

LAKE WOODRUFF NATIONAL WILDLIFE REFUGE

NARRATIVE REPORT

FEBRUARY 1 - DECEMBER 31, 1964

PERSONNEL

Kent E. Myers

Refuge Manager

Clyde W. Lee

Wildlife Technician

UNITED STATES DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE

BUREAU OF SPORT FISHERIES AND WILDLIFE

P.O. BOX 1391, DELAND, FLORIDA 32721

HISTORY

LAKE WOODRUFF NATIONAL WILDLIFE REFUGE

Lake Woodruff National Wildlife Refuge, activated February 1, 1964, is located on the west side of Volusia County, Florida along the east side of St. Johns River. Daytona Beach is about 23 miles east-northeast, Orlando 40 miles southwest, Cocoa (the missile center) 50 miles southeast, and Ocala 40 miles northwest. St. Augustine and Jacksonville are 50 and 100 miles northeast, respectively. The nearest city is DeLand about 7 miles from the refuge.

Geographic location relative other national wildlife refuge is about 125 miles south of Okefenokee, 200 miles southeast of St. Marks, 80 miles east of Chassahowitzka, 160 miles north of Loxahatchee and 50 miles northwest of the famed Merritt Island marshes (now Merritt Island National Wildlife Refuge). The Florida Game and Fresh Water Fish Commission operates a waterfowl management area on Guano River, 80 miles north of Lake Woodruff National Wildlife Refuge. The location will serve well to complete a chain of resting and wintering ground for migratory waterfowl in Florida.

The west boundary is along the St. Johns River and the east boundary generally along the marsh edge and flood plain of the St. Johns. The south boundary is Zeigler Dead River and Highland Park Canal near State Road 44. The south edge of Lake Dexter constitutes part of the north boundary and a tract of land north of Lake Woodruff within the St. Johns flood plain and Spring Garden Creek east, almost to DeLeon Springs, the remainder of the north boundary. Approximately 18,800 acres are owned in fee by the Bureau and about 3,500 acres navigable waters adjacent and within the confines of the refuge boundary will be closed to taking and pursuing waterfowl.

Topographically, Lake Woodruff National Wildlife Refuge consist of sizeable marshes surrounded by hardwood swamp and averages .10 foot above sea level, with a scattering of islands ranging up to perhaps 5 feet above sea level. Jones Island contains about 500 acres and Tick Island about 225 acres and the highest point of either would be approximately 5 feet above sea level. The marsh is about .60 foot above the average level of Lake Woodruff.

The soils consist of small amounts of Cocoa fine sand, St. Lucie fine sand and Delray fine sand, while there are considerably more Manatee fine sand and Leon fine sand. Extensive deposits of peat and muck up to 10 feet or more in depth constitute the majority of soils in the refuge area.

Topography of the area lends itself to a wide variety of vegetative cover. The highest elevations along the north and east sides, as well

as Jones and Tick Island, host a pine-palmetto type cover consisting of loblolly and longleaf pine, turkey and live oak, cabbage palm, etc. This type quickly diminishes to the lower elevation and hardwood swamp type supporting cypress, cabbage palm, oak, hickory, pecan, black locust, red maple, etc. This type again gives way rather rapidly to marsh type consisting of principally cordgrass, Spartina bakeri, with sawgrass, Cladium jamaicense and dotted smartweed, Polygonum punctatum sharing about equally next in predominance. Other species appearing in small clumps or patches consist of spikerushes, Eleocharis cellulosa and parvula, bulrush, Scirpus californicus, Hibiscus sp., cattails, etc.

Waters within the confines and adjacent the refuge are supplied by DeLeon Springs which produces 60,000,000 gallons per day on the east side of the area and the St. Johns River runs along the west boundary, of which a part of this source is diverted through and into the area via Norris Dead River and Honey Creek. The remainder is supplied by direct rainfall and runoff from the east and north sides. Runoff from the refuge is through Lake Dexter. Submergent vegetation in evidence are Naias, Fanwort, Cabomba sp., waterweeds, Anacharis (Elodea) sp., coontail, Ceratophyllum demersum, wild celery, Vallisneria spiralis, etc. Emergent vegetation is mainly spatterdock, Nymphaea advena, with some pickeral weed, Pontederia cordata, pennywort, Hydrocotyle umbellata, etc. Floating aquatics include water hyacinth, Eichhornia crassipes, alligator weed, Alternanthera philoxeroides, water lettuce, Pistia stratiotes, Salvinia, Azolla sp., etc.

The climate is subtropical in nature with mild temperatures prevailing year round, except for the passing of an occasional cold front that will drop temperatures to the freezing mark or less for a day or two at the time. The mean high temperature is 83.5 degrees and the mean low 61 degrees. Rainfall averages 53 inches annually with heaviest amounts occurring June - October. Flooding from the St. Johns usually occurs during this period. The area is subject to hurricanes but is 20 miles inland from the ocean and the intensity isn't usually too great. Past records indicate that about 1 in 30 hurricanes have affected the area.

History of the area dates back to 1513, when Ponce de Leon discovered DeLeon Springs in his search for the Fountain of Youth. The area changed hands several times. In 1570 the Spaniards took the Spring from the Indians. It was ceded to England, with all of Florida, in 1763. The Indians again took the Spring from the British in 1783. Florida was again ceded back to Spain and the Spaniards took the Spring from the Indians. The Indians again took the Spring, this time from the Spanish, just prior to the Seminole Wars in 1817 and held it until 1832 when General Zachary Taylor, Commander of the United States Armies in Florida took the Spring from the Indians.

Development of the area began in 1570 when the Spaniards cleared 100 acres and planted sugar cane. They also built a sugar mill to process the cane. The English cleared hundreds of acres and planted indigo

between 1763 - 1783. They also built a corduroy highway to Savannah. Mr. Thomas Stark purchased all grants to the area and developed quite a thriving little community in 1840. He built machinery to grind sugar, corn and other grains. He also ran three cotton gins. Early transportation was by boat through the lakes and the St. Johns River. The Federal Troops defeated the Confederacy, captured and destroyed most of Starke's property at the Spring, during the war between the States. In 1924 it was developed into a tourist attraction and remains such today.

Little, if any, of the early development is in evidence on the refuge area. Cattle have grazed Jones and Tick Islands for at least 75 years, according to one "old time resident". There was evidence of a small farming operation on Tick Island. A small dwelling, barn and cattle dipping vat was on the island but have been destroyed by the timber operator now removing timber from the island. Cattle have been removed from the islands. In 1952 private land developer's made an abortive attempt to develop about 3,300 acres east of Lake Woodruff and south of Jones Island to Highland Park for agriculture. Dikes of poor quality and construction were constructed and two 24,000 gpm pumps installed to drain the land. They found this impractical, if not impossible, and gave up the venture. The pine timber was removed from Jones Island in about 1957 - 1958. Shell deposits at Bennett's Landing on Tick Island are now in the process of being removed. Timber and shell removal rights were reserved to the previous owner for a period of 5 years. The Bureau started acquisition processes on the area in 1962.

Principal industry in the area are forest products and agriculture. Timber producers harvest pulpwood, saw timber, and tarwood in that order of quantity. The largest agricultural crop in this area is, of course, the citrus, followed by cattle, and then miscellaneous crops including ferns, truck crops, etc. Small manufacturing concerns produce electrical transformers, air conditioners, disposable hypodermic syringes, etc. in and around DeLeon Springs and DeLand.

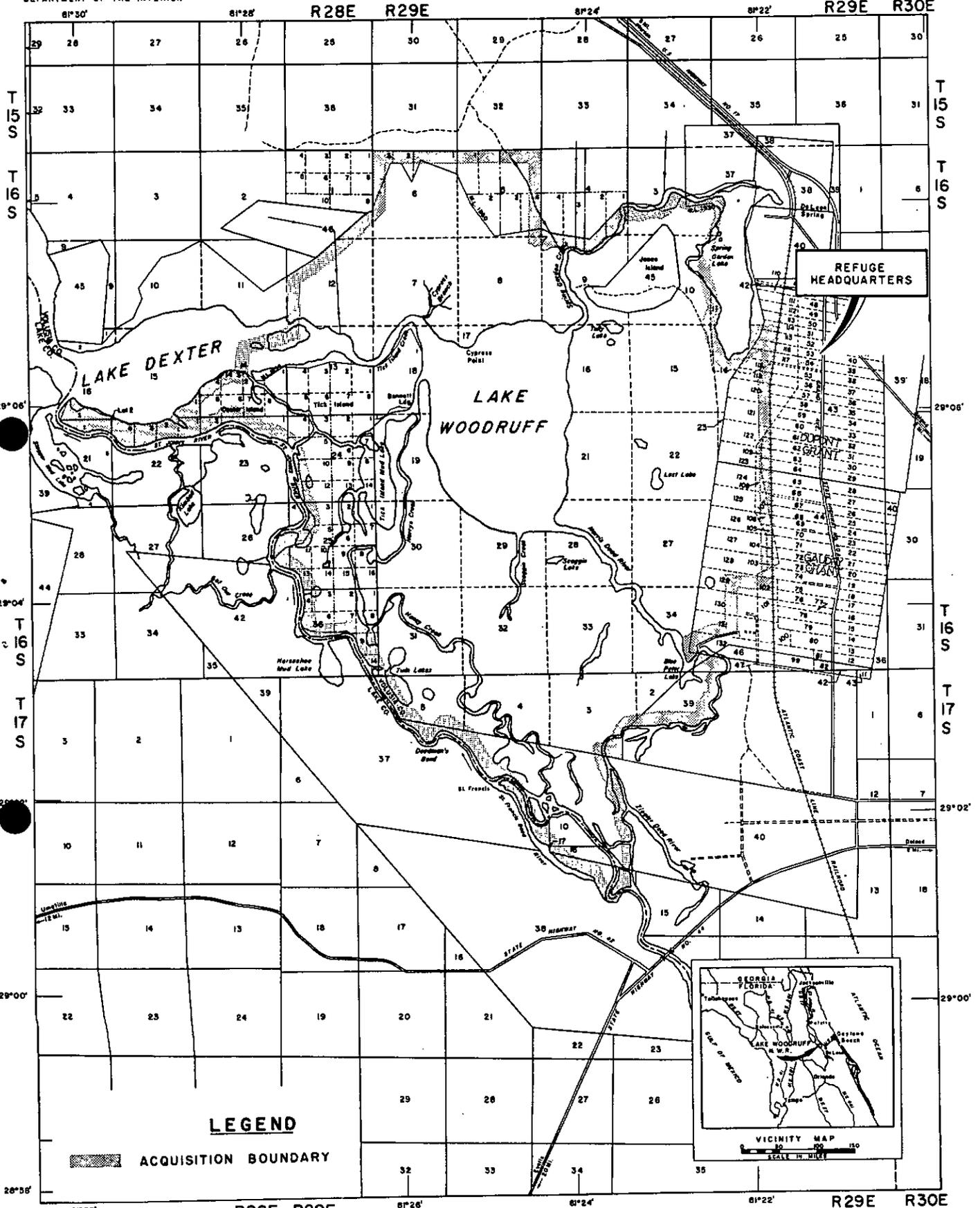
Utilities for the area are served by the Atlantic Coast Line Railroad, U. S. Highway 17 and State Road 40A, Florida Power Corporation and Southern Bell Telephone Company. Schools from elementary through university are nearby. The headquarters is located along State Road 40A between DeLeon Springs and Glenwood.

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VOLUSIA COUNTY, FLORIDA

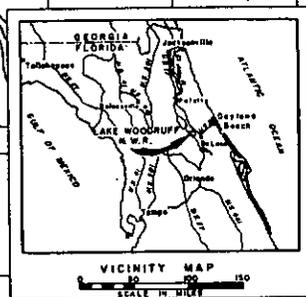
UNITED STATES
DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE



LEGEND

 ACQUISITION BOUNDARY



COMPILED IN THE BRANCH OF REALTY
FROM SURVEYS BY C. B. O. S., G. L. O., F. W. S.,
PRIVATE SURVEYS & AERIAL PHOTOGRAPHS

TALLAHASSEE MERIDIAN



TOWNSHIP
DIAGRAM

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I. GENERAL

A. Weather Conditions

Rainfall for the year exceeded normal by about 10 inches. Heaviest rains were received July through September. Moderately heavy rains were received January through April. Severe drought conditions prevailed during May and June. Near normal rainfall occurred October through December.

Average temperatures during January and February were below normal and tumbled to 27 degrees on January 14. Frost occurred on 11 days during this period. September and October also produced below normal average temperatures but no frosts have been recorded since February 24. Mild to warm temperatures have prevailed throughout the fall and early winter. Above normal temperatures prevailed during the remainder of the year. The highest temperature of the year, 97 degrees, was recorded on June 17. Ninety degree temperatures were fairly common June through August.

Two hurricanes brought adverse weather to the area during the year. The first hurricane, "Cleo", passed directly over DeLand and the refuge area on August 28 with highest sustained winds of 40 mph and highest gust of 60 mph. Accompanying rains were not heavy and only 3.82 inches were recorded with passing of this storm. The second hurricane, "Dora", passed off shore, turned from its northerly course abruptly to the west and came inland at St. Augustine. Highest winds were about 70 mph and heavy rains accompanied the storm to record 8.58 inches rainfall. Damage to the refuge area was light except for a few trees blown over and flood conditions to about 3 feet.

TEMPERATURE AND PRECIPITATION TABLE

<u>Month</u>	<u>Precipitation</u>		<u>Max. Temp.**</u>	<u>Min. Temp.**</u>	
	<u>This month*</u>	<u>Normal*</u>			
January	6.38	2.03	82	27	
February	3.84	2.93	80	35	
March	5.16	3.75	88	39	
April	4.37	3.38	88	44	
May	1.43	3.43	92	60	
June	2.84	7.85	97	68	
July	9.20	8.38	95	69	
August	11.95	7.45	94	69	
September	9.48	6.88	92	64	
October	2.19	4.93	89	48	
November	4.96	1.86	85	44	
December	3.13	1.83	83	37	
Total	64.93	54.70	Extremes	97	27

*Precipitation recorded by Florida Forest Service, DeLeon Springs, Florida. The normal is a compilation of records by that office for the past 25 years.

** Temperatures recorded by U. S. Weather Bureau, Daytona Beach, Florida. The Florida Forest Service does not keep this record.

B. Habitat Conditions

1. Water

No water management plan for Lake Woodruff Refuge exist and no management is possible until water facility development is accomplished.

One small pool of possibly 40 acres, southeast of Jones Island, has fairly good dikes but no control structures. It is dependent upon rainfall and a very limited run-off area for a source of water. It has not been dry during the year but was low during the extreme drought throughout May and June. Water was high in this pool from July until November 15. It has now subsided to a more desirable level.

About 3,300 acres, south of Jones Island and east of Lake Woodruff, are under dike of poor quality. Much of the dike along the eastern shore of Lake Woodruff was constructed of muck and peat without coring. The dike in this general area has subsided until very little water control is possible. The flood condition which resulted from hurricane "Dora" placed as much as 18 inches of water over the dike, thus flooding the pool to a depth of about 3 feet. The dike has in place two 24,000 gpm pumps to pump discharge only. These could be of no help during the flood period as a result of the dike condition, which permitted the flooding. Some of the dike can be repaired to useable condition. The remainder will require complete rebuilding or new construction. During periods of low water outside the impounded area, seepage is of such consequence that extensive pumping isn't necessary to lower the water level inside the impoundment. Drainage is possible to a certain extent but flooding is entirely dependent upon rainfall and run-off from an area of perhaps 2,000 acres east of the refuge proper. Seepage has reduced the flood condition in the impoundment to near a desirable level at the close of the year.

The remaining marshes around Jones Island, north of Lake Woodruff and between Norris Dead River and St. Johns River are more or less dependent upon the flood stage of the rivers and lake. No impoundments have been constructed, however, there are a few depressions and small shallow lakes in the marshes and except for prolonged periods of severe drought a considerable area is covered with shallow water. High water is contingent upon the flood stage of the rivers and lake. The rivers and lake have now subsided within their banks and water of proper depth to permit waterfowl feeding is available in the marsh areas, especially between Norris Dead River and Honey Creek and also north of Lake Woodruff.

2. Food and Cover

Most all of the marsh area, 11,585 acres, is predominantly cordgrass, Spartina bakeri. Dotted smartweed, Polygonum punctatum and sawgrass, Cladium jamaicense are found in about the same abundance. Sawgrass is generally sparse except for one 300 - 400 acre area north of Lake Woodruff and this area is too dense to be conducive to waterfowl utilization. Dotted smartweed is generally widespread throughout the marsh area with heavier concentrations along stream banks and other higher elevations. Dense cordgrass inhibits effective utilization of this food source. Several other marsh plants, including smartweeds, spike rushes, bulrush, etc. appear on the area but not generally in abundance that would warrant consideration as food and cover at this time. Waterfowl use of the marsh has been light due to difficult penetration of the dense cover in most instances.

Wild celery, Vallisneria spiralis, coontail, Ceratophyllum demersum, waterweeds, Eleoidea sp., and Najas are principal submergent vegetation. Limited waterfowl use of the wild celery beds has been noted.

Water hyacinth, Eichhornia crassipes and alligator weed, Alternanthera philoxeroides are present in fair to considerable abundance. Coots have utilized these pest plants moderately heavy.

The hardwood swamps host an abundance of mast bearing trees and other food producing vegetation. These areas were flooded until early December to encourage effective utilization of this habitat. Dotted smartweed was noted in several locations in the hardwood swamp. These swamp areas, about 6,282 acres, along with the small pond of about 40 acres, southeast of Jones Island are the only bright spots in waterfowl management until development and improvement of the other marsh areas can be accomplished.

Heaviest waterfowl usage on the refuge has been noted on the small pond. Chara and Cabomba sp. are fairly heavy in the pond. Eleocharis cellulosa and spiny naiad, Najas marina are also present. A considerable area of cattail, Typha latifolia, threatens to take over in the pond. Control measures are planned. Some cordgrass is in evidence but appears weak due to constant flooded condition. No control structure is available to manipulate water levels for complete management of the pond.

Despite adverse vegetation and lack of water management controls, food and cover have been adequate to excellent for the number of waterfowl utilizing the area. However, management facilities must be developed to achieve our waterfowl objective. The first target, of course, to control cordgrass which for the most part renders the marsh ineffective for waterfowl management.

II. WILDLIFE

A. Migratory Birds

1. Waterfowl

When the refuge was activated on February 1, 1964 waterfowl, especially ducks, were virtually non-existent. Only 23 ducks had been observed through May 2. Coot numbers ranged from a peak of 500 down to 50 at the close of the spring period. There was evidence of hunting pressure (spent shotgun shells) in the vicinity of the major use area, Spring Garden Lake. This may have had some bearing on waterfowl use at the beginning of this year. The last blue-winged teal were noted on March 9 and the last ringnecked duck was observed on April 13. The last 5 coots were observed on May 27.

As the summer progressed the number of wood duck observations increased to an estimated 310 birds during the week of June 14 - 20 and remained at about this number until early October. An estimated 180 young wood ducks were produced. Heaviest production was along Spring Garden Creek and Honey Creek. No young mottled ducks were observed.

The fall migration was a slow starter and never gained exciting momentum. Fifty coots were the first fall birds observed on September 12. The first fall ducks were 25 ringnecks observed on October 12. Three mottled ducks were also observed that date. Blue-winged teal arrived October 21, scaup - October 22, pintail and green-winged teal - November 14, hooded merganser - November 15, shoveler - November 19, canvasback - November 21, ruddy - November 22, bufflehead - November 25 and common merganser - November 26.

We entered the fall period with 310 wood ducks and steadily climbed to a peak of 400 early in December. A peak for all species combined reached 1,865 ducks and 6,000 coots during the week of December 6 - 12. Ring-necks, scaup and wood ducks were the major species. Numbers began to decline following that week and reached a low of 743 ducks and 3,500 coots at the close of the year. Probable reason for the departure was continued mild to warm temperatures which prevailed throughout most of December. Early December gave us ducks and hope. At the close of the year we have hope.

Major areas of use for ducks were Spring Garden Lake, the small pond southeast of Jones Island and Zeigler Dead River. Coots were found mainly on Spring Garden Lake, the small pond, Lake Dexter and the St. Johns River. Lake Woodruff has not supported many ducks or coots. Aerial census on December 15 revealed that very few ducks were using the marsh or small interior lakes. Heaviest wood duck use was in the vicinity of Tick and Dexter Islands and Zeigler Dead River.

2. Waterbirds

Many species of waterbirds have been with us most of the year. White ibis reached the highest peak of any one species when 2,000 were observed on the south shore of Lake Dexter on December 19. One hundred twenty five common egrets were also observed that day. Thirty five little blue heron were sighted August 7. One colony of little blue heron produced 30 young in the vicinity of Tick Island. Anhinga, great blue heron, green heron, Louisiana heron, limpkin, and snowy egret are common observations but not in any great numbers. Cattle egret, black-crowned night heron, yellow-crowned night heron, and wood stork are less common observations and rarely over 5 of any one species will be noted in a complete census. Least and American bitterns are present but rarely sighted.

Florida gallinule are common, especially in the small pond near Jones Island. The call of the king rail is fairly common in the marsh. Three were sighted October 15. Sora rail were common and 8 - 10 per mile could be flushed out of the marsh in early November. Two Virginia rails were sighted September 23. The cover type is ideal for these species but makes it very difficult to sight them.

Pied-billed grebes were the only one of the grebe family observed. Fifteen to twenty could be sighted at times during the fall. The first fall observation was on September 23. They were present at the close of the period.

3. Shorebirds

Only one Wilson snipe was observed this year and this one was sighted in the vicinity of Jones Island on October 22.

Ringbilled gulls were observed last spring and again in the fall. The last observation in the spring was on April 28 and the first of the fall December 3. Eight herring gulls were sighted March 6. Least terns were observed December 3. Fifty Caspian terns were observed over the refuge November 21.

4. Doves

A few ground doves are sighted from time to time along the road (dike) to Jones Island and on the east side of the refuge near the ACL railroad. This is also true with the mourning dove. Not more than 5 - 6 ground doves or 10 - 15 mourning doves have been sighted during one day. Eight young mourning doves and 4 ground doves were produced.

B. Upland Game Birds

Quail were the only upland game birds observed by refuge personnel during the year. Two covies were sighted on Tick Island on April 16

and May 6. One covey was noted on Jones Island May 19. Another covey was sighted along the east boundary of the Thompson Tract on several occasions. Considerable habitat on Tick and Jones Island, as well as along the east and north boundary is fair to good for quail.

No turkey were sighted during the period. One local resident claimed to have observed a flock of 25 along the shore of Tick Island in late February. However, the timber operator on Tick Island has not reported any turkey observed by his crew. Much of the hardwood swamp areas and the upland areas of Tick and Jones Island are ideal for turkey.

C. Big Game Animals

Only two deer were observed by refuge personnel. One on April 2 and the other June 24. The timber operator reported sighting one adult female and a fawn on Tick Island and one large buck. Deer sign may be found in the more remote areas. Heavy boat traffic in navigable waters adjacent the refuge keeps the deer out of most areas where they may be observed. The habitat is good and protection should increase the deer population. We understand that many forms of illegal kills, ranging from killing them as they swim the river and streams to "fire" hunting, have been the past history on the area. Intensive patrol this year has not turned up a single deer case or a case of trespass dogs. We have watched several parties who looked like they wanted to but they turned to something less offensive - fishing.

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

Several otter signs have been noted. Actual observations were 1 sighted October 2 and three on December 21. Some otter trapping has been the pattern in the past.

Raccoon are present but rarely sighted. Also, the signs indicate that the raccoon population is low. Marsh rabbit and o'possum are also present but not in large numbers. We, no doubt, have some mink but no observations were made.

Armadilla are fairly common on Tick Island. Several were observed and the timber operator reported more. An occasional sighting was made in the vicinity of Jones Island.

Bob-cat sign is quite common but the numbers are not excessively high. A large cat track, measuring 3 1/2 x 4", was found on the Jones Island road December 4. A large, dark animal with a tail was observed momentarily at 75 yards on the east side of Jones Island December 24. We claim it was the Florida black panther.

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

1. Eagles

Bald eagles were present last spring. Two were observed April 1 and

1 on April 2. They returned October 21, when 5 were observed. Two have remained on the refuge until the close of the year. No nests have been observed, but we suspect one to be located somewhere on Tick or Dexter Islands.

2. Swallow-tailed kites

Two swallow-tailed kites were first observed May 19. They were sighted until July 23 in numbers up to 4. A Deputy Sheriff, whose patrol is the St. Johns River, reported observing 7 in one day.

3. Others

Two osprey were observed April 1 and a peak number of 12 was reached July 1. Six nests produced 10 birds. They disappeared during the late summer and early fall but came back October 2, when 1 was observed. At least 3 were present at the close of the year.

Red-shouldered hawks are present in limited numbers year round. One or two pigeon hawks were noted on several occasions. A few marsh hawks were also noted.

Fish crows were common throughout the fall and early winter. A peak of about 500 was reached November 4. Common vultures are observed throughout the year but numbers are not excessive.

F. Other Birds

Several species of woodpeckers, including pileated, red-breasted, downy and others, are observed frequently. Twelve pileated were noted November 14.

Tree swallows in numbers up to 3 - 4 thousand were noted September 28. Three thousand robins were observed on Tick Island December 6. Yellow-billed cuckoo's were noted from time to time.

G. Fish

With aching arms, an empty stomach, and a worn out reel, we can say that fishing was not tops for some folk. The crappie (spock) season was over before activation of the refuge, and has not come back in full swing at the close of the year. Bream fishing was good during the summer. Bass fishing was sporadic, depending on temperatures, water conditions and other factors but we did see some happy fishermen with some nice catches. Shad season is just starting.

Heavy rains and high water brings their problems with high ph and resulting fish kills. Numerous catfish are killed on commercial fishermen's trot lines, where they are caught in the flow of what the fishermen call "bad water". In general the fishing has been good, as witnessed by the number of people trying and not too much complaining.

H. Reptiles

Snakes, including rattlers and moccasins, are present but not overly abundant.

Streaked head turtles are common on about every log in the water. Snapper's cause the commercial fishermen some concern. Soft-shelled turtles are present but not in excessively large numbers.

Physical evidence of alligator's is very rare. Alligator hunting has been the favorite past time with some local people and a livelihood with others. Only 5 alligator's were noted throughout the year. One 3' 'gator was observed April 14 along Spring Garden Creek, one was sighted on the west side of Lake Woodruff on May 27, one 5' long was observed along Scoggins Creek May 28, another was sighted in Lake Woodruff on June 16, and one 3 1/2' along Spring Garden Creek on October 2.

I. Disease

No diseased animals or birds have been noted throughout the year.

III. REFUGE DEVELOPMENT AND MAINTENANCE

A. Physical Development

Brush in the immediate vicinity of the pump house along Norris Dead River was cleared to permit access. It had grown up until it was necessary to crawl under the brush in order to reach the pumps.

Thousands of dirt dobber nest were cleaned from the inside the pump house, as well as from the UD-18 engines. They were completely covered and the radiator cores choked with nest.

The pump engines and pumps were operated periodically for preventive maintenance.

A trip was made to Choctaw Refuge, Jackson, Alabama to secure a truck load of excess aluminum angle for post.

About 33 miles of boundary was initially posted (see map). Final posting has been postponed pending title vesting of remaining tracts within the proposed acquisition area.

A '58 Chevrolet sedan was secured in April from Navy excess and \$200 spent to place the vehicle in useable condition.

The '60 Plymouth station wagon now in use was secured in October from Navy excess and \$273 spent to place the vehicle in over-the-road condition.

A new Dodge pickup truck was purchased June 22 and is serving well with its "special traction" differential.

An amphibious marsh vehicle (tracked), the "Kristi KF-4", was procured September 12. Transmission troubles of locking into first gear have been encountered and determined to be faulty manufacture. The company is correcting the trouble. Two or three other small problems have been encountered but some engineering design changes could make this machine very versatile. In general, we are pleased with its performance to date.

One 20 hp and one 50 hp Mercury outboard motors were purchased to use with our "Boston Whaler" boat. The boat is the most safe and stable boat that we have had an occasion to use. The 20 hp motor is used in our work program in shallow water and the 50 mainly for patrol and census work. Even with this power, we find ourselves short in competition sometimes.

A radio system consisting of a base set with Bureau frequency, 34.83 mc, and the State Game and Fresh Water Fish Commission frequency, 151.415 mc, and two mobile sets of 34.83 mc were purchased and installed. KIE-618 has been assigned the 34.83 mc frequency.

B. Control of Vegetation

No vegetative control efforts were made during the year. However, limited operations are planned for 1965. Two small areas of cattail, totaling about 20 acres, will be given herbicidal applications to prevent further infestation of areas. Certain areas of water hyacinth, totaling about 50 acres, will be treated to facilitate operation of the pumps and to aid navigation. No attempts at cordgrass control will be initiated until water management facilities are in place.

C. Fires

No fires occurred during the year. Conditions were ripe for fires during May and June but we were very fortunate. Fires west of Lake Woodruff and Norris Dead River and south of Lake Dexter will be practically uncontrollable due to inaccessibility with fire fighting equipment. Fires occurring east and north of Lake Woodruff may be controlled only to the extent that ground conditions will permit operation of equipment. Much of the area is of deep deposits of muck and peat.

IV. RESOURCE MANAGEMENT

No resource management considered economic use of the refuge was carried out during 1964. The timber and shell removal operations now being conducted on Tick Island are not associated with management of the refuge. The activities were reserved by the previous owner for a period of 5 years.

V. FIELD INVESTIGATION OR APPLIED RESEARCH

A. Progress Report

Field investigations have been limited to general observation of field conditions and habitat. Wildlife activity and behavior has also been noted. No biological programs have been set up as of this date. The Bureau Biologist for Florida will probably initiate some activity along these lines during 1965.

VI. PUBLIC RELATIONS

A. Recreational Uses

Total refuge use amounted to about 25,000 visitor use days during 1964. Major use was fishing and boating. Bird watching, picnicking, etc. are virtually non-existent due to inaccessibility by vehicle. During summer, fishermen and boaters accrue about an equal number of use days. In winter, the fishermen outnumber other recreational interest 3 to 1.

B. Refuge Visitors

<u>Name</u>	<u>Organization or address</u>	<u>Date</u>	<u>Purpose</u>
Lawrence S. Givens	BSF&W, Reg. Supv'r., Br. of Refuges, Atlanta, Ga.	2/27	Inspection
Walter Stieglitz	BSF&W, Mgmt. Biologist Delray Beach, Florida	2/27 5/18-19	Inspection M&W Survey
Theodore Myers	1312 North Amelia Deland, Florida	6/1	Employment
H. A. Wyckoff	Thiokol Chemical Corp. Hialeah, Florida	6/9 & 7/23	Marsh vehicle demonstration
Curtis Wilson	BSF&W, Merritt Is. Refuge Titusville, Florida	6/9 8/3-5	Ditto Enforcement Workshop
A. J. Sands	Orlando, Florida	7/7	Employment
Gerald Roberts	FG&FWFC, Wildlife Officer Astor, Florida	8/3-5 3 visits	Enforcement Workshop Enforcement
Jim Fields	Volusia Co. Sheriff's Office, Deland, Florida.	7/20	Enforcement
Victor Parkman	Morgan Coal Co. St. Louis, Missouri	7/29	Land acquisition
Ken Gerrard	Morgan Coal Co. Ft. Lauderdale, Florida	7/29	Land acquisition
Paul Fearington	Morgan Coal Co. DeLand, Florida	7/29	Land acquisition
Bob Marrs	ACL Railroad DeLand, Florida	7/30	Freight shipments
Warren Lupton	BSF&W, Ass't. Reg. Supv'r., Br. of M&E, Atlanta, Ga.	8/3-4	Enforcement workshop
Jacob Wolfley	BSF&W, USGMA Orlando, Florida	8/3-5 11/4	Enforcement workshop Enforcement
Noah Long	BSF&W, USGMA Williston, Florida	8/3-5 11/6	Enforcement workshop Enforcement
Hugh V. Hines	BSF&W, USGMA Sebring, Florida	8/3-5 12/15	Enforcement workshop Aerial census

George Byrd	BSF&W, St. Marks Refuge St. Marks, Florida	8/3-5	Enforcement workshop
Raymond Brown	Ditto	8/3-5	Ditto
Culver Gidden	Ditto	8/3-5	Ditto
Ronald Hood	Ditto	8/3-5	Ditto
Ernest Cook	Ditto	8/3-5	Ditto
James Crawley	Ditto	8/3-5	Ditto
Jack Watson	BSF&W, Key Deer Refuge Big Pine Key, Florida	8/3-5	Ditto
Ira Westbrook	BSF&W, Loxahatchee Refuge Delray Beach, Florida	8/3-5	Ditto
William Julian	Ditto	8/3-5	Ditto
Richard Thompson	Ditto	8/3-5	Ditto
Even Rude	Ditto	8/3-5	Ditto
Charles LeBuff	BSF&W, Sanibel Refuge Sanibel, Florida	8/3-5	Ditto
Robert Germany	BSF&W, Chassahowitzka Refuge Homosassa, Florida	8/3-5	Ditto
Irvin McIntosh	Ditto	8/3-5	Ditto
David Swindell	FG&FWFC, Personnel Officer Tallahassee, Florida	8/4-5	Ditto
E. G. Pierce	FG&FWFC, Area Supervisor DeLand, Florida	8/3-5 5 visits	Ditto Enforcement
Al Clifton	FG&FWFC, Wildlife Officer DeLand, Florida	8/3-5 11/12	Enforcement workshop Enforcement
Bob Johnson	FG&FWFC, Wildlife Officer Lake Mary, Florida	8/3-5 11/12	Enforcement workshop Enforcement
H. W. Holdridge	FG&FWFC, Wildlife Officer Bunnell, Florida	8/3-5 11/12	Enforcement workshop Enforcement
William Weiserth	Radiation Service Daytona Beach, Florida	8/6	Radio installation

John Findlay	BSF&W, Ass't. Reg. Director Region IV, Atlanta, Ga.	8/12	Official business
W. A. Finney	Daytona Bch. News-Journal Daytona Beach, Florida	8/21	News article
Tom Odum	DeLand Police Department DeLand, Florida	8/24	Camp site permit
Kenneth Woody	DeLand Chamber of Commerce DeLand, Florida	9/2	City directory information
C. B. Messenger	Kristi Company Broomfield, Colorado	9/12	Deliver marsh vehicle
C. E. Addy	BSF&W, Atlantic Flyway Rep. Laurel, Maryland	10/15	Official business
Arthur Hawkins	BSF&W, Mississippi Flyway Rep., Minneapolis, Minnesota	10/15	Ditto
Parker Smith	BSF&W, Ass't. Reg. Supv'r. Br. of M&E, Atlanta, Ga.	10/15	Ditto
Walter A. Gresh	BSF&W, Regional Director Region IV, Atlanta, Ga.	10/15-16	Ditto
H. R. Wilber	515 North Amelia DeLand, Florida	10/16	Visit
Marvin Hires	DeLeon Springs, Florida	10/19	Grazing permit
Bob Young	BSF&W, Br. of Realty, Atlanta, Georgia	11/16	Quarters appraisal
Dick Lingman	Ditto	11/16	Ditto
Buddy Nordmann	DeLand, Florida	11/27	Hunting regulations

C. Refuge Participation

Refuge Manager Myers and Wildlife Technician Lee attended a hunting regulations hearing held by the Florida Game and Fresh Water Fish Commission at the Volusia County Court House, DeLand, Florida on March 11, and were introduced to about 500 people in attendance.

Lee spoke to 25 members of the West Volusia Sportsman Club in the evening of April 7. Myers also attended the meeting and briefly spoke to the group.

Myers and Lee attended the Branch of Refuges law enforcement workshop held in DeLand, August 3 - 5.

Lee participated in preparation of a 15 minute radio tape on refuge activities, with Myers sitting in as an adviser. The tape was broadcast locally on October 29.

D. Hunting

No hunting is permitted on lands under Bureau control. Waters of Spring Garden Lake, Spring Garden Creek, Lake Woodruff, Dexter Creek, Lake Dexter, St. Johns River, Highland Park Canal, Zeigler Dead River and Norris Dead River, all adjacent refuge lands, were open to hunting. Only one hunter that we would class a waterfowl hunter, was contacted in 19 days of patrol during waterfowl season. Three cases of shooting from a motorboat under way were made but we did not consider these waterfowl hunters but those that would shoot at anything that got in the way. No blinds were noted in any of the hunting areas mentioned. A generous estimate of 50 hunter days has been given this recreational use.

E. Safety

Safety meetings have been held monthly. All safety materials provided by the Regional Office have been studied and complied with where applicable. Boat cushions and life jackets were purchased for use in connection with our boating activities. Fire extinguishers and first aid kits have been placed in each piece of equipment. A total of 335 calendar days have accrued 3,644 exposure hours without accident. Also, 15,004 miles were driven without accident.

F. Violations

The Branch of Wildlife Refuges held its first law enforcement workshop for personnel in Florida in DeLand, August 3 - 5. The Bank of Florida generously donated the use of their Board of Director's room. Assistant Regional Supervisor for Management and Enforcement, Warren Lupton, did an excellent job of supervision. Agents Jacob Wolfley, Noah Long and Hugh Hines presented the instruction in very fine form. All personnel present were impressed with the valuable instruction and information received. This effort should be repeated time and time again to keep personnel abreast with up-to-date law enforcement policies and activity, in order to protect and preserve the wildlife that the refuge program attracts.

Hunting pressure has been light, thus a limited number of hunting cases were made. Several trespass cases were made. We had considerable trouble with defacing and removal of signs. Two signs were removed from the posts, two or three signs and posts were removed, and two aluminum angle posts were broken off at the ground and the signs torn off. Several signs were shot up. One had twenty seven .30 cal. bullets,

plus a shotgun blast or two. In one instance, we found a sign that we had put up 30 minutes earlier with 4 bullet holes in it. No destruction of Government property cases have been made but if this activity continues, we are bound to get luck one day. Nineteen patrols were made during hunting season, which began November 14.

The following cases were made during 1964.

Date: 11/14/64

Name & address: Theado N. Wall, P.O. Box 62, DeLand, Florida.

Charge: (1) Trespassing; (2) Unauthorized fishing; (3) Unauthorized vehicle use.

Disposition: Pending.

Date: 11/15/64

Name & address: Larry Junior Stephens, 553 Brook Circle, Daytona Beach, Florida.

Charge: (1) Hunting without license; (2) Killing State protected non-game bird.

Disposition: 6th Dist. JP, DeLeon Springs, Florida - 12/7/64

Fine: (1) \$20 or 40 days; (2) \$20 or 40 days suspended.

Date: 11/27/64

Name and address: Glen Hoke Jones, 437 No. Amelia, DeLand, Florida.

Charge: (1) Trespassing; (2) Unauthorized fishing; (3) Unauthorized vehicle use.

Disposition: Pending.

Date: 11/27/64

Name & address: Charles David Reed, 234 So. Alabama, DeLand, Florida.

Charge: (1) Trespassing; (2) Unauthorized fishing.

Disposition: Pending.

Date: 11/28/64

Name & address: Howard W. Freier, 327 Magnolia, Daytona Beach, Florida.

Charge: (1) Trespassing; (2) Unauthorized boat use.

Disposition: Pending.

Date: 11/28/64

Name & address: Robert Titus, 516 Wisteria, Daytona Beach, Florida.

Charge: (1) Trespassing.

Disposition: Pending.

Date: 11/29/64

Name & address: David G. Landon, 8216 Dandy, Jacksonville, Florida.

Charge: (1) No hunting license; (2) Shooting at coot with .22 rifle;
(3) Shooting at coot from motorboat while underway.

Disposition: Pending.

Date: 11/29/64

Name & address: M. L. Wallace, Rt. 1, Oklawaha, Florida.

Charge: (1) Shooting duck from motorboat while underway.

Disposition: Pending.

Date: 11/29/64

Name and address: D. D. Esco, 2314 Burke, Tampa, Florida.

Charge: (1) Hunting waterfowl without duck stamp; (2) Shooting duck from motorboat while underway.

Disposition: Pending.

Date: 12/20/64

Name & address: Joseph B. Clifton, Rt. 1, Box 481, DeLand, Florida.

Charge: (1) Trespassing; (2) Unauthorized fishing.

Disposition: Pending.

Date: 12/20/64

Name & address: Banard Clifton, Rt. 1, Box 481, DeLand, Florida.

Charge: (1) Trespassing; (2) Unauthorized fishing.

Disposition: Pending.

Date: 12/20/64

Name & address: Marshall B. Bailey, Rt. 1, Box 482, DeLand, Florida.

Charge: (1) Trespassing; (2) Unauthorized fishing; (3) Unauthorized boat use.

Disposition: Pending.

VII. OTHER ITEMS

A. Items of Interest

The refuge was activated February 1, 1964 and Refuge Manager Kent E. Myers transferred from Gulf Island National Wildlife Refuge to serve at Lake Woodruff. Wildlife Technician Clyde W. Lee was transferred from South Florida National Wildlife Refuges to assist him.

Office space was leased at 1131 North Boulevard, DeLand, Florida on May 4. A headquarters has been purchased along State Road 40A at the south edge of DeLeon Springs, Florida and the office will be moved to that location this coming spring.

One news item appeared in the Daytona News-Journal, August 23, treating establishment of the refuge favorably.

This entire report has been prepared by Wildlife Technician Lee and was edited by Refuge Manager Myers.

Respectfully submitted,

Date Completed: January 27, 1965

Kent E. Myers
Refuge Manager

Approved: (Signature)
(Regional Supervisor)

Date: JAN 29 1965



64-4-17. Headquarters along SR 40A at south end of DeLeon Springs. 1/10/65 - Lee.



64-4-15. Headquarters grounds with Office in background. 1/10/65 - Lee.



64-4-18. Rose garden on north side of Headquarters office building. 1/10/65 - Lee.



64-4-20. Pool 1a (small pond SE of Jones Island). Note cordgrass weakened by continued flooding. Cattail at left is a sample of the growth that threatens management of the pool. Spring Garden Lake is in the background. 1/10/65 - Lee.



64-2-1. Remains of old dipping vat found on Tick Island. Has now been destroyed by timber operator. 4/16/64 - Lee



64-2-2. Old dwelling house on Tick Island has also been destroyed by timber operator. 4/16/64 - Lee.



64-4-8. Limpkin with only one leg photographed along Norris Dead River. 11/7/64 - Lee.



64-4-12. White ibis in cypress trees along Scoggins Creek. 1/8/65 - Lee.



64-3-11. Example of dike erosion found along the east side of Lake Woodruff. This is a portion of the higher dike. Other portions were under water as much as 18 inches. 10/2/64 - Lee.



64-3-16. Water over the dike at the pumphouse near Norris Dead River. 10/2/64 - Lee.



64-3-13. Pumphouse on west side of impounded area near Norris Dead River. It houses two 24,000 GPM pumps powered by two UD-18 International engines. They pump discharge only. 10/2-64 - Lee.



64-4-14. Refuge Manager's headache. We work and spend money to put them up and they vandalize and spend money to shoot them up. This defaced sign was along the St. Johns River. 1/8/65 - Lee.

The following listed NR Forms have been omitted as not applicable or of negative report.

NR-7 Plantings
NR-8 Cultivated Crops
NR-8a Refuge Grain Report
NR-9 Collections and Receipts
NR-11 Timber Removal
NR-12 Annual Pesticide Application Report

WATERFOWL
 (Continuation Sheet)

REFUGE Lake Woodruff

MONTHS OF January TO May, 1964

(1) Species	(2) Weeks of reporting period								(3)	(4)	
	3/8-14	15-21	22-28	29-4/4	5-11	12-18	19-25	26-5/2	waterfowl: Broods: Estimated	Production Estimated	
	11	12	13	14	15	16	17	18	days use	seen	total
Swans:											
Whistling											
Trumpeter											
Geese:											
Canada											
Cackling											
Brant											
White-fronted											
Snow											
Blue											
Other											
Ducks:											
Mallard											
Black											
Gadwall											
Baldpate											
Pintail											
Green-winged teal											
Blue-winged teal	22									28	
Cinnamon teal											
Shoveler											
Wood					5					49	
Redhead											
Ring-necked							1			63	
Canvasback											
Scaup											
Goldeneye											
Bufflehead											
Ruddy											
Other <u>Mottled</u>						2	1			21	
Goot:	100	25	10	500	26	500	100	50		11,943	
					(Over)						

(5) Total Days Use	(6) Peak Number	(7) Total Production	SUMMARY
Swans	:	:	Principal feeding areas <u>Unknown as unable to explore area</u>
Geese	:	:	<u>at time of peak concentration.</u>
Ducks	161	12	Principal nesting areas <u>Unknown</u>
Coots	11,943	500	

Reported by Kent E. Myers, Refuge Manager

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

- (1) Species In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.
- (2) Weeks of Reporting Period: Estimated average refuge populations.
- (3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.
- (4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.
- (5) Total Days Use: A summary of data recorded under (3).
- (6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.
- (7) Total Production: A summary of data recorded under (4).

WATERFOWL

REFUGE Lake Woodruff N. W. Refuge

MONTHS OF May TO September, 1954

(1) Species	(2) Weeks of reporting period									
	5/3-9 1	10-16 2	17-23 3	24-30 4	5/31-6/6 5	7-13 6	14-20 7	21-27 8	28-7/4 9	5-11 10
<u>Swans:</u>										
Whistling										
Trumpeter										
<u>Geese:</u>										
Canada										
Cackling										
Brant										
White-fronted										
Snow										
Blue										
Other										
<u>Ducks:</u>										
Mallard										
Black										
Gadwall										
Baldpate										
Pintail										
Green-winged teal										
Blue-winged teal										
Cinnamon teal										
Shoveler										
Wood	130	148	160	175	225	275	310	310	310	310
Redhead										
Ring-necked										
Canvasback										
Scaup										
Goldeneye										
Bufflehead										
Ruddy										
Other										
<u>Coots</u>	50	20	5	5						

WATERFOWL
 (Continuation Sheet)

REFUGE Lake Woodruff N. V. Refuge

MONTHS OF May TO September, 1954

(1) Species	(2) Weeks of reporting period								(3)		(4)	
	7-12-16 11	19-25 12	26-31 13	2-8 14	9-15 15	16-22 16	23-29 17	30-2/5 18	Estimated days use	Production Broods: seen	Estimated total	
<u>Swans:</u>												
Whistling												
Trumpeter												
<u>Geese:</u>												
Canada												
Cackling												
Brant												
White-fronted												
Snow												
Blue												
Other												
<u>Ducks:</u>												
Mallard												
Black												
Gadwall												
Baldpate												
Pintail												
Green-winged teal												
Blue-winged teal												
Cinnamon teal												
Shoveler												
Wood	310	310	310	310	310	310	310	310	33,831	* 7	15	
Redhead												
Ring-necked												
Canvasback												
Scaup												
Goldeneye												
Bufflehead												
Ruddy												
Other												
<u>Coot:</u>												

560

*Gannet personnel were restricted to open navigable waters with outboard boat. Corps of Engineer hydraulic crews operating airboats in Harry's Creek and Spk Creek reported several broods. (over)

	(5)	(6)	(7)
	Total Days Use	Peak Number	Total Production
Swans			
Geese			
Ducks	33,831	310	180
Coots	560	50	

SUMMARY

Principal feeding areas Spring Garden Creek and adjacent marsh.
Also between Harry's Creek and St. Johns River.

Principal nesting areas Wooded areas along waterways and flooded
swamp on Tick and Dexter Islands.

Reported by Refuge Personnel

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

- (1) Species In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.
- (2) Weeks of Reporting Period: Estimated average refuge populations.
- (3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.
- (4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.
- (5) Total Days Use: A summary of data recorded under (3).
- (6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.
- (7) Total Production: A summary of data recorded under (4).

WATERFOWL

REFUGE Lake Woodruff

MONTHS OF September TO December, 19 64

(1) Species	(2) Weeks of reporting period									
	9/6-12 1	13-19 2	20-26 3	28-10/3 4	4-10 5	11-17 6	18-24 7	25-31 8	11/1-7 9	8-14 10
<u>Swans:</u>										
Whistling										
Trumpeter										
<u>Geese:</u>										
Canada										
Cackling										
Brant										
White-fronted										
Snow										
Blue										
Other										
<u>Ducks:</u>										
Mallard										
Black										
Gadwall										
Baldpate										
Pintail										25
Green-winged teal										5
Blue-winged teal							25	25		10
Cinnamon teal										
Shoveler										
Wood	310	310	310	310	310	325	325	325	325	325
Redhead										
Ring-necked						100	100	100	100	800
Canvasback										
Scaup							10	10	10	50
Goldeneye										
Bufflehead										
Ruddy										
Other Mottled						25	25	25	25	25
Coot	50	50	50	50	50	100	200	200	1,500	2,000

WATERFOWL
 (Continuation Sheet)

REFUGE Lake Woodruff

MONTHS OF September TO December, 1961

(1) Species	(2) Weeks of reporting period							(3)	(4)
	15-21	22-28	29-12/5	6-12	13-19	20-26	27-1/2	Estimated: Production	waterfowl: Broods: Estimated
	11	12	13	14	15	16	17	18	days use : seen : total
<u>Swans:</u>									
Whistling									
Trumpeter									
<u>Geese:</u>									
Canada									
Cackling									
Brant									
White-fronted									
Snow									
Blue									
Other									
<u>Ducks:</u>									
Mallard									
Black									
Gadwall									
Baldpate			10	10	19	20			113
Pintail	10	15	10		5	10			525
Green-winged teal									35
Blue-winged teal	60	35	4	30	15	15	8		1,379
Cinnamon teal									
Shoveler	5	5							70
Wood	325	350	400	400	400	400	200		40,110
Redhead									
Ring-necked	800	800	1,000	1,000	800	750	400		47,250
Canvasback	2								11
Scaup	75	125	400	400	200	200	50		10,710
Goldeneye									
Bufflehead	5	5							70
Ruddy	75	7			75				1,099
Other Mottled	25	25	25	25	25	25	5		1,960
<u>Goat:</u>	5,000	5,000	6,000	6,000	5,000	5,000	3,500		278,250
					(Over)				

	(5)	(6)	(7)
	Total Days Use :	Peak Number :	Total Production
Swans	_____ :	_____ :	_____
Geese	_____ :	_____ :	_____
Ducks	<u>103,635</u> :	<u>1,065</u> :	_____
Coots	<u>273,250</u> :	<u>6,000</u> :	_____

SUMMARY

Ducks - Spring Garden Lake & vicinity
 Principal feeding areas and Zeigler Dead River. Coots - Spring
 Garden Lake & vicinity, Lake Dexter and St. Johns River.

Principal nesting areas _____

Reported by Refuge Personnel

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

- (1) Species In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.
- (2) Weeks of Reporting Period: Estimated average refuge populations.
- (3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.
- (4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.
- (5) Total Days Use: A summary of data recorded under (3).
- (6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.
- (7) Total Production: A summary of data recorded under (4).

MIGRATORY BIRDS
(other than waterfowl)

Refuge. Lake Woodruff Months of January to May 1954.

(1) Species Common Name	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total Estimated Number
	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	
I. <u>Water and Marsh Birds:</u>										
Anhinga	1	3/6	2	4/22	2	4/22				6
Black Cr. Night Heron	2	4/9	2	4/9	2	4/9				4
Common egret	1	3/6	12	4/2	2	4/21				50
Cormorant	5	4/10	5	4/10	5	4/10				15
Florida gallinule	2	3/6	10	4/20	10	4/20				500
Great blue heron	1	4/1	6	4/21	2	4/22				50
Green heron	1	4/6	2	4/10	2	4/10				25
Limpkin	1	4/1	1	4/22	1	4/22				10
Louisiana heron	6	4/2	6	4/2	2	4/10				15
Pied-billed grebe	1	3/6	2	4/9	2	4/9				3
II. <u>Shorebirds, Gulls and Terns:</u>										
Herring gull	8	3/6	8	3/6	8	3/6				100
Ring-billed gull	10	3/6	20	4/21	5	4/23				250

	(1)	(2)	(3)	(4)	(5)	(6)	
III. Doves and Pigeons:							
Mourning dove	1	1/6	1	1/6	1	1/6	25
White-winged dove							
Ground dove	2	1/6	2	1/6	2	1/6	15
IV. Predaceous Birds:							
Golden eagle							
Duck hawk							
Horned owl							
Magpie							
Raven							
Crow (fish)							50
Bald eagle	2	1/1	2	1/1	1	1/2	2
Osprey	2	1/1	3	1/20	1	1/22	10
Pigeon hawk	2	1/20	2	1/20	2	1/20	4
Marsh hawk	1	1/20	1	1/20	1	1/20	2

Reported by.

Kent E. Myers
Refuge Manager

INSTRUCTIONS

- (1) **Species:** Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern," etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiformes)
 II. Shorebirds, Gulls and Terns (Charadriiformes)
 III. Doves and Pigeons (Columbiformes)
 IV. Predaceous Birds (Falconiformes, Stringiformes and predaceous Passeriformes)
- (2) **First Seen:** The first refuge record for the species for the season concerned.
- (3) **Peak Numbers:** The greatest number of the species present in a limited interval of time.
- (4) **Last Seen:** The last refuge record for the species during the season concerned.
- (5) **Production:** Estimated number of young produced based on observations and actual counts.
- (6) **Total:** Estimated total number of the species using the refuge during the period concerned.

3-1751
Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge. Lake Woodruff N. W. Refuge Months of to September 19. 61

(1) Species Common Name	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total Estimated Number
	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	
<u>I. Water and Marsh Birds:</u>										
<u>Anhinga</u>	1	5/6	6	8/13	6	8/13				25
Cattle Egret	1	6/4	1	6/4	1	6/4				20
Common Egret	1	5/15	2	8/13	2	8/13				20
Cormorant	1	5/27	1	5/27	1	5/27				5
Florida Gallinule	3	8/31	3	8/31	3	8/31				150
Great blue heron	2	5/16	8	6/10	2	8/13				30
Green heron	1	5/6	15	8/11	15	8/11				15
La. heron	1	5/19	2	7/29	2	7/29				30
Limpkin	5	5/15	5	7/23	4	8/13				60
Little blue heron	2	5/19	35	8/7	15	8/13	1	-	30	60
White ibis	60	5/27	60	5/27	25	7/29				60
Wood ibis	2	7/29	2	5/29	2	7/29				10
<u>II. Shorebirds, Gulls and Terns:</u>										

(over)

	(1)	(2)	(3)	(4)	(5)	(6)				
III. Doves and Pigeons:										
Mourning dove	5	5/19	5	5/19	5	5/19	-	5	8	30
White-winged dove							-	2	4	10
Ground dove										
IV. Predaceous Birds:										
Golden eagle										
Duck hawk										
Horned owl										
Magpie										
Raven										
Crow (fish)	2	5/27	4	5/23	2	8/31				150
*Bald eagle										
Cowbird	2	5/6	12	7/1	4	8/23	-	6	10	20
Scallop-tailed kite	2	5/19	4	7/23	4	7/23				7

Reported by: Refuge Personnel

INSTRUCTIONS

- (1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern," etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiformes)

*For informational purposes only. One immature bald eagle observed at Kings Bay, Crystal River on August 29, 1964.

II. Shorebirds, Gulls and Terns (Charadriiformes)

III. Doves and Pigeons (Columbiformes)

IV. Predaceous Birds (Falconiformes, Stringiformes and predaceous Passeriformes)

- (2) First Seen: The first refuge record for the species for the season concerned.
- (3) Peak Numbers: The greatest number of the species present in a limited interval of time.
- (4) Last Seen: The last refuge record for the species during the season concerned.
- (5) Production: Estimated number of young produced based on observations and actual counts.
- (6) Total: Estimated total number of the species using the refuge during the period concerned.

MIGRATORY BIRDS
(other than waterfowl)

Refuge. Lake Hopewell Months of. September to. December 1964.

(1) Species Common Name	(2)		(3)		(4)		(5)		(6)
	First Seen Number	Date	Peak Numbers Number	Date	Last Seen Number	Date	Production Number Colonies	Total # Nests	Total Estimated Young Number
I. Water and Marsh Birds:									
Anhinga	3	9/1	31	12/6	21	12/19			50
Least bittern	1	9/23	1	11/3	1	11/3			25
Cormorant	1	11/4	1	11/4	1	11/4			10
Common egret	3	9/1	125	12/19	125	12/19			200
Snowy egret	20	11/21	25	11/25	5	12/9			50
Florida gallinule	3	10/22	6	12/11	6	12/11			500
Pied-billed grebe	1	9/23	10	11/19	5	12/16			50
Black Cr. Night heron	1	10/21	5	12/16	5	12/16			25
Great blue heron	4	9/1	25	11/25	6	12/19			50
Green heron	5	9/1	5	9/1	1	12/16			25
Louisiana heron	2	9/28	6	12/16	4	12/19			25
Little blue heron	35	9/28	50	11/21	10	12/19			75
White ibis	1	9/2	2000	12/19	2000	12/19			4000
Wood ibis	3	11/21	10	11/25	6	12/6			15
Limkin	2	10/1	2	10/1	1	11/7			5
King rail	1	9/12	3	10/15	3	10/15			200
II. Shorebirds, Gulls and Terns									
Ternycosora rail	1	10/1	15	11/3	15	11/3			500
Virginia rail	2	9/23	2	9/23	1	11/8			200
Wilson snipe	1	10/22	1	10/22	1	10/22			25
II. Shorebirds, Gulls and Terns									
Ring-billed gull	4	12/3	6	12/16	6	12/16			20
Caspian tern	50	11/21	50	11/21	5	12/13			75
Least tern	1	9/28	2	12/16	2	12/16			15

	(1)	(2)	(3)	(4)	(5)	(6)	
<u>III. Doves and Pigeons:</u>							
Mourning dove	3	9/2	3	9/2	2	10/22	25
White-winged dove							
Ground dove	8	9/3	8	9/3	6	10/22	25
<u>IV. Predaceous Birds:</u>							
Golden eagle							
Duck hawk							
Horned owl							
Magpie							
Raven							
Crow (fish)	400	10/21	500	11/4	500	11/6	1000
Bald eagle	5	10/21	5	10/21	1	12/19	5
Marsh hawk	1	12/3	5	12/15	5	12/15	10
Red-shoulder hawk	1	9/23	4	10/21	2	12/19	10

Reported by. . . Refuge Personnel

INSTRUCTIONS

- (1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern," etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiformes)
 II. Shorebirds, Gulls and Terns (Charadriiformes)
 III. Doves and Pigeons (Columbiformes)
 IV. Predaceous Birds (Falconiformes, Stringiformes and predaceous Passeriformes)
- (2) First Seen: The first refuge record for the species for the season concerned.
- (3) Peak Numbers: The greatest number of the species present in a limited interval of time.
- (4) Last Seen: The last refuge record for the species during the season concerned.
- (5) Production: Estimated number of young produced based on observations and actual counts.
- (6) Total: Estimated total number of the species using the refuge during the period concerned.

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 Lake Woodruff N. V. ^(Refuge activated 2/1/64)
For 12-month period ending August 31, 1964

Reported by Refuge Personnel Title Refuge Mgr. & Wildlife Tech.

(1) Area or Unit Designation	(2) Habitat			(3) Use-days	(4) Breeding Population	(5) Production
	Type	Acreage				
Timbered swamp Mgmt. Area #1	Crops	1,000	Ducks	10,197	42	54
	Upland	200	Geese			
	Marsh	4,200	Swans			
	Water	300	Coots	3,050		
	Total	5,700	Total	13,047	42	54
Timbered swamp Mgmt. Area #2	Crops	1,300	Ducks	6,798	26	36
	Upland		Geese			
	Marsh	4,140	Swans			
	Water	760	Coots	2,500		
	Total	6,400	Total	9,298	26	36
Timbered swamp Mgmt. Area #3	Crops	2,200	Ducks	16,971	62	90
	Upland	960	Geese			
	Marsh	3,050	Swans			
	Water	3,000	Coots	6,353		
	Total	9,210	Total	23,350	62	90
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
Timbered swamp TOTAL	Crops	4,500	Ducks	33,972	130	100
	Upland	3,160	Geese			
	Marsh	11,450	Swans	12,603		
	Water	4,260	Coots	16,195	130	100
	Total	21,370	Total			

*Includes Lake Woodruff and part of Lake ~~Osborne~~ which are not refuge waters but will be covered by closing order prohibiting waterfowl hunting.

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.

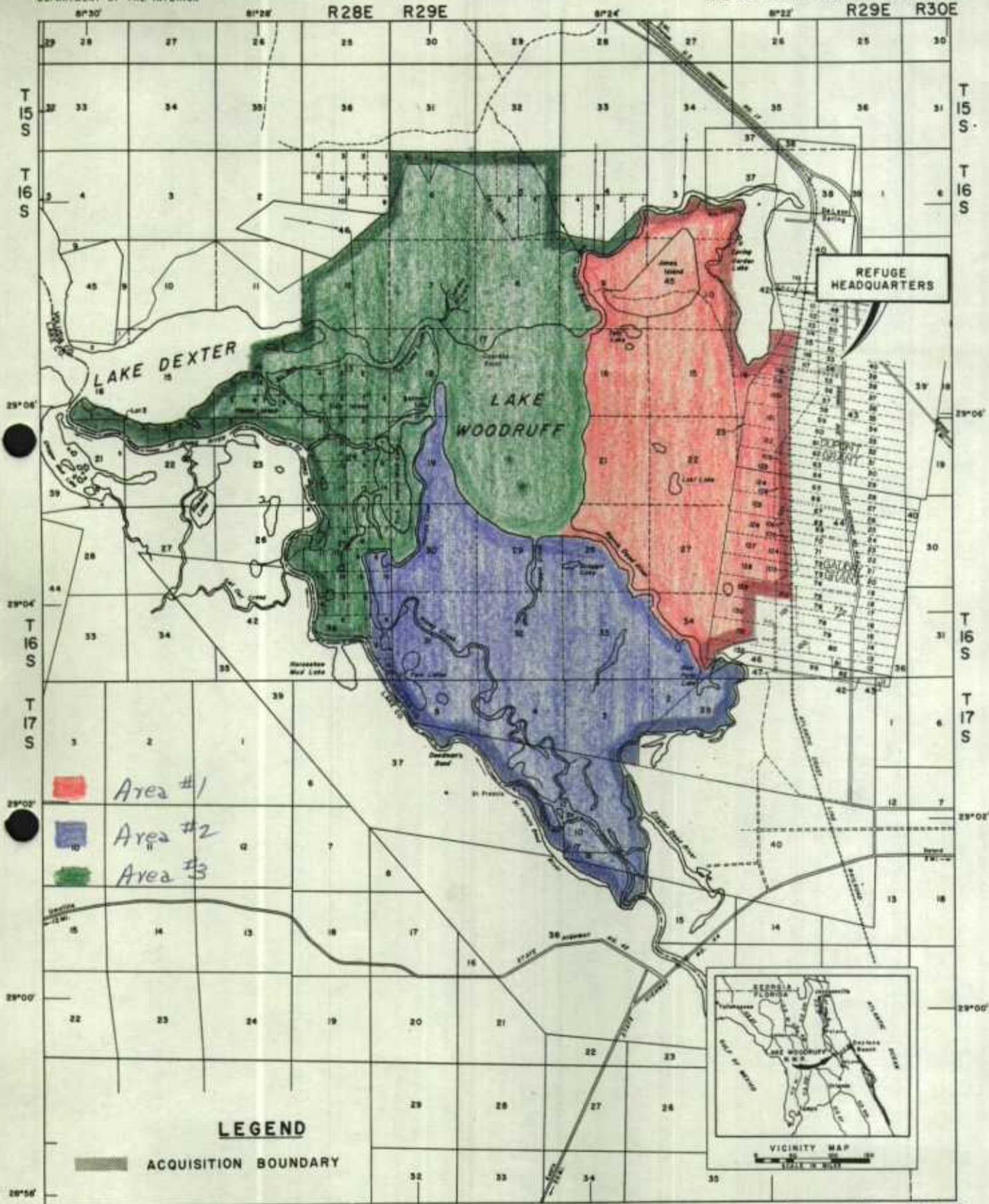
- (5) Production: Estimated total number of young raised to flight age.

LAKE WOODRUFF NATIONAL WILDLIFE REFUGE

VOLUSIA COUNTY, FLORIDA

UNITED STATES
DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE



- Area #1
- Area #2
- Area #3

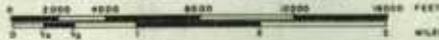
LEGEND

ACQUISITION BOUNDARY



COMPILED IN THE BRANCH OF REALTY
FROM SURVEYS BY C. B. S., S.L.C., F.W.S.,
PRIVATE SURVEYS & AERIAL PHOTOGRAPHS

TALLAHASSEE MERIDIAN



TOWNSHIP
DIAGRAM

MEAN
DECLINATION
1962

WATERFOWL HUNTER KILL SURVEY

Refuge Lake WoodruffYear 196 4

(1) Weeks of Hunting	(2) No. Hunters Checked	(3) Hunter Hours	(4) Waterfowl Species and Nos. of Each Bagged	(5) Total Bagged	(6) Crippling Loss	(7) Total Kill	(8) Est. No. of Hunters	(9) Est. Total Kill
(Note: No Bureau controlled lands were open to public hunting. However, adjacent waters were open to hunting and patrolled effectively. Only 3 waterfowl hunters were observed and these were checked.)								
11/26	1	4	None	-	-	-	5	-
11/28	2	8	2 scaup	2	-	2	10	10
TOTAL	3	12	2 scaup	2	-	2	15	10

(over)

INSTRUCTIONS

- (1) The first week of hunting begins with opening day and ends at the close of hunting 6 days later. Successive weeks follow the same pattern.
- (2) The goal is to survey a minimum of 25 percent of refuge hunters each week and to record data only from those who have completed their day's hunting. This information should be collected during each day of the week and in each area hunted in relative proportion to the hunter effort expended. When the 25 percent goal cannot be achieved, particular care should be taken to collect representative data.
- (3) Record the total number of hours the hunters spent hunting on the refuge.
- (4) List waterfowl species in decreasing order of numbers bagged. Sample entry: Mallard (61), Pintail (36), Redhead (16), Gadwall (11), Widgeon (6), Coot (4), Canada Goose (3), Green-winged Teal (1).
- (5) Record total numbers of waterfowl bagged.
- (6) Record total numbers of waterfowl reported knocked down but not recovered.
- (7) Total of Columns 5 and 6.
- (8) Estimate the total number of hunters who hunted on the refuge during the week, including hunters checked (Column 2).
- (9) Kill sample projected to 100 percent. $\text{Column 9} = \frac{\text{Column 8}}{\text{Column 2}} \times \text{Column 7}$.

UPLAND GAME BIRDS

Refuge Lake Woodruff Months of January to May, 1964

64

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'vd.	Estimated Total	Percentage	Hunting	For Re- stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Bob-white quail	500 A. upland & hardwood swamp	10	1	30	unknown				50	Field investigation in- sufficient for complete reporting at this time. Tw o covies observed on Tick Is.
Eastern wild turkey	3,000 A. upland & hardwood swamp									(Refuge personnel observed no turkeys. A local citizen reported observing 25 turkey in oen flock along waters edge on Tick Island).

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

- (1) SPECIES: Use correct common name.
- (2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
- (3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.
- (4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.
- (5) REMOVALS: Indicate total number in each category removed during the report period.
- (6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.
- (7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

Refuge Lake Woodruff S.W. Refuge Months of May to September, 1961

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
						Hunting	For Re- stocking	For Research		
Common Name	Cover types, total acreage of habitat	Acres per Bird	10. broods obs'vd.	Estimat- ed Total	Percentage				Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Bob-white Quail	500 A. upland & hardwood swamp	5	1	75	unk.	-	-	-	100	
Eastern wild Turkey	3,000 A., upland & hardwood swamp	(Refuge personnel observed no turkeys. Habitat is suitable.)								

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

- (1) SPECIES: Use correct common name.
- (2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
- (3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.
- (4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.
- (5) REMOVALS: Indicate total number in each category removed during the report period.
- (6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.
- (7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

- (1) SPECIES: Use correct common name.
- (2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
- (3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.
- (4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.
- (5) REMOVALS: Indicate total number in each category removed during the report period.
- (6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.
- (7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1753
Form NR-3
(June 1945)

BIG GAME

Refuge Lake Wociruff Calendar Year 1964

(1) Species	(2) Density	(3) Young Produced	(4) Removals						(5) Losses	(6) Introductions		(7) Estimated Total Refuge Population		(8) Sex Ratio
			Hunting For Re- stocking	Sold	For Research	Predation	Disease	Winter Loss		Number	Source	At period of Greatest use	As of Dec. 31	
Common Name	Cover types, total Acreage of Habitat	Number												
White-tailed deer	4,500 Ac. hardwood swamp, 1,160 ac. upland, & 11,450 ac. marsh	10										25	25	unk.

Remarks:

Reported by Refuge Personnel

INSTRUCTIONS

Form NR-3 - BIG GAME

- (1) SPECIES: Use correct common name; i.e., Mule deer, black-tailed deer, white-tailed deer. It is unnecessary to indicate sub-species such as northern or Louisiana white-tailed deer.
- (2) DENSITY: Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge: once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
- (3) YOUNG PRODUCED: Estimated total number of young produced on refuge.
- (4) REMOVALS: Indicate total number in each category removed during the year.
- (5) LOSSES: On the basis of known records or reliable estimates indicate total losses in each category during the year.
- (6) INTRODUCTIONS: Indicate the number and refuge or agency from which stock was secured.
- (7) TOTAL REFUGE POPULATION: Give the estimated population of each species on the refuge at period of its greatest abundance and also as of Dec. 31.
- (8) SEX RATIO: Indicate the percentage of males and females of each species as determined from field observations or through removals.

SMALL MAMMALS

Refuge Lake Woodruff Year ending April 30, 1964

(1) Species	(2) Density		(3) Removals					(4) Disposition of Furs					(5) Total Popula- tion	
								Share Trapping			Total Refuge Furs Shipped	Furs Donated		Furs Destroyed
								Permit Number	Trappers Share	Refuge share				
Common Name	Cover Types & Total Acreage of Habitat	Acres Per Animal	Hunting	Fur Harvest	Predator Control *	For Re- stocking	For Re- search							
Armadilla	500 ac. upland & hardwood swamp	100										5		
Marsh rabbit	15,000 ac. marsh & hardwood swamp	30										500		
Raccoon	Ditto	20										750		
O'possum	Ditto	23										650		
Mink	Ditto											?		
Otter	Ditto											?		
<p>(The above are estimates based on sign and habitat available. Acutal observations have been very limited for non-existent due to absence of suitable equipment to adequately inventory the marsh and more remote areas.)</p>														
* List removals by Predator Animal Hunter														

REMARKS:

Reported by _____

INSTRUCTIONS

Form NR-4 - SMALL MAMMALS (Include data on all species of importance in the management program; i. e., muskrats, beaver, coon, mink, coyote. Data on small rodents may be omitted except for estimated total population of each species considered in control operations.)

- (1) SPECIES: Use correct common name. Example: Striped skunk, spotted skunk, short-tailed weasel, gray squirrel, fox squirrel, white-tailed jackrabbit, etc. (Accepted common names in current use are found in the "Field Book of North American Mammals" by H. E. Anthony and the "Manual of the Vertebrate Animals of the Northeastern United States" by David Starr Jordan.)
 - (2) DENSITY: Applies particularly to those species considered in removal programs. Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottom land hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
 - (3) REMOVALS: Indicate the total number under each category removed since April 30 of the previous year, including any taken on the refuge by Service Predatory Animal Hunter. Also show any removals not falling under headings listed.
 - (4) DISPOSITION OF FUR: On share-trapped furs list the permit number, trapper's share, and refuge share. Indicate the number of pelts shipped to market, including furs taken by Service personnel. Total number of pelts of each species destroyed because of unprimeness or damaged condition, and furs donated to institutions or other agencies should be shown in the column provided.
 - (5) TOTAL POPULATION: Estimated total population of each species reported on as of April 30.
- REMARKS: Indicate inventory method(s) used, size of sample area(s), introductions, and any other pertinent information not specifically requested.

Refuge Lake Woodruff

Year 19 64

Botulism

Lead Poisoning or other Disease

Period of outbreak _____

Period of heaviest losses _____

Losses:

	Actual Count	Estimated
(a) Waterfowl	_____	_____
(b) Shorebirds	_____	_____
(c) Other	_____	_____

Number Hospitalized	No. Recovered	% Recovered
(a) Waterfowl	_____	_____
(b) Shorebirds	_____	_____
(c) Other	_____	_____

Areas affected (location and approximate acreage) _____

Water conditions (average depth of water in sickness areas, reflooding of exposed flats, etc.) _____

Condition of vegetation and invertebrate life _____

Remarks _____

Kind of disease _____

Species affected _____

Number Affected Species	Actual Count	Estimated
_____	_____	_____
_____	_____	_____
_____	_____	_____

Number Recovered _____

Number lost _____

Source of infection _____

Water conditions _____

Food conditions _____

Remarks No diseased birds or animals observed during
the year.

PUBLIC RELATIONS

(See Instructions on Reverse Side)

Refuge Lake WoodruffCalendar Year 1964

1. Visits

a. Hunting 50 b. Fishing 15,000 c. Miscellaneous 10,000 d. TOTAL VISITS 25,050

1a. Hunting (on refuge lands)

TYPE	HUNTERS	ACRES	MANAGED BY
Waterfowl	No hunting on Bureau lands. Hunting		
Upland Game	was permitted on navigable waters		
Big Game	adjacent the refuge.		
Other			

Number of permanent blinds 0Man-days of bow hunting included above 0Estimated man-days of hunting on lands adjacent to
refuge 50

1b. Fishing (area open to fishing on refuge lands)

TYPE OF AREA	ACRES	MILES
Fonds or Lakes	<u>4,260</u>	
Streams and Shores		<u>25</u>

1c. Miscellaneous Visits

Recreation 9,884 Official 116
Economic Use 1 Industrial 0

2. Refuge Participation (groups)

TYPE OF ORGANIZATION	On Refuge		Off Refuge	
	NO. OF GROUPS	NUMBER IN GROUPS	NO. OF GROUPS	NUMBER IN GROUPS
Sportsmen Clubs			<u>1</u>	<u>25</u>
Bird and Garden Clubs				
Schools				
Service Clubs				
Youth Groups				
Professional-Scientific				
Religious Groups				
*State or Federal Govt.			<u>1</u>	<u>500</u>
Other				

3. Other Activities

*WFGM/WFC regulations hearing.

TYPE	NUMBER	TYPE	NUMBER
Press Releases		Radio Presentations	<u>1</u>
Newspapers (P.R.'s sent to)		Exhibits	
TV Presentations		Est. Exhibit Viewers	

INSTRUCTIONS

Item 1: Total of a, b, and c, equal d.

"Visit" - definition. Any person who is on refuge lands or waters during a day or part thereof for the purpose of: hunting, fishing, bird-watching, recreation, business or economic use, official visit, or similar interest. INCLUDE - those who stop within the refuge while traveling on a public highway because of an interest in the area. EXCLUDE - persons engaged in oil or other industry not directly related to the refuge, persons using refuge as most direct route or principal avenue of traffic, and those boating on navigable rivers or the Intercoastal Canal, unless they stop to observe wildlife on the refuge.

Computing visits. Where actual counts are impractical, "sampling" is used with midweek and weekend samples varied by season or weather. A conversion factor of 3.5 (of passengers per car) is used when accurate figures are not available. Each refuge will develop a conversion factor for boats based on range of usage. Count a camper once for each 24-hour period or fraction thereof.

Item 1a: Acres - of refuge open for each type of hunting.

Managed hunts require check in and out of hunters, issuance of permits, or assignment of blinds.

Other - INCLUDE crow, fox, and similar hunting.

Lands adjacent to refuge. Normally considered within 1 mile or less of boundary, unless established sampling procedures cover a wider area. For big game hunting, the distance may be greater.

Item 1b: Acres of streams open to fishing, if practical; otherwise just miles open. Information on "shores" is primarily for coastal fishing.

Item 1c: Recreation. INCLUDE photography, observing wildlife, picnicking, swimming, boating, camping, visitor center use, tours, etc. TOTAL Recreation, Official, and Economic Use visits under Item 1.

Industrial. INCLUDE persons engaged in industry, i.e., oil industry or factories. EXCLUDE these from Item 1.

Item 2: INCLUDE the "On Refuge" groups in Items 1c and 1. In "Off Refuge" column include only those group meetings in which refuge employees actually participate. EXCLUDE these from Items 1c and 1.

Item 3: Exhibits - INCLUDE displays, fairs, parades, and exhibits OFF the refuge; EXCLUDE those ON.