



U.S. Fish and Wildlife Service

Okefenokee National Wildlife Refuge

Okefenokee Swamp's Peatlands: A Hidden Resource

Okefenokee's Peatlands

Each year within the Okefenokee Swamp, leaves and plants die and fall to the ground. If exposed to the air and oxygen decomposition happens quickly, but if fallen vegetation lands in an oxygen-poor environment such as swamp water, decomposition is slowed. Plant material has been building up like this in the Okefenokee for over 6,500 years! The wet volume of peat within Okefenokee is estimated to be 401 million cubic meters. It compresses as more weight from more plant material is added, creating peat beds up to 15 ft deep. It takes about 53 years to create one inch of peat in the Okefenokee.

The climate and vegetation history of the area is recorded within these peat layers. The Okefenokee Swamp preserves the changes between water lily "prairies" and forested wetlands, past wildfire events and even holds a record of atmospheric deposition of nuclear testing that occurred far from the swamp in the 1960s. Beyond the obvious benefits of wetlands for biodiversity, water availability and quality, and flood, storm, and fire control, Okefenokee's associated peatlands are extremely important in storing carbon in efforts to reduce greenhouse gases and combat climate change.

Global Peatlands

Peatlands are amazing places and can be found around the world. They exist in over 175 countries but are globally rare, covering only 3% of the world's land area. Because of cooler temperatures, peatlands are mostly found in northern latitudes such as Canada, Europe, and Russia. Significant peat deposits also occur within the tropics where there is prolific growth of vegetation along with moist conditions. Expanses of peatlands like the ones found in the Okefenokee are even rarer because they sit in the temperate/subtropic climate zone where rapid decomposition is expected. The high water table within the swamp keeps dead plant material waterlogged in anaerobic conditions and the low topographic relief of the area results in water moving slowly through the system, creating an ideal environment for peat development.

Many of the world's peatlands have been or are being degraded by draining, agriculture, erosion, and deforestation especially within the highly populated subtropical zone. As people around the globe become more aware of the benefits peatlands provide, preserving the hydrology of peatlands like the Okefenokee is growing in importance.

Carbon Storage

Peatlands store more than twice as much carbon as the world's forests, making it extremely important to preserve remaining peat deposits. When peatlands dry, carbon dioxide is released into the atmosphere, so it is critical for these areas to remain waterlogged. The carbon stored within the Okefenokee peat is equivalent to over 95 million tons of carbon dioxide alone representing 65% of the total carbon stored within the swamp. Additional carbon is stored within the living plants.

Fortunately, peat disturbance in the Okefenokee have primarily been limited to the construction of the Suwannee Canal and peat harvesting of approximately 18 acres prior to the area becoming a refuge. Wildfires, which are beneficial to the Okefenokee Swamp to maintain habitat diversity, often sweep across the landscape with the water saturated peat protecting the deeper peat deposits.

Significance of Okefenokee's Peatland

Okefenokee's peatland is significant as the largest remaining undisturbed peat deposit on the North American Coastal Plain (NACP) that stretches from Massachusetts to Mexico and within the northern hemisphere's subtropical zone around the globe. The NACP and the subtropical zone are the some of the most populated areas of the world with a long history of resource manipulation and exploitation. This amazing hidden resource of the Okefenokee is worthy of protection.



U.S. Fish and Wildlife Service

Okefenokee National Wildlife Refuge Greater Okefenokee Association of Landowners (GOAL)

History of GOAL



The year 1990 was a turning point in fire management operations in this unique fire ecosystem. The Shorts Fire stretched the staff, equipment and all organizations involved in firefighting operations. It was apparent that a more concerted and coordinated effort by those involved would result in more efficient efforts.

During the first half of 1994, several informal meetings were held. The landowners around the Okefenokee envisioned a more formal gathering of partners that could deal not only with better preparation and communication during wildfires, but with other issues of forest and wildlife. Key representatives were invited to a steering committee meeting to determine if a formal organization was necessary. They identified a multitude of issues that could benefit from such an organization. Their vision was to develop an organization of interested parties to address land management issues of special concern to southeast Georgia and northeast Florida and produce a consolidated and influential position to deal with these issues. The Greater Okefenokee Association of Landowners was born.

Mission of GOAL



“To serve as a unified team managing, protecting, and promoting forest resources in and around the Okefenokee Swamp through a stewardship ethic to assure these resources will be available for future generations.”

GOAL recognizes that:

- Forest resources are the major industries in the area.
- The Okefenokee Swamp is a national treasure and economically and biologically beneficial to the local communities and the states of Georgia and Florida.
- It is essential to have a coordinating committee for fire protection of public and private resources.
- A formal organization of landowners will provide an avenue for communications and develop strength in dealing with area issues.

Accomplishments



In 2005 and again in 2015, GOAL received the United States Department of Agriculture’s Pulaski Award. Named in honor of its creator, Edward “Big Ed” Pulaski, the Pulaski, a half ax/half hoe fire tool has become the symbol of wildland firefighters. The Pulaski Award is awarded annually to the group that shows the greatest example nationally of interagency cooperation, coordination, and standardization; safety of firefighters and/or the American public during a wildfire; and outstanding group performance in fire management and suppression activities. Through the years, the GOAL organization has addressed a number of fire-related issues. Landowners cooperate on maintenance of Swamp Perimeter Road, compile and maintain a resource list of fire equipment and personnel, maintain 80 helicopter dip-sites surrounding the swamp, and share radio frequencies and contact information for members. The organization also supported the black bear research at Okefenokee National Wildlife Refuge and Osceola National Forest by providing access to their lands and the expertise of their employees. The U.S. Forest Service and the Fish and Wildlife Service contributed a total of \$550,000 to the construction of the John Bethea State Forest Joint Work Center. The Georgia Forestry Commission is also partnering in this important cooperative venture located in Baxter, Florida. The work center is designed to decrease the response time to wildland fires in the adjoining GOAL area.



Okefenokee National Wildlife Refuge Significance

To the Local Community

The future of the swamp, surrounding landscape, and species that depend on them is directly tied to maintaining the integrity of the ecosystem's complex ecological processes. The future of people and communities surrounding the swamp also is dependent on conserving this unique wilderness. The Refuge spans 407,000 acres, protecting approximately 93% of the wetlands that comprise the Okefenokee Swamp. The Refuge sees over 600,000 visits annually, with 10% of the visitation represented by international guests from over 46 different countries. According to the 2017 Banking on Nature Report, the total recreational expenditures for the four counties surrounding the refuge were \$64.7 million with non-residents accounting for \$59.8 million. The contribution of recreational spending in local communities was associated with about 753 jobs, \$17.2 million in employment income, and \$5.4 million in total tax revenue for the counties.

The Okefenokee Swamp has shaped the culture of southeast Georgia. Most residents of Charlton, Clinch, and Ware counties have ancestors who once lived or worked in the swamp as a part of their heritage.

To the States of Georgia and Florida

- Combined with Osceola National Forest, private timberlands, and state-owned forests, over 1 million contiguous acres provide suitable habitat for a diversity of wildlife and recreational opportunities.
- The Okefenokee Swamp, as the headwaters of the Suwannee and the St. Marys Rivers, provides clean water to the most pristine rivers in the southeast.
- The Refuge is a Class I Airshed, protecting the air quality within the region.
- Stephen C. Foster State Park leases 142 acres of the refuge and provides visitor services and protection to about 120,000 people each year.
- The most remote location in Georgia is located within the Okefenokee Swamp.
- The universities and colleges of Georgia and Florida, along with schools across the country, conduct research within the swamp and its surrounding ecosystem.

To the United States

- Okefenokee National Wildlife Refuge (NWR) contains the third largest National Wilderness Area east of the Mississippi River.
- People from all over the country visit the famous swamp to view alligators and other creatures in their natural surroundings. Okefenokee NWR is one of the top 20 most visited refuges in the National Wildlife Refuge System.
- Okefenokee NWR preserves the unique qualities of the Okefenokee Swamp for future generations to enjoy. It is part of the National Water Trails System.
- The refuge is a National Natural Landmark. In addition, eight Research Natural Areas are designated to preserve examples of natural habitats. Habitats provide for endangered and threatened species such as red-cockaded woodpeckers, wood storks, and indigo snakes. Over 600 plant species have been identified on refuge lands.

To the World

- The Okefenokee Swamp is one of the world's largest intact blackwater ecosystems. It has been designated a Wetland of International Importance under the Ramsar Convention of 1971.
- Okefenokee NWR is a proposed World Heritage Site.
- In 2012, National Geographic magazine recognized the Okefenokee Swamp as one of the top 100 Most Beautiful Places on Earth.
- The Okefenokee Swamp provides an important baseline for wetland research worldwide.
- The swamp is world renowned for its amphibian populations that act as bio-indicators of global health.
- The water of the Suwannee River as it exits the swamp is a standard reference for scientific study throughout the world.



U.S. Fish and Wildlife Service

Okefenokee National Wildlife Refuge Wilderness

Wilderness Designation



On October 1, 1974, ninety percent of the lands in the Okefenokee National Wildlife Refuge (NWR) were designated as part of the National Wilderness Preservation System. The Wilderness Act of 1964 defines wilderness as “an area where the earth and its community of life are untrammelled (unfettered) by man, where man himself is a visitor who does not remain.” The Act further defines wilderness as areas that:

- Are affected primarily by nature, where people are visitors;
- Possess opportunities for solitude;
- Are Federally-owned, undeveloped, and generally over 5,000 acres;
- Are managed to allow natural processes to operate;
- May contain scientific, educational, scenic, or historical features;
- Are formally designated by Congress.

Air Quality and Wilderness



The legislation that created the Okefenokee NWR wilderness area (353, 981 acres) grandfathered in historic uses such as fishing and the use of motorboats up to ten horsepower. It also required the U.S. Fish and Wildlife Service to maintain 4 public access areas and up to 120 miles of trails.

A small number of National Wilderness Areas have additional protection as Class I Air Sheds under the 1990 Clean Air Act. Okefenokee is one of only 21 national wildlife refuges across the country with this additional designation.

In the Southeastern United States, the most widespread air pollutants are common, everyday substances: particulates (dust and soot), nitrogen and sulfur gases, the daily by-products of engine combustion, coal-burning power plants, and other industrial processes.

Wilderness Values



Okefenokee is a partner with the U.S. Environmental Protection Agency, other federal land management agencies and state agencies in two air quality monitoring programs established to detect airborne pollutants. One program detects pollutants deposited by rain on Okefenokee’s plants, soils, and surface water; and the other analyzes airborne particles.

The Wilderness Act is a uniquely American piece of legislation. It preserves natural areas in their wild, beautiful, and primitive character. Wilderness is a chance for visitors to experience a level of solitude not often found in our increasingly technological society. These Wilderness Areas provide an opportunity for people to test themselves against the elements and the unknown. Wilderness is the prospect of gazing at the night sky without competition from surrounding city/neighborhood lights.

Studies show that Americans value wilderness areas, even if they never have an opportunity to visit - they just like to know that some pieces of the Earth will not be paved, dredged, mined, harvested, or otherwise impacted by people.

*In the end, our society will be defined not only by what we create
but by what we refuse to destroy.*



U.S. Fish and Wildlife Service

Okefenokee National Wildlife Refuge Fire Management



Fire is an important part of the Okefenokee ecosystem. Disruption of the naturally occurring fire cycle has resulted in major changes in upland and wetland habitats in the Okefenokee ecosystem. Although fire is essential for the restoration and management of the Okefenokee upland and wetland communities, remaining habitats and adjoining private property must be protected from uncontrolled, destructive wildfire. Even if all wildfires were allowed to burn, the landscape has become so fragmented by human development, there would not be enough naturally-occurring fire to replicate the historic fire cycle.

Strategies using natural and prescribed fire to accomplish refuge management goals:



- All wildland fire will be managed in a safe and efficient manner, utilizing the best method that will produce the least negative impact on the environment and adjacent private property. The refuge staff of six fire management personnel maintains almost three million dollars worth of equipment to accomplish prescribed and wildfire management projects. Refuge fire management plans and step-up plans dictate the level of readiness to be maintained throughout the year.

- Dormant (winter) and growing (summer) season prescribed fire will be used to reduce hazard level of existing fuels and to restore fire dependent, grassy fuel types where brush types now exist. The fire staff burns an average of 6,000 to 10,000 acres per year.



- Develop cooperative ventures with adjacent landowners to aid in management of swamp perimeter fires. Most cooperative ventures will be accomplished through the 80-member GOAL organization representing 20 major landowners surrounding the Okefenokee Swamp.

- Replace historic fire seasons and frequencies with prescribed fire to restore and maintain longleaf pine habitats throughout refuge uplands.

- Restore habitat diversity throughout refuge wetlands making use of prescribed and natural fire as it occurs.

- Continue developing a fuel management zone around the perimeter of the swamp to allow more natural control of fire within the swamp.





Okefenokee National Wildlife Refuge Visitor Services and Ecotourism

The Okefenokee is part of the National Wildlife Refuge System (NWRS) with the overall mission “To administer a national network of lands and waters for the conservation, management and where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of future generations of Americans”... to put it simply **Wildlife FIRST**.

The Okefenokee Swamp has shaped the culture of southeast Georgia. Most residents of Charlton, Clinch, and Ware counties have ancestors who once lived or worked in the swamp and view the swamp as a part of their heritage.

Visitation:

The NWRS supports wildlife-dependent recreation such as hunting, fishing, wildlife observation, wildlife photography, interpretation, and environmental education. Other types of visitor opportunities vary depending on the refuge.

There are over 600,000 visits to Okefenokee National Wildlife Refuge (NWR) each year. The most popular visitor activity at Okefenokee is wildlife observation, which brought 325,933 visits in Fiscal Year (FY) 2017.

Visitors to Okefenokee come from across the country and internationally; in any given year, visitors from all 50 states and 40 countries have been recorded visiting Okefenokee’s Main Entrance. The refuge estimates at least 10% of our overall visitation is comprised of international visitors.

Economic Impact:

The contribution of recreation spending in local communities is associated with about 753 jobs, \$17.2 million in employee income, \$5.4 million in total tax revenue, and \$64.6 million in economic output. (Banking on Nature Report; 2017)

Funding for the NWRS has declined substantially since FY 2010’s record high appropriation. The entire NWRS has nearly 20% fewer visitor services personnel than in FY2011, while the Okefenokee visitor services staffing levels are down by 66%. Visitation to refuges has increased across the system and at Okefenokee; the NWRS sees 48 million visits each year, with less capacity to serve visitors today than ever before.

Designations:

The Okefenokee Swamp is the largest intact freshwater wetland in North America. It has been designated a Wetland of International Importance under the Ramsar Convention of 1971.

The Okefenokee NWR is a proposed World Heritage Site.

Other designations include:

- National Wilderness Area
- National Natural Landmark
- National Water Trail System
- National Recreation Trail
- Important Bird Area (National Audubon Society)
- One of the seven natural wonders of Georgia





U.S. Fish and Wildlife Service

Okefenokee National Wildlife Refuge Wildlife and Habitat Management



Okefenokee National Wildlife Refuge (NWR) exemplifies an ecologically driven freshwater wetland managed at a landscape level. Researchers and environmental organizations have long realized the importance of this world-renowned wetland for both conservation and research.

The biology and forestry programs at Okefenokee NWR are responsible for managing and monitoring the refuge's natural resources. Management efforts emphasize natural processes to enhance habitat for native fauna and flora. Prescribed fire is the main tool that is used to simulate the historic frequency of wildfires. Upland management concentrates on restoring the native longleaf pine communities that provide habitat for the endangered red-cockaded woodpecker. To support management, incidental sightings and standardized surveys provide long-term data sets as well as identifying trends in populations. Short-term detailed studies are generally conducted by outside institutions under contract with the U.S. Fish and Wildlife Service. The unique qualities of the Okefenokee Swamp also attract researchers from around the world. These researchers work under a Special Use Permit after compatibility is determined.



The 2006 Refuge Comprehensive Conservation Plan presents strategies to accomplish the goals of the refuge in the next 15 years. The Inventory and Monitoring Plan and Habitat Management Plan fine tune the strategies and protocols so they coincide with regional and national efforts and data sharing. The following are the topics addressed through the strategies:



- Surveying neotropical migrants, breeding birds, marsh and wading birds, and sandhill cranes within designated habitats.
- Monitoring black bear populations in and around the refuge.
- Monitoring amphibian and reptile populations within the swamp and the isolated wetlands.
- Monitoring fish populations and their health.
- Surveying invertebrate composition and relative abundance within specific habitats.
- Monitoring activity within red-cockaded woodpecker clusters.
- Managing habitat for the expansion of red-cockaded woodpecker populations.
- Inventorying forested upland communities around the perimeter of the swamp.
- Establishing vegetation plots, transects, and photo plots on the uplands and within the swamp.
- Maintaining records on prescribed burns and wildfires.
- Controlling pests and exotic species.
- Maintaining two weather stations.
- Monitoring water levels and water quality within the swamp.
- Maintaining air monitoring equipment which includes an IMPROVE site, wet deposition site, and a mercury deposition site.
- Coordinating studies, information and surveys with private, state, and other federal agencies.
- Establishing partnerships with adjacent landowners to improve the quality of habitat on the refuge.
- Presenting technical information and assistance to local, state, and federal agencies, private individuals and companies.





U.S. Fish and Wildlife Service

Okefenokee National Wildlife Refuge Red-cockaded Woodpeckers



Okefenokee National Wildlife Refuge (NWR) has approximately 97 red-cockaded woodpecker (RCW) clusters (a group of trees used by a family group). Of these, 50 are active. Clusters occur in forested uplands surrounding the swamp and on interior islands within the swamp itself. There are 36 active and 22 inactive/recruitment perimeter clusters, and 14 active and 25 inactive clusters on the interior islands. Okefenokee NWR's recovery goal is 86 potential breeding groups based on total pine acres within identified use areas. The focus of management is on areas able to support a self-sustaining population of RCWs.

Okefenokee NWR RCW clusters are most likely the remains of a much larger population that once depended on the pine stands surrounding the refuge. Although the refuge currently consists of 24,413 acres of suitable RCW habitat, this acreage is not contiguous. The upland forestry compartments that are intensively managed with fire and silvicultural practices comprise 12,444 acres. An additional 11,969 acres is dispersed over 11 interior islands. The clusters are very isolated due to fragmentation of the habitat. The mature stands of pine preferred by the birds are separated both by natural swamp vegetation and by private industrial lands. This makes it difficult for groups of RCW's to interact regularly and to replace lost or dispersing family members. Four populations have been identified within the refuge and different management strategies have been developed for each.



Thirty-two percent of Okefenokee's RCW groups live on the upland islands in the interior of the swamp, most accessible only by helicopter. These islands are also within the Okefenokee Wilderness Area. Following Wilderness philosophy, "where the earth and its communities are untrammelled by man", artificial nest boxes and silvicultural practices are not used in the management of these islands. Fire is the only management tool used to manage habitat on these remote islands. Banding of RCW is not currently conducted on these interior islands due to logistical difficulties. Monitoring the islands for RCW activity during breeding season and checking cavities for suitability allows the refuge staff to determine the status of the populations, reproductive success, and potential limiting factors.

Refuge land on the perimeter of the swamp is more intensively managed to preserve and promote the native longleaf pine communities. This management has led to excellent habitat conditions with no mid-story problems, good composition of understory species, and an increasing longleaf pine component. RCW adults and nestlings are banded to monitor group size, composition, and dispersal. Artificial cavities (inserts or drilled cavities) are installed where cavities are limited, ensuring that each cluster has at least four suitable cavities.

During 1998, we began releasing RCWs from other populations because of the decrease in the number of active clusters around the refuge perimeter. Between 1998 and 2013, forty birds were translocated to the Okefenokee, of which 28 have remained in refuge populations.

Management goals are focused on optimizing habitat for the RCW while restoring and maintaining the longleaf-wiregrass ecosystem and forest management agreements with surrounding landowners will be pursued to increase the amount of suitable habitat.





U.S. Fish and Wildlife Service

Okefenokee National Wildlife Refuge Upland Forest Management



Okefenokee National Wildlife Refuge (NWR) has 44,026 acres of upland forest out of a total of 406,650 acres. About 21,000 acres of Okefenokee's uplands are located in forest management compartments located around the perimeter of the Okefenokee Swamp. In addition, Forest Investment Associates manages the timber and recreation on 6,654 refuge acres along Trail Ridge. The remaining uplands are located on islands within the 353,981 acre Okefenokee Wilderness Area.

The main emphasis of management activities in Okefenokee's uplands is the restoration, management, and protection of longleaf pine communities. This diverse habitat supports a vast association of wildlife species including the red-cockaded woodpecker (RCW), Bachman's sparrow, gopher tortoise, indigo snake, flatwoods salamander, gopher frog, Eastern fox squirrel, and many other native wildlife species common to the Southeastern Coastal Plain.



Okefenokee's uplands, like the rest of the Southeastern Coastal Plain, were once dominated by fire dependent longleaf pine communities. Because of changes in the fire cycle, indiscriminate timber harvesting, stand conversion, clearing, and settlement of the area, only 3% of this historical habitat remains in the southeast. Many of Okefenokee's longleaf communities are located in poorly drained areas where other species rapidly invade with the absence of fire. Without fire, the understory becomes a tangle of tall hardwood shrubs and vines. Through the use of prescribed fire, the refuge's pine habitat is in good condition with older trees reaching approximately 100 years old with a life expectancy of over 300 years and an open park-like understory.

Management activities conducted on Okefenokee NWR to restore or manage longleaf pine communities include:

- Restoration of pure longleaf pine stands in mixed pine stands by selective thinning, promoting natural longleaf pine regeneration, and planting seedlings.
- Establish new age classes in large, even-aged, longleaf pine stands for a sustainable forest.
- Periodic use of dormant and growing season fire to destroy slash and loblolly pine seedlings, kill hardwood midstory, and to stimulate growth and reproduction of grasses, blueberry, ground oak, and other longleaf pine community species.

Habitat management surveys are conducted on forest management compartments and wilderness islands periodically to determine management needs. Through these surveys age, size, crown density, basal area, and species composition of each stand is determined. Areas are identified for promoting regeneration and establishment of longleaf pines along with determining improvements needed to provide habitat for existing RCW colonies. Monitoring also evaluates the need and effects of prescribed burning and other management practices.





U.S. Fish and Wildlife Service

Okefenokee National Wildlife Refuge

Historic Chesser Island Homestead



In the late 1800's, W.T Chesser and his family settled a small island on the eastern edge of the Okefenokee Swamp. The Chessers were a rugged family, carving out a life in the often harsh conditions of the area. Their history is typical of many area settlers; they ate what they could shoot, catch, and grow on the sandy soil. Cash crops were primarily sugar cane, tobacco, and turpentine. They lived simply, worked hard, and played hard when possible.

W.T. Chesser came from the Tattnall and Liberty County area to settle on the edge of the Okefenokee Swamp. Chesser Island is now named after the family who settled there. Chesser Island is a 592-acre island filled with forests of longleaf pine, slash pine, pond pine, and occasional oak hammocks. The site of the original homestead was south of the current dwelling (built later in 1927) and its outbuildings. W.T. Chesser had six sons and one daughter. One son, Sam Chesser married Sara Altman and had 9 children. The youngest, Robert Allen Chesser married Lizzie Altman (Sarah Altman's daughter) and had 13 children. The youngest of Sam and Sara's sons, Tom Chesser, built the current standing homestead in 1927, with his wife Iva.

The current home is built of yellow pine and was built by Tom and a contractor who was paid \$150.00 for his work. The original home design had seven rooms and featured an indoor kitchen. Bathroom facilities were outside, but as the family grew, the home expanded to include a bath on the back porch. Other additions include two bedrooms to accommodate their seven children.

Outbuildings at the homestead include a smokehouse, syrup shed, chicken coop, corn crib, and hog pen. The yard retains its original character – it is free of all vegetation, as was the custom of the time to reduce fire danger and increase visibility of snakes. The white sand yard also helped keep bugs away from the home due to lack of shade for them to travel through.

The Chesser family was typical of the hardy, pioneer families that settled southern Georgia. Work and play often came together – hog butchering and syrup grinding were times when families got together to visit, share stories, and play outside. Typical of families at that time, they sang songs, attended church all day on Sundays, and played with home-made toys. The Chessers were fond of a distinctive type of music- sacred harp singing. Chesser family descendants continue to sign these a capella harmonies today.

Most of the Okefenokee Swamp became a National Wildlife Refuge in 1936; slowly the Chesser family relocated to other areas, with Tom and Iva being the last to leave in 1958. Many members of the Chesser family remain in the local area and are involved in maintenance and interpretation of the site.