worked only marginally. Using soured corn in a hog trap counted for several hogs being removed from the island. A total of 39 hogs were removed from the island in 1999. More aggressive measures were discussed and will be implemented in early 2000.

5

Coordination Activities

5a. Interagency Coordination

The Carolinian-South Atlantic Bio-Reserve was established in 1986. The Reserve is represented by designated areas situated along the Eastern Coast of the United States and includes Blackbeard Island. Hubert Hinote, Director of the Southern Appalachian Man and the Biosphere Program, coordinated the first-ever meeting of Reserve members which was held on February 12, 1997, in Savannah, Georgia. The meeting was informative and led to the organization of a Coastal Georgia Barrier Island Managers Meeting. Managers from Islands along the Georgia Coastline, featuring various ownerships (private, state, and federal), were in attendance. The islands represented by managers attending the meeting feature somewhat dissimilar habitat attributes and are often managed to meet distinctly different goals or agendas. However, many of the islands along the Georgia Coastline experience similar dilemmas (i.e., public demands, wildlife and habitat management, transportation of goods and materials, etc.).

The first meeting of the year was hosted by the National Park Service at Cumberland Island National Park. Project Leader Drake, Deputy Project Leader Flock, Bio-tech Range, and Manager Johnson attended the meeting. A tour of the island was given to the participants along with talks pertaining to the island's natural history and future programs to be implemented by the Park Service.

The Altamaha Ecosystem Team and attending partners were given a tour of Blackbeard Island on August 19 by Refuge Manager Johnson, Project Leader Drake, and Refuge Officer Bryant. The Ecosystem team was given a tour of the Island and were able to see the islands sea turtle program first hand. Bio-tech Barnard presented a small talk to the group about the turtle program.



Bio-tech Debra Barnard shows participants of the Altamaha Ecosystem Team baby sea turtles. (99-BLB4-MJ)

A tour of Blackbeard Island was arranged, at the request of Georgia DNR, for participants of the "Weekend for Wildlife" Program. This annual event was held on February 13 and generates funds for the state's non-game species program. The tour was given by refuge staff and volunteers serving as interpretive naturalists.

Towards the end of 1998 an excellent rapport was built with the Brunswick Job Corps Center (BJCC) and the staff at Harris Neck and Blackbeard Island. The BJCC students completed several jobs for the refuge's. The BJCC painting instructors and Manager Johnson met several times to discuss the feasibility of painting the main residence on Blackbeard. The BJCC agreed to take on the project providing the Service pays for all the supplies that will be needed. Several weeks were spent prepping the house in June and July to get ready for painting. This included scraping the 2400 sq. ft. house, caulking around window sills, taping windows, nailing back on 1X2" wooden strips, and cleaning off mildew buildup.



Brunswick Job Corps students prepping the main residence for painting. (99-BLB5-SG)

The color chosen for the main residence was ships' hull grey. Painting the house would prove to be a long process since the BJCC students could only make the trip to the island three days a week, weather permitting. By the end of 1999, the BJCC students had the first coat of primer paint on the house and were ready to actually start the painting process. Future plans call for painting all the buildings on the island the same color.



The newly painted main residence on Blackbeard Island. (99-BLB6-SG)

In May of 1999, Manager Johnson and Tractor Operator Gilje transported Service Engineer Dale Bailey along with Brunswick Job Corps officials from the Brunswick and Washington, D.C. office to Blackbeard Island. The purpose of the trip was to discuss the BJCC design and construction plans for a new 1500 sq.ft. staff/research facility that would replace the one that is currently being used.

6

Resource Protection

6a. Law Enforcement

Throughout Savannah Coastal Refuges, recreational boating is increasing. Blackbeard Island NWR has witnessed a dramatic increase in boating traffic over the past few years. With this increase in vessel traffic, refuge officers have investigated many more boating incidents than in years past. The narrow winding creeks through the refuge provide access to the barrier island. Combinations of excessive speed, unfamiliar channels, and general inexperience are the causes of most boating accidents.

Specific law enforcement violations will be discussed in the Appendix (Savannah Coastal section).

6b. Permits & Economic Uses

Southeast Adventure Outfitters, Inc. continued conducting interpretive tours on Blackbeard Island during 1999. Their first permit, issued in 1997 expires in 2000. The company generated \$2,035 for their walking tours of the refuge in 1999, accommodating 68 visitors.

Clean Coast, a non-profit Savannah based conservation organization, was issued a renewal of their special use permit (valid through September 30, 2000) in order to sponsor a beach clean-up on October 9, as a 1999 National Wildlife Refuge Week activity open to the public.

Inclement weather and boat transportation difficulties prevented four permittees from conducting interpretive and educational programs on the refuge. Sea Kayak Georgia, The Nature Conservancy, The Georgia Conservancy, and the Charleston County Park and Recreation Commission canceled trips to the island in 1999.

6c. Contaminant Investigation

In 1992, the service installed two 500 gallon above ground fuel tanks to be in compliance with federal guidelines concerning secondary spill containment and monitoring. In December of 1998 two 500 gallon underground storage tanks (UST's) were removed from the island. No physical contamination was present, but soil samples showed minute quantities of benzene.

Victor Grant of NTC Environmental Group conducted additional soil sampling in January of 1999 at the tank removal site. In April of 1999, Refuge Manager Johnson provided the results to Environmental Engineer Jim Poje to the confirmed contamination of soil associated with the underground storage tanks. The information was provided for submission of a no action to the state given the location of site and amounts of contamination detected (traces of benzene in approximately 12 cubic yards of soil). In June the Blackbeard UST closure report was denied by the state and was re-submitted. In July the state of Georgia and Jim Poje FWS Environmental Engineer signed off on the closure documents for the UST's re-submitted in June by NTC Environmental Group.

6d. Contaminant Clean-up

During the year, refuge staff continued the cleanup of Blackbeard's "treasures." Accumulations of tires, inoperable equipment, old boats, scrap metal, and other nonessential items from years of service management were removed from the island.

6f. Cultural Resource Management

The proposed renovation of the Nelson's Bluff bulkhead and barge slip and associated habitat restoration were reviewed by Rick Kanaski, the Regional Archeologist in August 1999. As part of the restoration, the remains of mid-20th century barge would be removed. The barge was used by the Refuge in the early 1960's and was determined not to be eligible for the National Register of Historic Places.

In October 1999, John Metz discovered several exposed timbers on the beach. On November 11, Refuge Manager Johnson, and Regional Archeologist Rick Kanaski shovel skimmed a small area and exposed a 33 foot port stern section of a shallow-draft barge. The remains consisted of three timbers held together with large iron pins and exterior plank sheathing. A burned area, circa 1.5 meters in diameter, was observed near the stern. Most of the iron fasteners appeared to have been salvaged. Upon completion of a site plan and photo-documentation, the wreck was re-covered with sand. It does not appear to be associated with the first wreck, but probably comes from one of the many ships which sank in the shoals off Blackbeard Island. The recent spate of Atlantic storms tossed the six-foot section onto the beach.



Regional Archaeologist Rick Kanaski photographing the remains of the shallow-draft barge. (99-BLB7-SG)

7

Public Education and Recreation

7a. Provide Visitor Services

Visitation to Blackbeard Island refuge was estimated at 3,776, a decrease from the 1998 total of 9,851 visitors. This was largely due to the fact that there was little or no employee presence to account for the visitation. Public use on Blackbeard is greatly affected by weather and sea conditions. Visitation was highest in the late spring and early fall, coinciding with more productive saltwater fishing periods and perfect beach weather. Other uses included bird watching, hiking, bike riding, and freshwater fishing.

During the summer months, use of the Blackbeard Island beaches by the public is pronounced. This is also the time of year severe afternoon thunderstorms are common. During the year, several boaters were caught off-guard and exposed to dangerous lighting and rough seas. On several occasions during 1999, stranded and panicky boaters sought shelter and assistance from refuge personnel. Assistance and shelter was provided to the extent possible on each occasion. The efforts of refuge staff were appreciated by those assisted.

Sea kayaking activity continued to grow in coastal Georgia waters, and several kayak groups paddled to Blackbeard then hiked to the beach from the dock. Southeast Adventures Outfitters of St. Simon Island was re-issued their special use permit authorizing kayak access to Blackbeard for interpretive tours on the island. The permit limited tours to four per month, with no more than two scheduled in any week. The group visited the island several times from February to August, accommodating 68 participants. Fees collected by the outfitters totaled \$2,035.

Another nature tour company, Sea Kayak Georgia based at Tybee Island, was also issued a permit to conduct no more than two tours per week on Blackbeard and Wassaw NWR receptively, with a total of no more than four tours per month. However, this permittee was unable to conduct any of the company's scheduled tours due to weather factors.

Interpretive programs

Interpretive programs were provided to three groups during the year. Among those accommodated by volunteers and refuge staff were officers of the Ogeechee Audubon Society, members of Clean Coast who participated in NWR Week programs on Savannah Coastal Refuges (October 9), and supporters of the Georgia Department of Natural Resources' Annual "Weekend for Wildlife" non-game wildlife program (February 13).

Special Events

Clean Coast - Savannah Chapter, authorized by a special use permit to conduct beach cleanups, organized one litter patrol on the island in 1999. More than 1000 pounds of debris was removed by the Clean Coast group. During the October 9 beach-sweep, the volunteers cleaned from south beach road to Cabretta inlet. This activity was planned to highlight National Wildlife Refuge Week. Clean Coast provided transportation to the 30 beach sweepers. Twice as many would have joined the group if additional boat transportation could have been provided. After a morning of beach cleaning, the volunteers were rewarded with a low-country boil they prepared and an interpretive program presented by Assistant Manager Gilje.



One group of beach-sweepers stopped briefly to model their new volunteer t-shirts. (99-BLB7-SG)

Fishing

Recreational fishing continued to be very popular in Blackbeard creek. Several boats were seen almost every day fishing for spot-tail bass, flounder, trout, and sheephead.

Fresh water fishing is limited to only Flag Pond on the island. In recent years the state has been in severe drought conditions which has greatly impacted the fresh water fisheries. The pond was supplied water via artesian wells, but when industry moved into the area, the wells dried up. The only way to replenish the water is through rainfall. Average rainfall for the coast is 64 inches, this past year we only had 35 inches. By the end of 1999, the pond had severely shrunk in size. With very little rainfall predicted for a long-term forecast, Flag Pond might simply dry up and destroy the bass fishery.

Hunting

Blackbeard Island archery hunters enjoyed the 53rd season of bow hunting for deer on the refuge in 1999. The Blackbeard archery hunt, reputed to be the oldest bow hunt for deer managed in the national wildlife refuge system, evolved into a traditional event for many hunters who hardly ever miss a hunt, their hunting groups were joined, through the years, by their children and grandchildren. The first hunt of the 1999 season was held October 26-28. A total of 161 hunters participated and harvested 55 deer and twelve hogs. This was the second time that the taking of hogs was officially allowed on the island. Hunters were asked to shoot hogs even if they did not want to keep them, thereby helping reduce the population on the island.

The second hunt of the 1999 season was held December 2-4. A total of 128 hunters participated. During the December hunt, 28 deer and seven hogs were harvested.

It is believed the hogs crossed the narrow waterway (Cabretta Inlet) that separates Blackbeard Island from the nearby Island of Sapelo which has a growing feral hog population. Attempts to curtail establishment of hog populations on Blackbeard Island are being made by refuge management. However, given the resilience of the animal, habitat density and inaccessibility, and expanding populations on Sapalo Island, a promising solution will be difficult to devise.

7b. Outreach

Activities which attracted media coverage occurred during International Migratory Bird Day, Coast Weeks, and National Wildlife Refuge Week. In addition, the Savannah Coastal Refuges' news release (July 30) announcing the 1999 hunt schedule generated several hundred requests for information regarding the Blackbeard hunts.

8

Planning and Administration

8b. General Administration

Blackbeard Island NWR is part of the Savannah Coastal Refuges Complex which is headquartered in Savannah, Georgia. The complex is comprised of seven national wildlife refuges, totaling 54,027 acres, found along a 100-mile stretch of coastline in Georgia and South Carolina. The seven refuges are Pinckney Island and Tybee Refuges in South Carolina, Savannah (located in both South Carolina and Georgia along the Savannah River), and Wassaw, Harris Neck, Blackbeard Island, and Wolf Island Refuges in Georgia.

Personnel



Refuge Manager Michael Johnson; right,
Bio-Tech Debra Barnard-Keinath; center,
Assistant Refuge Manager Scott Gilje; left,
(99-BLB8-PM)

Blackbeard Island NWR staff during 1999.

<u>Permanent Full Time</u>	<u>Grade/Series</u>	<u>EOD Date</u>
1. Johnson, Michael W. Refuge Manager	GS-11/485	07/15/96
2. Gilje, Scott A. Assistant Refuge Manager	GS-5/485	03/01/93
<u>Temporary Full Time</u>	<u>Grade/Series</u>	<u>EOD Date</u>
3. Barnard-Keinath, Debra Biological Technician	GS-07/404	06/11/95

In April, Debra Barnard-Keinath, sea turtle biologist and researcher, returned for a fifth season to manage the sea turtle program on Blackbeard Island. .

Scott A. Gilje was hired as a Refuge Operations Specialist for Blackbeard Island June 21 after selection off a competitive announcement. The new ROS will be responsible for building and grounds maintenance as well as the administrative and biological aspects for managing the island.

Volunteer/Work Programs

Volunteers contributed valuable time and skills to the following biological, public use, and maintenance activities on Blackbeard Island NWR during 1999:

- Mid-Winter waterfowl survey
- Mid-Winter Bald Eagle survey
- International Shorebird survey
- Neotropical songbird point count surveys
- Water bird nesting survey
- WHSRN shorebird surveys (Manomet Bird Observatory)
- International migratory bird survey (Partners in Flight)
- Loggerhead sea turtle research
- Beach clean up
- Grounds upkeep
- Interpretive tour for DNR's "Weekend for Wildlife" participants
- Replacement of the main docks stringers and decking
- Interpretive exhibit planning/research

Other Manpower Programs

Refuge staff stationed at other refuges within the Savannah Coastal Refuges Complex, fire crew, and YCC employees were instrumental in providing a means to accomplish ongoing activities on Blackbeard Island throughout the year.

Equipment and Facilities

In January, Project Leader Drake and Volunteer Junior Archer replaced the screen on the front porch.

A new television was purchased by refuge staff for use on the island February 10.

Power, water, and gas lines were disconnected from the old staff trailer by Savannah refuge electrician Dennis Williams.

In March, firefighters and refuge staff dismantled the old staff trailer and storage shed.

In March the Brunswick Job Corps carpentry students were transported to the island to rebuild the front kiosk (information booth).

New beach markers were placed every 1/10 km. in March.

The Brunswick Job Corps painting crew began house prep work at the end of March.

In April refuge staff removed encroaching wax myrtle from Toar Savannah dike.

New spark plugs and filters were installed on the 25' Frontier and the 40' SeaArk in April.

In April the 25' Frontier was taken to D & E (boat mechanic) to have a new power head installed.

The floating dock was re-decked and new stringers installed by refuge staff and volunteers in April. The cross braces were also replaced.

On April 27, the 1995 White Ford 4X4 was transported to the island. The 1971 Dodge 4X4 was taken off and transported to Harris Neck.

New linoleum was placed in the turtle hut in May.

Savannah mechanic Rahn replaced the heat sensor and thermostat in the island's D4 bulldozer. Rahn also cleaned out the radiator.

Refuge mechanic Rahn placed a new core in the radiator on the blue 4X4 dodge in May.

The Blackbeard ice machine was switched with the Harris Neck ice machine after it quite working in May. The ice machine was later repaired and remained at Harris Neck.

Youth Conservation Corps leader John Metz and YCC students tore down the old barbed wire fence from around the garden area.

A new Venturi valve was ordered to replace the one that was broken off the main water tank line in June.

June and July found the Brunswick Job Corps painting students busy continuing house prep work and painting.

In July, the radio room was cleaned out in attempts to make an office out of it.

On August 15, both 4-wheelers received maintenance.

A new starter switch a placed on the 4-wheeler on August 26.

The septic tank for the main residence was repaired and pumped out in August.

Blackbeard Island was closed September 14-16th for hurricane prep for the coming Hurricane Floyd.

Blackbeard Island was closed September 17-20th for cleanup from Hurricane Floyd. No structural damage occurred, mostly downed trees.

Electrician Dennis Williams performed maintenance on the islands deer cooler on October 10.

Savannah refuge mechanic Rahn replaced broken transmission lines on the blue 4X4 dodge in November.

Safety

There were no lost time accidents on Blackbeard Island in 1999 by refuge staff.

Noteworthy Visits

Melissa Walker and Bill Wharf of Wilderness Watch visited Blackbeard Island during the month of April to evaluate the area and the refuge's wilderness management activities. Refuge Officer Bryant provided the tour of the Island.

Bruce Evans from the Senate Appropriations Committee, Ann Feltner from the Service's External Affairs Office were given a tour of Blackbeard Island on January 12.

Congressional Aids of Georgia Republican Congressman Jack Kingston (Tripp Tolleson and Trish DuPriest) were given a tour of Blackbeard Island on March 23. The tour was given by refuge staff and was at the request of Mr. Kingston's office

Assistant Regional Director Dale Hall visited Blackbeard Island on June 14 and 15 to see first hand ongoing refuge projects and to discuss refuge issues concerning upcoming activities (i.e. bulkhead project, new research quarters). The two-day trip allowed Mr. Hall to see the islands sea turtle program, discuss refuge law enforcement issues with Refuge Officer Bryant, and to see the management activities of the island.

District manager Grabill visited Blackbeard Island on the 15 and 16 of May. The visit focused on island management issues, as well as an opportunity for him to see first hand the refuge's needs and ongoing work projects.

A Refuge Revenue Sharing Act check for \$94,284 was presented to the McIntosh County Commissioners Office by Refuge Officer Bryant. The check represented revenue sharing payments for Harris Neck, Wolf Island, and Blackbeard Island NWR's. This year's check was \$13,322 less than 1998.

HARRIS NECK NATIONAL WILDLIFE REFUGE
ANNUAL NARRATIVE

Townsend, Georgia
Calendar Year 1999

U.S. Department of the Interior
Fish and Wildlife Service

Sam O. Drake, Jr. 1-02-01
Refuge Manager Date

Bill A. Gabriel 4-17-01
Refuge Supervisor Date

Edward W. Lott 4/18/01
Regional Chief, Date
National Wildlife Refuge System

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INTRODUCTION

Harris Neck National Wildlife Refuge is one of seven refuges administered as part of Savannah Coastal Refuges (SCR). The refuge is located in McIntosh County, Georgia, 50 air miles south of the port city of Savannah. Harris Neck serves as an important link in the chain of refuges along the eastern seaboard, and is the inland base for two neighboring barrier island refuges, Blackbeard Island and Wolf Island, both located south-east of Harris Neck.

The 2,762 acres comprising Harris Neck Refuge have had a long, and at times, controversial history. Distinguished as one of the oldest intensively farmed areas along the Georgia coast, Harris Neck was among the first land grants given to the early English and Scottish settlers in 1750. While staple crops were produced, it was the high quality Sea Island Cotton which brought European fame to the coastal agricultural industry. Unfortunately, poor farming practices soon exhausted the fragile sandy loam soils, and large scale farming was abandoned in 1860.

The Civil War brought an end to the "Old South" plantation era, and Harris Neck was divided into smaller farms. The community, thus established, thrived until the advent of World War II, when the U.S. Government condemned the property for use as an air base. Twelve hundred acres were converted into a triangular landing strip for use as a training facility by the War Department.

After World War II, the property was given to McIntosh County for guardianship and use as a municipal airport. Due to county mismanagement of the land resources, Harris Neck was transferred to the Federal Aviation Agency. On May 25, 1962, the U.S. Bureau of Sport Fisheries and Wildlife (forerunner of the USFWS) acquired the property, and established the area as a migratory bird refuge.

This valuable and productive refuge is managed primarily for marsh and wading birds, waterfowl, resident wildlife, and interpretive and recreational purposes. It is crisscrossed by 15 miles of paved roads and runways once used by P-39 and P-40 fighter planes. These roads and runways now provide visitor access, and facilitate management of the refuge.

The refuge's 2,762 acres includes 665 acres of open fields, 649 acres of mixed forest, 1,295 acres of salt marsh, and 153 acres of freshwater impoundments. Mud flats, thickets, swamps, and ponds are interspersed throughout the refuge.

Management of six man-made freshwater impoundments enhances the refuge's importance as a wintering area for migratory birds. They serve as a rookery site for the endangered wood stork, and roosting and feeding areas for waterfowl and wading birds.

HIGHLIGHTS

- * Harris Neck NWR closed because Hurricane Floyd (pg 1)
- * Drought conditions affect stork production (1b,)
- * Paul Sykes, Patuxent Wildlife Research Center, bands 55 painted buntings on Harris Neck as part of a five year study (1b, 4a)
- * Refuge and Brunswick Job Corps Center form successful work partnership (5a, 8b).
- * Six acre longleaf pine demonstration area planted at Harris Neck NWR (5a).
- * Sixty-three acre Lucas tract purchased by The Nature Conservancy (6g).

Climatological Review - 1999

The 30-year precipitation average for the state of Georgia is 56 inches. However, the Southeast Coast of Georgia averages approximately 64 inches each year (National Weather Service).

<u>Month</u>	<u>Rainfall (In.)</u>	<u>High Temp. (F)</u>	<u>Low Temp. (F)</u>
January	3.44	76°	22°
February	2.60	81°	30°
March	0.74	80°	36°
April	1.54	97°	40°
May	0.46	92°	49°
June	5.11	92°	66°
July	5.40	102°	70°
August	0.97	106°	69°
September	10.45	96°	57°
October	3.86	87°	45°
November*	0.75	80°	36°
<u>December*</u>	<u>1.09</u>	75°	27°
Total	36.41		

Precipitation amounts have been extremely low the past two years. Rainfall amounts have been approximately half of what is typically received which has affected some of our management operations, restricted prescribed burn opportunities, and created conditions favorable for devastating wildfires. Any significant amounts of rain that has come our way, has occurred over a short period of time followed by long periods with little to no precipitation.

* Temperature data taken from the Savannah NWR station and rain data from McIntosh county Forestry Commission office due to mechanical problems with the Blackbeard Island weather station.

Eight named storms were produced in the Atlantic during the 1999 tropical storm season. Five of the storms were classified as major, although only two threatened the Georgia Coastline. Hurricane Dennis approached the coast of Georgia in September. Refuge staff boarded windows and moved equipment to secure locations. The hurricane proceeded to the North and had little effect on the refuge. Hurricane Dennis was followed two weeks later by hurricane Floyd. The threat from Floyd resulted in mandatory evacuation of all coastline counties. The refuge was closed the afternoon of the 13th. The outer bands of the storm brushed along coast of Florida, Georgia, and South Carolina before the eye made landfall in North Carolina. Heavy rains and gusty winds resulted in several downed trees and some damage to facilities located closest to coastal waters. After the damage was assessed and cleanup efforts were completed, the refuge was reopened to the public on the afternoon of the 16th.



Refuge Officer Bryant closes Harris Neck NWR as Hurricane Floyd approaches and mandatory evacuations are issued by the surrounding counties. (99-HSN1-RFC)

1

Monitoring and Studies

1a. Surveys and Censuses

The Christmas bird count was conducted on December 17. The Refuge was included as part of the area covered in McIntosh and Liberty Counties. A total of 12,264 birds were recorded representing 124 species, for the two county area.

The mid-winter waterfowl survey was conducted on January 7, 2000. A total of 138 ducks were counted (111 green-winged). One Canada goose and several teal were counted on the Lucas property recently acquired by The Nature Conservancy. In addition to waterfowl, 12 wood storks were counted on Wigeon Pond.

The mid-winter American bald eagle survey was conducted on January 7. Although no eagles were recorded during the survey, they frequently use the refuge for roosting and feeding from fall through early spring.

Wading bird nest surveys were conducted throughout the breeding season. All nesting occurred in Woody Pond with 196 great egret nests and 82 wood stork nests.

Georgia Department of Natural Resources (DNR) Non-Game Program annually conducts a "Birding Boot Camp" to train individuals who will participate in point-counts of nesting neotropical migratory birds. This year's boot camp was conducted on April 19-21. As in the past, Harris Neck Refuge was used as one of the field training areas.

Ten volunteers conducted the annual Butterfly Survey on Harris Neck on July 24. Thirty-five species were recorded.

During May and September, a North American Migratory Bird Survey was conducted by volunteers. The annual surveys were coordinated by volunteer Larry Carlile, a biologist from Fort Stewart Army Base.

1b. Studies and Investigations

Results from the wood stork nesting study (conducted by refuge personnel) on Harris Neck NWR were analyzed and sent to Savannah River Ecology Laboratory (SREL) and Georgia DNR. A total of 56 nests were followed through the nesting season to obtain nesting success data. The nest total was 169, with 82 nests producing chicks to flight stage. Chicks fledged per nest were 0.95 (2.18 during the 1998 season) and chicks per successful nest were 1.83 (2.52 - 1998). A total of 150 young storks were fledged during 1999 as compared to 270

fledged during the 1998 season. Twenty-seven of the 56 monitored nests failed. Fifty-two percent of the monitored nests were successful during the 1999 season, compared to 93% success for monitored nests during the 1998 season. Success for monitored nests that were on natural sites was 23% and for nests on artificial structures success was 60%. The artificial wood stork nesting structures contained one, two, three, or four nests and nest success was 40%, 63%, 75% and 75%, respectively. The lower nest success and production, during 1999, was most likely due to the extreme drought conditions. Drought can limit the number of suitable nesting sites. There were only three coastal Georgia wood stork colonies that produced chicks during 1999. During a normal year 10 coastal colonies should be active and produce chicks. Drought conditions that persist throughout the year can also eliminate almost all fresh water food sources. Freshwater food sources play a significant role in wood stork production. These areas can be utilized by feeding storks 24 hours a day while tidal areas are available only during a few hours each day near low tide. The feeding ponds on Harris Neck can make a difference in production during years of drought. Production counts from Black Hammock, another coastal colony, resulted in an estimate of 1.3 storks produced from successful nests while the Refuge colony produced 1.8 chicks. Two feeding ponds on the refuge were lowered during chick rearing providing a concentrated supply of sunfish and bullhead catfish.

Savannah River Ecology Laboratory - University of Georgia and Savannah Coastal Refuge staff banded 75 wood stork fledglings from the Harris Neck colony on June 3, 1999. Future sightings of banded birds will give us valuable information on post breeding dispersal, survival and nesting area fidelity as the banded birds reach maturity.

Two wood storks banded in 1995 (one was a male) nested on the artificial structures in Woody Pond. The male banded four year old bird raised two chicks to flight stage and the other four year old bird raised one chick. In addition, an adult stork, banded and fitted with a radio transmitter in 1998, nested on one of the artificial structures, but the nest failed. Another bird, banded and fitted with a satellite transmitter in 1996, nested on an artificial structure and fledged three chicks.

Paul Sykes, Patuxent Wildlife Research Center, is conducting a five year study to determine the annual survival of painted buntings using banded birds from the bunting's coastal breeding range (north Florida - southern North Carolina). The study will involve capture and banding of buntings using mist nets and bird feeders to attract the birds. Harris Neck NWR was selected as one of the 24 study site locations. On March 22, Mr. Sykes visited the refuge and selected three locations to place bird feeders. The feeders were baited by refuge personnel for approximately one month prior to banding efforts in July. A total of 55 painted buntings were banded during a three day period. This spring staff and volunteers will be watching and reporting sightings of banded buntings.

2

Habitat Restoration

2a. Wetland restoration

Twenty-three nesting islands were created in Woody Pond in 1997 as a part of a Ducks Unlimited (DU) Marsh Project. The islands were planted with black gum and bald cypress trees to restore natural nesting structure for the endangered wood stork and other wading birds. During January 1999, the man-made islands were cleared of competing vegetation by refuge staff and the members of the Savanna Fire Crew. Once the islands were cleared, seedling survival was evaluated. Survival was estimated to be above 80% with observable mortality factors being from shading, rubbing from antlered deer, uprooting by nesting alligators, and breakage from wading birds seeking nest material. An additional 1,000 trees donated by the National Tree Trust (NTT) were planted to replace trees that were lost. In addition, cylindrical screens made of wire were constructed and placed around approximately 10% of the trees on each island to hopefully aid in their survival.

2b. Upland restoration

Survival was minimal for the 3,000 hardwood trees received through a NTT grant in 1998. Poor survival was a result of an ongoing drought being experienced throughout North Florida and South Georgia. An additional 3,300 trees donated by the NTT were planted by refuge staff and volunteers this year. The trees species planted were flowering dogwood, white oak, swamp chestnut oak, and cherrybark oak. The trees were planted on upland sites where forest succession has been minimal since the land was cleared.

3

Habitat Management

3a. Water level management

The refuge has two series of manageable impoundments (east and west) with three ponds in each series. The east series consists of Teal Pond (14 acres), Greenhead Pond (14 acres) and Goose Pond (11 acres). The west series consists of Snipe Pond (28 acres), Woody Pond (48 acres), and Bluebill Pond (35 acres). Each series is gravity-fed from one pond to the next. The ability to provide water as needed in refuge impoundments is crucial to the management of wildlife at Harris Neck. Refuge water management begins with the capture of as much

rainwater as possible. To supplement natural rainfall accumulations, a 16" deep-water-well is utilized.

Because of the ongoing drought, it was necessary again this year to pump water to fill Woody Pond. Pumping began in early February in anticipation of wood stork arrivals which typically begin in early March. By the end of the month, water levels were sufficient to support the nesting stork colony.

During April, May, and June it was necessary to pump water in Woody Pond to offset evapotranspiration losses. In the past, pumping costs associated with maintaining sufficient water-levels in the wood stork colony pond were paid through the refuge's operation and maintenance funding. During drought years, the cost has been as high as five thousand dollars. Endangered species funding has been requested to offset these costs as well as many other costs associated with management of endangered species on Savannah Coastal Refuges. Inclusion of these funds into the refuge's funding base annually are necessary to support status-quo endangered species management and critical to any additional initiatives.

Draw-down of Snipe Pond began in June to expose fish resources to nesting and nestling storks. The draw-down was completed by the end of June. Fish stocked the previous fall moved with the water and did not become available for feeding storks until the water became extremely low. The fish that migrated to the deeper areas of the pond soon became available as dissolved oxygen levels dropped prior to complete draw-down.

The water drained from Snipe Pond was used to maintain water levels in Woody Pond (location of stork nesting colony). Typically, Snipe Pond is pumped to capacity in November for re-stocking of fish. However, this year the supply of fish was not available and the pond remained dry for the remainder of the year. Refuge personnel and FWS Fisheries personnel met late in the year to develop a design for Snipe Pond that would enhance our draw-down management capabilities. The existing problem is a product of pond elevations. Deep pockets were created along the fringes of the pond in 1996 using bulldozers. These pockets are concentrated around the edges of the pond because the equipment being used was restricted from the pond's interior due to mucky conditions. This type of design was intended to be a quick, inexpensive way to provide concentrations of fish during mid-summer when high water temperatures occur (fish naturally seek deeper cooler water). Water levels were then dropped trapping fish for storks to feed as the remaining pockets of water slowly began to dry naturally. The strategy worked partially, however, most of the fish would migrate to the pond's interior instead where a larger area of deep water exists. The consequences of this behavior allowed for only one short period of feeding opportunity for storks, the period when the pond was completely de-watered.

The objective of the new design for the feeding pond is to provide management capabilities that expand or extend the feeding period artificially created by management. The quality of feeding areas outside the refuge depend on fall flooding (restocking of fish in intermittent wetlands) and timing of decreasing water levels in the spring and early summer in intermittent

wetlands (water depths must be conducive to wading bird feeding and must occur when young stork chicks begin to require large quantities of food) The purpose of the feeding pond is to compensate for feeding areas off the refuge that do not materialize because of lack of fall rainfall or when dropping water levels do not coincide with food needs of developing chicks. The new design proposes a system of three levees across the existing pond each with a water control structure. Three separate draw-downs could be conducted as determined necessary and most beneficial to nesting storks. The proposal and design is being supported as a priority by the Altamaha and Savannah Pee Dee Ecosystem Teams. At the close of the year, hopes were high that this initiative will be realized in the upcoming year.

Water from Woody Pond was released in early December and transferred to Bluebill pond through gravity flow. Bluebill Pond currently serves as one of the refuge's moist soil management impoundments and has been filled the past two falls with water from Woody Pond. An alternate rotation for providing fall water on the refuge is recommended for next year.

3b. Moist soil management

The refuge manages approximately 20 acres of moist soil areas on a rotational basis. Lack of rain and budget restraints have prevented flooding of Goose Pond the past two falls. As a result, water was not present this spring and summer to prevent germination of plants suited to drier soil conditions. The term "moist soil area" was not appropriate when referring to the Goose impoundment this year. The year ended with persisting drought conditions and no budget, as a result our moist soil production in Goose Pond is likely to be poor again next year.

Bluebill Pond was drained in late summer to allow germination of desirable moist soil plants. A host of desirable moist soil plants responded to the draw-down and an excellent moist soil crop was produced on approximately half of the pond's acreage. The remaining acreage has somewhat higher elevations and was taken over by less desirable plants. Attempts will be made next year to discourage the growth of these plants by an altered the flood regime and/or disking.

3c. Graze/mow/hay

Approximately 25 acres of road edges, levees, and small openings were mowed to promote habitat diversity, maintain access routes, and release established early successional plants during 1999.

3e. Forest management

A National Tree Trust Grant provided 1,000 bald cypress, 1,400 (white oak, swamp chestnut oak, cherry bark oak), and 600 flowering dogwoods to the refuge during January. The trees were planted in an area that has been slow to succeed. The objective is to accelerate the succession process and to provide greater diversity in upland areas of the refuge.

3f. Fire management

Prescribed burning

Four prescribed burns and one brush pile burn were completed this year, for a total of 234.4 acres.

Prescribed Burns - 1999

Date	Unit	Acres	Type	Fire #
1/13	C-6	43.1	hand	4128
1/13	C-16	83.7	hand	4129
3/2	C-8	97.5	hand	4289
3/2	Pile #1	0.1	hand	4310
11/4	Plot C-10	10.0	hand	4700
Totals		234.4		

Wildfire activity

We were fortunate that no wildfire activity occurred in 1999. The KBDI (drought index, 0-800 scale) stayed high most of the year. The southern portion of the State of Georgia suffered under a significant spring and summer drought. Our KBDI topped 625 (extreme) during May, June, August and September. The adjacent counties saw significant fire activity during this time period.

The renovation of the fire cache was completed. The fire crew assisted with numerous refuge projects including: brush clearing, working the hunts, refuge maintenance and clean up. Seasonal Forestry Technician and fire crew member Troy Phelps returned to his BLM position in April. We were able to bring him back as a GS-05 Lead Forestry Technician in December of the year. Seasonal forestry technician, Mike Coley left the fire crew after one year in the position to pursue other work opportunities.

4

Fish and Wildlife Management

4a. Bird banding

Seventy-five wood stork chicks were banded on June 3. The crews from Savannah River Ecology Laboratory and the Refuge conducted the banding. In addition to banding, feather and blood samples were taken from the chicks. The colony in Woody Pond has been used as a control for contaminant investigations. The samples were tested for mercury. In past investigations the mercury levels in samples taken from stork chicks at Harris Neck have not been above what would be expected for normal environmental conditions, while samples from the Brunswick area were elevated.

Paul Sykes, Patuxent Wildlife Research Center, selected Harris Neck NWR as one of 24 study locations along the east coast to conduct a five year bunting study. On March 22, Mr. Sykes visited the refuge and selected three locations to place bird feeders. The feeders were baited by refuge personnel for approximately one month prior to banding efforts in July. A total of 55 painted buntings were banded during a three day period. This spring staff and volunteers will be watching and reporting sightings of banded buntings (See 1b).

4d. Nest structures

During January and February, maintenance was conducted on 300 artificial wood stork nest structures that have been erected over the past few years. The large platforms and boggy ground conditions always make this annual event somewhat trying on those involved. However, the effort was soon rewarded as the first, of many storks, began to appear and build nests on the structures again this year.

Bluebird box checks indicated >90% of refuge bluebird boxes were being used by bluebirds. The boxes are tended by refuge volunteers which is a great benefit to the refuge. Twenty boxes are currently in place. Each box is experiencing two to three nestings per season. The refuge has plans to add additional boxes as soon as time permits.

4e. Predator and exotic control

An intensive feral hog removal strategy was implemented on Harris Neck in 1999. The program has been effective in reducing the impacts of feral hogs on the refuge. However, constant removal efforts remain necessary to keep the population in check. During 1998, approximately 30 animals were removed by refuge staff and hunters. This year approximately 10 animals were removed. It appears our efforts are beginning to pay dividends as sightings of feral hogs and evidence of their presence has become minimal.

4f. Fisheries Resource

Stocking of fish in refuge impoundments is part of the refuge's plan to provide ideal feeding areas for wading birds (particularly nesting and fledgling wood storks). Orangeburg National Fish Hatchery in coordination with the state of South Carolina typically provide fingerling bluegill to be stocked in Snipe Pond. The Georgia DNR hatchery located in Richmond Hill, Georgia has also provided fish in the past to stock feeding ponds on the refuge. Following the closure of Bo Ginn National Fish Hatchery, we have not received the numbers of fish needed to provide optimum feeding habitat for nesting and fledgling wood storks, and this year we received no fish. In an effort to remedy this problem, the Service has entered into an agreement with the state of Georgia to use 20 ponds at Bo Ginn to raise bluegill and bullhead catfish for the stocking needs associated with wood stork recovery. The hatchery was given to Georgia DNR following closure, but they have not raised any fish at the hatchery. If the funding is available to raise these fish in FY2000, we will have all the fish needed for our program and similar programs at Savannah, ACE Basin, and Choctaw NWR and for Audubon's feeding ponds at Cathwood near Aikin, South Carolina.

Service Fisheries personnel, Savannah Coastal Refuge's Biologist Robinette, and Harris Neck Manager Johnson, attempted to seine bluegill and bullhead catfish from small pockets of water remaining in some of the refuge's impoundments on September 2. The fish were to be used as brood stock for the Bo Ginn ponds that are soon to come on-line (See 1b). However, seining efforts were ineffective because of the mucky bottom conditions. Only a small number of fish were captured and one 8' Alligator. The inadvertent gator capture abruptly ended the seining for the day.

5

Coordination Activities

5a. Interagency coordination

An excellent rapport was developed with instructors of the Brunswick Job Corp Center (BJCC) towards the end of 1998. During January of 1999, it was agreed a cooperative partnership between the BJCC and Savannah Coastal Refuges (SCR) would mutually benefit all involved. Harris Neck Refuge is located nearest to the BJCC and was the most feasible location for project work activities. However, small projects on other refuges within the complex were also possible. During the year, students and instructors constructed 56 wood duck boxes (installed 25 at Harris Neck and checked the boxes for use after the nesting season); enclosed the underside of A-frame roofs on kiosks structures at Harris Neck, Blackbeard, and Savannah NWR's; painted a refuge vehicle; constructed pavers for landscaping purposes; designed and constructed a concrete containment structure for trucks delivering fuel (See 8b); scraped, primed, and painted a 2,400 sq.ft building; and met with Service Engineers to design a 1,600 sq.ft. living quarters to be constructed by the BJCC in FY 2000.

The refuge, wildlife resource, and public have benefitted from the partnership. Job Corps students have had an opportunity to learn trade skills at a pace and in an environment conducive to learning. Students have been presented opportunities to participate in environmental education activities conducted by staff. This alone has been very rewarding as most of the students are from inner-city areas and have had little exposure to what nature has to offer. Some of the work projects associated directly with environmental improvements have received media coverage which has been positive for the FWS, BJCC, and students.



One of the projects receiving media coverage was the installation of wood duck boxes at Harris Neck by Job Corps students. (99-HSN2-MWJ)

The final step to the Ducks Unlimited Marsh Project initiated in 1996 was the installation of a 4' x 5' sign. The sign was erected as part of the agreement between DU and the Service and accounts for the cooperative wildlife conservation project.



In recognition of a cooperative partnership formed to benefit waterfowl, the endangered wood and many other wetland dependent species, this sign was erected by refuge staff in March. (99-HSN3-MWJ)

Department of Transportation (DOT) personnel visited Harris Neck Refuge in April to review proposed road improvement projects submitted earlier in the year. The various refuge road projects were prioritized with the 0.6 mile entrance road to the refuge's five mile wildlife drive being the highest priority. The 0.6 mile Barbour River Landing road was designated as the second highest priority.

Refuge Manager Johnson met with representatives from the Georgia Soil and Water Conservation Commission, Coastal Resource Development Agency, Natural Resource Development Agency, and the Georgia Forestry Commission in April to discuss a proposal to use a site at Harris Neck for establishment of a longleaf pine stand. The objective of the venture was to locate a site that was accessible to the public in order to promote the native pine species that has all but been replaced by the loblolly or improved loblolly pine. This demonstration area, as it was termed, would hopefully encourage private landowners to commit lands to longleaf reforestation. The initial discussions of the project focused on sites that could be viewed from the refuge's wildlife drive and would be suitable for construction of an informative platform or kiosk. A suitable site was located and the project proposal was submitted to the refuge for review.

Further investigation into the site selected led to concerns regarding archaeological impacts. Regional Archaeologist, Rick Kanaski conducted a survey of the area in October and recommended an alternate site be selected. An alternate site was located and reviewed by Mr. Kanaski in November. After two weeks of arduous work approximately 10 acres was approved for the planting.

Prior to the planting at Harris Neck, a meeting was held in Midway, Georgia to present history, economic benefits, wildlife benefits, etc. to landowners. Speakers from The Georgia Forestry Commission, Longleaf Alliance, Georgia Soil and Water Conservation Agency, and University of Georgia presented programs to approximately 40 people who were in attendance. After all questions had been addressed, the group adjourned to a nearby field. Dan Gary, District Supervisor for the Georgia Forestry Commission conducted a brief planting demonstration and announced a permanent demonstration site would be planted at Harris Neck NWR for landowners interested in viewing annual stages of longleaf growth.

The planting site selected at Harris Neck was burned prior to planting. Mr. Gary and a Georgia Forestry Commission Crew planted approximately 3,000 trees on six acres towards the end of November. During the next two weeks the refuge did not receive any precipitation. The most critical time for the survival of young longleaf seedlings is during planting and the first few weeks following planting.

Towards the end of the second week after planting, Georgia Forestry foresters decided to attempt watering the newly planted trees. Three water trucks were filled to capacity and used to distribute the water. By the close of the year it was too early to determine survival rates. If 75% of the trees survive it will be considered a successful project.



Georgia Forestry personnel planting longleaf pine on the site selected as a demonstration area at Harris Neck . (99-HSN4-MWJ)

The original proposal was to reforest 20 acres on the refuge to longleaf this year. However, a shortage in the seedling supply reduced the acreage to only six. Tentative plans are to continue planting in future years to increase stand acreage. Georgia Forestry and the other partners involved have indicated an interest in increasing acreage planted and have agreed to assist if possible.

6

Resource Protection

6a. Law enforcement

The Barbour River Boat Landing, located on Harris Neck, continued to be a favorite launching facility for many fishermen. Refuge Officer Bryant and Georgia Department of Natural Resources (DNR) investigated numerous complaints in this area, primarily involving commercial fishing and shrimping violations. In December, Officer Bryant and DNR Officers arrested four individuals for shrimping with illegal gear, over the limit of shrimp, and several other violations. The subjects were using taped nets and had put their shrimp in gunny-sacks and hid them in the marsh. Upon DNR's approach, the subjects attempted to elude the approaching officers, and threw nets and shrimp overboard. Officers managed to seize over 500 pounds of shrimp. At the close of the year, the subjects were in the plea bargaining stage. Georgia DNR will also be pursuing civil charges of \$50 per quart of shrimp over the limit and boat forfeitures. In addition the individuals will be fined \$700 per person criminal fine if adjudicated guilty.

Refuge Officer Bryant assisted the Division of Law Enforcement on several occasions during the year. Officer Bryant transported his patrol boat to Merritt Island NWR and assisted in the enforcement of manatee speed zones. Officer Bryant also assisted investigators in the contaminants investigation at Lake Apopka, Florida.

Refuge Officer Bryant stayed extremely busy with training mandates this year. Firearms qualifications were conducted for Savannah Coastal Refuges, Piedmont NWR, Okefenokee NWR, Kingsland Police Department, Charlton County Sheriff's Office, and the Law Enforcement Coordinator for Region 2. Officer Bryant also taught Motorboat Operator Certification Course (MOCC) classes at Cumberland Island National Park and Harris Neck.

Collateral duty officers Johnson and Barrett attended Law Enforcement refresher training in Tallahassee, Florida in March.

Harris Neck collateral duty officers Johnson and Barrett assisted Savannah Coastal Refuges full-time officers on various occasions throughout the year with vehicle and boat check-points on Savannah NWR.

Collateral duty officer Johnson traveled to Piedmont NWR for firearm qualification in September. Collateral duty officer Barrett qualified at Okefenokee in October.

Sixty-three violation notices were issued on Harris Neck in 1999, equaling 27.7% of the total for the entire Savannah Coastal Refuge Complex. The majority of violations on Harris Neck involved trespass after hours and/or into closed areas, night hunting, drug possession, migratory bird and fishing/boating violations.

6b. Permits & Economic uses

In 1985, the Service used special funds to construct a commercial-fishing dock adjacent to the Barbour River boat ramp. Under a Special Use Permit (SUP), the Barbour River Waterman's Association is permitted to use the facility. The annual meeting between the Association and Service was held on October 13. The meeting was held to renew the SUP, collect fees, and discuss topics of concern.

6d. Contaminant cleanup

Representatives from Atlas Sand and Gravel of Savannah, Georgia were contacted twice during the year to determine if the company still had an interest in the removal of asphalt and concrete associated with the World War II airfield on Harris Neck. The project was proposed to begin in 1997, however, the removal and recycling project has yet to be initiated. It is believed Atlas has been saving the project for a "rainy day" and for a county project nearby that would be able to utilize the recycled product. Basically, Atlas knows the project will continue to be available because no other contractors have shown an interest. Additionally, the refuge has not pressed the issue because of other ongoing projects. The project remains postponed indefinitely.

6f. Cultural resource management

Rick Kanaski, the Regional Archeologist, conducted an archeological test of the proposed long-leaf pine restoration site this fiscal year. Chris Depkin, a Refuge volunteer, and the refuge staff served as field crew. The initial proposed site was located on the western edge of 9McI41, a large multi-component aboriginal site occupied between 1330-1720 A.D. Investigations performed by Drucker in 1981 and Braley, O'Steen, and Quitmyer in 1986 revealed substantial and intact cultural features present at or near the ground surface. An alternative planting site was selected and subsurface testing was done between August and October. Two Woodland Period sites were identified within the project boundaries. The first site was a small scatter of ceramics and shell contained entirely within the uppermost disturbed soil horizon or plow zone. The second site, although partially impacted by past agricultural practices, yielded evidence for intact shell-filled pits and post holes immediately below the plow zone. Preliminary indications that the aboriginal inhabitants heavily exploited oyster, hard-shell clam, razor clam, and scallop in the adjacent creeks and brackish marches. The configuration of the planting site was altered to avoid any potential impacts to the latter site. A technical report describing these investigations will be available in FY 2000 (for additional information refer to 5a.).

6g. Land acquisition support

A preliminary proposal for purchase of a 63 acre tract of land bordered by existing refuge lands on two sides was forwarded to the Regional Office in Atlanta, Georgia in February 1997. The property was appraised in January of 1998 and in March of 1998. The land purchase proposal slowly moved through the land purchase process until finally a purchase agreement was signed in July of 1998. The patient landowner finally saw this as the conclusion to the government's long drawn-out means of approving and purchasing land. However, a new problem arose, that of securing funding to complete the purchase. Different funding avenues were explored but were not justifiable or could not be secured timely enough to guarantee the landowner would maintain the agreement.

Once all timely avenues had been explored refuge personnel contacted members of the local chapter of The Nature Conservancy (TNC) who then began talks with Service Realty Specialists. Initially, TNC felt they would be able to assist with the land purchase. However, a few weeks later it was determined that until TNC could recoup monies tied-up in a similar land purchase partnership with The National Park Service (NPS) on Cumberland Island, they would not be able to commit to the full purchase price of \$395,000. In September, Refuge Manager Johnson met with landowner, Art Lucas; Tom Follrath and Zeb Matthews from the Service's Realty Division, and Kathy Edmunds of TNC. The meeting was held in Atlanta, Georgia with the topic of discussion focusing on available options and acceptable time frames for purchase of the property. Leasing of the property until monies became available seemed the most viable to the Service and TNC. However, the landowner viewed lease as an option, only if, half the acreage was purchased within the purchase agreement time frame. He would then lease the remainder of the property to the Service until FY2000. Realty Specialists once again attempted to secure funding for the purchase of half of the total acreage initially proposed. Again they were unsuccessful.

Near the close of the 1998, TNC, was once again contacted to determine the status of the NPS acquisition/TNC reimbursement. According to TNC officials, the political approval necessary to complete the partnership reimbursement with the NPS was nearing completion.

The NPS deal was completed early in 1999. Subsequently, TNC agreed to purchase the property being pursued by the FWS at Harris Neck. During March of 1999, TNC managed to close on the property. The property is currently being held by TNC until funding can be obtained by the Service. The project was included in the Administrations FY 2000 budget but not funded. The Georgia delegation redirected all Georgia acquisition projects to the National Park Services Chattahoochee River project near Atlanta.

7

Public Education and Recreation

7a. Provide visitor services

Entry into the refuge at the main entrance is monitored by an electronic vehicle counter. Slightly over 53,000 visits were recorded on Harris Neck in 1999, a decrease of 7,000 from 1998. However, this lower count also reflects the periods during which the counter was inoperative or malfunctioned before repairs were made. Of those visitors counted, approximately 15% accessed the refuge via the Barbour River Landing.

During periods in the spring and summer, wading bird rookery areas were closed except to environmental education groups led by refuge volunteers. Most visitors utilized some of the refuge's public facilities: a four and one-half mile auto tour route, two recreational fishing piers, two boat launching ramps, a commercial fishing dock, two parking lots, portable toilets, and an interpretive/information exhibit kiosk. The latter received much needed maintenance with carpentry skills provided by the Job Corps.



Job Corps workers completed repairs to the interpretive kiosk.
(99-HSN5-PEM)

Interpretive Programs

Volunteer wildlife interpreters conducted several group tours on Harris Neck in 1999. Tour groups included the Georgia Department of Natural Resources (Nongame Wildlife Heritage Section), the Ogeechee Audubon Society (Savannah, Georgia), Coastal Audubon Society (Brunswick, Georgia), and The Nature Conservancy. In addition to the interpretive tours, volunteers assisted with a variety of other public use and refuge management activities (See 8b).

Environmental Education

Several environmental education programs were conducted on the refuge in 1999. On June 18, Armstrong Atlantic State University's Teachers-Environment-and-Free-Enterprise-Institute (TEFEI), an annual teachers' ecology workshop, incorporated a day of field study at Harris Neck into their two-week summer schedule of activities. Volunteer Dr. Lloyd Newberry, a founder of TEFEI, served as the instructor for the session which covered a variety of topics related to refuge management, objectives, and concerns.

The annual butterfly survey, conducted on July 31, was promoted as an educational opportunity for the public to learn butterfly identification and promote wildflower management. Volunteer Mike Chapman served as the instructor for this combination outdoor class and wildlife census.

Several presentations were made to local school and youth groups in the spring and summer. These programs often featured live animals found injured on the refuge, or the Savannah Coastal Refuges' collection of illegal endangered species products confiscated by U. S. Fish and Wildlife Service special agents. Officer Matt Bryant and volunteer Rowland Clark provided the staff support for most of these outdoor classes.



Officer Bryant used a few props to liven up his children's programs
(99-HSN6-MB)

Special Events

Savannah Coastal Refuges' celebration of National Wildlife Refuge Week was launched at Harris Neck NWR on Saturday October 9 with morning birdwatching trips, led by volunteers, followed by a "Refuge Raptors" show. The raptor program, starring hawks, falcons, and owls from Georgia Southern University's Lamar Q Ball, Jr. Raptor Center, was funded by the Coastal Audubon Society, the Ogeechee Audubon Society, the McIntosh County Chamber of Commerce, and the Coastal Georgia Center for Sustainable Development.



A red-shouldered hawk was one of the stars of the Refuge Raptors program with falconer Wendy Denton. (99-HSN7-PEM)

The NWR Week programs were planned to coincide with the inauguration of the Colonial Coast Birding Trail. Modeled after the highly successful birding trail along the Gulf Coast of Texas, the Georgia route includes Harris Neck NWR among the 18 sites designated as outstanding by the Georgia Department of Natural Resources as outstanding coastal Georgia birdwatching areas.



One of the birding trail signs, provided by Georgia DNR, was installed opposite the refuge entrance. (99-HSN8-PEM)

Hunting

The fourth annual archery hunt on Harris Neck took place on September 23-25. The refuge's first two archery hunts were open to an unlimited number of hunters, then a quota of 125 permits was set for the 1998 archery hunt, due to unexpected high hunter turnout. The non-quota archery hunt was reinstated in 1999, largely by popular demand. Refuge officer Bryant estimated over 400 hunters participated in the three day hunt, though most hunted on a single day. Fifty four deer were harvested; no hogs were taken.

Harris Neck's one-day quota shotgun hunt was held on November 12. There were 455 applicants for the permit drawing. Of the 100 gun hunters selected, 54 participated in the hunt. Nineteen deer and two hogs were harvested.

7b. Outreach

Savannah Coastal Refuges' (SCR) staff and volunteers continued to support "distance learning" programs in 1999. SCR Ranger Metz, and instructors from the University of Georgia's Marine Extension Service (MAREX) devoted several days at Harris Neck to the expansion of an existing program featuring painted buntings, and other neotropical migratory songbirds. Additional video footage was obtained by refuge volunteer Anne Lindsey to enhance the barrier island ecology program presented through the Georgia Statewide

Academic and Medical System (GSAMS). This comprehensive learning and health care network allows Georgia students to interact live with instructors at distant locations in the State. Through the use of telephone lines, video cameras, and television monitors, GSAMS links public schools (grades K-12), colleges, universities, adult and technical schools, hospitals, prisons, and Georgia's public television network together in an interactive, two-way learning environment.

News Media Relations

Media coverage of refuge management, wildlife, and special activities included six articles written by Gail Krueger for **The Savannah Morning News**. The Krueger articles covered a variety of topics such as the five-year painted bunting research project conducted jointly by the U. S. Fish and Wildlife Service and the U. S. Geological Service on Harris Neck, Blackbeard Island, Pinckney Island and Wassaw NWRs; the annual butterfly survey managed by volunteers on July 24; the possible land acquisition benefits to Harris Neck NWR from the federal Land Legacy initiative; the Christmas Bird Count held on December 17; the inauguration of Georgia's Colonial Coast Birding Trail on October 9; and the programs planned to celebrate National Wildlife Refuge Week (October 9-17). Reporters from **The Darien News** also wrote articles about the refuge's painted bunting research, and National Wildlife Refuge Week. **The Florida/Georgia Times Union** covered Refuge Week events, and the Job Corps' contributions to projects such as wood duck nest box construction.

Partnerships

The Belvedere Ladies Club developed a bluebird management plan, in 1997, with support from the Harris Neck staff and volunteer corps, for Belvedere Island Plantation. The 2,000 acre private residential community, located adjacent to Harris Neck NWR now supports twelve nest boxes. Volunteer Charles Warnock, who maintains several hundred bluebird nest boxes in Chatham County, initially met with club officers and visited the plantation to determine the area's potential for an increased bluebird population. Based upon his recommendations, sites were chosen for twelve boxes. Anne Baggett and Cindy Peterson, Belvedere residents, were recruited as a refuge volunteers, and received training in nest data recording as well as box maintenance. In 1999, Anne continued collecting data and assumed sole responsibility for box maintenance. She also agreed to provide assistance with monitoring and maintenance of the refuge's 25 bluebird boxes.

8

Planning and Administration

8b. General Administration

Harris Neck NWR is part of the Savannah Coastal Refuges Complex which is headquartered in Savannah, Georgia. The complex is comprised of seven national wildlife refuges, totaling 54,027 acres, found along a 100 mile stretch of coastline in Georgia and South Carolina. The seven refuges are Pinckney Island and Tybee Refuges in South Carolina, Savannah (located in both states along the Savannah River), and Wassaw, Harris Neck, Blackbeard Island, and Wolf Island Refuges in Georgia.

Personnel

Harris Neck NWR staff during 1999



Refuge Manager Michael Johnson (Right); Maintenance Worker Leo Barrett (left) (99-HSN9-AF).

<u>Permanent Full Time</u>	<u>Grade/Series</u>	<u>EOD Date</u>
1. Johnson, Michael W. Refuge Manager	GS-11/485	07/15/96
2. Barrett, Leo Maintenance Worker	WG-08/4749	11/03/91

Maintenance worker Barrett and refuge manager Johnson were awarded On-The-Spot awards during the year.

Maintenance worker Barrett and refuge manager Johnson attended a basic surveying class at Okefenokee NWR in January. The class was developed and taught by the Regional Office Engineering Department.

Manager Johnson attended an Audubon Refuge Keepers (ARK) workshop at the Savannah Coastal Office on May 15. The workshop was coordinated and presented by Lora Wondolowski, Assistant Director of Outreach for the National Audobon Society.

Volunteer/Work Programs

Refuge volunteers contributed valuable time and skills to the following biological, public use, and maintenance activities on Harris Neck NWR during 1999:

- Christmas bird count surveys
- International shorebird surveys (Manomet Bird Observatory)
- Mid-Winter waterfowl survey
- Mid-Winter Bald Eagle survey
- Water bird nesting survey
- International migratory bird day survey (Partners in Flight)
- Grounds upkeep
- Environmental education programs for (MAREX, TEFEL, Armstrong Atlantic Faculty, and Hinesville Elementary classes).
- Environmental Education programs for Cub/Boy/Girl Scout Troops from Savannah and Athens, GA.
- Wood stork nesting structure maintenance
- Bluebird box checks
- National Wildlife Refuge Week Birds of Prey program
- Material and supply hauling to Blackbeard Island
- Boat operation
- Boundary marking

Other Manpower programs

Refuge staff stationed at other refuges within the Savannah Coastal Refuges Complex, fire crew, and YCC employees were instrumental in providing a means to accomplish ongoing activities on Harris Neck throughout the year.

Shane Hrobar, a forestry/wildlife major at Texas A&M University signed on as a refuge volunteer during the month of September. Shane assisted with boundary marking, grass cutting, tours, general facility and vehicle maintenance etc. His volunteer services were much needed and much appreciated.

Maintenance worker, John Metz, seasonal appointment ended on August 11 after two years of dedicated service at all of the refuges in the Savannah Coastal Refuges Complex. John's last project involved YCC supervision and scheduling of YCC work projects at Harris Neck. During his two year tenure, he assisted with completion of many projects on the complex and at Harris Neck.

Chris Depkin, a research assistant with the Savanna River Ecology Lab in South Carolina, assisted the refuge as a volunteer while conducting research activities on wood storks in the area. Chris assisted with various refuge projects beginning in August and ending in November.

Rowland Clark, son of a former seasonal Service employee Rob Clark, began volunteer work at Harris Neck in August. Rowland's intent was to spend approximately one month with the refuge to assist with ongoing projects and gain work experience in the field of wildlife conservation. His stay was extended and Rowland assisted the refuge through the close of the year. His presence has been invaluable in the absence of former maintenance helper Metz.

Four individuals participated in the YCC program from June to August. The participating youths were from Liberty and McIntosh counties and stationed at Harris Neck, although they assisted with projects on other SCR managed refuges. This year's crew was supervised by Maintenance Helper, John Metz.



Left to Right; Javon Howard; Jason Brown; Carlos Button;
John Metz; Lewis Richardson (99-HSN10-MWJ)

Equipment and Facilities

Inspection of the fueling facility at the boathouse compound was conducted by the state fire marshal in January. The refuge was cited for failure to provide a containment site for the fuel delivery vehicle. The Brunswick Job Corps Center worked with the refuge to construct the facility which was approved by the state Fire Marshall in December.

A new transformer was installed by Coastal Electric Membership Corporation at the Harris Neck shop and office facility. The replacement resulted from an inspection request submitted by Manager Johnson because of frequent power surges and power outages.

One of the two above ground fuel storage tanks moved because of the Army Corps of Engineers excavation project last year was reinstalled at the Harris Neck boathouse facility. The project occurred during March and included pouring of a new foundation, rewiring, and reconnection of fuel lines.

New 15" props and hydraulic trim tabs were supplied and installed on the two 22' Boston Whalers purchased in 1997. The installation work was conducted under the manufacture's warranty and after several calls and letters to Boston Whaler about the way the boats performed after factory set-up.

A 1989 GMC 4 x 4 pickup was picked up by refuge staff from the Federal Law Enforcement Training Center in Brunswick, GA in April. The truck was transferred from the Division of

Law Enforcement to the refuge. The truck was used at Harris Neck and will be evaluated for use on one of the island refuges in the future.

Electrician (SCR), Dennis Williams, repaired blown fuses and melted wires at the Eulonia tower radio base station in April. The damage was a result of a lighting strike. Lighting damage was again incurred in October and repaired by Electrician Williams.

A new 1000 gallon above ground diesel storage tank was purchased from Convault in May. The new tank was wired and installed on a new concrete support pad that was constructed earlier in the month.

A 8' x 24' concrete pad was poured at the refuge's deer check station in May.

A contract was awarded to Allenhurst Fence for the Installation of a new chain-link security fence at the Harris Neck shop fueling facility and at the Harris Neck boathouse facility in August. The work was completed to satisfaction by the end of September.

A new 61" diesel powered Grasshopper mower was delivered to Harris Neck in July.

Approximately 90% of all building materials for the new duplex quarters to be constructed on Blackbeard Island were ordered and delivered to Harris Neck for transport during July, August, and September.

During August, 23,600 tons of crush and run granite was delivered and spread on the 0.6 mile refuge entrance road. Otis Bentley was detailed from Savannah Refuge to assist with the project.

Coastal Electric Membership Corporation met with manager Johnson in August to discuss relocating power lines/poles to provide additional maneuvering room within the yard of the boathouse facility. Also discussed was installation of new security lighting at the Harris Neck boathouse facility and Waterman's Association's dock, and removal of two 50' poles supporting non-functional security lights. All work associated with wiring, pole realignment, pole removal and addition of new security lights (4) at the site was completed in November.

Maintenance worker Barrett replaced the front door of the main office in October.

Warranty work was conducted on the 1997 Scotsman Ice Machine three times during the year. The problem has yet to be corrected. The problem was not corrected by the close of the year but will be monitored by Scotsman until the problem is resolved.

Lumber for the Blackbeard and Wassaw bulkhead projects was delivered on October 20.

Futch Contracting completed the last warranty spraying for grass protruding through the new asphalt along portions of the wildlife drive.

Electrician Williams replaced the panel box, breakers, etc. at the Waterman's Association dock in November.

On December 8th, Ranger Metz and staff from Wilderness Graphics installed new panels in the informative Kiosk located at the front entrance.

Cleanup of the refuge's boneyard takes constant effort. In January, a 50' x 8' x 8' metal container was filled with scrap metal and transported to Savannah for recycling. In addition, 150 gallons of used oil was also sent to the recycling center.

Safety

There were no lost time accidents on Harris Neck in 1999 by refuge staff.

Officer Bryant and other MOCC instructors conducted a motorboat operators course required by the Service in November at the Harris Neck boathouse facility.

Other

A Refuge Revenue Sharing Act check for \$101,269 was presented to the McIntosh County Commissioners on April 15. The check represented revenue sharing payments for Harris Neck, Wolf Island, and Blackbeard Island NWR's. This year's check was \$6,337 less than presented to the county in 1998. Typically, the check is hand delivered to the county. However, this year the funds were electronically transferred.

Bruce Evans from the Senate Appropriations Committee and Ann Feltner from the Service's External Affairs Office were given a tour of Harris Neck on January 12.

Congressional Aids of Republican Congressman Jack Kingston, Tripp Tolleson and Trish DuPriest were given a tour of Harris Neck on March 23. The tour was given by refuge staff and was at the request of Mr. Kingston's Office.

District Refuge Supervisor Bill Grabill was given a tour of the Altamaha River south of highway 84 in May. The Nature Conservancy and Fish and Wildlife Service have a sincere interest in the conservation of this unique riverine habitat through easements and/or fee title ownership.

District Refuge Supervisor, Bill Grabill visited Harris Neck Refuge on May 16 to observe ongoing projects and discuss refuge issues and concerns.

Maintenance worker Barrett and volunteer Clark picked up litter along highway 131 twice during the year. The highway traverses through the refuge and is maintained as part of the keep McIntosh County Beautiful Campaign organized by the local county.

Assistant Director for Refuges and Wildlife, Dan Ashe visited Harris Neck and adjacent tract of land purchased by The Nature Conservancy on August 18.

FEEDBACK

Another year has ended and it seems I was just writing this section yesterday. People say time goes by faster as you get older and I will attest that seems true. Having an extremely busy day, or in our case an extremely busy year, will also make time pass without notice. The ardent pace of the staff didn't slow during the year, yet it seemed we were barely able to keep our heads above water. Our accomplishments were many, but I feel can only be described as status-quo management (if that). This has become an annual cycle and I contemplate the effects of such management on our habitat, wildlife, and public. It is discouraging not being able to do more. I continue to admire our dedicated employees and volunteers, year after year willing to take on an annual work load that in most businesses would be assigned to twice the number of employees. Minimum staffing to achieve basic needs at our station should be twice the number we currently employ. To go beyond basic management of our resources, to where we should be, it would take three times the staff. This is not new information or a problem just at our station. We desperately need increases in refuge staffing if we expect to move forward as an organization and prevent stagnation of management at our refuge, as well as other refuges.

We have been successful in pursuing avenues to recruit volunteers and partners to assist us in our attempts to do as much for the resource as possible. However, it will take addition of permanent staff to give the daily attention needed at our refuges.

Again this year, our volunteers, partners, and seasonal hires pulled us through. Refuge Volunteers, John Metz, Shane Hrobar, Chris Depkin, Rowland Clark and the Brunswick Job Corps instructors and students, to name a few, made the year a success in the absence of adequate personnel. I sincerely don't know what we would have done without them and am grateful for their help.

PINCKNEY ISLAND NATIONAL WILDLIFE REFUGE
ANNUAL NARRATIVE

Calendar Year 1999

U.S. Department of the Interior
Fish and Wildlife Service

Sam O. Drake Jr 1-02-01
Refuge Manager Date

Paul Gabriel 4-17-01
Refuge Supervisor Date

Edward W. Lotu 4/18/01
Regional Chief, Date
National Wildlife Refuge System

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INTRODUCTION

Location and General Description

Pinckney Island National Wildlife Refuge is located in Beaufort County, South Carolina. The refuge lies 0.5 miles west of Hilton Head Island, South Carolina, population 34,000 and 37 miles northeast of Savannah, Georgia, population 250,000. In addition to permanent residents, approximately 1.5 million tourists visit Hilton Head Island each year. An average of 20,000 vehicles cross the refuge daily on Highway 278 going to and from Hilton Head Island. In relation (air miles) to other National Wildlife Refuges within the Savannah coastal Refuges, Pinckney Island lies 20 miles northeast of Savannah Refuge and 50 miles north of both Harris Neck and Blackbeard Island Refuges.

The refuge consists of small interior coastal islands buffered from the Atlantic Ocean by the Intracoastal Waterway (Skull Creek) and Hilton Head Island. The 4,053 acre refuge is separated from the mainland by a wide expanse of salt marsh and associated tidal creeks. The north end of the refuge is bordered by the Chechessee River and Port Royal Sound; the south end is connected to both the mainland and Hilton Head by Highway 278. Pinckney Island is the largest island on the refuge. Corn, Little Harry, and Big Harry are the other major islands. These islands are accessible only by boat and are separated from Pinckney Island by Mackay Creek, a navigable waterway which runs through the refuge.

Cultural Resources and History

Pinckney is archaeologically rich, with 115 prehistoric and historic sites identified. Analysis of the prehistoric sites indicate human occupation dating from the Archaic Period (8000-1000 BC), with intensive use during the Mississippian Period (1000-1500AD). Historic artifacts indicate that small scale, impermanent settlements were made on Pinckney by French and Spanish groups in the 16th and 17th centuries. Permanent settlements did not occur until 1708 when Alexander Mackay, an Indian trader, obtained title to 200 acres of Pinckney Island. By 1715, Mackay had acquired the rest of Pinckney and most of the other islands which comprise the present refuge. In 1736, Mackay's widow sold the islands to Charles Pinckney, father of General Charles Cotesworth Pinckney. General Pinckney was a commander during the Revolutionary War, a signer of the U.S. Constitution, and, in 1804 and 1808, a presidential candidate. Pinckney was an absentee landowner until 1804, when he moved to the island and began managing the property. The Pinckney family developed the islands into a plantation, removing much of the maritime forest and draining and tilling the fertile soil. By 1818, over 200 slaves were being used to produce fine quality long-staple sea island cotton on 297 acres; 386 slaves were maintained on the island by 1840.

The plantation flourished until the Civil War when it was occupied by Union Troops. Small skirmishes took place on Pinckney island. The most significant incident occurred on August 21, 1862, when the Confederate Beaufort Light Artillery/11th Infantry attacked the camp of company H, Third Regiment, New Hampshire Volunteers, killing four Union soldiers and wounding ten men (eight confederate, two Union). Army records also reflect that black troops were recruited for the Union from the area. Five military (U.S. Colored Infantry) headstones are located in a cemetery on the northwest side of Pinckney Island indicating the possibility that slaves living on the plantation during the Civil War were recruited by the U.S. Army.

After the war, the plantation did not prosper and, by the 1930's, was virtually abandoned. In 1937, after over 200 years of Pinckney ownership, the plantation was sold to Ellen Bruce, wife of James Bruce, a New York banker, who used the property as a hunting preserve. Hardwoods and pine were planted, ponds were built to attract waterfowl and for irrigation, and 70 percent of the farm fields were placed back into cultivation.

Edward Starr and James Barker purchased the islands in 1954 and continued to manage them as a game preserve. In 1975, the islands were donated to the U.S. Fish and Wildlife Service to be managed exclusively as a National Wildlife Refuge and as a nature and forest preserve for aesthetic and conservation purposes.

Habitat Types

The refuge consists of 67 percent salt marsh and tidal creeks, 23 percent forest, five percent brush, two percent grassland and fallow fields, two percent roads and administrative land, and one percent freshwater ponds. Uplands, ranging from 5 to 15 feet above main sea level, contain soils of sandy loam. Coastal areas, hammocks, and the north end of Pinckney are dominated by live oak with water oak, loblolly pine, and cabbage palm as associates; secondary species include hickory, pecan, magnolia, sweetgum, red cedar, and lesser numbers of maple, sassafras, hackberry, redbud, and winged elm. A small number of longleaf, loblolly, and slash pine plantations and volunteer pine stands are located throughout the refuge. Brush and hedge rows are dominated by wax myrtle and sweetgum with lesser amounts of sassafras, sumac, and black cherry. The salt marsh consists primarily of salt marsh cord grass. Other typical vegetation found in a narrow band around the islands and in the higher marsh hammocks includes glasswort, needle grass, and sea-ox eye.

Freshwater habitat on Pinckney is limited to approximately 38 acres. There are between 20-30 small ponds/depressions (less than 0.5 acres) that hold water during some portion of the year. Many of these ponds were constructed 25-30 years ago for livestock and crop irrigation. When the refuge was acquired in 1975, three major ponds existed on the main island: Clubhouse Pond (five acres), Harrison Pond (four acres), and Dick Point Pond (one and one-half acres). Four additional ponds were created during the 1980's to provide

wading bird nesting, feeding, and/or loafing habitat: Ibis Pond (five acres), Osprey Pond (four and one-half acres), Wood Stork Pond (four acres), and Barn Pond (one and one-half acres). A green tree reservoir was created adjacent to Clubhouse Pond when the main road bed was raised in the early 1980's. Water supply for all ponds has been dependent on precipitation. Only Clubhouse Pond has a water control structure. In 1995, a donation from Nini Chapin of \$10,000 with matching funds from the Fish and Wildlife foundation allowed for the installation of three four-inch wells. The wells supplement the water supply for Ibis, Clubhouse, and Wood Stork Ponds (14 acres) and help maintain adequate water levels in ponds, thereby protecting wading bird rookeries from potential raccoon predation during dry periods. Pump capacity for each well is 55 gallons per minute, unfortunately, during drought years, these pumps barely keep up with evapotranspiration and are quite expensive to operate.

For a complete summary of habitat types and their respective acreage refer to the table on **page 4** of this narrative.

Wildlife Diversity

Because Pinckney Island is managed to maximize habitat diversity, a wide variety of wildlife species are found on the refuge, including a number of species listed as federally endangered or threatened. Federally listed species include the American alligator, bald eagle, and wood stork, which feed and roost on the refuge, but do not nest. Although usually observed in the island's freshwater ponds, alligators can also be seen floating leisurely in the adjacent salt waters of Mackay Creek or lying on mud flats during low tide. Refuge staff have also witnessed them moving along trails and roads during the breeding season. Bald eagles are not an uncommon sight at the island's White Point and along its main road near Ibis Pond. Two active bald eagle nests, one on Bull Island and one on St. Phillip's, are located near Pinckney Refuge. Historically, bald eagles nested at White Point during the 1940's and early 1950's. The refuge bird list encompasses some 257 different bird species, the most flamboyant of which is the Painted Bunting, a common summer visitor that nests on the island. West Indian manatees also occur in waters adjacent to the refuge and frequent sightings occur near Daws Island, in Port Royal Sound.

Other wildlife include white-tailed deer, bobcat, raccoon, opossum, eastern grey and fox squirrels, river otter, and red fox. A species list of reptiles and amphibians found on the island was partially completed and currently contains 22 species. Some of the more common snake species include the cottonmouth, eastern diamondback rattlesnake and copperhead. Other snake species observed crossing roads have been black racers, corn snakes and yellow and grey rat snakes.

PINCKNEY ISLAND REFUGE LAND TYPES

HABITAT TYPE	ISLAND	ACREAGE
Upland		
Hardwood/Pine	Pinckney Island	515
	Big Harry Island	33
	Little Harry Island	36
	Corn Island	28
	Total Hardwood/Pine	886
Pine	Pinckney Island	200
	Big Harry Island	34
	Little Harry Island	30
	Corn Island	10
	Total Pine	274
Grassland	Pinckney Island	100
Brush	Pinckney Island	210
	Big Harry Island	30
Total Brushland		240
Administrative Land	Pinckney Island	60
TOTAL UPLAND		1,286
Wetland		
Saltwater Marsh/Tidal Creeks	Entire Refuge	2,729
Freshwater Ponds	Pinckney Island	38
TOTAL WETLAND		2,767
TOTAL REFUGE ACREAGE		4,053

Highlights

Hurricanes Floyd and Dennis created quite a bit of clean up knocking down large live oak trees blocking road ways. Wind and rain erosion blew and washed away a considerable amount of the thin layer of what little lime rock was left on the main road. The roof of the residence was damaged and the resultant leaks did considerable damage to the ceilings in quarters 1.

The main road was topped with granite gravel from the parking lot to Osprey pond entrance for \$52,000.

No storm damage money was received for this year's hurricanes.



Biological Technician Debra Barnard-Keinath observed and photographed a Roseate Spoonbill feeding in the tidal marsh late in the summer. This was the first confirmed sighting of this species on the refuge. (99-PKY1-DBK)

CLIMATIC CONDITIONS

1999 Weather Data

PRECIPITATION (INCHES)			
Month	1999*	Normal**	Deviation
January	2.84	3.09	-0.25
February	1.12	3.17	-2.05
March	0.75	3.83	-3.08
April	1.00	3.16	-2.16
May	1.52	4.62	-3.10
June	10.05	5.69	+4.36
July	0.85	7.37	-6.52
August	0.00	6.65	-6.65
September	0.00	5.19	-5.19
October	0.00	2.27	-2.27
November	0.00	1.89	-1.89
December	1.26	2.77	-1.51
Totals	19.39	49.70	-29.81

* Rainfall at Pinckney Island residence rain gauge.

** 30 Year Average, National Weather Service, Savannah, GA.

Drought conditions prevailed throughout 1999. Barn and Heron ponds went almost completely dry. Osprey and Ibis ponds retained sufficient water to allow nesting of egrets and ibis, but were extremely low.

1

Monitoring and Studies

1a. Surveys and Censuses

Pinckney's midwinter waterfowl survey was conducted by helicopter on January 8. A total of 80 ducks were counted. Wood ducks, bufflehead, hooded mergansers, and ringneck ducks were observed. Scaup normally make up the majority of ducks counted during the mid-winter survey on Pinckney, however, the arrival of scaup is dependent on weather conditions. A mild winter resulted in few observations of scaup in Refuge waters.

Also done in conjunction with the midwinter waterfowl survey was the midwinter bald eagle survey. Both are done in coordination with the South Carolina DNR. No eagles were observed during the survey but mature bald eagles have been observed feeding and roosting on the refuge. Most likely these are birds from the two active eagle nests located within five miles of the refuge.

Amphibian surveys were conducted in an attempt to document the absence or presence of the newly listed (threatened) flatwoods salamander, and none were found. It is every difficult to find adult flatwoods salamanders, but they can be caught as they travel to breeding ponds in the fall. Also, the most efficient survey method is to seine the breeding ponds to find the larvae following breeding. These temporary ponds are dependent upon fall rains. Dry conditions from October through December impacted survey results. Surveys will continue, and hopefully normal rain patterns will return and provide the breeding habitat needed for this species. From these surveys a herptafauna list is being compiled; to date we have confirmed 22 species.

Colonial waterbird nesting surveys were conducted on June 8, 1999. Wood Stork Pond was dry. Ibis pond and Osprey ponds had 540 nests.

Colonial Waterbird Nesting Survey Pinckney Island NWR - 1999			
Species	Ibis Pond No. Nests	Osprey Pond No. Nests	Total
Snowy Egret	32	89	121
Cattle Egret	20	9	29
Tri-colored Heron	18	32	50
White Ibis	236	4	240
Great Egret	28	31	59
Black-crowned Night Heron	17	6	23
Anhinga		15	15
Little Blue Heron		3	3
Total	351	189	540

Twenty three bluebird boxes were inspected in March. Two boxes were beyond repair and were removed and 21 boxes were cleaned. The boxes were inspected again in May and June. Six boxes had one nest and two boxes had two nests. A minimum of 20 chicks were fledged and five boxes still had active nests during the last inspection.

In the early 90's, three Osprey platforms were erected on the island. Only one of the three platforms was used. The platform constructed in the salt marsh just west of Clubhouse Pond reared three young but for some reason all were lost the last weekend in May.

1b. Studies and Investigations

Paul Sykes, Wildlife Research Biologist, USGS Patuxent Wildlife Research Center, Warnell School of Forest Resources, University of Georgia, began a five year study to evaluate movements, survival and productivity of the Atlantic Coast population of painted buntings using color banded birds. As a part of this study three feeders were placed on Pinckney and maintained by the staff. Twenty- seven buntings were captured and banded by mist netting at the feeders during the summer of 1999.



Dr. Paul Sykes banding a female Painted Bunting during his studies on Pinckney Island. (99-PKY2-AF)

2

Habitat Restoration

2a. Wetland restoration: On refuge

No wetland restoration took place on the refuge in 1999. However, we are still hopeful that we will be able to resume negotiations with a local construction company regarding the project we were discussing with them in 1998. This project would be a cooperative venture in that the construction company would come in and expand and renovate Pinckney's ponds in exchange for fill dirt.

3

Habitat Management

3a. Water Level Management

Clubhouse, Osprey, and Ibis ponds are monitored annually during the nesting season to ensure wading bird rookeries have sufficient deep water around them to deter predation. Due to the sandy nature of island soils and excessive evapotranspiration during summer months, water levels in these ponds are difficult to maintain. During drought periods each year, supplemental water for each pond is pumped from a 4" well located behind each respective pond to maintain the desired water levels. Unfortunately the pumps barely keep up with evapotranspiration and are very expensive to operate.

3c. Graze/mow/hay

Approximately 15 miles of hiking and biking trails on the island are maintained for public use. A large portion of staff time is spent mowing road shoulders, trails and areas around ponds to promote better access and provide the public with wildlife viewing opportunities. Mowing is done every 3 to 4 weeks from April through November.

All of Pinckney's fields were mowed three times due to the extensive amount of woody vegetation present. The fields are important to fall migration and possibly wintering of sparrows. During the spring through fall season the fields are very important to large butterfly populations. Investigation into altering the mowing patterns/timing to enhance the fields for these uses and yet protect the fields from being over taken by wax myrtle, Chinese tallow, sweetgum and slash pine needs to be done.

3f. Fire management

Prescribed burning

One prescribed burn was completed on the refuge this year. The Boat Ramp unit was burned with a growing season burn in April of 1999. The 73.2 acre unit was hand ignited and contained with a crew of six refuge firefighters. Equipment used were two pumper trucks, one ATV, and two light pick-up trucks. The Boat Ramp unit consists of mixed hardwood and pine stands, and was treated with a flanking/backing fire to reduce the potential for

catastrophic wildfire on the refuge. There were no injuries to personnel while conducting the burn and only one small equipment problem.

Table

Prescribed Burns - 1999

Date	Unit	Acres	Type	Fire #
4/7	Boat Ramp	73.2	hand ignition	4389
Totals	Units	73.2		

Wildfire activity

1999 was a quiet year for wildfire activity. We had high fire danger (KBDI's above 550) late April through June, and then again in August, September and October.

Other activities

The fire crew assisted with other refuge projects including public use monitoring, trail and road clean-up and maintenance.

4

Fish and Wildlife Management

4d. Provide nest structures

No new nest structures were erected this year. However, refuge volunteers, Paige and Mary Bess Mulhollan, maintained and monitored bluebird boxes throughout the 1999 nesting season (see pg. 8 For nesting results). All boxes had been emptied, cleaned by the close of the season.



Volunteer Paige Mulhollan served as the refuge's bluebird box custodian. (99-PKY3-MBM)

5

Coordination Activities

5a. Interagency coordination

In 1996, concerns over saltwater intrusion into the Floridian aquifer prompted Georgia's Environmental Protection Division (GAEPD) to fund a joint monitoring effort of coastal water resources that would extend into the year 2005. The monitoring effort is intended to track movement and rate of intrusion by saltwater into the aquifer and will be accomplished by drilling test wells within the aquifer's upper unit. Joining forces with the GAEPD is the South

Carolina Department of Health and Environmental Control (DHEC) who conducts all field work related to monitoring efforts. Data accumulated by DHEC will be used by the GAEPD to develop a long range strategy designed to cope with the problem. The refuge assisted with these plans by issuing a special use permit for the installation of three test wells on Pinckney and granting ingress and egress during monitoring efforts on the island.

Pinckney's overhead power supply was replaced with a new underground line in February 1999. Palmetto Electric Cooperative agreed to shoulder a substantial proportion of these costs. Total costs for the project were \$92,000. This was roughly \$46,000 more than required for normal overhead power construction. The refuge share of this agreement was \$28,000.

Historically, overhead power has been both unreliable for island residents and labor intensive for the power company. The island's frequent electrical storms leave refuge staff habitually without power and scrambling for candles to ride out the storm. Cooperative personnel spent hours troubleshooting the area looking for downed lines or fallen limbs which could be contributing to the power outage. Service personnel have, on occasion, expressed sentiment that the sound of bellowing gators leave them reluctant to enter swampy areas when troubleshooting problem lines. Often, once they have corrected the problem, technicians leave, only to be called back again as the wind blows down yet another tree across overhead power lines. Finally, the refuge has a dependable power source.

5e. Cooperative/Friends Organizations

The Hilton Head Audubon Society participated in the Audubon Refuge Keepers (ARK) workshop held at the Savannah Coastal Refuges (SCR) headquarters on May 15. Mary Gray, the chapter's ARK program chair, collaborated with representatives of other Audubon chapters in South Carolina to plan the meeting which included presentations by Region 4 Refuge Supervisor Bill Grabill; Lora Wondolowski, National Audubon's director of the Wildlife Refuge Campaign and ARK Program; Sam Drake, SCR Project Leader; Allan Flock, SCR Deputy Project Leader; Gene Singleton, Savannah NWR manager; Michael Johnson, Blackbeard Island/Harris Neck/Wolf Island NWRs' manager; and Peter Range, Wassaw NWR's acting manager; and Pat Metz, SCR Supervisory Refuge Ranger. Also in attendance were refuge managers Scott Lanier (Carolina Sandhills NWR) and Larry Klimek (Cape Romain NWR), along with Audubon leaders representing the Georgia and South Carolina chapters. The workshop generated many ideas for future partnerships between Audubon chapters and refuges that ranged from performing bird and biological surveys to conducting environmental education programs. The foundation was set for development of other ARK groups, in addition to strengthening the newly established Hilton Head ARK program.

As a direct result of the ARK workshop, the Ogeechee Audubon Society formalized a plan to develop new t-shirt designs for Pinckney Island, Harris Neck, Blackbeard Island, and Wassaw NWRs. Lauree San Juan, the Ogeechee chapter's ARK chair, reported on the success of the Savannah shirt, developed and marketed in 1998. This fund-raising enterprise not only paid for the chapter's initial financial investment, it yielded a \$400 profit before the year's end. The Hilton Head Audubon Society's ARK group agreed to assist with marketing of the Pinckney shirt, once it could be produced in quantity. By October 9, the beginning of NWR Week, the first batch of Pinckney Island NWR t-shirts were distributed to refuge volunteers, and the remaining dozen were sold to SCR staff. The next production was planned for January, 2000.



Volunteer Lauree San Juan was awarded the new Pinckney Island t-shirt which she helped produce with ARK funding. (99-PKY4-PEM)

With encouragement from the Hilton Head Audubon Society, Ralph Starr, son of Edward Starr the former co-owner of Pinckney Island responsible for the donation of the property to the U. S. Fish and Wildlife Service, proceeded with plans to fund a public educational facility on the refuge. Ralph Starr conferred with Project Leader Drake and Ranger Metz in March to discuss options such as funding construction of a visitor center which would include public restrooms and a classroom suitable for environmental education programs. On January 7, Ralph and his wife, Joan, visited Pinckney Island and met with Audubon chapter officers along with Ranger Metz. The meeting, held at the home of volunteer, and refuge benefactor, Nini Chapin resulted in a concensus on the need to construct some type of visitor center on Pinckney Island NWR. On March 26, Ranger Metz provided Mr. Starr a blue-line drawing of an office building designed by Region 4 architects and adaptable to the proposed Pinckney Island facility. Mr. Starr then began negotiations with other Starr family members, anticipating their desire to contribute financially to the proposed construction project.

Sadly, Mr. Starr died in July, but he was reportedly viewing construction plans and promoting the project until the very end. Joan immediately contacted Ranger Metz and expressed the family's intent to fulfill Ralph's commitment to the project. To that end, Joan and Mrs. George "Pooh" Gephart, Ralph's niece, requested a meeting with the Hilton Head Audubon Society officers, Project Leader Drake, and Ranger Metz to formalize their support for construction of a visitor/environmental education center. The meeting, held on October 27 at Pinckney Island, solidified plans to move forward with a partnership between the Audubon Society, the Starr family, and the U. S. Fish and Wildlife Service to develop the center.

6

Resource Protection

6b. Manage permits and economic uses

Special use permits issued to the Coastal Discovery Museum and Disney's Hilton Head Island Resort are still in force this year. Both companies offer regularly scheduled tours of Pinckney Island that are guided by seasoned naturalists. Hilton Head Museum provides tours on Tuesdays and Thursdays, while Disney's Resort conducts tours on Wednesdays and Fridays. The Coastal Discovery Museum charges a fee for their tours and took in \$5,657 during 1999. The Disney Resort does not charge their visitors for refuge tours.

Another existing permit, issued to the Charleston County Parks and Recreation Commission to conduct tours, was still in effect this year, however, no actual tours conducted by this group were reported.

One new special use permit was issued to Paul Sykes, a biologist from the University of Georgia who was contracted by the Biological Resources Division of the U.S. Geological Survey. Dr. Sykes is conducting a study to determine "Annual Survival in the Southeastern Breeding Population of the Painted Bunting." In addition, the study will also determine if the current population decline is associated with breeding grounds or other locations. The research was conducted by capturing Painted Buntings using mist nets, banding them with colored leg bands and then releasing them. We issued Dr. Sykes' permit free of charge due to the fact that his research provides a service to the refuge by helping us to understand and better manage these magnificent birds.

6c. Contaminant investigation

In the early 80's the well by the residence was condemned because of saltwater intrusion. In October, 1997 two test wells, approximately 200 ft. deep, were drilled as part of the Georgia Environmental Protection Division's (GAEPD) interim strategy for monitoring saltwater intrusion into the upper unit of the Floridian aquifer (see section 5a). The first test well was placed between the condemned well and the salt marsh, facing Port Royal Sound, and the second well was placed on Bull Point. During 1998, a third well was drilled across from the boat ramp to the left of the Dick Point Road. No additional wells have been drilled for the study.

7

Public Education and Recreation

7a. Provide visitor services

Although established as a National Wildlife Refuge in 1975, Pinckney Island Refuge was not open for public use until October 21, 1985. Only the main island is open to the public; Corn, Little Harry and Big Harry Islands are accessible only by boat and are closed to public entry. Refuge public use facilities include approximately four miles of gravel roads, ten miles of grass trails, a visitor contact point/interpretive exhibit kiosk, a 17-space parking lot with bus parking area, and a county-managed boat ramp and fishing pier constructed in 1983.

7b. Annual visitation

Visitor use estimates are based on traffic counter readings at the main entrance gate, daily observation of boat/pier visits at the county boat ramp, and boating/fishing activity in Mackay Creek and the tidal creeks surrounding the refuge islands.

Since the refuge opened to the public in 1985, public use has escalated sharply with visitor numbers reaching 158,000 by 1995. By 1998, this number had more than doubled reaching a record high of 337,000 visitors. This year, annual visitation dropped to 227,672. This decrease is most likely due to circumstances beyond our control such as Hurricanes Dennis and Floyd and a malfunctioning gate counter. Despite the recorded decline in public use, Pinckney Island NWR's visitor total was the higher than Savannah NWR's (168,012 visits), or other Savannah Coastal Refuges. With annual public use exceeding a quarter of a million visits, some signs of illicit activities were inevitably found on the refuge. Alcoholic beverage cans and other sundry litter reinforced the need to control access to the refuge, or at least make it a less convenient stop for the more unsavory clientele. Of equal concern was the threat of excessive visitation to productive wading bird rookeries during nesting season.

Conversely, such intense public use is an opportunity to gain support for the refuge system. Each year, through the Refuge Operational Needs System (RONS), the refuge identifies the need to provide a staffed visitor center on the refuge to provide informational and outreach services to the public. However, currently the only source of information on the refuge besides refuge staff is the interpretive kiosk in the refuge parking area. An estimated 41,000 people visited the refuge kiosk this year.

7c. Special Events

National Wildlife Refuge Week was commemorated this year with a variety of special events. On Saturday, October 9, the festivities began with an interpretive walking tour of the refuge led by Jim Bitler, Chief Naturalist for Disney's Hilton Head Island Resort. Participants were able to view a variety of habitats during the course of the walk. Freshwater pond, salt marsh, tidal flat, maritime forest, and sandy beach habitats were discussed, and the diversity of flora and fauna associated with each was emphasized.

Later that afternoon, Georgia Southern University's Lamar Q. Bell Raptor Center put on a spectacular "Refuge Raptors" program. The show featured several different birds of prey, with the content of the program focusing on raptor biology with an emphasis on avian adaptations. A highlight of the event was the falconry demonstration, during which several birds performed exciting aerial displays. Over 100 free vehicle passes were issued to allow visitors access to the Pinckney Island program site, a field north of the equipment storage facility. Volunteers who assisted with traffic control and parking reported that twice as many vehicles could easily have been accommodated, and they recommended that additional passes be issued in 2000, if the program is repeated.

The final event of the week-long celebration was held the following weekend. On Saturday, October 16, the Sierra Club-Nancy Cathcart Group conducted a litter patrol concentrating on trash removal around the refuge entrance area.

Approximately 160 visitors attended the National Wildlife Refuge Week events, which were all free of charge. This was made possible by a generous donation of \$500.00 from Disney's Hilton Head Resort, not to mention the hours of time donated by our dedicated volunteers.

Another special event was held on Pinckney in observance of Coast Week. Outside Hilton Head, a local outdoor adventure service, sponsored a group to come to the island via sea kayaks and clean up along its shores.



The magnificent Barred Owl was a favorite among the stars of this year's Refuge Raptors program. (99-PKY5-BL)

7d. Interpretation

Special use permits were reissued in 1999 permitting both the Coastal Discovery Hilton Head Museum and Disney's Hilton Head Resort to conduct interpretive tours of Pinckney Island. These tours are led by seasoned naturalists and account for the majority of group tours held on the refuge. In addition to these, several refuge volunteers, very familiar with Pinckney's wildlife, habitats and history, also lead groups, many of which were organized by local Audubon Society chapter's members.

A total of 606 people participated in the Coastal Discovery Museum of Hilton Head programs in 1999, 133 more than recorded in 1998. The highest level of participation occurred in April (103 people in 7 groups); the lowest occurred in January and December (17 people in up to 3 groups).

Disney's Hilton Head Resort escorted a total of 479 people on refuge tours. The lowest level of participation occurred in January (no tours scheduled) and the highest level of participation occurred in March (107 people in 7 groups).

Other tours included two led by Volunteer John Stafford who led an Ogeechee Audubon Society party of 32. Volunteer Paige Mulhollan conducted several tours for members of the Hilton Head Audubon Society, and led a special tour for 25 member of Rotary Clubs of America during their North American Gift of Life Program conference held on Hilton Head Island.



Ibis Pond was a popular destination for interpretive tours let by volunteers.
(99-PKY6-MBM)

7e. Hunting

The refuge hunting program began in 1978 in response to evidence that the refuge deer herd was suffering from over-population. Since 1978, either a one-day, or two separate one-day hunts have been held annually. Deed restrictions prohibit any form of hunting except for biological reasons. However, in 1995, one shotgun-only hunt was held on two consecutive days. This hunt was so successful (65 hunters harvested 54 deer) that only one day of hunting was scheduled (November 22) in 1996. Of the 188 applicants for the 1999 hunt, 75 were selected, all 75 paid the \$12.50 permit fee, and 58 hunters participated in the one day hunt. The 31 deer taken included 12 males and 19 females. The largest deer taken, a 6 ½ year old six-point buck, weighed 146 pounds (live weight). Another 3 ½ year old buck, however, took the prize of largest rack, with a 14 ½ “ inside spread and 7 points.

**FIVE YEAR SUMMARY OF DEER HUNT DATA
PINCKNEY ISLAND (1994-1999)**

YEAR	TYPE HUNT	NO. APPLY	NO. DRAWN	NO. HUNTED	HARVESTED		HUNTER	
					BUCKS/	DOES	TOTAL	SUCCESS
1999	GUN**	188	75	58	12	19	31	53%
1998	GUN**	207	75	55	36	45	81	147%
1997	GUN**	269	75	52	27	15	42	81%
1996	GUN**	267	75	57	27	19	46	80%
1995	GUN*	221	75	65	26	28	54	83%
1994	GUN**	199	100	88	28	27	55	63%

* One hunt two consecutive days ** One hunt (one day) *** Two, one-day hunts**** Only 60 applicants out of 200 qualified for the second hunt.

7f. Fishing

Due to deed restrictions, refuge freshwater ponds are closed permanently to public fishing; however, the surrounding marshes and tidal creeks are open to fishing from boats and from the pier at the county boat ramp. During 1999, the boat ramp parking lot was filled to capacity on many weekend days.

One of the most popular fishing activities in South Carolina is shrimping. This sport peaks in popularity during the state shrimp baiting season, from September through November. During the first few weeks of the 1999 season, the Last End boat ramp was filled to capacity almost every night.

Pinckney's tidelands are divided into public and state shellfish areas, both managed by South Carolina Department of Natural Resources. The public shellfish grounds are located on the west side of Last End Point, north and south of Mackay Creek bridge. The remaining grounds are leased by the State to individuals for oyster/clam harvesting. During the season (September through May), shellfishermen were a common sight along the refuge's tidelands.

7g. Outreach

Developed by Refuge Ranger Pat Metz in 1996, an exhibit highlighting the plight of neotropical migratory songbirds in the Carolina low country continued to be displayed at the Coastal Discovery Museum on Hilton Head. The vivid, full color exhibit, made possible by funds obtained through the Watchable Wildlife Program, sends a message that is reaching growing numbers of people each year. In 1999, approximately 91,000 people were informed of Pinckney Island's role in ecosystem management by the educational display.

Throughout the year, Ranger Metz participated in Savannah-Santee-PeeDee Ecosystem (SSPD) outreach committee meetings, acting as committee co-chair. In this capacity, she represented Pinckney Island NWR in the development of an SSPD exhibit planned for use during the Southeastern Wildlife Exposition and other outreach supported events. This traveling exhibit, featuring SSPD's major habitats, included wildlife scenes photographed by volunteer Barry Lowes on Pinckney Island. During the SSPD's July meeting, funding for the exhibit was secured from the Ecological Services' Charleston field office and the refuges represented in the ecosystem. Thereafter, design of the exhibit was begun, and contacts scheduled with potential exhibit builders.

7h. Media Coverage

The local news media highlighted Pinckney Island in at least four newspaper articles throughout 1999. One article announced the introduction of new trail maps/brochures for Pinckney Island which were paid for by a donation from the Audubon Society's ARK (Audubon Refuge Keepers) program. Two articles were written, one in the *Carolina Morning News*, the other in *The Island Packet*, in response to a press release from our office outlining the 1999 hunt schedule. In addition, there were several announcements and feature stories covering special events such as National Wildlife Refuge Week and Coast Weeks.

8

Planning and Administration

8b. General administration

Due to the departure of Refuge Manager Rebecca Schapansky in January, Pinckney Island was without on-site management for the entire year. However, shortly after Ms. Schapansky left, Savannah Coastal Refuges hired a new assistant manager for the complex, Allan Flock and he and his wife Linda took up residence in Quarters 1 on Pinckney Island in February 1999. Since then, Allan has assumed many of the responsibilities of managing the refuge, including maintenance, visitor contact, and providing a much needed law enforcement presence. The need for an on-site manager and/or park ranger remains vitally important, however, and we hope to have someone in place in that capacity by the end of 2000.

Biological Technician Debra Barnard-Keinath continued to reside on the refuge in Quarters 2 with her husband John, who has become a great volunteer for us. Debra, whose formal training was in herpetology, conducted informal surveys of the reptiles and amphibians found on Pinckney Island and eventually compiled a species list. Prior to this, there had been no other comprehensive biological lists compiled for the refuge other than the refuge bird list. Debra also assisted with the refuge hunts, as well as with various maintenance duties.

There are no other full-time personnel stationed at Pinckney Island National Wildlife Refuge. Management of the island is coordinated with Savannah Coastal Refuges Complex (see appendix), and all management activities are accomplished by refuge staff assigned to other refuges within the complex.

8c. Noteworthy Visitations to Pinckney

On January 9, Ranger Metz accompanied Ralph Starr, son of Edward Starr the former co-owner of Pinckney Island, and his wife Joan on a tour of the refuge. Prior to the outing, they attended a meeting at the home of volunteer Nini Chapin to discuss Ralph's intentions to fund a major public use facility on the refuge. Hilton Head Audubon Society President Betty Walters, ARK (Audubon Refuge Keepers) program chair Mary Gray, and other Audubon officers present at the meeting, but did not accompany the Starrs on the refuge visit.

Following the death of Ralph Starr in July, Joan Starr returned to Pinckney Island on October 27 to meet again with Audubon officers, Project Leader Drake, and Ranger Metz to assure continuation of Ralph's support for construction of a visitor/environmental education center on the refuge. Ralph's niece, Mrs. George "Pooh" Gephart, accompanied Joan on the tour of Pinckney Island led by Project Leader Drake, Deputy Project Leader Flock, and Ranger Metz.

SAVANNAH NATIONAL WILDLIFE REFUGE
ANNUAL NARRATIVE

Chatham and Effingham Counties, Georgia
Jasper County, South Carolina
Calendar Year 1999

U.S. Department of the Interior
Fish and Wildlife Service

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INTRODUCTION

Savannah National Wildlife Refuge (NWR) is located, in Chatham and Effingham Counties, Georgia and Jasper County, South Carolina, on the lower Savannah River between mile markers 18 and 41. The port city of Savannah lies immediately downstream of the refuge and is a center of pulp, paper, and organic chemical industries. The Savannah area is rich in history. After thousands of years of use by various Indian tribes and cultures, the first European visitor arrived in 1526. James Oglethorpe established the city of Savannah in 1773. By the mid-eighteenth century, rice planters were farming much of the land now part of the Savannah NWR. The old rice levees, which were built by hand, form the basis for our impoundment dikes. Remnants of the original rice field trunk water control structures and narrow dikes are still visible in some places. Within the impoundment system there are 36 historic and prehistoric archeological sites which have been located and inventoried.

On April 6, 1927, Executive Order No. 4626 established the Savannah River Bird Refuge and set aside 2,352 acres as a preserve and breeding ground for native birds. On November 12, 1931, Executive Order No. 5748 added 207 acres to the refuge and renamed the area the Savannah River Wildlife Refuge. An additional 6,527 acres were assigned to the refuge on June 17, 1936, by Executive Order No. 7391. On July 30, 1940, Presidential Proclamation 2416 renamed the refuge the Savannah National Wildlife Refuge. These three Executive Orders established the 9,086 acre core of the present refuge; subsequent acquisition using Duck Stamp funds and other special funding added 3,557 acres. An additional 459 acres were added when the fee title to Hog Marsh Island and adjacent lands to the north were acquired through an exchange of spoilage rights with Chatham County, Georgia. In 1964, Savannah Electric and Power Company deeded 34 acres to the refuge in exchange for a power line right-of-way. In 1978, the 12,472-acre Argent Swamp tract was purchased from Union Camp Corporation using Land and Water Conservation Funds. Bear Island (687 acres) was purchased in fee title, from a private individual, on October 19, 1993. In order to straighten our east boundary, two tracts totaling 54 acres were purchased from Union Camp Corporation, on August 27, 1996. The Barrows tract (535 acres), which lies adjacent to our southeast boundary, was purchased in fee title during 1998. This brings the total current refuge acreage to 26,884 acres.

Refuge habitats include bottomland hardwoods, palustrine, estuarine, and riverine wetlands. All wetlands are subject to tidal fluctuations with amplitudes ranging from 6 to 8 feet. A fringe area of upland hardwoods exists along the eastern boundary, 2,000 acres of which is impounded. An additional 87 acres are administrative areas. The Seaboard Coastline Railroad has a 24-acre Right-of-Way agreement with the Fish and Wildlife Service.

Savannah NWR offers an array of wildlife dependent public use opportunities: wildlife observation, interpretation, sport fishing, and hunting (deer, turkey, feral hog, and squirrel). Thirty-six miles of dikes are open seasonally to foot traffic. The four-mile Laurel Hill Wildlife Drive is open to vehicular traffic throughout the year.

HIGHLIGHTS

- * Impoundment 15/16 cross-dike constructed.
- * Savannah River harbor deepening continues to be an issue.
- * Prescribed fire integral part of management. See 3f. Page 13.
- * Major improvements made to Savannah shop building.
- * Rice field trunk installed in John Hill canal.

CLIMATIC REVIEW - 1999

Precipitation (inches)

Month	1999 *	Normal **	Deviation
January	4.73	3.59	+1.14
February	1.95	3.22	-1.27
March	1.25	3.78	-2.53
April	1.68	3.03	-1.35
May	2.54	4.09	-1.55
June	14.25	5.66	+8.59
July	7.15	6.38	+0.77
August	4.26	7.46	-3.20
September	6.50	4.47	+2.03
October	2.04	2.39	-0.35
November	0.49	2.19	-1.70
December	1.94	2.96	-1.02
Total	48.78	49.22	-0.44

* Rainfall at Savannah, Georgia Airport

** 30 year average, National Weather Service, Savannah, Georgia

Dry weather patterns prevailed throughout 1999. Eight months had below normal rainfall. The highest recorded temperature was 102°F on August 1, and the lowest recorded temperature was 17°F on January 6. There were 28 nights with temperatures at or below 32°F. The year was characterized by near normal average temperatures. There were 68 days where temperatures were at or above 90°F. Rainfall for the year was slightly below normal.

1

Monitoring and Studies

1a. Surveys and Censuses

During the fall and spring shorebird migration, large groups of birds take advantage of drawn-down management units. Refuge volunteers play an important role in inventorying these shorebirds. American avocets, yellowlegs sp., stilt sandpipers, and dowitchers are some of the species that have peaked at around 1000 on the refuge.

In late summer, evaporation lowers water levels in the management units at Savannah Refuge. The receding water concentrates fingerling bullhead catfish and other small fish that attracts young wading birds. Surveys are conducted seasonally on these areas, and some years 175 wood storks were counted. During the 1999 season, a group of 70 wood storks used the pools in July and August. Other wading birds are also counted. One particular count yielded 1000 white ibis, 650 glossy ibis, and 600 great egrets.

Swallow-tailed kites feed on flying insects over our moist soil areas during late summer. These aggregations of kites are preparing for migration as they stage over the fields. A group of 35 swallow-tailed and 80 Mississippi kites were seen almost daily in July of 1999.

On January 8, 1999, the annual Bald Eagle Survey was held. A total of one adult bald eagle was seen incubating on the nest. Eagle Production Surveys were conducted twice during the nesting season. One eagle chick was raised to flight stage from the Savannah nest.

The Midwinter Waterfowl Survey was held on January 4, 2000. The total waterfowl count was 6,029. This figure included a total of 14 species. The Refuge total accounted for about 9% of the total count for the state of South Carolina.

Savannah Refuge has participated in a South Carolina DNR state wide waterfowl census for the last three years. The count starts in early November and ends in January. These weekly counts require surveying the same management units consistently throughout the year. Since only half of our units are flooded in early November, the results often do not reflect the refuge's true population.

Bi-weekly Wintering Waterfowl Surveys of the entire refuge began in November and continued through February of 2000. Volunteers contributed significantly to these surveys. Total numbers increased from 4,000 in November to over 13,000 by early February.

Peak Waterfowl Populations 1988/89 - 1999/00

Season	Peak Waterfowl	Date
1988 / 90	27,600	Dec / 88
1989 / 90	35,650	Dec / 89
1990 / 91	26,000	Jan / 91
1991 / 92	52,125	Jan / 92
1992 / 93	15,000	Jan / 93
1993 / 94	17,000	Jan / 94
1994 / 95	17,000	Jan / 95
1995 / 96	26,000	Feb / 96
1996 / 97	20,600	Jan / 97
1997 / 98	18,000	Jan / 98
1998 / 99	13,400	Jan / 99
1999 / 00	13,326	Feb / 00
Ten Year Average	24,100	1989/90 - 1998-99

This year's peak population, 13,326 ducks, was below the 10 year average wintering population of 24,100. The lower numbers of waterfowl may have resulted from extreme weather patterns of drought and the mild temperatures. Private land as well as refuge land in the ACE Basin, has been extensively improved for waterfowl over the last three years. This may have short-stopped some birds that would have otherwise wintered at Savannah. However, comparing weekly surveys from data representing the entire state of South Carolina, Savannah Refuge held an average of 13% of the states waterfowl from November 1999, to February 2000.

1b. Studies and Investigations

Savannah River Harbor Deepening Project:

The Georgia Ports Authority initiated a study on April 20, 1997 to deepen the Savannah Harbor by eight feet under Section 203 of the Water Resources Development Act of 1986. That authority allows a non-Federal entity to perform a feasibility study and submit it to the Assistant Secretary of the Army for Civil Works. The Assistant Secretary's office reviews the report and transmits to Congress an assessment of whether the study report and process comply with Federal law and regulations, along with any recommendations that the Corps of Engineers may have concerning the proposed project. When Congress authorizes the proposed harbor improvement project, it becomes eligible for Federal cost sharing. The study schedule developed by the Georgia Ports Authority employed a fast track process to provide efficiencies in time and corresponding cost savings. The goal was to complete the necessary documents by March 1998, in order to secure funding in the anticipated Water Resources Development Act of 1998.

Congress did not enact a Water Resources Development Act in 1998. In 1999, PL 99-662 was proposed. This bill included authorization of the Savannah Harbor Project with several prerequisite criteria to address environmental concerns of federal and state agencies as well as non-government organizations. Based on language in the proposed legislation, the Georgia Ports Authority initiated development of a Tier II Environmental Impact Statement in January of 1999 for the Savannah Harbor Deepening Project (since their Tier I environmental Impact Statement did not meet Section 203 criteria). A Stakeholders Evaluation Group was formed to identify studies and data needed to identify and address environmental consequences of the project. Service representatives attended the initial Stakeholder Evaluation Group meeting on January 11, 1999. The Georgia Ports Authority continued with their fast track tactics during this meeting emphasizing the need to identify mitigation for their proposed project and not complete an analysis of the alternative depths of the project. Service representatives attended the second meeting on February 2, 1999 with more of the same philosophy. The Fish and Wildlife Service formally withdrew from the Stakeholder Evaluation Group on February 11, 1999 in a letter from Regional Director Sam Hamilton to Doug Marchand, Executive Director of the Georgia Ports Authority. One of the main reasons we withdrew was that the Stakeholder Evaluation Group process was proposed by the Georgia Ports Authority to facilitate inclusion of the Savannah Harbor Project in legislation to get the project prematurely authorized and no authorization had been enacted to date.

The Service preferred to focus efforts on educating elected officials relative to anticipated impacts of the proposed harbor deepening on freshwater wetlands of the Savannah National Wildlife Refuge. The Georgia Congressional delegation (Congressman Jack Kingston, Senator Max Cleland, and Senator Paul Coverdell) were sponsoring authorizing legislation to be included in a Water Resources Development Act of 1999. The South Carolina delegation (Congressman Floyd Spence, Congressman James Clyburn, Senator Earnest Hollings, and Senator Strom Thurmond) were briefed on the issue during March of 1999. Thanks to efforts

of Judy Jennings with the Coastal Group of the Sierra Club in Savannah, Senator John Chaffee had included restrictions on the proposed Savannah Harbor Deepening Project on the Senate version of the proposed bill. Considerable dialogue occurred in Washington during March and April while the House and Senate were conducting markups on the proposed bill. The Water Resources Development Act of 1999 (Public Law 106-53) was enacted during August 17, 1999 and included desired protective language relative to the Savannah Harbor Project.

The Service advised the Georgia Ports Authority on August 19, 1999 that it would rejoin the Stakeholder Evaluation Group following passage of the Water Resources Development Act of 1999. However, our participation was conditional upon the Savannah Harbor Project being planned, designed, and constructed with minimal impact to the important natural resources of the region; that the Stakeholder Evaluation Group be a fair and open process; that cumulative impacts of previous deepenings be addressed in any mitigation plan; and, that the full range of alternatives, including the no action alternative and alternate harbor locations be addressed during the NEPA process. The Stakeholder Evaluation Group meetings were attended by Service representatives on the scheduled day for each month September thru December.

It is impossible to summarize the amount of time that refuge staff, Atlanta Regional Office staff, and Charleston Ecological Service Office staff have devoted to this project. Tours for elected officials, non-government organizations, and media were conducted frequently to highlight and garner support to protect the refuge tidal freshwater wetlands from additional saltwater intrusion.

"Savannah Harbor Long Term Management Strategy Study":

The Savannah Harbor Long Term Management Plan (which was developed during the Savannah Harbor Long Term Management Study) began to be implemented during 1997. In 1998, several shorebird nesting islands within one of the confined disposal areas were constructed. During the 1999 nesting season, several species nested successfully, including gull-billed tern (22 nests), least tern (146), black-necked stilt (52), black skimmer (21), wilson's plover (1) and killdeer (1).

Research Associated with the Potential Deepening of the Savannah Harbor:

"Striped Bass Recovery Study":

The National Biological Survey, University of Georgia, together with Georgia DNR continue to conduct Striped Bass Recovery Studies in the Savannah River. Operations of the COE tide gate from 1977-1991 eliminated striped bass recruitment in the Savannah River. Striped bass have been stocked in the river from Service and Georgia DNR hatcheries. Survival of the stocked fish has been excellent, but little spawning has occurred. What spawning has occurred has been in the Savannah Front River where survival of the eggs and larvae would be minimal at best. Reproduction in traditional pre-tide gate spawning grounds (the Savannah Back River) has been insignificant. Hydrology and bathymetry in the Back River were drastically altered during the operation of the tide gate. A 1135 project designed to determine actions needed to restore a self sustaining striped bass population was begun in 1998. The study will examine maturation of adult female striped bass using ultrasound imagery, examine fish for

contaminants, conduct egg transport studies, and use a hydrologic model of the estuary to predict conditions (flow, velocity, bathymetry, etc.) prior to and following past river modifications.

As part of this project, striped bass egg transport rate and distribution within the Savannah River is being investigated by Berry College. In 1999, surrogate striped bass eggs were released in the Back River near the center of the traditional striped bass spawning grounds. Twenty-seven percent of the eggs flowed through rifle cut, into the Middle River, and then through steamboat cut and into the Savannah Front River harbor area. In this location they would be susceptible to toxic salinity levels, and possibly other contaminants. A striped bass contaminants study is being conducted by the Service. Testing has not been completed, however, results of testing for radioactive elements were negative. Results from the maturation and fecundity studies, being conducted by the University of Georgia and Georgia DNR, are pending.

Applied Technologies Management, funded by Georgia Ports Authority, is developing a hydro-dynamic model to predict existing and changing conditions in association with potential harbor deepening. Parameters include flow, dissolved oxygen, chlorides, salinity, and spacial/temporal conditions of the tidal marsh vegetative community.

A study of the Savannah River short nose sturgeon population status and recruitment is being conducted by the South Carolina DNR.

An evaluation of fish nursery habitats is being conducted by The Universities of Georgia and Florida.

Avian distribution and use of the tidal fresh marshes of the Savannah River, with emphasis on breeding neo-tropical migrants, is being conducted by the Service and the University of Tennessee.

Avian use of forested hammocks within the wetland management units of the Savannah NWR is being conducted by Georgia Southern University.

The Georgia Ports Authority is funding most of this research to assess the potential impact of a proposed six foot deepening of the Savannah River harbor. The studies are scheduled to be completed in the spring of 2001.

Other ongoing research

The USGS Patuxent Wildlife Research Center concluded a study on the effects of management practices (burning, disking, undisturbed) on soil contaminants, and soil chemistry in the wetland management units at Savannah Refuge. The preliminary results showed that survival of *Hyalella azteca* (freshwater amphiod) was significantly reduced after (96 h) exposure in pore water from most sites. The survival and growth remained constant, though, during a 28 day exposure to the solid-phase sediments. Parameters contributing to the pore-

water toxicity were reduced pH (3.7 to 4.1), ammonia (20 mg/L), and an excess of simultaneously extracted metals over the acid volatile sulfites in the sediments. The acidic conditions were attributed to the drying and oxidation of the seasonally flooded management units. The disturbance of sediments through disking may temporarily contribute to the levels of ammonia through microbial activities on fragmented organic matter. The environmental significance of the pore-water pH and elevated element concentrations are not known, but corrective measures like lime application may improve conditions.

Impacts and the efficient, low cost control of Chinese tallow in Georgia is being conducted by the University of Georgia.

Pending studies that relate to harbor deepening

The following studies have been submitted to the Georgia Ports Authority for funding and slated to begin in 2000:

- Seed production from tidal marsh vegetative communities
- Tidal forested tree "gap" analysis
- Nekton study to determine fisheries and nursery functions of the tidal marsh system
- Avian use and distribution throughout the tidal marsh system by fall, and spring neo-tropical migrants.

3

Habitat Management

3a. Water Level Management

The ½ mile crossdike between Impoundments 15 (160 acres) and 16 (184 acres) was completed during August, making independent water level manipulation in these units possible. Also, perimeter canals in these units were cleaned out using the excavator and dikes were cleared of encroaching trees and shrubs utilizing a bulldozer and the excavator. Additionally, the perimeter ditches on the 123 acre Impoundment 14 were cleaned out. Limited cleanout of floating masses of water hyacinth and giant cutgrass were completed in the water diversion canal near Fife Plantation entrance (structure 2) and towards Impoundments 17 and 18. This facilitated water movement through the water control structures.

A ricefield trunk was installed in the wildlife drive near the VORTAC station in the John Hill Canal during April and May. There was a concrete structure at this site which had been partially deactivated in the 1980's. During excavation of this site, two 48" culverts that had been left from a prior demolition effort were removed as well as the associated concrete bulkheads. The new wooden structure facilitates water delivery to Impoundments 10 (187 acres) and 11 (180 acres).

Dikes are in constant exposure to the test of tide, feral hogs, wind, and rainfall. This required moving soil almost weekly to maintain the integrity of dikes. The settling of the peat soil on the river dike allows extreme tides to flow over. These areas are being elevated to grade as needed during the year. Maintenance of our 40+ water control structures included repairing flap gates, building stop-log sections, filling in erosion, and general repair. Salt water intrusion has damaged most of our structures, and some are going to have to be replaced in the near future.



Results of Rehabilitation of Dike Separating Units 15 and 16. (99-SVH1-RW)



Rice field trunk installed in John Hill Canal. (99-SVH2-RW)

3b. Moist Soil Management

The combination of uplands, bottom land hardwoods, fresh and brackish tidal marsh, and the refuge impoundment system provides for a diversity of plant, fish, and wildlife species. One unique feature of the refuge is the 200 acre tract of virgin bottom land hardwoods on Bear Island. Refuge marshes, both fresh and brackish, are subject to an average tidal amplitude of eight feet. It is this tidal change that allows for water management of the 20 impoundments (5,752 acres) on the refuge.

Average tidal fluctuations during full moon phases exceeded eight feet. Storms which coincided with high tides often result in extreme tides of 12-14 feet. Therefore, tides impacted refuge operations throughout the year. Tide tables were consulted prior to planning and scheduling all maintenance, rehabilitation, and habitat management projects.

Moist Soil Management (1,768 acres):

Nine impoundments were in moist soil management this season. Staggered timing of draw downs, varied length of draw downs (slow and fast), burning, discing and mowing produced a variety of natural waterfowl foods. Early, slow draw downs expose mud flats for shorebirds. This also encourages millet and smartweed production. Sesbania was controlled by flooding and mowing. Late season draw downs benefitted post breeding wading birds and fall migrant shorebirds.

Moist soil management this season included discing of 260 acres, mowing 400 acres, and prescribe burning 1565 acres. Late season mowing in impoundments killed sesbania prior to seeding and released millet and fall panicum. In addition, 15 acres of Japanese millet was planted adjacent to the Laurel Hill Wildlife drive. The moist soil impoundments held large amounts of flying insects in late summer. Post breeding aggregates of swallow-tailed kites and Mississippi kites fed on insects in July through August. Peak counts included 35 swallow-tail and 80 Mississippi kites. 304 wood ducks were banded in 1999, and 468 wood ducks hatched from 84 wood duck boxes. Peak populations of over 1,200 wading birds, including 150 wood storks, fed in management units during periods of draw down. Shorebird habitat was provided during spring and fall migration, with peak populations of over 1000 shorebirds, representing twelve different species feeding within the impoundment system. Some of the species found were American avocets, stilt sandpipers, yellowlegs sp., and dowitchers.



Echinochloa crusgalli in pool 18.
(99-SVH3-RW)

Aquatic Management (4,000 acres):

White water lily, coon tail and slender pond weed dominated the plant community in six of seven aquatic impoundments. The aquatic impoundments provide an important habitat to the nesting wood ducks. The winter migrating ducks also use the aquatic plants and invertebrates to fuel up. These clear, shallow, aquatic impoundments become choked in undesirable floating and immersed plants and require rehabilitation periodically. Pool 16 (170 acres) was drained, burned, and heavily scarified to remove a mono-specific stand of cattail. The East Marsh (3,000) is dominated by button bush and arrowhead and provides excellent wood duck habitat, even though management is still limited due to the large size of the unit and inadequate water level management capabilities.

3c. Graze/mow/hay

There are 50 miles of dikes on Savannah Refuge. In order to control encroaching undesirable vegetation such as tallow trees and to provide visitor access to the impoundment system for fishing and other approved uses, the dikes are mowed several times a month throughout the spring and summer months.

3d. Farming

Part of Impoundment 12/13 was disced and then planted in August with 10 acres of Japanese millet. The dike edges of impoundment 10 and 12 were also disced and planted with around 5 acres of millet. Waterfowl were drawn to these areas and provided excellent viewing for the public.

3f. Fire management

Prescribed burning Ten prescribed burns were conducted on 1,1618 acres at Savannah NWR. Impoundments 4, 5, 12, and 13, were burn to provide open water marsh habitat for migratory waterfowl. Impoundments 16 and 18 were burn as part of a integrated program of impoundment rehabilitation. A portion of Impoundment 6 was burned during the summer to look at the seasonal effects of fire on moist soil plants and cut grass. Unit T-29k is a small pine plantation that was burned to reduce the hazardous fuels.

Prescribed Burns - 1999

Date	Unit	Acres	Type	Fire #
1/13	I-12/13	459.9	hand	4127
2/5	I-1	238.8	aerial	4181
2/6	I-4/5	323.6	aerial	4186
2/12	I-4/5 dike	15.0	hand	4267
3/30	T-29k	35.0	hand	4380
4/8	Onslow Pile	0.2	hand	4390
6/15	I-6 test	2.0	hand	4543
11/6	I-18	60.0	hand	4701
11/15	I-16	160.0	hand	4719
12/13	I-4/5	323.6	hand	4779
Totals	Units 10	1618.1		

Wildfire activity There were no wildfires on the refuge this year. The fire danger (as measured by the KBDI or drought index) stayed in the high to extreme range during the months of May, June August and September.

Heavy Equipment Operator Harry Bentley was detailed to the Hickory Ridge fire on the Okefenokee NWR for 21 days. He served as a dozer operator. Farm Tractor Operator Vic Scott spent a short detail at the Cumberland Island National Park as a helicopter crewman. A complete list of all the fire details completed by Savannah Coastal Refuges personnel can be found in the coastal appendix.

WEATHER TABLE

Savannah NWR 1999 Weather Data					
Month	High Temp	Low Temp	Rainfall	Days below 32°	Days above 100°
January	77°	23°	5.17	5	
February	79°	30°	1.81	3	
March	81°	35°	1.37		
April	93°	41°	1.40		
May	93°	46°	2.59		
June	93°	61°	19.70		
July	100°	70°	4.05		2
August	105°	61°	3.08		3
September	98°	51°	9.18		
October	85°	41°	2.76		
November	80°	36°	0.41		
December	75°	27°	1.56	3	
Annual Summary	105°	23°	53.08	11	5

The year 2000 was a dry year even though the annual rainfall of 53 inches is near normal. It is important to note that 54% of the moisture came during the months of June and September.

3g. Pest Plant Control

Almost 1,000 acres of the refuge is infested with pest species, such as water hyacinth, American lotus, sesbania, alligator weed and cattails, which have all become prolific within the river system and impoundments. Water level manipulation was the primary method used to control sesbania. This method works well if the sesbania is flooded when it first sprouts, and flooding has no negative impacts on the more desirable waterfowl foods (i.e. wild millet, smart weed, flat sedge etc.). Late season mowing of sesbania prior to seed production has also been successful in interrupting the life seed production of the plants. This timed late season mowing often releases panicum grass, barnyard grass, and smart weed in time to complete their life cycle. Mowing impoundments, prior to fall flood, has also been very effective in

controlling giant cutgrass. Mowing the annual grass just prior to it going dormant has proved an effective mechanical treatment. During 1999, 500 acres were mechanically treated for pest plants. Treatment included mowing, discing and even bulldozing in some areas. In addition, 10 acres were treated chemically. In an effort to control alligator weed, growing season prescribed burning was implemented in test plots. The fire partially controlled the alligator weed. In addition to treating for pest plants, it is necessary to treat both sides of the 50 mile dike system for Chinese tallow trees. Experience has shown that mechanical treatment not only removes the above ground vegetation, it also removes the root system. During this period, approximately 4 miles (40 acres) of overgrown dike was bulldozed in order to remove tallow. By keeping the cleared areas mowed annually, tallow should not reestablish itself. In the twenty plus miles of canals, floating pest plants often become invasive. Water hyacinth and alligator weed form large mats that interfere with water control and degrade habitat. Late in 1999, a long reach back hoe was used to remove pest plants. This mechanical method has proven extremely effective and will be used to clear all water ways in 2000.



Removing invasive plants from water way.
(99-SVH4-RW)

3h. Spoil Area Management

Three spoil disposal sites encompassing 467.42 acres were established on Savannah National Wildlife Refuge on February 19, 1965 under a twenty year deed of easement with Chatham County. The Service had previously received title to 458.57 acres in exchange on August 12, 1963. The original spoil areas included 158.03 acres in the middle of Onslow Island, 223.14 acres on Argyle Island, and 86.25 acres on the south end of Onslow Island. On June 7, 1973 (before these easements expired), the Fish and Wildlife Service issued a special use permit for an indefinite period of time to the Corps of Engineers. In essence, Chatham County assigned their easement to the Corps of Engineers. In exchange for the extension of the expiration date from February 19, 1985, to an indefinite period, the Service received a release of spoil rights on 206 acres which the Corps of Engineers owned on Wolf Island National Wildlife Refuge (which was being proposed for wilderness designation at the time). There are nine special conditions to the special use permit, some of which could be cause for termination of this permit either in whole or part. The Corps permit included four parcels—tracts 124P, P-1, P-2, and P-3. These areas totaled 542.52 acres. The difference is 75.10 acres in tract 124P located on Argyle Island which adjoins the 223.14 acre covered by the Chatham County easement.

Each year about 150,000 cubic yards of high quality (construction grade) sand is deposited on Onslow Island as a result of maintenance dredging the upper end of the ship channel, including the Kings Island and Port Wentworth turning basins. The Service allows public agencies and private companies working on public projects to haul dirt from the spoil area at the rate of a dollar per cubic yard. A special use permit is issued to cover each company or agency hauling sand during each calendar year. Due to a limited amount of sand and need for use of some of the sand on refuge roads during 1999, we did not issue any permits during the first half of the year. However, we issued a permit to R. B. Baker Company for use at the Georgia Ports Intermodal Facility on October 1, 1999. They hauled 21,024 cubic yards between October 27 and December 24, 1999 for a total of \$21,024. These funds go directly to the U.S. Treasury, so we have no way to recoup our expenses to manage the spoil areas.

An interesting development during 1999 was a proposal from the Georgia Department of Transportation to explore a land exchange between the Georgia Ports Authority and the Service. This plan was to accomplish expansion by 500 acres of upstream disposal capacity on Onslow Island downstream of the Houlihan Bridge (refuge lands) and continued protection of valuable wetlands upstream of the Houlihan Bridge (Georgia Port Authority's 2,100 acre Mulberry Grove Plantation). The Georgia Department of Transportation became local sponsor (replacing Chatham County) to the Corps of Engineers for the existing federal navigation project in the Savannah Harbor. They anticipate a need for 500 additional acres of spoil disposal. Also, Georgia Ports Authority desires to acquire land on Argyle Island adjacent to the Kings Island Turning Basin for future port expansion. A July 19, 1999 letter from Commissioner Wayne Shackelford to Regional Director Sam Hamilton contained a tentative land exchange proposal. A follow-up meeting was held in Commissioner

Shackelford's Atlanta Office on September 2, 1999 with Regional Director Sam Hamilton and Executive Director Doug Marchand of the Georgia Ports Authority. A memorandum dated October 8, 1999 from Regional Director Hamilton to Mr. Marchand and Mr. Shackelford declined the initial land exchange offers made during this meeting. However, the Service is willing to look at other exchange options provided full long range plans and needs are identified by the Georgia Ports Authority and Georgia Department of Transportation so we can deal with the issue comprehensively, rather than piecemeal. Also, we would only exchange diked areas currently used for spoil disposal and not allow filling of additional undiked wetlands. We would expect to receive all of Mulberry Grove Plantation in whatever deal is consummated, rather than about 1/3 of the property as proposed during the September meeting.

4

Fish and Wildlife Management

4a. Bird Banding

Savannah NWR has a banding quota of 225 woods ducks. During 1995, a permanent rocket net banding site was developed in management unit 1. This one site has always produced enough use to meet our quota. During the summer months 304 wood ducks were banded at this site.

4d. Nest Structures

Volunteers contributed significantly to Savannah NWR programs including wood duck box installation and maintenance. Production from the wood duck nesting box program on Savannah NWR is summarized in the following table:

**Annual Narrative Report Form
Wood Duck Box Program Information
Savannah NWR - Nesting Year 1999**

	Number	Percent
Total boxes	84	
Total usable boxes	84	100 %
Estimated boxes used by wood ducks	59	70 %
Number of boxes with dump nest (16 or more eggs)	5	6 %
Number of successful boxes (wood duck)	59	70 %
Estimated boxes used by other ducks	0	
Estimated boxes used by other wildlife	1 (Screech owl)	
Estimated duck broods produced	59	
Estimated total wood ducks hatched	468	
Estimated wood ducks surviving to flight stage *	234	50 %

All boxes were checked, cleaned, new chips added, replaced or repaired as necessary. A total of 91 eggs did not hatch and 4 dead chicks were found in nest boxes.



Volunteer Charles Warnock cleaning and servicing boxes. (99-SVH5-RW)

4e. Predator and Exotics Control

Feral hogs are the major pest species. As they feed, they root up large sections along refuge dikes which then erode during rains and high tides. Refuge policy is to remove feral animals from the refuge. During 1999, over 200 animals were removed from the refuge mostly by hunters during public hunts.

5

Coordination Activities

5a. Interagency Coordination

The Georgia Department of Transportation assumed the role of local sponsor for harbor maintenance from Chatham County on May 20, 1999. Essentially, this involves providing and maintaining spoil disposal sites for the 7½ million cubic yards of material dredged from the Savannah River port channel each year and cost sharing the dredging costs. A group of people representing county, state, federal and private entities meet quarterly to discuss ongoing work and future needs. This provides much needed coordination and discussion of work projects. The Fish and Wildlife Service is involved because of spoil disposal sites located on Savannah National Wildlife Refuge and Tybee National Wildlife Refuge. Up to forty individuals attend these meetings which were held on January 13, June 7, and October 14 during 1999. The host issue continued to be a need for an additional 500 acres of upland spoil sites at the upper end of the harbor.

The Service frequently coordinates activities with various divisions of the South Carolina Department of Natural Resources and the Georgia Department of Natural Resources. The proposed Harbor Deepening Project by the Georgia Ports Authority has been the topic of many interagency discussions. Ongoing research associated with this project relative to striped bass and endangered shortnose sturgeon were the issues of concern.

Essentially the project, as proposed, will have adverse impacts on endangered shortnose sturgeon nursery habitat, striped bass spawning habitat, and refuge tidal freshwater marshes by increasing salinity and decreasing dissolved oxygen levels. The previous four deepening projects have resulted in the freshwater/saltwater interface moving 13 miles further upriver from the Atlantic Ocean. Refuge freshwater marshes have over 100 plant species versus about 7 plant species in saltwater marshes. Less plant diversity equates to less wildlife diversity on the refuge--our biggest concern. Past harbor deepening activities have resulted in degradation of 53% of the refuge's 6,000 acres of tidal freshwater marsh, and this proposed deepening will impact an additional 20%. We looked for win-win scenarios within this proposal, but to date Georgia Ports Authority has not given serious consideration to project alternatives of a 2-4 foot deepening.

See Section 1b. "Studies and Investigations" and Section 7a. "Environmental Education" for details on other interagency coordination efforts.

5c. Private Lands Activities

The South Low Country Focus Area is a four county area in South Carolina consisting of Allendale, Beaufort, Hampton and Jasper counties. It is one of five focus areas developed by South Carolina under the North American Waterfowl Management Plan to address the need to protect wildlife habitat. The Ace Basin project is the best known and advertised of these five areas. However, progress to protect and keep some of the plantations and forest in the lowcountry from being developed into golf courses and residential areas is being made. A task force team has been developed for the South Carolina Lowcountry Focus area, and the Service is represented by Refuge Manager Drake. The group is securing conservation easements which are being administered by a variety of land trust organizations such as Ducks Unlimited's Wetland Trust America. No meetings were held during 1999. About 10,000 acres have been protected by easements in this focus area to date.

6

Resource Protection

6a. Law Enforcement

See appendix.

6b. Permits & Economic Use Management

There were 16 active Special Use Permits (SUP) issued or in effect during 1999.

In 1954, the U.S. Department of Transportation Federal Aviation Administration (FAA) was issued a SUP to maintain and operate a Very high frequency Omnidirectional Range antenna and a military TACTical air navigational antenna which is commonly called a VORTAC station. A compatibility review during 1994 found this secondary use of the refuge to be incompatible with the requirements of the National Wildlife Refuge Administration Act 16 U.S.C.. 668dd-668ee. The FAA was notified on May 4, 1994 of the incompatible determination and notified that they had a five year grace period (ie until December 31, 1999) to remove the VORTAC station. The FAA was given an opportunity to appeal this decision, however, Jim Wall DOT-FAA Senior Real Estate Contracting Officer decided that no appeal was necessary and that they would remove the station by the deadline as requested. Special use permit 34876 was issued to cover this five year period of activity. However, shortly before the end of 1998 the Service was notified that no monies had been requested by FAA to fund moving the station and an extension was needed. They wanted an additional five year grace period. Not surprising this is the exact time (i.e.10 years to remove the station) that they wanted when first notified of the incompatibility. A decision was made to issue special use permit 41620-99017 effective January 1, 2000 through September 30, 2001 to allow for continued use and dismantling of the facility.

During 1999, permits were issued to the City of Port Wentworth, City of Savannah, Savannah Airport Commission, and R.B. Baker Company for the removal of spoil from Onslow Island

The Chatham County Georgia Mosquito Control Commission was given a SUP permit to control both the black and brown salt marsh mosquito on portions of Savannah NWR. Only EPA approved larvacides for sensitive salt marsh areas are approved for use on refuge property, therefore, the SUP is issued for a one year period which outlines the treatment areas, chemicals to be used, application rates and application methods.

Applied Technology and Management Incorporated was issued two permits. One permit was for conducting studies to assess impacts of the proposed harbor deepening on Savannah NWR and/or other federal trust resources and the other was for the installation of water quality monitoring equipment.

The Army Corps of Engineers had two permits in effect. One indefinite period permit for use of four spoil areas on the refuge and the other for access for mowing dikes in the spoil

Permits for two research studies were issued to Scott Somershoe and Patrick Carnegie.

In addition, there were two permits in effect to conduct environmental education tours with the Georgia Conservancy and Savannah Country Day School.

6c. Contaminant Investigation

Survival of amphipods was not reduced in solid-phase sediment exposures, but was reduced in pore water from several locations associated with drainage from dredge disposal areas. Basic water chemistry (ammonia, alkalinity, salinity) was responsible for reduced survival at several sites, but at the other sites factors were unknown. Certain metals were bioavailable and bioaccumulated in livers of birds and raccoons to concentrations higher than those in the dredge-spoil sediments. Metals in livers of raccoons collected near the river and dredge spoil areas were higher than those in raccoons from the upland control site.

6e. Water Rights Management

Water was supplied and delivered through the diversion canal to three adjacent landowners, as outlined in the 1977 Water Use Agreement. The agreement gives the Service priority use of the water during the first twenty days of each month. During the remainder of each month, the diversion canal is operated to supply water to the refuge or to the three adjacent plantations upon request of the owners. The water control structures (all metal) are rusting and deteriorating due to past saltwater intrusion during the Tidegate Operation Era.

Since this six mile canal system was installed as a mitigation feature, we are trying to get the Corps of Engineers to address the problem. Adjacent landowners are also putting pressure on Georgia Department of Transportation officials, who assumed local sponsor duties for this project from Chatham County.

7

Public Education and Recreation

7a. Provide Visitor Services

Savannah NWR offers an array of public use opportunities: wildlife observation, interpretation, environmental education, freshwater fishing, and hunting (deer, feral hog, squirrel and turkey). Thirty-six miles of dikes are open seasonally to foot traffic. The four-mile Laurel Hill Wildlife Drive is open to vehicular traffic throughout the year.

During 1999, 168,012 of the 467,477 visits to the Savannah Coastal Refuges were recorded on Savannah NWR. Of the five refuges within the Savannah Coastal Refuges (SCR) complex which support major public use programs, Savannah NWR continued to rank second in annual visitation. Pinckney Island again ranked first with 227,672 visits. However, unlike Savannah NWR, Pinckney's visitation is greatly influenced by consistently high boating activity which occurs in neighboring sounds, the Intracoastal Waterway, and tidal creeks. In addition, nationally acclaimed sporting events, such as the Family Circle tennis match and the Professional Golfing Association's Heritage Classic golf tournament, draw thousands of tourists to Hilton Head Island; when even a fraction of these out-of-town visitors make side trips to Pinckney Island, their numbers can dramatically raise the refuge's public use figures. Whereas, Savannah NWR's total public use is most affected by the numbers of visitors drawn to the Laurel Hill Wildlife Drive (153,769 in 1999), and water-related uses only accounted for about 6% of the visitation.

Volunteers were indispensable in supporting routine maintenance of the drive entranceway, especially the visitor information kiosk, and refuge signs. One of the few public use related maintenance projects conducted without volunteer assistance was the installation of a new entrance sign on SC-170 at the refuge's eastern boundary. This endeavor called for a heavy equipment operator, a boom truck, and an excavator.



Post hole diggers were inadequate for this sign installation project. (99-SVH6-PEM)

Special Events

The refuge's most popular special event of the year was held during National Wildlife Refuge Week (October 9-17). On Saturday, October 10, the second annual interpretive boating tours of the refuge were conducted on the Savannah River from the Houlihan Bridge north to the Interstate Highway-95 Bridge. The "River Adventures" were co-sponsored by the Sierra Club-Coastal Group and the Ogeechee Audubon Society as a combination recreational and educational activity to help focus attention on the harbor deepening issue, and awaken public awareness of the refuge waterways' potential for ecotourism. Volunteer, and Sierra Club president, Teri Leffek coordinated chartering a pontoon boat for the event, and managed publicity and ticket sales. All 90 river ride tickets, 30 for each of the three scheduled rides, were sold, but space was found on the mid-day trip to accommodate a reporter and videographer from television station WTOG, the CBS network's Savannah affiliate. The televised segment on the event was broadcast on the local evening news, prompting many calls from listeners who hoped to sign up for a future trip.

Local legend, and refuge volunteer, John "Crawfish" Crawford, served as the primary naturalist on all three river excursions, providing entertaining commentary as the boat cruised by basking alligators and roosting ibis. Refuge ranger Metz accompanied all groups offering information on the refuge's wildlife and management. Volunteer Dave Chafin was enlisted to fill the Sierra Club's mandatory CPR-certified field trip leader position on the trips. To further enhance the outdoor experience for the river riders, a live baby alligator, on loan from the Ogeechee Canal Museum and Nature Center, was introduced at the end of each trip, along with an eastern kingsnake handled by volunteer Teri Leffek, the reptile's legal guardian.



Volunteer Teri Leffek and her Eastern Kingsnake added more excitement to the river rides.
(99-SVH7-PEM)

Environmental Education

Savannah Country Day Schools's (SCDS) Summer Ecology Camp conducted several programs on the refuge. However, no field staff or volunteer support was provided for these activities. Since the Camp's participation fees resulted in profits for the school, camp director Bill Eswine was required to obtain a special use permit authorizing camp programs on the refuge. A total of 37 students were enrolled in the SCDS 1999 summer camp.

Other classes were offered to divergent groups such as the Charleston Parks and Recreation Commission; the Georgia Department of Natural Resources - Nongame Wildlife Program's "Birding Boot Camp" (a field class in neotropical migratory songbird identification); and Boy Scouts, instructed by volunteer Dave Chafin, who were earning various wildlife related merit badges. Off-refuge environmental education programs were coordinated mainly by volunteer Dave Chafin who conducted classes focused on refuge wildlife and endangered species. One of these was held in the rural community of Marlowe (GA) for 100 Cub Scouts of Pack # 61. Dave also taught at the first Chatham County (GA) Humane Society summer camp, instructing more than 80 students.

Interpretation

In 1999, Savannah NWR's volunteer wildlife interpreters provided guide services to 11 groups. Only two public school groups scheduled refuge tours in 1999: a clear reflection of reduced county (primarily Chatham County, Georgia) allocations for field trips. Among the groups accompanied by guides at Savannah NWR were members of the Audubon Society chapters from Savannah (GA), Hilton Head (SC), Fripp Island (SC), and Charleston (SC); the Spring Island Trust; the Charleston Park and Recreation Commission; the Sierra Club - Coastal Group (Savannah, GA); The Nature Conservancy (Georgia chapter); and the Georgia Department of Natural Resources' Nongame-Endangered Wildlife Program. Of these groups, only the Charleston Park and Recreation Commission and The Nature Conservancy were required to obtain special use permits; their programs were open to the public on a fee basis only.

On May 15, ranger Metz conducted a tour for directors of National Audubon Society chapters in Georgia and South Carolina who were participating in the Audubon Refuge Keepers (ARK) workshop held at the Savannah Coastal Refuges' office. Lora Wondolowski, National Audubon's Assistant Director of Outreach for their Wildlife Refuge Campaign, requested the interpretive tour as a means of introducing chapter representatives to advocacy opportunities provided by the proposed Savannah harbor deepening project—an example of a refuge threat which could benefit from “friend group” support. The refuge tour provided ARK members a first hand view of the habitats, particularly tidal freshwater marsh, which would be impacted by the proposed deepening

Hunting

Savannah NWR held its fifth annual two-day hunt (October 21, 22) managed exclusively for wheelchair-dependent individuals, providing them an opportunity to hunt white-tailed deer. This year thirteen individuals participated in the event taking a total of six deer.

A total of seventeen hunters applied for permits. Since the permit quota for this hunt had been set at 15, a drawing for permits was needed. The \$12.50 permit fee, required for all national wildlife refuge quota hunts, was again paid by the American Business Club (AMBUCS) of Savannah. Officer Porter attended an AMBUCS meeting during the summer, reporting on the success of the 1998 hunt; the organization voted to continue payment for all permits. Due to illness or other extenuating circumstances, not all of the permit holders participated in the October hunt.

Additional community support for the handicapped hunters was demonstrated by several volunteers who, along with some of the staff, assisted the hunters with getting to and from the hunt area, getting into the blinds, tracking wounded deer, dressing deer taken, and sitting with some of the hunters that required a little extra help. A barbecue lunch was prepared by International Paper's Palmetto Bluff employee's hunt club, and a pizza feast was provided by a local eatery on the second day. A good time was had by all.



Refuge volunteer assists a hunter into his blind before afternoon stand hours. (99-SVH8-RP)

Savannah NWR held its third turkey hunt on April 19-24. All areas open to deer/hog/squirrel hunting in 1998 were again open to turkey hunting in 1999. Hunters were allowed to harvest up to three turkeys (gobblers only). Authorized weapons were shotguns and bows, in accordance with state regulations. The possession of slugs or buckshot was prohibited. Though no check station was managed for the hunt, refuge officers made daily observations of hunter participation and success. The opening day of the hunt on Monday, April 19, drew the most hunters. Twenty six hunters were checked by officer Porter, with twelve turkeys harvested. Though favorable weather conditions continued during the following five days, less than a dozen hunters were observed on any of these days. Six additional turkeys were checked during the last five days of the hunt. Whether successful or not, all hunters encountered expressed enthusiasm and appreciation for the opportunity to turkey hunt on the refuge.

Only one potentially serious accident occurred during the turkey hunt. While Officer Porter was checking a hunter's license and other gear, the hunter's boat hit a snag in the river causing his boat to overturn. The hunter attempted to climb into Officers Porter's boat causing it to overturn also. The hunter lost everything to the river. Fortunately, no one was injured.

The Savannah deer/hog hunts, drew large numbers of hunters to the refuge this year. The archery-only hunt for deer and hogs was held during the entire month of October. From November 1-30, deer and hogs could be taken by shotguns, 20 gauge with slugs (high powered rifles were permitted north of I-95 only), and squirrels could be taken with rimfire rifles or shotguns with #2 shot or smaller. Most hunters came for the hogs, with over 250 reportedly taken. Fortunately there were no accidents, though SCR officers spent several nights looking for lost hunters.

Fishing

Savannah River's striped bass fishery remained closed in 1999. The Georgia Department of Natural Resources announced the closure in 1988, followed in 1991 by the same action on the part of the South Carolina Wildlife and Marine Resources Department. The positive results of the moratorium continued to be observed by refuge officers and fishermen: the growing number of stripers caught and released in 1999 was indicative of the significant progress made in the striper restoration program.

There were several major bass fishing tournaments that originated off-refuge but used refuge waters almost exclusively. Fishing for large mouth bass, as well as several other species, has increased significantly since the Corp of Engineers' Back River tidal gate was taken out of operation.

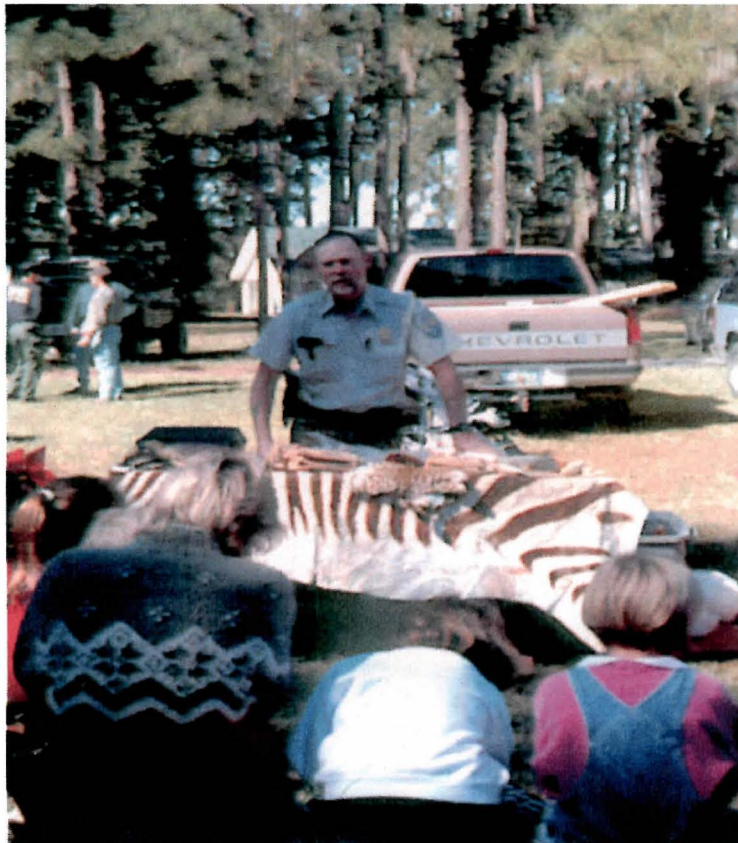
Refuge fishermen utilizing the Savannah River continued to be vocal, and angry, in their comments to refuge and state conservation officers regarding jet ski disturbance. In the past, the majority of the protests over jet ski activity were registered by coastal saltwater fishermen. As the number of personal watercraft owners utilizing the Savannah River increased, conflicts between the skiers and fishermen were more numerous and heated.

7b. Outreach

Project Leader Drake, Refuge Biologist Robinette, and Ranger Metz engaged in numerous outreach activities in 1999 to foster community understanding of refuge management plans and support for management positions. In February, Project Leader Drake addressed the Sierra Club on Hilton Head Island (SC) to review impacts of the proposed harbor deepening project, and priority land acquisition plans. At the same meeting, Ranger Metz addressed issues relating to volunteer opportunities and recreational programs on the Savannah Coastal Refuges. In November, Biologist Robinette met with members of the Georgia and South Carolina chapters of the Sierra Club and National Wildlife Federation to discuss the impacts of harbor deepening on the Savannah River's wetlands and associated fish and wildlife. Following this meeting, Biologist Robinette accompanied chapter members on a four-hour boat tour of the Savannah River, from the GA-25 boat landing to the I-95 bridge.

Throughout the year Ranger Metz participated in Georgia Partners in Flight (PIF) Outreach Committee meetings, frequently accompanied by volunteer Diana Churchill who served as the Savannah Coastal Refuges' outreach liaison for volunteer programs. During the June PIF meeting, held at Georgia Southern University's Lamar Q Ball Raptor Center, the committee completed development of traveling neotropical migratory bird "tool boxes" for educators, teaching aids for supporting neotropical migratory bird classes. These kits were available, on a loan basis, to Georgia teachers, Scout leaders, and other youth instructors. Diana also utilized the kits whenever she volunteered to conduct a school outreach program. Two of the kits were retained by the refuge's "friend" group, the Ogeechee Audubon Society and were accessible to Savannah area teachers.

In October, Refuge Officer Porter coordinated an outreach event at the Pinckney Colony on Hilton Head Island for the Beaufort County chapter of Ducks Unlimited (DU). Outdoor educational activities were planned for the chapter's Greenwing children's program. The activities included presentations by state conservation officers on hunting safety and ethics.



Officer Porter displayed confiscated wildlife products, evidence of federal violations. (99-SVH9-BC)

Officer Porter captivated the group with his talk on wildlife related violations, supported with a fascinating array of confiscated illegal wildlife products such as boots made from endangered sea turtle hide and purses made from threatened species of crocodiles and lizards. Non-DU members were invited to bring their children to this annual youth outreach project, held alternately on state, federal, or private land. Last year, Pinckney Island NWR was the chosen venue.

Media Coverage

Media interest in the refuge throughout the year continued to focus mainly on the harbor deepening issue. The Savannah Morning News alone printed 22 stories involving the impact of harbor deepening on the refuge. In addition, nine editorials related to the issue were also printed in The Savannah Morning News. Other out-of-town newspapers, The Atlanta Constitution; The State (Columbia, South Carolina); and the Island Packet (Hilton Head Island, South Carolina), published articles concerning the issue. All were highly critical of the project promoted fiercely by the Georgia Port Authority. While the issue continued to draw public response, project leader Drake made appearances on local television news shows and offered blunt commentary on the negative impacts the project would have on Savannah NWR and the entire Savannah River ecosystem.

On February 2, project leader Drake and ranger Metz jointly addressed the Sierra Club-Nancy Cathcart Group on Hilton Head Island, South Carolina. They alternately discussed threats to Savannah NWR, including the proposed harbor deepening, land acquisition plans, funding concerns, and volunteer projects. The program received much local media attention resulting in several radio and television commentaries reviewing the program highlights.

In March, project leader Drake and refuge biologist Robinette were interviewed by Georgia Public Radio, reviewing the history of Savannah harbor deepening and its consequences on the environment. These radio interviews were broadcast intermittently on the popular Georgia Digest program in March and April. Meanwhile, the Port Authority continued its pursuit of federal funding for the dredging project..

Thanks to the sustained personal attention provided by Gail Krueger, a reporter and a refuge volunteer, The Savannah Morning News covered all notable refuge activities. She wrote eight different articles covering a range of topics including refuge collaboration with local schools participating in the Junior Duck Stamp competition; the impact of bird watchers and their local refuge visits on the local economy; Migratory Bird Day events organized for the public; Earth Day activities sponsored by the Savannah Coastal Refuges; and programs planned to commemorate National Wildlife Refuge Week.

8

Planning and Administration

8b. General Administration

Personnel



Pictured L-R: 2, 1, 5, 8, 6, 4, 7 (not pictured, 3) (99-SVH10-PM)

1. Gene P. Singleton, Refuge Manager, GS-485-11, EOD 05/22/94, PFT.
2. Otis Bentley, Crane Operator, WG-5725-11, EOD 08/21/72, PFT.
3. R. Dennis Williams, Electrician, WG-2805-10, EOD 10/23/88, PFT.
4. W. Russ Webb, Range Technician, GS-0455-7, EOD 01/29/90, PFT.
5. H. (Jack) Bentley, Engineering Equipment Operator, WG-5716-8, EOD 03/02/92, PFT.
6. Donald F. Williford, Heavy Mobile Equipment Mechanic, WG-5803-10, EOD 01/10/94, PFT.
7. Vic Scott, Tractor Operator, WG-5701-6, EOD 05/15/97, PFT.
8. Robert H. Rahn, Heavy Mobile Equipment Mechanic, WG-5803-10, EOD 07/06/98, PFT.

Awards

Awards were given to the following staff:

<u>Employee</u>	<u>Award</u>	<u>Purpose</u>	<u>Amount</u>
William J. Poole	On-the-Spot	ACE's Joint Venture Project	\$150
Michael Coley	On-the-Spot	Largest Red-cockaded woodpecker capture and transfer	\$150
Keith Penrose	On-the-Spot	Getting Clys radio tower on line	\$500
William J. Poole	Group Award	Dismantled and removed condemned mobile home from Blackbeard NWR	\$728
John Metz	Star Award	YCC leader, island bird surveys, and maintenance work	\$2,500
Michael D. Coley	Group Award	Dismantled and removed condemned mobile home from Blackbeard NWR	\$728
Ricky Owen	Group Award	Dismantled and removed condemned mobile home from Blackbeard NWR	\$546
John Metz	Group Award	Rehab work on boat dock at Blackbeard NWR	\$182
Leo Barrett	Group Award	Rehab work on boat dock at Blackbeard NWR	\$637
Scott Gilje	Group Award	Rehab work on boat dock at Blackbeard NWR	\$455
Troy Phelps	On-the-Spot	Taken lead in two significant areas of fire program	\$500
William R. Webb	QSI	Sustained exceptional performance	
Richard Kanaski	Star Award	Professional contribution made in support of Farm Bill grants	\$1,800
Michael Coley	Group Award	Cleanup Savannah NWR bone yard	\$364
Keith Penrose	Group Award	Cleanup Savannah NWR bone yard	\$364

Ricky Owen	Group Award	Cleanup Savannah NWR bone yard	\$364
Charles Johnson	Group Award	Cleanup Savannah NWR bone yard	\$364
William J. Poole	Group Award	Cleanup Savannah NWR bone yard	\$364
William R. Webb	Group Award	Cleanup Savannah NWR bone yard	\$364
Vic L. Scott	Group Award	Raising dikes of impoundments at Savannah NWR	\$910
Otis Bentley	Group Award	Raising dikes of impoundments at Savannah NWR	\$910
Harry Bentley	Group Award	Raising dikes of impoundments at Savannah NWR	\$910
Debra Keinath	On-the-spot	Work with sea turtles	\$910
Peter Range	On-the-spot	Bird banding and biological programs on Wassaw NWR	\$910
Patricia Metz	QSI	Sustained exceptional performance	

Equipment and Facilities

During the last 20 years the refuges' 50 miles of dike system has slowly deteriorated due to the peaty nature of the materials from which the dikes were constructed. Work on portions of the river and interior dike system was started in 1997 and continued throughout most of this period. Raising the dike between Impoundments 7 and 8 was completed and work began on raising the dike between Impoundments 8 and 5 began. The amount of work needed to bring the dike system up to the correct elevations insures someone a job for the foreseeable future. See Section 3a for more details.

Noteworthy Visitations

Savannah National Wildlife Refuge is a popular site for official visitors. Also, the proposed harbor deepening project provided many opportunities to show agency and congressional visitors some of Savannah NWR. Visiting dignitaries during 1999 the following:

<u>Date</u>	<u>Visitor(s)</u>	<u>Purpose</u>
1/6/66	Craig Watson	North American Waterfowl Conservation Act projects
1/11/99	Bruce Evans	Senate Appropriations Committee field trip
1/13/99	Bland Holman	Harbor Deepening Issues of Concern to Southern Environmental Law Center
1/20/99	Betty Gouge	Expansion of Savannah NWR
4/29/99	Pat McIntosh, John Sibley	Georgia Conservancy Concerns on Harbor Deepening
5/14/99	Bill Grabill	Site Visit
10/22/99	Jim Kurth, Janet Tennyson and Lonnie Williams	Tour of Savannah and article on new Chief of Refuges
11/16/99	Cdr. Jim McDonald	Oil Spill Contingency Planning
11/17/99	Sandy Tucker	Ecological Services Support on Harbor Deepening Issues
12/8/99	Patricia Reece	Orientation Tour for Georgia Ports Authority Employees
12/17/99	Congressman Jack Kingston, Adjacent Landowner	Concerns Relative to Harbor Deepening

TYBEE ISLAND NATIONAL WILDLIFE REFUGE
ANNUAL NARRATIVE

Jasper County, South Carolina
Calendar Year 1999

U.S. Department of the Interior
Fish and Wildlife Service

Sam Q. Drake Jr 1-02-01
Refuge Manager Date

Paul Galvin 4-17-01
Refuge Supervisor Date

Edward W. Lott 4/18/01
Regional Chief, Date
National Wildlife Refuge System

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INTRODUCTION

Tybee National Wildlife Refuge is located in Jasper County, South Carolina, at the mouth of the Savannah River, adjacent to the Georgia state line and across the river from the small Georgia town of Tybee Island (population 2,700). In relation to other National Wildlife Refuges within Savannah Coastal Refuges, Tybee Refuge lies 15 miles south of Pinckney Island Refuge, 15 miles east of Savannah Refuge, and eight miles north of Wassaw Refuge.

The 400 acre migratory bird refuge began as a one-acre oyster shoal. The Army Corps of Engineers (COE), while engaged in river and harbor improvements, used the shoal as a spoil site. Accumulated spoil created Oyster Bed Island (the nucleus of the present refuge). Title to Oyster Bed Island was conveyed to the United States by the state of Georgia on December 30, 1820. Since that time the COE has continued to use the area as a spoil site. Accumulated spoil eventually joined Oyster Bed Island and Jones' Island to form the north bank of the Savannah River. The refuge is bordered by the Savannah River on the south, the Atlantic Ocean on the east, Wright River on the north, and Jones Island on the west. Salt marsh and marsh hammocks separate the refuge from the mainland.

The refuge was established by Executive Order No. 7882 on May 9, 1938 "in order to effectuate further the purposes of the Migratory Bird Conservation Act". In the enabling legislation the United States Coast Guard (U.S.C.G.) retained control over a one-acre site known as the Oyster Bed Lighthouse Reservation and the COE retained the authority to deposit spoil on the refuge. The legislation does stipulate "that any accretions thereto resulting directly or indirectly from river and harbor improvement work shall when formed become a part of the refuge".

The U.S.C.G. transferred the Day Beacon Tower and surrounding area (formerly the Oyster Bed Lighthouse Reservation) to the U.S. Fish and Wildlife Service on February 17, 1960. No further acquisition is planned.

Tybee National Wildlife Refuge has been closed to public entry due to Corps of Engineers harbor maintenance dredging activities and use of the refuge as a spoil disposal site. The refuge is accessible only by boat. Due to staff limitations, remote location of the refuge, and limited wildlife dependent public use opportunities, it will remain closed to public entry for the immediate future. However, efforts are being initiated to cease use of the area as a spoil disposal site which will eventually enhance habitat, wildlife and public use management options for this area.

Executive Order No. 7882 provided that administration of the area for wildlife conservation purposes shall be without interference with any existing or future uses of either the Department of Commerce for lighthouse purposes or the War Department for purposes of river and harbor improvement.

We assume there is latitude in the authorizing language for the area to be managed to meet wildlife conservation purposes. Otherwise, why was it made a national wildlife refuge? In the

past, everything has gone to meet purposes of river and harbor improvement. That interpretation needs to be challenged and changed. Fortunately, the Corps of Engineers is looking at offshore disposal sites that will make spoil available for beach renourishment through natural ocean current processes. They are considering options of discontinued use of Tybee Refuge as a spoil site in this overall assessment.

HIGHLIGHTS

1. Quarterly harbor maintenance meetings were attended by refuge staff. See Section 3h.
2. Mosquito control activity continued. See Section 5a.

Climatological Review - 1999

Precipitation (inches)

Month	1999*	Normal**	Deviation
January	4.73	3.59	+1.14
February	1.95	3.22	-1.27
March	1.25	3.78	-2.53
April	1.68	3.03	-1.35
May	2.54	4.09	-1.55
June	14.25	5.66	+8.59
July	7.15	6.38	+0.77
August	4.26	7.46	-3.20
September	6.50	4.47	+2.03
October	2.04	2.39	-0.35
November	0.49	2.19	-1.70
December	1.94	2.96	-1.02
Total	48.78	49.22	-.44

* Rainfall at Savannah Airport

** 30 Year Average, National Weather Service, Savannah, GA.

Extremely dry weather patterns prevailed throughout 1999. Eight months had below normal rain fall. We had 6.77 inches of rain fall in a 24 hour period on June 28-29, 1999. There were 20 nights with temperatures below 32°F. The year was characterized by near normal average temperatures, however, there were only 3 days during June, July, August, and September where temperatures were at or above 100°F. Rainfall for the year was slightly below normal.

Habitat Management

3h. Spoil Area Management

Tybee NWR is a spoil site and is managed as such in cooperation with the Georgia Department of Transportation and the Savannah District Corps of Engineers. Spoil deposition is timed to miss or minimize impacts to nesting birds or other species. The Savannah District Corps of Engineers has focused most of their effort in recent years on rehabilitating other spoil impoundments west of Oysterbed Island for continued placement of spoil.

Refuge staff have begun efforts to encourage the Corps to use sites other than Tybee Refuge for spoil for the benefit of nesting shorebirds. We have worked closely with South Carolina DNR biologists and Corps biologists to design and create a nesting island, utilizing spoil from future harbor maintenance, just east of Oysterbed Island.

In 1996, the Georgia Department of Transportation raised the dikes on Jones and Oysterbed Islands with plans to spoil both Islands during 1997 and 1998. Between May 18, and May 31, 1997, 102,760 yards of spoil was deposited, and during the period of December 20, 1997 and January 31, 1998, the COE deposited another 161,700 yards of spoil on Jones and Oysterbed Islands. There was not any spoil deposited on the refuge during 1999. The only project planned is some erosion control revetment along the shipping channel river bank.

Coordination Activities

5a. Interagency Coordination

Due to the location of the refuge to populated areas of Tybee Island and Savannah, the Chatham County Georgia Mosquito Control Commission was given a SUP permit to control both the black and brown salt marsh mosquito on Tybee NWR. Only EPA approved larvacides for sensitive salt marsh areas are approved for use on refuge property. The SUP is issued for a one year period and outlines the treatment areas, chemicals to be used, application rates and application methods. Altosid SR-10 (Zoecon) is used at the rate of 3 ounces of active ingredient per acre in a sand mix. An average of four applications are made by helicopter per year. Aerial treatments occurred on July 17, September 30, and October 11, 1999. Larvae counts are made to determine when and where to spray. Four inspection trips were made in 1999 on July 7, September 22, October 7, and October 12.

Quarterly Harbor Maintenance Meetings are held by the local sponsor (Georgia Department of Transportation) and the Savannah District of the Army Corps of Engineers. These are

attended by federal and local agencies and other interested parties concerning harbor maintenance, deepening and other issues such as dredge disposal. Because both Savannah NWR and Tybee NWR have spoil sites, staff members from the Savannah Coastal Refuges attend each meeting to provide input and to protect refuge resources.

Resource Protection

6a. Law Enforcement

Tybee NWR because of its small size and limited areas for wildlife is closed to the public. Whenever possible law enforcement personnel check the refuge for violations. No citations were issued during 1999.

Planning and Administration

8b. General Administration

Refuge objectives for Tybee National Wildlife Refuge were approved on July 30, 1985. The required management programs, as approved, dictate that basic ownership and protection are all that will be accomplished.

The 1998 revenue sharing check for refuge lands in Jasper County, South Carolina was delivered to the County Administrator. The \$14,814 check was for 14,814 acres at Savannah Refuge and Tybee Refuge.

Tybee Refuge is unstaffed and is administered from the Savannah Coastal Refuges office. The entire refuge is considered sanctuary for migratory birds and closed to all public use. Refuge staff rarely visit Tybee more than two or three times per year.

Feedback

Tybee National Wildlife Refuge historical records indicate that it was more important to migratory birds, sea turtle nesting, and other wildlife uses when it was much smaller and a part of a dynamic river delta estuarine system. Intensive harbor improvement projects have changed this and ecological ramifications have not been fully analyzed or appreciated. Future efforts must be made to collect biological data and initiate actions to improve management and protection of Tybee Island National Wildlife Refuge. I am as guilty as my predecessors for the "out of sight out of mind" attitude that prevails for this refuge. This must and will change.

WASSAW NATIONAL WILDLIFE REFUGE
ANNUAL NARRATIVE

Calendar Year 1999

U.S. Department of the Interior
Fish and Wildlife Service

Sam E. Drake, Jr. 1-02-01
Refuge Manager Date

Bill A. Gralst 4-17-01
Refuge Supervisor Date

Edward W. Loya 4/18/01
Regional Chief, Date
National Wildlife Refuge System



Fort Morgan From the air. (Magathlin, WSW #1 99)

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Introduction

Location

Wassaw National Wildlife Refuge (NWR) lies in Chatham County, Georgia. The refuge is one of seven refuges that comprise the Savannah Coastal Refuges complex. Wassaw NWR is 14 miles southeast of Savannah, Georgia (population 217,000). It is 20 miles southeast of Savannah NWR, 25 miles south of Pinckney Island NWR, and 25 miles north of both Harris Neck and Blackbeard Island NWR's.

Description

The 10,070 acre migratory bird refuge consists of a single barrier island (Wassaw Island), tidal salt marsh, two smaller islands (collectively known as Little Wassaw Island), several small hammocks and 20 acres of leased land on the mainland (Priest Landing). The refuge, with approximately 25 miles of boundary/ shoreline, comprises 76% salt marsh, 24% beach dune and upland forest communities, roads, trails and administrative land. The refuge is bordered by the Wilmington River and Wassaw Sound on the north, the Vernon River and Ossabaw Sound on the south, the Atlantic Ocean on the east. Salt marshes, marsh hammocks, and tidal creeks separate the refuge from the mainland (and Skidaway Island) to the west.

Wassaw Island is one of seven islands that form a chain of barrier islands along Georgia's coast from Savannah to Florida known collectively as the "Golden Isles." Wassaw Island is five and one-half miles long, from one-half to one mile wide, with seven miles of ocean beach. It has a prominent central sand-dune ridge running the length of its northeast axis reaching elevations of nearly 45 feet above mean sea level (MSL). A series of lower sand-dune ridges parallel the main ridge. Numerous swales and ponds lie between these ridges. There are 1,975 acres of "dune land coastal beach association" upland dominated by sandy soils. Vegetation types consist primarily of beach-dune and forest communities. Wassaw Island's plant community has suffered relatively little disturbance by humans. From the bare sand beach to the virgin stands of live oak and mixed pine/hardwood climax forest of the central and back dunes, a succession of vegetative habitats provides for an abundance of wildlife species.

Little Wassaw Island is the only other appreciable land mass on the refuge and it includes both Pine Island and Flora Hammock. Both are low, essentially flat, and have little topographic relief. Their combined area is 384 acres of upland. The remaining acreage within the refuge consists of salt marsh, marsh hammocks, and tidal creeks that flood twice daily with lunar tides of five to nine feet. These areas are dominated by soils high in clay content with many pockets of sand ("tidal marsh swamp association"). These areas provide breeding and nursery grounds for an abundant fish and shellfish resource, as well as feeding, loafing and breeding areas for a variety of bird species.

Endangered and Threatened Species

The following endangered and threatened species are known to use the land and waters in and around Wassaw NWR:

Manatee - Manatees are located in and around the waters of the refuge annually.

Piping Plovers - 19 birds were seen on the refuge in September of this year. This is the highest number ever seen on Wassaw Island.

American Alligator - approximately 200 alligators inhabit the fresh water ponds and swales on Wassaw Island.

Loggerhead Sea Turtle - currently nest on the refuge (See section 1b.).

Southern Bald Eagle - nest on Flora Hammock and raised two young this year (See section 1a.).

Peregrine Falcon - are annual fall and winter time visitors to the refuge.

Cultural Resources

The refuge is archaeologically rich and diverse with 78 identified, prehistoric and historic sites. Shoreline progradation analysis indicated that Wassaw Island began formation about 400 AD, Prehistoric site analysis revealed artifacts dating to the Deptford III Archaeological Phase (500-600 AD). Historic debris, dating from the 18th century to the present, is widely scattered over the refuge.

History

The island's recorded history began with Anthony Odingsell who owned Little Wassaw Island during the early 1800's. Odingsell was a black planter who listed eleven slaves among his possessions. In 1846, in an attempt to escape a cholera epidemic, 300 slaves from Liberty County, Georgia, were brought to Wassaw only to suffer and die in isolation. According to the records, all were buried on the big island but the locations of the burial sites are unknown.

During the Civil War, the islands were successively occupied by Confederate and Union troops. Blowing sand once revealed the unmarked grave of a soldier, bones intact, along with a 56-caliber bullet and a uniform button of the First Georgia Regiment. Cannon balls were found the full length of the northern end of the island indicating heavy shelling, possibly by Union troops.

In 1866, the islands were purchased by George Parsons, a wealthy businessperson who dealt in railroads, banks, real estate, and cotton. During the following years, he built the

existing housing compound as a private hideaway for his family and friends. These houses reflect the New England background of the Parsons and are filled with memorabilia of the family including a family log which recalls the island's colorful history.

Acquisition

In October 1969, after 103 years of Parsons' family ownership, the islands were sold (except for a 180-acre inholding) to the Nature Conservancy for one million dollars. The Conservancy, in turn, for the sum of one dollar, deeded the land to the U.S. Department of the Interior to be managed as a wildlife refuge. The primary purpose of the refuge is to maintain and enhance habitats for migratory birds, the loggerhead sea turtle, other resident and nonresident wildlife, and to protect and preserve this unique barrier island.

Climate

The area is influenced by the coastal waters of the Atlantic Ocean. The 30 year (1961 - 1990) mean annual rainfall is 49.7 inches. The mean annual temperature is 65.9°F with a mean high of 90.8°F during July, and a mean low of 39.4°F in December. There are between 275 and 300 frost free days per year. Temperatures below freezing occur from five to fifteen times per year. Wassaw is subject to tropical storms and hurricanes from June through October.

Highlights

- 1) Refuge wins lawsuit over hunter camping. Mr. McMaster's appeal was defeated.
- 2) Refuge participated in the International Shorebird survey in cooperation with the Manomet Bird Observatory.
- 3) Bald Eagles nested for 13th straight year.
- 4) Refuge held its 28th annual deer hunt.
- 5) Two Painted Bunting studies initiated.
- 6) Nineteen ninety Jeep taken to Savannah for renovation.
- 7) Priest Landing returned to state after the lease expired.

Climate Data

...1999 was a mild year. We had no long hot spells of 100-F plus weather and only mild freezes during the winter. The spring was dry with a moderate drought during April and May. The fall and winter saw a mild drought in the last quarter of the year.

Rainfall - 1999

Month	inches	Month	inches
January	6.38	July	17.75
February	2.78	August	4.78
March	1.13	September	5.14
April	1.09	October	1.77
May	3.17	November	1.25
June	0.35	December	1.42
		Total	51.28

This year was active on the storm front with hurricane Floyd and Irene causing significant forest and property damage with 55 mph winds.

1 Monitoring and Studies

1a. Surveys and Censuses

- The following wildlife surveys were conducted on Wassaw NWR in 1999:
 - Winter Bald Eagle survey. One pair nested on Flora Hammock and two chicks were observed in the nest. This is the 13th consecutive year there has been nesting on the refuge.
 - The mid winter waterfowl count observed zero birds. The low count was attributed to mild weather.
 - 132 loggerhead turtle nests were located on the refuge producing 9030 hatchlings (See section 1b. for further details).
 - Wassaw NWR participated in the International Shore bird survey in cooperation with the Manomet Bird Observatory.
 - 90 bird species were observed during the North American migratory bird count in association with International Migratory Bird Day. The count included such diversity as Chestnut sided warbler and Rose Breasted Grosebeak.
 - A 50-point bird count was conducted by refuge volunteers Steve Calver and Peter Range on May 22 and 23. The Carolina wren, Great crested flycatcher and Parula warbler were the most commonly observed species.
 - Two Painted Bunting studies started this year. USGS is doing a five-year survivorship study, and the refuge is operating a monitoring avian productivity and survivorship (MAPS) banding station.

1b. Studies and Investigations

Wassaw NWR "Caretta Tagging and Nesting Study - 41628-1-84":

This ongoing sea turtle research program started in 1973 and has been conducted by the Savannah Science Museum (SSM) in cooperation with the U.S. Fish and Wildlife Service. The logistic support provided by the Service includes furnishing vehicles for beach patrols and providing transportation or staff assistance, when needed. Housing for the SSM crew has been provided by the Wassaw Island Trust.

Caretta research personnel included three island leaders from the SSM, and one *intern* (college student/graduate student), and volunteers who pay a fee, to the museum, to participate in this program. The museum uses the fees to pay for the program (i.e., staff

salaries, food, transportation, repair of vehicles, etc.). During 1999, the twenty-seventh consecutive year of sea turtle research, there were 69 volunteer participants. This brings the total number of volunteers, since the program began, to 2010, including volunteers from the Republic of Singapore, Great Britain, Canada, Holland, West Germany and from 48 different states. Since 1973, project participants have observed 1,221 loggerheads, observed 4,431 crawls, monitored 1,912 nests containing approximately 214,734 eggs, and released an estimated 128,434 hatchlings.

On Wassaw NWR, beach patrols for nesting turtles began on May 10 and continued nightly through September 11. At times, nests were located below the high tide line. In order to insure hatching success, eggs laid within this area were relocated to a hatchery either north of the area (known as the bone yard) or toward the south of the Avenue. All nests left on the beach (laid in a safe location) were covered with a wire screen to prevent predators from digging into the egg cavity while still leaving room for hatchlings to escape.

During 1999, (Wassaw and Pine Island/Little Wassaw), at least 64 turtles made a total of 319 crawls, resulting in 132 nests, in which an estimated 15,589 eggs were laid, producing 9,103 hatchlings that made it to the water, with an overall hatchling success (number of hatchlings released divided by number of eggs X 100) of 65.9%. This is about the same as the 64.7% hatch rate of 1998.

Table 1.
Five Year Summary of Caretta Research Data
Wassaw and Pine Island/Little Wassaw (1995 - 1999)

YEAR	CRAWLS	NESTS	% NESTS	STRANDINGS	EGGS LAYED	% HATCH SUCCESS	TURTLES RELEASED
1999	183	132	72.0	8	15589	65.9	9103
1998	133	80	60.2	4	8192	69.9	5152
1997	109	67	61.5	10	8121	69.9	5661
1996	250	148	59.2	6	17457	73.5	12826
1995	236	85	36.0	14	9358	64.8	6066
mean	182	102	57.8	8.4	11743	67.8	7760

The turtles were marked with two types of tags, metal Inconel tags and Passive Integrated Transponder (PIT) tags. Sixty-nine turtles were observed. Nineteen of those had been previously tagged, and fourteen had tag scars (from the Wassaw or other programs). This left a minimum of 35 turtles, or 51% of all nesting turtles, as first time nesters (neophytes) to Wassaw. Research from other long term tagging studies in Georgia report 30-40% of nesting turtles each season are neophytes. Three of the previously tagged turtles were tagged on other nesting beach projects. Tag returns from Wassaw show that inter-island nesting is common.



Paul Sykes at work banding one of the ninety-four Painted Buntings he banded on Wassaw NWR. (WSW #2 CRW)

USGS Painted Bunting Research Project

The Painted Bunting study conducted by Paul Sykes of the USGS is an Atlantic Coast population study that includes the species entire breeding range from North Carolina to Florida. One of the study sites is Wassaw Island. The study is performed by setting up feeding sites to attract the birds and then capturing with mist nets. The buntings are trapped once a year. Each bird is individually color marked with a unique four-color band combination. In 1999, a total of ninety-four buntings were banded. This is the highest number banded at any one site on the Atlantic Coast.

2 Habitat Restoration

2a. Wetland restoration

500 meters of beach was bladed to enhance the beach for turtle nesting.

3 Habitat Management

3e. Forest Management

The forest of Wassaw Island suffered through some unusual mortality this past year. The mortality can be classified into two groups. The first of the younger (20 years or less) slash pines located on the ocean side of Fire Management Unit 3. These trees were stressed by a too hot prescribed burn which occurred during the 1998. The second group

was a scattering of mature, old growth, dominated canopy slash pines. These trees were located in Fire Management Units 3 and 5. These trees were also subject to the prescribed burns of 1998. Many of these trees were not stressed from a too hot fire, but died anyway. The mortality continued for so long into the year that Southern pine or Ips bark beetles were suspected. Upon further investigation, we determined that insects were not the cause of mortality but a secondary infestation.

3f. Fire management

Prescribed burning

No prescribed burning was accomplished on the refuge this year. Three burns were scheduled for the winter of 1999/2000. These burns were put on hold due to the unexpected mortality of some dominate old growth canopy pines within the boundaries of the prescribed burns completed in December of 1998. The Regional Fire Ecologist and a review team have been requested to examine the 1998 prescribed burns and the Wassaw burn program. This review is expected in March of 2000.

Wildfire activity

Wassaw, like the other stations in the Complex, felt the impact of a prolonged spring and summer drought. Three small wildfires were detected and controlled during March and April of the year. The KBDI (drought index, scale 0-800) was above 550 (high fire danger) in January, April, May, June, August and September.

Table 2.
Wildfires - 1999

Date	Fire name	Acres	Cause	Cost	Fire #
3/28	Trust debris	0.25	Escape debris burn	1538	4379
4/25	Old HSE Rd	0.1	lightning	840	4427
4/26	Marker 35	0.2	lightning	2834	4428
Totals		0.55			

Other items

The fire crew assisted with a number of refuge projects, including working the hunts, maintenance, road/trail/fire break clearing and refuge/facilities cleanup.

4 Fish and Wildlife Management

4a. Bird banding

This year, for the first time a Monitoring Avian Productivity and Survivorship (MAPS) banding station was operated on Wassaw Island. The monitoring site is one of more than

five hundred continent wide and will provide vitally important information regarding the causes of population change and community turnover, and valuable insights as to appropriate management actions to reverse the population declines and help stabilize landbird communities.

The MAPS banding station is operated from May until the second week in August. All species of birds are monitored at this station through banding and audio/visual observation. There is a special interest in Painted Buntings on the island because of the precipitous decline of the east coast population. All buntings are color banded with a white over a red band on the right leg and the silver USFWS-Numbered band on the left leg. This year a total of thirty Painted Buntings were banded with this combination. The station as a whole banded a total of one hundred and sixty-nine birds of twenty-six species.



Painted Buntings banded on Wassaw as part of the MAPS Project (WSW#3 99 PR)

4d. Nest structures

Wood Ducks

Due to staff shortages, Wassaw NWR's 23 wood duck boxes were not checked in 1999.

American Wood Stork

Ten nesting platforms were erected in Golden Pond at Priest Landing. Wood storks and other wading birds did use the structures for resting and loafing, but no Wood stork nesting was observed.

Loggerhead Turtle

For the second year, "mini" hatcheries that could hold up to eight nests were constructed. Nine of these units were set up holding 70 nests.

4e. Predator and exotic control

Hog activity on Wassaw Island was moderate this year with three hogs on Wassaw for approximately four months, and then returned to flora hammock. To curtail hog intrusions on Wassaw, a hog control program was instituted this year. Fourteen hogs were removed from flora hammock.

5 Coordination Activities

5a. Interagency Coordination

Refuge staff and volunteers, the Caretta Research Project, the Georgia Department of Natural Resources, and the Brunswick Ecological Services office coordinated on the examination and retrieval of tissue samples from stranded marine mammals and sea turtles. Table 3 outlines the recorded strandings for Wassaw Island in 1999.



Stranded Rough-tooth dolphin (WSW#4 99 PR)

Table 3.
Marine Mammal and Sea Turtle Strandings
Wassaw NWR - 1999

DATE	SPECIES	COMMON NAME
5/10	<u>Caretta caretta</u>	Loggerhead turtle
5/11	<u>Caretta caretta</u>	Loggerhead turtle
5/16	<u>Dermochelys coriacea</u>	Leatherback turtle
6/12	<u>Lepidochelys kempii</u>	Kemp's ridley
6/14	<u>Caretta caretta</u>	Loggerhead turtle
7/1	<u>Lepidochelys kempii</u>	Kemp's ridley
8/21	<u>Steno bredanensis</u>	Rough-tooth dolphin
9/6	<u>Chelonia mydas</u>	Green turtle

5c. Private land activities

The Parson trust owns and manages a 180 acre in-holding within the refuge. A yearly meeting is held on the island to increase communication and resolve any issues that may have developed in the last year. This year, the meeting was canceled because of hurricane Irene. All issues that the trust brought forward were answered as they were asked individually at later dates.

6 Resource Protection

6a. Law enforcement

Due to the remote location of Wassaw Island, law enforcement problems are minimal. Our primary problems are litter, no wake violations by the dock and visitors taking their dogs on the beach. We have very few problems with our deer hunt that verbal or written warnings do not resolve.

(See coastal section for further information)

6b. Management permits and economic uses

The yearly permit was reissued to the Chatham County Mosquito Control District to treat approximately 162 acres of salt-marsh with Altosid larvicide.

7 Public Education and Recreation

7a. Provide visitor services

Visitation to Wassaw Island increased in 1999 with 14,901 visits reported, compared to 9,443 in 1998. This was well below the 1995 and 1996 public use levels of 30 and 50 thousand, respectively. Most visitation was concentrated during the late spring and early summer months when temperatures were moderate and mosquitoes were not abundant. Consumptive forms of public use (hunting, shrimping, crabbing, fishing, etc.) accounted for nearly 70% of the total use.

Hunting

Hunting on Wassaw NWR is the most cost effective management tool to regulate our white-tail deer population. In 1999, two separate deer hunts were held on Wassaw. The first, October 7-9, was held for primitive weapons hunters (the first two days were for bow hunters, the third for both archers and muzzleloaders). Sixty-three hunters participated in this "non-quota" hunt, and a total of 11 deer (5 bucks and 6 does) were harvested. In addition, a three-day "quota" gun hunt was held November 5-7. Fifty-three hunters harvested a total of 53 deer (26 bucks and 27 does). This year's harvest on the modern weapons hunt was close to a normal hunt with moderate weather and hunter turn-out.

Table 4.
Five Year Summary of Deer Hunt Data
Wassaw Island (1995 - 1999)

Year	Hunt Type	Hunt Days	# Hunters	Number Harvested		
				# Bucks	# Does	Totals
1999	Primitive	3	63	5	6	11
1999	Modern	3	53	26	27	53
	Total	6	116	31	33	64
1998	Primitive	3	64	14	12	26
1998	Modern	3	119	39	25	64
	Total	6	183	53	37	90
1997	Primitive	3	73	10	4	14

1997	Modern	3	59	36	13	49
	Total	6	132	46	17	63
1996	Primitive	3	61	22	15	37
1996	Modern	3	38	22	11	33
	Total	6	99	44	26	70
1995	Primitive	3	60	14	7	21
1995	Modern	3	40	24	14	38
Total all years		54	1160	386	247	633
Mean for all years		10.8	232	77.2	49.4	126.6

Fishing

Saltwater fishing is one of the most popular public use activities on the refuge. Sports enthusiasts ply Wassaw's shoreline and tidal creeks for speckled trout, spot tail sea bass, shark, sheepshead and shrimp. Most activity occurs in the summer, however a few diehards fish these waters year-round.



Charles Warnock receiving a pin for his many thousands of hours of volunteer service.
(WSW#5 PR 99)

Environmental Education

Wassaw Island serves as an ideal outdoor classroom for barrier island ecology studies. A cross island hike exposes students to a range of habitats including salt marsh, oceanfront beach, and maritime forest. In cooperation with the University of Georgia and Savannah Country Day School, environmental education programs were conducted on-site with support from refuge staff and volunteers.

The University of Georgia Marine Extension Center (MAREX) provided classes for high school and college students, as well as continuing adult education classes on barrier island and salt marsh ecology, and intertidal relationships. Most programs began with discussions of the recent geological history of Holocene barrier islands, such as Wassaw, and proceeded to human history, beginning with the Guale Indians and their use of Wassaw for hunting and fishing. The classes also included the historic importance of African Americans in our history, as exemplified by the Anthony Odingsell family that settled on Flora Hammock and lived there from 1835 to the 1870's. The historical discussion concludes with a brief summary of the island's ownership from the Parsons family era to 1969 when the land was sold to the Nature Conservancy, then transferred to the U. S. Fish and Wildlife Service. MAREX instructors and refuge staff or volunteers also provide information on the Service's current role in managing the refuge. A total of 714 students participated in these environmental education programs.

In addition to the MAREX classes held on Wassaw NWR, MAREX instructors and Service volunteers conducted "virtual" field trips to the refuge via the Georgia Statewide Academic and Medical System (GSAMS). This "distance learning" program allowed thousands of Georgia students to "visit" coastal waters. The interactive learning sessions linked students at 160 sites in Georgia with Wassaw's marine environment. Through the use of telephone lines and television monitors, GSAMS enables students to interact live with other students and instructors at distant sites. The MAREX presentations allowed students to travel electronically to Wassaw. This year, for the first time, students were introduced to the plight of neotropical migrants, as well as other topics. Explanations of the future research on Painted Buntings were discussed.

At both Priest Landing and Wassaw Island, the Savannah Country Day School's Coastal Ecology Summer Camp Program provided courses in coastal awareness and field-oriented education. Since fees were charged for these courses, the program was regulated through a special use permit. 168 students visited the refuge as participants in these programs. Studies included fresh and salt marsh ecology, identification of marine organisms, barrier island flora and fauna, and geological history. Classes also covered a review of the Service's role in protecting natural resources.

7b. Outreach

Media Coverage

Wassaw NWR and Savannah Coastal Refuges receive excellent news coverage from the Savannah Morning News and our local television stations. Refuge Ranger Patricia Metz coordinates media requests between the staff and reporters. Below is a list of 1999's media coverage.

June - Cause of Sea Turtle deaths a mystery, Savannah Morning News

August - Loggerhead Sea turtles have a good year, Savannah Morning News

August - Wassaw Hunts, Savannah Morning News

October - Earth Day, Savannah Morning News

8 Planning and Administration

8b. General administration

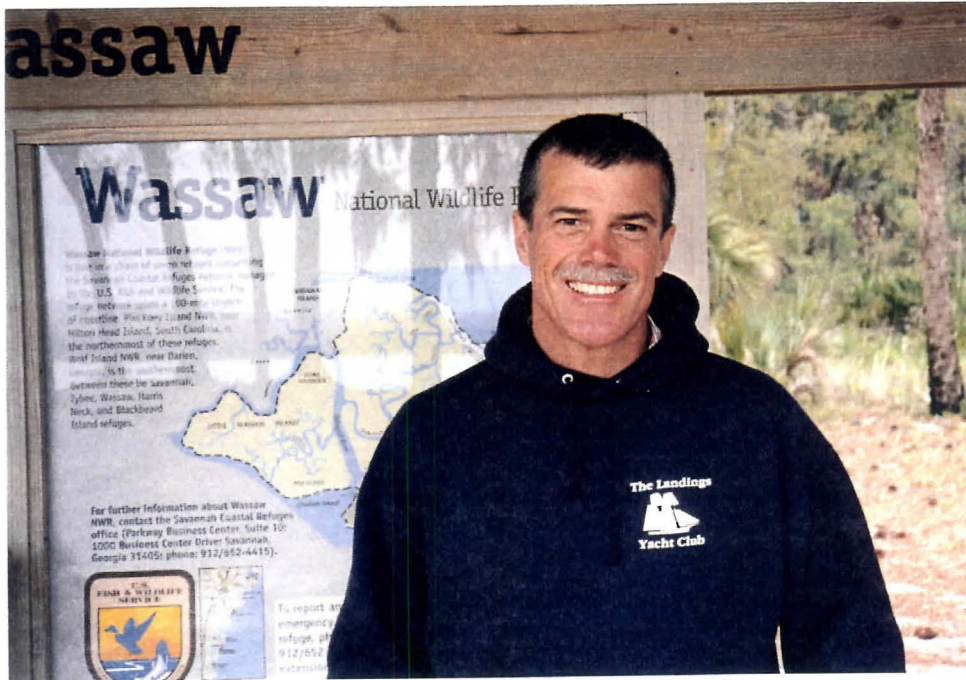
On September 8, 1976 the Fish and Wildlife Service entered into an agreement with Chatham County, Georgia to sublease two parcels at Priest Landing on Skidaway Island. Parcel 1 is 3.43 acres and contains a refuge radio repeater tower. It is a 50-year lease that expires on September 7, 2026. The second parcel, consisting of 16.57 acres, originally had a 20-year lease with a one year extension which expired August 3, 1999. The service maintains a floating dock for boat storage and launching at the nearby Priest's Landing Pier. The boat has been moved to a nearby marina, and the dock is no longer used on a regular basis. It was felt that Parcel 2 could be better managed by the Skidaway Institute of Oceanography, which has interest in the parcel for environmental educational purposes. The lease on Parcel 2 was allowed to expire this year.



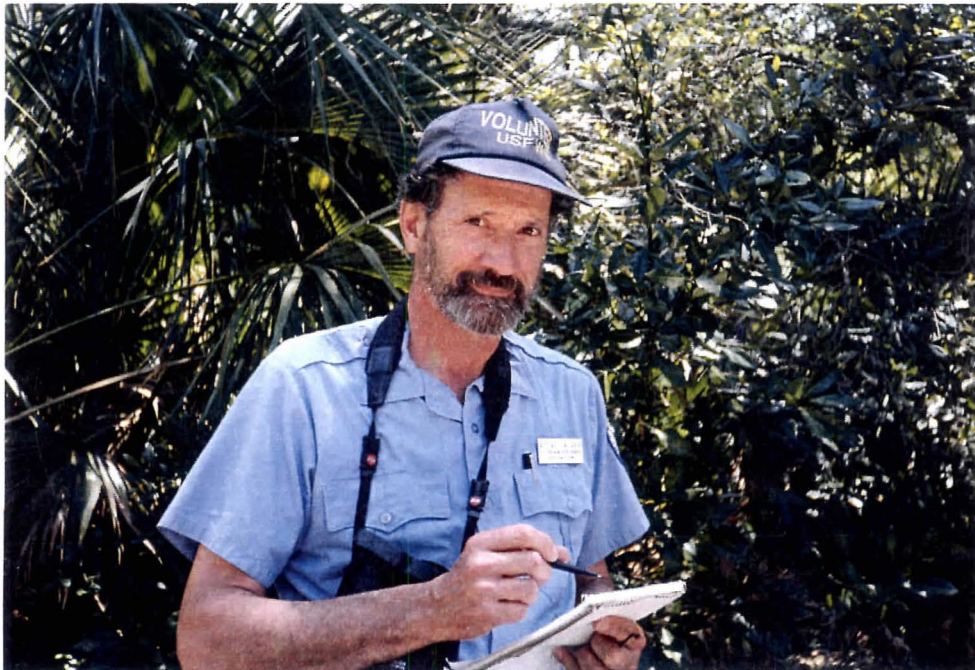
Peter Range, Biological Science Technician, GS 404-7, Designated Manager in charge of Wassaw Island NWR, EOD 6-21-98. (WSW#6, 99 PM)

Volunteers

Wassaw NWR is blessed with outstanding volunteers. Charles Warnock put in over 287 hours in 1999, which was the vast majority on Wassaw. Mr. Warnock is as familiar with the refuge and its history as any Service employee. Steve Calver, a master birder, conducts many of the refuges avian surveys. John Crawford conducts most of the MAREX tours and saves us countless staff hours. This year, Mike Bousquet cleaned the bottom of the Wassaw boat approximately once every six weeks, saving countless work hours for the refuge staff.



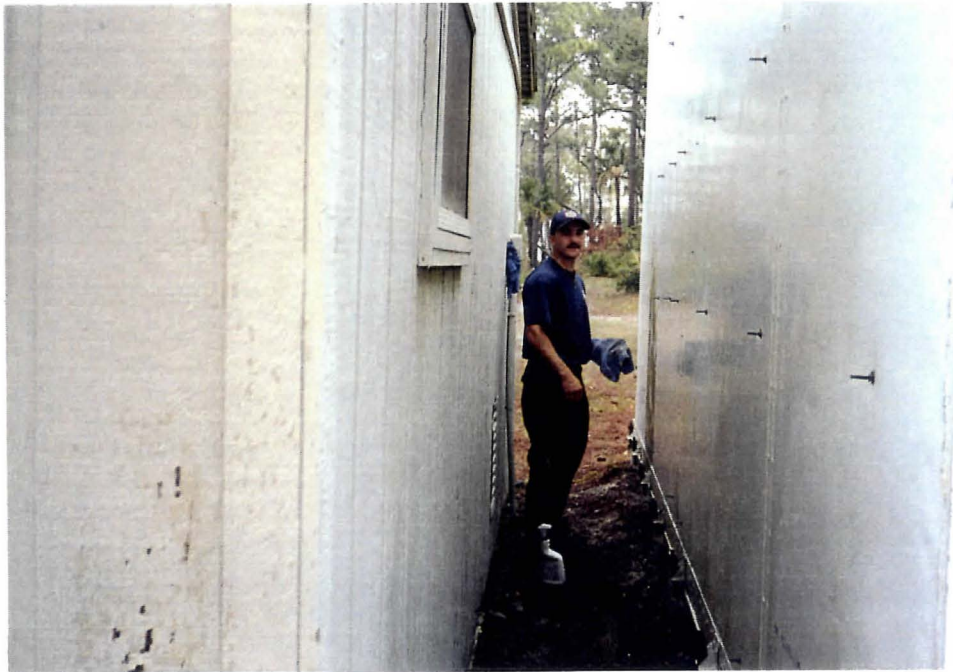
Mike Bousquet (WSW#7 99 PR)



Steve Calver (WSW#8 99 PR)

Equipment and Facilities

This year, several important projects were completed on Wassaw Island. First, the living quarters, maintenance building, and the deer cooler, as well as several out buildings, got a fresh coat of paint. The 1990 CJ Jeep received a new set of springs and air conditioner. The garage doors were replaced in the maintenance area. The dock house door was replaced. The barge slip was laid out.



The deer cooler gets a paint job. (WSW#9-10 99 PR)



Feedback

WOLF ISLAND NATIONAL WILDLIFE REFUGE
ANNUAL NARRATIVE

Townsend, Georgia
Calendar Year 1999

U.S. Department of the Interior
Fish and Wildlife Service

Sam O. Duke Jr 1-02-01
Refuge Manager Date

Paul A. Grubel 4-17-01
Refuge Supervisor Date

Edward Loren 4/18/01
Regional Chief, Date
National Wildlife Refuge System

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INTRODUCTION

Wolf Island National Wildlife Refuge is located in McIntosh County, Georgia (population 9,200) 12 miles east of the small town of Darien. In relation to other Savannah Coastal Refuges, Wolf Island lies 10 miles south southwest of Blackbeard Island Refuge and 20 miles south of its mainland support base, Harris Neck Refuge. This 5,126 acre migratory bird refuge is composed of Wolf Island (4,519 acres), Egg Island (593 acres), and Little Egg Island (14 acres). The refuge is bordered on the north by South River and Doboy Sound; on the east by the Atlantic Ocean; on the south by Altamaha Sound; and on the west by the Intra coastal Waterway (Little Mud River) and vast expanses of associated marshes, marsh hammocks, and tidal creeks which separate the refuge from the mainland.

The island's recorded history began in 1769 when Christopher DeBrake was granted title to Wolf Island by the King of England. In 1828, part of the island (538 acres) was conveyed to the U.S. Government. The strategic location of Wolf Island made it an important identification point on early navigational charts. An old Coast Guard light, which stood on the northern tip of Wolf Island, has long since disappeared into the ocean. No navigational lights or other structures now exist on the refuge.

The refuge was established by Executive Order No. 5316 on April 3, 1930, when the 538 acres already in government ownership were set aside as a sanctuary for migratory birds. On October 3, 1972, an additional 4,071 acres were purchased from the Nature Conservancy for \$100,000. The balance of the refuge (517 acres) was added December 8, 1972, by a Declaration of Taking. The U.S. District Court, Southern District of Georgia (Civil No. B/1147) set compensation at \$20,841.02. No further acquisitions are planned.

Wolf Island contains 300 acres of uplands (6.6%) including a long, narrow four mile strip of ocean front beach and several small (less than 20 acres) spoil sites along the Little Mud River. The highest elevation recorded on the island is 10.57 feet above mean low water and is located on one of the spoil sites. The remainder of the island (4,219 acres) is salt marsh, small marsh hammocks, and tidal creeks which flood daily with lunar tides of five to nine feet. Tidal action constantly influences the physical shape of the island. Each high tide flows across low lying portions of the northern dunes, and has resulted in a wide mud flat through the central marsh. High spring and flood tides inundate most of the refuge.

Vegetation on the upland portions of the refuge consists of sea oats, sand spurs, and other beach-dune perennials. The only woody growth consists of wax-myrtle and cedars on the highest elevations. The salt marsh is dominated by salt marsh cordgrass with sea-ox-eye, needle-grass, and glasswort in a narrow band around the spoil sites and higher elevations.

Egg Island contains 200 acres of uplands (33.7%) ranging from six to ten feet above mean low water. Approximately 70 acres of this island are above nine feet. This acreage has a dense growth of cedar, greenbrier, and blackberry, along with a small number of oak and pine. The remaining upland acres are dominated by wax-myrtle except for a long narrow stretch

(one and one-half miles) of ocean front beach, which is dominated by sea-oats, sand-spurs, and other beach-dune perennials. The balance of the island (393 acres) is salt marsh dominated by salt marsh cordgrass.

Little Egg Island (14 acres) is a low salt marsh dominated by salt marsh cordgrass. This island is completely inundated during high tides with only the tops of the tallest grasses exposed.

The refuge was closed to hunting of migratory birds on April 17, 1973, and was designated a National Wilderness Area on January 3, 1975. No staff lives on the refuge. However, personnel from Harris Neck Refuge and other refuges within Savannah Coastal Refuges (SCR) make periodic visits.

In 1970, Congress passed the Clean Air Act, establishing a national policy toward protecting and enhancing air quality. Amendments passed in 1977 and 1990 strengthened the act making it a more effective tool protecting air quality in national parks and national wilderness areas. Sections of the act (160-169A) established a Prevention of Significant Deterioration of Air Quality permitting process. As a result, Wolf Island (one of 21 refuges in the system) was selected and remains a Class I Air Quality Area as defined by the criteria of the Act. That is, the Environmental Protection Agency or the state permitting authority must notify the federal land manager if emissions from a proposed project may impact the air quality of a Class I area. That includes all major facilities proposing to locate within 100km (62 miles) of the refuge and any that might possibly impact it over that distance.

As a result of Wolf Island's designation as a Class I area, two permits were forwarded to the Regional Office from the Bureau of Air Regulation, Florida Department of Environmental Protection. Florida Steel Corporation in March (Baldwin, FL-136 km southwest) and Georgia-Pacific Corporation in April (Palatka, FL-150 km south) were granted permission to expand their steel production facility and modify their pulp mill support systems, respectively.

Brown pelicans, loggerhead sea turtles, and diamondback terrapins are significant species which utilize the refuge. Loggerhead sea turtles occasionally nest on the beaches, but rarely are successful due to tidal inundation or predation, while diamondback terrapins use the higher dunes for nesting. Raccoon predation of turtle nests is heavy along the entire southeast coast. Shorebirds and marsh birds utilize the refuge extensively. Migratory waterfowl wintered on the refuge and surrounding waters. Scaup, scoters, black ducks, mergansers, and buffleheads were the most common species.

Saltwater fishing and crabbing are popular activities along the creeks that intertwine through the refuge during the summer and fall. The upland portions of the refuge are closed to the public.

Climatological Review - 1999

The 30-year precipitation average for the state of Georgia is 56 inches. However, the Southeast Coast of Georgia averages approximately 64 inches each year (National Weather Service).

Month	Rainfall (In.)	High Temp. (F)	Low Temp. (F)
January	3.44	76°	22°
February	2.60	81°	30°
March	0.74	80°	36°
April	1.54	97°	40°
May	0.46	92°	49°
June	5.11	92°	66°
July	5.40	102°	70°
August	0.97	106°	69°
September	10.45	96°	57°
October	3.86	87°	45°
November*	0.75	80°	36°
December*	1.09	75°	27°
Total	36.41		

Precipitation amounts have been extremely low the past two years. Rainfall amounts have been approximately half of what is typically received which has affected some of our management operations, restricted prescribed burn opportunities on nearby Blackbeard Island, and created conditions favorable for devastating wildfires. Any significant amounts of rain that has come our way, has occurred over a short period of time followed by long periods with little to no precipitation.

*Temperature data taken from the Savannah NWR station and rain data from McIntosh county Forestry Commission office due to mechanical problems with the Blackbeard Island weather station.

1

Monitoring and Studies

1a. Surveys and Censuses

Recent studies suggest that there are two subspecies of red knots indigenous to the Western Hemisphere. One migrates to Southern Argentina. The second, *Calidris canutus roselarii*, has an estimated population of fewer than 20,000 birds and a winter range that probably includes, and may be exclusive to, the west coast of Florida. In September 1998 Brian Harrington and crew from the Manomet Center for Conservation Sciences conducted a survey for red knots on Wolf Island NWR and Egg Island Bar, owned by the State of Georgia. They observed five banded knots all of which had been marked in North America, most likely, from the population wintering in Florida. Between 8,000 - 11,000 knots were observed during surveys (40-55% of the total population). Many of the birds observed were molting flight feathers. The Georgia coast is being used as a staging/molting area prior to the last leg of migration to the Western coast of Florida. Bird movements were recorded and these observations indicated that knots were using Egg Island Bar as a roosting area, at or near high tide, and moving to Wolf Island to feed as the tide went out.

Wolf Island and the adjacent State and privately owned lands within the Altamaha River Delta have proven to be a significant wintering area for the endangered piping plover. This area has produced 48-50% of all piping plovers recorded along the Georgia coast during mid-winter January shorebird surveys for the past three years 1997-99. Thirty color banded piping plovers have been recorded during these surveys. The color bands have been traced to the Great Lakes breeding population where there are only 25 known breeding pairs. One bird came from a failed nest and the plover was hand reared.

During the 1999 Georgia mid-winter shorebird survey The Altamaha River Delta area contained 4,714 shorebirds representing 15 species. Also, 76 piping plovers were recorded representing 50% of all piping plovers for the State of Georgia. It is obvious that the Refuge and adjacent islands play an important role in the life history of several shorebird species. The Altamaha River Delta was nominated for inclusion into the Western Hemispheric Shorebird Reserve in 1999.

6

Resource Protection

6a. Law enforcement

Refuge Officers made trips during the year to Wolf Island NWR to insure public compliance with refuge regulations. The majority of law enforcement attention concentrated on waterfowl hunters and commercial fisherman.

6b. Permits & Economic uses

A special use permit was issued during the year to Brian Harrington, shorebird researcher at the Monomet Center for Conservation Sciences, for investigation of Red Knots (see 1a).

8

Planning and Administration

8b. General administration

Wolf Island NWR is part of the Savannah Coastal Refuges Complex which is headquartered in Savannah, Georgia. The complex is comprised of seven national wildlife refuges, totaling 54,027 acres, found along a 100 mile stretch of coastline in Georgia and South Carolina. The seven refuges are Pinckney Island and Tybee Refuges in South Carolina, Savannah (located in both states along the Savannah River), and Wassaw, Harris Neck, Blackbeard Island, and Wolf Island Refuges in Georgia.

Wolf Island NWR is an unstaffed refuge operated from the Harris Neck NWR station.

APPENDIX

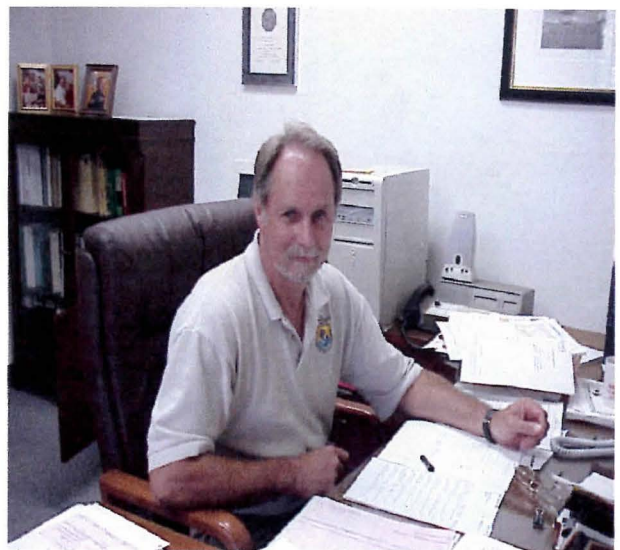
General Administration SCR

Savannah Coastal Refuges Complex staff during 1999

Personnel



Sam O. Drake, Jr.,
Refuge Manager



Allan W. Flock,
Deputy Project Leader



Robin Gay,
Office Assistant



Gail Stewart,
Secretary



Pat Metz,
Supervisory Refuge Ranger



Jim Stockie,
Forester / FMO



John R. Robinette,
Biologist



Matthew Bryant, LE Officer
Ray Porter, LE Officer

A total of 26 permanent full time, four permanent career seasonal, and one term appointment employees make up the staff for the entire complex. Employees assigned to specific stations are reported in the appropriate refuge narrative. The following ten staff persons report to the complex headquarters office:

1. Sam O. Drake, Jr., Project Leader, GM-485-14, EOD 01/09/95.
2. Allan W. Flock, Deputy Project Leader, GM-485-13, EOD 02/02/99, transferred from Arthur R. Marshall Loxahatchee NWR.

3. John R. Robinette, Wildlife Biologist, GS-486-12, EOD 02/29/88.
4. Jim Stockie, Forester / FMO, GS-460-11, EOD 05/29/96.
5. Patricia E. Metz, Refuge Ranger, GS-023-11, EOD 07/07/77.
6. Chester R. Porter, Refuge Law Enforcement Officer, GS-083-7, EOD 10/13/85.
7. Matthew Bryant, Refuge Law Enforcement Officer, GS-083-7, EOD 02/28/94.
8. Robin R. Gay, Office Assistant, GS-303-7, EOD 01/26/87.
9. Gail Stewart, Secretary, GS-318-5, EOD 01/10/94.
10. Chris Graves, Student Trainee, GS-499-5, EOD 05/23/99.

Savannah Coastal is fortunate to be staffed with a permanent fire crew that conducts prescribed burning and wildfire suppression activities on the entire complex and within Fire Management District II. The District includes Savannah Coastal Refuges, ACE Basin NWR, Cape Romain NWR, Carolina Sandhills NWR, Pee Dee NWR and Santee NWR. The fire crew reports for duty at Savannah NWR. They include:



Pictured left to right are Ricky Owen, Troy Phelps, William Poole, Keith Penrose, and Michael Coley (top back), Amy Bess (Not Pictured) (99-SCR1-GS)

Permanent Full Time

- ▶ Keith Penrose, Fire Control Officer, GS-0462-07, EOD 05/26/97, Savannah NWR.
- ▶ Charles Johnson, Engineering Equipment Operator, WG-5716-08, EOD 05/26/97, Savannah NWR.

Career Seasonal

- ▶ Troy Phelps, Forestry Technician, GS-0462-05, EOD 01/03/99.
- ▶ Ricky Owen, Forestry Technician, GS-0462-04, EOD 03/02/93, Savannah NWR.
- ▶ William Poole, Forestry Aid, GS-0462-03, EOD 06/07/98, Savannah NWR.
- ▶ Amy Bess, Forestry Technician, GS-0462-04, EOD 04/25/99, Savannah NWR.

Mr. Poole was converted to career seasonal appointment on 03/14/99. Mr. Mike Coley was also converted to a career seasonal appointment at that time. Ms. Bess was selected for a career seasonal position from the National Park Service, Grand Canyon National Park, Arizona in May of the year. Mr. Phelps was originally brought on as a GS-4, temporary seasonal in January of 1999, He returned to his GS-6 Engine Captain's position with the Bureau of Land Management in California in April of the year. He returned in November to his temporary position and was converted to a GS-05 career seasonal position on December 24th.

Resigned

- ▶ D. Michael Coley, Forestry Technician, GS-0462-03, EOD 06/07/98, Savannah NWR.
Mr. Coley resigned his position on 05/28/99 to pursue a private business venture.

Training

The following table outlines fire related training and training completed by the fire staff for 1999.

1999 Fire & Fire Staff Training

<u>Employee</u>	<u>Course</u>	<u>Date</u>	<u>Location</u>
Johnson, Charles	S-131, Advance Firefighter	1/12-1/13	Gautier, MS
Owen, Rick	S-131, Advance Firefighter	1/12-1/13	Gautier, MS
Penrose, Keith	New Employee Orientation	1/25-1/28	Atlanta, GA
Stockie, James	LE Refresher	2/2-2/26	Quincy, FL
Phelps, Troy	PLDO Training	3/4-3/5	Dillard, GA
Coley, Mike	Light Engine Workshop	3/23-3/24	Savannah NWR, SC
Owens, Rick	Light Engine Workshop	3/23-3/24	Savannah NWR, SC
Poole, Jesse	Light Engine Workshop	3/23-3/24	Savannah NWR, SC
Ranger, Peter	Light Engine Workshop	3/23-3/24	Savannah NWR, SC
Owen, Rick	Jackson Hotshot Preseason	5/17-5/28	Jackson, MS
Poole, Jesse	Jackson Hotshot Preseason	5/17-5/28	Jackson, MS
Penrose, Keith	Level II, COR/CORT Inspector	6/22-6/24	Savannah, GA

Volunteer Program

The Savannah Coastal Refuges (SCR) volunteer program is administered by refuge ranger Metz from the Savannah Coastal Refuges' headquarters. Although some volunteers confined their work to a single refuge, others alternately worked on several as needed to provide management support.

The hours logged by 115 volunteers in 1999 (4,339 hours) were only 60 hours short of the total contributed by 121 volunteers in 1998. The slight decline in hours, and volunteer numbers, could be attributed to the cancellation of one Clean Coast sponsored beach clean-up planned to coincide with National Wildlife Refuge Week; a small craft advisory prevented the group from transporting volunteers to Wassaw NWR.

The bulk of the hours (586) logged in the environmental education category were attributed to the barrier island ecology classes taught on Wassaw NWR in collaboration with the University of Georgia Marine Extension Service (MAREX). Four volunteers served as the primary instructors for these outdoor classes tailored for a diversity of students including seniors enrolled in Elderhostel programs, photographers with the Savannah College of Art and Design's media department, and youngsters participating in MAREX's Sea School summer camp. In addition, volunteer Annie Lindsay Frick conducted one distance learning program (Georgia Science and Medical System - GSAMS network) from the MAREX video studio on June 25. This statewide broadcast featured sea turtle research conducted on Wassaw and Blackbeard Island NWRs.

Another significant volunteer contribution to the environmental education program was made at Harris Neck NWR on June 18. Armstrong Atlantic State University conducted its annual Teachers-Environment-and-Free-Enterprise (TEFEE) workshop on the refuge under the direction of volunteer Dr. Lloyd Newberry, who also serves as the university's Education Department head. The day-long field study culminated with the class of 30 Georgia secondary school teachers viewing the active wood stork rookery at Woody Pond. This year, the Youth Conservation Corps workers and their crew leader, John Metz, were invited to accompany the class, affording the YCCs an opportunity to learn more about the refuge's wildlife resources.

Twenty four volunteers supported wildlife management activities on the Savannah Coastal Refuges (SCR). They responded to staff biologist Robinette's appeal for assistance with wood duck banding at Savannah NWR; painted bunting research at Blackbeard Island, Harris Neck, Pinckney Island, and Wassaw NWRs; expansion of the winter waterfowl surveys; monitoring of nesting storks at Harris Neck NWR; continuation of the regular SCR wading bird rookery counts; broadening the Manomet Bird Observatory and Western Hemisphere Shorebird Reserve Network surveys to meet their designated seven-month shorebird survey schedule; and greater coverage of SCR beaches during annual piping plover surveys.

Interpretive tours were provided by 19 volunteers who accommodated groups including Boy Scout troops; The Nature Conservancy; National Audubon Society (chapters from Hilton Head Island, Fripp Island, and Charleston, South Carolina; Savannah, Atlanta, and Brunswick,

Georgia); The Rotary Club; Charleston County Parks and Recreation Commission; Clean Coast; and classes from local private schools. Few tours were provided to public school groups as budgetary constraints all but eliminated field trips which required busing.

Special events scheduled to commemorate Earth Day, International Migratory Bird Day, CoastWeeks, National Fishing Week, National Wildlife Refuge Week, and the inauguration of the Colonial Coast Birding Trail (CCBT) were managed almost exclusively by volunteers. In support of NWR Week, they helped with administrative activities such as mailing information and passes to the prospective Savannah NWR River Adventure participants; they prepared program bulletins and media information packets for the raptor shows held at Harris Neck and Pinckney Island NWRs; and they served as on-site facilitators at all the events. Volunteers offered interpretive and birdwatching tours at Harris Neck NWR in conjunction with the CCBT inauguration; at Pinckney Island and Savannah NWRs during NWR Week. CoastWeeks '99 drew more than 50 volunteers to Pinckney Island and Wassaw NWRs for litter patrols. This event on Pinckney Island, cosponsored by The Sierra Club-Nancy Cathcart Group and Outside Hilton Head, involved a flotilla of kayaks used to access the refuge marshland and waterfront which was combed for debris. Participants in both refuge patrols recorded the type and quantity of marine debris collected. All data was submitted to the Center for Marine Conservation, which promotes coastal clean-ups as annual CoastWeeks events.

Volunteer Lauree San Juan, who also serves as coordinator of the Audubon Refuge Keeper (ARK) program for the Ogeechee Audubon Society, continued efforts to complete a series of Savannah Coastal Refuges t-shirts. Longwater and Company, a Savannah-based international advertising firm, again offered their services in the production of Harris Neck and Pinckney Island NWR shirt designs. Volunteer Kitty Strozier, the company's top graphic artist, completed all silk screen design work and the new shirts were available for sale during NWR Week. Profits from the sale of the Savannah NWR t-shirt, introduced in 1998, covered the production costs of the new shirts. Advance sales of these were sufficient for the ARK program to bolster the financial commitment made by the Sierra Club-Coastal Group (Savannah, Georgia) to contract Bull River Marina for the NWR Week boat excursions into Savannah NWR's waterways.



This volunteer will have to log a few years of service before he can fill out the new refuge t-shirt. (99-SCR2-PEM)

Volunteers were invaluable to the outreach mission of the Savannah Santee PeeDee and Altamaha Ecosystems. They implemented ecosystem outreach priority plans, such as development of Partners in Flight education programs. Diana Churchill, SCR's volunteer outreach coordinator, attended the Georgia Partners in Flight meetings, and collaborated with Georgia Department of Natural Resources Nongame Wildlife Natural Heritage Section to develop traveling neotropical migratory bird teacher's "tool boxes." These kits were available on loan to teachers throughout the state of Georgia. Diana also utilized the boxes in pre-field trip sessions held in the classroom before students visited Savannah NWR. Over 200 children were included in these sessions in 1999.

Savannah NWR volunteers were instrumental in organizing an Audubon Refuge Keepers (ARK) workshop at the Savannah Coastal Refuges headquarters on May 15. Volunteer Lauree San Juan, the Ogeechee Audubon Society's ARK program chair, coordinated a series of meetings between Ranger Metz and Lora Wondolowski, director of National Audubon's Wildlife Refuge Campaign and ARK Program, to prepare for the workshop. Volunteers San Juan, Dave Chafin, John Stafford, and Mary Gray assisted with planning an agenda, a participants' list, and a field trip to Savannah NWR. As a result of their efforts, six Audubon chapters from South Carolina and Georgia and managers from the Savannah Coastal Refuges, Cape Romain, and Carolina Sandhills NWRs attended the workshop. The group succeeded in generating many ideas for future partnerships between Audubon chapters and refuges that ranged from performing bird and biological surveys to leading environmental education projects. The ideas generated created the foundation for developing other ARK groups, in addition to strengthening the newly established Ogeechee Audubon group.

VOLUNTEER SERVICES ON SAVANNAH COASTAL REFUGES, 1999

<u>Work or Service Provided</u>	<u>Hours Volunteered</u>
Bird Banding	85.0
Cultural Resource Management	11.0
Environmental Education	586.0
Fire Management	21.0
Hunts	188.0
Interpretive Services	124.0
Land Acquisition Support	1.7
Law Enforcement Support	13.0
Mowing	39.0
Nest Structures	38.0
Outreach	267.1
Photography	62.0
Pest, Predator, Exotic Control	113.0
Visitor Services	1,661.7
Studies & Investigations	67.0
Surveys & Censuses	856.5
Tours	347.1
Upland Restoration	166.0
Water Level Management	24.0
Total Hours	4,339.1

Easements

The complex administers 16 Farmers Home Easements in six counties in southeast Georgia. The counties include Burke, Jenkins, Emanuel, Screven, Tattnall, and Wheeler. A total of 810 acres are under some form of restrictive easement and are posted with Service boundary signs. These tracts range in size from three to 217 acres and are difficult to administer because of their distance (45-100 miles) from Savannah.

Fee title lands

There are two tracts of land that were given to the Service by Farmers Home in fee title since no private landowner was interested. One tract is 104 acres in Tattnall County and the other tract is 196 acres in Emmanuel County. Both have been posted with refuge boundary signs.

Off refuge activities

Refuge Manager Drake and other staff members continued to participate in the "Georgia Coastal Barrier Islands Manager Council"--a loosely organized group of individuals who manage state, federal, and private coastal islands on the Georgia coast. The group formed in 1997 with the initial meeting hosted by the Service at Blackbeard Island NWR. The only meeting during 1999 included Cumberland Island on February 5, 1999.

The South Lowcountry Task Force is a group of representatives from non-government organizations, private landowners, plus state and federal agencies committed to the goal of preserving a historic lifestyle characterized by ample fish and wildlife habitat and resources. It is one of five focus areas along coastal South Carolina formed originally to focus on needs of waterfowl and wetland dependent species under the North American Waterfowl Management Plan. The group did not meet during 1999. Refuge Manager Sam Drake is the Service representative at these meetings which normally occur a few times each year.

Savannah Coastal Refuges' staff participated in numerous off-refuge programs involving conservation organizations, civic groups, community leaders, and representatives from state and local governments, in addition to attending meetings sponsored by the Service and state conservation agencies.

On June 1, Ranger Metz and volunteer Diana Churchill attended the Georgia Partners in Flight (PIF) outreach committee meeting at Georgia Southern University. Members of the committee collaborated to develop traveling neotropical migratory bird "tool boxes" for teachers. These kits were completed on August 5, when volunteer Diana Churchill and John Stafford attended the next PIF outreach committee meeting held at the Georgia Department of Natural Resources' (DNR) Nongame-Endangered Wildlife Program office in Forsyth, Georgia.

Project Leader Drake and Ranger Metz attended the February meeting of the Sierra Club - Nancy Cathcart Group held at the Palmetto Electric Company office on Hilton Head Island. Project Leader Drake was invited to speak on threats to the Savannah National Wildlife Refuge, specifically the impact of the proposed harbor deepening project, and the refuge's possible expansion. Ranger Metz was asked to discuss volunteer opportunities and recreational programs on the Savannah Coastal Refuges.

Planning the Colonial Coast Birding Trail (CCBT) was an effort which demanded the sustained support of Ranger Metz throughout the development phase. On September 8, Ranger Metz attended a meeting called by the Georgia Department of Natural Resources (DNR) to finalize plans for the inauguration of the trail on October 9, 1999. Terry Johnson, program manager of DNR's Nongame-Endangered Wildlife Program, and Jeanne Bohannon,

DNR's education and information officer, reviewed the schedule of inaugural events, and emphasized the expected economic impact to communities along the trail from anticipated increased tourism. Representatives from Georgia Southern University, contracted by DNR to conduct economic impact surveys, explained the methods being employed to collect baseline data relative to CCBT use. Chambers of commerce in coastal communities and the Georgia tourism industry will benefit from the surveys as they develop marketing strategies. Ranger Metz provided a summary of the activities planned at Harris Neck NWR to commemorate the CCBT inauguration day. Since the trail opening was planned to coincide with NWR Week, extra attention was automatically given to Harris Neck NWR, one of six sites from 18 comprising the CCBT showcased during the dedication.

In February, Savannah Country Day School students became the first Chatham County, Georgia participants in the Federal Junior Duck Stamp art contest. Ranger Metz collaborated with the school's art and science teachers to facilitate the event, and served as the judge for the competition. The entries selected as first, second, and third place winners were sent to Okefenokee NWR, along with other Georgia junior contest entries, where finalists were chosen to compete in the final phase of the national contest held at the U. S. Department of the Interior office in Washington, D. C.



Fifth grader Mark Nagleberg's winning rendition of a mallard, inspired by the mounted specimen in the background, was photographed for a Savannah Morning News feature story. (99-SCR3-PEM)

Savannah Coastal Refuges fire crew and staff spent 160 man-days on off refuge fire assignments at 16 incidences in four states serving in four different positions. Firefighters Rick Owen and Jesse Poole spent their fire assignments with the Type 1, Jackson Hotshot Crew, gaining valuable hand crew experience.

1999 Off-Refuge Fire Details

Employee	Position	Incident	Dates
K. Penrose	CRWB	Tunnel Ridge, NC (#4238)	4/10 - 4/20
C. Johnson	DOZ1	Hickory Island, OKR, GA (#4393)	4/20 - 5/10
J. Bentley	DOZ1	Hickory Island, OKR, GA (#4393)	5/12 - 6/3
C. Johnson	DOZ1	Hickory Island, OKR, GA (#4393)	6/3 - 6/18
R. Owen	FFT2	Fairground, NV	7/9-7/10
R. Owen	FFT2	Clover, NV	7/11
R. Owen	FFT2	Lang Syne, NV	7/13-7/16
R. Owen	FFT2	Pilot, NV	7/17-7/18
R. Owen	FFT2	Fire Cracker, NV	7/19-7/22
J. Poole	FFT2	Sutro, NV	8/26-9/2
J. Poole	FFT2	China Gulch, NV	9/6-9/7
J. Poole	FFT2	Chicken Ranch, NV	9/8
J. Poole	FFT2	Bruneau, NV	9/9-9/12
J. Poole	FFT2	Tacoma, NV	9/13-9/14
J. Poole	FFT2	Red Rock, NV	9/15-9/16
R. Owen	HECM	Bankhead Complex, AL	9/7-9/30
V. Scott	HECM	Cumberland Is, GA	9/8-9/12
A. Bess	HECM	LaJolla Incident, CA	10/4-10/10

Ecosystem

SCR is located in two ecosystems. Pinckney Island, Savannah, Tybee, and Wassaw refuges are in the Savannah-Santee-Pee Dee (SSPD) Ecosystem. Harris Neck, Blackbeard Island, and Wolf Island refuges are in the Altamaha Ecosystem. The SSPD met January 26-27, June 2-3, and September 22.

Team meetings were held on February 17 and August 18-19. Pat Metz served as the co-team leader for the Outreach Committee for both ecosystems.

Ray Porter serves as the Region 4 Drug Task Force leader for refuges. As such he purchases equipment and obtains training for the task force and coordinates with refuge managers to determine enforcement efforts on field stations on drug related issues. Ray Porter and Matt Bryant served as instructors during law enforcement refresher training sessions during February 22-26 and March 1-5.

The Savannah Coastal Fire crew with assistance from the refuge staff completed 50 prescribed burns on 6 refuges within the Savannah Pee Dee Eco-system and 2 refuges in the Altamaha Ecosystem. We also prescribed burned 12 units at Shaw AFB in Sumpter County, South Carolina. This was done in support of their Red-cockaded woodpecker and

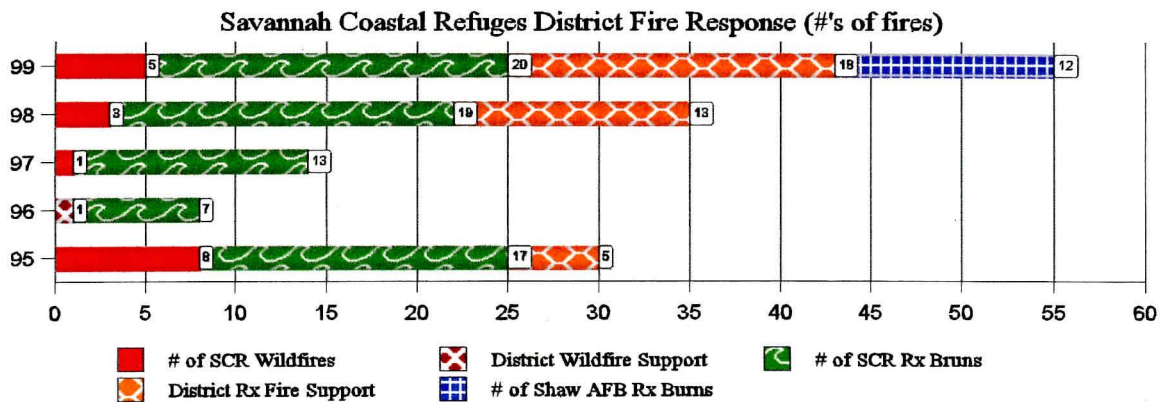
longleaf/wiregrass management. A total of 7,703 acres were treated with prescribed fire, by members of the Savannah Coastal fire crew. This continues the increased activity by the fire crew in supporting prescribed fire goals and objectives within our two ecosystems and with cooperating agencies.

Prescribed Burns 1999

	Date	Station	Unit	Acres	Type	Fire #
1	1/13	Savannah NWR	I-12/13	459.9	hand	4127
2	1/13	Harris Neck NWR	C-6	43.1	hand	4128
3	1/13	Harris Neck NWR	C-16	83.7	hand	4129
4	1/21	Blackbeard Island NWR	Toar Savannah	325.0	aerial	4150
5	2/5	Savannah NWR	I-1	238.8	aerial	4181
6*	2/5	Carolina Sandhills NWR	15/06	250.0	aerial	4182
7*	2/5	Carolina Sandhills NWR	06/08	240.0	aerial	4183
8	2/6	Savannah NWR	I-4/5	323.6	aerial	4186
9	2/12	Savannah NWR	4/5 dike	15.0	hand	4267
10*	2/14	Carolina Sandhills NWR	05/02A	348.0	aerial	4213
11*	2/14	Carolina Sandhills NWR	09/03	441.0	aerial	4214
12*	2/14	Carolina Sandhills NWR	08/06	690.0	aerial	4215
13*	2/14	Carolina Sandhills NWR	04/03	312.0	aerial	4216
14*	2/16	Carolina Sandhills NWR	01/05	51.0	hand	4224
15*	2/22	Carolina Sandhills NWR	18/04	648.0	aerial	4259
16*	2/22	Carolina Sandhills NWR	11/05	618.0	aerial	4260
17*	2/22	Carolina Sandhills NWR	11/01A	208.0	aerial	4261
18*	2/22	Carolina Sandhills NWR	06/01	161.0	aerial	4262
19*	2/23	Carolina Sandhills NWR	11/02	124.0	aerial	4268
20*	2/23	Carolina Sandhills NWR	04/08	43.0	hand	4269
21*	2/23	Carolina Sandhills NWR	01/05B	20.0	hand	4270
22	3/2	Harris Neck NWR	C-8	97.5	hand	4289
23	3/2	Harris Neck NWR	Pile #1	0.1	hand	4310
24	3/3	Blackbeard Island NWR	Campground	5.0	hand	4307
25	3/4	Blackbeard Island NWR	Pile #1	0.2	hand	4308
26	3/5	Blackbeard Island NWR	North Trail	100.0	hand	4309
27	3/12	Santee NWR	Caddo C-2a	89.0	hand	4325
28	3/19	Santee NWR	Caddo C-2b	208.0	hand	4363
29	3/30	Savannah NWR	T-29k	35.0	hand	4380
30	4/7	Pinckney Island NWR	Boat Ramp	73.2	hand	4389
31	4/8	Savannah NWR	Onslow Pile	0.2	hand	4390
32	6/15	Savannah NWR	I-6 test	2.0	hand	4543
33	7/20	Shaw AFB	Poinsett Unit 7	88.0	hand	4632
34	7/21	Shaw AFB	Poinsett Unit 6	45.0	hand	4633
35	7/21	Shaw AFB	Poinsett Unit 8	14.0	hand	4634
36	7/21	Shaw AFB	Poinsett Dry Pond	25.0	hand	4635
37	7/21	Shaw AFB	Poinsett Unit 2	46.0	hand	4636
38	7/22	Shaw AFB	Poinsett Unit 1	14.5	hand	4637
39	7/22	Shaw AFB	Poinsett Unit 4	15.0	hand	4638
40	7/22	Shaw AFB	Poinsett Unit 3 (part)	60.0	hand	4639
41	7/23	Shaw AFB	Poinsett Unit 3 (part)	100.0	hand	4639
42	11/04	Harris Neck NWR	Plot C-10	10.0	hand	4700
43	11/05	Savannah NWR	I-18	60.0	hand	4701
44*	11/05	ACE Basin NWR	WM-G9AB-99	240.0	hand	4714
45	11/15	Savannah NWR	I-16	160.0	hand	4719
46	11/16	Shaw AFB	Poinsett Cedar Bay	59.0	hand	4795
47	11/17	Shaw AFB	Poinsett Unit 12a	10.0	hand	4796
48	11/17	Shaw AFB	Poinsett Unit 12c	30.0	hand	4797

	Date	Station	Unit	Acres	Type	Fire #
49	12/13	Savannah NWR	I-4/5	323.6	hand	4779
50	12/15	ACE Basin NWR	WMV-B1-299	150.0	hand	4775
		8 stations	50 units	7703.4	acres	
*Rx	burn	boss not provided by	Savannah Coastal	Refuges		

This year's prescribed burn production show the impact of our growing workload and commitment to assisting the other stations of Fire Management District II and interagency cooperation. The following chart shows a five year fire work history for the Savannah Coastal Fire Team.



Partnerships

As part of the long term management plan for spoil disposal areas for the Savannah Harbor, nesting islands are planned in each area as well as constructing a three acre nesting island off the coast. John Robinette served as the station representative on meetings concerning nest island design and construction. The meetings involved representatives from the Corps of Engineers and Fisheries and Wildlife departments of the states of Georgia and South Carolina.

John Robinette serves as station representative on Georgia's state sea turtle committee and a southeast wood stork advisory committee.

Sam Drake and Allan Flock participated in quarterly harbor maintenance meetings. Hosted by the local assurer for the harbor, Chatham County, the committee reviews all activities related to harbor maintenance, dredging, and spoil disposal areas. Three of the active disposal areas are found on refuge lands. Area IN (Onslow Island) and Area 2A (Hutchinson Island) are part of Savannah refuge and Oysterbed Island is on Tybee refuge.

Sam Drake attended meetings on both the Georgia and South Carolina chapters of the Wildlife Society.

FMO Jim Stockie attended the following interagency meeting relating to the fire program:

- ▶ Georgia Prescribed Fire Council Annual Meeting, Tipton, GA
- ▶ NWCG Smoke Management Meeting, Phoenix, AZ
- ▶ SE Fire Cache Coordination Meeting, Onieda, TN

The Georgia Interagency Coordination Meeting was canceled due to high fire danger throughout the state last spring.

FCO Keith Penrose attended the SE Interagency Cache meeting in Tennessee.

Administration

Annual funding for the seven refuges comes in one package for the complex. All budgeting, purchasing, and accounting is done from the headquarters office in Savannah. The same holds true for all personnel matters.

Six year funding comparison (In thousands)

FY	Refuge O & M	Endangered Species	Fire	Total Base	Special Funding	Total
99	1164.6	32.0	257.0	1453.6	763.3	2216.9
98	1169.8	62.0	256.1	1487.9	781.6	2269.5
97	1079.9	12.0	237.5	1329.4	799.6	2129.0
96	996.0	12.0	264.9	1008.0	187.3	1460.2
95	935.7	22.0	296.0	957.7	213.7	1467.4
94	897.0	12.0	227.8	909.0	217.8	1354.6

Funding was included in the station budget to cover salary, travel, training and other costs for the regional archeologist stationed at SCR.

FY99 special funding (in thousands) was designated for the following purposes:

Project	Total	Fund Source
Station Funds Needed for Barnard-Keinoth	32.0	1113
Initial Allocation-Base Operations	1076.4	1261
Volunteer Support	3.6	1261
Firearms instructor-Porter & Bryant	5.0	1261
FY 97 Ecosystem add., Wetlands Management for Endangered Species	39.6	1261
Additional Salary Funds for Kanaski	6.0	1261
Contaminant Cleanup (UST)	21.0	1261
Rehab. Bulkhead on Blackbeard Island	82.6	1262 MMS

Replace Support Braces for Dock & Boardwalk on Blackbeard Island	6.6	1262 MMS
Replace Batwing Mower for Pinckney Isl.	10.0	1262 MMS
Pinckney Island Interpretive Panels	5.0	1261
Co-op Program - Chris Graves	8.0	1261
Remove 6 USTs	65.0	1262 MMS
Replace Braces on Fishing Piers & Repair Walkways/Docks at Harris Neck	25.0	1262 MMS
Replace Dump Truck at Harris Neck	30.0	1262 MMS
Repair East Marsh Bridge	4.1	1262 MMS
Replace Well Used to Supply Water	10.0	1262 MMS
Replace LE Vehicle	30.0	1262 MMS
Rehab Barge Mooring at Wassaw	50.0	1262 MMS
Misc. Small Projects	60.0	1262 MMS
4 Enrollees	7.2	1262 YCC
Road Repair/Cleanup/Other	25.6	2952
Levee Repair/Road Repair/Debris Cleanup	219.7	2962
Road Repair at Pinckney Island	58.5	2962
Staffing Allocation	226.5	9251
Support Costs Including Maintenance	45.0	9251
Engine Chassie	34.0	9251
Staffing Permanent - ½ Stockie	30.5	9263

FMO Stockie attended the first U.S. Fish and Wildlife Service National Fire Management meeting held in Las Vegas, NV. He was also on the team that help scope and plan the agenda for that meeting.

A regional Fire Management meeting was held in Atlanta, Georgia in August. This meeting was the hand off for the new fire management program - Firebase. This program is the vehicle through which we input our prescribed burn projects, personnel, equipment and facilities request through. FMO Stockie attended for the Complex and will be inputting FY-01 prescribed burn projects into the system next spring.

Complex (major acquisitions)

The complex was offered \$33,000 of year end money to spend on a chassis for a new type 6 fire engine. A new Ford F-450, turbo diesel was order and it is expected to be delivered next April.

Technical Assistance

In March of the year FMO Stockie, FCO Penrose and FF Phelps put on a Light Engine Workshop. All refuges within Fire Management District II were invited to attend with their engines. Staff from Carolina Sandhills, Cape Romain and Santee, Wassaw NWR's attended along with members of the Savannah Coastal Fire Crew.

In May of the year FMO Stockie assisted Refuge Biologist Robinette in providing input into the Sea Island Corporation's land management plan. Sea Island is a major developer on Jekyll Island, Georgia. Some of the issues address were wood stork impacts, wildfire and prescribed burning.

1999 Fire Training Courses Taught

Employee	Course	Date	Location
Stockie, J	Light Engine Workshop	3/23-24	Savannah NWR
Penrose, K.	Light Engine Workshop	3/23-24	Savannah NWR
Phelps, T.	Light Engine Workshop	3/23-24	Savannah NWR

Savannah Coastal Refuge Fire Management agreed to assist Shaw Air Force Base, Natural Resources Section with prescribed burning on their electronic warfare range. The range encompass nearly 10,000 acres of longleaf pine habitat. This habitat also supports wire grass and the endangered red-cockaded woodpecker. The Air Force transferred \$20,000 to Savannah Coastal in return for burning 1,500 to 1,700 acres. By December 31 of the year we had completed 12 burns for 506 acres. (See the above prescribed fire and fire occurrence charts)

Law Enforcement

Refuge officers at the Savannah Coastal refuges were kept busy by a variety of problems this year. SCR officers set up several refuge checkpoints this year with some success, and used a county K-9 during the Wassaw Is. Refuge deer hunt. As in previous years, alcohol violations were the most encountered problem. Although some drugs were found during the checkpoints no drugs were found at the Wassaw refuge hunt. Overall, drug arrests were down for the second year in a row. Maybe, people are beginning to get the point.

Officers Porter and Bryant took an active part in several different training assignments this year. Both officers assisted with the in-service training at Lively Law Enforcement center. Officer Porter was assigned to teach at the Refuge Officer Basic School at the National Conservation training center in West Virginia, and Officer Bryant assisted with several MOCC boating courses.



A county K-9 unit was used to inspect hunters camping equipment on the Wassaw NWR deer hunt. Unlike previous years, no drugs were found. (99-SCR4-RP)

The Savannah Refuge logged several traffic accidents this year. Luckily, there were no fatalities. However, several of the accidents involved tractor trailer rigs that ended up in the fresh water impoundments that required HAZ-MAT clean up.



This eighteen-wheeler overturned, rupturing it's fuel tank, spilling fuel into one of the fresh water impoundments. The company was charged with the clean-up costs. (99-SCR5-RP)



Officer Porter apprehended an individual placing this illegal fish trap in one of the Savannah Refuge's water ways. (99-SCR6-BC)

Reptile collecting has been a problem at the Coastal Refuges for some time and officers have contacted individuals from several different states in past years looking for snakes. Officers found an area on the Savannah Refuge near a major highway where someone had placed several pieces of tin for the purpose of collecting snakes. The area was placed under surveillance for several weeks without results.



Eight pieces of tin were strategically placed in an area closed to the public by snake collectors. (99-SCR7-RP)

The following is a list of violations for the SCR:

CATEGORY OF VIOLATIONS	# OF VIOLATIONS
CFR TITLE 50 PART 20	
MIGRATORY BIRD HUNTING:	
Taking Migratory birds with boat under power	10
Possession of Raptor parts	3
Total	13
CFR TITLE 50 PART 26	
Trespass	19
Total	19
CFR TITLE 50 PART 27	
PROHIBITED ACTS	
Drive without license	12
Open Alcoholic beverage container	33
Under-aged drinking	3
Possession of a controlled substance	9
Operating a boat without lights	10
Insuf. PFDs	20
Possession of a firearm	10
Operating a boat without registration	7
Operating a boat without proper safety equipment	4
Negligent boating operation	1
TOTAL	109
CFR TITLE 50 PART 33	
SPORT FISHING	
No fishing license	41
Fishing with illegal tackle	16
Possession of undersized fish	29
Illegal harvesting of shellfish	10
TOTAL	96

CFR TITLE 50 PART 33	
HUNTING	
Hunt without license	4
Violation of Refuge specific hunt regs.	7
TOTAL	11
Total Refuge violations	237

Miscellaneous

Refuge Revenue Sharing Act payments accounting to over \$200,000 were paid to counties in two states as follows:

County	Amount
Chatham County, Georgia	\$68,207.00
McIntosh County, Georgia	\$107,606.00
Emanuel County, Georgia	\$2,028.00
Tattnall County, Georgia	\$132.00
Beaufort County, South Carolina	\$67,849.00
Jasper County, South Carolina	\$19,734.00
Effingham County, Georgia	\$11,436.00
Total	\$276,992.00

U.S. Fish & Wildlife Service

Savannah

Coastal Refuges



The chain of national wildlife refuges (NWR) comprising the Savannah Coastal Refuges complex extends from Pinckney Island NWR near Hilton Head Island, South Carolina, to Wolf Island NWR near Darien, Georgia. Between these lie Savannah (the largest unit in the complex), Wassaw, Tybee, Harris Neck, and Blackbeard Island refuges. Together they span a 100-mile stretch of coastline and total 55,483 acres. The Savannah Coastal Refuges are administered from headquarters located in Savannah, Georgia.



This blue goose, designed by J.N. "Ding" Darling, has become the symbol of the National Wildlife Refuge System.



© Karen & John Hollingsworth

Great egret

The Lowcountry

Bordered on the west by sandhill ridges and on the east by the Atlantic Ocean, lies a band of low land extending from Georgetown, South Carolina, to St. Mary's, Georgia, known locally as the Lowcountry. For over two centuries the diversity of fauna and flora within this region has attracted such naturalists as Alexander Wilson, Mark Catesby, John James Audubon, and William Bartram.

While the Carolina parakeets and ivory-billed woodpeckers which once inhabited the freshwater swamps within this coastal lowland have vanished, many rare and uncommon species remain. The southern bald eagle still soars majestically over the remnants of vast bottomlands such as those contained within the Savannah National Wildlife Refuge. Egrets and herons, once hunted nearly to extinction by the plume hunters of the early 1900's, continue to nest in rookeries such as those on Harris Neck National Wildlife Refuge.

The variety of birdlife within the Lowcountry is enhanced by its location on the Atlantic flyway. During the winter months, thousands of mallards, pintails, teal and as many as ten other species of ducks migrate into the area, joining resident wood ducks on the coastal refuges. In the spring and fall, transient songbirds and shorebirds stop briefly on their journey to and from northern nesting grounds.

Among these casual visitors are the diminutive warblers (magnolia, prairie, blackpoll...) and sandpipers (buff-breasted, white-rumped, pectoral...). Many migrant songbirds and shorebirds terminate their southern journey and spend the winter. The hermit thrush, ruby-crowned kinglet, yellow-rumped

*Cover photo:
Great blue heron
Gerald Tollison*

warbler, black-bellied plover, and sanderling, are a few of the winter residents.

In the heat of the humid summer months, the Lowcountry's native flora ripens. The sweet magnolia blossoms, symbolic of the deep South, are abundant and lush beards of Spanish moss thicken with every rain. The live oak trees sport vibrant green manes of resurrection fern.

Visions of the Old South when rice was king in the Lowcountry best come to mind during these lazy summer months. The plantation homes may be gone, but the cultivated lands which made them possible live on. Though rice is no longer grown, the old fields have found new service as habitat for waterfowl and wading birds.



Nothing remains of Laurel Hill Plantation which once stood at the present main entrance to Savannah National Wildlife Refuge, but many of the dikes, originally built by slaves and itinerant Irishmen, and modernized rice field trunks (water control structures) continue to serve in management of the historic Lowcountry's marshland.



David E. Goeke

Barrier Islands

Barrier islands are so named because they form a barrier between the ocean and the mainland. They are an integral part of a continuous chain of islands and beaches, stretching from Maine to Texas that protect the coast from hurricanes and storms.

Nowhere can there be found a more completely developed system of large barrier islands than on the Georgia Coast. The Spanish called them Guale, the Golden Isles.

Anyone who has spent time at the beach is at once aware of two major forces which affect barrier islands—wind and tides. The energy released by these natural elements is awesome indeed, and has battered our coastline unceasingly for thousands of years. To counter this force, nature has come up with a remarkable defense system—sand. Sand offers enough resistance to absorb and dissipate the tremendous energy of coastal storms. Thus, man and his structures on the mainland are protected from the full violence of storms by the barrier islands.

Behind the barrier islands lie salt marshes, described by some as the world's most productive acreage.

Here nutrients from both fresh and salt water mix, providing organic material that moves into the sea to become a major link in the marine food chain. These marshes are also the nurseries for countless marine organisms, including shrimp, oysters, crabs, striped bass, and other commercial and sport species that are particularly important to the coastal economy. Without the protection afforded by the barrier islands, the tidal creeks and salt marshes would be no place for the delicate juvenile stages of so many species.

Such an abundance of life in the salt marsh invites other animals to rest, feed or nest. Located on the Atlantic Flyway, the islands are important to migrating waterfowl, especially those displaced from the rapidly disappearing marshes further up the Atlantic coast. The islands themselves provide ideal habitat for a wide variety of plants and animals, including endangered or threatened species

like the American alligator, piping plover, wood stork, loggerhead sea turtle and southern bald eagle.

Pinckney Island National Wildlife Refuge

Pinckney Island NWR, established December 4, 1975, was once included in the plantation of Major General Charles Cotesworth Pinckney, a prominent lawyer active in South Carolina politics from 1801 to 1815. Few traces of the island's plantation life in the 1800's exist today.

Habitat

The 4,053-acre refuge includes Pinckney Island, Corn Island, Big and Little Harry Islands, Buzzard Island and numerous small hammocks. Pinckney is the largest of the islands and the only one open to public use. Nearly 67% of the refuge consists of salt marsh and tidal creeks. A wide variety of land types are found on Pinckney Island alone: salt marsh, forestland, brushland, fallow field and freshwater ponds. In combination, these habitats support a diversity of bird and plant life.

Wildlife Observation/ Hiking/Bicycling

Studying, viewing and photographing the island's wildlife and scenery are popular activities throughout the year. Over fourteen miles of trails are open to hiking and bicycling. No motorized vehicles are allowed north of the public parking lot.

Hunting

When necessary for management purposes, a deer hunt is held on Pinckney Island (for hunt dates and regulations contact the Coastal Refuges' office).

Directions

The refuge entrance is located on U.S. 278, 18 miles east of Hardeeville, South Carolina, or .5 miles west of Hilton Head Island.

Savannah National Wildlife Refuge
Savannah NWR, established April 6, 1927, consists of 27,771 acres of freshwater marshes, tidal rivers and creeks and bottomland hardwoods.



Layne Hamilton



Tupelo Trail

David E. Goeke

Management

The 3,000 acres of freshwater impoundments managed for migratory waterfowl were formerly the rice fields of plantations dating back to the mid or late 1700's. Many of the dikes enclosing these pools were originally built during the rice culture era.

Wildlife Observation

All dikes are open to foot travel during daylight hours, unless otherwise posted, and provide excellent wildlife observation points.

Habitat

About half the refuge is bottomland, composed primarily of cypress, gum and maple species. Access to this area is by boat only.

Waterfowl are most abundant from November through February, while alligators and other reptiles are frequently seen from March through October. Birdwatching opportunities are good all year but are best from October through April when temperatures are mild and many species of waterfowl and other wintering birds are present.

Auto Route, Hiking



Motorists are welcome on Laurel Hill Wildlife Drive, off S.C. 170, which meanders along four miles of earthen dikes through managed freshwater pools and hardwood hammocks. Cistern Trail and other walking routes are also available to the visiting public. From December 1 to February 28, entry into the impoundment area north of S.C. 170 is prohibited to reduce disturbance while wintering waterfowl numbers are at a peak.

Fishing, Hunting

Fishing is permitted in the freshwater pools from March 1 to November 30 and is governed by South Carolina and refuge regulations. The refuge administers deer, feral hog, squirrel, and turkey hunts during the fall and winter. Permits to hunt on the refuge must be obtained from the Coastal office in Savannah.

Directions

Savannah NWR is located on SC-170, six miles south of Hardeeville, South Carolina via US-17 (Exit 5 off I-95); or one mile north of Port Wentworth, Georgia on GA-25/SC-170 (take I-95 Exit 109 to GA-21 South, then east on GA-30 to GA-25 North.)



David E. Goeke

Tybee National Wildlife Refuge

Tybee NWR was established on May 9, 1938 as a breeding area for migratory birds and other wildlife. The majority of the 100 acre-refuge is covered with sand deposits from the U.S. Army Corps of Engineers' dredging activities in the Savannah River. The more stable portions of the island are densely covered with such woody species as eastern red cedar, wax myrtle, and groundsel. Saltwater marsh borders parts of the island. At low tide the shoreline provides a resting and feeding place for many species of migratory birds.

The refuge is located in the mouth of the Savannah River directly opposite Fort Pulaski National Monument which is 12 miles from Savannah on U.S. 80. **Tybee NWR is closed to public use.**



Wassaw National Wildlife Refuge

Wassaw, one of Georgia's coastal barrier islands, was designated a National Wildlife Refuge on October 20, 1969. Unlike many of Georgia's Golden Isles, little development and few management practices have modified Wassaw's primitive character. The 10,053-acre refuge includes beaches with rolling dunes, live oak and slash pine woodlands, and vast salt marshes.

Refuge visitors may enjoy recreational activities such as birdwatching, beachcombing, hiking and general nature studies. The 20 miles of dirt roads on Wassaw Island and seven miles of beach provide an ideal wildlife trail system for hikers. Birdwatching is particularly fruitful during the spring and fall migrations.

The island supports rookeries for egrets and herons, and a variety of wading birds are abundant in the summer months. In summer, telltale tracks on Wassaw's beach attest to nocturnal visits by the threatened loggerhead sea turtles which come ashore for egg laying and then return secretively to the sea.

Deer hunts (both bow and gun) are scheduled in the fall and winter. The Coastal Refuges' office can provide a schedule of hunt dates and issue hunt regulations. The saltwaters of the refuge marshland are open to fishing throughout the year.

Wassaw NWR is accessible only by boat. Both Wassaw and Pine Island are open to the public during daylight hours—**other upland areas are closed.** Transportation to the refuge must be arranged by the visitor. Several local marinas in the Savannah area (at Skidaway Island and Isle of Hope) and a public boat ramp adjacent to the Skidaway Island bridge can serve as launching sites for trips to Wassaw.

Habitat

Wildlife Observation

Harris Neck National Wildlife Refuge

Harris Neck National Wildlife Refuge was established in 1962 by transfer of federal lands formerly managed by the Federal Aviation Administration as a WWII Army airfield. The refuge's 2,762 acres consist of saltwater marsh, grassland, mixed deciduous woods and cropland. Because of this great variety in habitat, many different species of birds are attracted to the refuge throughout the year.

In the summer, thousands of egrets and herons nest in the swamps, while in the winter large concentrations of ducks (especially mallards, gadwall and teal) gather in the marshland and freshwater pools. Over 15 miles of paved roads and trails provide the visitor easy access to these areas. Some portions of the refuge may be closed seasonally to protect wildlife from human disturbance.



Wood storks with downy young

Fishing, Boating

Fishing is allowed in the tidal creeks bordering the refuge. Piers have been constructed for public use on Harris Neck Creek at the refuge entrance. Access to refuge tidal waters and Blackbeard Island can be gained from a public boat ramp located on the Barbour River (at the termination of Harris Neck Road). The Barbour River Landing is open daily from 4:00 am to midnight, or as posted.

Hunting

Deer hunts are managed on the refuge in the fall and winter. Hunters may obtain a schedule of hunt dates and hunt regulations from the Coastal Office.

Directions

To reach Harris Neck, take Exit 67 off I-95 and travel south on U.S. 17 for approximately one mile, then east on Harris Neck Road for seven miles to the main entrance gate.

Habitat

Blackbeard Island National Wildlife Refuge

Blackbeard Island was acquired by the Navy Department at public auction in 1800 as a source of live oak timber for ship building. A Presidential Proclamation in 1940 changed its designation from Blackbeard Island Reservation to Blackbeard Island National Wildlife Refuge. Today, the refuge's 5,618 acres include maritime forest, salt marsh, freshwater marsh, and beach habitat. In 1975, three thousand acres of the refuge were set aside as National Wilderness.

Wildlife Observation, Hiking, Fishing, Hunting

Blackbeard Island offers a variety of recreational activities year-round. Wildlife observation, especially birdwatching, is excellent throughout the year. In winter months, waterfowl utilize the marshland and man-made freshwater pools, while songbirds abound in the wooded acres in the spring and fall. The existing trails and roads provide hikers with scenic paths ideal for nature study. Saltwater creeks which pass through refuge marshland are open to fishing the entire year. Presently, two archery hunts for deer are scheduled on the island in the fall and winter (for exact dates and hunt regulations contact the Coastal Refuges' headquarters).

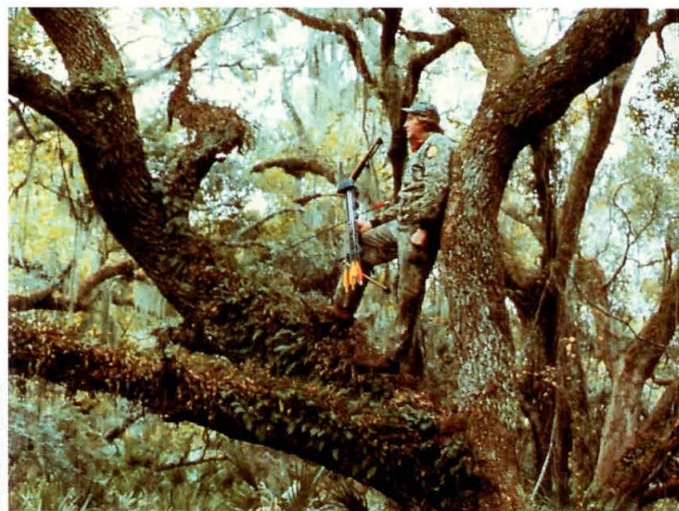


Tommy King

Access

Blackbeard Island is accessible only by boat. Transportation to the island is not provided by the U.S. Fish &

Wildlife Service. Arrangements for trips to the refuge can be made at Shellman's Bluff. To reach Shellman's Bluff, travel south from Savannah on U.S. 17 for approximately 51 miles to Shellman Bluff Road which terminates at Shellman Bluff on the Julienton River. A public boat ramp on Harris Neck NWR (Barbour River Landing) may also be used as a launching site for trips to the island.



David E. Goeke

Blackbeard Island archery hunter

Wolf Island National Wildlife Refuge

Wolf Island NWR, which includes Egg Island and Little Egg Island, was established on April 3, 1930. The refuge consists of a long narrow strip of oceanfront beach backed by a broad band of salt marsh. Over 75% of the refuge's 5,126 acres are composed of saltwater marshes.

Wolf Island NWR was designated a National Wilderness in 1975, therefore no public use facilities are planned on the refuge. Though the refuge's saltwaters are open to a variety of recreational activities, **all beach, marsh, and upland areas are closed to the public.** Visitors must make their own arrangements to reach the refuge. Marinas in the Darien, Georgia area may offer transportation to Wolf Island NWR.



Regulations

Questions regarding specific regulations for individual refuges should be directed to the Coastal office. Here, in brief, are some general regulations:

Defacement, damage, or removal of any government structure, sign, or marker is prohibited.

Feeding, capturing or hunting wildlife is strictly prohibited unless otherwise authorized.

All of the refuge's historical, archaeological, and natural resources are protected. Artifact hunting is not allowed. Do not pick flowers or remove vegetation.

Shell collectors are asked to take no live shells and to limit their collection to a handful or so.

Dogs, cats and other pets are not permitted.

For further information

Call the Savannah Coastal Refuges office during business hours (Monday through Friday, 8:00 am to 4:30 pm; closed on federal holidays: 912/652 4415.

Visit the Savannah Coastal Refuges office located in the Parkway Business Center on Chatham Parkway. To reach the office, take Exit 33-a (Chatham Parkway) off I-16 East to Savannah, Georgia; drive one mile south on Chatham Parkway to the Parkway Business Center. The refuge headquarters occupy Suite 10.

Write to:

Savannah Coastal Refuges
Parkway Business Center, Suite 10,
1000 Business Center Drive
Savannah, Georgia 31405



Equal opportunity to participate in and benefit from programs and activities of the U.S. Fish & Wildlife Service is available to all individuals regardless of physical or mental disability. For more information please contact the U.S. Department of the Interior, Office for Equal Opportunity, 1849 C Street, NW, Washington, D.C. 20240

Savannah Coastal Refuges
Parkway Business Center
Suite 10
1000 Business Center Drive
Savannah, Georgia 31405
912/652 4415

U.S. Fish & Wildlife Service
1-800/344 WILD
<http://www.fws.gov>

May 2000



U.S. Fish and Wildlife Service
Savannah Coastal Refuges
1000 Business Center Drive
Parkway Business Center, Suite 10
Savannah, Georgia 31405
912/652 4415
<http://southeast.fws.gov>

U.S. Fish and Wildlife Service
1 800/334 WILD

June 2000



U.S. Fish & Wildlife Service

Harris Neck

National Wildlife Refuge Hunting Regulations 2000



2000 Harris Neck NWR Bow Hunt Permit

When signed and in your possession, this brochure serves as your Harris Neck bow hunt permit, and acknowledges your understanding of the regulations contained herein.

Signature _____

*Harris Neck NWR
McIntosh County,
Georgia*

Harris Neck is one of over 500 National Wildlife Refuges. The primary objective of a National Wildlife Refuge is to provide habitat for the conservation and protection of all species of wildlife. The harvest of surplus animals is one tool used to manage wildlife populations at a level compatible with the environment, provide recreational opportunities, and protect the use of a valuable renewable resource.

Public hunting on Harris Neck National Wildlife Refuge is permitted on approximately 2,400 acres. Certain areas (marked on the map printed on the reverse side) are closed to hunting.

The regulations listed below supplement the general regulations which govern hunting on the wildlife areas as set forth in Title 50, Code of Federal Regulations. Hunting will be in accordance with applicable state (Georgia) regulations.

*General
Hunting
Regulations*

Federal permits are required for all hunts and must be carried on the person while hunting. All hunters must obtain a permit regardless of age. Permits are non-transferable. Only hunt participants with proper licenses and permits will be allowed on the refuge during the hunt. **A Georgia hunting license is required to hunt feral hogs.**

Hunters 15 years of age or under (youth hunters) must have successfully passed a state-approved hunter education course in order to participate in any refuge hunt. Satisfactory completion of the course must be demonstrated by a card or certificate. Youth hunters must be supervised by an adult 21 years of age or older, and must remain in sight and normal voice contact with the adult. During

refuge hunts, the adult may supervise only one youth.

Personal identification (driver's license, or official state identification card) will be required at check-in.

Hunters may place their stands on the refuge prior to the opening day of each hunt. However, hunters assume all responsibility for the loss or damage of personal property left on the refuge. Stands must be removed by the end of each hunt.

No flagging, blazing, or trail marking devices may be used to locate stands, or for any other purpose.

Deer harvested during scheduled hunts must be checked by refuge personnel before leaving the refuge.

Hunting from a tree into which a metal object has been screwed or driven to support a hunter is prohibited.

The distribution of bait, and hunting over bait, is prohibited.

Participating in "man-drives" for deer is prohibited.

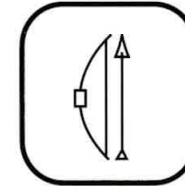
Only white-tailed deer and feral hogs may be taken and other wildlife may not be molested in any manner.

From one-half hour before legal sunrise until 9:00 am and from two hours before sunset until legal sunset hunters must be on their stands.

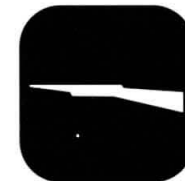
The possession of alcoholic beverages while hunting is prohibited.

All forms of litter should be placed in trash receptacles for proper disposal.

Bow Hunt



Gun Hunt



Hunting will not be permitted closer than 100 yards of State Highway 131, the refuge entrance drive, refuge headquarters, Barbour River Landing, Barbour River Road and Gould's Cemetery.

Harris Neck National Wildlife Refuge will be closed to the general public on all hunt days.

Bow hunting for deer and feral hogs will be permitted from September 21—23, 2000, in all areas designated on the map in this brochure.

Bow hunters must enter the refuge between 5:00 am and 6:00 am to hunt during the morning stand hours. From 9:00 am until 4:00 pm hunters will be allowed to enter and exit through the entrance gate only. After 4:00 pm no one will be permitted to enter the refuge.

Vehicles are restricted to the designated auto tour route. Two-way traffic will be permitted.

A total of three deer, either sex, may be taken during this hunt (bonus tags will be issued for all deer taken). No limit on hogs.

Only bows in accordance with state regulations will be authorized. **No crossbows will be allowed.**

The possession or use of poison or poison pods is illegal.

Archery hunters are encouraged to wear a fluorescent orange outer garment while hunting on the ground or walking to and from stands.

Gun hunting for deer on Harris Neck NWR will be permitted on November 18, 2000 within the area indicated on the attached refuge map.

Gun hunters must check-in at the refuge headquarters between 4:00 and 5:00 am and park in the designated areas prior to hunting. Entry by boat is prohibited.

Transportation is not provided to, from, or on the refuge. Any movement within the refuge must be by foot or bicycle. Entry and exit points for motor vehicles are limited to check stations or other specified areas.

Three deer, either sex, may be taken (bonus tags will be issued for all deer taken).

Feral hogs (no bag limit) may also be taken with weapons legal for this hunt.

Shotguns, 20 gauge or larger, with slugs are the only weapons permitted.

Firearms must be unloaded and cased except during hunting periods.

Target practice is prohibited.

Gun hunters must wear an outer garment which contains a minimum of 500 square inches of hunter-orange material above the waist.

How to obtain bow hunt permits

The attached permit (on cover) to participate in the bow hunt is validated when signed. An unlimited number of permits will be available for the bow hunt.

Hunters who participate in the bow hunt may also participate in the gun hunt.

Gun Hunt Permit Application Procedures

The attached permit-application for the Harris Neck NWR gun hunt should be used by one hunter only. To apply as a party, applications for

all party hunters (a maximum of three) should be stapled together and mailed to: Savannah Coastal Refuges 1000 Business Center Drive Parkway Business Center, Suite 10 Savannah, Georgia 31405

Additional applications may be obtained by mail, or picked up at the Coastal Refuges office located in the Parkway Business Center (off I-16 at Chatham Parkway, Savannah, Georgia).

Only one application may be submitted per hunter. Applications must be received by August 31 to be entered in the drawing; 100 permits will be issued for the gun hunt.

Hunters selected by drawing on September 1, 2000 will be notified by mail. A \$12.50 permit fee must be paid by each hunter selected by drawing. A personal check, cashier's check, or money order made payable to the U.S. Fish and Wildlife Service must be **received** at the Coastal office by November 10 to guarantee issuance of a hunt permit.

Harris Neck National Wildlife Refuge Permit Application for the November 18, 2000 Gun Hunt

Print:

Name _____

Date of Birth _____

Street Address _____

City _____ State _____ Zip _____

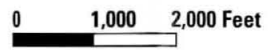
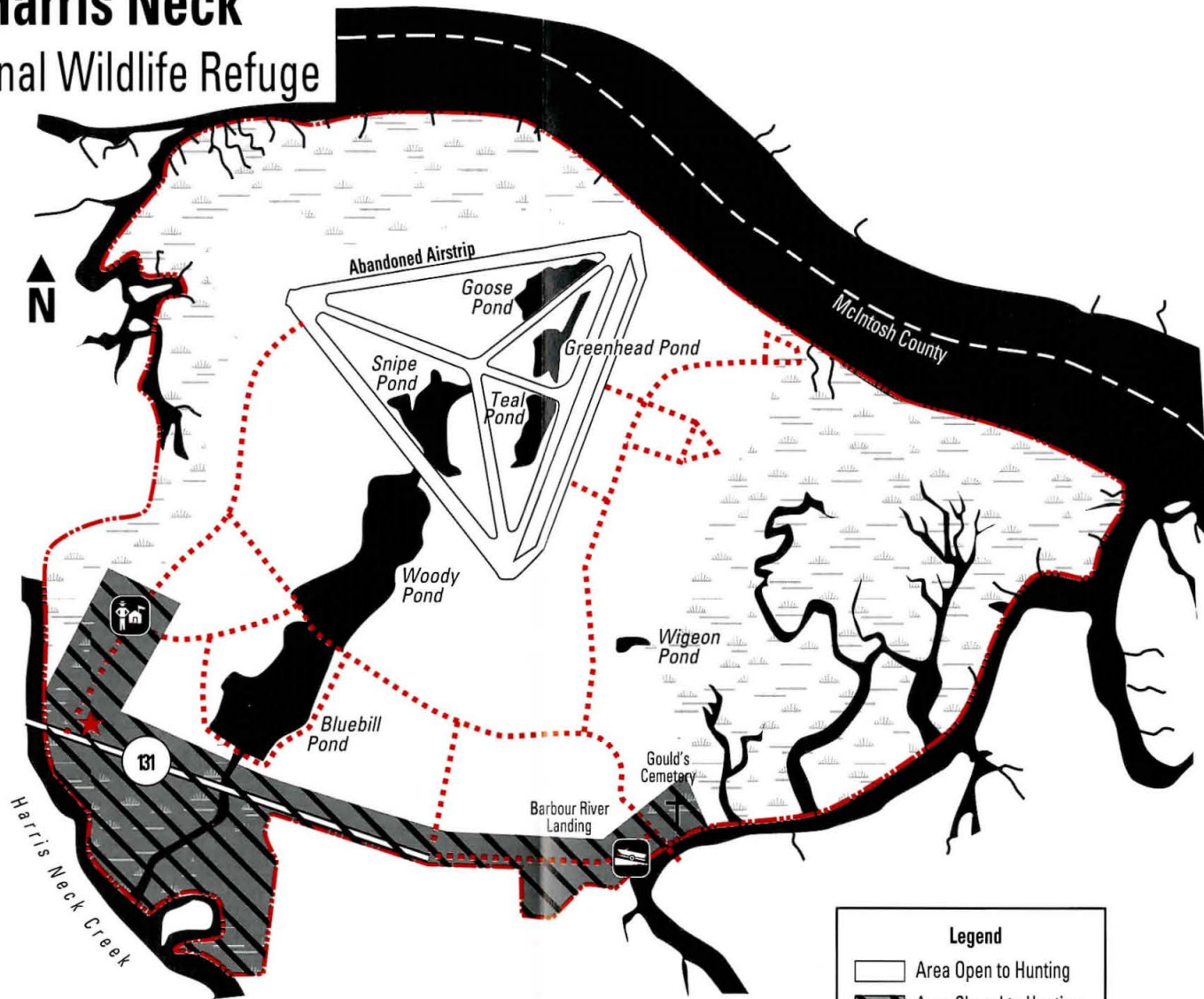
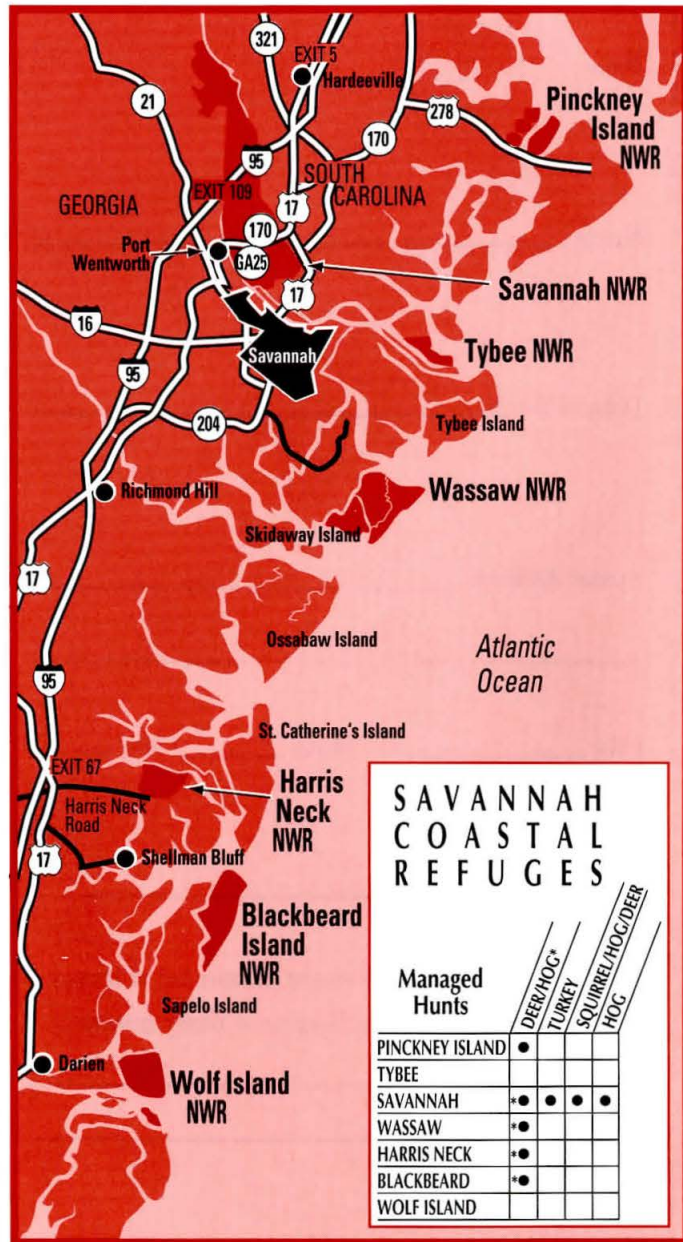
Telephone number _____

Applications for party hunters (maximum of three) must be stapled together. List your party hunters:

1. _____

2. _____

Harris Neck National Wildlife Refuge



Signs Protect
Visitors and
Resources

Millions of people visit national wildlife refuges each year. The impact of human activity, if not regulated, can degrade these wildlands. Signs control recreational activities while protecting natural resources on the refuge. Please respect the following signs:



This sign delineates the refuge boundary or a restricted access area. You may enter only on designated access routes. Consult manager for restrictions.



This area is closed to all entry. No hunting or sight-seeing is permitted. Roads and trails within this area are closed to the public.

Savannah Coastal Refuges
1000 Business Center Drive
Parkway Business Center, Suite 10
Savannah, Georgia 31405
912/652 4415
<http://southeast.fws.gov>

U.S. Fish & Wildlife Service
1 800/344 WILD

June 2000



U.S. Fish & Wildlife Service

Wassaw

National Wildlife Refuge Hunting Regulations 2000



2000 Wassaw NWR Bow Hunt Permit

When signed and in your possession, this brochure serves as your Wassaw bow hunt permit, and acknowledges your understanding of the regulations contained herein.

Check-in is required upon arrival at the refuge dock.

Signature

*Wassaw NWR
Chatham County,
Georgia*

Wassaw is one of over 500 National Wildlife Refuges. The primary objective of a National Wildlife Refuge is to provide habitat for the conservation and protection of all species of wildlife. The harvest of surplus animals is one tool used to manage wildlife populations at a level compatible with the environment, provide recreational opportunities, and permit the use of a valuable renewable resource.

*Certain areas
(marked on the
map printed on the
reverse side) are
closed to hunting*

Public hunting on Wassaw National Wildlife Refuge is permitted on approximately 2,000 acres.

The regulations listed below supplement the general regulations which govern hunting on wildlife areas as set forth in Title 50, Code of Federal Regulations. Hunting will be in accordance with applicable State (Georgia) regulation. All Coast Guard and State boating regulations will be enforced.

*General Deer
Hunt Regulations*

Federal permits are required for all hunts and must be carried on the person while hunting. All hunters must obtain a permit regardless of age. Permits are non-transferable. Only hunt participants with proper licenses and permits will be allowed on the refuge during hunts. **A Georgia hunting license is required to hunt feral hogs.**

Hunters 15 years of age or under (youth hunters) must have successfully passed a state-approved hunter education course in order to participate in any refuge hunt. Satisfactory completion of the course must be demonstrated by a card or certificate. Youth hunters must be supervised by an adult 21 years of age or older, and must remain in sight and normal voice contact with the adult. During refuge hunts, the adult may supervise only one youth.

Hunters must check in at the refuge dock prior to setting up camp.

Personal identification (driver's license, or official state identification card) will be required at check in.

Hunters may place their stands on the refuge prior to the opening day of each hunt. However, hunters assume all responsibility for the loss or damage of personal property left on the refuge.

Hunters may check in no more than one day in advance of the opening day of each hunt period. Hunters will be confined to the camping area until noon on the first day of check-in; from noon until 5:00 pm. scouting will be permitted. Weapons may not be taken from the campground during these authorized scouting periods.

Hunters must be off the refuge the day following the last day of the hunt period.

Boats may not be moored to the government dock except for loading and unloading purposes. Boats must be moored at the specified area near the government dock.

All camping will be at the designated camping area only. Fires must be confined to the camping area.

The possession of alcoholic beverages while hunting is prohibited.

Firearms must be unloaded and disassembled or cased while boats are in motion. Loaded firearms are not allowed in the headquarters and/or camping area.

The possession of poison, or poison pods, is illegal.

The distribution of bait, and hunting over bait, is prohibited.

Target practice during both the archery hunt and the gun/primitive weapons hunt is prohibited.

From one-half hour before legal sunrise until 9:00 am and from two hours before sunset until legal sunset, hunters must be on their stands.

Transportation is not provided to, from, or on the refuge. Any movement within the refuge must be by foot or bicycle. Entry and exit points are limited to the check station. Hunters are not allowed to leave by boat to reach other parts of the island.

Deer harvested during scheduled hunts must be checked by refuge personnel before leaving the refuge.

Only white-tailed deer and feral hogs may be taken and other wildlife may not be molested in any manner.

Hunting from a tree in which a metal object has been screwed or driven is prohibited.

Participating in "man-drives" for deer is prohibited.

No flagging, blazing, or trail marking devices may be used to locate stands, or for any other purpose.

All forms of litter must be placed in trash receptacles for proper disposal.

Specific regulations governing the bow and gun hunts are listed separately.

*How to obtain
bow hunt permits*

The attached permit (on cover) to participate in the bow hunt will be validated during check-in at the refuge headquarters on Wassaw Island. An unlimited number of permits will be available for the bow hunt.

Hunters who participate in the bow hunt may also participate in the gun hunt.

Gun Hunt Permit Application Procedures

The attached permit-application for the Wassaw NWR gun hunt should be used by one hunter only. To apply as a party, applications for all party hunters (a maximum of three) should be stapled together and mailed to the Savannah Coastal Refuges office (1000 Business Center Dr., Parkway Business Center, Suite 10, Savannah, Georgia 31405).

Additional applications may be obtained by mail, or picked up at the Coastal Refuges office located in the Parkway Business Center (off I-16 at Chatham Parkway, Savannah, Georgia).

Only one application may be submitted per hunter. Persons or groups submitting more than one application will be disqualified. Applications for the hunt must be received by August 31 to be entered in the drawing; 125 permits will be issued for the gun hunt.

Hunters selected by drawing on September 1, 2000 will be notified by mail. A \$12.50 permit fee must be paid by each hunter selected by drawing. A personal check, cashier's check, or money order made payable to the U.S. Fish and Wildlife Service must be **received** at the Coastal office by October 25 to guarantee issuance of a permit to the selected hunter.

Bow Hunt (Deer)

Archery hunting for deer on Wassaw NWR will be permitted only on October 5-7, 2000 within the area indicated on the attached refuge map. Primitive weapons are permitted only on October 7. No crossbows will be allowed.

All hunters must wear an outer garment which contains a minimum of 500 square inches of hunter-orange material above the waist while hunting on the ground, or walking to and from stands on the last hunt day.

Gun Hunt (Deer)



Five deer may be taken (bonus tags will be issued for all deer taken). Feral hogs (no bag limit) may also be taken with weapons legal for this hunt.

Wassaw NWR will be closed to the general public one day before and one day after the hunt period as well as on hunt days.

Gun hunting for deer on Wassaw NWR will be permitted only on November 2-4, 2000 within the area indicated on the refuge map printed in this brochure.

Five deer may be taken (bonus tags will be issued for all deer taken). Feral hogs (no bag limit) may also be taken with weapons legal for this hunt.

Hunters are required to wear an outer garment which contains a minimum of 500 square inches of hunter-orange material above the waist.

Shotguns, 20 gauge or larger (slugs only), centerfire rifles, bows, and primitive weapons, in accordance with state regulations, are the only weapons permitted.

Wassaw NWR will be closed to the general public one day before and one day after the hunt period as well as on hunt days.

Campground Facilities



All campsites are primitive. Potable water and chemical toilets are available at the nearby check station. A cooler unit is operated to store harvested deer.

Signs Protect Visitors and Resources



This sign delineates the refuge boundary or a restricted access area. You may enter only on designated access routes. Consult manager for restrictions.



This area is closed to all entry. No hunting or sight-seeing is permitted. Roads and trails within this area are closed to the public.



Wassaw National Wildlife Refuge Permit Application for the November 2-4, 2000 Gun Hunt

Print:

Name _____

Date of birth _____

Street address _____

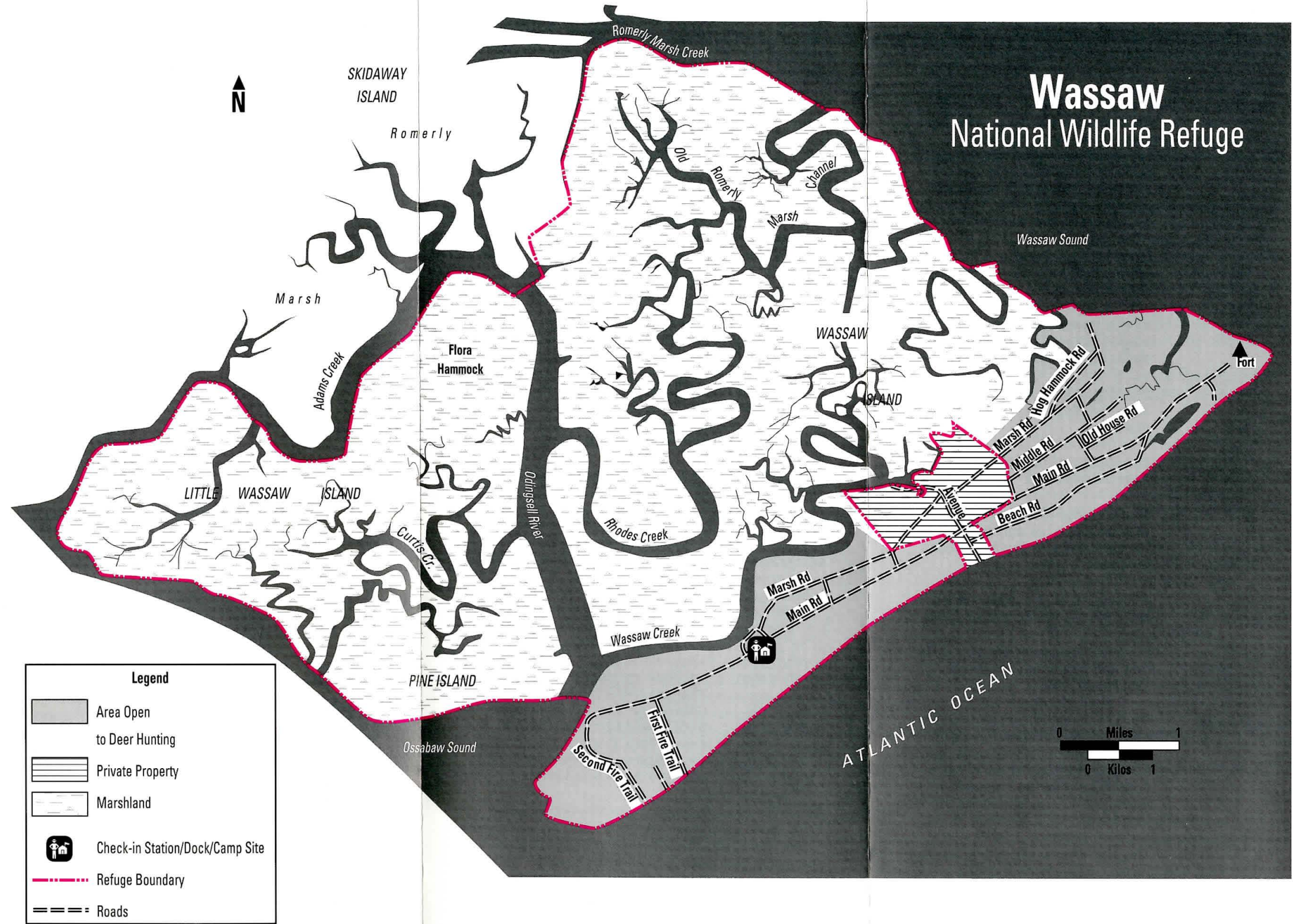
City _____ State _____ Zip _____

Telephone number _____

Party hunters: Staple applications together
(maximum of three). List your party hunters:

1. _____

2. _____



Wassaw National Wildlife Refuge



U.S. Fish and Wildlife Service
Savannah Coastal Refuges
1000 Business Center Drive
Parkway Business Center, Suite 10
Savannah, Georgia 31405
912/652 4415
<http://southeast.fws.gov>

U.S. Fish & Wildlife Service
1 800/344 WILD

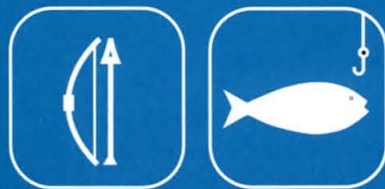
June 2000



U.S. Fish & Wildlife Service

Blackbeard Island

*National Wildlife Refuge
Hunting and Fishing
Regulations 2000-2001*



2000 Blackbeard Island NWR Bow Hunt Permit

When signed and in your possession, this brochure serves as your Blackbeard bow hunt permit, and acknowledges your understanding of the regulations contained herein.

Check-in is required upon arrival at the refuge dock.

Signature

*Blackbeard
Island NWR
McIntosh County,
Georgia*

Blackbeard Island National Wildlife Refuge is one of over 500 national wildlife refuges. The primary objective of a national wildlife refuge is to provide habitat for the conservation and protection of all species of wildlife. The harvest of surplus animals is one tool used to manage wildlife populations. Carefully managed hunts maintain wildlife populations at a level compatible with the environment, provide recreational opportunities, and permit the use of a valuable renewable resource.

Public hunting on Blackbeard Island NWR is permitted on approximately 4,500 acres. Certain areas (marked on the map printed on the reverse side) are closed to hunting.

The regulations listed below supplement the general regulations which govern hunting on wildlife refuge areas as set forth in Title 50, Code of Federal Regulations. Hunting will be in accordance with applicable State (Georgia) regulations. **All Coast Guard and State boating regulations will be enforced.**

Federal permits are required for all hunts and must be carried on the person while hunting. All hunters must obtain a permit regardless of age. Permits are non-transferable. Only hunt participants with proper licenses will be allowed on the refuge during hunts.

Hunters 15 years of age or under (youth hunters) must have successfully passed a state-approved hunter education course in order to participate in any refuge hunt. Satisfactory completion of the course must be demonstrated by a card or certificate. Youth hunters must be supervised by an adult 21

years of age or older, and must remain in sight and normal voice contact with the adult. During refuge hunts, the adult may supervise only one youth.

Hunters may place their stands on the refuge prior to the opening day of each hunt. However, hunters assume all responsibility for the loss or damage of personal property left on the refuge. Stands must be removed by the end of each hunt.

Hunters must check in at the refuge dock prior to setting up camp. Personal identification (driver's license, or official state identification card) will be required at check in.

Hunters may check in no more than one day in advance of the opening date of each hunt period. Check in will not be permitted after sunset of the second hunt day.

Hunters will be confined to the camping area until noon on the first day of check-in; from noon until 5:00 pm scouting will be permitted. Weapons may not be taken from the campground during this authorized scouting periods.

Hunters must be off the island the day following the last day of each hunt period.

Transportation is not provided to, from, or on the refuge. Any movement within the refuge must be by foot or bicycle. Entry and exit points are limited to designated check stations or other specified areas. Hunters are not allowed to leave by boat to reach other parts of the island.

Firearms are not allowed on the island. Archery target practice will be permitted in designated areas only.

The possession or use of poison, or poison pods, is illegal.

The distribution of bait, and hunting over bait, is prohibited.

All camping will be at designated camping areas only. Fires must be confined to the camping area.

The possession of alcoholic beverages while hunting is prohibited.

From one-half hour before legal sunrise until 9:00 am and from two hours before sunset until legal sunset, hunters must be on their stands.

Deer harvested during scheduled hunts must be checked by refuge personnel before leaving the refuge.

Archery hunters are encouraged to wear a fluorescent orange outer garment while hunting on the ground or walking to and from stands.

Hunting from a tree in which a metal object has been driven or screwed is prohibited.

No flagging, blazing, painting, or trail marking devices may be used to locate stands, or for any other purpose.

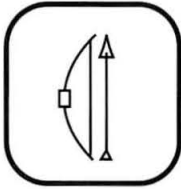
Only designated game species may be taken and other wildlife may not be molested in any manner.

All forms of litter should be placed in trash receptacles for proper disposal.

Participating in "man-drives" for deer is prohibited.

*General
Hunting
Regulations*

Archery Deer Hunts



Archery hunting for deer on Blackbeard Island NWR will be permitted only on October 26-28, 2000 and December 7-9, 2000.

Five deer may be taken (bonus tags will be issued for all deer taken). Feral hogs (no bag limit) may also be taken.

Only bows, in accordance with state regulations, will be authorized. No crossbows will be allowed.

Blackbeard Island NWR will be closed to the general public one day prior to, and one day after, the hunt period as well as on hunt days.

The attached permit (on the cover) to participate in the bow hunt will be validated during check-in at the refuge dock. An unlimited number of permits will be available for both archery hunts.

All campsites are primitive. Potable water, flush toilets, and showers are available at the campground. A cooler unit is operated to store harvested deer.

Boater Caution

Coastal waters are subject to extreme tidal fluctuations of six to ten feet. Hunters should be familiar with tide tables, and monitor coastal weather conditions before navigating to the barrier island refuge.

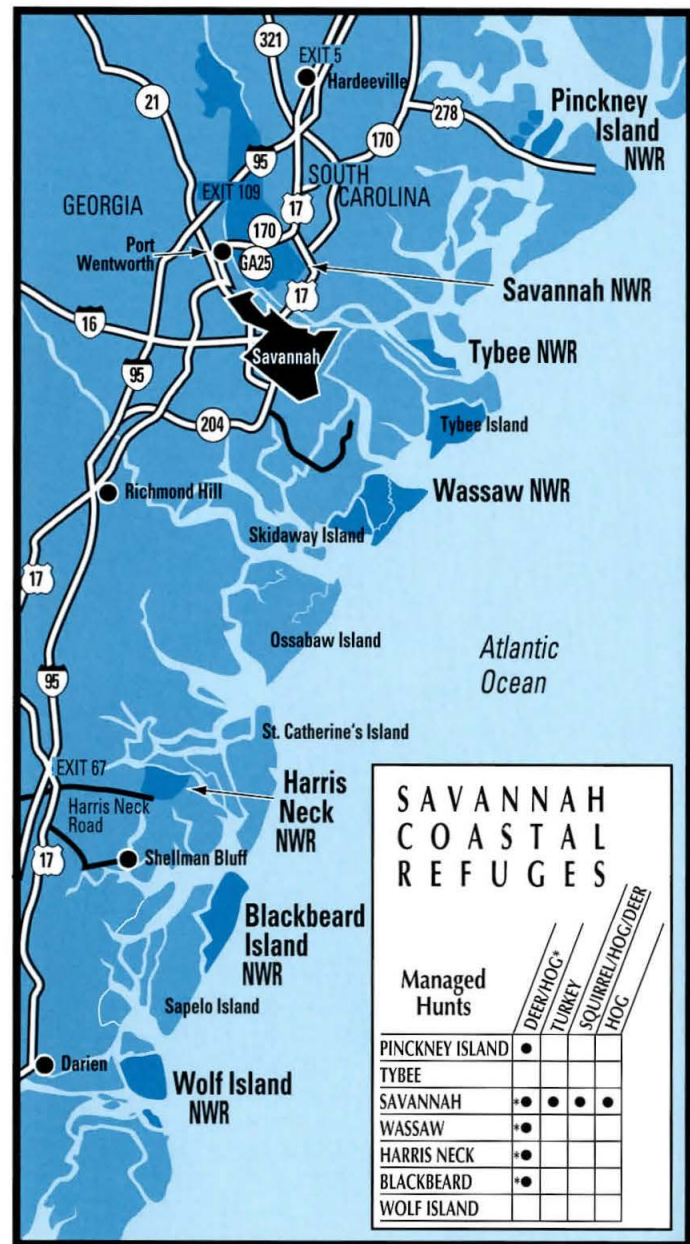
Barbour River Landing at Harris Neck NWR is open daily 4:00 am-midnight only. Parking permits will be issued to Blackbeard hunters who require 24-hour use of the landing. Vehicles, other than those bearing permits, are unauthorized at the landing from midnight to 4:00 am. Permits (valid one day prior to, during, and one day after hunt periods) can be

How to Obtain Refuge Permits

Camping Facilities

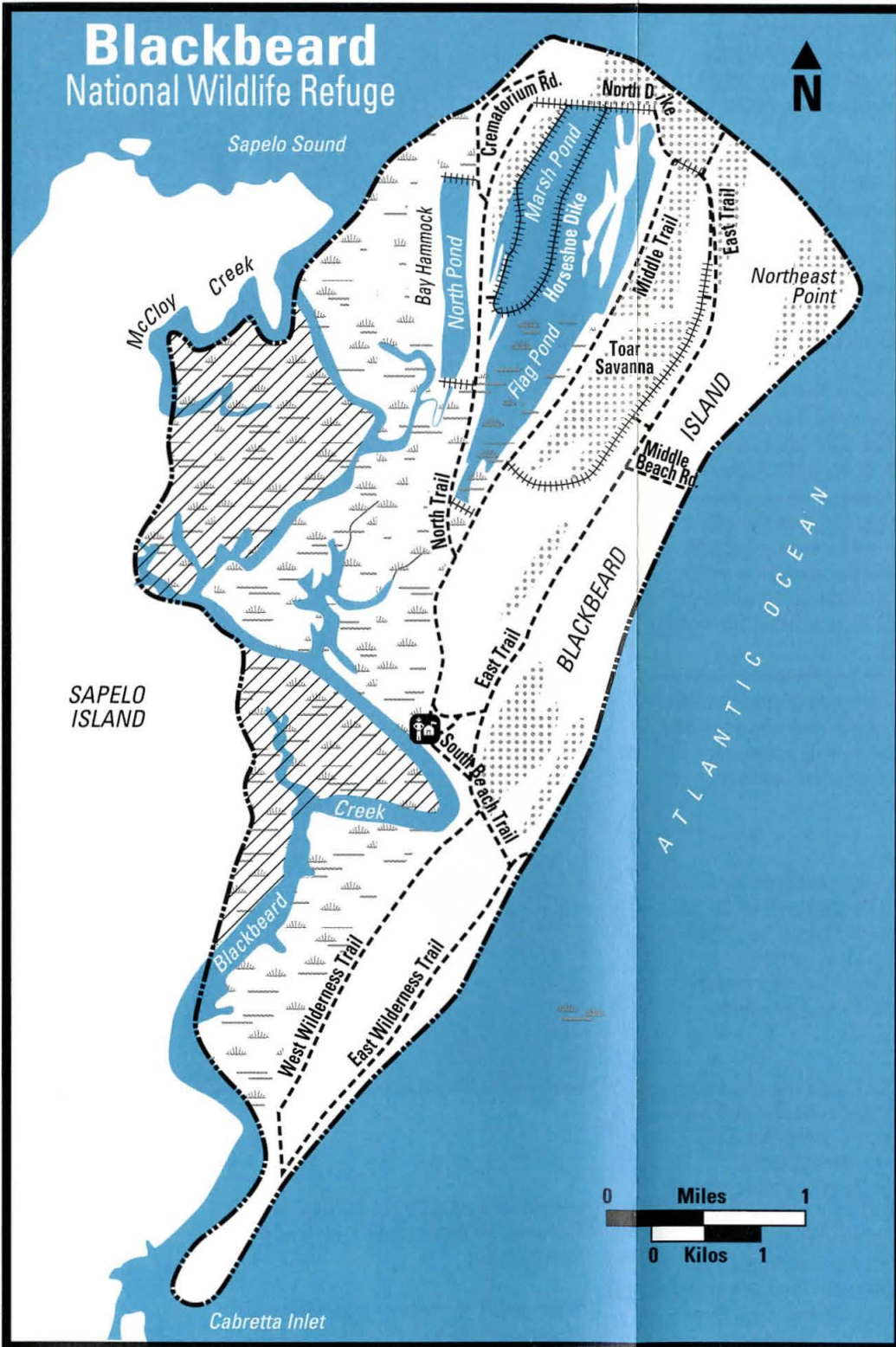


Notice for boaters launching from Harris Neck NWR

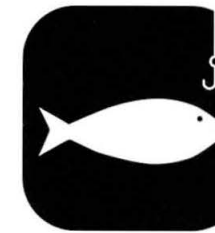
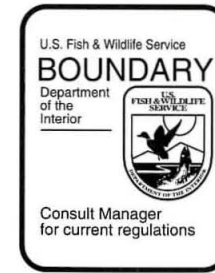


obtained at the Savannah Coastal Refuges' office 912/652 4415 after October 1.

Take pride in your refuge. Report violations. Pick up litter.



Signs Protect Visitors and Resources



Millions of people visit national wildlife refuges each year. The impact of human activity, if not regulated, can degrade these wildlands. Signs control recreational activities while protecting natural resources on the refuge. Please respect the following signs:

This sign delineates the refuge boundary or a restricted access area. You may enter only on designated access routes. Consult manager for restrictions.

This area is closed to all entry. No hunting or sight-seeing is permitted. Roads and trails within this area are closed to the public.

Fishing Regulations

Sport fishing on Blackbeard Island NWR is permitted from the beach, in tidal creeks, and on ponds (impounded waters) within the refuge boundaries. Sport Fishing shall be in accordance with all applicable State regulations* and subject to the following special conditions:

Freshwater fishing is permitted year-round from sunrise to sunset, except during managed hunts.

Some portions of the freshwater ponds may be closed seasonally to protect wildlife from human disturbance.

Only non-motorized boats with electric motors are permitted on the freshwater ponds.

The use of live minnows as bait is not permitted.

Bank fishing into estuarine waters is permitted only from sunrise to sunset.

Boats may not be left on the refuge overnight.

Savannah Coastal Refuges
U.S. Fish and Wildlife Service
1000 Business Center Drive
Parkway Business Center, Suite 10
Savannah, Georgia 31405
912/652 4415
<http://southeast.fws.gov>

U.S. Fish & Wildlife Service
1 800/344 WILD

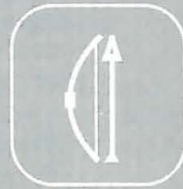
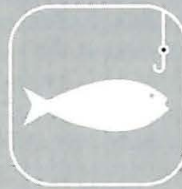
July 2000



U.S. Fish & Wildlife Service

Savannah

National Wildlife Refuge Hunting and Fishing Regulations 2000-2001



2000-2001 Savannah NWR Hunt Permit

When signed and in your possession, this brochure serves as your permit for Savannah NWR's 2000 season hunts (including the March 12-18, 2001 hog hunt and the April 14-29, 2001 turkey hunt), and acknowledges your understanding of the regulations contained herein.

Signature

*Savannah
National
Wildlife
Refuge
Jasper Co., South
Carolina,
Effingham Co.,
Chatham Co.,
Georgia*

Savannah is one of over 500 National Wildlife Refuges. The primary objective of a National Wildlife Refuge is to provide habitat for the conservation and protection of all species of wildlife. The harvest of surplus animals is one tool used to manage wildlife populations at a level compatible with the environment, provide recreational opportunities, and permit the use of a valuable resource.

Public hunting on the Savannah National Wildlife Refuge is permitted on approximately 19,000 acres. Certain areas (marked on the map printed on the reverse side) are closed to hunting.

The regulations listed below supplement the general regulations which govern hunting on wildlife refuge areas as set forth in Title 50, Code of Federal Regulations. Hunting will be in accordance with applicable State (Georgia and/or South Carolina) regulations. **All Coast Guard and State boating regulations will be enforced.**

Permits are required for all hunts and must be carried on the person while hunting. All hunters must obtain a permit (printed on the cover of this brochure) regardless of age. Permits are non-transferable. Only hunt participants with proper licenses and permits will be allowed on the refuge to hunt. A hunting license is required to hunt feral hogs.

Hunters 15 years of age or under (youth hunters) must have successfully passed a state-approved hunter education course in order to participate in any refuge hunt. Satisfactory completion of the course must be demonstrated by a card or certificate. Youth hunters must be supervised by an adult 21 years of age or older, and must remain in sight and normal voice contact with the adult. During refuge hunts, the adult may supervise only one youth.

No check-in or checkout is required. Transportation is not provided to, from,

or on the refuge. Any movement within the refuge must be by foot, bicycle, or boat.

Hunters will not be permitted to enter the hunting area sooner than one hour before sunrise.

Hunting hours will be from one-half hour before legal sunrise to one-half hour after legal sunset.

Firearms must be unloaded and disassembled or cased while boats are in motion.

The possession or use of poison or poison pods is illegal.

The distribution of bait, and hunting over bait, is prohibited.

Handguns are prohibited.

Hunting from a tree in which a metal object has been screwed or driven to support a hunter is prohibited.

No flagging, blazing, painting, or trail marking devices may be used to locate stands, or for any other purpose.

Dogs will not be allowed on refuge hunts.

Camping is not permitted on the refuge.

The possession of alcoholic beverages while hunting is prohibited.

Only designated game species and feral hogs may be taken, and other wildlife may not be molested in any manner.

Hunting will not be permitted closer than 100 yards of S.C. Highway 170 or the refuge headquarters area; or railroad rights of way, nor within the areas marked as closed on the map printed in this brochure.

All persons within the hunt zone are required to wear an outer garment

which contains a minimum of 500 square inches of hunter-orange material above the waist, except during the archery-only deer hunt and the turkey hunt.

Specific regulations governing the deer, turkey, and squirrel hunts are listed separately.

An unlimited number of permits will be available for all refuge hunts. Permits will be available beginning August 1 and throughout the hunt periods.

*Deer/Hog
Archery Hunt
October 1-31, 2000*

Archery hunting for deer and hogs on Savannah National Wildlife Refuge will be permitted from October 1-31, 2000, in all areas designated on the map printed in this brochure.

Only bows will be authorized for deer/hog hunting. Crossbows are not allowed.

Five deer (no more than three antlerless and two antlered) and feral hogs (no bag limit) may be taken. "Bonus" deer tags will not be issued for deer taken.

Doe days for refuge lands in Georgia will coincide with doe days set by the state for Effingham County only.

Does taken in South Carolina must be tagged with state doe tags before being removed from the refuge. South Carolina antlerless deer tags (\$5 each) may be purchased from any authorized state license agent.

*Deer/Hog/
Squirrel Gun
Hunt
November 1-30,
2000*

Deer/hog/squirrel hunting on Savannah National Wildlife Refuge will be permitted on November 1-30, 2000 in all areas designated on the map printed in this brochure.

Five deer (no more than three antlerless and two antlered) may be taken. "Bonus" tags will not be issued for deer taken. Doe days for refuge lands in Georgia will coincide with doe days set by the state for Effingham County only.

*General
Hunting
Regulations*

Does taken in South Carolina must be tagged with state doe tags before being removed from the refuge. South Carolina antlerless deer tags (\$5 each) may be purchased from any authorized state license agent.

Georgia and/or South Carolina Game Zone 11 bag limits for squirrel will apply.

Feral hogs may also be taken (no bag limit) during the deer hunt with weapons legal for this hunt.

Only .22 caliber rimfire rifles or shotguns with #2 shot or smaller will be authorized for squirrel hunting.

Only shotguns with slugs and bows (crossbows prohibited), in accordance with state regulations, will be authorized for deer and hog hunting throughout the designated hunt area. However, high-powered rifles are permitted north of Interstate Highway 95 only.

Hog Hunt March 12-18, 2001

Hog hunting on Savannah National Wildlife Refuge will be permitted March 12-18, 2001 in all areas designated on the map printed in this brochure.

Only hogs (no bag limit) may be taken.

Only shotguns with slugs and bows, in accordance with state regulations, will be authorized during the March hog hunt.

Turkey Hunt April 14-29, 2001

Turkey hunting on the Savannah National Wildlife Refuge will be permitted April 14-29, 2001 in all areas designated on the map printed in this brochure.

Hunters may harvest three gobblers only.

Only shotguns with #2 shot or smaller, and bows in accordance with state regulations, will be authorized for turkey hunting.

Disabled Persons' Deer Hunt October 19, 20, 2000



Write

Special Information

Boater Caution



Possession of slugs or buckshot is illegal during the turkey hunt.

A limited number of disabled hunters (permanently dependent on wheelchairs for mobility) will be permitted to hunt deer/hogs within a portion of the refuge on October 19 and 20, 2000. For information concerning this hunt, contact the refuge office before October 1.

Savannah Coastal Refuges
Parkway Business Center, Suite 10
1000 Business Center Dr.
Savannah, GA 31405
or phone: 912/652 4415

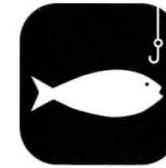
Portions of the refuge lying in both Georgia and South Carolina are open to hunting. Therefore, hunters should familiarize themselves with the area they wish to hunt and obtain the appropriate state license/licenses.

Boats are needed to hunt the Georgia portions of the refuge; some areas in South Carolina are accessible by foot. Motorized land vehicles may not be used.

Coastal waters are subject to extreme tidal fluctuations of six to ten feet. Hunters are urged to be familiar with tide tables, carry adequate safety equipment, and exercise caution when participating in hunts on the refuge.

Signs Protect Visitors and Resources
Millions of people visit national wildlife refuges each year. The impact of human activity, if not regulated, can degrade these wildlands. Signs control recreational activities while protecting natural resources on the refuge. Please respect the following signs:

This sign delineates the refuge boundary or a restricted access area. You may enter only on designated access routes. Consult manager for restrictions.



This area is closed to all entry. No hunting or sight-seeing is permitted. Roads and trails within this area are closed to the public.

Fishing Regulations

Sport fishing on Savannah National Wildlife Refuge is permitted on impounded waters, tidal creeks, and canals within the refuge boundaries. Sport fishing shall be in accordance with all applicable state regulations and subject to the following special conditions:

Bank fishing from the Laurel Hill Wildlife Drive is permitted year-round. Kingfisher Pond (located off US-17, one mile north of the refuge impoundments on SC-170) is open to fishing all year. For all other impounded waters, the fishing season extends from March 1 through November 30. A South Carolina fishing license is required to fish in any of these areas.

Only non-motorized boats and boats with electric motors are permitted on Kingfisher Pond and other impounded waters.

State licenses are required, but no special refuge permit is needed for sport fishing.

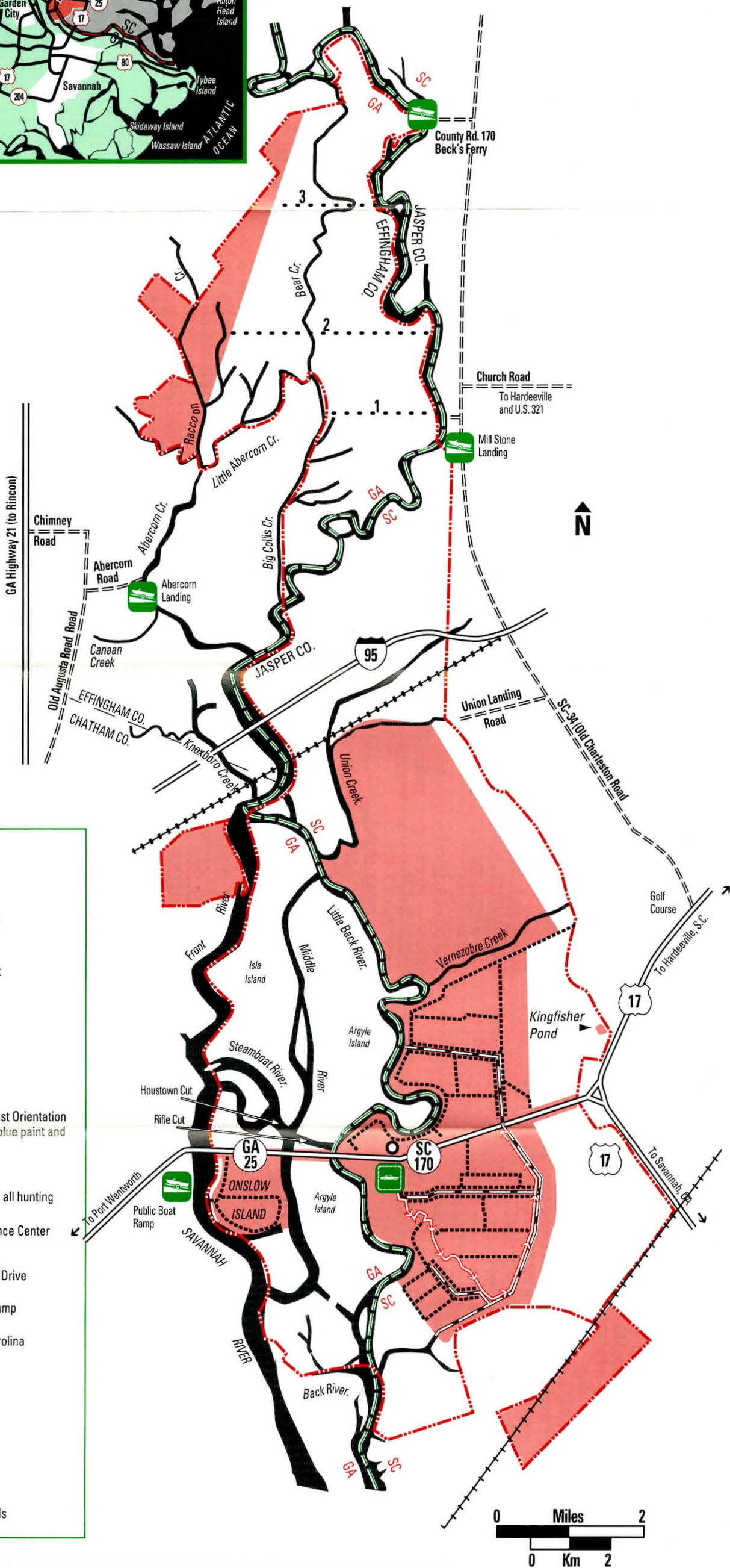
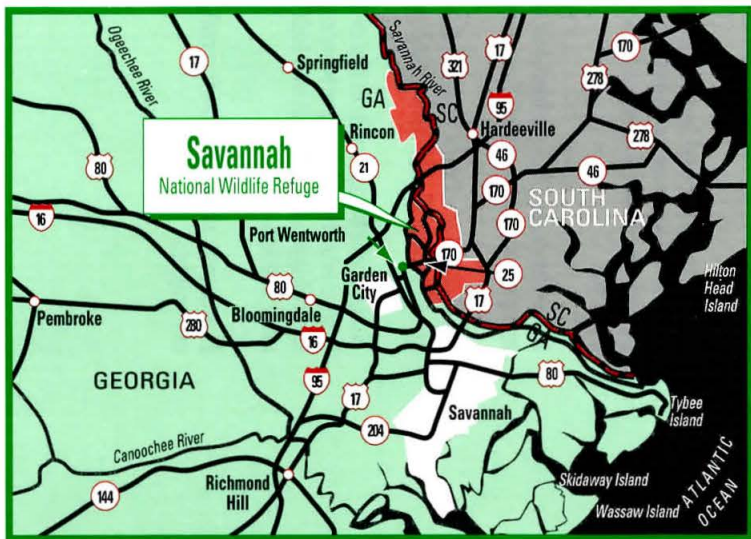
All areas posted with "Closed Area" signs are closed to all activities including fishing.

No one will be allowed on the refuge before sunrise and all persons must be off the refuge no later than one half hour after sunset.

Boats may not be left on the refuge overnight.

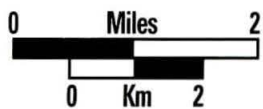
Savannah

Wildlife National Refuge



Legend

- Areas open to hunting unless otherwise posted
 - Archery Deer/Hog Hunt
October 1-31, 2000
 - Deer/Hog/Squirrel Gun Hunt
November 1-30, 2000
 - Hog Hunt
March 12-18, 2001
 - Turkey Hunt
April 14-29, 2001
- (1, 2, & 3) East/West Orientation Lines (trees marked with blue paint and reflectors)
- Areas closed to all hunting
- Refuge Maintenance Center
- Laurel Hill Wildlife Drive
- Boat Launching Ramp
- Georgia/South Carolina Boundary
- - - - Refuge Boundary
- Diversion Canal
- Dikes
- +—+— Railroad
- ==== County/State Roads



Savannah Coastal Refuges
1000 Business Center Drive
Parkway Business Center, Suite 10
Savannah, Georgia 31405
912/652 4415
<http://southeast.fws.gov>

U.S. Fish & Wildlife Service
1 800/344 WILD

June 2000



U.S. Fish & Wildlife Service

Pinckney Island

*National Wildlife Refuge
Hunting Regulations
2000*



Pinckney Island National Wildlife Refuge is one of over 500 national wildlife refuges. The primary objective of a National Wildlife Refuge is to provide habitat for the conservation and protection of all species of wildlife. The harvest of surplus animals is one tool used to manage wildlife populations. Carefully managed hunts maintain wildlife populations at a level compatible with the environment, provide recreational opportunities, and permit the use of a valuable renewable resource.

Public hunting on Pinckney Island National Wildlife Refuge is permitted on approximately 1,050 acres. Certain areas (marked on the map printed on the reverse side) are closed to hunting.

The regulations listed below supplement the general regulations which govern hunting on wildlife refuge areas as set forth in Title 50, Code of Federal Regulations. Hunting will be in accordance with applicable State (South Carolina) regulations.

Federal permits are required for all hunts and must be carried on the person while hunting. All hunters must obtain a permit regardless of age. Permits are non-transferable. Only hunt participants with proper licenses and permits will be allowed on the refuge during the hunt.

Hunters 15 years of age or under (youth hunters) must have successfully passed a state approved hunter education course in order to participate in any refuge hunt. Satisfactory completion of the course must be demonstrated by a card or certificate. Youth hunters must be supervised by an adult, 21 years of age or older, and must remain in sight and normal voice contact with the adult. During refuge hunts, the adult may supervise only one youth.

Hunters may place their stands on the refuge prior to the hunt day. However, hunters assume all responsibility for the loss or damage of personal property left on the refuge. Stands must be removed by the end of the hunt.

Hunters must be checked in at the designated check station by refuge personnel between 4:00 and 5:00 am., and park in the designated area prior to hunting. Entry by boat is prohibited.

Personal identification (driver's license, or official state identification card) will be required at check-in.

Transportation is not provided to, from, or on the refuge. Any movement within the refuge must be by foot or bicycle. Entry and exit points for authorized motor vehicles are limited to designated check stations or other specified areas.

Hunters are required to wear an outer garment which contains a minimum of 500 square inches of hunter-orange material above the waist.

Doe must be tagged with state doe tags. A maximum of four antlerless deer tags (\$5 each) may be purchased from any authorized state license agent.

Deer harvested during any scheduled hunt must be checked by refuge personnel before leaving the refuge.

Hunting from a tree in which a metal object has been screwed or driven to support a hunter is prohibited.

Participating in "man-drives" for deer is prohibited.

No flagging, painting, blazing, or trail marking devices may be used to locate stands, or for any other purpose.

Gun (Deer) Hunt



Permit Application Procedures

Only designated game species may be taken and other wildlife may not be molested in any manner.

The distribution of bait, and hunting over bait, is prohibited.

Camping is not permitted on the refuge.

The possession of alcoholic beverages while hunting is prohibited.

All forms of litter should be placed in trash receptacles for proper disposal.

Gun hunting for deer on Pinckney Island NWR will be permitted only on November 17, 2000 within the area delineated on the attached refuge map.

Five deer (no more than four antlerless) may be taken.

Shotguns, 20 gauge or larger, with slugs are the only weapons permitted.

From one-half hour before legal sunrise until 9:00 am and from two hours before sunset until legal sunset, hunters must be on their stands.

Hunting will not be permitted closer than 100 yards of U.S. Highway 278 or the check station area, nor closer than 200 yards of the residence area.

The refuge will be closed to the general public any day on which a hunt is scheduled.

The attached permit-application for the Pinckney Island NWR gun hunt should be used by one hunter only. To apply as a party, applications for all party hunters (a maximum of three) should be stapled together and mailed to the Savannah Coastal Refuges office, 1000 Business Center Drive, Parkway Business Center, Suite 10, Savannah, Georgia 31405. Additional applications may be obtained by mail, or picked up at the Coastal

Refuges office located in the Parkway Business Center; off I-16 at Chatham Parkway, Savannah, Georgia.

Only one application may be submitted per hunter. Applications must be received by August 31 to be entered in the drawing. The number of permits issued will be determined by management needs.

Hunters selected by drawing on September 1, 2000, will be notified by mail. A \$12.50 permit fee must be paid by each hunter selected by drawing. A personal check, cashier's check, or money order made payable to the U.S. Fish and Wildlife Service must be **received** at the Coastal office by November 10 to guarantee issuance of a permit to the selected hunter.

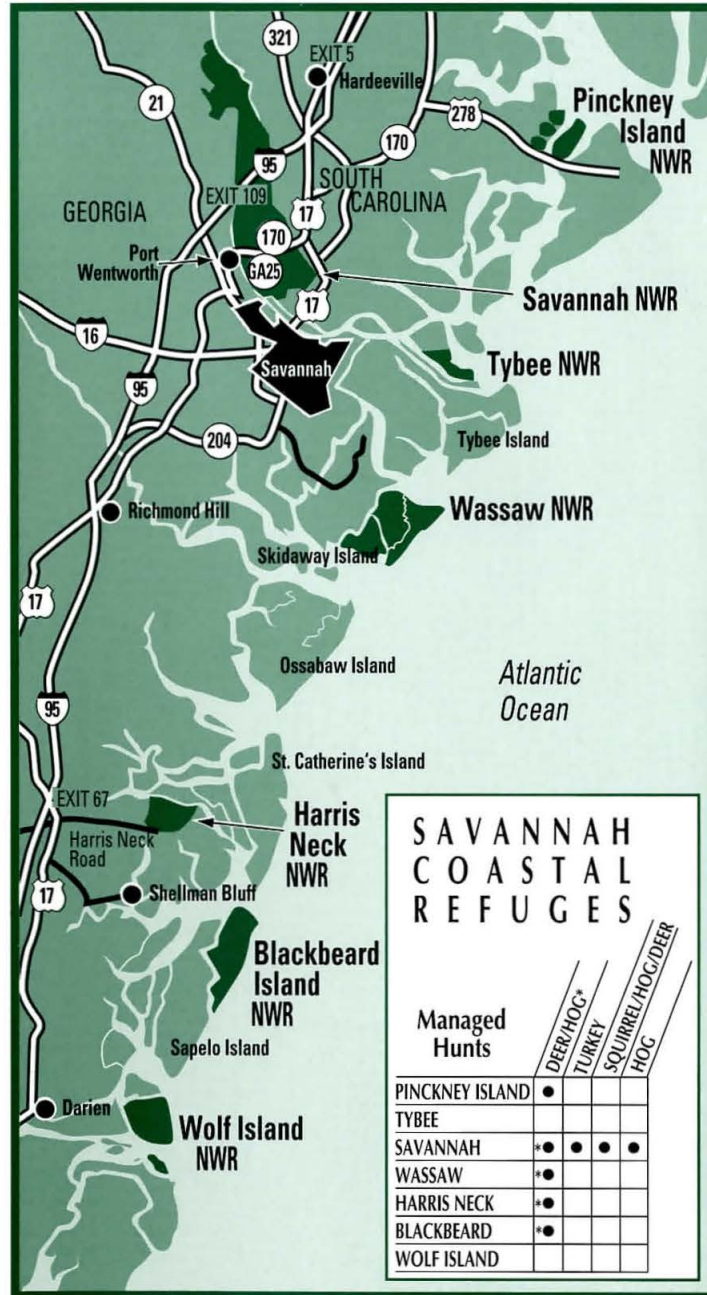
Assistance can be provided to hunters with disabilities. Contact the refuge manager for advance planning.

Millions of people visit national wildlife refuges each year. The impact of human activity, if not regulated, can degrade these wildlands. Signs control recreational activities while protecting natural resources on the refuge. Please respect the following signs:

This sign delineates the refuge boundary or a restricted access area. You may enter only on designated access routes. Consult manager for restrictions.

This area is closed to all entry. No hunting or sight-seeing is permitted. Roads and trails within this area are closed to the public.

Take pride in your refuge! Report violations. Pick up litter.



PINCKNEY ISLAND NATIONAL WILDLIFE REFUGE PERMIT-APPLICATION FOR THE NOVEMBER 17, 2000 GUN HUNT

Print: _____

Name _____

Date of Birth _____

Street Address _____

City _____ State _____ Zip Code _____

Telephone number _____

Applications for party hunters (maximum of three) must be stapled together. List your party hunters:

1. _____

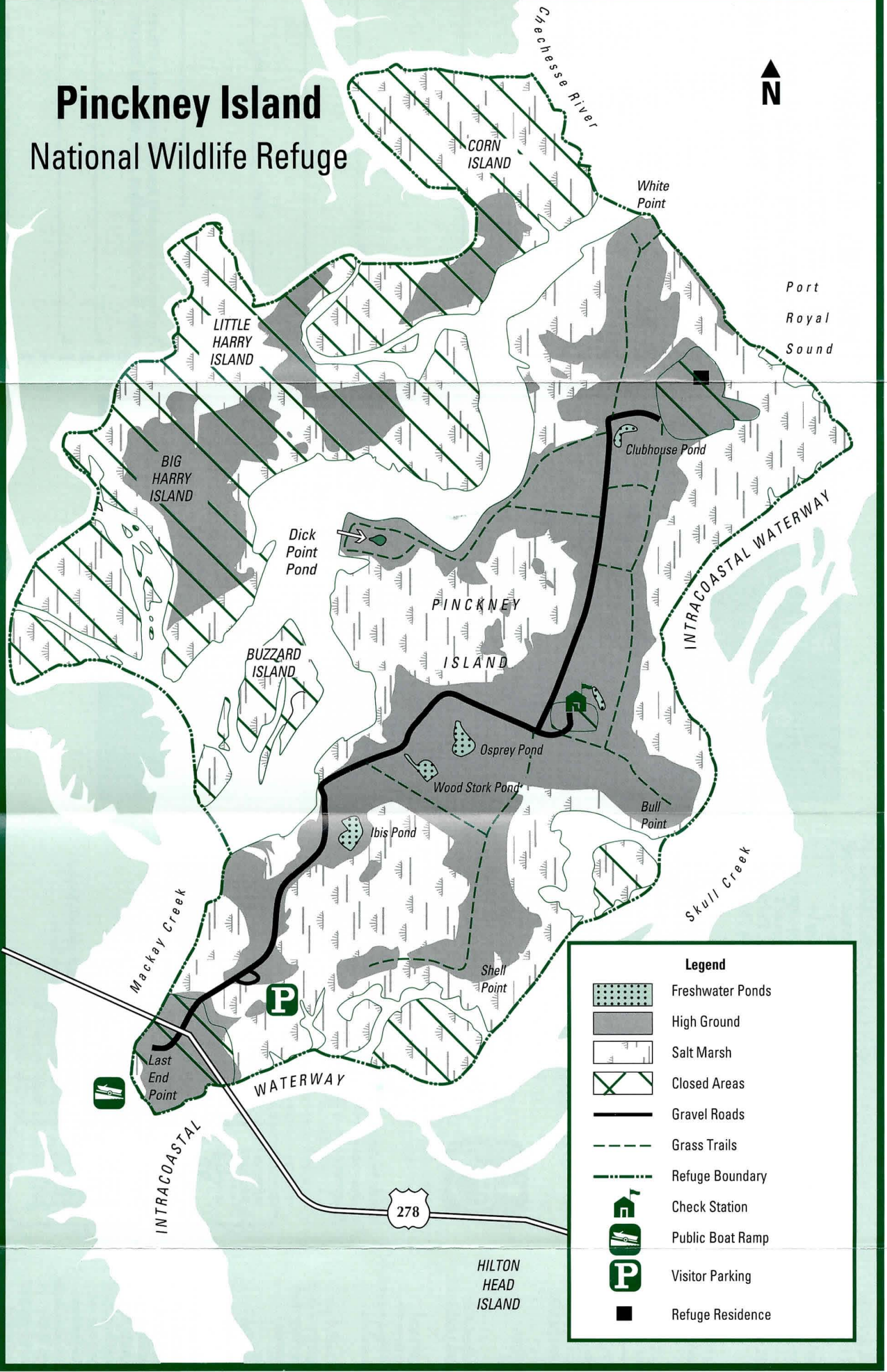
2. _____





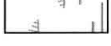








Signs Protect Visitors and Resources



Pinckney Island National Wildlife Refuge



Legend

-  Freshwater Ponds
-  High Ground
-  Salt Marsh
-  Closed Areas
-  Gravel Roads
-  Grass Trails
-  Refuge Boundary
-  Check Station
-  Public Boat Ramp
-  Visitor Parking
-  Refuge Residence