

OKEFENOKEE
Descriptions by the U.S. Biological Survey
(1917-1939)
C.T. Trowell
1995

The following descriptions of the Okefenokee Swamp were written by biologists or other officials of the U.S. Biological Survey. Francis Harper, a zoologist, prepared the first report for the Biological Survey. Harper's brother, Roland M. Harper, conducted a botanical survey of the Okefenokee in 1902 and prepared a report for the U.S. Department of Agriculture. He published an article on the Okefenokee Swamp in Scientific Monthly in 1909. Francis Harper, a beginning student at Cornell University in 1912 did not accompany the biological reconnaissance of the Okefenokee led by Albert H. Wright and J. Chester Bradley, but he made the trek alone several weeks prior to their arrival. Harper published two articles on his 1912 exploration, one on birds with Albert H. Wright in The Auk in 1913. He received an award for another article, describing his Okefenokee experience in 1912, published in the Brooklyn Museum Quarterly in 1915. Harper was employed by the U.S. Biological Survey in 1917, just prior to service as a Lieutenant in Europe. Following his military service, Harper returned to Cornell and completed his doctorate on mammals in the Okefenokee Swamp. During 1921-22 he accompanied A.H. Wright and his wife Anna Allen Wright on several of their trips to the Okefenokee. He returned several times during the 1920s and lived on a cabin on Chesser Island for a perior during the early 1930s. Over the years he amassed dozens of notebooks filled with field notes.

The first of his papers included in this compilation was prepared for the Biological Survey following a reconnaissance to south Georgia and northern and eastern Florida in 1916-1917. It was later submitted to a congressional committee considering the purchase of the Okefenokee as a biological preserve in 1931 and published in their report in 1932. A revised and updated version was published in Natural History in 1920, following the organization of the Okefinokee Society. This paper was also published in the congressional committee report in 1932.

OKEFENOKEE SWAMP AS A RESERVATION

By Francis Harper, U.S. Biological Survey, 1917

There are several respects in which Okefenokee Swamp has particular value as a potential reservation under Federal or other auspices.¹ It is a refuge for some especially rare or interesting forms of animal life. It is a winter resort for large numbers of

¹ For a description and map of this area see Wright and Harper, The Auk, XXX, October 1913, pp. 477-489. Cf. also Harper, Bird Lore, November, 1912, pp. 402-407.

migratory waterfowl. It still contains, in spite of extensive lumbering operations, about 500 square miles of diversified territory in an absolutely primeval state, offering naturalists unsurpassed opportunities for faunal and ecological studies. Finally, it has a distinct aesthetic value, the very exceptional beauty of its scenery making a strong appeal to all lovers of nature who have been privileged to visit the region.²

Rare or Interesting Species

Those may be briefly touched upon in the following notes:

Wood duck: This is a resident species, of which there are probably hundreds of individuals in the swamp. I was especially impressed by the fact that during a six weeks' trip throughout central and eastern Florida I found wood ducks distinctly less common than in the Okefenokee.

American egret: A small number of these birds have been found breeding in the environs of the swamp in recent years. Apparently they are more common in the swamp in winter than in summer, for on January 2, 1917, I saw about 85 birds flying over Floyds Island prairie on their way to roost.

Sand-hill crane: This is a resident and quite common species. Like the wood duck, the American egret, and the pileated woodpecker, it seems at present much commoner in the Okefenokee than in any part of central or eastern Florida.

Limpkin: The Okefenokee is probably the northern limit of the breeding range of this fast-disappearing species. One or two birds were found here in May, 1912.

Ivory-billed woodpecker: A very small number of ivory bill still remain in the swamp. The Minne Lake Islands, where they nest, will probably be ruined by lumbering operations this year.

Pileated woodpecker: This splendid bird is astonishingly abundant in the Okefenokee. Its numbers appear greater than those of any other woodpecker in the swamp, except possibly the red-bellied woodpecker and the flicker.

Black bear: There are probably from 100-300 bears in the swamp and its immediate environs.

Florida deer: This is a rather common and well-distributed species on the islands and in other parts of the swamp.

Otter: Dozens of these animals are trapped every winter in the swamp.

Panther: Several have been recorded about the borders of the swamp within a year or two.

Florida wolf: There seems to be only one specimen of this species in the museums of the country. One was killed near the edge of the swamp about 1910, and some animal believed to be a wolf has been heard in the swamp several times very recently.

Round-tailed muskrat: This very interesting species has

² Prof. J.G. Needham has characterized a scene in Chase Prairie as "one of the most remarkable landscapes of the world." The Life of Inland Waters, 1916, p. 93.

recently been found to be very abundant in the Okefenokee, which represents the northern limit of its known range.

Winter Resort of Migratory Waterfowl

Eleven species of waterfowl, of interest as game, were found wintering in 1916-17. A very loose estimate of their numbers in the swamp is as follows: Hooded merganser, several hundred; mallard, several thousand; black duck, 1,000; green-winged teal, 25; pintail, 50; wood duck, 500; ring-necked duck, several hundred; sand-hill crane, 100; woodcock, 100; Wilson's snipe, 500; killdeer, 100.

The conditions here compared very favorably with those in eastern and central Florida in the winter of 1916-17. Mallards, black ducks, and wood ducks seemed much more numerous in the Okefenokee than in any part of Florida that I visited.

Other Game

At present a considerable amount of hunting is carried on, chiefly by residents in and about the swamp. Not only the ordinary game birds, but also such species as the wood ibis, Ward's heron, and sand-hill crane, and occasionally even a cormorant or a water turkey are killed and eaten. The wood duck, though protected by both State and Federal laws, is highly prized and is killed in considerable numbers, some being sold at the rate of three for a dollar. Wild turkeys, though now very scarce, were formerly common in the swamp, and their numbers might be restored with protection. Bobwhites are still common.

Trapping is extensively pursued. Great numbers of raccoons and several dozen otters are taken every winter. Smaller numbers of opossums, wildcats, and skunks are trapped.

Deer, bear, and wildcats are hunted with hounds at practically all seasons of the year. Alligators were formerly killed in large numbers, but during the last few years their hides have brought so little in the market that the hunting has practically stopped.

About 85 species of birds have been recorded from the swamp in summer and about 90 in winter. At the latter season it attracts great numbers of berry and fruit eating birds.

The swamp waters abound in pickerel, large-mouthed black bass and other smaller basses, chub suckers, mudfish (*Amia*), and various species of catfish.

In connection with its possibilities as a game preserve, it is perhaps worth while to remark that the swamp is an exceptionally healthful region.

The Swamp as a Field for Biological Investigation

During the past five years the swamp has been utilized as a field for biological reconnaissance work by several of the scientific departments of Cornell University, and recently it has been further investigated by the Biological Survey. Reports on the

birds, reptiles, and some of the insects have already been published, and reports on the mammals, amphibians, fishes, and plants are in course of preparation. These reports are of a preliminary nature, and might well form the basis for a vast amount of further and more detailed biological work extending over an indefinite period. It is safe to say that there is no area of equal interest, importance, and suitability in the eastern United States for the carrying on of such investigations. And its whole value for this purpose --- the study of life histories and ecological relations --- depends upon the preservation of primeval conditions.

History, Present Status, and Future of the Swamp

The history of the swamp is briefly outlined in The Auk, XXX, October, 1931 [1913], pages 477-482.

At present the Hebard Cypress Co. owns and controls by far the greater portion of the swamp. Its mill at Hebardsville (sic), near Waycross, consumes about two trainloads of cypress logs per day. Its lumber railroad now extends from Hebardsville (sic) to Billys Island, in the heart of the swamp. The cypress timber has been cleaned out for probably several miles on each side of the main line of the railroad from Suwanee Creek to the northwestern margin of the swamp to Jones Island south of Billys Lake. The devastated area comprises perhaps 100 square miles.

Fortunately, the entire area in which the removal of the timber is planned does not comprise more than about one-third of the swamp. This area lies mainly in the northwestern part, extending south to Honey Island and east to Minne Lake Islands, and also through the "bay" northeast of Billys Island to Floyds Island. In the rest of the swamp the timber is too small or too scattered to be worth cutting by the present methods. (The logs are taken out by railroad or tramroad resting on piles driven into the swamp muck.) It may be decided later to extend the railroads south to Black Jack Island in order to cut the fine pine timber on this island.

After the lumbering operations come to an end the untouched parts of the swamp are safe, unless drainage is tried and proves successful. This would involve great expense, and it is very doubtful if drainage could be accomplished under any circumstances. It was once tried by means of the Suwanee Canal, leading from the east side of the swamp to the St. Marys River, and it failed. Probably hundreds of miles of canal network would have to be dug before it could be seen whether the scheme would be successful or not.

It unfortunately happens that most of the very interesting islands in the swamp are included in the area that has been or will be devastated. The owners contemplate saving Floyds Island, however, as a game preserve; and this is one of the most diversified and most interesting of the islands. Black Jack, Billys, and Honey Islands, with their magnificent growth of pines, are of more real value to naturalists than to lumbermen, and these too should by all means be preserved.

Okefenokee Swamp contains many features of extraordinary interest, and it has no counterpart anywhere in the world. Its complete exploitation for commercial purposes, with the accompanying destruction of primeval conditions, would be a severe loss to science and to the Nation, just as its preservation in its original state would be a cause for rejoicing and lasting benefit to the whole country.

OKEFENOKEE SWAMP AS A RESERVATION

By Francis Harper, assistant biologist, U.S. Biological Survey
(as published in Natural History, XX(1), Jan-Feb 1920, 28-41.)

The famous Okefenokee, "the greatest natural wonder" of Georgia, covers nearly 700 square miles in the southeastern part of the State, between the city of Waycross and the Florida line. Among the fresh-water swamps, east of the Mississippi, it is exceeded in size only by the Everglades; in the richness of its historical and literary associations, in the marvelous beauty and charm of its diversified scenery, and in its extraordinary interest as a faunal and floral area, Okefenokee Swamp is unique. It has no counterpart anywhere in the world.

There are several respects in which the swamp would make a particularly useful and valuable reservation under Federal or other auspices. It is a refuge for some exceptionally rare forms of animal life. It is an important wintering ground for large numbers of migratory waterfowl. It still contains, in spite of extensive lumbering operations, about 500 square miles of diversified territory in an absolutely primeval state, offering to naturalists unsurpassed opportunities for faunal and ecological studies. Moreover, it has a distinct aesthetic value; the extraordinary beauty of its scenery makes a strong appeal to all lovers of nature who have been privileged to visit the region. Prof. James G. Needham has characterized a scene on Chase Prairie as "one of the most remarkable landscapes in the world."³ If the destruction which now so direly threatens the swamp is permitted to be carried out, one of the most interesting natural features of our country will be lost forever.

While the Okefenokee has enjoyed historical and literary renown for more than a century, it is only within a comparatively few years that its biological features have been systematically investigated by men of scientific training, and that the published results of their work have begun to appear.

The Animal Life of Okefenokee

In the eastern United States there is certainly no area of

³ James G. Needham and J.T. Lloyd, The Life of Inland Waters, Ithaca, 1916, p. 93. For a general description, history, and map of the swamp, cf. Wright and Harper, The Auk, XXX, Oct., 1913, pp. 477-505.

equal extent which affords such exceptional opportunities for the study of animal life in a primeval environment as does Okefenokee Swamp. With the rapid destruction of natural conditions over the entire country, it is of the utmost importance, from the standpoint of science, that at least a few areas here and there should be preserved in their original state. The following notes touch upon just a few of the rarer or more interesting forms among Okefenokee's marvelous wealth of animal life.

There are probably between one and two hundred black bears in the swamp and its immediate environs; the Florida deer is a rather common and well distributed species on the islands and in other parts of the swamp; the Florida otter is a fairly common denizen of this wilderness; several panthers have been recorded about the borders within the past few years; a Florida wolf was killed near the edge of the swamp about 1910; and some animal believed to be a wolf was heard in the swamp several times in 1916. This species is virtually extinct, and there are only one or two specimens in the museums of the country. That curious little animal, the Florida water rat or round-tailed muskrat (Neofiber alleni), has just recently been discovered in the swamp. It is very abundant here in its only known habitat in Georgia.

The ivorybill, our greatest and most magnificent woodpecker, now on the very verge of extinction, has maintained in the Okefenokee one of its last strongholds. The Minne Lake Islands, its principal haunt, were reached by lumbering operations about two years ago, and the few remaining birds may have been driven to some other part of the swamp. The great pileated woodpecker, scarcely less splendid than the ivorybill, is astonishingly abundant, its numbers here perhaps surpassing those of any other part of the country. The American egret, once nearly exterminated for its plumes, has been found breeding in the environs of the swamp. It also has here a safe winter refuge. Late one January afternoon I beheld about 85 of these birds winging their way, singly and in bands, over Floyds Island Prairie toward their roost. The Okefenokee is the only place in Georgia where one may find the sand-hill crane and the limpkin. The former is a resident and quite common species, but only one or two of the curious and fast-disappearing limpkins have been observed in the swamp, which doubtless represents the northern limit of their breeding range. The wood duck is a resident species of which there are probably hundreds of individuals in the swamp. In the entire country there is perhaps no other equally favorable habitat for this rare and beautiful little duck.

As a wintering ground for migratory waterfowl, the Okefenokee is of very considerable importance. Eleven species of interest to game conservationists were found wintering in 1916-17. Mallards, black ducks, and wood ducks then seemed relatively much more numerous in the Okefenokee than in those parts of Florida. Altogether about 85 species of birds have been recorded from the swamp in summer and about 90 in winter. At the latter season it attracts great numbers of berry and fruit eating birds.

At present a considerable amount of hunting is carried on, chiefly by residents in and about the swamp. Deer, bear, and

wildcats are hunted with hounds at virtually all seasons of the year. Not only the ordinary game birds, but also such species as the wood ibis, Ward's heron, sand-hill crane, and occasionally even a cormorant or a water turkey, are killed and eaten. The wood duck although protected by both State and Federal laws, is killed in considerable numbers; some have been sold in recent years at the rate of three for a dollar. Wild turkeys are now much scarcer than formerly, but their numbers might be restored by proper protection. Bobwhites are still common.

Trapping is extensively practiced. Great numbers of raccoons and several dozens of otters are taken every winter. Smaller numbers of wildcats, opossums, and skunks are trapped.

The Mississippi alligator, now rapidly disappearing from the haunts of man, has found the Okefenokee a goodly place in which to survive. This reptile was formerly killed in large numbers, but during recent years the hides have brought so little in the market that the hunting has practically stopped. For the student of herpetology the region holds a vast and fascinating store of riches.

The swamp waters abound in fish life, including pickerel, large-mouthed black bass and other smaller bass, shortnosed gars, club suckers, mudfish (*Amia*), various species of catfish, and numerous killifishes. Among the recent discoveries is a particularly dainty little fish, Lucania ammata, which was previously known only from a few specimens taken in Florida; it enjoys the distinction of being one of the very tiniest of existing vertebrates.

The Plant Life of Okefenokee

The wonderfully rich and diverse plant life of the Okefenokee constitutes one of its greatest charms and beauties. And herein one may perceive a veritable illustration of the "curse of beauty," for it is the magnificent timber of the swamp that furnishes its commercial value and has invited destructive exploitation. There are two major types of forest growth, the pine barrens on the islands, and the cypress "bays" occupying inundated portions of the swamp.

The so-called pine barrens are upon forests of longleaf and slash pines, between whose straight and lofty trunks one may look for a distance of a quarter of a mile in almost any direction. The low undergrowth consists principally of saw palmetto, together with a profusion of huckleberries and blueberries, which form an important element in the food of many birds and mammals. One may find on some of the Okefenokee islands, where the "turpentine" and logger have not yet penetrated, the southern pine forest in its finest glory.

In the "bays" which cover a large portion of the swamp the dominant growth is the pond cypress. Probably nowhere else in the world does it attain a heavier growth or finer proportions. Other trees in this habitat are the black gum, red bay, white bay, sweet bay, and red maple. Every tree is draped with luxuriant festoons of hanging moss. Among the thick undergrowth in the somber,

impressive depths of the "bays" there is a handsome little evergreen shrub, Pieris phillyreifolia, which usually starts at the base of a cypress tree and works its way upward between the inner and outer layers of the bark, sometimes reaching a height of 40 feet and sending out branches with leaves and flowers every few feet. This manner of climbing is quite without a known parallel in the whole vegetable kingdom.

The so-called "prairies" of the Okefenokee are one of the most remarkable features. They are essentially marshes, with more or less open water, but filled for the most part with a luxuriant growth of aquatic plants --- water lilies, maiden cane, pitcher plants, arrow-head, saw grass, fern paintroot, sphagnum, and many others. They are the favored resort of waterfowl and other especially interesting forms of animal life. Here and there on the prairies stand picturesque clumps or "head" of cypress and pine.

There are a number of other distinct types of vegetation in the swamp, including hammocks, "sand scrub," sphagnum bogs, and cypress ponds, each with a charm of its own. To behold the marvelous array of natural scenery in the Okefenokee wilderness is something apart from all ordinary experiences. It is all but impossible to convey in words an adequate idea of its exquisite, primeval beauty, or of the emotions it inspires. Practically every piece of literature on the swamp, from William Bartram's account of this "most blissful spot of the earth" to Will Henry Thompson's fine appreciation, reveals something of the singular fascination that the place holds for those who have been so fortunate as to gain intimate acquaintance with it.

The Swamp as a Field for Biological Investigations

During the last 10 years the swamp has been utilized as a field for biological reconnaissance work by several of the scientific departments of Cornell University, and it has been further investigated by the United States Biological Survey. Reports on the birds, reptiles, and some of the insects have already been published, and reports on the mammals, amphibians, fishes, and plants are in course of preparation. These reports are largely of a preliminary nature, and should form the basis for a vast amount of further and more detailed biological work extending over many years. It is safe to say that there is no area of equal interest, importance, and suitability in the Eastern States for carrying out of such investigations. The Okefenokee would be an ideal location for a field biological station for the universities, museums, and other scientific institutions of the country. And its whole tremendous value for this purpose --- the study of life histories and ecological relations --- depends on the preservation of natural conditions.

The late war has demonstrated for all time the necessity for scientific research. Since the opportunities that the Okefenokee presents for the investigation of the laws of nature are alike unequalled and unlimited, is it not a national duty to preserve it?

In connection with its potentialities as a great outdoor laboratory, as a game preserve, and as a national park, it perhaps

worth while to remark that the swamp is an exceptionally healthful region.

Commercial Operations in Okefenokee

For 10 years past the very existence of the Okefenokee, in any condition worth preservation, has been threatened by rapidly extending commercial operations until matters have now reached an acute stage. One lumber company, with a great mill near Waycross, has already removed the heavy cypress timber in the northwestern quarter of the swamp, between Suwanee Creek and Billys Island. The company's railroad, with many branches, now extends to the very heart of the swamp between Billys and Floyd Islands. Another company has turpentine the magnificent pines on Billys Island and the Pocket. Thus the area already devastated probably comprises more than 100 square miles, and there is a constant menace of industrial encroachment from all sides of the swamp.

Fortunately, the entire area in which the removal of the timber either has been accomplished or is being planned comprises only about one-third of the swamp. This lies mainly in the northwestern part, extending south to Honey Island and east to Minnes Lake, and also through the "bay" northwest of Billys Island to Floyds Island. In most other parts of the swamp the timber is too small or too scattered to be worth cutting by the present methods. It is most unfortunate, however, that so many of the islands have already been devastated and that nearly all the rest are marked for destruction.

As this is being written, word comes that operations are on the point of being extended to Honey Island, for the sake of its pine resin and timber, and there appears to be no available means of saving this wonderful bit of the Okefenokee. In the course of two or three years the same fate awaits Black Jack and Mitchells Islands. The pine forests covering these islands, about 3,000 acres in extent, constitute practically the only merchantable timber in the entire southern portion of the swamp. Furthermore, in the recently expressed opinion of a prominent lumberman, they are among the last remaining areas of "unboxed" long-leaf pines in the whole State of Georgia. At the prevailing price of lumber it will require no small sum to preserve these islands as rather solitary types of the primeval long-leaf pine forest. Floyds Island, in the eastern portion of the swamp, is the most diversified, and in some respects, the most interesting of the islands. The owners have kept it as a sort of game preserve, and it is evidently in to immediate danger of exploitation.

Even if all the merchantable timber were cut, the large portions of the swamp remaining untouched, would still form a valuable wild-life refuge as well as a noteworthy and useful field for scientific investigations. There is, however, another menace, which, unless warded off in time, bids fair eventually to destroy the last vestiges of interest or value which the Okefenokee holds for nature lovers. This, in brief, is drainage. Plans are already being considered for a definite system of drainage operations to be started after the timber has been taken out, for the purpose of

converting the swamp into land suitable for agricultural purposes. On the other hand, the great cost of the undertaking, as well as the uncertain value of the land after being drained, is a factor which lends encouragement to those who make bold to consider the Okefinokee (sic) prairies a greater national asset in their present state than in any other.

The Okefinokee Society

The Okefinokee Society was organized in 1918, its object being "to give authentic publicity regarding the Okefenokee Swamp; to secure its reservation and preservation for public, educational, scientific, and recreational uses." One of the most encouraging features of this movement is the fact that it originated through the local sentiment in Waycross, Ga. The citizens here recognize the scientific and historical interest of the swamp, its scenic wealth, its recreational advantages, and other phases of its many side attractiveness, and may be depended upon to help safeguard its welfare and usefulness when it is made into a reservation. The society has the hearty endorsement of the National Parks Association, the United States Biological Survey, the American Museum of Natural History, the National Association of Audubon Societies, the Ecological Society of America, the American Game Protective Association, the State Geological Survey of Georgia, the Cornell University departments of zoology and entomology, and many scientists and nature lovers throughout the country. The president of the society is Prof. James G. Needham, of Cornell University, and the secretary, Dr. J.F. Wilson, of Waycross, Ga. All lovers of wild life and natural beauty may do their bit for the cause by becoming members of the society and keeping posted on its activities.

One of the first aims of the society is to secure certain representative portions of the swamp as the nucleus of a reservation, to which additions may be made as rapidly as opportunity or funds permit. The prospects of State or Federal aid, especially in the immediate future, are quite uncertain. Therefore, at the present critical stage in the history of the swamp, the one certain way of preserving at least part of the Okefenokee in a natural state is by the use of sufficient private funds. The Okefenokee Society is accordingly prepared to undertake the raising of such funds. The society plans, after securing the area for a reservation, to present it to the United States Government, in order that it may be administered and perpetuated as a national wild-life refuge. In conclusion, the complete commercial exploitation of Okefenokee Swamp would be an incalculable loss to science and to the Nation, just as its preservation in its present state would be a lasting benefit to the whole country.

Two of the three great swamps of the Atlantic seaboard, the Dismal Swamp and the Everglades, have already been changed by man beyond the hope or possibility of preservation in a natural state. Let us act now, before it becomes forever too late, in behalf of the Okefenokee.

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Most of the lands in the Okefenokee Swamp were purchased by Charles Hebard of Philadelphia in 1901 and 1902. He died soon thereafter. His sons incorporated the Hebard Lumber Company in 1904 and leased the lands in the Okefenokee to a subsidiary, the Hebard Cypress Company. One of the sons, Daniel Hebard, was in charge of the Okefenokee property. He was also an avid duck hunter. He built duck blinds in the prairies adjacent to Floyds Island as early as 1920 or 1921 and built a hunting cabin on the island in 1925. Corn was hauled regularly from Camp Cornelia to Floyds Island to feed (really bait) the ducks.

The profitable stands of cypress were nearing exhaustion in 1925 and the company began gleaning operations that lasted until 1927. Meanwhile, Mr. Hebard developed an interest in increasing the waterfowl population. Charles C. Sperry visited the Okefenokee to advise him on the local plants that were eaten by waterfowl and on plants that might be grown in the prairies as duck food.

REPORT ON DUCK FOOD CONDITION IN OKEFENOKEE SWAMP, GA.

By Charles C. Sperry

Pursuant to letter of authorization No. 83 Bi and travel instructions thereunder, I left Washington, D.C., on July 26, (1926) to make a survey of wild-duck food conditions in Okefenokee Swamp, southeastern Georgia. Upon arriving in Waycross I got in touch with Mr. A.J. Armstrong, general manager of the Hebard Cypress Co., who had charge of logging operations in the Okefenokee. Mr. Armstrong informed me that his company was winding up activities in the swamp and that most of the steel had already been pulled while the main line to Billys Island was blocked with a skidder set. Entrance to the swamp from Hebardville via Billys Island thus being closed, two attempts were made to enter through the canal from the east side via Camp Cornelia 17 miles southwest of Folkston. Two auto trips to Folkston were useless, however, a torrential rains had washed out bridges and made the road from Folkston to Camp Cornelia impassable. No other entrance to the swamp being practicable the main line was finally cleared and our party proceeded to Billys Island by motor car, arriving at noon on Monday, August 2. Mr. Armstrong and his assistants immediately returned to Hebardville leaving my guide and myself with boats and supplies established on Billys Island. The next 12 days were divided between Billys Island and Floyds Island (five days on the later) from which side trips were made to Billys Lake, Minne's Lake, Big Water, Floyd's Island Prairie, Chase Prairie, and the northern end of the canal.

Plants recommended for addition to the Okefenokee are mentioned in Department of Agriculture Bulletins 205 and 465, copies of which accompany this report. Methods of propagating the plants are described in detail in these bulletins. A list of dealers in the various plants also is attached.

General Features

The Okefenokee is a fresh-water swamp embracing nearly 700 square miles of southeastern Georgia; natural drainage within the swamp is chiefly from northwest to south and southwest, a number of creeks entering from the north and west while the Suwannee River and a branch of the St. Marys emerge from the south; the central portion of the east side drains eastward through the canal into the main body of the St. Marys River.⁴ This entire area is roughly classified by the natives under four heads, namely, islands, lakes, prairies, and swamp. The swamp proper is inundated by 3 to 4 feet of dark amber-colored yet sweet tasting water, yet support a dense vegetative growth of entirely different character from that found in the rest of the swamp.

Islands

Upon entering and leaving the Okefenokee I crossed several of the smaller islands, but no extensive walking was done except on Billys and Floyds. Billys Island is some four times as large as Floyds, but both have been worked by loggers, with the result that only the stumps of the big pine are left and the vegetation over most of either island now consists of the former undergrowth, that is, huckleberries (Gaylussacia), blueberries (Vaccinium), gallberry (Ilex glabra), and saw palmetto (Serenoa serrulata). Billys Island presented the more desolate aspect because the lumbered area was so much greater (than on Floyds) and because its northern end was strewn with the wreckage of a deserted lumber camp, which at one time was a flourishing village. The lumbered pine, both long leaf (Pinus palustris) and slash (P. caribaea), was represented by a few narrow strips of saplings and an occasional big tree, the latter probably having been used as a skidder mast.

Other species of trees found on the islands were live oak (Quercus geminata), water oak (Q. nigra), sweet gum (Liquidambar), and magnolia (Magnolia foetida), the last-named plant being common on the south end of Floyds Island. Spanish moss (Tillandsia usneoides), often with long streamers reaching almost to the ground (or water), was present in all kinds of trees and abundant not only on the islands, but throughout the swamp as well. Miscellaneous plants more or less common on the islands included greenbrier (Smilax auriculata), dwarf sumac (Rhus copallina), large indigo (Sesban macrocarpa), spider-flower (Cleome spinosa), pokeberry, goldenrod, ragweed, cacti, ferns, grasses, sedges, etc.

The Lakes

Under this heading may be included not only the so-called

⁴ Part of this statement is erroneous. Water did not drain through the canal to the St. Mary's River.

lakes such as Billys, Minnes, and Big Water, but the canal as well, for the largest open water in the swamp (Billys Lake) is not over 100 yards wide and the nonnative observer classes all of them as flowing streams rather than lakes. Some of these watercourses are open, while others are covered with "bonnets," chiefly yellow pond lily (Nymphaea advena) with an occasional patch of white water lilies (Castalia odorata). In either case the sides of the streams are almost invariably bordered with maiden cane (Panicum hemitomum), while beneath the surface stands a dense growth of submerged spike rush (Eleocharis elongata) interspersed with purple bladderwort (Utricularia purpurea). The confines of these lakes or streams, as well as the narrow runs connecting them, are marked by the most impenetrable growth of swamp underbrush. Other plants frequently seen along the watercourses included wampee (Peltandra virginica), pickerel weed (Pontedria cordata), bull tongue or "never-wet" (Orontium acnaticum), buttonbush (Cethalanthus occidentalis), water pepper (Persicaria opelousana), flags (Oris), yellow-eyed grass (Xyris), arrowheads (Sagittaria gramineae and S. latifolia), sedges (Rynchospora axillaris and R. corniculata), and grasses (Andropogon glomeratus and Sacciolepis striata).

The Prairies

The "prairies" of the Okefenokee are vast areas of shallow water (1 to 3 feet deep) in which stand numerous but scattered "tree islands" locally termed "heads" or "houses." The trees and shrubs composing these prairie houses differ little or any from those making up the body of the swamp, but the vegetation of the open "prairie" is highly characteristic. Here the white water lily was the dominant species, although there were occasional large beds of bladderwort, bull tongue, maiden cane, and swamp fern (Anchistea virginica). Other species more or less common on the prairie included floating heart (Limnanthemum acuaticum), spike rushes (Eleocharis elongata and E. prolifera), red root (Gyrotheca tinctoria), wampee and pickerel weed, water pennywort (Hydrocotyle numbellata), yellow pond lily, pipe wort (Eriocaulon ravenelii), water milfoil (Myriophyllum) and the flag were comparatively rare. Bordering some of the houses and in parts of the shallow runs there were thick beds of sphagnum in which club moss (Lycopodium), sun-dew (Drosera capillaris), and a sedge (Dulichium arundinaceum) were common. Other plants most frequent about the prairie heads were red-root, yellow-eyed grass, arrowheads, pitcher plants (Sarracenia minor), sedges (Rynchospora exillaris, and R. corniculata), saw grass (Zizaniopsis miliaceae), and another grass (Sacciolepis striata).

The Swamp

The dominant tree of the swamp is the pond cypress (Taxodium imbricarium), although in some places most of the larger trees have been cut for lumber. River cypress (Taxodium distichum) was present along the lakes and runs but nowhere abundant. Black gum

(Nyssa syhatica) was abundant throughout the swamp and other gums (Nyssa ogeeche and N. biflora), were common along the water courses. Sweet bay (Magnolia virginiana), called "red bay" by my guide, was frequent, while trees less common included red maple (Acer rubrum), spruce pine (Pinus taeda), live oak, and water oak, the latter chiefly bordering the islands.

The underbrush of the swamp, composed of saplings of the various trees together with shrubs and vines, was extremely thick and often impenetrable. The dominant shrub was leather-wood (Cyrilla racemifora); my guide called it "honeysuckle," which was found everywhere in the swamp and was especially abundant bordering the open water courses. Other shrubs of local abundance in the swamp were gallberry, buttonbush, swamps loosestrife (Decedon verticillatus) and a leucothoe (Leucothoe racemosa), while the vines included muscadine grape (Muscadinia munsoniana), bamboo vine (Smilax laurifolia), greenbrier and poison ivy (Rhus radicans). Isolated stands of a bullrush (Scirpus pedicellatus) were occasionally seen and one small patch of gama grass (Tripsacum dactyloides) was found.

Duck Food Plants

There is no one species of plant in the Okefenokee Swamp that can be considered an excellent and reliable source of food for wild ducks. However, a number of the native plants produce seed that are sometimes eaten in quantity by feeding ducks and it is on them no doubt that the wintering ducks depend for sustenance. Among these plants the more important are white water lily, wampee, pickerel weed, and the sedges (Carex, Dulichium, Eleocharis, Rynchospora and Scirpus). Most of the yellow pond lilies grow in the deeper water of the lakes hence their seed are not available to shoal-water ducks while the arrowheads, after (sic) good duck food plants, are nowhere abundant enough to be of value. Bladderwort rarely produces seed but its succulent leaves and stems as well as those of water milfoil and water pennywort occasionally enter into the menu of wild ducks: other local although minor sources of vegetable food for wild fowl are acorns, grapes, bamboo vine berries, fruits of large flags, gums and gallberries, and the seeds of water pepper, sumac, maple, and pitcher plant.

Recommendations

The prairies are the duck-feeding grounds in the Okefenokee swamp and it is in them that improvement should be attempted. Wild celery (Vallisneria spiralis), saga pondweed (Potamogeton pectinatus), leafy pondweed (Potamogeton foliosus), redhead grass (Potamogeton perfoliatus), and bushy pondweed (Najas flexilis), all submerged plants, are reliable sources of food for wild ducks and probably could be made to grow in the Okefenokee prairies. Wild celery requires a perceptible current, so would most likely succeed along the edges of the prairie runs; when once established

it will be naturally spread to other favorable localities. The different species of Potamogeton mentioned and the Najas likewise will start best in the immediate vicinity of the runs, but probably can be successfully grown in any part of the more open prairies. Water shield (Brasenia schreberi) is extremely abundant in many Georgia lakes, where conditions are similar to those found in parts of the Okefenokee. It no doubt will grow either in the lakes or in the prairies and should be planted in both places. Other duckfood plants that are worth a fair trial in the Okefenokee swamp are wild rice (Zizania palustris) if southern seed can be obtained, water elm (Pianeca aquatica), and floating duckweeds (Lemna minor, Spirofolia, and Wolffiella). Wild rice may be a complete failure in this region and yet conditions are favorable enough to warrant a thorough test. Experimental plantings should be made about the prairie houses, along the edges of runs, and in the shallower portions of the open prairie. Water elm can be transplanted along the prairie of the swamp and about the cypress heads. The floating duckweeds may be scattered within the smaller cypress heads, along the prairie edges of the swamp, and within the dense patches of prairie fern and maiden cane or other protective cover.

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In February 1929, Senator Walter J. Harris introduced Bill S-5714 "To Establish the Okefenokee Wildlife and Fish Refuge." Congressman Lankford also introduced a bill in the House at the same time to purchase the Okefenokee as a national park. By May 1929 Senator Harris was promoting the purchase of the Hebard property as a forest reserve. In July, B.H. Stone of Union County introduced a bill in the Georgia Legislature to enable the Federal government to purchase the property as a wildlife refuge or a forest reserve. The legislature passed the bill. Congressional action was delayed because the Georgia delegation "could not agree on what they wanted." Meanwhile a number of prominent businessmen and professors organized the Georgia Society of Naturalists and began to promote the purchase of the property as a wildlife refuge. The U.S. Biological Survey examined the property in May 1930.

OKEFENOKEE SWAMP, GEORGIA

Surveyed by Neil Hotchkiss and L.E. Ekvall, May 28-30, 1930

Location:

The swamp lies mostly in southern Ware and Western Charlton Counties in southeastern Georgia, along the Florida line. A small portion lies in Clinch and Brantley Counties. The village of Folkston and the city of Waycross are a few miles east and north from the swamp, respectively. Latitude 30 33' - 31 07'N. Longitude 82 08' - 82 33'W.

Area:

Okefenokee Swamp has an east-west extent of approximately twenty-five miles, and a north-south extent, in Georgia, of about forty miles. It is roughly elliptical in shape, and extends a short distance into Florida. The swamp comprises approximately 700 square miles, or 450,000 acres. (See map taken from Francis Harper's paper on the swamp; and the Folkston and Moniac quadrangles of the U.S. Geological Survey topographic atlas, and U.S. Bureau of Soils map of Waycross Area.)

Shores (and adjacent land):

The swamp lies at an altitude of 110 - 130 feet above sea level, being higher than much of the nearby country. It is bounded on the east side by a low, broad sand ridge, and elsewhere, likewise (?), by nearly flat, more or less forested country. Within the swamp are several well-drained, low, sandy islands, four or five of which are as much as five miles long. Elsewhere the body of the swamp is covered by forest or by marsh ("prairie"), or rarely, open water.

Bottom:

Except for the islands the entire swamp is inundated most of the time. The forested area ("swamp") has the least water; the "prairies" are covered by one to three or four feet; and in the lakes or streams the water is still deeper. Everywhere the water is dark-colored from organic matter in solution or suspension. Among the prairies visited, it is somewhat clearer on Grand Prairie. The bottom is usually soft and mucky. On Grand Prairie it is somewhat firmer than on Chase Prairie.

Inlet and Outlets:

The swamp forms an enormous catch basin for rain. On the west side several short streams flow into the swamp, thence out through the Suwanee River. The St. Mary's River drains the southeast side. In general, the drainage is sluggish.

Vegetation (Marsh):

For a general description of the swamp and its vegetation, see the report of C.C. Sperry, based on his visit August 2-13, 1926.

The following areas were visited, and their marsh vegetation will be described in order: Okefenokee Canal, west and northwest from Camp Cornelia; west side of Chase Prairie, Jackson Bay, Floyd Island Prairie, Big Water and Big Water Run (south of Big Water), Chesser Prairie (west of Chesser Island), Grand Prairie, and Buzzard Roost Lake.

Okefenokee Canal:

Toward the east side of the swamp maiden cane (Panicum hemitomum) is the most conspicuous plant along the canal, growing out from the banks in dense stands. Further into the swamp, the banks are more often covered by shrubs and there is, in places

only, a growth of Peltandra, Orontium, and a little Pontederia. "Prairie" borders the canal much of the way. In it are many small "houses" of cypress, pine, etc.

Chase Prairie:

The dominant marsh vegetation on Chase Prairie is Orontium, interspersed with numerous aquatics, particularly, white water lily. Other marsh species are Panicum hemitomum (some), Pontederia (little), Eriocaulon sp. (little), Sarracenia sp. (little), Eleocharis sp. (some), Peltandra (some).

Jackson Bay:

Peltandra and Orontium are abundant in the more open places.

Floyd Island Prairie:

Southeast side has, in places, considerable Woodwardia, some Panicum hemitomum, Carex --- (some), Peltandra (some), small Sagittaria sp. (some), Orontium (some), Hydrocotyle sp. (some), Pontederia (little). A boggy section has some Xyris, Eriocaulon, Calopogon, Sarracenia, Hypericum virginicum, Dulichium, and Rhynchospora corniculata (?).

Further northwest is an area with much Decondon and Panicum hemitomum, some Carex ---, and a little Scirpus etuberculatus.

In more open places there is considerable Eleocharis, Orontium, and Xyris. Panicum hemitomum is abundant nearly everywhere, and cypress "heads" are dense and numerous throughout the prairie.

Still further northwestward, there is much Eleocharis in numerous pond-like openings in the Panicum hemitomum marshes. Some Pontederia grows in the latter. Carex --- occurs frequently in this part of the marsh.

Big Water:

A slight fringe of Orontium, and Panicum hemitomum in a few places, grows along the edge of the bordering swamp forest.

Chesser Prairie:

Chesser Prairie has a marshy vegetation similar to that of Chase Prairie. Orontium is abundant and there is considerable Carex --- northward, and more of a large species of Eriocaulon than on Chase Prairie. Cypress and pine "houses" bordered by shrubs and Woodwardia are more numerous. Southward, a little Pontederia occurs.

Grand Prairie:

The vegetation bears a general similarity to that of the other prairies, but has in many places dense patches of vegetation, containing a large species of Sagittaria, and Peltandra. A little Scirpus stuberculatus grows scattered about, and there is much Orontium. This prairie is more open than the others and has more scattered and smaller "houses". Southward, there is some Xyris, and toward Monkey Lake, there is a scattering of Scirpus and some Fuirena in a vegetation that is generally

denser than it is northward. South of Monkey Lake there is an abundance of Pontederia.

Buzzard Roost Lake:

The whole surrounding vegetation is very dense. There is much Peltandra over a large area (more than observed elsewhere). Pontederia is common, especially back a short distance from the pond. Decodon, Polygonum hydropiperoides, Hydrocotyle sp., and a little Cephalantus grow along the shore, and at the north end is a little Limnobium.

Vegetation (Aquatic):

The white water lily (Castalia odorata) is the most abundant and conspicuous aquatic plant on most of the prairies visited. Places where an abundant growth was observed are as follows: small ponds close to the Okefenokee Canal, west side of Chase Prairie, central part of Floyd Island Prairie (less of this and more of Nymphaea on the northwest and southeast sides of the prairie), Chesser Prairie, Grand Prairie. A slighter amount was observed along Big Water.

Other aquatic plants observed are as follows:

Nymphaea advena (?) - Abundant at the Floyd Island landing in Jackson Bay. Abundant on the southeast and northwest sides of Floyd Island Prairie and along Big Water Run and Big Water.

Utricularia (mostly U. purpurea?) - Very dense growth on the west side of Chase Prairie. Some in central and northwest parts of Floyd Island Prairie. Abundant on Chesser and a little on Grand Prairie.

Utricularia (yellow-flowered species) - Considerable on the southeast side of Floyd Island Prairie.

Elocharis (a submerged, proliferous species) - Some on west side of Chase Prairie and a small amount in several other localities.

Nymphoides aquaticum - Some on the west side of Chase Prairie and in the central part of Floyd Island Prairie. Considerable all over Chesser Prairie, and on the southern part of Grand Prairie.

Brasenia schreberi - Some in Jackson Bay and much among open Peltandra marsh on the west side of Buzzard Roost Lake. It is said to be abundant across the marsh eastward from the lake and to occur in several other places in the swamp.

Lemna sp. - Abundant along the margins of Buzzard Roost Lake.

Myriophyllum sp. - Some between Chesser and Grand Prairie, and considerable in Grand Prairie.

Sphagnum - Much on the southeast side of Floyd Island Prairie, some on the northwest side. Elsewhere, especially abundant close to the "houses", as in Chesser Prairie.

Algae - In Floyd Island Prairie and elsewhere.

Summary:

Okefenokee Swamp in southeastern Georgia comprises 450,000 or more acres, a large part of which is covered by swamp forest and much of the remainder by marsh ("prairies"), inundated by one to four feet of water. The swamp lies at a higher altitude than much

of the adjacent country, which is nearly level, and it drains rather sluggishly into the St. Mary's and Suwanee Rivers, to the southeast and southwest, respectively. Except for several sandy islands, the swamp is almost wholly inundated the water being deepest in lakes and streams and shallowest in the swamp forest. It is dark colored and the bottom is mostly rather soft and mucky. The most conspicuous marsh plants, growing principally over the prairies, are Orontium, which covers hundreds of acres, Peltandra, Pontederia, Panicum hemitomum, Eleocharis sp., Carex ---, Eriocaulon sp., Xyris sp., and Woodwardia virginica. Among aquatic plants, the white water lily, Castalia odorata, is the most abundant nearly everywhere in the prairies. Nymphaea is abundant locally. Other common aquatics are Utricularia spp., Eleocharis sp., Nymphoides aquaticum, Brasenia (locally), Myriophyllum (locally), and Sphagnum.

General Remarks:

Wood ducks and mallards are said to feed on the fruits of Orontium. The tender, succulent leaves and roots of a large species of Eriocaulon are reported to be a favorite duck food in the region, as are the bladders of Utricularia. Floyd Island Prairie was at one time one of the best ducking places in the swamp. It is now too much grown up to be much frequented by them. Wood ducks are said to feed on "pink root" (Gyrotheca -- or Lachnanthes?). Grand Prairie is said to be the best place in the swamp for mallards and other ducks at the present time. A seed said to be eaten by ducks is thought to be that of the Scirpus, which is said to have a dense growth in places.

We observed the following birds (See Wright & Harper, Auk 30: 477-505. 1913):

Anhinga - Chase Prairie, Floyd Island Prairie (several nests, one with young and eggs; from six to eight adult birds), Buzzard Roost Lake (2).

Duck (all wood ducks?) - Chase Prairie, Buzzard Roost Lake (2), Floyd Island Prairie (20-30, one with three young), Chesser Prairie.

Great blue heron - Okefenokee Canal, Chase Prairie (2), Floyd Island Prairie.

Little blue heron - Floyd Island Prairie (several, mostly immature birds, white with dark markings on wings), Buzzard Roost Lake (several).

Little green heron - Okefenokee Canal (2), Chesser Prairie (several).

American egret - (?) Grand Prairie (3).

Least bittern - Floyd Island Prairie, Buzzard Roost Lake.

Sandhill crane - Chase Prairie (2), Floyd Island Prairie.

Turkey vulture - Floyd Island (several).

Barred owl - Heard on Chesser Prairie.

Kingbird - Floyd Island Prairie.

Red-winged blackbird - Chase Prairie (several), Floyd Island Prairie (fairly numerous), Buzzard Roost Lake.

Cardinal - Floyd Island Prairie (several heard here and elsewhere).

Prothonotary warbler - Big Water, Chesser Prairie.

We heard numerous frogs and several alligators. Birds were few compared with many places visited by us in the South.

Okefenokee Swamp may be reached by railroad or automobile road to Folkston, thence by wagon road to Camp Cornelia on the east edge of the swamp, and by boat through the Okefenokee Canal.

Okefenokee would make an excellent refuge for game and other wild life and would be well worth preserving for its vegetation, but there is no pronounced concentration of water-fowl there, nor is the plant food exceptionally good. Deer and bear frequent the swamp, and several birds which are rare in the general region or rare anywhere occur; sandhill crane, limpkin, ivory-billed woodpecker. It could well be made a National Forest or Park, but is not here recommended as a bird refuge area.

Report by Neil Hotchkiss

June 22, 1930

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Following five years of intense lobbying by the Georgia Society of Naturalists and many other wildlife organizations a critical mass of support resulted in action by Congress and the Biological Survey. The Georgia Coastal Flatwoods Upland Game Project was created in the northern section of the Okefenokee in 1935. This legislation included plans to establish a wildlife refuge.

In addition, efforts to purchase the Hebard Lumber Company property would bare fruit in 1936. The property was examined again in 1935 by James Silver, the regional director of the U.S. Biological Survey.

OKEFENOKEE SWAMP

James Silver - 3-15-1935

I spent 3 days from February 13 to 15 in Okefenokee Swamp, together with Messrs. John M. Hopkins, 1921 State St., Waycross, Ga., who has long been chief engineer and now agent of the Hibbard (sic) Lumber Company, H. A. Carter, of the Georgia Game Commission, Carlyle Carr, F. M. Connable, and four local guides. Entrance to the swamp was made from Folkston, Ga. We proceeded 12 miles west by auto, 12 more by outboard motor boat and 4 by push boat to Floyd's Island. Chase Prairie was covered in some detail and a small part of Floyd's Prairie, including a visit to a stand of virgin cypress. Excellent accommodations are to be had by arrangement of Floyd's Island. This swamp has been visited and written up several times by personnel of the bureau. The following is submitted as supplementary data:

Mr. Hopkins informs me that 35,000 feet of cypress, worth about \$5 per 1,000 feet can be sold at present and that Maxwell Brothers, of Chicago, have been dickering for the purchase of a

large stand of gum on the west side. He estimates a total of 103,000,000 feet of marketable saw log and pulp wood, worth, conservatively, \$250,000. It has been indicated that the Hibbard Lumber Company has asked \$2 per acre for their 300,000 acre holding, or about \$600,000. What possible value there is to the swamp to them, other than the timber, is not apparent to me and I therefore feel that this company should sell for \$250,000, particularly as it is my opinion that they would experience great difficulty in obtaining buyers for that much of the timber. They could not see their way clear to taking out this timber at a time when their tracks penetrated the middle of the swamp, and the overhead cost would now be much greater. The taxes paid on the 300,000 acres amounts to roughly \$4,000 annually. In my opinion, the Okefenokee Swamp should be acquired by the Federal Government, either as a wildlife refuge or a National park, to be preserved for all time as the outstanding swamp area of the United States, with all the unique bird and mammal life that goes with such an area. In either case the public should be allowed access to at least certain areas, accompanied by responsible guides. This would not interfere with the wild life. The National Park Service now has acquisition under advisement and the State of Georgia is now running a survey through the swamp to determine the practicability of running a highway through it. Such a road would ruin its charm, which in part results from its isolation and difficulty of access, and it would cost the federal government many times the cost of preserving it as a wild life refuge under natural conditions. The key to its value, as a water fowl refuge, in my estimation, lies in the construction of a dam across the Suwannee River to enable the control of the water level. At present the water is very low and many thousands of acres normally under water are now dry. At least 50 percent of the 300,000 acres of Hibbard (sic) holdings are open prairie practically all of which at high water are under water, and by raising the water 2 feet on open water area of over 150,000 acres would result.

The potential value of the swamp as a duck refuge is indicated more by what it has been in the past than by what it has shown in recent years, providing it is possible to restore it to something like its original state. Old timers tell me that before the swamp was invaded by the lumber interests about 1907, and when the water was from 2 to 4 feet deeper than now, that great numbers of ducks wintered in the swamp. Since the lumbering started an average of 325 men have been working in the swamp, and they, together with the resident population, who have largely lived on the wild life of the swamp, have decimated the numbers. It is said that \$30,000 worth of alligator hides were sold out of the swamp in a single year. Mr. Hopkins has accompanied several engineers on surveys of the swamp waters and he tells me that practically all water leaves the swamp via the Suwannee River, the volume being enough to completely drain the swamp in 2 weeks time where it is not fed by numerous springs. He also tells me that a dam across the river at a point 15 miles up stream, from Fargo on Sec. 36, is entirely feasible and would enable control of the

water level. Investigation of this possibility should be conducted prior to giving serious consideration to the acquisition of the area as a waterfowl refuge. As an area for preservation of indigenous wild life, particularly as a refuge for the fast disappearing alligator, the area could well be left as is.

From an administrative angle, it would require 5 wardens, each with the assistance of local guides (self supporting) to successfully protect the area (one at each of the chief points of entrance). The cost would be at least \$15,000 a year for personnel; supplies, equipment and labor additional.

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In 1936, the Hebard property was examined again. William D. Marshall reported his findings to the Migratory Waterfowl Division, USBS. He included recommendations for a three-year management program is the property was purchased.

PRELIMINARY REPORT ON OKEFENOKEE SWAMP

Report Prepared for the Migratory Waterfowl Division
U.S. Biological Survey
March 7, 1936
(See ONWR Biologist Files: Birds)

By William D. Marshall

The Okefenokee Swamp lies in southeastern Georgia. It is bordered on the south by the St. Mary's and Suwanee rivers and extends north to within ten miles of Waycross, Georgia. The area is roughly 418,000 acres, of which 300,000 acres are owned by the Hebard lumber interests.

During February, 1936, a preliminary reconnaissance of the area was made. The observations made, information gathered, and recommendations for management are embodied in this report.

Procedure was simple. At the outset five days were spent in the east central part of the swamp. Then two weeks were spent circling the swamp and entering it wherever possible. Lastly and airplane flight over the swamp was made. Map #1 shows the routes taken. Second-hand information was obtained from every available source during these days.

No detailed description of the flora and fauna of the swamp is attempted in this report. Reference is made to "The Habitats and Composition of the Vegetation of the Okefenokee Swamp in Georgia," by A.H. and A.A. Wright (1932); an excellent and usable discussion of the flora in the swamp. Harper (1927) and Wright and Harper (1913) are of value in giving information on the fauna of the area.

Since this report is made for the Migratory Waterfowl Division, first consideration was given to the waterfowl habitats. These are the so-called "prairies", which made up roughly 20% of the swamp area. A short analysis of there typical prairies follows, others are described comparatively.

Chase Prairie

Known as a "low" prairie, i.e., that it is nearly always wet. At the time of inspection water depths were from three to six feet and the water was a light brown color. Aquatic vegetation noted (in approximate order of abundance) was: Rynchospora corniculata, Utricularia purpurea, Nymphoides spp., Orontium aquaticum, Castalia odorata, Eriocaulon compressum, Xyris smalliana, Hydrocotyle umbellata, Peltandra virginica. Emergent vegetation such as Andropogon glomeratus, Woodwardia virginica, Erianthus saccharoides, and Sarracenia pattacina was confined to narrow belts around the "heads" or occasional "floating batteries". The "heads" vary in size and character from west to east. Those on the west side are small and are bushy (Ilex cassine, Cephalanthus occidentalis, Smilax laurifolia, and Panicum caribaea). Those toward the east are larger and most have mature Taxodium ascendans dominating them.

The drainage of this prairie is slow and evidently is toward the west around the ends of Floyds Island.

Floyds Island Prairie

Known as a "high" prairie because it drains directly and readily into Minnies Run and the Suwanee River. At the time of inspection water depths were from one-half to one foot and the water was a light brown color. Conditions are considerably changed since Wright's (1932)(pp. 125) description.

At present 80% of the open prairie, chiefly that nearest Floyds Island, is covered by A. glomeratus, Panicum hematommum, or W. virginica. Those plants are rapidly taking the prairie over evidently due to recent drought years. Harry Chesser, guide, pointed out several old blind locations which formerly were in open water but which are a half mile from any open water now.

The remaining portion, largely to the west and north, supports U. purpurea, S. Smalliana, N. aquaticum, H. umbellata, P. virginica, and a few other aquatics. There are large areas of Lachnanthus tinctoris, Gerardia spp.(?), Bideus coronata, and similar emergent vegetation. Ducks were observed feeding in and the around these plants.

The "heads" on this prairie are large and have mature T. ascendans dominating them.

Grand Prairie

This is the largest of the prairies and can best be described as intermediary between the two previous ones.

At the time of inspection water depths were from one-half to three feet and water was light brown in color.

These are large open water areas which support aquatics similar to those of Chase Prairie but with E. compressum relatively more abundant. Interspersed with these areas are

smaller ones supporting P. hematomm in pure stands. Along the east, south and west borders are wide (3-400 yard) zones of A. glomeratus. Heads are few and far between and are largely bushy in character.

A few Cyperus spp. and Diedia virginica, a new plant to the swamp, are present in the open-water areas.

For convenience other prairies are listed as comparable to the above:

1. Chase Prairie

Territory, Chesser Island, Honey Island, True Lake, Coward Lake, Carters, Stump.

(Honey Island Prairie has clear water.)

2. Floyds Island Prairie

Cox, Sapling, Maul Hammock, Hog Island, Buck Lake, Davis.

3. Grand Prairie

Gannet Lake.

While on an airplane flight a sketch map of the prairies was made. This is given as map #2. This map may be superimposed on map #1 and a more correct picture of the prairies obtained.

One plant, Sphagnum, has not been mentioned above. This plant is present over the entire swamp as a thick mat varying from 0 feet at the edge to some 12-14 feet in the prairies. It is underlain by a layer of sand about a foot in depth. Under this is a heavy blue clay strata which evidently holds up the water.

Very little time was spent in the other types. They are fully discussed by Wright (1932).

The lakes listed on the map are of negligible importance to waterfowl because of their small size. They varied in depth from 4 to 12 feet at the time of inspection and supported Nyphoides spp. (?) and Castalia spp. (?) chiefly.

Attention was given to other factors of importance in management such as:

Climate

Table 1 of Wright (1932) gives a climatological summary. In brief, mean annual rainfall in the area is 49.72 inches. The peak is reached during the early summer months (about 6"/mo.) with a dry period usually occurring in October and November (about 2"/mo.). Mean annual temperature is 68.2 F., the lowest recorded being 4 in February while the highest was 106 in June. Mean relative humidity at Jacksonville for 7:00 a.m. is 83. The non-frost season averages about 250 days.

Water Levels

No exact data on water levels are available for the swamp. They evidently fluctuate from highs, such as in February 1936, when the entire swamp was under water, to periods when only the lakes have water in them and one can walk across the prairies. This low is unusual and disastrous if fire gets in the swamp.

Water Inlets

Water enters the swamp from numerous "branches" on the north, east, and west sides and from the Suwanee Canal. One spring was observed on Maul Hammock Prairie. This was a place where water was flowing to the surface to make a round place, as evidenced by a rise in the surface and water movement. The aggregate rainfall over such an area must be considerable.

Water Outlets

There are two outlets. Of these the Suwanee River is the most important. On February 23, 1936, the river was about one-half mile wide at Mixon's Ferry. The majority of this width was about 3 feet in depth and the current was barely perceptible. The main channel, about 100 feet wide, was approximately 14 feet deep and an appreciable current (5 m.p.h. estimate) was noted. The north prong of the St. Mary's River enters the swamp near Moniac. It appears to be of small importance.

Travel

Travel in the swamp is by foot or by "poling" small boats. The former is used in the islands and the scrub and timbered areas. It is not very speedy or pleasant. The boats may be poled over all the prairies in high water but are confined largely to boat runs during the low water of late summer. Progress is at about a fast walking rate under good conditions. Guides are essential to newcomers. Boat landings are shown on map # 3.

There are roads entirely around the swamp. Graded roads are rare into the edge of the swamp; however, many places can be reached along "ruts". The Federal Highways are the only paved roads in the district.

Travel

All of the towns around the swamp are connected by telephone lines. There are none extending to the edge of the swamp itself.

Inhabitants

Waycross, Lake City, and Jacksonville are the nearest sizeable cities. Other towns listed, such as Fargo, Moniac, and Folkston, have from 40 to 500 inhabitants, mostly dependent on nearby farms, turpentine, logging, and the railroads.

The borders of the swamp have scattered houses, of rather primitive type. These are used by people who hunt or trap in the swamp, grow some corn, turpentine, work in the logging outfits, and run hogs. Most of them are from old families in the area. They are very fine woodsmen and many of them are the only people who know the swamp.

The animal life on the swamp is extremely varied. To date, most published lists have been of summer residents. Mr. Fred

One of the main objectives of entering the swamp itself was to ascertain what species of ducks were present, how many, where, and their activities.

All observations on Chase Prairie between 9:00 a.m. and 4:00 p.m. -- Four observers.

<u>Date</u>	<u>Mallard</u>	<u>BlackRingneck</u>	<u>Wood</u>	<u>Teal</u>	
1/23	157	542	211	264	--
1/24	227	1021	295	271	6
1/25	134	330	290	191	4
	513	1893	796	726	10

The following table of observations during the trip is submitted:

Prairie	Date	Hours	Number of Ducks								
			HM	BL	WO	RN	MA	WI	GWT	PU	TOTAL
Chase2/15	12:30-2	1	53	4	28	3	x	x		85	
Chase	2/15	4-6:30	x	7	20	1	x	x	x	28	
Chase2/17	1-2:30	x	17	6	2	1	x	x		25	
----- Floyds	2/16	7-10	x	22	11	6	x	x	x	39	
Island		3-6	x	56	20	x	x	x	x	76	
----- Territory	2/17	10-12	x	10	5	134	9	11	x	158	
----- Buck Lake	2/17	3:30-4	x	5	11	3	x	x	x	19	
----- Hog Island	2/17	4-5	x	x	5	x	67	x	x	72	
----- Chesser	2/17	6-8p	x	9	17	21	2	x	x	49	
Island	2/18	9-10:30	8	22	8	111	x	x	x	149	
		2-3	8	77	20	42	45	x	1	192	
----- Grand	2/18	11-2	x	100	2	x	30	38	x	4	174
----- Honey Is.	2/23	10-3	2	x	2	x	x	x	x	4	

Maul Hammock	2/25	9-3	2	2	x	x	x	x	x	x	4

TOTAL		33.5	20	330	131	340	157	49	1	4	

(HM=Hooded Merganser; BL=Black; WO=Wood; RN=Ring Neck; MA=Mallard;
WI=Widgeon; GWT=Green Wing Teal; PI=Pintail)

Estimates of the numbers of ducks in the area are difficult. The following points are noted:

(1) E.V. Komerack (sic), Thomasville, Ga., reports he estimates 3,000 ducks on Chase Prairie in early January, 1936.

(2) Four observers recorded a total of 3,943 ducks on the same area on January 23, 24, and 25, 1936.

(3) Marshall saw 113 on a very small part of the area on February 15 and 16.

(4) Marshall saw 227 ducks on all the prairies on an airplane flight February 28. (These were all Blacks and Mallards and do not include singles or doubles which were missed, so hence not any Wood Ducks.)

From this and information gathered from guides it is estimated Chase Prairie carries some 3,000 ducks in December and January. I would judge that there were about 10,000 ducks in the swamp at this time.

The following is noted on my observations on February 15-21:

(1) Black, Ringneck, Mallard, and Wood ducks were most abundant in the order named.

(2) It was possible to put up ducks at all times on all the prairies visited.

(3) No large concentrations were observed. The largest group was 130 mixed Black and Mallards on Grand Prairie.

(4) Average groupings were:

Wood Ducks and Mallards in pairs

Black Ducks in group of 3-10

Ringneck Ducks in groups of 10-20

Particular attention was paid to observations on the feeding of ducks. E. compressum and X. smalliana were being fed on wherever present and available by Ringneck, Black, and Mallard ducks. The roots and base of the leaves were taken while the root "collar" and tips of the leaves were left floating. It seemed probable that a few Mallards and all the Wood Ducks were feeding on the seeds of R. corniculata, which were present in numbers enmeshed in submerged Utricularia spp. and filamentous algae.

Duck roosts, of importance in former years, were pointed out on several prairies. They were all in open water of depths over 3 feet. Ducks on Territory and Grand Prairies evidently are now roosting on such sites.

According to reports, the Wood Duck is resident on the Okefenokee Swamp. On February 18 a pair was seen flying among the Cypress of Chesser Island "Bay" and were said to be looking for "nests".

The other ducks arrive late in November and are gone by the first of March, according to Harry Chesser. From observations only about 200 were present on February 28 of this year.

Information was obtained on certain other animals:

Florida Cranes, Grus canadensis practensis, were observed on Floyd Island, Chase, Chesser Island, Maul Hammock, and Honey Island Prairie. On the airplane flight 21 were recorded. Natives report they feed largely on Lachnanthus tinctorium. One was flushed from a bed of this plant on Honey Island. It had been digging up the roots of these plants.

I could find no evidence of White Cranes except one hazy idea that once one had been seen. The Florida Cranes are called "Whooping Cranes" by the natives.

Canada Geese, Branta canadensis canadensis, have been reported as stopping for short periods on Grand and Honey Island Prairies.

I saw the head of a Whistling Swan, Cygnus columbianus, shot about two years ago on Floyd Island Prairie.

An immature Golden Eagle, Aquila chrysaetos canadensis, was seen on Honey Island February 24.

Osprey were observed on Floyd Island and Maul Hammock Prairies. They nest here.

Bald Eagles, Haliaeetus l. leucocephalus, were reported as nesting near Stump Prairie between 1925 and 1930. Mr. Stoddard reports them fairly common.

Loon, probably Gavia immer, have been killed in the swamp. I saw four in Lake City, Florida, on February 22.

Quail, Colinus v. virginianus, are present on the islands in the swamp. Coveys were seen on Floyd's, Billy's and Honey Island.

Round Tailed Muskrat, Neofiber alleni alleni, houses were common on Floyds Island and Grand Prairies and were observed on all the prairies visited. Its preferred habitat seems to be areas of A. glomeratus.

Otter, Lutra canadensis vaga, Coon, Procyon lotor lotor, and Wild cat, Lynx rufus floridana, signs were noted. Trappers took about forty otter from the swamp this winter, valued at an average of \$10 each.

Black bear, Euractos floridanus, is reported for the swamp. Local people kill them at every opportunity because they eat the hogs.

Deer, Odocoileus virginianus virginianus, are present in the swamp according to reports.

Vague reports of two Ivory Bill Woodpeckers seen near Minnies Island last year were heard.

Alligators, A. mississippiensis, are present in limited numbers in the swamp. Two old nests were found and three were seen.

A wide variety of fish is present in the swamp. Black Bass, Sunfish, Perch, Gar fish, Brim, and Mudfish are reported by fishermen. I saw thousands of Killifish, some Gar, Bass, and Mudfish.

The above presents an analysis of present conditions in the swamp.

Some history will give information on possible future management.

Water Levels

Beginning in 1930, there has been a series of very dry summers in the swamp. 1931 was so dry that fire burned in the swamp for five months, according to reports. 1935 was again very dry and there were serious fires on Honeys in Honey Island Prairie. At the present, levels are the highest for five years.

Hunting

Hunting has gone on in the swamp for probably as long as man has known it. According to reports, until some 30 years ago the interior was not hunted for the simple reason one did not have to go that far to get a full bag.

The Hebards have had blinds in the swamp for about 15 years. They report that when they first hunted in the swamp, their kill was nearly entirely Mallard ducks. However, in the last ten years numbers of Black and Ring neck ducks have become equal and greater than those of Mallards. From reports the Hebards have always faithfully obeyed laws on limiting. They baited for ten years prior to 1935 and were able to get very heavy concentrations of birds. Mr. Stoddard told me of seeing thousands of Ring neck ducks at these blinds several years ago.

The local people have hunted, and still are hunting, ducks in the swamp all year round. They shoot roosts and use any means to get to the ducks.

Other animals have been shot or trapped intensively. The Alligator has been so heavily hunted that few are left. Deer are scarce. Bear are hunted all year round because they feed on hogs. The Florida Crane is a prized tid-bit and shot on every occasion. Fur bearers are trapped during the entire winter by some dozen men.

Plantings

The Hebards have been interested in increasing the duck foods in the swamp. The following information on planting was obtained from Mr. Dan Hebard:

1924	<u>Ruppia maritima</u> from Louisiana --- no growth
1926	<u>Ruppis maritima</u> and <u>Potamogeton foliosus</u> from Back Bay Virginia --- no growth
1927	<u>Zizania palustris</u> --- grew until about 3" high, then died <u>Sagittaria latifolia</u> -- were all pulled out but not eaten by Florida cranes when 2"

high.

Fire

Fires, as in all the South, have run in the swamp whenever opportunity presented itself. That of 1931 is the worst in the memory of inhabitants -- it burned for 5 months. The islands on the west side have all been very severely burned during recent years.

Logging has been very destructive in the past. A large proportion of the swamp has been logged. This was done with steam skidders and other heavy equipment and has seriously damaged wildlife habitats. Map #4 show approximately where logging is being done and where it had has been done in the past.

To outline a preliminary management program, the main policy must be first agreed upon.

The forces and organizations which have been most actively pushing acquisition of the Okefenokee are those interested in the maintenance of its status quo. From observations it would seem that this policy will serve the specific purposes of the Migratory Waterfowl Division as well as their broader interests.

The problem of increasing use of migratory waterfowl and of maintaining the swamp as such revolves around protection. I believe that complete protection will lead to the material increase in the use of the swamp by ducks and that at present there is sufficient food to carry such an increase.

Blocking out by a acquisition of certain tracts on the east side of the swamp is essential. The minimum areas are shown on map #1 outlined in purple. These areas include considerable acreage in prairies and also control the majority of boat landings in the swamp. The parts which are not prairie have been logged over and should be purchased at a low figure. The total area is approximately 80,000 acres.

Protection itself will probably involve two seasonal programs.

During the winter months a patrol of the prairies, from the interior, by three men and patrol of the boundaries by two men, will adequately control the situation.

During the summer a border patrol by three men with occasional trips in the interior will control entry and egress. During this period a local man can tell whether a person has been through a certain place for about two days afterwards and can track the person down.

In connection with the above, the construction of two cabins and the renovation two existing cabins will be necessary. Their location is given on map #3. Existing cabins are now at Camp Cornelia and Floyd's Island.

Protection will involve two other factors than hunting. First, timber. It is comparatively easy to cut out a few cross ties and get them out quickly on a truck. If not stopped, this practice might grow to come volume. Border patrol will stop this.

Fire, as mentioned before, has been in the swamp a great deal. Chief hazards seem to be on the west side where the large

islands are. The fire season in this country is during February and March. Establishing caches of tools on Honey, Billy's and Blackjack islands will be desirable. Two of the patrolmen used in the interior of the swamp during the winter could be shifted to this side. The large land owners, Superior Pine Products of Fargo, to the west have a system of towers adjacent to the swamp and I think would willingly cooperate on a fire-control program.

Fire also occurs in the swamp during the drought years, such as 1931. Fighting such fires would be a very difficult proposition, and occasion to do so will occur rarely. Very rigid patrol during such times will do most good by keeping out "fire bugs". I would recommend a study be given to the possibility developing a portable pump and well-drilling device similar to those used by the Michigan Department of Conservation.

The question of legal entry comes up. There will be three types of users: (1) Scientific men, (2) Sightseeing tourists, and (s) Fishermen.

It would seem that beyond a doubt the first class should be cooperated with, if not encouraged, at every opportunity. Their main point of entry will be Camp Cornelia and Edith. Such parties should not present problems.

Class 2 will be somewhat different (sic) to handle. Camp Cornelia would be the best entry for this class. A sliding policy, flexible with the man in charge, might be best with these people. Those who show actual, concrete interest could be directed, with guides, to the most desirable parts of Chase Prairie and possibly Floyd's Island. Others, with minor or casual interest, could be shown the outer edge of Chase Prairie and would see all that was necessary. In this respect, a listing of local guides could well be made with definite rates set.

Fishermen will be interested chiefly in one entry --- Edith. There Lem Griffis now conducts parties into Billy's Lake and Big Water. Since the Survey owns no dry land to control this entry, I would recommend an agreement with Griffis as to how he will control parties and then put a man in Billy's Lake at intervals to see he does it.

It would seem that, in connection with the above types of uses, a permit system could be developed to cover boats and people in the swamp. This would make apprehension and arrest of people not belonging in their easier. Such a system could be controlled from Edith and Camp Cornelia.

Some information on personnel was picked up during the trip. If a policy of strict enforcement, as the main object for the first few years, is decided upon, Mr. John Hopkins would be the man for the job. He has been the Hebard's manager for some 25 years now. Everyone in the region not only respects him, but fears him. I would recommend that an attempt be made to get him as refuge manager and send a young man to the refuge, who could be expected to take over the job in a few years, as assistant.

Certain of the local guides appear to be good men. Of these I used Harry Chesser, Folkston, Brantley Gay, Folkston, and Dan McMillan, Edith, who were good men. Chesser knows a great deal of the swamp and I think will be absolutely reliable.

The above recommendations cover the management of persons using the swamp. Of equal importance is the management of the swamp and its animals.

More positive development than the above does not seem necessary at present. It is recommended that a study of the ecology of E. compressum and X. smalliana be made with a view of getting information on the management of these species. This man could also determine the feasibility of introducing other plant species.

The fur resources of the swamp could be made to yield considerable revenue if properly controlled. Otter populations can be built up to where a sizable annual take is probable. However, there are so few at present, protection seem advisable for some time.

The question of constructing a dam at the outlet has been raised.

The primary purpose of this dam could best be to prevent extreme droughts as in 1931.

The difference in elevation between Mixon's Ferry and Camp Cornelia is 12.5 feet (107.3 and 120). The bottom of the Suwanee river is some 12 feet lower than the elevation given for Mixon's Ferry. In order to hold water at its present high level, a dam 25 feet high in the enter and one-half mile long would be necessary. Due to the nature of the river swamp, I think a dam completely across it is the only type that will hold. There is some doubt in my mind as to where the 13 foot drop from east to west occurs. I think most of it is between Billy's Lake and Mixon's Ferry, as this is where the maximum current is. In this case, a low dam would probably not materially affect the western prairies.

I would recommend that a series of levels be run up the river first to make sure the dam will influence the prairies on the east side of the swamp before work and plans are begun.

Summary

1. The Okefenokee Swamp is about 418,000 acres in extent, of which some 20% is waterfowl habitat.

2. The swamp has values as a "wilderness" area and waterfowl refuge.

3. It is recommended that a three-year program, revolving about the following points be inaugurated:"

a. Program of blocking out the refuge on the east side.

This involves purchase of about 80,000 acres.

b. Very energetic enforcement against unauthorized trespassers.

c. Development of a permit system for authorized entry.

d. Building of two cabins and telephone lines to each.

e. Building a skeleton fire fighting organization on the west side.

f. Ecological study of the prairies and of E. compressum and X. smalliana.

g. Engineering study of the possibilities of a dam at Mixon's Ferry.

h. Correlation of points f. and g. to arrive at conclusions regarding this dam.

4. The swamp may later be made to furnish an income to the Biological Survey through fishing and trapping permits.

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Chief,
Biological Survey,
Washington, D.C.

6-26-1939

Attention: Mr. Salyer

Dear Sir:

Please accept our thanks for your letter of criticism in the matter of a Biological Management Report for the Okefenokee Swamp.

Indian traditions were included in that any introductions of wildlife would need be supported by the past history of the area.

You will recall that efforts on our part to establish definitely whether or not beaver were a part of the original fauna have not been successful so far, although Mr. Hopkins has standing orders to make efforts at determining this.

With respect to personnel needs, I would prefer to place, with you, emphasis on the man's background and training, rather than to consider expediency.

The cutting of vegetation in the boat channels materially increases run off. This is due, of course, to the difference in water level between the beginning of the Suwannee River and that of the North end of the swamp. This flow amounts to seven feet as I recall. There is a perceptible flow of water through the boat runs between Big Water Lake to Minnie Lake and between Minnie Lake and Billys Lake. This flow amounts to as much as two miles per hour. Vegetation, which is rank materially, checks this flow where allowed to do so. Large logs in the stream bed accomplish the same purpose. In this connection, it would be possible and desirable to leave some stands of vegetation as check dams and to have fishermen and others proceed by poling for 200-300 feet through these areas.

In connection with suitable amounts of food being available for beaver, I will say that such is the case. The preferred foods of southern beaver include gum and bay, of which there are large

stands along the boat runs on the west side of the swamp.

Mr. Salyer

2

6-26-39

The original plan in connection with the Okefenokee states that natural conditions are to be maintained in as much as is practicable. The 1933 fire did not destroy many of the large cypress, but did materially check other vegetation. As I interpret the prevailing regulations with respect to management on the area, the natural conditions clause makes no mention of whether or not action of type of succession of either plants or animals hinges upon whether or not it is beneficial, but rather whether or not it is a natural condition. Fire is, of course, a natural phenomenon and many people refuse to recognize it as such.

I am thinking in terms of some recent articles noted with respect to the everglades. In tropical and sub-tropical areas the occurrence of savannah conditions hinges upon just such natural phenomena. You of course are familiar with Dr. Ruthven's investigations covering this point, particularly his conclusions were based on scientific data showing that the American savannahs had not developed a fauna which was peculiar to them alone. The fauna of the savannahs, on the contrary, gather their numbers from surrounding vegetative types. I, of course, appreciate that the public would never tolerate a laissez-faire attitude on the part of Biological Survey with respect to fire on the Okefenokee and that the policy of fire suppressors would, for the reason if for no other need, be put in force as it now is. Such a situation is of course no reason why we should not approach a problem with respect to broad principles involved. In this connection I should mention that Mr. Stoddard has finally resulted in his chief opponent giving it recognition and some favorable consideration.

The matter of a more plausible consideration of a fisheries program on the Okefenokee was first approached in two letters to the Refuge Division nearly three years ago. Again last year the matter came up for consideration without definite support for investigation to determine a more suitable management of the fisheries. I have talked this over with Mr. Salyer recently and our ideas on the subject differ in a few respects, but are in agreement on the method of approach.

Specifically, we feel that with a closer cooperation between the Bureau of Fisheries and this Bureau, which will be the result of reorganization, that the problem should be presented to them for solution.

The above remarks, I trust, clarify further the report submitted.

Very Truly Yours,

E.P. Creaser,
Regional Biologist