PUMPKIN HILL CREEK PRESERVE STATE PARK

Park Chapter

ATLANTIC COAST REGION

PUMPKIN HILL CREEK PRESERVE STATE PARK

DUVAL COUNTY, FLORIDA

SURROUNDING FEATURES
- Salt Marsh
- Agriculture
- Forests
- Silviculture
- Conservation Lands

PARK FEATURES
- Park Boundary
- Structures
- Stabilized Park Roads
- Unstabilized Park Roads
- Hiking Trail
- Hiking/Biking/Equestrian Trails

0 0.5 1 Miles

N W E S

INTRODUCTION

LOCATION AND ACQUISITION HISTORY

Pumpkin Hill Creek Preserve State Park is located in Duval County (see Vicinity Map). Access to the park is from Pumpkin Hill Road via Cedar Point Road. The Vicinity Map also reflects significant land and water resources existing near the park.

The first 2,655.09 acres of what is now Pumpkin Hill Creek Preserve State Park were initially acquired by the Board of Trustees of the Internal Improvement Trust Fund (Trustees) and the St. Johns River Water Management District (SJRWMD) on Aug. 31, 1994. Since this initial acquisition, the Trustees and the SJRWMD have jointly acquired additional parcels. The most recent acquisition, 241 acres on Black Hammock Island, was acquired by the Trustees on Dec. 27, 2022, as Amendment 4 to Lease No. 4074, which is a 50-year lease. The current lease will expire on June 28, 2045.

Pumpkin Hill Creek Preserve 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. 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 the Division of Recation and Parks' (DRP) 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 timber harvesting as part of the park's natural community restoration and management activities could be accommodated in a manner that would be compatible and 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 timber harvesting for the express purpose of natural community restoration and management is appropriate as an additional source of revenue for land management since it is compatible with the park's primary purpose of outdoor recreation and conservation. 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 Pumpkin Hill Creek Preserve State Park is to preserve biodiversity and protect water quality while providing natural resource-based recreational opportunities.

Park Significance

- The park is the largest contiguous conservation area in Jacksonville, and includes diverse natural communities such as salt marsh, hydric hammock, maritime hammock, sandhill and various pine flatwoods.

- Dynamic fluctuations of wet and dry periods result in a landscape significantly shaped by fire and water. This landscape provides watershed protection for the region's important estuarine resources.

- The park contains a significant estuarine system encompassing portions of five tidal creeks (Fitzpatrick Creek, Pumpkin Hill Creek, Clapboard Creek, Bogey Branch and an unnamed creek near Bogey Branch).

- The property provides opportunities for paddling, fishing, hiking, biking, equestrian and nature appreciation, essential resource-based recreational needs in the greater Jacksonville metropolitan area.

Central Park Theme

The expansive coastal flatwoods of Pumpkin Hill Creek Preserve State Park purify surrounding waters before they flow to the St. Johns and Nassau Rivers.

Pumpkin Hill Creek Preserve State Park is classified as a preserve in the DRP unit classification system. Preservation and enhancement of natural conditions is the priority. Resource considerations are given priority over user considerations and development is restricted to the minimum necessary for ensuring its protection and maintenance, limited access, user safety and convenience, and appropriate interpretation. Permitted uses are primarily of a passive nature, related to the aesthetic, interpretive/educational and recreational use of the preserve, although other compatible uses may be permitted within preservation-oriented limitations. Program emphasis is placed on interpretation of the natural and cultural attributes of the preserve.

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 the Department. The park is adjacent to the Nassau River-St Johns River Marshes Aquatic Preserve as designated under the Florida Aquatic Preserve Act of 1975 (Section 258.35, Florida Statutes).

PARK ACCOMPLISHMENTS

- Safely and successfully applied prescribed fire to nearly 1,200 combined acres in fiscal years 2021 and 2022.
- Completed habitat restoration measures on 272 combined acres.
- Reforested 80 acres with the hand-planting of 10,000 longleaf pines.
- Constructed multiple low water crossings to improve surface hydrology and access for resource management.
- Acquired critical heavy equipment necessary for fuels management and associated natural communities restoration.

RESOURCE MANAGEMENT COMPONENT

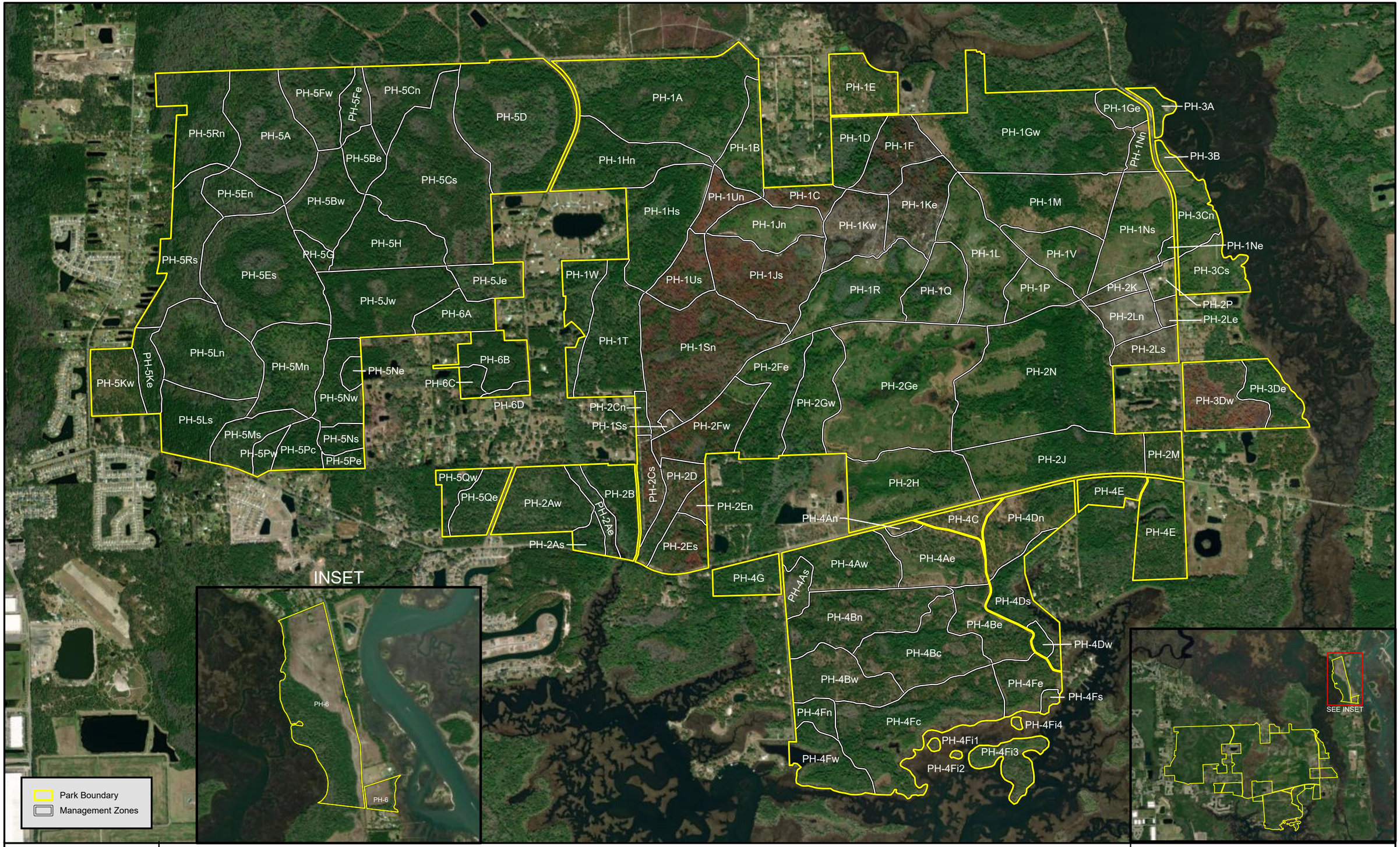
Pumpkin Hill Creek Preserve State Park Management Zones			
Management Zone	**Acreage**	**Managed with Prescribed Fire**	**Contains Known Cultural Resources**
1A	126.87	Y	N
1B	26.65	Y	N
1C	14.44	Y	N
1D	24.48	Y	N
1E	31.80	Y	N
1F	32.31	Y	N
1Ge	12.14	Y	N
1Gw	132.47	Y	N
1Hn	54.39	Y	N
1Hs	62.02	Y	N
1Jn	33.73	Y	N
1Js	66.69	Y	N
1Ke	40.28	Y	N
1Kw	34.88	Y	N
1L	60.41	Y	Y
1M	66.97	Y	N
1Ne	2.55	Y	N
1Nn	9.22	Y	N
1Ns	54.85	Y	N
1P	23.44	Y	Y

Pumpkin Hill Creek Preserve State Park Management Zones			
Management Zone	**Acreage**	**Managed with Prescribed Fire**	**Contains Known Cultural Resources**
1Q	33.71	Y	Y
1R	63.25	Y	Y
1Sn	107.69	Y	N
1Ss	2.74	Y	N
1T	59.87	Y	N
1Un	15.51	Y	N
1Us	24.9	Y	N
1V	33.64	Y	Y
1W	25.41	Y	N
2Ae	11.27	Y	N
2As	8.09	Y	N
2Aw	45.61	Y	Y
2B	26.52	Y	N
2Cn	4.85	Y	N
2Cs	17.2	Y	N
2D	22.01	Y	N
2En	6.29	Y	N
2Es	23.35	Y	N
2Fe	45.98	Y	N
2Fw	41.34	Y	N
2Ge	148.79	Y	Y
2Gw	41.91	Y	Y
2H	70.33	Y	N
2J	73.63	Y	N
2K	9.77	Y	Y

Pumpkin Hill Creek Preserve State Park Management Zones			
Management Zone	**Acreage**	**Managed With Prescribed Fire**	**Contains Known Cultural Resources**
2Le	5.03	Y	N
2Ln	20.67	Y	Y
2Ls	17.23	Y	Y
2M	14.61	Y	Y
2N	155.26	Y	Y
2P	8.34	Y	N
3A	7.64	Y	Y
3B	4.36	Y	N
3Cn	24.22	Y	N
3Cs	26.38	Y	N
3De	23.41	Y	Y
3Dw	42.35	Y	Y
4Ae	43.25	Y	N
4An	2.99	Y	N
4As	11.43	Y	N
4Aw	43.11	Y	N
4Bc	59.08	Y	Y
4Be	31.37	Y	N
4Bn	61.16	Y	N
4Bw	39.94	Y	Y
4C	12.92	Y	N
4Dn	41.88	Y	N
4Ds	29.4	Y	N
4Dw	4.51	Y	N
4E	57.2	Y	N

Pumpkin Hill Creek Preserve State Park Management Zones			
Management Zone	**Acreage**	**Managed With Prescribed Fire**	**Contains Known Cultural Resources**
4Fc	92.56	Y	N
4Fe	24.39	Y	N
4Fi1	1.14	Y	N
4Fi2	0.66	Y	N
4Fi3	20.75	Y	Y
4Fi4	0.92	Y	N
4Fn	10.44	Y	N
4Fs	2.89	Y	N
4Fw	31.86	Y	N
4G	19.85	Y	N
5A	70.58	Y	N
5Be	17.66	Y	N
5Bw	41.02	Y	N
5Cn	35.92	Y	N
5Cs	117.65	Y	N
5D	112.47	Y	N
5En	22.69	Y	N
5Es	102.26	Y	N
5Fe	13.72	Y	N
5Fe	46.82	Y	N
5Fw	35.54	Y	N
5G	7.08	Y	N
5Je	20.72	Y	N
5Jw	64.92	Y	N
5Ke	16.31	Y	N

Pumpkin Hill Creek Preserve State Park Management Zones			
Management Zone	**Acreage**	**Managed With Prescribed Fire**	**Contains Known Cultural Resources**
5Kw	28.46	Y	N
5Ln	67.69	Y	N
5Ls	39.99	Y	N
5Mn	50.14	Y	N
5Ms	24.63	Y	N
5Ne	5.18	Y	N
5Ns	10.81	Y	N
5Nw	26.54	Y	N
5Pc	17.24	Y	N
5Pe	6.07	Y	N
5Pw	8.03	Y	N
5Qe	22.50	Y	N
5Qw	11.84	Y	N
5Rn	53.54	Y	N
5Rs	51.55	Y	N
6	239.85	N	N
6A	22.59	Y	N
6B	27.04	Y	N
6C	6.82	Y	N
6D	3.75	Y	N



PUMPKIN HILL CREEK PRESERVE STATE PARK
Management Zones

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

Elevations at Pumpkin Hill Creek Preserve State Park range from about 7 feet above mean sea level (msl) to 20 feet msl. The highest elevations occur in the eastern and central portions of the preserve. Topographic variation in the interior of the preserve is primarily due to the depression marshes and basin swamps that are scattered throughout the flatwoods.

Some of the more significant topographic disturbances in the preserve include the channelized upper portion of Fitzpatrick Creek in zone PH-4E, the Caldwell Tract ditch that encircles a basin swamp in zone PH-6B, a large drainage ditch that extends from Pumpkin Hill Road east to Pumpkin Hill Creek, and an elevated causeway called Mary Jane Road that passes through flatwoods west of Boney Road.

SOILS

Fourteen different soil types have been identified at Pumpkin Hill Creek Preserve (see Soils Map). A complete listing and description can be found in Appendix.

Soils within the preserve range from the frequently flooded and poorly drained soils of the floodplain wetlands to the moderately well-drained sandy soils found on some of the higher knolls. Nearly half the soil types are classified as Spodosols, one of the five different soil orders represented at the preserve (i.e., Entisols, Histosols, Inceptisols, Ultisols, and Spodosols).

The defining characteristic of Spodosols is the spodic horizon, a subsurface layer that contains an accumulation of organic material, aluminum, and possibly iron. This distinctive layer acts as an almost impenetrable clay-like band of soil that can store saturated freshwater runoff in the upper soil horizon and at the surface for long periods.

Soil disturbance and erosion from surface water runoff can be highly detrimental. Management activities will continue to follow accepted best management practices regarding fire line/resource management road maintenance to minimize or prevent additional soil erosion and to protect the park's soil and water resources. Fire line road maintenance will avoid rutting, or creation of sunken segments of roadway that could lead to erosion, particularly when paired with heavy rains.

DEM (ft.)
255
0
Contours (5 ft.)
Park Boundary

bing

PUMPKIN HILL CREEK PRESERVE STATE PARK
Topography

N

0 0.25 0.5 1 Miles

Sources: ESRI; Florida Department of Environmental Protection
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Soils

- 14 - Boulogne fine sand, 0 to 2 percent slopes
- 22 - Evergreen-wesconnett complex, depressional, 0 to 2 percent slopes
- 24 - Hurricane and ridgewood soils, 0 to 5 percent slopes
- 32 - Leon fine sand, 0 to 2 percent slopes
- 33 - Leon fine sand, 0 to 2 percent slopes, very frequently flooded
- 35 - Lynn haven fine sand, 0 to 2 percent slopes
- 36 - Mandarin fine sand, 0 to 2 percent slopes
- 38 - Mascotte fine sand, 0 to 2 percent slopes
- 46 - Ortega fine sand, 0 to 5 percent slopes
- 49 - Pamlico muck, depressional, 0 to 1 percent slopes
- 58 - Pottsburg fine sand, high, 0 to 3 percent slopes
- 62 - Rutlege mucky fine sand, 0 to 2 percent slopes, frequently flooded
- 66 - Surrency loamy fine sand, depressional, 0 to 2 percent slopes
- 67 - Surrency loamy fine sand, 0 to 2 percent slopes, frequently flooded
- 68 - Tisonia mucky peat, 0 to 1 percent slopes, very frequently flooded
- 99 - Water

SEE INSET

PUMPKIN HILL CREEK PRESERVE STATE PARK
Soils

N

0 2,000 4,000 Feet

Sources: ESRI; Florida Department of Environmental Protection

HYDROLOGY

Pumpkin Hill Creek Preserve State Park is uniquely located on the northeast coast of Florida between two major river basins (the lower St. Johns River and the Nassau River) and within four distinct drainage sub-basins (Edwards Creek, Pumpkin Hill Creek, Cedar Point Creek and Clapboard Creek) (DEP 2017a). The park shares a common boundary with portions of the Nassau River-St. Johns River Marshes Aquatic Preserve (DEP 1986), which encompasses one of the most important salt marsh ecosystems in northeast Florida and is the fourth-largest publicly managed estuary in the state. In addition, the National Park Service (NPS) manages or assists in managing 46,000 acres of estuarine and maritime hammock communities in this region as the Timucuan Ecological and Historical Preserve (Anderson et al. 2005).

The park contains a high diversity of freshwater wetlands including blackwater stream, coastal dune lake, flatwoods lake, depression marsh, basin swamp, dome swamp, floodplain swamp, alluvial forest, bottomland forest, baygall and hydric hammock. Also within the park is a significant estuarine system encompassing portions of five tidal creeks (Fitzpatrick Creek, Pumpkin Hill Creek, Clapboard Creek, Bogey Branch and an unnamed creek near Bogey Branch). The main hydrological issues affecting the park are 1) historic channelization of portions of upper Fitzpatrick Creek and Mary Jane Road, 2) regional groundwater depletion and saltwater intrusion, 3) increased degradation of estuarine water quality, and 4) erosion and sedimentation along the Pumpkin Hill Creek shoreline.

Unfortunately, very few waterbodies within the park have received designation as an Outstanding Florida Water (OFW). Those that are currently designated as OFWs occur within the eastern and southern parts of the park, specifically portions of Pumpkin Hill Creek and the upper part of Fitzpatrick Creek (DEP 2017a). Nonetheless, all five tidal creeks mentioned above flow directly into OFW waters associated with the Nassau River-St. Johns River Marshes Aquatic Preserve. Both the aquatic preserve and the Timucuan Historic and Ecological Preserve are designated as OFWs under Rule 62-302-700, Florida Administrative Code.

Over 70% of the park's surface water eventually drains southward into the Clapboard Creek sub-basin, however drainage in the northeast corner of the park trends toward Edwards Creek, and eastern sections of the park are within the Pumpkin Hill Creek sub-basin (Adamus et al. 1997). A very small area in the southeastern part of the park falls within the Cedar Point Creek sub-basin. Edwards and Pumpkin Hill creeks are surface waters that generally flow north into the Nassau River Basin, but Clapboard and Cedar Point creeks tend to flow south into the lower St. Johns River even though the north end of Cedar Point Creek is narrowly connected with Pumpkin Hill Creek (DEP 2017a). Each of these sub-basins is predominantly composed of pine uplands, freshwater and estuarine wetlands, and salt marsh.

The St. Johns River basin covers approximately 9,168 square miles from St. Lucie County to the Atlantic Ocean in Jacksonville (DEP 2004, DEP 2007). The drainage area of the lower St. Johns River, which extends north from the confluence of the St. Johns and Ocklawaha rivers to the Atlantic Ocean, is 2,750 square miles. The last 21 miles of the lower St. Johns is unique in that it has limited freshwater inputs and daily tidal influences (Magley and Joyner 2008). The Nassau River drains an area of approximately 464 square miles, including about 17 square miles of forested and estuarine wetlands around the park, and it flows nearly 65 river miles (Adamus et al. 1997). At least half of the Nassau River basin experiences daily tidal influences (Ayres Associates 1999).

The Clapboard Creek sub-basin is one of the largest in the region, draining about 16 square miles compared to only 4.5 square miles for the Cedar Point sub-basin. The Clapboard Creek watershed contains five major tidal creek systems (Clapboard Creek, Fitzpatrick Creek, Bogey Branch and two unnamed creeks). Four of the five creeks have their origins in freshwater wetlands and blackwater streams within the park.

Fitzpatrick Creek has been altered in the past, both within and adjacent to the park. The blackwater stream portion of Fitzpatrick Creek, within zone PH-4E of the park, and a section of salt marsh and tidal creek immediately adjacent, were historically ditched and channelized. The uppermost section of channelized Fitzpatrick Creek appears to end abruptly at Cedar Point Road. However, a culvert under this road connects the canal with freshwater wetlands to the north. Flooding often occurs in this region of the park. The freshwater wetlands north of Cedar Point Road obviously play an integral role in the hydrology of the Fitzpatrick Creek system. Similar alterations of creek systems have occurred elsewhere in the park, including within the Bogey Branch drainage just west of Nungezer Road.

Groundwater and Saltwater Intrusion

Three groundwater aquifers are typically described for the Pumpkin Hill Creek region. The surficial aquifer consists of water-bearing soils with occasional limestone beds close to the surface. The intermediate aquifer, which underlies the surficial, is composed of sand and limestone beds from the Hawthorn Group. Although it is a secondary aquifer, it is an important source of freshwater in the Pumpkin Hill Creek area (Watts 1998). The primary aquifer is the Floridan aquifer, which is the main source of freshwater for Duval County and most of Florida. In the Jacksonville area, the Floridan begins about 200 to 400 feet below MSL, immediately below the Hawthorn Group (McGrail et al. 1998). Recharge of the surficial and intermediate aquifers occurs readily with local rainfall. Direct recharge of the Floridan aquifer, however, does not occur within most of the Pumpkin Hill Creek area because of the nature of the local geology.

Nassau and Duval counties in northeast Florida and Camden County in southeast Georgia fall within a groundwater sub-area covering over 1,000 square miles (Peck et al. 2005). Regional flow of groundwater in this region is from west to east, following subsurface water contours that define the potentiometric surface, simply defined as the directionality and underground topography of the Floridan aquifer as measured by tightly cased wells (Brown 1984). Because Pumpkin Hill Creek Preserve State Park is located at the eastern edge of the Florida mainland, the availability of surface water and groundwater there can be extremely limited (Tarbox and Hutchings 2003). Although the Upper Floridan in northeast Florida can extend up to 50 miles offshore as a thin lens of varying depth (Levy 1966; Barlow 2003), there is a long history of groundwater depletion in this region dating back to about 1880 (Peck et al. 2005). Dramatic human population increases, large groundwater withdrawals and recent unprecedented droughts in the southeastern United States have all contributed to a significant decline in the Floridan aquifer in northeast Florida (SJRWMD 2017a).

Since groundwater pumping first began to be recorded, water scientists have closely monitored subsurface “cones of depression” that develop at the aquifer’s potentiometric surface (SJRWMD 2015). These numeric depressions in the potentiometric surface indicate that significant discharge is taking place in those locations, including anthropogenic groundwater withdrawals (Knowles 2001). Major cones of depression have appeared over the past 20 years in four locations along the Florida/Georgia coast, including Fernandina Beach and Jacksonville in Florida and St. Marys and Brunswick in Georgia

(Fairchild and Bentley 1977; Brown 1984; Kinnaman and Dixon 2011). Regional cones of depression can cumulatively lead to major changes in watershed boundaries, as was recently described for the Suwannee River basin of north Florida (Grubbs and Crandall 2007; Grubbs 2011; Still 2010; Swihart 2011). Although the paper mill industry has been a primary contributor to significant groundwater decline in this region since the 1940s (Peck et al. 2005), withdrawal for public supply has greatly increased during the past 20 years and is threatening to overtake industrial use (Borisova and Carriker 2009).

The St. Johns River Water Management District (SJRWMD) is the state agency responsible for issuing water use permits in the region, and in doing so, must ensure that proposed uses are in the public interest, which includes the conservation of fish and wildlife habitat and the protection of recreational values (Chapter 373, Florida Statues). In October 2011, the SJRWMD, Suwannee River Water Management District (SRWMD) and DEP entered into an interagency agreement that outlined closer coordination in the management of north Florida water supplies. The two water management districts are now required to address the issues of decreased groundwater resources when they conduct district water supply planning activities (SRWMD 2010; SJRWMD 2011; SJRWMD 2017a).

As of 2011, groundwater withdrawals in northeast Florida appeared to have stabilized and the cone of depression was much reduced. Aquifer deficits, however, were still nearly 70 feet below historic levels (Barlow 2003; Marella and Berndt 2005; Williams et al. 2011). Given the projected water supply needs for the area, water managers predict that groundwater levels throughout north Florida will continue to decline (Sepulveda 2002; SJRWMD 2017a). Numerous water scientists now suggest that Florida can no longer rely on estimation techniques to monitor groundwater extraction, especially for agricultural purposes, and they recommend that all consumptive use of the Floridan aquifer be accurately tracked (Kincaid 2011; Gao et al. 2007; Knight and Clarke 2016).

The increased consumptive use of groundwater along the northeast coast and the resulting decline in groundwater levels has caused an acceleration of saltwater intrusion into the Floridan aquifer (McGrail et al. 1998). Saltwater intrusion can occur both naturally, such as during droughts when the freshwater lens shrinks, and anthropogenically, such as during periods of heavy groundwater withdrawal (Spechler 1994, 2001; Barlow 2003). The two most recent severe droughts on record in Florida (i.e., 1998-2002 and 2010-2012), resulted in saltwater intrusion on a statewide scale, and groundwater pumping exacerbated this process (Marella and Berndt 2005; Copeland et al. 2011). Water scientists now suggest that saltwater encroachment will become an even greater environmental threat in Florida than global sea level rise (Payne 2010).

Water Quality

Water scientists have sampled groundwater levels and quality in coastal areas of northeast Florida since the late 1970s (Frazee and McClaugherty, 1979; Brown 1984; Spechler 2001; Peck et al. 2005). Within a 5-mile radius of the park, over 100 wells are currently set up to monitor groundwater quality in the region (DEP 2017a). Water scientists also monitor surface water conditions at hundreds of different locations throughout this region. Much of the hydrological information that has been collected, stored and managed by state water management agencies can now be accessed through a variety of web-based filters (SJRWMD 2017b; DEP 2017a; DEP 2017b; USGS 2017).

Among the various types of groundwater wells being monitored are private and public water supply wells, Florida Geological Survey wells, confined and unconfined aquifer wells, Class V (non-ASR) wells, and status network monitoring wells. Some of these wells are associated with saltwater intrusion monitoring, while others are used to document changes associated with known contaminated sites. At least 30 additional wells (i.e., Very intensive Study Area (VISA) and Superfund sites) located within a 10-mile radius of the park are used to monitor known groundwater contamination sites in the greater Jacksonville area.

Eight groundwater wells are located inside Pumpkin Hill Creek Preserve State Park, including six that the SJRWMD installed in 2003 to monitor potentiometric levels and water chemistry within the three regional aquifers (DEP 2017a). Three of these wells (MW-1, MW-2, and MW-3) are located near Nungezer Road and were only monitored from 2003-10. The remaining five wells are in the administration/shop area of the park just west of Pumpkin Hill Creek Road.

Four of the five wells in the administration/shop area are still actively monitored by the SJRWMD and the DEP as part of a status network program. Data recorded at these well sites since 2003 include daily groundwater levels and semiannual water chemistry. The semiannual monitoring occurs at two surficial wells (Z3-UA-11028, 29 feet deep and SJ4-UA-2019, 29 feet deep), one intermediate well (Z3-CA-5124, 82 feet deep) and one deeper well that extends all the way to the Ocala limestone of the Floridan aquifer (SJ4-CA-2028, 570 feet deep).

The potential for surface waters in Pumpkin Hill Creek Preserve State Park to be contaminated by outside sources may be relatively limited given that most surface waters in the park are in the form of wetlands that drain into small tidal creeks, which in turn discharge into larger creeks that are outside the park. The exception may be Bogey Branch, which originates in wetlands within the park but then flows southward across private lands before re-entering the park near Nungezer Road. Bogey Branch exits the park again when it reaches Cedar Point Road and shortly thereafter flows into Clapboard Creek, a much larger system that eventually empties into the St. Johns River. It is important to note, however, that five tidal creeks intimately link the surface waters of the park with down-gradient estuarine systems outside the park and that degradation of water quality in those estuaries can potentially influence wetlands up-gradient within the park.

Unfortunately, there is very little historical data for surface water quality within the park. However, at least 37 monitoring stations are scattered throughout the sub-basins that encompass, or are adjacent to, the park. Various surface water quality data have been collected from these stations (DEP 2017a). An even larger network of monitoring stations is in place for the numerous waterbodies in the greater Jacksonville region. Much of the monitoring was initiated in response to burgeoning urban development that was having significant detrimental effects on resources in the lower St. Johns River (Anderson et al. 2005). It wasn't until the late 1980s, however, that state officials recognized how serious the surface water quality problems in northeast Florida had become, and they began to implement meaningful regulations to protect sensitive coastal resources at that time (DEP 1986).

The federal Clean Water Act of 1972 required that all states classify their surface waterbodies according to designated uses (Alexander 1998). Within and adjacent to Pumpkin Hill Creek Preserve State Park, surface waterbodies are classified as either Class II (i.e., shellfish propagation or harvesting) or Class III (i.e., Fish Consumption, Recreation, Propagation and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife, per rule 62-302.400, F.A.C.).

Although Pumpkin Hill Creek is the only surface waterbody within the park that is designated a Class II waterbody, several others in the region also fit this category, including portions of Nassau River, South Amelia Island and the Fort George River (DEP 2017a). Nearly all the remaining surface waters in the greater Jacksonville region are considered Class III waterbodies. In 1984, DEP reclassified several waterbodies within the Nassau River and lower St. Johns River basins as "prohibited from harvesting" due to chronically high levels of fecal coliform bacteria and known point/non-point sources of industrial pollution, including heavy metals (DEP 1986). In 1994, the Florida Department of Agriculture and Consumer Services (FDACS) recommended that all Class II waterbodies in Duval and Nassau counties be prohibited from shellfish harvest due primarily to fecal coliform bacteria pollution. This prohibited harvest rule for northeast Florida became effective in 1996 and continues today (Anderson et al. 2005, FDACS 2017).

Water quality in estuarine systems adjacent to the park has been compromised by long-permitted effluent discharge from multiple industrial sources such as paper/pulp mills, power plants, chemical plants and manufacturing plants. One of the largest single contributors of nutrient loading to the lower St. Johns River in this region has a National Pollutant Discharge Elimination System (NPDES) permit to discharge over 800 million gallons per day (DEP 2017a). This is only one of numerous NPDES permits issued throughout the lower St. Johns River basin. There is also significant input from non-point sources of pollution such as stormwater runoff and faulty septic systems (Magley and Joyner 2008). Development of private lands throughout the greater Jacksonville area, including areas close to the park, is increasing rapidly, especially along the western boundary of the park. Urban development near the park will continue to contribute to elevated nutrient and bacteria levels in the surface waters and groundwaters of the region, increasing contaminant loads in hundreds of waterbodies in the lower St. Johns and Nassau River basins that have already been declared impaired (DEP 2017a).

In 1996, DEP initiated a formal statewide program for monitoring groundwater and surface water quality, including the lower St. Johns and Nassau River basins (Maddox et al. 1992; DEP 2009). This Integrated Water Resource Monitoring Program (IWRMP) adopted a comprehensive watershed approach based on natural hydrologic units (Livingston 2003) and designed to provide a framework for implementing Total Maximum Daily Load (TMDL) requirements that will attempt to restore and protect waterbodies that have been declared impaired (Clark and DeBusk 2008).

According to DEP's basin status report for this region, numerous waterbodies (i.e., creeks, tributaries, and lakes) within the lower St. Johns River basin and Nassau River basin became potentially impaired water bodies in 1998 because of high levels of at least one of the following parameters (i.e., fecal coliform, total bacteria, total nitrogen, total phosphorus, nutrients, lead, metals, iron and mercury) (DEP 2004, 2007). Based on Florida's Impaired Waters Rule (IWR), the U.S. Environmental Protection Agency (EPA) in 2004 verified that those waterbodies were impaired, which meant that their surface water quality did not meet applicable state water quality standards (Chapter 62-303, F.A.C.). This designation triggered a long chain of mandatory requirements that Florida must accomplish to achieve compliance with EPA regulations concerning polluted waterbodies. The regulatory compliance process started when Florida prioritized the tributaries of the St. Johns and Nassau River basins and appropriately assigned a TMDL for each polluted system (Magley and Joyner 2008).

Up to 10 impaired waterbodies that are near or adjacent to the park are tributaries of the St. Johns River, including Rushing Branch, Dunn Creek, Terrapin Creek, San Carlos/Nichols Creek, Brown Creek,

Clapboard Creek, Cedar Point Creek, Sisters Creek, the Fort George River and the St. Johns River main stem. In 2008, a Basin Management Action Plan (BMAP) was adopted for the lower St. Johns main stem, but only for the nutrient impairment parameter (DEP 2008).

Within marine segments of the lower Nassau River located near or adjacent to the park, the only impairment parameter known to occur was mercury. Upstream segments of the Nassau River, however, have a larger number of waterbody impairments including fecal coliform, total bacteria and dissolved oxygen. As of 2017, the only surface TMDL report written for the Nassau River basin was a statewide mercury plan and a dissolved oxygen plan for an unnamed freshwater stream in the upper basin (DEP 2012).

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

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

The park's most significant hydrological feature is its estuarine system, which includes portions of five major tidal creeks, including Clapboard Creek, Bogey Branch, an unnamed branch adjacent to Bogey Branch, Fitzpatrick Creek and Pumpkin Hill Creek. The park also contains a highly diverse collection of freshwater wetlands. Control of erosion and sedimentation along the Pumpkin Hill Creek shoreline and preservation of surface water and groundwater quality will remain top priorities for DRP. The following are hydrological assessment actions recommended for the park.

Since the 1940s, excessive consumption of groundwater regionally has exacerbated saltwater intrusion and created a significant cone of depression near the park. The effects of groundwater depletion on freshwater wetlands in the park are unknown. For water managers to be able to protect water quality and potentially restore historic groundwater levels, they will need to track the extent of the groundwater drawdown. Additionally, regulatory agencies have determined that surface waters adjacent to the park are impaired because of high levels of fecal coliform and other bacteria, as well as mercury. Shellfish harvesting in waterbodies throughout Duval County is currently prohibited. Although these water quantity and quality issues are complex, genuine improvements are still achievable. To facilitate that process, DRP will continue its tradition of close cooperation with state and federal agencies and independent researchers engaged in hydrological research and monitoring in the park, and it will encourage and facilitate additional research in those areas.

DRP will rely on agencies such as the SRWMD, the U.S. Geological Survey (USGS) and DEP to keep it apprised of any declines in surface water quality or suspected contamination of groundwater in the region. District 2 staff will continue to monitor Environmental Resource Permit and Water Use Permit requests for the region and provide timely, constructive comments that promote protection of the park's water resources. Additional cooperative efforts may include facilitating the review and approval of research permits and providing researchers with assistance in the field, including orientation to the park's resources. Recommendations derived from monitoring and research activities will be essential to the decision-making process during management planning. One activity worthy of DRP support is continued groundwater monitoring of all important wells and waterbodies within the park.

Staff will continue to monitor land-use or zoning changes within lands bordering the park. Major ground disturbances on neighboring properties or inadequate treatment of runoff into local streams could ultimately cause significant degradation of park resources. When appropriate, DRP staff will provide comments to other agencies regarding proposed changes in land use or zoning that may affect the park. In addition, staff will closely monitor mining and consumptive use permit applications in the St. Johns/Nassau River basins for possible adverse impacts on the park's resources. DRP will continue to work closely with the SJRWMD to ensure that consumptive use permits for the region are responsibly issued so as to protect current groundwater levels and eventually restore historic conditions.

Objective B: Restore natural hydrological conditions and functions to approximately 2 acres of blackwater stream natural community.

- Action 1 - Assess hydrological impacts of the channelization and ditching of tidal creeks in the park, especially Fitzpatrick Creek.
- Action 2 - Develop plans for restoring the natural hydroperiods of tidal creeks impacted by channelization or ditching.

Historic channelization and ditching of Fitzpatrick Creek may have impacted upper reaches of the creek within the park by altering historic flows, interrupting natural sheetflow, and disrupting ecological function, especially north of Cedar Point Road. The following hydrological restoration actions are recommended for the park.

DRP will evaluate the condition of all tidal creeks in the park. Staff will determine the feasibility of restoring the creeks, particularly those that have been altered by historic ditching. If restoration seems possible, DRP will develop and implement a restoration plan. Park staff will comply with best management practices to maintain existing water quality onsite and will take appropriate action to prevent soil erosion or other impacts to water resources.

DRP staff will evaluate other alterations in the park that may have negatively affected natural hydrology. If necessary, staff will initiate corrective actions such as installation of low water crossings or culverts in appropriate locations.

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

- Action 1 - Develop and implement a trail management plan for the park's recreational trails.
- Action 2 - Assess erosion prone sites in the park for impacts from tidal creek flow, surface water runoff or recreational use and implement corrective measures as needed.

Some areas of the park, such as the canoe launch site along the Pumpkin Hill Creek shoreline, continue to have erosion issues. The following are erosion control actions recommended for the park.

DRP will continue its tradition of close cooperation with state and federal agencies engaged in shoreline protection strategies. DRP will continue to work with appropriate entities to adopt sound strategies for reducing erosion rates and stabilizing shorelines in the park.

Staff will regularly monitor areas of the park that are prone to erosion. Wherever necessary, park staff will use corrective measures to reduce impacts of soil erosion on water resources.

DRP will investigate best management options for additional mitigation of erosion in public-use areas such as the canoe launch area along Pumpkin Hill Creek, as well as along equestrian and hiking trails. DRP will develop and implement a trail management plan for the park's recreational trails. This plan will define expectations for a well-maintained and sustainable trail system by prioritizing impacts and educating all stakeholders about the need for protecting resources in the park.

NATURAL COMMUNITIES

The park contains 20 distinct natural communities as well as five altered landcover types (see Natural Communities Maps). A list of known plants and animals occurring in the park is contained in Addendix.

Coastal Strand

A thin strip of coastal strand occurs at the ecotone between uplands and salt marsh at the southern boundary of Pumpkin Hill Creek Preserve State Park along Fitzpatrick Creek and also on three small islands in the salt marsh just south of there. Cabbage palm, yaupon holly, wax myrtle (*Myrica cerifera*), sawgrass (*Cladium jamaicense*) and broomsedge (*Andropogon virginicus*) are the dominant species. The coastal strand in the park is in fair to good condition. Although it has not yet been determined if prescribed fire should be directly applied to coastal strand in the park, the long thin strip of coastal strand along the southern edge of the park will be exposed to prescribed fire whenever adjacent uplands are burned. There are no plans to burn the small islands of coastal strand further south. Coastal strands in central and South Florida have shown a tendency to be easily invaded by invasive plants. Since these South Florida exotic species are gradually migrating northward, staff should routinely monitor the coastal strand at Pumpkin Hill Creek Preserve State Park for the appearance of new invasive infestations.

Maritime Hammock

Several examples of maritime hammock can be found along the eastern and southern edges of Pumpkin Hill Creek Preserve State Park and on Hog Plumb Island adjacent to the salt marsh. These are well-developed hammocks, dominated by live oaks festooned with Spanish moss (*Tillandsia usneoides*) and resurrection fern (*Pleopeltis polypodioides*). Other canopy hardwoods include laurel oak (*Quercus laurifolia*) and southern magnolia. Maritime hammock does not occur as frequently at Pumpkin Hill Creek Preserve State Park west of the creek as it does in the island systems to the east. This is probably due to the more intense and frequent fire regime that exists on the mainland compared with that on the sea islands. The maritime hammock at the kayak launch area has been heavily disturbed by previous land uses, and its central portion has been disturbed to such an extent that it is classified as developed. A recent addition to the park includes over 120 acres of maritime hammock located on Black Hammock Island on the eastern side of Pumpkin Hill Creek. In general, maritime hammock in the park is in relatively good condition.

Fires are naturally rare in this community but may have occurred infrequently in areas that are adjacent to fire-adapted communities. Due to the location of the maritime hammocks on the periphery of the park, it will be important to remove invasive plant species as soon as they appear. Invasive species dispersal may be exacerbated in areas that are near visitor use areas.

Mesic Flatwoods

The mesic flatwoods natural community dominates the landscape at Pumpkin Hill Creek Preserve State Park, extending across the entire preserve. It grades into scrubby flatwoods on rises that are slightly better drained and into wet flatwoods in more poorly drained areas. Scattered among the mesic flatwoods are wetlands such as basin swamps, depression marshes and dome swamps. Several blackwater streams with associated floodplains drain the wetlands and flatwoods.

Although the mesic flatwoods community has been altered to varying degrees by timber harvests and fire suppression, most of it retains a relatively high species diversity. The majority of the mesic flatwoods is in good condition, with some in excellent condition. There is little evidence of intensive site preparation, even in the planted pine areas. In more fire suppressed areas, the understory is dominated by gallberry, saw palmetto, fetterbush and tarflower (*Bejaria racemosa*). Herbaceous species such as wiregrass and broomsedge are more common in areas having a more recent history of fire and/or resource management practices such as mowing or roller-chopping.

Depending on its fire history, the mesic flatwoods in the park may have a dense to open canopy, with the fire-suppressed areas being overly dense. Due to timber harvests that occurred prior to state management, some areas have a lower density of adult pines, with little pine regeneration. However, natural stands of uneven-aged longleaf pines and slash pines (*Pinus elliottii*) may be present. Pond pine (*Pinus serotina*) also occurs in some mesic flatwoods areas that are adjacent to wet flatwoods, but predominantly where there has been a lack of frequent fire. Fuel loading is very high in areas that have not been burned recently.

Frequent use of prescribed fire and mechanical treatments such as mowing, roller-chopping and fuel reduction harvests are critical to sustaining restoration efforts in the mesic flatwoods. In the past, it was found that roller-chopping or mowing during the growing season produced an ecological response similar to that of growing season burns. Mechanically treated areas were burned one growing season later in order to achieve significant restoration while reducing fuels and stimulating herbaceous species at optimal reproductive times. A few areas of mesic flatwoods will require longleaf pine plantings to restore overstory that was lost to past wildfires and timber harvests prior to state management. Conversely, there are numerous areas of mesic flatwoods that would benefit from concurrent pine thinning and off-site hardwood removal before undertaking other resource management activities. Remnant shrub and herbaceous components are still present in these areas, which should reduce the need for enhancement plantings of native groundcover species.

Sandhill

Pockets of sandhill in the park occur in isolated areas of higher elevation containing yellow sand. The sandhills grade into mesic and scrubby flatwoods. Sandhills are currently in a degraded state due to past exclusion of fire and subsequent encroachment by scrub oaks from neighboring scrubby flatwoods. Scattered remnant longleaf pines are present in several areas of sandhill, but, due to past timber harvests, the longleaf pines are at lower densities than would naturally occur and regeneration is poor in many areas. Midstory species such as turkey oak have become more thickly established than is typical for sandhills, probably due to the lack of fire prior to state management. Remnant individuals of herbaceous sandhill species such as wiregrass, bluestem, lopsided Indiangrass and narrowleaf silkgrass

(*Pityopsis graminifolia*), as well as ground lichens (*Cladonia* sp.), are evident throughout the sandhill areas. Populations of gopher tortoises (*Gopherus polyphemus*) are denser in the sandhills than in other natural communities in the park. Most of the sandhills are improving to fair to good condition due to recent mechanical fuel treatments and prescribed fires.

Sandhill restoration in the park is relatively straightforward. It consists of instituting a more natural fire regime along with planting of longleaf pines and selective removal of hardwoods to halt the transition into successional hardwood forest in zones 2D, 2En, 2M and 4E. Locally collected seeds of a variety of herbaceous species may need to be planted in the sandhills to supplement sparse fine fuels and needle cast and re-establish a sufficiently dense groundcover that prescribed fires will be able to pass through.

Scrubby Flatwoods

The scrubby flatwoods community mainly occurs in the eastern half of the park on scattered, slightly elevated sandy knolls within an expansive matrix of mesic and wet flatwoods. The typical shrub components such as myrtle oak, sand live oak, Chapman's oak and staggerbush (*Lyonia fruticosa*) are present at densities and heights that are greater than desired, leaving little to no bare ground or areas open enough for herbaceous growth. Previously harvested scrubby flatwoods lack a longleaf pine overstory, but longleaf regeneration is occurring in some areas. Most of the scrubby flatwoods in the park are in relatively good condition, but there is a need for more frequent fire and other fuel management techniques such as mowing, roller-chopping and selective herbicide use to reduce hardwood densities and create open patches of bare ground.

The scrubby flatwoods community doesn't require much to restore it to the desired future condition. For areas that are currently in poor to fair condition, multiple treatments of mowing and/or roller-chopping, followed by prescribed fire, may be needed to restore the vegetation to the proper condition. Planting longleaf pine seedlings may also be necessary in areas that lack nearby seed trees.

Shell Mound

Limited areas of shell mound exist within the park. These mounds are associated with shell middens that accumulated near human use areas over the millennia, usually along tidal creeks or other waterbodies. The shell mounds are in a dynamic area in the sense that tidal actions and sea level rise can significantly disturb them. Plant roots provide them with some protection, but excessive root development can disturb the integrity of the shell heap when roots are torn out of the ground during storms or human disturbance. The shell mounds in the park are currently in fair to poor condition, but they are likely to decline further over time.

The shell mound areas that still have significant onsite cultural resources should be monitored at least yearly to evaluate mound stability and any trends in vegetation loss/erosion and/or human disturbance. If invasive plants are observed on a mound, they should be removed in such a way as to avoid disturbing any subsurface resources. Dead trees will be treated in a similar fashion to limit ground disturbance. To improve protection of these vulnerable resources, park staff should inform appropriate law enforcement personnel about locations of mounds and encourage more frequent patrols.

Wet Flatwoods

The wet flatwoods community in the park is restricted to lower, less well-drained elevations within the flatwoods gradient. It typically occurs in bands around cypress domes and basin swamps, in isolated depressions and in low drainageways leading toward alluvial forests and blackwater streams. The soils in the wet flatwoods tend to be darker and richer in organics than in the adjacent mesic flatwoods.

Wet flatwoods areas in the park have pond pine, slash pine and a few longleaf pines forming a dense canopy. These pines are generally larger in diameter at breast height (DBH) and height than in the other natural communities in the park, possibly due to richer soils or to exclusion from past timber harvests during higher water levels. Due to a history of fire suppression, the gallberry, fetterbush, saw palmetto, loblolly bay and wax myrtle components are very dense, and heights reach 5 to 7 feet on average. Native herbaceous groundcover is very sparse due to the increased shrub density. In some areas, due to lack of fire, the wet flatwoods community is transitioning into a baygall community with dense stands of bay trees, some of which are invading surrounding uplands. However, the overall condition of the wet flatwoods in the park is good.

As with scrubby and mesic flatwoods, the wet flatwoods will benefit greatly from increased application of prescribed fire. It may be necessary to use mechanical treatments such as mowing to allow for safe burning in areas of high fuel heights. In areas having an overly dense canopy, thinning of timber for restoration purposes should be considered. Historic plow lines should be rehabilitated as they are discovered during other restoration activities such as thinning or mowing. Staff should try to arrange for plow lines to be rehabilitated immediately after their purpose has been served.

Alluvial Forest

The most extensive floodplain system in the park is associated with Clapboard Swamp, west of Boney Road. In floodplain areas, it is often difficult to distinguish alluvial forest from floodplain swamp or bottomland forest. However, the three communities do differ topographically in that alluvial forest lies slightly above floodplain swamp but below bottomland forest. That elevational difference causes alluvial forest to have a hydroperiod intermediate between that of floodplain swamp and bottomland forest. Most of the alluvial forests in the park are in relatively good condition today, but they probably were selectively logged in the past.

Alluvial forests should be managed as part of the whole riverine system. Natural hydrological functions need to be protected to maintain the health of adjacent floodplain communities and downstream systems. Altered habitats in vicinity of the alluvial forest should be restored to a natural state in order to mitigate erosion sites that may exist and to maintain natural hydroperiods. Other measures will include control of invasive exotic plants and removal of feral hogs (*Sus scrofa*) as needed.

Basin Swamp

The numerous basin swamps in the park tend to be in lower elevation depressions within flatwoods communities. The basin swamps often occur as chains of depressions along a shallow gradient. During high water events, water often flows between adjacent swamps. The larger swamps contain pond cypress, with smaller numbers of swamp tupelo and red maple present. Although larger cypress was logged from the swamps in the past, these forested wetlands remain in good condition.

Increased exposure to prescribed fire at different water levels would benefit basin swamps in the park. To reduce the fire shadow effect that can occur along the edges of these embedded wetlands, prescribed fire teams should use different firing techniques and wind directions when applying fire to the upland communities that surround the basin swamps. In areas that lack a fire history, pine removal projects have been employed in the past to eliminate the encroaching pine overstory. Park staff should evaluate additional basin swamps for possible canopy reduction designed to open up overgrown areas and encourage development of a lush herbaceous component. Staff should also assess the feasibility of rehabilitating historic plow lines that lead to or cut through basin swamps. Elimination of these plow lines would help restore the natural flow of surface water through the basin swamps.

Baygall

The baygall community that has developed in low drainage areas in the park has an overstory of loblolly bay and sweet bay. The most dominant understory species is fetterbush, which creates dense thickets that are tangled with smilax vines. The three baygalls in the park are located within a matrix of uplands that have been previously harvested and are severely fire suppressed.

As with other wetlands, the baygalls are best managed at the landscape level by maintaining high quality uplands around the community and by allowing prescribed fires to penetrate wetland ecotones when conditions are acceptable. In areas that have been fire suppressed, it may be necessary to mechanically remove encroaching bay trees that have invaded adjacent uplands. Additional examination of existing baygalls in the park will be necessary to determine if they are true baygalls or perhaps some other community types that have succeeded into baygalls because of past timbering and fire suppression.

Bottomland Forest

Bottomland forest occurs only in the Clapboard Swamp area in the northwestern corner of the park. The bottomland forest lies slightly upslope of the floodplain on a relatively flat plateau that floods infrequently. Most areas that are adjacent to floodplain swamps and alluvial forests in this part of the park contain mesic or wet flatwoods that are maintained by periodic fire, but the bottomland forest lies in a natural fire shadow and is protected from fire by adjacent floodplain swamp, basin swamp and hydric hammock.

The best way to manage bottomland forest is to allow natural hydrological processes to take place and to monitor for the occurrence of invasive species. Since the wetland communities in the Clapboard Swamp area are all interconnected, singling out the bottomland forest for management by itself will not be feasible. Instead, all the hydrophytic communities in the area will be managed as one conglomerate. As future planned developments north of the park become a reality, changes in sheetflow and sediment deposition in the bottomland forest will occur. These changes will need to be monitored and analyzed to determine what negative effects, if any, they may have on wetlands in the Clapboard Swamp system.

Depression Marsh

Depression marshes are scattered throughout the flatwoods at Pumpkin Hill Creek Preserve State Park. Though usually dominated by herbaceous plants, some of these depression marshes contain scattered hardwoods and small cypress trees. These species have likely invaded the marshes due to lack of frequent fire. Marshes that have gone too long without fire often have pine and palmetto encroachment along the ecotone. However, most of the depression marshes are in good to excellent condition. Hooded pitcher plants often grow on the fringes of the depression marshes. The marshes also likely serve as critical habitat for various amphibian species that require ephemeral wetlands as breeding sites. Rooting damage in the depression marshes indicates that there is a dense population of feral hogs in the park. Efforts are being taken to reduce feral hog numbers.

Continued feral hog removal and the frequent application of fire in the uplands will greatly benefit the depression marshes. Fire should be applied at multiple water levels and allowed to move through the whole depression marsh on occasion to remove organic buildup. For marshes having a thickly vegetated edge, staff should consider mechanically treating at least 75% of the edge and follow up the treatment with prescribed fire to improve fossorial amphibians' access to these ephemeral wetlands. As plow lines are encountered in and around depression marshes, they should be rehabilitated so that natural sheet flow of surface waters in the area is restored.

Dome Swamp

Several domes occur within the park. Although it is often difficult to differentiate between a small basin swamp and a large dome swamp, the cypress swamps in the park that are mapped as dome swamps conform to the classic description of that natural community. These dome swamps are nearly circular in shape, with the larger cypress trees closer to the center. At least one dome has an open depression marsh in the center. The dome swamps in the park are in good to excellent condition.

It is important to maintain natural hydroperiods in dome swamps. Where plow lines have altered natural hydrological function in dome swamps to the detriment of cypress trees, the lines will be rehabilitated as soon as they are no longer necessary. Wherever possible, fires will be allowed to move through the dome swamps and extinguish on their own since fire is an important facet of dome swamp ecology.

Floodplain Swamp

Floodplain swamps in the park occur in association with several blackwater streams that originate in or pass through the park and channel fresh water to tidal creeks and estuarine systems outside. Like the adjacent alluvial forests, the floodplain swamps are in good condition. Floodplain swamps and alluvial forests both have relatively diverse assemblages of plants. The floodplain swamps in the park are dominated by bald cypress and hardwoods such as swamp tupelo, sweetgum and red maple.

The floodplain swamps need protection from landscape alterations that may affect their hydrological function. Construction of low water crossings in areas where fire lines cross the swamps will help mitigate impacts of existing alterations. Coordinating with the Florida Forest Service in determining appropriate locations to establish plow lines in the event of wildfires will be beneficial as well. Other measures will include controlling invasive plants and removing feral hogs as needed.

Hydric Hammock

Several areas of hydric hammock occur at Pumpkin Hill Creek Preserve State Park in association with blackwater stream systems. The hydric hammocks occupy slightly higher areas adjacent to alluvial forests and floodplain swamps. Live oaks and sabal palms are the dominant trees. Hydric hammocks flood infrequently but derive most of their hydrological input from upslope seepage and precipitation. Bottomland forests, in contrast, get most of their hydrological input from the flooding of blackwater streams (Vince et al. 1989). To date, the only hydric hammock in the park to have experienced fire is that bordering the floodplain swamp along an unnamed blackwater stream in zones 2Fe and 2Gw. Fire intensity in the northern portions of the hydric hammock was high, while the fire in the southern portions was less intense, creeping through the understory and leaf litter until it went out naturally. Plow lines were put in toward the edge of the hydric hammock, but not through it, to contain the fire. This area of hydric hammock lacks the red cedar component found in the hydric hammocks that are associated with Clapboard Swamp and Bogey Branch. In fact, it is more like wet flatwoods in composition. Additional prescribed fire may reveal that it is actually an area of wet flatwoods that has been invaded by hydric hammock species due to lack of fire.

When uplands adjacent to hydric hammocks are burned, fires should be allowed to creep into the hammock ecotone and go out on their own. The frequency of fire in the ecotone is determined by the presence of pyric species along the edge and by the relative proportion of pines in the canopy. Existing firebreaks that cut through the hydric hammock and associated communities should be at grade, without a shoulder edge that could alter sheetflow during heavy rain events. The plow lines that already exist in zone 2Fe should be restored to natural grade to allow for natural regeneration of vegetation. Feral hogs, which tend to prefer the hydric hammock community, should be strictly controlled to reduce soil disturbance and allow for development of more diverse groundcover.

Salt Marsh

Limited areas of salt marsh occur within the boundaries of the park. Most of the salt marsh lies just outside the park within the Nassau River-St. Johns River Marshes Aquatic Preserve, which borders Pumpkin Hill Creek Preserve State Park on three sides. High quality salt marsh within the park is associated with Fitzpatrick Creek, Bogey Branch, Clapboard Creek and Pumpkin Hill Creek, as well as smaller unnamed tidal creeks. Due to recent higher tides and increased storm action within salt marshes on the south side of the park, the three small islands that lie between the mainland and Hog Plumb Island are beginning to transition into salt marsh as they are invaded by species such as saltmarsh cordgrass. The salt marsh provides important breeding habitat for the imperiled Worthington's marsh wren (*Cistothorus palustris griseus*) and MacGillivray's seaside sparrow (*Ammospiza maritimus macgillivraii*) (NeSmith and Jue 2003).

In the past, prescribed fires within the park have only been allowed to creep into the salt marsh along Pumpkin Hill Creek. The salt marsh fringe there is included in fire prescriptions for adjacent upland zones to reduce the potential for wildfires and to remove thatch buildup. The use of prescribed fire in other areas of salt marsh in the park should be considered while ensuring that moisture levels are adequate to reduce the potential for soils to ignite. Severe feral hog damage has been noted in the salt marsh in the past, so staff will likely need to monitor and remove feral hogs in the future.

Natural Communities (in acres)

- AF - Alluvial Forest 75.24
- AP - Artificial Pond .05
- BF - Bottomland Forest 18.85
- BG - Baygall 11.96
- BS - Basin Swamp 212.68
- BST - Blackwater Stream 4.84
- CD - Canal/ditch 1.11
- CDLK - Coastal Dune Lake 3.61
- CL - Clearing/Regeneration 0.69
- CS - Coastal Strand 6.38
- DM - Depression Marsh 52.17
- Dome Swamp 16.19
- DV - Developed 4.89
- EUS - Estuarine Unconsolidated Substrate 4.27
- FPLK - Flatwoods/Prairie Lake 4.94
- Floodplain Swamp 163.00
- HH - Hydric Hammock 193.37
- MAH - Maritime Hammock 138.29
- MF - Mesic Flatwoods 1877.10
- PP - Pine Plantation 177.60
- SAM - Salt Marsh 21.80
- SCF - Scrubby Flatwoods 464.10
- SH - Sandhill 201.66
- SHF - Successional Hardwood Forest 50.62
- SHM - Shell Mound 2.35
- WF - Wet Flatwoods 609.23

INSET

SEE INSET

PUMPKIN HILL CREEK PRESERVE STATE PARK
Natural Communities - Existing Conditions

N

0 2,000 4,000 Feet

Sources: ESRI; Florida Department of Environmental Protection

Natural Communities
- AF - Alluvial Forest
- BF - Bottomland Forest
- BG - Baygall
- BS - Basin Swamp
- BST - Blackwater Stream
- CDLK - Coastal Dune Lake
- CL - Clearing/Regeneration
- CS - Coastal Strand
- DM - Depression Marsh
- DS - Dome Swamp
- DV - Developed
- EUS - Estuarine Unconsolidated Substrate
- FPLK - Flatwoods/Prairie Lake
- FS - Floodplain Swamp
- HH - Hydric Hammock
- MAH - Maritime Hammock
- MF - Mesic Flatwoods
- SAM - Salt Marsh
- SCF - Scrubby Flatwoods
- SH - Sandhill
- SHM - Shell Mound
- WF - Wet Flatwoods

INSET

SEE INSET

PUMPKIN HILL CREEK PRESERVE STATE PARK
Natural Communities - Desired Future Conditions

N

0 2,000 4,000 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.

Coastal Dune Lake

The coastal dune lake at Pumpkin Hill Creek Preserve is in zone 4Fw in the Clapboard Creek area. Assessment of historic aerial photographs illustrates that inflow from adjacent salt marshes occured during storms such as Hurricane Matthew in October 2016. The coastal dune lake, which is mostly open water, is used by wading birds such as the wood stork (*Mycteria americana*), great egret (*Ardea alba*) and great blue heron (*Ardea herodias*). Marshelder (*Iva frutescens*), groundsel tree and various rushes form a fringe of vegetation.

Coastal dune lakes are extremely vulnerable to hydrological alterations. Excessive groundwater withdrawals could lower local water tables and increase the salinity of the lake. Degraded water quality could have a devastating effect on fauna and flora in the coastal lake community, so groundwater sources should be regularly monitored for signs of pollution.

Flatwoods Lake

Several flatwoods lakes occur within the park. Flatwoods lakes are like depression marshes and in fact may succeed toward depression marsh as they fill in with organics. In general, flatwoods lakes tend to be deeper and have larger open water zones than depression marshes. They are less likely to dry up on a regular basis, but they share many of the same species. The flatwoods lakes in the park are in excellent condition.

During prescribed fires within adjacent fire-dependent uplands, fires will be allowed to move into the edges of the flatwoods lakes. Wildfires in surrounding uplands impacted the flatwoods lake in Zone 4E in 2015 and 2016. Minimal plow lines were cut in the area, but these should be rehabilitated to mitigate any alterations of natural sheet flow that might have occurred.

Blackwater Stream

Four blackwater streams drain most of the park's freshwater wetlands into the Clapboard Creek system and ultimately into the St. Johns River. One of these blackwater streams, the upper portion of Fitzpatrick Creek, was altered in the past when it was channelized, and culverts were installed. Another blackwater stream, this one associated with Bogey Branch, originates in the park but then flows through some private outparcels, exiting and re-entering the park at least twice before eventually emptying into Clapboard Creek.

Most of the blackwater streams within the park appear to be in good condition, however the quantity of water quality data for surface waters in the park is inadequate for accurate evaluation of their health. In comparison, a high percentage of the surface waterbodies south of the park are known to be impaired for numerous parameters, including fecal coliforms. Another concern is feral hog rooting along the banks of some of the streams in the park.

The blackwater streams within the park are minimally disturbed except in areas where they leave or enter the park or connect to other surface waters. In areas where the blackwater streams run adjacent to roads or developments or connect to other surface waterbodies, stormwater runoff pollutants or other contaminants are likely to accumulate. These areas should be monitored routinely. Feral hogs will be removed as quickly as practical.

Estuarine Unconsolidated Substrate

The limited occurrence of this important estuarine community within the park consists of three significant tidal creeks (Boney, Fitzpatrick and Pumpkin Hill) that are intimately linked to the region's vast salt marsh system. Most of the estuarine tidal creeks within the park have mud substrates, although some areas may have limited amounts of sand deposition derived from adjacent uplands. The tidal creeks also have extensive supratidal mud flats that are important feeding areas for wading birds and shorebirds.

Where this community occurs in the park, it appears to be in good condition. Nonetheless, it is important to note that the state of Florida has declared many waterbodies south of the park to be impaired for numerous parameters.

Like salt marsh, this community can be resilient to ecosystem stressors and require little active management other than periodic checks for damage from storms or human activity. However, contamination of estuarine unconsolidated substrate by heavy metals, oils and pesticides, or high nutrient inputs from nearby upland developments or from distant interconnected watersheds, can become problematic and impact the local food web.

Canal/Ditch

Three significant ditch alterations took place in the park before the state acquired the property. These alterations have affected Pumpkin Hill Creek in zone PH-3Cn, Fitzpatrick Creek in zone PH-4E and a basin swamp in the Caldwell Tract in zone PH-6B.

The Pumpkin Hill Creek ditch extends between Pumpkin Hill Creek and Pumpkin Hill Road. The Fitzpatrick Creek canal drains freshwater wetlands that are located north of Cedar Point Road in zone PH-2J southward through a channelized ditch into the Fitzpatrick Creek system outside the park. The exact extent of the historic disturbance of this creek above and below Cedar Point Road remains unknown. The Caldwell Tract ditch was excavated around the perimeter of a basin swamp in zone PH-6B, apparently in the mid-1990s, to drain the area for silvicultural purposes, specifically a pine plantation.

A plan for restoring the Caldwell Tract ditch should be incorporated into an overall restoration plan for the whole tract (zones PH-6B, PH-6C, and PH-6D). All ditches within the park will need to undergo hydrological assessment before it can be determined what restoration efforts will be necessary.

Developed

Developed areas consist of natural communities that have been replaced or nearly replaced by structures or permanently cleared areas. At Pumpkin Hill Creek Preserve State Park, these areas include roads, parking areas, an office, a shop and residences. There are no current plans to convert any of the developed areas back to their original natural communities. Resource management in the developed areas will focus on removal of all priority invasive exotic plants (Florida Exotic Pest Plant Council Category I and II species). Maintenance of current facilities and the design of any future developments

will continue to be done so that they are compatible with prescribed fire management in adjacent natural areas.

Impoundment/Artificial Pond

In zone 1W, about 0.05 acres of a small, private artificial pond that was dug at an unknown date accidentally extends across the property line into the park.

Pine Plantation

Four distinct pine plantations exist in the park in areas known as the Wallace Tract, Caldwell Tract, North Shore Tract and Black Hammock Island. The pine plantations were all planted with slash pines at dense stocking rates.

The Wallace Tract plantation in zones 5Ms and 5Pw in the southwestern part of the park consists of 22.1 Please confirm accuracy.

acres of third-row-thinned slash pines with a basal area of approximately 90 square feet per acre. The area was planted in 1980 and third-row-thinned in 1999. The area is generally in good condition, with appropriate species composition present. Selectively thinning the stand to achieve a more natural appearance and reintroducing fire should be the only management needs for the Wallace Tract.

The Caldwell Tract is in the center of the park along Boney Road in zones 6B, 6C and 6D with a basal area of 135 square feet per acre. The Caldwell Tract was privately owned and planted in 1997 with bedding techniques. The area was previously heavily infested with numerous invasive species and still contains many infestations to be removed. A man-made ditch system was added around the time of the plantation either for draining the area or for recreational purposes. The area has very distinctive wetland and wet flatwoods species growing within and around the existing plantation.

The North Shore Tract (also referred to as the 4-block) is actually located south of Cedar Point Road. The northern band of management zones (located immediately south of Cedar Point Road) is slightly higher in elevation and largely consists of sandhill with a mature overstory of on-site longleaf pine. Overstory basal area is considered appropriate within this northern belt of longleaf pine, precluding any need for timber management. Management zones 4Aw and 4Ae were successfully prescribed burned following understory fuel height reduction in 2022 and 2023 respectively. Identical prep and burning is planned for management zones 4C and 4Dn in 2024.

The remainder of the 4-block was planted with slash pine in 1991. This remaining (southern area of the North Shore Tract) underwent heavy pine thinning in 2013 as part of the North Shore Tract Restoration Plan. Three small patches were excluded from the restoration efforts due to soil moisture conditions at the time of harvest or because of the relative isolation of the patches. These three non-thinned areas are in zones 4Fc, 4Fn, 4Fw, 4Be, and 4Dw. Since 2013 the overall harvest area has experienced heavy slash pine regeneration with dense clumps of even-aged pines ranging from less than 1 acre to several acres in size. In other areas, the understory is heavily overgrown with small oaks and other woody shrubs. Mechanical reduction of understory fuels via roller chopping or forestry mulcher (the latter used to shred fuels – not mulch) is recommended as the initial management measure to mitigate hazardous live fuel heights and greatly improve horizontal fuel continuity and receptivity to fire, prior to burning.

Given the density of off-site (undesirable) hardwoods, a broadcast herbicide application (appropriately timed as hardwoods begin to coppice post fire) is recommended. Mowing and burning alone will likely fail to significantly shift species proportions in favor of grasses and forbs – a condition necessary if longleaf pine seedlings are to be eventually re-introduced into this southern portion of the North Shore Tract. The success of longleaf pine plantings is entirely dependent upon effectively reducing hardwood competition for sunlight and nutrients.

Successional Hardwood Forest

Successional hardwood forest is a closed canopy forest dominated by fast-growing hardwood species such as laurel oak (*Quercus hemisphaerica*), water oak (*Quercus nigra*) and sweetgum (Liquidambar styraciflua), with remnant pines mixed in. The successional hardwood forest in the park occurs due to previous timbering and subsequent planting of slash pines without the use of fire to maintain the uplands. The understory consists of American beautyberry (*Callicarpa americana*), saw palmetto (*Serenoa repens*), sparkleberry (*Vaccinium arboreum*) and muscadine (*Vitis rotundifolia*). The very few remnant groundcover species include wiregrass (*Aristida beyrichiana*), witchgrasses (*Dicanthelium* spp.) and bluestems (*Andropogon* spp.).

Park staff attempted to restore a portion of what was considered to be successional hardwood forest in zones 4Bw and 4Bn to determine if the area was really successional hardwood forest or perhaps upland hardwood forest instead. When vegetation and soil samples in the restoration plots were compared with those in adjacent mesic flatwoods and sandhill, it was determined that the plots most closely resembled successional hardwood forest. It is recommended that staff continue with restoration of the remaining successional hardwood forest in zones 4Bw, 4Fc, 4Fn, 4Bn, and 4As by thinning the hardwood canopy, treating stumps of the cut trees and reintroducing fire. There is an additional area of successional hardwood forest in zones 3De and 3Dw that is in similar condition. Planting longleaf pines may be necessary. The park biologist should monitor groundcover recovery to determine if supplemental plantings of wiregrass and other appropriate herbaceous species will be required.

Objective A: Within 10 years, have 2,268 acres maintained within the optimum fire return interval.

- Action 1 - Develop/update an annual prescribed fire plan.
- Action 2 - Manage fire dependent communities by burning between 756.78 and 2,562.9 acres annually.

Table 5 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)**
Sandhill	201.58	1-3
Mesic Flatwoods	1877.02	1-4
Scrubby Flatwoods	464.4	3-8
Wet Flatwoods	609.63	2-4
Depression Marsh	49.36	2-5

Prescribed Fire Management		
Natural Community	**Acres**	**Optimal Fire Return Interval (Years)**
Annual Target Acreage	756.78 – 2562.90	

The landscape at Pumpkin Hill Creek Preserve State Park is dominated by natural communities that require fire to maintain their ecological integrity, making prescribed fire the park's most important resource management tool. Application of safe and effective prescribed fire in the park must consider the rapidly expanding development on the north side of the city of Jacksonville. Interstates 95 and 295 and the Jacksonville International Airport are all within 15 miles of the west section of the park. Sheffield Elementary School and numerous suburban communities have been developed near the park in the last 10 years, with more planned in the future.

An additional compounding factor is the easterly sea breeze that develops at varying times during the day, which makes smoke management particularly difficult. Wind shifts are common during the daily convergence of sea breeze and land breeze. Further complicating the prescribed fire program at the park is the network of wetlands within the flatwoods that can limit all-weather access. Heavy rains can make many fire lines impassable in the wet flatwoods and in natural drainage areas. DRP has placed a high priority on improving the system of fire lines including the addition of low water crossings where necessary. All existing fire lines along the park perimeter have been widened to enhance safety during prescribed fires and to help prevent the spread of wildfires into or out of the park. In 2015, a large-scale project at the park increased the width of the mineral soil fire lines and created an additional mowed, vegetated edge along 54.4 miles of firebreaks. An additional 3 miles of new firebreaks were installed.

It is important for fire managers to recognize that the overwhelming majority of the park is dominated by shrub fuels. In most areas, there is very little fine fuel to carry a backing fire (under acceptable weather parameters). Attempting downwind ignition (i.e. blacklining) in these high/dense shrub fuels will inevitably prove both difficult and frustrating, tempting the use of flanks and narrow strip-heads to achieve the necessary "black line". This approach will consistently produce high intensity fires that will result in frequent escapes. To burn safely and effectively, dense shrubs need to be mechanically reduced 30 to 60 feet interior of adjacent fire lines. This precursory measure significantly reduces the risk and complexity of the blacklining operation by creating a low, contiguous, cured fuel bed where backing fire can be effectively utilized.

Post-burn growing season follow up within the mechanically treated strip should include a broadcast herbicide treatment to impede the recovery of the dense shrub layer (particularly if the zone will not be burned again for several years). A broadcast application of 9-10% Triclopyr with appropriate non-ionic surfactant will effectively reduce the density of woody shrubs while avoiding impacts to existing grasses and regenerating pines.

Preparation and planning for wildfires or escaped prescribed fires within the park should be components of the prescribed fire plan. Preferred fire suppression techniques and guidelines should be identified and discussed with local Florida Forest Service (FFS) staff as a component of pre-planning. Sensitive

resources such as wetlands, imperiled species and cultural sites should be identified and mapped, and that information should be conveyed to FFS prior to any suppression activities.

Fire season and fire return intervals are critical components of a fire regime. In most cases, the goal is for fires to be conducted during the natural lightning season. However, dormant season fires are favorable for initial fuel reduction, when values at risk require highly specific wind directions, and as a last resort to prevent a zone from going into backlog status. Fire managers need to remain flexible, with the goal of not missing opportunities to burn in areas with constraining factors.

Fire-dependent natural communities at Pumpkin Hill Creek Preserve State Park include mesic flatwoods, wet flatwoods, scrubby flatwoods, sandhills and depression marshes. Basin swamps, dome swamps, baygalls, maritime hammocks and salt marshes are fire-influenced to a lesser degree, and prescribed fires in adjacent uplands should be allowed to enter those communities to better maintain their ecotones. Fire return intervals listed by the Florida Natural Areas Inventory (FNAI) are good guidelines for managing fire-dependent communities in general, but they are too long for natural communities at the park due to local growing conditions. Generally, fire should be applied to the park's fire-type communities at least once every three years. If that frequency is not achievable, for safety reasons it may be necessary to mow or roller-chop zones before attempting to burn them. The mesic flatwoods natural community dominates the park landscape. The other fire-dependent and fire-influenced communities in the park are basically embedded in an expansive mesic flatwoods matrix. Due to the intermingling of natural communities, some communities in the park will end up burning more frequently than their standard recommended fire return interval.

Duff moisture content is an important consideration in wet flatwoods, mesic flatwoods and baygall ecotones. Field checks of moisture content in duff layers throughout the zones should be conducted prior to a prescribed fire to ensure that the moisture content is adequate. This is critical for preventing loss of pine overstory due to fires smoldering in deep duff, as well as for smoke management. Accumulated duff should be burned off gradually, not exceeding 1 inch of depth on average with each burn. When possible, the sandhill, mesic flatwoods, scrubby flatwoods and wet flatwood zones in the park should be burned during the growing season once the initial fuel reduction burns have been completed. The depression marshes should be incorporated into burns of surrounding natural communities, but only under conditions which will prevent muck and duff deposits from igniting. This precaution is necessary to reduce risks of prolonged smoke production.

Prescribed fire is planned for each burn zone at the appropriate interval. The park's prescribed fire plan is updated annually because fire management is a dynamic process. To provide adaptive responses to changing conditions, fire management requires careful planning based on annual and very specific burn objectives. Each annual prescribed fire plan is developed to support and implement the broader objectives and actions outlined in this 10-year unit management plan.

Based on fire return intervals and acreage figures for the natural communities in the park, optimally at least 757 acres should be burned each year to maintain the communities within their target fire return intervals. Staffing, funding and weather conditions will influence the ability to keep natural communities within their optimal fire return intervals. Not all zones will be burned within their maximum

recommended fire return intervals, while others may be burned more frequently. Some fire-type acres will be unavailable for burning until conditions within the management zone improve. It will be important for park staff to monitor the results of their management practices. Post-fire evaluations that include the review of established photo points should be conducted to assess progress in meeting restoration goals and to determine if management practices need to be adapted.

Fire-dependent wildlife species in the park include the gopher tortoise, eastern diamondback rattlesnake, striped newt, northern bobwhite (*Colinus virginanus*) and wild turkey (*Meleagris gallopavo*). These species favor areas where regular fire has enhanced their preferred habitat, which is essentially an open-canopied woodland with an abundant and diverse groundcover consisting of mixed herbaceous and woody species. To improve all flatwoods areas in the park to the point that they once again become attractive to fire-dependent wildlife, it will be necessary to modify habitat structure in the remaining overgrown areas using a combination of mechanical treatment and fire.

Objective B: Conduct habitat/natural community restoration activities on 51 acres of successional hardwood forest.

- Action 1 - Develop/update a site-specific restoration plan for 51 acres of successional hardwood forest to be restored to sandhill, mesic flatwoods, and scrubby flatwoods.
- Action 2 - Implement the restoration plan.
- Action 3 - Monitor the progress of the restoration, including the native groundcover and shrub components.

A portion of the successional hardwood forest in zones 4Bn and 4Bw was included in the North Shore Tract Restoration Plan as a "test area." When the test area of successional hardwood forest was investigated, remnants of the original sandhill and mesic flatwoods natural communities were identified. Not only should the park undertake restoration of the natural communities in the test area, it should also treat the remaining successional hardwood forest zones similarly (i.e., zones 4As, 4Bn, 4Bw, 4Fc, and 4Fn in the North Shore Tract and zones 3De and 3Dw in the northeast part of the park near Pumpkin Hill Creek).

Conversion of the successional hardwood forest to the original pineland communities will require a "fuel wood" harvest to remove the off-site hardwoods. Herbicide treatment of stumps after the hardwoods are removed will be necessary to reduce the amount of re-sprouting. The seed bank for representative groundcover and understory species will need to be monitored. Supplemental seeding and/or plantings of groundcover species may be necessary. Longleaf pine seedlings should be planted at 400 trees per acre once the area becomes suitable for planting. Park staff will need to monitor the progress of the hardwood treatment efforts. Supplemental chemical and mechanical treatments will occur as needed to achieve effective control of offsite hardwoods. Monitoring requirements will include checking for native groundcover survival and for possible re-establishment of off-site hardwoods. Hardwood sprouts will likely require multiple treatments. Prescribed fire will be an integral part of the restoration project, particularly growing season fire.

Objective C: Conduct habitat/natural community restoration activities on 66.4 acres of pine plantation.

- Action 1 - Develop/update a site-specific restoration plan for each of the three pine plantations: the Wallace Tract, Caldwell Tract and North Shore Tract.
- Action 2 - Implement the restoration plans.
- Action 3 - Monitor the progress of restoration, including the native groundcover and shrub components.

The Wallace Tract should be the simplest of the three pine plantation sites to restore. The tract needs selective thinning to provide a basal area of 20-80 square feet per acre. Trees having the strongest crowns and lacking adverse health conditions should be left standing, while the weaker, unhealthy trees should be harvested. Park staff will need to follow up the harvest with prescribed fire, which will be on a regular schedule at the appropriate fire return interval.

The Caldwell Tract will need a more elaborate restoration plan, which will begin with the removal of non-native plant species. Additionally, the site will need to be investigated more to determine what natural communities existed there historically and what the restoration goals should be. There are many places within the planted pine area that host species commonly found in hydric natural communities (e.g., red maple, pond cypress, and fetterbush). Hydrological alterations caused by the man-made ditch system will also need to be corrected and included in the overall restoration plan. This multi-phased restoration project should be a high priority as it will take many years to accomplish.

The pine plantations in the North Shore Tract that have not yet been thinned (zones 4Fc, 4Fn, 4Be, and 4Dw) should be added to the ongoing North Shore Tract restoration project, with the same harvest techniques and monitoring plan specified. The zones should be thinned to attain a basal area of no less than 40 square feet per acre. Some number of larger trees having a DBH of 10 inches or greater should be left uncut. Underplanting with longleaf pine seedlings at 400 trees per acre should not be attempted until adequate control of competing hardwood vegetation has been achieved to ensure pine seedling survival.

Park staff will monitor the progress of the pine-thinning operations, as well as any hardwood treatments conducted. Supplemental chemical and mechanical treatments will occur as needed to achieve effective control of off-site hardwoods. Monitoring requirements will include checking for native groundcover survival and for signs of off-site hardwood re-establishment. Burn managers must remain flexible regarding seasonality as the entirety of the North Shore Tract is north wind dependent due to Cedar Point Road. Maintaining a fire return frequency of every three years is critical to success.

Objective D: Conduct natural community/habitat improvement activities on 1,775 acres of sandhill, mesic flatwoods, scrubby flatwoods and wet flatwoods to prepare zones for the safe application of prescribed fire.

- Action 1 – Mechanically treat (mow and/or roller-chop) a minimum of 60 feet into the burn zones from firebreaks to mitigate the height and structure of the standing live fuel load prior to applying prescribed fire.

- Action 2 - Mechanically treat (mow and/or roller-chop) palmetto and woody vegetation in zone interiors prior to applying prescribed fire as necessary to mitigate flame lengths and improve fuel consumption.
- Action 3 – Use appropriate herbicides and application rates to reduce shrubby hardwood regrowth and help restore more natural (woody versus herbaceous) proportions along fire lines. The intent is to establish a strip of largely herbaceous fuels that will readily carry backing fire away from the edge of the fire line with low intensity and minimal spotting.
- Action 4 - Harvest dense areas of off-site hardwoods.
- Action 5 - Thin pines as feasible to reduce basal areas to meet natural community specific ranges.

Mechanical treatment, followed by prescribed fire, will continue to be the most effective management approach for restoring upland fire-dependent communities and the wetlands embedded within them. Conducting hardwood harvests at the same time as the pine thinning will reduce disturbance and facilitate natural communities restoration. Chemical treatment of remaining hardwood stumps and/or re-qrowth will likely be necessary. Preserve staff will monitor hardwood re-sprouting in the treatment areas and repeat hardwood treatments as needed.

Objective E: Conduct natural community/habitat improvement activities on 26 acres of depression marsh and basin swamp.

- Action 1 - Remove encroaching pines and off-site hardwoods from depression marshes and basin swamps.
- Action 2 - Repair plow lines that alter natural hydrologic functions of depression marshes and basin swamps.

Develop a sensitive, feasible methodology for removing pines and hardwood shrubs that have invaded depression marshes and basin swamps in the park, particularly where hooded pitcher plants occur. Rehabilitate plow lines that demonstrably alter the natural sheet flow of surface waters from upland communities into depression marshes and basin swamps.

IMPERILED SPECIES

Imperiled species are those that are (1) tracked by FNAI as critically imperiled (G1, S1) or imperiled (G2, S2), or (2) listed by the U.S. Fish and Wildlife Service (USFWS), Florida Fish and Wildlife Conservation Commission (FWC) or the Florida Department of Agriculture and Consumer Services (FDACS) as endangered, threatened or of special concern.

Several important tools have been created by FWC to assist with the conservation and management of Florida's highest priority imperiled wildlife species. These include a list of species of greatest conservation need (FWC 2012a). Additionally, FWC has developed a strategic statewide imperiled species management plan for Florida's imperiled species conservation and management (FWC 2016) as well as more specific species action plans.

Four imperiled plant species and 16 imperiled animal species have been recorded at Pumpkin Hill Creek Preserve State Park (see Table 2 below). Imperiled plants found at the park include pondspice (*Litsea*

aestivalis), blue butterwort (*Pinguicula caerulea*), hooded pitcher plant (*Sarracenia minor*), and rosebud orchid (*Cleistesiopsis divaricata*). The state-endangered rosebud orchid is listed as critically imperiled by FNAI. All the imperiled plant species in the park are adapted to a fire-maintained landscape and have suffered from previous fire suppression. Pondspice is additionally threatened by the spread of a non-native fungal agent (*Raffaelea lauricola*) that has caused large-scale die-offs of several plant species in the family Lauraceae (Fraedrich et al. 2008; USDA Forest Service 2010). Periodic monitoring has indicated that the pondspice in the park is only being partially impacted by this pest (Surdick and Jenkins 2010). All four imperiled plant species can occur throughout mesic flatwoods communities but are more often located at the ecotone margins between the flatwoods and lower elevation depression marsh, dome and basin swamp wetlands.

Continued use of prescribed fire, maintenance of natural hydroperiods and protection of wetlands from impacts of park operations and recreational activities are all vital tools for conserving these imperiled plants. It is important for the conservation of these species to avoid mechanical impacts (i.e. roads or firebreaks) within all transitional areas between wetlands and upland flatwoods. Additionally, prescribed fire should be allowed to burn into the ecotone margins of adjacent wetlands (Surdick and Jenkins 2010). Restoration measures (e.g., fire and selective hardwood removal) that are effective at reducing canopy density in fire-dependent natural communities will ultimately benefit groundcover species that require full sunlight.

Several imperiled animal species, including striped newt (*Noptophthalmus perstriatus*), Florida pine snake (*Pituophis melanoleucus mugitus*), gopher tortoise (*Gopherus polyphemus*) and eastern indigo snake (*Drymarchon couperi*) will also benefit from an active prescribed fire program.

As of 2017, no imperiled invertebrates were known within the park, however, there are several important species within the region, such as the frosted elfin (*Callophrys irus*), that are closely aligned with fire-dominated pine savannas and should be present. The specific effects of fire on invertebrate assemblages is largely unknown, but retaining a certain percentage of unburned refugia within suitable habitats, as well as adjustments to the frequency and seasonality of prescribed fires, appear to be critical elements for continued survival of many imperiled invertebrates (Schweitzer et al. 2011).

One important reptile species that deserves mention because of its rarity and the fact that it forages and nests within estuarine habitats adjacent to Pumpkin Hill Creek Preserve is the Carolina diamond-backed terrapin (*Malaclemys terrapin centrata*). This species has been designated by FWC as highly vulnerable and as a species of greatest conservation need in Florida (FWC 2012a).

The gopher tortoise is one of the better-known imperiled reptiles in Florida. Scientists recognize it as a keystone species of critical importance because hundreds of commensal species, mostly invertebrates, utilize their burrows as refugia (Jackson and Milstrey 1994). Tortoises typically inhabit well-drained sandy soils in a variety of upland habitats including the sandhill and mesic and scrubby flatwoods of the park. Because of its keystone status, the gopher tortoise is considered an indicator of upland natural community health (FWC 2012b). Prescribed fire is a vital tool to maintain tortoise habitat. In the absence of frequent fire, hardwood trees invade upland communities and shade out herbaceous plants required by tortoises for forage. FWC has adopted a statewide protocol for monitoring gopher tortoises based on a line transect distance sampling method (LTDS) (Smith et al. 2009). Any assessments of the status of gopher tortoise populations in the park should consider using this standard protocol.

The eastern indigo snake (*Drymarchon corais*) is a federally listed species that is becoming increasingly rare throughout its range due to loss and fragmentation of its critical habitat (Enge et al. 2013). Indigo snakes utilize gopher tortoise burrows as refugia and for thermoregulation, especially during periods of cold weather. Striped newts were first discovered in the park in 2006 in cooperation with an FWC initiative to determine the statewide status of this USFWS-candidate species. Subsequent monitoring for striped newts has been conducted, but no further records have been obtained. Striped newts are complex, multi-staged life history salamanders that can spend long periods of time in dry upland habitats (i.e., during droughts) and are extremely vulnerable to upland (e.g., fire suppression) and wetland (e.g., breeding pond alterations) threats (May et. al. 2011). A species action plan has been developed for the Florida pine snake (FWC 2013b).

Pumpkin Hill Creek Preserve State Park is also an important bird location because its diverse wetlands provide suitable nesting habitat for imperiled residents such as the wood stork (*Mycteria americana*), little blue heron (*Egretta caerulea*) and tricolored heron (*Egretta tricolor*). The park is also important as a stopover point for many neotropical migrants, as well as a breeding area for rare bird populations that include painted buntings (*Passerina ciris*), another species of greatest conservation need.

Historically, wood storks have used at least two different cypress wetlands in the park as nesting rookeries. The last wood stork rookery documented by park staff was in 2008. It is unknown why the rookeries disappeared, but it is thought to be related to the forested wetlands drying up. Additionally, the nearby Jacksonville Zoo contains a growing wood stork rookery, and it now appears to be a preferred annual nesting and foraging site for this and other wading bird species. At least one active bald eagle (*Haliaeetus leucocephalus*) nest is documented annually within the park. Significant imperiled bird rookeries such as these will require monitoring, special attention and protection from disturbance during critical nesting periods.

Worthington's marsh wren (*Cistothorus palustris griseus*) and McGillivray's seaside sparrow (*Ammospiza maritimus macgillivraii*) are two imperiled birds that inhabit salt marsh areas in the park. The population status of these species is still relatively unknown (Sauer et al. 2014). A recent biological review of this species conducted by FWC concluded that increased monitoring efforts were needed because of ongoing threats to salt marsh habitat along the east coast and a trend of declining marsh wren/sparrow populations in the area (FWC 2011). A species action plan has been developed for these two species (FWC 2013a).

The table below contains a list of all known imperiled species within the park and identifies their status as defined by various entities. It also identifies the types of management actions that are currently being taken by DRP staff or others and identifies the current level of monitoring effort. The codes used under the column headings for management actions and monitoring level are defined following the table. Explanations for federal and state status as well as FNAI global and state rank are provided in Addendix.

Imperiled Species Inventory						
Common and Scientific Name	**Imperiled Species Status**				**Management Actions**	**Monitoring Level**
	FWC	**USFWS**	**FDACS**	**FNAI**		
PLANTS						
Rosebud orchid *Cleistesiopsis divaricata*			LE	G4,S1	1,4,10	Tier 2
Pondspice *Litsea aestivalis*			LE	G3?,S2	1,4,6	Tier 2
Blue butterwort *Pinguicula caerulea*			LT		1,4,6,10	Tier 1
Hooded pitcherplant *Sarracenia minor*			LT		1,6,7,10	Tier 2
AMPHIBIANS						
Striped newt *Notophthalmus perstriatus*	ST			G2G3,S2	1,4,6	Tier 2
REPTILES						
American alligator *Alligator mississippiensis*	FT(S/A)	T(S/A)		G5,S4	4	Tier 1
Eastern indigo snake *Drymarchon couperi*	FT	LT		G3,S2?	1,6,10,13	Tier 1
Gopher tortoise *Gopherus polyphemus*	ST	C		G3,S3	1,6,7,10,13	Tier 2

Imperiled Species Inventory						
Common and Scientific Name	**Imperiled Species Status**				**Management Actions**	**Monitoring Level**
	FWC	**USFWS**	**FDACS**	**FNAI**		
Florida pine snake *Pituophis melanoleucus mugitus*	ST	UR		G4,S3	1,6	Tier 1
BIRDS						
MacGillivray's seaside sparrow *Ammospiza maritimus macgillivraii*				G4T3,S2	4	Tier 2
Worthington's marsh wren *Cistothorus palustris griseus*	ST			G5T3,S2	4	Tier 2
Little blue heron *Egretta caerulea*	ST			G5,S4	4	Tier 1
Tricolored heron *Egretta tricolor*	ST			G5,S4	4	Tier 1
Peregrine falcon *Falco peregrinus*				G4,S2		Tier 1
American oystercatcher *Haematopus palliatus*	ST			G5,S2	4,10,13	Tier 2

Imperiled Species Inventory						
Common and Scientific Name	**Imperiled Species Status**				**Management Actions**	**Monitoring Level**
	FWC	**USFWS**	**FDACS**	**FNAI**		
Wood stork *Mycteria americana*	FT	LT		G4,S2	4,10,13	Tier 2
Roseate spoonbill *Platalea ajaja*	ST			G5,S2	4,10	Tier 1
Least tern *Sternula antillarum*	ST			G4,S3	4,13	Tier 1

Management Actions:

1. Prescribed Fire
2. Exotic Plant Removal
3. Population Translocation/Augmentation/Restocking
4. Hydrological Maintenance/Restoration
5. Nest Boxes/Artificial Cavities
6. Hardwood Removal
7. Mechanical Treatment
8. Predator Control
9. Erosion Control
10. Protection from visitor Impacts (establish buffers)/law enforcement
11. Decoys (shorebirds)
12. Vegetation planting
13. Outreach and Education
14. Other [If referenced in table, provide discussion in narrative]

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

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. [If referenced in table, provide discussion in narrative]

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

Additional surveys for imperiled plant and animal species are needed at Pumpkin Hill Preserve to ensure that all imperiled species are documented. The DRP will enlist the assistance of academic researchers and staff from other agencies during development of species occurrence inventory lists, especially where necessary for certain taxonomic groups.

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

Action 1 - Develop monitoring protocols for six selected imperiled animal species, including the striped newt, gopher tortoise, eastern indigo snake, pine snake, MacGillivray's seaside sparrow, and Worthington's marsh wren.

Action 2 - Implement monitoring protocols for the six imperiled animal species listed in Action 1.

Imperiled species that are part of ongoing monitoring projects include the striped newt, gopher tortoise, wood stork rookeries and bald eagle nests. All wood stork rookeries and bald eagle nests will be monitored and documented.

As upland natural community restoration projects proceed, particularly through annual prescribed fire and improvements made within the North Shore Tract, it will be increasingly important to track gopher tortoise numbers.

Park staff will monitor the gopher tortoise population for upper respiratory tract disease (URTD). Continued cooperation with FWC will be an important part of the management of this imperiled species. Any incidence of the disease or any abnormally frequent observations of dead tortoises should be reported to the FWC Wildlife Research Laboratory in Gainesville, Florida. Staff will continue to refer to the FWC Gopher Tortoise Management Plan (FWC 2012b) to guide management of this imperiled species.

Documentation of eastern indigo and pine snake sightings will provide important information about the status of these imperiled species in the park. Monitoring of striped newts, MacGillivray's seaside sparrow and Worthington's marsh wren will be conducted through cooperative survey efforts with FWC.

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

- Action 1 - Develop monitoring protocols for four selected imperiled plant species including pond spice, blue butterwort, hooded pitcher plant and rosebud orchid.
- Action 2 - Implement monitoring protocols for four imperiled plant species including those listed in Action 1 above.

Four imperiled plant species will be surveyed and documented periodically to detect the presence of any new populations that may have appeared in the park and assess their condition. These imperiled plants are all indicator species of fire-dominated pine communities. Specific protocols will be developed and implemented for these species in cooperation with FNAI.

INVASIVE SPECIES

Pumpkin Hill Creek Preserve State Park is fortunate to have few sizable invasive plant species populations present. However, developed areas west of the park contain serious infestations of invasive plants. Chinese tallow tree (*Triadica sebifera*) is a dominant canopy tree in some of the woodlands along the boundary of the park and is present in many park zones. Cogongrass, which is currently only known to occur in zone 4E, should be treated twice annually in effort to eradicate it.

The primary means by which invasive plants gain a foothold in the park are escaping from adjacent private properties and dispersion by birds. Equipment is another method of invasive species introduction. Preserve staff will continue to watch vigilantly for infestations along roadsides and in disturbed areas, including firebreaks and additionally survey the park regularly.

Zones 6B, 6C, and 6D in the Caldwell Tract have historically been heavily infested by numerous invasive species. In the past, FWC and Bureau of Invasive Plant Management grants were used to hire contractors to help eradicate invasives from these areas. Since then, park staff has continued retreatments in-house. Since adjacent private property will likely continue to infest the park with invasives periodic application to FWC for funding may be necessary. Additionally outreach to surrounding neighbors may help reduce invasives on their property.

The most significant exotic animal in the park is the feral hog. The hogs are plentiful within the park and do significant damage to marshes and other seasonally wet areas. Preserve staff currently trap and remove feral hogs. Feral cats and dogs occasionally take up residence in the park and are removed as needed.

Invasive Species			
Species Name **Scientific Name - Common Name**	**FLEPPC Category**	**Distribution**	**Zone ID**
Albizia julibrissin - Mimosa	I	Linearly Scattered, Scattered Plants or Clumps, Single Plant or Clump	PH-5Je, PH-2Cn, PH-4Ds, PH-5G, PH-5Jw, PH-5Qe, PH-6B, PH-6C, PH-6D, PH-1E, PH-1Ns, PH-2B, PH-4Dw, PH-4E, PH-5Ke
Ardisia crenata - Coral ardisia	I	Scattered Dense Patches	PH-1W
Broussonetia papyrifera - Paper mulberry	II	Scattered Plants or Clumps, Single Plant or Clump	PH-6C, PH-6B
Cinnamomum camphora - Camphor-tree	I	Scattered Plants or Clumps, Single Plant or Clump	PH-1W, PH-4Ds, PH-5Qe, PH-6B, PH-6C, PH-6D, PH-5Je
Colocasia esculenta - Wild taro	I	Dominant Cover	PH-6B
Dioscorea bulbifera - Air-potato	I	No Invasive Plants Present	PH-2N
Imperata cylindrica - Cogon grass	I	Scattered Plants or Clumps	PH-4E
Lantana camara - Lantana	I	Scattered Dense Patches, Single Plant or Clump	PH-5Jw, PH-3A

Invasive Species			
Species Name Scientific Name - Common Name	**FLEPPC Category**	**Distribution**	**Zone ID**
Ligustrum sinense - Chinese privet	I	Scattered Plants or Clumps	PH-6B, PH-6D
Lonicera japonica - Japanese honeysuckle	I	Scattered Plants or Clumps, Single Plant or Clump	PH-5Jw, PH-6B
Ludwigia peruviana - Peruvian primrosewillow	I	Linearly Scattered	PH-4E
Melia azedarach - Chinaberry	II	Dominant Cover, Scattered Plants or Clumps, Single Plant or Clump	PH-5Jw, PH-1L, PH-6B, PH-6C, PH-6D, PH-1Ke, PH-1V
Mimosa pigra - Catclaw mimosa	I	Scattered Plants or Clumps	PH-6D
Sapium sebiferum - Chinese tallow tree	I	Dominant Cover, Linearly Scattered, Scattered Dense Patches, Scattered Plants or Clumps, Single Plant or Clump	PH-4Fc, PH-5Cs, PH-5H, PH-5Je, PH-5Jw, PH-5Pw, PH-5G, PH-1A, PH-1B, PH-1E, PH-1Gw, PH-2Aw, PH-2H, PH-2J, PH-4Ds, PH-4Dw, PH-4E, PH-5Es, PH-5Jw, PH-5Ls, PH-5Qw, PH-6A, PH-6B, PH-6C, PH-6D, PH-1F, PH-1L, PH-1M, PH-1R, PH-2Cn, PH-3Dw, PH-5En, PH-5Ke
Sesbania punicea - Purple sesban	II	Linearly Scattered, Scattered Plants or Clumps	PH-4E, PH-5H, PH-5G, PH-6B, PH-6C
Solanum viarum - Tropical soda apple	I	Scattered Plants or Clumps, Single Plant or Clump	PH-6B, PH-6C, PH-6D, PH-5G, PH-5Je, PH-5Ls
Sphagneticola trilobata - Wedelia	II	Dense Monoculture	PH-6C
Urena lobata - Caesar's weed	I	Single Plant or Clump	PH-6C
Wisteria sinensis - Chinese wisteria	II	Scattered Plants or Clumps	PH-3A

Objective A: Annually treat 20 gross acres or 1.7 infested acres of invasive plant species in the park.

- Action 1 - Annually develop/update invasive plant management work plan.
- Action 2 - Implement annual work plan by treating 20 gross acres or 1.7 infested acres in park annually and continue maintenance and follow-up treatments as needed.
- Action 3 - Complete invasive plant surveys of known infestations at a minimum of once every two years to stay current with conditions.

Regular updates of invasive plant coverage surveys will guide future treatment locations and priorities. In general, there will continue to be emphasis of retreatment of existing treatment areas. In addition, each year staff will develop maps to execute treatment of infestations that will serve the overall goal of expanding the areas in maintenance condition.

Objective B: Implement control measures to remove sounders of invasive feral hogs in the park annually.

- Action 1 - Establish feral hog surveys to determine relative abundance in the park.
- Action 2 - Establish and maintain corral-based hog traps.

The use of larger corral-based traps to capture the whole sounder will allow for a more efficient use of time and materials. This method will also reduce the number of "trap shy" hogs that are found within the park. The current extent of the feral hog population is unknown. Camera traps should be placed where hog damage is found to get an estimate of the size of the hog population. The information gathered can also be used to identify locations where corral traps or single box traps might be needed.

CULTURAL RESOURCES

Prehistoric and Historic Archaeological Sites

Desired future condition: All significant archaeological sites within the park that represent Florida's cultural periods or significant historic events or persons are preserved in good condition in perpetuity, protected from physical threats and interpreted to the public.

Description: Pumpkin Hill Creek Preserve State Park contains a total of 11 documented cultural sites that have been recorded with the Florida Master Site File (FMSF), including five aboriginal sites, three historic sites and two historic linear resource groups. A historic cemetery that is located immediately adjacent to the park is also included in the site list because of its significance to the history of the Pumpkin Hill Creek area. The Cultural Resource Table contains a list of the sites complete with site numbers, the significance of each site and the most current site condition assessments.

Archaeologists suggest that the park lies within a prehistoric Native American aboriginal area, called the St. Marys region, that encompasses northeastern Florida and southeastern Georgia (Russo 1992; Ashley 2008a). The St. Marys region was occupied by aboriginal people 5,000 or more years ago (Russo 1992; Milanich 1994; Ashley 2008b). It is important to note that the long history and abundance of recorded cultural sites in this region can be intimately linked to the very rich and productive estuarine creeks and tributaries representative of the area. The abundant estuarine resources in the St. Marys region were able to sustain stable year-round occupation by early aboriginal people through the millennia (Russo 1988; Ashley 2008b; Wayne and Dickenson 2010). The region also had strategic military value for western colonists who arrived after first European contact (Caudle 1993).

Several archaeological studies that are important to understanding the St. Marys region have been conducted in northeast Florida. These have significantly broadened our understanding of the rich cultural landscape of the area (Milanich and Fairbanks 1980; Hammersten 1988; Russo et al. 1993; Dunbar et al. 1995; Ashley 2008a; Ashley 2008b; Wayne and Dickinson 2010).

Although no comprehensive cultural resource surveys have yet been conducted at Pumpkin Hill Creek Preserve State Park, several properties immediately adjacent to the park (i.e., Betz-Tiger Point Preserve

to the north, Black Hammock Island to the east and a large assemblage of cultural sites within the Clapboard Creek area of the Timucuan Ecological and Historic Preserve) have undergone extensive archaeological assessment (Russo et al. 1993). Within these areas, archaeologists have studied a variety of sites that will undoubtedly help define the cultural history of the park and give additional insight into the potential for resources of significance to eventually be discovered there (Hammersten 1988; Russo et al. 1993; Dunbar et al. 1995; Ashley 2008b).

Eleven different archaeological field surveys have been conducted within the park, including five professional surveys (Browning 1983; Russo et al. 1993; Newman et al. 1997; Dynamic Environmental Associates Incorporated 2009; Torres 2005), five staff monitoring surveys (District 2 files), and a cultural resource sensitivity modeling survey (Collins et al. 2012). The University of South Florida (USF) Alliance for Integrated Spatial Technologies completed the 2012 sensitivity model as a functional predictive model for determining cultural significance within the park. As part of the modeling project, the USF team used LIDAR remote sensing imagery, historic aerial photographs, historic survey maps and existing archaeological research maps to develop a map of the park showing areas of high, medium and low sensitivity for archaeological resources.

The FMSF inventory for the park includes a wide range of cultural sites and artifacts that cover a considerable span of Florida's prehistory from Late Archaic (Orange), Woodland (Deptford and Weeden Island), and Mississippian (St. Johns and St. Johns II) to the period of European contact (circa 1562 French Huguenots, per Ribault 1964), and from that period to the present (Newman et al. 1997; Ashley 2008a).

The five prehistoric aboriginal sites that have been identified in the park include Cedar Point Road (DU00079), Hog Plumb (DU00095), Abandoned Picnic (DU11297), Sandy Rise (DU11304) and Scrubby Knoll (DU17804). Based on their small size and the types of artifacts discovered there, these sites were probably not areas of long-term occupancy, but rather were used for hunting game or collecting a specific resource over a limited span of time (Newman et al. 1997). The DU11297 site may have been a specialized site for procurement of raw materials for oyster processing, but its significance relative to prehistoric activities in the region around the park is unknown.

Archaeological evidence from the Betz-Tiger Point area north of the park also suggests that aboriginal peoples inhabiting this area of Pumpkin Hill Creek during the Middle-Late Archaic (7,000-3,000 years ago) made repeated visits to numerous temporary encampment sites throughout the region (Ashley 2008b). According to existing investigations, no aboriginal village is known from Betz-Tiger Point Preserve. However, Betz-Tiger Point and Black Hammock Island to the east are both regionally significant and help define patterns of prehistoric aboriginal settlement and subsistence (Russo et al. 1993; Ashley 2008b).

The earliest known artifact evidence that has been recovered from aboriginal sites in the park (i.e., DU00079, DU00095) is a distinctive fiber-tempered ceramic called Orange pottery (Russo 1992; Newman et al. 1997; Ashley 2008b). This evidence dates aboriginal use of the Pumpkin Hill Creek area to as early as 4,000 years ago(Newman et al. 1997).

The following is a brief description of the aboriginal sites in the park:

The Hog Plumb site (DU00095) is a multiple-component shell midden located adjacent to Fitzpatrick Creek. This site contains remnants from several prehistory chronologies including Orange, Deptford, St. Johns, St. Johns II, Transitional, and 20th-century American.

The Cedar Point Road site (DU00079) is a multiple-component aboriginal scatter. The extent of its known location is along an existing major road (i.e., Cedar Point Road) that cuts through the southern portion of the park. This site contains remnants from several prehistory chronologies including Orange, Deptford, St. Johns and St. Johns II. The full extent of the site is unknown.

The Abandoned Picnic site (DU11297) is a shell midden of undetermined extent containing prehistory remnants from the late St. Johns II period (i.e., Savanna). The actual location of this site was recalculated during a resource management evaluation using maps, reconnaissance and physical evidence. The new information obtained from this evaluation resulted in corrections regarding the physical location of the site being submitted to the FMSF in 2005.

The Sandy Rise site (DU11304) is a terrestrial aboriginal location of unknown function, density and extent. This site contains prehistoric check-stamped ceramic remnants that probably date from the Weeden Island II period (i.e., Late Woodland).

The Scrubby Knoll site (DU17804) is a terrestrial aboriginal location of unknown function, density and extent that contains prehistoric remnants of surface and sub-surface oyster shell scatter.

A number of European nations (i.e., France, Spain, Great Britain) have occupied Native American areas in the St. Marys region of northeast Florida (Caudle 1993; Milanich 1995; Ashley 2008b). The United States acquired Florida from Spain in 1819 and it officially became a U.S. territory in 1821. Much of the land associated with the St. Marys region became important for European settlement during this time.

Florida was a strategic military location and was important for its settlements and exportation of goods as well. Many landowners planted large crops of rice and indigo and eventually produced turpentine from pine plantations (Perry 1968). In the U.S., the extraction of pine tree resin for use in the naval stores industry dates to the late 18th century (Randall and Rooney 2008). In 1795, William Fitzpatrick acquired a land grant on Black Hammock Island, located east of Pumpkin Hill Creek (Jones 1985). The Fitzpatrick family was undoubtedly the source of the name for Fitzpatrick Creek, the estuarine tidal creek that runs along the southeast edge of the park.

In 1870, Ezekiel Hudnall came to Florida and was eventually deeded a 500-acre land grant that included property from the “mouth of the Nassau River at Pumpkin Bluff” and perhaps some portion of what is now Pumpkin Hill Creek Preserve State Park (Newman et al. 1997). Additional research will be needed to further understanding of the boundaries of this land grant and how it might be important to the cultural resources of the park. There is a post-1817 map that appears to illustrate at least one structure across the waterway from the Fitzpatrick family plantation (i.e., at the south end of Black Hammock Island) that likely dates to the early 17th century (Newman et al. 1997). It is unknown how this structure relates to other known historic sites in the park.

Three historic sites and two historic linear resource groups have been identified within the park, as well as one historic site immediately adjacent to the park: Shady Retreat (DU17805), Bogey Path (DU17806), an unnamed site (DU17795), Pumpkin Canal and Landing (DU17768), Pumpkin Hill Historic Road

(DU21334) and Anderson Cemetery (DU14252). Following is a brief description of the known historic sites in the park.

Three of the sites, Shady Retreat (DU17805), DU17795 (unnamed) and Bogey Path (DU17806), have terrestrial locations, but their function, density and extent are unknown. All three sites are limited in size and contain surface scatter remnants of 20th-century American ceramics and some disarticulated building materials. The Shady Retreat site also contains some surface shell scatter. A 1936 topographic map and a historic aerial photograph indicate that there once was a potential home site near this location.

Two sites, Pumpkin Canal and Landing (DU17768) and Pumpkin Hill Historic Road (DU21334), are historic linear resource groups. Pumpkin Canal and Landing (DU17768) is potentially a historic canal and vessel landing area that extends onto park property from the adjacent Pumpkin Hill Creek estuary. The extent of this canal site was originally delineated using aerial photographs. Additional research will be required to document its boundaries, age and significance. Pumpkin Hill Historic Road (DU21334) is the most recent site to be added to the FMSF. This historic road is a 19th- and 20th-century resource group that was added upon completion of the 2012 modeling study (Collins et al. 2012). The road is clearly visible on available historic maps and aerial photographs of the region, but its full extent has not been mapped and it may extend much further outside the park. Historic photographic evidence, as well as surface fragments of turpentine pottery (i.e., herty cups) and old cat-faced pine trees on the property, suggest that the park was utilized by timber and turpentine industries in the past.

Anderson Cemetery is a 0.78-acre private cemetery immediately adjacent to the southeastern boundary of zone PH-4E. There are over 60 grave sites at the location, ranging in date from 1901 through the present. It is unknown if any unmarked grave sites extend onto the park, but at present there are no indications that any do. This cemetery is only mentioned in the management plan because of its significance to the area and because of the possibility that some grave sites might extend onto the park.

Condition Assessment: All archaeological sites within the park are in good condition except for the Hog Plumb (DU00095), Cedar Point Road (DU00079) and Abandoned Picnic (DU11297) sites, which are in fair condition.

The Hog Plumb site (DU00095) has historically suffered from heavy streambank erosion. Some looting has occurred at this location as well (Newman et al. 1997). In 2006, park staff initiated some restoration at the site in the form of sandbag stabilization of an area where extensive looting had occurred. Continued monitoring of the restoration area has indicated that the restoration has been at least partially successful. As of 2017, the looted area where sandbags were strategically placed has stabilized and is slowly becoming revegetated. Since the restoration, no additional looting has been observed at this site. The site was judged to be in fair condition in 2017, based on an evaluation of the current level of threat from streambank erosion and on improvements noted after the successful stabilization of the looted area.

Prior to establishment of the park, the Cedar Point Road site (DU00079) had repeatedly been disturbed during initial construction of Cedar Point Road. Additional disturbance of the site occurred when fire lines were constructed around the perimeter of the park in 1998. A 2017 evaluation of the site determined that the site was in fair condition.

Disturbances at the Abandoned Picnic site (DU11297) appear minimal. A small amount of disturbance is contributed by small boats that use the area as a launch ramp and by short-term users of the picnic area. However, the site is subject to periodic tidal creek inundation and some erosion. The condition of the site in 2017 was fair.

Overall, the Sandy Rise site (DU11304) is stable and undisturbed. Some animal burrowing occurs at the site, primarily by gopher tortoises, but the effects are minimal. When the site was evaluated in 2017, it appeared stable and in good condition.

Level of Significance: Archaeological sites in the park have not been evaluated by the State Historic Preservation Office (SHPO) for National Register of Historic Places (NRHP) eligibility.

The Hog Plumb shell midden site (DU00095) has been briefly evaluated by professional archaeologists who have indicated that it is potentially eligible for local designation, as well as for the NRHP (Newman et al. 1997).

Although professional archaeologists have briefly evaluated the Cedar Point Road site (DU00079) on at least four occasions, current information is insufficient to determine the site's level of significance for potential local or NRHP designation. One professional opinion suggested that the site probably didn't possess the inherent qualities needed to meet NRHP criteria because it may have been compromised by extensive disturbance during construction of Cedar Point Road (Newman et al. 1997).

The Abandoned Picnic (DU11297) and Sandy Rise (DU11304) sites have only been evaluated briefly. Current information is insufficient to determine the sites' potential significance for local or NRHP designation.

The full extent of two sites, Pumpkin Canal and Landing (DU17768) and Pumpkin Hill Historic Road (DU21334), is unknown. Current information is therefore insufficient to determine the sites' potential significance for local or NRHP designation.

General Management Measures: The 10 cultural sites in the park should be monitored at least annually. All sites need to be checked regularly so that potential problems from erosion, looting, vegetative growth, fire line maintenance and other factors can be detected before resources become damaged. If heavy foot traffic has caused significant erosion in visitor use areas, protective measures may need to be implemented.

The park will develop a routine monitoring plan for cultural resources that includes a visitation schedule and a protocol for recording concerns and needed actions at the time of each visit. Staff will consult the 2012 sensitivity map whenever any ground-disturbing activities or archaeological studies are planned for the park.

Park staff should seek professional archaeological evaluation of the previous restoration activity at the Hog Plumb site (DU00095). Assessment by professional archaeologists would help staff identify additional preservation/restoration activities that might be beneficial, determine site significance and the sites' potential for inclusion in local or NRHP designations, and evaluate the degree and extent of continued streambank erosion.

The full extent of the following sites needs to be determined: Cedar Point Road (DU00079), Sandy Rise (DU11304), Scrubby Knoll (DU17804), Shady Retreat (DU17805), DU17795 (unnamed), Bogey Path (DU17806), Pumpkin Canal and Landing (DU17768) and Pumpkin Hill Historic Road (DU21334).

As mentioned above, the Hudnall land grant may have been partially located within what is now Pumpkin Hill Creek Preserve State Park. Additional research is needed to confirm that and to establish whether the Hudnalls have any connection to known cultural resources recorded in the FMSF inventory.

Collections

Desired future condition: All historic, natural history and archaeological objects within the park that represent Florida's cultural periods, significant historic events or persons, or natural history specimens are preserved in good condition in perpetuity, protected from physical threats and interpreted to the public.

Description: The collection at Pumpkin Hill Creek Preserve State Park contains archaeological, historic and natural history items. All items have been catalogued in a spreadsheet using PastPerfect museum software. The park maintains several collection objects for interpretive purposes that are from the early 20th-century turpentine industry (e.g., Herty cups) and a few archaic tools that were found within the park but are out of context and have an unknown date of collection. The park also has several historic photographs from the 1940s that are probably associated with the Anderson family during the period prior to state acquisition of the property.

Archaeological items that have been discovered in the park over the years are displayed in the main office lobbies of Little Talbot Island State Park and Pumpkin Hill Creek Preserve State Park. Among the collection items are stone points and pottery sherds and several pieces of historic American ceramics. The natural history collection consists of several taxidermy items, as well as turtle shells and other skeletal materials. The taxidermy items include two barred owls, one fox squirrel and one bobcat. The natural history collection is also housed in the lobbies of the two park offices.

Condition Assessment: In general, the park's collection items are in good condition. The taxidermy animals are in good condition, but staff will need to assess them regularly to detect whether moths or other insects have infested them. All collection items are displayed or stored in climate-controlled buildings that are locked when they are unoccupied.

Level of Significance: All collection items stored or exhibited at the park or at Little Talbot Island State Park were obtained from the Pumpkin Hill Creek Preserve State Park property. These collection items are significant because staff use them in interpreting the park's history and natural resources. The value of the objects lies in their interpretive, educational and research potential in reference to the cultural and natural history of the park and the surrounding area.

General Management Measures: The park does not have a Scope of Collections Statement but does have a complete inventory for all collection items except for the historic photographs. Most historic items from the park have been compiled using PastPerfect museum software, except for historic photographs. All historic photographs need to be catalogued, and a collection management assessment should be completed. The park should develop a housekeeping and record keeping system for cyclical maintenance of the collection.

Cultural Sites Listed in the Florida Master Site File					
Site Name and FMSF #	**Culture/Period**	**Description**	**Significance**	**Condition**	**Treatment**
DU00079 Cedar Point Road	**Prehistoric multicomponent**	**Archaeological Site**	**NE**	**F**	**P**
DU00095 Hog Plumb	**Prehistoric shell midden/ Deptford, 700 B.C.-300 B.C.**	**Archaeological Site**	**NR**	**F**	**P**
DU11297 Abandoned Picnic	**Prehistoric shell midden**	**Archaeological Site**	**NE**	**F**	**P**
DU11304 Sandy Rise	**Prehistoric Weeden island II**	**Archaeological Site**	**NE**	**G**	**P**
DU17804 Scrubby Knoll	**Prehistoric shell scatter**	**Archaeological site**	**NE**	**G**	**P**
DU21334 Pumpkin Hill Historic Road	**Historic late 19th century American, 1821-1899**	**Historic linear resource**	**NE**	**G**	**P**
DU17805 Shady Retreat	**Historic 20th century American 1900-present**	**Archaeological site**	**NE**	**G**	**P**
DU17768 Pumpkin Canal and Landing	**Historic unspecified**	**Historic linear resource**	**NE**	**G**	**P**

Cultural Sites Listed in the Florida Master Site File					
Site Name and FMSF #	**Culture/Period**	**Description**	**Significance**	**Condition**	**Treatment**
DU17806 Bogey Path	**Historic 20th century American**	**Archaeological site**	**NE**	**G**	**P**
DU17795 Unnamed site	**Historic unspecified**	**Archaeological site**	**NE**	**G**	**P**
DU14252 Anderson Cemetery	**Early 20th century American**	**Historic cemetery**	**NE**	**G**	**P**

Objective A: Assess and evaluate 11 of 11 recorded cultural resources in the park.

- Action 1 - Complete 11 assessments and evaluations of archaeological sites.

The park staff will locate, assess and evaluate the 11 known cultural resource sites in the park (Table 4) for condition and threats, and will document recommendations that will allow for long-term preservation and integrity of the sites. All cultural sites should be monitored at least annually.

Staff will document site assessments in a written and photographic format. Any threats detected, including looting, erosion, fire line construction, or site deterioration, will be documented during the assessments. Documentation should be consistent so that changes in site conditions can be determined by comparing assessments made over the years. Park staff will prioritize future preservation and rehabilitation treatments based on these assessments.

To ensure the ongoing recognition, protection and management of cultural resources, there should always be at least one staff member at the park who is a certified archaeological resource monitor. In addition, park management should ensure that all personnel have sufficient training to provide adequate protection for the park's cultural resources, both documented and undocumented.

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

- Action 1 - Ensure all known sites are recorded or updated in the Florida Master Site File.
- Action 2 - Conduct a comprehensive archaeological evaluation of the Hog Plumb site, given that it has NRHP potential.
- Action 3 - Develop and adopt a Scope of Collections Statement.

The locations of all known archaeological sites in the park have been mapped using GPS technology. If new sites are found, their boundaries will also be mapped. As this information is compiled, staff will update FMSF forms for the sites and forward the information to the FMSF. All new sites will be recorded with the FMSF as they are discovered.

DRP should seek professional archaeological evaluation of the Hog Plumb Site to determine if the significance of the site is worthy of NRHP designation. Any evaluation of the site should include management, preservation and stabilization recommendations.

A Scope of Collections has not yet been completed for the park. Park staff will develop a Scope of Collections Statement and organize collections information so that it is readily accessible for reference purposes.

Objective C: Bring three of 11 recorded cultural resources into good condition.

- Action 1 - Design and implement regular monitoring programs for all cultural sites.
- Action 2 - Create and implement a plan to protect vulnerable sites from ground disturbance associated with the prescribed fire program.

Cultural sites will be visited and monitored on a regular basis. The park will develop and implement a program to monitor all sites at least once a year, especially those sites that are more susceptible to impacts from prescribed fire or wildfire. Park staff will maintain records of each site and describe any changes that are observed.

Sites that have previously been impacted by fire line construction should be evaluated for ways of reducing the impacts. Appropriate proactive measures may include reducing the depth of soil disturbance during fire line maintenance or relocating sections of fire lines that pass through particularly sensitive areas. All sensitive areas should be designated on maps and made available to equipment operators.

LAND USE COMPONENT

VISITATION

Pumpkin Hill Creek Preserve State Park was initially acquired by the state of Florida to act as a buffer preserve to protect the adjacent tidal creeks and salt marshes, many of which are incorporated within the greater Timucuan Ecological and Historic Preserve. Today, Pumpkin Hill Creek Preserve State Park is bordered by several other parks and preserves managed in partnership. Collectively these units are known as the 7 Creeks Recreation Area. Along with Pumpkin Hill Creek Preserve State Park, the 7 Creeks Recreation Area includes Cedar Point (National Park Service), Bogey Creek Preserve (North Florida Land Trust), Betz-Tiger Point Preserve, Cedar Point Preserve and Jim Wingate Preserve (city of Jacksonville). These properties are connected by 30-plus miles of trails and collectively protect over 5,600 acres of conservation lands.

Use areas at Pumpkin Hill Creek Preserve State Park are limited to one main trailhead/parking/picnic area and a separate kayak launch. The other parks within the 7 Creeks Recreation Area such as Betz-Tiger Point Preserve provide more developed day-use areas where visitors will find restrooms, covered picnic pavilions and fishing docks. The National Park Service provides a public boat ramp on Cedar Point Creek at one of the area's few shoreline locations with adequate depth to accommodate launch and recovery through the full tidal range. These more extensive visitor support facilities on the adjacent partnering lands alleviate the need for duplication at Pumpkin Hill Creek Preserve State Park, where preserving natural communities and watershed function are the primary objectives.

The vast acreage of the park attracts many long-trek recreation types, such as hiking, biking, equestrian, and paddling. It is one of the few public conservation lands in heavily urbanized Duval County where visitors can still experience a deep immersion in nature.

Trends

Pumpkin Hill Creek Preserve State Park experiences relatively modest attendance, represented almost exclusively by various trail users and those seeking paddling access. The visitation trends are similar to other trail-focused parks in Florida, with higher recorded attendance in the cooler months and lower recorded attendance in the summer.

EXISTING FACILITIES AND INFRASTRUCTURE

Recreational facilities at Pumpkin Hill Creek Preserve State Park are concentrated on the eastern side of the park along Pumpkin Hill Road. The park's main support area is located on the west side of Pumpkin Hill Road. Included in this main support area is the park shop, administrative office and multiple storage buildings. The administrative office also provides visitors with interpretive displays describing the local history as well as the area's natural resource-based recreational opportunities. A second, smaller support area is located at the center of the park and consists of a two-bay metal storage building and pumphouse enclosed within a fenced compound. This smaller support site is an important forward staging area for materials used to construct and maintain service roads, low water crossings, fences, gates and perimeter signage.

Just north of the park office and shop area is the main park entrance. Here, visitors will find the park's main trailhead, several scattered picnic tables, a portable restroom and a grass parking lot large enough to accommodate vehicles and horse trailers. A short trail with exotic species interpretive panels winds

through the adjacent pine flatwoods. Across Pumpkin Hill Road to the east are two short trails that lead to overlooks along Pumpkin Hill Creek. The park's paddling launch is also located along the east side of Pumpkin Hill Road, just before the entrance to Betz-Tiger Point Preserve. In addition to the stabilized paddling launch, this area provides parking, picnic tables, an informational kiosk, a natural history interpretive panel and a portable restroom. In total, the park offers 16.1 miles of trails as well as 54.8 miles of unpaved management roads which are generally accessible to the public.

Facilities Inventory

Support Area	
ADA Parking Space	1
Unpaved Parking Areas	3
Park Office	1
Storage Buildings	7
Tractor Shelter	1
Two-bay Shed	1
Shop Building	1
Park Entrance/Main Trailhead	
ADA Parking Space	1
Unpaved Parking Area	1
Kiosk	1
Portable Restroom	1
Stock Tank	1
Picnic Tables	3
Nature Trail Mileage	0.19
Paddling Launch	
ADA Parking Space	1
Unpaved Parking Areas	1
Paddling Launch	1
Kiosk	1
Interpretive Panel	1
Picnic Tables	2
Trails	
Hiking Trail Mileage	3.97
Equestrian Trail Mileage	3.66
Hiking/Equestrian Trail Mileage	8.48
Roads	
Park Road Stabilized Mileage	0.29
Park Road Un-stabilized Mileage	55.65

CONCEPTUAL LAND USE PLAN

Four use areas at Pumpkin Hill Creek Preserve State Park are listed below for improvements to be implemented within the 10-year planning cycle. Specific plan details are available in the next section.

Support Area

Objective: Improve organization, equipment storage and staff support
Action Items:

- *Remove underutilized buildings.*
- *Construct a four-bay pole barn.*
- *Repurpose the former park office as a residence or consider new construction.*

Several of the storage buildings at the shop compound are underutilized or ineffective due to design. The condition and practical use of all outlying storage buildings should be assessed, and underutilized or poorly suited buildings should be considered for removal.

The park has heavy equipment such as tractors and a crawler dozer, as well as smaller equipment and PTO attachments that are currently stored beneath inadequate shelters or parked in the open. A four-bay pole barn is needed to store and protect this critical land management equipment.

Another leftover building from CAMA management is the former park office. The building should be repurposed as an employee residence or overnight accommodation for assisting regional staff. If repurposing is not viable, there should be provision for new construction.

Park Entrance/Main Trailhead

Objective: Improve visitor services
Action Items:

- *Construct a permanent restroom facility.*
- *Construct up to two picnic shelters.*

Visitor facilities at the park entrance and main trailhead area are minimal, commensurate with the park's status as a preserve. However, some improvements are needed to enhance the visitor experience. An appropriately located permanent restroom facility should be constructed to replace the existing portable toilet, and pavilions should be constructed to provide sheltered picnic spots and gathering points.

Paddling Launch

Objective: Improve and stabilize the paddle launch use area
Action Items:

- *Grade and stabilize the entrance loop.*
- *Resurface the tidally inundated portion of the kayak launch with oyster shell.*
- *Resurface the kayak launch and approach path.*

The park's paddling launch is a popular use area as it provides paddling access to the namesake Pumpkin Hill Creek. Some improvements are needed to enhance visitor access and mitigate some misuse at this

area. Over time, the impacts of vehicle compaction have created a sunken roadbed along the loop drive. Clean, exotic-free sand should be machine spread along the loop drive to match the adjacent elevation. The loop drive should then be armored with appropriate-sized rock.

Parkwide

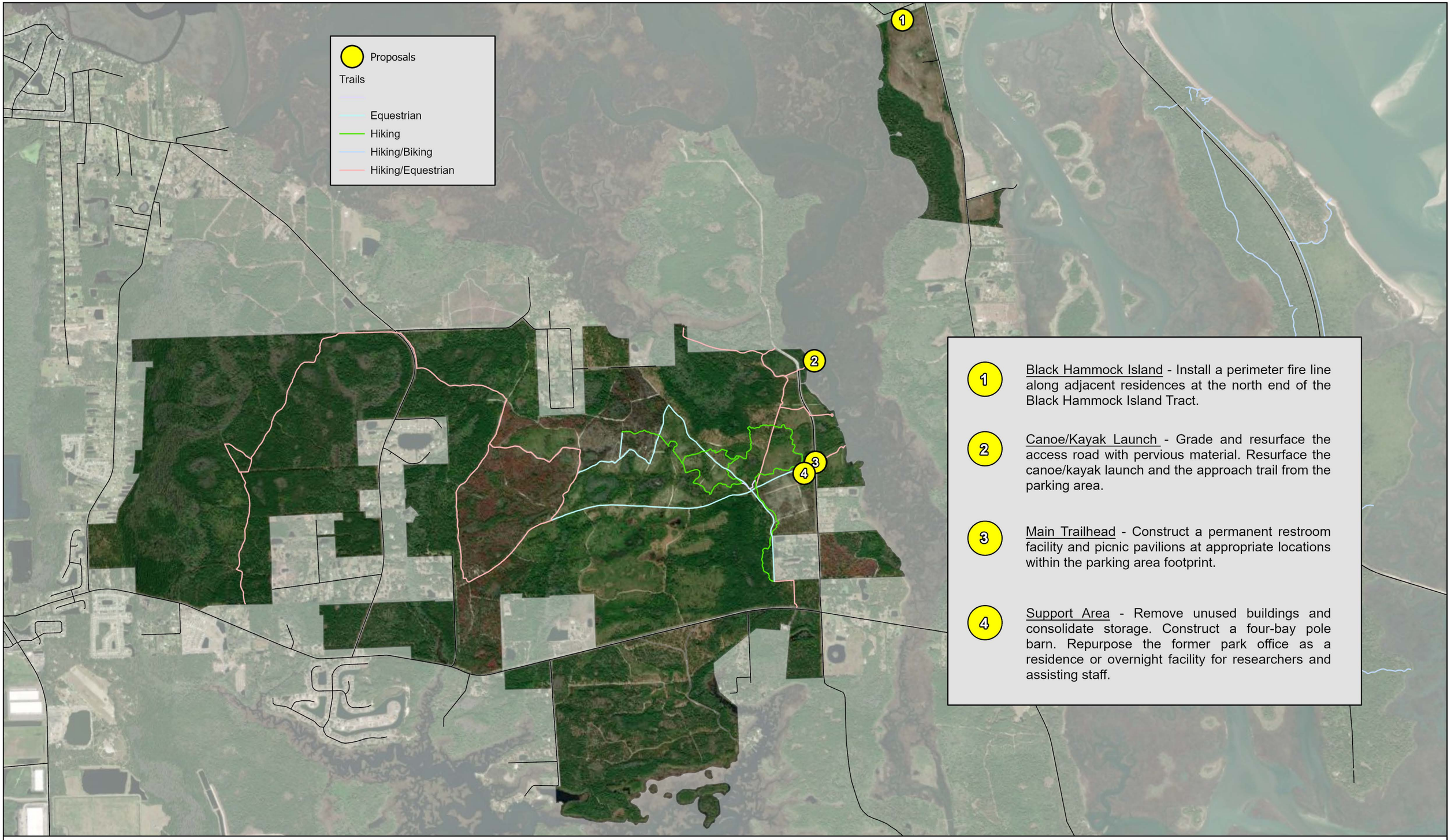
Objective: Improve resource management road system and trail system
Action Items:

- *Install low water crossings.*
- *Install fire line along the north boundary of the Black Hammock Island tract.*
- *Improve wayfinding along the trail system.*
- *Produce a comprehensive interpretive plan and install interpretive elements at appropriate locations.*

Many of the park's management roads cross through low-lying wet flatwoods and are frequently flooded. These areas of persistent flooding should be mapped, and low water crossings should be installed where appropriate to provide adequate resource management access.

Equestrians are a major user group at the park. The current multi-use trailhead off Pumpkin Hill Road remains the most suitable point of embarkment for equestrians, with all portions of the park accessible from this point via the extensive network of resource management roads and the 7 Creeks Trail.

A parkwide interpretive plan is needed to convey the ecological significance of the park and greater 7 Creeks Recreation Area in preserving regional biodiversity and water quality. The type, design, quantity and placement of interpretive elements to deepen understanding will be specified during this additional planning process.



1 Black Hammock Island - Install a perimeter fire line along adjacent residences at the north end of the Black Hammock Island Tract.

2 Canoe/Kayak Launch - Grade and resurface the access road with pervious material. Resurface the canoe/kayak launch and the approach trail from the parking area.

3 Main Trailhead - Construct a permanent restroom facility and picnic pavilions at appropriate locations within the parking area footprint.

4 Support Area - Remove unused buildings and consolidate storage. Construct a four-bay pole barn. Repurpose the former park office as a residence or overnight facility for researchers and assisting staff.

Pumpkin Hill Creek Preserve State Park

Conceptual Land Use Plan

0 0.5 1 Miles

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OPTIMUM BOUNDARY

Pumpkin Hill Creek Preserve State Park is a unique natural relict located within the metropolitan city of Jacksonville. Due to an alarming growth in residential development, very few undeveloped parcels remain adjacent to the park. The surrounding properties were historically rural-residential, but large suburban developments are swiftly moving in. Without quick action, these few remaining parcels will be divided and developed, becoming unavailable for conservation acquisition.

Most of the undeveloped land surrounding the park is therefore identified as optimum boundary. Acquisition of these areas would help protect one of the larger conservation lands left in Duval County and enhance the park's role as a natural buffer area for the Nassau and St. Johns rivers and associated salt marshes.

These parcels would also allow an expansion of the recreational opportunities at the park. The optimum boundary for Pumpkin Hill Creek Preserve State Park is designed to advance objectives developed in this management plan. The main objectives of the recommended additions are 1) preserve water quality and hydrological function, 2) establish access points which facilitate public resource-based recreational use, 3) facilitate the safe use of prescribed fire and wildfire safety, 4) provide connectivity to adjacent conservation lands for wildlife corridors and development of a regional trail system, 5) protect archaeological sites, 6) preserve and restore rare and threatened habitat types, and 7) acquire outparcels to establish connectivity within park boundaries.

Some parcels containing modest single-family houses are at locations where park staff residences are necessary for security. Mobile homes on parcels acquired would be of little value to management of the property. In most cases where agreeable, sellers would be encouraged to retain and remove these mobile structures. Where this is not agreeable, the park would remove these on a case-by-case basis.

Pumpkin Hill Creek Preserve State Park is surrounded by conservation lands, including federally-owned and managed Timucuan Ecological and Historic Preserve, the city of Jacksonville's Preservation Project, Nassau-St. Johns River Marshes Aquatic Preserve, the Nature Conservancy's Machaba Balu Preserve, and St. Johns River Water Management District conservation land. All parties are interested in additional acquisition of properties adjoining the current park boundary that have a high risk of becoming developed.

Existing Park Boundary
Optimum Boundary (ARC Approved)
Optimum Boundary (Proposed Additions)
Florida Forever BOT Projects
Other Existing Conservation Lands

Pumpkin Hill Creek Preserve State Park

Optimum Boundary Map

0 1 2 Miles

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