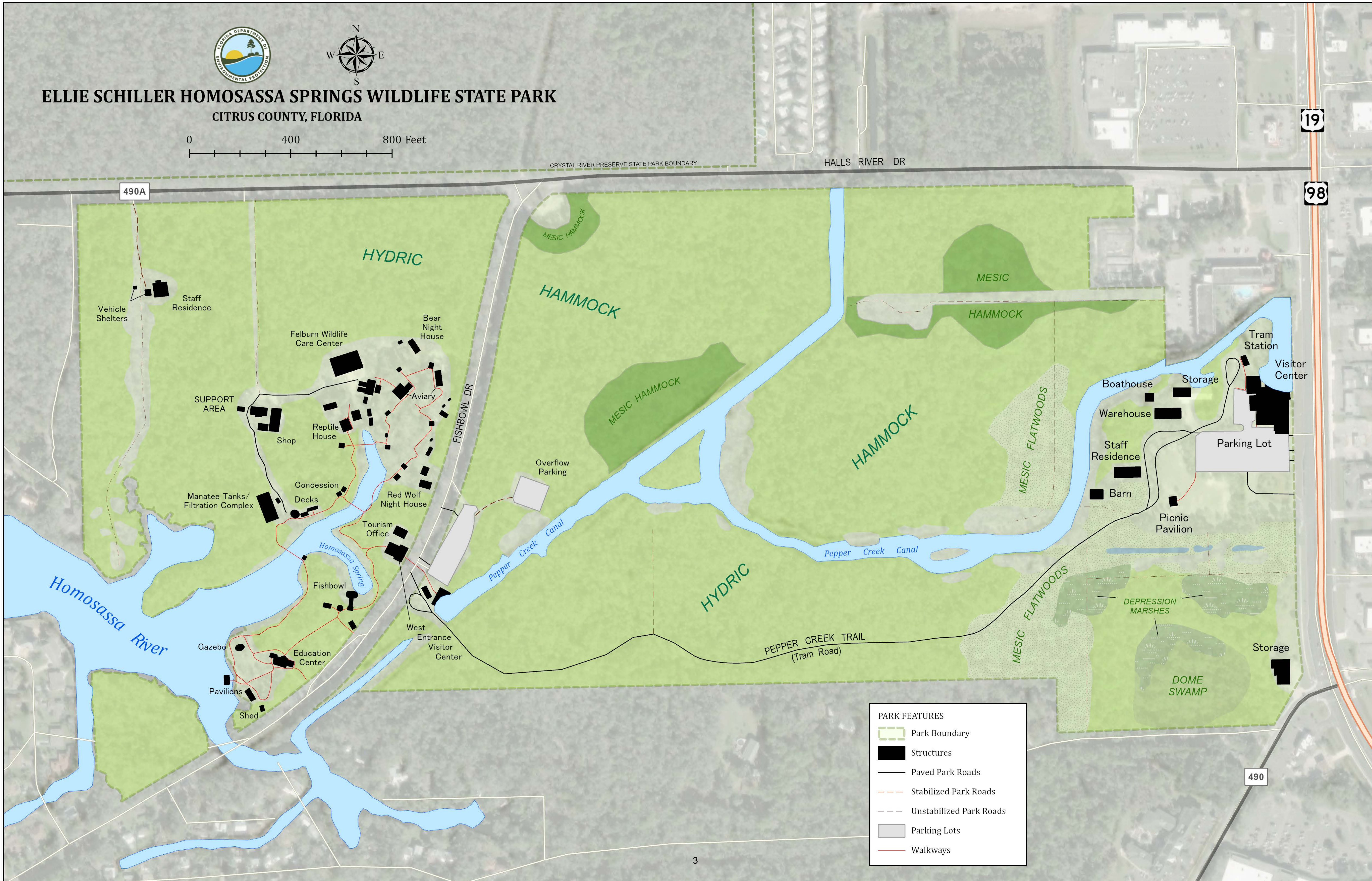
ELLIE SCHILLER HOMOSASSA SPRINGS WILDLIFE STATE PARK
Park Chapter

GULF COAST REGION


ELLIE SCHILLER HOMOSASSA SPRINGS WILDLIFE STATE PARK
CITRUS COUNTY, FLORIDA
0
400
800 Feet
N
S
E
W
CRYSTAL RIVER PRESERVE STATE PARK BOUNDARY
HALLS RIVER DR
490A
19
98
490
HYDRIC
HAMMOCK
MESIC HAMMOCK
MESIC
HAMMOCK
MESIC HAMMOCK
HAMMOCK
MESIC FLATWOODS
HYDRIC
MESIC FLATWOODS
DEPRESSION MARSHES
DOME SWAMP
Vehicle Shelters
Staff Residence
Felburn Wildlife Care Center
Bear Night House
SUPPORT AREA
Shop
Aviary
Reptile House
FISHBOWL DR
Concession
Decks
Manatee Tanks/ Filtration Complex
Red Wolf Night House
Tourism Office
Overflow Parking
Homosassa Spring
Fishbowl
Homosassa River
Gazebo
Education Center
Pavilions
Shed
West Entrance Visitor Center
Pepper Creek Canal
Pepper Creek Canal
PEPPER CREEK TRAIL (Tram Road)
Tram Station
Visitor Center
Boathouse
Storage
Warehouse
Parking Lot
Staff Residence
Barn
Picnic Pavilion
Storage
PARK FEATURES
Park Boundary
Structures
Paved Park Roads
Stabilized Park Roads
Unstabilized Park Roads
Parking Lots
Walkways

Ellie Schiller Homosassa Springs Wildlife State Park

INTRODUCTION

LOCATION AND ACQUISITION HISTORY

Ellie Schiller Homosassa Springs Wildlife State Park is located in Citrus County (see Vicinity Map). Access to the park is from U.S. Highway 19/98 and Fishbowl Drive. (See Reference Map). The Vicinity Map also reflects significant land and water resources existing near the park.

Ellie Schiller Homosassa Springs Wildlife State Park was initially acquired on Dec. 30, 1988, by the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida under the Conservation and Recreation Lands (CARL) program. Currently, the park comprises 200.25 acres. The Board of Trustees of the Internal Improvement Trust Fund (Trustees) hold fee simple title to the park and on Sept. 1, 1989, the Trustees leased (Lease No. 3786) the property to DRP under a 50-year lease. The current lease will expire on Aug. 10, 2039.

Ellie Schiller Homosassa Springs Wildlife State Park is designated single-use to provide public outdoor recreation and conservation. There are no legislative or executive directives that constrain the use of this property (see Appendices). 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 no additional revenue generating activities are appropriate during this planning cycle. 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 Ellie Schiller Homosassa Springs Wildlife State Park is to ensure the protection and preservation of the park's namesake first magnitude spring, and to provide for the rehabilitation, conservation, and interpretation of native wildlife species for Florida residents and visitors.

Park Significance

- Homosassa Springs and spring run are considered critical habitat for the Florida manatee with more than 100 manatees visiting the park during the winter. Rehabilitation facilities at the park serve orphaned manatees and manatees impacted by red tide.

- The park contains a wildlife care facility and well-developed visitor facility. Animal exhibits at the park showcase mostly native Florida wildlife, including Key deer (*Odocoileus virginianus clavium*), Florida panther (*Puma concolor coryi*), whooping crane (*Grus americana)* and hippopotamus (*Hippopotamus amphibious*).

- An underwater observation platform allows visitors to view manatees and fish in the spring basin.

- The park serves an important role in connecting vital habitat tracts to the north and south for the Florida black bear (*Ursus americanus floridanus*) and other notable species. Natural communities include hydric hammock and mesic flatwoods.

- Native Americans utilized the spring group located in the park for thousands of years before European settlement. The early 1900s saw the development of a popular tourist attraction for visitors who arrived on the "Mullet Train." The use of the springs as a tourist attraction has continued to the present day.

Central Park Theme

The life sustaining waters of Homosassa Springs are at the heart of a park for rescued wildlife whose stories as animal ambassadors illustrate how our choices can affect the health and survival of both the spring and its residents.

Ellie Schiller Homosassa Springs Wildlife State Park is classified as a state special feature site in the DRP unit classification system. In the management of a state special feature site, a special feature is a discrete and well-defined object or condition that attracts public interest and provides public benefit through interpretive observation and study. A state special feature site is an area that contains such a feature and is set aside for controlled public enjoyment. Special feature sites, for the most part, are either historical or archaeological by type, but they may also have a geological, botanical, zoological or other basis. State special feature sites must be of unusual or exceptional character or have statewide or broad regional significance. Management of special feature sites places primary emphasis on protection and maintenance of the special feature for long-term public enjoyment. Permitted uses are almost exclusively passive in nature and program emphasis is on interpretation of the special feature. Development at special feature sites is focused on protection and maintenance of the site, public access, safety, and the convenience of the user.

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.

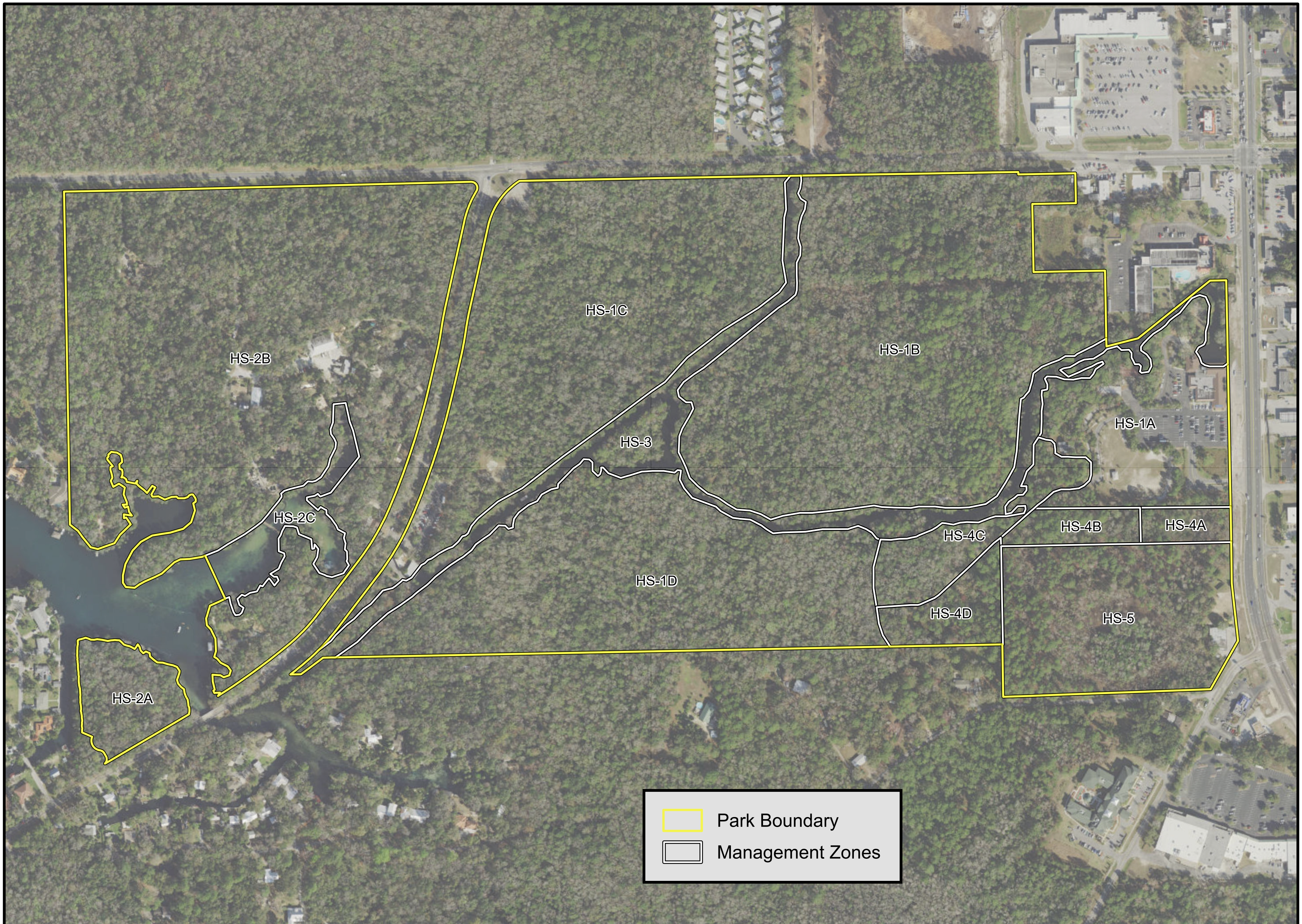
All waters within the park have been designated as Outstanding Florida Waters, pursuant to Chapter 62-302, Florida Administrative Code. Surface waters in this park are also classified as Class III waters by DEP. The park is not adjacent to an aquatic preserve as designated under the Florida Aquatic Preserve Act of 1975 (Section 258.35, Florida Statutes).

PARK ACCOMPLISHMENTS

- Ongoing rehabilitation and release of wild manatees.
- Installed new railings on boardwalk.
- Treated 13.75 acres for invasive species.
- Ongoing installation of interpretive signage.
- Completed prescribed fire on all backlogged acres.

RESOURCE MANAGEMENT COMPONENT

Ellie Schiller Homosassa Springs Wildlife State Park			
Management Zone	**Acreage**	**Managed with Prescribed Fire**	**Contains Known Cultural Resources**
HS-2C	3.6	N	Y
HS-1A	10.84	Y	Y
HS-1B	39.9	Y	N
HS-1C	30.66	N	N
HS-1D	25.8	N	N
HS-2A	3.69	N	N
HS-2B	51.8	N	Y
HS-3	11.35	N	N
HS-4A	1.26	Y	N
HS-4B	1.81	Y	N
HS-4C	4.03	Y	N
HS-4D	2.9	Y	N
HS-5	13.21	Y	Y



ELLIE SCHILLER HOMOSASSA SPRINGS WILDLIFE STATE PARK
Management Zones

N
Feet
0 500 1,000

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.

TOPOGRAPHY

Ellie Schiller Homosassa Springs Wildlife State Park (Homosassa Springs) is situated in the Gulf Coastal Lowlands, a physiographic province that includes most of the broad coastal plain between the Brooksville Ridge and the Gulf of Mexico (White 1970).
Topography in the Gulf Coastal Lowlands is generally level, but ancient dunes occasionally rise above the flat terrain, some attaining elevations as high as 100 feet above mean sea level (msl). Within the coastal lowlands are swamps and marine terraces of Pleistocene age (10,000 to 1.8 million years ago) that formed during cycles of sediment deposition and erosion as sea levels fluctuated (Rupert and Arthur 1990).
Homosassa Springs is located on one such marine terrace, the Pamlico Terrace, which occurs at elevations below 25 feet msl. Sands and clayey sands of variable thickness, underlain by Eocene and Oligocene limestone and dolomite, are characteristic of this terrace (Spencer 1984, Pilny et al. 1988). Given the low elevation nature of this park, potential impacts of sea level rise to the parks natural and cultural resources are an important management concern (Scavia et al. 2002; Ellis et al. 2004; Dean et al. 2004).

Homosassa Springs is further described as being within the Chassahowitzka Coastal Strip physiographic region (White 1970, Brooks 1981). This low-lying coastal area contains an abundance of subsurface and exposed limestone. Characteristic natural communities include basin swamps, hydric hammocks, and pine flatwoods. Typical elevations in the region are 10 feet above msl or less. An elevated escarpment about three miles east of the park and parallel to U.S. Highway 19 forms the western edge of the Brooksville Ridge, which surficially consists of ancient coastal ridge sands (Karst Environmental Services 1992). Although much of Homosassa Springs lies below the five-foot contour, elevations at the eastern end of the park near U.S. Highway 19/98 range from 5 - 10 feet above msl (see Topographic Map).
The major topographic feature in the park is the main spring basin, which is approximately 90 feet long by 50 feet wide, with steep sides and irregular depths reaching 35 feet below the surrounding land surface (Scott et al.2004). Subsurface openings in the southwest side of the basin lead to a series of caverns and solution features (Karst Environmental Services 1992). A detailed description of the topography of the main spring vent and aquatic cave system is provided below in the Hydrology section of this plan.

Topographic alterations that occurred at Homosassa Springs before the state acquired the property include the excavation of Pepper Creek as a tour boat channel, construction of Fishbowl Drive along the historic route of the Mullet Express, creation of a tram road between Fishbowl Drive and U.S. Highway 19/98, and deposition of fill in several developed areas. Pepper Creek is not actually a natural feature but rather a very large drainage ditch. Spoil produced during excavation of the ditch was deposited along both sides of the channel, forming an elevated berm as high as 12 feet above msl. While much of Pepper Creek is a linear canal, there is a winding section in the eastern part of the park that appears more natural.
However, it too was artificially created in the 1960s for the Homosassa Wildlife Park attraction. The Division of Recreation and Park s (DRP) continues to maintain a large portion of Pepper Creek for tour boat operations.

ELLIE SCHILLER HOMOSASSA SPRINGS WILDLIFE STATE PARK

N

0 150 300 600 Feet

Florida Department of Environmental Protection
Division of Recreation and Parks
2004 DEM Courtesy of USGS

TOPOGRAPHIC MAP

SOILS

Nine soil types occur within the park (Pilny et al. 1988). These soils include moderately well-drained sands created when wetlands were filled during earthmoving activities; poorly drained sands in the flatwoods; and very poorly drained, frequently flooded, mucky soils in areas of hydric hammock (see Soils Map). The Appendix contains detailed descriptions of these soils.

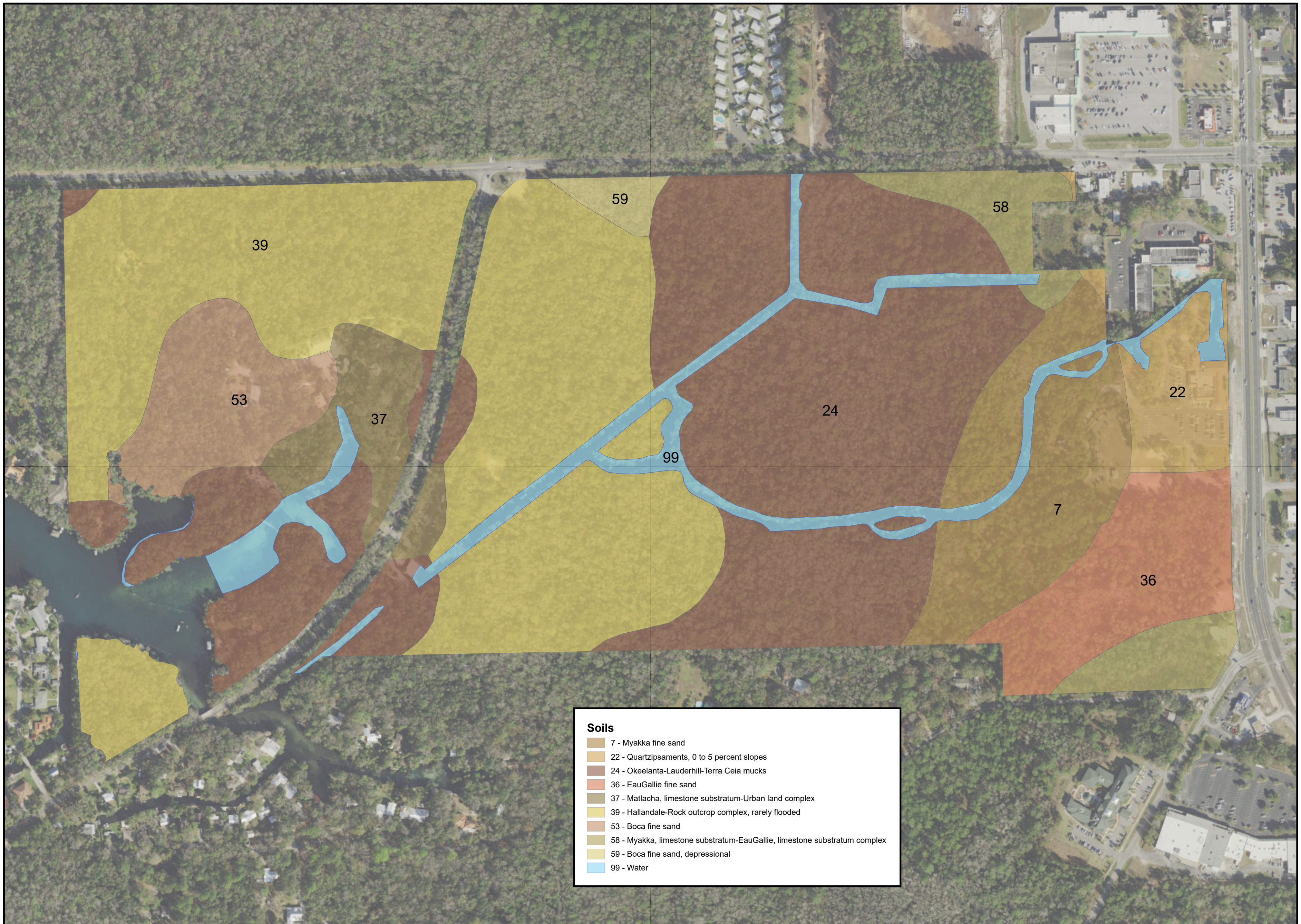
In general, the native soils at Homosassa Springs consist of a thin layer of organic material overlying limestone. Little or no horizon development is apparent. Trees are necessarily very shallow rooted.

Alterations of natural topography and drainage patterns by road construction, canal excavation, and spoil deposition have changed the soil characteristics in many areas of the park. Where spoil piles are located atop wetland soils, plant species typical of more upland environments have become established, attracted to the better drained microhabitat created by the artificial spoil. In some areas, particularly sites that historically were developed, offsite fill from the Brooksville Ridge east of the park now caps the native soils (Ellis et al. 1998a; Ellis et al. 1998b). Foreign soils from this ridge were used in at least two areas of the park, the main park entrance on U.S. Highway 19/98 and the original attraction area adjacent to the Homosassa head spring.

HYDROLOGY

Ellie Schiller Homosassa Springs Wildlife State Park encompasses the primary headwaters of the Homosassa River in southwest Citrus County (Leeper et al. 2012). The main hydrological features within the park include an intact tract of hydric hammock, a large drainage canal (Pepper Creek) that was excavated prior to the 1950s, and several major spring vents that constitute the second largest source of freshwater discharge to the Homosassa River (Simmons et al 1989; Basso 2010).

Homosassa Springs is in a broad karst dominated landscape that lies at the southern extent of Florida's "Big Bend" coastline, but more specifically within the northern third of the Springs Coast region (Wolfe et al. 1990). In this region, there are numerous spring-fed rivers that are embedded within a large matrix of hydric hammock, salt marsh, mangrove swamp and other nearshore habitats. These provide the nearby estuarine environment with a constant supply of freshwater (Raabe and Stumpf 1996; Mattson et al. 2007). The Springs Coast is appropriately named because it contains five known springsheds and seven major spring-fed rivers, including the Homosassa, Crystal and Chassahowitzka rivers. Crystal River Preserve State Park lies immediately north of Homosassa Springs Wildlife State Park and shares a common boundary with a portion of it. In addition, St. Martins Marsh Aquatic Preserve (AP) is situated downstream of the park near the mouth of the Homosassa River (DEP 2016a). St. Martins Marsh AP and Big Bend Sea Grasses AP to its north comprise Florida's most significant publicly managed estuary, containing the largest seagrass beds in the state (DEP 2014). The Homosassa, Crystal and Chassahowitzka rivers, as well as St. Martins Marsh AP are all classified as Outstanding Florida Waters (OFW). The Homosassa River is a Class II waterbody that flows westward for nearly 8 miles before emptying into the Gulf of Mexico (Leaper et al. 2012).



FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

ELLIE SCHILLER HOMOSASSA SPRINGS WILDLIFE STATE PARK
Soils

N

0 500 1,000 Feet

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.

Ellie Schiller Homosassa Springshed and its Major Springs

The primary source of freshwater for the Homosassa River is the Homosassa Springs Group, a series of about 25 named springs occurring both inside and outside the park within an area of approximately 4 square miles around the upper Homosassa River (Champion and Starks 2001). Springs located outside the park are in the Southeast Fork and in the Halls and Hidden rivers (Knochenmus and Yobbi, 2001; Leeper et al. 2012). The Southeast Fork springs are immediately upstream of the park, while spring vents in the Halls and Hidden rivers lie to the north and south of the park respectively.

Spring flow from the Homosassa Springs Group emanates from an expansive groundwater discharge area that is fed directly by the Floridan aquifer (Yobbi and Knochenmus 1989a). The Floridan is the principal source of most of the drinking water used in the Homosassa area. The upper boundary of the Floridan aquifer is at or very near the land surface within the park, as evidenced by the scattered karst features and spring vents. A surficial aquifer is not present in the park (Fretwell 1983; Jones et al. 2011). Because of its proximity to the coast, the Homosassa Springs Group has long been characterized as an “oligohaline” or saltwater-influenced system (Sloan 1956). The only exceptions to this are the Southeast Fork springs, which historically have always discharged freshwater with very little influence from high chloride content groundwater (Yobbi 1992; Jones et al. 2011). Like neighboring spring-fed streams, the Homosassa River exhibits very distinct salinity gradients between headwater areas and outfalls into the Gulf of Mexico (Champion and Starks 2001). Daily tidal cycles, as well as saline groundwater influences, play key roles in determining water chemistry changes within the Homosassa River.

The surface water and groundwater contributing area for the Homosassa springshed comprises about 292 square miles, roughly the southern half of Citrus County and eastern Hernando County (Southwest Florida Water Management District (SWFWMD) 2016a). Even though the tentative boundaries of this springshed have been mapped, water scientists suggest that this defined area is not the only region contributing groundwater to the system. Groundwater resources in portions of the Suwannee River, St. Johns River and Southwest Florida water management districts may also influence the volume of groundwater discharge in the Homosassa River system (Leeper et al. 2012).

Dye trace research is an important tool used in delineating possible groundwater connections between surface waterbodies in karst terrain (Aley 1999; Skiles et al. 1991). No dye trace work has yet been conducted in the Homosassa springshed even though connections among the various karst features in the region likely exist. Dye trace work, in conjunction with cave mapping, can provide evidence that surface runoff entering the Upper Floridan aquifer within the Homosassa springshed may travel rapidly through underground conduits, ultimately exiting at spring vents. Dye trace studies in other Florida springsheds have demonstrated travel times as fast as 1 mile per day (Karst Environmental Sciences 2009; Champion and Upchurch 2003). These studies have revealed that there is a direct link between surface/groundwater connectivity and rapid transport of surface runoff through karst features to exit points at springs (Hisert 1994; Hirth 1995; Butt et al. 2006). They have also provided scientists with a better understanding of how surface contaminants move through the Floridan aquifer (Macesich 1988).

Collectively, springs in the Homosassa Springs Group have an average discharge range of 287 cubic feet per second/186 million gallons per day to 354 cubic feet per second/229 million gallons per day (Jones et al. 2011; Leeper et al. 2012). The cumulative volume of discharge from this spring group affords Homosassa Springs first magnitude spring status, placing it among 32 other first magnitude spring systems in Florida (Rosenau et al. 1977; Spechler and Schiffer 1995; Scott et al. 2004). In 2012, the

SWFWMD governing board adopted a minimum flow and level (MFL) guidance rule for the Homosassa head spring and Southeast Fork springs combined (Leaper et al. 2012). Water scientists' analyses indicated that any groundwater withdrawals causing more than a 3% reduction in historic flows could cause significant harm to this waterbody. Therefore, a minimum five-year moving average of 133 cubic feet per second was suggested as the MFL for the Homosassa/Southeast Fork springs to maintain 97% of the historic flows. A re-evaluation of the Homosassa MFL occurred in 2019.

A complex of at least nine named springs forms the headwaters of the Homosassa River within Homosassa Springs Wildlife State Park. Included among the nine are the Main Spring Pool (i.e., Nos. 1, 2 and 3 spring vents), Blue Hole Spring, Unnamed Spring No. 1, Unnamed Spring No. 2, Bear Spring, Banana Spring and Alligator Spring. The Main Spring Pool, which is the largest contributor of spring discharge within the park, contains several vents. These are the only vents at the park where flow rates have been measured individually. Blue Hole Spring and the two unnamed springs are situated along the southern shoreline downstream from the Main Spring Pool. Discharge from these three springs is generally not very strong, especially during drought periods, and they often reverse flow under normal tidal conditions. Bear, Banana and Alligator springs are all located in an upstream tributary of the Homosassa (i.e., Bird Island Tributary) that flows south through the park's wildlife exhibits before entering the Main Spring Pool above the Long River Bridge. Immediately downstream and west of the Main Spring Pool is a medium sized embayment called Mitten Cove. Judging from historic aerial photographs, Mitten Cove appears to have been the site of a previously flowing spring surrounded by hydric hammock.

Water Quantity

Even though the nine-spring complex within the park constitutes the primary head spring of the Homosassa River, discharge from this source only provides the second largest input to the river (Leeper et al. 2012). For the period of record from 1931 to 1974, the average discharge for all springs in the wildlife park was reported to be 106 cubic feet per second, with a range of 80 to 165 cubic feet per second (Rosenau et al. 1977; Scott et al. 2004). These flow records include all nine known springs in the park. Beginning in 1995, the U.S. Geological Survey (USGS) and SWFWMD began to collect continuous daily measurements from the three main vents in the Main Spring Pool. For the period of record from 1995 to 2010, the Main Spring Pool's average discharge was reported to be 89 cubic feet per second, with a range of 34 to 141 cubic feet per second (Leeper et al. 2012).

The Southeast Fork tributary, containing at least 10 named spring vents, merges with the Homosassa River approximately 0.2 miles downstream of the Main Spring Pool. The channelized Pepper Creek empties into the Southeast Fork very close to its confluence with the Homosassa River, immediately upstream from Fishbowl Drive. Several small vents have been observed in the lower reaches of Pepper Creek (Karst Environmental Services 1992). For the period of record from 1931 to 1974, the Southeast Fork springs had an average discharge of 69.1 cubic feet per second (Jones et al. 2011). Continuous daily measurements have been collected from Southeast Fork by the USGS and SWFWMD since 2000. For the period of record from 2000 to 2010, the Southeast Fork springs' average discharge was reported to be 61 cubic feet per second, with a range of 23 to 100 cubic feet per second (Leeper et al. 2012).

The Main Spring Pool is composed of multiple spring vents that emerge from a steep-sided, rectangular-shaped open basin measuring about 90 feet by 50 feet and having a maximum depth of about 35 feet (Karst Environmental Services 1992). Large limestone rock ledges overhang the pool, extending outward from the basin walls along the west and southwest sides. In the northern half of the pool there is an extremely large piece of collapsed limestone resting on the bottom amongst many smaller boulders. The contour of the basin bottom is highly irregular, with numerous collapsed boulders scattered throughout the entire area. Groundwater flow can be detected at numerous vents around the bases of these boulders as well as from the opening to the large main conduit located on the southwest side of the pool. Partly submerged below the surface of the Main Spring Pool is a floating underwater viewing platform that was originally constructed in 1964.

In the early 1990s, professional cave scientists explored and mapped the Main Spring Pool and sampled water chemistry as well (Karst Environmental Services 1992). These researchers provided park management with some of the first maps, groundwater quality characteristics, sediment analyses, spring discharge rate analyses and detailed descriptions of the basin, conduits and caves at Homosassa Springs Wildlife State Park. The researchers discovered that the diver-accessible portion of the Main Spring Pool cavern extends downward to 70 feet below median sea level, at which point the passages become too narrow or unsafe to traverse. At the 70-foot depth, a large open cave room called the “lower chamber” extends north and south beneath the Main Spring Pool basin. Divers have documented those discharges from the numerous spring vents located beneath the collapsed boulders on the floor of the basin, as well as from the main spring conduit, are ultimately connected to three primary groundwater sources at vents within the Lower Chamber (Karst Environmental Services 1992).

Within the lower chamber, each of the three main groundwater sources has a distinct water chemistry that is uniquely characterized by a specific concentration range of chlorides (i.e., salinity) and total dissolved solids (Karst Environmental Services 1992; Jones et al. 2011). The freshest groundwater source comes from a “honeycomb-like maze” of conduits in the northern end of the lower chamber, some exceeding 70 feet in depth, but all of them too difficult for divers to traverse safely. Chloride concentrations measured at this source have ranged from 324 and 590 milligrams per liter. The highest concentration of chlorides comes from a second groundwater source located in the central area of the lower chamber, where the discharge from numerous small vents contains chloride concentrations ranging from 1,250 to 2,000 milligrams per liter. A third groundwater source is found in the southernmost section of the lower chamber, where there is a very narrow conduit called the “body tube.” Groundwater flows through the body tube contain intermediate chloride concentrations that have ranged from 860 to 1525 milligrams per liter. The total dissolved solids at each groundwater source mimics this same progressive phenomenon.

One notable peculiarity of the Homosassa aquatic cave system is the apparent instability of underwater karst formations (Karst Environmental Services 1992). The entire cave system is considered a collapse cavern feature, perhaps one that is undergoing significant changes because of a rapid dissolution of limestone. Similar chemical eroding processes occur in many estavelle springs along the Suwannee River (Gulley et al. 2011). High-salinity estuarine coastal waters that move through preferential flow pathways and enter the Upper Floridan aquifer within the Homosassa springshed might explain these higher rates of cavern dissolution (Tihansky 2004). In the mid-1950s, scientists observed fine, flocculant, reddish iron precipitate within the Homosassa head spring (Odum 1957). Since the head spring is not always covered with this type of flocculant, it is assumed that there may have been a collapse event during the research period. The only other similar event recorded at the head spring occurred on March 2, 2011, when the entire head spring was observed to be milky orange/red with many areas covered by thick flocculent material (District 2 files). This turbidity event lasted for about 3-4 days before normal clarity returned to the head spring. Although there was no direct confirmation of the origin of the red flocculent, the consensus was that there was a conduit collapse within the aquatic cave system.

Two additional spring-fed tributaries of the Homosassa River are the Halls and Hidden rivers. The confluence of the 3.2-mile-long Halls River with the Homosassa is about 1 mile downstream from the park.

As previously mentioned, minimal surface drainage occurs in the Springs Coast region, including at Homosassa Springs Wildlife State Park. The major influences on surface water movement are tides from the Gulf of Mexico and groundwater flow from the Floridan aquifer (Fretwell 1983; Yobbi 1989; Yobbi and Knochenmus 1989b). Aquifer recharge is derived almost entirely from rainfall that occurs within the springshed. Groundwater flow is generally from east to west and aquifer discharge to the surface occurs at springs, submarine vents and lesser-known fractures and seeps (Raabe and Bialkowska-Jelinska 2007). The continuous discharge of groundwater into Springs Coast estuaries plays an essential role in maintaining the health and productivity of the coastal ecosystems (Raabe and Bialkowska-Jelinska 2010).

Average annual rainfall for the Springs Coast region approaches 56 inches per year (Jones et al. 2011; Fernald and Purdum 1998). For the most part, surface water runoff in the park passes through the hydric hammock community, eventually entering the Homosassa River and its estuarine system. The park's hydric hammock plays a significant role in hydrologic processes within the landscape (Wharton et al. 1977; Vince et al. 1989). During periods of heavy rainfall, hydric hammocks tend to flood and surface waters travel slowly through the community as sheet flow. By temporarily storing surface water, hydric hammocks improve water quality and attenuate freshwater pulses into the Homosassa estuarine system (Vince et al. 1989; Wolfe 1990). For at least 25 years, sea level rise has played a pivotal role in the conversion of hydric hammock into salt-dominated communities in areas north of the park, including Crystal River Preserve State Park and Waccasassa Bay Preserve State Park (Williams 2003; Ellis et al. 2004). No similar changes have been observed as of 2019 at Homosassa Springs Wildlife State Park.

Water Issues

Complex interactions between surface waters and groundwater play a significant role in steering ecological processes in coastal ecosystems, including those in the Springs Coast region (Raabe and Bialkowska-Jelinska 2007). Within the interface between the park's natural areas and downstream estuarine communities, major issues of concern include watershed alteration, groundwater withdrawal, saltwater intrusion and nutrient enrichment.

<u>Watershed alteration</u>
Several prominent landscape alterations, most notably at Pepper Creek and Parsonage Point, have caused unnecessary disruption of natural sheet flow regimes in the park's hydric hammock community.

The Pepper Creek waterway is an approximately 3-mile long, artificially-constructed complex of drainage ditches that originates outside the park in urban parts of the town of Homosassa Springs. Pepper Creek proper is composed of three main sections, including a northern canal that enters the park beneath Halls River Road, an eastern canal that enters the park beneath U.S. Highway 19/98 near the park's main entrance, and a sinuous portion that lies entirely within the park boundary. Ultimately the Pepper Creek drainage system empties directly into the Southeast Fork tributary of the Homosassa River.

Aerial photography clearly illustrates that the northern and eastern ditches were constructed prior to the 1950s, whereas the winding canal section in the park was designed specifically for the Homosassa wildlife attraction in the 1960s, well before the state of Florida acquired the property. Dredge spoil piles line the Pepper Creek waterway, forming earthen berms that contribute to the disruption of sheet flow in the adjacent hydric hammock. Additionally, the canals can artificially drain the hammock community and create drier soil conditions than would naturally occur. Prior to the dredging of this channel, much of the original hydric hammock through which Pepper Creek now passes was undoubtedly inundated with freshwater for longer periods.

Because much of the developed area around Homosassa Springs, including U.S. Highway 19/98, connects directly to the Pepper Creek drainage system, hydrologists consider the ditch to be a major point source of stormwater pollution for the Homosassa River. Base flow of Pepper Creek is typically less than 5 cubic feet per second, but volume estimates of runoff passing through the ditch during large storm events total as high as 250 cubic feet per second (Citrus County 1989).

Pepper Creek not only serves as a drainageway for much of the Homosassa Springs area, but also as a waterway to transport visitors from facilities on U.S. Highway 19/98 to the wildlife exhibits area of the park. There are approximately 200,000 visitors that annually use the tour boat. A weir system located in the park maintains sufficient depth for the boats to operate. This weir system underwent maintenance in 2014.

Algae and other nuisance aquatic plants often proliferate within Pepper Creek and may contribute to water quality problems further downstream. On a seasonal cycle, the aquatic plants bloom, die and decay, adding sediments to the waterway. Control of aquatic plants has been a continual maintenance issue.

A small spring beneath the boat dock at the visitor center on U.S. Highway 19/98 contributes to the flow of Pepper Creek. Given that this area of Pepper Creek was artificially constructed, it is unknown if this spring might be a result of the breaching of a shallow conduit during dredging operations. Several small seeps and boils also exist where Pepper Creek empties into the Homosassa River near the southwestern boundary of the park. Again, it is unknown if these seeps and springs are naturally occurring. Parsonage Point Road, located near the west boundary of the park, has been a target area for wetland restoration since 1998. A plan for the Parsonage Point restoration has already been developed (District 2 files). A park residence is situated at the north end of the road and a river dock on the south. A single road that extended west toward the park boundary and another old road that ran parallel to the service road were both restored in 2009 (District 2 files). The 2009 restoration project included the removal of 0.32 acres of road to grade, revegetation of native species in the hydric hammock and removal of materials from an old Florida Department of Transportation (FDOT) dump site which contained a substantial amount of concrete/steel debris and fill prior to state acquisition of the parcel. Additional information about the restoration of Parsonage Point will be provided below in the *Management* section of this plan.

<u>Groundwater withdrawal</u>

Many water managers have long been concerned about the unsustainable depletion of groundwater resources in the Floridan aquifer (Bush and Johnston 1988; Grubbs and Crandall 2007; Copeland et al. 2011). Concerns were heightened during the recent drought periods of 1998-2002 and 2010-12, as water scientists documented significant declines in spring discharge at nearly all of Florida's first magnitude springs, including those along the Springs Coast (Copeland et al. 2011; Pittman 2012). One recent statewide analysis concluded that the drought of 1999-2001 had precipitated significant negative health trends in all the spring systems in the state, including Homosassa. This was due to lowered groundwater levels, significant saline encroachment and simultaneous increases in groundwater use during one of the worst droughts on record in Florida (Verdi et al. 2006).

Whether the evidence indicates that fluctuations in groundwater supply are natural (i.e., due to Atlantic multi-decadal oscillation) or anthropogenic (i.e., due to water supply withdrawals) is still being determined (Kelly 2004; Williams et al. 2011). Nonetheless, coastal springs have experienced significant increases in lateral saline encroachment compared to inland systems because of their proximity to the freshwater/saline water interface (Marella and Berndt 2005; Hydrogeologic Inc. 2011).

Saltwater intrusion

Saltwater encroachment along Florida's coasts has long been recognized as a threat to groundwater quality (Fairchild and Bentley 1977; Fretwell 1983). Throughout the Springs Coast region, a natural saltwater wedge that diminishes in thickness landward extends inland from the Gulf of Mexico, intruding into the Floridan aquifer. The depth of the saline wedge ranges from zero at the coast to around 250 feet inland (Fernald and Purdum 1998; Guvanasen et al. 2011). Boundaries of the zone of transition from saltwater (19,000 milligrams per liter chloride) to freshwater (25 milligrams per liter chloride) can fluctuate in response to changes in aquifer recharge and discharge (Fretwell 1983). Data clearly illustrates that saltwater intrusion into the Floridan aquifer contributes to the brackish nature of spring vents within Homosassa Springs Wildlife State Park, and that this phenomenon can alter the water chemistry of freshwater spring vents over time.

It has been demonstrated that during periods of low groundwater levels, seawater can move inland through existing dissolution channels and mix directly with waters of the Floridan aquifer (Tihansky 2004; Shaban et al. 2005). Not only are there conduits in the aquifer that can carry seawater inland, but there are also large, interconnected fractures and faults in the limestone bedrock underlying the Floridan aquifer. These faults, which trend either northeast or northwest, are referred to as "preferential flow pathways" (Lines et al. 2012). Flow pathways can extend adverse water quality or quantity impacts over a much larger region than just at a local point source. For example, saltwater intrusion in Pinellas County expanded significantly through preferential flow paths when groundwater levels were artificially lowered during localized extractions from water supply fields that were placed too close to the coastline (Tihansky 2004).

A recent statewide analysis of water quantity and quality variables compared groundwater and spring water parameters from 1991 to 2003 (Copeland et al. 2011). Analysis of data from that period indicated that the Floridan aquifer's freshwater "lens" had decreased significantly in volume and that significant saltwater encroachment had occurred throughout most of the state.

Nutrient enrichment and Submerged Aquatic vegetation

Over the past 40 years, the Springs Coast region has experienced rapid development and population growth which has led to increased groundwater consumption, saltwater encroachment, and nutrient enrichment especially within recognized springsheds. Water scientists now believe that these cumulative factors are responsible for the deterioration of estuarine and freshwater resources in this region (Copeland et al. 2011; Yarbro and Carlson 2013; Knight and Clark 2016).

One example of the declining health of coastal spring ecosystems is that, as late as the 1970s, spring-run streams within the Homosassa and Crystal River springs groups supported dense and biologically diverse assemblages of submerged aquatic vegetation (SAV) (Sloan 1956; Odum 1957; Frazer et al. 2006, Jacoby et al. 2014). However, long-term monitoring of freshwater springs in this region has indicated that SAV abundance and diversity have declined precipitously over the last few decades (Frazer et al. 2006).

In the 1950s, the Homosassa Springs complex was characterized as an oligohaline freshwater system containing both native macroalgae and SAV components (Whitford 1956; Sloan 1956). It is noteworthy that in the mid-1900s a diverse assemblage of "attached" and "unattached" algae comprised over 50% of the aquatic plant growth at many of Florida's springs, including Homosassa (Whitford 1956). If the Homosassa Springs ecosystem of today had retained its healthy condition, it would still contain a biologically diverse assemblage of algae and microscopic diatoms, as well as a diversity of submerged aquatic plants.

Historical narratives and photographic records of the Homosassa Spring illustrate that a high diversity (at least eight species) of SAV once covered significant areas of the spring bottom (Sloan 1956; Whitford 1956; Frazer et al. 2006; Wetland Solutions Incorporated 2010). In their research at Homosassa in the mid-1950s, ecologist Howard T. Odum and his colleagues recorded that 30% of the head spring bottom was covered by three dominant species of SAV. In order of abundance, these species were American eelgrass (*Vallisneria americana*), sago pondweed (*Stuckenia pectinata*) and southern waternymph (*Najas guadalupensis*). In contrast, the dominant aquatic plant upstream of the head spring within the Bird Island tributary was waterlettuce (*Pistia stratiotes*), a non-native floating plant (Wetland Solutions Incorporated 2010).

Ecological studies at Homosassa from the late 1980s through the present day indicate that it is highly likely that at least four additional SAV species once occurred within the head spring in varying abundance, including coontail (*Ceratophyllum demersum*), small pondweed (*Potamogeton pucillus*), a native macroalga called muskgrass (*Chara* sp.) and the non-native hydrilla (*Hydrilla verticillata*) (Frazer et al. 2006). The Homosassa River in the late 1960s was reported to be infested with the non-native Eurasian watermilfoil (*Myriophyllum spicatum*) (Blackburn and Weldon 1967). In 2005, Eurasian watermilfoil remained the most dominant macrophyte in the Homosassa River, but in dramatically lower abundance. The highest overall vegetative biomass was contributed by the nuisance macroalga, *Lyngbya wollei* (Frazer et al. 2006). Since 2005, the only SAV found within the Homosassa head spring has essentially been various species of nuisance macroalgae.

Water Quality

In 1996, DEP initiated a formal, statewide monitoring program for surface waters and groundwater, including waters within the Homosassa watershed (Maddox et al. 1992; DEP 2005). These efforts were expanded in 2000. This program, called the Integrated Water Resource Monitoring Program (IWRMP), follows a comprehensive watershed approach based on natural hydrologic units. The 52 hydrologic basins in Florida are on a five-year rotating schedule that allows water resource issues to be addressed at different geographic scales (Livingston 2003). In addition, the IWRMP has assigned a waterbody identification number (WBID) to each waterbody. This watershed approach provides a framework for implementing total maximum daily load (TMDL) requirements to restore and protect waterbodies that are declared impaired (Clark and DeBusk 2008).

DEP has completed two major water quality assessments for waterbodies in the Springs Coast region, including one at Homosassa Springs (DEP 2006; DEP 2008). The Homosassa Spring (WBID 1345G) was declared impaired for nutrients, specifically excess nitrates, and a TMDL was assigned (Bridger et al. 2014). In 2018, a Basin Management Action Plan (BMAP) was developed for the Homosassa and Chassahowitzka Springs Groups (DEP 2018). The largest nutrient load contributors to groundwater within the Homosassa springshed was agriculture (farm fertilizer and livestock waste, 42%) followed by turf grass fertilizers (24%) and faulty septic systems (16%).

There is a vast amount of historic water quality data available for Homosassa Springs (Rosenau et al. 1977; Scott et al. 2004; Wetland Solutions Incorporated 2010; USGS 2016). Many water management agencies collect, store, and manage hydrological information that is accessible to all through a variety of web-based databases (SWFWMD 2016b; USGS 2016; DEP 2016b; DEP 2016c). Additionally, there are a substantial number of water quality and quantity parameters now available as live, satellite-tracked data that are updated daily on a springs dashboard website (SWFWMD 2016a). Water quality has been measured at the Homosassa Spring since 1946, first by the USGS and more recently by the SWFWMD (SWFWMD 2016b). In 1992, Karst Environmental Services installed dedicated sampling tubing in the three Main Spring Pool source areas. The SWFWMD currently collects water quality data from them on a quarterly basis (Karst Environmental Services 1992; SWFWMD, 2016b).

Historically, groundwater discharged at the Homosassa Spring had nitrate concentrations at the background level of 0.05 milligrams per liter (Cohen et al. 2007). However, when the USGS measured nitrate values in 1946, the concentration had increased to milligrams per liter. By 1988, the level had increased to 0.34 milligrams per liter (USGS 2016). As of 2016, nitrates in the Main Spring Pool have risen to a maximum level of 0.69 milligrams per liter (Harrington et al. 2010; SWFWMD 2016b; USGS 2016). Similar significant increases in nitrate levels have been observed in spring discharges in other parts of the state, particularly further north in the Suwannee River basin.

Unfortunately, elevated groundwater nutrients (i.e., nitrates and phosphorus) have contributed to significant declines in the ecological health of spring systems across Florida, including Homosassa (Jones et al. 2011; Munch et al. 2006; Albertin 2007; Wetland Solutions Inc. 2010). Studies suggest that the visible presence of nuisance algal biomass in a spring ecosystem is an indicator of an imbalanced distribution of aquatic flora (i.e., Rule 62-302.500 (48) (b) F.A.C.). The U.S. Environmental Protection Agency (EPA) states that waterbodies with periphyton levels exceeding 150 mg/m2 may be biologically impaired and may experience a decline in ecosystem health. It is now widely recognized that increased levels of nuisance algae, along with nutrient enrichment, are symptoms of the declining ecological health of springs in Florida (Kolasa and Pickett 1992; Hornsby et al. 2000; Stevenson et al. 2007; Brown et al. 2008).

In 2013, Homosassa was declared a priority waterbody within the SWFWMD's Surface Water Improvement and Management (SWIM) program (SWFWMD 2017). The SWIM planning for Homosassa was finalized in 2017. Because of observed reductions in water clarity, decreases in SAV cover and the spread of nuisance aquatic vegetation/algae, water managers will establish water quality improvement projects throughout the Homosassa springshed with the goal of restoring historic surface and groundwater conditions within the now impaired OFW (Jones et al. 2011; Jacoby et al. 2014).

Most of the wildlife exhibits at Homosassa Springs are located around the periphery of the Bird Island tributary, which includes Banana and Alligator springs where crocodilians, otters, a hippopotamus named Lu, and other water loving species are on display. Bear Spring and several other small spring vents in the Wildlife Walk area (Bird Park) are where captive and wild wading birds congregate. Flows from all the Bird Island tributary springs merge to form an unnamed stream that empties into the northeast part of the Homosassa Main Spring Pool. A weir at the mouth of the Bird Island tributary controls water levels in the system upstream. Waste products from both captive and free-ranging wildlife do contribute nutrient levels in the tributary, however, as will be outlined below, DRP has and will continue to update all wildlife facilities using state-of-the-art technology to maximize nutrient reductions within this waterbody.

Once the state acquired the park in 1988 and DRP assumed management in 1989, it became a high priority to improve water quality in the wildlife exhibits area by reducing or eliminating animal waste inputs into the Bird Island tributary. Historically, large amounts of organic matter, fecal waste and soil sediments had accumulated in the outfall area of the Bird Island tributary on the downstream side of the hippopotamus enclosure. Because Homosassa Springs Wildlife State Park maintains a captive group of Florida manatees year-round, federal regulations apply here. Since 1996, the U.S. Department of Agriculture and the U.S. Fish and Wildlife Service have required DRP to conduct weekly water quality testing for fecal coliform bacteria at the main spring and the Long River Bridge.

By 1999, DRP had already connected nearly all the animal exhibits, including the hippopotamus enclosure, to an upgraded centralized wastewater treatment facility. Several years later, the entire park became connected to the Citrus County sewage system (Citrus County 1989). These changes have dramatically decreased the amount of wildlife waste deposited into the lower Bird Island tributary, and ultimately the Homosassa head spring, by nearly 50-80%. However, complete containment of the hippopotamus wastes has not been achieved. According to park records, Lu the hippopotamus was born in 1960 and has been living in its enclosure for over 60 years. Hippos generally have a life expectancy of 50 to 55 years. When Lu the hippo dies, the park will either convert the enclosure to a Florida native wildlife exhibit or restore the enclosure back to freshwater wetland habitat.

Some observers still consider the park’s captive animals to be a major source of the relatively higher levels of fecal coliform found in the Homosassa River downstream from the park (Griffin et al. 2000). DRP has attempted to resolve this issue by funding two independent multiyear studies within the park specifically designed to answer questions regarding overall water quality in the Bird Island tributary in comparison with the Homosassa River outside the park (Griffin et al. 2000; FDEP 2015).

In one study, water scientists monitored and analyzed various water quality parameters, including fecal coliform bacteria, both inside and outside the park. These researchers confirmed that fecal coliform bacteria were present in the Bird Island tributary and that humans were not the source (Griffin et al. 2000). The study also indicated that bacterial levels in all waters exiting the park via the Homosassa River were at nearly the same levels as waters sampled in the Southeast Fork tributary that joins the Homosassa River just below the park (Griffin et al. 2000). Based on these observations, the researchers concluded that the contribution of the park’s wildlife facilities to bacterial levels in the Homosassa River was relatively minor and was comparable to that produced by other sources within the Homosassa watershed.

In 2015, DEP similarly investigated potential water quality impacts of the Bird Island tributary on the Homosassa River. In this research, scientists set out to determine the influence of the Bird Island tributary on water quality in the Main Spring Pool (DEP 2015). Researchers discovered that, for most water quality parameters, the concentrations measured downstream from the Bird Island tributary outfall into the Main Spring Pool were nearly identical to those measured upstream of the outfall. It is important to note that since the Bird Island tributary has a total discharge volume of less than 2% of the Homosassa River headwaters area, the tributary’s contribution of nitrate and orthophosphate to the head spring was only 0.34% and 3.5%, respectively. The total mean nitrate and orthophosphate loading measured in the park headwaters during the study was 287.8 and 9.51 pounds per day, respectively. An exception to the above was the mean ammonium concentration in the Bird Island tributary as compared to both the Main Spring Pool and the river downstream from the Long River Bridge. Water in the Bird Island tributary had an ammonium concentration nearly five times greater than that in the Main Spring Pool but given the relatively low discharge rate from this upstream tributary, the ammonium input quickly became diluted. It is important to note that the park has participated in weekly coliform testing within the main spring since 1996, with collected samples analyzed by independent certified laboratories (District 2 files).

Between 1989-99, DRP completed nearly 20 major restoration projects within the head spring area designed to significantly reduce hydrological impacts of the wildlife exhibit area (District 2 files). An abbreviated list of these projects includes the phasing out of non-native wildlife from exhibits and replacement with native Florida species, construction of several new wastewater treatment facilities, implementation of several water quality studies, removal of unnatural sediment buildup from the upper springs (i.e., Bird Island tributary), removal of some water control structures, initiation of a phased project to improve runoff infiltration in the bird park, construction of elevated walkways and construction of drainage retention swales.

Since 2000, DRP has implemented at least 15 additional projects with similar goals, including additional phases of surface water drainage improvements, soil stabilizing native plantings, shoreline restoration, connection of the entire park to the Citrus County wastewater treatment system, additional wastewater lift station upgrades, and removal of sediments from the main spring and Mitten Cove. After completion of these projects, the only water control structure that will remain in place within the Bird Island tributary is upstream of the hippo enclosure at the terminus of the alligator lagoon. Projects implemented to remove impervious walkways and replace them with elevated boardwalks were designed to help eliminate erosion, restore natural drainage and create better stormwater infiltration within the adjacent hydric hammock community. The elevated walkway projects have proven to be extremely beneficial to water quality in the head spring and have been systematically implemented since the late 1990s (Ellis et al. 1998b).

Objective A: Assess the park's hydrological restoration needs.

- Action 1 - Continue to cooperate with other agencies and independent researchers in hydrological research and monitoring programs.
- Action 2 - Continue to monitor and track surface and groundwater quality issues within the region.
- Action 3 - Continue to monitor land-use or zoning changes in the region and offer comments as appropriate.
- Action 4 - Seek funding for dye trace studies within the springshed to determine groundwater sources for karst features within the park.
- Action 5 - Conduct dye trace studies within the springshed to determine groundwater sources for karst features within the park.
- Action 6 - Continue to cooperate with the SWFWMD to establish meaningful MFLs that will ensure maintenance of historic flows.
- Action 7 - Assess and evaluate hydrological impacts in the park where natural sheetflow has been disrupted; initiate corrective actions as appropriate.
- Action 8 - Develop a hydrological restoration plan for the park and prioritize restoration projects.

Significant hydrological features at Homosassa Springs Wildlife State Park include a major spring complex and remnant hydric hammock. Preserving surface water and groundwater quality and controlling erosion and sedimentation into creek systems and karst features will remain top priorities. The following are hydrological assessment actions recommended for the park.

DRP will continue its tradition of close cooperation with state and federal agencies and independent researchers engaged in hydrological research and monitoring programs within the park, and it will encourage and facilitate additional research in those areas. Agencies such as the SWFWMD, USGS and DEP will be relied upon to keep DRP apprised of any declines in surface water quality or any suspected contamination of groundwater in the region. District 2 staff will continue to monitor Environmental Resource Permit (ERP) and Water Use Permit (WUP) requests for the region 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. Recommendations derived from the monitoring and research activities will be essential to the decision-making process during management planning.

The proximal sources of flow from the Floridan aquifer to spring features in the park are still unknown. To remedy that, DRP should continue to encourage hydrological studies that are designed to understand underground conduit connections within the Homosassa springshed (as discussed in the *Hydrology* section above). Previous dye trace studies in other managed springsheds in Florida have provided park managers with invaluable information about the various sources of springs and the timing of surface to groundwater interactions that potentially affect important surface water bodies. For water managers to be able to protect water quality and potentially restore spring flows to their historic levels, they will need to know these springshed connections.

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 resources in the park. When appropriate, DRP staff will provide comments to other agencies regarding proposed changes in land use or zoning that may affect the park.

DRP will continue to work closely with the SWFWMD to ensure that MFLs developed for the Homosassa Springs Group are implemented conscientiously and that historic groundwater flows are protected.

DRP staff will initiate hydrological assessments of natural systems in the park wherever wetland communities have been artificially impounded or ditched and where ecological functions have been disrupted, especially within the hydric hammock on the eastern side of the park and including Pepper Creek. If it is determined that the natural hydrological regime has been significantly altered, then DRP, using best management practices, may initiate corrective actions such as installing culverts in appropriate locations or restoring spoil areas back to the historic grade of the adjacent natural landscape.

Objective B: Restore natural hydrological conditions and functions to approximately 4.35 acres of spring-run stream natural community.

- Action 1 - Conduct an assessment and evaluate the feasibility of conducting experimental SAV plantings in the spring and spring-run stream.
- Action 2 - Conduct an assessment and evaluate the feasibility of conducting experimental plantings to remove nutrients from Bird Island tributary.

Research has already indicated that the Homosassa spring-run stream has experienced major anthropogenic impacts because of increased nutrients, reductions in groundwater flow, saltwater encroachment and a collapse of the SAV population. It is unknown if these changes will be permanent in nature, but they have been occurring since the 1960s.

DRP staff will continue to coordinate with and assist DEP, the SWFWMD, and independent researchers in monitoring water quality and quantity in the spring system and in numerous park monitoring wells, as well as at other open-water karst features within the park. DRP staff will seek to increase the frequency of monitoring if changes in water quality or abnormal fluctuations in discharge are noted. Restoration of Homosassa Springs is critically important for maintaining the site as a warm water refugium for the federally endangered West Indian manatee. In that respect, DRP staff over the next 10 years will examine the feasibility of conducting experimental plantings of key species of SAV within Homosassa Springs and its spring-run stream to re-establish plant species native to this system.

DRP will continue its longstanding commitment to restoring historic water quality conditions in the Bird Island tributary. Projects that are proposed to eliminate higher nutrient loads in this upper tributary spring system will be assessed for feasibility and implemented accordingly.

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

- Action 1 - Investigate best management options for erosion mitigation in public access areas.
- Action 2 - Monitor areas prone to erosion.
- Action 3 - Implement corrective measures to reduce impacts of soil erosion on water resources.

Some areas in the wildlife facilities portion of the park continue to have periodic erosion issues despite past corrective measures. Additional stormwater treatment projects within the park may be needed to minimize erosion during strong storm events by diverting stormwater into surrounding hydric hammock to encourage natural infiltration.

NATURAL COMMUNITIES

The park contains seven distinct natural communities as well as three altered landcover types. A list of known plants and animals occurring in the park is contained in the Appendix.

Mesic Flatwoods

This community type occurs at higher elevations within the eastern portion of the park, north and south of Pepper Creek, and in the southeast corner of the park. Mesic flatwoods extend south of the visitor center parking lot, lie adjacent to the assistant manager’s residence and border the paved tram road for some distance. Both longleaf pine and slash pine are present. Saw palmetto and typical flatwoods shrubs dominate the understory. Herbaceous ground cover species are sparse, probably due to long-term fire exclusion. Nearly all the mesic flatwoods in the park underwent prescribed fires in 2015, 2016, 2019 and 2023. Off-site hardwoods such as laurel oak and water oak have invaded portions of the mesic flatwoods. Drainage ditches alter the natural hydrology of the flatwoods south of the visitor center, and the tram road fragments a small portion of the community. Skunk vine (*Paederia foetida*) and other invasive plants also occur in the mesic flatwoods, and feral hogs are also having some impacts through rooting. The current condition of the mesic flatwoods in the park is fair to good.

Continued prescribed fire should release many of the suppressed or dormant herbaceous species that remain on site. The old drainage ditches and associated spoil piles should be assessed to determine if they are impacting the local hydrology of the mesic flatwoods. Removal of spoil areas may cause more damage than good, and the drainage ditches appear to be already blocked in several areas. Invasive plants will be controlled through prescribed fire and chemical methods. Control of feral hogs should be implemented as necessary.

Mesic Hammock

Mesic hammock occurs in the park on slightly higher elevations above the hydric hammock. Stands range in character from mature and relatively diverse to quite young with few species represented. Some of the mesic hammock areas are small and occur scattered within and along the roadside edges of the hydric hammock. The Natural Communities Map depicts only the larger areas of mesic hammock. Patches too small to differentiate readily are included within the hydric hammock designation. The current condition of the mesic hammock is fair to good. Little active management of mesic hammock is required beyond control of feral hog populations and periodic surveys for invasive plants.

Depression Marsh

Three areas classified as depression marsh occur in the southeast portion of the park. All of these areas are overgrown with woody species because of past fire suppression, although herbaceous plants remain dominant. In addition, there is evidence of surface hydrologic alteration including scrapes, ditches and roads, both within and surrounding the depression marshes. Analysis of aerial photo images of the property indicates that the depression marshes may intermittently connect hydrologically with the dome swamp. The current condition of the depression marshes is poor.

Where appropriate, the park should treat depression marshes with prescribed fire at the same time as adjacent fire type natural communities. Maintenance of a natural ecotone is important, as is keeping the marshes free of invasive species. Removal of well-established slash pines and other hardwoods that have resisted fire may require additional measures such as felling or herbicide control.

Dome Swamp

A dome swamp is located in the southeast corner of the property. This dome is dominated by younger hardwoods, although some young pond cypress trees are also present. A band of herbaceous vegetation occurs around the edges of the dome. This emergent vegetation, and the several small spoil piles apparent in the wetland, indicates that scraping or rim ditching of the dome may have occurred in the past. The dome connects hydrologically with the depression marsh areas immediately to the north. However, surface alterations and past fire suppression have affected the drainage patterns. The current condition of the dome swamp is poor.

The dome swamp should be protected from additional hydrological disturbances. However, prescribed fires conducted in adjacent fire-maintained natural communities should be allowed to burn through the ecotone into the dome swamp periodically, under conditions appropriate for restoring the natural transition zone. Control of feral hogs may also be necessary. Park staff will regularly monitor the dome swamp for the appearance of invasive plants and will remove any found.

Hydric Hammock

Hydric hammock is the dominant community type in the park and generally occurs below the 5-foot elevation. This community usually inundates during extreme high-water events such as storm surges associated with major storm systems. While selective cutting of southern red cedar occurred in this region during the early part of the 20th century, the hydric hammock within the park retains the structure and species composition typical of the area. Over the past 25 years, researchers have documented the effects of sea level rise by a gradual recession and conversion of the hydric hammock to salt-dominated communities in areas north of the park. This includes Crystal River Preserve and Waccasassa Bay Preserve (Ellis et al. 2004) state parks. No similar sea level rise issues have been documented at Homosassa Springs Wildlife State Park as of 2023. The current condition of the hydric hammock is fair to good.

Several major hydrological disruptions within the hydric hammock occurred in the past. Two major roads and a large, dredged canal transect the hydric hammock and undoubtedly affect drainage patterns and local water table levels. Other disturbances within the hydric hammock include the development of the Homosassa Springs attraction itself. In the management plan, the overall footprint of the numerous buildings and structures of the attraction is classified as developed. Numerous walkways and footpaths occur within the hydric hammock. Developers of the attraction used crushed and compacted lime rock on most of these walkways to stabilize the organic soils of the hydric hammock. The park has removed many of the walkways and replaced them with elevated boardwalks to restore the natural sheet flow of the hydric hammock. The replacement of all remaining lime rock walkways with elevated boardwalks should continue, especially where it is most effective in restoring the hydric hammock's natural hydrology. Other fill sites, including abandoned roads, also occur within the hydric hammock.

The spoil piles that remain from the dredging of Pepper Creek during the development of the attraction have impacted the hydric hammock adjacent to the creek. The park is considering removing much of that spoil, but that may cause even greater environmental impact due to lack of easy access and existing vegetation on the spoil piles. At Parsonage Point in the northwest portion of the park, fill was placed in the hydric hammock to create a road to the shoreline of the Blue Waters area sometime between 1974 and 1985. Concrete debris was dumped in the hydric hammock along the sides of the road. Parsonage Point was added to the park in 1995, and initial restoration began in 2008 with the removal of spoil from portions of the roadway and vegetation planting. Much of the concrete debris and most of the roadway remain onsite.

Undisturbed hydric hammock typically requires little in the way of active management except for control of feral hogs and invasive plants. At Homosassa Springs Wildlife State Park, maintenance, or restoration of natural sheet flows will continue to be a priority in the management of the hydric hammock. While spoil piles associated with the Pepper Creek canal system may be left in place, restoration through removal of spoil and concrete debris at Parsonage Point will remain a priority.

Spring-Run Stream

Homosassa Springs Wildlife State Park has two main spring-run drainages, the main boil and the watercourse that flows from at least three upper tributary springs called Bird Island. Numerous other smaller springs and seepages occur within the park.

The spring run associated with the main boil is relatively broad and shallow with large patches of bare sand. The main boil also houses the "fishbowl" observatory, which is a floating, underwater observation chamber. Near the western boundary of the park, the Long River Bridge spans the spring run. The bridge incorporates an underwater barrier to prevent the escape of captive manatees during the summer months. This barrier is removed during the winter months to allow entry of wild manatees, large fish, and other large animals into the main spring boil. During the time the barrier is open, the captive manatees are maintained in a separate paddock within the main spring area. The number of manatees held in the main spring has varied since the park began serving as a rehabilitation center for manatees. Most of the aquatic vegetation normally found within a spring-run stream is absent at Homosassa Springs Wildlife State Park due to the intensive foraging of the captive manatees and a decrease in ecological health of this spring system as discussed above in the *Hydrology* section.

Due to factors such as sediment displacement by captive manatees in the head spring, stormwater runoff from existing and historic lime rock trails, and alterations of smaller springs over the years, sediments have accumulated above and below the Long River Bridge. Water depth in several areas of the main spring run have varied from 0-5 feet, and when water levels were low, substantial areas were either dry or too shallow for use by aquatic organisms, including manatees. In 2006, the SWFWMD and DRP implemented a spring ecosystem restoration project to remove unnatural sediment accumulation from Homosassa Spring to restore natural depth within the spring run.

The spring-run system that originates in Bird Island tributary has been developed as an exhibit area for crocodilians and other aquatic animals, including river otters and a hippopotamus. This area of the park is known as the Wildlife Walk.

Several smaller magnitude springs occur in Bird Island tributary, including the largest three, Bear Spring, Banana Spring and Alligator Spring. Even though all three of these springs still produce visible flow as of 2019, Alligator Spring generally has the strongest observable discharge. No recorded flow rates are available for each individual spring in Bird Island tributary.

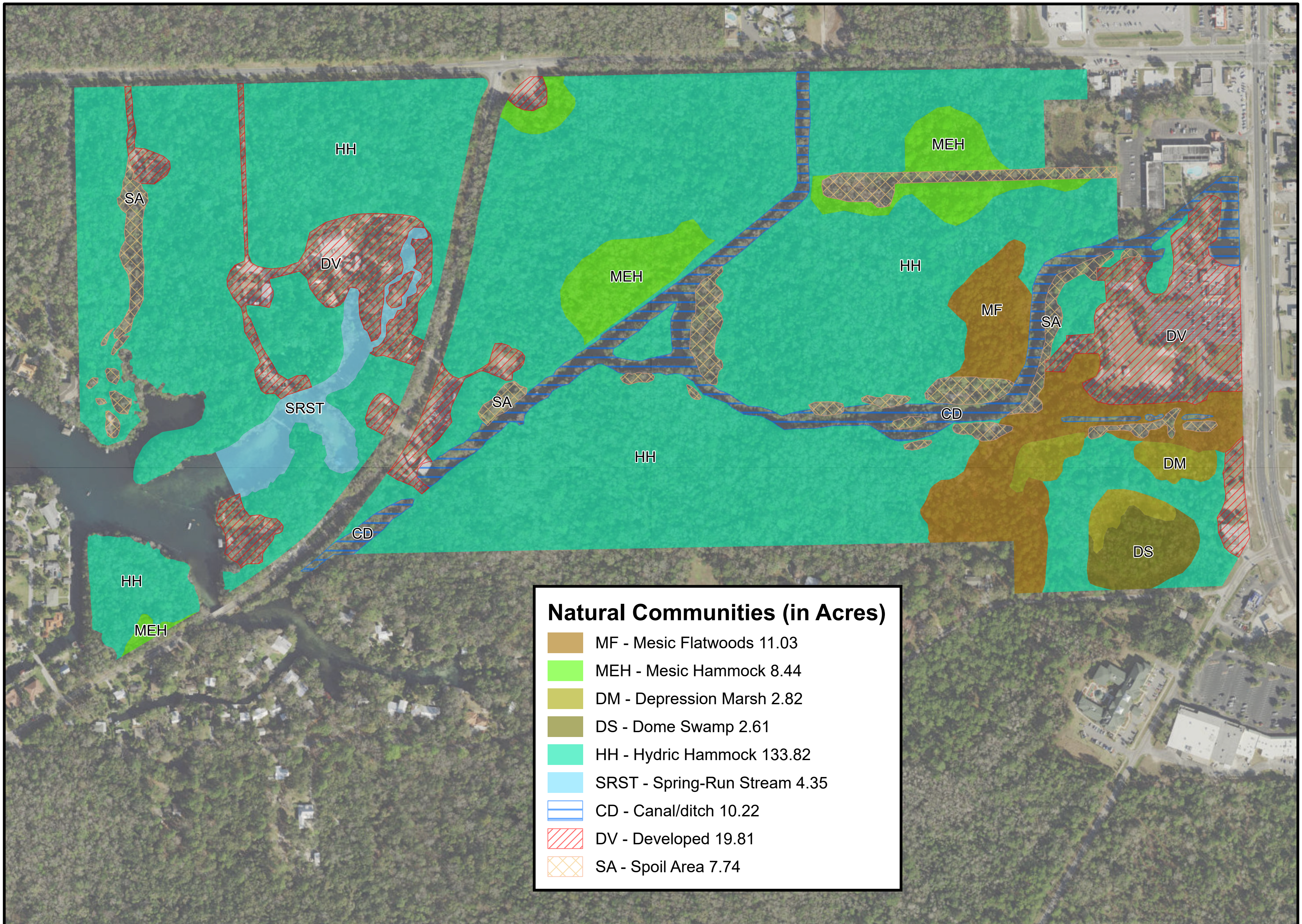
Water levels in this system are artificially maintained by a weir system located just below the alligator lagoon. Nutrient and fecal coliform levels can be increased in this watercourse due to the amount of food and animal waste discharged into it. The park has lowered levels of these pollutants by instituting some basic operational changes. The current condition of the spring-run streams is poor to good.

Staff will continue to work with other agencies to improve the water quality in the spring-run streams and will try to reduce the impact of the wildlife park on water quality and quantity. In 2017, the park implemented a floating vegetated wetland project to test for its effectiveness in reducing nutrient loads between the Bird Island tributary and the Homosassa head spring. Additionally, researchers have shown a strong interest in testing the effectiveness of revegetating the SAV in the spring run.

Aquatic Cave

Several aquatic caves are located underneath the main boil of Homosassa Springs Wildlife State Park. At the bottom of this depression, water flows from several vents and fissures, emerging from aquatic caves within Homosassa Springs. There are at least three sources of subterranean flow. Divers have explored two of the cave openings to a depth of 65 and 70 feet, respectively. A study of the main spring and aquatic cave systems by Karst Environmental Services recorded two troglobitic species in the caves, an amphipod, and an isopod. The *Hydrology* section above and the report issued by Karst Environmental Services (1992) contain additional descriptions of the aquatic caves. The aquatic caves are in good condition.

Protection of the springshed of Homosassa Springs from excessive groundwater withdrawals and contamination are important management measures for the aquatic caves as well as the spring-run stream. However, most of the springshed for Homosassa Springs lies outside the park boundary. As with the spring-run stream, park staff will continue to work with other agencies and researchers on issues that extend beyond the park boundary.



ELLIE SCHILLER HOMOSASSA SPRINGS WILDLIFE STATE PARK

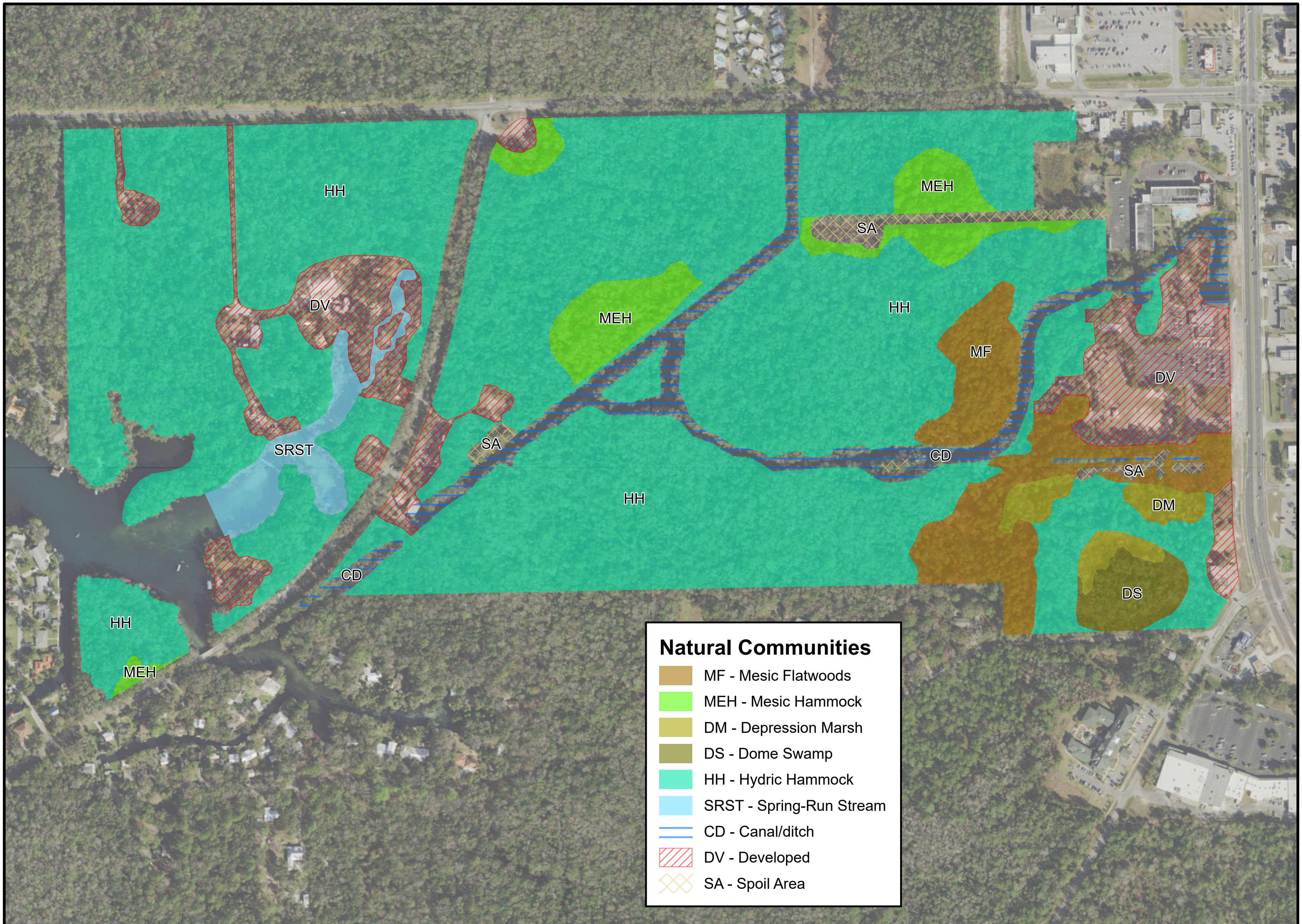
Natural Communities - Existing Conditions

N

0 500 1,000 Feet

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.



ELLIE SCHILLER HOMOSASSA SPRINGS WILDLIFE STATE PARK

Natural Communities - Desired Future Conditions

N

0 500 1,000 Feet

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.

ALTERED LAND COVER

Spoil Area

Several spoil areas occur within the park. One area, located in the northeast portion of the park, was cleared, and used as a spray field at one time. This practice has been discontinued and the area is now a possible site for hydric hammock restoration. Spoil piles are also common along the course of Pepper Creek and along former drainage canals. As mentioned above, the hydric hammock at Parsonage Point has multiple spoil areas of fill, lime rock, and concrete debris.

Canal/Ditch

Pepper Creek is classified as an altered landcover type due to the large-scale dredging that occurred during development of the attraction. The attraction created the Pepper Creek channel in the 1960s to facilitate the passage of tour boats. The downstream portion of Pepper Creek follows what may have originally been a mosquito ditch or drainage ditch. The original ditch or canal continues to the northeast and passes under Halls River Road and out of the park.

In several locations, spoil piles of limestone and soil border both Pepper Creek and the canal that passes under Halls River Road. Many of these piles are heavily vegetated. It is unlikely that the park will ever be able to reclaim the original aspect of Pepper Creek or the other drainage ways in this area.

A weir that controls the water level of the Pepper Creek system is located near the park entrance on Fishbowl Drive, a short distance downstream from the boat dock. Sediments are likely accumulating upstream of this structure and the park may need to address their disposition in the future. Untreated runoff from U.S. Highway 19/98 and from the town of Homosassa Springs likely lowers the water quality in Pepper Creek. The *Hydrology* section above contains additional details.

Developed

There are several developed areas in the park. Developed areas at the main entrance on Fishbowl Drive include the snack bar and gift shop complex, the boat dock area, the museum building and its landscaped gardens, the animal cages and enclosures, the animal care and shop buildings, and a residence area. A park residence is also located within the Parsons Property addition near the western boundary of the park. Developed areas at the east end of the park adjacent to U.S. Highway 19/98 include the main visitor center building, parking areas, the boat dock and associated boat storage, the park warehouse, and a park residence.

Resource management in the developed areas will focus on removal of all priority invasive plants (Florida Invasive Species Council Category I and II species) and using native species in landscaping where possible. Other management measures will include maintenance of proper storm water and wastewater management facilities and the designing of future development so that it is compatible with prescribed fire management in adjacent natural areas. There are no current plans to convert any of the developed areas back to their original natural community.

Objective A: Maintain 14 acres within the optimum fire return interval.

- Action 1 - Develop/update annual prescribed fire plan.
- Action 2 - Conduct prescribed fire on 5-12 acres annually.

The table below contains a list of all fire-dependent natural communities found within the park, their associated acreage and optimal fire return interval, and the annual average target for acres to be burned.

Prescribed Fire Management		
Natural Community	**Acres**	**Optimal Fire Return Interval (Years)**
Mesic Flatwoods	11.03	1-3
Depression Marsh	2.82	2-4
Annual Target Acreage	5 - 12	

Recent efforts to establish firebreaks have allowed the park to reintroduce fire into the mesic flatwoods and wetlands. Nearly all the fire-dependent acreage within the park was burned in 2015, 2016, 2019 and 2023. Where possible, the park uses soft lines and existing breaks to reduce disturbance instead of creating new cleared or disked lines. The mesic flatwoods will need frequent prescribed fires to continue improving its condition. After a lengthy period of fire exclusion, the depression marshes and dome swamp located within the southeast corner of the park will also require additional fires. An average of 5 to 12 acres should be burned annually to maintain a natural fire return interval.

Cogongrass occurs along the shoulder of the tram road, which passes through the mesic flatwoods. Fire, a natural form of disturbance, would likely encourage the spread of this pest into the flatwoods. The park should continue to treat this highly invasive species with an appropriate herbicide during the late growing season. The proximity of U.S. Highway 19/98 and the adjacent developed areas within the park are important smoke management concerns.

Wildlife dependent on fire include gopher tortoises and other species in the mesic flatwoods. Transient black bears also use the mesic flatwoods and benefit from prescribed fire.

Objective B: Conduct natural community/habitat improvement activities on 5 acres of hydric hammock.

- Action 1 - Implement additional phases of the Parsonage Point project.

Various areas of hydric hammock have been impacted by fill, placement of spoil piles and concrete debris. The road to Parsonage Point is an example of this. Additional concrete and spoil remain in the hydric hammock and should be removed. In several places, the road consists of fill. Where the road elevation exceeds that of the surrounding area, it should be reduced to be level with the adjacent grade.

IMPERILED SPECIES

Although the park displays many imperiled species in captivity, a significant number of free-ranging imperiled species also make use of the park. Several species of herons and egrets forage, roost and even breed within the park. A wading bird rookery is in the trees surrounding the alligator enclosure. The presence of alligators below the nests discourages the nocturnal feeding forays of wild raccoons and other nest predators. Staff will protect the wading bird rookeries within the park from undue disturbance.

Unlike rookeries that develop in remote areas, most wading birds that nest in locations like Homosassa Springs tend to become habituated to humans and are remarkably tolerant of human presence. Unusual noises may disrupt rookeries, however, so staff should avoid the use of noisemakers or similar measures when attempting to deter black vultures from entering the park during the wading bird nesting season.

Homosassa Springs Wildlife State Park is also an important corridor for the Florida black bear in this region. The hydric hammock within Homosassa Springs represents a bottleneck of forested land in an otherwise developed landscape. The corridor is bounded by Halls River and the Homosassa River to the west and U.S. Highway 19/98 and the town of Homosassa Springs to the east. The park lies within the Big Bend Bear Management Unit (BMU). The subpopulation of black bears in this part of the Big Bend area was estimated to be around 12-28 bears, mostly concentrated south of the park. The minimum subpopulation target is 200 bears according to the Florida Black Bear Management Plan (FWC 2012). Unfortunately, the Big Bend BMU suffers from low levels of genetic diversity (Dixon et al 2007). Wildlife managers know that bears migrate through the park along this narrow corridor that connects extensive public lands to the north and south. Crystal River Preserve State Park and St. Martins Marsh State Aquatic Preserve are located north of Homosassa Springs Wildlife State Park, while the Withlacoochee State Forest, Chassahowitzka River and Coastal Swamps, and Chassahowitzka National Wildlife Refuge lie to the south. Citrus County and DRP officials should always consider the importance of this bear migration path when planning future land uses in the area. The posting of bear crossing signs and increasing the enforcement of speed limits on Halls River Road and Fishbowl Drive would substantially improve migrating bears' chances of survival. The park will continue to cooperate with FWC and the Big Bend Bear stakeholder group. The park will also continue to assist FWC with the rehabilitation and release of orphaned bear cubs. Prospects for the long-term survival of the Big Bend region's bear population would improve if the appropriate agencies secured a protected landscape connection between these properties and public lands in the Big Bend region to the north (Cox et al. 1994).

The Homosassa shrew (*Sorex longirostris eonis*), a subspecies of the southeastern shrew, was discovered in the area and described from 10 specimens in the 1950s (Davis 1957). Scientists originally thought this subspecies occurred only at Homosassa Springs. Based on morphological measurements of southeastern shrews from across the range of the entire species, however, Jones et al (1991) proposed that the range of the Homosassa shrew extended throughout peninsular Florida. It is likely, then, that the Homosassa shrew is not restricted to a single locality and is not distinct from the remainder of the southeastern shrew population within peninsular Florida. The Homosassa shrew was recently removed from the FWC list of endangered and threatened species. The park will continue to work to protect habitat for the shrew and will be guided by the FWC species action plan (FWC 2015). Protection of the upland natural areas within the park, particularly the hydric hammock, should suffice to protect the local population of the Homosassa shrew.

In 2023, FWC began an investigation into reports of alligator snapping turtles in Pepper Creek and parts of the Homosassa River. The Homosassa River is 45 miles south of the known range of alligator snapping turtles, with the closest known population being the Suwannee alligator snapping turtle in the Suwannee River drainage. In a single night of trapping, seven male and two female alligator snapping turtles were captured in Pepper Creek with the largest weighing 90 lbs. Most appear superficially to be Suwannee alligator snapping turtles, and genetic samples were collected for confirmation of the species. While there are anecdotal accounts of alligator snapping turtles escaping from the wildlife park in past decades, it is possible that there is a natural population in the Homosassa River drainage. The park will continue to cooperate with FWC researchers to document the population within the park and adjacent areas and try to determine if it is an introduced or natural population.

Perhaps the best-known imperiled species in the park is the West Indian manatee, which occurs both in captivity and in the wild. Wild manatees frequent the Homosassa River and are occasionally visible from the park. Large numbers of manatees may be observed in the river during winter months. Both the Crystal River and the Homosassa River are important winter refugia for the northwest Florida manatee population.

Homosassa Springs received its first permit as a manatee rehabilitation site in 1980 and currently has three female resident manatees. Assistance with manatee care is provided by professional veterinarians. The park is an active member, along with Zoo Tampa at Lowry Park, in the Manatee Rescue, Rehabilitation and Release Partnership set up by the U.S. Fish and Wildlife Service (USFWS) to manage rescued and rehabilitated manatees. All manatees in Florida, whether captive-born or wild-caught, are considered federally threatened and are held only under permit from USFWS.

The park has an isolation pool that can be partially drained to allow better access to the manatees for routine examinations, medical treatments, and potential transfers to other institutions. The USFWS currently prohibits the captive breeding of manatees in the United States. This ban serves to keep the captive population from outgrowing the facilities permitted to house manatees and leaves spaces available for the temporary care and rehabilitation of wild manatees. Because of the ban, the captive herd at Homosassa Springs is designated a female herd. Adult males are not permitted within the captive area but may be contained in a separate area away from the females.

In addition to the isolation pool, the park has a critical care containment pool that can hold five adult manatees. The park is listed as a temporary critical care facility and only takes critical care manatees as a harbor of last resort.

In the past, the park temporarily housed manatees before their eventual release back into the wild. In 1997, a papillomavirus was discovered in the captive manatee herd at Homosassa Springs Wildlife State Park. From 1998 to 2008, the captive manatees at the park were placed under quarantine. When active, the virus causes wart-like lesions on the skin of the infected animals. Transmission of the papillomavirus was not completely understood, and the park took measures to prevent direct physical contact between the captive and wild manatees. Barriers were installed in the spring run at the Long River Bridge to prevent contact between the captive herd and wild manatees in the spring run. The park cooperated with other entities including the University of Florida, Harbor Branch Oceanographic Institute (HBOI), FWC and USFWS in researching and monitoring the progression of the papillomavirus within the herd. After extensive research, scientists determined that the papillomavirus was restricted to manatees, most likely coevolved with manatees, and that most manatees carry a latent form of the papillomavirus. This information made it clear that the papillomavirus that is present in the park's captive manatees does not threaten the wild population as officials had originally feared, prompting the park to lift the quarantine on its captive manatees.

The park also coordinates protection of wild manatees within the park with USFWS and FWC. Wild manatees often congregate in the Homosassa River and in the spring-run downstream of the captive manatee area. This warm water area is particularly important as a winter refuge for manatees. Unfortunately, these same areas are attractive to recreational boaters and swimmers, resulting in a high potential for human-manatee conflicts. There is a designated no-entry zone within the lower portion of the Homosassa spring run downstream of the barrier grate at the Long River Bridge. Boating and swimming are prohibited in this area to allow wild manatees to avoid human contact. In addition, USFWS and FWC have established a seasonal manatee sanctuary in the Blue Waters area adjacent to the park, where human activity is restricted during winter months when manatees are congregating. The park will continue to provide support to USFWS and FWC in the management of wild manatees that frequent areas adjacent to the park. In January 2010, at the request of USFWS, a barrier fence was erected within the captive manatee area. This created a paddock to separate the captive manatees from wild manatees that were brought in for short-term rehabilitation. In December 2010, this paddock was used to house the captive animals and allow the opening of the main spring to wild manatees. From Nov. 15 through the end of March, wild manatees are allowed access to the warm waters of the main spring boil. When the wild manatees have access, the resident manatees are housed in the paddock area and given access to a heated pool.

In 2006, DRP and SWFWMD cooperated on a spring ecosystem restoration project to remove a total volume of 12,859 cubic yards (cy) of unnatural sediments from Homosassa Spring (i.e., head spring: 1,989 cubic yards, Blue Water: 7,926 cubic yards, Mitten Cove: 2,944 cubic yards). This project was conducted to benefit all aquatic organisms, including manatees (see Spring-Run Stream in *Natural Communities* section above).

There are relatively few records of imperiled plant species within the park. Informal surveys indicate that several imperiled terrestrial orchid species occur within the park (Paul Martin Brown, personal communication). A formal, multi-season survey is needed to identify species, locations and numbers of these and other rare plant species that may occur within the park. Protection of the hydric hammock from disturbance and prescribed fire in the mesic flatwoods should suffice to protect both the known and undiscovered populations of imperiled plant species.

Imperiled Species Inventory

Common and Scientific Name	**Imperiled Species Status**				**Management Actions**	**Monitoring Level**
	FWC	**USFWS**	**FDACS**	**FNAI**		
PLANTS						
Angularfruit milkvine *Gonolobus suberosus*			LT			Tier 1
Cardinal flower *Lobelia cardinalis*			LT		4	Tier 1
Southern tubercled orchid *Platanthera flava*			LT		4	Tier 1
REPTILES						
American alligator *Alligator mississippiensis*	FT(S/A)	T(S/A)		G5,S4	4,10,13	Tier 1
Eastern indigo snake *Drymarchon couperi*	FT	T		G3,S2?	1,10,13	Tier 1
Gopher tortoise *Gopherus polyphemus*	ST			G3,S3	1,10,13	Tier 1

Imperiled Species Inventory						
Common and Scientific Name	Imperiled Species Status				Management Actions	Monitoring Level
	FWC	USFWS	FDACS	FNAI		
Suwannee alligator snapping turtle *Macrochelys suwanniensis*	ST	PT		G2,S2	2,4	Tier 3
BIRDS						
Little blue heron *Egretta caerulea*	ST			G5,S4	4,10,13	Tier 1
Tricolored heron *Egretta tricolor*	ST			G5,S4	4,10,13	Tier 1
Swallow-tailed kite *Elanoides forficatus*				G5,S2	10, 13	Tier 1
Wood stork *Mycteria americana*	FT	LT		G4,S2	4,10,13	Tier 1
Roseate spoonbill *Platalea ajaja*	ST			G5,S2	4,10,13	Tier 1
MAMMALS						
West Indian manatee *Trichechus manatus latirostris*	FT	T		G2G3T2, S2S3	4,10,13	Tier 3

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
14. Other

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.
Tier 5.
Other: may include habitat assessments for a particular species or suite of species or any other specific methods used as indicators to gather information about a particular species.

Objective A: Update baseline imperiled species occurrence inventory lists for plants and animals.

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

- Action 1 - Implement monitoring protocols for one imperiled animal species, including the West Indian manatee.

Park staff will continue monitoring the wild West Indian manatees that utilize the Blue Waters area year-round and are allowed to enter the main spring boil in the winter months. Daily logs monitor manatee use of the warm water refuge during winter months. The park cooperates with FWC and USFWS in the monitoring of wild manatees and in the monitoring of interactions between recreational users and wild manatees. The park provides extensive interpretive and educational materials to the public about manatee protection and conservation.

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

- Action 1 - Develop monitoring protocols for one selected imperiled plant species, including southern tubercled orchid (*Platanthera flava*).
- Action 2 - Implement monitoring protocols for one imperiled plant species, including those listed in Action 1 above.

DRP staff will develop a monitoring plan for the southern tubercled orchid and, where possible, locate and map occurrences. The plant is native to hydric hammocks.

Objective D: Continue partnerships with FWC and USFWS in the rehabilitation of native imperiled species.

- Action 1 - Continue working with FWC and USFWS as a partner facility in the Manatee Rescue, Rehabilitation and Release Partnership.
- Action 2 - Continue working with FWC to provide housing and care for orphaned black bear cubs to be released back to the wild.
- Action 3 - Continue serving as a rehabilitation center for other imperiled species and as a permanent home for imperiled species that are unable to be released.

Homosassa Springs Wildlife State Park has long served as a rehabilitation facility for the West Indian manatee. The park works in partnership with FWC, USFWS and other facilities in the state and nation to house and rehabilitate manatees for release back into the wild. The park also assists FWC by providing space for orphaned black bear cubs. Most of these juvenile bears are released within the Big Bend Bear Management Unit to supplement the wild population and provide additional genetic diversity.

The park also houses imperiled species that cannot be released due to injuries or other restrictions. The park provides housing for whooping cranes and red wolves that contribute to captive breeding programs. This assists the agencies involved with the captive breeding programs and allows the park to display and interpret these species to the public. The park also currently houses two Florida panthers that were rescued as kittens.

INVASIVE SPECIES

Homosassa Springs has a diversity of invasive plants, in part because of its development as an attraction prior to acquisition by the state. Another contributing factor is the ever-increasing urban interface along the park boundary. Some species such as Mexican petunia (*Ruellia simplex*), Sprenger's asparagus-fern (*Asparagus aethiopicus*) and wedelia (*Sphagneticola trilobata*) were planted as ornamentals. Others, such as cogongrass (*Imperata cylindrica*), were probably introduced during development projects either within the park or on adjacent properties. Species such as skunkvine (*Paederia foetida*) have likely been introduced by birds.

Air potato (*Dioscorea bulbifera*) infestations are reduced by the biological control leaf beetle (*Lilioceris cheni*) which has been spreading throughout the area. Park staff regularly treat invasive species, survey infestations and tracks their activities in the statewide Natural Resources Tracking System (NRTS) database.

Invasive plant control should focus first on treating and protecting the park's natural areas. In the developed areas of the park, control of species such as Chinese tallow, ardisia and skunkvine that are spread by birds should be the focus. This approach may help protect the park's natural areas.

Feral hogs (*Sus scrofa*), occasionally appear in the park. They should be removed as needed.

Black vultures have been an issue at the park over the years. The black vultures are attracted by the animal feed and other food sources in the park. Staff have obtained appropriate permits to use sprinklers as a form of deterrence to encourage the black vultures to avoid the park in some cases. However, park staff have primarily focused on interpretation of why vultures are present and how they are integral components of the environment. The use of any deterrence method should be avoided during the wading bird nesting season, especially since there is a significant number of imperiled species that use the park (see *Imperiled Species* section above).

Species Name **Scientific Name - Common Name**	**FLEPPC Category**	**Distribution**	**Zone ID**
Ardisia crenata - Coral ardisia	I	Scattered Plants or Clumps	HS-1B
Cinnamomum camphora - Camphor-tree	I	Single Plant or Clump	HS-1A, HS-1B
Colocasia esculenta - Wild taro	I	Scattered Plants or Clumps	HS-2B, HS-2C
Dioscorea bulbifera - Air-potato	I	Single Plant or Clump Scattered Plants or Clumps	HS-2C, HS-2B
Eichhornia crassipes - Water-hyacinth	I	Single Plant or Clump	HS-2C
Hydrilla verticillata - Hydrilla	I	Scattered Plants or Clumps	HS-2C
Imperata cylindrica - Cogon grass	I	Scattered Plants or Clumps Scattered Dense Patches	HS-1A, HS-1C, HS-1D, HS-2B, HS-4C, HS-4D, HS-5, HS-1B
Lantana camara - Lantana	I	Scattered Plants or Clumps	HS-2A
Ludwigia peruviana - Peruvian primrosewillow	I	Scattered Plants or Clumps	HS-1A, HS-1B

Lygodium japonicum - Japanese climbing fern	I	Scattered Plants or Clumps	HS-5
Nephrolepis cordifolia - Tuberous sword fern	I	Single Plant or Clump Scattered Plants or Clumps Scattered Dense Patches	HS-5, HS-1A, HS-1B, HS-1D, HS-2A, HS-2C, HS-4A, HS-2B
Paederia foetida - Skunk vine	I	Scattered Plants or Clumps Scattered Dense Patches	HS-1B, HS-4B, HS-5, HS-4A
Panicum repens - Torpedo grass	I	Scattered Plants or Clumps Scattered Dense Patches	HS-1A, HS-1B
Sapium sebiferum - Chinese tallow tree	I	Scattered Plants or Clumps	HS-4D, HS-5
Sphagneticola trilobata - Wedelia	II	Scattered Plants or Clumps	HS-1D, HS-2B, HS-4D, HS-5
Syngonium podophyllum - Arrowhead vine	I	Single Plant or Clump Scattered Dense Patches	HS-2C, HS-2B
Xanthosoma sagittifolium - Elephant ear	II	Scattered Plants or Clumps	HS-2B

DRP actively removes invasive species from state parks, with priority being given to those causing ecological damage. Removal techniques may include mechanical treatment, herbicides or biocontrol agents.

Objective A: Annually treat 30 gross acres that are equivalent to 1.5 infested acres of invasive plant species in the park.

- Action 1 - Annually develop/update invasive plant management work plan.
- Action 2 - Implement annual workplan by treating 30 gross acres or 1.5 infested acres in park annually and continuing maintenance and follow-up treatments as needed.

Annually, DRP staff will develop and implement a management plan for non-native invasive plants. The number of acres of invasive plants treated per year is likely to vary depending on the status of established infestations and any new infestations that might occur or be detected during the management plan period. However, the goal should be to treat all infestations that are in the maintenance area and treat any new infestations before they can increase in size on a rotating cycle.

Priority should be given to FISC Category I and II species when treating invasive plant species. Additionally, non-native plants that occur within the park should be removed whenever possible and replaced with native species. A plan and schedule should be developed that complies with DRP standards for scouting and mapping invasives in every zone within the park. Areas that have sources of particularly invasive species will need to be scouted more frequently. Finding new populations of invasive plants before they become established will help prevent larger infestations from occurring and reduce the cost and effort needed to control them. All known locations of invasive plants should be mapped.

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

- Action 1 - Remove invasive animals as they appear in the park.

Occasionally feral hogs or other invasive animals appear in the park. They should be removed as needed.

CULTURAL RESOURCES

Prehistoric and Historic Archaeological Sites

The park has nine archaeological sites listed with the Florida Master Site File (FMSF). Eight sites are prehistoric. One site also has a historic component and one is a historic site. There is also one resource group from the historic era.

The archaeological sites represent the culture of native peoples who lived near the water resources of the Homosassa River from the Archaic period through the Weeden Island period. The Homosassa Spring site (CI208) is underwater. The spring vent was dredged in the past and artifacts recovered from this site represent a cross section of Florida's past. This includes prehistoric cultures such as the Paleoindian, Archaic and Woodland groups. A midden site (CI209) in the park is of the Weeden Island period of the Woodland group. The Parking Lot site (CI414) is a prehistoric site discovered during archaeological monitoring for a parking lot that was never constructed. This site comprises a lithic scatter of unidentified cultural affiliation that could possibly be associated with the midden and spring sites. The Shady Bank site (CI1046) was discovered and recorded during the process of archaeological monitoring for the removal of a lime rock walkway and the subsequent building of a boardwalk for hydrologic restoration. It appears that construction of the original walkway, probably in the 1960s, had previously disturbed this site. It is a deeply buried site where cultural materials exist within a thin lens (Ellis et al. 1998). The Manatus site (CI1077) is a disturbed lithic scatter site of unspecified prehistoric context. CI1232 and CI1233 are both in the spring run. CI1232 is redeposited refuse from an extractive site. CI1233 is intact refuse from a resource extraction area and disturbance of this site should be avoided. Parsonage Point (CI1313) is a non-diagnostic Archaic scatter located in a very disturbed area.

During the late 18th century, the spring and attraction was a stop along a rail line (CI557) called the Atlantic Coast Line 501, also known as the "Mullet Train." Here, tourists could enjoy the view of the spring and ship out commodities such as crabs, cedar wood and spring water. The train ran from Ocala to Homosassa carrying passengers, mail, express and cargo. A freight train, added later, carried goods to Homosassa such as ice, fish net twine, corks, leads, rope, lumber, wooden barrels and an array of items for the general store. The cargo leaving Homosassa consisted of barrels of fish, cedar, cedar slats and cypress logs. The train track ran along the shoulder of what is now Fishbowl Drive and is recorded as a resource group.

A predictive model for the park was completed in 2011 (Collins et al. 2012).

The condition of all the sites is good or fair. Some were disturbed during the development of the attraction prior to becoming a state park but are currently stable. Primary threats are possible disturbance from any future development.

The park should maintain a file of all cultural sites. Sites should be visited annually and checked for stability and condition. Any significant changes to the sites should be documented. Sites that are listed in fair condition are stable. They cannot be returned to good condition due to previous disturbance.

Historic Structures

The park has five historic structures and one resource group containing structures relating to the attraction.

The historic structure CI375 consists of the structural components of the tourist attraction at Homosassa Springs. While documented accounts of visitation to the spring by persons of European descent date back to the 1880s, CI375 was built during the 1960s. Structure CI1382 was formerly a commercial structure, and it also was built in the 1960s. CI1383 is also a 1960s-era structure that serves as the visitor center. These latter two structures are included in the resource group CI1402. Structure CI1511 is still used in park operations but consists of a deteriorating boathouse built in 1966. Structure CI1566 is an original 1965 underwater observatory used as part of the attraction.

The condition of CI1383 and CI375 is good. The condition of CI1382 and CI1566 is fair. The CI1382 structure is not used by the park and could deteriorate due to lack of use. The condition of CI1511 is poor.

All the historic structures other than CI1382 are used by the park for park operations or as part of the attraction. They should be included in a regular maintenance schedule. Except for CI1566, all historic structures are not considered significant. The boathouse structure (CI1511) and underwater observatory (CI1566) both remain integral to park operations. Structure CI1511 has deteriorated to the point that a replacement is needed. The Division of Historical Resources (DHR) has approved demolition of this structure for replacement by a new modern boathouse. The underwater observatory (CI1566) may have historic significance, and restoration or rehabilitation of that structure might be feasible. Discussions of restoration include ADA and safety access considerations.

CI1382 is in a separate area from the rest of the park operations and not used by the park. The structure should be documented and DHR should be consulted for permission to demolish the building.

Collections

The park's primary collection consists of material relating to the history of the Homosassa Springs attraction and the surrounding community. Documents include newspaper articles, photographs and other ephemera dating mostly to the 1960s. Some photographs and material date to as early as the 1920s. A few items such as the original sign depicting a sheepshead fish are displayed in the visitor center.

A much smaller collection consists of natural history items, mainly skulls of native Florida animals and a few skeletons from species like bobcat (Lynx rufus) and West Indian manatee (Trichechus manatus). These have been displayed at the park's Discovery Center or kept in storage to use for interpretive programs.

Some items were recovered from the spring run stream during a dredging project. These have been transferred to DHR.

The condition of the park's collection is generally good, although some individual items may be in fair condition and not stable. The items pertaining to the history of the park and surrounding community area are stored in the climate-controlled archive room which is dedicated completely to this collection. Many photographs have been digitized. Other original documents are stored in metal cabinets. The natural history collection is stored in the teaching classroom.

Park staff should develop and update the Scope of Collection Statement to reflect the focus on the history of Homosassa Springs attraction and the surrounding community. Staff should also further develop and implement conservation actions in consultation with an archivist. Some previous recommendations, such as the purchase of an archival scanner, transferring documents to wooden cabinets and improving climate control, are still important to implement. Park staff should continue to work with DRP staff to document the collection in Past Perfect museum software.

The park has previously consulted with an archivist and has implemented some of the recommendations. Further humidity control is needed, and wood storage cabinets should replace the metal ones. The process of properly storing the material is ongoing and archival supplies are needed. Items such as archival paper and an archival scanner would benefit the park's collection. The park should periodically seek the input of an archivist on the management of the collection to maintain it in good condition.

Cultural Sites Listed in the Florida Master Site File					
Site Name and FMSF #	**Culture/Period**	**Description**	**Significance**	**Condition**	**Treatment**
CI00208 Homosassa Springs	Archaic, 8500 B.C.-1000 B.C.	Archaeological Site	NE	G	P
CI00209 Homosassa Springs Midden	Weeden Island, A.D. 450-1000	Archaeological Site	NE	G	P
CI00375 Homosassa Springs Attraction	C1940, Boom Times	Historic Structure	NE	G	P
CI00414 Parking Lot	Prehistoric lacking pottery	Archaeological Site	NE	G	P
CI00557 Ocala & Gulf Railroad	Nineteenth century American, 1821-1899 Twentieth century American, 1900-present	Resource Group	NS	G	P
CI01046 Little Spring Site	Prehistoric/Unspecified Weeden Island, 20th Century American	Archaeological Site	NE	G	P
CI01077 Manatus	Middle Archaic	Archaeological Site	NE	G	P
CI01232 B-27	Prehistoric/Unspecified	Archaeological Site	NE	G	P
CI01233 H-7	Prehistoric/Unspecified	Archaeological Site	NE	G	P
CI01281 HSWSP-1	Prehistoric/Unspecified	Archaeological Site	NS	G	P
CI01313 Parsonage Point 1	Archaic, 8500 B.C.-1000 B.C.	Archaeological Site	NS	G	P
CI01382 8746A W. Halls River Road	c1965	Historic Structure	NS	F	R
CI01383 Homosassa Springs Wildlife Visitor Center	c1964	Historic Structure	NS	G	P
CI1511 Boathouse*	1966	Historic Structure	NS	P	R
CI1566 Underwater Observatory	1965	Historic Structure	NE	F	RH
CI01402 8746 W. Halls River Road	1964-1966	Resource Group	NS	G	P

*CI511 has been replaced with a new structure.

Objective A: Assess and evaluate 14 of 14 recorded cultural resources in the park.

- Action 1 - Complete 14 assessments and evaluations of archaeological sites and resource groups annually.

No Historic Structures Reports are needed. All archaeological sites and resource groups should be assessed. The park should maintain files for each cultural site.

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 - Consult with the Bureau of Archaeological Research to identify areas needing a cultural resources reconnaissance survey and assessment.
- Action 3 - Develop and adopt a Scope of Collections Statement.

All known sites have been recorded with the Florida Master Site File, but the park should continue to record sites as they are found. Park staff should also continue to participate in the Archaeological Resource Management (ARM) training so that they can better recognize and protect cultural sites.

DRP staff should coordinate with staff from the Bureau of Natural and Cultural Resources (BNCR) and DHR to conduct a cultural resources reconnaissance survey, assess known sites and provide further management recommendations.

Objective C: Bring one of 16 recorded cultural resources into good condition.

- Action 1 - Design and implement an annual monitoring program for 16 cultural sites.
- Action 2 - Create and implement a cyclical maintenance program for each cultural resource.
- Action 3 – Restore/renovate the underwater observatory.

Since all but three of the cultural sites are in good condition, park efforts should concentrate on maintaining that good condition. The park should maintain files of all cultural resources and include them in an annual monitoring program to check for threats. Project efforts to remove and replace the boathouse (CI1511) are ongoing and appropriate authorizations have been granted.

To maintain the historic structures in good condition, the park should implement a cyclical maintenance program that focuses on preventative maintenance.

LAND USE COMPONENT

VISITATION

Ellie Schiller Homosassa Springs State Wildlife Park has been a local tourist attraction since the early 20th century. Formerly a classic Florida roadside attraction, the park once hosted non-native animals that were specially trained for performances in movies and television. Today, the park's most famous non-native inhabitant is a former 1960s screen actor, Lu the Hippopotamus, who is now renowned as the oldest hippopotamus in North America.

After several decades as a privately-owned or county-managed Florida roadside attraction, Homosassa Springs was acquired under the CARL Program by the Florida Park Service on Dec. 30, 1988. The park has since transitioned from an old roadside attraction to narrow its focus on the rehabilitation of native Florida wildlife. The park also preserves first magnitude springs and fine examples of hydric hammock and mesic flatwoods. The natural communities in the park form a key connection in a wildlife corridor between Crystal River Preserve State Park and the Withlacoochee State Forest. The park is also notable for its manatee and endangered animal healthcare and rehabilitation facilities.

Visitation Trends

Attendance at Homosassa Springs Wildlife State Park sees a notable increase during the cooler months, especially between December and April. March is typically the strongest month for park visitation, while September is typically the quietest.

EXISTING FACILITIES AND INFRASTRUCTURE

Facilities in Homosassa Springs Wildlife State Park are concentrated on the western end (abutting Fishbowl Drive) and the eastern end (abutting U.S. Highway 19/98) of the park. The western end of the park includes a complex of wildlife exhibits and animal care and rehabilitation facilities. There is also an underwater manatee observatory. The eastern end of the park, situated on U.S. Highway 19/98, includes the primary visitor center and adjacent pontoon boats and accompanying boathouse. Visitors who arrive at the main entrance are shuttled via boat or tram to the west entrance. The two entrances are connected by a paved tramway and Pepper Creek.

Two concessionaires provide services within the park utilizing existing park structures. Service includes food and beverage service and boat rides.

Facilities Inventory

Visitor Center Area	
Visitor Center	1
Boat Dock & Shelter	1
Pepper Creek Birding Trail (Tram Road)	1
Dog Kennels	1
Tram Road	1
Tram Station (East)	1
Barns	2

West Entrance	
West Entrance Building (Ticket Office/Ranger Station)	1
Tourism Office	1
Tram Station (West)	1
Paved Parking Lot	1
Overflow Parking Lot	1
Boat Dock & Shelter	1
Wildlife Walk Area	
Boardwalk	1
Rain Shelters	3
Wildlife Encounters Pavilion	1
Reptile House	1
Red Wolf Exhibit & Night House	1
Fox Exhibit & Night House	1
Great Horned Owl Exhibit	1
Barn Owl Exhibit & Night House	1
Barred Owl Exhibit	1
Aviary – Small Birds of Prey	1
Additional Aviary	1
Mew – Small Birds of Prey	1
Old Mew	1
Eagle Aviary	1
Eagle Exhibit & Night House	1
Hawk Exhibit & Night House	1
Whooping Crane Exhibit & Night House	1
Shorebird Enclosure	1
Bear Exhibit & Night House	1
Vulture Exhibit	1
Florida Panther Exhibit & Night House	1
Florida Panther Observation Deck	1
Bobcat Exhibit (incl. Rain Shelter & Night House)	1
Bobcat Observation Deck	1
Otter Exhibit & Night House	1
Alligator Lagoon	1
Gopher Tortoise Pen	1
Hippopotamus Exhibit	1
Key Deer Exhibit	1
Key Deer Observation Deck	1
Fridge Building	1
Snack Shack	1
Homosassa Spring	
Underwater Observatory	1
Bleachers	1
Manatee Observation Deck	1
Long River Bridge Observation Deck	1
Footbridge	1

Garden of Springs	
Discovery Center	1
Garden Pavilion (Gazebo?)	1
Picnic Area	1
River Overlook	1
Artificial Waterfall	1
Support Facilities (East)	
Staff Residence	1
Warehouse	1
Support Facilities (West)	
Staff Residences	2
Residence Sheds	2
Residence Vehicle Shelters	2
Shop	1
Felburn Wildlife Care Center	1
Manatee Care Building (Operations Office)	1
Manatee Handling Pool	1
Above-Ground Manatee Treatment Pool	1
Below-Ground Manatee Pool	1
Vehicle Shelter	1
Old Quarantine Building	1

CONCEPTUAL LAND USE PLAN

Detailed Conceptual Land Use Plan Objectives

The use areas at Ellie Schiller Homosassa Springs Wildlife State Park listed below detail specific objectives and action items to be implemented within the 10-year planning cycle.

Parkwide

Objective: Update and improve interpretation and signage.

Ellie Schiller Homosassa Springs Wildlife State Park includes a plethora of informative and educational paneling to enhance the visitor experience. Comprehensive interpretive planning is recommended to determine the most effective way to connect visitors to the meaningful and relevant themes in multiple areas of the park including the Wildlife Exhibit Area, Underwater Observatory and Tramway. The type, design, quantity, and placement of interpretive elements to deepen understanding will be specified during this additional planning process.

Wildlife Exhibit Area

Objective: Update structures within the wildlife park to increase safety and usability.

Actions:

- *Raise habitats that are threatened by flooding.*
- *Renovate the Wildlife Encounters building.*
- *Make necessary renovations to outdated exhibits including:*

   a. *Expand the Florida panther exhibit.*
   b. *Replace the Shorebird Aviary.*
   c. *Renovate the barn and barred owl exhibit.*
   d. *Renovate the reptile exhibit.*
   e. *Renovate the bird of prey night house and exhibit.*
- *Renovate Discovery Center.*
- *Renovate and address manatee paddock maintenance issues.*
- *Develop plans to construct a bear rehabilitation facility.*

Several wildlife exhibits face different degrees of flooding issues that stem from heavy rainstorms and tropical storms/hurricanes. The exhibits that are threatened from flooding events should be raised to mitigate any flooding. Flood mitigation efforts are also needed on the pedestrian walkways through the wildlife exhibit area.

Since most species within the exhibit area are imperiled, infrastructure improvements support better care for the inhabitants. Additionally, several exhibits are outdated and can lead to heightened stress for the species within the enclosure. Therefore, updating all the exhibits to provide safer and easier maintenance and protection to the species is necessary.

Specifically, the shorebird aviary exhibit, the barn and barred owl exhibit, the bird of prey night house and exhibit and the Florida panther exhibit should be renovated to attend to the specific species needs. Due to the high stress involved when moving the shorebirds to an enclosed space during severe weather events, renovations should include a space to mitigate this. The Florida panther exhibit needs to be expanded to provide more space. The reptile room and discovery center should also be expanded and renovated. Finally, a wild bear habitat is needed in the wooded area of the park behind the Felburn Wildlife Care Center building. The relative seclusion of this site is warranted to avoid imprinting on humans and allow for less problematic adjustment to the wild for the bear cubs.

Underwater Observatory

Objective: Renovate underwater observatory to enhance the visitor experience.

Actions:
- *Renovate observatory to repair windows, replace flooring and provide ADA accessibility.*
- *Replace air conditioning unit.*

The underwater observatory is one of the key features within the unit and plays a role in the overall immersive park experience. However, the observatory faces several impairments. The structure is not ADA compliant. In addition, several windows leak and fog up, leading to reduced visibility for viewers and leakage within the structure. This leakage has led to wet carpeting and odor within the structure. The air conditioner has also ceased to work. Restoring the observatory's functionality, charm and character should focus on these items and include updated interpretive programming.

One option for consideration is the relocation of the air conditioning unit in the facility to allow for more space for movement, with special consideration for wheelchair users, such as a lift. Updating the windows and carpeting should include waterproof materials. The windows should also contain the right materials to reduce fogging. Including more interpretive elements will also create a more meaningful experience for visitors.

West Entrance

***Objective:* Enhance visitor safety and reduce traffic congestion.**

Actions:

- *Reconfigure the park entrance to reduce congestion and improve visitor flow.*
- *Implement traffic control measures.*

The parking area at the west entrance faces higher visitation numbers than the main entrance. This leads to traffic and pedestrian congestion at the west entrance during peak visitation. To improve traffic/pedestrian flow, traffic control measures along Fishbowl Drive should be implemented to enhance visitor safety. A reconfiguration of the park entrance would also reduce congestion at the entrance of the park. Since the east entrance is considered the main entrance and contains more parking spaces, improved signage should direct visitors toward that entrance.

Visitor Center/East Entrance

***Objective:* Enhance the primary entrance point for the park.**

Actions:

- *Renovate visitor center and fabricate and install new interpretive exhibits.*
- *Improve signage to direct visitors to the visitor center.*
- *Remove the commercial storage building along U.S. Highway 19/98*

Despite serving as the park's primary entrance, the signage and wayfinding does not direct visitors to this entrance. Instead, visitor trends tend to follow parking and entrance at the west entrance. Renovations would help provide a true sense of place and emphasize the entrance point as a gateway to the park. Exhibits and additional interpretive elements are planned to orient visitors to recreational opportunities, introduce the watershed and its significance, demonstrate the relationship between springs and wildlife, show what is needed for native wildlife success and help visitors understand how the choices they make affect the health and survival of both the springs and wildlife. In order to preserve the sense of arrival to the park and reduce congestion, signage and wayfinding should primarily direct visitors to this entrance.

Additionally, the commercial storage building to the south of the east entrance along U.S. Highway 19/98 should be removed. A new storage building should be constructed at a more appropriate location.

Tramway

***Objective:* Highlight the park's history in a safe and effective manner.**

Actions:

- *Highlight the "Mullet Train" with well-developed interpretation.*
- *Widen shoulder to delineate a pedestrian walkway.*

As a former roadside attraction, highlighting the history of the park is integral to the park experience. One of those pieces of history is the "Mullet Train." Highlighting the "Mullet Train" should include well-developed interpretation.

While the tramway, Pepper Creek Trail, is typically used for tram rides, visitors can also walk on the road. Pepper Creek Trail does not delineate a specific section for pedestrian use, which could lead to future safety issues. One solution includes widening the shoulder to include a pedestrian walkway.

Park Shoreline Erosion

***Objective:* Stabilize shoreline through enforced aquatic boundary delineation and interagency coordination.**

Actions:

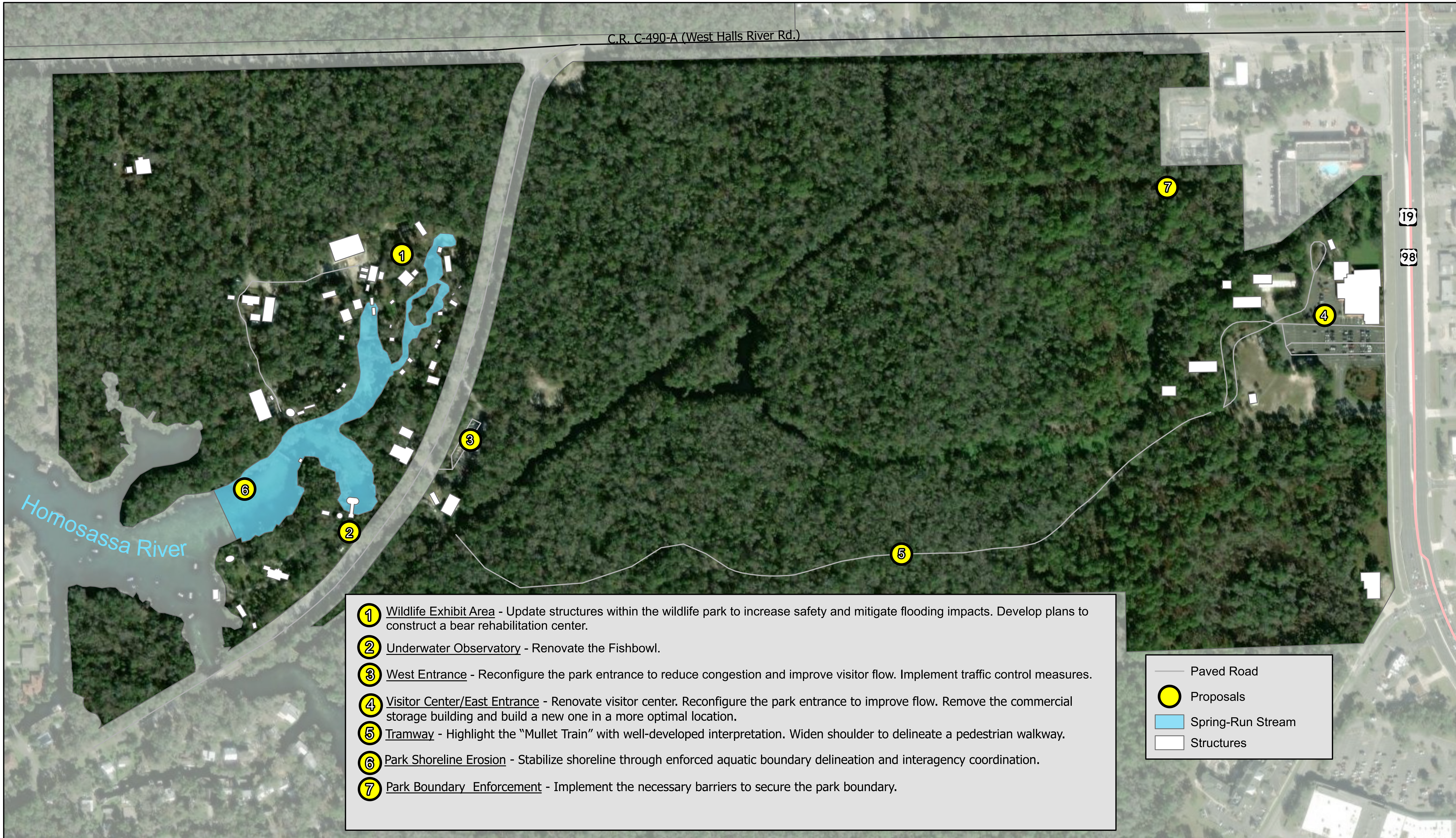
- *Coordinate with FWC to improve aquatic boundary delineation and enforcement of unauthorized access.*
- *Stabilize shoreline in spring/spring run.*

Due to the park's proximity to other houses and boating areas, boaters tend to tie within the park boundary. This leads to shoreline erosion. Improved boundary demarcation and appropriate signage would deter unauthorized boater access and provide some level of mitigation of shoreline erosion. This would include coordination with FWC.

Park Boundary

***Objective:* Implement the necessary barriers to secure the park boundary.**

On the northeast part of the park, the park boundary lies adjacent to an inn. Behind the inn, vagrant camping tends to encroach into the park. Coordination with FWC and local law enforcement should include implementing the necessary barriers and patrolling to reduce vagrant camps within the park.



Ellie Schiller Homosassa Springs Wildlife State Park

Conceptual Land Use Plan

0 400 800 Feet

N

Succession Plan

Due to the park's proximity to the Gulf Coast and the continued trend of flooding events, there is a need to draft and implement a successional plan. This will address the loss of resources, facilities and infrastructure associated with the impacts of sea level rise.

Specifically, the wildlife within the park faces continual threats from severe weather patterns. Ensuring the safety of wildlife without compromising structural stability may require researching alternative areas to be considered for a long-term relocation plan.

The park currently protects a spring/spring run while simultaneously caring for and rehabilitating native Florida wildlife. Identifying a local relocation site for the wildlife facilities will be a multifaceted endeavor. An identifiable constraint relates to the land surrounding the park. It is either low-lying flood plain, river basin or a preserve, or interfaces with significant urban and suburban development. Another qualification for future relocation efforts should consider the importance of maintaining a strong relationship between the park and the Tampa Zoo. This could include a specific radius upon which the park should be located from the zoo. Additional interagency partnerships should also be explored.

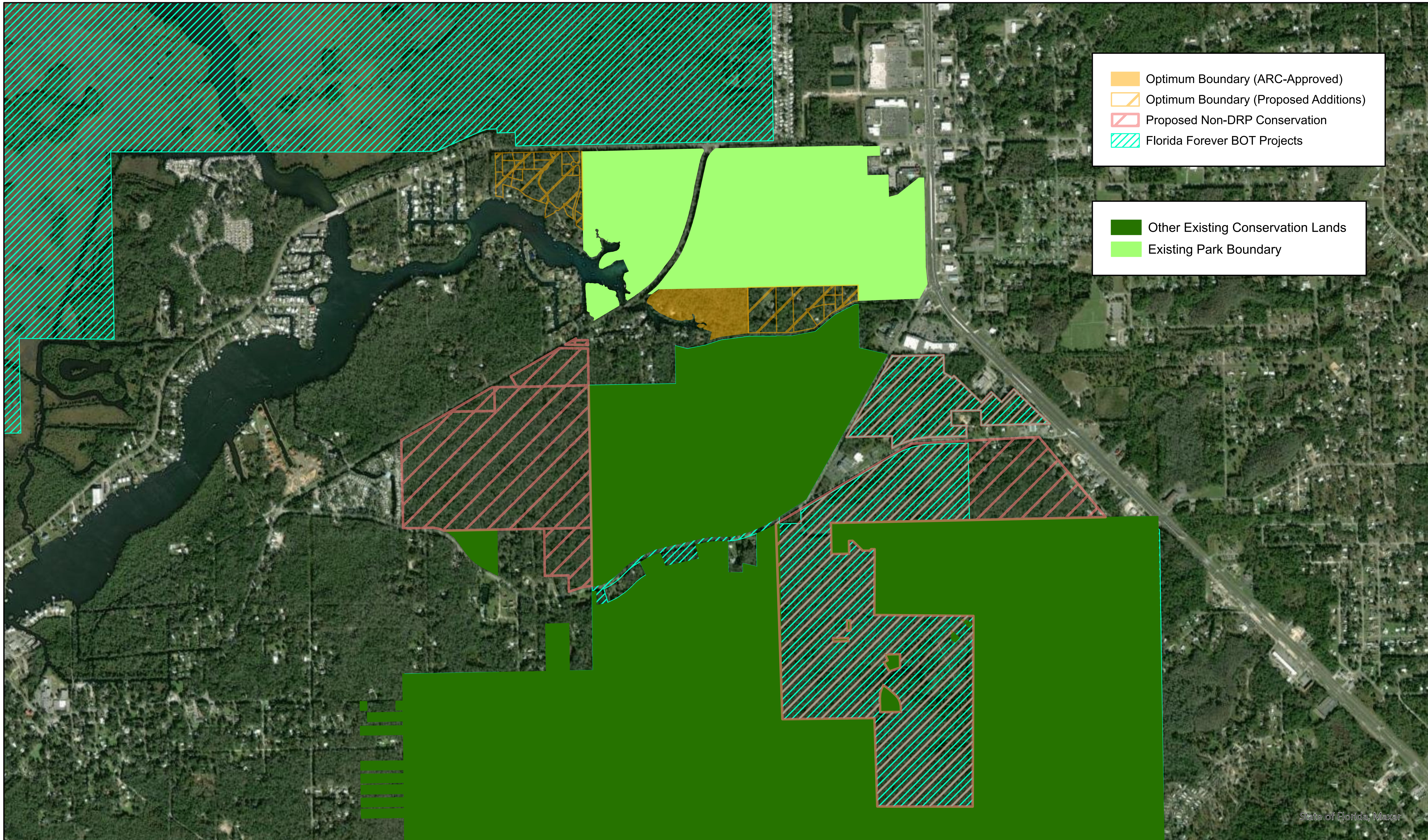
The purpose of the future proposed park would also change from its current purpose, as the park would be removed from the spring/spring run area. If a new location is chosen, the location should still adhere to the essential resource-based mission of the Florida Park Service. The new park should support protection and interpretation of Florida's native wildlife while providing educational opportunities for park visitors.

With the park's vulnerability to flooding expected to increase, creating a phased plan to identify incremental actions and associated catalysts/trigger points should include the following:

1. Mitigating any near-term risks on resident wildlife.
2. Drafting a successional plan that identifies a phased process for addressing long-term risks. This includes:
    a. Conducting a risk assessment that identifies short-term and long-term risks, as well as trigger points that would initiate actions.
    b. Proposed actions would include:
        i. Identifying a new wildlife park.
        ii. Implementation process.
        iii. Specific target outcomes.

OPTIMUM BOUNDARY

Several adjacent parcels of land abutting the southern park boundary are under consideration for potential park expansion. Acquisition of these parcels would serve to protect Homosassa Springs and other karst features in the area while enhancing park security. Acquisition of parcels to the west of the park boundary would also support contiguous conservation land with other conserved lands, as well as Crystal River Preserve State Park. Several parcels to the west and southwest of the park would be beneficial to acquire under other conservation efforts to connect the Withlacoochee State Forest to the park.



Ellie Schiller Homosassa Springs Wildlife State Park

Optimum Boundary

0 0.5 1 Miles

N