

**LAND PROTECTION PLAN
FOR THE PROPOSED BOUNDARY MODIFICATION OF
WACCAMAW NATIONAL WILDLIFE REFUGE**

Georgetown, Horry, and Marion Counties, South Carolina

U.S. Department of the Interior
Fish and Wildlife Service
Southeast Region
Atlanta, GA

July 2019

I. OBJECTIVES

The U.S. Fish and Wildlife Service (Service) is proposing to modify the Refuge's Approved Acquisition Boundary (AAB) by removing 6,849 acres from the current AAB and adding 6,638 acres (Figure 1). Upon approval of the minor boundary modification, the Refuge would acquire the added acreage from willing sellers only. The purpose of this project is to remove land that is no longer available and/or compatible with the mission and goals of the Refuge and the National Wildlife Refuge System and add land that contains valuable habitat suitable for threatened, endangered, and other priority species. The Minor Boundary Modification (MBM) would also enable the Refuge to expand its public use program and acquire land that is critical to flood mitigation on Refuge lands and neighboring private lands.

The scope of this Land Protection Plan is limited to the proposed modification of the AAB at Waccamaw National Wildlife Refuge (NWR). This plan is not intended to cover the specific method(s) of land acquisition that may be used, nor the development and/or implementation of specific programs for the administration and management of said lands. The Refuge would update its existing management plans to incorporate new properties as they are acquired. The updated management plans would be developed in accordance with the requirements set forth by the Department of Interior and the National Environmental Policy Act.

II. BACKGROUND

Waccamaw NWR was established on December 1, 1997, to protect habitat for the wetland-dependent wildlife associated with the floodplain basins of the Waccamaw and Great and Little Pee Dee rivers. The Refuge's AAB encompasses 54,767 acres located in Georgetown, Horry, and Marion counties. The diversity of the wetlands within the Refuge distinguishes it from similarly protected areas along the coast. Habitats include historic tidal rice fields and the blackwater and tidal freshwater forested wetlands (TFFW) that border the Waccamaw and Great Pee Dee rivers. These TFFW are among the most biologically diverse ecosystems in North America, and they provide important habitat for a variety of migratory birds and several threatened and endangered species.

The Refuge's AAB is divided into three management units (Figure 2). Each unit is defined by habitat type and requires unit-specific management strategies and objectives. Unit one is approximately 39,819 acres and consists of blackwater wetlands and TFFW. Unit two totals 12,046 acres and encompasses TFFW, emergent wetlands, and mature longleaf pine forests on Sandy Island. Unit three is 2,902 acres and includes several historic tidal rice fields, many of which remain intact and are managed for wintering waterfowl. The Refuge currently owns or leases ≈34,545 acres within the approved acquisition boundary.

III. DESCRIPTION OF ADDITION AND SUBTRACTION AREAS

Subtraction Areas

The subtraction areas consist of 6,849 acres that have been, or are in the process of, being developed or are otherwise unavailable for acquisition by the Refuge. This acreage will be removed from the Refuge's AAB and will no longer be available for acquisition. Subtraction area one is comprised of a portion of the Woodbury Wildlife Management Area, which is currently owned and managed by South Carolina Department of Natural Resources (SCDNR) and is unavailable for acquisition. Subtraction areas two and three contained upland buffer habitat when added to the AAB during the 2001 minor expansion but were subsequently converted into golf courses and residential communities. Subtraction area four is owned by the Grand Strand Water and Sewer Authority (GSWSA). In 2010, GSWSA clear-cut the majority of the longleaf pine on this tract and converted the land into a tertiary waste water treatment facility. They have recently received the permits necessary to construct a marine industrial park and are in the process of building a four-lane highway to facilitate commercial access to the property. Subtraction area five contains a privately owned golf course with an adjoining residential community.

Addition Areas

The addition areas consist of 6,638 acres of land that has been identified as valuable wildlife habitat and/or is conducive to wildlife-dependent recreation. This acreage would be added to the Refuge's AAB and acquired from willing sellers. The wetlands within the proposed addition areas meet the assessment threshold criteria of the National Wetlands Priority Conservation Plan (U.S. Fish and Wildlife Service [USFWS], 1989). As such, they are listed as part of the Winyah Bay Wetland System in the Service's Regional Wetlands Concept Plan for the Southeast Region (USFWS, 1997). In addition, riparian and bottomland hardwood forested wetlands are identified as nationally threatened ecosystems, having experienced a 70-84% decline (Noss, LaRoe, & Scott, 1995).

Longleaf Pine Forest

The historical range of longleaf pine forests spanned over 90 million acres; however, as a result of development and logging, it is estimated that less than 3 million acres remain (North Carolina Forest Service [NCFS], 2012). Surpassed only by tropical rainforests, longleaf pine forests are considered the second-most species-rich ecosystem in North America (USFWS, n.d.a). Approximately half of the 1,630 plant species found in the Southeastern U.S. are only found within longleaf pine ecosystems (NCFS, 2012). In addition, longleaf pine is the preferred cavity site of the federally endangered red-cockaded woodpecker (RCW). Addition area two includes ~660 acres of newly restored longleaf pine. Additional opportunities to restore longleaf pine exist along the upland rims of the Carolina bays in addition area three, and in addition area four, which contains unmanaged longleaf pine. Management of longleaf pine forests via prescribed burning is an objective in the Refuge's Comprehensive Conservation Plan (CCP) USFWS, 2008).

Riparian Corridor

A riparian zone is the area along a river or water body that functions as an interface between terrestrial and aquatic ecosystems (Natural Resources Conservation Service [NRCS], 1996). Riparian corridors serve as connectors between habitats and as migration routes for a variety of species, including American black bears and waterfowl. In addition, this type of habitat reduces downstream flooding and decreases nonpoint source pollution by storing and recycling nutrients

(NRCS, 1996). There are approximately 15 miles of riparian corridor in addition areas one and two.

Tidal Forested Freshwater Wetland

TFFW serves as an interface between coastal marshes and fluvial bottomland forested wetlands (United States Geological Survey [USGS], n.d.). In addition to supporting a wide range of biodiversity, these wetlands also provide several important ecosystem functions, including flood mitigation, sediment trapping, and carbon sequestration (USGS, n.d.). Common trees include swamp tupelo (black gum), bald cypress, swamp chestnut oak, cherry bark oak, sweet gum, river birch, and red maple. There are 262 acres of TFFW in addition area two. These forested wetlands constitute a large portion of the Sandy Island/Great Pee Dee floodplain.

Blackwater Forested Wetland

Blackwater forested wetlands are located along the Waccamaw and Little Pee Dee rivers. This habitat contains slow-moving water that is acidic and tea colored as a result of tannins leaching into the water from decaying vegetation. Because of the acidity of the water, these habitats often support organisms that are not found in nearby, less acidic wetlands. There are approximately 1,400 acres of blackwater forested wetlands in addition area one.

Managed Wetland

Addition area two contains 58 acres of managed wetlands. These wetlands are currently managed by the Refuge in fulfillment of a lease agreement with the owner. The hydrology of the impoundments is manipulated to encourage the growth of emergent vegetation, such as smartweed (*Polygonum* spp.), panic grass (*Panicum* spp.), red root (*Lachnanthes caroliana*), water shield (*Brasenia schreberi*), spikerush (*Eleocharis baldwinii*), arrow-arum (*Peltandra virginica*), white water lily (*Nymphaea odorata*), southern naiad (*Najas guadalupensis*), Asiatic dayflower (*Commelina communis*), and soft-stem bulrush (*Schoenoplectus tabernaemontani*). This type of vegetation provides food for a variety of waterfowl species. In addition, the acquisition of managed wetlands for migratory waterfowl and marsh birds is listed as an objective in the CCP (USFWS, 2008).

Carolina Bay

Carolina bays are isolated, elliptical depressions that provide upland wetland habitat for a variety of species, including black bears. In 2001, the Supreme Court issued a decision to reduce protections for isolated wetlands under the Clean Water Act (Sharitz, 2003), thus leaving Carolina bays vulnerable to development. Carvers Bay, located in addition area three, is the largest Carolina bay in Georgetown County and is considered one of the most important black bear conservation areas in South Carolina. The acquisition of black bear habitat is also listed as an objective in the CCP (USFWS, 2008). In addition to Carvers Bay, addition area three also includes Vandross Bay. These two bays total over 4,000 acres. The remaining acreage is upland and serves as a wildlife corridor between the bays.

Table 1: Summary of habitats within addition areas

Area One	Area Two	Area Three	Area Four
Riparian Corridors	Longleaf Pine	Carolina Bay	Longleaf Pine
Blackwater Forested Wetlands	Riparian Corridors		
	Forested Tidal Wetlands		
	Managed Wetlands		

IV. MAJOR FISH AND WILDLIFE VALUES

Waccamaw NWR lies within the Central Coastal Plain region, a globally recognized biodiversity hotspot. In addition to four species of concern, three federally endangered species have been documented or are suspected to reside on the Refuge. The Refuge is also a nesting site for swallow-tailed kites, a state listed endangered species, and the American black bear, a species currently listed as vulnerable in the state of South Carolina (SCDNR, 2006).

American Black Bear

The coastal black bear has an estimated population of 200-250 bears in South Carolina, the majority of which are located in Georgetown and Horry Counties (Butfiloski, Still, & SCDNR, n.d.). They are primarily associated with upland forests, such as the habitats found in addition areas one, two, and three. A minimum of 5,000 acres of suitable habitat is required before management techniques can be successfully implemented (SCDNR, n.d.). Acquisition of addition area three would give the Refuge the opportunity to create a black bear sanctuary that surpasses the 5,000 acre threshold recommended by SCDNR. Effective conservation of such a wide-ranging species requires landscape-scale planning, and forested corridors are an important consideration for maintaining connectivity between black bear populations (Hector, 2012). Addition areas one, two, and three have been identified as important hubs for connectivity of lands and waters across the South Atlantic region (South Atlantic Landscape Conservation Cooperative, 2017).

Red-cockaded Woodpecker

The red-cockaded woodpecker is a federally endangered species with an estimated population of 10,000 to 20,000 birds (USFWS, n.d.b). Currently, there are approximately 50 active RCW clusters within the Refuge boundary that likely serve as a donor population for the upper coastal portion of South Carolina. RCWs are present on nearly every property that is 1) located within a 20-mile radius of Sandy Island and 2) managed in accordance with RCW management guidelines. Addition area two has mature longleaf pine forests and one active RCW cluster. In addition, acquisition of the property within the proposed MBM accomplishes the following goals as outlined in the Service's 2003 RCW Recovery Plan (USFWS, 2003):

- Protection and development of large, mature pines throughout the landscape;
- Protection of existing cavities and judicious provisioning of artificial cavities;
- Restoration of sufficient habitat to support the population size necessary for recovery.

Swallow-tailed Kite

Historically, the swallow-tailed kite inhabited at least 21 states. They experienced a dramatic

decline in population between 1880 and 1910 (Cely & SCDNR, n.d.), and their current range is restricted to six states in the southeastern U. S. Waccamaw NWR contains the highest density of nesting swallow-tailed kites in South Carolina (Cely & SCDNR, n.d.). They prefer to nest and forage in the bottomland hardwood forests found within all four addition areas. In addition, management of hardwood stands to provide habitat for swallow-tailed kites is an objective listed in the CCP (USFWS, 2008)

V. RELATIONSHIP OF PROJECT TO ECOSYSTEM MANAGEMENT GOALS AND OBJECTIVES

In the early 1980s, the Service identified the Refuge area as critical habitat for migratory birds. It was included in the Service's Atlantic-Eastern Gulf Coast Migratory Bird Habitat Preservation Plan (USFWS, 1982) and the Preservation of Black Duck Wintering Habitat Plan (USFWS, 1985). In the Southeast Regional Wetlands Concept Plan, a component of the National Wetlands Priority Conservation Plan that was developed in response to the Emergency Wetlands Resources Act of 1986, the Service also identified the Refuge area as a top priority for protection.

In addition, the Refuge is located within the heart of the Winyah Bay Focus Area (WBFA), which is considered a conservation priority in the Atlantic Coast Joint Venture of the North American Waterfowl Management Plan. The WBFA encompasses 525,000 acres in the lower drainage basin of the Black, Sampit, Waccamaw, and Great and Little Pee Dee rivers and has garnered national attention for the conservation partnerships it has developed.

In 2015, The South Atlantic Landscape Conservation Cooperative and several key partners, including American Rivers, the City of Conway, Horry County, The Nature Conservancy (TNC), Coastal Carolina University, SCDNR, and the National Oceanic Atmospheric Administration, developed the Central Coastal Plain Landscape Conservation Design (LCD) (Mordecai, 2018) which includes conservation strategies specific to Waccamaw NWR.

In accordance with the established objectives of Waccamaw NWR, the 2014 National Wildlife Refuge System Strategic Growth Policy (602 FW 5), the Central Coastal Plain LCD, and the broader directives of the Service, the MBM would accomplish the following goals:

- Provide habitat for waterfowl, wading birds, raptors, neotropical migratory birds, and resident species;
- Ensure that existing refuges, new refuges, and refuge expansions support viable and persistent populations of priority conservation species and achieve measureable conservation targets, such as population objectives, that have been developed in cooperation with partners at various landscape levels (e.g., national, regional, and local);
- Ensure the future growth of the Refuge System supports species-based population objectives derived from landscape conservation designs that further an ecologically-connected network of public and private lands that are resilient to climate change and support a broad range of species under changed conditions;
- Integrate the best available science from biological planning and conservation design into the process of identifying and prioritizing lands and waters for inclusion in the Refuge System;
- Provide compatible wildlife-dependent recreational activities including hunting, fishing, wildlife observation & photography, and environmental education & interpretation for the enjoyment of present and future generations;

- Maximize the quantity and representation of cultural sites.

VI. THREATS

In the early 1900s, the Nation began to realize the detrimental effects of unrestrained logging, sprawling agriculture, and the unregulated harvesting of wildlife for sporting and commercial purposes. The challenges associated with the conservation of wildlife populations were exacerbated after World War II. Many states, including South Carolina, entered a period of rapid, sustained economic expansion and human population growth. During these boom times, South Carolina's economy and workforce began to shift away from agriculture. Migration into the state increased, and the urban population began to dominate the rural population (SCDNR, 2006).

From 1992 to 1997, approximately 100,000 acres were converted from forests, farmland, and other open space into urban developments (United States Department of Agriculture [USDA], 1997). As a result, South Carolina was ranked ninth in the Nation in terms of total land area developed per year (USDA, 1997). According to the same report, the National Resources Inventory, the growth rate from 1982 to 1992 was only 40,000 acres per year. Thus, the rate of land conversion more than doubled during this 15-year period. This development trend and the conversion of rural lands to urbanized uses – with their attendant impacts on wildlife habitat – continue unabated today.

Strong economic forces are also transforming South Carolina's agricultural economy. An increase in the cost of living coupled with the reduced profitability of agriculture has created economic hardship. As of 1997, there were approximately 4.5 million acres in agricultural production in South Carolina, representing an 18% drop since 1982 (SCDNR, 2006). Long-term declines in farmland are even more dramatic. In 1954, 124,203 farms were producing goods in South Carolina, and 57% of the land in the state consisted of farms (SCDNR, 2006). By 1992, the number of farms in the state had been reduced to 20,242, comprising 23% of South Carolina's land use (SCDNR, 2006). As the state's population continues to grow, additional undeveloped land will be converted to accommodate the increase in the demand for urban and suburban land.

In addition, downward trends in species that had been previously overlooked have become more evident. In a recent state-by-state analysis of biodiversity conducted by TNC, South Carolina ranked 14th among all states in total number of native plant and animal species and 15th in terms of risks to native species (SCDNR, 2015). In a planning exercise conducted in 1994, biologists from SCDNR estimated that as many as one third of the state's vertebrate species were already, or at risk of, experiencing a sharp decline in population (SCDNR, 2006).

The elimination and fragmentation of coastal habitat has also decimated wildlife species throughout the southeast region and is recognized by the Service as a serious threat to wildlife in South Carolina. The species most adversely affected by fragmentation are those that require special habitat. Fragmentation affects migratory songbirds and black bears, primarily through habitat loss and nest predation. In addition, more than 200 species of migratory songbirds, shorebirds, waterfowl, and raptors are found in this region and many of them are struggling. These species require large, managed blocks of forest to recover and sustain their populations.

Fragmentation of bottomland hardwood forests has transformed remaining forested tracts into

biological oases surrounded by open land that attracts large avian predators, such as great-horned owls. Drastic changes in land use have destroyed the majority of the forested corridors located along the large wetland complexes that were formerly connected by forest patches. The loss of connectivity between the remaining forested tracts hinders the movement of wildlife and reduces the functional value of smaller tracts. Severed connections also result in a loss of the gene flow required to maintain genetic viability and diversity within a population. As a result, remaining populations are rendered even more vulnerable to habitat modification and degradation. The reestablishment of migration corridors is of critical importance to the conservation of wide-ranging species.

VII. ALTERNATIVES

In determining how to best protect the 6,638-acre project lands identified in this document, the Service considered and evaluated two alternative actions:

Alternative A: Modification of AAB (Preferred Alternative)

Under this alternative, the Service would remove 6,849 acres from the current AAB, which would result in those areas no longer being eligible for acquisition by the Service. The Service would also add 6,638 acres to the AAB. This is the preferred alternative, as it would enable the Refuge to acquire and manage these lands and preserve their nationally significant historic value, the ecological services they provide, and their diversity of wildlife habitats.

Alternative B: Retention of AAB (No Action)

The Service would not modify the existing Refuge acquisition boundary, nor accept donations or otherwise acquire any tracts within the MBM area. Said lands would remain in private ownership, and recreational, residential, and commercial development is probable. The 6,849 unacquired acres within the AAB would remain within the boundary but are unlikely to be acquired due to unwilling sellers and/or the loss of ecological value that prevents these lands from contributing to the purposes and mission of the Refuge and the NWRS.

Protection of the area's fish and wildlife habitats and its other natural resource values would be contingent upon the enforcement of existing federal, state, and local regulatory authorities (the Clean Water Act, state water quality and pollution requirements, etc.), and the discretion of the private landowners.

VIII. BENEFITS

The MBM is the most effective strategy to meet the immediate conservation goals and objectives of the Refuge and our watershed conservation partners. It is a valuable tool that would remove developed lands with no clear conservation value from the AAB. This action aligns with the landscape analysis conducted by the Refuge and its conservation partners. The MBM would allow the Refuge to refocus land acquisition to align with the needs identified in the landscape analysis process and respond to dynamic threats, such as sea level rise and development.

Waccamaw NWR benefits the surrounding community by mitigating the effects of sea level rise and flood events. Sea level rise affects coastal communities in a variety of ways, including gradual creeping of seawater into community infrastructure, which causes extensive damage to residential and commercial developments and septic systems. Sea level rise and associated climate change contribute to more intense storms, the impacts of which can be reduced by preserving undeveloped wetlands. An example of this benefit has been demonstrated in Horry County, SC. In 2017, the protected land within the Refuge contributed to the upgrade of Horry County from a Class 9 to a Class 7 rating in the Community Rating System (CRS) of the National Flood Insurance Program, which is administered by the U.S. Department of Homeland Security and the Federal Emergency Management Agency. As a class 9 community there was approximately \$314,313 in flood insurance savings in the unincorporated areas of Horry County. As an upgraded Class 7 community, residents who reside within the floodplain of the unincorporated areas of Horry County will receive a 15% discount on their flood insurance premiums, which will total \$875,147. Although not an established purpose of the Refuge, this benefit demonstrates the ecosystem services the Refuge provides and garners support in the local community.

The TFFW of the Waccamaw and Pee Dee rivers are conservation investments that contribute to the conservation of wildlife, promote human-nature connection, improve climate resilience in the surrounding community, and preserve crucial ecosystem services. In addition, the protection and management of Carvers Bay and its associated wetland corridors would reduce bear fatalities due to auto collisions and habitat fragmentation and preserve genetic diversity within the population. The MBM would also provide opportunities to improve public access to nature, which would benefit urban residents in the City of Conway. Lastly, the MBM would provide the public with access to Hasty Point Plantation, protect the drinking water supply, and protect vulnerable habitat critical to the conservation of endangered species.

IX. ESTIMATED COST

Land acquisition costs would be based on the current fair market value as determined by an appraisal. A significant number of the parcels in the addition areas have been acquired by refuge partners, such as TNC, American Rivers, Historic Ricefields Association, and Horry County, and would be donated to the Refuge upon approval of the MBM. These land values at the time of acquisition are included in Table 2.

Table 2: Summary of estimated cost

Addition Area	Cost Per Acre	Number of Acres	Total
Area One	\$2000	1,400 (956 Donation)	\$888,000
Area Two (Bargain Sale Acreage)	\$9,494.81	777	\$5,000,000
Area Two (Market Value Acreage)	\$3,500	215	\$752,500
Area Three	\$1,500	4,426 (3,191 Donation)	\$1,852,500
Area Four	\$2,400	60	\$144,000
Total		6,638	\$8,637,000

X. ENVIRONMENTAL CONTAMINANTS AND HAZARDOUS WASTE

No contaminants or hazardous wastes are known to exist within the proposed action area. The partners who acquired them have conducted pre-acquisition contaminant screenings on several parcels. These screenings include the Carvers Bay Tract, Floyd Tract, RMS/City of Conway, and the Westmoreland Tracts. A Level I contaminant survey for the addition areas will be conducted prior to final approval of the Decision Document and individual Level 1 contaminant Surveys will be conducted on every tract that is proposed for acquisition by the Service.

XI. CULTURAL AND HISTORIC RESOURCE IMPACTS

Section 106 of the National Historic Preservation Act of 1966, as amended, and Section 14 of the Archaeological Resources Protection Act require the Service to evaluate the effects of any of its actions on cultural resources (e.g. historic, architectural, and archaeological) that are listed or eligible for listing in the National Register of Historic Places. That consultation has been requested of the appropriate Service personnel as part of this process.

Located in the Pee Dee River Rice Planters Historic District within Addition Area Two, Hasty Point Plantation is a former rice plantation that was listed on the National Register of Historic Places on October 3rd, 1988. The Plantation also contributed to the designation of Plantersville Road as a State Scenic Byway. As such, Hasty Point is an important cultural and historical site for colonial Georgetown and the United States.

This MBM would connect visitors with the rich cultural history of the area by providing the public with opportunities to enjoy Hasty Point Plantation. The Plantation is listed on the National Register of Historic Places and is a representation of the rice plantation era in colonial Georgetown. Hasty Point would also provide future opportunities for cultural exploration and tourism by serving as an ADA accessible access point to Sandy Island, which is one of the largest undeveloped islands on the East Coast and is deeply rooted in Gullah Geechee culture.

Figure 1. Overview of Refuge lands , addition areas, and subtraction areas.

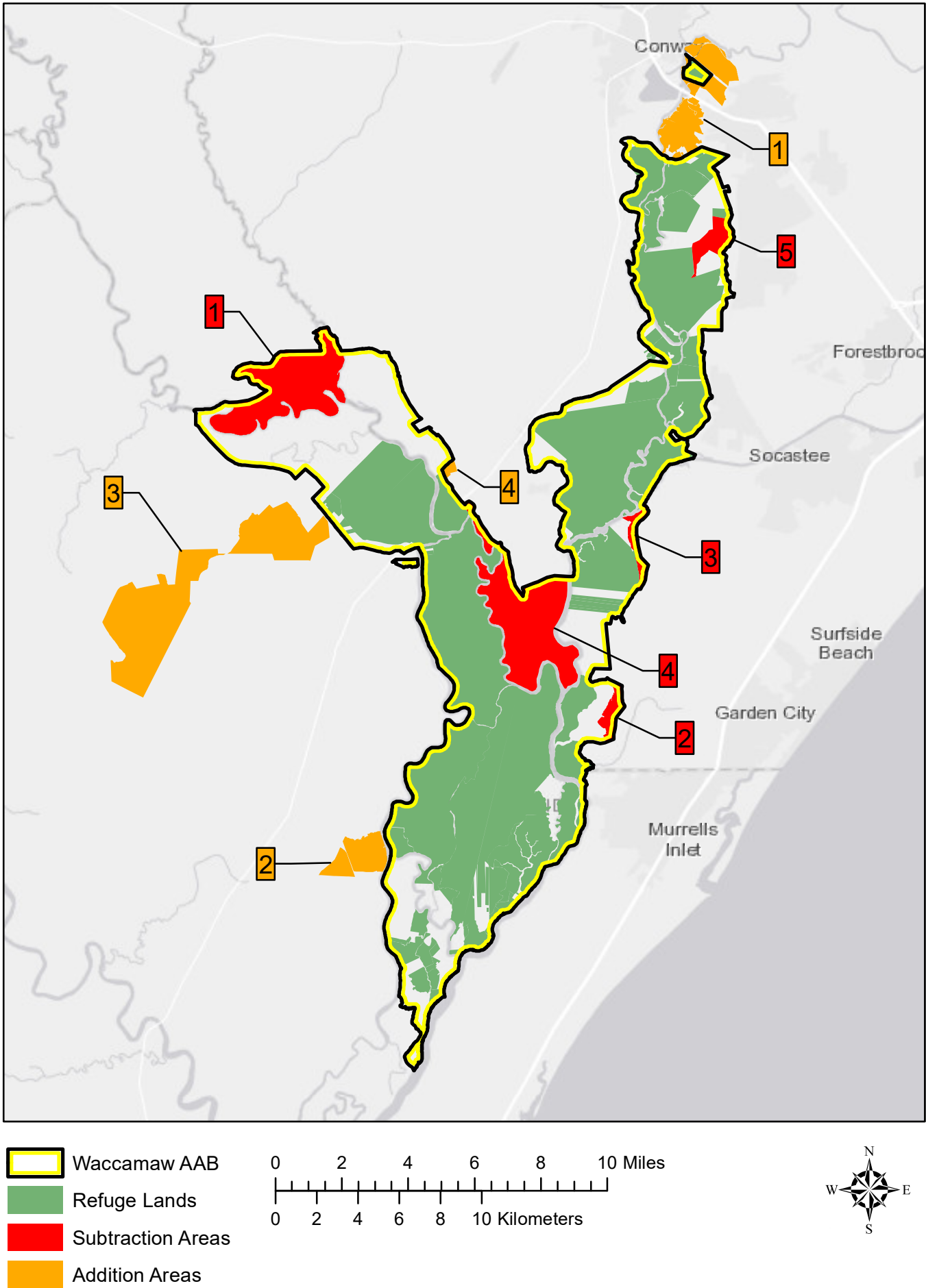
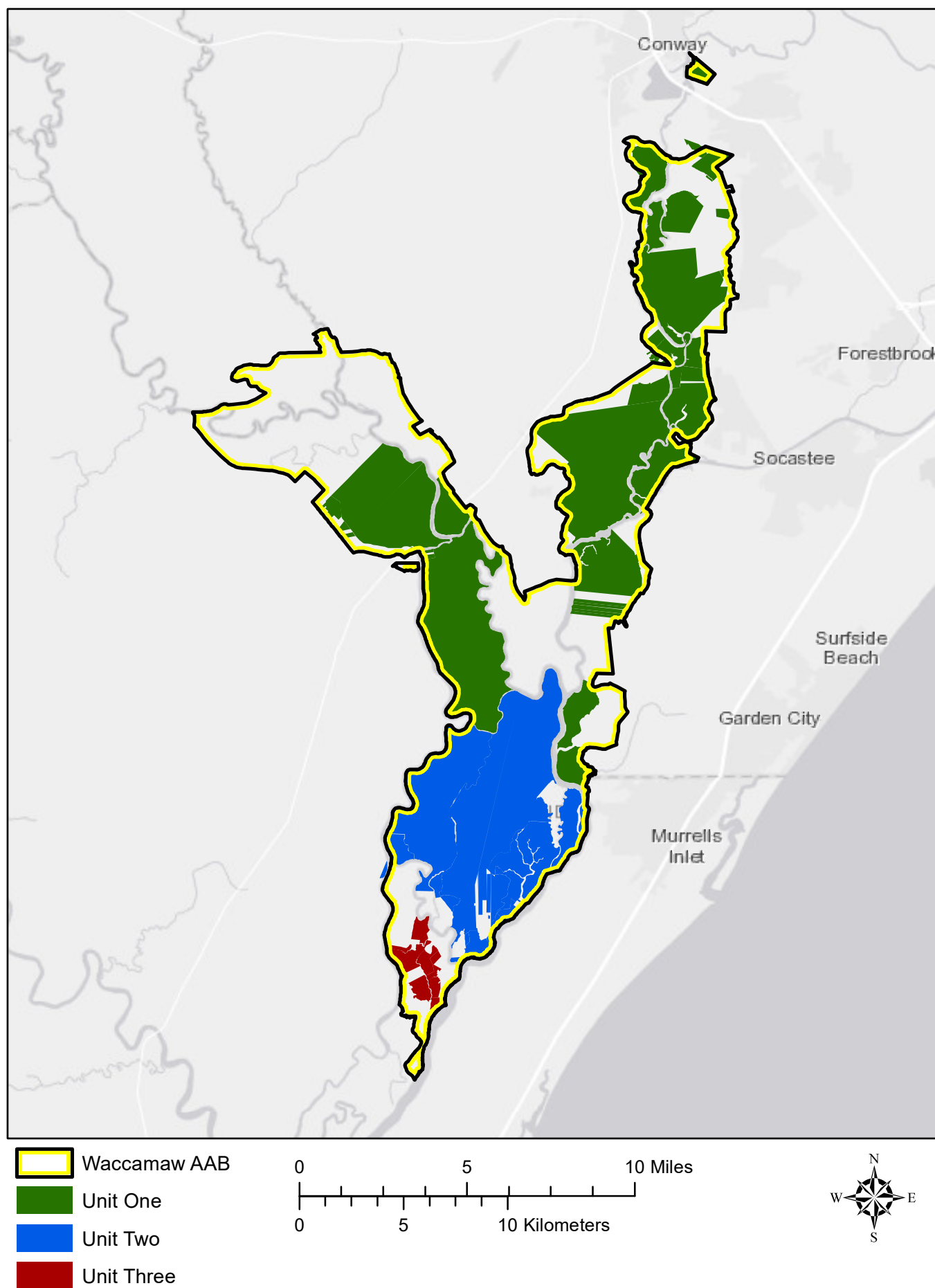


Figure 2. Overview of Refuge management units.



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