Okefenokee in the Balance: Protecting the Swamp for Georgia's Climate Resilience

Rena Ann Peck, Georgia River Network*, 126 South Milledge Avenue, Ste. E3, Athens, GA 30605, rena@garivers.org

Elise Bennett, Center for Biological Diversity*, P.O. Box 2155, St. Petersburg, FL 33731, ebennett@biologicaldiversity.org

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Overview

The Okefenokee Swamp is one of the world's largest naturally driven freshwater systems, preserving largely undisturbed peat beds and encompassing a matrix of varied ecosystems that support a broad diversity of plants, insects, and animals, including several endangered and threatened species. As a largely intact freshwater ecosystem, Okefenokee is an irreplaceable resource in the pursuit of climate resilience. Its largely undisturbed peat beds play a significant role in carbon sequestration, and its unfragmented swaths of wildilfe habitat will serve as critical "lifeboat habitat" for many of Georgia's native species as human populations retreat from sea level rise into previously undeveloped areas.

Unfortunately, the Okefenokee Swamp is also at risk from myriad threats that are likely to be exacerbated over time by climate change. The most imminent of threats is a proposed titanium mine on Trail Ridge, near the southeastern border of the Okefenokee National Wildilfe Refuge, which threatens to adversely alter the hydrology of the Okefenokee Swamp and surrounding area. When combined with the effects of climate change, threats to Okefenokee also threaten Georgia's overall climate resiliency. This poster explores the threats to Okefenokee through the lens of the intensifying effects of climate change and recommends focusing resources toward protecting the Okefenokee Swamp and National Wildilfe Refuge as part of Georgia's climate resiliency planning.

Okefenokee is Unique

Okefenokee Swamp is one of the world's largest natural ecologically driven freshwater systems covering approximately 177,000 ha (438,000 ac) on the lower Atlantic Coastal Plain. Okefenokee National Wildlife Refuge protects 90% of this expansive acidic, blackwater system.

The deep-water swamp contains peat deposits up to 5 m (16.4 ft) deep and is the headwaters of two free-flowing rivers—the Suwannee River flowing to the Gulf of Mexico and the St Marys River flowing to the Atlantic Ocean. Okefenokee provides pristine habitats because natural processes still dominate the landscape. The Suwannee River, as it leaves the Swamp, is used by scientists throughout the world as a standard ecological reference.

The Okefenokee system is a mosaic of 21 classified vegetation communities, from open water to old growth cypress stands, and includes the Refuge's forested pine flatwoods on Trail Ridge, interior islands, and other upland management compartments surrounding the swamp. These uplands are being restored to native longleaf pine communities critical to the recovery of the gopher tortoise (*Gopherus polyphemus*), eastern indigo snake (*Drymarchon couperi*), and red-cockaded woodpecker (*Picoides borealis*). Its unparalleled biodiversity abounds with 856+ species of plants, 48 mammals, 238 birds, 39 fish, and 90 reptiles and amphibians. It is critical habitat for large populations of wading birds and is valuable for large home range species like the black bear (*Ursus americanus floridanus*) and Florida panther (*Felis concolor coryi*).

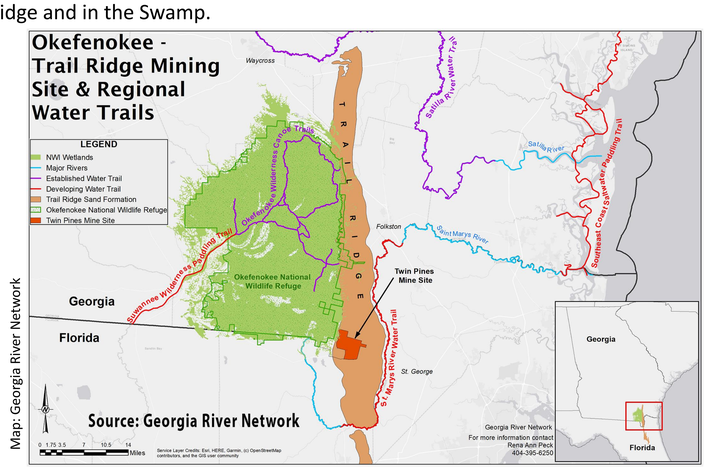
All photos: USFWS

Okefenokee is Threatened

The fragility of Okefenokee lies in the precariousness of its ability to hold water. Climate change threatens the swamp with decreased expected precipitation that normally provides 70–80% of the water volume. The swamp water depth averages 45 to 90 cm (1.5 to 3 ft), with the natural range of variability resulting in unnavigable canoe trails during drought.

Human disturbances can exacerbate the anticipated extreme drought periods. Proposed strip mining for titanium on the border of the swamp threatens to disturb natural groundwater flows and associated hydroperiods that maintain the swamp's water levels. Pumping of the Floridan Aquifer along the coast already affects Swamp water levels, and the additional pumping by the proposed mine (63 L/s, 1.44 mgd) is predicted to further lower groundwater levels by up to 4.1 m (13.6 ft) under the Swamp.

Water loss by leakage to the underlying aquifer, plus increased losses due to dredging-induced permeability increases on Trail Ridge, are very likely to further lower Swamp water levels. Likely effects of lower water levels include higher swamp acidity (lower pH) and increased mercury contamination of fish and wildlife, as well as drying and oxidation of peat soils that promotes wildfires and increased carbon release to the atmosphere. These effects will likely further imperil state and federally listed endangered and threatened species by killing, harassing, and harming them, and destroying and degrading their habitat on Trail Ridge and in the Swamp.



Map: Georgia River Network

Okefenokee's Role in Climate Resilience

Okefenokee National Wildlife Refuge can play a critical role in Georgia's climate resiliency planning by assisting with carbon emission management and imperiled wildlife conservation.

Carbon Storage

Okefenokee's extensive, largely undisturbed peat beds provide important carbon storage services, contributing to an estimated $146 million in U.S. carbon storage value. Peatlands like those in Okefenokee are the largest natural terrestrial carbon stores in the world; however, damaged peatlands are a major source of greenhouse gases. Peatland drainage, and subsequent burning in particular, results in substantial greenhouse gas emissions. Activities that conserve the hydrology and maintain waterlogged peat layers within Okefenokee can help prevent and reduce such emissions.

Lifeboat habitat

Okefenokee provides essential wildlife habitat that will only become more valuable in the face of future climate change effects. The best available science shows that climate change will cause significant sea level rise along the southeastern Atlantic Coast of the United States, with recent projections predicting sea level could rise as high as 2.5 meters (8.2 feet) by as early as the year 2100. Species ranging across Georgia's lower coastal plain like the wood stork (*Mycteria americana*) and frosted flatwoods salamander (*Ambystoma cingulatum)* face displacement and extinction due to loss of habitat as coastal human populations shift inland in response to rising seas. While policy prescriptions like passive and active "assisted migration" may offer conservation solutions, they will require areas of protected "lifeboat habitat" for displaced species populations. Okefenokee's expansive and diverse ecosystems could serve as this lifeboat habitat for many imperiled species in Georgia.

Okefenokee National Wildlife Refuge's unique ecological landscape can play a critical role in Georgia's climate resiliency planning, but only if it remains protected and intact.

We recommend reducing risks of harm to the Refuge and its hydrology by halting near-term threats from mining and establishing a protective buffer around the refuge.

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