



BIG SHOALS STATE PARK

Park Chapter

SUWANNEE RIVER REGION

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Big Shoals State Park

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Big Shoals State Park

Planning Region: Suwannee River

County: Hamilton and Columbia

Lease/Management Agreement Number: 3541

Overview: Big Shoals State Park is home to the only Class III whitewater rapids in Florida and protects several distinct natural communities. The park is home to a variety of imperiled plant and animal species, cultural resources, and prominent hydrological features. Resource-based recreational opportunities include canoeing/kayaking, wildlife viewing, cycling, hiking, birding, equestrian trails, fishing, and hunting.

Total Acreage: 1,681

Natural Communities	Acres
Alluvial Forest	216.88
Basin Swamp	28.75
Baygall	15.47
Blackwater Stream	7.31
Bottomland Forest	41.01
Dome Swamp	20.24
Floodplain Swamp	104.21
Mesic Flatwoods	697.44
Mesic Hammock	15.78
Sandhill	35.01
Seepage Stream	2.46
Upland Hardwood Forest	164.45
Upland Mixed Woodland	16.00
Upland Pine	58.3

Altered Land Cover	Acres
Abandoned Field/Abandoned Pasture	26.91
Canal/Ditch	0.03
Developed	20.29
Pine Plantation	6.84
Restoration Natural Community	22.42
Successional Hardwood Forest	181.20

Acquisition: Originally purchased from the Nature Conservancy in 1986 with funds from the Conservation and Recreation Lands (CARL) program; with several different public agencies managing what is collectively referred to as Big Shoals Public Lands.

Big Shoals State Park

Resource Management Component

Hydrology

- Assess the park's hydrological restoration needs.
- Restore hydrological conditions to approximately 1.5 acres of blackwater stream and 12 acres of floodplain swamp natural communities.
- Evaluate and mitigate the impacts of soil erosion in the BSPL.

Natural Communities

- Encourage interagency planning meetings/briefings prior to each year's burn season to review burn plans, fuel conditions, resource availability and tactics.
- Maintain 2,000 acres within the optimum fire return interval.
- Conduct natural community/habitat improvement activities on 15 acres of upland mixed woodland natural community.
- Conduct natural community/habitat improvement activities on 10 acres of sandhill natural community.
- Conduct natural community/habitat improvement activities on 26 acres of mesic flatwoods and upland mixed woodland natural community.
- Conduct natural community/habitat improvement activities on 1 acre of upland mixed woodland natural community.
- Evaluate former Southern Pine Beetle harvest areas to identify appropriate actions to remove/reduce loblolly pine recruitment and re-establish native vegetation.

Imperiled Species

- Update baseline imperiled species occurrence list.
- Continue existing monitoring protocols for two imperiled animal species (gopher tortoise, flatwoods salamander).
- Develop new monitoring for one selected imperiled plant species (Florida toothache grass).

Invasive and Nuisance Species

- Annually treat all known populations of invasive plant species.
- Prevent the introduction and spread of invasive plants.
- Survey the entire BSSP property for invasives at least 2 times over 10 years.
- Implement control measures on feral hogs.

Cultural Resources

- Assess/evaluate 20 of 20 recorded cultural resources in the park.
- Compile reliable documentation for all recorded historic and archaeological resources.
- Bring 1 of 22 recorded cultural resources into good condition.

Big Shoals State Park

Land Use Component

Conceptual Land Use

Parkwide

- Create and implement an interpretive sign plan.
- Implement a comprehensive trails assessment through the BSPL.

Big Shoals Day Use Area Entrance

- Formalize and update park entrances to provide a sense of arrival.

Big Shoals Day Use Area

- Enhance visitor facilities and improve interpretation.

Proposed semi-primitive campground

- Provide tent camping tailored for paddling and hiking excursions.

Big Shoals Portage

- Assess paddling trail infrastructure to increase safety and improve wayfinding.

Additional paddling access

- Provide safe paddling access for all park visitors.

Columbia County Easement Improvements

- Enhance accessibility and safety.

Observation Platform- Hamilton County

- Update and improve infrastructure to provide an immersive experience.

Bell Springs Entrance

- Ensure coordination with the adjacent water management district (SRWMD) and the Florida Trails Association to seamlessly integrate infrastructure throughout BSPL.

Woodpecker Trail

- Expand trail connectivity between state parks through interagency collaboration.

Woodpecker Trail – East Trailhead

- Improve wayfinding and interpretive elements.

Little Shoals Day Use Area

- Improve facilities and interpretive elements.

Little Shoals Access

- Improve wayfinding through trail system map updates and additional interpretive elements.

Big Shoals State Park

Old Godwin Bridge

- Improve interpretation and stabilization of significant features.

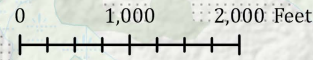
Optimum Boundary

The park is situated within a patchwork of conservation lands, managed by both the Florida Forest Service and Suwannee River Water Management District. Previously identified optimum boundary parcels include several encompassing the critical Southeast 94th Street entrance road to the Big Shoals Day Use Area, parcels to the east of the Columbia County portion of the park, and parcels to the south and southwest of the park in Columbia and Hamilton counties. Acquisition of these parcels would bolster protection of the waters of the Suwannee River by acquiring additional lands within the watershed. Additional parcels to the northwest would provide an extensive corridor within the patchwork of conservation lands. Several of these parcels are agriculture or silviculture and would require significant restoration efforts.



BIG SHOALS STATE PARK

HAMILTON/COLUMBIA COUNTY, FLORIDA

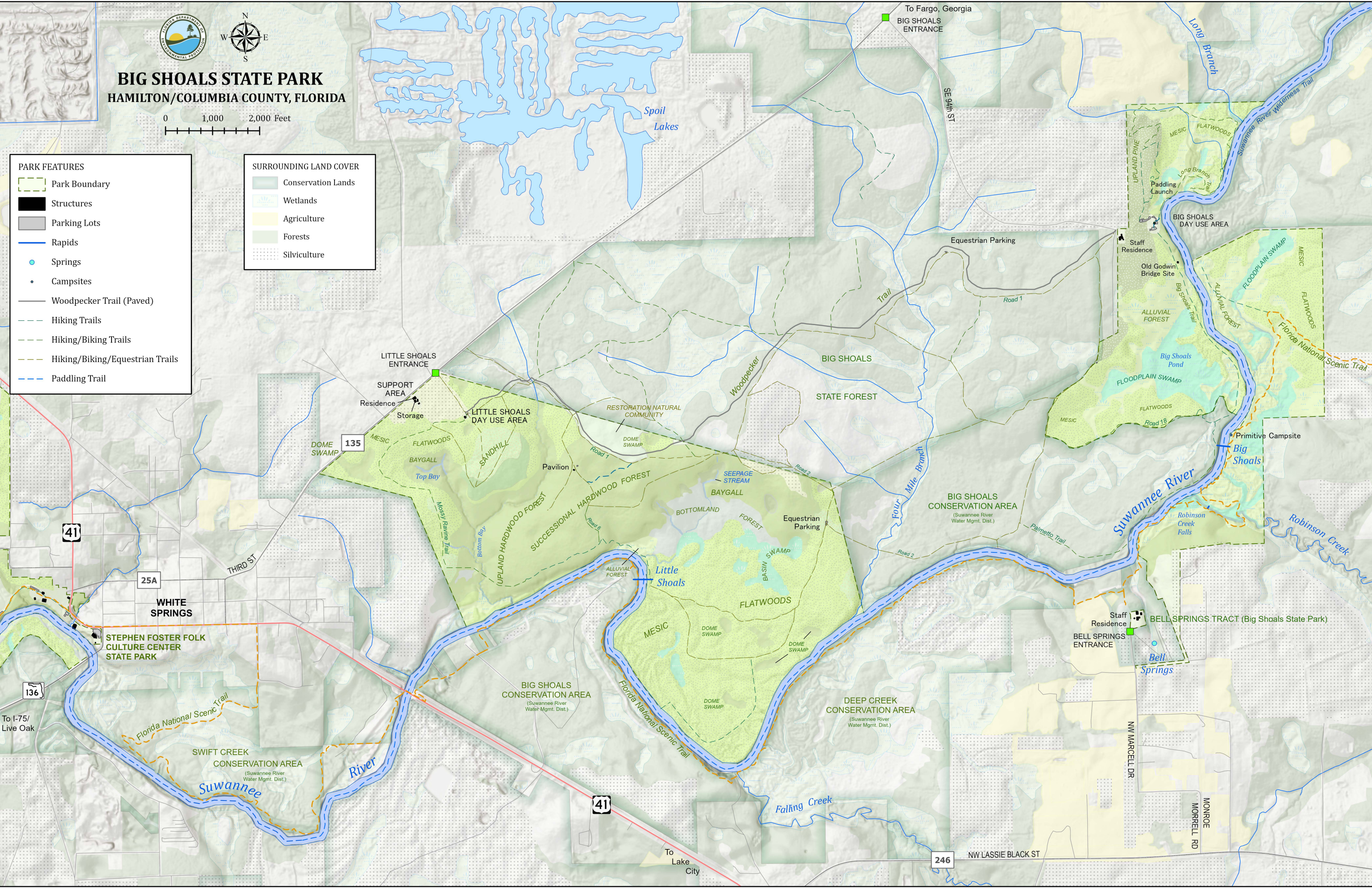


PARK FEATURES

- Park Boundary
- Structures
- Parking Lots
- Rapids
- Springs
- Campsites
- Woodpecker Trail (Paved)
- Hiking Trails
- Hiking/Biking Trails
- Hiking/Biking/Equestrian Trails
- Paddling Trail

SURROUNDING LAND COVER

- Conservation Lands
- Wetlands
- Agriculture
- Forests
- Silviculture



To I-75/
Live Oak

To Lake
City

To Fargo, Georgia
BIG SHOALS
ENTRANCE

WHITE
SPRINGS

BELL SPRINGS TRACT (Big Shoals State Park)

SWIFT CREEK
CONSERVATION AREA
(Suwannee River
Water Mgmt. Dist.)

BIG SHOALS
CONSERVATION AREA
(Suwannee River
Water Mgmt. Dist.)

DEEP CREEK
CONSERVATION AREA
(Suwannee River
Water Mgmt. Dist.)

NW LASSIE BLACK ST

NW MARCELL DR

MORRELL RD

MONROE

INTRODUCTION

LOCATION AND ACQUISITION HISTORY

Big Shoals State Park, which constitutes a portion of the Big Shoals Public Lands (BSPL), is located in Hamilton and Columbia counties (see Suwannee River Region Map). Access to BSPL is from U.S. Highway 41 north on County Road 135. The entrance to the Little Shoals area is found on County Road 135, while the Big Shoals area is accessed from County Road 135 to Old Goodwin Bridge Road (see Reference Map). The regional map also reflects significant land and water resources existing near the park.

Big Shoals Public Lands consists of conservation lands managed in cooperation with the Florida Department of Environmental Protection (DEP) Division of Recreation and Parks (DRP), Florida Forest Service (FFS), Suwannee River Water Management District (SRWMD), and Florida Fish and Wildlife Conservation Commission (FWC). The original acquisition of the area known as Big Shoals Public Lands was originally purchased from The Nature Conservancy (TNC) in 1986 through the Conservation and Recreation Lands (CARL) program. Fee simple title interest in these public lands is divided between the Board of Trustees of the Internal Improvement Trust Fund (Trustees) and the Suwannee River Water Management District. The FFS holds the Trustee lease on the northern 1,612.45 acres of the Hamilton County property known as Big Shoals State Forest. DRP holds the Trustee lease for the southwest portion of the property within Hamilton County and a smaller parcel located on the opposite side of the Suwannee River in Columbia County. These two portions of BSPL total 1,329.24 acres. The SRWMD owns 870.03 acres in the Hamilton County portion of BSPL and leases 351.76 acres to DRP. This totals 1,681 acres of DRP managed lands that comprise Big Shoals State Park. FWC regulates recreational hunting in the Big Shoals Wildlife Management Area, an approximately 2,130-acre portion of the property that includes FFS and SRWMD land (see Agency Boundary Map).

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

SECONDARY AND INCOMPATIBLE USES

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

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

In accordance with 253.034(5) F.S., the potential for generating revenue to enhance management was also analyzed. Visitor fees and charges, timber harvesting and FWC licenses are the principal source of

revenue generated by the property. Techniques such as entrance fees, concessions and similar measures will be employed on a case-by-case basis as a means of supplementing management funding. Generating revenue from consumptive uses or from activities that are not expressly related to resource management and conservation is not under consideration.

PURPOSE AND SIGNIFICANCE OF THE PARK

Park Purpose

The purpose of Big Shoals Public Lands (BSPL) is to protect in perpetuity a wild and scenic stretch of the Suwannee River, including the largest section of whitewater in Florida, and to provide access to its unique vistas, upland watershed, and river floodplain.

Park Significance

- Big Shoals State Park is part of the only multi-agency collaborative management unit in Florida, protecting miles of the Suwannee River with the only Class III whitewater rapids in the state, which are visible from the high banks of the Suwannee River.
- Protects several prominent hydrological features including three named blackwater streams, Robinson Branch (Long Branch and Four Mile Branch) and several unnamed streams, significant seepage wetlands (Top Bay and Bottom Bay), and numerous forested wetlands. Steep slopes above the river are covered by an outstanding upland hardwood forest traversed by blackwater and seepage streams flowing to the Suwannee.
- Within BSPL, 15 distinct natural communities and 17 imperiled plant and animal species are present. These include Chapman's sedge (*Carex chapmanii*), Suwannee alligator snapping turtle (*Macrochelys suwanniensis*), gopher tortoise (*Gopherus polyphemus*) and the wood stork (*Mycteria americana*). BSPL contains a unique representative sample of nearly all the region's ecosystems.
- Several cultural resource sites are present, including an early 19th-century homestead, historic bridge remnants, and the site of a former turpentine camp.
- Situated within one of the least urbanized and sparsely populated portions of Florida, the park offers a rare sense of solitude and remoteness that can be experienced by hikers or paddlers along the extensive mileage of upland trail and river.

Central Park Theme

Traverse Florida's ancient geology at Big Shoals State Park, where pronounced bluffs overlook thunderous whitewater displays of nature's beauty and power.

Big Shoals State Park is classified as a state park in the DRP unit classification system. In the management of a state park, balance is sought between the goals of maintaining and enhancing natural conditions and providing various recreational opportunities. Natural resource management activities are aimed at the management of natural systems. Development in the park is directed toward providing public access to and within the park, and to providing recreational facilities, on a reasonable balance,

that are both convenient and safe. Program emphasis is on interpretation of the park's natural, aesthetic, and educational attributes.

OTHER DESIGNATIONS

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

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

PARK ACCOMPLISHMENTS

- Treated 907 acres with prescribed fire in fiscal year 2020-21 and 474 acres in fiscal year 2021-22.
- Treated 2 acres of invasive plant species in fiscal 2020-21 and two acres of invasive plant species in fiscal year 2021-22.
- Restored 134 acres of longleaf pine on the Big Shoals tract in fiscal year 2020-21 and 98 acres in fiscal year 2021-22.
- Welcomed 10,872 estimated day-use visitors in fiscal year 2020-21 and 12,241 in fiscal year 2021-22.

RESOURCE MANAGEMENT COMPONENT

Big Shoals State Park Management Zones			
Zone ID	Acreage	Managed with Prescribed Fire	Cultural/Historical Indicator
BSH-2Dw	54.46	N	N
BSH-2L	10.28	N	Y
BSH-1A	103.2	Y	Y
BSH-1B	36.42	Y	Y
BSH-1C	16.63	Y	Y
BSH-1D	96.69	Y	N
BSH-1E	13.08	Y	Y
BSH-2A	132.3	Y	Y
BSH-2B	54.3	N	N
BSH-2C	35.02	Y	Y
BSH-2Dn	51.42	Y	N
BSH-2Ds	157.51	Y	Y
BSH-2En	42.03	Y	N
BSH-2Es	33.9	Y	N
BSH-2F	47.33	Y	N
BSH-2G	35.16	Y	N
BSH-2J	21.86	Y	N
BSH-2K	86.04	Y	Y
BSH-3	304.13	Y	Y
BSH-4A	114.25	Y	Y
BSH-4B	235.01	Y	Y

TOPOGRAPHY

Topographic relief within BSPL varies from flat plateaus to steep slopes and ravines (see Topographic Map). Elevations range from about 135 feet mean sea level (msl) to below 55 feet msl along the Suwannee River channel. Large ravines form the backbones of local drainage systems. At the western end of BSPL in Hamilton County, interconnected wetlands outside the property coalesce to form the Top and Bottom Bay ravine system inside. Waters within this ravine system ultimately flow into the Suwannee River. Another significant topographic feature is the Robinson Branch drainage, which is located in the Columbia County portion of BSPL.

On the Hamilton County side of the Suwannee River, a steep bluff provides a scenic view of the river. The northeastern portion of this bluff slopes downward onto a flat expanse of flatwoods that extends to the river. Another smaller bluff parallels the Four Mile Branch drainage where it enters the river. Less pronounced, smaller slopes are associated with the Long Branch drainage system in the northern part of the SRWMD property. Numerous shallow depressions occur throughout the BSPL.



BIG SHOALS STATE PARK
Management Zones

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.

The Big Shoals in the Suwannee River, for which the property is named, is the largest whitewater rapids in the state. A smaller set of rapids, Little Shoals, occurs downstream of Big Shoals. Both of these shoals occur because of the presence of dolomitic and silicified sediments that are relatively more resistant to fluvial processes than other sediments in the exposed geologic formation.

The natural terrain on BSPL property appears to have experienced few alterations other than construction of roads (including the paved Woodpecker Trail), firebreaks and recreational trails. Some of the steep slopes above the Suwannee River have become eroded due to recreational use. Also, a few small ditches were created to drain wetlands prior to state acquisition. Erosion issues will be described in the Soils section below.

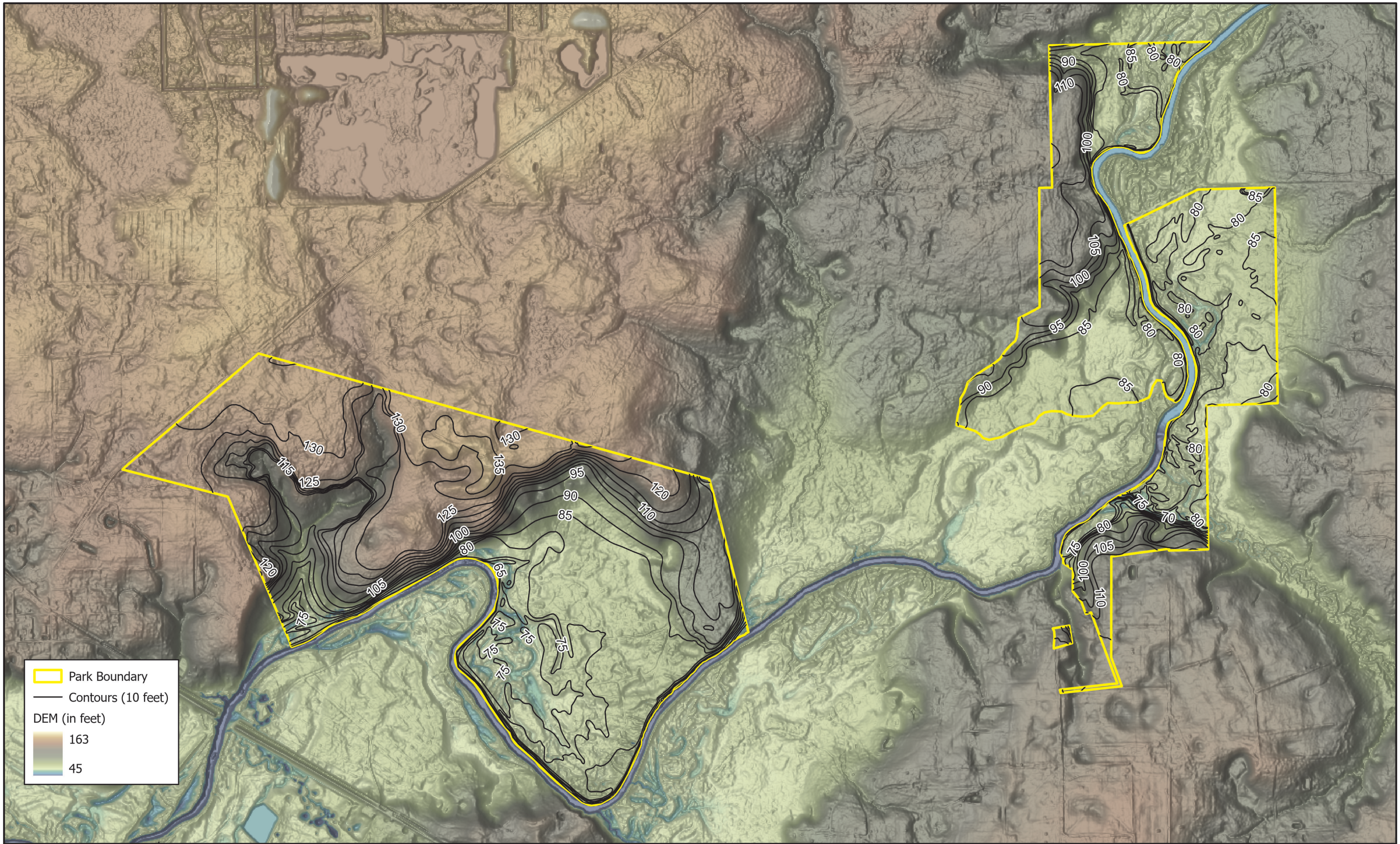
SOILS





Twenty-five soil types are found within BSPL (see Soils Map). There are 16 soil types found in the Hamilton County section of BSPL and nine soil types within the Columbia County portion of the property (Weatherspoon et al. 2004; Howell 1984). A complete description of the soils in BSPL can be found in Addendum 4. Soils at BSPL can range from well-drained sands of the uplands to frequently flooded, hydric soils of the floodplains and basins.

Areas of BSPL that are most prone to significant soil impacts include roads, fire breaks and trails, especially ones that are located along the steep banks of the Suwannee River. Significant areas of erosion can also be found in places along the Suwannee's primary levees where visitors try to traverse the steep banks. One example of this occurs along the Big Shoals hiking trail. From the Big Shoals overlook, visitors can get a glimpse of a unique geologic feature from high above the river's edge. The site features a steep drop down to the river and its rapids, but visitors often manage to make the descent. This has caused erosion gullies to form on the steep banks. In 2010, staff and volunteers constructed a boardwalk and platform overlook above Big Shoals that was designed to allow aesthetic views of the river and reduce the potential for soil erosion.

Recreational use of the BSPL trail system can also cause extensive soil erosion on the bluffs and levee system of the Suwannee River as well as in adjacent forested wetlands. The BSPL trail system accommodates both hikers and mountain bikes, and in some areas equestrians. Most of these unimproved trails follow gently undulating topography through the property, but occasionally the trail is routed onto more erosion-prone areas along the steep banks of the Suwannee River or adjacent wetlands. A bike and hiking trail, which follows the contours of the large bluff on the west side of the river, is developing erosion issues. In one section a deep hole has developed in the middle of the trail. Other steep sections of the trail that include creek, seep, and river levee crossings may develop erosion problems as trail use increases. This erosion, particularly where the trail is being undercut by cavities, needs to be addressed before it progresses further. It is well known that all trails will eventually suffer from the effects of soil erosion in the absence of an adequate maintenance plan (Bratton et al. 1979). A Trail Management Plan for the recreation trails of BSPL is needed to evaluate these issues.

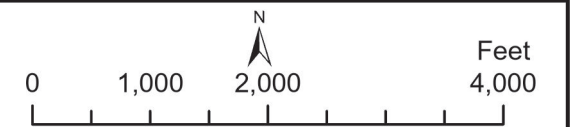
Another disturbed area along the banks of the Suwannee is located in the Columbia County section both above and below the Big Shoals. Foot traffic from canoeists and kayakers who are ascending or descending riverbanks as they bypass the rapids at Big Shoals has caused significant riverbank erosion.



 Park Boundary
 Contours (10 feet)
 DEM (in feet)
 163
 45



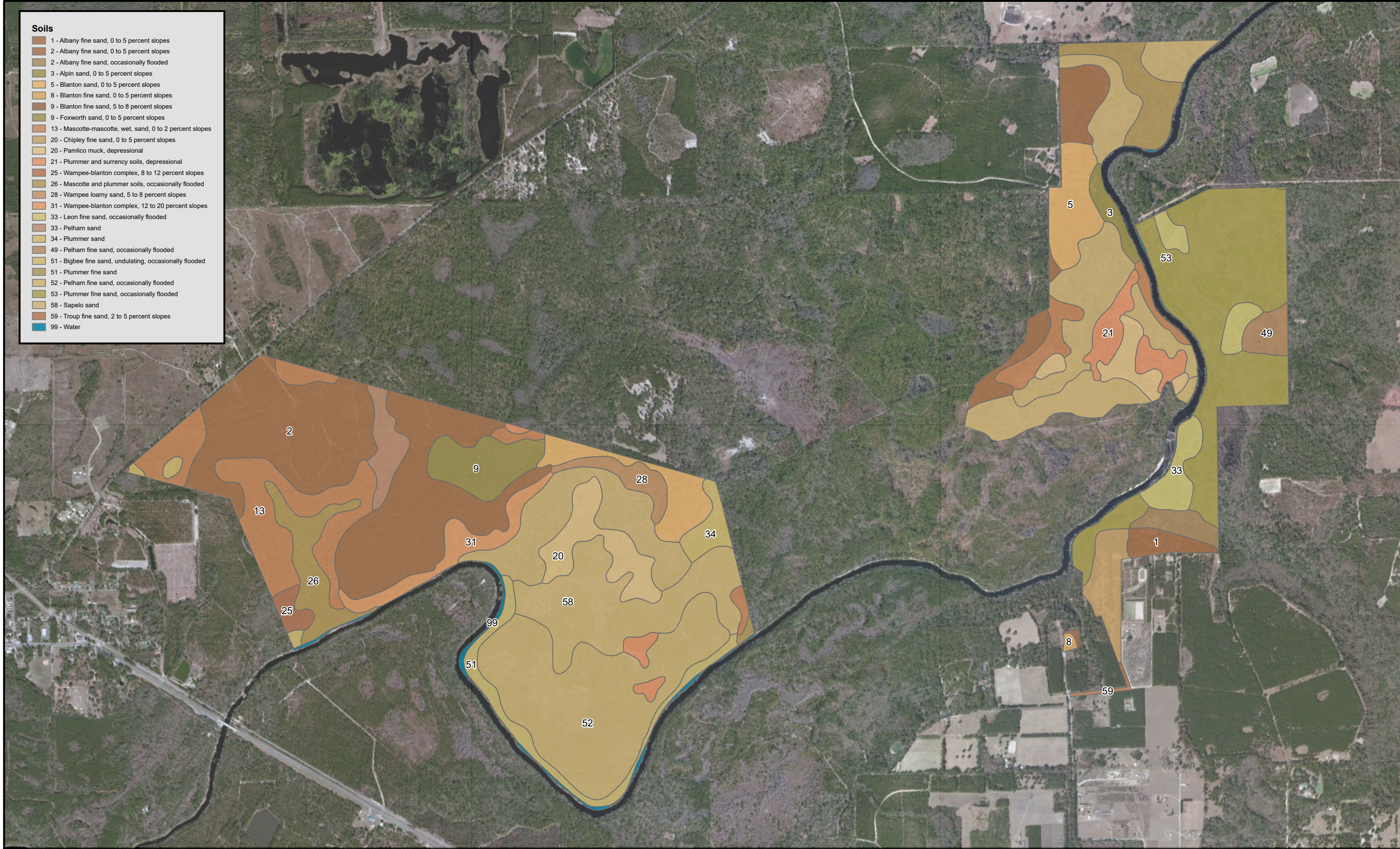
BIG SHOALS STATE PARK
Topography



Sources: ESRI; Florida Department of Environmental Protection
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Soils

- 1 - Albany fine sand, 0 to 5 percent slopes
- 2 - Albany fine sand, 0 to 5 percent slopes
- 2 - Albany fine sand, occasionally flooded
- 3 - Alpin sand, 0 to 5 percent slopes
- 5 - Blanton sand, 0 to 5 percent slopes
- 8 - Blanton fine sand, 0 to 5 percent slopes
- 9 - Blanton fine sand, 5 to 8 percent slopes
- 9 - Foxworth sand, 0 to 5 percent slopes
- 13 - Mascotte-mascotte, wet, sand, 0 to 2 percent slopes
- 20 - Chipley fine sand, 0 to 5 percent slopes
- 20 - Pamlico muck, depressional
- 21 - Plummer and surrency soils, depressional
- 25 - Wampee-blanton complex, 8 to 12 percent slopes
- 26 - Mascotte and plummer soils, occasionally flooded
- 28 - Wampee loamy sand, 5 to 8 percent slopes
- 31 - Wampee-blanton complex, 12 to 20 percent slopes
- 33 - Leon fine sand, occasionally flooded
- 33 - Pelham sand
- 34 - Plummer sand
- 49 - Pelham fine sand, occasionally flooded
- 51 - Bigbee fine sand, undulating, occasionally flooded
- 51 - Plummer fine sand
- 52 - Pelham fine sand, occasionally flooded
- 53 - Plummer fine sand, occasionally flooded
- 58 - Sapelo sand
- 59 - Troup fine sand, 2 to 5 percent slopes
- 99 - Water



BIG SHOALS STATE PARK
Soils



Sources: ESRI; Florida Department of Environmental Protection
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HYDROLOGY

BSPL is located within Hamilton and Columbia counties, specifically along the Suwannee River. The park is a short distance upstream of the town of White Springs, Florida. The Suwannee River Water Management District (SRWMD) has calculated flood elevations for BSPL for the two-, 10- and 100-year flood events along the River Mile 171-178 stretch of the Suwannee River. All data are expressed as feet above mean sea level (MSL).

Suwannee River Flood Elevations				
Event	2-year	10-year	100-year	Flood of Record
River Mile 171	70.7	81.2	88.3	88.6 at White Springs
River Mile 178	74.7	96.2	92.3	88.6 at White Springs

The Suwannee River meanders along a southwesterly course for about 245 miles from its headwaters in Okefenokee Swamp in southeastern Georgia before emptying into the Gulf of Mexico (Ham and Hatzell 1996). The entire Suwannee basin drains an area of 9,950 square miles (Hornsby et al. 2003). Three significant tributaries drain into the Suwannee downstream of White Springs: the Withlacoochee, Alapaha and Santa Fe rivers. Nearly 57% of the entire Suwannee basin lies in Georgia (Farrell and Upchurch 2005). The Suwannee River is a Class III waterbody and is designated as an Outstanding Florida Water in Rule 62-302.700(9) (i), Florida Administrative Code. In 1987, the SRWMD delegated the Upper Suwannee River as a top priority water body under the Surface Water Improvement and Management Act (SWIM), Section 373.451 Florida Statutes (SRWMD 1988; SRWMD 2017; SRWMD 2023).

The section of the Upper Suwannee River above White Springs encompasses a drainage area of approximately 2,643 square miles, which includes a wetland area of indeterminate size within the Okefenokee Swamp in southeastern Georgia (DEP 2003). The mean annual flow rate of the Suwannee River at White Springs is 2,290 cubic feet per second for the period of record from May 1906 to December 1908, and from February 1927 to the current year (U.S. Geological Survey 2023). The highest flow measured was in 1948 at 6,806 cubic feet per second and the lowest flow was in 2011 at 71.1 cubic feet per second. In the upper reaches of the Suwannee, especially above White Springs, stream flow is primarily dependent on surface water runoff. Confining beds over 300 feet deep in the area prevent discharge from the Floridan aquifer, so groundwater is generally not an important water source for the Suwannee in the upper basin. Below White Springs, the river is increasingly fed by groundwater.

The stretch of the Suwannee River where the BSPL property encompasses both riverbanks contains two significant limestone outcroppings. The easternmost karst feature is named Big Shoals, while the western feature is called Little Shoals. Both rocky outcroppings are clearly exposed during periods of low flow, but flood stage transforms them into Florida's only Class III whitewater rapids.

BSPL contains numerous other prominent hydrological features, including three named blackwater streams (Robinson Branch, Long Branch and Four Mile Branch), several unnamed streams, significant seepage wetlands (Top Bay and Bottom Bay), and numerous forested wetlands. Robinson Branch is perhaps the largest intermittent blackwater stream within BSPL. This stream originates outside of state lands in forested wetlands of Osceola National Forest and passes through the Columbia County portion of BSPL before emptying into the Suwannee River.

Long Branch and Four Mile Branch flow through the Hamilton County portion of BSPL. Their headwaters are located just outside BSPL at the southern end of a large-scale strip mining and fertilizer manufacturing complex. The area of potential development for this mining operation, which has been in existence since the early 1960s, spans more than 75,000 acres. One Mile Bay and Cabbage Head Bay are two forested wetlands that once fed Four Mile Branch. Mining at One Mile Bay took place prior to 1990 and at Cabbage Head Bay from 2011-13.

In the early 1980s, Hamilton County mining operations withdrew an average of 28.8 million gallons of groundwater per day from the Floridan aquifer (Ceryak et al. 1983). During the nine-year period from 1987-1995, annual groundwater withdrawals at this facility averaged 42 million gallons per day, with the highest average (i.e., 53 million gallons per day) recorded in 1988. From 1996-2012, the average withdrawal was 30 million gallons per day (St. Johns River Water Management District (SJRWMD) 2014). Water scientists have documented that groundwater withdrawals associated with Hamilton County mining operations have contributed to significant aquifer drawdowns within local watersheds and have also affected flows at a second-magnitude spring, White Sulphur Spring, located in nearby Stephen Foster Folk Culture Center State Park (Ceryak et al. 1983; Mirti 2001; SJRWMD 2014; SJRWMD 2023). Surface water hydroperiods and groundwater resources within local watersheds may be adversely impacted (Lewelling et al. 1998; Bacchus 2006; Southwest Florida Water Management District 2006; Kinkaid and Meyer 2009).

A portion of One Mile Bay also serves as the headwaters of Top Bay and Bottom Bay, two large baygalls that contribute surface waters to a seepage stream that passes through an extensive ravine system en route to the Suwannee River. Water supply for seepage streams is closely tied to local precipitation and flow rates tend to be highly variable. In the absence of rainfall, groundwater seepage may be the only water source for these streams, but exactly what contribution the surficial aquifer makes is unknown. Nevertheless, lateral seepage seems to be maintaining water input to the bays, and indirectly to the seepage stream as well.

Regionally, in the upper Suwannee River basin there are three aquifer systems (Ceryak et al. 1983). The surficial aquifer consists of sand and clayey sand layers ranging from 20 to 150 feet thick. These layers are situated above the confining Hawthorn Formation. Recharge of the surficial aquifer occurs through percolation of rainwater and increased river flows. Water is discharged from the surficial by means of evapotranspiration, lateral seepage and percolation into underlying aquifers via breaches in the Hawthorn. A secondary artesian aquifer is located in the sand and limestone layers of the lower Hawthorn Formation. Recharge is chiefly via the surficial aquifer. Discharge occurs laterally along the Cody Scarp and into streams that have cut through confining strata into this aquifer. The Floridan aquifer is the principle artesian freshwater reserve for north-central Florida. Composed of carbonates that were deposited during the Tertiary Period, the Floridan may attain a thickness of 1,250 feet in the Big Shoals area (Meyer 1962; Ceryak et al. 1983).

Locally, the Floridan aquifer is confined, but recharge can occur when water leaks through breaches in the overlying, confining beds of the Hawthorn Formation (Ceryak et al. 1983). Recharge can also occur when the Suwannee River reaches flood stage and when springs and other karst features begin to act as “siphons” or inflow points into the Upper Floridan (Gulley et al. 2011). The mixing of surface water and groundwater can cause substantial changes in groundwater quality (Katz et al. 1999; Katz and Hornsby 1998; Berndt et al. 1998). Normally, the water level of the river is lower than the piezometric surface of the aquifer, resulting in discharge of water at springs and seeps where they occur along the course of the Suwannee.

Many water management experts now acknowledge that there has been a significant lowering of the Floridan aquifer in parts of north Florida (Grubbs and Crandall 2007; Gao et al., 2010; Renken 2011). Water managers understand that springshed boundaries can change naturally over time, but they also recognize that consumptive overuse and contamination of groundwater within springsheds can be especially detrimental to the springs within them (Upchurch and Champion 2004). Recent research has revealed that a significant area of groundwater supply in the eastern part of the SRWMD that is considered a groundwater divide between the SRWMD and the St. Johns River Water Management District has declined. This decline has led to a westward shift in groundwater potentiometric contours (Grubbs and Crandall 2007). The groundwater divide between the two districts has migrated further west. East of the divide, groundwater now tends to flow in an easterly direction rather than westerly toward springs in the upper Suwannee basin. It is unknown at this time whether the westward shift of the groundwater divide will have a significant impact on groundwater resources in the Big Shoals area.

Given the two most recent significant droughts (i.e., 2001-02 and 2010-12) and the increasing consumptive use of groundwater resources, hydrologists have become concerned about lowered water tables and decreased spring flows throughout the Suwannee River basin. Both the SRWMD and the SJRWMD are now closely coordinating their regional monitoring programs and water supply planning for north Florida. The SRWMD is currently developing Minimum Flows and Levels (MFLs) for the Upper Suwannee River. There is currently no scheduled completion date.

In the 1990s, DEP began a statewide long-term water monitoring program that based surface water assessments on the state's natural hydrologic units. This program uses a watershed approach to provide a framework for implementing the Total Maximum Daily Load (TMDL) requirements necessary for restoring and protecting water quality in specific waterbodies (Hallas and Magley 2008). Implementation of a Basin Management Action Plan (BMAP) is DEP's primary resource for addressing specific water quality issues (DEP 2013).

State water managers have monitored surface and groundwater quality of water bodies throughout the Upper Suwannee River above White Springs since 1980 (Hand et al. 1990; Hand and Paulic 1992; Hand et al. 1994; Hand et al. 1996). Much of the important hydrological information collected, stored, and managed by various agencies can now be accessed through a variety of web-based databases (FDEP, 2015a; FDEP, 2023; SRWMD 2023).

Well monitoring for groundwater quality occurs at various locations throughout the region. This includes DEP background and geological monitoring sites, groundwater contamination sites, waste management facilities, brownfield sites, Class V non-ASR sites, and private wells. At least 194 wells located within 10 miles of BSPL have undergone various levels of sampling over the years (DEP 2015b). There are no Very Intense Study Area (VISA) wells within the immediate vicinity of BSPL. However, DEP is closely monitoring 17 VISA wells in Live Oak, Florida, 15 miles west of BSPL.

There are five active stations monitoring surface water quality along the upper Suwannee River basin in the BSPL area. All stations are maintained by the SRWMD as a part of the SWIM program. The stations closest to BSPL include one located on Robinson Branch, two along Falling Creek, one along Deep Creek and one just below White Springs. The DEP Northeast District monitors four biological reference sites where several water quality parameters are measured. One of these sites is on Robinson Branch, another is on Falling Creek, and two others are on creeks upstream of BSPL.

The only major point source discharge contributor within the Upper Suwannee River planning unit is associated with the large Hamilton County mining operation mentioned above (DEP 2001, DEP 2003). Mining operations have been permitted with a capacity to discharge up to 226.9 gallons per day of treated effluent into at least three named blackwater streams (Swift Creek, Camp Branch and Hunter Creek) that drain into the Suwannee River (DEP 2003). Hunter Creek is located upstream of BSPL, while the other two are downstream. Water managers have documented that effluent discharges have contributed to significant nutrient loading in the three creek systems. This includes ammonia, phosphorus, organic nitrogen, sulfates, fluorides, and fecal coliform bacteria (Hand et al. 1994; Ham and Hatzell 1996; DEP 1992; DEP 2000a; DEP 2000b; DEP 2000c; DEP 2008; DEP 2014). Scientists have also conducted comparisons between altered streams used for mine discharge and local reference streams. Those comparative studies have specifically demonstrated the detrimental effects of ammonia toxicity on certain aquatic macroinvertebrates such as larval mayflies (DEP 1992; DEP 1995; DEP 1998).

As of 2016, there have been no permitted discharge releases into any of the blackwater streams at BSPL. Four Mile Branch and the unnamed stream that joins the seepage stream at Bottom Bay have the highest probability of being impacted by mining operations outside BSPL. Since the streams originate on or near lands being mined for phosphates, the water quality could be degraded if effluent from the mining operations reaches them. Significant changes in water chemistry could threaten water quality throughout the drainage area. Additionally, natural communities within BSPL may face a decline in seepage flow if mining operations withdraw large quantities of groundwater.

In December 2009, a sinkhole collapse at the Hamilton County Mine Complex caused 82 million gallons of processed water containing gypsum acid to be released into the Upper Floridan aquifer (DEP 2014). This release was successfully contained onsite, but water management officials subsequently increased the water quality monitoring at private and public wells throughout the region. It is unknown what effects the release may have had on groundwater resources or aquatic cave fauna within BSPL.

According to the 2003 DEP Basin Status Report for the Upper Suwannee River planning region, no known verified impaired water bodies occur within the planning unit above White Springs (DEP 2001, DEP 2003). However, in 2014 DEP developed the first ever basin wide TMDL for the entire Suwannee River (Rojas 2014). Several blackwater tributaries of the Upper Suwannee above White Springs were listed as verified impaired waterbodies based on high fecal coliform levels, which means that their surface waters do not meet applicable state water quality standards.

BSPL contains numerous fire lines that should be inspected to determine if any are negatively affecting hydrological resources. If a fire line is causing hydrological disturbance or is no longer necessary, it should be restored to the greatest extent practical. Fire line construction should follow best management practices. The seven low water crossings within the BSPL should also be inspected and maintained regularly to prevent sedimentation, turbidity and degradation of affected water bodies.

Assessment of Needs

Objective: Assess the park's hydrological restoration needs.

Actions:

- Continue to maintain interagency collaboration and close ties with independent researchers engaged in hydrological research and monitoring in the upper Suwannee basin.

- Seek SRWMD assistance in establishing water flow monitoring programs at two blackwater streams, Robinson Branch and Top/Bottom Bay.
- Continue to track agency monitoring of surface water and groundwater quality in the BSPL area.
- Continue to monitor land-use or zoning changes on properties near BSPL, including mining areas.
- Continue to cooperate with the SRWMD in ensuring that MFLs for the Upper Suwannee River are expeditiously implemented.

The most significant hydrological features within BSPL are four blackwater streams (Long Branch, Robinson Branch, Four Mile Branch and Top/Bottom Bay) and the Suwannee River. Since the 1960s, a Hamilton County mining complex has expanded its potential development area to over 75,000 acres. Water quality and quantity issues associated with regional development include industrial effluent wastewater treatment, increased groundwater withdrawals and significant reductions in acreage of functional forested wetlands. Regulatory agencies have determined that specific segments of the Upper Suwannee River are impaired because of high fecal coliform levels. The following are hydrological assessment actions recommended for BSPL.

The BSPL managing agencies will continue their close cooperation with state and federal agencies and independent researchers engaged in hydrological research and monitoring within BSPL and on the Suwannee River. They will rely upon agencies such as the SRWMD, USGS, and DEP to keep apprised of any declines in surface water quality or suspected contamination of groundwater in the region. BSPL staff will continue to monitor Environmental Resource Permit and Water Use Permit requests for the region to provide comments that promote protection of BSPL water resources. The BSPL staff should work with the SRWMD to implement water level monitoring in Robinson Branch and Top/Bottom Bay to document potential ecological responses to nearby mining activities in Hamilton County. The agencies will continue to support SRWMD efforts to ensure that MFLs already developed for the Upper Suwannee River are implemented within a reasonable timeframe.

BSPL managing agencies will continue to monitor land-use or zoning changes on properties bordering BSPL, particularly major ground disturbances or inadequate treatment of runoff into local streams that could ultimately degrade BSPL resources. When appropriate, BSPL staff will provide comments to other agencies regarding proposed changes in land use or zoning. BSPL staff will also closely monitor any changes in mining operations or consumptive use permitting in the upper Suwannee River basin that may adversely affect BSPL resources.

Restoration

Objective: Restore hydrological conditions to approximately 1.5 acres of blackwater stream and 12 acres of floodplain swamp natural communities.

Actions:

- Evaluate the extent of hydrological disturbance along Robinson Branch and initiate corrective actions as appropriate.
- Develop plans for eliminating a vehicular ford across Robinson Branch, establishing a new non-public crossing upstream (substituting a basic bridge for the ford), and restoring the old crossing site to the extent possible.

Erosion of steep slopes and sedimentation of Robinson Branch has occurred over the years due to lack of access throughout much of the Columbia County portion of BSPL. Depending on water levels, access by staff has often been restricted, and erosion of banks and the stream bottom is evident. The following hydrological restoration actions are recommended for BSPL.

DRP will develop plans to restore the ford site and provide an alternative crossing designed to eliminate erosion and sediment buildup in Robinson Branch while allowing year-round vehicular access for staff. The BSPL managing agencies will evaluate other hydrological alterations in BSPL that may have negatively affected natural hydrology. If necessary, the agencies will initiate corrective actions such as installing low water crossings or culverts in appropriate locations.

Managing agency staff will comply with best management practices to maintain the existing water quality onsite and will take appropriate action to prevent future soil erosion or other impacts to significant water resources.

Monitoring and Evaluation

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

Actions:

- Investigate and implement best management options for mitigating erosion in public access areas and at low water crossings and roads.
- Develop and implement a trail management plan that addresses erosion issues on BSPL recreational trails.
- Monitor areas prone to erosion.

BSPL staff will investigate best management options for mitigating erosion in public access areas such as the slopes of the BSPL hike and bike trail system. DRP will develop and implement a trail management plan for the BSPL bike trails. This plan will define expectations of a well-maintained and sustainable trail system and educate all stakeholders about resource protection needs at BSPL.

Staff will regularly monitor areas of BSPL that are prone to erosion. To minimize erosion during strong storm events, staff may need to install additional water bars on roads and trails that divert stormwater into surrounding woodlands, thereby encouraging natural infiltration. Wherever necessary, BSPL land managers will adopt corrective measures to reduce the impacts of soil erosion on water resources.

NATURAL COMMUNITIES

Mesic Flatwoods

Mesic flatwoods is the dominant natural community at BSPL. In this resource assessment report for the Florida Natural Areas Inventory, J. Merrill Lynch (1984) considered the mesic flatwoods at BSPL to be “one of the best examples of this natural community found along the upper Suwannee River.” These flatwoods range from relatively intact areas dominated by longleaf pine to disturbed areas having few pines. Loblolly pines (*Pinus taeda*) and invasive hardwoods dominate many previously disturbed areas. Some areas of mesic flatwoods in good condition are dominated by slash pine (*Pinus elliottii*) rather than longleaf pine, particularly in the eastern portions of the property. Hooded pitcher plants (*Sarracenia minor*) are present in some areas (Johnson 2001). The overall condition of the mesic flatwoods ranges from fair to good.

Fire history in the flatwoods ranges from frequent to very infrequent. Some of the long-unburned areas have accumulated a deep layer of duff. Invasion by fire-intolerant species such as laurel oak (*Quercus laurifolia*), water oak (*Quercus nigra*) and loblolly pine due to fire suppression is a problem in some areas.

In recent years, as a result of wildfires and prescribed fires in fire-suppressed zones and a high forest density of loblolly and other southern pines, pine beetle outbreaks have occurred. These infestations resulted in the thinning or clear-cutting of portions of the mesic flatwoods. The flatwoods in the northern part of BSPL are often dominated by loblolly pine rather than longleaf due to a more intensive history of timber management, fire exclusion and other factors prior to state management.

Past restoration efforts in this area included timber harvesting of off-site hardwoods and loblolly pine, retaining longleaf pines, prescribed fire, site preparation and hand-planting of longleaf pine.

Frequent use of prescribed fire and additional plantings of longleaf pine in mesic areas or slash pine in the wetter ecotones are critical to continuing the restoration process in the mesic flatwoods. In some of the flatwoods, the presence of dense saw palmetto and gallberry understory may necessitate the use of chemical or mechanical site preparation to facilitate the establishment of planted pines. Portions of the flatwoods may need additional harvest or chemical treatment of off-site hardwoods, planting of pines and enhancement plantings of native groundcover.

Mesic Hammock

Mesic hammock at BSPL usually occurs on slopes or plateaus above bottomland forest, alluvial forest or upland hardwood forest. It often occurs in the narrow ecotone between wetland and upland natural communities. A typical example would be the strip of mesic hammock that separates sandhill, upland mixed woodland or upland pine from bottomland forest, alluvial forest or floodplain swamp along the Suwannee River. Development of mesic hammock in such areas may have been caused by inadequate fire frequency, perhaps a result of direct suppression. Mesic hammock at BSPL also occupies on higher ground on river levees adjacent to floodplain communities associated with the Suwannee River. The latter examples are located where landscape characteristics may greatly hinder the spread of fire from nearby fire-dependent communities.

No specific management is needed other than control of invasive plants on an as-needed basis. Minimal management measures will be used. The usage of prescribed fires in adjacent pyrogenic communities may be used to keep volunteer loblolly pine seedlings thinned to natural background levels.

Sandhill

Dominant canopy species in the BSPL sandhill community include longleaf pine, turkey oak, sand post oak and widely scattered sand live oak (*Quercus geminata*). Saw palmetto is occasional. Where the groundcover is in good condition, wiregrass dominates. Bracken fern (*Pteridium aquilinum*) and various forbs typical of sandhills are also present. The sandhill community often grades into upland pine, upland mixed woodland or mesic flatwoods. The dominance of turkey oak over mockernut hickory (*Carya tomentosa*) typically defines the boundary between sandhill and adjacent upland pine or upland mixed woodland communities.

Several areas of sandhill have experienced years of fire suppression and subsequent proliferation of sand live oak and invasion by laurel oaks. The native groundcover in the fire-suppressed areas can be

very sparse. The number of active gopher tortoise burrows also has diminished in these areas. In particular, the sandhill adjacent to the Little Shoals entrance has lost much of its herbaceous groundcover due to fire suppression. Another area of fire-suppressed sandhill is in the southeastern portion of the property between intact sandhill and the steep slopes leading to the Suwannee River. While this area is fire suppressed, the groundcover is intact. The sandhill community at BSPL ranges in condition from poor to good.

Off-site hardwoods and sand live oaks dominate some of the sandhills that have experienced long-term fire exclusion. Some areas also have relatively few large longleaf pines remaining. These areas will require additional hardwood reduction and prescribed fire to release suppressed herbaceous species and encourage longleaf pine recruitment. The sandhill just south of the Little Shoals entrance will require groundcover restoration. Otherwise, the continued use of frequent prescribed fire in the sandhills will be essential to maintaining community structure and ecological integrity. Additional lightning season burning will no doubt continue to improve sandhills that are already in fair to good condition.

Upland Hardwood Forest

Upland hardwood forest at BSPL occurs along the tops of valley walls and on steep slopes. Downslope, it grades into blackwater and seepage streams and in some areas, baygall. The highest quality upland hardwood forests in BSPL are dominated by swamp chestnut oak, American beech, southern magnolia, Florida maple and pignut hickory, in addition to other mesophytic hardwoods. Mid-story species include American holly, eastern hop hornbeam and eastern redbud. Needle palm (*Rhapidophyllum hystrix*), slender wood oats (*Chasmanthium laxum*) and beechdrops are found in the understory.

At the tops of the steep slopes, the upland hardwood forest gradually interfaces with sparse remnants of the upland mixed woodland community. Along this ecotone, swamp chestnut oak and needle palm mix with mockernut hickory, longleaf pine, dogwood and blackseed needlegrass (*Piptochaetium avenaceum*). In some areas because of historic fire suppression and land clearing, upland hardwood forest may encroach into the upland mixed woodland community.

In the previous management plan, the steepest of the forested slopes in BSPL had fit the Florida Natural Areas Inventory (FNAI) description of slope forest. Other high-quality hardwood forest areas found on less-steep slopes were mapped as upland hardwood forest. In 2010, however, FNAI botanists revised their definition of slope forest. Currently, only forested slopes in the Apalachicola River basin that serve as refugia for a particular suite of Appalachian species are designated as slope forests. Consequently, areas in BSPL that were formerly classified as slope forest have since been reclassified as upland hardwood forest. Most of the hardwood forest in BSPL is in excellent condition.

Upland hardwood forests typically require little active management. The main concern for this community type will be keeping it free of invasive plant species in the future. Feral hogs (*Sus scrofa*) may be a threat, especially in areas where beeches and beechdrops are prevalent. Steep slopes will need to be protected from potential erosion caused by recreational activities such as mountain biking.

Upland Mixed Woodland

In many areas, only remnant species indicate the former presence of upland mixed woodland at BSPL. The most notable indicator species of this community at BSPL is mockernut hickory. At BSPL, it is usually associated with longleaf pine, dogwood, southern red oak, sand post oak and blackseed needlegrass. The remnants of this community are mostly found along the upper edges of slopes that descend to the

Suwannee River and Four Mile Creek. Upland mixed woodland occurs as a transition between sandhill and the upland hardwood forest on the descent to the Suwannee and also as a transition to the mesic flatwoods close to Four Mile Creek. The upland mixed woodland west of Four Mile Creek has remnant groundcover that appears to be in fairly good condition. Indian plantain (*Arnoglossum floridanum*), occasional wiregrass and other species are still present. The upland pine natural community may be present here as well, but it is difficult to distinguish the two communities due to their current condition. The area recently had off-site hardwoods such as laurel oak harvested with the intention of improving the herbaceous understory and planting longleaf pine. The condition of the remaining groundcover will be easier to evaluate after the application of prescribed fire. Other areas that contain remnants of this community were in cultivation prior to 1937 because the soil is richer than that found in sandhills, and it is not as difficult to clear as upland hardwood forests.

Most of the upland mixed woodland at BSPL is in poor condition. Restoration of this community should begin where it is adjacent to intact fire-type natural communities. Off-site hardwoods such as laurel oak and sweetgum should be removed. Fire should be encouraged to penetrate upland mixed woodland when adjacent communities are burned. It will be necessary to supplement or in many cases restore the groundcover. Longleaf pine is the preferred species to be planted. The area next to Four Mile Creek should be a restoration priority because of the presence of some remnant native groundcover. An herbicide treatment is planned here to control re-sprouting of off-site hardwoods. Care should be taken to protect the remaining desirable trees such as southern red oak, mockernut hickory and sand post oak, as well as the remaining native groundcover. The area should be planted with longleaf pines.

Further evaluation of the condition of remnant patches of upland mixed woodland will be needed. It will be important to determine if the patches contain native groundcover remnants and are adjacent to intact fire-type communities to facilitate the reintroduction of fire. The upland mixed woodland should be burned whenever adjacent communities are burned, and managing agency staff should develop a restoration plan.

Upland Pine

Upland pine is transitional between upland mixed woodland and sandhill. Because the upland pine and upland mixed woodland communities at BSPL have both been subject to historical disturbance and fire suppression, it is now often difficult to distinguish between the two communities. Off-site hardwoods such as laurel oak have invaded the upland pine community in many areas and suppressed the herbaceous native groundcover.

The longleaf pine cover may be inadequate in certain areas, and off-site pines such as loblolly or slash may have supplanted them. Most of the upland pine at BSPL is in poor to fair condition. The optimal fire return interval for this community is two to three years.

Further evaluation of the condition of remnant patches of upland pine will be needed. It will be important to determine if they contain native groundcover remnants and are adjacent to intact fire-type communities to facilitate the reintroduction of fire. Upland pine should be burned whenever the adjacent communities are burned. Managing agency staff should develop a restoration plan for this community.

Xeric Hammock

An area of xeric hammock occurs in the southeastern part of BSPL along the ridge of the Suwannee River's primary levee. The sandy, well-drained ridges along the river are dominated by large evergreen oaks, with an understory that includes many species from the adjacent mesic flatwoods such as saw

palmetto. These levees are frequently impacted by flooding of the Suwannee River and do not appear to burn frequently. For lack of a better term, they are designated xeric hammock. The xeric hammock in BSPL is in good condition.

No additional management is needed other than controlling invasive plants on an as-needed basis.

Alluvial Forest

Alluvial forest occurs on lower elevations in the Suwannee River floodplain. Alluvial forests flood frequently, usually on an annual basis. They occur on slightly higher elevations than floodplain swamps, which are usually flooded for most of the year. The alluvial forest on the Hamilton County side of BSPL is somewhat limited in extent due to the presence of steep slopes along parts of the Suwannee River and to the domination of much of the 10-year floodplain by mesic flatwoods and basin swamps. Alluvial forest is likely limited to the two-year floodplain and would normally occur at elevations below 72 feet mean sea level at the downstream (western) end of the property and 78 feet mean sea level at the upstream (eastern) end.

The largest areas of alluvial forest are near Big Shoals Pond and its associated drainages and on the Columbia County side of the river within a large, diffuse floodplain area. Alluvial forest also occurs north of the Godwin Bridge. Limited amounts of alluvial forest are also found at confluences of blackwater stream tributaries of the Suwannee River and along natural levees associated with the Suwannee River.

The alluvial forest in BSPL was undoubtedly impacted during early logging efforts in the Suwannee River floodplain, but most of it now appears to be in relatively good condition. Some natural erosion occurs during flood periods. This erosion appears to have accelerated moderately on the Columbia County side of the property near the Big Shoals rapids due to increased use of the canoe/kayak portage trail located there.

Maintenance of the natural flooding cycles of the Suwannee River are important to the health of this natural community. The occasional populations of Japanese climbing fern (*Lygodium japonicum*) that are found along low riverbanks will need regular treatment with herbicide or hand removal.

Basin Swamp

Several large basin swamps occur within the mesic flatwoods at BSPL. Most of the basin swamps are in relatively good condition. The major overstory species are pond cypress and swamp tupelo. One basin swamp west of the intersection of Road 1 and Road 2 has an old ditch connecting to it.

Restoration and maintenance of the basin swamps will require restoration of natural hydrological regimes. All drainage ditches connected to basin swamps will need to be identified and their impacts on the associated basin swamps evaluated. Prescribed fires should be allowed to burn into the edges of basin swamps to maintain the natural ecotone between them and surrounding flatwoods.

Baygall

Baygalls are found within several areas of BSPL. Generally, they are in good condition. Baygalls typically occur near the bases of slopes where seepage provides a nearly constant supply of water. Some of the baygalls are located northeast of Little Shoals near the bottom of a slope on which upland hardwood forest grows. Another baygall is near the northern end of the Bottom Bay area to the north of Little Shoals. Some baygalls drain into Four Mile Creek while others occur within low depressions in mesic flatwoods rather than at the bases of hardwood forest slopes. The optimal fire return interval for

baygalls is 25-100 years. However, fires from adjacent fire-type communities should be allowed to enter baygall ecotones when moisture conditions are sufficient to discourage the ignition of peat fires.

In most cases, small, converging seepage streams are associated with the baygalls. However, blackwater streams drain the general vicinity of the baygall within Bottom Bay and the baygalls along Four Mile Creek.

Prescribed fires will be allowed to burn on the edges of the baygalls to maintain a natural ecotone. Under drier conditions, fires may penetrate or even pass through baygalls.

Bottomland Forest

Limited areas of bottomland forest have been identified within BSPL. Bottomland forest typically occurs on low-lying plateaus just above the floodplains of streams and rivers. At BSPL, however, most of the lower plateaus are covered by mesic flatwoods. The floodplain communities in the western portion of the property are relatively restricted due to the local topography. Upland hardwood forest tends to occupy the steep slopes that rise from the banks of the Suwannee River. The bottomland forest at BSPL is located just upslope of the alluvial forest which lies east of Little Shoals. Lynch (1984) also classified this area as bottomland forest, although it is not as typical an example as found elsewhere in the Suwannee River basin. This area rarely floods but is distinct from the upland hardwood forest located upslope. The bottomland forest occurs on terrain that is more level and that tends to have more evergreen hardwoods and loblolly pines in the canopy than does the upland hardwood forest. At BSPL, the bottomland forest may grade into baygall, basin swamp, alluvial forest, or mesic flatwoods.

The bottomland forest at BSPL has been timbered in the past, but it has recovered nicely and is now considered to be in good condition. Additional fieldwork will be needed to identify any additional bottomland forest that may occur within the Columbia County parcel.

As with most natural communities that are influenced by water, maintenance of a natural hydroperiod is the primary management action needed for bottomland forest. Protection from the impacts of feral hogs and invasive plants is also important.

Dome Swamp

Dome swamps at BSPL occur within a matrix of mesic flatwoods. Generally, they are in good condition. They are dominated by pond cypress and tend to be smaller and more circular in shape than the larger basin swamps that also occur within the mesic flatwoods. Dome swamps may be surrounded by a diverse herbaceous community, but fire suppression has made this less obvious.

Maintenance or restoration of natural hydrology is the most important management measure for these isolated wetlands. Allowing prescribed fires to penetrate domes from the surrounding natural communities will also be important in maintaining the domes and their associated diverse herbaceous fringes.

Floodplain Swamp

The floodplain swamps are in the eastern portion of BSPL on both the east and west sides of the Suwannee River. Most of them are located behind river levees that contain alluvial forest or mesic flatwoods. In 2007, the mesic flatwoods and floodplain swamp on the west bank of the Suwannee River burned for several weeks. That fire killed numerous trees in the swamp as well as in the surrounding mesic flatwoods.

Managing agency staff need to evaluate the fire-damaged floodplain swamp to determine if any tree replanting is necessary. Natural hydrology should be maintained or restored if any other areas of disturbance are identified.

Blackwater Stream

Several blackwater streams are found within BSPL, including the Suwannee River itself. BSPL contains approximately 6.25 miles of frontage along the Suwannee River in Hamilton County and 1.5 miles in Columbia County. Additional information about the Suwannee River is contained in the *Hydrology* section.

Other blackwater streams and their tributaries that flow through BSPL include Four Mile Branch, Long Branch, Robinson Branch, and a smaller unnamed stream that originates north of the park and passes through the Top Bay area. The upper reaches of Four Mile Branch pass through lands managed by the Florida Forest Service (FFS). Portions of the headwaters of Four Mile Branch and Long Branch are located north of State Road 135, partly on private lands that are mined for phosphate. The mineral rights on part of the FFS property north of State Road 135 are partially owned by a private individual. Another source of the headwaters of Four Mile Branch is located on FFS property south of State Road 135. PCS Phosphate owns mineral rights on this portion of the FFS property. To detect potential impacts from these mining operations, the water quality and quantity of Four Mile Branch and the unnamed stream that passes through Top Bay should be monitored periodically. Additional information on water quality issues is included in the *Hydrology* section.

Robinson Branch is a small blackwater stream that flows through the Columbia County part of BSPL on the east side of the Suwannee River. It originates within Osceola National Forest and empties into the Suwannee River just downstream of the Big Shoals. Robinson Branch must be crossed if one is trying to access the Columbia County portion of BSPL from the south. The current crossing is a fording site that is passable only at low water. The access road to the crossing descends a steep erosion-prone slope. Vehicles crossing Robinson Branch tend to stir up sediments in the streambed and elevate turbidity levels.

In general, however, water quality in Robinson Branch (as measured by the SRWMD and the DEP Northeast District) is considered to be good (Hand et al. 1994). The other blackwater streams in BSPL are also considered to be in good condition.

Protection of blackwater stream watersheds is a critical need for maintaining or enhancing water quality and quantity in these streams. A low water crossing at Robinson Branch would provide a more environmentally friendly crossing of the stream than does the current fording site where four-wheel drive vehicles tend to wallow out the streambed and cause increased erosion and sedimentation and reduced water quality.

Seepage Stream

In most cases at BSPL, seepage streams are associated with baygalls and upland hardwood forests. The seepage streams vary in length and are generally in good condition. Seepage streams northeast of Little Shoals originate along the face of the upland hardwood forest and descend to the Suwannee River floodplain. In several cases, these streams originate in or pass through baygalls located near the base of the slope. Another seepage stream originates in and passes through the Bottom Bay area. Although this stream receives some surface runoff, it appears to be mainly fed by seepage. It joins a larger blackwater

stream that emerges from the Top Bay area. Most of the seepage streams in BSPL have multiple water sources, including groundwater, direct runoff from the uplands during rainfall events and discharge from basin wetlands or baygalls. The predominant water source usually defines the type of stream.

Protection of the watersheds of seepage streams is important in maintaining and enhancing water quality and quantity.

Altered Landcover Types

Abandoned Field/Abandoned Pasture

The DFC for much of the abandoned pasture in BSPL is mesic flatwoods. When partially restored, these areas will have a longleaf pine canopy and an understory containing a mix of some native groundcover species as well as some of the remaining bahiagrass (*Paspalum notatum*).

BSPL contains two areas of abandoned pasture. One is adjacent to the Little Shoals entrance and the other occurs east of the intersection of Road 1 and Road 2. Planted pine was harvested from the sites in preparation for planting of longleaf pines.

The sites need to be burned on a 2–3-year fire return interval and planted with longleaf pines.

Canal/Ditch

The Desired Future Condition (DFC) for each of the ditches within BSPL corresponds to the natural communities through which they pass: upland mixed woodland, upland pine and upland hardwood forest (as defined by FNAI).

There are four short ditches within BSPL which may primarily serve the function of draining forest roads. The deepest section is about 2.5 feet deep.

The ditches should be evaluated to determine if any corrective actions are needed. The deepest ditch runs north of Road 1 into a basin swamp. This is just west of where Road 1 takes a sharp turn to the north prior to meeting Road 2.

Developed

There are several developed areas within BSPL ranging from staff residences to the Woodpecker Trail, canoe launch and picnic areas. A complete list of all the developed areas may be found in the *Land Use Component*. Most development is generally located away from riverbanks and the Suwannee River. The developed areas within BSPL will be managed to minimize their effects on adjacent natural areas. Priority invasive plant species (Florida Invasive Species Council (FISC) Category I and II species) will be removed from all developed areas. Other management measures will include implementation of proper stormwater management procedures and use of development guidelines designed to be compatible with prescribed fire management in adjacent natural areas.

Pine Plantation

A small area of pine plantation occurs on the east side of the Suwannee River. The desired future condition is upland mixed woodland.

Off-site slash pines were planted prior to acquisition by DRP. Since there are less than 10 acres of pine plantation, it is not economically feasible to harvest these pines at this time. No action is planned during this management plan.

Restoration Natural Community

The desired future condition for the restoration natural community sites described below will be upland mixed woodland and mesic flatwoods (as defined by FNAI).

There are six sites at BSPL that are considered to be restoration natural communities as defined by FNAI's description under Altered Landcover Types. Three sites have a DFC of upland mixed woodland/upland pine and three have a DFC of mesic flatwoods. Most of these areas had been cleared for agricultural fields or experienced pine harvesting and alterations in fire regime by the 1930s. Currently, they are in various stages of restoration. All sites have had the majority of off-site pines removed. Some sites have had herbicide applied to control off-site hardwoods, and one area has been planted with longleaf pines. One site has an understory of bahiagrass.

These areas need to continue a year fire return interval of two to three years and receive off-site hardwood control as needed. Longleaf pines should be planted throughout. Areas should be evaluated to determine if they need supplemental groundcover plantings or chemical control of invasive pasture grasses.

Successional Hardwood Forest

The long-term plan for the successional hardwood forest at Big Shoals State Park is to restore it to the natural communities that originally existed there, primarily upland mixed woodland and upland pine, but also some mesic flatwoods. The desired future condition for the upland areas of successional hardwood forest, after the initial phase of what will be an extended period of restoration, will be very basic versions of upland mixed woodland or upland pine (as defined by FNAI). When fully restored, sites will contain representative species such as longleaf pine, southern red oak and mockernut hickory. The sites will have a pyrogenic groundcover of appropriate native forbs and grasses and will have had most of the invading off-site hardwoods (e.g., laurel oak) eliminated from the restoration area. The restored mesic flatwoods will have a canopy of longleaf pines and a groundcover of low stature native shrubs, grasses and forbs as described above in the *Natural Communities* section.

The greatest extent of successional hardwood forest occurs east of Top Bay. This area was cleared to create agricultural fields prior to the 1930s. Some of it had been planted in cotton in the 1800s. This forest retains very little of its former community type. Today, just a few very widely scattered longleaf pines and some southern red oaks and mockernut hickories remain. Native groundcover is virtually absent. The area is now heavily dominated by laurel oaks and sweetgums. Successional hardwood forest areas that were formerly flatwoods retain more elements of the original natural community, at least in terms of native groundcover. Longleaf pines are sparse throughout, however. Restoration of these areas will require intensive multi-year efforts.

Substantial effort will be required to restore pyrogenic natural communities in areas that have changed to successional hardwood forest. Those areas will generally not be targeted for intensive restoration activities such as off-site hardwood removal until the natural communities that are still relatively extant in BSPL have been restored to the desired degree. However prescribed fire in the altered areas will continue. The fire return interval should be no greater than 10 years for some areas and at least every two to five years for many other areas, depending on the stage of restoration. If a fire-type natural community exists within a zone containing successional hardwood forest, then the fire frequency for the zone will be dictated by the recommended fire return interval for that natural community. Fires in adjacent natural communities should be allowed to burn into the successional hardwood forest.

Restoration of much of the successional hardwood forest will require a long-term concerted effort to remove off-site hardwood species and replant with canopy and groundcover species representative of the original natural community.

Prescribed Fire Planning

Objective: Encourage interagency planning meetings/briefings prior to each year's fire season to review prescribed fire plans, fuel conditions, resource availability and tactics.

Actions:

- Schedule prior to December 15 each year a fire planning meeting with all agency managers of Big Shoals Public Lands and document with summary/maps.

Within BSPL, prescribed fires are coordinated among the land management agencies wherever possible. Staff from each agency work together to ensure prescribed fire goals and objectives are met. This includes the utilization of multiple agency teams.

DRP, the FFS, and the SRWMD are primarily responsible for prescribed fire on their managed lands. However, interagency cooperation on prescribed fires is essential. The SRWMD uses contract burners and equipment to meet its goals. DRP staff and equipment from Stephen Foster State Folk Culture Center State Park, BSPL and other state park units in the area are used for maintenance of firebreaks and prescribed fire. In order to implement the overall prescribed fire program, there must be an ongoing focus on coordination and sharing of staff and equipment among the management agencies at BSPL.

There are four fire-dependent/fire-maintained natural communities in BSPL: mesic flatwoods, sandhill, upland pine and upland mixed woodland. The other communities, including wetlands, may also be affected by fire to some extent, particularly when they border a fire-maintained community. Allowing fire to penetrate wetland boundaries is an important factor in maintaining wetland ecotones. Three altered landcover types, restoration natural community, successional hardwood forest and abandoned field/abandoned pasture are also managed with prescribed fire. Successional hardwood forest has a desired future condition of either upland mixed woodland, upland pine, sandhill or a small amount of mesic flatwoods depending on the location.

Consideration should be given to rotating between dormant and growing season fires over time. Fire return intervals are recommended to fall within the natural, historic range for the dominant natural community or communities within a given prescribed fire occurrence. However, winter fires and shorter return intervals may be used exclusively during the earlier phases of habitat restoration. BSPL operational records and staff experience should be combined with FNAI or DRP biologist inventories and assessments to identify areas that may require mechanical treatments in conjunction with prescribed fire to achieve a more natural vegetative structure.

Prescribed Fire Implementation

Objective: Maintain 2,000 acres within the optimum fire return interval.

Actions:

- Conduct prescribed fire on 301-519 acres annually.
- Track all fire management activity in the Natural Resource Tracking System (NRTS).

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

Prescribed Fire Management		
Natural Community	Acres	Optimal Fire Return Interval (Years)
Sandhill	37	1-3
Restoration Natural Community	264	2-3
Successional Hardwood Forest	222	1-10
Abandoned Field/Pasture	30	2-3
Annual Target Acreage	301 - 519	1,037

Fire-maintained and fire-dependent communities within Big Shoals Public Lands include mesic flatwoods, upland pine, upland mixed woodland and sandhill. Portions of the mesic flatwoods have been impacted by prolonged fire exclusion. Effects include extensive invasion by off-site hardwoods and increased fuel loading. Prescribed fire in this area has become more difficult and potentially more hazardous. In other areas, harvest of the pine canopy during efforts to control southern pine beetle infestations has removed the major fuel source from the site. Portions of the flatwoods were clearcut in the past 10 years. Other areas were very heavily thinned. Flooding of the Suwannee River can reduce the windows of opportunity for conducting effective prescribed fires in parts of the flatwoods.

A lack of adequate access and perimeter firebreaks on the Columbia County side of the river has also slowed the progress of the prescribed fire program in that area. In most cases, fire return intervals will follow the guidelines of the Florida Natural Areas Inventory (FNAI 2010). Winter fires and shorter return intervals may be used during some phases of restoration.

The transition from one natural community to another is often gradual and indistinct. In order to eliminate false boundaries that are caused by artificial internal firebreaks, adjoining communities usually are treated with fire at the same time.

A combination of hard breaks and natural breaks are used at BSPL. When possible, natural firebreaks are preferred instead of hard firebreaks, particularly near ecotones.

Prescribed fire plans for the property are revised annually and priorities are determined based on a variety of parameters. The annual targeted burn acreage for each agency is indicated in Table 5. Several areas within the property, including the southern pine beetle control areas, will require additional effort if restoration goals are to be met. Some of the clearcut sites will need repeated burning and subsequent replanting with appropriate pine and groundcover species to prevent a recurrence of the loblolly pine invasions that made the sites so vulnerable to southern pine beetle infestations in the recent past.

Natural Community Improvement

Objective: Conduct natural community/habitat improvement activities on 15 acres of upland mixed woodland natural community.

Action:

- Shorten the fire return interval to two to three years to remove off-site hardwoods and improve the native groundcover.

Between Top Bay and Bottom Bay, a reduced fire return interval allows off-site hardwoods to encroach into the upland mixed woodland. If a shortened fire return interval is not successful in reducing hardwoods, a plan for the use of chemical and/or mechanical treatments will be developed.

Objective: Conduct natural community/habitat improvement activities on 10 acres of sandhill natural community.

Action:

- Improve coverage of native groundcover.

The native groundcover in the sandhills south of the Little Shoals entrance is sparse due to many years of fire suppression. DRP will supplement existing groundcover to facilitate management of the habitat with fire and to improve the quality of the sandhill community.

Objective: Conduct natural community/habitat improvement activities on 26 acres of mesic flatwoods and upland mixed woodland natural community.

Action:

- Plant longleaf pine and improve native groundcover in areas of abandoned pasture to further the restoration of these sites to their former natural communities of mesic flatwoods and upland mixed woodland.

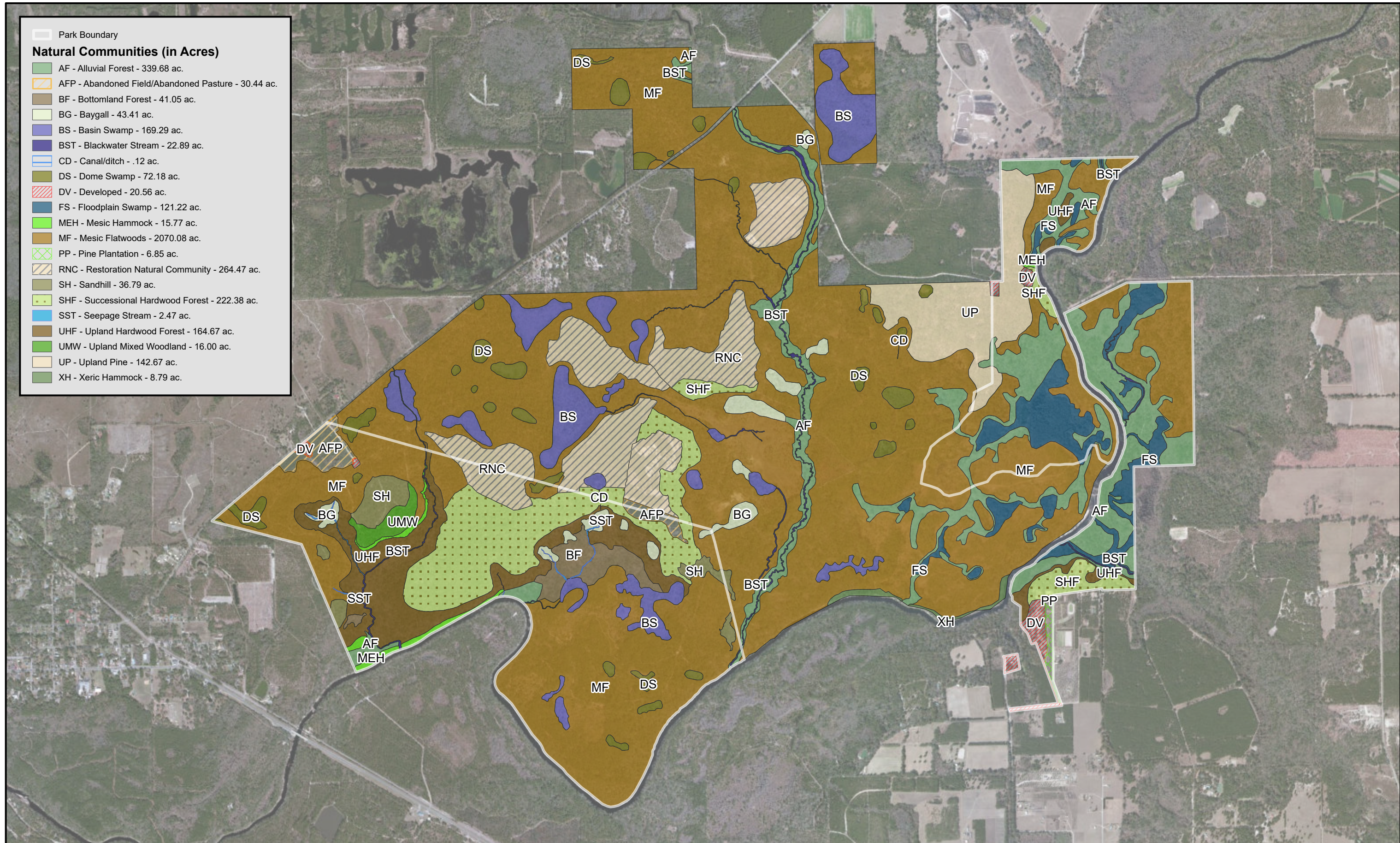
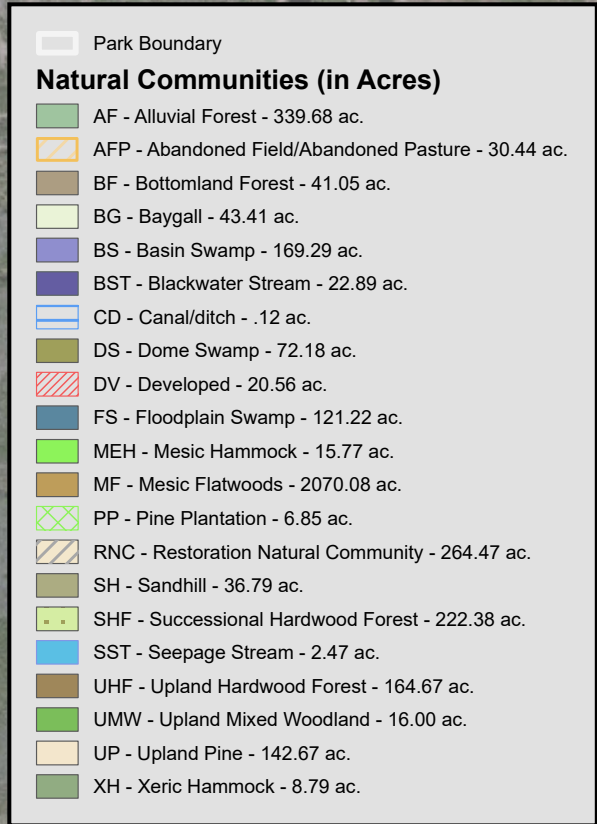
Two areas of abandoned pasture recently had loblolly pines and off-site hardwoods harvested. Both sites need reforestation with longleaf pine. The mesic flatwoods site is adjacent to the Little Shoals entrance and ranger residence. The former upland mixed woodland site is just east of the intersection of Road 1 and Road 2 and south of Road 2.

Objective: Conduct natural community/habitat improvement activities on 1 acre of upland mixed woodland natural community.

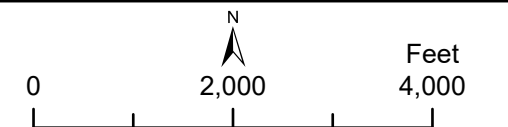
Action:

- Reduce the canopy of off-site hardwoods in the upland mixed woodland/sandhill ecotone.

South of where Road 2 enters the flatwoods are approximately 5 acres of sandhill with intact groundcover. This is bordered to the northwest by successional hardwood forest with a fringe of upland mixed woodland. Off-site hardwoods will be chemically and or mechanically treated in the upland mixed woodland fringe.



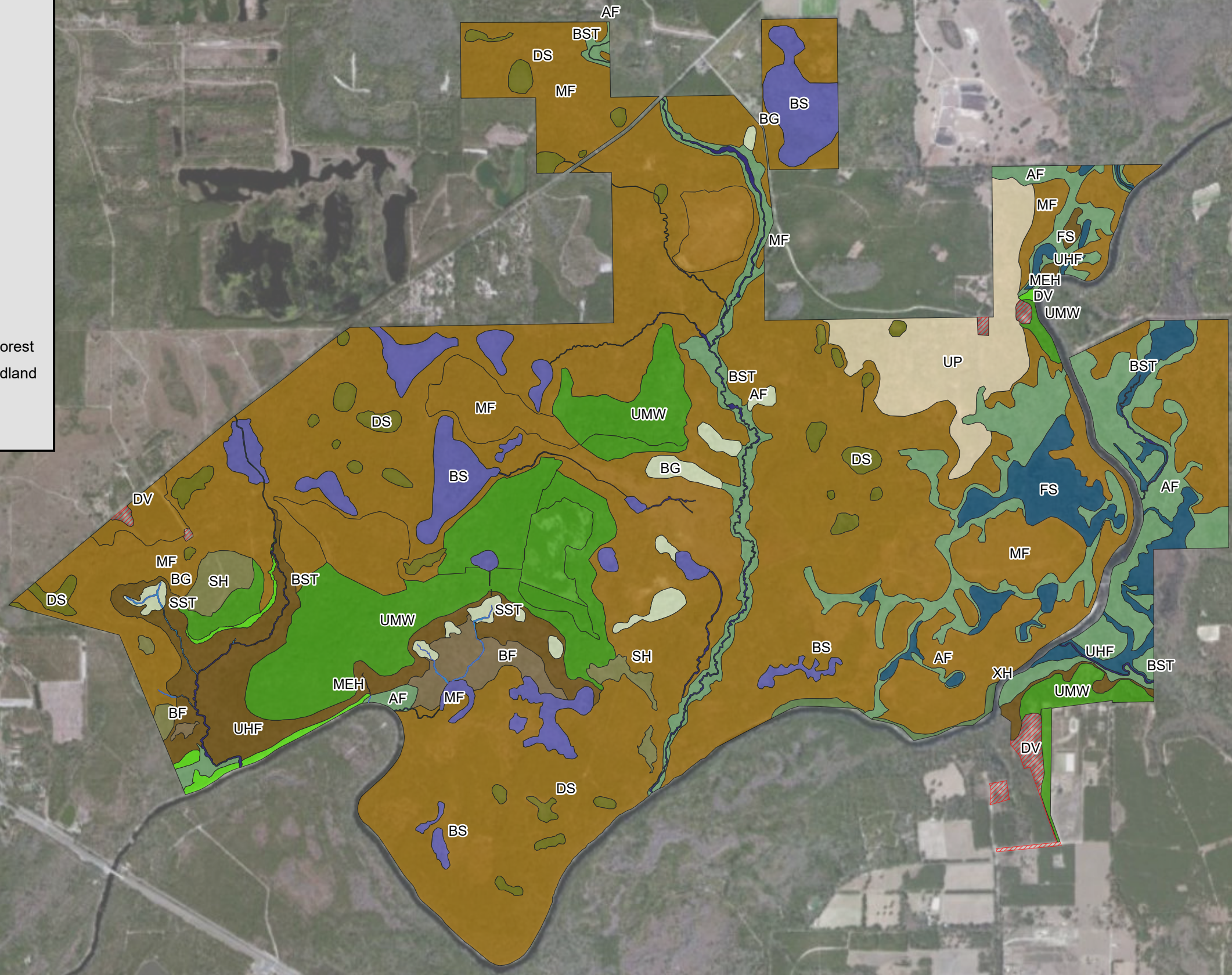
BIG SHOALS STATE PARK
 Natural Communities - Existing Conditions



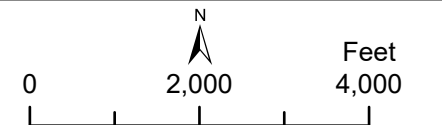
Sources: ESRI; Florida Department of Environmental Protection
 This graphical representation is provided for informational purposes and should not be considered authoritative for navigational, engineering, legal, and other uses.

Natural Communities

- AF - Alluvial Forest
- BF - Bottomland Forest
- BG - Baygall
- BS - Basin Swamp
- BST - Blackwater Stream
- DS - Dome Swamp
- DV - Developed
- FS - Floodplain Swamp
- MEH - Mesic Hammock
- MF - Mesic Flatwoods
- SH - Sandhill
- SST - Seepage Stream
- UHF - Upland Hardwood Forest
- UMW - Upland Mixed Woodland
- UP - Upland Pine
- XH - Xeric Hammock



BIG SHOALS STATE PARK
 Natural Communities - Desired Future Conditions



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

Objective: Evaluate former southern pine beetle harvest areas to identify appropriate actions to remove/reduce loblolly pine recruitment and re-establish native vegetation.

Action:

- Within five years, complete assessments of all sites and implement practices necessary to achieve desired compositions, structures, and prescribed fire intervals.

Several areas within the property, including the southern pine beetle control areas, will require additional effort if restoration goals are to be met. Some of the clear-cut sites will need repeated prescribed fire and subsequent replanting with longleaf pine and groundcover species to prevent a recurrence of the loblolly pine invasions that made the sites so vulnerable to southern pine beetle infestations in the recent past.

IMPERILED SPECIES

The size and natural community diversity of BSPL creates a habitat mosaic for a wide variety of wildlife species. Resident wildlife will be managed for optimum richness, diversity, and abundance. In addition to resident wildlife, BSPL provides resources critical to many migratory birds, including waterfowl, passerines, raptors, shorebirds, and others. Habitats important to migratory species will be protected, maintained or enhanced. In managing wildlife species, an emphasis will be placed on conservation, protection and management of natural communities.

Wildlife management emphasis is placed on documenting the occurrence and abundance of rare and imperiled species on the property. Where feasible, staff will continue to update inventories for certain species, with emphasis on rare and imperiled fish and wildlife species. Monitoring of wildlife species will continue as an ongoing effort for the area. The method of monitoring will be contingent on time and funding.

Concurrent with ongoing species inventory and monitoring activities, management practices are designed to restore, enhance, or maintain rare and imperiled species, and their habitats. This will be accomplished by consulting approved federal species recovery plans and FWC Species Action Plans (SAP), guidelines and other scientific recommendations. Guided by these recommendations, land management activities, including prescribed fire and timber stand improvements, will address rare and imperiled species requirements and habitat needs.

Imperiled vertebrate species at BSPL include the gopher tortoise (*Gopherus polyphemus*), which is associated with the sandhill, upland pine, and upland mixed woodland natural communities. Other species like the eastern indigo snake (*Drymarchon couperi*), Florida pine snake (*Pituophis melanoleucus mugitus*) and southern hognose snake (*Heterodon simus*) would have occurred there in the past but have not been observed. Continued restoration of the upland fire-maintained communities will benefit the known species.

A historic wading bird colony occurred at BSPL. However, wading birds have not been observed there since the 1980s.

Although a floristic study has not been performed on BSPL, several imperiled plants are known to occur onsite. A particularly interesting occurrence is a population of the state endangered Florida toothachegrass (*Ctenium floridanum*). This species occurs only in a few counties in Florida and Georgia.

The only known population of this species west of the Suwannee River in Florida occurs at BSPL (Surdick et al. 2009). As the sandhills, flatwoods, upland pine and upland mixed woodland communities have their fire regimes restored, it is likely that more imperiled plant species will be observed. BSPL needs a survey to determine the locations of toothachegrass and other rare plants, as well as a floristic study to determine common species and rare plants. Currently known populations of imperiled plants should be documented.

The following table contains a list of all known imperiled species within BSPL and identifies their status as defined by various entities. Explanations for federal and state status as well as FNAI global and state rank are provided in the appendix.

Imperiled Species Inventory						
Common and Scientific Name	Imperiled Species Status				Management Actions	Monitoring Level
	FWC	USFWS	FDACS	FNAI		
PLANTS						
Chapman’s sedge <i>Carex chapmannii</i>			LT	G3, S3	1, 4	Tier 1
Florida toothachegrass <i>Ctenium floridanum</i>			LT	G2, S2	1, 4	Tier 1
Cardinal flower <i>Lobelia cardinalis</i>			LT		4, 9	Tier 1
Blue-flowered butterwort <i>Pinguicula caerulea</i>			LT		1, 4, 9	Tier 1
Hooded pitcherplant <i>Sarracenia minor</i>			LT		1, 4, 9	Tier 1
Rainlily <i>Zephyranthes atamasco</i>			LT		1, 4, 9	Tier 1
FISH						
Gulf Sturgeon <i>Acipenser oxyrinchus desotoi</i>	FT	LT		G3, T2, T3, S2?	4, 9, 13	Tier 1
REPTILES						
American Alligator <i>Alligator mississippiensis</i>	FT (S/A)	T(S/A)		G5, S4	4, 10	Tier 1
Gopher Tortoise <i>Gopherus polyphemus</i>	ST			G3, S3	1, 6, 7, 10, 13	Tier 1
Gopher frog <i>Lithobates capito</i>		UR		G2, G3,S3	1, 4, 6	Tier 1

Imperiled Species Inventory						
Common and Scientific Name	Imperiled Species Status				Management Actions	Monitoring Level
	FWC	USFWS	FDACS	FNAI		
Suwannee alligator snapping turtle <i>Macrochelys suwanniensis</i>	ST	PT		G2, S2	4, 9, 13	Tier 1
BIRDS						
Little blue heron <i>Egretta caerulea</i>	ST			G5, S4	4	Tier 1
Swallow-tailed kite <i>Elanoides forficatus</i>				G5, S2	10	Tier 1
Wood stork <i>Mycteria americana</i>	FT	DL		G4, S2	4, 10	Tier 1

Management Actions:

1. Prescribed Fire
2. Invasive Plant Removal
3. Population Translocation/Augmentation/Restocking
4. Hydrological Maintenance/Restoration
5. Nest Boxes/Artificial Cavities
6. Hardwood Removal
7. Mechanical Treatment
8. Predator Control
9. Erosion Control
10. Protection from Visitor Impacts (Establish Buffers)/Law Enforcement
11. Decoys (Shorebirds)
12. Vegetation Planting
13. Outreach and Education
14. Other

Monitoring Level:

Tier 1.

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

Tier 2.

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

Tier 3.

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

Tier 4.

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

Tier 5.

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

DRP strives to maintain and restore viable populations of imperiled plant and animal species primarily by implementing the effective management of natural systems. Resident wildlife will be managed for optimum richness, diversity, and abundance. In addition to resident wildlife, BSPL provides resources critical to many migratory birds, including waterfowl, passerines, raptors, and others. Habitats important to migratory species will be protected, maintained, or enhanced. In some cases, specialized management is appropriate when the maintenance, recovery or restoration of a species or population is complicated due to constraints associated with long-term restoration efforts, unnaturally high mortality, or insufficient habitat. However, specialized management should be compatible with the maintenance and restoration of natural processes and should not imperil other native species or seriously compromise BSPL values. There currently are no species on Big Shoals Public Lands that require the specialized management approach.

In the preparation of this management plan, BSPL staff consulted with staff of FWC's Imperiled Species Management, or that agency's regional biologist, and other appropriate federal, state, and local agencies for assistance in developing imperiled animal species management objectives and actions. Likewise, for imperiled plant species, BSPL staff consulted with the Florida Department of Agriculture and Consumer Services. Data collected by the U.S. Fish and Wildlife Service (USFWS), FWC, FDACS and FNAI as part of their ongoing research and monitoring programs will be reviewed by BSPL staff periodically to inform management of decisions that may have an impact on imperiled species at BSPL.

Ongoing inventory and monitoring of imperiled species in the BSPL property is necessary to meet the managing agencies' mission. Long-term monitoring is also essential to ensure the effectiveness of resource management programs. Monitoring efforts must be prioritized so that the data collected provides information that can be used to improve or confirm the effectiveness of management actions on conservation priorities. Monitoring intensity must at least be at a level that provides the minimum data needed to make informed decisions to meet conservation goals. Not all imperiled species require intensive monitoring efforts on a regular interval. Priority must be given to those species that can provide valuable data to guide adaptive management practices. Those species selected for specific management action, as well as those that will provide management guidance through regular monitoring, are addressed in the objectives below.

Inventory

Objective: Update baseline imperiled species occurrence list.

Action:

- Conduct a floristic study of Big Shoals Public Lands with the intent of identifying imperiled plant species as well as common plant species.

Fauna

Objective: Continue existing monitoring protocols for two imperiled animal species.

Actions:

- Conduct additional gopher tortoise surveys using current methodology.
- Coordinate with FWC to assess flatwoods salamander habitats, develop strategies for improving habitats and conduct surveys to determine species status.

- Assess wetlands for existing or potential breeding success for flatwoods salamander and provide data/maps to managing agencies to inform of areas where greater sensitivity is needed during fire line preparation.

Previous research has provided some baseline information on gopher tortoise populations within BSPL. Additional surveys would be useful to document the status of the gopher tortoise population. Ideally, burrow counts would be conducted using newer procedures such as the line transect distance sampling (LTDS) method developed by Smith et al. (2009).

Many species of wildlife and plants are adapted to natural communities that periodically burn. Species such as the gopher tortoise and the many commensals that share their burrows require fire-maintained habitats. At BSPL, these areas include the upland pine, upland mixed woodland, sandhill and mesic flatwoods natural communities. Maintenance of the gopher tortoise population requires regular prescribed fire to manage the preferred habitat of abundant herbaceous groundcover under an open canopy forest.

Certain amphibian species also depend on fire. One of these, the imperiled flatwoods salamander (*Ambystoma cingulatum*), may still exist within BSPL. A priority will be to use prescribed fire to maintain the natural ecotone around potential breeding wetlands in the mesic flatwoods. To avoid possible impacts to adult salamanders, roller-chopping or disking should not occur near basin swamps and dome swamps in the mesic flatwoods.

Flora

Objective: Develop new monitoring protocol for one selected imperiled plant species.

Action:

- Conduct a survey for Florida toothachegrass (*Ctenium floridanum*).

Conduct a survey for Florida toothachegrass and other rare plants at BSPL. FNAI recorded the original occurrence of Florida toothachegrass in 2009, but most of BSPL has not been surveyed for this species or other rare plants. Staff should be able to identify this species and protect it from ground disturbance.

INVASIVE SPECIES

Big Shoals State Park is fortunate to have very few populations of invasive plants. Staff periodically surveys for invasive plants and treats them as they are found. Japanese climbing fern (*Lygodium japonicum*), camphortree (*Cinnamomum camphora*), Chinese tallowtree (*Triadica sebifera*), Chinese privet (*Ligustrum sinense*) and mimosa (*Albizia julibrissin*) are known to occur within the park. While all invasive plant species require vigilance, staff should be particularly diligent in watching for cogongrass (*Imperata cylindrica*), which thrives under a fire regime and can be spread by heavy equipment. Both of these conditions are common at Big Shoals State Park.

Another non-native plant that occurs in the park is centipedegrass (*Eremochloa ophiuroides*). This species has often been planted to stabilize woods roads. Although centipedegrass is not currently listed as invasive by the Florida Invasive Species Council (FISC), it invades native pinelands, suppresses native groundcover species, changes fine fuel characteristics and is spread by equipment like tractors, skidders and mowers. This plant should be removed where found within Big Shoals State Park.

Because Big Shoals State Park has few invasive plants present, it is important to adopt preventative measures to keep invasives from inadvertently entering the property. Those measures should include developing and putting in practice guidelines for inspecting equipment that enters the park to ensure that mowers, logging equipment and other types of equipment are clean and free of soil, plant material and invasives. Any fill or lime rock used should be from an invasive-free site. Staff should be aware of the locations of any invasives in the property and not inadvertently move them when disking fire lines or mowing, or, in the case of climbing fern, carrying propagules on vehicles or clothing.

It is also important that staff survey regularly for the presence of invasive plants, particularly areas that are less frequently visited. Regular surveys will enable the identification of new infestations before they have a chance to spread and cover larger areas. Newly discovered infestations of invasives should be treated promptly so that the plants do not have a chance to spread.

An invasive animal species of concern in the park is the feral hog. These animals have high reproductive rates, and, when populations reach high densities, feral hogs can significantly degrade natural communities through foraging activity (rooting). FWC helps manage feral hogs on the wildlife management area portions of the property by hunts during the wild hog-dog hunt season, archery, small game, general gun, muzzleloading gun, and archery/and muzzleloading gun seasons. Trapping is another measure that may be implemented throughout Big Shoals State Park to augment ongoing feral hog control efforts and to further reduce the natural community damage and degradation caused by this species. Other invasive animal species will be controlled as necessary.

In 2002, the red bay ambrosia beetle (*Xyloborus glabratus*) was first detected in the United States in southeastern Georgia. The beetle carries the fungal pathogen *Raffaelea lauricola*, which it transmits to red bays (*Persea borbonia*) and other species in the Lauraceae family, causing laurel wilt disease and death. The beetle and its associated pathogen spread rapidly, and by 2007 it had appeared in Duval County. The disease was discovered in Columbia and Hamilton counties in 2008 and 2011, respectively. The beetle (and laurel wilt) has now spread throughout most of Florida and into many neighboring states. It may be that members of the Lauraceae family will continue to survive in shrub form as the remnant tree root systems continue to re-sprout. At this point, much remains unknown about the long-term impacts of this disease on red bays and other Lauraceae. Big Shoals State Park should continue to restrict the movement of firewood in and out of the property and educate visitors about the issue.

An invasive insect pest that staff should be familiar with and watching out for is the emerald ash borer (*Agrilus planipennis*). This beetle has not yet been detected in Florida but in 2013 it was found in DeKalb and Fulton counties in Georgia. The emerald ash borer was first found in Michigan in 2002 and now occurs in 21 states and parts of Canada. It probably arrived in the U.S. on wood packing material from Asia. It can kill all species of ash found in the U.S. This species is also spread by moving firewood and other wood products.

The table below contains a list of the FISC Category I and II invasive plant species found within Big Shoals State Park (FISC 2019). The table also identifies relative distribution for each species. An explanation of the codes is provided following the table.

Invasive Plant Species			
Species Name <i>Scientific Name - Common Name</i>	FISC Category	Distribution	Zone ID
<i>Cinnamomum camphora</i> - Camphor-tree	I	Scattered Plants or Clumps	BSH-1B, BSH-1E
<i>Ligustrum sinense</i> - Chinese privet	I	Single Plant or Clump	BSH-1B
<i>Lygodium japonicum</i> - Japanese climbing fern	I	Single Plant or Clump Scattered Plants or Clumps	BSH-2C, BSH-2G, BSH-4A, BSH-1B
<i>Melia azedarach</i> - Chinaberry	II	Single Plant or Clump	BSH-1B
<i>Solanum viarum</i> - Tropical soda apple	I	Single Plant or Clump Scattered Plants or Clumps Scattered Dense Patches	BSH-2Dn, BSH-1C BSH-3

Park staff actively remove invasive species, with priority given to those causing ecological damage. Removal techniques may include mechanical treatment, herbicides, or biocontrol agents.

Invasive Plant Treatment

Objective: Annually treat all known populations of invasive plant species.

Actions:

- Annually develop/update and execute an invasive plant management work plan.
- Implement the annual work plan by treating all known invasive plants on the property and continuing maintenance and follow-up treatments as needed.

Big Shoals State Park is fortunate to have very few acres infested with invasive plants. It is possible that staff could completely eradicate invasive plants from the park. All known infestations should be treated every year.

Invasive Plant Preventative Measures

Objective: Prevent the introduction and spread of invasive plants.

Action:

- Develop and adopt preventative measures to avoid the introduction and spread of invasive plants in the park.

Invasive plants are often introduced or spread to natural areas on equipment, in fill dirt or mulch, and in ornamental plantings. Park staff should develop and implement a protocol to inspect equipment and fill dirt and ensure that all equipment or materials entering the park are free of invasives. All equipment must be cleaned before entering the park.

Invasive Plant Preventative Measures

Objective: Survey the entire Big Shoals State Park property for invasives at least twice over 10 years.

Actions:

- Develop and implement a method to survey the entire property for invasive plants twice over the course of 10 years.

In a situation such as at Big Shoals State Park where very few invasive plants occur, early detection of invasives through vigilant surveying becomes very important. Surveys should be conducted with the goal of finding any new infestations quickly so that they can be promptly treated.

Invasive and Nuisance Animal Control

Objective: Implement control measures on one invasive animal species.

Actions:

- Remove feral hogs from the park as needed.

Feral hog removal occurs on the Wildlife Management Area (WMA) during FWC-managed hunts. DRP manages feral hogs on the portion of Big Shoals State Park that is excluded from the WMA.

CULTURAL RESOURCES

Prehistoric and Historic Archaeological Sites

Big Shoals State Park contains 18 archaeological sites and one resource group that has been recorded with the Florida Master Site File (FMSF). The cultural periods represented by these sites range from the Archaic (8500-1000 B.C.) and Deptford (800-300 B.C.) to the American pioneer (1821 through the mid-20th century).

Two cultural surveys have been conducted at Big Shoals State Park. The Wheeler survey (1999) encompassed the entire park, while the Stanton survey (2002) focused on the area of the Woodpecker Trail.

Few details are known about the Archaic and Deptford sites due to the lack of diagnostic debris. Most are lithic scatters. These sites are all listed in the table below. However, two historic era cultural sites are particularly interesting representatives of their era.

In 1833, land along this part of the Suwannee River began to pass from the state of Florida into private hands. William Hooker was a leading cattleman who began to acquire some of this land in 1833 and subsequent years. His homestead (Hooker Homestead, HA177) has been identified, although no structure remains. In addition to raising scrub cattle, he cultivated black seed cotton and operated a ferry. The habitat disturbance resulting from cotton farming is still visible on the landscape (Wheeler 1999). The Hooker Homestead is considered eligible for the National Register of Historic Places (NRHP). A potential concern regarding this site is that an unpaved bike trail passes through it.

In addition to agriculture and timbering, naval stores for turpentine production were a significant component of the economy in this part of north Florida. In the late 1800s and early 1900s in Florida, naval stores were harvested primarily from longleaf pine trees. Workers lived in camps or short-lived towns close to the tree resource. The labor, which was difficult and at times dangerous, was often done by African Americans.

HA00322, the Downing and Tippins Turpentine Camp, is a site where turpentine harvesters lived. Early aerial photos show the layout of two rows of buildings typical of turpentine camps. It is believed that the laborers were African American. The site represents an important component of rural African American history in the southern United States and is NRHP eligible (Wheeler 1999). Oral histories could help gather additional information.

Other historic sites at Big Shoals State Park are bridge remnants, old roads and river crossings from the 19th and early 20th centuries. The Old Godwin Bridge (HA321, CO773), built at the turn of the 19th and 20th centuries, contains the ruins of a bridge crossing the Suwannee River and connects to Old Godwin Bridge Road (HA431). This area is also known as Hewitts Ferry (Slatterly 1913). The Little Shoals Bridge foundation (HA324) is thought to date from the early 1800s. No structure remains, but cuts in the dolomite and clay substrate indicate its former location. Its location also fits the description of the historic stage road from Lake City to Jasper where it crossed the Suwannee River at Little Shoals (Wheeler 1999).

A predictive model has been completed for the portion of Big Shoals State Park that is managed by DRP (Collins et al. 2012). Twenty-nine percent of this part of Big Shoals State Park is considered high sensitivity and 32% medium sensitivity for cultural resources.

All of the archaeological sites in Big Shoals State Park are in good condition, with the exception of CO00111, HA00322 and HA00324, which are in fair condition. The threat to CO00111 and HA00324 is from looting from the river. HA00324 is also impacted by erosion. HA00322 was damaged somewhat by previous land clearing. The condition of HA177 should be re-evaluated to determine what, if any, impact the bike trail has had on the site.

All sites should be monitored on a regular basis to detect damage or other changes. Sites that have a history of looting (CO00111 and HA00324) should be monitored more frequently. HA00322 should be protected from ground disturbance. The section of the bike trail where it crosses HA00177 should be assessed to determine if it is impacting the site and if remedial actions or trail relocations are needed.

Historic Structures

Big Shoals State Park has one historic structure, the Morrell House (CO1106). It was built in about 1900, is in good condition, and had been moved to its current location. The predictive model mentions another historic structure, HA331 (Old House), as being located within Big Shoals State Park. This structure was moved sometime after 1999 and is no longer within the property.

Two other historic structures (HA429 and HA430) occur just outside Big Shoals State Park and are associated with the archaeological site HA00322 (Downing and Tippins Turpentine Camp), which is located inside the park. Big Shoals State Park does not manage these structures but they, along with HA322, are potentially eligible for inclusion in the NRHP. These structures and the archaeological site were part of a turpentine camp from about 1911-1940. It is believed that the camp was staffed by

African American men and women and represents part of the history of African Americans in rural Florida.

The condition of the Morrell House is good. The two structures associated with the turpentine camp are in ruinous condition.

Preventative maintenance is required to keep the Morrell House in good condition. No Historic Structures Report is needed.

Cultural Sites Listed in the Florida Master Site File					
Site Name and FMSF #	Culture/Period	Description	Significance	Condition	Treatment
CO001106 Morrell House	Ca. 1900	Historic Structure	NE	G	P
CO00111 Big Shoals	Archaic, 8500 B.C.-1000 B.C.; Prehistoric	Archaeological Site	NE	F	P
CO00773 Old Godwin Bridge (Columbia; also HA321)	Early 20 th C American to present	Archaeological Site	NE	G	P
CO00774 Robinson Hill	Archaic, 8500 B.C.-1000 B.C.	Archaeological Site	NE	G	P
CO01106 Morrell House	Ca. 1900	Historic Structure	NE	G	P
HA00177 Hooker's Homestead	19 th -20 th C American; Archaic	Archaeological Site	NR	G	P
HA00317 Godwin Bridge Site	Archaic	Archaeological Site	NE	G	P
HA00318 Check Station	Early 20 th C American to present; Deptford	Archaeological Site	NE	G	P
HA00319 Road 12 Site	Archaic	Archaeological Site	NE	G	P
HA00320 Boundary Line	Early 20 th C American to present; Archaic	Archaeological Site	NE	G	P
HA00321 Old Godwin Bridge (Hamilton; also CO773)	Early 20 th C American to present	Archaeological Site	NE	G	P
HA00322 Downing & Tippins Turpentine Camp	Early 20 th C American to present	Archaeological Site	NR	F	P
HA00323 Road 7 Site	Prehistoric, lacking ceramics	Archaeological Site	NE	G	P
HA00324 Little Shoals Bridge Foundation	Nineteenth C American – 1821-1899	Archaeological Site	NE	F	P

Cultural Sites Listed in the Florida Master Site File					
Site Name and FMSF #	Culture/Period	Description	Significance	Condition	Treatment
HA00325 Little Shoals	Archaic, 8500 B.C.-1000 B.C.	Archaeological Site	NE	G	P
HA00327 Road 2 Scatter	Twentieth century American, 1900-present; Archaic, 8500 B.C.-1000 B.C.	Archaeological Site	NE	G	P
HA00328 Palmetto Island	Archaic, 8500 B.C.-1000 B.C.	Archaeological Site	NE	G	P
HA00329 Long Branch Trail No. 1	Archaic, 8500 B.C.-1000 B.C.	Archaeological Site	NE	G	P
HA00330 Long Branch Trail No. 2	Archaic, 8500 B.C.-1000 B.C.	Archaeological Site	NE	G	P
HA00331 Old House	C1920	Historic Structure	NE	G	RH
HA00332 Lucky Hole	Archaic, 8500 B.C.-1000 B.C.; Deptford, 700 B.C.-300 B.C.	Archaeological Site	NE	G	P
HA00431 Old Godwin Bridge Road	Nineteenth century American, 1821-1899	Resource Group	NE	G	P

Significance:

NRL - National Register Listed
 NRE - National Register Eligible
 LS - Locally Significant
 NE - Not Evaluated
 NS - Not Significant

Conditions:

G - Good
 F - Fair
 P - Poor

Recommended Treatment:

RS - Restoration
 RH - Rehabilitation
 ST - Stabilization
 P - Preservation
 R - Removal

Condition Assessment

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

Action:

- Complete 20 assessments/evaluations of archaeological sites.

All cultural resources should be assessed, and baseline documentation should be compiled and kept for future reference. The site with the highest priority for assessment is HA00177. A section of the unpaved bike trail crosses HA00177. The assessment should determine if the trail is impacting the site and if remedial actions or trail relocation are needed.

No historic structures reports are needed.

Documentation of Recorded Sites

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

Action:

- Record all known archaeological sites within the park.

Big Shoals State Park needs a Phase I survey for the entire property, as well as a Phase II survey for both HA00322 and HA00177. Additional research on the Downing and Tippins Turpentine Camp (HA00322), particularly in the form of oral history, is needed. This would increase the information about the life of African Americans in the turpentine industry, which is relatively undocumented.

Further research and documentation of the Hooker's Homestead (HA00177) and Little Shoals Bridge foundation (HA00324), and of the location of William Hooker's historic cotton and other agricultural fields, would provide information on homesteader life in the early 1800s and increase understanding about some of the original natural communities and their subsequent changes.

Preservation Measures

Objective: Bring one of 22 recorded cultural resources into good condition.

Actions:

- Evaluate the impact of the trail system on the Hooker Homestead.
- Develop and implement a plan to mitigate any impacts.

All archaeological sites are in good or fair condition, and their conditions should be protected from deteriorating. A monitoring program to detect changes in their conditions should be developed and implemented. All archaeological sites and resource groups should be monitored on a regular basis. Those sites that have experienced looting, erosion or ground disturbance should be monitored more frequently.

The Hooker Homestead, HA177, needs to be evaluated for damage and erosion impacts from the bike trail. If needed, a plan should be developed and implemented to protect the site. One option might be the rerouting of the bike trail.

The cyclical preventative maintenance program for the Morrell House (CO1106) needs to be documented and its practice continued to keep the house in good condition.

SPECIAL MANAGEMENT CONSIDERATIONS

Arthropod Control Plan

All DRP lands are designated as “environmentally sensitive and biologically highly productive” in accordance with Ch. 388 and Ch. 388.4111 Florida Statutes. If a local mosquito control district proposes a treatment plan, the DRP works with the local mosquito control district to achieve consensus. By policy of DEP since 1987, aerial adulticiding is not allowed, but larviciding and ground adulticiding (truck spraying in public use areas) is typically allowed. The DRP does not authorize new physical alterations of marshes through ditching or water control structures.

Big Shoals State Park does not have an arthropod control plan. Mosquito control plans temporarily may be set aside under declared threats to public or animal health, or during a Governor’s Emergency Declaration.

LAND USE COMPONENT

VISITATION

Big Shoals State Park is a prime hiking and bicycling destination in north-central Florida, centered at the base of a sweeping bend in the Suwannee River. Visitors are drawn to the park primarily to view Florida's most intense and dramatic river rapids, the namesake Big Shoals. Downriver, Little Shoals, a more modestly pronounced and less-visited stretch of rapids, can be accessed via hiking trail. The northeastern and southwestern parcels of Big Shoals State Park are connected by the paved Woodpecker Trail, a scenic bicycling route.

Visiting the park requires careful planning, especially for first-time visitors. The Little Shoals entrance on Hamilton County Road 135, northeast of White Springs, features a large park entrance sign, pervious parking, portable restroom, and a picnic pavilion.

Conversely, the Big Shoals area requires a trek of approximately four miles to the northeast on County Road 135 and Southeast 94th Street (Old Godwin Bridge Road), a winding stabilized road that passes through pine plantation and alongside private properties.

The Big Shoals Day-use Area is the hiking gateway to the Big Shoals on the Suwannee River. The Big Shoals rapids are located about a mile south of this day-use area, accessed via a riverside hiking trail. The trail boasts impressive scenery, as it is lined with live oak forest and dense saw palmetto understory.

The scenic value of the Big Shoals rapids area cannot be overstated. Park improvements and interpretation at the Big Shoals Day-use Area should be prioritized in a manner that is proportional to the scenic value of the rapids, as the park possesses the potential to significantly increase visitation.

Trends

As resource-based recreation at Big Shoals State Park is focused on hiking, horseback riding, camping, and paddling, attendance at the park increases between October and March. Visitation trends at the park display a clear correlation with cooler autumn and winter temperatures that are more conducive to outdoor recreation in north Florida.

Economic Impacts

Big Shoals State Park recorded 18,483 visitors in FY 2022/2023. According to DRP estimates, the FY 2022/2023 visitors contributed \$2,294,808 in direct economic impact, the equivalent of adding 32 jobs to the local economy (FDEP 2023).

EXISTING FACILITIES AND INFRASTRUCTURE

Facilities at Big Shoals State Park are concentrated at two locations. The Big Shoals day-use area includes a paved parking loop, restroom facility, picnic area, paddling launch, and small operational support area with a staff residence. The Little Shoals day-use area includes a six-table picnic pavilion that is accessed by an unpaved stabilized road with pervious parking.

The general character of the park – being remotely located and offering distinctly challenging hiking and paddling experiences – conveys a sense of wilderness. Although the park is not classified as a preserve and does not feature a formally designated wilderness area, the minimalistic infrastructure, mileage of its trails, and the class III rapids are attractive to a visitor demographic seeking adventurous outdoor pursuits and relative solitude. By contrast, other park units along the Suwannee River offer entry-level and facilitated recreation opportunities (e.g., Suwannee River or Lafayette Blue Springs state parks).

Facilities Inventory

<i>Big Shoals Tract</i>	
Restroom	1
Kayak Launch	1
Ranger Residence	1
Pumphouse	1
Storage	1
Carport	1
Primitive Campground	1
<i>Little Shoals Tract</i>	
Ranger Residence	1
Vehicle Shelter	1
Shed	1
Pole Barn	1
Storage	1
6-Table Pavilion	1

CONCEPTUAL LAND USE PLAN

Parkwide

Objective: Improve visitor understanding of the park trail system by implementing an interpretive sign plan and conducting a trails assessment.

Actions:

- Create and implement an interpretive sign plan.
- Implement a comprehensive trails assessment throughout the BSPL.

A comprehensive trails assessment is needed to identify opportunities to improve the trail system throughout BSPL for all users. The trails assessment should address issues such as wayfinding maps, rerouting user group trails (equestrian, hiking, biking) and assessing potential needs, connections with trails outside of BSPL’s boundary, environmental impacts such as erosion, and the potential northern extension of the Florida National Scenic Trail. The trail assessment should also review current signage and provide the basis for updating signage throughout the trails to guide the different users throughout the myriad of trails. Specifically, equestrian signage needs to be updated to adequately indicate what trails are available for equestrian use. Considering that single track trails are not suitable for equestrian use and are prone to erosion, signage needs to support the variety of different user groups. Many trails at BSPL utilize existing service roads and are single track trails that run through sensitive habitat and are prone to erosion. The trails assessment should explore rerouting options that will minimize conflict

between different user groups and staff, as well as minimize erosion and other impacts to the surrounding natural communities.

Comprehensive interpretive planning is recommended to determine the most effective way to connect visitors to relevant park themes and provide orientation in use areas and on trail systems. The type, design, quantity, and placement of interpretive elements to deepen understanding and improve safety will be specified during this additional planning process. The following land use areas and subsequent objectives provide additional details per area.

Big Shoals Day Use Area Entrance

Objective: Formalize and update park entrances to provide a sense of arrival.

Actions:

- Coordinate with the county and relevant entities to pave Southeast 94th Street (Old Godwin Bridge Road).
- Formalize entrance.

To access the Big Shoals day use area, visitors use County Road 135 to travel northeast from the town of White Springs, then turn right and travel for 1.5 miles along Southeast 94th Street. The entrance at the intersection of County Road 135 and 94th Street is not formalized. Rather, it appears to be an unremarkable, unpaved rural farm road. Locating and driving along 94th Street to access the park may be disorienting for first-time visitors.

To alleviate this issue, DRP should pursue acquisition of the parcels of land between County Road 135 and the day-use area. Once acquired, Southeast 94th Street should be paved and transformed into a formal park entrance road, and the park entrance on County Road 135 should be formalized with attractive fencing, an entrance station, and a Big Shoals State Park sign.

Big Shoals Day Use Area

Objective: Enhance visitor facilities and improve interpretation.

Actions:

- Install wayfinding consistent with the existing hiking trails as well as proposed semi-primitive campground.
- Provide interpretation previewing the park's namesake natural features.
- Construct up to two small pavilions.

Due to its proximity to the scenic and unique Big Shoals along the Suwannee River, the main day-use area has the potential to be a premier attraction within the Florida State Parks system. In conjunction with improvements to Southeast 94th Street, the day-use area should be further formalized. The primary need in the day-use area is interpretation and wayfinding. An explanation of the natural and ecological characteristics of the Suwannee River and a robust visual preview of the shoals are appropriate for this location. Paddling and hiking interpretive elements should be added. Wayfinding should include a detailed park trail and amenity map at the trailhead, with special attention towards highlighting the existing paddling launch. Additionally, visitor infrastructure should be improved in this location. Pavilions

are proposed to organize and consolidate the otherwise dispersed tables and to provide sheltered space for hikers/paddlers staging gear or picnicking opportunities.

Proposed Semi-Primitive Campground

Objective: Provide tent camping tailored for paddling and hiking excursions.

Actions:

- Construct a semi-primitive tent campground with up to five sites with communal water and electricity.

A semi-primitive five-site walk-in tent-only campground should be constructed north of the day-use area. Secluded from the main day-use area, this location offers privacy but is convenient to both the existing day-use restroom, parking area, and paddling launch.

As a semi-primitive campground, the tent-only camping area should utilize the existing restroom to the south, thereby not requiring construction of a dedicated bathhouse. Camper vehicles should utilize the existing day-use parking area, requiring a short walk to the campsites. The campground should also include a small communal utility station (rather than utility pedestals extended to each site) located at the periphery of the array of campsites. Utilities should include potable water for hydration and camp cooking and electricity to recharge portable devices. Sites should be adequately spaced to emphasize natural immersion over social interaction.

The addition of semi-primitive campsites is an attractive feature for the visitor demographic seeking the type of adventurous trail and river experiences that Big Shoals State Park is especially apt to provide. The opportunity to camp may be particularly popular among hikers or paddlers seeking to embark at first light. It is anticipated that some campers will proceed from Big Shoals to primitive camping experiences along the FNST or Suwannee River.

Big Shoals Portage

Objective: Assess paddling trail infrastructure to increase safety and improve wayfinding.

Actions:

- Evaluate existing portage trail to improve the exit/re-entry points.
- Improve signage and interpretive elements to better direct paddlers along the path.

The Big Shoals contain sharp, agatized limestone that can cause significant damage. Over the years, multiple paddling accidents have occurred at the Big Shoals. Precautions are urged accordingly at the park, encouraging paddlers to portage around the natural hazards of the shoals.

East Side (Inside Bend)

The existing portage trail to bypass the rapids is on the east (Columbia County) side of the river. However, there is sparse signage and wayfinding along the portage trail directing paddlers to the re-entry site. Prior to reaching the Big Shoals, the inside bend of the river is characterized by slack (sheltered/slower moving) water, providing an intuitive landing site, superior to the opposite bank. Despite the favorable exit point on the east side, however, the re-entry point past the Big Shoals requires paddlers to descend a steep informal trail to reach the water. This re-entry point is not marked

by any signage and worsening erosion impedes passage. The portage also conflicts with a wilderness campsite along the Florida National Scenic Trail. Assessing and evaluating the current portage trail and take-out/re-entry locations for paddlers should focus on safety improvements. Basic identification of exit/re-entry points must be maintained.

West Side (Outside Bend)

Efforts to improve safety (i.e., improved access for emergency responders) and logistics of portaging have entailed consideration of relocating the portage to the west side of the river (Hamilton County), where the portage trail would follow a segment of the already-existing Big Shoals Hiking Trail. This existing trail extends along an even grade and leads to a safer location to re-enter the river (along a wide sandy beach) that offers a gentle gradient of access. Shifting the portage to this opposite side of the river would yield the additional benefit of separating the hiking and wilderness camping experience of the Florida National Scenic Trail.

While relocation to the west side offers such benefits (above-mentioned) – exiting the water at an outside bend of the river (where swift current is constant), poses unavoidable challenges. Unlike the east side, beaching and maintaining control of paddlecraft at this point is difficult such that most paddlers will continue to favor the east side.

Determination to Retain East Side Portage

Based on the above comparative rationale, continued use of the existing portage trail is recommended with improvements, including updates to signage and consideration of measures to improve the re-entry point for paddlers after the rapids of the Big Shoals. Discrete signage and interpretive elements delineating the portage trail would provide more guidance for paddlers, and some form of modest infrastructure would allow for safer re-entry to the water. A platform or steps to ease re-entry might mimic design elements of the current launch site at the Big Shoals Day-use Area to ensure durability to flood events. It should be noted, however, that the designated launch site at the Big Shoals Day-use Area is subject to less severe current because of its placement at a sweeping bend in the river. Site suitability for any proposed re-entry infrastructure should consider several factors – minimal disruption of hydrology and natural communities, avoidance of damage due to erosion, and discreteness of visibility along this otherwise undeveloped stretch of river. Whatever measure is taken to improve the re-entry point, care must be taken to avoid creating new hazards with infrastructure that could be easily damaged by floodwaters at this high-velocity segment of the river.

Restoration of heavily eroded segments of the portage trail was considered in the development of this plan, however the volume of fill material needed to restore these segments to matching grade and durability to future flood events, was deemed impractical.

Additional Paddling Access

Objective: Provide safe paddling access for all park visitors.

Recognizing the challenges and safety concerns associated with paddlers navigating through or portaging around the rapids of Big Shoals, an alternative point of access for paddlers may be sited downstream of the rapids. While paddlers preferring to avoid the rapids are advised to launch from other downstream sites (e.g., Big Shoals Conservation Area, Deep Creek Conservation Area, or Stephen Foster State Park), some paddlers seeking access upstream of the recommended alternative launch points (but downstream of the rapids) may benefit from a potential access that requires vehicular access

from management roads 1 or 2 (across SRWMD Big Shoals Conservation Area, requiring interagency coordination) and then along management road 18, which follows the southern boundary of Big Shoals State Park (separating the park from the Suwannee River Water Management District Big Shoals Conservation Area). As this road is currently in rugged condition and susceptible to river flooding, further evaluation is required. Topographic and hydrologic conditions would likely necessitate that the small parking area be situated several hundred feet (and up to a half mile) west of the river access point, requiring paddlers to carry their vessels a considerable distance before launching. The trail would intersect with the Big Shoals Trail before descending steep erodible embankments to a wide sandy beach, variably exposed dependent on water levels (n.b., same location contemplated below as an alternative portage re-entry). As this lower segment of trail leading to the river extends south of the park boundary, construction and maintenance would require coordination with the Suwannee River Water Management District. From this potential launch point, paddlers would still encounter the rapids of Little Shoals.

Citing additional access to the river should be mindful of the immersive natural aesthetics of the park and the de facto wilderness characteristics sought by many hikers and paddlers. The widening and stabilization of management road 18 and creation of stabilized parking that would be required for such a paddling launch point may detract from the otherwise unaltered landscape of this area. For the purposes of safety operations, however, an improved ingress/egress (albeit narrow and prone to inaccessibility under variable natural conditions) would allow for more efficient rescue of distressed paddlers downstream of the main rapids.

Apart from construction of an alternative launch point to further address safety concerns associated with paddling through or portaging around the Big Shoals, clear interpretation at the current (upper) launch point is recommended to advise of the risks and advanced skills required for navigation of this stretch of river.

Columbia County Easement Improvements

Objective: Enhance accessibility and safety.

Actions:

- *Stabilize all segments of the easement road to provide reliable access.*

The Florida National Scenic Trail provides an access point for hikers on the Columbia County side of the park. The trail intersects and ultimately overlaps with the easement access road, however, trail blazes or signage for hiker orientation are lacking. This service road easement that connects to the National Florida Scenic Trail is insufficiently stable for vehicular passage, including for the purposes of land management activities or emergency access. No alternative access exists on the east (Columbia County) side of the river.

Existing Road Improvements

The easement road that provides access to the Columbia County side of Big Shoals State Park should be improved. Installation of road improvements along segments of road with saturated soils, or along segments that are intersected by ephemeral drainageways, would provide the roadbed/sub-grade stabilization required for reliable access.

Trail Benefits

Additional road improvements may be considered if acquisition of the adjacent parcel (identified in *Optimum Boundary*) comes to fruition. By acquiring the adjacent parcel, reliable access for emergency vehicles and resource management could be routed to not overlap the Florida National Scenic Trail. This would enhance the quality of the Florida National Scenic Trail through Columbia County. Since this is a less-trafficked area of the park, if deemed adequate, visitor access to this portion of the park could be incorporated through road improvements and an entrance station. Visitor access to this portion of the park provides an opportunity to experience the unique vistas and environmental features of this remote scenic area. However, due to the sensitive natural features such as Robinson Branch Falls, adequate trail and interpretive elements would need to ensure minimal impact.

Observation Platform - Hamilton County

Objective: Update and improve infrastructure to provide an immersive experience.

Actions:

- Remove smaller platform.
- Update large platform to provide an immersive experience with a clear viewshed.

The Big Shoals Trail on the Hamilton County side leads to two observation platforms and one bench/table site in a small trailside clearing. Each of these three points overlook the Big Shoals. Both platforms need repairs. However, since the two are in close proximity to each other, the smaller platform should be removed to focus efforts on providing one high quality overlook. The one reconstructed overlook should include an updated interpretation and clear viewshed. It is important to take into consideration the sensitive ecology and hydrology of the area when consolidating these structures. The unused sites should be allowed to revegetate.

Bell Springs Entrance

Objective: Ensure coordination with the adjacent water management district (SRWMD) and the Florida Trails Association to seamlessly integrate infrastructure throughout BSPL.

Actions:

- *Improve wayfinding.*
- *Collaborate with Florida Trails Association to construct and restore sections of the Florida National Scenic Trail.*
- *Update interpretive elements to direct visitors toward important vantage points.*

The entrance to Bell Springs is not managed by the DRP, but the trailhead that begins at the Bell Springs Entrance connects with the Florida National Scenic Trail and the DRP portion of BSPL. Therefore, coordination with the SRWMD should focus on providing up-to-date interpretive elements that depict and properly direct the visitor throughout the trail(s).

The trail from Bell Springs connects to the Florida Scenic Trail and faces two significant issues. First, there is no formalized crossing over Robinson Branch. Second, the trail intersects a washout area adjacent to Big Shoals. The trail also does not include sufficient signage in order to find specific points of interest such as the Big Shoals or Robinson Creek Falls.

Ensuring that washout crossings and wetland crossings are addressed for trail improvement is necessary. Collaboration with the Florida Trail Association will include restoring access over Robinson Branch at a new, environmentally sensitive, and aesthetically appealing crossing point. The new access point will be on a narrower site on the upper part of the Robinson Branch where a footbridge can effectively span uplands on either side of the creek. The area's sensitive hydrology will be factored into the design.

Just farther north, the trail intersects a washout. Continual collaboration with the Florida Trail Association will support the need for designing another environmentally sensitive footbridge to cross over the washout. This will be coupled with erosion mitigation efforts to manage any further abrasion.

The Robinson Branch Falls and the Big Shoals are beautiful natural features within Big Shoals State Park. Visitor access to the falls and Big Shoals is available via the Florida Scenic Trail. Wayfinding and interpretation, however, are minimal. Increasing both wayfinding and interpretive elements along the trail is recommended to improve orientation, sense of arrival, and understanding of these landmarks. Signage along the trail will include design elements that discourage users from erring off trail and impacting sensitive features.

Woodpecker Trail

Objective: Expand trail connectivity between state parks through inter-agency collaboration.

The woodpecker trail is a multi-use paved recreational trail that travels throughout the BSPL. A multi-purpose paved recreational trail is envisioned to connect BSPL with Stephen Foster Folk Culture Center State Park and the Town of White Springs. The first phase of the Trail was completed in 2004 with funding from the federal Intermodal Surface Transportation Efficiency Act (ISTEA) program and connects the Little Shoals and Godwin entrances within BSPL.

Several options exist to extend the Woodpecker Trail into White Springs. One option is for the trail to be aligned along the State Road 135 corridor and local roads in White Springs. A second option is to route the trail from the Little Shoals Entrance and then south through the Barnett Tract of the Swift Creek Conservation Area (SCCA), across US 41 and then west through other tracts of the SCCA towards Stephen Foster Folk Culture Center State Park.

Trail connections beyond the BSPL boundary will require coordination and implementation efforts with other government agencies and landowners to secure funding and ensure operational and public safety. Specifically, representatives from DRP, SRWMD, Hamilton County, White Springs, DOT, and cycling community members will have to develop a plan.

Woodpecker Trail – East Trailhead

Objective: Improve wayfinding and interpretive elements.

Actions:

- *Formalize the Big Shoals Trailhead.*

The trailhead at the eastern terminus of the Woodpecker Trail should be formalized with paved parking, passive fee collection, and an interpretive panel that features a park map, emphasizing the complex trail system and location of the shoals and day-use areas.

Though the Woodpecker trailhead is situated within the park boundary, the trail passes through Florida Forest Service-managed lands to the west. Maps and interpretation at the trailhead should clearly depict the patchwork of land managers and interagency cooperation within the Big Shoals Public Lands.

Little Shoals Day Use Area

Objective: Improve facilities and interpretive elements.

Actions:

- Construct a permanent restroom.
- Improve wayfinding and interpretation.
- Relocate equestrian trailhead.

The Little Shoals day-use area is currently more formalized than the Big Shoals day-use area, despite the contrast in significance and visual splendor between the two river features. The Little Shoals access point is situated much closer to County Road 135 and the entrance is relatively stately.

Currently, a portable restroom accompanies a six-table picnic pavilion. However, visitors would benefit from the addition of a permanent restroom facility and access to potable water. As this use area serves as an access point to both the Woodpecker Trail and Little Shoals, robust wayfinding should be an interpretive focus at this area, along with interpretation of the significance of the Little Shoals.

The equestrian trailhead that is currently located near the observation tower in the state forest portion of the property will be relocated to the Little Shoals parking area in an effort to minimize conflict between equestrians and staff on service roads. Big Shoals State Forest representatives have provided their support for this land use objective. Continued dialogue with forestry representatives will be necessary throughout this process to ensure successful relocation.

Upon relocating the equestrian trailhead, an equestrian trailer parking area will need to be incorporated into the existing parking lot adjacent to the day use area. This will require expanding the current footprint of the Little Shoals Day Use Area. Updated wayfinding, signage, and interpretation should be consistent with the parkwide interpretive plan, while guiding the rider through the appropriate trails. Consideration needs to be taken to minimize ecological and hydrological impact. The parking area and equestrian facility will need to be stabilized to ensure an even surface for the safety of horses and trailers. Additional consideration must ensure enough separation between cyclists/bicycling parking and the equestrian parking/unloading area.

Little Shoals Access

Objective: Improve wayfinding through trail system map updates and additional interpretive elements.

The trail that connects the Little Shoals Day-use area to the Little Shoals stretch of the Suwannee River should have a clear and concise wayfinding system installed. The trail system to the shoals should be well-marked, and a current trail system map should be installed on a panel in this area.

Old Godwin Bridge

Objective: Improve interpretation and stabilization of significant features.

Actions:








- Stabilize the bank by placing a structure to reduce foot traffic.

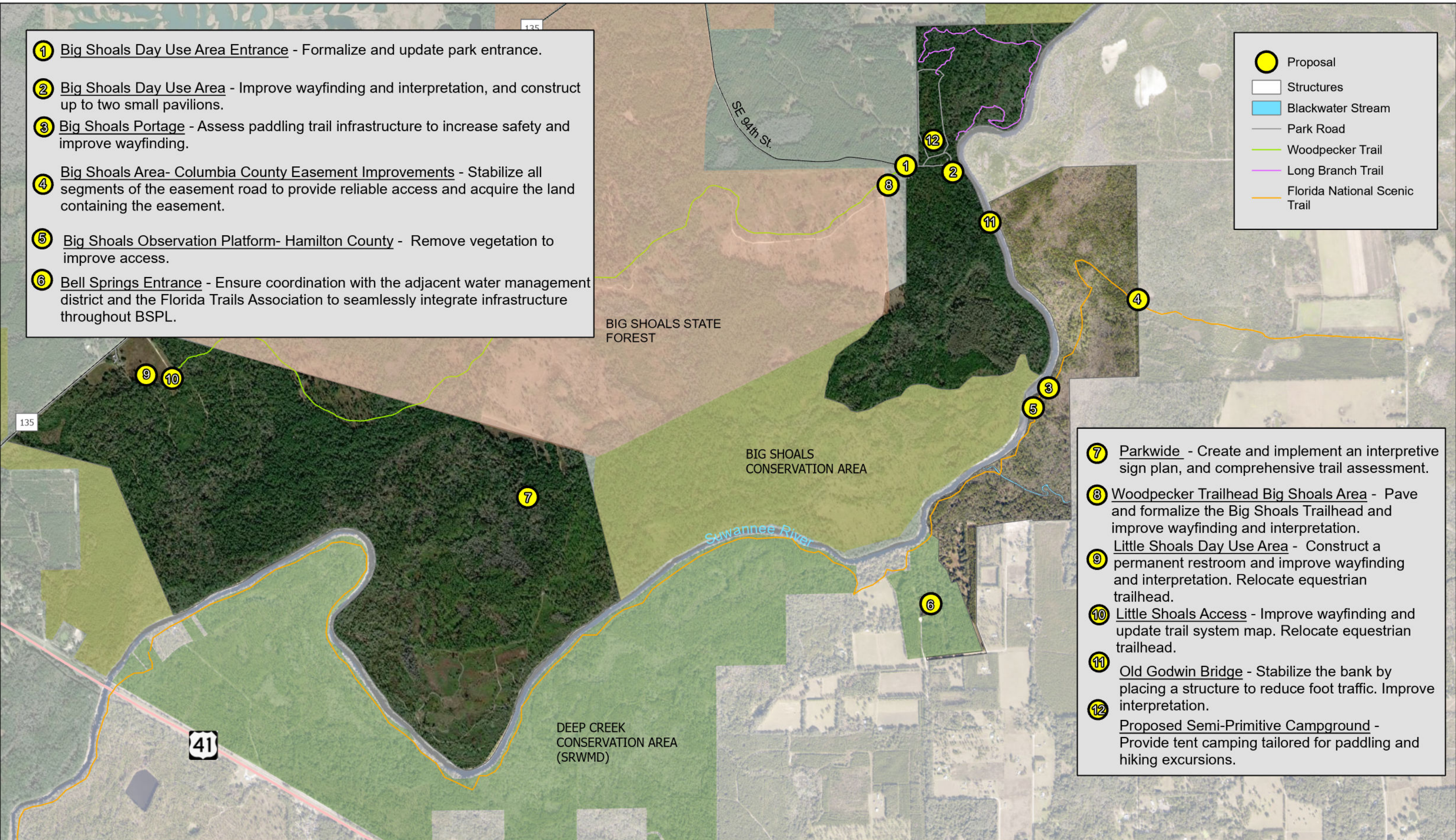
The Old Godwin Bridge is a significant historic structure within the park. To see the actual pilings, trail users must walk down an unstable bank. Lack of a formalized trail down the bank can lead to unsanctioned paths that are unsafe and cause erosion. To solve both issues, an access structure to minimize the impacts of foot traffic on the bank should be built. This could be stairs or a short, small boardwalk that provides a viewpoint over the river and pilings. This should not include a full descent down the bank, instead, a structure that is on grade. Mitigating erosion efforts directly supports resource management objectives.

OPTIMUM BOUNDARY

The park is situated within a patchwork of conservation lands managed by both the Florida Forest Service and the Suwannee River Water Management District. Previously identified optimum boundary parcels include several encompassing the critical Southeast 94th Street entrance road to the Big Shoals day-use area, parcels to the east of the Columbia County portion of the park, and parcels to the south and southwest of the park in Columbia and Hamilton counties. Acquisition of these parcels would bolster protection of the waters of the Suwannee River by acquiring additional lands within the watershed. Additional parcels to the northwest would provide an extensive corridor within the patchwork of conservation lands. Several of these parcels are agricultural or silvicultural and would require significant restoration efforts.

- ① Big Shoals Day Use Area Entrance - Formalize and update park entrance.
- ② Big Shoals Day Use Area - Improve wayfinding and interpretation, and construct up to two small pavilions.
- ③ Big Shoals Portage - Assess paddling trail infrastructure to increase safety and improve wayfinding.
- ④ Big Shoals Area- Columbia County Easement Improvements - Stabilize all segments of the easement road to provide reliable access and acquire the land containing the easement.
- ⑤ Big Shoals Observation Platform- Hamilton County - Remove vegetation to improve access.
- ⑥ Bell Springs Entrance - Ensure coordination with the adjacent water management district and the Florida Trails Association to seamlessly integrate infrastructure throughout BSPL.

-  Proposal
-  Structures
-  Blackwater Stream
-  Park Road
-  Woodpecker Trail
-  Long Branch Trail
-  Florida National Scenic Trail

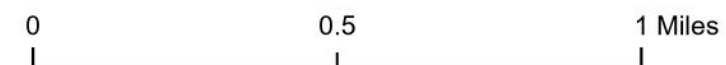


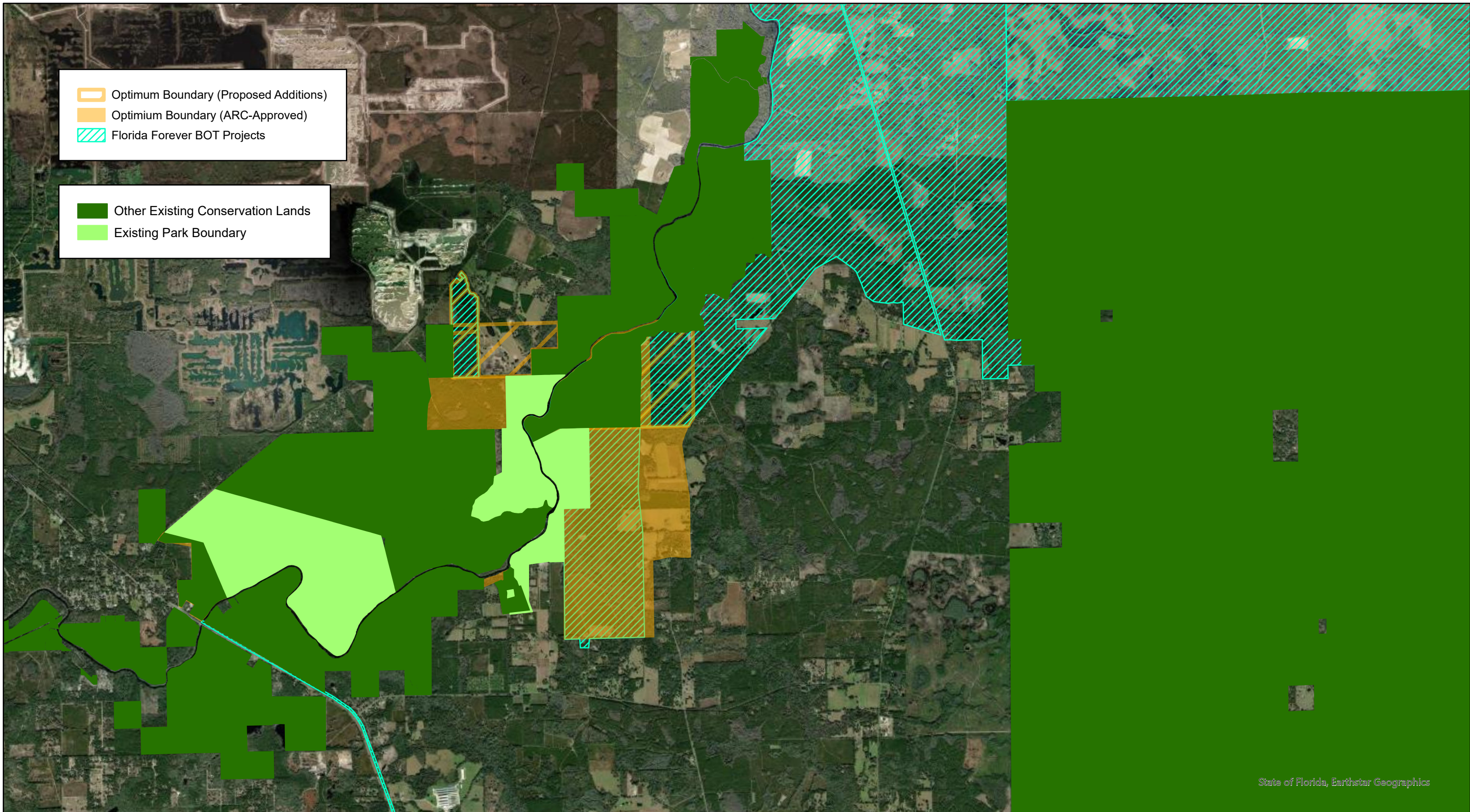
- ⑦ Parkwide - Create and implement an interpretive sign plan, and comprehensive trail assessment.
- ⑧ Woodpecker Trailhead Big Shoals Area - Pave and formalize the Big Shoals Trailhead and improve wayfinding and interpretation.
- ⑨ Little Shoals Day Use Area - Construct a permanent restroom and improve wayfinding and interpretation. Relocate equestrian trailhead.
- ⑩ Little Shoals Access - Improve wayfinding and update trail system map. Relocate equestrian trailhead.
- ⑪ Old Godwin Bridge - Stabilize the bank by placing a structure to reduce foot traffic. Improve interpretation.
- ⑫ Proposed Semi-Primitive Campground - Provide tent camping tailored for paddling and hiking excursions.



Big Shoals State Park

Conceptual Land Use Plan





State of Florida, Earthstar Geographics



Big Shoals State Park

Optimum Boundary



