

Brief synthesis

Okefenokee National Wildlife Refuge (ONWR) is a vast and heterogeneous property in the Southeastern United States comprising a significant portion of a major biodiversity hotspot for the North American Coastal Plain. Federally managed by the Okefenokee National Wildlife Refuge (OKE), the ONWR is made up of a diverse mosaic of forest and wetland ecosystems, including dry areas, such as temperate grasslands, forests, savannas, shrublands, as well as miniature islands, peninsulas, and one of the only subtropical peatlands in the world. Encompassing a vast area at 164,565 hectares, the uniqueness and scientific value of the area has been recognized since 1937 when it was officially designated a National Wildlife Refuge, and was more recently included on Global 200 Priority ecosystem lists, affirming the urgency of conservation efforts.

Although ONWR has long been colloquially referred to as the “Okefenokee swamp,” that label undercuts the diversity of natural landscapes and biomes offered by the refuge. ONWR was initially established for migratory bird conservation, but its habitat diversity makes it ideal, and even essential, for the preservation and reintroduction of a significant number of critically endangered species, supporting 1,270 flora and fauna species and untold thousands of invertebrate species. In addition, the subtropical peat bogs are a crucial resource in the fight to limit carbon emissions and to examine the region’s geological history. The region’s rich species biodiversity alongside the symbiosis of varied ecosystems in a unique biogeographic context, conforms with the expectations of UNESCO’s criteria ix and x and positions ONWR as an ideal candidate for World Heritage Site status and its concomitant promise of permanent protection.

Justification for criterion ix

The ongoing ecological processes among diverse ecosystems—including wetlands, peatlands, and longleaf pines—showcase remarkably intact habitats and ample opportunities for researchers. A fuller understanding of the property will deepen scientific insights on a global scale as well as enrich surveys of the property’s surrounding ecosystems.

The ONWR contains extremely rare subtropic peatlands, which typically form outside of the temperate/subtropical climate zone. The ONWR’s peatlands are the largest remaining undisturbed freshwater peat deposit within the eastern United States, and one of the largest subtropical peat deposits worldwide. These deposits have remained relatively untouched, making them ideal for research and conservation. Even though humans have attempted development projects multiple times throughout the ONWR’s past, these and other water trail maintenance efforts have cumulatively disturbed less than one percent of the ONWR’s surface peat.

ONWR obtains most of its water from precipitation. The area contains a large basin for receiving runoff water, which flows throughout the region. This area is a great example of a minerotrophic peatland because it receives its nutrients from the groundwater that flows through mineral-rich soil and rock. The slow flow of water allows dead plant material to stay in place for years, which creates an ideal environment for peat to form.

While the majority of peatlands appear in cooler climates and feature slow vegetative growth and decomposition, the peat development in ONWR proliferates among layers upon layers of growth powered by the property’s high water table and low topographic relief, which mutually enable continual water seepage. These peat layers store the geochemical history of the

region, functioning as a database of global events recorded in the soil over the past 6,500 years. The events decoded here encompass natural events as well as man-made topographic impact events, including evidence of nuclear testing in the 1960s. As ideal repositories of carbon—peatlands store double the carbon of forests—peatlands are essential resources in the global effort to limit carbon emissions and combat rising temperatures and impending climate change. Because peatlands comprise less than 3% of the world’s land area, international scientists and scholars contend that their role in carbon storage is increasingly pressing.

Peat layers also reveal the history of natural fires that propelled the development of the Okefenokee ecosystem. Evidence in the peat layers reveals severe fires as recently as the 19th century, events which spurred the development of surrounding prairies and open water areas that are home to diverse flora and fauna. And the region still features some of the highest occurrences of lightning fires in North America, with surface fires continuing to control vegetative growth. The symbiosis between the ONWR’s varied ecosystems is best demonstrated through these ongoing ecological processes which produce awe-inspiring phenomena, including floating tree islands originally spawned by accumulated peat moss. While many of these natural characteristics can be found in other global sites, no other site in the world offers all of them together, making ONWR a true mosaic of co-existing natural phenomena and ongoing ecological processes.

Justification for criterion x

The rare mosaic of ONWR habitats has a ripple effect throughout the property, enabling a similarly diverse range of living organisms to prosper, some of which are only found within the ONWR. As a globally recognized “biodiversity hotspot” and “key biodiversity area,” ONWR is an outstanding example of a natural habitat that maintains ideal conditions for the conservation of variegated species of flora and fauna, many of which have been designated as “threatened” or “endangered,” such as the red-cockaded woodpecker and several types of alligators.

While the substantial endemic biodiversity on the property encompasses mammals, reptiles, amphibians, and a host of plant species, it is the avian community where the property stands out as an essential refuge for the region. The region supports 238 species of migratory and resident bird species, representing 88% of all bird species found in the North American Coastal Plain. Indeed, ONWR was originally established as a refuge for migratory birds taking advantage of the property’s location along the Atlantic Flyway, which stretches north into Canada and south into the Caribbean and South America, as an ideal resting area or overwintering location. This connection inextricably links the ecological history—and future—of the ONWR with that of the entire eastern portion of the Americas. As the global climate continues to warm and coastal shorelines shrink, the importance of ONWR as a migratory stopover for the North American region will grow increasingly pronounced.

Beyond the valuable resources the ecosystem provides for the bird community, threatened species of other animals also rely on the refuge’s diverse landscape. The Florida black bear, once considered threatened, is now designated a “recovered” species, with approximately 400 currently living in the upland hardwood habitat, dining out daily on black gum fruit. And the American alligator, which serves as a veritable icon of the southeastern United States, has one of its largest populations in the world at ONWR, where it is one of the few regions the alligator resides that is unimpeded by development, hunting threats, or other human interventions. ONWR is one of three sites that is being considered to support the reintroduction of the Florida panther, which is one of the most endangered large mammals in the world. Historically, the Florida

panther roamed throughout the southeastern region, but is now isolated to remote areas of south Florida. The ivory-billed woodpecker, believed to be extinct until recently, is also being considered for reintroduction into the forested areas of ONWR since it used to inhabit the area, and the sweetgum stands of ONWR are a particularly important habitat for the woodpecker.

And these rich animal stories present only a fraction of ONWR's overall biodiversity, which extends to 620 plants, including eighteen species of carnivorous plants, nearly half of which are listed as at least vulnerable globally, as well as thousands of invertebrates, with as many 1,000 species of moth alone. The strong presence of carnivorous flora indicates the long-term significance of the unique, low-nutrient habitat in which these types of plants evolve and thrive. The bog habitats within ONWR are part of the 3% of *Sarracenia* (pitcher plant) habitat that remains in the Geological Coastal Plain, making the ONWR a vital resource for the continuation of these unique and fascinating species. These staggering numbers reflect a region where species do not merely flourish temporarily, but one that offers conditions for sustained species survival.

Like many wetlands, ONWR plays a major role in maintaining the health of the greater watershed and nearby rivers. This unique assembly of habitats is crucial to the region's biodiversity, water cycle, and health of downstream ecosystems. The downstream Suwanee River maintains its pristine condition largely due to the ONWR's protection. Within these waters, the fish of the ONWR have historically been difficult to research given the physical conditions of the area, and, consequently, historical data is relatively limited compared to other kinds of organisms in ONWR. However, there is a great diversity present, including many fish that are popular prey for local fishers.

Statement of integrity

In an area littered with roadside signage advertising that "trees grow jobs," it is not surprising that ONWR has been subjected to incursions by the lumber industry and other industrial efforts at land development. The area has been largely protected from significant industrial interventions since 1937, allowing it to maintain much of its native habitats and wilderness character. And, despite dogged attempts to develop the area throughout the late 1800s and early 1900s, the rare subtropical peat bogs are miraculously well-preserved, continuing to contribute to the important ONWR fire cycles as well as carbon sequestration. Given the area's history, its high degree of naturalness is a testament to the property's resilience, a particularly noteworthy trait because of how many comparable wetlands have been unable to survive comparable development efforts, human interactions, or changes to climate and wildlife cycles. Many of the species that once flourished throughout the Southeastern United States are now limited to small patches of their previous ranges in ONWR, patches that constitute ideal blueprints for habitat restoration, preservation, and potential reintroduction of once-abundant species.

The perimeter of the property remains largely unchanged for 7,000 years, constituting contiguous stretches of protected lands along the Suwanee and St. Mary's rivers and down to the state border with Florida. While mining companies have made inroads to develop titanium and zircon operations on the eastern boundary of the property, environmental groups have expressed opposition to these threats. The unfragmented nature of ONWR is a testament to these and similar efforts over the past 85 years to maintain the area's natural character, beauty, and heterogeneity.

Requirements for protection and management

While the land within ONWR's boundaries remains largely protected, development threats outside its borders persist in the form of planned mining operations, timber interests, pollution, and human environment expansion. Because of the symbiotic nature of the intermingling ecosystems within and outside the property, conservancy efforts are essential to maintain the naturalness and biodiversity ONWR displays. Since 1938 and the efforts of the Civilian Conservation Corps (CCC), the property has benefitted from a rigorous protection regime that monitors entrances, maintains facilities, and recognizes the need for continued vigilance. The refuge staff will continue working on partnerships with organizations and resources outside ONWR, including the Greater Okefenokee Association of Landowners, to preserve its natural resources and to ensure protection during crises and emergency weather situations. Upland management must focus on the maintenance and restoration of the longleaf pine and other endangered or vulnerable species, while downstream landowners and interest groups strive to protect the larger aquifer, air shed, and biota exchange pathways of which the ONWR is a crucial component. Cooperation with groups across the surrounding areas and continued education and outreach are essential as the refuge works to ensure its valuable place as "a natural island within a sea of the highly modified landscape of the Southeastern United States."