

1 9 7 2 N A R R A T I V E R E P O R T

OKEFENOKEE NATIONAL WILDLIFE REFUGE

REFUGE PERSONNEL

PERMANENT

John R. Eadie (EOD 8/7/72)	Refuge Manager
Larry L. Galvert (Transferred 7/21/72)	Refuge Manager
Ronald L. Fowler (EOD 8/14/72)	Assistant Refuge Manager
Donald J. Kosin (Transferred 8/18/72)	Assistant Refuge Manager
Wendell D. Metzen	Wildlife Biologist (Mgt.)
William E. Kelley	Forester
Ronald G. Bisbee	Recreation Specialist
Robert R. Germany (Transferred 6/16/72)	Public Use Specialist(Trainee)
Larry Mallard	Assistant Refuge Manager(Trainee)
Omer L. Bowen	Biological Technician
William C. Cone	Biological Technician
Jewett V. Hall	Biological Technician
Jay W. Burch	Maintenanceman
Virgil Crews	Maintenanceman
Barcus Hamilton	Laborer
Margaret L. Ball	Clerk-Stenographer

TEMPORARY

Allison Boone	Recreation Assistant
Carl M. Holcomb	Laborer
R. Claire Johnson	Recreation Aid
Patricia Lloyd	Laborer (Receptionist)
Lonnie Varnedoe	Laborer (Recreation Intern)

PART-TIME

Cecile M. Davis	Clerk-Typist
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UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
WAYCROSS, GEORGIA

OKEFENOKEE NATIONAL WILDLIFE REFUGE

NARRATIVE REPORT

C. V. 1972

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OKEFENOKEE NATIONAL WILDLIFE REFUGE

NARRATIVE REPORT

C. Y. 1972

I. GENERAL

A. Weather Conditions

The rainfall pattern for the January to July period of 1972 was repetitive in nature; two months of above average precipitation followed by two months of below average rainfall. August precipitation was 4.63 inches above that of the 28 year average. A thunderstorm on August 25 deposited 3.32 inches of rainfall in one hour on the Suwannee Canal Recreation Area. As a result, the Wildlife Drive was flooded in more than 25 places and was closed for one week. During September .75 of an inch of rainfall was recorded. This was the lowest September rainfall in the 28 years that rainfall records have been kept. Precipitation recorded at the Camp Cornelia Weather Station during the calendar year measured .40 inches above the 28 year average.

Despite relatively normal water levels in the swamp, during the fall the pine uplands experienced a high fire danger period. The fire danger factor reached class 5 in mid-October and lessened with increased moisture levels during the month of November.

Overall, the temperatures for the year were cooler than normal. The mean temperature was equal to or lower than the 28 year mean for each month except September and December. Temperature extremes included a high of 99 degrees in July and August and a low of 23 degrees in January. The 85 degree reading recorded in December represented the highest temperature ever recorded for that month in the 28 years that records have been kept at the Camp Cornelia Weather Station. Average December temperatures were five degrees warmer than the 28 year average.

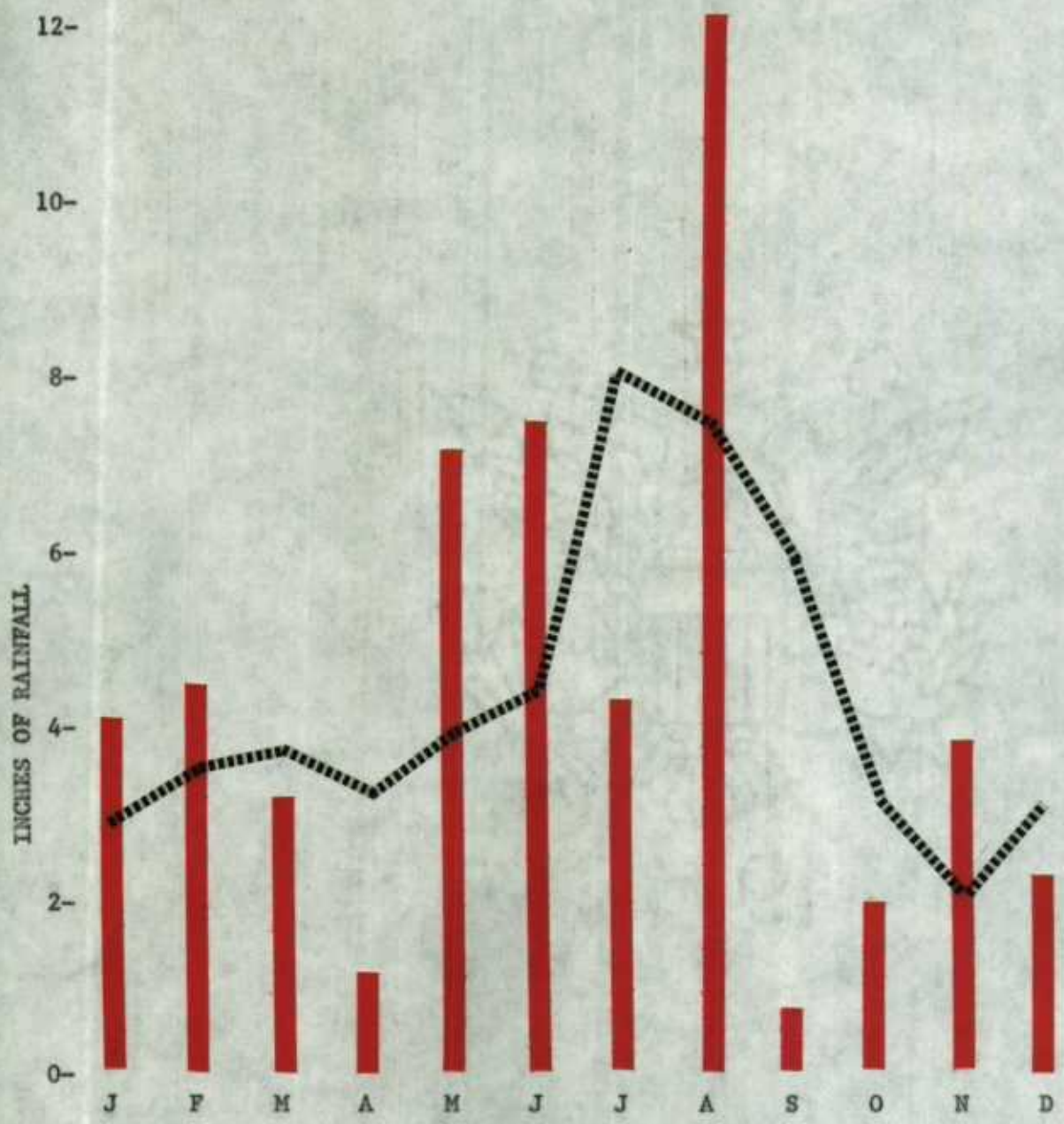
WEATHER DATA, CAMP CORNELIA WEATHER STATION

<u>Month</u>	<u>Precipitation in Inches</u>		<u>Temperatures F</u>			
	<u>1972</u>	<u>28-Yr. Avg.</u>	<u>Max.</u>	<u>Min.</u>	<u>Mean</u>	<u>1946-72 Mean</u>
January	4.10	2.93	82	23	54	54
February	4.49	3.52	83	24	55	56
March	3.22	3.77	84	31	61	64
April	1.20	3.37	92	40	68	71
May	7.20	3.99	89	51	72	77
June	7.48	5.46	96	53	76	82
July	4.34	8.06	99	62	81	83
August	12.17	7.54	99	66	81	84
September	.75	5.85	98	59	79	77
October	1.99	3.34	90	43	70	72
November	3.82	1.90	86	34	61	61
December	2.27	2.93	85	27	60	55
Totals	53.03	52.66	Ex- 99	23		

B. Habitat Conditions1. Water

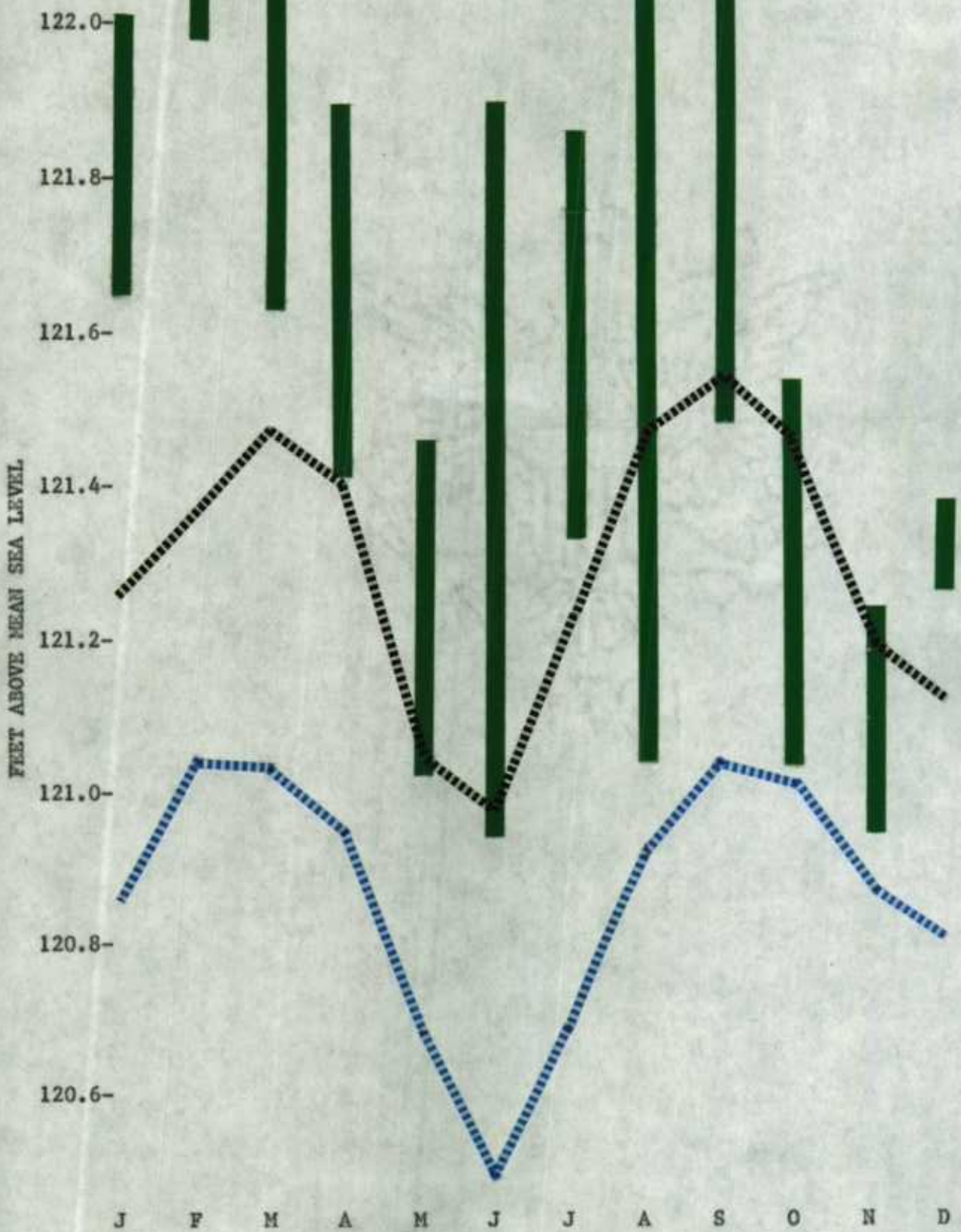
Water levels are measured at two gauges; one at the Suwannee Canal and the other at Billy's Lake. With the erratic precipitation distribution that occurred this year, it was felt that the two gauges did not accurately reflect the water levels in the swamp. Fluctuations in the amounts of monthly rainfall caused several variations in swamp water levels. However, these variations were not abnormal extremes. There were above water levels present in the spring and summer months and several average periods in the fall. Water levels during the spring months were .41 feet above the 32 year average. The month of September saw only .75 of an inch of rainfall. However, the water levels during that month were .40 feet above the 32 year average.

The fluctuating rainfall pattern tended to result in above average water levels in the swamp, but the upland portions of the refuge suffered drought conditions during September and October. Upland habitat fuel moisture was extremely low during this period and hazardous wildfire conditions prevailed.



1972 RAINFALL AT CAMP CORNELIA SUBHEADQUARTERS

■ 1972 Rainfall
..... 28 Year Average



1972 SUWANNEE CANAL WATER LEVELS

1972 Monthly Variation
 32 Year Average Monthly High
 32 Year Average Monthly Low

2. Food and Cover

The higher than normal water levels in the spring reduced the production of paintroot and beakrush. These two species are favored by average or below average water levels. The higher than normal spring water levels resulted in a general dispersal of aquatic fauna; consequently, many waterbirds shifted their feeding activities to upland moist pine barrens. The high waterlevels in the spring also provided extremely favorable conditions for bladderwort and white water lily. The lower water levels in October and November provided ideal conditions for the wood and white ibis. These two species were better able to find invertebrates which make up most of their diets.

The pine forests produced less mast than last year. The acorn crop around the refuge was excellent. Personnel of the Georgia Department of Natural Resources reported the highest concentration of wood ducks in recent years along streams in the area. Gall and palmetto berries were produced in good numbers this year. The cassena holly berry crop was good this year, but below last years bumper crop. The blackgum and bamboo berry production was normal. Increased turkey and deer activity has been noted around the wheat and ryegrass plots which were planted this fall, along the Wildlife Drive and at the Deer Stand tower.

Prescribed burning in the upland pine forests continues to provide excellent wildlife foods. Frequent burning of the palmetto and gallberry understory rough enables wildlife food plants such as legumes, panic grasses, beggar-tick, ground oak and ground chinquapin to increase in number and seed production. Various seeds become more accessible to wildlife and nesting conditions and moveability are greatly improved.

II. WILDLIFE

A. Migratory Birds

1. Waterfowl

Waterfowl populations during the mid-winter and early spring were comparable to those in recent years. Estimates for mallards during this period varied from a peak of 5,860 in January to 850 during mid-February. The peak estimates for other species were 3,000 wood ducks, 2,075 ring-necked ducks, 2,200 green-winged teal, 1,240 American widgeon, 580 black duck, 975 shovelers and 125 gadwall.

The resident wood duck population varied from an early summer estimate of 2,500 wood ducks to a peak of 3,800 in August. The only ducklings observed were four broods in the flooded timber above the Suwannee River Sill. Production was estimated at 1,500 wood ducks; this was an average hatch.

Except for a few transient waterfowl, fall arrivals were very late. The first reported observations of ring-necks and American widgeons did not occur until mid-November, and it was December before any significant increase in the waterfowl population occurred. When the ducks did arrive finally during mid-December, the population build-up was rather rapid. At the close of the year the waterfowl population was estimated at 15,075. This was comparable to last year's estimate during December of 12,250 ducks.

The only sighting of geese near the refuge this year was of seven Canada geese flying over Gannet Lake during November.

2. Other Water Birds

The above average water level in the swamp created unfavorable feeding conditions for wading birds during the winter and spring months. The birds which were present during this period generally moved off the refuge to feed along the rivers and in the uplands of the moist pine barrens.

Several species of wading birds again nested at the rookeries located in Chesser Prairie, Mack's Island and along the North Fork of the Suwannee River. While the rookeries were active from March through mid-July, several surveys were taken to estimate the number of active nests. A nesting survey was not taken at the North Fork rookery. The dense growth of brush within and around this rookery made it impractical to conduct a survey. The results of the other nesting surveys are summarized in the following table.

1972 NESTING SURVEY

<u>Species</u>	<u>Nests in Chesser Prairie Rookery</u>	<u>Nests in Mack's Island Rookery</u>
Common Egret	1,500	---
Little Blue Heron	50	150
Green Heron	40	10
Cattle Egret	900	200
Black-crowned Night Heron	---	5
White Ibis	250	3,000
Anhinga	<u>4</u>	<u>3</u>
Totals	2,744	3,368

Several thousand wood and white ibis were attracted to the refuge by the favorable feeding conditions created by the early fall drought. During the last week of October the wood ibis population was estimated at 7,500 and the white ibis population at 9,000. This was a rather high population of ibis for this period of the year. The concentration of ibis remained at the refuge until the water level in the swamp rose during the first week of December. At the close of the year the wood ibis population was estimated at 250 birds and the white ibis population at 2,000.

Peak estimates for other wading birds were 9,000 common egret, 4,000 little blue heron, 2,000 green heron, 2,500 cattle egret, 1,500 great blue heron and 12,000 white ibis. These peaks occurred during the nesting season in June.

The refuge population of Florida sandhill cranes was estimated at 200 pair; this is comparable to last year's population. During the spring a survey was conducted to monitor their nesting success. The results of this study are reported under the Field Investigation section.

The greater sandhill cranes arrived later than normal; it was mid-December before a noticeable increase of cranes occurred. On December 16 Manager Eadie observed a total of 111 cranes as follows: 40 in Durden Prairie, 38 in Chase Prairie, 24 in Buck Lake Prairie and 9 in Chesser Prairie. The sandhill crane population at the close of the year was estimated at 1,200 birds. This was below last year's estimate of 1,775 cranes.

Pied-billed grebes were observed during the fall, winter and spring. Four were seen at Seagrove Lake on December 2. The pied-billed grebe population at the close of the year was estimated at 150 birds.

The anhinga is fairly common but not abundant on the refuge. On October 24, twenty-five were observed during a boat trip from the Suwannee Canal to Territory Prairie. The population, estimated at 150 birds, appears to be stable.

Twenty-two herring gulls were observed in Chesser Prairie on November 27. The herring gull is considered a rare visitor to the Okefenokee.

Only a few snips were observed in the prairies this year. The above average water levels during the spring and summer resulted in unfavorable feeding conditions for this species. The few observations which were reported occurred during the fall when the water level in the swamp approached normal.

A double-crested cormorant, an occasional visitor to the refuge, was observed at Seagrove Lake on December 10. Another, perhaps the same bird, was seen in the Suwannee Canal on the same date.

Twenty-one black-crowned night herons were observed along the canal run in December. These birds are quite common, but because they inhabit the wooded portions of the swamp, they are only occasionally observed.

American bitterns occasionally were observed throughout the year. From one to four bitterns usually were observed during the routine water bird censuses from the Suwannee Canal to Gannet Lake.

B. Upland Game Birds

1. Turkey

The only turkeys observed during the year consisted of one small flock containing not more than fifteen birds. From one to six of these turkeys were regularly observed along the Swamp Island Drive and in the vicinity of Trail Ridge at Camp Cornelia. During July a hen was observed with eight poults near the hardwood plot at Camp Cornelia.

An effort was made to obtain turkeys for stocking on Billy's Island. Originally this 3,300 acre swamp island contained turkeys; but without prescribed burning, the habitat became unsuitable, and the birds disappeared. Since 1967 the island has been prescribed burned and the habitat again appears suitable for turkeys. It is hopeful that some turkeys will be available for stocking during the coming year.

2. Quail

The quail population at the close of the year was estimated at 1,400 birds which is above last year's estimate of 900. The prescribed burning of the upland timber compartments on a shorter rotation schedule since 1967 has resulted in a tremendous improvement of habitat conditions. The burning has opened up the brushy understory and made room for the invading annual grasses and forbs. During 1967 when a rough understory existed, the population estimate was based on a quail per 25 acres. This year the estimate was one per 8 acres.

C. Big Game Animals

1. Deer

The deer population at the close of the year was estimated at 1,000 animals. This compares with last year's estimate

of 900. Deer are quite abundant in the upland timbered areas around the swamp except along the northwestern perimeter where poaching is a problem. Deer are especially abundant in the Pocket area on the western side of the refuge and in the timber compartments near the Suwannee Canal Recreation Area. During the twilight hours from 20 to 25 deer usually may be observed along the auto tour routes in either of these areas.

Several fawns were observed at various locations during the summer. Two sets of twin fawns were regularly seen along the Swamp Island Drive at Camp Cornelia. Three sets of twins were observed in the Pocket area.

The deer kill in the vicinity of the swamp, as reported by the Georgia Game and Fish Commission, was 269 in Clinch County and 24 in Charlton County. This was an increase of 49 deer over last year's combined kill of 244 deer for these two counties. After being closed during 1971, the deer season in Ware County was reopened between November 4 and 18. During this 15 day season, 60 deer were killed which included 28 taken on the Waycross State Forest.

2. Bear

Observations of bear have been reported more frequently than in the past several years. Most of the observations occurred along the Swamp Island Drive near the Suwannee Canal Recreation Area and in the Pocket area on the western side of the swamp. Other sightings occurred at Cowhouse Island, Floyd's Island, Ohio Lake, Suwannee River, Sirman's Station, St. Regis' Pasture and Mattox Corner's.

Ten bear cubs were seen during the year. This was a sizeable increase over the usual reporting of only two or three cubs. The location of observations along with the number of cubs observed are as follows: one at Ohio Lake and two each at Floyd's Island, the Pocket, Swamp Island Drive and Cowhouse Island.

Poaching in order to protect beeyards from damage continues to be a problem. In October Biological Technician Hall overheard a conversation that twelve bears were killed during the year along the northwestern perimeter of the swamp. Three others were killed on U. S. Highway 1 near Racepond after being struck by vehicles during October.

The killing of bears in and around the Okefenokee has occurred since the early 1800's. However, with a 435,000 acre swamp in their backyard, the bears have persevered over the year's and no doubt will continue to do so. It is encouraging that several of the beekeepers have constructed electric fences to protect their beehives. Over a period of year's, an electric fence will provide cheap protection.

Based on this year's number of bear observations, last year's population estimate of 40 seems rather low. This year's estimate is, therefore, being increased to 80 animals.

D. Fur Animals, Predators, Rodents, and Other Mammals

Bobcats are abundant around the perimeter of the swamp and on the larger swamp islands. During July a female with kittens was observed crossing the entrance road to the Suwannee Canal. Another was observed on three different occasions along the Swamp Island Drive. The bobcat population at the close of the year was estimated at 600 animals.

The number of raccoon observations was comparable to last year's. They are abundant around the swamp and common on the larger swamp islands. Their population is estimated at 3,000 animals.

The striped skunk was not observed as frequently as during last year. This year's population estimate of 200 animals compares with last year's estimate of 270.

Otters were regularly observed in the Suwannee Canal behind the Swamp's Edge Information Center during the winter period. These animals are observed only during the colder days when alligators are inactive. Their population at the close of the year was estimated at 800 animals.

E. Hawks, Eagles, Owls, Crows, Ravens, and Magpies

1. Hawks

The first osprey of the year was observed near Minnie's Lake on January 24. This was about a week earlier than last year's first observation. The number of osprey seems to be stable with about 30 returning each year to nest.

Eight active osprey nests were reported this year. These nests were located as follows: three in Chesser Prairie, one in Chase Prairie, two on Mack's Island, one at Billy's Lake, and one at the northern end of Minnie's Lake. Another nest was located in Chase Prairie during October. It is not known if this nest was active this year. The nest in Buck Lake Prairie was inactive, and the nest in Territory Prairie was not surveyed this year. The three osprey nests in Chesser Prairie were observed regularly throughout the spring and early summer months without any sighting of young birds. The other nests were not observed often enough to determine their hatching success.

The last reported observation of an osprey was on December 8 of a single bird in the sill area. Since ospreys normally depart the refuge shortly after the nesting season in August or September, this is a rather late observation. Other reported observations during the fall include the sighting of a single bird at the Okefenokee Swamp Park on October 5 and another in the sill area on December 3.

The swallow-tailed kite was observed on several occasions in the Pocket area. A bird was also seen along the Swamp Island Drive on April 5 and again on the 10th. This was the first reported observation of a kite in the Camp Cornelia area in several years.

The red-shouldered hawk is numerous in the swamp. The population is stable at an estimated number of 250 birds. The red-tailed and sparrow hawks are common winter residents. Their populations were estimated at 25 and 300, respectively. A Marsh hawk was observed on two occasions from the observation tower in Chesser Prairie during December. The turkey and black vultures are common year round residents. Their combined population is estimated at 1,600 birds.

2. Eagles

The bald eagle is only an occasional transient at Okefenokee. On October 7 an adult was observed near the refuge about two miles west of St. George along State Highway 94.

3. Owls

13.

The barred owl is a common resident in the Okefenokee Swamp. Their population of an estimated 250 birds is considered about average. Other owls inhabit the swamp but little is known about their population sizes.

F. Other Birds

1. Red-Cockaded Woodpecker

A total of 59 cavity trees were counted during a red-cockaded woodpecker nesting tree survey in December. This was an increase over last year's total of 53. Of the 59 cavity trees located this year 48 were active; this was a rather large increase over the 28 active cavities reported in 1971 and 26 in 1970. The reasons for the increase in active cavities are unknown, but it is thought that the clear cutting of pine timber on lands adjacent to the refuge could be causing an influx of woodpeckers into the refuge timber compartments. In 1973 the cavity trees will be numbered so that the history of each tree can be followed.

During July the red-cockaded woodpecker population was estimated at 75 birds. Since there was an unexpected increase of 20 active cavities during the year, this may be a low population estimate.

2. Christmas Bird Count

The Christmas Bird Count was conducted on December 16 with the assistance of nineteen participants, most of whom were from the Okefenokee Bird Club in Waycross.

A total of 81 species and about 11,502 individual birds were observed. This was above last year's total of 77 species but below the 1970 count of 95 species.

The details of the Christmas Count are included at the end of this report.

G. Fish

As usual, sport fishing for "bream" was especially good during the early summer months. During this period the sunfish tend to concentrate in the swamp lakes and deeper water courses and are easily caught.

As a result of a fisheries survey conducted by the Georgia Department of Natural Resources, Game and Fish Division, it was determined that warmouth perch were being over-harvested in the swamp. It was recommended that the aggregate creel limit for sunfish in the swamp be reduced from the present limit of 50 to 25. Other species of sunfish were included in the reduced limit because of potential enforcement problems. This recommendation has become a regulation to take effect on April 1, 1973.

Fishing for large-mouthed bass was slower than usual with an occasional large fish or a limit catch being reported. Chain pickerel and bowfin were regularly caught throughout the year.

H. Reptiles

Alligators are numerous in the Okefenokee and may be seen on almost any warm day. Night counts were conducted along ten of the eleven established census routes during the summer. The census route from the Swamp Park to Dinner Road was not taken because of the difficulty in navigating this boat run at night. Based on the counts the refuge alligator population was estimated at 8,076 which compares with last year's estimate of 11,700. Although this year's estimate is below last year's, it is doubtful that there actually has been a population decline. The fluctuation in estimates is probably due to the low reliability class of the inventory procedure. The refuge alligator population probably numbers somewhere between eight and fourteen thousand.

During July a female alligator which had constructed a nest near the boat basin at the Stephen Foster State Park was moved to a borrow ditch along the Swamp Island Drive. This alligator was aggressive and threatened the safety of the visiting public.

Several alligator nests were located and checked weekly during the summer to evaluate nesting success. The details of this survey are reported under the Field Investigation section of this narrative.

I. Disease

No diseases were reported during the calendar year.

III. REFUGE DEVELOPMENT AND MAINTENANCE

A. Physical Development

Maintenance of refuge facilities comprised a large portion of the work accomplished on the refuge this year. The public use facilities constructed at the Suwannee Canal in 1967-68 are beginning to require considerable maintenance. An effort was launched during the last half of the year to bring numerous structures and facilities up to "Bureau maintenance standards". Many man hours were expended in maintaining the one hundred and twenty miles of boat and canoe trails.

1. Kingfisher Landing

The restrooms and storage building were repainted on the inside and outside. The boat ramp was repaired and lengthened for ease of launching during low water. Parking barriers were constructed and the road to the launching area and the service building were rebarked. We are still getting bark free from U. S. Plywood in Waycross.

The boat trails from Kingfisher to Bluff Lake and Maul Hammock Lake were recut with the trail cutter.

2. Suwannee Canal Recreation Area

Replacement bark was placed on the access trail from the parking lot to the boardwalk, the Canal Diggers Trail, the Homestead Trail, and the Deer Stand Trail. Three additional culverts were installed under the Deer Stand Trail to facilitate drainage.

The nature drive was patched with hot asphalt mix. It has deteriorated considerably because of water standing over the road. Following the 3.32 rain in one hour on August 25, water was over the road in twenty-five places between the Suwannee Canal and Chesser Island.

The water pump at Chesser Island was finally repaired after more than a year of frustrating difficulties. New parking barriers were installed at the Chesser Island parking lot.

On April 17, 1971 Mrs. Agnes Mae Schneider suffered a fall from the steps on the Deerstand Tower. The resultant tort claim was settled for \$17,500 in December 1972. In an effort to eliminate any existing safety hazards, the tower was modified extensively. The modifications included the construction of wider steps and cement was poured around the base of each of the ~~same~~ pilings. For added stability the roof and sides were strengthened with steel brackets. Non-skid paint was applied to the steps.

The boat trails south of the Suwannee Canal to Grand Prairie were recut with the trail cutter.

3. Camp Cornelia

A long overdue cleanup was conducted at Camp Cornelia Sub-headquarters in August. New parking barriers were also installed near the shop. A primitive campground for youth groups was established one half mile south of Camp Cornelia. The fire lanes and perimeter road into timber compartments 3 and 4 were rehabilitated. The boathouse was also repainted to bring it up to "Bureau maintenance standards".

The ceilings in quarters No. 9 were repainted.

4. Wilderness Canoe Trails

Construction was begun on the "brown" canoe trail from Stephen Foster State Park; work had to be discontinued because of low water.

Three new sign-in registers were placed at the overnight stops to provide better control of the wilderness canoeing program.

Extensive "peat blowups" in the late fall forced the closing of the "yellow" and "green" canoe trails. The yellow canoe trail was later reopened, but the green canoe trail west of Floyd's Island remained closed at the end of the year.

A new canoe trail was opened from the Suwannee Canal Recreation Area to Stephen Foster State Park via the Suwannee Canal run. Placing canoe trail mile markers in the existing waterway was all that was required to establish this canoe trail. The canal run will remain closed to outboards. For the time being canoeists will stay overnight at the canal run shelter; hopefully in the near future the trail to Bugaboo Island can be reopened; this will provide a more equidistant overnight stop.

The following canoe trails were recut with the trail cutter this year: (1) Suwannee Canal to Cedar Hammock (2) Yellow canoe trail between Christia Prairie and Chase Prairie, and (3) Yellow canoe trail to Duck Island.

5. Stephen Foster State Park

The pit toilets at both Minnie's Lake rest shelter and the Big Water rest shelter were removed. The steps at both the Minnie's Lake rest shelter and the Big Water patrol cabin were repainted.

B. Plantings

1. Aquatics and Marsh Plants

None this calendar year.

2. Trees and Shrubs

None this calendar year.

3. Upland Herbaceous Plants

None this calendar year.

4. Cultivated Crops

Winter Wheat was planted in three plots along the Wildlife Drive and at the Deerstand Tower clearing; total acreage was 3 acres. The wheat provided excellent browse for white-tailed deer.

Ryegrass was seeded in a 7 acre plot adjacent to the Deerstand pond. Chufa was planted in the Deerstand Trail plot to provide browse for turkey, however, most of it was consumed by escaped hogs.

C. Collections and Receipts

1. Seed or Other Propagules

None this calendar year.

2. Specimens

None this calendar year.

D. Control of Vegetation

The Suwannee and Kingfisher Canals, the Suwannee River narrows, and the borrow pit at the Suwannee River Sill were treated with herbicides to control an encroachment of maidencane. The spraying was accomplished in May using dalapon applied at a rate of 10 pounds acid equivalent per acre. The results were excellent, except along Kingfisher Canal where a second application was required to achieve the desired kill. Although maidencane is now under control in the above waterways, annual spot treatment will be required to prevent vegetative regrowth.

The wax myrtle on the Suwannee River sill was sprayed with silex on May 5; the rate of application was two pounds acid equivalent per acre. Results were considered to be good.

An encroachment of spatterdock was sprayed in Maul Hammock Lake during June with 2-4-D applied at a rate of two pounds per acre. Poor results were achieved from this treatment. Better results might have been achieved if the spraying had been conducted when the spatterdock was in an earlier stage of growth.

E. Planned Burning

Prescribed burning continues to be an important part of the forest-wildlife management program on Okefenokee Refuge. Weather conditions were unfavorable for burning; suitable conditions occurred on only a few days. Despite the unfavorable conditions, a total of 4,800 acres was prescribed burned during calendar year 1972. Burning began in early January and was completed in March. A total of 540 man hours were required to accomplish the burning at a cost of \$0.65 an acre.

Areas burned were as follows:

Compartment 1	530 acres
Compartment 3	300 acres
Compartment 4	60 acres
Compartment 8	600 acres
Billy's Island	3,300 acres
Kingfisher Landing	<u>10 acres</u>
Total acreage burned	4,800 acres

F. Fires

The refuge had one wildfire during the year. It was started by lightning on August 9, 1972 and burned 23 acres before being controlled. The fire occurred in a mature longleaf slash pine stand in timber compartment 13 on the northwest side of the refuge. The fire burned slowly against the wind on the night of August 9 and was detected on August 10. Two firefighting crews from the Georgia Forestry Commission controlled the fire. No damage to the timber stand was evident.

IV. RESOURCE MANAGEMENT

A. Grazing

No grazing was authorized on refuge lands during the year.

B. Haying

None was authorized on the refuge during the year.

C. Fur Harvest

None was authorized on the refuge during the year.

D. Timber Removal

The refuge forest management program has been involved with a timber-for-land exchange with ITT-Rayonier, Inc. Under the provisions of this agreement, ITT-Rayonier, Inc., exchanged 7,418 acres of company owned swampland for 10,264 cords of refuge pulpwood. Cutting operations began on February 7, 1970 and were completed on August 26, 1972.

No refuge timber sales were scheduled due to the annual allowable cut (3,400 cords) for 1972 being included in the ITT-Rayonier transaction.

E. Commercial Fishing

No commercial fishing was authorized on the refuge during the year.

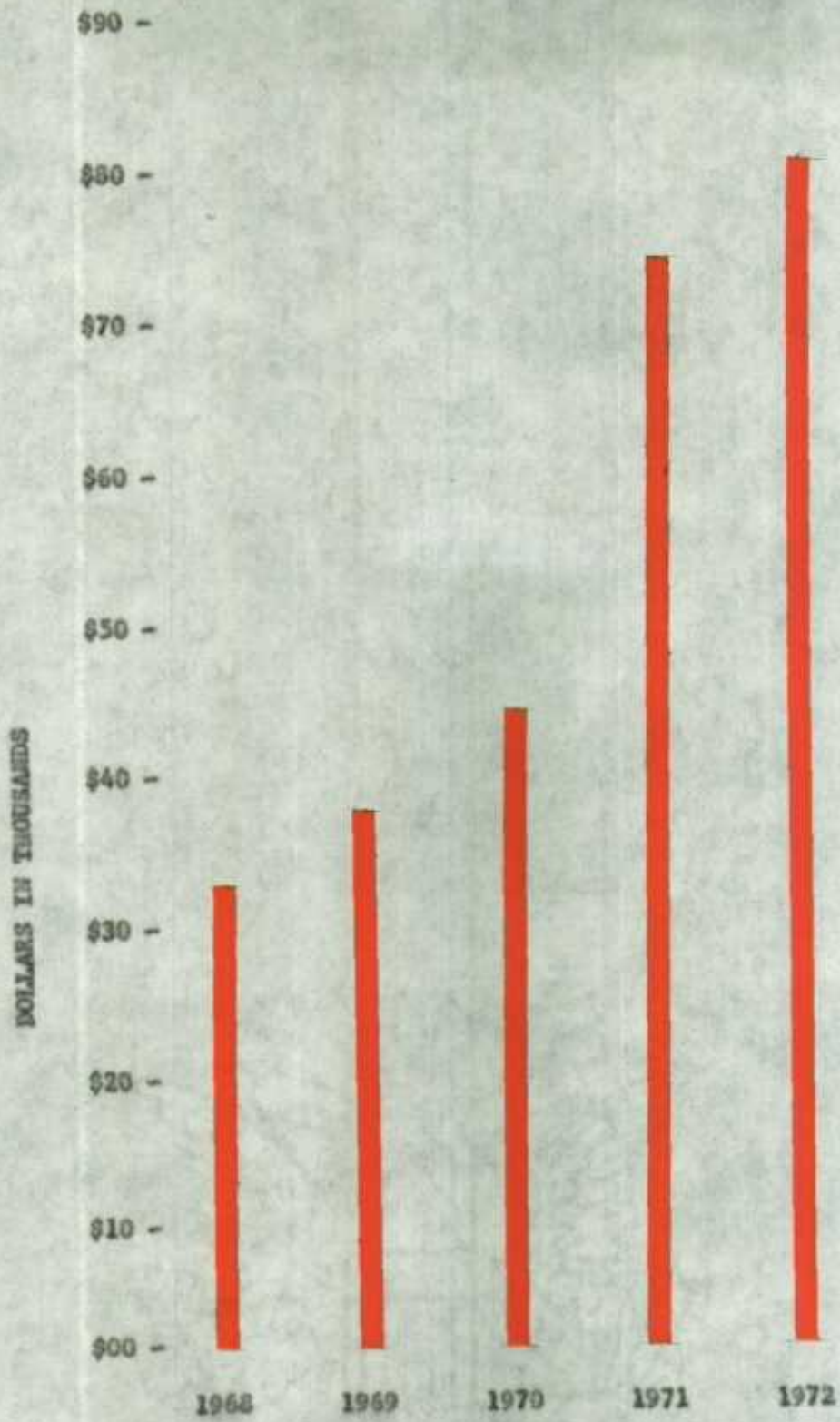
F. Other Uses

The Okefenokee Association, Inc., (Okefenokee Swamp Park) paid a \$25 franchise fee under contract agreement for use of boat runs on the northeast portion of the refuge.

John H. Holt, concessioner at the refuge's Suwannee Canal Recreation Area, paid a \$100 annual franchise fee plus a graduated percentage of his gross income from concession operations. Mr. Holt pays 3% of the first \$20,000 gross receipts, 4% of the next \$5,000 and 5% of any gross receipts over \$25,000. His net receipts for calendar year 1972 totaled \$92,413.18 and the

percentage paid by him, in addition to the annual franchise fee of \$100, amounted to \$3,590.93.

Mr. Harry Johnson bought the stock, supplies, etc., of Mr. John Holt and was formally awarded the remainder of Mr. Holt's contract on September 25, 1972. All percentages of gross receipts from that date forward were paid by Mr. Johnson.



NET RECEIPTS - SUZEE CANAL CONCESSION

V. FIELD INVESTIGATION OR APPLIED RESEARCH

A. Waterfowl Trapping and Banding

Attempts to band wood ducks were largely unsuccessful this year. The above average water level in the swamp hampered the trapping of waterfowl during the winter period. With the high swamp levels the ducks dispersed over the entire refuge and were not concentrated enough in any one area for trapping. Although the water levels were ideal for trapping during the fall period, many of the wood ducks moved off the refuge to feed on acorns along the river bottoms.

Seventeen wood ducks were banded during the post season; the quota was 300. In addition, 62 wood ducks were banded during the "pre-season" period and 29 during the "in season" period. Other ducks banded included 74 widgeon, 60 green-winged teal, 1 mallard and 1 blue-winged teal.

Tabulation of 1971 and 1972 recoveries reported by Patuxent during 1972:

<u>Wood Ducks</u>		<u>Green-Winged Teal</u>	
Florida	7	Florida	1
Georgia	5	Georgia	1
North Carolina	4	Maryland	1
South Carolina	3	New York	1
Minnesota	2	Nova Scotia	1
Alabama	1		
Arkansas	1	<u>American Widgeon</u>	
Missouri	1	Florida	2
New Hampshire	1	Indiana	1
New York	1	Louisiana	1
Ohio	1		
Pennsylvania	1		
Virginia	1		
Wisconsin	1		

B. Nesting Ecology of Alligators

During the summer a study was conducted to learn more about the nesting ecology of the alligator in the Okefenokee Swamp. The objectives of the study were to determine the preferred nesting habitat, nest dimensions, number of eggs present per nest, and the kind and amount of egg losses due to predation.

During the third week of June through mid-July, an intensive effort was made to locate alligator nests in Chesser, Grand and Chase Prairies. When a nest was located it was marked and rechecked on a weekly basis. During June, 29 partially constructed nests were located in Chesser and Grand Prairies. Most of these were dummy nests and were not used for egg laying.

Most of the nesting occurred during the second week of July. A total of 15 active nests with eggs were located. These were located as follows: 9 in Grand Prairie, 4 in Chesser Prairie, 1 at the Stephen Foster State Park boat basin and one along the middle fork run in Floyd's Island Prairie. Thirteen of the nests were constructed from the most readily available material. Maidencane was one of the main plants at the nest site; it was used in 93 per cent of the 15 nests. There was considerable variation in the size of the alligator nests. The largest measured 96 inches in diameter and 34 inches above the water surface; the smallest measured 30 inches in diameter and 13 inches high. The average nest was 92 inches in diameter and 27 inches high.

The egg laying was closely synchronized between July 7 and July 12. The average number of eggs found per nest was 27.5, ranging from 15 to 38.

Although the alligator is reported to protect its nest from predators, this was not demonstrated during the study. Only three females attempted to protect their nest when visited by persons conducting the survey. Only one of the 15 nests examined hatched successfully. Fourteen or 94 per cent of the nests were destroyed by predators. The majority were destroyed during the first week following egg laying. The black bear was the primary predator responsible for the nest loss.

The only successful nest was located on an old house (small island) adjacent to Monkey Lake in Grand Prairie. This was the only nest surrounded by a dense vegetative overstory of woody species which could possibly provide some protection from predation. It would seem that to maintain an alligator population, the nesting success would have to be higher than found to occur during this year's survey.

C. Sandhill Crane Nesting Survey

A nesting survey was initiated to study the nesting habitat requirements of the Florida sandhill crane in the Okefenokee Swamp and to document nesting chronology.

During March, six crane nests were located in Grand Prairie. An intensive search was conducted in Chesser Prairie, but no nests were found. The first crane nest was found on March 24 and the last on April 19. Each of the six nests contained a set of two eggs. The nests were generally built on a battery in an open area where the visibility of the crane was unobstructed. Batteries with a thick growth of maidencane were preferred over those batteries vegetated with woody species. Maidencane was the predominant material used in nest construction.

Two of the six nests were found before incubation had begun. One of these nests which contained one egg on March 24, was closely followed through the nesting period. During a survey on March 27, this nest had a complete set of two eggs. Incubation was probably initiated on either March 25 or 26. On April 21, the nest was observed and one egg had hatched. On the following day the second egg hatched. The chicks were in the nest and were not too weak to stand upright on their long legs. On March 23 only one chick was found. After a short search, the other downy chick was found about 75 feet from the nest, belly deep in water. The following day the nest was abandoned. Five other nests were located during the survey; three hatched successfully, one was deserted during incubation because of human disturbance; the outcome of the other nest was unknown.

A young sandhill crane about one-fourth grown was observed on two occasions along the airboat run into Chesser Prairie. During July an old nest with one infertile egg was found near Monkey Lake.

VI. PUBLIC RELATIONS

A. Recreational Uses1. Recreational Use at the Suwannee Canal Recreation Area

<u>Activity</u>	<u>Number of Participants</u>		<u>% Change</u>
	<u>1972</u>	<u>1971</u>	
Boat tours	13,805	12,509	+ 10%
Boat observers	2,851	2,899	- 2%
Swamp boardwalk	33,443	27,434	+ 22%
Wildlife drive	44,587	31,649	+ 41%
Information Center	28,939	29,049	0%
Fishing	8,094	9,508	- 15%
Picnicking	4,315	6,006	- 28%
Total visitors	108,197	98,089	+ 10%

The attendance at this Bureau administered facility increased 10,108 over last year. Visitation for the three summer months increased 27% over the similar period in 1971; 38% of this year's visitation occurred during the months of June, July and August. The increased summer use can be partially explained by Disney World at Orlando; this was the first summer that their facilities were open. Numerous visitors have indicated that Disney World would be another stop on their vacation.

Visitor use of the Wildlife Drive and boardwalk increased 41% and 22% respectively over 1971. At the same time, boat tours increased 10% (about the same as the rate of increase for the Suwannee Canal Recreation Area). This suggests that visitors are making increased use of the facilities that are available.

The number of fishermen at the Suwannee Canal Recreation Area decreased 15%; 8,094 fishermen were reported in 1972, compared with 9,508 in 1971. The parking lot at the Suwannee Canal can accommodate 143 cars. This is more than adequate, except for the period of increased fishing activity on March and April weekends. During March and April of this year, on six days the parking lot was filled to capacity; it was necessary for refuge personnel to direct traffic and patrol the area on these weekends.

2. Recreational Use at Stephen C. Foster State Park

<u>Activity</u>	<u>Number of Participants</u>
Boat tours	7,027
Wildlife observation by boat	9,012
Fishermen	17,346
Campers	23,111
Cabin Users	8,651
Group Campers	6,523
Nature trail	5,201
Museum building	52,473
Picnicking	9,746
Total Visitors	103,476

In preparing this narrative report, it was discovered that the public use figures reported by Stephen Foster State Park were grossly inflated. A new reporting procedure has been devised for this area which will insure more accurate information than we have received in the past. The above figures represent the revised data for 1972. Since 1971 public use figures for Stephen Foster may also be unreliable, no comparison can be made with the 1972 figures.

3. Recreational Use at Okefenokee Swamp Park

The Okefenokee Swamp Park is managed by a privately administered non profit organization. It is located on lands leased from the State of Georgia which are adjacent to the Okefenokee National Wildlife Refuge. The short boat tours included in the price of admission do not go on refuge lands, only the extended boat tours go on the refuge. Prior to July 1971, all visitors to the Okefenokee Swamp Park were included in the visitation for the Okefenokee Refuge. Only the extended boat tours and the environmental education program, which is conducted on refuge lands adjacent to the Swamp Park, are now included in the public use data for the refuge. In 1972, 3,765 visitors took the extended boat tours from this privately managed park. Park Manager Jimmy Walker estimated the total 1972 visitation at 120,000. The environmental education program which was financed by Title III, U. S. Office of Education, is now funded by the Okefenokee Science Curriculum Center, which is a part of the Georgia Department of Education. In 1972, 5,122 students and 217 teachers participated in the environmental education program.

4. Recreational Use at Kingfisher Landing

Fishing and canoeing are the primary uses at this undeveloped entrance. The number of fishermen decreased this year at Kingfisher Landing; 656 were recorded this year, compared with 783 fishermen in 1971.

5. Fishing at the Suwannee River Sill Access

This access point was used by fewer fishermen this year; the 4,284 reported was a 19% decrease over 1971.

6. Recreational Use of Canoe Trails

This was the first full year of the wilderness canoeing program. Prior to 1971 when the program was initiated, overnight use within the swamp was not authorized.

Because of sanitation conditions around the overnight platforms, each canoe party was required to carry portable toilets. This requirement was added to the permit issued to each party and has generally been well received.

The Sierra Club sponsored two national outings that began at Kingfisher Landing and ended six days later on the Suwannee River. The Wilderness Society also sponsored an Okefenokee canoe trip as part of their 1971 "A Way to the Wilderness" program.

Three times as many canoeists participated in the wilderness canoeing program as were recorded in 1971; 921 people made use of the trails this year. The peak of 219 canoeists occurred in March. The most popular trip was from Kingfisher Landing to Stephen Foster State Park via Maul Hammock Lake and Big Water. Nearly one half of the canoeists chose this trail.

On October 23, a group of girl scouts had to be rescued when they became stranded in a peat blowup on the green trail west of Floyd's Island. The green and yellow trails were closed because of peat blowups in October and November. At the end of the year the conditions had improved and all trails, except the green canoe trail west of Floyd's Island were reopened.

Kingfisher Landing was the most popular starting point; 529 canoeists embarked on their wilderness canoeing experience from that point. Two hundred and nineteen canoeists started at the Suwannee Canal Recreation Area; 173 began their trip from Stephen Foster State Park.

B. Refuge Visitors

1. General

The 1971 and 1972 public use figures are not directly comparable. Until July 1971, off refuge visitation to the Okefenokee Swamp Park was included in refuge public use figures. If the 1971 Swamp Park off refuge use is not counted, the total refuge visitation decreased 11% in 1972; 223,409 visitors were recorded this year.

2. Visitors of Interest

The following photographers and journalists visited the refuge this year:

SHAD NORTHSHIELD, Executive Producer of NBC News, visited the refuge on January 22-25, to take photographs for his book, The People's Birds, which was published in the fall.

RUSS KENNY, free lance photographer from New Caanan, Connecticut, visited the refuge on January 26-31.

Artist-photographer GENE KLEBE, visited the refuge on March 1, to obtain photographs for future painting.

JERRY ROBINSON, writer and HANS CAROL, photographer, with Sports Afield, took a three day canoe trip across the swamp on March 6-8. They were gathering material for an article on the Okefenokee in a forthcoming issue of Sports Afield.

PAT CAULFIELD spent several weeks throughout the year on the refuge doing photography for a Time-Life book on the Okefenokee, which is expected to be published in August, 1973.

THASE DANIELS visited the refuge on March 31-April 11, doing free lance photography for National Wildlife. She also visited the refuge later in April and again June 2-10.

MR. PAUL BROWN of WSPA-TV in Spartanburg, South Carolina, visited the refuge on June 6, to videotape an interview with Manager Calvert about the wilderness canoeing program.

LENARD LEE RUE, III, from Belvedere, New Jersey, visited the refuge from June 29 to July 15, to take photographs for a story on the Okefenokee.

Three cameramen from Paramount Pictures visited the refuge on June 29-30, to make a short film on the swamp.

During October, FRANK RUSSELL, a writer on assignment for Time-Life, spent several weeks in the area gathering material for the Time-Life book on the Okefenokee wilderness.

FERRELL GREHAN spent several weeks in October on the refuge; he took photographs for a forthcoming National Geographic article on the Okefenokee.

DOYLE LEWIS of the Charlton County Herald visited the SCRA several times for photographs and stories of items of local interest.

FRANK LEYDET, from Kentfield, California visited the refuge for several weeks in December. He was on assignment from National Geographic to write an article on the Okefenokee wilderness.

The following Bureau personnel also visited Okefenokee during 1972:

<u>Date</u>	<u>Name</u>	<u>Purpose of Visit</u>
3/2-3	Mr. Ken Butts, RO	Public Use Survey
4/11-13	Mr. John Yount, RO	Land acquisition
4/7	Mr. Joe Yovino, WO	Visit
4/12	Mr. & Mrs. Joe Hardy, Div. of Wildlife Services	Visit
4/17-18	Mr. & Mrs. John Davis, Mattamuskeet	Visit
5/11	Dr. Harry Ohlendorf & Dr. Edwin Klass, Patuxent Wildlife Research Center	Collection of eggs for pesticide study
5/16-19	Mr. Royston R. Rudolph, RO	Comprehensive inspection
5/30	Mr. John Yount & Bob Heittiko, RO	Land acquisition
7/3	Mr. & Mrs. Ernest Wilson & Family, RO	Visit
7/10-11	Mr. Dick Thompson, Area Biologist	Alligator research
7/14	Mr. John Dargo, U.S. Solicitor's Office	Tort claim
7/19-20	Mr. Conley Moffett, RO	Interpretive devices
8/28-31	Mr. Conley Moffett, RO	Regional AIN meeting
8/28-9/15	Mr. Bob Heittiko, RO	Land acquisition
9/11	Mr. Walter Stieglitz, RO	Concession contract
9/15	Mr. Larry Givens, RO & Mr. Richard Cotta, USGMA, Puerto Rico	Visit
9/18-22	Mr. John Yount, RO	Land acquisition

10/5-7	Mr. Jim Pulliam, WO	AIN meeting
	Mr. Walter Stieglitz, RO	" "
	Mr. Conley Moffett, RO	" "
	Mr. Jimmy Tisdale, Eufaula	" "
	Mr. Bob Barber, J. N. "Ding" Darling	" "
	Mr. Denny Holland, Back Bay'	" "
	Mrs. Liz Lindeman, Loxahatchee	" "
	Mr. Robert Bridges, St. Marks	" "
	Mr. Marvin Hurdle, Lake Woodruff	" "
	Mr. Robert Germany, Blackwater	" "
	Ms. Robin Fields, Merritt Island	" "
	Mrs. Robin Martindale, RO	" "
	Mr. Raymond McMatter, White River	" "
	Ms. Jacky Grody, Chincoteague	" "
	Mr. Harold Johnson, Wheeler	" "

C. Other Non-Bureau Visitors

Staff members of the Fern Bank Science Center in Atlanta visited the refuge on February 23-26, to collect plants by permit.

Mr. and Mrs. Francis Njiri, Deputy Director of the National Parks on Kenya, toured the Suwannee Canal Recreation Area on March 27, 1972.

Dr. Matti Helminen of the National Game and Fish Research Institute of Finland visited the Suwannee Canal Recreation Area on April 3, 1972.

Tom Taggart, unsuccessful candidate for the U. S. Congress was given a tour of the Suwannee Canal Recreation Area on April 27, 1972.

Mr. George Bagby, Deputy Commissioner for Natural Resources for the state of Georgia and his family visited the refuge on August 26, 1972.

Dr. Arthur Cohen from the Coal Petrology Laboratory, Southern Illinois University visited the refuge from August 15 to September 7, 1972, to collect peat core samples. This was part of a continuing study which was funded by the National Science Foundation.

Mr. Roberto Vasquez, Assistant Secretary, Area of Natural Resources, Department of Public Works for Puerto Rico, visited the refuge on September 15, 1972.

Congressman elect Bo Ginn and five other guests toured the Suwannee Canal Recreation Area on September 27, 1972.

On September 27-28, a group of twelve South Carolina officials interested in the future of the Santee Swamp, toured the refuge to learn about our facilities.

On November 11, 1972, Mr. Jack Mays of Folkston and forty industrial developers visited the Suwannee Canal Recreation Area for a brief orientation.

D. Refuge Participation

1. Off Refuge Programs

A big increase was noted in the demand for off refuge programs; 94 programs were presented to 11,419 people. This compares with 76 programs and 6,445 people reached by off-site programs in 1971.

Most of the programs were slides or movies and were presented to school classes, scout groups, church groups, and conservation organizations. During National Wildlife Week in March, 56 programs were presented to 5,025 children. Wildlife Week was given publicity on Waycross cable television and in local newspapers.

Manager Calvert presented a slide program on "Birding in the Okefenokee" to a combined meeting of the Atlanta Bird Club and the Atlanta Sierra Club. About 175 people attended the meeting.

A forest-wildlife exhibit was displayed at the Waycross-Ware County Forest Festival on May 3, 1972. About 3,000 people attended the festival.

On October 12-14, the refuge provided an exhibit at the Farm Power and Recreation Show at Abraham Baldwin Agricultural College in Tifton, Georgia. About 1,100 people viewed a refuge forestry exhibit.

2. On Refuge Programs

Sixty-three groups totaling 1,194 people visited the refuge this year and were given on site programs. This is a significant increase over 1971 when 36 groups totaling approximately 725 people were reached by on site programs. Most of the programs consisted of orientation slide programs followed by a guided tour of the Suwannee Canal Recreation Area.

National Officers of the Sierra Club, Friends of the River, and the National Audubon Society were given a tour of the Suwannee Canal Recreation Area and the west side of the swamp on May 6-7, 1972.

The Association of Interpretive Naturalists held its Southeastern Regional Workshop at Okefenokes October 5-7. Sixty-six people attended the meeting, including Bureau Personnel from the Central Office, Regional Office and twelve refuges in Region 4.

A group of 100 people attending the annual meeting in Jacksonville, of the National Sciences for Youth Foundation, visited the Suwannee Canal Recreation Area on December 7. They were given slide programs and tours of the Wildlife Drive and boardwalk.

On site programs were presented to groups from the following educational institutions:

<u>Date</u>	<u>School</u>	<u>Department</u>	<u>Number in Group</u>
1/6	Denison University	Biology	36
1/20	Waka Forest	Biology	16
1/21	University of Georgia	School of Environmental Design	19
1/23	Mount Mercy College	Biology	6
1/25	University of Delaware	Biology	6
3/3	University of Florida	Wildlife	21
3/30	Lawrence Kansas	High School	20
4/2	Robertson High School	Skyland, North Carolina	21
4/6	James Madison High School	Madison, Wisconsin	16
4/19	Colorado State University	Forestry	22
4/28	N. Georgia College	Biology	22
5/26	Auburn University	Plant Ecology	23
6/2	University of Georgia	Recreation	16
6/10	University of Connecticut	Natural Resources	14
7/28	University of Tennessee	Forestry	32
9/12	University of Tennessee	Forestry	35

11/6	Antioch College	Biology	8
11/10	Auburn University	Plant Ecology	18

E. Hunting

Hunting on the refuge was not authorized during the year.

F. Violations

During the year the following cases were made on the refuge.

<u>Name</u>	<u>Violation</u>	<u>Disposition</u>
Richard A. Calley	Damaging govt. property	\$20 fine
Dewey S. Carroll, Jr.	Poss. of firearm	\$50 fine
Joel Chancey	" " "	\$50 fine
John A. Dale	" " "	\$50 fine
Daniel L. Giddens	Damaging govt. property	\$50 fine
David R. Giddens	" " " "	\$50 fine
Thomas D. Groover	Illegal camping	\$25 fine
Allen V. Kennedy	Damaging govt. property	\$25 fine
H. Williams Marshall	Poss. of firearm	\$50 fine
Harold D. Moon	Damaging govt. property	\$50 fine
James W. Oglesby	Poss. of firearm	\$50 fine
Brenda Phillips	Littering	\$50 fine
Julian R. Pittman	Poss. of firearm	\$50 fine
Alvin F. Robinson	" " "	\$75 fine
Sanford G. Rothon	Illegal camping	\$50 fine
George L. Sims	Poss. of firearm	\$50 fine
Sidney N. Strickland	" " "	\$50 fine
Travis W. Taylor	Speeding	\$30 fine
Jimmy D. Daniels	Poss. of firearm	Pending
Elroy Douglas	" " "	Pending
Miles E. Dubberly, Jr.	" " "	Pending
Roswald Mancil	" " "	Pending
Jessie Steedley	" " "	Pending
William Steedley	" " "	Pending
Archibald C. Tweedie	Speeding	Pending

On January 19, 1972, Manager Calvert and Assistant Manager Kosin attended a seminar detailing the operation of the National Crime Information Center. Special Agent Lewis of the FBI conducted the seminar in the Recorder's Courtroom, Waycross, Georgia.

On March 8, 1972, Technician Cone, Forester Kelley and Biologist Metzen observed Mr. Richard Calley and Mr. Allen Kennedy throwing a knife at the registration station located at the sill.

On April 19, 1972, a seminar on Organized Crime was presented in the Recorder's Courtroom, Waycross, Georgia. The FBI was in charge of the program; Assistant Manager Kosin, Technician Bowen and Public Use Trainee Germany attended.

Biologist Metzen and Assistant Manager Mallard attended a firearms training session held at the Waycross Police Pistol Range on May 25, 1972. Special agents from the FBI were the instructors.

Biological Technician Hall discovered signs of illegal deer kills in the Pocket on October 31 and December 13 of this year. Evening patrols were conducted along Stephen Foster's access road in an effort to preclude further illegal activity.

On December 31, 1972, the comfort station at Chesser Island was vandalized. A wall vent and wall mirror were taken. Several of the walls were defaced.

The raccoon figures on the "Do Not Enter" signs at the boat-house entrance are still considered collector's items. Two more were stolen this year.

Manager Eadie, Assistant's Fowler and Mallard, Forester Kelley, Biologist Metzen and Technician Bowen assisted Georgia Game and Fish Commission Enforcement personnel on the first day of dove season. Cooperation between the refuge staff and state protection personnel has been excellent.

G. Safety

Safety meetings were held monthly throughout the year. Topics presented during the 1972 safety programs were as follows:

1. Prevention of accidents in the home.
2. Care and handling of portable electric tools.
3. The wise and unwise use of drugs.
4. What to do in case of ingested or inhaled poisons.
5. Proper lifting methods.
6. Night driving.
7. Defensive driving.
8. What to do before the ambulance comes.
9. Rabies detection and control.
10. Driving in the fog.

Along with the topics presented above, safety films and slide programs were presented as a training aid. The following were shown in 1972:

1. "Be Your Own Judge" emphasized that defensive driving must be the answer because 80% of all collisions can be avoided.
2. "Rehearsal for an Accident" emphasized and presented facts and tips on how to prevent driving accidents.
3. "Perception of Driving Hazards" stressed the drivers ability to recognize a driving hazard and avoid an accident before it happens.
4. "Safety Everywhere, All the Time" showed accidents which are common to the Bureau of Commercial Fisheries and the Bureau of Sport Fisheries and Wildlife.
5. "Ain High in Steering" emphasized the advantage of covering great distances with the eyes while driving.
6. "Make Sure They See You" stressed that by signaling to other drivers by use of the horn, headlights, turn signals or flashers, one can prevent accidents.
7. "Keep Your Eyes Moving" stressed the importance of knowing what driving hazards are around you.
8. "Manual Lifting and Handling" illustrated the proper procedure for lifting loads to prevent injury to the back.
9. "Hand Tools" illustrated proper care and handling of tools.
10. "Guard Your Hands" stressed the importance of protecting your hands.

Margaret Ball, Cecile Davis, Patricia Lloyd, Mitch Holcomb, Claire Johnson, Allison Boone and Larry E. Mailard have taken the National Safety Council's Defensive Driving Training Course this year.

All safety equipment was checked and replaced as needed. This included first aid kits, fire extinguishers, accident pockets, hard hats and life preservers.

The filter material was changed in the water filtration system at the Suwannee Canal Recreation Area.

Mr. Jeff Naugle, Chief of Operation's, Georgia Department of Natural Resources, met with Manager Calvert and Assistant Manager Kosin at Stephen C. Foster State Park on February 16, 1972. The purpose was to inspect Stephen Foster's boats for operational safety.

Cables were placed in front of the two spillways on the sill to prevent boats from going over them during periods of high water.

Maintenanceman Jay Burch strained his lower back on September 5, 1972. Mr. Burch was attempting to load crates of nuts and bolts when the accident occurred. As a result of this injury, Mr. Burch missed two working days. Prior to this occurrence, the last lost time accident recorded was on May 15, 1965. Lifting aids such as a mobile forklift, and chain hoist have been procured to aid in the prevention of this type accident.

VII. OTHER ITEMS

A. Items of Interest

A great deal of time was spent in reviewing proofs of the Time-Life Okefenokee Wilderness book that is to go on sale during the summer of 1973. Numerous photographers and feature writers visited Okefenokee during the year.

The Okefenokee Wilderness Proposal is still just that. Hopefully 1973 will see Congressional action on this protective proposal. It would appear that all concerned parties agree that 344,000 acres of Okefenokee Refuge should be placed in the National Wilderness Preservation System.

Alligators continue to respond positively to protection. Several mavericks had to be relocated during the year. People just won't leave them alone. Several visitors expressed doubts concerning the "realness" of basking 'gators, but close inspection (2'-3') usually allayed their doubts.

Wilderness canoeing trips (2, 3, 4, 5, 6 day trips) continued to gain popularity. Conflicts between motor boaters and canoeists are not uncommon but are usually solvable.


Cooperation between refuge and state employees continued at a high level. Stephen C. Foster State Park is superimposed on 60 acres of the refuge.

Manager Larry Calvert transferred to Washington in July and Manager Eadie (with a permanent grin) took over the reins in August. Assistant Manager Don Kosin took over Wapanocca Refuge in August and new Okefenokee Assistant Manager Ron Fowler filled Don's vacancy in August. Larry Mallard continued his refuge manager training on Okefenokee in May.

A great deal of tribute is due all refuge employees involved in canoe trail development. Grass rakes, chain saws, axes, 'gator fleas (a stinging underwater creature) and chest deep water created unusually difficult working conditions.

All facilities on Okefenokee Refuge that are about four years old require considerable maintenance but funds aren't available. There is no way to meet Bureau Standards with the current funding situation. Either closure or additional maintenance funds are the only apparent solutions. The older facilities (1935 vintage) are beyond economical repair.

Assistant Manager Ron Fowler, Public Use Specialist Ron Bisbee, Biologist Wendell Metzner, Forester Bill Kelley, Assistant Manager Larry Mallard, and Clerk-Typist Cecile Davis happily participated in this annual production.



John R. Eadie, Refuge Manager

March 27, 1973

Approved: _____



Assistant Regional Refuge Supervisor

APR 2 1973

CHRISTMAS BIRD COUNT

OKEFENOKEE NATIONAL WILDLIFE REFUGE, 30° 48' N, 82° 08' W (all points within a 15-mile diameter circle, center near the forks of Ridge Road near Gowan Tower, area as described in 1971).

December 16, 1972; 8:00 a.m. to 5:30 p.m. Cloudy all day; temperature 38° to 45°; wind direction N-NW, 5-20 m. p. h.

Nineteen observers in six parties. Total party-hours 45 (25 on foot, 12 by car, 8 by boat); total party-miles 209 (26 on foot, 157 by car, 26 by boat).

Pied-billed Grebe	3	Yellow-bellied Sapsucker	26
Anhinga	11	Downy Woodpecker	1
Great Blue Heron	28	Red-cockaded Woodpecker	2
Little Blue Heron	36	Eastern Phoebe	13
Common Egret	44	Tree Swallow	330
Wood Ibis	54	Barn Swallow	83
White Ibis	416	Blue Jay	35
Mallard	21	Common Crow	38
Black Duck	15	Fish Crow	4
Green-winged Teal	43	Tufted Titmouse	2
American Widgeon	118	Brown-headed Nuthatch	4
Wood Duck	29	House Wren	2
Ring-necked Duck	26	Winter Wren	7
Hooded Merganser	3	Carolina Wren	10
Turkey Vulture	92	Mockingbird	33
Black Vulture	56	Catbird	6
Red-tailed Hawk	2	Brown Thrasher	13
Red-shouldered Hawk	25	Robin	1,500
Marsh Hawk	5	Hermit Thrush	8
Sparrow Hawk	21	Eastern Bluebird	154
Bobwhite	41	Golden-crowned Kinglet	4
Turkey	7	Ruby-crowned Kinglet	11
Sandhill Crane	79	Water Pipit	38
American Coot	45	Loggerhead Shrike	16
Killdeer	50	Starling	10
American Woodcock	2	White-eyed Vireo	2
Common Snipe	9	Myrtle Warbler	5,250
Mourning Dove	107	Pine Warbler	2
Ground Dove	8	Palm Warbler	1
Barred Owl	3	House Sparrow	4
Belted Kingfisher	6	Eastern Meadowlark	199
Yellow-shafted Flicker	28	Red-winged Blackbird	1,054
Pileated Woodpecker	8	Common Grackle	471
Red-bellied Woodpecker	15	Brown-headed Cowbird	200

Cardinal	83	Chipping Sparrow	55
American Goldfinch	30	Field Sparrow	96
Rufous-sided Towhee	50	White-Throated Sparrow	66
Savannah Sparrow	26	Fox Sparrow	3
Henslow's Sparrow	6	Swamp Sparrow	30
Vesper Sparrow	29	Song Sparrow	14
Slate-colored Junco	25		

Total of 81 species; about 11,502 individuals.

Participants alphabetically.

Harold Belcher, Donald Berryhill, John Burch, Eugene and Mary Louise Cypert, L. A. and Mary Dillard, Ronald Fowler, Wendell Freeman, Lois Groszmann, Lois Hafford, A. D. and Rebecca Middleton, Wendell Metzen, Roy Moore, Burton and Marian Park, Jane Park, Margaret Scott.

Loading Cypress Timber
from Okefenokee Swamp
for Hebard Cypress Co. Mill,
Waycross, Ga.



Prior to the establishment of the Okefenokee National Wildlife Refuge in 1937, more than 400 million board feet of cypress were cut in the swamp. These days are gone forever.

The Wilderness Canoeing Program had a three-fold increase over last year; 921 people participated in the program this year. National Outings sponsored by the Wilderness Society and the Sierra Club canoed through the Okefenokee.



The Swamp's Edge Information Center at the Suwannee Canal Recreation Area is open seven days a week. R-5-72 (exp 7)



What was once a legitimate way of life for many local residents is no longer relevant in today's society. The endangered species act has helped to reduce our alligator poaching problems.



Despite the adverse conditions we were able to band 108 wood ducks. We have 324 wood duck nest boxes, but this program has been relatively unsuccessful because of the abundance of natural cavities R-6-72 (exp 8)



Twelve thousand acres of uplands are managed for timber and wildlife. Prescribed burning is used extensively in the management of these uplands.



Chase Prairie in early winter. The Okefenokee offers aesthetic as well as wildlife values.



The overnight platform at Maul Hammock on the 29 mile Red Canoe Trail is the first stop on the canoe trail from Kingfisher Landing to Stephen Foster State Park. Administration of the Wilderness Canoeing Program is becoming time consuming as the popularity of this program increases. R-2-72 (exp 4)



Assistant Manager Don Kosin receives a citation for outstanding performance from Refuge Manager Larry Calvert. Don is now Refuge Manager at Waponacca National Wildlife Refuge in Arkansas. Larry has transferred to the Branch of Planning in the Washington Office. R-1-72 (exp 12)



The refuge participated in the first annual Okefenokee Festival at Folkston. We also provided a refuge forestry exhibit at the Farm Power and Recreation Show at Tifton and the Forest Festival in Waycross. R-1-72 (exp 6)



More than 5,000 students participated in the environmental education program offered by the Okefenokee Science Curriculum Center in Waycross. The field studies are conducted on the Okefenokee Refuge. R-5-72 (exp 1)



Omer "Neb" Bowen prepares to load the blades on the trail cutter. The blades are powered by separate engines. R-9-72 (exp 4)



All the boat trails were recut with the trail cutter. Keeping the 120 miles of boat and canoe trails open is an almost overwhelming task. R-10-72 (exp 6)



The trail cutter works well in open prairies where the trails have stabilized, but it can only be used during high water. In October, extensive "peat blowups" forced us to close most of the canoe trails for two months. We are still searching for a method to handle this problem. R-10-72 (exp 5)



Parking barriers were installed at Chesser Island and at the shop at Comp Cornelia. R-7-72 (exp 2)



The Deer Stand Tower was extensively modified. This included installation of galvanized brackets for additional strength and . . . R-8-72 (exp 8)



. . . pouring concrete around each of the nine supports. R-6-72 (exp 11)



We are still getting all the bark that we need from US Plywood in Waycross at no cost. We have found that bark works well on nature trails and roads that have light traffic. R-11-72 (exp 10)



Maintaining the swamp perimeter road reminds us that we are in a timberland climate. R-4-72 (exp 4)

The following NR Forms are not included:

<u>FORM</u>	<u>TITLE</u>	<u>REASON</u>
NR-5	Disease	Negative
NR-7	Nonagricultural, collections, receipts, and plantings	Negative

3-1750b
 Form NR-1B
 (Rev. Nov. 1957)

UNITED STATES
 DEPARTMENT OF THE INTERIOR
 FISH AND WILDLIFE SERVICE
 BUREAU OF SPORT FISHERIES AND WILDLIFE
WATERFOWL UTILIZATION OF REFUGE HABITAT

Refuge Okefenokee NWR For 12-month period ending August 31, 1972

Reported by Wendell D. Metzner Title Refuge Biologist

(1) Area or Unit Designation	(2) Habitat Type Acreage		(3) Use-days	(4) Breeding Population	(5) Production
	Crops	Ducks	<u>1,775,076</u>	<u>2,000</u>	<u>1,500</u>
	Upland	Geese	<u>21</u>		
	Marsh	Swans			
	Water	Coots	<u>122,960</u>		
	Total	Total	<u>1,898,057</u>		

	Crops	Ducks			
	Upland	Geese			
	Marsh	Swans			
	Water	Coots			
	Total	Total			

	Crops	Ducks			
	Upland	Geese			
	Marsh	Swans			
	Water	Coots			
	Total	Total			

	Crops	Ducks			
	Upland	Geese			
	Marsh	Swans			
	Water	Coots			
	Total	Total			

	Crops	Ducks			
	Upland	Geese			
	Marsh	Swans			
	Water	Coots			
	Total	Total			

	Crops	Ducks			
	Upland	Geese			
	Marsh	Swans			
	Water	Coots			
	Total	Total			

(over)

INSTRUCTIONS

All tabulated information should be based on the best available techniques for obtaining these data. Estimates having no foundation in fact must be omitted. Refuge grand totals for all categories should be provided in the spaces below the last unit tabulation. Additional forms should be used if the number of units reported upon exceeds the capacity of one page. This report embraces the preceding 12-month period, NOT the fiscal or calendar year, and is submitted annually with the May-August Narrative Report.

- (1) **Area or Unit:** A geographical unit which, because of size, terrain characteristics, habitat type and current or anticipated management practices, may be considered an entity apart from other areas in the refuge census pattern. The combined estimated acreages of all units should equal the total refuge area. A detailed map and accompanying verbal description of the habitat types of each unit should be forwarded with the initial report for each refuge, and thereafter need only be submitted to report changes in unit boundaries or their descriptions.

- (2) **Habitat:** Crops include all cultivated croplands such as cereals and green forage, planted food patches and agricultural row crops; upland is all uncultivated terrain lying above the plant communities requiring seasonal submergence or a completely saturated soil condition a part of each year, and includes lands whose temporary marsh extends from the upland community to, but not including, the water type and consists of the relatively stable marginal or shallow-growing emergent vegetation type, including wet meadow and deep marsh; and in the water category are all other water areas inundated most or all of the growing season and extending from the deeper edge of the marsh zone to strictly open-water, embracing such habitat as shallow playa lakes, deep lakes and reservoirs, true shrub and tree swamps, open flowing water and maritime bays, sounds and estuaries. Acreage estimates for all four types should be computed and kept as accurate as possible through reference to available maps supplemented by periodic field observations. The sum of these estimates should equal the area of the entire unit.

- (3) **Use-days:** Use-days is computed by multiplying weekly waterfowl population figures by seven, and should agree with information reported on Form NR-1.

- (4) **Breeding Population:** An estimate of the total breeding population of each category of birds for each area or unit.

- (5) **Production:** Estimated total number of young raised to flight age.

3-1758
 Form NR-8
 (Rev. Jan. 1956)

Fish and Wildlife Service Branch of Wildlife Refuges

CULTIVATED CROPS - HAYING - GRAZING
 Baker

Refuge Okefenokee National Wildlife Refuge County Ware, Charlton, Clinch State Florida Georgia

Cultivated Crops Grown	Permittee's Share Harvested		Government's Share or Return				Total Acreage Planted	Green Manure, Cover and Water-fowl Browsing Crops Type and Kind	Total Acreage
	Acres	Bu./Tons	Harvested		Unharvested				
			Acres	Bu./Tons	Acres	Bu./Tons			
								Wheat Ryegrass Chufa	2½ 8 2
								Fallow Ag. Land	0

No. of Permittees: Agricultural Operations 0 Haying Operations 0 Grazing Operations 0

Hay - Improved (Specify Kind)	Tons Harvested	Acres	Cash Revenue	GRAZING	Number Animals	AUM'S	Cash Revenue	ACREAGE
				1. Cattle				
				2. Other				
				1. Total Refuge Acreage Under Cultivation				
Hay - Wild				2. Acreage Cultivated as Service Operation				

DIRECTIONS FOR PREPARING FORM NR-8
CULTIVATED CROPS - HAYING - GRAZING

Report Form NR-8 should be prepared on a calendar-year basis for all crops which were planted during the calendar year and for haying and grazing operations carried on during the same period.

Separate reports shall be furnished for Refuge lands in each county when a refuge is located in more than one county or State.

Cultivated Crops Grown - List all crops planted, grown and harvested on the refuge during the reporting period regardless of purpose. Crops in kind which have been planted by more than one permittee or this Service shall be combined for reporting purposes.

Permittee's Share - Only the number of acres utilized by the permittee for his own benefit should be shown under the Acres column, and only the number of bushels of farm crops harvested by the permittee for himself should be shown under the Bushels Harvested column. Report all crops harvested in bushels or fractions thereof except such crops as silage, watermelons, cotton, tobacco, and hay, which should be reported in tons or fractions thereof.

Government's Share or Return - Harvested - Show the acreage and number of bushels harvested for the Government of crops produced by permittees or refuge personnel. Unharvested - Show the exact acreage and the estimated number of bushels of grain available for wildlife. If grazing is made available to waterfowl through the planting of grain, cover, green manure, grazing or hay crops, estimate the tonnage of green food produced or utilized and report under Bushels Unharvested column.

Total Acreage Planted - Report all acreage planted, including crop failures.

Green Manure, Cover and Waterfowl Grazing Crops - Specify the acreage, kind and purpose of the crop. These crops and the acreage may be duplicated under cultivated crops if planted during the year, or a duplication may occur under hay if the crop results from a perennial planting.

Hay - Improved - List separately the kinds of improved hay grown. Annual plantings should also be reported under Cultivated Crops, and perennial hay should be listed in the same manner at time of planting.

Total Refuge Acreage Under Cultivation - Report total land area devoted to agricultural purposes during the year.

REFUGE GRAIN REPORT

Okefenokee National Wildlife Refuge

January

December

// 72

Refuge

Months of through, 195...

(1) VARIETY*	(2) ON HAND BEGINNING OF PERIOD	(3) RECEIVED DURING PERIOD	(4) TOTAL	(5) GRAIN DISPOSED OF				(6) ON HAND END OF PERIOD	(7) PROPOSED OR SUITABLE USE*		
				Transferred	Seeded	Fed	Total		Seed	Feed	Surplus
Yellow corn	340 bu.	780 bu.	1,120 bu.			745 bu.	745 bu.	375 bu.		375 bu.	
Wheat		4 bu.	4 bu.		4 bu.		4 bu.				
Ryegrass		200 lb.	200 lb.		200 lb.		200 lb.				
Melot's wild game seed		25 lb.	25 lb.		25 lb.		25 lb.				
Chufa seed		95 lb.	95 lb.		95 lb.		95 lb.				

Corn was transferred from Eufaula National Wildlife Refuge, Alabama.

(8) Indicate shipping or collection points
refuge seed bins at Camp Cornelia and at the sill.

(9) Grain is stored at

(10) Remarks The corn is used in trapping waterfowl and feeding along wildlife nature drive; wheat and ryegrass planted as forage for deer and turkey; chufa was planted for turkey and deer, but was consumed by feral hogs.

*See instructions on back.

REFUGE GRAIN REPORT

This report should cover all grain on hand, received, or disposed of, during the period covered by this narrative report.

Report all grain in bushels. For the purpose of this report the following approximate weights of grain shall be considered equivalent to a bushel: Corn (shelled)—55 lb., corn (ear)—70 lb., wheat—60 lb., barley—50 lb., rye—55 lb., oats—30 lb., soy beans—60 lb., millet—50 lb., cowpeas—60 lb., and mixed—50 lb. In computing volume of granaries, multiply the cubic contents (cu. ft.) by 0.8 bushels.

- (1) List each type of grain separately and specifically, as flint corn, yellow dent corn, square deal hybrid corn, garnet wheat, red May wheat, durum wheat, spring wheat, proso millet, combine milo, new era cowpeas, mikado soy beans, etc. Mere listing as corn, wheat, and soybeans will not suffice, as specific details are necessary in considering transfer of seed supplies to other refuges. Include only domestic grains; aquatic and other seeds will be listed on NR-9.
- (3) Report all grain received during period from all sources, such as transfer, share cropping, or harvest from food patches.
- (4) A total of columns 2 and 3.
- (6) Column 4 less column 5.
- (7) This is a proposed break-down by varieties of grain listed in column 6. Indicate if grain is suitable for seeding new crops.
- (8) Nearest railroad station for shipping and receiving.
- (9) Where stored on refuge: "Headquarters granary," etc.
- (10) Indicate here the source of grain shipped in, destination of grain transferred, data on condition of grain, unusual uses proposed.

TIMBER REMOVAL

Refuge Okefenokee National Wildlife Refuge Year 19 72

Permittee	Permit No.	Unit or Location	Acreage	No. of Units Expressed in B. F., ties, etc.	Rate of Charge	Total Income	Reservations and/or Diameter Limits	Species Cut
ITT Rayonier, Inc. (Land exchange)				1,652 cords				Longleaf pine Slash pine

Total acreage cut over _____

Total income None, land exchange

No. of units removed B. F. _____
Cords 1,652
Ties _____

Method of slash disposal Prescribed burning

3-1979 (NR-12)
(9/63)

Bureau of Sport Fisheries and Wildlife

Refuge

Okefenokee National Wildlife Refuge

ANNUAL REPORT OF PESTICIDE APPLICATION

Proposal Number

1

Reporting Year

1972

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Date(s) of Application	List of Target Pest(s)	Location of Area Treated	Total Acres Treated	Chemical(s) Used	Total Amount of Chemical Applied	Application Rate	Carrier and Rate	Method of Application
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
5/9/72	Maidencane	Suwannee River Sill borrow pit and river narrows	10	Dalapon	105 lbs.	10 lbs./Ac.	Water 13.5 lbs. per 100 gal.	Power sprayer from boat

10. Summary of results (continue on reverse side, if necessary)

Results were good. Estimated 80% kill of maidencane.

3-1979 (NR-12)
(9/63)

Bureau of Sport Fisheries and Wildlife

ANNUAL REPORT OF PESTICIDE APPLICATION

Refuge

Okefenokee National Wildlife Refuge

Proposal Number

Reporting Year

2

1972

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Date(s) of Application	List of Target Pest(s)	Location of Area Treated	Total Acres Treated	Chemical(s) Used	Total Amount of Chemical Applied	Application Rate	Carrier and Rate	Method of Application
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
5/1/72	Maidencane	Suwannee Canal	5	Dalapon	45 lbs.	10 lbs./Ac.	Water 13.5 lbs per 100 gal.	Power sprayer from boat

10. Summary of results (continue on reverse side, if necessary)

Results were good. Estimated 90% kill of maidencane.

3-1979 (NR-12)
(9/63)

Bureau of Sport Fisheries and Wildlife

Refuge

Okefenokee National Wildlife Refuge

ANNUAL REPORT OF PESTICIDE APPLICATION

Proposal Number

Reporting Year

3

1972

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Date(s) of Application	List of Target Pest(s)	Location of Area Treated	Total Acres Treated	Chemical(s) Used	Total Amount of Chemical Applied	Application Rate	Carrier and Rate	Method of Application
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
5/10/72	Wax Myrtle	Suwannee River Sill	Spot treatment of 4 Ac.	Silvex	3/4 gal.	2 lb./Ac.	1 lb. per 25 gal. water	Power sprayer

10. Summary of results (continue on reverse side, if necessary)

Good results. Estimated 70% kill of wax myrtle. Annual treatment will probably be required to keep this brushy invader under control.

3-1979 (NR-12)
(9/63)

Bureau of Sport Fisheries and Wildlife

ANNUAL REPORT OF PESTICIDE APPLICATION

Refuge

Okefenokee National Wildlife Refuge

Proposal Number

Reporting Year

4

1972

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Date(s) of Application	List of Target Pest(s)	Location of Area Treated	Total Acres Treated	Chemical(s) Used	Total Amount of Chemical Applied	Application Rate	Carrier and Rate	Method of Application
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
4/27/72	Maidencane	Kingfisher Canal	5	Dalapon	50 lbs.	10 lbs./Ac.	13.5 lb per 100 gal. water	Power sprayer from boat

10. Summary of results (continue on reverse side, if necessary)

Good results. Estimated 70% kill of maidencane.

3-1979 (NR-12)
(9/63)

Bureau of Sport Fisheries and Wildlife

ANNUAL REPORT OF PESTICIDE APPLICATION

Refuge

Okefenokee National Wildlife Refuge

Proposal Number

Reporting Year

5

1972

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Date(s) of Application	List of Target Pest(s)	Location of Area Treated	Total Acres Treated	Chemical(s) Used	Total Amount of Chemical Applied	Application Rate	Carrier and Rate	Method of Application
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
6/6/72	Spatterdock	Maul Hammock Lake	10	2, 4-D Dimethyl amine salt	3.25 gal.	2 lbs./Ac.	4 lbs. per 100 gal. water	Power sprayer from boat

10. Summary of results (continue on reverse side, if necessary)

Poor results. At time of spraying, plants had already reached maximum stage of growth. Spraying should have been done earlier in year when spatterdock was in an early growth stage.