



FORT CLINCH STATE PARK Park Chapter

ATLANTIC COAST REGION

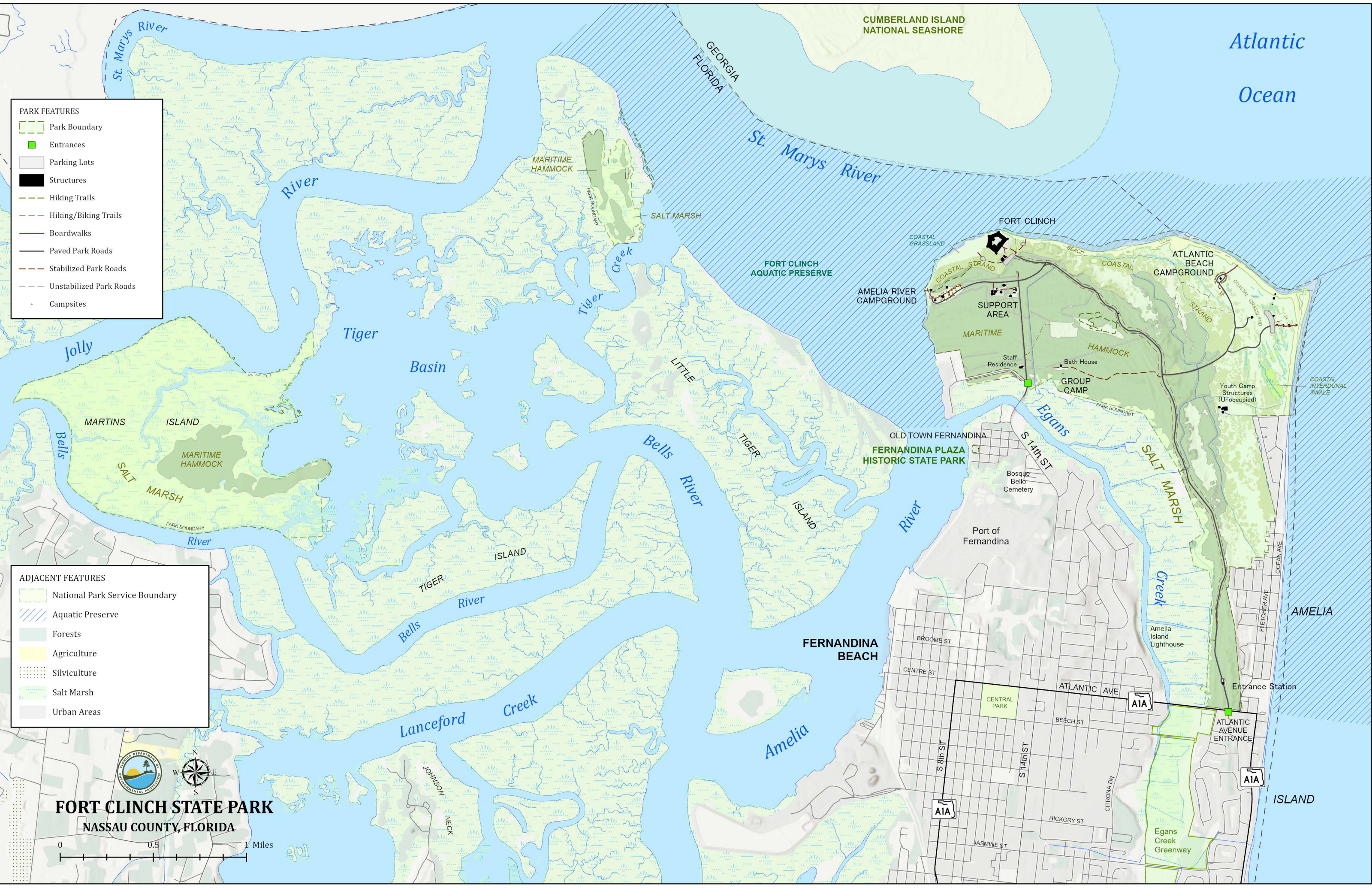
PARK FEATURES

- Park Boundary
- Entrances
- Parking Lots
- Structures
- Hiking Trails
- Hiking/Biking Trails
- Boardwalks
- Paved Park Roads
- Stabilized Park Roads
- Unstabilized Park Roads
- Campsites

ADJACENT FEATURES

- National Park Service Boundary
- Aquatic Preserve
- Forests
- Agriculture
- Silviculture
- Salt Marsh
- Urban Areas

FORT CLINCH STATE PARK
 NASSAU COUNTY, FLORIDA



CUMBERLAND ISLAND
 NATIONAL SEASHORE

Atlantic
 Ocean

GEORGIA
 FLORIDA

AMELIA

ISLAND

FERNANDINA PLAZA
 HISTORIC STATE PARK

FERNANDINA
 BEACH

Port of
 Fernandina

FORT CLINCH

ATLANTIC
 BEACH
 CAMPGROUND

AMELIA RIVER
 CAMPGROUND

SUPPORT
 AREA

GROUP
 CAMP

Youth Camp
 Structures
 (Unoccupied)

OLD TOWN FERNANDINA

Bosque
 Bello
 Cemetery

Amelia
 Island
 Lighthouse

Entrance Station

ATLANTIC
 AVENUE
 ENTRANCE

Egans
 Creek
 Greenway

AIA

AIA

ATLANTIC AVE

BEECH ST

CITRONA DR

HICKORY ST

JASMINE ST

BROOME ST

CENTRE ST

S 8th ST

S 14th ST

OCEAN AVE

FLETCHER AVE

Egans

S 14th ST

HAMMOCK

COASTAL

COASTAL

BEACH

COASTAL
 GRASSLAND

COASTAL
 STRAND

FORT CLINCH
 AQUATIC PRESERVE

LITTLE

TIGER

ISLAND

ISLAND

TIGER

Basin

Tiger

River

ISLAND

MARTINS

Bells

Jolly

River

St. Marys
 River

MARITIME
 HAMMOCK

SALT MARSH

Creek

park boundary

INTRODUCTION

LOCATION AND ACQUISITION HISTORY

Fort Clinch State Park is located in Nassau County within the city limits of Fernandina Beach (see Vicinity Map). Access to the park is from State Road A1A in Fernandina Beach, also known as Atlantic Avenue. The Vicinity Map also reflects significant land and water resources existing near the park.

Fort Clinch State Park was initially acquired on Sept. 20, 1935. Currently, the park comprises 2,178.2 acres. The Board of Trustees of the Internal Improvement Trust Fund (Trustees) hold fee simple title to the park and on Jan. 23, 1968, the Trustees leased (Lease No. 3620) the property to the Division of Recreation and Parks (DRP) under a 99-year lease. The current lease will expire on Jan. 22, 2067.

Fort Clinch State Park is designated single-use to provide public outdoor recreation and other park-related uses. There are no legislative or executive directives that constrain the use of this property (see the Appendix). A legal description of the park property can be made available upon request to the Florida Department of Environmental Protection (DEP).

SECONDARY AND INCOMPATIBLE USES

In accordance with 253.034(5) F.S., the potential of the park to accommodate secondary management purposes was analyzed. These secondary purposes were considered within the context of DRP's statutory responsibilities and resource values. This analysis considered the park's natural and cultural resources, management needs, aesthetic values, visitation and visitor experiences. It was determined that no secondary purposes could be accommodated in a manner that would not interfere with the primary purpose of resource-based outdoor recreation and conservation.

DRP has determined that uses such as, water resource development projects, water supply projects, stormwater management projects, linear facilities and sustainable agriculture and forestry (other than those management activities specifically identified in this plan) would not be consistent with the management purposes of the park.

In accordance with 253.034(5) F.S., the potential for generating revenue to enhance management was also analyzed. Visitor fees and charges are the principal source of revenue generated by the park. It was determined that multiple-use management activities would not be appropriate as a means of generating revenues for land management. Instead, techniques such as entrance fees, concessions and similar measures will be employed on a case-by-case basis as a means of supplementing park management funding. Generating revenue from consumptive uses or from activities that are not expressly related to resource management and conservation is not under consideration.

PURPOSE AND SIGNIFICANCE OF THE PARK

Park Purpose

The purpose of Fort Clinch State Park is to protect pre-Civil War era Fort Clinch and interpret the fort's historic artifacts while also preserving the diverse surrounding ecosystem and dependent imperiled species habitats of Florida's northernmost barrier island. The park provides for compatible recreation opportunities to interpret and improve understanding of these natural and cultural features.

Park Significance

- Listed in the National Register of Historic Places in 1972, the park protects Fort Clinch, built as a part of the "Third System" of defense used to defend the entrance of Cumberland Sound. Fort Clinch was erected with a detached scarp wall and is one of the only coastal fortifications in the nation with this unique construction style. Construction on the fort began in 1847 and remains unfinished.
- The park offers active living history interpretations that showcase the life of a Union soldier in 1864. Artifacts such as small arms, soldier uniforms, personal letters, construction materials and cannons are displayed at the fort and in the museum.
- The park interprets the Civilian Conservation Corps (CCC) program, as Fort Clinch State Park was one of eight state parks in Florida built by the CCC. The CCC program was the impetus for the Florida State Parks system.
- The park protects diverse natural communities that include Florida's iconic white sand beaches and coastal beach dunes, one of the state's most outstanding examples of maritime hammock, and portions of the Amelia River saltwater estuary.
- The park provides vital habitat for imperiled species such as Worthington's marsh wren (*Cistothorus palustris griseus*), piping plover (*Charadrius melodus*), gopher tortoise (*Gopherus polyphemus*) and loggerhead sea turtle (*Caretta caretta*).
- The park provides numerous opportunities for resource-based outdoor recreation including camping, beach activities, fishing, hiking, biking, wildlife viewing, and interpretation of the structure and artifacts found at Fort Clinch.

Central Park Theme

Watching over the Cumberland Sound coastline, Fort Clinch comes to life with the voices of soldiers who lived here, sharing their stories of dedication, hardship and daily preparation as they defended our nation.

Fort Clinch State Park is classified as a state park in the DRP unit classification system. In the management of a state park, a balance is sought between the goals of maintaining and enhancing natural conditions and providing various recreational opportunities. Natural resource management activities are aimed at management of natural systems. Development in the park is directed toward providing public access to and within the park, and to providing recreational facilities, in a reasonable balance, that are both convenient and safe. Program emphasis is on interpretation of the park's natural, aesthetic, and educational attributes.

OTHER DESIGNATIONS

The unit is not within an Area of Critical State Concern as defined in section 380.05; Florida Statutes and is not presently under study for such designation. The park is a component of the Florida Greenways and Trails System, administered by the DEP Office of Greenways and Trails.

All waters within the park have been designated as Outstanding Florida Waters, pursuant to Chapter 62-302, Florida Administrative Code. Surface waters in this park are also classified as Class III (suitable for fish consumption and recreation) waters by DEP. This park is within Fort Clinch State Park Aquatic Preserve as designated under the Florida Aquatic Preserve Act of 1975 (Section 258.35, Florida Statutes).

PARK ACCOMPLISHMENTS

- Completed Division of Historical Resources (DHR) grant for Fort Bastion restoration. Awarded Phase II of DHR grant in 2019.
- Annually exceeded invasive plant treatment goals.
- Continued to cooperate with federal, state and local agencies and researchers regarding monitoring and assessments of beach erosion within the park particular to the historic fort structure.
- Continued to be the “flagship” for living history in Florida and one of the most significant living history programs in the country.
- Provided more than 100 interpretive programs, adding two new annual programs (“Cars and Cannons” and “Cannons on the Plaza”).

RESOURCE MANAGEMENT COMPONENT

Fort Clinch State Park Management Zones		
Management Zone	Acreage	Managed with Prescribed Fire
FCL-01	92.59	N
FCL-02A	144.54	N
FCL-02B	3.95	N
FCL-03	278.64	N
FCL-04	376.23	N
FCL-05	171.97	N
FCL-06	207.68	N
FCL-07	49.34	N
FCL-08	35.25	N
FCL-09	74.35	N
FCL-10	756.53	N
FCL-NoZoneID	41.32	N



FORT CLINCH STATE PARK
Management Zones



Sources: ESRI; Florida Department of Environmental Protection
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TOPOGRAPHY

Fort Clinch State Park is located at the northern tip of Amelia Island, the northernmost barrier island along Florida's Atlantic coast in Nassau County. The unique feature of this barrier island chain is its extremely broad expanse of lowland salt marshes and meandering tidal creeks lying landward of old beach ridges that formed during the Pleistocene Epoch (Alber et al. 2005). In Florida, geologists describe this distinct physiographic region as the Atlantic Coastal Ridge and part of the St. Marys Meander Plain (White 1970). The origins of the beach sediments that comprise these coastal islands are from both continental shelf deposits and Piedmont-draining river systems (Giles and Pilky 1965). In Florida, two major watersheds that have influenced the geologic processes in the formation of Amelia Island are the Nassau and St. Marys Rivers (Foyle et al. 2004). Cumberland Island, Georgia is positioned immediately north of Fort Clinch across the St. Marys Inlet. Because of their shared resources and similarities, scientists often discuss the numerous attributes of Amelia and Cumberland Island together (Raichle et al. 1997).

Topographic relief at Fort Clinch ranges from sea level to 52 feet mean sea level. The highest elevations occur along a ridge of old barrier dunes that extends in an arc from St. Marys Inlet southward through the center of the park. The park's topography contains linear undulating ridges with alternating interdunal swale depressions within the classic barrier island system (Graham and Parkinson 2009; Johnson and Muller 1993; Florida Natural Areas Inventory (FNAI) 2010). On the eastern shoreline of the park, dune ridges as high as 18 feet run parallel to the Atlantic Ocean. In contrast, dunes in the northwestern portion of the park are truncated. They generally run in an east to west direction, paralleling the St. Marys Inlet. These dune ridges are 10-25 feet in height, with an occasional dune reaching 38 feet.

The recent geomorphologic history of Amelia Island has been dramatic and includes tremendous anthropogenic efforts to stabilize and improve the St. Marys Inlet for human navigation. Historically, extensive shoals such as Kingsley Bank, Pelican Shoals and an emerging island called North Breakers existed at the entrance to the St. Marys River (McLemore et al. 1981). These deposits were the result of a natural net southerly transport of ocean sediments in the Cumberland Island region (Byrnes and Hiland 1995). A United States Coastal Survey Map from 1875 (Patterson 1875) depicts the north end of Amelia Island as substantially narrower than at present (Bache 1857; Parchure 1982). A comparison of historic maps during the period from 1857 to 1957 clearly shows Amelia Island's northeastern shoreline advanced approximately 3500 feet seaward (Raichle et al. 1997).

One primary reason that major topographic changes have taken place on Amelia and its northern neighbor, Cumberland Island is in response to the jetty armoring of the St. Marys Inlet (Kraus et al. 1994; Olsen 1995; Raichle et al. 1997). In northeast Florida, the St. Marys Inlet and the adjacent beaches, have long been designated as one of Florida most "critically eroded" coastal regions (DEP 2012a).

St. Marys Inlet has remained navigable since at least the mid-1500s even though subtle shifts in the main entrance channel naturally occurred due to sedimentation and shoaling processes. Prior to any inlet improvements, the St. Marys Entrance Channel was about 12 feet deep across its outer bar (Raichle et al. 1997). More recently, mechanical dredging has maintained the channel depth between 40-70 feet (Howard and Olsen 2004). Historically, a shallower secondary channel also hugged the Cumberland Island coast (Leslie 1862). In 1879, the U.S. Congress, seeking to guarantee and improve access to the Port of Fernandina, authorized construction of two large stone jetties at the St. Marys Inlet (McLemore et al. 1981). Jetty construction finished in 1904. One jetty, extending 19,150 feet, is located at the south

end of Cumberland Island; the other jetty, 11,200 feet long, is at the north tip of Amelia Island. The consequences of this anthropogenic armoring set in motion the need for the U.S. Army Corps of Engineers (USACE) to provide constant maintenance and attention to a vast set of coastal erosion and accretion issues in this region (USACE 1984, 1999).

Even before construction of the jetties, the USACE had noted a problem with erosion along the shoreline of the inlet fronting Fort Clinch. The counterscarp wall of the fort, described in 1843 as being hundreds of feet from the high-water mark, was observed in 1880 to be impacted by every high tide (Raichle et al. 1997). Attempts to stabilize the site began in 1881 with the construction of five spur groins; two additional groins were completed in 1883.

Construction of the north and south jetties exacerbated the erosion problem at the base of the fort. What had previously been a very broad inlet with two navigable channels was transformed into a constricted single inlet with all flow confined between the jetties (Parchure, 1982). An increase in the inlet flow rate (both quantity and velocity) resulted. Scouring forces of currents in St. Marys Inlet increased significantly. The forces were greatest at the narrowest point of the inlet, which happened to be opposite the fort. Another by-product of jetty construction was the removal of the capacity of the shoals at the mouth of the inlet to buffer the north tip of Amelia Island from incident wave energy. The vulnerability of both the island and the fort to erosional forces increased, and by 1899, a significant amount of shoreline east of the fort had been lost. It became apparent to engineers that the fort was beginning to act as a headland projecting into the inlet, thereby interrupting littoral drift of sand from east to west and starving the beaches west of the fort (Olsen 1995). In an attempt to resolve the problem, six more groins were constructed in 1899 along the shoreline just west of the fort (Raichle et al. 1997).

Among the more recent efforts to stabilize the shoreline in front of the fort was work done by the Civilian Conservation Corps (CCC) between 1937 and 1939. A 1937 survey by the National Park Service had recommended the placement of nine groins in the area. At least five of the original groins were still in existence then, albeit in need of repair. Consequently, the CCC project was a combination of new construction and rehabilitation of old structures, including restoration of an old seawall of undetermined age in front of the fort.

After Hurricane Dora caused significant damage to the groins at the base of the fort in 1964, erosion accelerated. The response was to construct a rock revetment along the beach as a temporary protective structure. Despite recommendations by the USACE, no further action took place until 1992 when a groin restoration project commenced. For a variety of reasons, especially lack of funding, the project did not fulfill design specifications. The groins in front of the fort received beach nourishment materials of 158,000 cubic yards (cy) in 1993 and 84,400 cy in 1996. Severe erosion continued, however, exacerbated by regular maintenance dredging of the inlet to accommodate Trident submarines stationed at the Kings Bay Naval Submarine Base (Kraus et al. 1994). The inadequacies of the groin system left the shoreline at the fort still vulnerable to erosion. If nourishment alone were the response, dredge sediment ranging from an estimated 100,000 to 250,000 cy would be needed every two years. However, coastal engineers have determined that long-term protection of the fort needed to include additional restoration alternatives beyond and including nourishment (Olsen 1995).

In the late 1990's the Division solicited various project options to address the significant on-going erosion problems. One such project called St. Marys Inlet Management Study addressed northeast Florida's coastal erosion in a regional context with additional discussions about possible measures to

protect the fort (Raichle et al. 1997). Another alternative that the Division eventually decided to support was the Fort Clinch Shoreline Stabilization Feasibility Study (Raichle and Olsen 1998). This favored option targeted restoration of shoreline sediments around the fort using a combination of activities, including groin rehabilitation, addition of revetments to existing groins, and construction of new revetment-equipped groins. In 1998, the Division acquired necessary funding to implement the Fort Clinch Shoreline Stabilization project and contractors completed the project in May 2000 (Raichle and Olsen 1998).

As constructed, the revitalized groin system along the fort shoreline consisted of two new T-head groins and four rehabilitated groins modified with T-heads. A concrete mattress foundation at the base of each groin provided additional support. In February 2001, the groin field in front of the fort and the inlet shoreline east of the fort received about 150,000 cy of beach nourishment materials dredged from the inlet. In January 2001, District staff established a monitoring protocol to document the long-term effectiveness of the groins. Periodic monitoring of the site currently includes photography at established photo points and use of GPS to map the shoreline in front of the fort.

In addition to shoreline erosion at the fort, another major consequence of jetty construction in 1904 was significant regional coastal shoreline changes (Howard and Olsen 2004). With such extreme alterations, this inlet jetty system functions as a complete littoral barrier to alongshore sediment transport (Kraus et al. 1994; Rosati et al. 2002). Over 200,000 cy per year passes over the north jetty at Cumberland to create an ongoing southerly advance of this island (Richards and Clausner 1988; Howard and Olsen 2004). As a result, regular maintenance dredging to move large quantities of sand is required, and numerous federally authorized improvement projects have deepened, lengthened and widened the St. Marys Inlet navigation channel (USACE 1999). Since 1957, a substantial portion of shoreline below the Fort Clinch jetty has been erosional due to this littoral barrier, and periodic nourishment with inlet sediment stabilizes this condition. Similar problems are also occurring at the south end of Amelia Island at Nassau Sound Inlet (Raichle 1993).

Jetty construction and beach manipulation are not the only human impacts upon the topography of Fort Clinch State Park. Landscape changes associated with early English Period plantations are likely also. Old maps indicate that an indigo processing facility once operated in vicinity of Willow Pond. When the fort itself was constructed in 1847, a military road was built to connect it with Old Fernandina. This road proceeded south from the fort, slicing through east-west dune lines (U. S. Coastal Survey 1875) and disrupting natural drainage patterns. Later, the City constructed 14th Street parallel to the military road, reinforcing this disruption.

Judging from old aerial photography, channeling and straightening of Egan's Creek to the west of the park occurred sometime before 1943. Spoil from the project was deposited along the edges of the marsh, much of it near the south end of the current park drive. In the 1950s, coastal managers constructed mosquito control ditches throughout the Egan's Creek marshes (Coastal Engineering Lab 1958). The ditches extended well into the uplands of the park, changing the drainage characteristics of the freshwater interdunal swale wetlands and introducing saltwater tidal influences. The ditches and their adjacent berms constitute a significant modification of the natural topography of the park. Another major alteration of topography took place sometime between 1953 and 1960 when a 2.5- acre borrow pit was excavated west of Willow Pond. The pit supplied material for approaches to the 14th Street Bridge across Egan's Creek. Other topographic changes in the park have resulted from destabilization of dunes on the east side of the park (especially the "walking dune"), due in large part to residential development east of the park.



DEM (ft.)

255

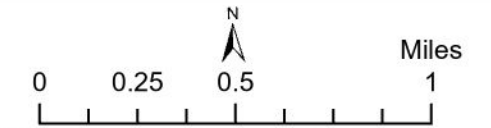
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5 ft. Contours

Park Boundary



FORT CLINCH STATE PARK
Topography



Sources: ESRI; Florida Department of Environmental Protection
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SOILS

Eleven soil types occur at Fort Clinch State Park, including Beaches, Fripp fine sand, Leon fine sand, Newhan-Corolla, Urban land, Leon fine sand tidal, Ridgewood fine sand, Tisonia mucky peat, Kureb-Resota fine sands, Aqualfs, and Corolla fine sand (Watts 1991). The soils are mapped (see Soils Map), and a detailed description of each soil type is included in the Appendix.

Most of the soils found at Fort Clinch State Park are Entisols. Entisols occur throughout Florida in the older dunes of the Pleistocene and Holocene epochs. These soils can sustain growth of maritime hammock such as that found at the park. The floristic richness of these hammocks is undoubtedly dependent upon the improved nutrient value of the substrate, which contains a considerable amount of coquina shell fragments. Only in two small areas of the park is the Spodosol order of soils represented. These areas, as one might expect, are associated with mature maritime hammock.

Representatives of two suborders of Entisols, aquents and psamments, occur at Fort Clinch State Park. Aquents are wetter soils, found in tidal marshes where they are in a continual state of saturation. Psamments, in contrast, have low water- holding capacity and account for all upland soils at the park. The only suborder of Spodosols represented at the park is Aquod. This particular suborder, very common in Florida, is distinguished by its characteristic hardpan and associated poor drainage.

Soil erosion is evident at three primary locations in the park including the St. Marys Inlet and Atlantic shorelines, the hiking/biking loop trail, and along the network of mosquito ditches that bisect the interdunal swale wetlands. The most severe park erosion occurs along the shorelines of the St. Marys Inlet and Atlantic Ocean as was discussed in the *Topography* section.

Soil disturbance and erosion from swift tidal currents in the St. Marys Inlet can be highly detrimental to the structural integrity of the park's primary cultural feature, namely Fort Clinch. Continual exposure to this type of environmental stress may eventually lead to serious destabilization of the fort's walls. The restoration efforts that took place in the early 2000s to revitalize the T-head groin system along the shoreline adjacent to the fort appear to have stabilized the majority of the erosion problem. However, Cumberland Island's continued accretion and growth southward into St. Marys Inlet is one of the current threats to the park's northern shoreline (Howard and Olsen 2004). As the south end of Cumberland Island accretes, the main navigation channel for the St. Marys inlet also migrates southward and becomes dangerously close to the park's shoreline near Fort Clinch.

Areas within the park that are also prone to significant soil erosion include service roads, footpaths, and areas of high visitor use including the hiking and mountain bike loop trail system. The Fort Clinch trail system, created in the late 1990s, accommodates both hikers and mountain bikes. This 5.5-mile loop trail is adjacent to the main park drive and runs from the park entrance at the south to the fort parking area at the northern terminus. Most of the trail follows gently undulating topography through oak dominated hammocks, but occasionally the trail is routed over more erosion-prone dune scarps. The trail has been excluded from the most sensitive and highest dune ridges and is diverted onto the main park drive as a shared multiple use trail in one of its sections. Considering the age of the trail, the trail system is in fairly good shape given the erosion rates. However, it is well known that all trails will eventually suffer from the effects of soil erosion in the absence of an adequate maintenance plan (Bratton et al. 1979). Even though there are specific areas on the trail that are in need of repair, the erosion is not extreme at any one location. The areas that do accumulate the heaviest erosion rates are

those sections with elevated slopes, areas where the trail passes immediately adjacent to large oak or cedar trees with extensive root systems, and sharp corners.

Despite attempts at mitigation, the foot trails into several old dunes that were once stable are also eroding significantly. For example, Fort Clinch has endured long- term problems with an illegal neighborhood cut-through that bisects a large beach ridge, dubbed the “walking dune”, on the eastern park boundary. Near the River Campground, unauthorized footpaths threatened to destabilize large vegetated dunes in the past. Strategically placed fences have discouraged these footpaths.

The park routinely monitors susceptible areas for changes in erosion patterns and will continually encourage compliance with staying on designated trails. Previous erosion control measures have included the planting of stabilizing vegetation such as sea oats and the placing of fences in strategic locations to block or divert foot traffic from erosion prone areas. Management activities will continue to follow accepted best management practices to minimize or prevent additional soil erosion and to protect the park’s soil and water resources.

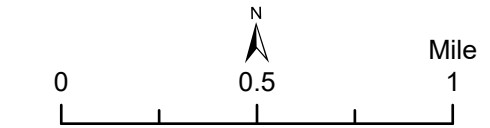


Soils

3 - Beaches
5 - Fripp fine sand, rolling
8 - Kureb fine sand, 0 to 5 percent slopes
9 - Leon fine sand, 0 to 2 percent slopes
12 - Newhan-corolla, rarely flooded, fine sands, rolling
17 - Urban land
19 - Leon fine sand, tidal
27 - Ridgewood fine sand, 0 to 5 percent slopes
28 - Tisonia mucky peat, tidal
30 - Kureb-resota fine sands, rolling
32 - Aqualfs, loamy
44 - Corolla fine sand, 2 to 6 percent slopes, rarely flooded
99 - Water
100 - Waters of the Atlantic Ocean



FORT CLINCH STATE PARK
Soils



Sources: ESRI; Florida Department of Environmental Protection
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HYDROLOGY

Fort Clinch State Park occupies the northern portion of Amelia Island, a coastal barrier island located on the Florida/Georgia border. Amelia Island lies at the southern extent of a large section of Atlantic coast known as the Sea Islands Coastal Region, which contains as many as 23 short drumstick-shaped barrier islands separated from the mainland and surrounded by water during high tides (Hayes 1994). This unique barrier chain extends for 112 miles from Bulls Island, South Carolina to Little Talbot Island, Florida (Mathews et al. 1980).

Amelia Island is approximately 13.5 miles long and has a maximum width of 3 miles. The island is oriented parallel to the mainland, bound on the east by the Atlantic Ocean, on the north by St. Marys Inlet (mouth of the St. Marys River and Cumberland Sound), on the west by the Amelia River and on the south by the Nassau River (Raichle et al. 1997). Amelia Island's land area totals about 11,600 acres, with 1,363 acres comprising Fort Clinch State Park. The park's most prominent hydrological features include the St. Marys River, Egans Creek, Willow Pond and an imperiled natural community, coastal interdunal swales (Florida Natural Areas Inventory 2010). The main hydrological issues that influence the park's water resources are 1) erosion and sedimentation along the shoreline of the St. Marys Inlet and Atlantic beaches, 2) regional groundwater depletion and saltwater intrusion and 3) increased estuarine water quality degradation.

The Nassau and St. Marys rivers are the two large surface water drainage basins west of the Amelia Island. The St. Marys River originates in the Okefenokee Swamp of southern Georgia, approximately 125 miles upstream from Cumberland Sound/St. Marys Inlet. The drainage area of the St. Marys watershed encompasses nearly 1,000 square miles in Florida alone (Georgia and Florida total is 1,585 square miles). Tidal influences on the St. Marys River can go as far as 64 miles upstream with typical tidal flow reversals that occur up to twice daily as far up as 21 miles (DEP 2004).

The Nassau watershed is about half the size (464 square miles) of the St. Marys basin and is contained entirely within Florida (Ayres Associates 1999). Egans Creek and the southern portion of the Amelia River are included within the Nassau River basin. Egans Creek, an extensive tidal creek and salt marsh community, lies along most of the eastern boundary of Fort Clinch State Park. At least one historic map references this system as Clarkes Creek (Leslie 1862). Egans Creek empties westward into the Amelia River. The Amelia River connects the St. Marys River to the north and with the Nassau River to the south (DEP 2004). Major portions of the Amelia River were historically channelized to create a navigable Intracoastal Waterway along the entire western side of the island. Numerous tributaries braid through the salt marsh ecosystem to make up the Amelia River estuary, which includes creeks such as Jackson, Alligator, Lanceford, Soap, St. Joseph, Tiger and Bells River. These waters are included either in the Fort Clinch State Park Aquatic Preserve or in the Nassau River-St. Johns River Marshes Aquatic Preserve (DEP 1986). Two isolated estuarine upland islands embedded within this extensive salt marsh system that are under DRP management and included in the park boundary are Martin's and Tiger Islands.

Saltwater Intrusion and Freshwater Wetlands

As their name implies, barrier islands are isolated from the mainland and, by their very nature, have limited surface water and groundwater availability (Tarbox and Hutchings 2003). On the Atlantic coast in northeast Florida, the Upper Floridan aquifer can extend as a thin lens of varying depth up to 50 miles offshore (Levy 1966; Barlow 2003). However, going back as far as 1880, groundwater resources in this region have undergone a long history of anthropogenic changes (Peck et al. 2005).

Northeast Florida (Nassau County) and southeast Georgia (Camden County) both belong to a groundwater sub-area that includes over 1,000 square miles. Regional flow of groundwater in this region is from west to east following subsurface water contours (i.e. potentiometric surface). The potentiometric surface simply defines the directionality and underground topography of the Floridan aquifer as measured by tightly cased wells (Brown 1984).

Since groundwater pumping first began, water scientists have closely monitored subsurface “cones of depression” that have developed on the aquifer’s potentiometric surface. It is important to understand that these numeric depressions in the potentiometric surface indicate significant areas of discharge, including anthropogenic groundwater withdrawals (Knowles 2001). Major cones of depression over the past 10 years or more have occurred in four specific Florida/Georgia locations including Fernandina Beach and Jacksonville, Florida, and St. Marys and Brunswick, Georgia (Fairchild and Bentley 1977; Brown 1984; Kinnaman and Dixon 2011). Regional cones of depression can cumulatively contribute to major alterations of watershed boundaries as was recently depicted in the Suwannee River basin of north Florida (Grubbs and Crandall 2007; Swihart 2011; Still 2010). The paper mill industry has been the primary contributor to significant groundwater declines in this region of Florida/Georgia (Peck et al. 2005). However, public supply in Florida during the past 20 years has greatly increased and is threatening to shift this balance (Borisova and Carriker 2009).

In the 1930s, four major paper mill companies set up large wood processing operations at Fernandina Beach, Florida (Nassau County) and St. Marys, Georgia (Camden County) and began to extract groundwater for these facilities at a rate of 0.5 million gallons per day (Peck et al. 2005). The mills generally shut down for maintenance only during short periods in July and December of each year. By 1977, these significant pumping centers alone withdrew groundwater at a rate of over 105 million gallons per day, which accounted for 90% or more of water use in Nassau and Camden counties (Brown 1984). Aquifer deficits at the center of pumping in Fernandina Beach during this time were over 120 feet below historic levels (Johnston et al. 1980; Brown 1984). One of Georgia’s mills in St. Marys closed its operations in 2002, and, as a result, the Nassau/Camden groundwater sub-area experienced a significant increase in the aquifer levels for the first time since the 1950s (Peck et al. 2005).

The St. Johns River Water Management District (SJRWMD) is the state agency responsible for issuing water use permits in the region, and, in doing so, must ensure that proposed uses are in the public interest, which includes the conservation of fish and wildlife habitat and the protection of recreational values (Chapter 373, Florida Statutes). In October 2011, the SJRWMD, Suwannee River Water Management District (SRWMD) and Florida Department of Environmental Protection (DEP) entered into an interagency agreement that outlined closer coordination in the management of north Florida water supplies. The two water management districts are now required to address the issues of decreased groundwater resources when they conduct district water supply planning activities (SRWMD 2010; SJRWMD 2011).

As of 2011, groundwater withdrawals in the Fernandina Beach region appear to have stabilized with a much-reduced cone of depression. However, aquifer deficits are still nearly 70 feet below historic levels (Barlow 2003; Marella and Berndt 2005; Williams et al. 2011). Given the projected water supply needs for the area, the U.S. Geological Survey (USGS) predicts that groundwater levels throughout Florida, including those underlying Amelia Island, will continue to decline (Sepulveda 2002). One serious outcome of the cumulative consumptive use of freshwater supplies on the lowering of groundwater levels has been increased coastal saltwater intrusion into the Floridan aquifer.

Saltwater intrusion can occur both naturally, such as during droughts when the freshwater lens shrinks, and anthropogenically during periods of heavy groundwater withdrawals (Spechler 1994, 2001; Barlow 2003). During the two most recent historically worst droughts on record (i.e., 1998-2002 and 2010-2012), saltwater intrusion occurred on a statewide scale and groundwater pumping exacerbated this process (Marella and Berndt 2005; Copeland et al 2011). Water scientists now suggest that saltwater encroachment is and will continue to become an even greater environmental threat to Florida than sea level rise (Payne 2010).

Saltwater intrusion can adversely interfere with the long-term sustainability of Florida's water resources. For example, residents of Fernandina Beach and Fort Clinch once obtained potable groundwater from on-site wells that pumped freshwater from the surficial aquifer that at the time ranged between 20 feet to 120 feet in depth as well as from deeper units in the Upper Floridan. As early as the 1970s, the surficial at both locations had already shown significant signs of saltwater intrusion as measured by increased chloride levels (Frazee and McClaugherty 1979). Chloride levels greater than 250 milligrams per liter exceed Florida's primary drinking water standards for public supply (Florida Administrative Code 62-302.530). By the late 1990s, Fort Clinch's groundwater quality precipitously declined to a point that the decision was made to cap all park supply wells and connect to the Florida Public Utility Commission of Fernandina Beach to receive potable water.

Saltwater intrusion, as well as artificial ditching and draining, can also negatively affect the freshwater ecology of natural communities (Florida Natural Areas Inventory 2010). Small coastal islands such as Amelia at Fort Clinch can have an extremely limited diversity of freshwater wetland communities, whereas a greater number and extent can typically occur on larger islands (Franz 1971; Hillestad et al. 1975). At Fort Clinch State Park, two important freshwater communities that make up surface wetlands are coastal interdunal swales and depression marshes (FNAI 2010; Johnson and Muller 1993). Mosquito control ditches have considerably altered the natural topography and thus the freshwater wetlands of the park. The park contains an 8-mile network of ditches, excavated during the early 1950s to late 1960s in an effort to eradicate mosquito larvae that developed in low elevation areas, including interdunal swale wetlands. As constructed, the ditches connected all low-lying areas of the park and drained westward toward the marshes of Egans Creek. With each tidal change, saltwater entered the park through these ditches. The resulting increase in salinity in the swales severely affected natural wetland vegetation. The ditches, some as deep as 15 feet, also modified the natural hydrology of the interdunal swales by intercepting lateral groundwater flow.

During the years following construction of the ditches, the local mosquito control district periodically used heavy machinery to keep the ditches open and functioning. Considerable damage to vegetation resulted. Lately, DRP has restricted the use of machinery in clearing the ditches, but it still allows cleaning by hand. The mosquito control district, however, has elected to adopt a hands-off approach in most cases, and the ditches and ditch banks appear to be reverting slowly to a more natural state. Perhaps the natural hydrology is also recovering to some extent.

Other than mentioned above, the current level of hydrological impact of these artificial ditches on interdunal swales wetlands of the park is unknown. Similarly, we also do not understand if the park's two additional freshwater depression marsh communities, namely Willow Pond and an adjacent human-made borrow pit, are being influenced by saltwater intrusion or drainage alteration by mosquito ditches.

Very little is known about Willow Pond, including its origin, freshwater source and previous extent of manipulation. Willow Pond may have been a source of freshwater for an indigo processing facility in the

18th century. Other manipulations of the pond may have occurred during construction of the fort in the mid-1800s. Aerial photography indicates that manipulations also occurred during construction of the park by the Civilian Conservation Corps in the 1930s. In the 1960s, a large irregularly-shaped borrow pit was excavated adjacent to Willow Pond to supply fill for the 14th Street Bridge reconstruction. Prior to this bridge retrofit, flood control structures that impounded Egans Creek were in place at this location (Henry 1971). Since the initial borrow pit disturbance, sediments have gradually accumulated, and a diverse assemblage of wetland vegetation has become established. The borrow pit marsh is now an important foraging and roosting site for wading birds, and it may function as a nesting site as well. A thorough evaluation of the park's freshwater wetland communities and potential restoration alternatives that could return natural surface water drainage within the park is needed.

Water Quality

Because the coastal region of northeast Florida has been important to our understanding of saltwater encroachment into the Floridan aquifer, water scientists have sampled groundwater levels and quality at Fort Clinch State Park since the late 1970s (Frazee and McLaugherty, 1979; Brown 1984; Spechler 2001; Peck et al. 2005). In the Fort Clinch region, over 100 different wells are an integral part of a mechanism to track groundwater quality in the area (DEP 2013a). Some of the wells are associated with coastal saltwater intrusion monitoring, while others have served to document changes associated with known contaminated sites. The Division of Water Resource Management in DEP monitors at least seven types of groundwater wells within the Fort Clinch region, including water supply wells, Florida Geological Survey wells, Class V wells, background-monitoring wells, and private wells (Hicks and Marks 2005).

Historically, there have been as many as six groundwater wells located within the boundary of Fort Clinch State Park (District 2 files).

Three of those wells that are important include N-19 (78 feet deep) and N-18 (33 feet deep) that penetrates the surficial, and N-3 (Florida Geological Survey (FGS) also refers to as No. 18823, 800 feet deep) that reaches down into the Ocala limestone of the Floridan. There are also numerous data available concerning surface water quality for the estuarine and beach water bodies that surround Fort Clinch State Park, however no data is available for the previously mentioned freshwater wetlands in the park. Much of the hydrological information that has been collected, stored and managed by state water management agencies can now be accessed through a variety of web-based filters (SJRWMD 2013; DEP 2013a, DEP 2013b).

It was not until the late 1980s that state officials began to first recognize the surface water quality problems in northeast Florida and to implement regulations to protect these water resources (DEP 1986). Effluent discharge from regional paper mill industries, as well as other sources has contributed to increased water quality issues associated with the aquatic estuarine system adjacent to the park. Throughout the 1980s and continuing today, paper mill companies in this region are permitted to discharge treated effluent directly into the adjacent water bodies such as the Amelia River, typically on outgoing tides. In the past, state environmental officials would constantly charge these industries with a series of Class III water quality standard violations (DEP 1991; DEP 1999). Associated with these violations have been exceedances of ammonia (extremely high), arsenic, silver, selenium and dissolved oxygen (DEP 1991; DEP 1999; Livingston, 1996). As of 2011, industry effluent discharged into these estuarine water bodies appears to better conform to Florida's standards concerning surface water quality regulations, however the list of toxic substances released into these waters is still overwhelmingly exhaustive (DEP 2011).

In addition to industrial pollution, development, rapid growth, stormwater runoff and an essential need for human wastewater treatment have contributed significantly to the nutrient enrichment of the estuarine ecosystem surrounding the park (DEP 1999; DEP 2009b). In 1986, water bodies in the St. Marys/Nassau River basin were classified as both Class II or Class III waters, and sustainable harvesting of shellfish was allowed (DEP 1986; Coffin et al. 1992; Newman et al. 2003; DEP 2013c). As of 2012, all water bodies surrounding the park are designated as “Unclassified” because the current sanitary conditions of the area have not been thoroughly characterized for the protection of the health of shellfish consumers (Chapter 5L-1.003(7) F.A.C.). Harvest of shellfish from these “Unclassified waters” is unlawful mainly because of unacceptable coliform levels (Florida Department of Agriculture and Consumer Services (FDACS) 2012). The Nassau County Soil and Water Conservation District was conducting a study to determine the feasibility of re-establishing shellfish harvests in the area. The outcome of that study is not known.

In 1996, DEP initiated a formal, statewide monitoring program for groundwater and surface water quality, including those within the St. Marys and Amelia River estuaries as mentioned above (Maddox et al 1992; DEP 2009a). This Integrated Water Resource Monitoring Program (IWRMP) takes a comprehensive watershed approach based on natural hydrologic units (Livingston 2003). This watershed approach provides a framework for implementing Total Maximum Daily Load (TMDL) requirements that will attempt to restore and protect water bodies that have been declared impaired (Clark and DeBusk 2008).

According to DEP’s basin status report for this region, several water bodies within the St. Marys River basin (10 total), including the St. Marys River and Jacksons Creek, and the Nassau River basin (13 total), including the Nassau and south Amelia rivers, all became potentially impaired water bodies in 1998 because of total coliform bacteria and high mercury levels (DEP 2004, 2007). Based on Florida’s Impaired Waters Rule (IWR), the U.S. Environmental Protection Agency (EPA) in 2003 verified that those water bodies were impaired, which meant that their surface water quality did not meet applicable state water quality standards (IWR, Chapter 62-303 F.A.C.). This designation triggered a long chain of mandatory requirements that Florida must accomplish to achieve compliance with EPA regulations concerning polluted water bodies.

The regulatory compliance process will start when Florida re-prioritizes the tributaries of the St. Marys and Nassau River basins and appropriately assigns a TMDL for each polluted system (DEP 2007). Officials have only classified one water body (an unnamed tributary in upper Nassau River basin) as a high priority for this region. That occurred in 2007. As of 2013, no additional TMDLs or Basin Management Action Plans (BMAP) had been adopted for the St. Marys/Nassau River basins. A statewide mercury TMDL is currently in draft format (DEP 2012b).

Objective A: Conduct/obtain an assessment of the park’s hydrological restoration needs.

- Action 1 - Continue to cooperate with state and federal agencies and researchers regarding hydrological research and monitoring programs within the park, particularly related to freshwater wetlands, groundwater levels and surface water quality of its associated estuarine water bodies.
- Action 2 - Continue to monitor, review and comment on proposed land-use/zoning changes within lands bordering the park.

The most significant hydrological features in the park include the St. Marys River, Egans Creek, Willow Pond and several coastal interdunal swales, an imperiled natural community type. Control of erosion and sedimentation along the St. Marys and Atlantic shorelines near Fort Clinch, as well as preservation of surface water and groundwater quality for all adjacent park water bodies, will remain top priorities. The following are hydrological assessment actions recommended for the park.

Since the 1940s, regional overconsumption of groundwater has exacerbated the level of saltwater intrusion and created a significant cone of depression near Fort Clinch State Park. The effects of this significant groundwater depletion on the freshwater wetlands of the park are unknown. For water managers to be able to protect water quality and potentially restore groundwater to historic levels, they will need to track the extent of the drawdown. Additionally, regulatory agencies have determined that the surface waters surrounding Fort Clinch State Park are impaired because of high levels of coliforms and mercury. Shellfish harvesting in water bodies throughout the St. Marys/Nassau River basin is currently "Unclassified." Although all these water quantity/quality issues are complex, genuine improvements are still achievable. To facilitate that process, DRP will continue its tradition of close cooperation with state and federal agencies and independent researchers engaged in hydrological research and monitoring in the park, and it will encourage and facilitate additional research in those areas.

DRP will rely upon agencies such as the SRWMD, USGS and DEP to keep it apprised of any declines in surface water quality or any additional suspected contamination of groundwater in the region. District staff will continue to monitor Environmental Resource Permit and Water Use Permit requests for the region in order to provide timely and constructive comments that promote protection of the park's water resources. Additional cooperative efforts may include facilitating the review and approval of research permits and providing researchers with assistance in the field, including orientation to park resources. Recommendations derived from these monitoring and research activities will be essential to the decision-making process during management planning. One activity worthy of DRP support is continued groundwater monitoring of all important wells and water bodies under the park's jurisdiction.

Staff will continue to monitor land-use or zoning changes within lands bordering the park. Major ground disturbances on neighboring properties or inadequate treatment of runoff into local streams could ultimately cause significant degradation of park resources. When appropriate, District 2 staff will provide comments to other agencies regarding proposed changes in land use or zoning that may affect the park. In addition, district staff will closely monitor any mining operations or large consumptive use permits in the St. Marys/Nassau River basins for significant changes that may adversely affect park resources.

DRP will continue to work closely with the SJRWMD to ensure that consumptive use permits for the region are responsibly issued and that current groundwater levels are protected and consciously restored to historic conditions.

Objective B: Restore natural hydrological conditions and functions to approximately 1 acre of the coastal interdunal swale natural community.

- Action 1 - Assess hydrological impacts (i.e. altered hydroperiod) to the park's interdunal swale wetland community.
- Action 2 - Determine if ditch block installation could be a useful restoration technique to restore natural hydroperiod within the park's interdunal swale wetlands.

Historic mosquito ditches and decreased groundwater supplies over the years may have impacted several acres of previously functioning interdunal swale wetlands at Fort Clinch State Park. Mosquito ditches have bisected a variety of upland (e.g. maritime hammock) and wetland (e.g. interdunal swales) natural communities at the park. Visible impacts of these ditches include fragmentation and an interruption of natural surface water sheetflow. The following hydrological restoration actions are recommended for the park.

DRP will evaluate the condition of all interdunal swale wetlands at Fort Clinch State Park by mapping, reconnaissance, and determining their current ecological status. DRP staff will determine if it is possible to restore these wetland communities, specifically those that are bisected by historic mosquito ditches. If staff determines that restoration is possible, restoration alternatives such as ditch blocks will be developed and implemented. Park staff will comply with best management practices to maintain the existing water quality on site and will take appropriate action to prevent soil erosion or other impacts to water resources.

DRP staff will evaluate other alterations in the park that may have negatively affected natural hydrology. For example, staff will seek funds or interested parties to research the origins, source of water supply and extent of manipulation of the Willow Pond wetlands. Additionally, if necessary, staff will initiate corrective actions such as the installation of low water crossings or culverts in appropriate locations.

Objective C: Evaluate and mitigate the impacts of soil erosion in the park.

- Action 1 - Develop and implement a trail management plan for the park's recreational trails.
- Action 2 - Assess erosion impacts from coastal erosion, surface water runoff and recreational uses and implement corrective measures.

DRP will continue its tradition of close cooperation with state and federal agencies engaged in park shoreline protection strategies associated with St. Marys Inlet navigation channel. DRP will continue to work with agencies such as the U.S. Army Corps of Engineers (USACE) and DEP to keep it apprised of new alternatives that will further stabilize shoreline erosion rates and preserve the historic structural integrity of Fort Clinch.

DRP staff will investigate the best management options for additional mitigation of erosion in public use areas such as the Fort Clinch hiking and biking trail system. DRP will develop and implement a trail management plan for this park recreational trail. This plan will define expectations of a well-maintained and sustainable trail system by prioritizing impacts and educating all stakeholders concerning park resource protection.

Coastal/Beach Management

The park includes approximately 0.76 miles of beach along the Atlantic Ocean, all of which is considered critically eroded. The park also includes approximately 2.58 miles of beach along the St. Marys Inlet and Amelia River. The 1.9 miles along the St. Marys Inlet is also classified as a critically eroded inlet beach. Several imperiled species depend on the park's beaches for nesting sites, including three species of marine turtles as well as least terns and Wilson's plovers. Other imperiled shorebird species, notably the federally threatened piping plover and red knot, use the park's beaches as resting and feeding sites during migration or over winter.

DRP has management authority over a 400-foot zone from the edge of mean high water in areas where the park fronts on the Amelia River, the St. Marys Inlet and the Atlantic Ocean. This also applies to the sovereign submerged lands surrounding the park boundary at Martin's and Tiger islands. Where emergent wetland vegetation exists, the zone extends water-ward 400 feet beyond the vegetation. Within this zone, the park staff will enforce DRP regulations. Harvest of any wildlife within this zone, except for fish, is prohibited.

As part of the effort to implement our goal to restore and maintain the natural communities and habitats of the state park, the following special management objectives for coastal systems are recommended.

Objective D: Continue to assist federal, state and local agencies with active monitoring of erosion and accretion cycles and assessment of beach and shoreline conditions following natural disasters.

- Action 1 - Continue to cooperate with federal, state and local agencies and researchers regarding monitoring and assessment of beach erosion within the park, particularly related to the historic Fort Clinch structure.

The St. Marys Inlet has three active federal navigation projects, namely access between the Atlantic Ocean into Fernandina Harbor (Florida), Kings Bay Naval Submarine Base (Georgia) and the Atlantic Intracoastal Waterway (Raichle et al 1997). Over a century of extensive inlet stabilization and shoreline hardening has caused severe impacts to littoral longshore transport along much of Amelia Island's Atlantic shoreline and Fort Clinch.

In 1986, Florida legislatively designated (Chapter 161 F.S.) numerous areas in the state, including Amelia Island and Fort Clinch, as "critically eroded" and began to develop regional remediation strategies and long-term restoration plans (DEP 2012a). Soon after, the state of Florida and the federal government executed a memorandum of understanding clarifying their partnership to dredge the St. Marys Inlet and transport the sediments to downdrift beaches and nearshore sites (DEP 2008). Federal, state and local stakeholders agreed to participate in active management actions that included inlet sand bypassing, beach nourishment and shoreline hardening where severe erosion cases were warranted (DEP 1998).

The 1997 St. Marys Entrance Inlet Management Plan became an integral restoration guidance document for all active management actions occurring on northern Amelia Island and Fort Clinch (Raichle et al 1997). Maintenance dredging in St. Marys Inlet has generally occurred on an annual basis with a sediment bypassing objective between 554,000 and 797,000 cubic yards per year (DEP 2008). Fort Clinch State Park, the city of Fernandina Beach and the Atlantic shoreline of Amelia Island all benefit from these management activities.

The DEP Office of Resilience and Coastal Protection (RCP) responsible for the protection and management coastal systems in the state of Florida. RCP has developed a statewide strategic beach management plan to help prioritize its responsibilities and effectively implement necessary management actions (DEP 2023).

This statewide RCP program also supports comprehensive shoreline surveys and monitoring, development of regulatory systems and detailed documentation of weather-related impacts along all sandy beach ecosystems in Florida. Annually, RCP obtains routine aerial photography that covers over one quarter of the state, gathering a complete photographic collection of Florida's shorelines every four years. RCP also documents and has extensive records of topography and nearshore bathymetry for all critical erosion regions of the state. RCP has a record of aerial photography (i.e. 1977-present).

All critically eroded beaches in Florida, including those at Fort Clinch State Park, are also periodically assessed for long-term changes and trends, especially those that are related to significant weather events such as hurricanes (Foster et al 1999, Absalonsen and Dean 2010, DEP 2012a). Beginning in 1981, RCP (then the Bureau of Beaches and Coastal Systems) established a series of coastal reference landmarks (i.e. range monuments) in order to delineate shoreline areas for comparative measurements. Nassau County has 82 range monuments, with R-1 beginning immediately east of the fort at Fort Clinch State Park and R-13 at the south boundary of the park (DEP 2013d). These range monuments are also involved with delineating regulatory boundaries (i.e. coastal construction control line or CCCL) in critically eroded coastal regions.

Objective E: Continue to partner with federal, state and local agencies to fund, design, permit, improve and maintain coastal and beach management programs consistent with the mission of DRP.

- Action 1 - Continue to cooperate with federal, state and local agencies and researchers regarding monitoring and assessment of beach erosion within the park, particularly related to the historic Fort Clinch structure.
- Action 2 - Continue to review, comment and establish effective protocols for monitoring imperiled species potentially affected by St. Marys Inlet dredge operations.
- Action 3 - Continue to work with DRP to determine the best options to mitigate for the expanding southern tip Cumberland Island.

Northern Amelia Island, and therefore Fort Clinch State Park, has undergone significant shoreline changes over the past 100 years. Since the successful implementation of the 1999 shoreline stabilization (i.e. groinfield reconstruction), the historic Fort Clinch structure has not been significantly impacted by storms or other factors (Raichle and Olsen 1998, Olsen 2013). The T-head groinfield and crenulate-shaped beach "cells" located between structures, however, do recede slowly over time and therefore require periodic refilling.

Federal maintenance dredging of the St. Marys Entrance channel occurs annually in order to assure the U.S. Navy that required navigational depths into Naval Submarine Base Kings Bay will be sustained. The two traditional areas of historic beach nourishment within the park are around the fort's groinfield area out to range monument R-3 and between R-8 to R-9.

Additionally, sand bypass operations to areas outside the park boundary, such as Fernandina Beach, still involves stakeholder negotiation, planning and construction activities on Fort Clinch beaches. In order to move dredged sand from St. Marys Inlet, the U.S. Army Corps of Engineers typically requests DEP authorization to position a large pipeline conduit across park lands parallel to the Atlantic beach shoreline from the south jetty structure (R-9) to the park's south boundary (R-13). To accomplish this operation, DRP and USACE develop a Use Agreement (UA) that details specific conditions associated the sand moving operations (USACE 2011). One of the more important constraints discussed during these operations concerns minimizing impacts to federal and state imperiled species as mentioned above.

Fort Clinch State Park has been a state designated marine turtle Index Nesting Beach since 1989, and DRP has played an active role in this program by monitoring marine turtle reproduction at the park. Fort Clinch State Park is also a significant shorebird nesting, migration and over-wintering location and is monitored year-round for several imperiled species. If sand bypassing or nourishment operations are planned to overlap with marine turtle or shorebird nesting seasons, USACE and DRP are required to develop and implement a plan to mitigate for potential impacts, including monitoring protocols. For this reason, when DRP is approached for sand bypassing operations on park lands, its partners are always encouraged to conduct construction activities outside the marine turtle and shorebird nesting seasons.

Another factor that complicates erosion management decisions at Fort Clinch State Park is that the St. Marys Inlet acts as a political boundary between Florida and Georgia. Cumberland Island lies on the north side of the inlet and, like Florida, is similarly subject to coastal littoral processes. In this case, however, the southern tip of Cumberland Island is undergoing accretion, gradually increasing its size and therefore decreasing the overall width of the St. Marys Inlet (Howard and Olsen 2004). The concern for Fort Clinch State Park is that these inlet changes are adding additional hydraulic stress to Amelia Island near the fort because of a southerly migration of the navigation channel.

NATURAL COMMUNITIES

Beach Dune

Beach dunes are typically wind-deposited and are sparsely to densely vegetated with salt-tolerant pioneer species. Though adapted to a harsh environment, dune plants are very vulnerable to human disturbance. The beach dune is usually a very dynamic community due to the unstable nature of active dune fields. Once pioneer vegetation stabilizes a beach dune community, succession to more enduring communities may occur, particularly in areas with long-term shoreline accretion. Beach dunes at Fort Clinch State Park occur along the Atlantic shoreline and along the Cumberland Sound shoreline. Shoreline accretion along the eastern shoreline has allowed an extensive area of beach dune to develop. The dunes are of a more limited extent along the receding northern shoreline that flanks the fort. An older field of beach dunes occurs in the center of the park along what was once the east shoreline of the north tip of Amelia Island (before construction of the jetties). This older dune area parallels the current eastern shoreline but is located up to two-thirds of a mile inland. This dune field is classified as coastal grassland due to the distance from the current shoreline and the coastal grassland species that are gradually invading it.

The shoreline along Cumberland Sound and the St. Marys Entrance is eroding, causing some loss of beach dune and adjacent natural communities. Natural and human impacts on the inlet are largely responsible for the erosion. Periodic renourishment of the beach near the fort has slowed the retreat of the shoreline somewhat. However, heavy equipment used during the placement of dredge spoil causes temporary damage to some of the beach dunes in the area.

In April 1982, the park began to prohibit vehicular traffic on the beach. Since that time, vehicular damage to beach vegetation and dunes has decreased dramatically. Boardwalks now extend from the beach campground and from the east and west parking lots through the dunes to the pier and swimming beach. Now that these walkways provide the public with convenient access to points of interest, most of the unauthorized footpaths that once degraded the dunes have disappeared. The beach dunes are in good condition.

Management of beach dunes usually centers on protection from human disturbance since the adjacent beaches are typically the focal point of recreational activities in coastal parks. Interpretive signs are generally effective in advising the park visitors of the need to stay off the beach dunes. Boardwalks leading to dune crossovers provide easy access to shorelines and discourage walking in the beach dunes. Periodic surveys for exotic plant infestations are also important in catching new infestations early. The park recently eradicated one of the first infestations of beach vitex (*Vitex rotundifolia*) in Florida. Seeds or plant fragments apparently washed up on shore from infestations in the Carolinas. Hand collection of sea oat seeds may be permitted under certain circumstances.

Coastal Grassland

The coastal grassland at Fort Clinch State Park occurs on level to low rolling terrain located in the northeastern and northern parts of the park, inland from the beach dune community. Typical plants of this community are species such as broomsedge (*Andropogon scoparius*), pink muhly grass (*Muhlenbergia capillaris*), croton (*Croton glandulosus*), camphor weed, earleaf greenbrier, prickly pear cactus (*Opuntia stricta*) and wax myrtle (*Myrica cerifera*). Scattered small pockets of scrubby oaks (*Quercus geminata*) are also present. Gopher tortoises, eastern moles, marsh rabbits, cotton mice rat snakes and eastern diamondback rattlesnakes occur here as well.

By its very nature, this community type is prone to natural disturbance from storm surges and blowouts. Artificial disturbances such as mosquito control ditching, former development sites, and road construction have also impacted several areas of coastal grassland within the park. Vegetation eventually stabilizes most soil disturbances, but disturbance of existing vegetation should be avoided to prevent destabilization of low dunes, which would cause increased wind erosion. The coastal grassland in the park is considered to be generally in good condition.

Although coastal grassland experiences a variety of natural disturbances, impacts from development, foot traffic and vehicular traffic should be kept to a minimum to avoid wind erosion issues. The native prickly pear cactus in the coastal grasslands is also susceptible to damage from the larvae of the exotic cactus moth (*Cactoblastis cactorum*). Surveys for this invasive species should be conducted on a regular basis, and infestations reported to the FDACS Division of Plant Industry.

Coastal Strand

Much of the coastal strand community at the park is relatively young, occurring on dunes that have recently accreted and stabilized.

Coastal strand is an ecotonal community that generally lies between beach dunes, coastal grassland and maritime hammock. In many instances, the coastal strand occurs as islands of woody vegetation within coastal grassland. In some cases, coastal strand may develop adjacent to or within coastal interdunal swales.

Mosquito ditch construction in the 1950s disturbed several of these sheltered pockets in zones FCL-04 and FCL-05. There is also a stand of slash pines covering about 8.5 acres in FCL-04 that appears to have been planted in the coastal grassland and coastal strand in the 1980s. Based on the proliferation of hardwoods in this area, it is classified as coastal strand and is likely to succeed to maritime hammock.

Establishment of coastal strand occurs only after herbaceous plants have stabilized the dunes. Due to its young age and a history of disturbance, the coastal strand at Fort Clinch differs somewhat from other,

more mature coastal strands found further south along the east coast of Florida, where saw palmetto and scrub oaks are the dominant vegetation.

In some cases, it is very difficult to distinguish between coastal strand and the earlier successional stages of maritime hammock. In the absence of periodic disturbances such as catastrophic storms or fire, coastal strand that is sheltered from salt spray will gradually succeed to maritime hammock. This process has occurred at Fort Clinch State Park, and much of what was once coastal strand is now young maritime hammock. Other than impacts from mosquito ditching, the coastal strand at the park is in good condition.

Unlike better developed coastal strands that occur further south along the Atlantic coast, and which share affinities with scrub vegetation, the coastal strand at Fort Clinch State Park developed recently because of the rapid accretion of sand after the construction of the St. Marys jetties. Fire does not appear to play a significant role in these young coastal strands that quickly succeed toward maritime hammock as the shoreline expands and reduces the effects of salt pruning. Older coastal strands that occur on stable shorelines are maintained in an early successional stage by constant salt spray and may be more pyrogenic as they mature and develop extensive stands of saw palmetto and pyrogenic oaks. The stand of slash pines in zone FCL-04 has been treated with prescribed fire in the past for fuel reduction, but coastal strand at Fort Clinch State Park is not considered a fire-maintained natural community. The coastal strand should also be monitored for the presence of the exotic cactus moth since prickly pear cactus may also occur here.

Maritime Hammock

The maritime hammock at Fort Clinch State Park is one of the most outstanding examples of this natural community in the state. Maritime hammock typically occurs as a band of hardwood forest lying inland of the coastal strand community. This community occurs on old dunes that have been stabilized long enough to allow the development of a mature, closed canopy, forest.

The maritime hammock at Fort Clinch State Park begins as a narrow band at the southern end of the park and extends some 3 miles to the northwest boundary on Cumberland Sound. About midway into the park, the hammock curves to the west and becomes much broader. Throughout this broad section, the dunes are generally oriented east and west.

Dominant canopy species include live oak, southern magnolia, American holly and southern red cedar. Hackberry (*Celtis laevigata*), red mulberry (*Morus rubra*), aralia (*Aralia spinosa*), American beautyberry (*Callicarpa americana*), ebony spleenwort (*Asplenium platyneuron*) and dwarf palmetto (*Sabal minor*) - all species typically supported by areas high in calcium - are also part of this mesic community. The maritime hammock here also supports many insect-eating birds such as vireos, warblers and flycatchers as well as other animals. Many songbirds migrate along coastal areas and use maritime hammocks for resting, feeding and staging areas during migration. Due to its strategic location at the end of a barrier island, the maritime hammock at the park is a critical area for migrating songbirds.

The maritime hammocks of the northeast Florida coast have been heavily impacted by the spread of laurel wilt disease, a fungal pathogen (*Raffaelea lauricola*) spread by an Asian species of ambrosia beetle (*Xyleborus glabratus*). The disease was first detected in northeast Florida in 2005 (Mayfield and Thomas 2009). While most of the adult red bays in the park have been infected and died back, small saplings and resprouts still exist in the park.

Historically, some damage to the maritime hammock occurred during the building of the military entrance road in the 1800s. Construction of mosquito control ditches beginning in the late 1950s caused additional damage. Another disturbance was the large borrow pit west of Willow Pond, excavated around 1960 during reconstruction of the 14th Street Bridge. Impacts to maritime hammock from park development are evident in several locations, including park roads, the ranger residences and shop area, and the river camping area.

The purpose of the mosquito ditches was to eradicate mosquito larvae that hatched in pockets of freshwater in swales located at the bases of dune ridges in the maritime hammock. The ditches allowed tidal flooding from adjacent salt marshes to penetrate deep into the maritime hammock, theoretically eradicating larvae dependent on the freshwater that collected in the swales. At present, however, tidal waters only flood some of the swales intermittently. In these areas, tidal waters trapped in the swales may form pools of standing water that attract breeding mosquitoes. The ditches may significantly alter the natural hydrology of the maritime hammock, presumably by dewatering the hammock through accelerated drainage of freshwater derived from precipitation. Other, more effective methods of mosquito control are now available. The ditches have long outlived their purported usefulness, and DRP should explore feasible means of restoring the disturbed areas or, at the very least, mitigate the hydrological impacts.

Erosion and compaction from foot traffic are occurring along the Willow Pond trails, around the river camping area and in the picnic area. In most cases, the erosion problems are a byproduct of unauthorized paths created by park visitors on the slopes of stabilized dunes. Erosion is also a serious issue along the off-road bicycle trail that runs parallel to and on both sides of the main park drive. Except for the limited areas impacted by the above disturbances, the maritime hammock at Fort Clinch State Park is in good condition.

Protection from disturbance is the primary management measure necessary in the maritime hammock. Maintaining a continuous and closed tree canopy prevents salt spray damage from enlarging gaps in the canopy. Mitigation of erosional impacts from visitor use is also a priority.

Signage and discreet fencing have been successful in modifying pedestrian behavior, and strategic mulching and stabilization have been useful in moderating the erosion caused by bicycles. Relatively few exotic plant or animal species occur in the maritime hammock, although armadillos (*Dasypus novemcinctus*) are common and damage the leaf litter and upper soil layers. Mitigation of the hydrological impacts of the mosquito control ditches may include strategically placed ditch blocks to exclude tidal influences and reduce dewatering of the adjacent maritime hammock soils.

Coastal Interdunal Swale

Coastal interdunal swales occur in low areas within the coastal grassland and coastal strand community types. Since these low areas are also more sheltered from salt spray, they may succeed to coastal strand as hardwoods begin to dominate. The coastal interdunal swales range from herbaceous to shrub-dominated wetlands. The herbaceous swales are dominated by sand cordgrass (*Spartina bakeri*) and other grasses that tolerate wet soils. Wax myrtle, sabal palm, southern red cedar, hackberry and peppervine (*Ampelopsis arborea*) are common in the shrub-dominated swales. Many of the larger swales were modified by mosquito ditching prior to 1973. The coastal interdunal swales range from fair to good condition depending on the extent of the mosquito ditching within them.

Maintaining a natural hydrological regime is a priority in the management of coastal interdunal swales. Runoff from developed areas should be avoided. Restoration of impacted coastal interdunal swales may include filling in or blocking of old mosquito ditches that may be affecting the surficial water table. DRP will assess the current condition of these wetlands to determine the proper restoration methods and to develop a restoration plan.

Salt Marsh

The Egans Creek area includes a large expanse of salt marsh, but only scattered strips of that salt marsh fall within the park boundary that lies to the east and north of Egans Creek. The most extensive areas of salt marsh within the park lie around Martin's Island. The park includes a narrower band of salt marsh that is associated with Tiger Island. Both islands include examples of the salt flat variant of salt marsh adjacent to the uplands.

The dominant plant of this community at Fort Clinch State Park is saltmarsh cordgrass (*Spartina alterniflora*). This species is the major indicator of the low marsh systems of the northeast atlantic coast region. Unlike the high marshes of the lagoons in Florida's lower peninsula, where saltgrass (*Distichlis spicata*) dominates, tides flood this marsh daily.

Although low in plant diversity, this estuarine area serves as feeding, cover and reproductive habitat for a great diversity of animal life such as worms, mussels, oysters, clams, shrimp, crabs, sand dollars, sea urchins, whelks, snails and fish. Diamondback terrapins (*Malaclemys terrapin*) are considered a species of greatest conservation need by the Florida Fish and Wildlife Conservation Commission (FWC). Protection of the salt marsh habitats and tidal creeks near Martin's and Tiger islands will help protect this declining species. The salt marshes also provide important breeding habitat for the imperiled Worthington's marsh wren (*Cistothorus palustris griseus*) and MacGillivray's seaside sparrow (*Ammodramus maritimus macgillivrayi*) (NeSmith and Jue 2003).

The salt marsh associated with Egans Creek is laced with parallel ditches that intersect Egans Creek. Egans Creek itself is an artificial channel created by dredging. Along the landward margin of the marsh a major ditch follows the contour, picks up the flow from the interior of the island and delivers it to the interconnected ditches that empty into the creek. Over the years, the species composition of the marsh has changed from a system primarily dominated by black rush (*Juncus roemerianus*) to one comprised almost exclusively of saltmarsh cordgrass (*Spartina alterniflora*). This situation may be the result of increased tidal inundation or some yet unknown factor. The salt marshes within the park are considered to be in good condition.

Salt marsh requires little active management as long as it is protected from human intrusion and disturbance. Stormwater runoff from developed areas may impact estuaries and should be minimized.

Estuarine Unconsolidated Substrate

Estuarine unconsolidated substrate occurs in the vicinity of Martin's and Tiger islands. These areas are far enough upstream that salinity levels fall below the threshold for them to be classified as a marine community type. Most of the estuarine unconsolidated substrate within the park are mud substrates associated with tidal creeks that lie within a matrix of salt marsh. These mud deposits lie below the elevation that will support salt marsh vegetation. In general, these areas are considered to be in good condition.

Management of estuarine unconsolidated substrate includes protection from pollution or other sources of contamination and avoidance of dredging of the tidal creeks.

Marine Unconsolidated Substrate

This community occurs along the Cumberland Sound and Atlantic shorelines of the main portion of the park. It is a sparsely vegetated or unvegetated, relatively open area of subtidal, intertidal and supratidal beach. The substrate is composed mainly of unconsolidated sand. The distribution of these sediments largely depends on the wind and water velocities that affect the beach shoreline. Salinity levels in the Cumberland Sound and along the Atlantic shoreline are typical of marine community types.

Unconsolidated substrate communities composed chiefly of sand are resilient and demonstrate a good ability to recover from recreational and renourishment disturbances. These areas have been renourished with beach quality sands numerous times since the St. Marys Inlet was first dredged to maintain shipping channels. With the gradual southerly migration of the inlet, there is a constant loss of sand from the shoreline along the Cumberland Sound. A series of rock groins and revetments has been built along that shoreline over the past century to protect Fort Clinch. The most recent manifestation is a series of T-shaped groins that were installed by retrofitting some existing linear groins. This has served to slow the loss of sand and establish a more stable shoreline adjacent to the fort.

The marine unconsolidated substrates are important habitats for nesting shorebirds, including Wilson's plovers and least terns. These species rear their young within these habitats, and Wilson's plover chicks actively forage between the water line and wrack line. Migratory and over-wintering shorebirds like the federally threatened piping plover and red knot also use these habitats for foraging. Marine turtles also nest in the supratidal areas of the high beach. Beach renourishment activities, including pipelines on the beach and direct placement of dredge spoil, can have direct impacts on nesting female turtles, nests and hatchlings.

By their very nature, marine unconsolidated substrates are very resilient and can recover from severe disturbances. Renourished areas quickly take on the characteristics of a natural beach, assuming that the proper type of spoil was used for renourishment. However, the imperiled species that use these habitats are not nearly so resilient. Protection of shorebirds from human and canine disturbances is a priority management measure for the shorelines at Fort Clinch. Strategically placed signage, temporary closure of limited areas, and diplomatic enforcement of the park rules are usually sufficient to protect shorebirds. Renourishment activities that involve laying pipelines within the park or placement of sand within the park should be restricted to the fall and winter months to avoid impacting marine turtle and shorebird nesting areas. After renourishment activities, the park is responsible for monitoring the condition of the beach to prevent escarpments or sand compaction from affecting subsequent nesting by marine turtles.

Altered Landcover Types

Borrow Area

This altered landcover type at Fort Clinch State Park includes a series of interconnected freshwater ponds collectively called Willow Pond and a large water-filled borrow pit located further to the west. Dominant trees include Carolina willow (*Salix caroliniana*). Shrub dominants are elderberry (*Sambucus canadensis*) and buttonbush (*Cephalanthus occidentalis*). Duckweed (*Lemna* sp.) often covers these freshwater ponds. Cattail (*Typha latifolia*) and pickerel weed (*Pontederia cordata*) are present as well.

The origins of Willow Pond are unclear. The pond is located in an interdunal trough within a mature maritime hammock. It is known that in the 1930s, members of the Civilian Conservation Corps (CCC) stationed at Fort Clinch dredged fill dirt from this area, creating a small oligotrophic lake. Sometime between 1943 and 1953, a large mosquito ditch was excavated from Egans Creek north toward the fort. A second ditch was later excavated, connecting the first to the western end of Willow Pond. The effects of these ditches on the hydroperiod of Willow Pond are unknown. A large borrow pit, excavated west of Willow Pond sometime around 1960, was located just south of the second ditch. This borrow pit provided fill dirt for the reconstruction of the 14th Street Bridge across Egans Creek. It may also affect water levels in Willow Pond.

The water levels of Willow Pond currently fluctuate according to the amount of local rainfall and the extent of pumping by local industrial mills. The main ponds appear to be fed by surficial groundwater, and the present depth of the largest pond is unknown. All of the small ponds are in advanced stages of eutrophication, and water depths are generally shallow.

The long term desired future condition for these borrow areas is to let them remain as facsimiles of natural wetlands. Restoration to maritime hammock or another original condition would dramatically disturb the surrounding natural communities. As they stand now, the ponds provide freshwater habitats that are otherwise not available elsewhere in the park and serve as important habitats for wildlife species such as wading birds and alligators.

Canal/Ditch

Over 8 miles of mosquito ditches were dug in Fort Clinch State Park between the early 1950s and late 1960s. The ditches were designed to drain intermittent wetlands into permanent ditches to create habitat for predatory fish that would prey on mosquito larvae. The ditches have not been maintained for several decades. Mosquito ditching is rarely used in freshwater wetlands due to modern wetland permitting constraints and the high cost of maintenance. Restoration of the mosquito ditches to the historical natural community types would cause a high level of damage and disturbance. Allowing the ditches to gradually revegetate and fill in, coupled with strategically based ditch blocks, would restore these areas to a more natural state with minimal damage to existing vegetation and at a much lower cost. The long term desired future condition for the mosquito ditches is to gradually restore the original natural community types, which include maritime hammock, coastal strand, coastal grassland and coastal interdunal swale.

Developed

Developed areas consist of natural communities that have been replaced or nearly replaced by structures or permanently cleared areas. At Fort Clinch State Park, these areas include roads, shop and residence areas, Fort Clinch, the park's visitor center and museum, ranger station, family and youth campgrounds, parking lots, and the Nassau House. The developed areas within the park will be managed to minimize the effect of the developed areas on adjacent natural areas. Priority invasive plant species (Florida Invasive Species Council Category I and II species) will be removed from all developed areas. Other management measures include proper stormwater management and development guidelines that are compatible with prescribed fire management in adjacent natural areas.

Spoil Area

Several areas with the park are mapped as spoil areas. Shoreline areas that have been renourished in the past with dredge spoil are classified as marine unconsolidated substrate, beach dune and coastal grassland where appropriate, and not included as spoil areas.

A series of dikes or embankments surround the artificial ponds that make up Willow Pond and the borrow pit west of Willow Pond. The Willow Pond dikes were probably constructed by the CCC while removing fill dirt from the Willow Pond area and currently serve as part of the Willow Pond Nature Trail. The long-term desired future condition for these spoil areas is to let them remain in place due to their close association with the adjacent freshwater wetlands.

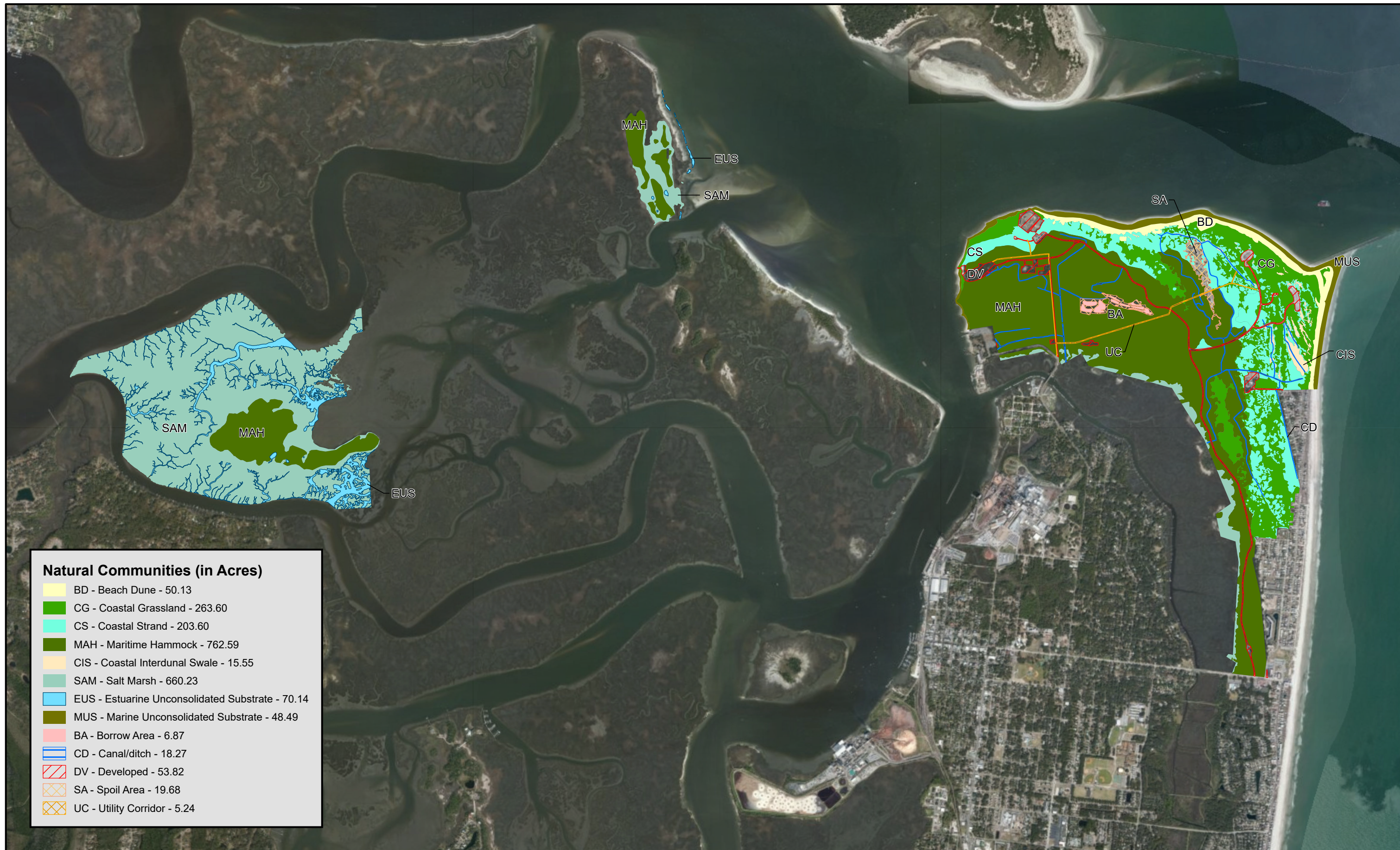
Although not mapped separately, there are spoil ridges and piles associated with most of the mosquito ditches that are mapped as canal/ditch within the park. These spoil areas within the maritime hammock will be left in place in most cases due to the maritime hammock vegetation that has recolonized them. Removal of spoil areas associated with mosquito ditches in coastal interdunal swales and coastal grasslands will be determined on a case-by-case basis depending on hydrological restoration priorities.

A large area of possible dredge spoil is in zone FCL-04 east of the old dune field. It consists of a long, narrow, fan-shaped deposition of sand and coquina that extends north from the proximity of the beach access road almost to Cumberland Sound. In early aerial photographs (1943), the area appears as a clearly defined, long triangle terminating in a narrow apex at the southern end with little or no vegetative cover. Sequential photographs show relatively little colonization by vegetation over the past 50 years. The deposit is topographically higher than the surrounding areas and appears from the soil survey to be of a different soil type (Newhan-Corolla).

The origins of this deposit are unclear, but it appears to have been greatly disturbed at some point before 1943. This section of the island accreted about the time the St. Marys Inlet jetties were constructed in the late 1800s. Early records from the dredging of the St. Marys Inlet do not record any upland spoiling of dredged material in this vicinity (Raichle et al 1997). Further research is needed to determine the origins of this deposit and to outline management actions that may be warranted.

Utility Corridor

Approximately 2 miles of electrical power line rights-of-way are mapped as utility corridor within the park. These pass mainly through maritime hammock, where they create a break in the canopy. Such breaks not only allow salt spray effects to penetrate the maritime hammock canopy but can also serve as access routes for invasive species. Brown cowbirds may use power lines and other corridors to access hardwood hammocks and infest the nests of native songbirds. Exotic plants, including lantana (*Lantana camara*), may also thrive in disturbed areas like power line easements. To the extent possible, the impacts of tree trimming and mowing should be minimized within the park. In certain areas it may be beneficial to investigate using underground power lines as an alternative to maintaining an open canopy over existing utility corridors. The long-term desired future condition for the utility corridors is to restore the altered landcover type to the original natural community types, which include maritime hammock, coastal strand and coastal grassland.

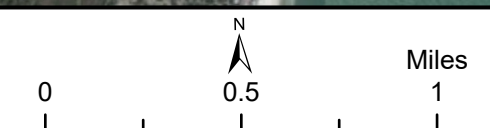


Natural Communities (in Acres)

BD - Beach Dune	50.13
CG - Coastal Grassland	263.60
CS - Coastal Strand	203.60
MAH - Maritime Hammock	762.59
CIS - Coastal Interdunal Swale	15.55
SAM - Salt Marsh	660.23
EUS - Estuarine Unconsolidated Substrate	70.14
MUS - Marine Unconsolidated Substrate	48.49
BA - Borrow Area	6.87
CD - Canal/ditch	18.27
DV - Developed	53.82
SA - Spoil Area	19.68
UC - Utility Corridor	5.24



FORT CLINCH STATE PARK
Natural Communities - Existing Conditions



Sources: ESRI; Florida Department of Environmental Protection
 This graphical representation is provided for informational purposes and should not be considered authoritative for navigational, engineering, legal, and other uses.



Natural Communities

- BD - Beach Dune
- CG - Coastal Grassland
- CS - Coastal Strand
- MAH - Maritime Hammock
- CIS - Coastal Interdunal Swale
- SAM - Salt Marsh
- EUS - Estuarine Unconsolidated Substrate
- MUS - Marine Unconsolidated Substrate
- BA - Borrow Area
- DV - Developed



FORT CLINCH STATE PARK
 Natural Communities - Desired Future Conditions



Sources: ESRI; Florida Department of Environmental Protection
 This graphical representation is provided for informational purposes and should not be considered authoritative for navigational, engineering, legal, and other uses.

Objective A: Complete a comprehensive floral and faunal survey and update the park's baseline plant and animal list.

- Action 1 - Conduct a comprehensive floral and faunal survey of the new additions to park, specifically Martin's Island and Big Tiger Island.
- Action 2 - Continue to update the park's plant and animal lists.

With the addition of Martin's Island and Big Tiger Island to the park, significant areas of salt marsh and estuarine unconsolidated substrate are now within the park boundary. More limited areas of maritime hammock were also added. Additional plant and animal surveys will be conducted to determine if any new species have been added to the park. Existing plant and animal lists will continue to be updated.

IMPERILED SPECIES

Several of the imperiled plant species at Fort Clinch State Park are orchids and occur in the maritime hammock. Other than protection from disturbance near visitor access points and along service roads, they require relatively little direct management.

Lechea divaricata, spreading pinweed, a state endangered species, was collected from Fort Clinch State Park in 1943. It is not known if this population still exists in the park, or if the determination was correct since there are no known herbarium records for this species from Nassau or adjacent counties. DRP staff should conduct a Tier 1 survey for the presence of this species.

A population of the state threatened shell-mound prickly pear, *Opuntia stricta*, occurs in the park. Recently the invasive exotic pest of the cactus, *Cactoblastis cactorum*, was also found in the park. Because of the arrival of this pest the park should monitor its populations of *Opuntia stricta* for *Cactoblastis cactorum* and remove the egg sticks of this exotic moth as needed.

All of the beaches at the park are accessible to the public. During shorebird nesting season, certain areas may be posted to prevent visitors from impacting nesting shorebirds. Although this may suffice to protect nests, once chicks are mobile and leave the nest, it is more difficult to protect them from visitor impacts. This is particularly problematic with Wilson's plovers, which do not form large colonies. Their isolated nests and mobile chicks are cryptic and often difficult to protect. Pedestrians and cyclists using the beach may also flush resting and feeding birds either intentionally or inadvertently.

Interpretive signs are used at beach access points to educate park visitors about avoiding impacts to shorebirds. Although dogs are not permitted on the park's beaches, this is occasionally violated by park patrons and likely more often violated by pedestrians accessing the park from the municipal beach to the south. Dogs may appear to shorebirds as a greater threat than humans, particularly if the dogs are allowed to run off-leash. The park uses signage at all access points, including the south boundary line on the beach, to inform park visitors of rules and regulations pertaining to dogs and other potential impacts.

Many of the imperiled animal species found at the park are transients that do not actually breed onsite. Significant numbers of imperiled wading and shorebird species use the marshes and beaches of the park as resting and feeding habitat during migration and over winter. The federally threatened piping plover may be found over-wintering on the shorelines of park, including the beaches of Tiger Island. The *rufa* subspecies of the red knot was recently listed as federally threatened due to the precipitous decline in this population of red knots along the eastern seaboard. This subspecies over-

winters in southern South America and passes through Fort Clinch State Park during the spring and fall migration periods.

Shorebird species tend to be vulnerable to human disturbance since they may compete with park visitors for access to the shoreline and beach areas. These species would benefit from an active environmental education program aimed at educating park visitors about the impacts of human disturbance on wildlife. The broad beach area immediately south of the jetty is a very important resting and roosting area for shorebirds. Repeated disturbances by park visitors walking along the shoreline may be detrimental to imperiled species such as the black skimmer and least, Caspian, gull-billed, and sandwich terns. H. Smith (personal communication) suggests that tangential approaches to roosting/resting shorebirds may be less disturbing than direct approaches. DRP staff will investigate methods of educating beach users, and the park will work to route visitors away from resting shorebirds to minimize disturbances whenever possible.

Shorebird species that breed within the park, the Wilson's plover and least tern, are systematically monitored during the breeding season. Known nest sites are posted and park visitors are excluded from these areas to protect the nesting birds in accordance with DRP policies. Conflicts with beach users can arise since young shorebirds are precocious and may leave the posted nest sites.

Staff will follow the guidelines and recommendations provided in the DRP Resource Management Standard, "Shorebird and Seabird Management," for the protection and management of least terns and other imperiled shorebird and wading bird species. Staff will adopt setback distances for protection of colonial breeding birds as recommended in "Shorebird and Seabird Management" and in Rogers and Smith (1995).

- Demarcating potential shorebird habitat by enclosing the perimeter of the habitat and buffer area with appropriate fencing and signage using guidelines from the Florida Shorebird Alliance (Avisar et al. 2012).
- Encouraging and focusing visitor activities into areas less suitable for shorebird nesting habitat. Monitoring during nesting season to identify and protect new breeding sites.
- Providing interpretive and educational outreach to the public prior to and during the nesting season to encourage visitor use that protects shorebirds and their habitat.
- When the same breeding sites are used year after year, posting the protected area will occur prior to the season (pre-posting).
- When new breeding sites are indicated, appropriate measures will be implemented, including demarcating new protected areas and expanding or initiating interpretive programs.
- Coordinating with FWC and local law enforcement agencies to ensure compliance with park rules and shorebird protection as needed.

Although most of the marine turtles nesting in the park are loggerhead sea turtles, both the green and leatherback sea turtles have also been recorded nesting in the park. Fort Clinch State Park participates in Florida's Marine Turtle Index Nesting Beach Survey. From May 1 through Aug. 31, the park provides daily logs of the nesting activity of marine turtles to the FWC's Fish and Wildlife Research Institute. The park also provides an annual nesting summary to FWC for the Statewide Nesting Beach Survey through the DRP marine turtle program coordinator. FWC's Imperiled Species Management Section issues permits for all marine turtle activities conducted at the park. Activities permitted at Fort Clinch State

Park include nesting surveys, stranding and salvage activities, nest relocations, nest screening with self-releasing cages, and the maintenance and display of preserved specimens. Staff generally avoids relocation of nests unless there is no other alternative. Protective caging of nests is only used when necessary. In most cases, nest disturbance by staff is kept to the minimum necessary. The FWC Marine Turtle Conservation Handbook (FWC 2016) directs all marine turtle activities at the park.

Diamondback terrapins occur in the marshes and tidal creeks of Egans Creek and near Martin's and Tiger islands. This species is declining and is considered a species of greatest conservation need by FWC. Population studies of this species in the park will be encouraged in cooperation with FWC and other partners.

Park management currently prohibits domestic dogs and cats on the park's beaches and dunes in order to protect nesting and resting shorebirds and marine turtles. Dogs are perhaps the most destructive and disturbing influence on ground-nesting shorebirds. Dogs also prey upon marine turtle eggs and hatchlings. The threat of domestic pets roaming the beach is most severe at night. Although park regulations prohibit pets on park beaches at all hours, this is particularly hard to enforce or document at night when campers may walk their pets without the likelihood of encountering uniformed personnel. Most of the egg laying and hatching of marine turtles occurs at night. Shorebirds are also vulnerable at night when tending nests. Park staff will continue to monitor beaches for unauthorized incursions by pets and will document any impacts observed on wildlife species.

Occasionally, special events may be held at the fort, sometimes after normal park operating hours. These events must be reviewed to ensure that they do not impact imperiled species on the beaches adjacent to the fort. This is particularly critical during shorebird and marine turtle nesting seasons when loud noises or lighting may disturb nesting species.

Worthington's marsh wren (*Cistothorus palustris griseus*), an FWC Species of Special Concern, breeds in the salt marshes of Martin's and Tiger islands. Florida Natural Areas Inventory (FNAI) staff have conducted surveys and documented Worthington's marsh wren and MacGillivray's seaside sparrow (*Ammospiza maritimus macgillivrayii*) within the park's salt marshes (NeSmith and Jue 2003). FWC (Schwarzer 2013) proposed further surveys of Worthington's marsh wren in the region and conducted surveys in 2014-15 (Schwarzer and Cox 2015).

The painted bunting (*Passerina ciris*), a species that nests at Fort Clinch State Park, has been declining in the southeastern United States over the past several decades according to Breeding Bird Survey data (Sauer et al. 2012; Delany et al 2013). Scientists now consider the eastern population of painted bunting at risk due to a number of factors, including loss of optimum breeding habitat and fragmentation of habitat in general (Sykes and Holzman 2005). The U.S. Geological Survey determined annual survival rates of the painted bunting at various locations in the southeastern Atlantic coastal states, including Fort Clinch State Park (Sykes 2004). FWC conducted surveys of singing males at the park between 2008 and 2010 to estimate population densities. Their study confirmed that populations have declined (Delany et al 2013). FWC will be continuing population studies of painted buntings in northeast Florida, including Fort Clinch State Park. The park likely plays an important regional role in the preservation of this species. Coastal strand, and to a slightly lesser extent maritime hammock, are the most important breeding habitats for painted buntings in the southeastern United States (Meyers 2011). In recognition of the vulnerability of the species, extra precautions should be taken when planning and implementing development in the park, and when planning and siting visitor use activities.

The waters offshore of Amelia Island serve as a winter calving ground for the endangered northern right whale from Dec. 1 through March 31. The south Georgia-north Florida region has been designated as Critical Habitat for the northern right whale by the National Marine Fisheries Service. The boundaries of the area extend from the shoreline to 15 miles offshore (Raichle et al 1997). The West Indian manatee occurs in the Amelia River and associated tidal creeks.

Imperiled Species Inventory						
Common and Scientific Name	Imperiled Species Status				Management Actions	Monitoring Level
	FWC	USFWS	FDACS	FNAI		
PLANTS						
Spiked crested coralroot <i>Hexalectris spicata</i>			E		9,10	Tier 1
Spreading pinweed <i>Lechea divaricata</i>			E	G2,S2	9,10	Tier 2
Shell-mound pricklypear <i>Opuntia stricta</i>			T		8,9	Tier 2
White fringed orchid <i>Plantanthera blephariglottis</i>			T		9,10	Tier 1
Yellow fringed orchid <i>Platanthera ciliaris</i>			T		9,10	Tier 1
Moundlily yucca <i>Yucca gloriosa</i>			E		9	Tier 1
REPTILES						
American alligator <i>Alligator mississippiensis</i>	FT(S/A)	T(S/A)		G5,S4	4,13	Tier 1
Loggerhead sea turtle <i>Caretta caretta</i>	FT	T		G3,S3	2,8,10,13	Tier 3
Green sea turtle <i>Chelonia mydas</i>	FE	E		G3,S2	2,8,10,13	Tier 3
Leatherback sea turtle <i>Dermochelys coriacea</i>	FE	E		G2,S2	2,8,10,13	Tier 3

Imperiled Species Inventory						
Common and Scientific Name	Imperiled Species Status				Management Actions	Monitoring Level
	FWC	USFWS	FDACS	FNAI		
Gopher tortoise <i>Gopherus polyphemus</i>	ST			G3,S3	8,10,12,13	Tier 1
BIRDS						
Macgillivray's Seaside Sparrow <i>Ammodramus maritimus macgillivrayi</i>				G4T3, S2	4	Tier 3
Rufa Red Knot <i>Calidris canutus rufa</i>	FT	T		G4T2,S2N	4,8,9,10,13	Tier 3
Piping Plover <i>Charadrius melodus</i>	FT	T		G3,S2	4,8,9,10,13	Tier 3
Wilson's Plover <i>Charadrius wilsonia</i>				G5,S2	4,8,9,10,13	Tier 3
Worthington's Marsh Wren <i>Cistothorus palustris griseus</i>	ST			G5T3, S2	4	Tier 3
Little blue heron <i>Egretta caerulea</i>	ST			G5,S4	4	Tier 2
Reddish egret <i>Egretta rufescens</i>	ST			G4,S2	4	Tier 2
Tricolor heron <i>Egretta tricolor</i>	ST			G5,S4	4	Tier 2
Merlin <i>Falco columbarius</i>				G5,S2		Tier 2
Peregrine falcon <i>Falco peregrinus</i>				G4,S2		Tier 2
Magnificent frigatebird <i>Fregata magnificens</i>				G5,S1		Tier 2

Imperiled Species Inventory						
Common and Scientific Name	Imperiled Species Status				Management Actions	Monitoring Level
	FWC	USFWS	FDACS	FNAI		
Gull-billed Tern <i>Gelochelidon nilotica</i>				G5,S2	10,13	Tier 2
American oystercatcher <i>Haematopus palliatus</i>	ST			G5,S2	10,13	Tier 2
Caspian tern <i>Hydroprogne caspia</i>				G5,S2	10,13	Tier 2
Wood stork <i>Mycteria americana</i>	FT	T		G4,S2	4	Tier 2
Roseate Spoonbill <i>Platalea ajaja</i>	ST			G5,S2	4	Tier 2
Black skimmer <i>Rynchops niger</i>	ST			G5,S3	10,13	Tier 2
Least tern <i>Sternula antillarum</i>	ST			G4,S3	4,8,9,10,11,13	Tier 3
Sandwich tern <i>Thalasseus sandvicensis</i>				G5,S2	10,13	Tier 2
MAMMALS						
West Indian manatee <i>Trichechus manatus</i>	FT	T		G2G3T2,S2S3	13	Tier 1

Management Actions:

1. Prescribed Fire
2. Exotic Plant Removal
3. Population Translocation/Augmentation/Restocking
4. Hydrological Maintenance/Restoration
5. Nest Boxes/Artificial Cavities
6. Hardwood Removal
7. Mechanical Treatment
8. Predator Control
9. Erosion Control
10. Protection from visitor impacts (establish buffers)/law enforcement
11. Decoys (shorebirds)
12. Vegetation planting
13. Outreach and Education

Monitoring Level:

Tier 1: Non-Targeted Observation/Documentation: includes documentation of species presence through casual/passive observation during routine park activities (i.e. not conducting species-specific searches). Documentation may be in the form of Wildlife Observation Forms, or other district specific methods used to communicate observations.

Tier 2: Targeted Presence/Absence: includes monitoring methods/activities that are specifically intended to document presence/absence of a particular species or suite of species.

Tier 3: Population Estimate/Index: an approximation of the true population size or population index based on a widely accepted method of sampling.

Tier 4: Population Census: A complete count of an entire population with demographic analysis, including mortality, reproduction, emigration, and immigration.

Objective A: Develop/update baseline imperiled species occurrence inventory lists for plants and animals.

- Action 1 - DRP staff and park volunteers will continue to inventory the park to update imperiled species inventory lists.

Objective B: Monitor and document eight selected imperiled animal species in the park.

- Action 1 - Develop monitoring protocols for two selected imperiled animal species, including Worthington's marsh wren and MacGillivray's seaside sparrow.
- Action 2 - Implement monitoring protocols for eight imperiled animal species, including those listed in Action 1 above and three marine turtle species, piping plover, Wilson's plover and least tern.

Imperiled species management at Fort Clinch State Park focuses primarily on shorebirds and other coastal bird species in addition to marine turtle species that nest within the park. The park coordinates all monitoring of imperiled species at the park with FWC and submits monitoring data to FWC as required.

FWC has developed a detailed species action plan for Worthington's marsh wren (FWC 2013) and conducted surveys in the region in 2014-15. The research is focused on habitat identification and population surveys (Schwarzer 2013, Schwarzer and Cox 2015). Surveys for MacGillivray's seaside sparrow within the park will also be a priority and will utilize park staff, volunteers and potentially FWC staff.

Shorebird surveys are conducted in accordance with the DRP Resource Management Standard, "Shorebird and Seabird Management." Surveys are conducted both during the nesting season and during the winter and migratory seasons. Data for nesting shorebirds are submitted to FWC via the online Florida Shorebird Database. The primary focus of nesting surveys is on Wilson's plovers and least terns. Winter Shorebird Survey data are also submitted to FWC. The park's survey efforts are supplemented by dedicated volunteers who provide valuable assistance in monitoring imperiled shorebird species in the park. Volunteers monitor the threatened piping plover and red knot and report information on banded birds to the U.S. Fish and Wildlife Service and international researchers working with these migratory species.

Marine turtle nesting is monitored in strict accordance with FWC Marine Turtle Conservation Guidelines (FWC 2007). The park participates in the Index Nest Beach Survey program as well as the Statewide Nesting Beach Survey in accordance with DRP's Marine Turtle Permit. The park uses a digital survey application developed by DRP and adopted by FWC using GPS data collectors in the field that allow direct digital data entry of the marine turtle nesting data.

Objective C: Monitor and document two selected imperiled plant species in the park.

- Action 1 - Develop monitoring protocols for two selected imperiled plant species including shell-mound prickly pear and pine pinweed.
- Action 2 - Implement monitoring protocols for the two imperiled plant species listed in Action 1 above.

DRP staff will conduct a Tier 1 survey to determine the presence of the state endangered spreading pinweed (*Lechea divaricata*). This species has not been documented at Fort Clinch State Park since it was determined to be there in 1943. A monitoring protocol is needed.

A population of the state threatened shell-mound pricklypear, *Opuntia stricta*, occurs in the park. Recently, the invasive pest of the cactus, *Cactoblastis cactorum*, was also found in the park. Because of the arrival of this pest, the park should monitor the health of its populations of *Opuntia stricta*. *Cactoblastis cactorum* egg sticks will be removed as an invasive animal action item. A monitoring protocol is needed for the shell-mound pricklypear.

INVASIVE SPECIES

While Fort Clinch does have some invasive plant species present, it is fortunate that their populations are not currently extensive. The park will work to keep those areas free of invasive plants free of them in the future and also reduce or eliminate current infestations. To achieve this, the park will need to be vigilant in their surveys to find and remove infestations before they expand.

In the past 10 years, the park staff has treated 147 acres of invasive plants. Some species have been detected and removed from the park by the quick action of staff. Beach vitex (*Vitex rotundifolia*) was found in the park in 2011 and immediately removed. This species is a serious pest further north along the Atlantic coastline, and the infestation at Fort Clinch State Park was documented as one of the first in the state of Florida. This type of early detection and rapid response (EDDR) approach by the park will be continued so that the park is protected from new, aggressive invasives. The park monitors the coastal areas for new infestations of beach vitex. As of 2013, additional beach vitex plants have been found and treated in the vicinity of the original infestation. Brazilian pepper (*Schinus terebinthifolia*) was initially found at the park and quickly removed. Unfortunately, this species still grows on neighboring properties and ongoing removal is necessary.

The park currently has scattered populations of Sprenger's asparagus fern (*Asparagus aethiopicus*), which is bird dispersed. This is a species that is increasingly appearing in coastal areas and should be removed as thoroughly as possible. It is often difficult to treat and may need a combination of hand removal and herbicide. Silverthorn (*Elaeagnus pungens*) is another species that is increasingly showing up in natural areas. It can form dense thorny thickets and ladder fuels and should be removed as soon as possible.

Lantana (*Lantana camara*) is also found in the park. The native state endangered pineland lantana, *Lantana depressa* var. *floridana*, has been found previously at Little Talbot Island State Park in Duval County, and could potentially occur at Fort Clinch State Park. Park staff should familiarize themselves with the difference between these two similar species. *Lantana depressa* var. *floridana* has solid

yellow or orange flowers, while *Lantana camara* has orange and yellow, or purple and yellow, multicolored flowers. Staff treating *Lantana camara* should be aware of the differences between the two species and should not remove any lantana plants that are not flowering.

The park will practice preventative measures to avoid unintended introductions of invasive plants. Equipment entering the park is inspected for plant material and soil and cleaned if necessary. Any fill, lime rock or landscaping material brought into the park should be clean, and the source should be inspected.

Many of the parks' invasive plant problems arise from invasive plants on neighboring properties. Park outreach efforts target invasive plants to encourage neighbors to assist in the removal of these species.

Over the previous 10 years feral hogs, feral dogs, feral cats, armadillos and raccoons have been removed. Feral hogs are present on Martin's Island and in the main park area in relatively low numbers. Feral cats are of particular concern since they may carry and transmit diseases to native wildlife, including bobcat and mink. Raccoons need to be regularly controlled in the park. The park follows DRP policy when removing raccoons. Coyotes are also known to occur within the park. Coyotes are typically only removed from parks if they are impacting imperiled species, specifically marine turtle or shorebird nests. The population of white-tailed deer has increased significantly in the park over the past few decades. Over-browsing of beach dunes and coastal grassland vegetation has led to destabilization of dunes and loss of vegetation. The expansion of coyotes in the park may help reduce the deer population or at least discourage deer from using the open habitats that coyotes prefer. If deer continue to damage sensitive vegetation, staff will consult with FWC to determine an appropriate course of action.

In 2002, the red bay ambrosia beetle, *Xyleborus glabratus*, was first detected in the U.S. in Georgia. The beetle carries a fungal pathogen (*Raffaelea lauricola*) that causes laurel wilt disease and results in the death of red bays (*Persea borbonia*) and other species in the Lauraceae family. The beetle and its associated pathogen spread rapidly, and in 2005 it was detected in Duval County (Mayfield and Thomas 2009). Since that time many of the adult red bays at Fort Clinch State Park have died. The beetle and laurel wilt have now spread throughout most of Florida and many of the surrounding states. While most of the adult red bays at Fort Clinch State Park have been top-killed, the trees continue to re-sprout from their roots. It may be that members of the Lauraceae will continue to survive as in a shrub form as the remnant tree root systems continue to re-sprout. The long-term impacts of this disease on members of the Lauraceae have many unknowns at this point.

Cactoblastis cactorum, an invasive cactus moth, arrived in the Florida Keys in 1989. It is a threat to native cactus species and has been spreading north, particularly along the coasts. By 2000, it had reached the northeast coast of Florida and Fort Clinch State Park. This is of particular concern because the state threatened shell-mound pricklypear, *Opuntia stricta*, occurs in the park. The park should continue to monitor the impact of the invasive moth on the shell-mound pricklypear.

Invasive Plants Inventory			
Species Name Scientific Name - Common Name	FLEPPC Category	Distribution	Zone ID
<i>Asparagus aethiopicus</i> - Sprenger's asparagus-fern	I	Scattered Plants or Clumps, Scattered Dense Patches, Dominant Cover	FCL-01, FCL-04, FCL-06, FCL-05
<i>Cinnamomum camphora</i> - Camphor-tree	I	Single Plant or Clump	FCL-01
<i>Dactyloctenium aegyptium</i> - Durban crowfootgrass	II	Single Plant or Clump, Scattered Plants or Clumps	FCL-04, FCL-05
<i>Dioscorea bulbifera</i> - Air-potato	I	Scattered Dense Patches	FCL-01
<i>Elaeagnus pungens</i> - Silverthorn	II	Single Plant or Clump, Scattered Plants or Clumps	FCL-05, FCL-10
<i>Lantana camara</i> - Lantana	I	Single Plant or Clump, Scattered Plants or Clumps, Scattered Dense Patches	FCL-01, FCL-02A, FCL-03, FCL-08, FCL-02B, FCL-05
<i>Melia azedarach</i> - Chinaberry	II	Single Plant or Clump, Scattered Plants or Clumps	FCL-03, FCL-05, FCL-10
<i>Nephrolepis cordifolia</i> - Tuberous sword fern	I	Scattered Plants or Clumps, Scattered Dense Patches	FCL-02A
<i>Panicum repens</i> - Torpedo grass	I	Scattered Plants or Clumps	FCL-05
<i>Pteris vittata</i> - Chinese brake fern	II	Scattered Dense Patches	FCL-01
<i>Sphagneticola trilobata</i> - Wedelia	II	Scattered Dense Patches	FCL-05
<i>Vitex rotundifolia</i> - Beach vitex	I	Single Plant or Clump	FCL-04

Objective A: Annually treat 1 acre of invasive plant species in the park.

- Action 1 - Annually develop/update invasive plant management work plan.
- Action 2- Implement annual work plan by treating 1 acre in park, annually, and continuing maintenance and follow-up treatments as needed.

Because Fort Clinch State Park is relatively free of invasive plants, park staff have the real opportunity to eliminate most invasives from the park. Species which may prove especially detrimental to the park habitats are beach vitex, Sprenger's asparagus fern, silverthorn and Brazilian pepper, however efforts will be made to remove all invasive species.

Park staff will engage neighbors in an outreach program. The goal should be to educate neighbors and visitors about the impacts of invasives and to encourage them to remove invasives from their properties.

Objective B: Implement control measures on three invasive animal species in the park.

- Action 1 - Remove feral hogs and feral cats as necessary.
- Action 2 - Monitor the invasive cactus moth and remove egg sticks from any cacti on which they occur and in particular remove them from the shell-mound prickly pear.

The focus will be on removing invasive species that impact the most important natural resources of the park. This might include species that impact shorebirds, sea turtles and other bird species. Invasive species that impact imperiled species should be given greater attention.

Feral hogs will be removed from the park as they occur. Although relatively small numbers of hogs have occurred within the park, they have the capacity to cause severe damage to natural areas, particularly wetlands. Whenever they are detected in the park, staff will institute control measures.

The park should monitor and remove egg sticks of the invasive cactus moth, *Cactoblastis cactorum*, from *Opuntia stricta* and any other cacti on which it may occur.

Further research on the biology of the red bay ambrosia beetle and the associated red bay fungal pathogen *Raffaelea lauricola* would be useful. It would be helpful to understand the biology of the pathogen and its vector on the Lauraceae hosts after the initial infection and mortality events have occurred. For example, does the pathogen persist in the red bay and other Lauraceae roots and root suckers, do the root suckers serve as a disease reservoir, will red bays persist in a shrub rather than tree form, will they survive to bear fruit and what is the disease impact on species that depend on the Lauraceae for fruit or as a plant host?

Objective C: Develop and implement measures to prevent the accidental introduction or further spread of invasive plants in the park.

- Action 1 - Prepare written guidelines to prevent the introduction and spread of invasive plants. Provide staff with the tools to implement the guidelines.

Invasive plants often invade an area accidentally through preventable methods of entry. To limit accidental introduction and movement of invasive species, park staff will need to develop and practice preventative measures, including a protocol for equipment inspection and decontamination. Activities such as mowing, logging, fire line preparation and road building can introduce or redistribute invasives through contaminated equipment. Fill dirt, lime rock, potted horticultural plants and mulch are all potentially contaminated by invasives even if they are not readily visible at the time of entry into the park. Some new infestations of invasives may be preventable by ensuring that contractors clean their equipment before entering the park. The further spread of invasives already established in the park may be avoided by making sure that staff and contractors do not move equipment from a contaminated area.

CULTURAL RESOURCES

Prehistoric and Historic Archaeological Sites

A predictive model for the park was completed in 2012 (Collins et al 2012). There are seven archaeological sites within the park. One archaeological site (NA 47) was remapped, and its location no longer occurs within the park boundary. Sites NA 16 and NA 48 are both prehistoric. The first, NA 16, is the Quarantine Station site. Its exact location is unknown. NA 48 is an unnamed shell heap or mound. Bullen and Griffin (1952, 1984) identified and recorded these during their surveys of Amelia Island in the mid-1950s. Martin's Island (NA 703) is a multi-component site that is historic and pre-historic (Hendryx and Smith, 2000). The historic period at the site spans from 1783 through the territorial settlement years and into the 20th century.

The remaining recorded archaeological sites are products of federal government military or civilian activities. Three sites (NA 52, NA 53 and NA 80A) date to the Civil War period of the fort. The Encampment Site (NA 52) is probably a component of a Civil War-era army camp. China, other ceramics and glass objects of the period were recovered. The file for NA 53, Fort Clinch Beach, is vague. Its map reference appears to include only the beach between the fort and the river, an area that for the most part no longer exists. This may be the site of a Civil War execution. Due to beach erosion, this component of the site may no longer exist. It may also refer to the series of brick masonry structures located on the beach west of the fort. The structures, including a well enclosure and several low retaining walls, have been covered by recent depositions of sand by the U.S. Army Corps of Engineers. A brick masonry ruin, sometimes called the "Sergeant's House," is nearby but higher in the dunes. Fort Clinch NA 80A is associated with the fort and contains pre-historic and Civil War components. The site was described during the fort's barracks drainage improvement project (Johnson and Lewis, 2004).

The Quarantine Point Ballast Dump, NA 57, marks a place where ships of the late 19th century removed ballast to better distribute cargo. It is an important site, and its existence testifies to the vigorous commerce of Fernandina over an undefined time.

Willow Pond is not a natural pond and its complete history is unknown. It is not recorded as an archaeological site. Further information is needed about the pond's development and activities during the CCC period.

The locations of several archaeological sites within the park are unknown and as such their conditions are unknown. Park staff and archaeologists preparing the predictive model for the park have looked unsuccessfully for Quarantine Station (NA00016), N-3, of Bullen & Griffin 1952 (NA00048), Amelia Island Civil War Encampment (NA00052) and Fort Clinch Beach (NA00053). The Fort Clinch Beach site may no longer exist since so much of the beach has eroded away.

The location of Quarantine Point (NA00057) is known, and the condition is good although there are ongoing threats to the site. The river and tides are eroding the site and illegal camping and vandalism also impact the site. Campers sometimes move rocks associated with the site to make fire rings.

The Martin's Island (NA00703) site is in good condition. An ongoing threat is the presence of feral hogs which could damage the site by rooting. Park staff should monitor damage caused by feral hog activity. If the site is threatened, it may be necessary to remove feral hogs.

Fort Clinch NA00080A is associated with the fort and is in good condition. The park should limit ground disturbance within and around the fort.

Park staff should photo-document changes in the condition of Quarantine Point (NA00057). Law enforcement should continue to regularly patrol the area to prevent illegal camping and vandalism.

Park staff should periodically monitor damage caused by feral hog activity. If Martin's Island (NA00703) is threatened by rooting, it may be necessary to remove feral hogs.

To protect the good condition of Fort Clinch NA00080A, the park should limit ground disturbance within and around the fort.

Historic Structures

There are 12 historic structures and one resource group in Fort Clinch State Park recorded with the Florida Master Site File (FMSF).

The park owes its name and prominence to its best-known cultural resource, Fort Clinch. The fort was a tertiary component of the Third, or Totten, System of Defense. Its purpose was to defend the entrance to Cumberland Sound (Nolan 1974; Shepard 1965). Construction work began in 1847 (Shepard 1965). It proceeded slowly and in spurts until federal reoccupation of the fort and surrounding reservation in 1862. Most of the construction visible today occurred between 1862 and 1867, although "modern" elements were added during the Spanish-American War of 1898 (Shepard 1965; Herndon et al 1995). The fort remains unfinished. When designed, Fort Clinch was a good example of the defensive advances of the early 19th century. Its brick masonry construction and protective embrasures for cannons and their crews were state of the art until about 1862. In that year, the ease with which the new and plentiful rifled cannons could breach masonry forts made Fort Clinch instantly obsolete. Fort Clinch is a classic public work of the pre-Civil War United States. The construction project brought together men and materials from all over the country in building a fort to defend the burgeoning commerce of the nation. It was the largest structure on Amelia Island, although it is not an especially large fortification. Fort Zachary Taylor in Key West is a larger, more complex structure, although its mass was significantly reduced during the late 19th century. Still, Fort Clinch is an impressive and historically significant edifice.

The fort has many structural components within its footprint, some of which have been assigned Florida Park Service building numbers. The structures were built at the same time as the fort, as part of the fort and of the same material as the fort. They are all recorded as part of the original FMSF NA 80 and National Register of Historic Places nomination. Two of these structures were recorded separately in 1989 (NA 718, NA 719) but will be linked in the FMSF database to indicate that they are part of NA 80.

Fort Clinch is recorded in the FMSF as NA 80. The National Register of Historic Places listed it on Feb. 23, 1972. A Restoration Master Plan for Historic Fort Clinch (Herndon et al 1995) was developed for the park.

The early development of Fort Clinch State Park was a project of the Civilian Conservation Corps (CCC). The original 1930s area of the park itself, as reflected in the formal park plan, is a resource significant

to development of public recreational facilities in Florida and the southeastern U.S. The plan and its surviving components were among the resources examined in the Survey of New Deal Era Resources in Florida State Parks (Historic Property Associates, Inc. 1989), hereinafter referred to as the “Survey of New Deal Resources.” That grant-supported project identified elements of nine state parks planned or constructed by “alphabet agencies” like the CCC, WPA and NYA. Identified components were recorded.

Among these components are the camping area latrine (NA00721, building 4); the combination building (NA00720, building 1), presently designated as the interpretive center, and a shop area storage building, actually a vehicle shelter (NA00722, building 15) constructed as a picnic shelter but subsequently moved to its present location.

CCC activities within Fort Clinch are the basis of all subsequent restorations. The CCC performed considerable work within and near the fort. The Survey of New Deal Era Resources concentrated on “new” construction and did not communicate the extent of repair or restoration work. For example, the survey confirmed restoration or adaptive alteration of the Quartermaster Building (NA00718, building 5) and the Soldiers’ Barracks (NA00719, building 6), but did not identify either as a park component constructed by the CCC. Of course, neither building represents original CCC construction

Fortunately, subsequent architectural and historical studies by Shepard (1965), Nolan (1974) and Herndon et al (1995) have recognized the CCC contribution to preserving the past.

One additional resource significant to the history of public works and aids to navigation is known. This is the Rear Range Beacon Oil Storage House complex (NA00983), a late-19th century brick-masonry structure. The site includes foundations for a fixed beacon structure and for storage tanks to supply illuminating oil to it and to a movable beacon on the beach. The structure, which is designated building 18, is mislabeled as “abandoned lighthouse” on some park maps.

Additional historic structures were constructed during the early Florida Park Service development period during the 1950s and 1960s. All of these structures were and still are utilitarian park buildings including a ranger residence (NA01283), shop/office (NA01284), shop/equipment shed (NA01285) and River Camp storage (NA01286) and bathhouse (NA01287).

The resource group Fort Clinch Entrance Drive (NA01282) was constructed by the CCC. This is now the main park drive.

No historic structure report has been done for any of the CCC buildings.

Fort Clinch has a multi-component nature, and, as a collective or single structure, is in fair condition. Individual elements within the fort are in conditions ranging from good to poor. Beach erosion that began during the late 19th century potentially threatens the fort itself. The condition of Fort Clinch (NA80) and all of its component parts, including the Quartermaster Building (NA00718) and the Soldiers’ Barracks (NA00719) is a primary concern of the park. Because of the multi-component nature of the fort and the ongoing need for maintenance and repair, effective management depends on judicious application of expertise and funds. Therefore, establishing and ongoing documentation of the conditions of the resources is the first step in allocating them.

Beach erosion along the northern edge of the fort could significantly damage the fort if not addressed. A series of unfortunate events that accelerated the loss of the fort beach began in the late 19th century

with construction of jetties to improve the inlet into Cumberland Sound. This disrupted the north-to-south sand flow along the barrier islands. Amelia Island was starved of waterborne sand while contributing sand to the southward flow beyond the navigation jetties. The subtraction of sand is evident along the Atlantic side of the island, but starvation is even more evident in front of Fort Clinch. Prior to the construction of the jetties, a beach some 100 yards wide once sloped from the fort to Cumberland Sound. Now what little beach remains is dependent on T-groins constructed in 2000 and the periodic deposition of dredge sand by the U.S. Army Corps of Engineers where the beach had been. Beach renourishment and dredging of the sound occurs on an annual basis, with the Fort Clinch groins usually receiving sand every other year. Renourishment is critical to protecting the fort from erosion. Protecting the renourished sand from erosion between replenishment events will benefit the condition of the fort. Beach plantings could aid the stabilization of the beach and the fort.

Iron used in the fort construction has a significant impact on the condition of the fort depending on its location in the structure. It was used in the gun ports, drawbridge and gun platforms. Only the iron contained within the structure of the fort gun ports is corroding and expanding to the point of gun port closure. Iron in other parts of the fort can be maintained. Iron expansion in the gun ports will eventually lead to structural failure. Several years ago, the iron was removed from the northwest bastion's gun ports and the masonry was tuckered and pointed to repair it. The remaining bastions still contain iron which is expanding.

The park is actively restoring the fort ramparts by removing trees and vegetation. There is also a plan to remove trees and vegetation that are encroaching on the fort walls.

The Rear Range Beacon Oil Storage House (NA00983) is a ruin, and its condition is poor. The park does not have enough information about the original structure at this time to restore it as there is only one known historic photograph. The structure should be stabilized. The masonry will need to be tuckered and pointed to stabilize it. If additional documentation of the structure is found, restoration could be considered at that time.

The River Camp bathhouse BL027023 (NA01287) is no longer in use. While the building is structurally sound, a new bathhouse has been constructed in the campground. The structure should be documented and demolished. Tent sites are planned in the vacated footprint.

The latrine (NA00721) is in fair condition. The building was added on to, and there are structural cracks adjacent to the addition.

The ranger residence BL027013 (NA01283) is a block building in fair condition. It needs to be rewired. The other historic structures in the park (shop/office BL027014 NA01284, shop/equipment shed BL027002 NA01285, maintenance shed NA00722 and storage BL027017 NA01286) are in good condition. The combination building (NA00720) is in good condition but has been modified since its construction during the New Deal era.

The CCC-era park entrance drive (NA1282) is a linear resource in fair condition. The primary concerns are to maintain the closed canopy structure over the road, to stabilize the road edge and to repave the road. The tree canopy is dying in the section near Egans Creek, apparently from saltwater intrusion. Large recreational vehicles are damaging the road surface. It is necessary to trim the canopy to accommodate them, but trimming should not open the canopy to salt spray.

Any restoration and maintenance of the fort should follow the direction of the Restoration Master Plan for Historic Fort Clinch (Herndon et al 1995). Any special events held within the fort must be reviewed for potential impacts to cultural resources.

The park employs a full-time mason to tuck and point the brickwork and maintain the structural integrity of the fort. Maintenance of metal surfaces in the fort is ongoing. Management measures vary depending on the location of the metal. Iron still needs to be removed and masonry repaired in all the fort's gun ports except the northwest bastion. In other areas, exterior metalwork can be maintained by sandblasting and painting.

The rampart slopes of the fort need to be stabilized with geoweb and sod. This will protect the ramparts and the kitchen, which is underneath.

To maximize the protection of the fort from erosion provided by the beach renourishment, the park should consider measures including additional plantings to aid the stabilization of the renourished sand beach and the fort.

The addition to the latrine (NA00721) should be removed so that only the CCC structure remains. The structural cracks adjacent to the addition should be addressed at this time.

The combination building (NA00720) should be restored to the CCC structural style in which it was built.

While maintaining the CCC-era park entrance drive (NA1282) it is important to protect the closed nature of the tree canopy. If any canopy trimming is needed it should be done with great care. If the canopy is opened too much by trimming, salt spray may enter and damage or kill the canopy.

A historic structure report is needed for the CCC structures.

Collections

The park maintains collections of objects and artifacts. Most of the collections relate directly or implicitly to the fort structure, to activities that took place there or to the lives of people who lived or worked at the fort. Some collection items make portions of the historic structure appear to be in use or aid rangers and volunteers in interpreting the history of the site.

The collections include several cannons: a mounted model 1861 Rodman 10-inch shell gun at the park entrance, an 1863 3-inch ordinance rifle donated by the great-grandson of Gen. Duncan Lamonte Clinch on display in the museum, and a model 1898 Gatling gun manufactured by Colt's Patent Firearms Manufacturing Company. Several original 24-pound howitzer cannon mounts are kept in the bakery pantry at the fort site as well. Cannon shot, shells, canister shot and grapeshot, as well as implements used in traversing and moving cannons, are located within the fort ammunition magazine. The park maintains an 1849 Colt pocket pistol in its original wooden case and an 1860 Spencer carbine rifle. Other personal items include a traveling Civil War desk and a doctor's amputation kit. The book collection is stored in the visitors' center in climate-controlled conditions.

Iron artifacts recovered during the restoration of the fort, including bullets, buttons, working tools and a wide variety of hardware from the fort are on display in the historic museum building NA00720. Other items pertaining to the fort include a collection of family Civil War documents, letters and discharge

papers for 1st Sgt. George D. Hughes, who was stationed at Fort Clinch from 1862 through 1865. His great-great grandson, Bill Bulger, donated the collection to the park. The documents are being digitized.

The park also maintains a list of collection items that are on loan. Objects of significance include a painting of Gen. Duncan Lamonte Clinch, Clinch's camp chair and military shackles for wartime prisoners.

The remaining collection objects are natural history interpretive specimens. The park has an inventory of its collection and a Scope of Collections Statement. Overall, the condition of the collection is fair, although certain components are in good condition. The majority of the collection is contained within the museum (NA00720) in climate-controlled conditions.

Considering their age, the Bulger collection of letters, documents and personal items is in good condition.

The Gatling gun is in good condition due to recent restoration that included rust removal and repainting.

The 1861 10-inch Rodman shell gun is in fair condition, and the 1863 3-inch ordinance rifle is in good condition. The 24-pound howitzer cannon mounts are in fair condition.

The small collection of metal objects, nails, bolts and miscellaneous hardware are in fair to poor condition due to their exposure to the salt environment.

The collection pieces directly associated with the fort are very significant. These include an 1863 ordinance rifle, a camp chair and personal items belonging to Gen. Clinch, tools, bullets and hardware discovered during restoration of the fort, and documents belonging to 1st Sgt. Hughes, who was stationed at the fort. These items original to the fort and period are artifacts that directly represent a snapshot of life at the fort during its use.

In general, the collection items should be protected from salt and sunlight and receive routine cleaning to prevent corrosion and deterioration.

The gatling gun should be kept in a climate-controlled area to prevent future corrosion and minimize exposure to outdoor environmental conditions.

Preservation of the 1861 10-inch Rodman shell gun and the 1863 3-inch ordinance rifle requires the routine cleaning of the metal components and repainting as necessary with oil or epoxy-based paints to prevent corrosion or further pitting of the metal. The 24-pound howitzer cannon mounts require similar maintenance to prevent corrosion.

Stabilization and management of the collection of miscellaneous metal objects includes removal of rust when possible and coating with rust inhibitor such as black paint. They should be stored in a humidity-controlled environment. The remaining items, including small firearms, a surgeon's kit, a traveling desk and miscellaneous accoutrements, require routine cleaning and care to prevent corrosion and buildup.

Historic documents related to the fort, including those Civil War documents donated by Bill Bulger need to be scanned. These documents should be displayed and stored in an archival manner in climate-

controlled conditions to protect them from degrading. They should be protected from exposure to UV light.

Cultural Sites Listed in the Florida Master Site File					
Site Name and FMSF #	Culture/Period	Description	Significance	Condition	Treatment
Quarantine Station/N-16 Bullen & Griffin 52 NA00016	Pre-historic	Archaeological Site	NE	NE	P
N-3 of Bullen & Griffin 1952 NA00048	Pre-historic	Archaeological Site	NE	NE	P
Amelia Island Civil War Encampment NA00052	Pre-historic and historic - Civil War	Archaeological Site	NE	NE	P
Fort Clinch Beach NA00053	Unknown	Archaeological Site	NE	NE	P
Quarantine Point NA00057	14 th to 19 th Century	Archaeological Site	NE	F	P
Fort Clinch NA00080	19 th Century Civil War	Historic Structure	NRL	F	P
Fort Clinch NA00080A	American Territorial, Civil War, Late 19 th Century	Archaeological Site	NR	G	P
Martin's Island NA00703	Pre-historic, Late 18 th Century -20 th Century	Archaeological Site	NR	G	P
Storage Building NA00718	1850 - New Deal CCC	Historic Structure	NR	F	P

Cultural Sites Listed in the Florida Master Site File					
Site Name and FMSF #	Culture/Period	Description	Significance	Condition	Treatment
Barracks NA00719	1850 - New Deal CCC	Historic Structure	NR	F	P
Combination Building NA00720	1940 New Deal CCC	Historic Structure	NR	G	RH
Latrine NA00721	1940 New Deal CCC	Historic Structure	NR	F	RH
Maintenance Shed NA00722	1939 New Deal CCC	Historic Structure	NR	G	RH
Rear Range Beacon Oil Storage House NA00983	19 th Century	Historic Structure	NE	P	ST
Residence-Ranger BL027013 NA01283	1952	Historic Structure	NE	F	RH
Shop/Office BL027014 NA01284	1958	Historic Structure	NE	G	RH
Shop/Equip Shed BL027002 NA01285	1961	Historic Structure	NE	G	RH
Storage BL027017 NA01286	1961	Historic Structure	NE	G	RH
Bathhouse, River Camp BL027023 NA01287	1963	Historic Structure	NE	F	R

Cultural Sites Listed in the Florida Master Site File					
Site Name and FMSF #	Culture/Period	Description	Significance	Condition	Treatment
Fort Clinch Entrance Drive NA01282	CCC New Deal	Resource Group	NE	F	P

Objective A: Assess and evaluate 20 of 20 recorded cultural resources in the park.

- Action 1 - Complete 20 assessments/evaluations of archaeological sites.
- Action 2 - Complete one Historic Structures Reports (HSR) for combination building NA00720.

All sites should be visited at least annually. Some of the archaeological sites have unknown locations. Despite this, park staff should continue to visit the area thought to contain sites. Any artifacts found around an unknown site should be documented by GPS location and the FMSF should be updated. Quarantine Point (NA00057) should be documented photographically so that changes are recorded.

The park has a Restoration Master Plan for Fort Clinch, therefore no Historic Structure Report is needed.

A Historic Structures Report should be prepared for the CCC/New Deal-era structures within the park. The priority should be combination building NA00720.

Objective B: Compile reliable documentation for all recorded historic and archaeological resources.

- Action 1 - Ensure all known sites are recorded or updated in the Florida Master Site File.
- Action 2 - Conduct Level 1 archaeological survey for any un-surveyed areas that may be impacted by proposed new developments.

A predictive model for the park identified areas of high, medium and low probability of locating archaeological sites was completed in 2012 (Collins et al 2012). New cultural sites will be recorded with the FMSF as they are encountered.

Any areas of new development should be confined to the current use area to limit the impact of ground disturbance. No Level I archaeological survey is needed at this time. However, if any development does occur, a Level I survey should be conducted in the area of expected impact.

The history of Willow Pond should be investigated and the pond recorded with the FMSF if appropriate.

The park has already developed a Scope of Collections Statement to guide the extent of the collection.

Objective C: Bring seven of 20 recorded cultural resources into good condition.

- Action 1 - Design and implement regular monitoring programs for 20 cultural sites.
- Action 2 - Create and implement a cyclical maintenance program for the park's collection items.
- Action 3 - Implement repair and stabilization of the bastion gun ports for Fort Clinch (NA00080).
- Action 4 - Scan Civil War documents and store archivally.
- Action 5 - Develop and implement a plan to restore the original structure, remove the addition and repair structural cracks of the latrine (NA00721).
- Action 6 - Develop and implement a plan to document and demolish the River Camp bathhouse BL027023 (NA01287).
- Action 7 – Develop and implement a plan to stabilize the Rear Range Beacon Oil Storage House (NA00983).

All bastion gun ports of the fort (NA00080) except the northwest one, need repair and structural stabilization. The corroding, expanding metal within the gun ports should be removed and bricks should be repointed or replaced as needed.

Develop and implement plans to augment stabilization of the fort provided by beach renourishment. This might include planting of beach species to stabilize the soil.

The latrine (NA00721) is a New Deal-era building in fair condition. It has been added on to, and there are structural cracks adjacent to the addition. The park should develop and implement a plan to restore the original structure, remove the addition and repair structural cracks.

The combination building (NA00720) is a New Deal-era building in good condition, however the building has been modified. The park should develop and implement a plan to return the design elements of the building to the original New Deal design.

The ranger residence BL027013 (NA01283) is in fair condition because it needs to be rewired. The park will rewire this structure.

The River Camp bathhouse BL027023 (NA01287) is currently not in use. The park should develop a plan to document and demolish the building and place tent sites in the vacated footprint.

The Rear Range Beacon Oil Storage House (NA00983) is a ruin that needs stabilization. The masonry should be tuckered and pointed to stabilize the structure.

The CCC-era park entrance drive (NA1282) needs management guidelines to protect the tree canopy over the road and to be repaved.

The park also has several significant collection items that need maintenance to bring them to or keep them in good condition. Specifically, historic documents related to the fort, including those Civil War documents donated by Bill Bulger, need to be scanned and displayed and stored in an archival manner in climate-controlled conditions to protect them from degrading. They should be protected from exposure to UV light. The collection's metal objects need preventative removal of rust and coating with a rust inhibitor such as black paint to maintain them in good condition. They should be stored in a humidity-controlled environment.

LAND USE COMPONENT

VISITATION

Fort Clinch State Park became one of Florida's first state parks in 1935 and was restored by the Civilian Conservation Corps through Franklin D. Roosevelt's New Deal proclamation. Situated adjacent to the Cumberland Sound and St. Mary's River, the fort has been of strategic and cultural significance for 300 years. Although the fort was never fully completed or used in direct combat, it served as a military post during three U.S. engagements.

Visitors are immersed in the history of the island by exploring the fort and surrounding landscape. While construction of the present-day structure began in 1847, the site was militarily occupied as early as the late 1700s. Fort Clinch State Park preserves artifacts and resources from the prehistoric period, Civil War, and the Civilian Conservation Corps era. This history is interpreted through numerous programs, including reenactments and educational programs.

Situated on the northernmost barrier island of Florida, bordering Cumberland Island National Seashore, Fort Clinch State Park offers visitors elevated panoramic beach and saltmarsh views, multiple beach access points, and canopied trails. For more than 2 miles, the park borders the expansive Egans Creek salt marsh and is accompanied by towering dune habitats.

Trends

Fort Clinch State Park annually admits over 350,000 visitors. Visitation is lowest during winter months but rises in the spring and summer. Park events, programs and interpretive tours are primary drivers for the abundant amount of visitation experienced.

Events at Fort Clinch State Park include candlelight tours, "Cannons on the Plaza," "Cars and Cannons" and several others. Similar to other state parks with battlefields or historic military elements, Fort Clinch State Park holds a "living history" program where reenactors and interpreters educate visitors about the 1860s in America. In addition to the above interpretive programming, the park annually conducts approximately 100 guided nature walks on the Willow Pond Trail, 50 guided candlelight fort tours, 30 ranger-led campfire interpretive programs, and 12 recreational skills programs. This park continues to be the flagship for living history in Florida and one of the most significant programs in the country.

EXISTING FACILITIES AND INFRASTRUCTURE

The park's recreational facilities are contained in four primary use areas: the Amelia River Campground, Atlantic Beach Campground, beach use area, and fort/visitor center. The Amelia River Campground and the fort are located on the western portion of the park. The Atlantic Beach Campground and beach use area are on the eastern edge of the park. A multiuse trail runs along both sides of Fort Clinch Road from the visitor center to the entrance station (See Base Map). The park's support facilities include the administration office south of the Atlantic Beach Campground and a maintenance area and residence along the park drive east of the Amelia River Campground.

When visitors enter Fort Clinch State Park, they are welcomed with a brick ranger station that is architecturally similar to other time period structures in the park, and parking areas on either side.

Farther down Fort Clinch Road, Egans Creek Overlook offers a small, stabilized parking area with an informational panel educating visitors about marsh habitat and the lighthouse. This use area provides a short walk to an overlook with panoramic marsh views of Egans Creek.

Paralleling the park road, starting near Egans Creek Overlook and ending at the fort, is a multiuse trail. Toward the north, the primitive group camping area is to the west and Atlantic Beach Campground is to the east toward the beach.

Along the campground road, there is a connection to a parking area for beach access with two boardwalks and restrooms. There is another road connection north of the beach access road that provides an administration building for support purposes. Bordering the shoreline, the Atlantic Beach Campground is the most northeast use area within the park. The Atlantic Beach Campground offers visitors several informational panels, six tent sites, 21 RV sites, camping facilities, three limited parking areas for about 14 vehicles, and a bathhouse. A boardwalk is also available for beach access.

South of the Atlantic beach access parking lot toward the eastern park boundary is the Nassau Halfway House, a previous youthful offender facility. Lisa Avenue previously provided access to these underutilized structures from outside of the park boundary but is now closed to the public.

Northwest of the primitive group camping area turn is the Willow Pond Trail. This trailhead offers bike racks, interpretive panels, benches and an unimproved parking area. Across from this trailhead are the lighthouse storage ruins that offer visitors several interpretive panels.

Along the park road to the west is another connection to the support area and the Amelia River Campground. At the support area, there are several residences, a maintenance shop, storage sheds, volunteer sites and a bathhouse. The Amelia River Campground located farther west along the Amelia River provides several bathhouses, a campfire circle, a pier and a trail connection to the west inlet parking area near the fort and visitor center. The campground is available, with reservations, for park visitors and for paddlers traveling along Amelia River.

The northern end of Fort Clinch Road provides access to the visitor center and CCC museum, a picnic area, and Fort Clinch. The visitor center provides a historical overview with interpretive exhibits, video programming and Civil War collections documents. There is a centralized, paved parking area as well as two additional stabilized parking areas toward the east and west that provide beach access. These smaller parking areas near the inlet provide limited spaces and are typically at maximum capacity. This area also provides multiple points of access to the shoreline, including two boardwalks.

To the west of Fort Clinch, Tiger Island provides one primitive campsite for overnight paddlers. There are no visitor facilities or infrastructure on Martin’s Island.

Facilities Inventory

<i>Entrance Area</i>	
Entrance Station	1
Parking Area (12 spaces)	1
<i>Egans Creek Overlook</i>	

Overlook	1
Interpretive Kiosk	1
Marsh Overlook Nature Trail (length in feet)	122
Stabilized Parking Area (4 spaces)	1
<i>Primitive Group Camp</i>	
Campsites	4
Bathhouse	1
<i>East Beach Area</i>	
Pier (length in feet)	605
Boardwalk (length in feet)	650
Observation Platform	4
Great Florida Birding Trail Exhibit	1
Restrooms	2
Interpretive Exhibit	1
Shower Stations	1
Parking Area (180 spaces)	1
<i>East Support Area</i>	
Administration Building	1
Stabilized Parking Area (5 spaces)	1
<i>Atlantic Beach Campground</i>	
RV Sites	21
RV Site Parking (8 spaces)	3
Tent Sites	6
Tent Site Parking (6 spaces)	2
Bathhouse	1
Boardwalks (length in feet)	450
Shower Station	1
Dump Station	1
<i>Willow Pond Trailhead</i>	
Willow Pond Nature Trail (length in miles)	1.5
Ruins Interpretive Panels	4
Dirt Parking Area (4 spaces)	1
<i>West Support Area</i>	
Maintenance Shops	2
Storage Structures	12
Residences	5
<i>Amelia River Campground</i>	
Campsites	42
Campfire Circle	1
Bathhouse	1
Dump Station	1
Amelia River/ Fort Access Path (length in miles)	0.35

<i>Fort Clinch</i>	
Historic Fort Complex	1
Visitor Center	1
Parking Area (130 spaces)	3
CCC Museum	1
Boardwalks	2
<i>Fort Clinch Picnic Area</i>	
Picnic Tables	25
Playground	1
Accessible Parking Area	1
<i>East Inlet Beach Access Area</i>	
Sandy Parking Area (5 spaces)	1
Boardwalk (length in feet)	240
<i>West Inlet Beach Access Area</i>	
Sandy Parking Area (5 spaces)	1
Boardwalk (length in feet)	107
<i>Parkwide</i>	
Interpretive Panels/ Kiosks	11
Multi-Use Trail (length in miles)	6
<i>Nassau House</i>	
Nassau Halfway House	1
Private Structures	3
<i>Tiger Island</i>	
Primitive Campsite	1

CONCEPTUAL LAND USE PLAN

Detailed Conceptual Land Use Plan Objectives

The use areas at Fort Clinch State Park listed below detail specific objectives and action items to be implemented within the 10-year planning cycle.

Parkwide

Objective: Improve pedestrian safety and minimize erosion.

Action Items:

- *Improve Fort Clinch Road.*
- *Extend the multiuse trail.*
- *Plant natural deterrents.*

In an effort to improve the safety of cyclists and pedestrians, improvements to the main park road and other access roads should be implemented. These improvements should include repaving or resurfacing, shared-lane markings and pedestrian crossings.

The existing multiuse trail should extend from Fort Clinch Road down the connecting roads including towards the east beach access area, Atlantic Beach Campground and Amelia River Campground. It is also recommended that the multiuse trail extend from the Amelia River Campground to the playground to benefit and improve the safety of visitors.

Along Fort Clinch Road, there are multiple unauthorized paths into the woods. Some of these paths are near or along vulnerable dune areas which have the potential to cause damaging erosion scars and habitat disturbance. This issue should be avoided in the future with native, stabilizing vegetation around makeshift paths that are common around the park.

Visitors commonly park along the road and walk to points of interest. Pulling off the road damages asphalt and causes ruts that lead to erosion and detract from the historic landscape. Crumbling road edges should be stabilized with site-appropriate natural materials such as oyster shell.

Beach Dunes

Objective: Repair and maintain plumbing infrastructure.

Plumbing runs through the dune system and has broken several times. As sand drifts, plumbing is exposed in several areas. This infrastructure should be repaired and maintained as needed.

Entrance Area

Objective: Alleviate traffic congestion.

Action Items:

- *Pave an additional lane.*
- *Provide a pass scanner and gate code.*

During peak visitation, the rate of arrivals exceeds the intake capacity such that vehicles stack into State Road A1A, causing traffic congestion outside of the park boundary. To alleviate traffic congestion, an additional ingress lane extending from A1A to the entrance station is proposed. If feasible, an additional 900-foot lane should be paved with a 10-foot width. When constructing the lane, the canopy road should remain intact, the historic entrance should be preserved and cultural resources should be avoided.

Across from the ranger station and at the end of this lane, a scanner for annual passes and a gate code for campers should be provided to help alleviate delays at the park entrance. Parks to emulate include Anastasia State Park, which utilizes an extra vehicular lane to avoid stacking issues onto A1A.

Willow Pond Trailhead

Objective: Improve pedestrian safety.

Action Items:

- *Reroute the multiuse trail.*
- *Improve parking lot.*
- *Provide a crosswalk.*

Currently, the multi-use trail accessed by this trailhead extends through the parking area, causing safety issues for pedestrians. The trail should be rerouted to the west to bypass the parking area through the maritime hammock. If the rerouted trail crosses the Willow Pond Trail, cautionary signage should be installed to avoid user conflicts.

This parking area should be resurfaced and parking spaces should be better delineated. This lot should hold eight to 10 vehicles, including one accessible parking space, and all spaces should be organized with parking blocks. When stabilizing the parking area, stormwater runoff improvements and soil erosion issues should be addressed.

Visitors must cross Fort Clinch Road to access the lighthouse oil storage building ruins, which is dangerous when there is heavy vehicle traffic. A pedestrian crosswalk with appropriate pavement markings will be designated and provide visitors with a direct route from the trailhead to the ruins. Signage should be limited or fully disregarded to preserve the visitors' viewshed.

Atlantic Beach Campground

Objective: Upgrade campground.

Action Items:

- *Upgrade utilities.*
- *Provide an additional campground loop.*
- *Provide necessary facilities for additional loop.*

Higher amperage needs of modern RVs necessitates electrical upgrades. The 30-amp electrical hookups for both the Atlantic Beach and Amelia River campgrounds should be replaced with 50-amp outlets and open faces.

The Atlantic Beach Campground is a high-demand facility and expansion is warranted. An additional 10-site campground loop should be provided in the most appropriate location. These standard facility campsites should provide 50-amp electrical hookups, potable water, picnic tables, and firepits.

Amelia River Campground

Objective: Improve campsites.

Action Items:

- *Stabilize campsites.*
- *Improve drainage and reduce flooding.*
- *Upgrade utilities.*
- *Convert to underground utilities.*
- *Provide additional campsites.*

Many of the campsites form bowl-shaped depressions, and the sites closest to the river commonly have flooding issues. All the sites in this loop should be stabilized to avoid future issues. Using sand and porous pea gravel as a base for these sites allows water to infiltrate into the ground faster while providing a strong, stable base for visitors to camp on. This stabilization solution has been effectively implemented within other state park campgrounds.

Drainage should be improved to help eliminate flooding issues common in this area. If feasible, the construction of a retention pond or vegetated swales should be considered to improve stormwater runoff and flooding problems. A hydrologic study and any recommended surface water retention measures should be considered. Any improvements should recognize this area's spatial restraints.

Replace 30-amp electrical hookups with 50-amp outlets and open faces.

Given its river proximity and vulnerability to flooding, all campground utilities should be placed underground. Sensitivity for cultural resources, however, may be a limiting factor.

Additional tent sites should be designated where appropriate. When considering locations, the campground's footprint should not expand to accommodate these sites and natural features should remain intact. River Camp Road is aged and difficult to maintain. The proposed pavement project should be prioritized before the new tent sites are added.

Visitor Center

Objective: Improve parking lot and visitor center.

Action Items:

- *Improve the parking lot.*
- *Reconfigure/renovate interior to maximize conference room space.*
- *Extend sidewalk.*

Flooding issues are prevalent along the outer edge of the parking area from stormwater runoff and depressions in the pavement. To reduce water pooling in all parking spaces, stormwater improvements should be implemented and resurfacing should be considered.

Food service ceased at the park several years ago. The new gift shop concessionaire has not reopened the food prep area and has instead used it as storage space. The existing kitchen is underutilized. The plan provisions combining the kitchen and existing conference room to provide a larger meeting space. This may be the most desirable solution for the capacity issues. To preserve this historic landscape, it is recommended that no exterior infrastructure be altered.

To improve the safety of visitors and support use of the picnic area, the visitor center sidewalk on the northwestern side of the parking area should be extended approximately 200 feet southwest around the curved tree line to the picnic area. The dumpster will need to be relocated to make this proposal feasible.

CCC Museum

Objective: Maintain museum exhibits.

All interpretive exhibits should be updated, repaired and replaced as needed.

Beach Use Area

Objective: Provide sheltered picnicking opportunities.

There are several scattered picnic tables along the boardwalk, but they do not provide any shelter. Two small picnic pavilions will be constructed adjacent to the parking area to provide sheltered picnicking opportunities for beach visitors.

Nassau House

Objective: Remove this use area.

Action Items:

- *Remove existing structures.*
- *Remove access road.*
- *Re-naturalize existing footprint.*

The Nassau House and all surrounding infrastructure should be removed since it is closed to the public, no longer in use, and potentially attracts trespassers. Lisa Avenue, the road to access the house, should also be removed. The existing footprint of the house and road should be restored to its natural state. After removal and restoration, this area should be secured from any public access. No recreational potential was identified due to the fragmentation from the park's primary use areas.

Martins Island

Objective: Maintain the island.

Replace the dock within the existing footprint.

Tiger Island

Objective: Improve primitive campsite.

Action Item:

- *Consider installing a tent platform.*

Considering salt marsh surrounds this small island, an elevated and durable tent platform should be considered for the primitive site here.

Southeast Park Boundary

Objective: Implement corrective actions to prevent erosion.

Action Items:

- *Install appropriate signage.*
- *Continue to install fencing.*

Fort Clinch State Park has had a longstanding problem with unauthorized paths stemming from an adjacent neighborhood. In the past, unauthorized footpaths have posed threats to sensitive dune vegetation. Although strategically placed fences have discouraged more footpaths, erosion is still a threat to these dunes. Corrective actions to deter makeshift paths should include installing standard boundary fencing with enforceable signage.

Fort Clinch Pier

Objective: Provision for pier reconstruction.

Following Hurricane Matthew and the damage sustained, the previous pier was structurally assessed and demolished in 2017. Considering this pier was the only public-access ocean pier on northern Amelia Island, DRP should provision for a pier rebuild, as funding becomes available.

OPTIMUM BOUNDARY

Fort Clinch State Park is surrounded by extensive development as well as other conservation lands including Cumberland Island National Seashore to the north and Egans Creek Greenway to the south. Most of Amelia Island is developed with shoreline and inland residencies, industrial and commercial zones, and several golf courses. To provide a better quality of life to surrounding communities, 1,696 acres should be acquired for resource preservation and compatible recreational opportunities.

Directly west of Fort Clinch State Park, there is a Florida Forever Board of Trustees Project for Tiger Island/Little Tiger Island that has been partially acquired. Out of the 1,463 acres, 1,283 acres should be considered for acquisition. This project will provide a connection of national and state park preserves and parks that will protect estuarine tidal marsh along the St. Marys River, Amelia River and some smaller linked rivers and creeks. This part of the coast has been recorded as one of the highest nesting concentrations of Worthington's marsh wren and MacGillivray's seaside sparrow and provides habitats for over-wintering species like the piping plover. This project will also protect cultural resources that show pottery-making aboriginal populations were here around the second millennium B.C. This area should be conserved to avoid further looting of these archaeological sites. Since this land is adjacent to Fort Clinch State Park, it may be suitable as an extension of the park. This would allow more resource-based recreation opportunities and marine communities protection.

Connected to and west of Fort Clinch State Park are an extensive salt marsh system, several businesses, and a public boat ramp. By acquiring this 413-acre area, DRP will 1) support other conservation land nearby like the city of Fernandina's Egans Creek Greenway just to the south, 2) preserve habitats for vulnerable species surrounding this area and 3) necessitate watershed protection, providing cleaner water for visitors and marine life. Since there is a public boat ramp in this proposed acquisition, more recreational opportunities will be provided if acquired.

	Proposals		Walkways
	Structures		Hiking Trails
	Parking Lots		Hiking/Biking Trails
	Campsites		Paved Park Roads

- ① Entrance Area - Develop an additional entrance lane. Provide a pass scanner and gate code at the end of lane.
- ② Southeast Park Boundary - Continue to install fencing and appropriate signage.
- ③ Nassau House - Remove existing structures and access road. Renaturalize existing footprint.
- ④ Parkwide - Improve Fort Clinch Road and extend multi-use trail to connecting roads. Plant natural deterrents along Fort Clinch Road to prevent further eroded paths.
- ⑤ Beach Use Area - Construct two covered pavilions.
- ⑥ Fort Clinch Pier - Provision for pier reconstruction.
- ⑦ Atlantic Beach Campground - Upgrade utilities at each campsite. Provide an additional campground loop with necessary facilities.
- ⑧ Beach Dunes - Repair and maintain plumbing infrastructure.
- ⑨ Willow Pond Trailhead - Reroute the multi-use trail. Improve parking lot. Provide a crosswalk to the adjacent lighthouse storage ruins.
- ⑩ Visitor Center/ CCC Museum - Improve parking lot to address stormwater issues. Extend sidewalk to picnic area. Reconfigure interior footprint of visitor center. Repair, replace, or update exhibits in the CCC Museum.
- ⑪ Amelia River Campground - Stabilize campsites, improve drainage, and reduce flooding. Upgrade utilities and convert them underground. Provide additional campsites where appropriate.
- ⑫ Tiger Island - Provide an elevated tent platform for the existing primitive campsite.
- ⑬ Martins Island - Replace and maintain the existing dock.



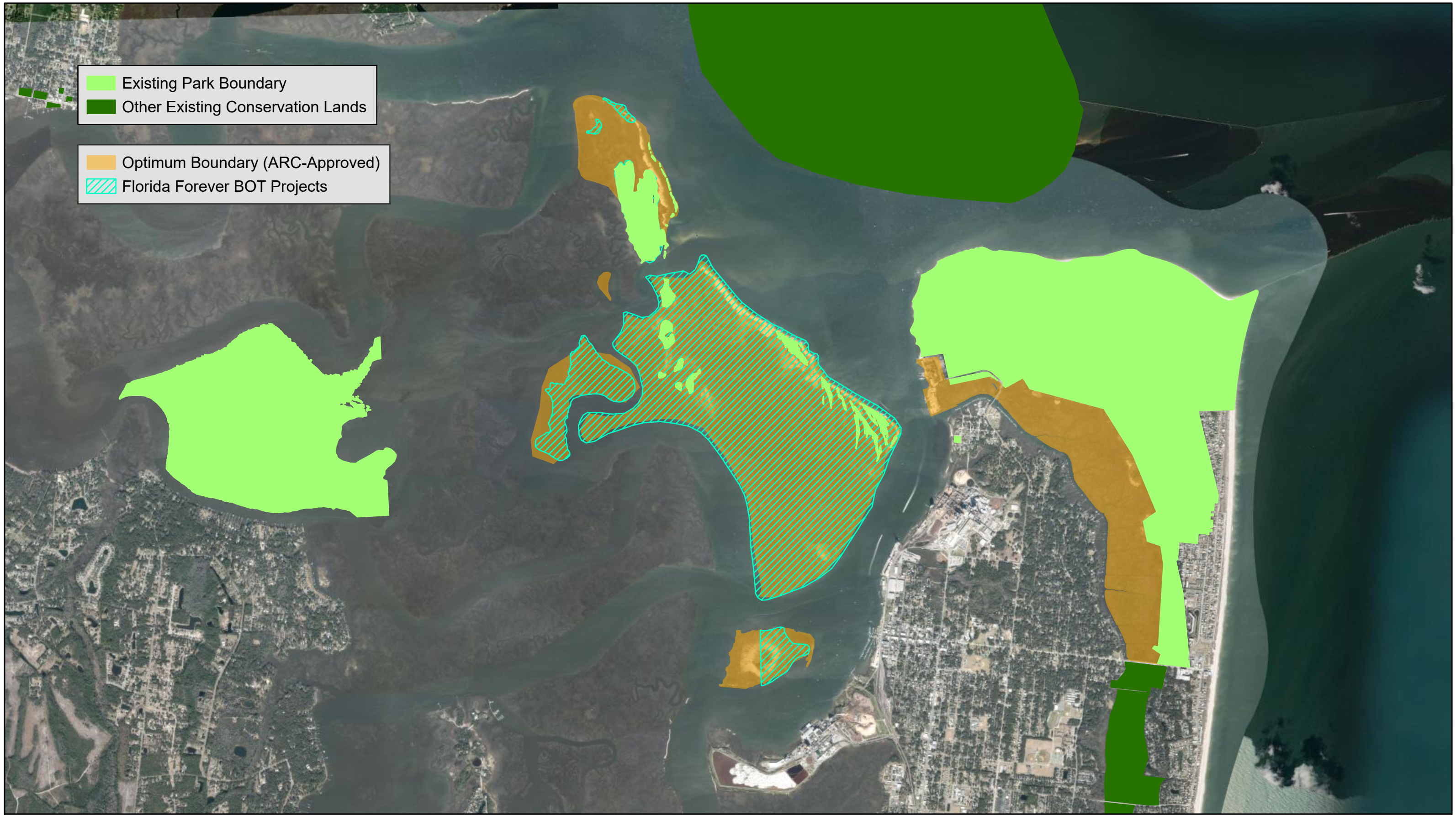
Fort Clinch State Park

Conceptual Land Use Plan



Existing Park Boundary
Other Existing Conservation Lands

Optimum Boundary (ARC-Approved)
Florida Forever BOT Projects



Fort Clinch State Park

Optimum Boundary



