REVIEW AND APPROVALS

## OKEFENOKEE NATIONAL WILDLIFE REFUGE

FOLKSTON, GEORGIA

ANNUAL NARRATIVE REPORT

Calendar Year 1990

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6/28/91 Date

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WW Berry

7/11/91 Date

Regional Office Review

Date

### INTRODUCTION

The Okefenokee National Wildlife Refuge is situated in the southeastern Georgia counties of Ware, Charlton and Clinch and northeastern Florida's Baker County. The refuge was established by Executive Order in 1937 and consists presently of 395,080 acres. The primary purpose of the refuge is to protect the ecological system of the 438,000-acre Okefenokee Swamp. Approximately 371,000 acres of the Okefenokee Swamp are incorporated into the refuge, and 353,981 acres within the swamp were designated as wilderness by the Okefenokee Wilderness Act of 1974. In 1986, the Okefenokee National Wildlife Refuge was designated by the Wetlands Convention as a Wetland of International Importance. The refuge headquarters is located at Camp Cornelia, which is 11 miles southwest of Folkston, Georgia.

Okefenokee's natural beauty was first threatened in the 1890's, when attempts were made to drain the swamp to facilitate logging operations. The Suwannee Canal was dug 11.5 miles into the swamp from Camp Cornelia. After the failure of this project, known as "Jackson's Folly," other interests acquired the swamp and began removing timber in 1909, using a network of tramroads extending deep into the major timbered areas. When logging operations were halted in 1927, over 423 million board feet of timber, mostly cypress, had been removed from the swamp.

The establishment of Okefenokee National Wildlife Refuge on March 30, 1937 marked the culmination of a movement that had been initiated at least 25 years earlier by a group of scientists from Cornell University who recognized the educational, scientific, and recreational values of this unique area. The Okefenokee Preservation Society, formed in 1918, promoted nationwide interest in the swamp. With the support of State and local interests and numerous conservation and scientific organizations, the Federal Government acquired most of the swamp for refuge purposes in 1936.

The Okefenokee Swamp is actually a vast peat bog filling a huge saucershaped sandy depression that was perhaps once part of the ocean floor. The upper margin of the swamp, or the "swamp line," ranges in elevation from 128 feet above sea level on the northeast side to 103 feet on the southwest side. The shallow, dark-stained waters of Okefenokee flow slowly but continuously across the swamp toward the two outlets--the famed Suwannee River on the southwest side and the historic St. Mary's River on the southeast. The eight predominant habitat types on the refuge include swamp islands, prairies (freshwater marsh), shrub swamp, mixed cypress forests, blackgum forests, bay forests, pure cypress forests, and managed upland pine forests.

Three primary entrances and two secondary entrances exist on the refuge. With access via the Suwannee Canal, the east entrance is located 11 miles southwest of Folkston, Georgia, and is managed solely by the Fish and Wildlife Service. The Stephen C. Foster State Park is located at the refuge's west entrance which is located 18 miles northeast of Fargo, Georgia. This state park is operated on refuge lands under the provisions of a long-term agreement with the Georgia Department of Natural Resources. The refuge's north entrance is via the Okefenokee Swamp Park which is located 13 miles south of Waycross, Georgia. This park is administered by a non-profit organization on refuge and state forestlands. Kingfisher Landing, located between Folkston and Waycross, and the Sill area on the west side are considered the secondary entrances into the refuge.

## INTRODUCTION

# TABLE OF CONTENTS

# A. HIGHLIGHTS

1

# B. CLIMATIC CONDITIONS

# C. LAND ACQUISITION

| 1. | Fee Title (Nothing | to | Report) |
|----|--------------------|----|---------|
| 2. | Easements          | to | Report) |
| 3. | Other (Nothing     | to | Report) |

## D. PLANNING

| 1. | Master Plan (Nothing to Report)   |
|----|-----------------------------------|
| 2. | Management Plan                   |
| 3. | Public Participation              |
| 4. | Compliance with Environmental and |
|    | Cultural Resources Mandates       |
| 5. | Research and Investigations       |
| 6. | Other (Nothing to Report)         |

## E. ADMINISTRATION

| 1. | Personnel                                   | 9  |
|----|---|----|
| 2. | Youth Programs                              | 14 |
| 3. | Other Manpower Programs (Nothing to Report) |    |
| 4. | Volunteer Program                           | 14 |
| 5. | Funding                                     | 18 |
| 6. | Safety                                      | 18 |
| 7. | Technical Assistance                        | 20 |
| 8. | Other                                       | 20 |



# F. HABITAT MANAGEMENT

| 1.  | General                                     | 24 |
|-----|---|----|
| 2.  | Wetlands                                    | 24 |
| 3.  | Forests                                     | 29 |
| 4.  | Croplands                                   |    |
| 5.  | Grasslands                                  |    |
| 6.  | Other Habitats                              |    |
| 7.  | Grazing                                     |    |
| 8.  | Haying                                      |    |
| 9.  | Fire Management                             | 38 |
| 10. | Pest Control                                |    |
| 11. | Water Rights                                |    |
| 12. | Wilderness and Special Areas                | 62 |
| 13. | WPA Easement Monitoring (Nothing to Report) |    |

# G. WILDLIFE

| 1.  | Wildlife Diversity                                 | 63 |
|-----|--|----|
| 2.  | Endangered and/or Threatened Species               | 63 |
| 3.  | Waterfowl  | 68 |
| 4.  | Marsh and Water Birds                              | 68 |
| 5.  | Shorebirds, Gulls, Terms, and Allied Species       | 59 |
| 6.  | Raptors  | 69 |
| 7.  | Other Migratory Birds                              | 72 |
| 8.  | Game Mammals                                       | 72 |
| 9.  | Marine Mammals                                     |    |
| 10. | Other Resident Wildlife                            | 72 |
| 11. | Fishery Resources                                  | 72 |
| 12. | Wildlife Propagation and                           |    |
|     | Stocking   |    |
| 13. | Surplus Animal Disposal (Nothing to Report)        |    |
| 14. | Scientific Collections                             | 73 |
| 15. | Animal Control (Nothing to Report)                 |    |
| 16. | Marking and Banding                                | 73 |
| 17. | Disease Prevention and Control (Nothing to Report) |    |



## H. PUBLIC USE

| 1.  | General                            | 77 |
|-----|------------------------------------|----|
| 2.  | Outdoor Classrooms - Students      | 78 |
| 3.  | Outdoor Classrooms - Teachers      | 78 |
| 4.  | Interpretive Foot Trails           | 78 |
| 5.  | Interpretive Tour Routes           | 79 |
| 6.  | Interpretive Exhibits/             |    |
|     | Demonstrations                     | 80 |
| 7.  | Other Interpretive Programs        | 80 |
| 8.  | Hunting                            | 83 |
| 9.  | Fishing                            | 83 |
| 10. | Trapping (Nothing to Report)       |    |
| 11. | Wildlife Observation               | 84 |
| 12. | Other Wildlife Oriented Recreation | 84 |
| 13. | Camping                            |    |
| 14. | Picnicking (Nothing to Report)     |    |
| 15. | Off-Road Vehicling                 |    |
| 16. | Other Non-Wildlife Oriented        |    |
|     | Recreation                         |    |
| 17. | Law Enforcement                    | 85 |
| 18. | Cooperating Associations           | 89 |
| 19. | Concessions                        | 89 |
|     |                                    |    |

# I. EQUIPMENT AND FACILITIES

| 1. | New Construction          | 90 |
|----|---------------------------|----|
| 2. | Rehabilitation            | 91 |
| 3. | Major Maintenance         | 95 |
| 4. | Equipment Utilization and |    |
|    | Replacement               | 95 |
| 5. | Communication Systems     | 97 |
| 6. | Computer Systems          | 97 |
| 7. | Energy Conservation       | 97 |
| 8. | Other (Nothing to Report) |    |

# J. OTHER ITEMS

| 1. | Cooperative Programs | 98 |
|----|----------------------|----|
| 2. | Other Economic Uses  |    |
| 3. | Items of Interest    | 98 |
| 4. | Credits              | 99 |
|    |                      |    |

K. <u>FEEDBACK</u> ..... 100

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

## A. HIGHLIGHTS

1

- -- Severe drought and accompanying wildfires. (Section F.9).
- -- Suwannee River Sill continues to deteriorate. (Section F.2).
- -- Suwannee River Sill workshop held. (Section F.2).
- -- New high band radio system purchased. (Section I.5).
- -- Director Turner visits Region 4 and Okefenokee for first time. (Section J.3).

#### B. CLIMATIC CONDITIONS

1990 was a very dry year at Okefenokee. Water levels and precipitation were the lowest on record since the drought of 1954 and 1955. Total rainfall for the year was 38.18 inches. This was a deficit of 14.83 inches below the 45-year average of 53.01 inches. During October, the refuge received 6.75 inches of rain from tropical storm Marcos which aided greatly in suppressing the Short's Wildfire (see chart). Water levels dropped during September to 118.61 ft. MSL. This was the lowest level since 1954 (see graph). Several canoe trails were closed most of the year. The winter of 1990 was considered warmer than usual.

Weather data is summarized in tables below.

| Month | 20-Year | 25-Year | 45-Year | 1990  |
|-------|---------|---------|---------|-------|
| Jan   | 2.35    | 3.45    | 3,18    | 3.30  |
| Feb   | 3.26    | 4.09    | 3.72    | 3.81  |
| Mar   | 3.74    | 4.57    | 4.20    | 3.96  |
| Apr   | 4.07    | 2.81    | 3.37    | 0.70  |
| May   | 3.87    | 4.40    | 4.16    | 0.79  |
| June  | 5.54    | 5.94    | 5.63    | 2.96  |
| July  | 8.03    | 7.55    | 7.60    | 6.46  |
| Aug   | 6.88    | 7.78    | 7.38    | 5.64  |
| Sept  | 6.40    | 4.79    | 5.50    | 1.33  |
| Oct   | 3.59    | 2.72    | 3.05    | 6.75  |
| vov   | 1.72    | 2.65    | 2.23    | 1.29  |
| Dec   | 2.68    | 3.25    | 2.99    | 1.19  |
| 5010  | 52.63   | 54.00   | 53.01   | 38.18 |

### Monthly Precipitation Averages

## Rainfall for Driest Years

|              | 1954     | <u>1955</u> | <u>1981</u> | 1990   |
|--------------|----------|-------------|-------------|--------|
| Preside from | 26.07    | 42.79       | 33.35       | 38.18  |
| 45-year aver | age26.94 | -10.22      | -19.66      | -14.83 |





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#### D. PLANNING

#### 3. Public Participation

The Short's Fire which burned from the end of August well into November provided opportunities on a daily basis to furnish fire status reports to the news media (both print and television). On two separate instances in September, public meetings were held to solicit input into the fire management process. The first meeting sought input from private landholders adjoining the southern portion of the refuge. In a meeting held at the Eddy Tower, a methodology was developed for the prescribed burning of private lands adjoining the perimeter of the swamp. The Incident Commander Bobby Kitchens, Florida Department of Forestry officials and the Project Leader anticipated that the fire would burn around the south end of the refuge and continue up the east side. These private landowners cooperated with fire personnel to help contain the fire within refuge boundaries.

A second public meeting was held in the community of Baxter, Florida. Florida Department of Forestry officials sponsored the meeting to provide accurate information on the status of the fire and to quiet rumors of individual citizens doing their own prescribed burning to further protect their private homes and property. This meeting was attended by about 100 local citizens who asked a number of insightful questions concerning fire policy and procedures. Officials in attendance at the meeting felt that a great deal of community tension was alleviated.

#### Compliance with Environmental and Cultural Resources

The U. S. Army Corps of Engineers made a final determination to issue an after-the-fact permit to the Okefenokee Swamp Park for the illegal construction of a rail tram into the swamp. Project Leader Perkuchin, Assistant Refuge Manager Lunceford and Supervisory Park Ranger Burkhart met with Swamp Park officials to discuss the mitigation commitments that had to be met. All mitigation measures suggested by the Service were included in the Corps permit. Supervisory Park Ranger Burkhart met with Marvin Cook of Wilderness Graphics to review the proposal for the new wetland exhibit at the Swamp Park.

5

### 5. Research and Investigations

## Okefenokee NR90-"Ethology and Natural History of the American Alligators, Alligator mississippiensis (41590-4) Zoo Atlanta

Howard Hunt, Curator of Herpetology for the Atlanta Zoological Park, continued his research on the American alligator in the Okefenokee Swamp. The objectives of the study include: Identifying factors impacting reproductive success and survival of eggs, observing the behavior of females, comparing behavior and nesting success in several areas of the refuge, observing parental behavior and other interactions between adults and offspring. The results of Mr. Hunt's research will assist the refuge in monitoring alligator nest predation, nest success and survival of young. These results will also be used to estimate annual recruitment into the Okefenokee alligator population.

### Okefenokee NR90-Monitoring Vegetative Transect Lines in the Okefenokee Swamp" (41590-8) Wildlife Management Staff

On August 21 and 22, Biological Technician Gooch evaluated the Sapling Prairie, Mizell Prairie and Bugaboo Vegetative Transect lines. Due to the very low water levels, a helicopter was used to reach these sites. These transect lines were surveyed in accordance with management study, Monitoring Vegetative Transect Lines in the Okefenokee Swamp.

1990 began with a rainfall deficit of 6.2 inches. By December, the swamp's rainfall was under the average of 52.58 by 15.22 inches. From 1980 through 1990, the Okefenokee is approximately 42 inches under average for the tenyear period. Water levels were 119.42 MSL, the lowest since this survey began. The trail leading to the Bugaboo transect was completely dry. Peat and sphagnum have filled in this trail to a depth of 2-3 feet. This condition made it difficult to reach the line. One had to literally crawl 1/4 mile to reach the transect line.

The five point sampling method appears to work best for sampling low growing emergent plants. Multiple sample categories are common when thick plant densities are encountered. Alternate sampling methods need to be explored for sampling woody vegetation in order to provide meaningful data.

Okefenokee NR90-"Microbial Ecology of the Okefenokee Swamp" (41590-9) University of Georgia

The objectives of the study are:

1. To determine the extent, efficiency, and rates of microbial transformation of detrital carbon, particularly detritus derived from lignocellulose, but also including algal, <u>Sphagnum spp</u>. moss, and non-lignocellulosic vascular plant detritus.

2. To investigate microbial food webs, including bacterial, protozoan, and small detritivore interactions.

3. To construct a simulation model of the trophic structure of Mizell Prairie ecosystem, including lignocellulose-based and non-lignocellulose-based food webs.

4. To determine community metabolism and gas flux from the Mizell Prairie ecosystem.

This work is the continuation of an 8-year research program investigating the microbial ecology of the Okefenokee Swamp. The swamp is unique in that it is a low-pH peat-building ecosystem. Annual plant matter input is not degraded completely by the microbial community, but instead builds up to the sediments of the swamp. This study is increasing our knowledge of the microbial community in the Okefenokee and allows us to understand the processes controlling microbial activity, including organic matter inputs, pH, water level fluctuations, and oxygen levels. The field and lab data are currently being used to build a simulation model which synthesizes our understanding of the microbial processes in this ecosystem.

Okefenokee NR90-"Evaluating the Effects of Warm Season Prescribed Fire at Okefenokee NWR" (41590-15) Okefenokee NWR Staff

This study project was started in 1988 with four primary objectives. These objectives are (1) to evaluate the effects of warm season prescribed fires on important wildlife plant species; (2) evaluate the effect of spring and fall prescribed fire on longleaf pine (Pinus palustris) regeneration; (3) to investigate the use of warm season burning to reduce and control undesirable hardwoods in the endangered red-cockaded woodpecker (Dendrocopus borealis) colony sites and (4) to provide supportive data for Okefenokee's Habitat Management Plan, especially as prescribed burning relates to threatened and endangered species such as the red-cockaded woodpecker, Eastern indigo snake (Drymarchon couperi) and the gopher Several threatened, endangered or tortoise (Gopherus polyphemus). protected "Sandhill Community Species", may benefit from this project. The results of several years of data collection will assist in making future management decisions at Okefenokee.

Eight plots were surveyed for species composition during 1990. Plot numbers 2, 10, 12, 17, 4, 6, 13, and 19 were surveyed during May and August for a total of 72 sites surveyed.

Okefenokee NR90-"Lichens and Air Quality in Okefenokee National Wildlife Refuge" (41590-16) Minnesota Cooperative Fisheries and Wildlife Research Unit

The Okefenokee National Wildlife Refuge encompasses 438,000 acres of freshwater wetlands located in southeastern Georgia and northern Florida. In 1974, 353,981 acres of the swamp were included in the National Wilderness System to preserve this unique area for future generations to enjoy. The Okefenokee Wilderness area is a class I area under the provisions of the 1977 amended Clean Air Act which affords it the highest air quality protection by regulation.

The main concern of the U. S. Fish and Wildlife Service is the potential impact to the flora and fauna of the refuge by industrial air emissions from Jacksonville, Florida to the south and Brunswick, Georgia to the north. The long range transport of sulfur dioxide  $(SO_i)$  is the primary pollutant of concern.

Dr. Clifford Wetmore of the Botany Department at the University of Minnesota is conducting a lichen study at the Okefenokee Refuge under contract Number USDI/14-16-0009-1566 #4. The objectives of the study were to survey the lichens in the refuge, produce a lichen flora list, collect and analyze lichens for chemical contents and evaluate the lichen flora with reference to the air quality. This study will also establish baseline data for future restudy and determine the presence of any air quality problems that might be revealed by the lichens at the time of the study. All work has been done at the University of Minnesota with close correlation with Wayne King, USFWS, in Denver and with Okefenokee Refuge personnel.

Okefenokee NR90-"SO, Monitoring in Okefenokee NWR" (41590-17) National Park Service, Okefenokee NWR

An important concern to the refuge is the impact of industrial air emissions from nearby pulp and paper mills. The long range transport of sulfur dioxide is the main pollutant of concern. During 1990, funds were obligated to the National Park Service to provide SO, monitoring equipment to the old Camp Cornelia Shop and has been operational for the year. To date, no preliminary results have been received from the testing contractor.

In response to the 1990 Amendment to the Clean Air Act, the Environmental Protection Agency is planning to add ten sites at eastern class I areas to the IMPROVE (Interagency Monitoring of Protected Visual Environments) network. These sites are crucial in evaluating the effect of the national SO, reduction program. The Okefenokee National Wildlife Refuge has been selected as one of the new sites to be incorporated into the national program.

8

#### E. ADMINISTRATION

#### 1. Personnel

Forestry Technician Huling was promoted to Automotive Worker (WG) effective June 17. Employee Huling filled the position vacated by Maintenance Mechanic Burch upon his retirement on December 15, 1989.

Range Technician Shelton was reassigned to Law Enforcement Officer (GS 1802) effective July 4.

On July 9, paperwork to recruit for a GS 7/9/11 Wildlife Biologist was sent to Atlanta. An applicant was chosen and will report to Okefenokee in early March 1991. This station has not had a biologist on staff since the late 1970's.

Randy S. Saunders, Assistant Forester/Fire Management Officer, came on board August 12. This is a new position under the supervision of Forester/FMO Phernetton.

Range Technician Nuss was converted to Engineering Equipment Operator (WG) on August 26.

On November 7, paperwork to recruit for a GS 5/6/7 Range Technician was submitted. This position is to be stationed on the west side of the refuge.

Paperwork to recruit for a GS 7/9 Assistant Manager was submitted November 27 to fill vacancy created when Assistant Manager Lunceford transferred to Panther Swamp NWR in Mississippi effective December 2.

On July 18, paperwork was sent in to recruit for a GS 5/6/7 Forestry Technician (fire position) to fill vacancy created when Huling filled the Automotive Worker position.

For the eighth straight year, a temporary fire crew was employed to assist with wildfire suppression and emergency pre-suppression activities. In 1990, there were 21 individuals in the program. They provided firefighting assistance not only on the refuge, but on several other interagency fire locations as well (see Section F.9).

Appointments of Firefighters Forcine, Hannans, Daniels and Craigmiles were extended an additional 40 days due to work time applied against their initial 180-day appointment during the work at Cape Romain following Hurricane Hugo.

During PP 9016 (ending July 28), this station had 22 refuge staff, 17 firefighters and 5 YCC enrollees.

Engineering Equipment Operator Virgil Crews retired effective June 2, 1990.

Deputy Project Leader Mallard was upgraded to GM-13 August 12, 1990.



Engineering Equipment Operator Virgil Crews is congratulated on his retirement by Manager Perkuchin after serving 21 years at Okefenokee. 06/90 90-01 JCL

A 5-year comparison of Okefenokee's approved staffing pattern is as follows:

|    |      | Fulltime | Part-time   | Temporary   | Firefighters |  |
|----|------|----------|-------------|-------------|--------------|--|
| FY | 1990 | 19       | 2 (1.6 FTE) | 1 (1.0 FTE) | 21           |  |
| FY | 1989 | 19       | 1 (0.8 FTE) | 2 (2.0 FTE) | 12           |  |
| FY | 1988 | 16       | 1 (0.8 FTE) | 3 (2.2 FTE) | 13           |  |
| FY | 1987 | 15       | 1 (0.8 FTE) | 4 (3.0 FTE) | 12           |  |
| FY | 1986 | 15       | 0           | 5 (3.4 FTE) | 10           |  |

\*FTE = Full-Time Equivalent



10



1. Don R. Perkuchin (EOD 01/02/89) 2. Larry E. Mallard (SOD 04/10/88) 3. James C. Lunceford (EOD 09/24/89; transferred 11/30/901 4. Ronald Phernetton (SOD 01 09/74) 5. Howard McCullough (ECD 01/05/87) 6. Andrew H. Gowen (EOD 04/23/89) 7. Robert T. Huling (EOD 05/08/89) 8. James A. Burkhart (EOD 06/11/78) 9. Paul S. Tritaik (EOD 01/15/89) 10. Tony R. Gooch (EOD 08/18/80) 11. Douglas E. Huss (EOD 01/16/77) 12. James N. Shelton (EOD 07/05/87)\* 13. Cecile M. Davis (EOD 10/16/72) 14. Dartha L. Pittman (EOD 12/06/76) 15. Kares D. Huling (EOD 06/04/89) 16. Virgil Crews (ECD 01/05/69; retired June 1, 1990) 17. Stiner Jones (EOD 09/19/83) 18. Jell 3. Snowden (EOD 07/14/77) 13. Bracie A. Gooch (200 05/19/24) 20. Sverette Sikes (SOD 03/15/87) 21. Judy Drury (EOD 04/10/88) 22. Randy Saunders (EOD 08/12/90)\*

"Not pictured.

### PERSONNEL

Senior Project Leader (GM 14, PFT) Deputy Project Leader (GM 13, PFT) Refuge Manager (GS 9, PFT)

Eorester/FHO (GS 11, PFT) Forestry Technician (GS 6, PFT) Engineering Equipment Operator, (Tire) WG 8, PFT) Automotive Worker (WG 8, PFT) Supervisory Park Ranger, GS 11, PFT) Park Ranger (GS 7, PFT) Range Technician (GS 6, PET) Engineering Equipment Operator (WG 3) Law Enforcement Officer (GS 7, PET) Office Assistant (GS 6, PFT) Clerk-Stenographer (GS 5, PFT) Clerk-Typist (GS 3, Temporary FT) Engineering Equipment Operator (NG 8, PFT) Maintenance Worker (WG 6, PFT) Laborer [36 1, Permanent PFT] Fark Suide (05 1, FFT) Hotor Venicle Operator (WG 5, feap.) Park Ranger (GS 3, PPT) Forester



Front Row: 15,13,18,16,Burch,21,19,7; Second Row: 14,10,5,6,4,20,2; Back Row: 1,3,9,17,11,8, (12/89) 90-2 JAB

## TEMPORARY FIRE CREW

| 1.  | Lawrence Allen, Forestry Technician/Firefighter      | (EOD  | 06/13/88) | GS | 4  |    |
|-----|--|-------|-----------|----|----|----|
| 2.  | Michael E. Barr, Forestry Aide/Firefighter           | (EOD  | 06/11/90) | GS | 3  |    |
| 3.  | Jeffrey Bennett, Forestry Aide/Firefighter           | (EOD  | 06/05/88) | GS | 3  |    |
| 4.  | Greg Blanks, Forestry Aide/Firefighter               | (EOD  | 06/18/89) | GS | 3  |    |
| 5.  | Robert B. Cone, Forestry Aide/Firefighter            | (EOD) | 07/15/90  | GS | 3  |    |
| 6.  | Gary Craigniles, Forestry Ride/Firefighter           | (EOD  | 07/03/88) | GS | 3  | ,  |
| 7.  | Lonnie Daniels, Forestry Technician/Firefighter      | (EOD  | 07/02/901 | GS | 4  |    |
| 8.  | Reggie Forcine, Forestry Technician/Firefighter      | (EOD) | 06/10/84) | GS | 4  | ,  |
| 9.  | Richard Hannans, Forestry Aide/Firefighter           | (EOD) | 06/05/88) | GS | 3  | *  |
| 10. | Lydia G. Hester, Forestry Technician/Fire Cache Hgr. | (EOD  | 06/17/90) | GS | 4  | *  |
| 11. | Nitchell Joiner, Laborer/Firefighter                 |       |           |    |    |    |
|     | (Resigned 06/04/90)                                  | (200  | 06/08/87) | ¥G | 3  | *  |
| 12. | Richard S. Moore, Forestry Aide/Firefighter          | (EOD  | 07/29/90) | GS | 2  |    |
| 13. | Michael E. Peacock, Forestry Aide/Firefighter        | (EOD) | 06/11/90) | GS | 3  |    |
| 14. | Dwayne Roberson (Resigned 08/17/90)                  | (EOD  | 08/12/90) | GS | 3* |    |
| 15. | Hatthew Rosengren, Forestry Aide/Firefighter         | (EOD  | 07/16/89) | GS | 2  |    |
| 16. | Natthew M. Rouse, Forestry Aide/Firefighter          | (BOD) | 07/15/90) | GS | 2  | 2  |
| 17  | David A. Shepard, Forestry Aide/Firefighter          | (200  | 07/15/90) | 65 | 2  |    |
| 18. | William Sikes, Forestry Aide/Firefighter             | (EOD  | 06/18/89) | GS | 2  |    |
| 19. | Avery M. Stafford, Forestry Aide/Firefighter         | (EOD) | 06/17/901 | GS | 1  | ۲  |
| 14. | Stary Taylor, Forestry Aide/Firefighter              |       |           |    |    |    |
|     | (Terminated 08/07/90)                                | (EOD  | 06/17/90) | GS | 2  | ۴. |
| 21. | Gavin Young, Forestry Aide/Firefighter               | (EOD  | 06/18/89) | GS | 2  |    |
| 22. | Jonathan Young, Forestry Aide/Firefighter            | (EOD  | 06/18/89) | GS | 2  |    |
|     |  |       |           |    |    |    |

\*Not pictured.



Okefenokee's 1990 fire management team. Back Row (L to R): 7, 22, 17, 5, 12, 18, 15; Front Row (L to R): 21, 13, 2, 1, 3 (07/90) 90-3 UK



Refuges sending personnel to the Mitchell Island wildfire included Mississippi Sandhill Crane, Lower Suwannee, Florida Panther, St. Vincent, Piedmont, Merritt Island, Felsenthal, Noxubee, Sabine, D'Arbonne, Mackay Island, Cape Romain, Choctaw, Savannah, Wichita Mountains, Seney, Shiawassee, Cameron Prairie, Klamath, Lower Rio Grande Valley and others. 07/90 90-4 UK

#### 2. Youth Programs

This year's Youth Conservation Corps (YCC) program employed five enrollees and one youth leader. Three of the enrollees and the youth leader were stationed on the east side with the other two enrollees at the west entrance.

The random selection of enrollees took place May 2. The YCC general orientation was held on May 12. The work program began on June 11.

On June 12, one of the enrollees quit due to transportation problems. On June 13, one of the enrollees quit due to health problems. Both enrollees were replaced.

On June 19, CPR and first aid training were held for all YCC enrollees. Payroll problems continued again this year, especially for the last youth hired.

The Youth Conservation Corps crew again proved to be very productive. They trimmed vegetation along the boardwalk, cleaned up the Chesser Island Homestead, conducted weekly litter pickup along the entrance road and picnic area, removed weeds from the edge of the long, borrow ditch, cleaned out the Suwannee Canal Recreation Area boat basin, spread bark and trimmed vegetation along the Canal Diggers and Deerstand Trails, edged sidewalks, conducted various maintenance projects, and assisted with various biological projects.

On August 3, the whole YCC crew was taken on an educational field trip to Cumberland Island. On August 8, all the YCC'ers stayed at the west side of the refuge in a spike camp for various work projects there.

The program ended August 10 with a picnic for all YCC'ers. Each YCC enrollee successfully completed their assignments with a sense of pride and accomplishment.

On February 17 and 18, Boy Scout Troop 209 from Conyers, GA participated in a trail maintenance project. About 30 boy scouts used hand tools to cut myrtle bushes along the wildlife drive.

On June 9, Okefenokee National Wildlife Refuge held a youth fishing tournament for kids age 3 to 12. A total of 23 youths fished during the 4 1/2 hours of the tournament. The tournament was held in conjunction with National Fishing Week, and co-sponsored by Carl Glenn, concessioner of Suwannee Canal Recreation Area, and Tom and Carol Foreman, owners of the Okefenokee Sportsman. The participants caught a total of 37 fish weighting 25 1/4 pounds.

### 4. Volunteer Program

The volunteer program involved 54 volunteers, contributing a total of 2,378 hours in FY 90. The highlight of the year was the transfer of the

the newly formed volunteer cooperative association, the Okefenokee Wildlife League (O.W.L.), effective March 31.

On June 22, Okefenokee NWR honored several volunteers during a Volunteer Pot-luck picnic. Joanne Nolan received a special gift for over 2,000 hours of volunteer service. Stanley Shultz and Pauline Shultz received recognition pins of 500 hours and 250 hours, respectively. Edythe Williams received a pin in recognition of her 100 hours of volunteer work.

Other highlights include: the production of a pictorial wildflower guide and the celebration of the Anniversary of Earth Day, as part of National Wildlife Week festivities.

The number of volunteer hours contributed by category are as follows:

| Maintenance      | 621  |  |
|------------------|------|--|
| Resource Support | 38   |  |
| Public Use       | 1719 |  |









Director John Turner poses with Volunteer Joanne Nolan and Jim Burkhart. Ms. Nolan utilized her excellent photographic skills to document the event. (08/90) 90-5 PFT



Volunteer Stanley Shultz enjoys some of the "fruits of his labor". (11/89) 90-6 Nolan

16



Volunteers Matt Rouse and Herb Reichelt participated as part of the "Shade Tree Pickers" in celebrating National Wildlife Week and Earth Day (04/90) 90-7 JAB



Youth volunteers trimming and thinning brush along the Wildlife Drive. (03/90) 90-8 PST

#### 5. Funding

Final funding for FY 90 was \$1,198,100. This figure includes \$1,003,300 for regular operating funds, \$3,400 for contaminants, \$20,000 for Sill workshop, \$5,000 for drug enforcement, \$22,000 for entrance fee administration, \$137,000 for station and regional fire equipment, and \$7,400 for YCC. A special funding of \$825,000 was received to replace bridges on the Perimeter Road. The following chart depicts the past five years of Okefenokee's budget.

## FIVE-YEAR FUNDING COMPARISON

| ACTIVITY  | 1990    | 1989  | <u>1988</u> | <u>1987</u> | 1986  |
|-----------|---------|-------|-------------|-------------|-------|
| 1260      | 598.1   | 564.7 | 615.8       | 507.3       | 489.0 |
| 6860      | 60.0    | 60.0  | 60.0        | 55.0        | 55.0  |
| 9110      | 66.6    |       |             |             |       |
| 9120      | 439.0   |       |             |             |       |
| 4960      | 22.0    | 9.3   |             |             |       |
| 1221      | 5.0     |       |             |             |       |
| 8610/1991 | 7.4     | 6.7   | 10.8        | 8.6         | 3.2   |
| 1210/1520 |         | 5.5   | 14.1        | 10.0        | 18.4  |
|           | 1198.10 | 646.2 | 700.6       | 580.9       | 565.6 |

### 6. Safety

Monthly safety meetings were scheduled during the year. Topics discussed or programs presented were pertinent to on-going activities. First aid and defensive driving were given to refuge staff, firefighters, and YCC in May. CPR and First aid classes were given June 20. Numerous topics were discussed during the year. These include: helicopter safety, wildfires on refuge; salt and hypertension; standard first aid; lightning; safety awareness test; dispatch plan; backup alarms, and Lyme disease.

Work Hazards Forms were completed for various tasks on the refuge. These forms were gone over with staff before each project.

A Notice of Unsafe or Unhealthy Working Conditions was received following a safety inspection and audit conducted March 9-14. Various staff were assigned to correct list of 37 conditions.

Accidents which occurred in 1990 are as follows:

### Permanent Staff

February 5 -- While on TDY in North Carolina, Andrew Gowen was a spectator at a volleyball game. A player charged the net to block the ball, landing under the net and accidentally kicking Gowen's right ankle, causing the joint to break. No corrective action was taken or planned. Employee was cautioned to take notice of his position when at such sports or other events in order to prevent injury.

May 24 -- Once again, Employee Gowen felt pain! While using a fire rake to clear brush at a helispot, employee struck a myrtle bush and the rake glanced off bush striking inner side of left ankle cutting through the boot. The rake was improperly sharpened. The tip of the blade was sharp when it should not have been. Employee should check any and all tools he plans to use to determine if it is a safe item to use.

#### Firefighters

June 7 -- Michael Barr had been performing plumbing work at helibase (irrigation) when he noticed a sharp pain in his right lower back. The emergency room physician's diagnosis was sacral ilian strain. All employees were cautioned to use proper body positioning and stance.

June 13 -- Matthew Rosengren came into contact with poison ivy while doing presuppression work on boardwalk trail. His physician treated him with medication. All employees were advised to wear long-sleeved shirts when working in area where poison ivy might be. Also, employees were advised that there is a medication (injection) which can be ordered by their physician to build up an immunity to poison ivy.

July 10 -- Gregory S. Blanks was stung on his left eyelid. Emergency room physician treated swollen lid with ice pack and medication. This station did not know of any corrective action to prevent this type of injury.

July 11 -- Matthew Rosengren experienced more skin irritation after he came into contact with poison ivy while working on the Mitchell Island Wildfire. His physician gave him an injection of medication. See corrective action for Mr. Rosengren on June 13.

July 14 -- Reginald Forcine was working on the North Wildfire line when he experienced pain in his lower back. Physician's diagnosis was muscle strain. He was treated with medication and hot packs. See correction action for Michael Barr on June 7.

November 19 -- Gary Craigmiles was cutting brush, carrying a tree scraper in his left hand and cutting with a sandvec in his right hand. A small limb or vine caught the scraper in his left hand and stripped it away from the employee, causing cuts to fingers on his left hand. Employees were cautioned to use tools in safe and correct manner and to wear proper protection equipment. Employee was removed as squad boss of small crew operations. During the Mitchell Island Wildfire in July, there were only four recorded accidents to firefighters and support personnel which ranged from tick bites, heat exhaustion, foreign object lodged in throat and ligament injury to right ankle requiring first aid at camp medical unit and/or treatment at emergency room with physician care.

The Short's Wildfire involved over 700 firefighters and support personnel during its peak and was actively being suppressed during September and October. During this 2-month period, there were over 40 reported injuries/accidents ranging from poison ivy, insect bites, scrapes, bruises, burns, lacerations, broken teeth, heat stress/exhaustion, various infections requiring first aid at camp medical unit and/or treatment at emergency room with physician care.

### 7. Technical Assistance

Assistant Manager Lunceford and Range Technician Gooch worked with other refuge employees on a law enforcement case involving the red-cockaded woodpecker at Fort Benning, GA from July 8-28.

8. Other

Deputy Project Leader Mallard and Forester Phernetton traveled to the Regional Office to discuss Perimeter Road bridge funding, equipment funding and burning activities at Cape Romain NWR January 3-4.

Range Technician Gooch attended a Helicopter Manager's Workshop in Tallahassee, FL January 8-12.

Deputy Project Leader Mallard, Assistant Manager Lunceford and Forester Phernetton traveled to the University of Florida on January 11 to discuss GIS applications at Okefenokee.

Park Ranger Tritaik attended a Project Wild Workshop at Piedmont Refuge January 13.

Senior Project Leader Perkuchin traveled to Piedmont NWR, Round Oak, GA to plan law enforcement refresher practical exercises January 24-25.

Engineering Equipment Operator Gowen attended a Forest Service Fire Cache Committee meeting in Knoxville, TN on January 29-February 1.

Senior Project Leader Perkuchin attended ARW Retreat in Atlanta, GA February 1-2.

Office Assistant Davis attended Federal Financial System training in Orlando, FL from January 30-February 1.

Engineering Equipment Operator Gowen attended S-390 (Intermediate Fire Behavior) in North Carolina February 5-9.

Forester/FMO Phernetton, Range Technician Gooch, Forestry Technician McCullough, and Automotive Mechanic Huling traveled to Cape Romain NWR, Awendaw, SC to assist with preparation and prescribed burning operations following Hurricane Hugo's devastation February 9-18. Clerk Pittman also traveled to Cape Romain to staff office and serve as dispatcher during the prescribed burning operations February 14-17.

Senior Project Leader Perkuchin attended the Project Leaders Conference in New Orleans, LA February 12-16.

Forester Phernetton attended a computer workshop for refuge foresters at the University of Georgia from February 27-March 1.

Senior Project Leader Perkuchin traveled to Tallahassee, FL to meet with other FWS personnel to finalize planning for law enforcement refresher practical exercises March 1-2.

Forester Phernetton served as an instructor for Basic Fire Management Training at Mississippi Sandhill Crane NWR from March 4-10.

Engineering Equipment Operator Nuss and Automotive Mechanic Huling traveled to Richmond, VA to pick up excess bridge material. A load of the material was then taken to Pungo NWR and personnel returned to Richmond to pick up more bridge material before returning to Okefenokee March 5-9.

Senior Project Leader Perkuchin, Supervisory Park Ranger Burkhart, Ranger Tritaik, and Deputy Project Leader Mallard attended law enforcement training in Quincy, FL March 11-16.

Office Assistant Davis traveled to Noxubee Refuge, Starkville, MS to attend computer workshop March 11-17.

Forestry Technician McCullough and Automotive Mechanic Huling attended a supervisor's training course in Atlanta, GA March 18-24.

Senior Project Leader Perkuchin traveled to Atlanta, GA to attend ARW Retreat March 22-23.

Office Assistant Davis attended PPFS training in Atlanta, GA April 10-13.

Senior Project Leader Perkuchin traveled to Quincy, FL to serve as law enforcement training instructor March 25-28.

Law Enforcement Officer Shelton attended law enforcement training at Quincy, FL March 25-30.

Engineering Equipment Operator Nuss and Automotive Mechanic Huling traveled to Lake Phelps, NC to pick up excess property April 24-26.

Supervisory Park Ranger Burkhart attended a planning meeting at St. Marks NWR, Tallahassee, FL in preparation for an I & R Workshop in September on April 30-May 1. Supervisory Park Ranger Burkhart attended the National Association of Interpretation - Federal Interagency Council - American Wetlands Workshop in Atlanta, GA May 7-11.

Park Ranger Tritaik traveled to the Regional Office to assist with graphics work May 13-15.

Senior Project Leader Perkuchin attended the ARW Retreat in Atlanta, GA May 17-18.

Senior Project Leader Perkuchin attended a pre-retirement planning seminar in Orlando, FL May 23-26.

Assistant Manager Lunceford and Automotive Mechanic Huling attended S-390 Fire Behavior) in Tallahassee, FL June 4-8.

Range Technician Gooch traveled to London, KY to attend I-375 and I-378 (Helicopter and Air Tanker Coordinator Training) June 11-15.

Assistant Manager Lunceford and Firefighters Daniels, Craigmiles, Forcine, and Allen attended S-217 (Helicopter Training) at Merritt Island NWR, FL June 11-14.

Forester/FMO Phernetton participated in a fire review at Piedmont NWR as part of the review team on June 26-28.

Forestry Technician McCullough and Engineering Equipment Operator Gowen attended a terra-torch training and demonstration session in Virginia June 26-28.

Park Ranger Tritaik, Motor Vehicle Operator Sikes, Automotive Worker Huling, Park Guide Gooch and Laborer Snowden and Park Ranger Drury attended and completed Coast Guard Boating Skills and Seamanship Course.

Engineering Equipment Operator Gowen, Automotive Worker Huling and Engineering Equipment Operator Nuss attended Advanced Tractor Operator Tactics and Safety Course in Tallahassee, FL July 16-19. Forester Phernetton served as an instructor in this course on July 16-17.

Senior Project Leader attended ARW Retreat in Atlanta, GA July 19-20.

Senior Project Leader Perkuchin and Deputy Project Leader Mallard traveled to Eufaula, AL to attend FWS workshop on baiting July 23-24.

Forester Phernetton traveled to Mississippi Sandhill Crane NWR to participate in a fire review July 23-26.

Motor Vehicle Operator Sikes attended Public Drinking Water and Sewerage Treatment Training in Macon, GA July 29-August 3. Park Ranger Gooch traveled to Atlanta, GA to work at Buckarama August 17-20.

Park Ranger Tritaik attended supervisory training at Kings Bay during the month.

Park Guide Gooch and Ranger Tritaik traveled to Hardin, KY to attend workshop September 10-14.

Forestry Technician McCullough attended Prescribed Burning Meeting in Starkville, MS November 4-9.

Engineering Equipment Operator Gowen traveled to Fall Creek Falls State Park, Pikeville, TN to attend Fire Cache Committee meeting November 5-9.

Assistant Forester Saunders attended training at Vicksburg, MS November 12-17.

Park Ranger Tritaik traveled to KY to conduct I & R review at Wolf Creek and Dale Hollow National Fish Hatcheries November 13-15.

Range Technician Gooch attended training at Monks Corner, SC November 26-28.

Assistant Forester Saunders traveled to Atlanta, GA to attend FWS orientation November 26-30.

Supervisory Park Ranger Burkhart traveled to Charleston, SC to attend interpretive workshop November 26-30.

Senior Project Leader attended Fire Management for Line Officers Course in Boise, ID November 26-30.

Assistant Forester Saunders traveled to Charleston, SC to attend meeting December 3-6.

Forestry Technician McCullough assisted with prescribed burning operations at Savannah Refuge December 10-12.

Range Technician Gooch traveled to Ocala, FL to attend workshop December 10-12.

Supervisory Park Ranger Burkhart traveled to Reno, NV to attend meeting December 10-17.

#### F. HABITAT MANAGEMENT

### 1. <u>General</u>

Okefenokee National Wildlife Refuge (395,080 acres) includes most of the 438,000-acre Okefenokee Swamp. The swamp has been classified into several major habitat types by the University of Georgia Institute of Ecology, based upon predominant types of vegetation. Approximately 32,000 acres of upland forest, located primarily on more than 70 islands within the Okefenokee Swamp comprise 8% of the refuge area. Prairies including aquatic macrophyte areas and grass-sedge areas cover 21% of the refuge. Shrub swamp is dominated by hurrah bush, titi, sweet spire, and poor man's soap cover 34%. Mixed cypress forests covering 23% of the refuge include pond cypress, blackgum, sweet bay, red bay, and loblolly bay. Blackgum forests cover 6% of the refuge area. Some pure stands of pond cypress cover 6% of the refuge area. The remaining area (2%) is open water or waterways.

Overall objectives for refuge habitats are as follows:

1. To provide habitats and protection for those species of plants and animals indigenous to the refuge which are officially listed as being threatened or endangered.

2. To provide optimum habitat diversity, as management constraints permit, in upland and wetland habitats to provide for a diversity of wildlife species.

3. To provide appropriate conditions for environmental education, interpretive and wildlife-oriented recreation opportunities for people.

The above objectives are accomplished through various levels of habitat management activities ranging from survey and typing of habitats and wildlife surveys, to prescribed fire in wilderness areas, to selective commercial timber harvest on some of the upland forests. Current and planned management activities are described in the following sections.

2. Wetlands

The wetlands of the Okefenokee Refuge were designated a "Wetland of International Importance" by the Ramsar Convention, also known as the Wetlands Convention of 1987. This convention is a global conservation delegation dedicated to the cause of international wetlands conservation. The Okefenokee is one of only four areas in the United State to receive such a distinguished designation. The Okefenokee Refuge contains 371,000 acres classified as wetlands. Wetlands management in the refuge is limited because of its size, remoteness, and insufficient data on the swamp's complex ecosystem. Current or proposed studies conducted by FWS, educational institutions, or private researchers will, hopefully, give refuge personnel a better understanding of the ecological processes unique to the swamp environment. Current wetland management being planned or conducted include: Protection of the swamp flora and fauna.

Management of waterways for public use to minimize the impact on the swamp's ecosystem.

Controlling a portion of the swamp's water level by means of the Suwannee River Sill.

Experimental prescribed fire to control the encroachment of scrub shrub into open marsh areas.

Fire has probably played a major role in the evolution of the swamp by setting back plant succession and preventing the conversion of marsh areas to swamp forest. The Suwannee River Sill was constructed in early 1960's to retain higher water levels in the swamp during droughts, thus reducing the probability and severity of fire. The long-term effect of the Sill and reduced fire potential during low water conditions is not well understood at this time. Several recent studies including a workshop held in April. 1990 indicate that the Sill has a significant impact on water levels in a very limited area (10,000 acres) and a very negligible effect over the rest of the swamp. Overall, from a habitat standpoint, the Sill probably has had a detrimental effect. Additional ecological studies and workshops should enable wetland management decisions to be made that would be conducive to the preservation of the Okefenokee Swamp in a natural state.

Six project wildfires and prescribed fires occurring during 1989 and 1990 provide opportunities to answer some of the questions about the role of fire in the swamp and possible management activities. The Short's Fire (September - October, 1990) burned out several inches of root mat in scrub shrub areas over a 200 acre area. Studies are planned to examine the effects of fire in these areas. Fire management in Okefenokee wetlands is described in Section F.9.

Several years of slightly lower than normal rainfall levels, followed by two years of drought resulted in the lowest water levels in the Okefenokee Swamp since 1954. A leaky water control structure in the Suwannee River Sill reduced what ever effects the Sill may have had.

25





The positive results of repeated fires on the same area can be seen along the Dragline Ditch. Fires occurred in this area in 1988, 1989, and 1990. The unwanted trees and scrub-shrub were consumed by the flames. The rains that followed began to provide more water habitat. (12/90) 90-9; 90-10 TRG





27

These shots were taken on the swamp side of the south sill water control structure. The areas highlighted with white paint demonstrate the extent of the damage caused by the swamp's acid water (4.0-5.0 ph). This structure had been replaced in 1979-80. (06/90) 90-11; 90-12 DEN



The combination of drought and damaged water control structures created the scene on the right. This shot facing north from the boat ramp depicts the situation the last two summers as the sill area was almost dry. The water normally would be up to the grass. Notice the fishermen lining the left bank. (06/90) 90-13 Nolan



Do you see a 'gator or 'gators in the photo below? Try 100+. This shot was also along the sill ditch. (06/90) 90-14 TFG



#### 3. Forests

Okefenokee National Wildlife Refuge contains 347,131 acres of forestlands, including 315,308 acres of wetland hardwoods, cypress and brush lands and 31,823 acres of upland forests. The upland forests support stands of longleaf, loblolly, slash, and pond pine and scattered upland hardwoods. Approximately half of the upland forest area (16,518 acres) is located on island within the National Wilderness Area. The remaining 15,305 acres of upland forest, 4.3% of the total refuge area, are in areas designated as forest management compartments where commercial harvesting may be permitted as a tool to accomplish habitat management goals.

#### a. Forest Management Compartments

Forestlands where commercial harvesting is utilized are divided into 16 forest management compartments ranging from 379 to 1,900 acres each (see Map 1, page 30). Habitat management objectives for the forest management compartments include those listed for all refuge habitats (page 24). These objectives are met by manipulating forest stands to provide a variety of overstory species, densities, age classes, and understory types. Specific objectives include providing habitat for the endangered red-cockaded woodpecker. A great deal of the forest habitat manipulation on Okefenokee Refuge involves red-cockaded woodpecker management.

Management tools utilized to accomplish habitat management objectives include managing pine forest stands on a long rotation (100 years or more), all-aged management of some stands, selective thinning on a 10-year cycle, and dormant and growing season prescribed fires on various cycles. Hardwood stands, openings and wetland types help to provide habitats to meet the needs of a wide variety of native wildlife species including Okefenokee's endangered species, as well as to provide an aestheticallypleasing variety of forestlands.

A major long-term habitat management activity related to red-cockaded woodpecker management on Okefenokee Refuge is the restoration of the longleaf pine-wiregrass community within its natural range on the refuge. Approximately, two-thirds of Okefenokee's uplands along with much of the upland forest lands of south Georgia historically supported almost pure stands of longleaf pine. These relatively open stands and the understory of wiregrass and scattered clumps of gallberry and palmeto were maintained by frequent, low intensity fire. Longleaf pine, its traditional wiregrass understory and many of its associated resident wildlife species such as the red-cockaded woodpecker, gopher tortoise, indigo snake and fox squirrel are long-lived, reproductively unprolific species.

Unnatural catastrophic events such as the almost total clear cutting occurring around the turn of the century and the disruption of the natural fire regime allowed more prolific tree species such as slash and loblolly pines, normally restricted to lower areas, to invade the longleaf pine sites. Over most of its range, only remnant stands of the longleaf pine remain. Many of the other species associated with the longleaf/wiregrass community are either endangered or threatened.




Several measures are taken in the forest management compartments to restore longleaf pine to its former sites and to insure its existence where it is still present. Some of these resources include:

- -- Selective thinning in mixed stands to favor longleaf pine.
- -- Patch regeneration in pure longleaf stands to establish new age classes. Patch regeneration is also used in pulpwood-sized longleaf pine plantations, once a seed source is established, to gradually replace row planted seedlings to add new age classes and to provide more natural aesthetically-pleasing stands.
- -- Shelterwood regeneration to replace entire stands where a longleaf seed source is available.
- -- Direct seeding to restore longleaf pine on suitable sites.
- -- Machine planting on suitable longleaf sites where an existing dense understory makes natural regeneration or direct seeding impossible.
- -- Warm season burning in selected longleaf pine stands to more closely duplicate the natural longleaf pine community fire regime, to encourage longleaf pine regeneration and to stimulate the spreading of wiregrass.

Methods used in upland wilderness areas to enhance existing longleaf pine/wiregrass communities and to improve red-cockaded woodpecker habitat are described in "Other Forests."

### Forest Management Prescriptions

For the second year, a severe wildfire season has monopolized the forestry/fire staff, leaving very little time for resource management projects. Okefenokee's prescription schedule fell even farther behind this year. Prescription field work for Compartment 7, several scattered fragments of upland totaling 1,960 acres, is 95% complete. Much of the compartment, land donated to the U. S. Fish and Wildlife Service in 1978 by Union Camp Corporation, now supports slash pine plantations. Most of the compartment was burned during the Short's Fire. About 500 acres of slash pine were killed and had to be salvaged. The prescription will propose the following activities:

-- Selective thinning over most of the compartment to improve habitat diversity. Where mixed stands exist, longleaf pine will be favored.

-- Regenerating one 15-acre stand on Fiddler's Island (see map) now a sparse stand of pulpwood-sized slash pine. Longleaf pine will be planted, restoring a former longleaf pine site. About 80 acres of pulpwood-sized slash pine plantations located on former longleaf pine sites on Union Camp donation lands will also be clear cut and replanted with longleaf pine seedlings.

-- Most of the 500 acre salvaged area is part of the Union Camp Corp. donated area where longleaf pine sites were converted to slash pine. Longleaf pine will be seeded or planted to provide future red-cockaded woodpecker habitat. Colonies are located adjacent to the site.

-- Patch regeneration will be utilized to create new age classes in a decadent longleaf pine stand near a red-cockaded woodpecker support stand. The small area (less than 2 1/2 acres) and subsequent patch regeneration to be initiated during the next four cutting cycles will insure future habitat for the red-cockaded woodpecker colonies.

-- Clearing of a wildlife opening on Fiddler's Island. The opening will double as a helicopter landing site and a water dip site for fire suppression purposes. The 2-acre opening, water site and surrounding forest area will improve habitat diversity.

Proposed management activities in Compartment 7 are expected to yield over 4,000 cords of forest products valued at approximately \$100,000.

### Timber Marking

The Compartment 7 (Fiddler's Island) fire salvage sale and several other salvage areas to accommodate fire suppression facilities were marked during 1990. No other resource management marking was completed. Habitat management prescriptions are approved on Compartments 6 (2,500 cords valued at \$90,000) and 9 (1,600 cords valued at 25,000) are approved and ready for marking.

### Timber Harvesting

Eight harvesting permits were active during 1990. Special Use Permit No. 39883, issued in October, 1988 to remove 6,503 cords of forest products from Compartment 8 (the Pocket) was completed during the year. A selective thinning operation began in 1987 to remove 4,671 cords of forest products from Compartment 5 (Soldier Camp Island) was completed. Permit No. 50892 was issued to South Georgia Timber Company to remove approximately 2,600 cords of forest products from Compartments 10, 11, and 12. Permit No. 58097 was issued to South Georgia Timber Company for the removal of 75 cords of pulpwood salvaged from a helispot construction area in Compartment 1 (Cowhouse Island). Mr. Bernice Register was issued permit No. 58099 for the salvage of pulpwood from a fireline and a helispot construction site in Compartment 8. Permit No. 58104 was issued to Mr. Register for the salvage of 71 cords of pulpwood from a Short's Fire camp construction site in Compartment 8. Permit No. 58114 was issued to The Steve Connor Logging Co. for the salvage of 49 cords of pulpwood salvaged from a fireline pushed in Compartment 7 during the Short's Fire. Permit No. 58113 was issued to the Hamilton Trading Company for the salvage of approximately 3000 cords of pine forest products killed in Compartment 7 (Fiddler's Island) by the Short's Fire. Hamilton Trading Co. was also issued permit No. 58128 for salvage of 127 cords of hardwood pulpwood killed during the Short's Fire. One other permit, No. 58115, inactive during 1990, was issued to Mr. Register for the harvest of pine fence posts salvaged from the Short's Fire area in Compartment 7.

Table No. 3 shows a breakdown of forest products harvested during CY 1990 and Table No. 4 is a 10-year summary of forest products removal.

|        | TABLE    | 3        |   |      |
|--------|----------|----------|---|------|
| FOREST | PRODUCTS | RECEIPTS | - | 1990 |

| SPECIAL<br>USE<br>PERMIT # | PERHITTEE                 | PERMIT<br>PERIOD      | PRODUCT  | VALUE/UNIT | TOTAL SALE<br>VOLUIIE | TOTAL<br>VALUE        | VOLUME<br>HARVESTED<br>1990 | 1990<br>RECEIPTS |
|----------------------------|---------------------------|-----------------------|----------|------------|-----------------------|-----------------------|-----------------------------|------------------|
| 39827                      | L. C.<br>Shave            | 06/11/87-<br>06/11/90 | PW<br>ST | \$37.65/cd | 4670.84 cds<br>(est)  | \$175,830.77<br>(est) | 476.61<br>(cds)             | \$17,944.36      |
| 39883                      | So. Ga.<br>Timber Co.     | 10/03/88-<br>04/03/91 | PW<br>ST | \$38.10/cd | 6515.78 cds (est.)    | \$248,251.22<br>(est) | 2580.71<br>(cds)            | 98,325.04        |
| 58092                      | So. Ga.<br>Timber Co.     | 01/29/90<br>01/29/92  | PW<br>ST | \$39.50/cd | 2600 cds<br>(est)     | \$102,000.00<br>(est) | 1335.80<br>(cds)            | 52,764.10        |
| 58097                      | So. Ga.<br>Timber Co.     | 04/30/90-<br>05/31/90 | PW       | \$25.00/cd | 74.53<br>(cds)        | \$ 1,863.25           | 74.53<br>(cds)              | 1,863.25         |
| 58099                      | Bernice<br>Register       | 05/02/90-<br>06/30/90 | PŴ       | \$8.00/cd  | 152.78<br>(cds)       | \$ 1,222.24           | 152.78<br>(cds)             | 1,222.24         |
| 58104                      | Bernice<br>Register       | 10/18/90-<br>10/31/90 | PW       | \$8.00/cd  | 71.27<br>(cds)        | \$ 570.16             | 71.27<br>(cds)              | 570.16           |
| 58113                      | Hamilton<br>Trading Co.   | 11/26/90-<br>04/26/91 | PW<br>ST | \$39.42/cd | 6000<br>(est)         | \$236,500.00<br>(est) | 486.89                      | 19,193.20        |
| 58114                      | Steve Con-<br>ner Logging | 11/01/90-<br>11/30/90 | PW       | \$10.00/cd | 48.98<br>(cds)        | \$ 489.80             | 48.98                       | 489.80           |

PW - Pulpwood; ST - Sawtimber. Receipts were received in CY 90.

\$192,372.15

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|   | - | - |  |

| CY   | *SAWTIMBER<br>(MBF) | PULPWOOD<br>(CDS) | STUMPWOOD<br>(TONS) | POSTS<br>(EA) | TOTAL VALUE<br>DOLLARS |
|------|---------------------|-------------------|---------------------|---------------|------------------------|
| 1981 |                     | 2,777             | 74                  | 9,745         | 48,591                 |
| 1982 | 92.3                | 788               | 282                 | 22,133        | 25,180                 |
| 1983 | 51.2                | 371               | . 115               | -             | 18,176                 |
| 1984 | 55                  | 513               |                     | 1.4           | 16,533                 |
| 1985 | 1. 2- 1.4           | 1,742             |                     | 26,021        | 32,882                 |
| 1986 | 1.1.1               | 1,499             |                     | 6,708         | 41,371                 |
| 1987 |                     | 837               | 55                  | 2,467         | 19,980                 |
| 1988 |                     | 5,399             | -                   | -             | 205,947                |
| 1989 |                     | 2,807             | 59                  | -             | 105,672                |
| 1990 | -                   | 5,228             | and and a           |               | 192,372                |

TABLE NO. 4 TEN-YEAR FOREST PRODUCTS REMOVAL SUMMARY

Much of the volume sold by the cord on Okefenokee is actually utilized as sawlogs or poles, but weighed and converted to cords.

35

## Site Preparation

Site preparation was begun to restore longleaf pine in two 20-acre regeneration areas in Compartment 8. Fire activities delayed work on these and other tracts scheduled for planting in early 1990. Site preparation work was begun on a 16-acre tract in Compartment 4. This extremely brushy area will need to be chopped or harrowed a second time before planting. Slash pine seedlings will be planted in the area.

#### Tree Planting

In order to re-establish longleaf pine on its former sites, several methods are used including seed tree/shelterwood and patch cutting methods of natural regeneration, direct seeding, and hand and machine planting. No tree planting was completed in 1990 because of the unusually active fire season.

## b. Other Forest Areas

Other forest areas where commercial harvesting techniques are not used as management tools include 16.518 acres of upland islands located within wilderness boundaries, d4,122 acres of swamp forest and 231,137 acres of scrub-shrub brushlands. Management activities taking place in these areas include protection, fire management, wildlife, and habitat surveys.

Warm season prescribed fire is being considered on some of the wilderness islands supporting red-cockaded woodpecker colonies in order to encourage recovery of the natural longleaf pine/wiregrass community. A series of spring and summer fires occurring on Blackjack Island has resulted in excellent replacement stands. Traditional winter prescribed fires on other islands have encouraged very little longleaf pine or wiregrass regeneration. Blackjack, Billy's, Number One, Mitchell's, Bugaboo, Honey, Strange, Pine, Rowells, and Boatlanding Islands receive winter burns periodically.

Wildlife surveys conducted in wilderness areas include red-cockaded woodpecker surveys. Billy's Island is surveyed annually. Mitchell, Number One, Bugaboo and Honey Islands are also surveyed periodically. Osprey and other water and shorebird surveys are conducted in the forested swamp areas.

A brief description of the other forest areas follows:

Upland Forest Islands (16,518 acres - 4% of refuge area) - These islands are very similar to the refuge uplands around the perimeter of the swamp, dominated by pine with hardwood hammock scattered throughout the higher areas. Major tree species include longleaf pine, loblolly pine, slash pine, pond pine and several species of oaks. On higher areas, longleaf pine dominates and includes grasses and palmetto. The understory includes several species of ground oaks, dwarf blueberry, and huckleberry. On wetter areas, gallberry and hurrah-bush are more predominant.

<u>Broad-Leaved Swamp Forest</u> (15,824 acres - 4% of refuge area) - Mixed wetland hardwoods including sweet bay, swamp tupelo, and red bay types dominate the overstory. The somewhat open understory and midstory contain various <u>Ilex</u>, <u>Magnolia</u>, <u>Gordonia</u>, and <u>Persea</u> species.

<u>Cypress Forest</u> (11,911 acres - 3% of refuge area) - Over 75% of the canopy is represented by cypress. A subcanopy of broad-leaved evergreens may be present. The understory may be open or dominated by scrub-shrub species.

Pine Swamp Forest (728 acres - 1% of refuge area) - These are stands of scrub slash pine growing in the swamp. Shrub species may be present.

<u>Mixed Forest Wetland</u> (55,659 acres - 14% of refuge area) - This type is a mixture of most of the forest species found in the swamp including cypress, pine, blackgum, bay, and scrub species.

Scrub Shrub Swamp (231,187 acres - 58% of refuge area) - The swamp brushlands include many everyreen and deciduous scrub-shrub species.

The remaining unforested area (48,384) acres is herbaceous prairie, aquatic macrophyte prairie, and open water.

# Wildlife Openings

Several wildlife openings, also serving as emergency helispots, have been developed within upland forests within the past two years. These areas include a 3-acre site in Compartment 1 (Cowhouse Island); a 2-acre site in Compartment 5 (Soldier Camp Island); a 3-acre site in Compartment 6 and a 3-acre site in Compartment 13 (Greasy Branch Island). All these sites are in various stages of completion. When finished, these four openings will contain helicopter dip sites providing open water to add to habitat diversity. The Compartment 6 opening, for example, will provide several edge habitats - pine forests, upland hardwoods, swamp forest, grassland and open water.

Additional openings are planned in Compartments 4, 7, 9, 11, 13 and 15. Permanent wildlife openings are extremely difficult to establish and maintain in the vicinity of Okefenokee Swamp because of the aggressive encroachment of understory and brush species. The most practical way of maintaining openings on Okefenokee Refuge is to maintain sites for dual purposes such as emergency helispots, log loading areas, temporary access roads, firebreaks, etc. Forest regeneration areas serve as temporary openings. Okefenokee Refuge presently has over 700 acres of permanent or temporary openings.

# 9. Fire Management

Fire management on this refuge reached a new level of complexity in 1990 as the Okefenokee experienced its driest year since 1954 when most of the swamp and over 150,000 acres of private timber land surrounding the swamp were ravaged by fire. Open water in the swamp "prairies" was nonexistent; the scrub shrub root mat levels and bog surfaces were "dusty dry"; and uplands were extremely dry. Local residents reported private lands surrounding the refuge to be drier than in 1954, probably due to the drainage projects that preceded recent wetland legislation. During much of the year, Cumulative Severity Index (CSI) levels approached the scale limit of 800. The Okefenokee Swamp was declared a "semi arid desert" by some of the Short's Fire overhead. For the second time in two years, a swamp prescribed fire jumped an intended natural barrier necessitating a costly suppression action. Wildfires kept the fire management staff occupied from May through December.

Although the 1990 drought presented both prescribed and wildfire management problems, it also presented the best opportunity since 1954 to preserve itself as a swamp. Both the swamp and the spland islands and surrounding uplands depend upon fire to preserve the conditions and nabitats supporting the wildlife species native to Okefenokee Refuge. Without periodic fire "setting back succession" the Okefenokee is dying.

The fire management dilemma facing the refuge staff involves the difficulty of keeping either prescribed or wildfires within the swamp and refuge boundaries when conditions are sufficiently dry to accomplish desired objectives. Protecting private lands during refuge fires is extremely costly. Current fire management planning includes the establishment of cooperative or easement agreements or memorandums of understanding with adjacent landowners to allow the development of a fuel reduction/burn out zone around the perimeter of the swamp to increase control of fires at the swamp's edge. This zone will reduce the risk of prescribed fire escape and allow utilization of prescribed natural fires to accomplish objectives.

### Prescribed Burning

Some of the many benefits of prescribed burning when properly applied are: reduction of wildfire hazard; control of diseases, insects, and parasites; increase of available wildlife habitat; seed bed preparation for natural forest regeneration; improvement of access for forest and wildlife management; and enhancement of certain aesthetic qualities.

Prescribed burning is of particular importance in the management of Okefenokee's longleaf pine/wiregrass community utilized by the endangered red-cockaded woodpecker. Burning helps to maintain open stands of longleaf preferred by this woodpecker species by killing back midstory and understory species and by removing less desired, competing pine species which are less tolerant of fire. When applied during the growing season, prescribed fire may stimulate the recovery of wiregrass and other grasses native to the area.







Above, Seagrove Lake on the east side of the Swamp with fair water levels. (09/89) 90-16 UK

Below, Seagrove during the peak of the drought. (09/90) 90-17 JLD





During the fiscal year, 6,109 acres of the prescribed 7,185 acres were burned. Some scheduled burning units were not completed because of low water levels in the natural barriers surrounding the burning unit boundary. For the second year, the burning season ended with an escaped fire (see wildfire section).

Total burning costs for FY 1990 were \$25,351, averaging \$4.15 per acre.

Table No. 5 on page 41 is a summary and evaluation of Okefenokee's FY 1990 prescribed burning activities.

# TABLE 5

# FY 1990 PRESCRIBED BURNING SUMMARY

OKEFENOKEE NATIONAL WILDLIFE REFUGE

| AREA     | BURN<br>UNIT | REPORT #<br>(DI 1202) | ACRES<br>PLANNED | ACRES   | DATE<br>BURNED | IGRITION | BURN<br>EVAL | COST      | COST PER<br>ACRE | REMARKS   |
|----------|--------------|-----------------------|------------------|---------|----------------|----------|--------------|-----------|------------------|---|
| Compl    | 1            | 4109                  | 500              | 750 02/ | 26/90 G.       | 19 34    | \$3,144      | \$ \$4.19 |                  | and the second second                           |
| Comp 2   | a,b          | 4030                  | 164              | 164     | 01/23/90       | G        | 38           | 698       | 4.25             |   |
| Comp 2   | c.d          | 4003                  | 30               | 30      | 01/03/90       | G        | 38           | 965       | 32.15            |   |
| Comp 3   | Er H         | 4365                  | 12               | 12      | 05/23/90       | 6        | 38           | 550       | 45.83            | Experimental Growing Season Burns - May         |
| Comp 3   | Er A         | 4364                  | 12               | 12      | 08/18/90       | G        | 38           | 640       | 53.26            | Experimental Growing Season Burns - August      |
| Comp 3   | 5            | 4010                  | 27               | 32      | 01/11/90       | 0        | 38           | 668       | 20.86            | Wildlife Openings                               |
| Comp 4   | 4            | 4111                  | 16               | 12      | 02/27/90       | G        | 34           | 198       | 16.46            | Wildlife Openings                               |
| Comp 5   | 1            |                       | 379              | 0       |                |          |              |           | **               | Timber harvesting operations in progress.       |
| Comp 5   | 2            | **:                   | 438              | 0       |                |          |              |           | **               | Timber barvesting operations in progress.       |
| Comp 5   | 3            | 4012                  | 248              | 248     | 01/13/90       | G        | 38           | 1,650     | 6.66             | Test fire on 1/12/90, Aborted by Ga For Con.    |
| Comp 5   | 4            | 4013                  | 188              | 188     | 01/10/90       | G        | 2A           | 1,097     | 5,84             |   |
| Comp 5   | 5            | 4251                  | 114              | 114     | 12/29/90       | G        | 38           | 2,390     | 20.95            |   |
| Comp 6   | 1            |                       | 135              | 0       |                | -        |              |           |                  | Burning conditions not suitable for plantation  |
| Comp 7   | Hisc         |                       | 200              | 0       |                |          |              |           |                  | Could not establish Swamps Edge Break.          |
| Comp 8   | 5            | 4031                  | 330              | 330     | 01/23/90       | G        | 38           | 2,122     | 6.43             |   |
| Comp 8   | Sill         | 4157                  | 10               | 10      | 03/06/90       | G        | 34           | 315       | 31.52            |   |
| Comp 11  | Exp          |                       | 35               | 0       |                |          | **           |           | **               | Too dry, wildfire is progress.                  |
| Comp 13  | 1            | ***                   | 119              | 0       |                | -        |              | **        |                  | Could not schedule during burning season.       |
| Comp 13  | 2            |                       | 688              | 0       | **             |          |              | **        | **               | Could not schedule during burning season.       |
| Comp 13  | 3            | **                    | 363              | 0       | **             | -        |              |           |                  | Could not schedule during burning season.       |
| Comp 13  | 4            |                       | 115              | 0       | **             |          | **           | **        |                  | Could not schedule during burning season.       |
| Comp 15  | 1-3          | 4046                  | _ 997            | 997     | 01/27/90       | G        |              |           |                  | Ground crews used to blackline perimeter.       |
|          |              | 4107                  |                  |         | 02/06/90       | G.       |              |           |                  | Remainder set by aerial ignition.               |
|          |              | 4108                  |                  |         | 02/07/90       | 19       | 30           | £,097     | £.11             | Some areas burned bot. Some mortality.          |
| Comp 15  | 4 -          | **                    | 337              | 0       | **             |          | -            | **        | -                | Could not schedule during burning season.       |
| Comp 16  | 1            | **                    | 225              | 0       |                |          | -            | **        | **               | (Old C-7) Rc Swamps Edge Break established.     |
| Boat Las | id Is.       | 4105                  | 160              | 160     | 02/06/90       | 12       | 28           | 953       | 5.95             | Poor burning conditions (wind).                 |
| Strange  | Is.          | 4112                  | 1,400            | 250     | 02/06/90       | 1F       | 24           | 937       | 3.75             | Four burning conditions (wind).                 |
| Billys 1 | is.          | 4110                  | 2,800            | 2,800   | 02/07/90       | 75       | 30           | 2,927     | 1.05             | Killed 13 RCWP trees, possibly due to high CSI. |
| Bugaboo  | Is/Prairie   | e 4210                | 1,400            | **      | 05/12/90       | AP       |              |           |                  | * Fire escaped - Declared to be wildfire.       |
| Grand Pr | rairie       |                       | 300              | 0       | **             |          |              | **        |                  | Swamp water level too low for safe burn.        |
| Floyds I | rairie       | **                    | 350              | 0       |                |          |              |           |                  | Swamp water level too low for safe burn.        |
| Refuge 1 | boundary     |                       | 100              | 0       | **             |          |              | **        |                  | Water level too low to contain fire.            |
| Suvatnee | Canal Ba     | ak                    | 10               | 0       |                |          | **           |           |                  | Water level too low to contain fire.            |
| 101      | ALS          |                       | 12,202           | 6,105   |                |          | 1            | \$25,351  | \$4.15           |   |
|          |              |                       |                  |         |                |          |              |           |                  |   |

## IGNITION METHOD

BURS EVALUATION

6 - Ignition by ground crews

AP- Aerial ignition (ping-pong balls)

- AT- Aerial ignition (belitorch)
- Fire and Resource Management Objectives
- 1 Prescribed fire failed to accomplish objectives.
- 2 Prescribed fire accomplished objectives in part but not within prescription limits.
- 3 Prescribed fire accomplished objectives within prescription limits.
- 4 Prescribed fire accompliabed objectives beyond prescription limits.

# Allowable Resource Damage Objectives (Crown Scorch, Mortality)

- A Little or no crown scorch.
- B Crown scorch within prescription limits.
- C Crown scorch exceeds prescription limits.
- D Excessive crown scorch Some mortality probable.

## Wildfire

High temperatures, dry weather, and low water levels resulted in the most severe fire season in and around Okefenokee NWR since 1954. Twenty-eight wildfires requiring suppression action and numerous natural outs occurred throughout the refuge. Map No. 2 on page 43 shows locations of the fires. Details of each fire are described on the following pages:

Fire 4210 - Mother's Day Fire: The Mother's Day Fire began as a spot over from a growing season prescribed fire conducted in a scrub-shrub area near Bugaboo Island on May 12, 1990. Fire smoldering around the edge of Bugaboo Island ignited a scrub-shrub area, not part of the target burn area but still within the overall burn boundary. Southeast winds blowing throughout the afternoon and evening caused the fire to jump or burn through a band of open marsh, a natural barrier comprising the intended prescribed fire boundary. By Sunday morning, May 13, the spot-over area had burned 616 acres of scrub-shrub and scrub-pine outside the prescribed fire area. The run came to within a few hundred yards of Honey Island, endangering redcockaded colonies on Honey Island, Billys Island, facilities at Stephen C. Foster State Park and private lands. Suppression and mop-up action (hand craws and helicopters with buckets) within the 615-acre wildfire area and the 3,100-acre prescribed fire area allowed very little spread of the fire perimeter after May 13. Smoldering within the two fire areas continued as lack of expected May rains allowed water levels to continue dropping. By May 28, water levels dropped several inches bringing the original prescribed fire area out of prescription. At this point, the entire 3,800acre fire area was included in the wildfire area. Suppression and mop-up action continued until the fire was declared out on June 7. The suppression costs were \$225,000. Resources committed during the suppression action included up to 2 helicopters and 3 short crews totaling 21 personnel.

Fire 4231 - Double Strike Fire: This fire was discovered on June 3 between Blackjack Island and Strange Island during a reconnaissance flight of the Mothers Day Fire. Several helicopter bucket drops controlled the fire. The fire burned 1.5 acres and was declared out on June 4. Suppression costs were \$3,700. Resources committed to the suppression action were one The Double strike was suppressed in accordance with FWS helicopter. interim policy directing that all fires be suppressed until revised Fire Management Plans identify approved prescribed natural fire areas. In addition, the water levels existing at the time of this series of fires. allow small spot fire to grow until they endanger resources beyond the refuge boundaries. Also, fires of this size can be suppressed with a single light or medium helicopter at minimum cost. If allowed to grow beyond a few acres in size, larger helicopters supported with hand crews are necessary to suppress the fire, enormously increasing suppression costs.

Fire 4232 - Stumphole Fire: This fire was discovered on June 4 between Mitchell Island and Gannet Lake during a helicopter reconnaissance flight of the Mother's Day Fire. A helicopter equipped with a bucket suppressed the fire the day it was discovered. Suppression costs were \$1,000.



Fire 4233, 4234, 4235 - Natural Outs: The fires which went out naturally were discovered during the Mothers Day Fire suppression operations. The three fires occurred between Mitchell Island and Bugaboo Island.

Fire 4236 - Mitchell Island Fire: The fire was started on Mitchell Island by a lightning storm on July 7, 1990. By the time the fire was detected by the Georgia Forestry Commission on July 9, the fire size was over 100 acres and was beginning to burn off from the island into the swamp. Dry fuel conditions and erratic winds driven by several thunderstorm cells caused the fire to run in several directions, increasing the fire size to 300 acres by mid morning. Because of the severe fire behavior conditions predicted, a Class I Interagency Team was requested. Attempts to confine the fire to the island with helicopter bucket drops and hand crews failed when new storm cells on July 11 spread the fire in all directions. The fire threatened Soldier Camp Island to the south, Chesser Island to the north, private lands to the south and east. With the existing severe fire weather conditions, it could have spread in any direction to threaten lands outside the swamp. By evening on the 11th, the fire had consumed 4,500 acres of forest and swamp brushland and had burned onto the east end of Blackjack Island. If it were not for a 2-inch rain associated with one of the thunder cells, this fire would have continued to spread and probably would have left the swamp. Heavy rains on July 12 and 13 aided suppression efforts and allowed mop-up to begin. Hand lines were constructed to prevent further spread of the fire on Blackjack Island. Tractor-plow units plowed lines on Solder Camp Island, Chesser Island and around Camp Cornelia in case the fire should continue to spread. Hand crews aided by helicopter bucket drops continued mop-up within the swamp until the fire was finally controlled on August 8 and declared out on the 16th. Final fire area was 4,500 acres and suppression costs were \$650,000. Resources used on the Fire include: 3 helicopters, 7 hand crews, 3 engines and 4 tractor-plow units for a total of 220 personnel. Two air tankers were on standby at a nearby retardant base if needed. Agencies cooperating in the suppression unit include: Fish and Wildlife Service, National Park Service, Forest Service, Georgia Forestry Commission, Florida Division of Forestry, Tennessee Division of Forestry, and Texas Forest Service. A first for FWS Region 4 fire suppression efforts occurred on the Mitchell Island Fire when three 20 person FWS crews with a total of 80 FWS personnel were working on the fire at one time.

<u>Fire 4251 - Moniac Fire</u>: This arson-caused fire occurred on August 3, outside the refuge boundary on the south end of the refuge. Refuge assistance was requested in the suppression of this fire because the refuge was threatened. Eleven tractor-plow units and two refuge helicopters responded to attack the fire. During the suppression action, the FWS provided tractor-plow units, helicopters with buckets, engine crews and hand crews. The fire was contained on August 4 and declared out on August 8 after burning 398 acres. Suppression costs were \$9,000.

<u>Fire 4255 - Reggie Fire</u>: This fire, just off the refuge boundary, was discovered on August 14 by a refuge suppression crew enroute to another fire (mop-up operation) on the west side of the refuge. The engine crew attacked and suppressed the fire before continuing their mop-up operation. The fire burned about 4 acres. The fire was probably caused by railroad equipment. Suppression costs were \$500.

Fire 4256 - Hannans Fire: The Hannans Fire is one of a series of lightning -caused fires in or near Compartment 9 of the refuge. This fire was off the refuge, next to the refuge boundary; however, it was threatening the refuge. The fire was suppressed along with two other fires in the vicinity. The fire was discovered on July 2 and suppressed on the same day. Two acres were burned. Suppression costs were \$1,000.

<u>Fire 4257 - Sammy Parr Fire</u>: The Sammy Parr is one of a series of lightning-caused fires in the vicinity of Forest Management Compartment 9. Initial attack was by the Georgia Forestry Commission. Refuge engine crews completed mop up. Two acres were burned. Suppression cost was \$1,000.

Fire 4258 - Bridge Fire: This fire occurred during the night of June 10 when an arsonist burned a Government-owned bridge on the Perimeter Road on the northwest side of the refuge. Some privately-owned timberland adjacent to the bridge was also burned. The fire was contained by the Georgia Forestry Commission. A joint investigation by the FWS, FBI and GBI failed to turn up the culprit. This was one of the few bridges not scheduled for replacement. Replacement costs are approximately \$25,000. Suppression and investigation costs were approximately \$5,000.

<u>Fire 4357 - Don's Fire</u>: The lightning-caused fire was detected on September 10 by the Project Leader while on a helicopter patrol. The fire burned about 4 acres on Cowhouse Island (Compartment 3) before being suppressed by Georgia Forestry Commission tractor-plow units. The fire was declared out on September 12. Suppression costs were \$1,500.

<u>Fire 4358 - Teddy Fire</u>: The lightning-caused fire started just north of Bugaboo Island in an area previously burned by the Mothers Day Fire. The fire was discovered by a FWS helicopter pilot during a helicopter patrol on September 20. Helicopters attacked the fire and suppressed it the same day. About one acre was burned. Suppression costs were \$2,000.

Fire 4359 - Long Lem Fire: The fire was discovered near Long Lem Road on September 10 by the Short's Fire suppression crews. The lightning-caused fire was burning on Container Corp. lands adjacent to the refuge boundary. Engine crews, hand crews and tractor plow units converged on the fire and suppressed it before it burned over an acre. Suppression costs were \$2,500. <u>Fire 4360 - Fish Camp Fire</u>: The fire, discovered on September 5 adjacent to the refuge boundary on private land, was apparently started by sparks from defective logging equipment. Its close proximity to the Short's Incident Base allowed fast suppression action by engine crews, hand crews, tractor-plow units and helicopters. Less than two acres were burned. The fire was declared out on September 7.

Fire 4361 - Shelton Fire: The Shelton Fire was started by the same group of lightning strikes that started the multi-million dollar Short's Fire. Smoke was detected during the evening of August 31 by refuge personnel in The Pocket area. A helicopter was dispatched to the area the next morning to locate source of smoke. When discovered, the fire was about 55 acres in size, burning in southern rough in The Pocket (Compartment 8). One refuge tractor plow unit contained the fire at 66 acres. The fire area was observed for several days before declaring it out on September 6. Suppression costs were \$6,000.

Fire 4362 - McCullough Fire: This lightning-caused fire occurred in Forest Management Compartment 13 on the northwest side of the refuge. The fire was discovered by helicopter on September 1 while suppressing the Shelton Fire (Fire 4361). Tractor-plow mits from the Beorgia Forestry Commission and ITT Rayonier suppressed the fire. Engine crews worked for several hours to mop-up the smoldering fire in heavy fuels adjacent to the tractor plow line. The fire was contained at 60 acres and was declared out on September 6. Suppression costs was \$5,500.

<u>Fire 4363 - Foster Fire</u>: A lightning strike started a fire in a snag a few hundred yards west of The Pocket (Compartment 8). The fire was discovered on September 3, by the Clinch County, Georgia Forestry Commission Ranger while patrolling the Short's Fire by helicopter. Helicopters with buckets began dumping water on the fire immediately, containing the fire before it could spread. Less than 0.1 acres burned. The fire was declared out on September 4. Suppression costs were \$500.

Fire 4374 - Bugs Neck Fire: This lightning caused fire was discovered on August 10 by the Georgia Forestry commission on Bugs Neck Island (Compartment 7). The fire was attacked by two tractor-plow units, one helicopter and a hand crew. The fire was contained on August 10, after burning 4 acres, then patrolled for several days before it could be declared out on August 15. Heavy fuels required expensive mop-up and patrol. Suppression costs were \$8,000.

Fire 4375 - Ritchie Fire : The lightning-caused fire was discovered on "The Pocket" (Compartment 8) by a Stephen C. Foster State Park employee on August 2. Refuge tractor-plow units contained the fire at 7 acres. Heavy fuels and dry conditions necessitated complete and extensive mop-up. The fire was declared out on August 6. Suppression costs were \$4,000.

Fire 4376 - Mill Road Fire: The lightning-caused fire occurred next to Mill Road in Compartment 13, burning refuge and ITT Rayonier lands. The fire was discovered by the Georgia Forestry Commission patrol aircraft on July 29, and contained by Forestry Commission tractor-plow units, one helicopter with bucket and one hand crew. Five acres were burned. Suppression costs were \$2,000.

Fire 4377 - Bee Hive Fire: This 8 acre fire was lightning-caused. On July 25, the Georgia Forestry patrol pilot discovered the fire in Compartment 13 near Mill Road. Two state tractor-plow units and one refuge hand crew responded to the fire and contained it on the same day. The fire was declared out on July 27. Suppression costs were \$6,000.

<u>Fire 4378 - Hammock Fire</u>: This lightning-caused fire near Hickory Hammock in Compartment 13 was discovered on July 11 while suppression actions for the Mitchell Island Fire were in full swing. The fire was suppressed by tractor plow units and engine crews dispatched by the Southern Interagency Red Team. The fire was controlled on July 13 and declared out on July 18. Seventy acres were burned. Suppression costs were absorbed by the Mitchell Island Fire suppression action (Fire 4236) but represent about \$30,000 of the project fire cost.

<u>Fire 4379 - Off Us Fire</u>: This lightning-caused fire occurred on July 2, just outside the refuge boundary on the north end of the refuge. Refuge assistance was requested because the fire was threatening a small refuge upland tract containing red-cockaded woodpecker habitat. Three state tractor-plow units and a refuge hand crew responded. The 30-acre fire was contained the same day and declared out on July 4. Suppression costs were \$3,000.

<u>Fire 4413 - Foq Fire</u>: The Fog Fire was started on December 27, probably by an arsonist. It was discovered by a Florida State Game Warden on December 28 and reported to the Florida Division of Forestry who dispatched a tractor-plow unit to the scene. The report was relayed to Okefenokee NWR personnel who responded with an additional tractor-plow unit, 2 engine crews and a hand crew. The actual fire location proved to be located north of the state line in Georgia. Mop-up operations continued throughout the 28th and the 29th. The fire was declared out on December 30. Ten acres were burned. Suppression costs were \$1,000.

Fire 4275 - Short's Fire: A line of thunderstorms moved through the southwest portion of the refuge on August 31, 1990 igniting the Short's and several fires in the area. On Friday night, August 31, smoke was detected in "The Pocket" area. It was not possible to schedule a reconnaissance flight that evening. Due to the extreme drought conditions in and around the refuge, a reconnaissance helicopter flight had previously been scheduled for the following day, September 1. During the flight, two fires, the Shelton and McCullough were located. Near the end of the day, during suppression operations, the Short's Fire was spotted in the swamp near Jack Island (see map). The fire was less than a quarter acre in size when located. Unfortunately, the aircraft was low on fuel and could not begin initial attack until refueling in Waycross, 40 miles to the north. By the time the aircraft returned, the fire had grown to several acres in size and was spreading too fast for the aircraft to handle. At this time, additional resources (helicopters, hand crews) were fire ordered. The Georgia Forestry Commission began plowing fire breaks to protect threatened areas. The fire continued to spread rapidly within the swamp and by the end of the day (September 1) had spread to 15 acres. Regional office personnel were notified.

By Sunday evening, September 2, the fire grew to 225 acres. Tractor-plow units continued to prepare uplands adjacent to the swamp for a major run. Fire ordering an interagency overhead team was discussed but delayed until the Labor Day weekend was over. By Monday evening (Labor Day), the fire had increased in size to 800 acres. Flame lengths were up to 75 feet. At 8:00 pm, the final run of the day drove the fire out of the swamp, across the refuge boundary onto Container Corporation lands. Resources at this time included 20 tractor-plow units, 3 engines, (1) 9,000-gallon water tank truck, 3 helicopters and 57 personnel. Suppression activities were concentrated on stopping the spread of the fire on private lands.

During the next few days, the fire continued to spread in the swamp with the growing flanks continuing to move along the swamp's edge. Suppression resources concentrated on containing the fire as it made runs out of the swamp (tractor-plow units and helicopters); burning out unburned fuels in front of the main fire as it approached uplands (tractor-plow units, helicopters and hand crews); cooling advancing heads as they approached containment forces (helicopters); and reducing fuels adjacent to resources (generally, hand crews). Sprinkler systems installed to protect Stephen C. Foster State Park facilities. Hand crews began raking around hundreds of red-cockaded woodpecker trees. All open line on the fire was too hot for hand crews to begin containment activities.

Resources threatened at this time included: Stephen C. Foster State Park; Refuge facilities on "The Pocket"; private forestlands adjacent to the refuge; private residences and a commercial tourist accommodation adjacent to the refuge; red-cockaded woodpecker colonies and support habitat on refuge uplands.

On September 5, a Type II incident commander and other interagency overhead were ordered. By the following day, an interagency team lead by Joe King of the Cherokee National Forest had been assembled to command the Short's fire. By September 8, all of the area between Ga. Hwy. 177 and the main fire had been burned out and the east side of "The Pocket" had been black lined between the highway and the swamp's edge (see Map). Retardant drops began on the east flank of the fire to protect Stephen C. Foster State Park. Helicopter bucket drops began reinforcing the retardant line. Hand crews began mop-up on the upland flanks of the fire; the swamp flanks were still too active to direct attack with hand crews. The fire area had increased to 2,500 acres. Resources on the fire at this point included 29 tractor-plow units, 7 engines, 1 water tender (9,000 gal.), 1 retardant aircraft, 6 helicopters and 170 personnel.

Between September 6 and 17, mop-up continued. Hand crews began containment and mop up activities in the swamp. A sprinkler system was established along the south flank in the swamp. The fire area had been stabilized at 2,600 acres. Seventy percent of the line had been contained by black lines, retardant lines, sprinkler systems, or helicopter/bucket wet lines. Within the 2,600-acre containment zone, fuels were low scrub-shrub, some of which were burned twice in the past 5 years. It was possible to work on the fire in the swamp and there was a reasonable chance of containing the fire until suppression forces were aided by rainfall. Resources committed to the suppression action peaked during this phase of the fire at 20 tractor-plow units, 8 engines, 1 engine tender, 5 helicopters, 2 retardant planes, and 253 personnel. The overhead team began demobilizing personnel and equipment and by September 17 had turned the fire back over to refuge personnel, leaving only the refuge staff, one 20-person crew, 3 helicopters and air support personnel.

Beginning with September 17, refuge personnel were faced with the task of holding the fire perimeter around a 2,600-acre fire, mostly within the swamp, with over 200 acres of burning peat in one area. Fire activity immediately began picking up. Several spots were suppressed around the perimeter of the fire. All available resources were committed toward reinforcing lines in anticipation of a cold front scheduled to pass within the next few days. Additional resources were ordered. On September 20, as fire behavior conditions continued to become more severe and in anticipation of the passage of a strong cold front, an interagency short team was ordered. The Virginia Team lead by John Coleman of the Washington National Forest assumed command of the fire on September 21.

On September 23, the long expected cold front passed through with winds of 10 to 15 miles per hour and relative humidities in the 20's. Lines held throughout the day, but just before dark, gusty winds blew flaming Spanish moss over the southeast corner of the swamp perimeter line. Attempts to suppress the escaped fire with helicopters before dark failed. North winds continued to expand the escaped fire area throughout the night. After the September 23 escape, the fire spread into swamp forest areas with heavier fuels. At this point, all suppression action within the swamp was curtailed. All suppression action was now concentrated on protecting property or resources on upland areas around the swamp except where it was necessary to drop water or retardant in the swamp to cool off or slow down a run or front advancing toward suppression crews on the upland.

The fire area increased rapidly over the next few days reaching 10,500 acres by September 26. Suppression action involved plowing lines between the swamp edge and the nearest major break (usually the Perimeter Road), burning out between the breaks, then suppressing any spots escaping the burn-out zone when the main fire made its runs toward the swamp's edge. Steady winds from the east aided suppression efforts tremendously, allowing suppression crews to confine the fire to the southeast part of the swamp by working the fire along the swamp's edge as the fire area enlarged to the south. Any time during the active phase of the Short's Fire, strong winds from any other direction could, in two days time, move the fire to any part of the swamp's edge, making defense of private property almost impossible. Although the east flank of the fire held during the September 23 escape and did not grow during the remainder of the suppression effort, a major concern was that the black line would be outflanked by the active head growing to the south. A south wind could once again endanger Stephen C. Foster State Park. In addition to protecting private lands and resources around the perimeter of the swamp, fire proofing activities continued around all west side refuge and state park facilities, refuge facilities at Camp Cornelia, and Chesser Island. Hand crews raked all red-cockaded woodpecker cavity trees within threatened areas. Suppression costs were now approaching \$200,000 per day.

On October 2, transition occurred from the Type II Virginia Team to the Type I Southern Interagency Red Team lead by Robert Kitchens from the Southeastern Regional Office of the USFS. The Short's Fire area continued to grow daily. Preparations were made for the expected burn out of the southern half of the Okefenokee Swamp. Several helicopter dip sites were constructed near the perimeter of the swamp; the Swamps Edge Break was extended around most of the southern half of the swamp; and preparations were made to move the Incident Command Post from the west side to Camp Cornelia. By October 9, the Short's Fire had burned 20,773 acres of swamp and forestland. Resources committed to the suppression action were 46 tractor-plow units, 16 engines, 6 engine tenders, 6 helicopters, 3 retardant aircraft, and 629 personnel.



SHORTS FIRE ORIGIN OKEFENOKEE NATIONAL WILDLIFE REFUGE



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During the heat of the day, this scene was common as the humidity dropped and the winds increased (Short's Fire). (10/90) 90-18 TRG





Back fires were set during the Short's Fire along the high ground to remove fuels ahead of the fire. This Terra-torch unit from Merritt Island NWR was very impressive. (09/90) 90-19 RAP



Up to nine helicopters were used during the Short's Fire. The size and remoteness of the refuge dictates their use. (10/90) 90-20 TRG



Fire retardant drops by airplane were used as a last resort to slow fires approaching the "hill". This then allowed the fire crews time to build breaks ahead of the flames and burnout areas to slow the oncoming inferno. (10/90) 90-21 TRG













During this period, other natural forces were at work. The progress of tropical storm Klaus had been monitored for several days. Although the storm began to disorganize as it approached the area on October 9, it still had 4 inches of rain to drop over the Short's Fire. Tropical storm Marcos followed dropping another 2.5 inches of rain. Water levels in the swamp increased 12 to 18 inches. Demobilization began on October 10. Plans were made to replace the Type I Red Team with the Type I Blue Team lead by Rex Mann from the Daniel Boone National Forest on October 14 to continue mop-up and fireline rehabilitation operations.

Mop-up continued for several weeks as hot spots kept showing up. Rehabilitation of firelines, roads and camp sites, bank sloping and seeding of helicopter dip sites, repairing damaged culverts, etc. continued throughout the remainder of the year. The Blue Team gradually demobilized as the danger of escape lessened but remained in command of the fire until October 28 when the last of the team left. The Short's Fire was then turned back over to the refuge. Much of the remaining mop-up in the swamp was accomplished by a helicopter rappelling team from Arizona. The team worked very effectively in the swamp. Much time is normally lost cutting through brush from the nearest helispot to the target hot spot. Engine strike teams mopped up the remaining hot spots near the edge of the swamp. Mop-up continued until November 10 when the remaining non-refuge personnel were demobilized. Aerial patrol was continued until November 22 when the fire was listed as controlled. On December 24, the Short's Fire was declared out.

Personnel and equipment from the following agencies were used to suppress the Short's Fire: U. S. Fish and Wildlife Service, U. S. Forest Service, National Park Service, Bureau of Land Management, Bureau of Indian Affairs, National Weather Service, Department of Defense, Federal Emergency Management Authority, Georgia Forestry Commission, Florida Division of Forestry, Texas Forest Service, North Carolina Division of Forestry, Charlton County, Ware County, Brantley County, Clinch County, Jefferson Smurffit/Container Corp., Champion International, The Langdale Company, and Gilman Paper Company.

During most of the suppression operation, the unified command concept was utilized where the interagency team and the Georgia Forestry Commission and sometimes the Florida Division Of Forestry were in joint command of the suppression operations.

Several points regarding the Short's Fire suppression action should be emphasized:

--During most of the suppression action, resources were committed to protecting property and natural resources around the perimeter of the swamp and valuable resources within the swamp. The objective of the suppression action was not to suppress the fire in the swamp.

--Of the 20,773 acres burned, only about 200 acres of private property burned. Suppression crews successfully kept the fire within refuge boundaries.

8

--Wind direction was relatively constant during the active fire period. Had any major wind shifts occurred, the fire area would have been much larger and the threat to private property would have been much greater.

--Approximately 500 acres of red-cockaded woodpecker habitat was destroyed within the refuge and will have to be rehabilitated.

--Over a 200 acre area the scrub-shrub root mat and some peat was burned. When higher water levels returned, some open water areas now exist where scrub-shrub existed before. Some of these areas were burned twice before, in 1985 and 1989.

-- The estimated total cost of the Short's Fire was \$9,000,000.

--Four interagency teams, an assembled team (Type II), the Virginia Team (Type II), the Southern Interagency Red Team (Type I), and the Southern Interagency Blue Team (Type I).

--The air operations personnel should be commended for their performance during the Short's Fire. Numerous rotary and fixed wing aircraft were operating simultaneously without any major incidents, accidents or injuries. During the Short's Fire, 964 hours of flight time were logged.

--Operationally, the suppression action went well, although there were some incidents of "lost motion" during transition from one team to another. Had Tropical Storms Klaus and Marcos not squelched the fire, it may have burned on for months. The standard procedure of changing teams every 14 days does not seem appropriate for this type of fire. Realizing that personnel must be rotated out periodically, a residential task force must be organized to coordinate suppression actions, transition between teams, accountability, etc, during the next long-term major fire.

--Logistically, there were some problems during the Short's Fire. Accountability for supplies was questionable. Large quantities of some supplies were unaccounted for or became missing. In some cases, procurement methods were questionable. The Project Leader requested a review of accountability and procurement procedures during the suppression action. This review was conducted during December and some incidents are still being investigated.

Of the 27 fires reported during 1990, 1 was ignited by prescribed burning operations, 21 by lightning, 3 by arson and 2 by equipment.

In addition to refuge fire activity, permanent staff and seasonal fire crew members served on several off refuge fire details during 1990.



| Fire   | Personnel and Po   | DSITION   | Dates       | Location                   |  |  |
|--|--|---|-------------|----------------------------|--|--|
| Hurricane Hugo<br>Fuel Reduction<br>Prescribed<br>Fire | Ron Phernetton<br>H. McCullough<br>Tony Gooch<br>Tim Huling<br>Dartha Pittman  | Burn Coord.<br>AI Operator<br>HeliBase Mgr.<br>Holding Crew<br>Dispatcher   | 2/9-18/90   | Cape Romain<br>NWR, SC     |  |  |
| Western Fire<br>Detail                                 | Vince Allen<br>Michael Barr<br>Michael Peacock<br>Reggie Forcine<br>Stacey Moore<br>Lonnie Daniels<br>Gavin Young<br>Matt Rosengren<br>William Sikes | Squad Boss<br>Firefighter<br>Firefighter<br>Squad Boss<br>Firefighter<br>Firefighter<br>Firefighter<br>Firefighter<br>Firefighter | 6/29-7/5/90 | Albuquerque,<br>New Mexico |  |  |
| Western Fire<br>Detail                                 | Jonathan Young<br>Avery Stafford<br>David Shepherd<br>Michael Peacock<br>Richard Hannans<br>Lonnie Daniels<br>Rob Cone<br>Greg Blanks<br>Vince Allen | Firefighter<br>Firefighter<br>Firefighter<br>Firefighter<br>Firefighter<br>Firefighter<br>Firefighter<br>Squad Boss               | 8/11-18/90  | Shasta,<br>California      |  |  |

# Interagency Fire Cache

During 1989, the U. S. Forest Service, Region 8 requested that the refuge store, maintain and transport one of four interagency mobile fire caches. The cache, capable of outfitting 150/250 fire suppression personnel, is stored at Okefenokee for use on wildfires in Georgia, Florida and other nearby states. As part of a cooperative effort between the Fish and Wildlife Service and the USFS Region 8, refuge personnel will transport the cache to the wildfire area when requested through the Region 8 Coordination Center. In 1990, the cache was moved to wildfires in the following areas:

| Heflin, Alabama |      | u.  | U. S. Forest Service |    |      | One Incident |          |         |              |      |
|-----------------|------|-----|----------------------|----|------|--------------|----------|---------|--------------|------|
| Okefenokee      | NWR, | Ga. | U.                   | s. | Fish | and          | Wildlife | Service | Mitchell Is. | Fire |
| Okefenokee      | NWR, | Ga. | U.                   | s. | Fish | and          | Wildlife | Service | Short's Fire |      |

61

# 12. Wilderness and Special Areas

Some 353,981 acres of Okefenokee were designated in 1974 for preservation under the Wilderness Act. Preservation consists primarily of regulatory enforcement and monitoring the biological and physical features within the swamp.

The following areas have been designated for protection as natural areas on the refuge:

# 1. Threatened Community Research Natural Areas

| Pond Cypress Research Natural Area | 14,989 acres |
|------------------------------------|--------------|
| Sweet Bay Research Natural Area    | 2,560 acres  |

# 2. Research Natural Areas

Floyd's Island (swamp island)160 acresPine Island (swamp island)90 acresTerritory Prairie (marsh and bog)1,450 acresBlackjack Island (sphagnum bog)15,027 acresCowhouse Island (hardwood hammock)10 acresNumber One Island (swamp island)126 acres

# 3. Public Use Natural Areas

| Chesser | Island Bay (swamp forest)            | 100 | acres |
|---------|--------------------------------------|-----|-------|
| Chesser | Island (hardwood hammock)            | 11  | acres |
| Floyd's | Island (swamp island)                | 575 | acres |
| Chesser | Prairie Rookery (wading bird colony) | 3   | acres |
| Chesser | Prairie (marsh prairie)              | 800 | acres |

### G. WILDLIFE

## 1. Wildlife Diversity

The Okefenokee Refuge is part of a large (438,000 acres) ecosystem consisting of several complex habitat communities. These habitats include longleaf pine wiregrass, swamp forest, scrub-shrub, and open aquatic marshes. The swamp is considered a palustrine, acidic, freshwater wetland with organic soil and a water regime described as intermittently exposed throughout the year. Ninety percent of the refuge is included in the National Wilderness System.

## 2. Endangered and Threatened Species

#### A. Florida Panther

The Florida Panther was once common throughout the Okefenokee Swamp. Several sightings are reported to the staff almost every year by visitors and others. To date, no physical evidence has been collected. The Florida Freshwater Game and Fish Commission suspended the experimental introduction of western cougars in the Osceola National Forest vicinity in early 1989. Scientists captured the last two of seven cougars that were released to test the area's suitability for re-introduction of the Florida Panther. Since the experiment began in June 1988, two of the cats apparently were killed by unknown persons; one died of unknown causes and one died from injuries sustained during recapture after it had developed a taste for livestock. Another cat also began hunting exotic deer at a private preserve, while another wandered into a residential area of west Jacksonville, Florida. Efforts will now revolve around the captive breeding program and the south Florida studies involving the bulk of the Florida Panther population.

### B. Bald Eagle

Bald eagles are occasional visitors to the refuge usually being sighted in the early and late winter as they pass through on their way to and from their wintering grounds. No records have been found that document bald eagles nesting on the refuge. One sighting of an eagle occurred in early December and two more sightings were reported by refuge guides in Chesser Prairie in late January.

### C. Wood Storks

Storks are a regular summer and fall visitor to the swamp. Many of these storks arrive from nesting areas along the coast of Georgia and Florida, while many come from the central and southern parts of Florida. Due to the extremely low water conditions this summer, very few storks were observed in the swamp. Less than 100 wood storks were observed this year.

63

## D. Red-Cockaded Woodpecker

The red-cockaded woodpecker was once common in mature longleaf pine forests throughout the Okefenokee. This bird is now listed as <u>Endangered</u> primarily due to habitat loss. As habitat loss continues on private lands, efforts to manage this species on public land becomes critical.

The annual red-cockaded woodpecker survey was not completed in its entirety due to the Mitchell Island Fire and assignment of Range Technician Gooch and Assistant Manager Lunceford to the investigation team concerning red-cockaded woodpecker management at the Fort Benning Military Base at Columbus, Georgia.

Billy's Island and Soldier Camp Island were surveyed during late May and early June. In 1990, there were 17 active colonies on Billy's Island, 34 of 105 trees were active. Nine red-cockaded woodpecker trees were found dead at the time of the survey. These trees were apparently killed by the prescribed burn of 1989. Conditions appeared to be marginal the day of the burn and temperatures climbed higher than were predicted. Several suggestions were made after a review of the incident to avoid any future losses. The Soldier Camp survey revealed three colonies of red-cockaded woodpeckers to be active this year. One "clan" of birds was observed feeding in Colony B.

The Mitchell Island Fire started on July 7 due to a lightning strike on the southwest side of the island. This island supports four colonies of red-cockaded woodpeckers, three of which were active during 1989 and 1990. Of a total number of 21 trees, 5 or 24% were killed by the wildfire. The fire severely burned the trunks of four trees and heat killed the crown of the fifth. Trees numbered 2, 4, 9, 11, and 1 unnamed tree are dead. Some damage was done to the longleaf pine regeneration as several seedlings were observed severely burned. No damage was done to the colonies on Blackjack Island as the fire was extinguished by rain before it reached colony sites.

The Short's Fire threatened to advance onto Billys Island and Honey Island but was slowed and eventually soaked by tropical storm Marcos. A fire crew was transported during the beginning of the fire to these islands in order to rake around red-cockaded woodpecker trees to prevent damage from the wildfire.

In all, 45 of 59 colonies were assumed to be active again this year. The total number of colonies was derived by including all known colonies since 1972 when records began. Some of these colonies may have been abandoned over the years; however, this number represents a reasonable estimate. The number of young produced is estimated at the same number as last year. The breeding population of 90 birds is derived by multiplying the number of active colonies by two.



## E. Ivory-Billed Woodpecker

Records indicate that the Ivory-Billed Woodpecker once was a common sight in the Okefenokee. The last reported sighting was in 1903 by John M. Hopkins, the first superintendent of the Hebard Cypress Company. The U. S. Fish and Wildlife Service has funded a "last effort" to determine if Ivory-Billed Woodpeckers still exist in the United States. If the study fails to find the Ivory-Bill in 1992, the Fish and Wildlife Service will initiate actions to change the Federal status of the species to extinct.

#### F. Eastern Indigo Snake

The Indigo snake was listed as threatened in 1978. Two sightings were reported in 1990 along the Chesser Island Wildlife Drive by refuge personnel. Sightings occur almost regularly near the hardwood plot during spring and summer. The refuge contains approximately 14,000 acres of suitable habitat for this elusive species. This snake should benefit from the warm season prescribed fire which is proposed to begin soon.

## G. American Alligator

The "gator survey" was not done this year due to extremely low water levels during the last of 1990. In the past, these surveys have provided the refuge with an index of population trends. The results of these surveys reflect an inverse relationship between number of animals and water levels. The higher the water levels in the swamp, the more the alligators are dispersed; whereas, the lower waters concentrate the animals in a limited area. During This the last of summer, water levels began to drop rapidly. condition forced the alligator to seek water where they could find During the initial drying out of the Sill, Range Technician it. Gooch observed one thousand alligators in the Sill ditch adjacent to the first spillway from a helicopter (see slide). Most of these animals were adults or subadults. No young gator under three feet were associated with this large concentration. As the Sill dropped lower, fewer numbers of gators remained. Many gators are thought to have crossed the Sill headed downstream seeking what water was left down the Suwannee River.

The past few years at Okefenokee have been environmental conditions at their extremes. Brief cold temperatures coinciding with low water levels have had a negative effect on the alligator population. Again, early this year, several frozen alligators were reported by the refuge staff. Fewer young hatchling alligators were observed this year.


Low water the past two summers has significantly reduced the alligator population. Poor nesting success results from depredation due to black bear below or cannibalization by other 'gators. (09/87) 90-25 and 90-26 Hunt



67

# 3. Waterfowl

Waterfowl populations were low during 1990 due to the very low water levels. Population totals were estimated to be below 5,000 ducks. The most common duck at Okefenokee is the wood duck. Refuge visitors regularly observe this tree nesting duck flying over the open prairies. Other common species visiting the refuge include green winged teal, blue winged teal, mallards, and ringnecks. Lesser numbers of American widgeon, pintails, and an occasional snow goose visit the refuge during the winter. During the Christmas Bird Count by the Okefenokee Bird Club, twelve Canadian geese and four hooded mergansers were observed.

### 4. Marsh and Water Birds

Approximately 20% of the Okefenokee Refuge is suitable habitat for this large group of birds. White ibis, great egrets, greater sandhill cranes, Florida sandhill cranes, snowy egrets, great blue herons and little blue herons are the most commonly observed birds on the refuge. Species such as the great blue heron and the American bittern have been identified as "INDICATOR SPECIES", on the refuge. The populations of these species are closely monitored by regular surveys to provide a reliable population index. Due to the drought this year, fewer birds than usual remained on the refuge. Populations were normal for the first half of 1990. When water levels began to drop during June, the birds began to leave the swamp. The annual colonial nesting bird survey was not conducted on the ground this year; however, during the Short's Fire many flights were flown over the area. White ibis attempted to nest early before water levels began to drop during June. The nesting area remained completely dry until late Approximately 2,000 birds were estimated to be in the Macks November. Island Rookery at the beginning of the season. Once the rookery area became dry, the birds soon deserted the site. Attempts were made to relocate the nesting birds along the Suwannee River, but no activity was This is the second year in a row that nesting has been observed. unsuccessful in the largest refuge rookery. Population estimates throughout the years have ranged from 4,000 to 30,000 birds at this Another small rookery was discovered approximately 3 miles location. southwest of Bluff Lake. The site was located on a "Bay Island" totally surrounded by swamp forest. No open water was within a mile of the locale. About 400-500 great egrets nested for several weeks at this spot. The Chesser Island, Craven's Hammock, and the North Forks rookeries were not active again this year. The St. Marys Rookery, south of Folkston, was active this year with cattle egrets and great egrets being the dominant species. During low water periods, many waders seek areas with water to roost over. Many birds roosted along the Suwannee Canal during much of the year.

| Species          | Peak Pop. Period | Peak Number<br>(Estimated) |  |  |
|------------------|------------------|----------------------------|--|--|
|                  |                  |                            |  |  |
| White Ibis       | Summer           | 5,000                      |  |  |
| Common Egret     | Summer           | 2,500                      |  |  |
| Snowy Egret      | Summer           | 500                        |  |  |
| Florida Sandhill | Resident         | 400                        |  |  |
| Greater Sandhill | Winter           | 1,629 (Actual              |  |  |
| Wood Storks      | Fall             | 100                        |  |  |
| Great Blue Heron | Spring/Summer    | 200                        |  |  |
| American Bittern | Spring/Summer    | 50                         |  |  |
|                  |                  |                            |  |  |

### MARSH AND WADING BIRD SURVEY DATA - CY 90

### 5. Shorebirds, Gulls, Terns and Allied Species

Suitable habitat is minimal within the Okefenokee Swamp for these species. Common snipe, often observed during the cooler months in the prairies, is the most frequently seen member of this group.

### 6. Raptors

Commonly observed raptors at Okefenokee include the red-shouldered hawk, barred owl, and an occasional swallow-tailed kite. Black and turkey vultures are the most numerous raptors at Okefenokee. Two known roosts exist on the refuge -- one in Mizell Prairie and the other at the Sill spillway. The Sill's roost averages 200+ birds and the Mizell roost averages 100+.

Osprey nesting surveys have been conducted by fixed-winged aircraft on Okefenokee National Wildlife Refuge since 1973. This year's survey was conducted May 10 at 9AM by Range Technician Gooch and terminated at 12 All areas were surveyed in accordance with the Okefenokee NWR noon. Wildlife Inventory Plan Procedure OKE-WS-4. The results of the survey are summarized in the following table. Seventeen nests were located of which eight were active. Eight young nestlings were observed during the search. Ten adult osprey were observed compared to eleven last year. Water levels were somewhat low at 114.08 feet at Stephen C. Foster State Park. Shortly after the survey was conducted, precipitation rates declined and water levels dropped drastically. The Sill area where most of Okefenokee's osprey nest was dry for most of the last half of 1990. Survival rates of the osprey fledglings is suspected to be very low due to these conditions. This is the second poor year for nesting osprey in this area. The decisions made in relation to the preservation or removal of the Sill will have a substantial impact on Okefenokee's osprey population.

#### 1990 OSPREY NESTING SURVEY RESULTS

| YEAR   | LOCATION                | NEST | STATUS | ADULTS | YOUNG | EGGS |
|--------|-------------------------|------|--------|--------|-------|------|
| 1990   | Chesser & Grand Prairie | 1    | I      | 0      | 0     | 0    |
| 1990   | Chesser & Grand Prairie | 5    | I      | 0      | 0     | 0    |
| 1990   | Buck Prairie            | 6    | I      | 0      | 0     | 0    |
| 1990   | Mizell Prairie          | 1    | I      | 0      | 0     | 0    |
| 1990   | Mizell Prairie          | 2    | I      | 0      | 0     | 0    |
| 1990   | Mizell Prairie          | 3    | I      | 0      | 0     | 0    |
| 1990   | Mizell Prairie          | 4    | I      | 0      | 0     | 0    |
| 1990   | Chase Prairie           | 2    | A      | 1      | 2     | 0    |
| 1990   | Chase Prairie           | 3    | N      | 0      | 0     | 0    |
| 1990   | Chase Prairie           | 5    | A      | 1      | 1     | Ø    |
| 1990   | Floyd's Prairie         | 1    | I      | 0      | 0     | 0    |
| 1990   | Floyd's Prairie         | 2    | Л      | 0      | 0     | 0    |
| 1990   | Suwannee River Sill     | 2    | N      | 0      | 0     | 0    |
| 1990   | Suwannee River Sill     | 4    | A      | 1      | 1     | 0    |
| 1990   | Suwannee River Sill     | 5    | A      | 2      | 1     | 0    |
| 1990   | Suwannee River Sill     | 6    | A      | 1      | 1     | 0    |
| 1990   | Suwannee River Sill     | 7    | A      | 1      | 1     | 0    |
| 1990   | Suwannee River Sill     | 8    | A      | 1      | 1     | 0    |
| 1990   | Suwannee River Sill     | 9    | I      | 1      | 0     | 0    |
| 1990   | Suwannee River Sill     | 10   | A      | 1      | 0     | 0    |
| 1990   | Suwannee River Sill     | 13   | N      | 0      | 0     | 0    |
| 1990   | Suwannee River Sill     | 14   | N      | 0      | 0     | 0    |
| TOTALS | Okefenokee NWR          | 17   | 8      | 10     | 8     | 0    |

A = Active: adult ospreys are on nest and do not flush; young observed in nest; eggs observed in nest. Adults carry food to nest if nest is observed by boat.

I = Inactive; no nesting occurred; no ospreys near nest.

N = Nest not located this year, but was located during past two years. Possibly fallen tree or abandoned; will search again next year.

D = Destroyed or completely abandoned. Nest has not been found for over three years.

\* = Adult bird would not flush.





Other water dependent species such as the otter (above) and the Florida sandhill (below) had poor reproductive success due to the drought conditions. UK 90-27 and 90-28 Hunt



### 7. Other Migratory Birds

Okefenokee Refuge has many diverse habitats which support a wide variety of bird species. Again this year, the Okefenokee Bird Club conducted the annual Christmas Audubon bird count. They saw a total of 75 species for a total of 7,807 birds. Club members observed a large number (1,030) of yellow-rumped warblers. During the winter, the refuge supports a large population of wintering and transient robins.

### 8. Game Mammals

Only white-tailed deer are hunted on the refuge. Due to the Short's Fire, the hunts were cancelled.

Though not hunted on the refuge, the black bear is hunted on adjacent lands in Florida and Georgia. The Okefenokee Swamp is considered one of the largest remaining Biological Reserves for this species in the southeast. Population estimates for the refuge range from 300 to 700 bears. Recently, the U. S. Fish and Wildlife Service's Endangered Species Office in Jacksonville, Florida was petitioned to list the black bear as threatened. The bear is now listed as protected in Florida with the exception being three northern counties, which are adjacent to the refuge. Georgia allows hunting for three weekends or six days during the year. The state of Florida has moved their hunting season for bears to the end of the year, which is a change from having the season concurrent with their deer season. Hopefully, this will result in fewer numbers of adult females being harvested which will in turn result in a higher breeding population. In cooperation with other state and Federal agencies, the refuge has proposed a study of the bear's ecology. The Georgia DNR, Florida Freshwater Fish & Game Commission and the U. S. Forest Service at the Osceola National Forest to the south of the refuge are very interested providing that funding can be obtained. Dr. Pelton of the University of Tennessee, a noted bear researcher, is currently working on a study proposal to be presented soon.

### 10. Other Resident Wildlife

Due to the varied habitat found on the refuge, the refuge supports a wide diversity of resident wildlife species. Wildlife commonly seen include raccoons, gray and fox squirrel, gray fox, and turkeys. Otter and roundtailed muskrat are seen in the cooler winter months. Occasionally, a beaver is sighted. Three sightings of coyotes have been reported this year in the headquarters vicinity. Several species of snakes are regularly observed. These include canebrake rattlesnakes, cotton mouths, pygmy rattlesnakes, diamondback rattlesnakes, and a large variety of nonpoisonous snakes.

#### 11. Fisheries Resources

Okefenokee's fishery habitat is closely linked to the cyclic fluctuations of water levels. Drought years reduce the fish populations, which may take several years to recover once a wetter weather cycle returns. Swamp water is very acidic, averaging 4 to 5 on the PH scale. This condition results in a very nutrient poor environment. During 1990, the University of Georgia and the Georgia Department of Natural Resources collected fish from five sites on the Suwannee and nearby Santa Fe Rivers to determine mercury levels. In addition, fish were collected on the refuge by electroshocking in the vicinity of both the east and west entrances. A total of 19 piscivorous fish were collected during a 2-day period. This preliminary survey indicated a high mercury residue of 0.86 ppm (wet weight) and a low of 0.14 ppm in 17 fillets. The mean was 0.34 ppm. Although these mercury residue values are higher than normal levels, none exceeded the FDA level. It is suspected, however, that the larger fish may approach the 1 ppm level.

Lead levels were surprisingly high with detectable values averaging approximately 0.72 ppm (wet weight). There is no FDA level for lead in fish, but a limit often used for food is 0.3 ppm.

Due to the high values of mercury and lead, further testing is planned next year in hopes of getting a better sample size.

#### 14. Scientific Collections

Two scientific collecting permits were issued during the year. These permits were: (1) Dr. Billy J. Jump of Dalton College at Dalton, Georgia for the collection of insects on Billys Island; (2) Dr. Arthur Cohen of the University of South Carolina for the purpose of collecting peat core samples from the Mitchell Island Fire and Short's Fire areas.

### 16. Marking and Banding

Success was limited this year due to very low water conditions, the lowest since 1955. Both the east side and the west side banding sites were dry for most of the season. Of the total number banded, 106 were mature and 6 were immature woodies. Forty-six or 41% were females. All were captured using rocket nets. As in recent years, problems were encountered in keeping bait on the site. Bears and raccoons were regular visitors to the banding sites often consuming the corn before the ducks arrived.

#### OKEFENOKEE'S 10-YEAR BANDING RESULTS

| 1980 | 1981 | 1982 | <u>1983</u> | <u>1984</u> | <u>1985</u> | 1986 | 1987 | 1988 | <u>1989</u> | 1990 |
|------|------|------|-------------|-------------|-------------|------|------|------|-------------|------|
| 216  | 161  | 59   | ?           | ?           | 131         | 331  | 242  | 250  | 251         | 112  |

(ALL FIGURES REPRESENT BANDED WOOD DUCKS)

73

| NOOD DUCK  | NUAL REPORT FORM  | ATTON                            |
|--|---|----------------------------------|
| WOOD DUCK  | YEAR 1990   | ALLON                            |
| Total Boxes  | 88  |                                  |
| Total Usable   | 85  |                                  |
| Used by Ducks  | 32%   |                                  |
| Successful   | _7  |                                  |
| Used by Other Ducks  | 0   |                                  |
| Month Checked  | Dec   |                                  |
| Use by Other Wildlife  | _10_  |                                  |
| Total Ducks Hatched *  |   |                                  |
| Wood Duck Broods   | 7   |                                  |
| Survive to Flight **   | 50%   |                                  |
| PLANS FOR NEXT YEAR (I   | ndicate Number)   |                                  |
| More Boxes   |   | _ Entrance Holes<br>in Trees     |
| Less Boxes   | X   | No Change                        |
| REMARKS <u>All figures ar</u><br>boxes. <u>Plastic boxes h</u><br>received no use. | e both wooden boxes<br>ad only 15% usage.   | and plastic<br>Forty-eight boxes |
|  | and the second se |                                  |
|  |   |                                  |
| * Unless one can actua<br>successful boxes by 10.                                  | lly count egg shell   | s, multiply                      |
| ** If survival rate is rationale in remarks se                                     | other than 50%, pl<br>ction.  | ease explain                     |
| <u>REMEMBER</u> document peri<br>and repair.                                       | ods that boxes were   | checked for use                  |
| THESE FIGURES REPRESENT<br>1989 DATA   | AN ESTIMATED SUCCE  | SS RATE BASED ON                 |



75

You can never tell where you might find one of these heart pounding wildlife species. We call it canned rattlesnake. (02/90) 90-29 BT



This doe, as seen from inside the refuge office, has utilized the edge of the refuge office the past two years to lie down in the shade away from the yellow flies. (06/89) 90-30 TRG 76

## H. PUBLIC USE

### 1. General

Visitation increased during CY 90 to 423,157. This attendance, the largest in the past five years, is skewed somewhat due to the presence of fire personnel for approximately 3 months at both east and west entrances. The occurrence of two major fires also increased public exposure with the generation of 198 news releases, 7361 inquiries, one personal appearance, and 92 days of professional service. Media exposure also was enhanced with television and newspaper coverage of the Short's and Mitchell Island fires and Earth Day activities. The span of media organizations varied from local television and newspaper to national ones, including NBC's Today Show and the USA Today newspaper.

#### Entrance

| Year | East    | West    | North  | TOTAL   |
|------|---------|---------|--------|---------|
| 1990 | 161,621 | 182,639 | 78,897 | 423,157 |
| 1989 | 177,318 | 121,738 | 36,307 | 386,063 |
| 1988 | 192,609 | 124,099 | 98,147 | 414,855 |
| 1987 | 146,927 | 113,460 | 97,545 | 357,934 |
| 1986 | 117,452 | 89,128  | 89,915 | 296,495 |

In 1990, the refuge improved the entrance fee kiosk area at both east and west entrances by paving the service road and installing informational signs regarding the entrance fee program. Compliance improved markedly as a result.

### FEDERAL RECREATION FEE COLLECTIONS

### ENTRANCE PERMITS

| Type of Permit   | No.    | Receipts    |
|------------------|--------|-------------|
| Single visit     | 16,397 | \$49,190.52 |
| Group/Commercial | 50     | 830.00      |
| Golden Eagle     | 55     | 1,375.00    |
| Golden Age       | 1,165  | 0.00        |
| Golden Access    | 88     | 0.00        |
| Duck Stamp       | 67     | 837.50      |
| Swamp Park       | 62,468 | 11,971.75   |
| TOTAL            | 80,290 | \$64,204.77 |



### RECREATION USER PERMITS

| Type of Permit                                  | No.      | Receipts    |  |
|---|----------|-------------|--|
| Special Use (Canoeing)<br>Commercial (Canoeing) | 569<br>6 | \$22,105.00 |  |
| TOTAL   | 575      | \$22,405.00 |  |

### 2. Outdoor Classrooms - Students

Mr. Don Berryhill, Science Specialist of the Okefenokee Regional Educational Services Agency (RESA), conducted most of our student programs - 2,646 visits of which 2,475 occurred at the north entrance.

# 3. Outdoor Classrooms - Teachers

Park Ranger Tritaik with the assistance of Mr. Berryhill conducted a Project Wild workshop for eight Charlton County teachers at the east entrance. Mr. Berryhill conducted programs for 333 teachers at the north entrance. Employee Tritaik also facilitated a Project Wild workshop for the attendants to the Regional Public Use Workshop in Land Between the Lakes, KY in September.

|          | Visits | Activity Hours |  |
|----------|--------|----------------|--|
| Students | 2,646  | 10,584         |  |
| Teachers | 353    | 1,444          |  |

### 4. Interpretive Foot Trails

Beam counters were utilized for various trails including the swamp boardwalk, Homestead and Peckerwood Trails. Each counter experienced mechanical failures at one time or another. Based on counter readings and calculated estimates, the use of the foot trails are as follows:

| Trails        | Number of Visits |
|---------------|------------------|
| Homestead     | 1,386            |
| Deerstand     | 1,093            |
| Boardwalk     | 15,133           |
| Peckerwood    | 2,197            |
| Canal Diggers | 1,716            |

YCC crews and volunteers have again been utilized to maintain trails and trim vegetation to allow better viewing.

# 5. Interpretive Tour Routes

# A. Watercraft Tours

Boat tours continued to decrease in 1990 due to extensive drought conditions. The west entrance experienced an interruption of over four months. The east entrance boat tours were halted for a period of over two months. The north entrance's 2-hour tours were ceased for eight months. The following is a list of the number of visitors using guided boat tours for the past three years:

| ENTRANCE | <u>1990</u> | <u>1989</u> | 1988   |
|----------|-------------|-------------|--------|
| East     | 13,363      | 21,130      | 21,293 |
| West     | 2,556       | 3,469       | 5,771  |
| North    | 2,345       | 464         | 6,566  |

During 1990, wilderness canoeing also decreased considerably as a result of the drought as compared with the previous 2 years:

|                     | 1990  | <u>1989</u> | 1988  |
|---------------------|-------|-------------|-------|
| Wilderness Canoeing | 2,325 | 3,186       | 3,522 |



Boat trails on the refuge looked like this, or worse, during the last half of '90. All boat access was terminated during part of this time. (07/90) 90-31 Hunt

## B. Automobile Tours

Visitation on the Swamp Island Drive actually increased despite being closed for one month. Visitation was estimated as 30% of the total of the land vehicle count. The counter on the Swamp Island Drive continues to be inoperable.

|       |        |       | 1990   | 1989   | 1988   |
|-------|--------|-------|--------|--------|--------|
| Swamp | Island | Drive | 42,882 | 39,038 | 62,668 |

#### 6. Interpretive Exhibits/Demonstrations

No changes were made in 1990 to exhibits at the Swamp's Edge Visitor Center or the Chesser Island Homestead. However, an interpretive exhibit was added to the museum at the north entrance to highlight the importance of wetlands. Visitation dropped at both the Swamp's Edge Visitor Center and the Chesser Island Homestead due to overall drop in visitation as a result of the drought.

|         |                     | 1990   | 1989   | 1988   |
|---------|---------------------|--------|--------|--------|
| Swamp's | Edge Visitor Center | 30,823 | 41,147 | 38,147 |
| Chesser | Island Homestead    | 14,092 | 18,733 | 24,771 |

#### 7. Other Interpretive Programs

On April 21 and 22, National Wildlife Week was observed in conjunction with the celebration of the 20th Anniversary of Earth Day. Activities included a juried art show, lectures, demonstrations, film showings, a children's poster content, and tree plantings. Highlights included: a bird presentation by Melanie Cain-Stage; a snake presentation by Sy and Paula Matusiak; lectures on Biodiversity by Nat Frazer, presentation on alligators and humans by Howard Hunt, and on poaching by Conservation Ranger Mike Brooks. Herb Reichelt and friends provided Bluegrass music. Media coverage was extensive. Park Ranger Paul Tritaik appeared on Brunswick independent TV-21 to promote the event. Jacksonville CBS affiliate TV-4 covered the activities on Sunday, April 22, as did Folkston radio station WOKF.

Night Owl Prowls and Night Boat Tours were conducted during the Earth Day weekend and throughout the year by concessioner Carl Glenn.

The annual Okefenokee Festival was cancelled for October, 1990 due to the potential threat from the Short's fire.

One hunter safety course was offered in the St. George fire hall in September. This event was coordinated with the local Georgia Department of Natural Resources Conservation Rangers. Supervisory Park Ranger Jim Burkhart represented the refuge at this 2-day course for 20 students.



Former Refuge Manager Roy Moore exhibits some of his award winning oil paintings at the National Wildlife Week Arts and Crafts Shops. (04/90) 90-32 JAB



Winners of the Kids Fishing Derby to Commemorate National Fishing Week. (06/90) 90-33 Nolan The 9th Annual Yule Log Ceremony at the Chesser Homestead attracted about 75 people. The devotional was given by Rev. Benji Varnell from the Folkston United Methodist Church. Christmas caroling was again led by the Roddenberry sisters. Webelo Pack 360 prepared the luminaries and other volunteers helped with the preparation of the Yule log, baking cookies and providing hot chocolate and coffee. All visitors who attended enjoyed the fellowship as they warmed themselves by the fire.

### INTERPRETATION - 1990

|                                      | No. of Visits | Activity Hours |
|--------------------------------------|---------------|----------------|
| Wildlife Trail - Non-motorized       | CO 100        | 126 147        |
| Conducted                            | 227           | 239            |
| Wildlife Tour Route - Motorized      |               |                |
| Self-guided                          | 42,882        | 38,593         |
| Conducted                            | 18,398        | 30,231         |
| Interpretive Center                  | 30,823        | 9,246          |
| Visitor Contact Station              | 95,396        | 9,539          |
| Interpretive Exhibits/Demonstrations |               |                |
| Self-guided                          | 141,874       | 11,735         |
| Conducted                            | 14,114        | 7,048          |
| Other On-Refuge Programs             | 16,108        | 8,054          |

### 8. Hunting

The four scheduled white-tailed deer shotgun hunts at the Pocket and Suwannee Canal Units were cancelled due to a potential threat from the Short's Fire. No archery hunts were scheduled.

### 9. Fishing

The fishing on the refuge suffered perhaps the worst conditions in many years due to the extended drought. Record low water levels and high temperatures contributed to declining water pH and dissolved oxygen levels. Sport fishing suffered the most at the east and west entrances. The entrance at Kingfisher Landing experienced less severe water level recession. Due to the stress from adverse environmental conditions and high predation by alligators, wading birds, and fishermen, the "season" on fishing was closed at the Sill on June 8, the west entrances on June 29, and the east entrance on July 13. All remained closed through December 1990. Fishing at Kingfisher Landing continued due to the minimal drought effects in the northeast corner of the refuge. Included below is a 3-year comparison of fishing visits.

83

# FISHING VISITS

|                     | # VISICS |        |        |
|---------------------|----------|--------|--------|
|                     | 1990     | 1989   | 1988   |
| East Entrance       | 2,035    | 2,881  | 3,777  |
| West Entrance       | 2,421    | 5,033  | 11,716 |
| Kingfisher Landing  | 785      | 1,011  | 858    |
| Suwannee River Sill | 2,635    | 3,385  | 6,013  |
| TOTAL               | 7,876    | 12,310 | 22,364 |

# 11. Wildlife Observation

Contained here is a comparison of visitor use in wildlife observation for the past three years:

|               | 1        | 990           | 19         | 8.9                  | 19       | 88            |
|---------------|----------|---------------|------------|----------------------|----------|---------------|
|               | Visitors | Activity Hes. | Visitors . | <u>Activity Brs.</u> | Visitors | Activity Hrs. |
| Foot Trails   | 1,093    | 820           | 1,468      | 1,101                | 4,283    | 3,214         |
| Boardwalk     | 15,133   | 21,186        | 22,254     | 30,233               | 21,427   | 29,998        |
| Land Vehicles | 239,056  | 59,764        | 226,468    | 74,420               | 292,416  | 73,107        |
| Watercraft    | 16,069   | 50,654        | 25,341     | 79,026               | 37,131   | 111,393       |

Unusual sightings during 1990 included: Florida panther (unconfirmed), vermillion flycatcher, adult and immature bald eagle, indigo snake, darkeye junco, rock dove, coyote, and willet.

# 12. Other Wildlife-Oriented Recreation

Wildlife-oriented camping, picnicking and photography are the other nonconsumptive wildlife-oriented recreation. Camping, aside from wilderness canoe and scout area camping, occurs exclusively at the west entrance (Stephen Foster State Park). Tent campers and cabin users accounted for 21,771 and 9,317, respectively.

Picnicking was partaken by a total of 10,750 visitors at both the east and west entrances.

Photography was enjoyed by more visitors at the west entrance as compared with the east entrance. The total at the west entrance is 3,709 and 214 for the east entrance. The large difference is probably due to a primarily difference in estimating the count.

### 17. Law Enforcement

Law enforcement problems during the year mostly occurred along the refuge boundary lines. The low water conditions along with the closure of the refuge due to the Short's Wildfire curtailed quite a bit of activity in the interior of the refuge. A total of five collateral duty officers patrolled the refuge. Biological Technician Shelton was converted to fulltime Refuge Officer 1802 in October to fill a badly needed function.

A total of 36 cases was prosecuted during the year. Several noteworthy cases made during the year were the apprehension of a person on the canoe trail that had collected pitcher plants (a State endangered species) on the refuge. Another case involved a family that was caught removing cypress saplings from the refuge to make "wicker" type furniture for resale. This family would enter into a cypress pond on the refuge and completely denude a pond of all saplings under two inches in diameter.

In August, the Short's Wildfire occurred on the refuge. During the peak of the fire, over 20,000 acres of refuge land had burned and over 700 firefighters and support staff were called in to help contain it. These crews were housed in a temporary fire camp built at Stephen Foster State Park on the refuge. Refuge officers were brought in from all around the region to provide security for the fire camp and refuge property. Round the clock security was provided by two refuge officers on duty. While on duty refuge officers responded to the following calls: vehicle accidents, speeding, theft of Government property, theft of personal property, use of alcohol, use of illegal narcotics, and injuring wildlife. Refuge officers had to capture and remove two alligators and transfer them to a more remote area. One of the primary jobs of the refuge officer on duty was to "seal" the refuge by staffing the main gate to insure no visitors enter the refuge during the greatest fire danger. One problem that occurred early in the fire was bringing alcoholic beverages into the fire camp. The staffing of and random inspections curtailed the alcohol problem gate the substantially.

During the fire, over 250 miles of push roads and fire breaks were built to contain the fire. Most of this fire break system meanders in and out of the refuge boundary on the south and southwest side of the refuge. This system of fire breaks was effective in curtailing the spread of the fire but in the future will prove to be a headache for law enforcement on the refuge. These fire breaks have now allowed public access to areas that had been shut off for years because of inaccessibility to these areas. Over 26 new gates will have to be installed to seal the new areas off from trespass. The push road system follows the boundary line for a good distance and averages 50 ft. wide. This push road system has been rehabed in rye grass for most of its length. The rye grass not only attracts deer but also the deer hunters. During the latter part of the fire, it seemed that when the dozer crews left a section of plow line finished, the hunting stands and illegal bait would appear overnight on the line. On one section of boundary, it appeared to have sprouted stands every 100 yards.

Illegal bear bait was found in several spots along the fire break system. Sardine cans, corn, pears, doughnuts, gut piles, and honey/corn buckets seemed to be very common along the refuge. In three or four cases, the bait was placed on the refuge. Patrols and surveillance of the areas by refuge officers and state officers lead to a few apprehensions and curtailed much of the illegal activity.

During the fire in October, when a fire plow operator drove his D-6 through a dry cypress pond, he noticed someone had planted a garden in 5-gallon pots in the center of the pond. Upon closer inspection, he found the pots to contain anywhere from 1-ft. to 4-ft tall marijuana. At this point, he notified his supervisor who in turn called refuge officers. Over 277 plants were found growing in this dry pond on Mim's Island. The week previous to this, the push line went off the refuge by about 100 yards and a "garden" was found in a 10 ft. tall pine plantation. This garden had been harvested within days prior to the dozers coming to the area. Over 750 plants had been harvested there.

The entrance fee program was established in mid-1988. Fee compliance rate is in the 80% to 90% range. Vehicles found in non-compliance of entrance fees are issued a warning with an opportunity to pay the fee before leaving the refuge. Warning notices not paid by mid-week of the week following issuance are entered into a computer file and stored. As additional entries into the file are made, the computer searches the files and prints out any vehicle license plate number that matches a previously entered number. When a vehicle license plate incurs a second violation, a Notice of Violation is issued and the owner is served with a violation notice. Many hours have been spent revising and documenting the procedures. Our latest figures indicate less than 10% non-compliance and very few multiple violations.

#### VIOLATIONS

Violation

| Fishing without a valid license                 | 10 |
|---|----|
| Using refuge after legal posted hours           | 4  |
| Failure to abide by terms and conditions of use |    |
| on NWR permits                                  | 4  |
| Illegal take of plant from a NWR                | 3  |
| Failure to comply with posted regulations       | 3  |
| Trespass on a refuge                            | 2  |
| No personal floatation device                   | 2  |
| Use of trotlines on refuge                      | 2  |
| Camping on refuge                               | 2  |
| Fishing with minnows                            | 2  |
| Introduction of a animal taken elsewhere        | 1  |
| Failure to pay entrance fee                     | _1 |
|   | 20 |

86

Number of Tickets



Violators have baited for black bear around the refuge many years, but they have become more brazen recently. A combination of corn and honey on the left and sardines below are two favorites. (09/90) 90-34 and 90-35 JNS





To our surprise, this gardening effort was found during the Short's Fire. These 2 to 5 gallon containers were found in a pond which had dryed up during the drought. The 325+ containers were filled with potting soil and located approximately one half mile into the refuge. (10/90) 90-36 JNS

## 18. Cooperating Associations

A cooperative agreement with Eastern National Park and Monument Association (ENPMA) to operate a bookstore in the refuge visitor center ended March 31. Okefenokee Wildlife League (O.W.L.) bought out ENPMA on that date. Ten titles were deleted and 39 were added during the year. Total sales for 1990 were \$10,084. ENPMA donated "Okefenokee Canoeing Brochures" and gray storage cabinet worth \$500. Okefenokee Wildlife League membership grew to 26 during the year.

## 19. Concessions

Concession operations at the three main entrances to the refuge provide visitors with tours, rentals, supplies and general services. Only the East Entrance concessioner pays a percentage (6%) of gross profits back to the Federal treasury in lieu of rental fees. Included below is a 3-year comparison of net sales for the East Entrance concessioner.

| 1990 | 1989 | 1988 |
|------|------|------|
|      |      |      |

NET SALES \$224,646.82 \$274,916.40 \$280,452.70

1990 was the first full year of operation for new owner Carl Glenn. The drop in sales is in large part due to the drop in visitation as a result of drought conditions and closures.

# I. EQUIPMENT AND FACILITIES

90

# 1. New Construction

During the Short's Fire, two highly discussed concepts were initated. One was the beginning of a fire break completely around the edge of the swamp to provide access for fire control. The other was construction of helicopter dip sites to provide for water during drought conditions. Most of the dip sites were constructed during the fire on private property. Two were dug on the refuge: the Pocket (Compartment 8) and Mim's Island (Compartment 6).

The entrances to the Chesser Island Restroom and adjacent Swamp Boardwalk were concreted to provide easier access to the physically disabled.

The access roads to the east and west side entrance fee kiosks were paved.



The Swamp's Edge Fire Break was begun during the Short's Fire using several crawler tractors. This was a rented D-6 Cat LGP (low ground pressure) crawler. (10/90) 90-37 HM



Another idea talked about for several years (helicopter dip sites) was also developed during the Short's Fire. (10/90) 90-38 HM

### 2. Rehabilitation

Following the Honey/Buck Fire of 1989, several recommendations were submitted by the fire review team. One of these was the need to replace the deteriorating bridges along the Perimeter Road. Congress allocated \$3,000,000 to replace some of these bridges. FY 90's budget contained \$825,000 to replace six of these units. Okefenokee Refuge offered to force account the demolition of the old bridges. After consultation with ARD Benson and Savannah Coastal Refuges Senior Project Leader John Davis, it was decided to allow Okefenokee and Savannah Coastal Refuges' staffs to remove the old bridge material. During September and December, 567 linear feet of bridges were removed. A rented Cat EL 200B excavator was used to pull pilings and lift decking material. Senior Project Leader Davis' knowledge and experience with construction techniques proved invaluable as both staffs accomplished their tasks in a safe, efficient manner. By year's end, no new bridges had been built. However, test pilings had been placed at several of the sites.



Equipment Operator Ferris Milliams along with Senior Project Leader John Davis from Savannah NWR assisted us in the initial stages of demolition of the bridges along the Perimeter Road. (09/90) 90-39 JCL



Okefenokee Equipment Operator Gowen used our new Cat 426 front-end loader/backhoe on the bridge project also. (09/90) 90-40 JCL



The twenty-three bridges along the Perimeter Road built in 1959-60 looked like this one at Suwannee Creek. The refuge offered to remove all the bridges scheduled for replacement. (01/90) 90-41 JCL



The Suwannee Creek bridge site after demolition and during the installation of the initial test piling. (10/90) 90-42 Parker

93

Ramps for physically disabled individuals were installed at the Visitor Center and refuge office.

The fuel tanks at Camp Cornelia were modified to prevent gravel and water from contaminating the system.

The irrigation system for the Pogo helibase was completed this year. It was mighty handy when up to nine helicopters used the site.

An underground drainage system was installed around the fueling facilities and the office parking area.



Everette Sikes puts the finishing touches on a concrete ramp at the front of the Swamp's Edge Visitor Center. Several ramps were installed during the year to insure architectural accessibility to the physically disabled. (12/90) 90-43 PFT

# 3. Major Maintenance

Boundary line maintenance continued in earnest during '90. Much of our efforts, however, were slowed by the extreme/fire situation.

The refuge cabin's septic system was repaired.

Canoe and boat trail maintenance continued in spite of low water. Plant succession along these trails made this never-ending problem worse each year.

The Panther airboat required major repairs as something went through the propeller while it was running. Eventually a new motor and prop were installed.

Improvements were made to the wood duck banding sites (Pine Island and corn bin). An automatic feeder was installed at the Pine Island location to cut down on trips to put out bait.

# 4. Equipment Utilization and Replacement

For the first time in the refuge's history, a front-end loader/backhoe was procured. A Cat 426 four-wheel drive loader/backhoe was obtained in August of this year. This versatile piece of equipment was purchased to assist in the demolition of the Perimeter Road bridges.

A Ford crew cab with utility bed and a Jeep Cherokee 4x4 were received in May.



This Ford crew cab was received in '90. (08/90) 90-44 HM; The trade-in vehicle below had seen its better days. Sometimes budget constraints delay vehicle replacements. (10/90) 90-45 JS



96

### 5. Communication Systems

Another recommendation of the Honey/Buck review team was to develop a radio communication system compatible with the local wildfire fighting agencies. Duane Herman, Communications Specialist, from Boise developed a high band system he thought would cover our needs. At the end of FY 90, a purchase order was issued to General Electric for a new high band system to replace our low band units. Also, frequency assignment was applied for through the Department. By the end of the year, no progress had been made obtaining a frequency.

#### 6. Computer System

This station has three desktop computers (1 Dell 286 and 2 CompuAdd 386's) and one Zenith laptop computer. These computers are used for tracking budget, entrance fees, law enforcement violations, word processing, various fire applications programs, etc. All four computers are in constant use at this station.

### 7. Energy Conservation

1990

Total electrical and fuel usage (gasoline and diesel) increased in CY 1990 as shown below:

| Electricity (KWH) | 155,937 | Electricity (KWH) | 116,000 |
|-------------------|---------|-------------------|---------|
| Gasoline (GAL)    | 46,576  | Gasoline (GAL)    | 19,480  |
| Diesel (GAL)      | 16,779  | Diesel (GAL)      | 8,152   |

All these increases are directly related to the major fires that occurred during CY 1990 (Mothers Day - May; Mitchell Island - July; and Shorts -September-October). All three of these fires occurred during the summer months. People supporting the firefighters worked in the offices both day and night, running the air-conditioning. Gasoline and diesel were needed to support the fire operations following mop-up of the fires.

In addition to the above fuel, an additional 49,737 gallons of gasoline and 27,915 gallons of diesel were used by the Refuge, Overhead Teams and their support personnel, firefighters, tractor-plow units brought in from other refuges, states, private industry, etc. The usage occurred during a 3-month period of active fire activity, mop-up and rehabilitation of fire areas (September, October and November).

The major bridge project which was started on the northwest side of the refuge also increased fuel consumption due to the long drive to the remote area to work and the fuel used by the machinery that the refuge furnished to assist the bridge contractor.

### J. OTHER ITEMS

### 1. Cooperative Programs

The refuge provided daily wind direction and speed information to the National Weather Service in Atlanta. The Weather Service provided and installed all equipment needed for this project. This equipment has proved a valuable asset in the prescribed burning and wildfire suppression programs. A weather station was also maintained at Camp Cornelia. Temperatures and rainfall for this station were furnished to the National Weather Service on a monthly basis. Information was also provided to the state of Florida Water Management District.

# 3. Items of Interest

Director Turner of the Fish and Wildlife Service, ARW Benson, Chief of Refuges Karges and Directors Bardwell and Edwards from the Washington office visited Okefenokee on July 31. This was a prelude to the ceremony at Banks Lake NWR.

Efforts to repair the west side entrance gate continued. After numerous calls to the manufacturer, a new motor was finally shipped which turned out to be the wrong style and size. Efforts continued to get the problem corrected.



Preflight helicopter briefing is conducted by H. McCullough (second from right) for (L-R): G. Edwards, J. Turner, McCullough, D. Perkuchin. Boise Interagency Fire Center (BIFC) film crew video taped the session for use in a fire training film. (07/90) 90-46 JAB

# 4. Credits

As in previous years, this narrative involved several staff members. The following individuals should receive all the credit, praise and/or criticism for the sections listed:

| Section | A | <br>Deputy Manager Mallard  |
|---------|---|---|
| Section | в | <br>Range Technician Gooch  |
| Section | C | <br>Deputy Manager Mallard  |
| Section | D | <br>Deputy Manager Mallard, Technician Gooch and Supervisory<br>Park Ranger Burkhart                    |
| Section | E | <br>Deputy Manager Mallard, Supervisory Park Ranger Burkhart,<br>Park Ranger Tritaik, and Clerk Pittman |
| Section | F | <br>Forester/FMO Phernetton   |
| Section | G | <br>Range Technician Gooch  |
| Section | Н | <br>Supervisory Park Ranger Burkhart  |
| Section | Ι | <br>Deputy Manager Mallard and Clerk Pittman  |
| Section | J | <br>Supervisory Park Ranger Burkhart  |

This narrative was edited by Deputy Manager Mallard and typed, compiled, and proofed by Clerk Pittman and Senior Project Leader Perkuchin.

## K. FEEDBACK

The drought conditions that Okefenokee NWR experienced in 1989 continued through 1990. Three major wildfires plus numerous smaller ones occurred.

The last and largest of these, the Short's Fire, burned approximately 21,000 acres of Federal and private property. The many issues that were addressed in '89 received more attention this year. Foremost of these issues included the perimeter road and accompanying bridges, radio communications, refuge fire management, and the Sill structure. Through the efforts of RD Jim Pulliam, ARD 'Sim Benson, Regional Fire Management Coordinator Skippy Reeves, and Service Fire Management Coordinator Frank Cole, tremendous progress has been made addressing these issues. The first six of the perimeter road's 23 bridges have been contracted for replacement. A high band radio system has been purchased and presently needs <u>only</u> a frequency assignment from Washington. The Department's need to develop a prescribed natural fire policy has been evidenced. The Suwannee River Sill workshop which had been discussed for numerous years was finally held.

The demands on Okefenokee's staff during 1990 were beyond comprehension. The threat of fire was present throughout the year. When they were not fighting fires, they were reorganizing from the last event or getting prepared for the next emergency. After two years of almost constant siege by drought, Okefenokee's staff had been called upon to perform time after time. As in past years, they rose to the occasion and superbly protected the Refuge's as well as the surrounding private landowners' resources.

The FWS and Region 4 in particular are rapidly coming of age with their fire programs. The fires at Okefenokee over the past two years have provided excellent opportunities for other field station's personnel to participate in wildfire events. During the Mitchell Island Fire in July, Service personnel from over 20 refuges provided valuable support. Over 80 Region 4 personnel worked on this fire and the sense of pride was evident. A special thank you to all who provided support during some extremely hectic events this year.

## INTRODUCTION

Banks Lake National Wildlife Refuge was acquired February 22, 1985 from The Nature Conservancy. This refuge, containing approximately 3,500 acres, is located in Lanier County near Lakeland, Georgia. The refuge contains a variety of habitat types including 1,000 acres of open water, 1,500 acres of marsh, and 1,000 acres of cypress swamp. Scattered through these types are hardwood swamp, pine forest, and other upland areas. The refuge was established for the protection and conservation of an unique environment as well as migratory and resident wildlife.

On April 16, 1980, the U. S. Fish and Wildlife Service entered a lease agreement with The Nature Conservancy to manage approximately 3,500 acres of the Banks Lake/Grand Bay wetlands complex, located in Lanier and Lowndes Counties in southeastern Georgia. The original intent of the lease was to eventually establish a National Wildlife Refuge on this area. Changes in the emphasis of the land acquisition program resulted in no funds being appropriated for acquiring this land. This area remained in a state of limbo during 1982 and 1983 with the U. S. Fish and Wildlife Service maintaining a caretaker position over Banks Lake. In 1984, funds were added to the FY 1985 budget for the purchase of this area at a land value of \$356,000. The refuge was authorized under the Fish and Wildlife Act of 1956 and funded through provisions of the Land and Water Conservation Fund Act of 1955 with strong local support from the Lakeland community and the congressional delegation.

# INTRODUCTION

TABLE OF CONTENTS

# A. HIGHLIGHTS

# B. CLIMATIC CONDITIONS

# C. LAND ACQUISITION

| 1. | Fee Title |
|----|-----------|
| 2. | Easements |
| 3. | Other     |

# D. PLANNING

| 1. | Master Plan                          | to | Report) |
|----|--------------------------------------|----|---------|
| 2. | Management Plan                      | to | Report) |
| 3. | Public Participation                 | to | Report) |
| 4. | Compliance with Environmental and    |    |         |
|    | Cultural Resources Mandates (Nothing | to | Report) |
| 5. | Research and Investigations (Nothing | to | Report) |
| 6. | Other                                | to | Report) |

# E. ADMINISTRATION

| 1. | Personnel                                   | 1 |
|----|---|---|
| 2. | Youth Programs (Nothing to Report)          |   |
| 3. | Other Manpower Programs (Nothing to Report) |   |
| 4. | Volunteer Program                           |   |
| 5. | Funding                                     | 1 |
| 6. | Safety                                      |   |
| 7. | Technical Assistance(Nothing to Report)     |   |
| 8. | Other (Nothing to Report)                   |   |

# F. HABITAT MANAGEMENT

| 1. | General                            |
|----|------------------------------------|
| 2. | Wetlands                           |
| 3. | Forests                            |
| 4. | Croplands (Nothing to Report)      |
| 5. | Grasslands                         |
| 6. | Other Habitats (Nothing to Report) |
| 7. | Grazing                            |
| 8. | Haying (Nothing to Report)         |
| 9. | Fire Management                    |


| 10. | Pest Control (Noth                 | ing to | Report) |
|-----|------------------------------------|--------|---------|
| 11. | Water Rights (Noth                 | ing to | Report) |
| 12. | Wilderness and Special Areas (Noth | ing to | Report) |
| 13. | WPA Easement Monitoring (Noth      | ing to | Report) |

#### G. WILDLIFE

| Wildlife Diversity                                 | ę  |
|--|--|
| Endangered and/or Threatened Species               | 6  |
| Waterfowl  | 6  |
| Marsh and Water Birds                              | 6  |
| Shorebirds, Gulls, Terns, and Allied Species       | 6  |
| Raptors  | 7  |
| Other Migratory Birds                              | 7  |
| Game Mammals (Nothing to Report)                   |  |
| Marine Mammals (Nothing to Report)                 |  |
| Other Resident Wildlife                            | 7  |
| Fishery Resources                                  | 7  |
| Wildlife Propagation and                           |  |
| Stocking (Nothing to Report)                       |  |
| Surplus Animal Disposal (Nothing to Report)        |  |
| Scientific Collections (Nothing to Report)         |  |
| Animal Control (Nothing to Report)                 |  |
| Marking and Banding (Nothing to Report)            |  |
| Disease Prevention and Control (Nothing to Report) |  |
|  | Wildlife Diversity.      Endangered and/or Threatened Species.      Waterfowl.      Marsh and Water Birds.      Shorebirds, Gulls, Terns, and Allied Species.      Raptors.      Other Migratory Birds.      Game Mammals.      Marine Mammals.      (Nothing to Report).      Marine Mammals.      (Nothing to Report).      Other Resident Wildlife.      Fishery Resources.      Wildlife Propagation and      Stocking.    (Nothing to Report).      Surplus Animal Disposal.    (Nothing to Report).      Scientific Collections.    (Nothing to Report).      Animal Control.    (Nothing to Report).      Marking and Banding.    (Nothing to Report).      Disease Prevention and Control.    (Nothing to Report). |

### H. PUBLIC USE

| 1.  | General  | 8 |
|-----|--|---|
| 2.  | Outdoor Classrooms - Students (Nothing to Report)      |   |
| 3.  | Outdoor Classrooms - Teachers (Nothing to Report)      |   |
| 4.  | Interpretive Foot Trails (Nothing to Report)           |   |
| 5.  | Interpretive Tour Routes (Nothing to Report)           |   |
| 6.  | Interpretive Exhibits/                                 |   |
|     | Demonstrations   |   |
| 7.  | Other Interpretive Programs (Nothing to Report)        |   |
| 8.  | Hunting (Nothing to Report)                            |   |
| 9.  | Fishing  | 9 |
| 10. | Trapping (Nothing to Report)                           |   |
| 11. | Wildlife Observation (Nothing to Report)               |   |
| 12. | Other Wildlife Oriented Recreation (Nothing to Report) |   |
| 13. | Camping (Nothing to Report)                            |   |
| 14. | Picnicking (Nothing to Report)                         |   |
| 15. | Off-Road Vehicling                                     |   |
| 16. | Other Non-Wildlife Oriented                            |   |
|     | Recreation   |   |
| 17. | Law Enforcement  | 9 |
| 18. | Cooperating Associations (Nothing to Report)           |   |
| 19. | Concessions  | 9 |

#### I. EQUIPMENT AND FACILITIES

| 1. | New Construction(Nothing      | to | Report) |
|----|-------------------------------|----|---------|
| 2. | Rehabilitation(Nothing        | to | Report) |
| 3. | Major Maintenance (Nothing    | to | Report) |
| 4. | Equipment Utilization and     |    |         |
|    | Replacement(Nothing           | to | Report) |
| 5. | Communication Systems(Nothing | to | Report) |
| 6. | Computer Systems (Nothing     | to | Report) |
| 7. | Energy Conservation(Nothing   | to | Report) |
| 8. | Other(Nothing                 | to | Report) |

#### J. OTHER ITEMS

| 1.             | Cooperative Programs   | 10       |
|----------------|--|----------|
| 2.<br>3.<br>4. | Other Economic Uses(Nothing to Report)<br>Items of Interest<br>Credits | 10<br>10 |
|                | K. FEEDBACK  | 11       |

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

#### A. HIGHLIGHTS

Service and B.A.S.S. sign national agreement on sport fishing. (Section H.).

More private docks being built along lake's edge even though property lines are unclear. (Section H).

First funding for Banks Lake since refuge established in 1985. (Section E.).

#### B. CLIMATIC CONDITIONS

No weather data is collected at Banks Lake Refuge. The nearest weather station is located in Homerville, Georgia approximately 15 miles from the refuge. A total of 40.02 inches of rain was recorded at this station, which is 7.79 inches below normal. Water levels dropped significantly during the months of August through October.

#### C. LAND ACQUISITION

3. On November 3, 1987, a Memorandum of Understanding between the U.S. Air Force and U.S. Fish and Wildlife Service became effective to exchange management rights on two 490-acre tracts of land. These two tracts have been proposed for fee title exchange for the last three years. Since no current authority exists allowing the two agencies to exchange land, the Memorandum of Understanding will serve as an interim document until the land exchange becomes a reality. Refer to the map on the following page for location of these two tracts.

#### E. ADMINISTRATION

#### 1. Personnel

No personnel are stationed at Banks Lake Refuge. All work was accomplished by staff of Okefenokee Refuge. Refer to Okefenokee National Wildlife Refuge's annual narrative for its staffing pattern. Assistant Manager Lunceford and full-time Law Enforcement Officer James N. Shelton had primary responsibility for most of the activities at Banks Lake NWR.

#### 5. Funding

For the first time since Banks Lake NWR was established in 1985, funding was earmarked for the station. A disabled fishing access pier has been proposed with this initial \$10,000 budget.



-



Director Turner (center) posed with some of the refuge staff from Okefenokee. (L-R) G. Gooch, L. Mallard, P. Tritaik, J. Burkhart, and D. Perkuchin at the Banks Lake Signing Ceremony in August. (08/90) 90-1 Nolan

#### F. HABITAT MANAGEMENT

#### 1. General

The refuge, which contains 3,500 acres, is composed of several wetland types. Approximately 1,000 acres are classified as open water, 1,500 acres as marsh, and 1,000 acres as cypress swamp. A water control structure constructed in the early 1940's on the north side of the lake is key to managing the area. This structure may require major rehabilitation or replacement.

#### 2. Wetlands

Most of the refuge is wetland consisting of open water, a shallow cypress pond, and shrub swamp. Pond cypress, blackgum, slash pine, sweetgum, and red-maple are the predominant tree species in the shallow pond cypress areas. Shrubs, including swamp red bay and fetterbush, also occur. Shrub swamp areas within the refuge are made up of such species as pond pine, sweet bay, loblolly bay, red maple, red bay, titi, and fetterbush. Open water in which pond cypress are scattered is a major wetland component.

Emergent aquatic vegetation in the main lake consists of lemon bacopa, white water lily, dollar bonnet, banana lily and spadderdock. The most abundant submergent is the <u>fanwort</u> spp. There was a dramatic increase in the density of these aquatics again this year.

A winter drawdown was attempted this year starting in late October to attempt to kill some of the aquatics. The winter rains and warm temperatures, however, prevented the expected kill. The lake levels will be dropped again in 1991.



Assistant Manager Lunceford stands on the 1940's vintage water control structure at Banks Lake NWR. This structure controls all the water on the refuge. Plans are to evaluate the need to replace or rehabilitate this structure (08/90) 90-2 Parker Forester Phernetton and Deputy Project Leader Mallard met with the Georgia Department of Natural Resources and Region 4 Forester/FMO Skippy Reeves to discuss prescribed burning in the Banks Lake/Grand Bay Wetland Complex. The DNR had requested that we lower Banks Lake so they could dewater the Grand Bay marsh area for a prescribed burn.

5

#### G. WILDLIFE

#### 1. Wildlife Diversity

Being one of the largest freshwater swamp systems in the coastal plains of Georgia, this unique ecosystem provides important habitat for a wide diversity of wildlife species.

#### 2. Endangered and Threatened Species

- a. Wood Stork Storks are commonly seen throughout the year.
- b. <u>Bald Eagle</u> The bald eagle is an occasional winter visitor to the refuge. A mature bald eagle was sighted during a routine wildlife survey.
- c. <u>Peregrine Falcon</u> Although the peregrine falcon is an occasional winter visitor to the refuge, none were sighted.

#### 3. Waterfowl

Banks Lake provides excellent habitat for both dabbling and diving ducks. However, being located off the main flyway, the lake does not have large concentrations of migratory waterfowl. Wood ducks are the most abundant species with most sightings occurring in March and June. The second most abundant waterfowl species on the refuge was blue-winged teal but in very low numbers. Lesser numbers of ring-neck ducks and coots were also seen this year.

In 1989, a wood duck box program was initiated at Banks Lake. Forty-three boxes were installed in the Eagle Roost and Old Fields area. Excellent brood habitat exists there but large cavity trees are in very short supply. All nest boxes were not checked this year due to low water. Those boxes checked look encouraging.

#### 4. Marsh and Water Birds

The refuge supports a sizable population of marsh and water birds. The most commonly seen are: great egrets, cormorants, anhingas, pied-billed grebes, white ibis, and great blue herons. Also seen with less regularity are wood ducks, snowy egrets, little blue herons, tri-color herons, cattle egrets, and green-backed herons. Sandhill cranes are commonly seen during the fall and winter months. A large percentage of the local birds feed and roost in the Old Field area of the refuge.

#### 5. Shorebirds, Gulls, Terns, and Allied Species

Since the refuge has little or no shorelines available for these avian species, the refuge has historically had low populations. The fall drawdown of 1987 created many floating peat islands in the Eagle Roost and Old Field area. These floating islands provide excellent feeding and loafing habitat for some shorebirds. Large flocks of common snipe were observed using these peat islands.

#### 6. Raptors

Raptors commonly seen on the refuge include the red-tailed and red-shouldered hawks, osprey, black and turkey vultures, American kestrel, and the barred owl. The great horned owl and golden eagle have been observed on the refuge in the past, but sightings are rare. Bald eagles are occasionally sighted during routine wildlife surveys.

#### 7. Other Migratory Birds

Huge flocks of common grackles and red-winged blackbirds were sighted roosting on the refuge. Eastern bluebirds, pileated woodpeckers, brown thrashers, and kingfishers were commonly seen during the wildlife surveys.

#### 10. Other Resident Wildlife

River otters were commonly seen feeding on fish in the main lake area. Two nutria were also reported in the main lake. There were no white-tailed deer sightings this year. No formal survey has been conducted on the refuge for white-tailed deer since little upland area is available for their use.

#### 11. Fishery Resources

With sport fishing a major program emphasis at Banks Lake, efforts in the past have been undertaken to make the refuge a pilot project area to develop and enhance partnerships between governments and the private sector for conserving and managing recreational fisheries.

This finally became a reality in 1990 as the national signing with B.A.S.S. took place in August. (See Section H. and accompanying information following the Feedback section.)

#### 1. General

Banks Lake is primarily noted its fine fishery resource of largemouth bass, crappie, bluegill and various other sunfish species.

Banks Lake's reputation as a National Wildlife Refuge took a turn for the better when a Memorandum of Agreement was signed between the Bass Anglers Sportsman Society (B.A.S.S.) and the Service at Banks Lake on August 1, 1990. Director Turner, Gary Edwards from Fisheries and Bob Karges from Refuges and Wildlife represented the Washington, D. C. office. Dave Allen, Deputy Regional Director, was the Master of ceremonies and B.A.S.S. was represented by Ms. Helen Sevier, CEO B.A.S.S., Al Mills, and Dave Precht also of B.A.S.S. The signing ceremony focused both Fish and Wildlife Service and B.A.S.S. attention on getting this agreement off the ground and doing something firsthand at Banks Lake.



Front L-R: Helen Sevier, B.A.S.S. John Turner, Director, FWS Rear L-R: Gary Edwards, AD of Fisheries, WO David Allen, R4, DRD

August 1, 1990 was a memorable day for both Banks Lake and the U. S. Fish and Wildlife Service. Pictured here is Helen Sevier, CEO, Bass Angler Sportsman Society and Director John Turner as they sign a Memorandum of Agreement uniting both organizations in efforts to further the enhancement of fishing habitat and opportunities for fish on national wildlife refuges nationwide. (08/90) 90-3 PST

#### 4. Interpretive Food Trails

Waning interest by a core of several local volunteers has left the refuge's only hiking trail unfinished. Efforts continue to try to revive interest.

#### 9. Fishing

A total of 9,098 fishermen used the refuge during the year. Hot, dry weather characterized the entire fishing year. Fish success suffered and emergent weeds flourished. A drawdown of the lake level to control weed growth was initiated in late September. The objective was to draw off about four feet of surface water to expose the weed beds to the killing frosts and freezes of winter. Drawdown level was achieved in December but due to a warmer than normal winter and increased rainfall, very little weed control was accomplished. Some bass fishing tournaments were held on the lake with catch and release specified in all refuge permits.

#### 17. Law Enforcement

Law enforcement efforts were carried out by refuge officers from Okefenokee Refuge. No violations were observed this year, though the normal rumors of overlimits and illegal fish traps were common. Adjacent landowners on the north side of the lake continue to build docks out into the lake. The refuge boundary in that area is unclear. Hopefully, a contract being proposed in FY 91 will finally answer that question.

#### 19. Concession

Operation of the concession at Banks Lake continued with Mr. Ricky Poe as the concessioner. Mr. Poe unsuccessfully sought another concessioner to take over the contract. Concession services include boat and motor rental, boat launching, various fishing supplies, and food snacks. Poe's optimism concerning the fishing resource at the lake continues. A concession operation has been in existence since 1981.

The Service receives two percent of the concession receipts. Receipts from the concession have generally been low through the years. As seen below, concession receipts, in gross dollars, is far below the level needed to maintain a top concessioner.

| 1987      | 1988        | 1989        | 1990        |
|-----------|-------------|-------------|-------------|
| 29,293.12 | \$28,201.74 | \$38,165.30 | \$33,302.41 |

It appears that fishing success is linked to the rise and fall of the weed mass in the lake. Lower weed levels increase fishing success and concessioner gross sales rise accordingly. Higher weed levels decrease fishing success and concessioner gross sales fall. There will be renewed interest in drawing down the lake level again in CY 91 to accomplish weed control.

#### J. OTHER ITEMS

#### 1. Cooperative Programs

A Memorandum of Understanding (MOU) between the Service and the U. S. Air Force went into effect November 3, 1987. The MOU covers the right of the Air Force to restrict public access and conduct low level flight operations over a portion of the refuge. In turn, the Service would have the right to manage a portion of Air Force property. The Air Force is continuing their efforts to initiate a land exchange of these two properties.

#### 4. Credits

This narrative was written by Deputy Project Leader Mallard except Section H which was written Supervisory Park Ranger Burkhart.

This report was compiled and typed by Clerk Pittman and proofed by Senior Project Leader Perkuchin.

#### K. FEEDBACK

Banks Lake NWR (established in 1985) finally steps out on its own, if only two small steps. First year funding and a signed Memorandum of Understanding on fish management, hopefully, will be followed by more significant efforts. As on all new stations, funding can allow many changes to occur over a short period of time. Staffing, facilities, and a definitive boundary would be some larger steps that Banks Lake will hopefully witness soon. BANKS LAKE NWR

news



#### DEPARTMENT OF THE INTERIOR U. S. Fish and Wildlife Service

Richard B. Russell Federal Building 75 Spring Street, S.W. Atlanta, Georgia 30303

52-90

r Release August 1, 1990

Vicki M. Boatwright (404) 331-3594 Craig L. Rieben (202) 208-5634

U.S. FISH AND WILDLIFE SERVICE AND B.A.S.S. SIGN MEMORANDUM OF AGREEMENT ON RECREATIONAL FISHING

OKEFENOKEE NWR The U.S. Fish and Wildlife Service and the Bass Anglers Sportsman Society (B.A.S.S.) joined forces to improve recreational fisheries. On August 1, Service Director John Turner and B.A.S.S. Chairman and CEO Helen Sevier signed a memorandum of agreement providing a framework for cooperation in improving fisheries habitats and developing new fisheryrelated activities on Service lands nationwide.

> The signing ceremony took place at the Banks Lake National Wildlife Refuge, located between Valdosta and Lakeland in southeast Georgia. It is one of more than 233 refuges in the National Wildlife Refuge System that offers some form of recreational fishing where compatible with the major purpose for which the refuge was established.

B.A.S.S. was originally organized to popularize and perpetuate the sport of bass fishing. In recent years, the 550,000-member organization has evolved into a major advocate for conserving the Nation's aquatic environments for their continued use and enjoyment by the American people. B.A.S.S. supports the activities of state and Federal conservation agencies and conducts youth programs to foster ethical angling practices and conservation principles.

The new agreement is in keeping with the spirit of the Service's new recreational fishieries policy, "Fisheries-USA," signed by Director Turner earlier this year. In announcing that policy, Turner said, "With the demand for recreational fishing expected to increase by 40 percent by the year 2030, the Service must join other government, industry, and conservation organizations to actively address the future of recreational fisheries and the habitats on which they depend."

The selection of Banks Lake National Wildlife Refuge as the site for the signing of the signing ceremony is significant because of the Service's past efforts to enhance recreational fishing opportunities on the refuge and its plan to work with local B.A.S.S. clubs to pursue additional improvement projects there. The refuge offers anglers 3,500 acres of open water. marsh, and cypress swamp.

August 1, 1990

х

ADER

#### BANKS LAKE NWR

Kentucky

Louisiana

Mississipp

Vicki Boatwright, Public Affairs Officer, Atlanta

North Carolina

South Carolina

Tennessee

Puerto Rico

Virgin Islands

Service and B.A.S.S. sign agreement on sport fishing

KHATA



With Banks Lake National Wildlife Refuge as the backdrop. Service Director John Turner and BASS. President Helen Sevier sign a memorandum of agreement to cooperate in improving sport fishing on national wildlife refuge lands.

Recreational fisheries will benefit from a recent agreement between the Service and the Bass Anglers Sportsman Society (B.A.S.S.). On August 1, Director John Turner and B.A.S.S. President Helen Sevier signed a memorandum of agreement providing a framework for cooperation in improving fisheries habitats and developing new fishery-related activities on Service lands nationwide.

The signing ceremony took place at Banks Lake National Wildlife Refuge in southeast Georgia. It is one of more than 233 refuges offering some form of recreational fishing where compatible with the major purpose for which the refuge was established.

In recent years, B.A.S.S., a 550,000-member organization founded to popularize and perpetuate the sport of bass fishing, has evolved into a major advocate for conserving the Nation's aquatic environments. B.A.S.S. supports the activities of state and Federal conservation agencies and conducts youth programs to foster ethical angling practices and promote conservation.

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Alabam

Arkania

Florida

Georgia

# Southeast Region hosts contaminants specialists workshop

In mid-March, contaminant specialists from the Service's Southeast Region joined the migration of thousands of college students on spring break to the Gulf Shore beaches of western Florida. Destination? Panama City, where Gulf Coast Community College hosted Region 4's Contaminant Specialists Workshop. Thanks to the adept orchestrations of Regional Contaminant Coordinator Dr. Don Schultz and Contaminant Specialist Mike Brim, the workshop provided nearly 4 days of intense, handson training in the set-up and use of various bioassessment techniques.

Most current fish and wildlife contaminant studies commonly entail collecting specimens and analyzing tissues for residues of pollutants that may be present in their habitat. The results of such studies, however, are often ambiguous because of the difficulty in equating amounts of a specific contaminant residue to levels of injury to various species of fish or wildlife. Bioassessments help remove some of the uncertainty by documenting responses of healthy living organisms exposed to sediments or water collected from a site known or suspected to be contaminated.

During the workshop, each contaminant specialist ran a battery of bioassessments on water and sediment samples collected from St. Andrews Bay at Panama City. Among the organisms selected were a marine amphipod, fresh- and saltwater rotifers, brine shrimp, and luminescent bacteria. Dr. Parley Winger of the Columbia National Fisheries Research Lab Field Station in Athens, Georgia, demonstrated the macroorganism bioassessment techniques and then coached each specialist through the rigors of catching amphipods, counting rotifers using a dissecting microscope, and other bioassessment intricacies.

Gary Evereklian of Microbics, Inc., demon-

strated the use of the Microtox spectrophotometer, which measures the difference in light output between a normal culture of luminescent bacteria and a similar culture that has been exposed to water or sediments suspected of being contaminated.

Unit leader of the North Carolina Cooperative Fish and Wildlife Research Unit Dr. Jim Fleming, and Dr. Donald White of Patuxent Wildlife Research Center's Athens field station, demonstrated the use of an enzyme bioassay to determine if fish or birds have been poisoned by a carbamate or organophosphate pesticide. The pesticides are so toxic they often kill an animal before any residue is deposited in its tissues. Since these pesticides interfere with the central nervous system, it is often possible to measure the amount of inhibition (reduced function) even though trace residues may not be present. Under the watchful eyes of Drs. Fleming and White, each contaminant specialist became a brain surgeon-du-jour and removed enough central nervous system tissue from starlings and grouper fish heads to practice running enzyme assays.

Steve Smith, contaminant specialist at the Vicksburg, Mississippi, Field Office, provided a 1-day refresher course in electrofishing techniques, including a 4-hour on-the-water demonstration.

> - Mark Wilson Fish and Wildlife Enhancement Field Office Cookeville, Tennessee



Region 4 environmental contaminants specialists remove brain tissue from fish heads. The tissue samples will be used in cholinesterase determinations. Left to right — Steve Smith, Vicksburg, Mississippi: Mike Brim. Panama City, Florida; and Dr. Jim Andreasen, Washington, DC.

# OKEFENOKEE NATIONAL WILDLIFE REFUGE SUWANNEE CANAL RECREATIONAL CONCESSION, INC.

Access From Folkston, Georgia

#### Prices Effective September 1, 1990

ACCESS: From Folkston, Georgia on Route 121 - 8 miles south, then 3 miles from Refuge entrance sign.

CONCESSIONER: Mr. Carl Glenn, Jr., Route 2, Box 336, Folkston, Georgia 31537 -- Telephone (912) 496-7156.

#### MISCELLANEOUS EQUIPMENT:

1. Canoe & Paddles: Day Use - \$9.50 Per Day Overnight Trips: 2-Day Trip -- \$22.00 3-Day Trip -- \$33.00

4-Day Trip -- \$44.00 5-Day Trip -- \$55.00

2. Boat (14 Ft.) & Paddles - \$8.50 Per Day

- 3. Family Boat (16 Ft.) & Paddles \$10.50 Per Day
- 4. Excursion Boat (20 Ft.) & Paddles -- \$11.50 Per Day
- 5. Outboard Motor with Gas (1 tank, 6 Gallons) -- \$17.50 Per Day
- 6. Life Jackets (Required by State Law) -- \$1.00 Per Day
- 7. Launching Fee \$2.50 Per Boat
- 8. Camping Supplies for Canoe Trip

#### EQUIPMENT RENTALS

| tem                     | Per Day | Item Per Day                                 |
|-------------------------|---------|--|
| Tent                    | \$4.00  | Poncho \$2.00                                |
| Sleeping Bag with Liner | \$4.00  | Coleman Stove (Fill tank with gas) \$4.00    |
| Foam Pads               | \$2.50  | Coleman Lantern (Fill tank with gas) .\$4.00 |
| Tarp                    | \$2.00  | Cartop Carrier \$2.50                        |
| Cookware Set            | \$4.00  | Portable Toilet \$2.50                       |

#### NOTICE

All rental equipment and canoes must be returned to Suwannee Canal Recreation Area by rentor. All rental equipment and canoes must be paid by Cash, Travelers Checks, Visa or Mastercard. No personal checks will be accepted.

9. Canoe Shuttle (Price is the same for 1-10 Canoes): Price available upon request.

10. Bicycle Rentals: Single Bicycles - \$1.50 Per Hour

#### GUIDED BOAT TOURS:

For Photography, Bird Watching, Nature Study, etc.

- One Hour Trip -- \$5.75 Per Person, \$3.50 Child 5-11 Years, \$2.25 Pre-School. (a.) Two or more people required to make one hour tour.
- Two Hour Trip -- \$11.50 Per Person, \$7.00 Child 5-11 Years, \$4.50 Pre-School.
  (a.) Four or more people required to make two hour tours.
- 3. Night Boat Tour -- \$1975 Per Person, minimum of 6 persons (By Reservation Only). //- 50
- 4. Night Owl Prowl -- \$7.75 Per Person, minimum of 6 persons (By Reservation Only).

#### ADDITIONAL FACILITIES:

Swamp's Edge Visitor Center Orientation Films Nature Trails Observation Tower Concession Building Picnicking Area Boardwalk Restored Swamp Homestead

#### OVERNIGHT CANOE TRAILS:

By Reservation Only -- Made through Refuge office, Okefenokee National Wildlife Refuge. Phone: (912) 496-3331, P.O. Box 338, Folkston, Georgia 31537 -- Monday thru Friday, 7:00 AM to 3:30 PM.

All Per Day Prices based on Posted Concession Hours unless stipulated otherwise.

NOTE: No Overnight Facilities at this Entrance.

#### CONCESSION HOURS:

September 11 thru February 28 - 8:00 AM to 6:00 PM March 1 thru September 10 -- 7:00 AM to 7:30 PM

"DO NOT FEED THE ANIMALS -- THEY WILL BITE"

#### K. FEEDBACK

The drought conditions that Okefenokee NWR experienced in 1989 continued through 1990. Three major wildfires plus numerous smaller ones occurred.

The last and largest of these, the Short's Fire, burned approximately 21,000 acres of Federal and private property. The many issues that were addressed in '89 received more attention this year. Foremost of these issues included the perimeter road and accompanying bridges, radio communications, refuge fire management, and the Sill structure. Through the efforts of RD Jim Pulliam, ARD Jim Benson, Regional Fire Management Coordinator Skippy Reeves, and Service Fire Management Coordinator Frank Cole, tremendous progress has been made addressing these issues. The first six of the perimeter road's 23 bridges have been contracted for replacement. A high band radio system has been purchased and presently needs <u>only</u> a frequency assignment from Washington. The Department's need to develop a prescribed natural fire policy has been evidenced. The Suwannee River Sill workshop which had been discussed for numerous years was finally held.

The demands on Okefenokee's staff during 1990 were beyond comprehension. The threat of fire was present throughout the year. When they were not fighting fires, they were reorganizing from the last event or getting prepared for the next emergency. After two years of almost constant siege by drought, Okefenokee's staff had been called upon to perform time after time. As in past years, they rose to the occasion and superbly protected the Refuge's as well as the surrounding private landowners' resources.

The FWS and Region 4 in particular are rapidly coming of age with their fire programs. The fires at Okefenokee over the past two years have provided excellent opportunities for other field station's personnel to participate in wildfire events. During the Mitchell Island Fire in July, Service personnel from over 20 refuges provided valuable support. Over 80 Region 4 personnel worked on this fire and the sense of pride was evident. A special thank you to all who provided support during some extremely hectic events this year. Okefenokee Swamp, a 412,000-acre peat-filled bog in Ware, Chariton, and Clinch Counties, Georgia, and Baker County, Florida, is one of the nation's great unspolled areas. Although a considerable amount of timber has been harvested here in past years, most of this great swamp is still little different from what it was when first seen by white men. About four-fifths of the swamp is included in the Okefenokee National Wildlife Refuge, which is administered by the U. S. Fish and Wildlife Service, in the Department of the Interior.

Except for some fifty islands which total about 25,000 acres. Okefenokee Swamp is usually shallowly flooded. Most of the flooded area is more or less densely forested with cypress, blackgum, bay, and maple, with an understory and interspersal of a variety of heaths, smilax, titi, and casena. About 60,000 acres is flooded marshland or "prairie" which is covered principally with waterillies, neverwet, pipewort, ferns, maidencane, and a variety of sedges and grasses.

Open water areas are the water courses, the prairie lakes, smaller prairie ponds known as 'gator holes, the twelvemile-long Suwannee Canal which was dug in 1891-2, and the borrow pit of the Suwannee River Sill, which was constructed in 1958.

The islands and the adjacent upland on the periphery of the swamp are usually covered by pine forests.

This variety of wooded swamp, prairies, lakes, water courses, islands, and pine barrens supports a varied fauna. The following list of reptiles, amphibians, and fishes is based on specimens collected or reliably reported.

Most of the species listed are supported by specimens from Cornell University, Philadelphia Academy of Natural Sciences, United States National Museum, University of Georgia Museum of Natural History, University of Michigan Museum of Zoology, and Florida State Museum. Scientific and common names are based on "A list of common and scientific names of fishes from the United States and Canada" 1970 American Fisheries Society, and "Standard common and scientific names for North American amphibians and reptiles" 1978 Society for the Study of Amphibians and Reptiles.

For further information write Refuge Manager, Okefenokee National Wildlife Refuge, Box 117, Waycross, Georgia 31501.





DEPARTMENT OF THE INTERIOR U.S. FISH AND WILDLIFE SERVICE RF-41590-5 December 1988



A CHECKLIST OF ANIMALS LIVING IN AND AROUND THE OKEFENOKEE SWAMP ON THE OKEFENOKEE NATIONAL WILDLIFE REFUGE

# REPTILES, AMPHIBIANS, AND FISHES OF OKEFENOKEE



#### REPTILES

Crocodilians American Alligator (Alligator mississippionsis)

#### Lizards

Eastern Slender Glass Lizard (Ophisaurus attenuatus longicaudus) Island Glass Lizard (Ophisaurus compressus) Eastern Glass Lizard (Ophisaurus ventralis) Green Anole (Anolis carolinensis) Southern Fence Lizard (Sceloporus undulatus undulatus) Broad-headed Skink (Eumeces laticeps) Northern Mole Skink (Eumeces laticeps) Five-lined Skink (Eumeces fasciatus) Southern Five-lined Skink (Eumeces inexpectatus) Ground Skink (Scincella laterale) Six-lined Race Runner (Cremidophorus sexlineatus sexlineatus)

#### Snakes

Northern Scarlet Snake (Cemophora coccinea copei) Southern Black Racer (Coluber constrictor priapus) Southern Ring-necked Snake (Diadophis punctatus) Indigo Snake (Drymarchon cornis couperi) Corn Snake (Elaphe guttata guttata) Yellow Rat Snake (Elaphe obsoleta quadrivittata) Gray Rat Snake (Elaphe obsoleta spiloides) Eastern Mud Snake (Farancia abacura abacura) Rainbow Snaks (Farancia ery trogramma) Eastern Hognose Snake (Heterodon platyrhinos) Southern Hognose Snake (Heterodon simus) Mole Snake (Lampropeltiz calligazter rhombomaculata) Eastern Kingsnake (Lampropeltis getulus getulus) Scarlet Kingsnake (Lampropeltis triangulum elapsoides) Eastern Coachwhip (Masticophis flagellum flagellum) Florida Green Water Snake (Nerodia cyclopion floridana) Yellow-bellied Water Snake (Nerodia erythrogaster erythrogaster) Bander Water Snake (Nerodia fasciata fasciata) Florida Water Snake (Nerodia fasciata pictiventris) Brown Water Snake (Nerodia taxispilota) Rough Green Snake (Opheodrys aestivus) Florida Pine Snake (Pituophis melanoleucus mugitus) Striped Swamp Snake (Regina alleni) Eastern Glossy Water Snake (Regina rigida rigida). Pine Woods Snake (Rhadinaea flavilata) North Florida Block Swamp Snake (Seminatrix pygaea pygaea) Florida Brown Snake (Storeria dekayi victa) Florida Red-bellied Snake (Storeria occipitomaculata obscura) Eastern Ribbon Snake (Thamnophis sauritus sackeni) Eastern Garter Snake (Thamnophis sirtalis sirtalis) Rough Earth Snake (Virginia striatula) Eastern Smooth Earth Snake (Virginia valeriae valeriae) Eastern Coral Snake (Micrurus fulvius fulvius) Florida Cottonmouth (Agkistrodon piscivarus conanti) Eastern Diamondback Rattlesnake (Crotalus adamanteus) Canebrake Rattlesnake (Crotalus horridus atricaudatus) Dusky Pigmy Rattlesnake (Sistruros miliarius barbouri)

#### Turtles

Common Snapping Turtle (Chelydra serpentina serpentina) Alligator Snapping Turtle (Macroclemys temmincki) Florida Red-bellied Turtle (Chrysemys nelsoni) Eastern Chicken Turtle (Deirochelys reticularia reticularia) Florida Cooter (Pseudemys floridana floridana) Red-Eared Pond Slider (Pseudemys scripta elegans) Yellow-bellied Pond Slider (Pseudemys scripta scripta) Florida Box Turtle (Terrapene carolina bauri) Eastern Box Turtle (Terrapene carolina carolina) Striped Mud Turtle (Kinosternon bauri palmarum) Eastern Mud Turtle (Kinosternon subrubrum subrubrum) Loggerhead Musk Turtle (Sternotherus minor minor) Stinkpot (Sternotherus odoratus) Gopher Tortois (Gopherus polyphemus) Florida Softshell (Trionyz ferox)

#### AMPHIBIANS

**Toads and Frogs** Oak Toad (Bufo guercicus) Southern Toad (Bufo terrestris) Florida Cricket Frog (Acris gryllus dorsalis) Gray Treefrog (Hyla chrysoscelis) Green Treefrog (Hyla cinerea cinerea) Southen Spring Peeper (Hyla crucifer bartramiana) Pine Woods Treefrog (Hyla femoralis) Barking Treefrog (Hyla gratiosa) Squirrel Treefrog (Hyla squirella) Little Grass Frog (Limnaoedus ocularis) Southern Chorus Frog (Pseudacris nigrita nigrita) Ornate Chorus Frog (Pseudacris ornata) Eastern Narrow-mouthed Toad (Gastrophryne carolinensis) Eastern Spadefoot Toad (Scaphiopus holbrooki holbrooki) Florida Gopher Frog (Rana areolata aesopus) Bullfrog (Rana catesbeiana) Bronze Frog (Rana clamitans clamitans) Pig Frog (Rana grylio) River Frog (Rana heckscheri) Southern Leopard Frog (Rana utricularia) Carpenter Frog (Rana virgatipes)

#### Salamanders

Flatwoods Salamander (Ambystoma cingulatum) Marbled Salamander (Ambystoma opacum) Mole Salamander (Ambystoma talpoideum) Tiger Salamander (Ambystoma tigrinum) Twö-toed Amphiuma (Amphiuma means) Southern Dusky Salamander (Desmognathus fuscus auriculatus) Southern Two-lined Salamander (Eurycea bislinestat cirriger) Dwarf Salamander (Eurycea quadridigitatus) Slimy Salamander (Plethodon glutinosus glutinosus) Gulf Coast Mud Salamander (Pseudotriton montanus floridanus) Many-lined Salamander (Stereochilus marginatus) Striped Newt (Notophthalamus perstriatus) Central Newt (Notophthalamus viridescens louisianensis) Dwarf Siren (Pseudobranchus striatus spp) Eastern Lesser Siren (Siren intermedia Intermedia) Greater Siren (Siren lacertina)

#### FISHES

Florida Gar (Lepisosteus platyrhincus) Bowfin (Amia calva) Eastern Mudminnow (Umbra pygmaea) Redfin Pickerel (Esox americanus americanus) Chain Pickerel (Esox niger) Lake Chubsucker (Erimyzon sucetta) Spotted Sucker (Minytrema melanopt) Yellow Bullhead (Ictalurus natalis) Brown Bullhend (Ictalurus nebulosus) Channel Catfish (Ictalurus punctatus) Tadpole Madtom (Noturos gyrinus) Speckled Madtom (Noturus leptacanthus) American Eel (Anguilla rostrata) Golden Topminnow (Fundulus chrysotus) Banded Topminnow (Fundulus cingulatus) Lined Topminnow (Fundulus lineolatus) Starhead Topminnow (Fundulus notti) Mosquitofish (Gambusia affinis) Pygmy Killifish (Leptolucania ommata) Least Killifish (Heterandria formosa) Pirate Perch (Aphredoderus sayanus) Mud Sunfish (Acantharchus pomotis) Flier (Centrarchus macropterus) Warmouth (Lepomis gulosus) Evergledes Pygmy Sunfish (Elassoma evergladei) Okefenokee Pygmy Sunfish (Elassoma okefenokee) Blackbanded Sunfish (Enneacanthus chaetodon) Bluespotted Sunfish (Enneacanthus gloriosus) Banded Sunfish (Enneacanthus obesus) Redbreast Sunfish (Lepomis auritus) Bluegill (Lepomiz macrochirus) Dollar Sunfish (Lepomis marginatus) Spotted Sunfish (Lepomis punctatus) Largemouth Bass (Micropterus salmoides) Black Crappie (Pomoxis nigromaculatus) Scalyhead Darter (Etheostoma barratti) Swamp Darter (Etheostoma fusiforme) Blackbanded Darter (Percina nigrofasciata) Brook Silverside (Labidesthes sicculus)

|                        | 5    | 5    | F  | W  |
|------------------------|------|------|----|----|
| House Sparrow*         |      | 120  | •  | 0  |
| Bobolink               | 1    |      | 1  |    |
| Eastern Meadawlark*    |      | •    |    | •  |
| Red-winged Blackbird*  | e    | ê    | e  | =  |
| Orchard Oriole*        | 1.00 |      |    |    |
| _Northern Oriole       | 100  |      |    |    |
| Rusty Blackbird        | 1.44 |      |    | v  |
| Brewer's Bluckbird     | 0    |      |    |    |
| Boat-tailed Grackle    | 1    |      |    |    |
| Common Grackle*        | e .  | e    | 6  | 2  |
| _Brown-headed Cowbird  |      |      | 0  | •  |
| Scarlet Tanager        |      | 1.   |    | -  |
| Summer Tanager*        | 4    | U    | U  |    |
| Northern Cardinal*     | e    | e    | e  | e  |
| Rose-breasted Grosbeak | 1    |      |    |    |
| Blue Grasbeak          |      | 1    | 1  |    |
| Indige Bunting         |      |      |    |    |
| Painted Bunting        |      |      |    |    |
| Purple Finch           | 143  |      | U. | w. |
| Pine Siskin            | - E  |      |    |    |
| American Galdlinch     | c    |      | c  | c  |
| Rufaus-sided To-hee    | c    | e    | 2  | 2  |
| _Savannah Sporrow      | 6    |      | u  |    |
| Grasshopper Sparrow    | 0    | 1.00 | 0  | 0  |
| Le Conte's Sporrow     |      |      |    | 1  |
| _Henslow's Sparraw     |      |      | 0  |    |
| Vesper Spatrow         | U.   |      | W. | ŭ. |
| Bachman's Sparrow*     | e i  | 0    |    | c  |
| Dark-eyed Junco        |      |      |    |    |
| _Chipping Spurrow      |      |      |    |    |
| Field Sparraw          | U    |      | U. | U  |
| White-throated Sparra- | c    |      |    |    |
| Fos Speriow            |      |      |    |    |
| Swamp Sparrow          | E    |      | E. | 3  |
| _Song Sparrow          | e    |      | e  | •  |

These additional 25 species are of very rare or accidental occurance:

American White Pelican Roseate Spoonbill Whistling Swan Snow Goose Vermilion Flycatcher Eurasian Wigeon Golden Eagle Limpkin Semipalmated Plover Whimbrel Laughing Gull Forster's Tern Common Merganser Arctic Tern Common Barn Owl Ivorv-Billad Woodpecker Iformerivi Grav Kingbird Western Kingbird Bachman's Warbler Lark Sparrow American Tree Sparrow Connecticut Warbler Clapper Rail Rough-legged Hawk Yellow Rail OKEFENOKEE SWAMP, a huge, shallow, peat-filled depression of flooded and semi-flooded forests and prairies, located in southeastern Georgia and a small part of adjacent Florida, is one of the most primitive wilderness areas in the Nation. This swamp covers approximately 412,000 acres. About 396,315 acres of this area with 12,000 acres of peripheral upland are included in the Okefenokee National Wildlife Refuge

Most of the swamp is covered with cypress, black gum, and bay forests. About 15 percent is flooded or semi-flooded prairie, and islands make up another 6 percent. The prairies are dotted with little lakes and ponds and various sized clumps of trees and shrubs, locally called "houses." The peripheral upland and the islands within the swamp are forested with pine interspersed with hardwood hammocks.

 This diversified habitat is attractive to a wide variety of birds. The following list contains 234 species recorded from the swamp and surrounding uplands by visiting ornithologists and refuge personnel. Those species denoted with an \* nest in the area, or have been known to do so. Abundance symbols are coded as follows:

S-March-May S-June-August F-September-November W-December-February a-abundant c-common u-uncommon o-occasional r-rare

#### NOTES:



U.S. FISH AND WILDLIFE SERVICE RF-41590-2 January 1982



# BIRDER OKEE



A CHECK-LIST OF BIRDS LIVING ON THE OKEFENOKEE NATIONAL WILDLIFE REFUGE

| the second se   | _  | _   | _     |                       |
|---|--|-----|-------|-----------------------|
|   | 3  |     | 1 K   | 1997                  |
| and the second second   | States of the local division of the local di |     |       | -                     |
| Lemmon Leon   |  | _   |       |                       |
| Hamed Grabe   |  |     |       |                       |
| Pied-billed Grebe   | e  |     | e     |                       |
| A COLORED COLORED AND A COLORED AND   | 1000   |     | 1111  | and the second second |
| Double+crested Cormorant  |  |     |       | 1.0                   |
| Anhings   | - E  | ~   |       |                       |
| Grant Blue Maron*   |  |     |       |                       |
|   |  |     |       | 1.                    |
| Green Backed Preron   |  |     |       | 1.0                   |
| Little Blue Heron"  | 5  | ¢   | e     |                       |
| Cattle Egret*   |  |     |       |                       |
| Great Egret"  | E  | =   | E     |                       |
| Corner Forest   |  |     | 14    |                       |
| Contraction of the second   |  |     |       |                       |
|   |  |     |       | 100                   |
| Disck-crowned Night Heron   |  |     |       |                       |
| Yellow-crowned Night Heren  |  |     | M     |                       |
| Leest Bittern*  | •  |     |       |                       |
| American Bittern  | 100  |     | 14    | 14                    |
|   |  |     |       | -                     |
| wood Stork *  | 10.0   | 8   |       |                       |
| Ginssy Ibrs   | - <b>1</b> 11  |     |       |                       |
| White Ibia"   | E  |     | 1     |                       |
|   |  |     |       | -                     |
| Canada Goose  | 1  |     |       |                       |
| Mallard   | c  |     |       | 5                     |
| American Black Duck   |  |     |       |                       |
| Gederall  |  |     |       |                       |
| And a state of the second s   |  |     |       | 100                   |
| Pepromern Pontain   |  |     |       | 124                   |
| Green-winged Test   | e.   |     |       |                       |
| Blue-winged Tesi  | v  | U   |       |                       |
| American Wigeon   | - 64   |     | 14    |                       |
| Northern Shoveler   |  |     |       |                       |
|   |  |     |       | 1.2                   |
|   | 21   | .c  |       |                       |
| Redhead   |  |     |       |                       |
| Ring-necked Duck  | ¢.,  |     |       |                       |
| Convusbock  |  |     |       |                       |
| Greater Scoup   | 100  |     |       | 1.4                   |
| and the second se   |  |     |       |                       |
| and the second s    |  |     |       | 1.0                   |
| Common Goldeneye  | 1  |     |       |                       |
| Bullishead  |  |     |       | 1                     |
| Ruddy Duck  | 0  |     | 6     | 1.0                   |
| Hopded Mergenset*   | e  |     | -     |                       |
| Barbara and Alexandre   | 201  |     |       | 100                   |
| THE ADDRESS OF A DESCRIPTION OF<br>A DESCRIPTION OF A DESCRI | 100  |     | IIM - | -                     |
| Turkey Vulture*   | C  |     |       | - 2                   |
| Black Volture*  | c  | e   |       |                       |
| American Smallum Tailed Kits  | 1  | 1   | 10    |                       |
| Contraction of the second s   | 1  |     | 100   |                       |
|   |  |     | 1000  | 1.00                  |
| Cooper's Hawk   | 2  |     | 5.2   | <b>B-</b> -81         |
| Red-tailed Hawk*  |  | 1   |       |                       |
| Red-shouldered Hawk*  | •  | 6   |       |                       |
| Broad-winged Hank   |  |     |       |                       |
| Bald Faels  |  |     | 1     |                       |
| and the second second   | 2  |     | 8-14  | 2000                  |
| Peorthern Harrier   |  |     |       | Contraction of the    |
| Uspiny  |  |     |       | -                     |
| Peregrine Falcon  | 1.1  |     | 10    |                       |
| Marlin  | 1  |     |       | 1.1                   |
| American Kentrel*   | 1  | 10  | 1     | 100                   |
| Contract of the second s   |  |     | 1000  | -                     |
| Northern Bobwhite*  | e .  | 2   |       | •                     |
| Turkey*   |  | 1   | 1     | 118                   |
| Sandhill Crane*   | -  |     | 1     | 10                    |
| Paul Paul   | 1  | 100 | 100   | 3                     |
| Constant of the second s   | 1 2  |     | 100   | 1.0                   |
| Triginia Rail   |  |     |       | 1 10.00               |
| Sara  |  |     | 110   | 1000                  |

|  | 5     | 5     | F   |       |
|--|-------|-------|-----|-------|
| Purple Gallinule*  | Nu?   | 100   |     | ų.    |
| Common Moorhen*  | 147   |       |     | •     |
| American Cost  | e.    |       | c   | e     |
| Killdeet   | e.    |       | •   | c     |
| American Woodcock  |       | 1     |     |       |
| Common Snipe   |       |       | •   | c     |
| Spotted Sandpiper  |       |       |     |       |
| Willet   |       |       |     |       |
| Greater Yellowlegs   |       |       |     | 10    |
| Lesser Yellowlegs  |       |       |     | 1.000 |
|  |       |       | 100 | 1.0   |
| Operitcher (species?)  |       |       |     |       |
| Semipalmated Sandpiper   |       |       |     |       |
| Western Sandpiper  | 1     | 1000  | 1   |       |
| Senderling   | •     |       | •   | •     |
| Herring Gull   | 10    |       |     | 1     |
| Block Tern   | 1     | 18    |     | -     |
| Mourning Dave*   | •     | C.    | 6   | •     |
| Common Ground Dove*  | e     |       | e . | e     |
| Yallow-billed Cuckos*  |       | e     | ε.  |       |
| Black-billed Cuckoo  | 100   |       | e.  | _     |
| Eastern Screech Owl*   | 10.00 | 100   |     | M     |
| Grept Homed Owl  | 64    |       |     |       |
|  |       | 10.00 |     |       |
| White the second |       | 1     |     |       |
| Common Nighthawk*  |       |       |     |       |
| Chimney Swift  | 2     | e     | e   | -     |
| Ruby-throoted Hummingbird*   |       | DMG   |     |       |
| Balted Kinglisher*   |       | - 46  | E.  | 0     |
| Northern Flicker*  |       | *     | 6   | 6     |
| Pileuted Woodpecker*   |       |       | E   | •     |
| Red-bellied Woodpecker*  |       |       |     | •     |
| Red-headed Woodpecker*   |       |       | e   |       |
| Yellow-bellied Sopsucker   |       |       | e   | 5     |
| Plotty Woodpecker  |       | 1.2   |     |       |
| Red-sockaded Woodpecket*   |       |       |     |       |
| Eastern Kingbird*  |       | 6     |     |       |
| Great Crested Flycotcher*  |       |       |     |       |
| Eastern Phoebe   |       |       | E   | e     |
| Acadian Flycatcher*  |       |       |     |       |
| Eastern Wood Pewee*  |       |       | £   | _     |
| Tree Swallaw   |       |       |     | e     |
| Bern Swallow   | •     | c     | e   |       |
| Purple Martin  | 1     | . U   | E.  |       |
| American Crown   |       | 182   | e . | 5     |
| Fish Crow  | 12    |       | -   | 10    |
| Carolina Chickedea   | 100   | IPOI  | 10  | 1000  |
| Tulted Titmouse*   |       |       | •   | •     |
| White-breasted Nuthatch  | 1     |       |     | -     |
| Red-breasted Nuthatch  |       |       | 1   |       |
| Brawn-headed Nuthatch*   |       | •     |     |       |
| Brown Creeper  | •     |       |     |       |

|                              | 5     | 5    | F    |      |
|------------------------------|-------|------|------|------|
| House Wren                   |       |      |      | -    |
|                              |       |      |      | 3    |
| Bawick's Wran                | 1.1   |      |      |      |
| Contractions without         | 1.    | 100  |      | 12   |
| Marsh Wren                   |       |      | 0    | 0    |
| Radae Wren                   | 1.3.1 |      |      | 10   |
| Northern Mockinghird*        | 12    | e    |      | 6    |
| Gray Cathird                 | 12    | e    |      | e    |
| Brown Thrasher*              | e     | e    |      |      |
| American Zahin               |       |      | 1    |      |
| Wand Thrush*                 |       |      |      | 1.   |
| Haunit Thrush                |       |      |      | 1.   |
| Swainann's Thrush            |       |      |      |      |
| Gravetheeked Thrush          |       | 100  |      |      |
| Verr                         |       |      | 220  |      |
| Fastern Bluebird*            |       | -    |      |      |
| Bluesses Contratcher!        | 1     | 1    | -    | -    |
| Galdenergeneral Kinglet      |       | 1    |      |      |
| Rubercrowned Kinglet         |       |      |      |      |
| Martine Direct               |       |      |      | -    |
|                              |       |      |      | -    |
| Cedar #axwing                | •     |      |      |      |
| Luggerheod Shrike*           | ×.    | C.C. | c    |      |
| European Starling            |       |      | . 4  |      |
| Whits-eyed Virso*            | 5     |      | e    |      |
| Yellow-throated Vires*       | 2     | 1    | 1    |      |
| Solitory Vires               | .0    |      | 63   |      |
| Red-eyed Vireo*              | W     | U    | 2    | -    |
| Black-and-white Warbler      | •     | 0    | 9    |      |
| Prathonotory Workler*        | •     | 4    | e    |      |
| Swainson's Warbler*          | 1     |      | 1    |      |
| Worm-esting Warbler          | 10    |      |      | (@)) |
| Gelden-winged Warhler        |       |      |      |      |
| Blue-winged Warbler          |       |      |      |      |
| Orange-crowned Warbler       |       |      | 1    | 2    |
| Northern Parula Warbler"     | e     | e    | e    |      |
| Tellow Warbler               |       |      | *    |      |
| Magnalia Warbler             | 1     |      |      |      |
| Cope May Warbler             | T.    |      |      |      |
| Discussingated Dive warbier  |       |      | 50   | -    |
| Black throated Crees Workley |       |      |      |      |
| Carulano Washing             | 14    |      |      |      |
| Blackburnian Warbler         |       |      |      |      |
| Yellow-throated Werbler*     |       |      |      | 10   |
| Chestnut-sided Warbler       |       |      |      |      |
| Blockpull Worbler            |       |      |      |      |
| Pine Warbler*                |       |      |      |      |
| Prairie Warbler              | U     |      |      |      |
| Palm Warbler                 | C     |      |      | 4    |
| Ovenbird                     | 4     |      | 1.84 |      |
| Northern Waterthrush         | 1     |      |      |      |
| Louisiana Waterthrush        | 9     | 1    |      |      |
| Kentucky Worblet             | •     |      |      |      |
| Connecticut Worbler          |       |      | 2    |      |
| Common Yellowthroat*         |       |      | *    |      |
| Tellow-breasted Chat         | 2     | -    | 1    |      |
| Hooded Warbler*              |       | v    |      |      |
| Canada Warbler               | 1     | -    | 1    |      |
| American Redstart            | C 100 | A    | E .  |      |

#### 6. Canal Diggers

The canal diggers were among the first men to become familiar with the swamp. They did not have books in which to look up the names of the animals they saw, and many could not read anyway. Many uncommon creatures were thus given local names. The wood ibis was called a bald-headed gannet. The pied-billed grebe was, and still is, called a didapper duck. The wood duck is still locally called a summer duck, and a dragonfly is a mosquito hawk.

During the rest of your visit, look for these and other animals and insects. Perhaps you can tell why their were given these local names.





DEPARTMENT OF THE INTERIOR U.S. Fish and Wildlife Service RF-41590-10 - January 1985

# CANAL DIGGERS TRAIL

Okefenokee NATIONAL WILDLIFE REFUGE

#### I. Introduction

Toward the end of the 19th century, "progress" nearly led to the extinction of the Okefenokee Swamp. This part of the Okefenokee was then owned by the State of Georgia. In 1891 the State granted these lands to the Suwannee Canal Company, a corporation formed to effect the drainage of the swamp. Captain Harry Jackson, a prominent lawyer in Atlanta, was the main force behind the newly formed company. Jackson and his associates expected to make millions of dollars from the sale of timber and from fertile crop lands that would be exposed ance the swamp was drained. Construction of the canal began in September, 1891. A few years later the entire project was abandoned.

This Canal Diggers Trail winds into the upland portions of the Suwannee Canal where the works of man have left unusual niches and which provides habitat for a variety of wildlife. The walk takes about 30 minutes.

#### 2. The Plan

The plan called for the swamp to be drained through Trail Ridge to the Atlantic Ocean by way of the Soint Mary's River. Although the ditch was cut through the ridge, it was never cut down to the water level of the swamp. The diggings exposed many small springs which created a flow of water running back into the swamp instead of away from the swamp. This gave rise to stories that when the canal was finished, the water from the Saint Mary's would flow back into the swamp. On this assumption, the project was abandaned and almost immediately became known as "Jackson's Folly."

The water still flows from the springs into the swamp just as it did during the early days of construction. Through the years nature has covered many of the scars while providing wildlife a place of refuge. In fall and winter, migrating warblers, white-throated sparraws, and other birds find protection here. They seek out berries and scratch for insects under the fallen leaves and in the decaying fallen trunks of trees.

in a moment you will leave the canal by one of the routes used by the canal diggers as they and their mules dragged scoop after scoop of sand from the ditch.





#### Spoil Bank Succession

To your right are the dunes left by the canal diggers. To your left are the pines which were planted after the virgin forest was cut to help pay the digging expenses.

As you walk along, notice how the digging of the canal has changed the appearance and plant life of the pine forest through which the ditch was dug. The change is evident in the contrast between the dense growth of mosses and ferns of the wet ditch bottoms, the pine forest, and the oaks of the open and drier dune uplands. This is a good place to look for signs of deer during autumn while acorns are falling to the ground.

#### 4. Animal Diggers

Men were digging the conol to eliminate a swamp. Some forms of wildlife also dig but their objective is to seek food or shelter. This digging was caused by a gopher tortoise, a land dwelling turtle better known locally as a gopher. Dens such as this may extend into the spoil dune for as much as 35 feet.

The gopher tortoise often shares his den with other animals – snakes, raccoans, apossums, and insects to name a few. One tenant, the gopher frag, seems to depend entirely on tortoise dens for its protection.

Other animals in this area that live in underground dens include faxes, skunks, and armadillos.

#### 5. Magnitude of Digging

From here the Suwannee Canal extends westward through the swamp for twelve miles and in the apposite direction for about two miles. It was near here on Trail Ridge where the attempt to drain the swamp began to fail. Diggers, using mule-powered shovel skids, had to go deeper and deeper to reach below swamp level. The soaring banks of sand continually broke loose and fell at their feet, filling in their progress. There seemed to be no end to the digging. Money to pay their wages began running low.

Deep in the swamp steam shovels mounted on barges discovered an increasing flow of water caming in from the wrong direction. At this point the feasibility of the project was re-examined. Captain Jackson cancluded that not only was this particular ditch a menacing problem, but that even it if were completed below swamp level, it probably would not drain the swamp dry. More ditches and canals would be needed. This was more than the promoters could handle, so the project was ended.

EASTERN HARVEST MOUSE (Reithrodontomys humilus humilus). Found in the prairies and in old fields near the swamp's edge.

HISPID COTTON RAT (Sigmodon hispidus hispidus). A common mammal in the pine woods and old fields on the upland around the swamp.

OLDFIELD MOUSE (Peromyscus polionotus polionotus). Feeds on seeds and berries.

EASTERN WOOD RAT (Neotoma floridana floridana). Fairly common throughout the swamp and in the hammocks on the upland.

WOODLAND VOLE (Microtus pinetorum paroulus). Tunnels through leaf mold and loose soil near the surface of the upland areas and eats bulbs, tubers and seeds.

ROUND-TAILED MUSKRAT (Neofiber alleni exoristus). Common in the prairies.



HOUSE MOUSE (Mus musculus musculus). Formerly common around habitations but now that few people live within the swamp, it has probably disappeared from the area. Very likely it is still common around human habitations in the vicinity of the swamp.

NORWAY RAT (Rattus norvegicus). Like the above species, this mammal has probably disappeared from the area with the cessation of human habitation.

BLACK RAT (*Rattus rattus rattus*). This and the following subspecies were the common barn rats when farming was practiced on some of the islands within the swamp. It probably occurs now on farmsteads in the vicinity of the swamp but not on the refuge. EASTERN COTTONTAIL (Sylvilagus floridanus mallurus). Common around clearings and in the more sparse pinewoods on the uplands surrounding the swamp and on some of the islands.

MARSH RABBIT (Sylvilagus palustris palustris). Fairly common on the swamp edge.

WILD PIG (Sus scrofa). These feral pigs were introduced by the early settlers of the swamp.

WHITE-TAILED DEER (Odocoileus virginianus). These deer are to be found on the upland entirely around the swamp and on the islands within the swamp. Occasionally they may be seen from the deer stand observation platform, and in the time of low water they may be seen in the prairies.

ARMADILLO (Dasypus novemcinctus mexicanus). This unusual "armored" mammal was first seen on the refuge in 1963. Since then it has become more numerous and is commonly seen along roadways and trails.



DEPARTMENT OF THE INTERIOR U.S. FISH AND WILDLIFE SERVICE RF41590-3 December 1988

# Mammals

of the Okefenokee National Wildlife Refuge



The varied habitat of Okefenokee Swamp forest and prairie, of swamp edge and of moist and dry upland affords a home for most mammalian species that are known to the southeastern coastal plain.

Most mammals are night prowlers and difficult to observe. Sometimes their tracks, or other signs of activity are all that is visible to remind us that they do exist. A few kinds such as squirrels, otters, deer, rabbits, bobcats and bears are often or sometimes seen during daytime. However, early morning and late afternoon are the best times to observe mammals.

The following list includes 49 species that now live or have recently lived in, or in the immediate vicinity of, Okefenokee Swamp. The list of mammals includes museum records from Cornell University, Florida State Museum, Philadelphia Academy of Natural Sciences, United States National Museum and University of Georgia Museum of Natural History.

Mammals to look for in or near Okefenokee are:

VIRGINIA OPOSSUM (Didelphis virginiana pigra). Common on the swamp edge and on the islands within the swamp. A night prowler, "Pogo" is often seen by campers at Stephen C. Foster State Park.

STAR-NOSED MOLE (Condylura cristala). Apparently rare, Has been collected in the swamp near Mixon's Ferry and on Chesser Island.

EASTERN MOLE (Scalopus aquaticus australis). Generally distributed on the upland adjacent to the swamp and has been found on some of the islands within the swamp.

LEAST SHREW (Cryptotus parva parva). Rarely seen but probably fairly common. Specimens have been collected on several of the islands, on the swamp edge, and in the pine woods around the swamp.

SOUTHERN SHORT-TAILED SHREW (Blarina carolinensis). A specimen was collected on Floyd's Island June 12, 1921.

EVENING BAT (Nycticeius humeralis). One of the most common bats of the Okefenokee. This and other bats are seen at dusk on warm nights in search of flying insects.

EASTERN PIPISTRELLE (Pipistrellus subflavus subflavus). A fairly common species in the area. BIG BROWN BAT (Eptesicus fuscus fuscus). An uncommon species in the area.

RED BAT (Lasiurus borealis borealis). An uncommon species in the area.

SEMINOLE RED BAT (Lasiurus seminolus). A common bat of the Okefenokee,

HOARY BAT (Lasiurus cinereus cinereus). This yellowishbrown bat flies high in the air late at night and will hang in trees when resting.

NORTHERN YELLOW BAT (Lasiurus intermedius floridanus). Apparently a rare species in the area. Two specimens were collected at King's Canal.

RAFINESQUE'S BIG-EARED BAT (Plecotus rafinesquii). A rather uncommon species in the area.

FREE-TAILED BAT (Tadarida brasiliensis cynocephala). An uncommon species in this area although it has been collected at Camp Cornelia.

BLACK BEAR (Ursus americanus floridianus). Bears range throughout the refuge. While they are rarely seen, their signs are found in all habitats.

RACCOON (Procyon lotor elucus). The most abundant large mammal on the refuge. It is found in all habitats but is most numerous on the swamp edge. They are commonly seen at the Stephen C. Foster State Park camping area and occasionally along boat trails.

LONG-TAILED WEASEL (Mustela frenata olivacea). This species is probably more common than the few observations would indicate. Specimens have been collected on Billy's Island and on Chesser Island.

FLORIDA RIVER OTTER (Lontra canadensis vaga). Occasionally observed along the water courses, especially during the winter.

FLORIDA STRIPED SKUNK (Mephitis mephitis elongata). This species is generally distributed on the upland surrounding the swamp and is found occasionally on the islands.

MINK (Mustela vison mink). Very rarely seen in the Okefenokee, this chiefly nocturnal animal is an excellent swimmer.

RED FOX (Vulpes fulva fulva). This species is rare but occurs occasionally on the upland in the vicinity of the swamp.

FLORIDA GRAY FOX (Urocyon cinereoargenteus floridanus). Fairly common on the upland around the swamp.

RED WOLF (*Canis niger niger*). Formerly this was the species of wolf native to this area. It is believed not to be present here now.

FLORIDA BOBCAT (Lynx rufus floridanus). Common throughout the swamp and on the surrounding upland. Occasionally seen along the nature drive.

FLORIDA PUMA (Felis concolor coryi). Apparently this species was never more than of rare occurence in the vicinity of the swamp.

SOUTHERN GRAY SQUIRREL (Sciurus carolinensis carolinensis). Abundant in the blackgum-bay forests in the swamp and in the oak woodlands on the upland.

SOUTHERN FOX SQUIRREL (Sciurus niger niger). Uncommon in the pine forests surrounding the swamp.

SOUTHERN FLYING SQUIRREL (Glaucomys volans querceti). This species is rarely seen but is probably fairly common. It has been collected on Floyd's and Billy's Islands and Chesser Island.

GEORGIA POCKET GOPHER (Geomys pinetis pinetis). Uncommon on dry, sandy sites on the east side of the swamp.

SOUTHEASTERN POCKET GOPHER (Geomys pinetis floridianus). An uncommon species of this area.

BEAVER (Castor canadensis carolinensis). The first record of beavers actually in the swamp was in 1969. Apparently they have disappeared since then, probably because of alligators.

COTTON MOUSE (Peromyscus gossypinus gossypinus). Common throughout the area.

GOLDEN MOUSE (Ochrotomys nuttalli aureolis). This species is probably rare. It has been found in hammocks on the islands.

MARSH RICE RAT (Oryzomys palustris palustris). A fairly common mammal throughout the swamp.



# S.C. FOSTER STATE PARK



Named after well-known songwriter Stephen Foster, the park is situated on Jones Island and is one of the primary entrances to the famed Okefenokee Swamp. Visitors can enjoy lush vegetation, 223 species of birds, 41 species of mammals, 54 different reptiles and 60 species of amphibians on the park's elevated boardwalk or on a guided boat trip across the black swamp waters.

#### MAJOR FACILITIES

- #80 Acres
- #66 Tent & Trailer Sites #Interpretive Center
- 5 Picnic Shelters
- 9 Cottages
- Educational Programs

#### POPULAR ACTIVITIES

- # Hiking-Vz-Mile Trembling Earth Nature Trail
- # 25 Miles of Public Day Use Waterways
- Boat Rental-Motorboats, Canoes, Jon Boats
- Guided Boat Tours

#### ANNUAL SPECIAL EVENTS (Subject to Change)

- = Intrepretive Programs and Tours (Near-Round)
- B Okefenokee Birding
- Man in the Swamp (November)

Freat Ferris' Fetaways

PARK SITE LOCATION



Located 18 miles northeast of Fargo via Georgia Highway 177.

#### NEARBY ATTRACTIONS

■ Okefenokee Swamp Park

Okefenokee National Wildlife Refuge

Suwance Canal Recreation Area

FOR RESERVATIONS OR MORE INFORMATION Stephen C. Foster State Historic Park Fargo, Georgia 31631 (912) 637-5274

PARK HOURS: 7:00 a.m. - 7:00 p.m., Sept. 15-Feb. 28 7:00 a.m. - 8:30 p.m., Mar 1-Sept. 14 PARK OFFICE HOURS: 8:00 a.m. - 5:00 p.m.

FOR MORE INFORMATION ON GEORGIA'S PARKS AND HISTORIC SITES. Georgia Department of Natural Resources Communications Office 205 Butler Street, SE, Suite 1258, Atlanta, Ga. 30334

(404) 656-3530

TOLL-FREE IN GEORGIA 1 (800) 342-7275 TOLL-FREE OUTSIDE GEORGIA 1 (800) 542-7275

DNR is an Equal Opportunity Employer—Naturally! For career information call (404) 656-2695

If anyone first subjected to discrimination on the basis of race, color, or national origin, they may like a complaint alleging discrimination with the Office for Equal Opportunity.

#### PLEASE READ CAREFULLY

Each cance trail will be limited to one party daily. Each party will be limited to a maximum of 10 cances and/or 20 persons. Cancelats are responsible to keeping trails free from litter. Litter must be held until after you have the swamp. litter left by previous parties should be retrieved. Motors are not permitted on cance trips.

WILDLIFE. Wildlife abound in the Okefenokee year round. Sandhill cranes, ducks and other migratory birds are most numerous from November through March. Other are commonly seen during cold weather when alligators are relatively inactive. Alligators are active in the summer and are observed sunning on banks mostly during spring and fail.

In general, mosquitoes are no problem except after dark from April through October. They are rarely encountered during the daytime. Destributes, although a biting menace at times during the summer, are not as bad deep in the swamp. There is no need to fear snakes or alligators as long as normal precautions are taken and animals or nests are not molested.

FISHING. Sport fishing is permitted during posted hours in accordance with Georgia State Law and refuge regulations. Live municies are not permitted as balt in Okefenckee waters. Bass fishing is best in early apring and late fall, but a lot depends upon water levels, moon phase, weather, and the skill of the fisherman.

#### DESIGNATED CANOE TRIPS

- 1 Kinofisher Bluff Lake Kinofisher 2 days (16 miles):
- 2. Kingfisher Maul Hammock Big Water Stephen Foster 3 days
- 131 miles). 13. Kingfisher - Bluff Lake - Floyd's Island - Staphen Foster - 3 days 04 miles).
- 14. Kinglisher Bluff Lake Round Top Suwannee Canal 3 days 130
- 5 Kingfisher-Bluff Lake-Floyd's Island-Canal Run-Stephen Fister -4 days (29 miles)
- \*5a. Kingfisher Bluff Lake Floyd's Island Canal Run Suwannee Canal - 4 days 131 milest
- Kingfisher Maul Hammock Big Water Floyd's Island Bluff Lake – Kingfisher – 5 days (43 miles).
- 7 Kingfistier Maul Hamnock Big Water Floyd's Island Canal Run - Stephen Foster - 5 days (38 miles)
- 7a Kingfisher Maul Hammock Big Water Floyd's Island Canal Run - Suwannee Canal - 5 days (41 miles).
- Kingfisher Bluff Lake Round Top Canal Run Stephen Foster - 4 days (31 miles).
- Suwannes Canal Cedar Hammock Suwannes Canal 2 days (16 mites)
- 10. Suwannee Canal Canal Run Stephen Foster 2 days (17 miles).
- 10s Suwannee Canal Canal Run Suwannee Canal 2 days (20 milles). 11 Suwannee Canal - Round Top - Floyd's Island - Stephen Foster - 3
- devs (24 miles) 11a Suwannee Canal - Round Top - Floyd's Island - Suwannee Canal - 3
- 11a. Suwannee Canal Hound Top Picyd a talano Suwannee Canal ... davs (32 miles)
- 12 Suwannee Canel Round Top Floyd's Island Bluff Lake Kingfisher Landing – 4 days (33 miles).
- Stephen Foster Canal Run Stephen Foster 2 days 114 miles).
  Stephen Foster Craven's Hammock Stephen Foster 2 days 116
- miles!
- Stephen Foster Flovd's Island Canel Run Stephen Foster 3 days (20 miles).

NOTE: Short portage across Floyd's latend required on all trips crossing this island

PLEASE NOTE: Boat launching fees are required at Stephen Foster State Pars and at Suwannee Canal Recreation Area.

"Starting point and destination may be reversed, but only by permit. Mileoges shown are total for each trip.

COMMERCIAL USERS AND OUTFITTERS: Any organization or proup neueroliess of its status as "profit" or "non-profit" which collects tem/charges for any service in excess of the normal costs for food, use permit and pay a \$50.00 administrative fee. This permit is visid during the period October through September 30 and allows the permittee to compete with the general public for cance trail the address and phone number listed for reservations. PERMITS: Effective January 1, 1990, Cance trails into the Okefenokee Wilderness may be reserved in advance BY PHONE ONLY. <u>Reservations</u> can be made no earlier than two months to the day in advance of the intended departure date. Wilderness Canoeing

National Wildlife Refuée

Due to seasonal peak, use of trains and limit availability, all individuals and organizations or groups are limited to one trip per year during the months of March and April. This restriction permits many different individuals to enjoy the area during the peak visitation period.

-496-3331

RESERVATIONS (Phone) U.S. Fish and Wildlife Service Okelencikee National Wildlife Refuge Telephone (912) 495-3331

Office hours are Monday - Friday, 7:00 a.m. til 3:30 p.m.

USER FEES; A non-refundable fee of \$5.00 per person per night is charged for each member of a cance party. This fee is in addition to normal entrance fees charged at the east and west entrances. The following information must be guardinated no later than 15 days prior to date of tho; otherwise the reservation will be percelled.

- 1. Date trip is planned
- 2. Choice of trails.
- 3: Expected number in party (maximum 20 people 10 cances).
- 4. Name, address, and phone number of group leader.
- 5. Names and addresses of all participants.

 Gashlars check, cartified check, or money order (no personal checks) totaling \$5.00 per person per night for the entire trip made payable to the <u>U.S.</u> <u>Finitr and Widdle Service.</u>

PHYSICAL CONDITIONS. The swamp terrain is flat, there is no fast, water and very little dry land. Your paddle will be used every inch of the way as you wind through cypress forests or cross open "preiries" exposed to the sun and wind. You may have to get out of your cence and push scross peel blowups or shallow water. Water levels in the Okefe noise Swamp sometimes become too low to permit use of certain trails; when this occurs, parties holding reservations will be notified.

WEATHER: June, July, August, September are hot and humid with temperatures ranging above 90". Winter days range from below 40° to 80°, but much of the time temperatures are in the lifties and slaties. Summer nights are warm, and winter nightime temperatures can be near or below freezing. Record lows have disped to 4°, with wind chills of -22°. The rainy season is normally from June through September. Many summer afternoons are drenched with localized thundershowers. Lightening is probably the most dangerous feature of an Osafenokee experience.

SAFETY: Each traveler is required by law, to have a <u>Coast Guard</u> approved life preserver in his postession. Each cance must contain a compass and a flashlight. Each cancelst must register when entering and leaving the swamp. Due to danger from alligators, pets may not be taken into the swamp. For the same reason, swimming is not permitted. Minimum party size is two persons. Parties will not be permitted to launch later than 10:00 a.m. to insure that the overnight stop is reached before dark.

CAMPING: Overnight camping is permitted only at designated overnight stops. You must remain at the designated overnight atea between subset and summer. You may camp only one night per rest stop. Since firm land is not available at all overnight stops, a 20 x28' wooden platform is provided. Pop tents are recommended. No nails should be used and no trees or limbs should be cut. Open fires are not permitted except at specified areas, so gasoline, bottle gas or similar types of stores will be required if you plan to cook meals. Portable toilets with disposable bags are required even though most overnight camp sites are

outfitted with chemical toilets. Canbe parties must adhere exactly to the scheduled trail and essigned overnight stops.

SUGGESTED SUPPLIES. 1) Rope for pulling cance, 2) Drinking water, 3) Insect repellant; 4) Mosquito petting, 5) Rain gear, 6) First aid kit; 7) Extra batteries, 8) Litter bags, 9) Pop tent and/or jungle hammock and singung bag.

Cances, other camping equipment, and services are available for rent from the concessioner. Suwannee Canal Recreation Ares. Polkston, Georgia, Phone (312) 496-7156 and Stephen C. Foster State Park, Faroc. Georgia, Phone (312) 637-5274



Okefenokee Canoeing Trails



