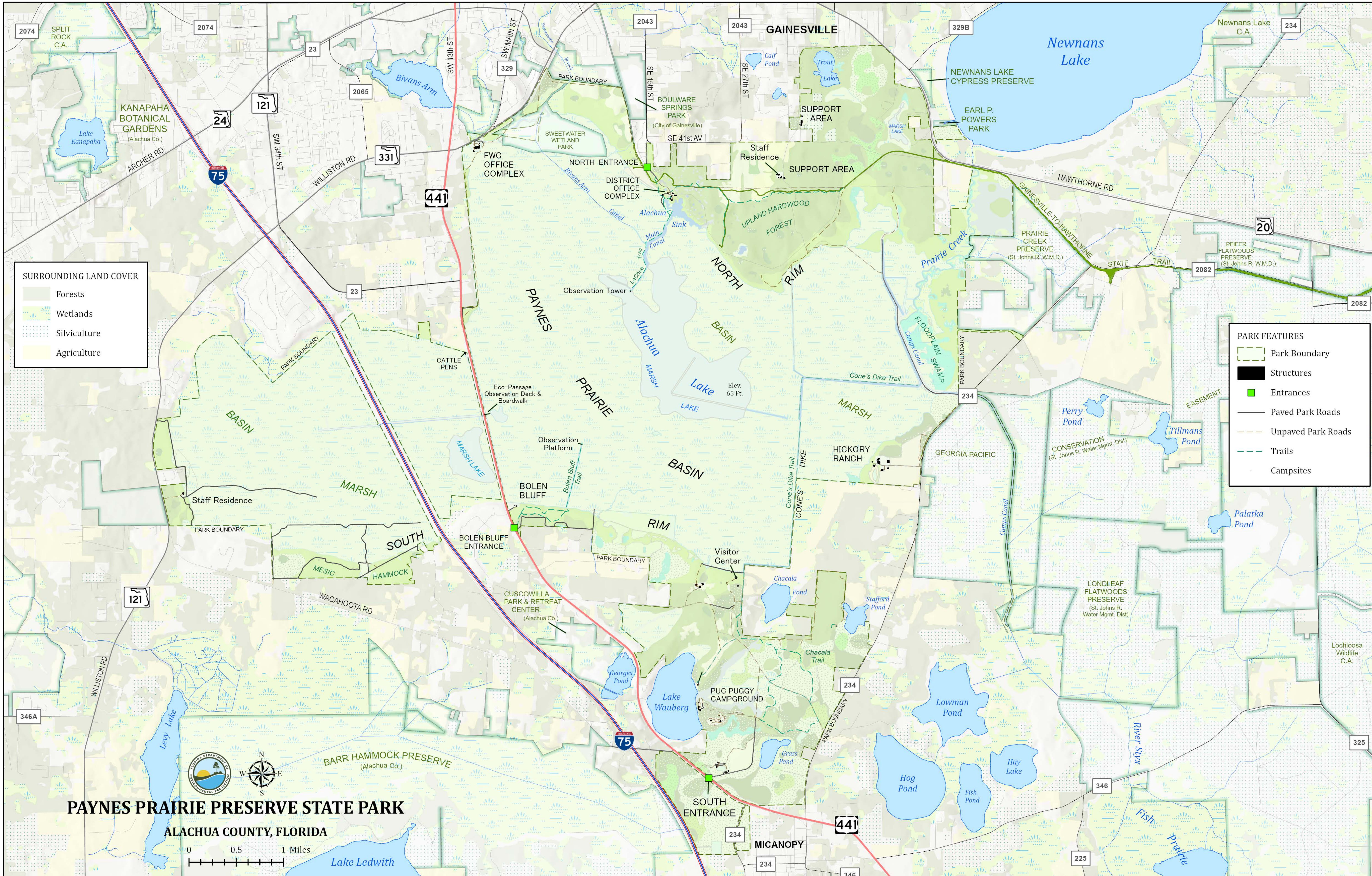
PAYNES PRAIRIE PRESERVE STATE PARK

Park Chapter

NORTH FLORIDA HIGHLANDS REGION



PAYNES PRAIRIE PRESERVE STATE PARK
ALACHUA COUNTY, FLORIDA
0 0.5 1 Miles
N S E W
SURROUNDING LAND COVER
Forests
Wetlands
Silviculture
Agriculture
PARK FEATURES
Park Boundary
Structures
Entrances
Paved Park Roads
Unpaved Park Roads
Trails
Campsites
GAINESVILLE
MICANOPY
Newnans Lake
NEWNANS LAKE CYPRESS PRESERVE
Newnans Lake C.A.
EARL P. POWERS PARK
SPLIT ROCK C.A.
KANAPAHA BOTANICAL GARDENS
(Alachua Co.)
Lake Kanapaha
Bivans Arm
SWEETWATER WETLAND PARK
BOULWARE SPRINGS PARK
(City of Gainesville)
Calf Pond
Trout Lake
MARSH LAKE
SUPPORT AREA
Staff Residence
SUPPORT AREA
FWC OFFICE COMPLEX
NORTH ENTRANCE
DISTRICT OFFICE COMPLEX
PARK BOUNDARY
SE 41st AV
SE 15th ST
SE 27th ST
SW 13th ST
SW MAIN ST
SW 34th ST
WILLISTON RD
ARCHER RD
HAWTHORNE RD
WACAHOOTA RD
GAINESVILLE-TO-HAWTHORNE STATE TRAIL
Alachua Sink
Bivans Arm Canal
Main Canal
LaChua Trail
UPLAND HARDWOOD FOREST
NORTH RIM
Prairie Creek
PRAIRIE CREEK PRESERVE
(St. Johns R. W.M.D.)
PFIFER FLATWOODS PRESERVE
(St. Johns R. W.M.D.)
FLOODPLAIN SWAMP
Camps Canal
Observation Tower
PAYNES PRAIRIE BASIN
Alachua Lake
MARSH
LAKE
Elev. 65 Ft.
BASIN
MARSH
Cone's Dike Trail
CONE'S DIKE
HICKORY RANCH
GEORGIA-PACIFIC
CONSERVATION EASEMENT
(St. Johns R. Water Mgmt. Dist)
Perry Pond
Tillmans Pond
Palatka Pond
CATTLE PENS
Eco-Passage Observation Deck & Boardwalk
Observation Platform
Bolen Bluff Trail
BOLEN BLUFF
BOLEN BLUFF ENTRANCE
BASIN MARSH
Staff Residence
SOUTH RIM
MESIC HAMMOCK
Visitor Center
Chacala Pond
Stafford Pond
Chacala Trail
CUSCOWILLA PARK & RETREAT CENTER
(Alachua Co.)
Georges Pond
Lake Wauberg
PUC PUGGY CAMPGROUND
Grass Pond
SOUTH ENTRANCE
LONGLEAF FLATWOODS PRESERVE
(St. Johns R. Water Mgmt. Dist)
Lochloosa Wildlife C.A.
Lowman Pond
Hog Pond
Fish Pond
Hay Lake
River Styx
Fish Prairie
Levy Lake
BARR HAMMOCK PRESERVE
(Alachua Co.)
Lake Ledwith
2074
2043
329B
234
23
121
24
2065
329
331
441
75
20
2082
346A
346
325
225

INTRODUCTION

LOCATION AND ACQUISITION HISTORY

Paynes Prairie Preserve State Park is located in Alachua County between Gainesville and Micanopy (see Vicinity Map). Access to the park is from U.S. Highway 441. Six other access points are located along U.S. Highway 441, Southeast 15th Street and State Road 20. The Vicinity Map also reflects significant land and water resources near the park.

Paynes Prairie Preserve State Park was initially acquired on Sept. 29, 1970, under the Land Acquisition Trust Fund (LATF) and the Land and Water Conservation Fund. Currently, the park comprises 21,561.71 acres. The Board of Trustees of the Internal Improvement Trust Fund (Trustees) hold fee simple title to the park and on Jan. 27, 1971, the Trustees leased (Lease No. 2515) the property to the Division of Recreation and Parks (DRP) under a 99-year lease. The current lease will expire on Jan. 26, 2070.

Paynes Prairie Preserve State Park is designated single-use to provide public outdoor recreation and conservation. There are no legislative or executive directives that constrain the use of this property (see Addendum 1). A legal description of the park property is 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 timber harvesting as part of the park's natural community restoration and management activities could be accommodated in a manner that would be compatible and not interfere with the primary purpose of resource-based outdoor recreation and conservation.

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

In accordance with 253.034(5) F.S., the potential for generating revenue to enhance management was also analyzed. Visitor fees and charges are the principal source of revenue generated by the park. It was determined that timber harvesting for the express purpose of natural community restoration and management is appropriate as an additional source of revenue for land management since it is compatible with the park's primary purpose of outdoor recreation and conservation. Generating revenue from consumptive uses or from activities that are not expressly related to resource management and conservation is not under consideration.

PURPOSE AND SIGNIFICANCE OF THE PARK

Park Purpose

The Florida Park System's first designated preserve, Paynes Prairie Preserve State Park protects complex natural resources and significant cultural resources, with particular emphasis on water resource protection for the dependent imperiled species of the expansive basin marsh ecosystem. The provision of resource-based recreation surrounding and within the basin also provides visitors the opportunity to explore the park and observe unique wildlife.

Park Significance

- The park protects Paynes Prairie, a 16,000-acre sinkhole valley. All surface waters within the prairie and its surrounding 121,000-acre watershed flow directly into the Floridan aquifer through the Alachua Sink at a rate of up to 1 million gallons per day.

- In 1974, Paynes Prairie Preserve State Park was designated as a National Natural Landmark as an exceptional example of karst prairie formation and freshwater marsh diversity. The park retains much of the historic landscape that William Bartram described as "the Great Alachua Savanna" over 230 years ago.

- Evidence of approximately 12,000 years of uninterrupted human occupation – Paleoindian period through the 20th century – are evidenced through 139 recorded cultural sites.

- The park protects the largest and most biologically diverse freshwater marshes in northern Florida. It is also nationally recognized as a major avian habitat area that supports one of the most diverse assemblages of bird species in the state, facilitating excellent wildlife viewing.

Central Park Theme

Only minutes from the cityscape, Paynes Prairie's timeless vistas feature the dynamic rhythms of water that is the lifeblood for seasonal displays and wildlife migrations across an expansive 16,000-acre wetland.

Paynes Prairie Preserve State Park is classified as a preserve in the DRP's unit classification system. In the management of a preserve, preservation and enhancement of natural conditions is all important. Resource considerations are given priority over user considerations and development is restricted to the minimum necessary for ensuring protection and maintenance, limited access, user safety and convenience, and appropriate interpretation. Permitted uses are primarily of a passive nature, related to the aesthetic, educational and recreational enjoyment of the preserve, although other compatible uses are permitted in limited amounts. Program emphasis is placed on interpretation of the natural and cultural attributes of the preserve.

OTHER DESIGNATIONS

The unit is not within an Area of Critical State Concern as defined in Section 380.05, Florida Statutes, and it is not presently under study for such designation. The park is a component of the Florida Greenways and Trails System, administered by the Department's 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 Class III (suitable for fish consumption and recreation) waters by DEP. The park is not within or adjacent to an aquatic preserve as designated under the Florida Aquatic Preserve Act of 1975 (Section 258.35, Florida Statutes).

PARK ACCOMPLISHMENTS

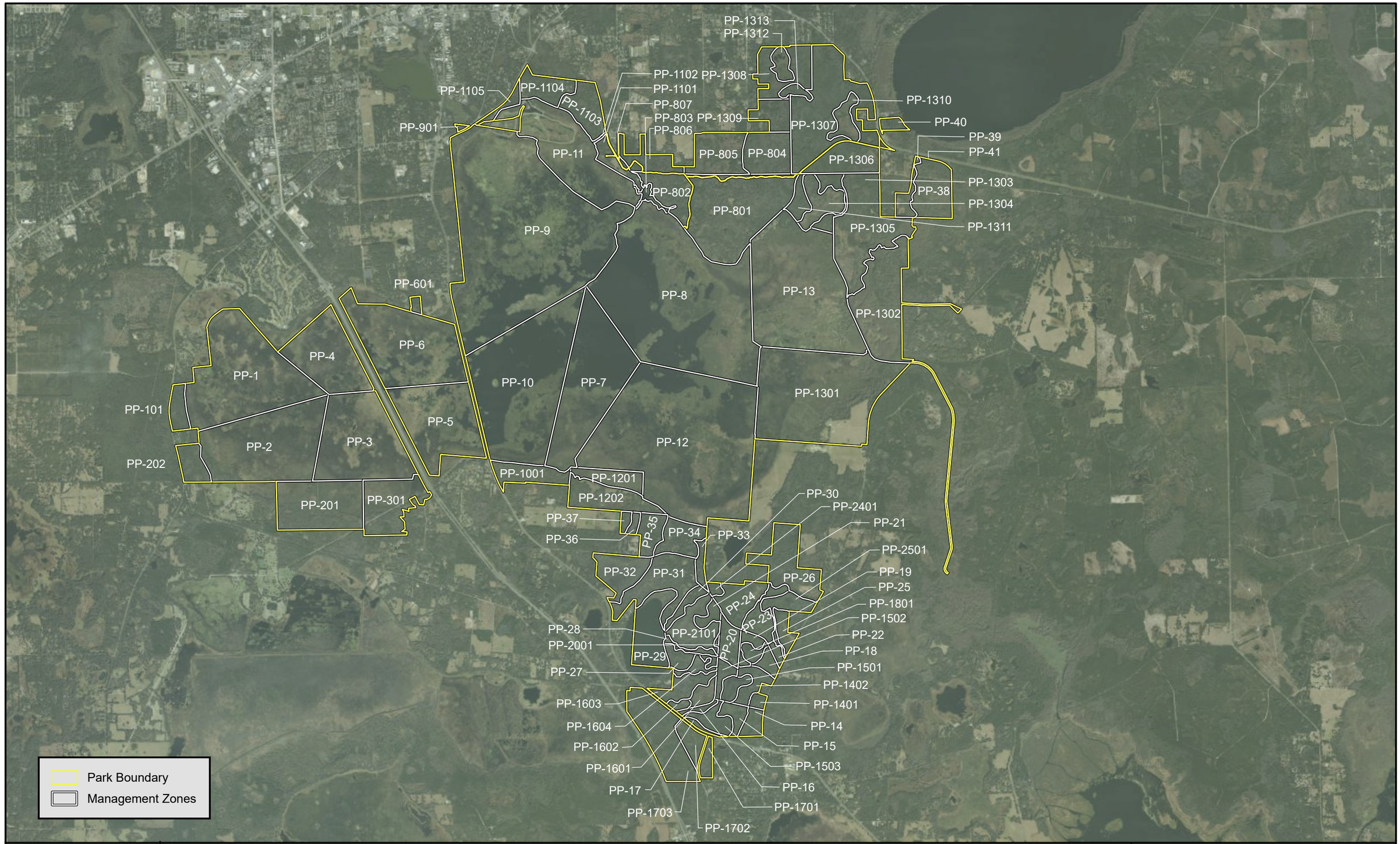
- Removed 656 invasive feral hogs from the property by working with multiple partners.
- Worked with the Bureau of Natural and Cultural Resources (BNCR), the Florida Fish and Wildlife Conservation Commission (FWC) and the Florida Natural Areas Inventory (FNAI) to survey 11,500 acres of basin marsh for exotic weeds for assessment of endangered snail kite habitat.
- Applied prescribed fire to 867 acres of uplands, including 714 backlogged acres and four zones with no known fire history (2018-2020).
- Treated 1,668 gross acres (559 acres infested) for upland invasive plant infestations using contract, volunteer and national service positions labor.
- Employed mechanical fuels treatments, including logging, hardwood control, roller chopping and mulching on a total of 191.8 acres and 3,000 pines planted for restoration of flatwoods, scrubby flatwoods and upland mixed pine plant communities.

RESOURCE MANAGEMENT COMPONENT

Paynes Prairie Preserve State Park Management Zones			
Management Zone	**Acreage**	**Managed with Prescribed Fire**	**Contains Known Cultural Resources**
PP-1	812.68	Y	
PP-101	64.42	N	
PP-2	692.45	Y	
PP-201	366.63	Y	
PP-202	82.31	N	
PP-3	587.54	Y	
PP-301	245.82	Y	
PP-4	380.94	Y	
PP-5	491.15	Y	
PP-6	639.87	Y	
PP-601	14.72	N	
PP-7	686.65	Y	
PP-8	1703.55	Y	
PP-801	606.01	Y	
PP-802	145.00	Y	
PP-803	25.33	N	
PP-804	169.25	Y	
PP-805	186.93	Y	
PP-806	98.06	Y	
PP-807	1.50	N	
PP-9	2135.68	Y	
PP-901	4.91	Y	
PP-10	1057.11	Y	
PP-1001	122.10	N	
PP-11	544.92	Y	
PP-1101	68.86	Y	
PP-1102	2.84	Y	
PP-1103	138.33	Y	
PP-1104	113.51	Y	
PP-1105	33.82	N	
PP-12	1734.35	Y	
PP-1201	95.50	Y	
PP-1202	180.51	Y	
PP-13	1025.54	Y	
PP-1301	936.03	Y	
PP-1302	467.07	Y	
PP-1303	65.54	Y	

Paynes Prairie Preserve State Park Management Zones			
Management Zone	**Acreage**	**Managed with Prescribed Fire**	**Contains Known Cultural Resources**
PP-1304	118.67	Y	
PP-1305	429.18	Y	
PP-1306	159.41	Y	
PP-1307	495.30	Y	
PP-1308	165.29	Y	
PP-1309	91.20	Y	
PP-1310	69.81	Y	
PP-1311	52.70	N	
PP-1312	46.74	Y	
PP-1313	26.47	Y	
PP-14	46.17	Y	
PP-1401	20.27	Y	
PP-1402	68.74	Y	
PP-15	48.30	Y	
PP-1501	44.81	Y	
PP-1502	39.32	Y	
PP-1503	67.65	Y	
PP-16	18.58	Y	
PP-1601	43.52	Y	
PP-1602	17.55	Y	
PP-1603	85.13	Y	
PP-1604	34.41	Y	
PP-17	16.81	Y	
PP-1701	36.62	Y	
PP-1702	64.37	Y	
PP-1703	278.98	Y	
PP-18	35.17	Y	
PP-1801	29.72	Y	
PP-19	35.11	Y	
PP-20	73.27	Y	
PP-2001	3.74	Y	
PP-21	34.71	Y	
PP-2101	144.80	Y	
PP-22	18.48	Y	
PP-23	91.77	Y	
PP-24	129.30	Y	
PP-2401	15.79	Y	
PP-25	50.67	Y	
PP-2501	76.97	Y	

Paynes Prairie Preserve State Park Management Zones			
Management Zone	**Acreage**	**Managed with Prescribed Fire**	**Contains Known Cultural Resources**
PP-26	237.54	Y	
PP-27	57.77	Y	
PP-28	22.51	Y	
PP-29	197.76	N	
PP-30	42.25	Y	
PP-31	237.69	Y	
PP-32	145.06	Y	
PP-33	35.82	Y	
PP-34	119.58	Y	
PP-35	82.59	Y	
PP-36	18.02	Y	
PP-37	17.00	Y	
PP-38	182.60	Y	
PP-39	49.37	Y	
PP-40	25.76	Y	
PP-41	4.48	N	



PAYNES PRAIRIE PRESERVE STATE PARK
Management Zones

N

0 1 2 Miles

Sources: ESRI; Florida Department of Environmental Protection
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Topography

Paynes Prairie Preserve State Park is located in a region of karst topography characterized by horizontal rock formations, irregular drainage patterns, sinkholes and other solution features. The dominant feature of the state park is Paynes Prairie, which is the largest of several flat-bottomed solution basins located in southeastern Alachua County. The Paynes Prairie basin extends about eight miles east to west and from one to four miles north to south. Low hills separate the basin from neighboring prairies and lakes. A primary topographic feature of Paynes Prairie is Alachua Sink, a swallow hole with direct surface water to groundwater connections. The sink is bordered on the north by bluffs rising 30 to 40 feet above the floor of the basin. Numerous sinkholes occur in the uplands bordering the basin. Elevations within the park range from about 45 feet above mean sea level (msl) at Alachua Sink to 151 feet above msl at a point 1.2 miles northeast of Alachua Sink.

Considerable alteration of terrain has occurred in the park. There are four borrow pits on the property. Numerous canals and dikes, along with two multilane highways, cut through the basin. Abandoned tram beds and railroad rights-of-way cross portions of the uplands in several locations. Topographic alterations such as the abandoned rail beds in the uplands have changed natural drainage patterns in the park and modified the natural fire regime. They also continue to provide corridors for dispersal of invasive exotic plants. Additional impacts from topographic alterations (i.e., canals and dikes) in the prairie basin are discussed in the Hydrology section below.

The most extensive abandoned railway, which follows the north rim of the prairie basin, was converted into the Gainesville to Hawthorne Trail in the early 1990s. For several miles within the park, however, the trail detours away from a portion of the old railway bed in order to avoid ecologically sensitive areas. The surface of the 2.9-mile stretch of railroad bed within the park shows minimal elevation change despite its location along the topographically varied north rim of Paynes Prairie. When the railroad bed was originally constructed, excavators removed soil from higher elevations along the route and deposited it in lower areas in order to create a grade that was suitable for locomotives. About 6000 feet of the western end of the abandoned railroad bed was recontoured in 2003 using heavy equipment to restore the natural topography of the rim of the basin and in the Alachua Sink Hammock. The restoration area will be allowed to restore itself naturally with the native species from the adjacent upland hardwood forest. Additional work is still needed on the remainder of the railway from just east of Melton's Pond to where the Gainesville to Hawthorne Trail rejoins the railway corridor. Approximately 8500 feet of the railway corridor remains to be restored.

MATCH LINE

MATCH LINE

Legend

- 41.000000 - 50.000000
- 50.000001 - 54.000000
- 54.000001 - 57.000000
- 57.000001 - 61.000000
- 61.000001 - 66.000000
- 66.000001 - 72.000000
- 72.000001 - 78.000000
- 78.000001 - 83.000000
- 83.000001 - 88.000000
- 88.000001 - 93.000000
- 93.000001 - 98.000000
- 98.000001 - 104.000000
- 104.000001 - 109.000000
- 109.000001 - 114.000000
- 114.000001 - 119.000000
- 119.000001 - 124.000000
- 124.000001 - 130.000000
- 130.000001 - 137.000000
- 137.000001 - 144.000000
- 144.000001 - 154.000000

PAYNES PRAIRIE
PRESERVE STATE PARK

N

0 0.5 1 2 Miles

Prepared by:
Florida Department of Environment Protection
Division of Recreation and Park
Date of Aerial:2009

TOPOGRAPHIC MAP

Soils

Paynes Prairie Preserve State Park contains forty-one of the soil types (see Soils Map) recorded in Alachua County by the Natural Resource Conservation Service (Thomas et al. 1985). This great diversity of soils reflects the complex geologic and hydrologic past of the park. Descriptions of soil types found in the park are contained in the Appendix.

An accurate assessment of current soil conditions in the park is difficult. Past agricultural practices have undoubtedly altered many of the original soil characteristics. Bedding or plowing of the basin marsh for crop production occurred in some of the higher elevations of the prairie basin. Substantial portions of the surrounding uplands were converted to improved pasture. Periodic fertilization of these areas likely caused changes in soil chemistry. Plowing in the uplands certainly caused some soil loss via erosion. Ditching to drain isolated wetlands, a common practice during the period of intensive management for cattle production, was also a contributing factor.

Despite past impacts to soils, there are relatively few soil erosion problems within the park today. However, some concern is still warranted within the Alachua Sink Hammock, also known as Bartram's Hammock, which encompasses a nearly continuous field of steep-sided sinkholes stretching from the Alachua Sink to the north boundary of the park. Foot traffic in this area is limited in order to protect the sinkholes from unacceptable levels of erosion. Other erosion sites are mainly associated with culverts and water control structures within the prairie basin. In these cases, erosion of dikes may be causing localized sedimentation impacts. Management activities will follow generally accepted best management practices to prevent further soil erosion and conserve soil and water resources on site.

Paynes Prairie Preserve has several sites of potential concern where cattle dipping vats once operated. Soil cores and groundwater well monitoring have verified that the dip vat sites are contaminated with arsenic and chlorinated hydrocarbons, chemicals used during historic cattle operations to combat tick fever in the early 1900s. Additional discussion of this issue appears in the Hydrology section below.

Soils

- 2 - Candler fine sand, 0 to 5 percent slopes
- 3 - Arredondo fine sand, 0 to 5 percent slopes
- 7 - Kanapaha sand, 0 to 5 percent slopes
- 8 - Millhopper sand, 0 to 5 percent slopes
- 14 - Pomona sand, 0 to 2 percent slopes
- 15 - Pompano sand
- 16 - Surrency sand
- 17 - Wauchula sand
- 19 - Monteocha loamy sand
- 20 - Tavares sand, 0 to 5 percent slopes
- 21 - Newnan sand
- 22 - Floridana sand, frequently ponded, 0 to 2 percent slopes
- 23 - Mulat sand
- 25 - Pomona sand, depressional
- 26 - Samsula muck
- 28 - Chipley sand
- 29 - Lochloosa fine sand, 2 to 5 percent slopes
- 30 - Kendrick sand, 2 to 5 percent slopes
- 31 - Blichton sand, 0 to 2 percent slopes
- 32 - Bivans sand, 2 to 5 percent slopes
- 33 - Norfolk loamy fine sand, 2 to 5 percent slopes
- 34 - Placid sand, depressional
- 35 - Gainesville sand, 0 to 5 percent slopes
- 38 - Pits and dumps
- 39 - Bonneau fine sand, 2 to 5 percent slopes
- 44 - Blichton-urban land complex, 0 to 5 percent slopes
- 46 - Jonesville-cadillac-bonneau complex, 0 to 5 percent slopes
- 48 - Myakka-myakka, wet, sands, 0 to 2 percent slopes
- 49 - Lochloosa fine sand, 0 to 2 percent slopes
- 50 - Sparr fine sand
- 51 - Plummer fine sand
- 52 - Ledwith muck
- 53 - Shenks muck
- 54 - Emeralda fine sandy loam
- 55 - Lake sand, 0 to 5 percent slopes
- 56 - Wauberg sand
- 59 - Pottsburg sand
- 68 - Candler fine sand, 5 to 8 percent slopes
- 71 - Millhopper sand, 5 to 8 percent slopes
- 72 - Lochloosa fine sand, 5 to 8 percent slopes
- 73 - Kendrick sand, 5 to 8 percent slopes
- 74 - Blichton sand, 2 to 5 percent slopes
- 75 - Blichton sand, 5 to 8 percent slopes
- 78 - Norfolk loamy fine sand, 5 to 8 percent slopes
- 81 - Starke sand, frequently flooded
- 99 - Water

PAYNES PRAIRIE PRESERVE STATE PARK
Soils

N

0 1 2 Miles

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.

HYDROLOGY

The Paynes Prairie Basin, a vast 16,055-acre solution depression that is the dominant landscape feature within Paynes Prairie Preserve State Park, is a closed watershed. Water that enters the basin does not exit via natural surface channels but rather through sinkholes to the aquifer or by evapotranspiration. This results in periodic wide-ranging fluctuations in water levels on the basin. In very wet years, the basin may flood completely, while during severe droughts it may become so dry that only the canals and Alachua Sink continue to retain water. These fluctuations are essential to the health of the prairie ecosystem. Despite past diversions of surface waters altering the natural hydrologic regime, the basin continues to experience extremes of high and low water levels on a recurring basis. Herbaceous wetland species dominate the Paynes Prairie Basin marsh, and the quantity and quality of water that enters the system is critical to their survival. Alteration of natural inflow into the basin, or even of the timing of the inflow, can cause rapid changes in natural community structure and function, generally to the detriment of the basin marsh community.

Paynes Prairie Preserve State Park protects a significant portion of the larger Paynes Prairie watershed along with adjacent conservation lands that include Earl P. Powers Park, Newnans Lake Cypress Preserve, Sweetwater Preserve, Cuscowilla Park, and Wacahoota park, managed by Alachua County, as well as Boulware Springs Park, Bivens Arm Nature Park, Sweetwater Wetlands Park, and Colclough Pond Nature Park, managed by the City of Gainesville.

Paynes Prairie Watershed: Surface Water Sources and Drainage

Although Paynes Prairie is often referred to as the Paynes Prairie Basin, it is a sub-basin within the larger Paynes Prairie watershed, whose surface waters eventually either drain into Alachua Sink or flow southward through Camps Canal to the River Styx and then to Orange Lake. The Paynes Prairie watershed, including all adjacent surface water sources, covers approximately 121,000 acres or 188 square miles. It is roughly rectangular in shape, 10 miles wide and 20 miles long. The long axis is oriented northeast-to-southwest with Paynes Prairie situated at its southwest end. The watershed consists of 12 sub-basins or drainage units, 11 of which contribute surface water to Paynes Prairie. The sub-basins range in size from 596 to 78,896 acres, with Newnans Lake the largest by far. The Paynes Prairie Watershed Sub-basins table lists the individual sub-basins and summarizes their characteristics (see also Hydrologic Sub-Basins map).

The Newnans Lake and Paynes Prairie sub-basins account for nearly 80% of the total area of the entire Paynes Prairie watershed (Robison et al. 1997). Within the watershed, there are three major surface water inflows (Prairie Creek, Sweetwater Branch and Bivans Arm) and five minor inflows (Jerevan seepage from the Persimmon Point sub-basin, Post Office Creek, Boulware Spring Run from the Robinson Heights sub-basin, Chacala Run from the Lake Wauberg sub-basin and Dog Branch) that discharge into the prairie basin. Greater detail about these inflows is provided later in this *Hydrology* section under sub-sections that describe the individual sub-basins in the Paynes Prairie watershed.

Because an artificial drainage-way, Camps Canal, has linked Paynes Prairie with Orange Lake since the 1920s, the Paynes Prairie watershed is now considered a component of the much larger Orange Creek Basin, which covers approximately 600 square miles in three North Florida counties: Alachua, Marion and Putnam. The basin marsh at Paynes Prairie is a major link in a series of wetlands that provide much of the water supply for the Orange Creek Basin. The general direction of water movement is from Hatchet Creek in north-central Alachua County southward through Newnans Lake, Prairie Creek, Camps

Canal, River Styx, Orange Lake and Lake Lochloosa, and then eastward along Orange Creek to the Ocklawaha River.

Surface water sources have two separate but related impacts on the Paynes Prairie Basin. First, they establish a sheetflow regime on the higher edges of the basin, and second, they contribute to the total water budget of the basin. Historically, surface waters entered the basin via typical stream channels or seepage from the surficial aquifer. Once the inflows reached the basin, due to the level terrain, they rapidly began to form braided channels. In many cases, they ceased to exist altogether as streams and began to sheetflow across the basin toward the area of lowest elevation, Alachua Lake.

Anthropogenic influences on the prairie such as dikes and canals have changed the natural hydroperiods of both sheetflow and basin wetlands far beyond their normal wet/dry cycles. Even some of the more subtle topographic alterations, such as levees, have modified the natural movement and direction of surface water sheetflow, especially at lower elevations. Combine those influences with the more substantial impacts of two major highways bisecting the basin and the result is compartmentalization and isolation of large areas of potential sheetflow across the watershed. Additional discussion about dikes and other disturbances of basin hydrology appears below in the *Dikes, Canals, and Sheetflow Restoration* section.

Ecosystem function within the Paynes Prairie Basin is highly dependent on the hydrologic quality of the surrounding sub-basins. Even the smallest of the sub-basin watersheds can significantly affect prairie resources. Historically, Sweetwater Branch and Bivans Arm, for example, were two of the most significant contributors of poor-quality water to the prairie basin (Alachua County Environmental Protection Department, ACEPD 2008). Their watersheds are highly urbanized and have a history of extremely inefficient storage capacity for stormwater runoff. Despite their relatively small sizes, they often discharge extremely high volumes of poor-quality surface water. These discharges had the ability to profoundly influence the prairie ecosystem by driving biological processes in portions of the basin, resulting in a greater diversity of plant associations than would otherwise be expected from a system seemingly so flat and uniform. An effort to ameliorate the discharge from Sweetwater Branch began in 2009. The large-scale effort culminated in 2015 with the Sweetwater Wetlands Preserve, a water treatment marsh and park detailed below.

In 1997, water managers for the St. Johns River Water Management District (SJRWMD) conducted a water budget analysis of inflows into the Main Canal, a large drainage channel east of U.S. Highway 441 that ultimately drains into Alachua Sink (Robison et al. 1997). For this analysis, hydrologists grouped sub-basins according to their proximity and location of discharge onto the Paynes Prairie Basin. One of the most interesting pieces of information derived from this water budget exercise was the apparent hydrologic importance of the western lobe of the basin (west of U.S. 441), including its adjacent sub-basins. According to the water budget analysis, the west portion of the basin appears to provide potentially the second largest amount of surface water sheetflow to the Main Canal. Coincidentally, the western part of the basin contains over half of the acreage within the Paynes Prairie sub-basin, underscoring its importance as a contributor to the direct rainfall portion of the overall water budget. It also demonstrates the need to continue dike restoration activities on the prairie basin to restore surface water sheetflow throughout Paynes Prairie.

Paynes Prairie Watershed Sub-basins			
Surface Water Sub-basins	**Number of Acres**	**Percent of Paynes Prairie Watershed**	**Percent Urban, or Built-up**
Newnans Lake	78,882	65%	11%
Paynes Prairie	16,055	13%	1%
West Side / South Rim	8,024	7%	28%
Lake Wauberg	3,347	3%	5%
Calf Pond	2,679	2%	27%
Rocky Point	2,441	2%	41%
Sweetwater Branch	2,229	2%	72%
Bivans Arm / Tumbling Creek	1,818	2%	83%
Persimmon Point	1,812	2%	7%
Dog Branch	1,564	1%	15%
Post Office	1,271	1%	37%
Robinson Heights	596	<1%	20%
Total Watershed	**120,719**	**100%**	**14%**

Newnans Lake

Newnans Lake sub-basin is the largest contributor of surface water discharge to the Paynes Prairie Basin. Historically, all the surface waters from this significant sub-basin drained to the prairie basin via Prairie Creek and its associated forested wetlands (Robison et al. 1997, DEP 2001). In the late 1920s, however, the most significant landowner in the prairie basin, Camp Ranch Incorporated, constructed a canal and levee system (Camps Canal) that diverted the Prairie Creek discharge away from Paynes Prairie and south to the River Styx and Orange Lake. Prior to that massive manipulation of local hydrology, surface water inflow through Prairie Creek accounted for roughly half the total water budget of the prairie basin.

Consequently, the most significant outcome of the diversion was the loss of over 50% of the historic surface water supply for the Paynes Prairie sub-basin. In 1975, the Florida Park Service sought to somewhat rectify that situation by redirecting just under half of the historic inflow from Prairie Creek to Paynes Prairie. In 1994, the SJRWMD permitted this partially-restored flow by rule. Currently, the SJRWMD apportions the various contributions to the water budget for the Paynes Prairie Basin as follows: one-third Prairie Creek, one-third all other adjacent surface water inflows and one-third direct rainfall (Price Robison personal communication).

Prairie Creek begins at the southern end of Newnans Lake. In the early 1960s, to raise water levels in the lake, Alachua County constructed a water control structure just south of where the lake drains into the

creek. When State Road 20 was widened in 1999, this weir system was completely removed. There is evidence that during the existence of the structure there was an increase in flocculent sediments in the southern half of the lake (Cohen et al. 2008, Di et al. 2010). These sediments appear to have contributed to the high nutrient loading in the lake (Gao and Gilbert 2003).

The surface area of Newnans Lake normally fluctuates from a low of 6,200 acres at 65 feet. MSL to a high of 7,400 acres at 68 ft. MSL (Lasi and Schuman 1996). Hatchet Creek, Little Hatchet Creek and Lake Forest Creek are the three major watersheds contributing surface water to Newnans Lake. Hatchet Creek has numerous tributaries and drains a large area of undeveloped land including the Austin Cary Memorial Forest and a few forested wetlands such as Buck Bay and Saluda Swamp. Little Hatchet Creek drains rural areas to the east and northeast of Gainesville and also receives runoff from northeast Gainesville, Gainesville Regional Airport and the airport industrial park. All three of the creeks are intermittent stream systems that may dry out completely during drought periods (Alachua County Environmental Protection Department 2008). A severe drought in the spring of 2000 reduced overall water levels in Newnans Lake to record low elevations.

Paynes Prairie

Paynes Prairie sub-basin is the second largest within the watershed. The dominant feature within the sub-basin is Paynes Prairie, a vast limestone depression situated below 65 feet NGVD and draining to Alachua Sink. About 87% of the prairie (14,047 acres) is contained within the boundaries of Paynes Prairie Preserve State Park. All surface water entering the Paynes Prairie Basin from adjacent sub-basins, except for that which evaporates or infiltrates downward, eventually discharges into Alachua Sink and thus directly into the Floridan aquifer.

Alachua Sink currently functions as a stream-to-sink feature that receives discharge from main canal fed by basin sheetflow into Alachua Lake. The Main Canal drains most of the Paynes Prairie Basin, the remainder of the surface flow coming in from the northwest out of Boulware Spring Run, Bivens Arm and Sweetwater.

The general direction of groundwater movement, once surface waters enter Alachua Sink (i.e., Upper Floridan aquifer), is either west/northwest toward the Santa Fe River basin, or east/southeast toward Orange Lake as part of an underground geologic feature called the Alachua Stream System (Foose 1981; Williams et al. 1977; Butt et al. 2006). The Alachua Stream System is one of the most recognizable and highly researched internally drained swallet regions in the state. Surface and groundwater are easily funneled throughout a regional underground parallel fault system of significantly fractured and cavernous limestone that runs along the Cody escarpment (Upchurch et al. 2022). This underground geologic formation is referred to as the Cross-County Fracture Zone (Vernon 1951), and it bisects the entire county from the Santa Fe River southeast past Alachua Sink (at Paynes Prairie) to Orange Lake (Williams et al. 1977).

One significant threat to groundwater flow in this region is the Murphree well field, which is the source of Gainesville's regional water supply. Consumptive use of groundwater pumped from this northeast Gainesville well field has caused a "cone of depression" to develop around it to the extent that local groundwater flow is now in that direction (Mercer et al. 2007).

Alachua Lake, situated east of U.S. 441 within a large depression in the Paynes Prairie Basin, is the largest open water marsh lake in the basin. It can greatly fluctuate in size, however. Depending on the year or season and the particular balance of inflows and outflows at the time, Alachua Lake may be

completely dry or it may cover the entire 16,000 acres of the basin. Alachua Lake drains to Alachua Sink via the Main Canal. The course of the Main Canal, despite past dredging, is believed to be quite similar to that of its historic channel, which William Bartram observed in the spring of 1774. Since the water level of Alachua Sink is essentially that of the Floridan aquifer, aquifer levels have a substantial influence on surface water levels within the basin. Specifically, if the surface of the aquifer rises high enough, the surface water flow from Alachua Lake will decrease as water backs up within the basin. It is conceivable that the aquifer could rise high enough for a flow reversal to occur, with the sink acting as a spring, but this is unlikely since Alachua Sink is a major recharge point and the local high point of the aquifer's potentiometric surface (Kinnaman and Dixon 2009).

While Alachua Lake typically maintains the largest and most open pool of standing water in the prairie basin, most of the basin is actually sheetflow wetland filled with emergent marsh vegetation. The proportion of sheetflow wetland to marsh lake is in constant flux. At the peak of the late summer growth of marsh vegetation, the water level in the basin marsh around Alachua Lake may actually be a foot higher than the lake level. This is possible because the marsh vegetation becomes so dense that it essentially impedes water flow, preventing surface waters from draining to a uniform level and sequestering local inflows and rainfall within the marsh.

West Side and South Rim

The vast majority of the West Side sub-basin lies outside the park and to the west of State Road 121, whereas the South Rim sub-basin is primarily north of Wacahoota Road. Currently there are only a few culverts under these roads, with none connecting to a stream channel or ditch draining into the prairie basin. This may lead to the conclusion that the contribution of surface waters to the prairie basin from these watersheds is negligible. Land use development in the West Side and South Rim sub-basins has increased in the past 15 years, with residential subdivisions scattered primarily in the far western area. Much of the property adjacent to the park along State Road 121 and Wacahoota Road is still relatively undeveloped.

Lake Wauberg

The Lake Wauberg sub-basin consists of a series of connected, shallow water depressions, each containing either a lake or a forested wetland (Opper 1982). The water bodies that make up this chain are Georges Pond, Lake Wauberg and Chacala Pond, all of which are clastic upland lakes. The major forested wetlands in the chain are Burnt Pond and Sawgrass Pond. Some evidence suggests that fire exclusion may have played a role in the ecological succession of the latter two ponds from basin marsh to forested wetland. Much of the Lake Wauberg watershed lies within the park. The portion outside the park contains low-impact agricultural lands, rural housing and woodlands.

The ponds in this watershed obtain their water mainly by way of seepage from the surficial aquifer or from direct rainfall. The only stream channels within the watershed are those connecting the major ponds. Burnt Pond and Georges Pond contribute surface water flow only when conditions are the wettest. Under high water conditions, Burnt Pond drains west under U.S. 441 to Georges Pond, which then overflows eastward under the highway again to Lake Wauberg. Lake Wauberg, in turn, overflows into Sawgrass Pond, which may then drain through Sawgrass Run to Chacala Pond and then by way of Chacala Run to the prairie basin. Chacala Run is yet another intermittent stream along the prairie rim that sometimes provides a significant amount of surface water inflow to the eastern prairie basin. A comparison of historic aerial photographs suggests that the course of this creek system where it meanders onto the basin has changed very little over the years. Much of the watershed east of Chacala Pond influences the Paynes Prairie hydrology only during the wettest of conditions.

Lake Wauberg is the central landscape feature in this watershed. The lake measures approximately 370 acres in surface area and reaches a depth of about 15 feet (Florida LAKEWATCH 2004). Very little fluctuation in the surface elevation of the lake occurs, even during severe droughts, because of its impervious bottom and the substantial input of seepage from surrounding uplands. The University of Florida has maintained recreational facilities on the western and southern shorelines of the lake since 1939. Some single-family home sites exist in this area as well.

In 2002, Lake Wauberg was designated an impaired Florida water body because of high nutrient levels (Wu et al 2003). However, there is a growing body of evidence that suggests Lake Wauberg may have always had a naturally high level of eutrophication (Carr 1934, Whitmore and Brenner 2002).

Calf Pond

Calf Pond is the main feature of a small, closed watershed on the northern rim of the Paynes Prairie Basin. This watershed is not a direct contributor of surface water to the prairie but instead discharges directly into the Floridan aquifer through a swallet in the Flamingo Hammock community just north of the park. During periods of heavy rainfall, surface water from Calf Pond can overflow into an intermittent stream system that carries it southwest to the above-mentioned swallet.

Rocky Point

The Rocky Point sub-basin contains an extensive network of shallow depressions, giving it substantial capacity for surface water storage. This sub-basin has no natural streams, but it does convey some limited surface water inflow to the rim of the prairie basin. One substantial drainage area in this sub-basin cuts across County Road 18 (Rocky Point Road) at the road's western end where it turns 90 degrees toward the northwest. There are several culverts under that portion of the road, and, during severe thunderstorms, this area can experience brief episodes of localized flooding. A sharp change in elevation in this area, from about 125 feet to 70 feet over a relatively short distance, may influence the movement of surface runoff toward the prairie basin. In the eastern part of the watershed, at least two culverts under U.S. 441 allow surface runoff to drain into PP-9 of the prairie basin.

The northwest part of this sub-basin has a high level of development that could potentially influence the prairie. Otherwise, the watershed contains low-density housing, pastures and forested landscapes.

Sweetwater Branch

Historically, Sweetwater Branch was a small intermittent seepage stream that drained pine flatwoods in what is now east Gainesville. Rosewood Branch is its only major tributary. As Gainesville grew, the Sweetwater basin began to urbanize, and the impervious surfaces of development replaced the natural communities that once flourished there. These natural areas had facilitated the infiltration and storage of surface water runoff. Currently, due to a near complete build-out within the watershed, the area of impermeable surface is so great that storage capacity for stormwater runoff above the basin is woefully inadequate.

Most of the urban development in the Sweetwater watershed pre-dated the adoption of government regulations dealing with stormwater retention. As a result, Sweetwater Branch morphed from an ephemeral stream to a deep canal, and massive stormwater pulses began to flush through the now sterile channelized ditch. Within parts of the lower Sweetwater drainage, these pulses ultimately scoured out permanent scars over 20 feet deep. The stormwater surges also greatly increased downstream sediment loads. At the terminus of its discharge into the prairie basin, the Sweetwater

Canal accumulated sediments that now extend more than 4 feet above what was once a 20-foot-deep canal. In addition, over the past 50 years huge amounts of urban trash, debris and spilled waste have washed downstream toward the prairie basin.

Stormwater runoff is not the only threat to the Sweetwater sub-basin hydrology. Treated sewage waste effluent from the Gainesville Main Street Water Reclamation Facility (Main Street Plant) has discharged directly into the Sweetwater system for at least 100 years. The John R. Kelly Generating Station (Kelly Power Plant) also discharges significant loads of nutrients directly into the stream. The cumulative result has been an acceleration of ecological succession in the Sweetwater outfall area of the prairie basin (management zones PP-9 and PP-11), radically changing it from a predominantly open herbaceous marsh system to a closed canopy system of willow swamp and dense shrub thicket. The dramatic alterations of the Sweetwater system also created a perfect environment for the establishment of invasive plants. Additional discussion about invasive plant infestations at Paynes Prairie appears below in the *Invasive Species* section of this management plan.

Complicating matters further is the specific influence that dikes and canals have had on the allocation and distribution of surface water sheetflow within the prairie basin. By 1937, the Camp Ranch had initiated construction of the Sweetwater Branch dike and canal to reduce sheetflow within the basin east of U.S. 441. Decisions made about the management of the Sweetwater Branch inflow in this part of the basin were similar to those for Camps Canal in the northeastern corner of the basin. Unfortunately, the only effective way of dewatering the part of the basin supplied by Sweetwater Branch was to short-circuit its natural sheetflow pattern and channelize it so that it flowed directly to Alachua Sink. Although this exercise apparently reduced some of the undesirable biological effects on the basin, it also effectively dewatered PP-11 and prevented surface and subsurface waters from draining into adjacent PP-9 and then to Alachua Lake. It also exacerbated issues at Alachua Sink by dumping water there directly into the Floridan aquifer, exposing the local groundwater supply to increased loads of pollutants (DEP 2008c).

With these various alterations within the watershed, Sweetwater Branch sub-basin presented Paynes Prairie with a significant ecological challenge (ACEPD 2007). Of all the small watersheds adjacent to the prairie basin, Sweetwater Branch has the second highest level of urban buildup (Robison et al. 1997). Restoration efforts conducted from 2006-17 on Sweetwater are described below.

Bivans Arm

The Bivans Arm sub-basin lies just west of the Sweetwater Branch watershed. Similar to Sweetwater, it has a much higher level of urban buildup than most of the other watersheds associated with the prairie basin. Historically, this watershed discharged to Paynes Prairie via an unaltered intermittent stream (Hoenstine and Lane 1991). Until 2015, dikes constructed in the same era as Sweetwater canal played a substantial role in controlling surface water inflows from this system. Almost 40% of these were removed as part of the Sweetwater Restoration Project, leaving approximately 0.65 miles of remaining berm that may be restored to grade in a future restoration project.

The two primary surface water sources for the Bivans Arm watershed are Tumbling Creek and Little Tumbling Creek. These streams flow through older urban areas that have little or no provision for stormwater storage. They eventually converge at Bivans Arm Lake and in forested wetlands located at the south end of the watershed. Tumbling Creek passes primarily through a region of heavy commercial and industrial development in south Gainesville, while Little Tumbling Creek flows through an area that is more residential. The creeks are rated as two of the poorest quality wetland systems in Alachua

County (ACEPD 2004). In contrast with Sweetwater Branch, most of the sediments carried by the Bivans stormwaters accumulate within Bivans Arm Lake and not the prairie basin.

Bivans Arm drains into Paynes Prairie Preserve State Park through a culvert under State Road 331 (Williston Road). In the park, flow is contained within the Bivans Arm Canal for the first 1,000 feet and then passes through a culvert under the Bivans Arm Dike, contributing to the sheetflow across management zone PP-9, and eventually discharging into Alachua Lake, the Main Canal and Alachua Sink. Stormwater surge overflows from Sweetwater Branch in the past also contributed to the flow in the Bivans Arm Canal, damaging much of the area in the process. The flow pattern and water quality that this sub-basin contributes to the basin remains a problem. This should be addressed in a future restoration project, perhaps similar to the efforts conducted for Sweetwater but at a smaller scale.

Persimmon Point

This sub-basin, which is wedged between the Calf Pond and Newnans Lake sub-basins, has minimal urban development since most of its lies within Paynes Prairie Preserve State Park. Though it is a small watershed, Persimmon Point contains substantial storage capacity, including Trout Pond and Pike Pond near the top of the sub-basin and Melton's Pond and Long Pond near the bottom. The upper portion of this watershed, referred to as the Jerevan Tract, maintains a hydrologic connection with Paynes Prairie by means of sheetflow through a series of forested wetlands in management zones PP-1307, PP-1306 and PP-1311, eventually draining into a lobe of the prairie basin in PP-1304.

Dog Branch

The Dog Branch sub-basin is similar to the adjacent Lake Wauberg watershed in that they both contain several shallow, interconnected depressional wetlands. Dog Branch, an intermittent stream, is the most significant landscape feature in this sub-basin. Surface water sources for Dog Branch originate just west of U.S. 441 in a series of small wetlands that drain eastward under the highway and combine to form a creek, which then flows north to the prairie basin. Though small, Dog Branch is a significant source of surface water inflow to the prairie. Much of the Dog Branch watershed is still in relatively good condition despite having only a small portion protected within the park boundaries. The same cannot be said for the part of Dog Branch that flows into Paynes Prairie, however. During the Camp Ranch period, the hydrology of the entire prairie basin, including Dog Branch, was manipulated extensively. Dog Branch represents a classic example of the conversion of a historic natural sheetflow system to a highly altered canal and dike system.

Post Office

The Post Office sub-basin is a small watershed lying entirely outside the park and just west of the Rocky Point sub-basin. Its headwaters consist of a linear strand of forested wetlands immediately west of Gainesville's main post office on Southwest 34th Street. These wetlands coalesce to form a small intermittent stream, Post Office Creek, that flows westward through culverts under Interstate 75, then southward under State Road 121 and ultimately through a local golf course before entering the prairie basin via an artificial channel into a highly disturbed area. This outflow area, mostly outside the park boundary, formerly received sewage effluent from a package treatment plant for the residential subdivision associated with the golf course. These impacts are particularly significant as Post Office Creek is the only major water source for the entire west side of the prairie basin.

Newnans Lake

Sweetwater Branch

Bivans Arm / Tumbling Creek

Calf Pond

Robinson Heights

Post Office

Rocky Point

Persimmon Point

West Side / South Rim

Paynes Prairie

Dog Branch

Lake Wauberg

Legend

- Bivans Arm / Tumbling Creek
- Calf Pond
- Dog Branch
- Lake Wauberg
- Newnans Lake
- Paynes Prairie
- Persimmon Point
- Post Office
- Robinson Heights
- Rocky Point
- Sweetwater Branch
- West Side / South Rim

PAYNES PRAIRIE PRESERVE STATE PARK

N

0 1 2 4 Miles

Florida Department of Environmental Protection
Division of Recreation and Parks
Date of Aerial: 2009

HYDROLOGIC SUB-BASIN MAP

Robinson Heights

The most significant feature in the Robinson Heights sub-basin is Boulware Spring and its associated spring run. Boulware is the only spring run that flows onto the prairie basin and is one of the few springs in southeastern Alachua County (Rosenau et al. 1977). Boulware Spring once supplied the city of Gainesville with drinking water, and the city still manages the property. Currently the site contains a historic water treatment building, a meeting facility and a city park that acts as the primary trailhead for the Gainesville-Hawthorne State Trail.

Flow measurements for Boulware Spring Run have ranged from 0.49 to 1.0 cubic feet per second (cfs), making it a minimal sized third magnitude spring (Scott et al. 2004).

Apparently, groundwater supplying this spring comes from the surficial aquifer and not the Floridan. Groundwater in this upper region of the aquifer is extremely vulnerable to surface contamination from events such as spills, dumping or even seepage from local stormwater ponds (Fernald and Purdum 1998).

Boulware Spring discharges across a series of concrete tanks before flowing into a highly channelized streambed that passes through the Robinson Heights subdivision en route to Paynes Prairie Preserve State Park(Water and Air Research Inc. 2004). The quality of riparian habitat in the upper spring run is poor since it has been severely altered by stream channelization and the unauthorized filling of wetlands. Prior to recent road upgrades within the Robinson Heights neighborhood, stormwater runoff washed heavy loads of sediment directly into the streambed. The sediments made the streambed an ideal site for the proliferation of numerous non-native aquatic plants in the floodplain, including wild taro (*Colocasia esculenta*). The sediments, in combination with the dense stands of wild taro, have often clogged the natural channel of the run, especially where they enter the park. Park staff has had some recent success in controlling the taro at this urban interface, allowing the portion of the run at the edge of the prairie rim to re-channelize.

Paynes Prairie Basin: Sheetflow Restoration

Disruption of surface water sheetflow within the prairie basin has been extensive. Most of the dikes, canals and other water control features in the basin were constructed from the 1920s through the 1970s. All water control structures built by previous landowners specifically manipulated water levels with the intent of dewatering the basin to create an optimal cattle-grazing landscape.

With the exception of a 0.4-mile stretch of Sweetwater Branch Canal rerouted by the Florida Park Service in the 1970s and 9 miles of dikes and highways built by the Florida Department of Transportation (FDOT), the Camp Ranch was responsible for constructing all of the water control features on the prairie basin. Including the two major highways, I-75 and U.S. 441, both of which cut through Paynes Prairie, the prairie basin contains about 38 miles of dikes and 50 miles of canals.

It is important to note that the water control features referred to herein as dikes were actually linear spoil piles constructed of materials dredged when canals were dug to drain water from the prairie. In some cases, only one canal was associated with a dike. In other cases, there were two canals, one on each side of a dike. There were rare occasions when a low berm, or second low dike, was placed on the side of a canal opposite a larger main dike. This explains why the total lengths of canals and dikes in the prairie basin are not the same. A prioritized hydrological restoration plan for all water control features in the basin is contained in the table below.

Hydrological Restoration Plan					
Name	**Restoration Activity**	**Priority**	**Year of Restoration**	**Length Restored (miles)**	**Length Unrestored (miles)**
Angle Dike	Yes	-	1990s	0.5	0.472
Bolen Bluff Dike	Yes	-	2002	1.5	0.657
Dog Branch Dike	Yes	-	2002-03	1.6	0.435
East-West Dike	Yes	-	2002-03	3.5	0.194
Camps Canal Dike	No	1			2.136
Prairie Creek East Berm	No	1			0.872
Prairie Creek West Berm	No	1			0.309
Sweetwater Branch Dike	No	2			2.067
Boulware Run Dike	Yes	2	1980s	0.09	0.242
Old Sweetwater Dike	No	2			0.259
Bivans Arm Dike	No	2			0.555
Old Culvert Dike	No	2			0.055
Stub Dike	No	2			0.040
Steve's Dike	No	2			0.383
"C" Dike	No	2			0.312
Cones Dike	No	3			3.875
Otto Waley Dike	Yes	4	1970s	0.07	1.145
Borrow Dike	Yes	5	1970s	0.16	1.213
Vortac Dike	No	6			1.004
I-75 East Dike	No	7			2.557
I-75 West Dike	No	8			2.082
Government Dike	Yes	9	1970s	0.25	0.866
Mystery Dike	No	10			0.518
Burnt Pond Dike	No	11			0.641
Rice Paddy Dikes	Yes	11	1970s	0.1	1.089
Alligator Point Dike	No	12			0.409
Main Finger Dike	Yes	13	2002-03	0.18	0.287
Main Canal Dike	No	-			0.982
U.S. 441 Dikes	No	-			1.928
I-75 Dikes	No	-			2.604
Total Restored				7.95	
Total Unrestored					30.188
Grand Total					**38.138**

These historic dikes and canals have significantly influenced surface water sheetflow across the prairie basin (Best et al 1995; JEA and WSI 2010). Some of the structures impede sheetflow, while others reduce or eliminate standing water by channelizing or directing its flow elsewhere. Over 70% of the historic water control features within the park still exist. A few, such as the Main Canal Dike, provide recreational vistas and are integral to interpretation of the park, so they likely will persist. Perhaps the two biggest obstacles to complete removal of unwanted dikes are a lack of dedicated funding and the very high cost (Goodman et al 2006). Permitting requires a considerable investment in time. Nevertheless, DRP will continue to consider hydrological restoration a high priority and will design and implement beneficial dike removal projects as funding becomes available.

Even though there is a strong level of uncertainty in assigning a higher priority to one restoration project over another, the primary objective will continue to be to increase natural sheetflow throughout the prairie basin. As the total area of natural sheetflow increases, so too will the ecological benefits for this unique landscape. Below is a discussion about the most significant water control features within the prairie basin, including those have experienced at least some restoration, those that have a high priority for removal and those that are likely to remain due to their importance to park operations.

Camps Canal

The earliest attempts at dike restoration within the prairie basin occurred at the Camps Canal Dike, built by the Camp Ranch in the 1920s. This dike, constructed across the natural outfall of Prairie Creek, effectively blocked the creek from flowing westerly onto the prairie basin and diverted it southward via Camps Canal, thereby eliminating over 50% of the natural surface water inflow to the prairie. As mentioned previously, Prairie Creek was, and still is, the most important source of water for Paynes Prairie. Following purchase of Camp Ranch by the state in 1970, the Florida Department of Natural Resources in 1975 breached the Camps Canal Dike in a logical effort to restore the Prairie Creek sheetflow to the eastern basin. This early project constituted the initial effort in what has become a long-term, complex and pivotal endeavor to restore the natural hydrology of Paynes Prairie.

Shortly after the initial breaching of the Camps Canal Dike, the Florida Park Service installed a three-culvert structure in the dike, complete with flashboard risers. However, the canal was deep and the culvert elevation relatively high so that when water levels in Prairie Creek dropped below a certain point, inflow through the culverts into the prairie ceased and Camps Canal captured the entire flow of the creek, carrying it south to the River Styx and Orange Lake. In 1994, the Governing Board of the SJRWMD passed Rule 40C-2.302 F.A.C. regarding the reservation of water for Paynes Prairie by rule (SJRWMD 2009). SJRWMD hydrologists have determined that, with the rule in place, the current water control structure at Prairie Creek distributes a long-term average of about 45% of the creek's flow to Paynes Prairie, with the remainder discharging to Orange Lake. Even with the diversion of 55% of the Prairie Creek flow, the portion that still manages to reach the prairie currently amounts to over half of the surface water inflow for the entire basin, and about one-third of the total water budget for the basin (Robinson et al. 1997).

Installing culverts in the Camps Canal Dike greatly improved the sheetflow regime within management zone PP-13 of the park. In October of 2017, following Hurricane Irma, a breach in this dike between the water control structure and CR234 had to have an emergency repair as flooding of U.S. 441 was

occurring (D. Forgione, personal communication). In the spring of 2019, SJRWMD had the water control structure completely rebuilt with new, larger culverts and a more user friendly riser mechanism to regulate flow. This system continues to be set for the mandated 45% of flow during non-emergency periods.

The removal of the Angle Dike was an early restoration project that helped reestablish important sheetflow patterns in PP-13. In this case, the water source was seepage from the Persimmon Point/Jerevan sub-basin into the northern one-third of the zone. Altogether, these early restoration efforts reestablished at least 500 acres of sheetflow across the basin marsh in PP-13. They also raised water levels in Alachua Lake and thereby increased the wetland acreage supported by the Alachua Lake pool (Robison et al. 1997). Clearly, to enable completion of the restoration process on the east side of the prairie, reallocation of 100% of the Prairie Creek discharge back to the prairie basin would be necessary.

Two other levee systems, Cones Dike and Otto Waley Dike, currently constrain sheetflow from leaving PP-13 and spreading into zones PP-1301 and PP-8, respectively. The elimination of both dike systems would be central to efforts to improve surface water sheetflow in the eastern basin, raise average water levels in the Alachua Lake pool, and increase the frequency, duration and height of high water events. During low water periods, PP-1301 is also affected by Cones Dike Canal, which dewaters the northern part of the zone. As Cones Dike is currently in regular use as a trail, in the short term the basin water budget would benefit from the installation of several culverts to equalize flow. Prior to the next planning period, a feasibility and cost estimate for full removal should be obtained.

Sheetflow Restoration Projects

The park made several other attempts at sheetflow restoration within the prairie basin in the 1970s. Most of these efforts were relatively minor in regard to total length of dike removed, but they specifically targeted the partial restoration of sheetflow in manipulated areas that received extremely limited surface water flow, including the Borrow Dike, Government Dike, Otto Waley Dike and Dog Branch Dike systems.

Historically, Boulware Spring Run would have been a source of sheetflow for the north- central part of the prairie basin (PP-11), but the Camp Ranch channelized its flow early on, conveying it directly to the Sweetwater Branch Canal. A considerable length of this channel remains today, but park staff backfilled the lower third in the late 1980s and placed two additional ditch blocks upstream of the restored portion. That effort stopped the ditch from draining the surrounding marsh and allowed some sheetflow from the spring run to resume its natural movement across PP-11.

During the Camp Ranch period, Borrow Dike was constructed westward from Cones Dike in order to dewater Alachua Lake, improve grazing and facilitate access to the central part of the prairie. For similar reasons, the ranch built another dike, Otto Waley, which connected Cones Dike with Persimmon Point to the north. In the late 1970s, park staff partially pushed the eastern end of Borrow Dike back into its canal. Two culverts were also removed from Otto Waley Dike, leaving gaps in the dike. Over a mile of Borrow Dike remains intact, but there is no vehicular access. Although there are two sets of staff gauges along this dike, fluctuating water levels and dense vegetation have made monitoring them almost impossible. Borrow Dike appears to follow an old Prairie Creek channel and in effect impedes its flow. The dike cuts off natural sheetflow from management zone PP-8 into PP-12, directing it instead toward Alachua Lake and Alachua Sink.

Some of the most ambitious and effective hydrological restoration projects at Paynes Prairie to date occurred in 2002-03, targeting the Dog Branch Dike, East-West Dike and Bolen Bluff Dike systems. These dike/canal systems either conveyed surface waters directly to the Main Canal and Alachua Lake or otherwise reduced sheetflow within the east part of the prairie basin. The attempts to remove the dikes and fill in the canals of the three systems represented the first large-scale effort by DRP to restore natural sheetflow within the east prairie basin.

Dog Branch Dike had been the object of earlier restoration efforts. In the 1970s, park staff bulldozed the southernmost end of the dike into the adjacent canal. This had the effect of obstructing the flow of the run, but it did not restore the natural sheetflow regime as desired. In 2002, the park resumed efforts to restore the Dog Branch Dike system more effectively. Much of the dike was pushed into the adjacent borrow canal, almost completely backfilling it. The only portion of the dike left intact was in the middle of the basin, adjacent to and north of Borrow Dike, where a stand of trees harbored a heron rookery.

East-West Dike and Bolen Bluff Dike were two of the most significant hydrological legacies of the Camp Ranch. Both of these dike/canal systems effectively dewatered the central part of the prairie basin. The Bolen Bluff system directly conveyed surface waters from zones 7 and 10 to the East-West Dike/Canal, virtually eliminating sheetflow from this part of the basin. The East-West Canal system funneled large quantities water from west of U.S. 441 and from management zone PP-10 to the Main Canal and Alachua Sink. In 2002 and 2003, DRP contracted the bulldozing of the majority of the East-West and Bolen Bluff Dikes and the backfilling of their adjacent borrow canals.

The Main Dike and the southern section of the Bolen Bluff Dike may never be completely restored since they provide visitors with all-season access to observation towers on the basin, except during extreme high-water events. La Chua Trail, which follows the Main Dike, is considered one of the finest wildlife viewing trails in the state. Further study may reveal, however, that DRP needs to reduce the length of the Main Dike and/or Bolen Bluff Dike to ensure there is an adequate flow of water through the system and to benefit wildlife. The high water event associated with Hurricane Irma in late 2017 and early 2018 punctuated the need for change in the layout of LaChua trail/ Main Dike by making the last 1600 feet before the tower inaccessible on foot due to a significant breach. The *Conceptual Land Use* section of this plan will include shortening this trail with the intention of the entire trail being raised boardwalk to allow water and wildlife to move beneath unhindered. The remainder of the main dike beyond the trail would be restored to grade in order to facilitate a more natural flow pattern from the basin. Over 9.5 miles of dike restoration and 9.5 miles of canal restoration have taken place within the prairie basin to date, resulting in the restoration of surface water sheetflow to over 6,000 acres of the prairie basin.

Interstate 75 and U.S. Route 441

These dikes and canals are prominent examples of levee systems that do not impede overall flow but nevertheless reduce sheetflow and dewater key portions of the prairie basin. These two landscape features exert a significant influence on the natural hydrology of the central and western parts of the prairie.

In general, water levels in the canals that run along both sides of these two highways continually strive toward equilibrium. Water is virtually always flowing from one canal to another through culverts under the dikes, but flows are of such low velocity that they generally do not cause measurable water level changes. The canals associated with the dike systems specifically channelize surface water flow, thereby reducing sheetflow and causing the surrounding landscape to dry out during periods of low water. This encourages invasion of the prairie by woody plant species, artificially amplifying ecological succession

within areas that were once predominantly open herbaceous marsh. When canals have berms or dikes associated with them, the woody vegetation problem becomes even more dramatic. DRP, with the assistance of FDOT, has invested considerable resources over the last several years in controlling woody invasive exotic and native species within Paynes Prairie, primarily along U.S. 441, but also along I-75.

Given the importance of the western half of the prairie basin to the total water budget for Paynes Prairie, DRP should seek a long-term solution to the chronic problems associated with the fact that two major highways cut through the park. DRP should work with appropriate government entities to achieve meaningful restoration of the natural sheetflow and wetlands within the prairie basin, with serious consideration given to raising these two roadways above the marsh landscape via bridging.

VORTAC and Government

VORTAC Dike is located between zones 3 and 4 west of I-75, while Government Dike extends east to west between U.S. 441 and I-75, forming the dividing line between zones 5 and 6. Both dike systems were part of a pre-1970 federal government effort to install a radio navigation tower within the prairie basin. DRP has subsequently worked with the Federal Aviation Administration (FAA) to decommission the site for any future use in order to proceed with restoration of the site. Government Dike, which begins at U.S. 441, was part of the access route to the VORTAC site prior to the construction of I-75. When I-75 was built, it effectively segregated Government Dike from the VORTAC site, so the federal government constructed an alternative access connector that originated at the north rim of the basin and ran southward parallel to I-75 on top of the berm associated with the I-75 canal. In its entirety, the VORTAC site consists of the main VORTAC Dike plus two additional short dikes and a widened earthen pad. The main east/west stretch of VORTAC Dike is approximately 3,100 feet in length. One of the short dikes is a westward extension of the main VORTAC dike, while the other dike projects north of the VORTAC pad for approximately 692 feet.

In 2001, park staff surveyed cross sections of the dikes, pads and canals within the VORTAC site. Survey results indicated that large amounts of spoil material were imported to the site, including gravel and limerock. Therefore, in addition to backfilling the adjacent canal with some spoil taken from the VORTAC Dike, restoration of the entire VORTAC site will require removal of excess spoil to an offsite disposal location. In the 1970s, the park backfilled small sections of Government Canal. The relative success of this early restoration attempt, in terms of acres returned to sheetflow, is unknown.

Sweetwater Branch and Bivans Arm

The most important restoration to take place in the east part of the prairie basin centered on the Sweetwater Branch/Bivans Arm dike and canal system. The entire system consisted of eight different dike segments measuring nearly 4 miles in length and including smaller “finger” dikes such as the “C,” Steve’s, Stub, Boulware, and Old Culvert Dikes. Historic aerial photography clearly illustrates the hydrological alterations that took place in this region of the prairie basin during the period from 1937 to 1960 (JEA and WSI 2010). The first dredge work in the canal occurred in 1937 (Robison et al. 1997). Sometime after 1938, the sheetflow pattern of the Sweetwater outfall into the basin shifted in direction. In addition, the canal systems associated with the dikes contributed significantly to the dewatering of management zone PP-11. These extensive hydrological changes translated directly into a severe invasion of zones PP-9, PP-10, and PP-7 east of U.S. 441 by woody plants and other undesirable wetland species.

By the time the state acquired Paynes Prairie in 1970, sediment deposition in Sweetwater Branch had already caused the canal to become severely clogged. A large volume of the canal’s flow was being forced onto the prairie basin through a culvert in Bivans Arm Canal and it was then sheetflowing across

PP-11 to the east. At that time, DRP asked the city of Gainesville to re-dredge Sweetwater Canal, which temporarily eliminated the nutrient-rich pollution loads that were sheetflowing across zones PP-9 and PP-11, but in turn increased the volume of stormwater and nutrients being discharged to Alachua Sink. Subsequent to the city's dredge work in the 1970s, Sweetwater Canal again clogged with sediments polluting PP-9 with nutrient-rich sheetflow.

The ultimate goal of DRP was to obtain high quality water from Sweetwater Branch, comply with a mandated Total Maximum Daily Load (TMDL) for Alachua Sink and provide sheetflow pulses to the east part of the prairie basin. From 2002 to 2006, multiple stakeholders, organized as the Orange Creek Basin Working Group (OCBWG), guided the development of the Sweetwater Branch Watershed Restoration Plan (JEA 2003). This plan was the first positive step in a long process of developing strategies to restore water quality in Sweetwater Branch and remove significant dikes and canals from the prairie basin. From 2006 through 2010, plan design and implementation progressed significantly (WSI 2006a, WSI 2006b, JEA 2009, JEA and WSI 2010).

The Sweetwater Branch/Paynes Prairie Sheetflow Restoration Project was implemented from 2011-2017. The project consisted of a complete capture and diversion of flow from Sweetwater Branch into a 125-acre enhancement wetland to provide stormwater treatment, storage and reestablish a natural sheetflow discharge back into Paynes Prairie (Wetland Solutions Incorporated 2006; Jones Edmunds and Associates Incorporated 2009). The expected outcome of all components of the enhancement wetland project was to achieve significant TMDL reductions, specifically to 3 mg/L total nitrogen (TN) concentration and 0.3 mg/L phosphorus concentration.

Over a six-year period, the planning and construction of Sweetwater Wetland Park was completed on state and county land totaling over 240 acres. A series of three storage wetlands and a distribution channel allows treated water to sheetflow southward onto the prairie basin toward Alachua Lake for further nutrient reduction through natural wetland processes. Additionally, and perhaps one of the most important components of TMDL reductions, surface sheetflow was further enhanced by removing 3.17 miles of the artificially constructed Sweetwater canal, a ditch and associated berms created in 1956 that captured and diverted all Sweetwater Branch discharge emptying directly into Alachua Sink and thus the Floridan aquifer (Gainesville Regional Utilities 2021).

The Sweetwater Wetlands Project will attenuate TN loads to 59,493 pounds per year (wet-weather years) prior to water entering Alachua Sink, and thus maintaining the regulated TMDL for the sink, which allows 61,114 pounds per year of TN (Gainesville Regional Utilities 2021). The Sweetwater Restoration Project, in conjunction with 2013-17 aerial herbicide control of woody shrubs in PP-9 and PP-11 management zones, has effectively returned a more natural water regime and flow to this area of the basin. Sweetwater Wetland Park is managed under sublease by the city of Gainesville and provides walking and nature observation opportunities in addition to the primary water treatment functions.

Water Monitoring

The premier natural resource within Paynes Prairie Preserve State Park is the prairie basin. The marsh and marsh lake within the basin are essential to maintaining the abundance and diversity of plants and animals for which the park is justifiably famous. One of the most significant properties of this ecosystem is that it responds quickly to local environmental changes. Fluctuations in water quality and/or quantity can cause rapid changes in the structure and function of natural communities in the basin, communities

that are characteristically herbaceous. Which species are dominant at any given time depends on the prevailing environmental conditions. Evidence is clear that increased nutrients and sediments from the Sweetwater Branch/Bivans Arm watersheds have accelerated ecological succession in areas receiving their sheetflow, with shrub swamps replacing basin marsh (Best et al. 1995).

The OCBWG was formed in 1994 out of a strong need to address the declining health of water bodies in the region. The park has benefited strongly from the formation of this large stakeholder group. With efforts to restore the troubled watersheds surrounding the park becoming more intensive, the OCBWG has played an integral role in identifying and implementing necessary actions to improve the health of the park. In the late 1990s, SJRWMD authorities responded to public concerns by instituting a comprehensive monitoring strategy for the region (Lasi and Shuman 1996).

Beginning in 1996, with expanded efforts in 2000, DEP also initiated a formal, statewide monitoring program for surface waters and groundwater (DEP 2001, DEP 2005). This Integrated Water Resource Monitoring Program (IWRMP) evolved from a mandate to implement the requirements of the 1999 Florida Watershed Restoration Act and to satisfy Section 303(d) of the Federal Clean Water Act (Maddox et al 1992; Copeland et al. 1999). The IWRMP takes a comprehensive watershed approach to monitoring Florida's water resources, based on natural hydrologic units. Accordingly, the 52 hydrologic basins in Florida are on a five-year rotating schedule that allows water resource issues to be addressed at different geographic scales (Livingston 2003). In addition, the IWRMP assigns a water body identification number (WBID) to each water body (DDEP 2001). This watershed approach provides a framework for implementing TMDL requirements to restore and protect specific water bodies (Clark and DeBusk 2008). All priorities for TMDL development in Florida follow strict adherence to verified priority water body lists reviewed by the United States Environmental Protection Agency (EPA) (EPA 1995). Specifically, DEP's primary plan to address water quality issues is to implement Basin Management Action Plans (BMAPs) (DEP 2008c; Grubbs 2001). Much of the important hydrological information collected, stored and managed by various agencies can now be accessed through a variety of web-based databases (DEP 2008a; DEP 2008b; Silvanima et al. 2008; SJRWMD 2010).

Water Quality

Several water bodies whose surface water outflows influence the Paynes Prairie Basin have experienced significant declines in water quality. Two indices that state officials use to rank surface water quality are Trophic State Index (TSI) and Water Quality Index (WQI). The TSI evaluates nutrient enrichment levels in lakes, whereas the WQI evaluates stream health (Hand et al. 1996).

In 1996, the SJRWMD and DEP reported that the following water bodies contained significant amounts of pollutants: Sweetwater Branch, Tumbling Creek, Newnans Lake and Lake Wauberg (Lasi and Schuman 1996; Hand et al 1996). Three of these water bodies lie north of the park within the most urbanized areas of Gainesville. In addition, there are two point sources of waste effluent, the Main Street Plant and the Kelly Power Plant, that have a long history of emptying directly into Sweetwater Branch (JEA 2009). Water managers have long recognized that these urbanized watersheds create serious water quality issues for Paynes Prairie (Best et al 1995; DEP 2001; ACEPD 2008).

According to DEP's basin status report for this region, Sweetwater Branch, Tumbling Creek, Alachua Sink, Newnans Lake and Lake Wauberg all became potentially impaired water bodies in 2001 because of excessive nutrients or high levels of fecal coliform bacteria (DEP 2001). Based on the Impaired Waters Rule (IWR), in 2002 the EPA verified that those water bodies were impaired, which meant that their surface water quality did not meet applicable state water quality standards (IWR, Chapter 62- 303 F.A.C). This designation triggered a long chain of mandatory requirements that Florida would have to accomplish to comply with EPA regulations concerning polluted water bodies. The compliance process started with assigning a TMDL for each polluted system.

In 2003, Sweetwater Branch, Tumbling Creek, Newnans Lake and Lake Wauberg were designated with specific TMDLs that would require reductions in either nutrient or fecal coliform bacteria levels (Burger and Magley 2003; Shelly and Magley 2003a; Gao and Gilbert 2003). Alachua Sink, the ultimate receiving body for the two Gainesville creek systems, was assigned a TMDL that would require a reduction in nutrient levels (Gao et al 2006). This TMDL specifically established regulatory limits on discharged nitrogen from the Main Street Plant and on stormwater from the city of Gainesville. Some OCBWG stakeholders have voiced serious concerns about implementing TMDLs based solely on these point sources when non-point sources such as Alachua Lake may actually be of greater importance (Goodman et al 2006).

In 2008, the OCBWG and DEP produced a phased implementation plan called the Orange Creek BMAP (DEP 2008b). Language in this document outlined those specific reductions necessary to meet TMDL allocations for this watershed. Three important management actions recommended were to identify and remediate sources of fecal coliform bacteria in urban "hot spots," implement the Sweetwater Branch/Paynes Prairie Sheetflow Restoration Project and develop Pollution Load Reduction Goals (PLRG) for Newnans Lake. The following is a brief discussion about the importance of each action.

The Alachua County Environmental Protection Department (ACEPD) has had a very strong monitoring program in Gainesville's urban creeks since the late 1990s (ACEPD 2007). This county agency is a very important and dedicated partner of the OCBWG group. The ACEPD has amassed an extensive surface water monitoring dataset from across the county that has been an effective tool in detecting existing and emerging watershed problems, some of which directly affect the Paynes Prairie Basin marsh community (ACEPD 2004). In addition, the county's creek "hot spot" monitoring program will allow managers to determine if the required TMDL reductions are being achieved (ACEPD 2008).

Perhaps one of the most ambitious projects proposed for water bodies in the Orange Creek Basin was the restoration of Sweetwater Branch system to its natural state as a significant provider of sheetflow across the east part of the prairie basin (JEA and WSI 2010). The sheetflow restoration project was completed in 2017 and had three major components. The first step was to construct a 125-acre treatment wetland within the prairie basin to remove nitrogen from the Sweetwater inflow. The second phase was to remove the Sweetwater Dike system to allow the resumption of sheetflow across zone PP-9 in the east prairie basin. The final phase was to institute alum treatment at the Main Street Plant to lower phosphorus concentrations in its waste effluent. Now that the overall project has been completed, DEP will continue to monitor Alachua Sink for verification of TMDL reductions.

The treatment wetland was hypothesized to remove most of the excess nitrogen from the Sweetwater Branch flow. Much of the remaining nitrogen was proposed to undergo removal when discharge water from the treatment wetland sheetflow across the prairie. Some other aspects of the project included creation of a sediment basin, installation of a trash trap and stabilization of the Sweetwater Branch streambed. In addition, since construction of the treatment wetland required the use of about 125 acres of the adjacent state park, OCBWG stakeholders acquired a similar parcel to offset the use of state lands for the project. One unexpected complication of the Sweetwater Wetland Project was an accidental introduction of a non-native snail called Giant applesnail (Pomacea maculata).

Newnans Lake is a shallow, hyper-eutrophic water body. The lake has experienced deteriorating water quality since the 1960s (Cohen et al. 2008; Di et al. 2010). Emerging evidence suggests, however, that phosphorus and perhaps nitrogen levels in this nearly 8,000-year-old lake have always been uniquely high, making it a naturally eutrophic water body (Gao and Gilbert 2003; Riedinger-Whitmore et al 2005). Lake Wauberg also seems to have naturally eutrophic characteristics (Florida LAKEWATCH 2004). Paleolimnological analysis has pointed to natural geologic and edaphic influences (i.e. the Hawthorn Formation) as the possible cause of the characteristically high background levels of phosphorus in some area lakes (Whitmore and Brenner 2002; Ramnarine 2003).

Unfortunately, nutrients in Newnans Lake over the past 30 years have increased markedly to nearly 2-3 times the natural background levels. Persistent algal blooms are now commonplace in the lake. In 2010, the SJRWMD developed systematic goals for the reduction of pollutant levels in Newnans Lake (Di et al. 2010). Each water management district in Florida is required under the Water Resource Implementation Rule (Chapter 62-40 F.A.C.) to set Pollution Load Reduction Goals (PLRGs). There are a number of influencing watersheds in eastern Gainesville surrounding Newnans Lake, but the Hatchet Creek systems apparently contribute the majority of the pollutants (Shelly and Magley 2003b).

There is an extensive well monitoring database for the Paynes Prairie Basin (DEP 2010). Numerous entities such as DEP, SJRWMD, environmental consulting firms and university researchers are all involved in the sampling of wells within the basin. The wells are used to monitor groundwater quality and background levels at Very Intense Study Areas (VISA), waste management facilities, drinking water contamination sites, cattle dip vats, private residential areas and public areas. There are now over 114 different wells scattered across the entire Paynes Prairie watershed that are undergoing various levels of sampling. Data from dedicated, long-term monitoring wells, used by state agencies for tracking water quality changes within watersheds, are accessible through a storage and retrieval database managed by DEP (STORET, DEP 2010).

One specific subset of well data important to the prairie basin is that which is associated with previous cattle dipping sites within Paynes Prairie Preserve State Park. Prior to 1961, arsenic and organochlorine pesticides were used in dip vats to remove ticks from cattle. In 2003, DRP identified and tested up to 10 significant areas of concern within the park where previous landowners had conducted intensive cattle operations (EEI 2008a, 2008b, 2008c, 2008d, 2008e, 2009a, 2009b, 2009c, 2009d). Rigorous sampling of groundwater and soils at these 10 sites revealed severely contaminated areas in all but one site (EEI 2008f). Recommendations from these reports suggest that the monitoring and assessment at the remaining nine sites should continue to delineate the extent of the problem further. Due to the

detrimental effects of these compounds in the soil surrounding historic dip vats, these areas have been marked for remediation by the DEP Bureau of Waste Cleanup. Paynes Prairie Preserve State Park has 12 known AOCs (Areas of Concern) that correspond to historic dip vats. To date, two areas corresponding to AL05583 (High Barn Dip Vat) and AL05584 (Jackson's Gap Dip Vat) have been remediated through this process (Geosyntec 2017, 2023).

Water Quantity

Paynes Prairie has had a long history of water level manipulations. Apparently the first major water control project took place in 1927 when the Camp Ranch decided to divert Prairie Creek southward away from the prairie basin. That action initiated a series of distinct hydrological changes in the eastern part of the basin. Those changes accelerated after the ranch constructed additional dikes and canals to dewater areas in an effort to improve cattle grazing. Also, in 1927, the state constructed the first major highway across the basin, U.S. 441. A second highway, I-75, was completed in 1964. Both highways have functioned as artificial water control structures and have altered the natural fluctuations of Paynes Prairie's dynamic marsh community.

As mentioned earlier, two major surface water inflows for Paynes Prairie are at Prairie Creek/Camps Canal and at Sweetwater Branch. The SJRWMD monitors water levels and discharge rates at both of these sites (SJRWMD 2011). For the Prairie Creek/Camps Canal system, stage and discharge are measured at State Road 20 near the head of the creek just south of Newnans Lake (2.93 miles upstream of the Prairie Creek control structure culverts) and at County Road 234, a short distance upstream from where Camps Canal flows under the highway (1.14 miles downstream of the culverts).

SJRWMD hydrologists determine the actual discharge through the Prairie Creek water control structure into Paynes Prairie by subtracting the Camps Canal flow from the Prairie Creek headwaters flow. For Sweetwater Branch, stage and discharge are measured where Sweetwater Branch flows under Williston Road.

The SJRWMD conducts similar monitoring for Alachua Sink. The stage of the Main Canal is measured on the upstream and downstream sides of the Main Water Control Structure. Discharge is measured at the culverts of the Main Control Structure. This arrangement enables a more accurate measurement of the actual contribution of surface water from Alachua Lake. With the microwave telemetry currently in use, monitoring at State Road 20, County Road 234 and the Main Canal is now continuous.

Since nearly all the water occupying the lowest elevations of the prairie basin has entered the prairie from east of U.S. 441, the direction of water flow under the two major highways remains highly dependent on whether water levels in the east basin are rising or falling. Currently, there is no water level monitoring at I-75 or points westward. In addition, there are no water level monitoring gauges within any of the five minor contributors of surface water to the prairie basin, namely the Jerevan seepage, Post Office Creek, Boulware Spring Run, Chacala Run and Dog Branch. However, water level gauges are in place along some of the remaining dikes in the park, as well as along some of the restored dikes.

As of May 2011, the SJRWMD had only adopted rules (40C-8.031 F.A.C.) for MFLs for four small lakes within the Orange Creek Basin. Lake Wauberg was one of those lakes, and the only one within the Paynes Prairie watershed that was considered (SJRWMD 2009, 2010; Mace 1997). Other significant water bodies in the Orange Creek Basin, including Orange Lake, Lake Lochloosa and Newnans Lake, are not currently on the SJRWMD's priority list for establishment of MFLs. In fact, Newnans Lake has never received a priority status for MFL assessment. DRP recommends the establishment of an MFL on Newnans Lake because of its importance to water availability in Prairie Creek and thus Paynes Prairie. Priority schedules and MFL lists for each water management district undergo mandatory annual review by DEP (Llewellyn 2008).

In 1994, Paynes Prairie was the second state-managed property in Florida to require implementation of a water protection strategy but the first to use a unique type of regulation called a "reservation" (Florida Statues Chapter 40C-2.302 F.A.C.). This regulation resulted from a multiyear study conducted by the SJRWMD to investigate restoration alternatives for manipulated water bodies within the Orange Creek Basin (Robison et al. 1997). The Prairie Creek reservation, currently the only one in Florida, was an allocation by rule. Its implicit intent was to require the SJRWMD to guarantee Paynes Prairie a certain portion of surface water flow from Prairie Creek (Neubauer et al 2008). The Governing Board of the SJRWMD had determined that such a water reservation was necessary in order to protect the fish and wildlife within Paynes Prairie Preserve State Park. The most important aspect of this rule is that it reserved "from use by permit applicants that portion of the surface water flow in Prairie Creek and Camps Canal that drains by gravity through an existing multiple culvert structure into Paynes Prairie".

This reservation amounts to an average flow of 36 cfs (23 mgd), which is only about 45% of the historic flow of surface water through Prairie Creek and Camps Canal. During severe droughts, water levels in Prairie Creek and Camps Canal may drop to the point that culverts in the water control structure at the Camps Canal Dike are completely exposed and inflow into the prairie basin ceases. Obviously, when there is no water flowing through the culverts, the 45% figure becomes somewhat theoretical. Under those circumstances, there may still be water in Camps Canal, but it is not available to Paynes Prairie, and it flows south to the River Styx and Orange Lake. On average, Orange Lake receives about 43 cfs (28 mgd) of the Camps Canal surface water flow. During the SJRWMD study in the 1990s, the maximum annual flow to the prairie basin from Prairie Creek was 57,500 ac-ft/yr (94 cfs or 61 mgd), whereas the minimum annual flow was 900 ac-ft/yr (1.3 cfs or 0.81 mgd) (Robison et al. 1997).

Periodic closure of the Camps Canal water control structure is required under emergency authorization declared by the SJRWMD and FDOT during times of extremely high water on the prairie basin. Closures are necessary to eliminate structural damage to the U.S. 441 roadway. In 2022, FDOT completed a project to replace the lime rock road base under U.S. 441 in the Prairie Basin with a granite road base and stabilizing membrane to reduce potential water damage to the road during high water events. When the gates of the Camps Canal structure are closed, all Prairie Creek surface water heads toward Orange Lake. During flood events, the park records daily water levels at a gauge located along U.S. 441 north of the visitor overlook. The Camps Canal gates are only reopened when the U.S. 441 gauge falls below 60.2 feet NGVD.

The SJRWMD is responsible for issuing water use permits in the region, and, in doing so, must ensure that proposed uses are in the public interest, which includes the conservation of fish and wildlife habitat and the protection of recreational values. Recent research has revealed that a significant region of groundwater supply in the eastern part of the SJRWMD, considered a groundwater divide of sorts between the SJRWMD and the Suwannee River Water Management District (SRWMD), has declined to the extent that a westward shift in groundwater potentiometric contours has occurred. The shift appears to be in response to the artificial depletion of groundwater reserves caused by large-scale pumping in Duval and Nassau counties (Grubbs and Crandall 2007). This regional drawdown may be partially responsible for declining groundwater levels within parts of north-central Florida (Mirti 2001; Grubbs and Crandall 2007). Both water management districts are now collaborating on a joint water supply plan for north Florida, and they are attempting to coordinate more closely when issuing consumptive use permits and monitoring groundwater withdrawals. Currently, it is unknown what effect these potential groundwater shifts will have on the prairie basin or its adjacent surface water sub-basins.

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

- Action 1 - Continue to cooperate with the SJRWMD to ensure reservation for Camps Canal culvert structure is monitored for compliance to maintain historic flows.
- Action 2 - Continue to cooperate with other agencies and independent researchers regarding hydrological research and monitoring programs.
- Action 3 - Continue active involvement in OCBWG partnership and the BMAP process.
- Action 4 - Continue to monitor, review and comment on proposed land use or zoning changes within lands bordering the park.
- Action 5 – Continue to assess and monitor surface and groundwater quality throughout the park.
- Action 6 - Seek expertise to use dye trace studies to determine connections among Alachua Sink, Santa Fe River and Orange Lake.
- Action 7 – Seek research and funding opportunities to conduct dye tracing to determine connections among Alachua Sink, Santa Fe River and Orange Lake.

Ensuring that Paynes Prairie receives a reliable and ecologically viable quantity of surface water is of critical concern to DRP. In the years before construction of Camps Canal, the Newnans Lake watershed contributed virtually all its surface water flow to the prairie basin through an unaltered Prairie Creek. At that time, inflow from Prairie Creek accounted for about half the total water budget of Paynes Prairie. Today, despite a major diversion of the creek's flow southward to Orange Lake, Prairie Creek remains the single largest contributor of surface water to the prairie basin. According to the current reservation by rule administered by the SJRWMD, Paynes Prairie holds under reservation the daily volume of water that passes through culverts in the water control structure at the Camps Canal Dike. That volume amounts to only 45% of the total Prairie Creek flow on average, but it accounts for one-third of the prairie's total surface water inflow today.

In pursuit of the above objective, DRP will continue to coordinate closely with the SJRWMD, DEP, Alachua County and the city of Gainesville in protecting and improving hydrological resources within the Paynes Prairie watershed, particularly at Paynes Prairie Preserve State Park. Coordination may consist of the maintenance of relevant correspondence and regular attendance at meetings concerned with

regional or local hydrology. DRP will continue to review county land use changes proposed for properties outside the park, looking for potential impacts to the Paynes Prairie hydrology. Staff will provide comments to public officials if any threats to the water resources of Paynes Prairie become apparent. Finally, DRP will continue its tradition of close cooperation with various independent groups engaged in hydrological research in the Paynes Prairie watershed.

The continued monitoring of water inflow to Paynes Prairie from adjacent sub-basins, including any associated stormwater runoff, is of paramount importance to the park. DRP should continue to support all entities that track water sources for the prairie basin, both surface water and groundwater. DRP will work closely with the SJRWMD to ensure that the reservation rule developed for the control structure at Camps Canal functions properly. The aim will be to either increase surface flow to the Paynes Prairie sub-basin or, at the very least, maintain the current flow so that the ecology of the Paynes Prairie system does not suffer significant harm. DRP will encourage all OCBWG stakeholders, including DEP water managers, to become actively involved in the MFL assessment for Newnans Lake.

Water quality monitoring is another need at Paynes Prairie Preserve, not only within the prairie basin but also within sub-basins that supply surface water to the prairie. Indications of increased nutrient loading within Sweetwater Branch and Alachua Sink have led to the listing of both water bodies as verified impaired for nutrients. Both have been assigned a specific TMDL (see details in the *Hydrology* section above) which establishes regulatory limits on discharged nitrogen from the Main Street Plant and from Gainesville stormwater facilities. In 2008, the OCBWG and DEP produced a phased plan called the Orange Creek BMAP, which was designed to reduce pollutants in the entire Paynes Prairie watershed. Complementing the BMAP will be pollution load reduction goals set by the SJRWMD for Newnans Lake.

DRP will continue to participate in the BMAP process. DRP staff will work closely with DEP regulatory personnel in seeking the best available options for continued pollutant reductions in Sweetwater Branch and Alachua Sink in order to attain the assigned TMDL level. DRP will continue to coordinate with the SJRWMD and the OCBWG in reducing nutrient loading in Newnans Lake and in developing PLRG goals for this important watershed. DRP staff will continue to support the OCBWG and will seek additional funding to supplement beneficial land management and restoration activities within the Paynes Prairie watershed.

With the water quality issues surrounding surface water inputs into Alachua Sink, water managers will need to better understand groundwater movements associated with the Cross County Fracture System. To facilitate that process, DRP should seek funding for dye trace studies to determine groundwater connections for karst systems in the park, including Alachua Sink.

Objective B: Restore hydrological conditions to approximately 5,000 acres.

Action 1 - Continue to assess and support any ongoing water quality monitoring efforts within the Sweetwater/Paynes Prairie Sheetflow Restoration Project.

Action 2 - Continue to seek funding to implement the Paynes Prairie Hydrological Restoration Plan for dike and canal removal.

Action 3 - Remove dikes, install culverts and backfill canals in accordance with the Paynes Prairie Hydrological Restoration Plan.

For decades within the prairie basin, historic dike and canal systems have significantly disrupted the natural sheetflow of surface waters across the landscape. Some of the systems impede sheetflow, while others reduce or eliminate standing water in the basin marsh and marsh lakes by channelizing or directing flow elsewhere. Removal of some of the dikes and canals, such as the East-West and Bolen Bluff systems, has definitely benefited Paynes Prairie hydrology. One basic need for additional restoration to proceed successfully is an evaluation of the benefits and/or drawbacks of removing other old dikes and canals from the prairie basin in order to restore natural sheetflow regimes. If restoration is projected to be both beneficial and feasible, DRP should commit to seeking funds for phased removal of the most intrusive of the remaining dikes and canals. DRP should also continue efforts to improve water quality in streams and lakes that contribute surface water flow to the prairie basin.

The Sweetwater Branch/Paynes Prairie Sheetflow Restoration Project had two major components that addressed issues of water distribution and quality within the east part of the prairie basin. The first was construction of a 125-acre treatment wetland within management zone PP-9 of the basin to remove excess nitrogen, and the second was the backfilling and removal of 3.9 miles of the Sweetwater Branch Dike system.

Since completion of the project in 2015, water scientists are continuing to examine whether the TMDL reductions of 3 mg/L of TN and 0.3 mg/L TP can be achieved (5-year rolling average).

It is important to understand if the restored sheetflow from the restoration project will begin to reverse ecological impacts associated with previous manipulations of the basin marsh hydrology.

In attempting to achieve the above objective, DRP staff will continue to implement the Paynes Prairie Hydrological Restoration Plan. The park will evaluate and prioritize additional dike and canal restoration projects and will seek funding to remove as many of the artificial water control features on the prairie as feasible. One of the most important sheetflow restoration projects, described in detail in the Sweetwater Branch/Paynes Prairie Sheetflow Restoration Plan, is the removal of all Sweetwater Branch dikes and the return of the east prairie basin to a natural sheetflow regime. DRP fully supports the OCBWG and other stakeholders in implementation of this restoration plan, which will result in improved water quality and restoration of a natural sheetflow regime to about 5,000 acres of prairie basin.

One hydrological issue still in need of better resolution is the continued diversion of part of the historic Prairie Creek sheetflow away from the prairie basin. Pertinent to that, DRP will continue to cooperate with sister agencies and other stakeholders in seeking ways to increase Paynes Prairie's proportionate share of the Prairie Creek flow.

Sheetflow restoration in other parts of the prairie basin is certainly a possibility, but additional evaluation may be necessary and adequate funding must be available. DRP will continue to coordinate with FDOT in seeking a long-term solution to hydrological issues caused by the two major highways, I-75 and U.S. 441, that cross the prairie basin. DRP will also proceed with efforts to find funding for the

dismantling of the VORTAC Dike system west of I-75. DRP staff will continue to consider the best means of reducing the impacts of Cones Dike and Otto Waley Dike on the hydrology of zones PP-1301 and PP-8. Restoring the sheetflow volume and distribution pattern there may require the partial or complete removal of dikes or the installation of additional culverts. As funding permits, DRP will conduct a similar evaluation of Borrow Dike and will determine if it would be beneficial to reduce the lengths of the Main and Bolen Bluff dikes. If evaluations indicate that any of these potential hydrological restoration projects are both beneficial and feasible, then DRP will seek funding to implement them.

Objective C: Monitor and evaluate the impacts of the historic cattle dipping operations at Paynes Prairie.

> Action 1 - Continue to seek funding and work with DEP Hazardous Site Assessment staff to assess, prioritize and remediate any recommended contaminated dip vat site.

In 2003, DEP identified significant areas of concern within Paynes Prairie Preserve State Park where previous landowners had conducted intensive cattle dipping operations. Rigorous groundwater and soil sampling at nine sites in the park revealed that soils were severely contaminated. Recommendations from DEP were to continue the monitoring and assessment at these nine sites in order to delineate the extent of the problem.

DRP will continue to cooperate with DEP and other agencies in the long-term monitoring of water quality and soils in areas where cattle dipping operations occurred and will mitigate impacts as needed, using the best available means of remediation.

NATURAL COMMUNITIES

Limestone Outcrop *(not on natural communities map)*
Most of the limestone outcrops in the park are found within the sinkholes and sinkhole lakes of the Alachua Sink Hammock on the north rim of the Prairie Basin. Due to their limited size and vertical nature, the limestone outcrops are not included on the natural community map for the park.

Limestone outcrops located near the Gainesville-Hawthorne State Trail are at greater risk from disturbance due to unauthorized foot or bicycle traffic. Rare plants, such as the brittle maidenhair fern, require a humid and protected microclimate. The outcrops are typically found on the vertical sides of sinkholes between the Alachua Sink and the north boundary of the park. Impacts to the sinkholes from erosion and exotic plants, as detailed in the sinkhole description and assessment, also hold true for limestone outcrops. The limestone outcrops in the park are in good condition.

Limestone outcrops must be protected from disturbance, particularly from damage due to foot or bicycle traffic. Most of the outcrops are within sinkholes that already have restricted access. Measures must be taken to prevent runoff and erosion from degrading limestone outcrops, particularly near existing trails or roadways. Ground disturbance during removal of non-native plant species in the surrounding sinkhole and upland hardwood forests should be monitored to prevent erosion and impacts to the limestone outcrops and the rare plants that may be present. Mapping of significant limestone

outcrops will be necessary to ensure their protection. An inventory of any imperiled plant species should be conducted at the same time.

Mesic Flatwoods

Mesic flatwoods occur on the south side of the park and in the northeast corner in the Jerevan Addition. The flatwoods on the south side are a complex mixture of mesic and wet flatwoods with baygalls and flatwoods ponds interspersed. Typically, mesic flatwoods are dominated by longleaf and slash pines with pond pines being restricted to wet flatwoods. Historic timbering throughout the mesic flatwoods of the park reduced the dominance of longleaf pine in the canopy. More recent timber removals have served to bring areas along the park drive closer to a natural density of pines. Plantings of containerized longleaf in appropriate areas have occurred since 2008 and are slowly restoring this species to the flatwoods landscape here.

Logging disturbances and land clearing operations may have also affected pine regeneration patterns. About 50 acres of this community were converted to improved pasture prior to 1956. The typical saw palmetto and gallberry ground cover was uprooted during the process and replaced by exotic grasses and sedges. Between 1970 and 2014, pond pines and slash pines rapidly recolonized this area. Exclusion of fire in this same period encouraged the spread of hardwoods and an increase in palmetto and other shrub dominance in large areas. Since 2014, increased fire and mechanical treatment efforts by park staff have reduced excessive shrub cover over much of the flatwoods on the south side of the park.

Areas located between U.S. 441 and I-75, north of the town of Micanopy, are suffering from an extended period of fire exclusion. These areas are extraordinarily difficult to treat with prescribed fire due to smoke management concerns and heavy fuel loads. Park staff has met on site with the Florida Forest Service to discuss ways to reduce these fuel loads safely with prescribed burning while minimizing smoke impacts on the adjacent highways. During the summer and fall of 2001, an outbreak of southern pine beetles affected a large proportion of the mesic flatwoods in the southern part of the park. Most of these areas were logged to control the expansion of the outbreak.

The Jerevan Addition in the northeast corner of the park has several areas of mesic flatwoods intermingled with successional hardwood forest and scrubby flatwoods. In many locations, hardwoods have increased in dominance due to fire exclusion.

Firebreaks have been established in the Jerevan flatwoods, including new breaks creating two burn units. Some of this area between State Road 20 and the Gaineville-Hawthorne State Trail (GHT) was burned from 2015-19 but still needs increased fire intensity and frequency. The mesic flatwoods within the park range from fair to excellent condition depending on recent fire history, impacts from past cattle operations, proximity to highways and current restoration stage.

Dormant and growing season fires will be needed in the mesic flatwoods of the park to reduce hardwood dominance in many areas and to limit the expansion of baygalls into portions of the flatwoods in the southern end of the park. In addition to this, some mesic flatwoods are still in need of mechanical treatment and hardwood removal through biomass harvest projects. Some areas, including historic farmland and southern pine beetle outbreak areas, will require extensive restoration efforts,

including the replanting of longleaf pines and possibly groundcover restoration. Prescribed fire will continue in the Jerevan flatwoods and restoration to a more natural condition will proceed.

Mesic Hammock

Much of the transitional area making up the prairie rim is mesic hammock with a canopy consisting almost solely of scattered live oak. Large areas of mesic hammock on the rim of the prairie were affected by the grazing of livestock from the late 1600s to the early 1970s. Many of these areas were maintained in the past as pastures under a monoculture of live oaks. Other hardwoods, particularly yaupon holly, have become established since the removal of cattle and the cessation of mowing. Some of these areas may even be the remains of the Indian fields mentioned by William Bartram in his journey around the rim of Paynes Prairie: "Passing through a great extent of ancient Indian fields, now grown over with forests of stately trees, Orange groves and luxuriant herbage" (Harper 1958:126).

The Crevasse and Edwards parcels are the most recent additions to Paynes Prairie and include significant areas of mesic hammock that, until recently, were grazed by cattle. The Crevasse property also includes large areas of mesic hammock that were fenced and used for raising various species of deer in the past. Gradual recovery of the understory is expected in these areas. As with the upland hardwood forest, the loss of the red bays (*Persea borbonia*) due to laurel wilt disease will have a large impact on the mesic hammocks. The condition of the mesic hammocks range from poor to good, with nearly all of them affected to some extent by past cattle grazing or agriculture.

As with the upland hardwood forest, invasive plants and feral hogs are the primary management concerns. Interior fences on the Crevasse Addition and Edwards property will be removed to allow natural movement of wildlife through the property. Remaining pasture areas will not be burned in the areas identified as mesic hammock to allow native species to recolonize these areas.

Sandhill

Remnant sandhills can still be found north of the park boundary. Most of this community type within the park and in the surrounding areas was cleared of virtually all marketable longleaf pines and converted to improved pasture or another form of agriculture. These conversions likely took place early in 1900s or even in the 1800s. Exclusion of fire in sandhills results in succession to xeric hammock and upland hardwood forest. Only relict examples of typical sandhill species remain today.

In many cases sandhill grades into upland pine and upland mixed woodland, which often act like an ecotone between the flammable sandhill and the fire-intolerant hardwoods of true upland hardwood forest. In natural situations, the line between sandhill and upland pine and upland mixed woodland is influenced by the local fire regime and may be difficult to discern. Within the park, there has been an almost complete loss of native sandhill, upland pine and upland mixed woodland indicator species, further blurring the distinction between these areas. Based upon early surveyors' notes, it appears that most of the sandhills were located to the north of the park, outside the park boundary with upland pine and upland mixed woodland lying within the boundary.

The limited sandhills on the south side of the park were impacted by an outbreak of southern pine beetles in the summer and fall of 2001. Much of this area was dominated by loblolly pines. These

loblolly stands were logged to limit the expansion of the outbreak. The sandhills within the park are in generally poor condition.

Restoration of the areas impacted by the southern pine beetle outbreak will require additional replanting with longleaf pines as well as groundcover restoration and hardwood control. For restoration efforts to be successful in the improved pasture areas that were once sandhill, replantings with longleaf pines and native groundcover species will have to be accompanied by measures to control or remove the non-native grasses. In the meantime, these areas will continue to be managed with prescribed fire. As with the previous two community types, more research is needed on conversion of pasture grasses to native groundcovers.

Scrubby Flatwoods

Scrubby flatwoods occur on the south side of the park near Micanopy and on the Jerevan Addition in the northeast corner of the park. This community's pine canopy has largely disappeared. The scrubby flatwoods along I-75 and in portions of the Jerevan Addition are typical of the community. These patches are dominated by characteristic species of scrubby oaks and lyonias. The absence of fire has resulted in the understory shrubs growing to approach tree size in localized patches found east of U.S. 441 and in parts of the Jerevan Addition. Sand live oak and staggerbush dominate these areas. The scrubby flatwoods are in fair condition, primarily due to lack of fire.

Within Alachua County, scrubby flatwoods are a relatively rare community type. Although these isolated patches are too small and discontinuous to support many scrub or scrubby flatwoods endemics, gopher tortoises (Gopherus polyphemus) and possibly Florida mice (Podomys floridanus) may be found in these areas. Florida mice historically occurred in sandhills outside the park boundary west of Newnans Lake. DRP staff have unsuccessfully surveyed the Jerevan scrubby flatwoods for Florida mice.

Restoration to a more characteristic scrubby flatwoods community using prescribed fire alone would require sufficient build-up of leaf litter to fuel an intense fire. Plans to use hardwood biomass harvesting and mechanical preparation are underway to speed restoration by lowering the fuel structure and opening the closed canopy before burning.

Sinkhole

Solution of the limestone underlying Paynes Prairie Preserve State Park has resulted in the formation of numerous sinkholes along the prairie rim. This process continues today and is most active on the north rim of Paynes Prairie. The uplands along the north rim are pockmarked with sinkholes that appear to follow weaknesses or fracture planes in the underlying limestone layers. The greatest concentration of active sinkholes occurs in the hammock north and east of Alachua Sink.

Although the sinks are in generally good condition, a number of problems exist. Non-native invasive plants thrive in many of these sinks, occasionally forming a complete monoculture. The condition of the sinkholes in the Alachua Sink Hammock varies from highly disturbed to pristine. The most disturbed sinkhole is located along the Gainesville-Hawthorne State Trail bypass within the power line right-of-way. It contains a concrete drainage structure designed to mediate the flow of runoff from the trail into the sinkhole. To the north of the trail, the chain of sinkholes continues relatively unbroken to the

northern boundary of the park, while to the south the sinkhole complex extends to Alachua Sink itself. Several of the sinkholes have been colonized by exotic plant species such as coral ardisia (*Ardisia crenata*) and small-leaf spiderwort (*Tradescantia fluminensis*). Recent treatments have reduced the cover of these plants, but more work is needed to remove invasives from difficult to reach sinkhole slopes. Some of the sinkholes adjacent to the Gainesville-Hawthorne State Trail or along the abandoned railroad bed have received untreated runoff from the trail or bed surface during periods of heavy rainfall, resulting in increased siltation and accelerated slope erosion. Several of the sinkholes have been subjected to increased foot traffic since the trail opened. The park maintains a narrow, ranger-guided hiking trail within the Alachua Sink Hammock that passes through the sinkhole field. Although the hiking trail has relatively little impact on the sinks due to the limited access, bicyclists have been documented leaving the Gainesville-Hawthorne State Trail, illegally entering these fragile areas and using the hiking trail as an off-road bike trail. Although these sinkholes are considered restricted areas due to their sensitivity, they are attractive sites for exploration and as a result can be expected to receive impacts from unauthorized visitor access. The sinkholes within the park range from fair to excellent condition.

Protection of the sinkholes from unauthorized foot and bicycle traffic and from stormwater runoff and erosion are the primary management measures. Mapping and monitoring of the sinkholes has been an ongoing process for many years. Light detection and ranging (LIDAR) datasets obtained from several sources have allowed highly accurate GIS mapping of the sinkholes under the closed canopy of the upland hardwood forests. Continued removal of invasive plants following an organized plan will help restore native groundcover where it has been lost.

Upland Hardwood Forest

Upland hardwood forest is an important upland community in the park, particularly on the North Rim. Some examples of this forest type are undoubtedly the result of succession from upland pine, upland mixed woodland or xeric hammock. During its history, the upland hardwood forest has endured varying levels of disturbance from human occupation of the region. Consequently, the forest ranges in age from early successional stages to relatively mature examples. The term “hammocks” used historically seems to apply to both upland hardwood forest, and to mesic hammock closer to the rim of Paynes Prairie.

North of Alachua Sink where limestone is very close to the surface, pines are largely absent. The underlying karst geology heavily influences this hammock; many sinkholes and limestone outcrops are present. Certain plant species, including the endangered silver buckthorn (Sideroxylon alachuense) and Godfrey's swamp privet (Forestiera godfreyi) occur in this hammock and in few other places due to the strong limestone presence in the soils. The Alachua Sink Hammock also contains numerous southern soapberry trees (Sapindus saponaria) including a former National Champion. This example of upland hardwood forest is one of the most diverse within the park and does not appear as disturbed as many of the other examples. The description offered by William Bartram in the spring of 1774 is remarkably similar (Harper 1958). The description even describes “Orange trees of remarkable magnitude and very fruitful” (Harper 1958:130). Trifoliate orange (Poncirus trifoliata), a common rootstock for citrus trees, still occurs scattered throughout this hammock and in many other locations around the prairie rim. First introduced by the Spanish, citrus has long been associated with agricultural pursuits at Paynes Prairie.

The unique setting of this hammock and its unusual underlying geology make it an exceptional community for the area, despite the human alterations of the past. Unfortunately, the abandoned railroad bed corridor causes fragmentation of the hammock, diminishing its ecological value. For example, the corridor serves as an invasion route for exotic plants such as chinaberry (Melia azedarach), Caesar weed (Urena lobata), coral ardisia and camphortree (Cinnamomum camphora). In addition, the linear nature of the disturbance allows grassland animal species such as the cowbird (Molothrus ater), a nest parasite of forest birds, to intrude deeper into hammock areas and to impact significantly greater numbers of nesting songbirds.

Large areas of upland hardwood forest near the rim of the prairie were probably affected by the continuous influence of cattle, feral hogs and horses from the late 1600s to the early 1970s. Much of the upland hardwood forest community was cleared for agricultural purposes in the past, including large areas that were converted to improved pasture. Most of these areas have resisted natural succession due to a thick ground cover composed mainly of non-native turf grasses and may be classified as abandoned pasture. Other areas undergoing succession may be classified as successional hardwood forest. Cattle grazing and selective cutting have also occurred in most areas, affecting the structure and diversity of the community. Southern magnolias were regularly harvested for the manufacture of crates in Micanopy. More recently, the arrival of laurel wilt disease has caused the loss of the majority of the adult red bay trees within the park. First affecting the southern end of the park, the disease reached the north rim and the Alachua Sink Hammock in 2010. Typically, this disease kills all or nearly all adult red bay trees over 4" dbh and results in a shift in species composition in hardwood forests (Shields et al. 2011). Depending on their land-use history, the upland hardwood forests at Paynes Prairie range from poor to excellent condition.

Upland hardwood forests typically require little active management. The main concern in this community type at Paynes Prairie is the control of invasive exotic plant species. Coral ardisia is a persistent problem that has been the target of concentrated control efforts in the north rim area. Other species, such as the small-leaf spiderwort, are more difficult to control and remain a significant threat. Feral hogs (*Sus scrofa*) are also a threat to upland hardwood forests here.

Upland Mixed Woodland

Upland mixed woodland often acts as a transition zone between upland pine or sandhill and adjacent upland hardwood forests or mesic hammocks. Like upland pine, upland mixed woodland is a fire-adapted community dominated by longleaf pine with scattered southern red oak and mockernut hickory. However, upland mixed woodland typically lacks wiregrass as a dominant groundcover, and the oaks and hickories may be co-dominant with the longleaf pines. Unfortunately, the richer soils of these longleaf forests made them more desirable for agricultural pursuits. Being a transitional community, upland mixed woodland is also very susceptible to succession to upland hardwood forest when there is a lack of fire. As a result, very few intact examples of upland mixed woodland exist in north central Florida.

Surveyors' records obtained from the General Land Office (GLO) Early Records (data.labins.org/2003/SurveyData/LandRecords/GLO/index.cfm), from surveys conducted in the first half of the 19th century, give details concerning the vegetation encountered along section lines and the

tree species used for witness trees at section corners. Surveyors distinguished between various types of hardwoods and pine lands. Pine lands were usually characterized as either flat, with or without palmetto, which were flatwoods, or rolling or wavy with blackjack (turkey oaks) being sandhills. The surveyors' notes also refer to "oaks and hickories" as being distinct from "hammocks." Given the location and soil types of the areas described as "oaks and hickories," it is likely that these areas were what we now refer to as upland mixed woodland.

With very few exceptions, nearly all of the indicator species for upland mixed woodland and upland pine have been extirpated from these sites due to a long history of agriculture and cattle production. Most of the areas that were once upland mixed woodland were eventually converted to improved pastures after a long history of agriculture and free ranging cattle. It is known from the early surveyors' records, and from comments by William Bartram, that true sandhills were located some distance north of the current park boundary and that a thick band of hardwoods rimmed the prairie basin. Between these extremes was a broad transition zone of upland pine and upland mixed woodland. Two isolated patches of upland mixed woodland (or possibly upland pine) occur within the pastures of the north rim. These contain mature southern red oaks, mockernut hickories and longleaf pines, along with scattered herbaceous and other woody remnants. Unfortunately, these areas suffer from long-term fire exclusion and the natural groundcover species have been lost from shading by invasive laurel oaks or replaced by muscadine (*Vitis rotundifolia*) grapevines.

At the south end of the park, very few survey data are available describing the vegetation types, so the existence of upland mixed woodland and upland pine are more difficult to discern. Like the north rim of the park, most of the upland longleaf sites were cleared for agriculture or cattle prior to the advent of aerial photography in the 1930s. The upland mixed woodland in the park is in poor condition.

The areas designated as upland mixed woodland will be restored to the extent possible. In most cases, the removal of bahiagrass (*Paspalum notatum*) pastures and complete restoration of native groundcover would be required to effect restoration. Initial steps will include removal of the exotic pasture grasses through mechanical and chemical means, site preparation and direct seeding with native groundcover species. Since wiregrass is typically not a dominant species in upland mixed woodland, appropriate seed mixes will be collected from intact upland mixed woodland where possible. The pasture areas will continue to be treated with prescribed fire to reduce offsite hardwoods.

<u>Upland Pine</u>

Soil types indicate this community probably once covered a much more extensive area on the north side of the park. Conversion to improved pasture removed most indicators of upland pine. Early land surveys of Florida documented vegetation types along section line surveys. These early surveyors' notes clearly note the presence of upland pine species north of the prairie rim and document the transitions between open sandhills, upland pine/upland mixed woodland and upland hardwood forests/mesic hammocks along section and Spanish grant lines. Surveys conducted by Washington and Burr in 1845-46 cover most of the park, with some surveys dating back to the 1830s or before.

As with other communities within the park, much of the upland pine was cleared at some point in time and eventually converted to improved pasture. Virtually all the longleaf pines were timbered. Only relict

individuals of typical upland pine species remain today (particularly southern red oak). Abandoned agricultural fields rapidly succeed to thickets of laurel oaks, water oaks and sweetgums, and eventually to a successional hardwood forest or xeric hammock. Areas that were converted to improved pasture are more resistant to successional changes. Natural recolonization and invasion by offsite hardwoods are very slow due to the thick sod dominated by exotic grasses such as bahiagrass and pangola (*Digitaria eriantha*).

Several degraded upland pine areas on the south side of the park were impacted by an outbreak of southern pine beetles in the summer and fall of 2001. Many of these areas were dominated by loblolly pines and were logged to limit the expansion of the outbreak. Upland pine within the park is in poor condition.

Restoration of this site through removal of invasive turfgrass and disturbance indicators such as dog fennel and sweetgum will continue. Prescribed fire will be applied to these zones to retain and spread relict native groundcover species. As is the case with upland mixed woodland, restoration of the diverse groundcover that is typical of upland pine is a difficult and expensive task.

Wet Flatwoods

Wet flatwoods occur within a mosaic of mesic flatwoods and baygalls on the south side of the park near Micanopy. Usually dominated by pond pine, wet flatwoods tend to be less well drained and more prone to shallow flooding than the adjacent slash and longleaf pine dominated mesic flatwoods. William Bartram passed through wet flatwoods between Tuscawilla Lake and Paynes Prairie in 1774, describing it as "a level, grassy plain, interspersed with low, spreading, three-leaved Pine-trees, large patches of low shrubs…" (Harper 1958:119). He describes the area as "savanna or bay-gale" (Harper 1958:119). Portions of this area maintain a similar aspect today.

Wet flatwoods are defined and maintained by both hydrologic and fire regimes. Both of these have been altered within the park through ditching, road building and timber operations. The wet flatwoods are in fair to good shape due to repeated prescribed fire despite past land use practices. The wet flatwoods between U.S. 441 and I-75 were heavily impacted by the southern pine beetle outbreak in 2001. Most of this area was logged to control the expansion of the outbreak. Natural regeneration of pond pines is occurring on-site, and this area is in fair condition. Heavy fuel loads in this area and the proximity of two major highways makes prescribed fire very difficult and dangerous. Additional firebreaks have been created to allow smaller sections to be burned, thereby increasing safety and lowering smoke production. As noted in the mesic flatwoods description, park staff will continue to work with the Florida Forest Service to use safe methods of applying fire to these areas.

The swamp bay trees in the wet flatwoods have been affected by the laurel wilt disease, resulting in a loss of adult swamp bays. In general, the wet flatwoods are in fair condition due to insufficient fire frequency across all sites.

Xeric Hammock

Xeric hammocks occur primarily in the uplands to the north of the basin. Here, the canopy is fairly open and dominated by sand live oaks while the understory is moderately thick, with rusty lyonia and scrub oaks predominant. Many of these areas were probably once scrubby flatwoods or sandhills that have suffered from long-term fire exclusion. Some of the xeric hammock of the park has suffered disturbance in the past, specifically the clearing of the understory by livestock or machinery. The xeric hammocks are in fair to good condition.

True xeric hammocks require relatively little active management. Most of the xeric hammocks at Paynes Prairie are of anthropogenic origin, usually due to fire exclusion. In some cases, restoration to a fire-adapted natural community may be warranted.

Alluvial Forest

Alluvial forest is found in limited areas within the park, occurring along the upland course of Sweetwater Branch and along Prairie Creek. The Sweetwater Branch area is one of the most adversely impacted by human activity in the park. Exotic plants such as the air potato (*Dioscorea bulbifera*) and Chinese tallowtree (*Sapium sebiferum*) are now widespread in this community. The Sweetwater Branch area is in poor condition. The alluvial forest along Prairie Creek has been altered hydrologically by the construction of tram roads and a powerline. Past logging activities have also caused changes. Revegetation of the some of this area with laurel oak, loblolly pine and sweetgum has created an uncharacteristic flora. This area is considered to be in fair to good condition, with the higher quality examples found on the Crevasse Addition.

Maintenance of the natural flooding cycles of Prairie Creek will help restore the alluvial forest areas that have been disturbed in that area. The Sweetwater Branch area will require significantly more effort to remove invasive plants. Portions of the alluvial forest were included in the Sweetwater Branch/Paynes Prairie Sheetflow Restoration Project.

Basin Marsh

This plant community is at once the largest in area and the most dynamic system at Paynes Prairie Preserve State Park, both giving the park its name and defining the focus for protection and interpretation. The area covered by this community generally varies on a seasonal cycle. It also will expand and contract over long periods of drought and flood conditions. However, this system tends to lie at or below 60-64 feet elevation (MSL) within the Paynes Prairie Basin. The species composition is relatively diverse, but species domination shifts with fluctuations in water level as well as with other environmental changes. Marsh above roughly 58.5 feet elevation tends to maintain emergent marsh vegetation even during periods of above average precipitation. The remainder of Paynes Prairie Basin is an example of the lake bottom variant of the basin marsh. This marsh alternates between lake and marsh depending on the amount of regional rainfall and the rate at which the basin drains through the Alachua Sink. In 1998 and 2004, and again in 2017-18, Paynes Prairie filled and flooded nearly the entire basin, with high water remaining for months or years after each event.

A legacy of the Camp Ranch period is the abundance of exotic grasses in the drier portions of this community. Dr. Larry White, who completed a study on the basin ecosystem in the mid-1970s, found

that exotic grasses such as bahiagrass and vaseygrass (*Paspalum urvillei*) generally dominated the higher elevations (White n.d.). Native grasses, primarily maidencane and southern cutgrass, most often dominated the lower elevations.

While it seemed likely that the high-water events in 1998 and 2004 would have allowed the native grasses to become established on the more elevated portion of the basin, such was not the case. In contrast, the extended high-water period, brought on by above-average rainfall and a hurricane in 2017-18, seemed to alter much of the high marsh, reducing non-native turfgrasses previously observed. Shrubs and trees, particularly wax myrtle and persimmon, were also set back by the flooding events that following concerted aerial herbicide treatments during 2012-17. These helicopter applications primarily used imazapyr and were very successful in setting back Chinese tallow and native hardwood encroachment on just over 4,000 acres of basin marsh. There are still a few areas dominated by hardwoods within the basin, but these are all in proximity to residential areas or other sensitive locations excluded from aerial treatments.

Unfortunately, the extended high-water event that started in 2017 has remained through 2022 and has allowed floating and emergent invasive plants previously existing in isolated patches to proliferate on the marsh lake. In 2020, an extensive survey was conducted on 11,500 acres of the basin that focused on invasive species, including water lettuce (*Pistia stratiotes*), water hyacinth (*Eichhornia crassipes*), Peruvian primrosewillow (*Ludwigia peruviana*) and Cuban bulrush (*Cyperus blepharoleptos*). This survey revealed over 2,300 acres of infestation among these four species (FNAI 2020). Long before this study was conducted, researchers and park staff also noted the presence of the non-native island apple snail (*Pomacea maculata*) in the prairie basin. Since this species has spread with the expansion of high water in the marsh, it has led to the increase of limpkin populations and (along with native apple snails, *Pomacea paludosa*) driven the return and range expansion of the endangered snail kite (*Rostrhamus sociabilis plumbeus*), starting in 2018. How all these species are interacting and affecting marsh habitat for native species is still being observed.

Two highways and the remaining portions of the dike and canal system interrupt the natural sheetflow regime of the basin. Transmission line rights-of-way cut across portions of the basin marsh. Before 2016, effluent-laden water from Sweetwater Branch flowed over part of this community during high-water periods. The nutrient-enriched water brought on unnatural changes in the vegetation. Silt was also deposited on the basin, particularly during flood events when the stream moved in large volumes of eroded soil.

Plans created in 2009 finally culminated in the conversion of 270 acres of dikes, ditches and basin marsh to a three-cell treatment wetland on the northwest corner of the main basin. The final construction of this Sweetwater Wetlands Park treatment marsh complex in 2016 has drastically reduced siltation and improved water quality in the marsh.

Though Sweetwater Dike was removed in the above construction, other historic dikes still provide the means for woody species, some of which are not native, to invade the interior of the system. Though aerial herbicide treatment for woody plants has been effective on the basin, very little of this was directed at dikes. These will likely have to be mechanically treated to remove trees growing in response

to this disturbance. Currently, most of the basin marsh in the prairie is judged to be in fair to good condition.

Two smaller basin marshes also occur at the northeast end of the park. These are known as Trout Pond and Red Wolf Pond, and both contain open water marsh lakes. Both are in relatively good condition. However, Trout Pond has been impacted somewhat by a pair of short causeways built within the marsh on the eastern side. These were built presumably for access to open water. A small stream flows into Trout Pond from private property to the north of the park boundary. This stream and its floodplain are lined with several invasive exotic species, including Japanese climbing fern (*Lygodium japonicum*) and coral ardisia (*Ardisia crenata*). Chinese tallow in the marsh and ardisia in the surrounding area have been effectively treated and are now in maintenance condition. Trout Pond has also been connected to Pike Pond via a ditch that likely transmits water during high-water events. These areas are in good condition.

Removal of additional dikes and filling of more canals will help restore sheetflow patterns on the basin itself, but most impacts occur outside the park boundary. The Sweetwater Branch/Paynes Prairie Sheetflow Restoration Project described elsewhere in this plan has greatly improved conditions in the basin marsh by removing dike sections and treating effluent water prior to release in the basin marsh.

While hydrology may have the greatest impact on the basin marsh of the prairie basin, fire is also a natural process that has shaped the vegetative structure of the basin marsh. The presence of privately owned lands within the basin restricts the effectiveness of resource management techniques such as water fluctuation and ecological burning. Despite this, some basin burning was done in 2015 and 2016, improving several hundred acres. Though prescribed fire plays a role, natural hydro-period changes and reduction of past sheetflow interruptions are now considered the best way to maintain the herbaceous wetlands and discourage the expansion of woody species in the basin marsh. Where fire and flooding are not sufficient to remove woody species and invasive plants, mechanical or chemical treatments will continue to be necessary.

Basin Swamp

Basin swamps occur in several locations within the park and along the Gainesville-Hawthorne State Trail. Some of these areas may actually be examples of fire-adapted communities that have suffered from long-term fire exclusion. The largest basin swamp occurs in a depression just north of Lake Wauberg. The major overstory species are now blackgum and red maple. In 1937, this area appeared to be an herbaceous wetland and clear of trees and woody shrubs. An abandoned logging tramway bisects this community and affects the natural hydrological regime. A basin swamp along the eastern rim of the prairie was probably once a depression marsh, but succession in the absence of frequent fire has allowed a basin swamp to develop. In the northeast corner of the prairie basin, north of Camps Canal, a basin marsh system extended north from the main basin. The northern limits of this basin may have naturally been a basin swamp. Hydrological disturbances and the absence of frequent fire have allowed swamp tupelo, red maple, and other basin swamp species to dominate much of this area. Most of the basin swamps are in fair to good condition.

Restoration and maintenance of basin swamps depend primarily on restoring and maintaining the natural hydrology and hydroperiod of the wetlands. Where serious perturbations have occurred to the

natural hydrology, such as is the case with the diversion of flow from Prairie Creek into Camps Canal, it will be difficult to maintain or restore some wetlands to their original condition. Some of the areas described as basin swamps may have historically been basin marshes. It may not be feasible to reverse that successional process. Prescribed fires will be used to maintain the ecotones around the basin swamps where they grade into fire-adapted communities.

Baygall

Pockets of baygall community are scattered throughout the park. Many of these areas are associated with mesic and wet flatwoods located to the east and south of Lake Wauberg. Baygalls also occur along the rim of the prairie where seepage from upslope saturates the soils. Although most baygalls are dominated by bays and gums, one in particular located north of the Hickory Ranch shop complex is dominated by large cypress trees. An adjacent baygall is physically similar but is dominated by typical hardwoods. Some difference in fire regime or land use may have affected the dominant tree species in these areas.

The baygalls to the southeast have likely expanded into the flatwoods due to fire suppression before acquisition. Several have been burned through during the course of prescribed fires. Some of these baygalls dominated by hardwoods may have been wet flatwoods at one time. Some baygalls may have been impacted by ditching activities, and a transmission line right-of-way cuts through several baygalls. Laurel wilt disease killed most of the larger swamp bays in the park's baygalls. In general, the baygalls are in fair to good condition.

Restoration of natural drainage patterns affected by ditching may be necessary in some baygalls. Prescribed fires will be allowed to burn into the edges of the baygalls to maintain a natural ecotone. Under some conditions, fires may penetrate into or through baygalls.

Bottomland Forest

Bottomland forest occurs along the edges of Lake Wauberg and Sawgrass Pond, and above the floodplain of Prairie Creek. The bottomland forest around Lake Wauberg and Sawgrass Pond is characterized by a dense, shrubby understory. The forest in the northeast corner, however, has an open understory with an abundant ground cover of ferns, herbs and grasses. The bottomland forests are generally in good condition.

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, particularly along Prairie Creek, is also a concern.

Depression Marsh

Depression marshes are scattered throughout the park. In many cases, the distinction between depression and basin marshes is simply one of scale, with basin marshes being the larger of the two. Most of the depression marshes within the park are rapidly being invaded by woody vegetation due to the absence of fire and periodic drought conditions. Depending on water levels, depression marshes may be classified as flatwoods ponds if they are dominated by open water. Water levels can vary greatly in depression marshes, and many that periodically dry up completely are important breeding sites for

amphibian species that cannot tolerate the presence of fish. The various depression marshes in the park vary from poor to good depending on the extent of hardwood succession and hydrological alterations. Prescribed fire in all depression marshes is needed if succession to forested wetlands is to be prevented. Some may require mechanical or chemical control of hardwoods to allow fires to penetrate. Where the hydrology has been affected by ditching or berms, consideration will be given to restoring the natural hydrology.

Dome Swamp

Scattered domes have developed in karst regions along the prairie rim. Most of these domes lack their cypress component because of selective cutting and fire exclusion in the past. Bays are dominating some of the domes. The arrival of the laurel wilt fungus in Alachua County has decimated the swamp and red bays within the park. The result is a loss of all but the smallest swamp bays within the dome communities. The domes are in fair to good condition.

Maintenance or restoration of the natural hydrology is the most important management measure for these isolated wetlands. Allowing prescribed fires to penetrate the domes from the surrounding natural communities will also be an important management action to maintain these areas within the park.

Floodplain Swamp

Floodplain swamp is primarily located in the Prairie Creek drainage system. The hydroperiod affecting this community was modified somewhat by diversion of the creek in the 1920s. A high dike paralleling Camps Canal cuts through a portion of the floodplain swamp. Additional floodplain swamp associated with Prairie Creek was acquired with the Crevasse Addition. Some of these examples may have been basin marsh prior to the diversion of Prairie Creek. Increases in cypress trees along Prairie Creek since the 1930s have caused these once-open herbaceous wetlands to transition into floodplain swamp. The floodplain swamps are mostly in good condition along the upper portions of Prairie Creek and in fair condition in the lower stretch of the creek.

Where serious perturbations have occurred to the natural hydrology, such as is the case with the diversion of flow from Prairie Creek into Camps Canal, it will be difficult to maintain or restore some wetlands to their original condition. To the extent possible, the natural hydrology should be restored and maintained.

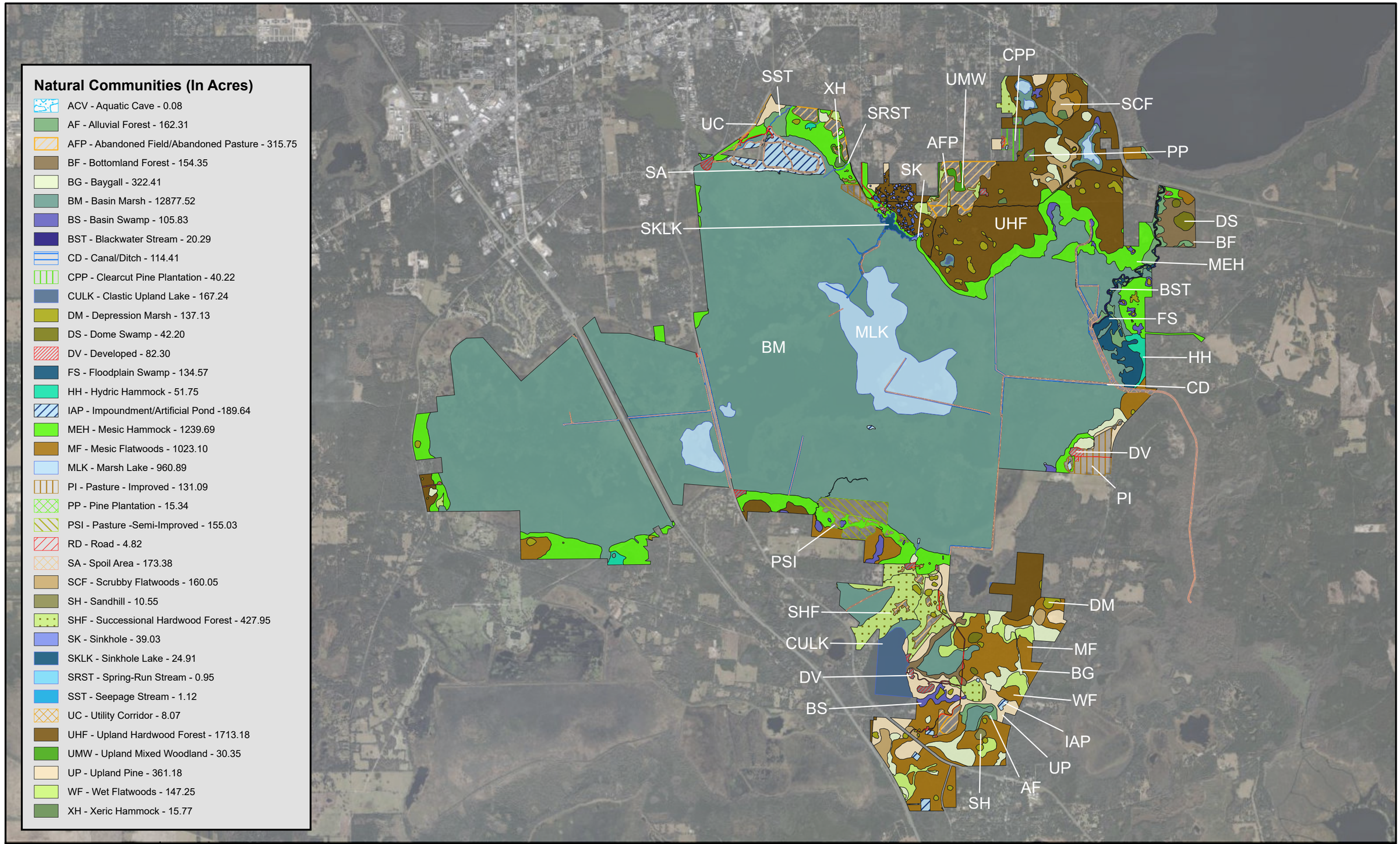
Hydric Hammock

This community is found in the bottoms of the broad ravine-like depressions and the small circular depressions that are widely scattered along the prairie rim. In many cases, this community is difficult to distinguish from baygall at the wetter end of the spectrum and upland hardwood forest or mesic hammock at the dryer end. Many of these hydric hammock areas are currently mapped within upland hardwood forest or mesic hammock until better resolution can be obtained using GPS technology to map these areas accurately. The hydric hammock areas are mostly in good condition.

Maintenance of natural hydroperiods is important for hydric hammocks. Allowing prescribed fires to burn into the edges from adjacent fire-adapted communities will help maintain natural ecotones.

Natural Communities (In Acres)

- ACV - Aquatic Cave - 0.08
- AF - Alluvial Forest - 162.31
- AFP - Abandoned Field/Abandoned Pasture - 315.75
- BF - Bottomland Forest - 154.35
- BG - Baygall - 322.41
- BM - Basin Marsh - 12877.52
- BS - Basin Swamp - 105.83
- BST - Blackwater Stream - 20.29
- CD - Canal/Ditch - 114.41
- CPP - Clearcut Pine Plantation - 40.22
- CULK - Clastic Upland Lake - 167.24
- DM - Depression Marsh - 137.13
- DS - Dome Swamp - 42.20
- DV - Developed - 82.30
- FS - Floodplain Swamp - 134.57
- HH - Hydric Hammock - 51.75
- IAP - Impoundment/Artificial Pond -189.64
- MEH - Mesic Hammock - 1239.69
- MF - Mesic Flatwoods - 1023.10
- MLK - Marsh Lake - 960.89
- PI - Pasture - Improved - 131.09
- PP - Pine Plantation - 15.34
- PSI - Pasture -Semi-Improved - 155.03
- RD - Road - 4.82
- SA - Spoil Area - 173.38
- SCF - Scrubby Flatwoods - 160.05
- SH - Sandhill - 10.55
- SHF - Successional Hardwood Forest - 427.95
- SK - Sinkhole - 39.03
- SKLK - Sinkhole Lake - 24.91
- SRST - Spring-Run Stream - 0.95
- SST - Seepage Stream - 1.12
- UC - Utility Corridor - 8.07
- UHF - Upland Hardwood Forest - 1713.18
- UMW - Upland Mixed Woodland - 30.35
- UP - Upland Pine - 361.18
- WF - Wet Flatwoods - 147.25
- XH - Xeric Hammock - 15.77



PAYNES PRAIRIE PRESERVE STATE PARK
Natural Communities - Existing Conditions

N

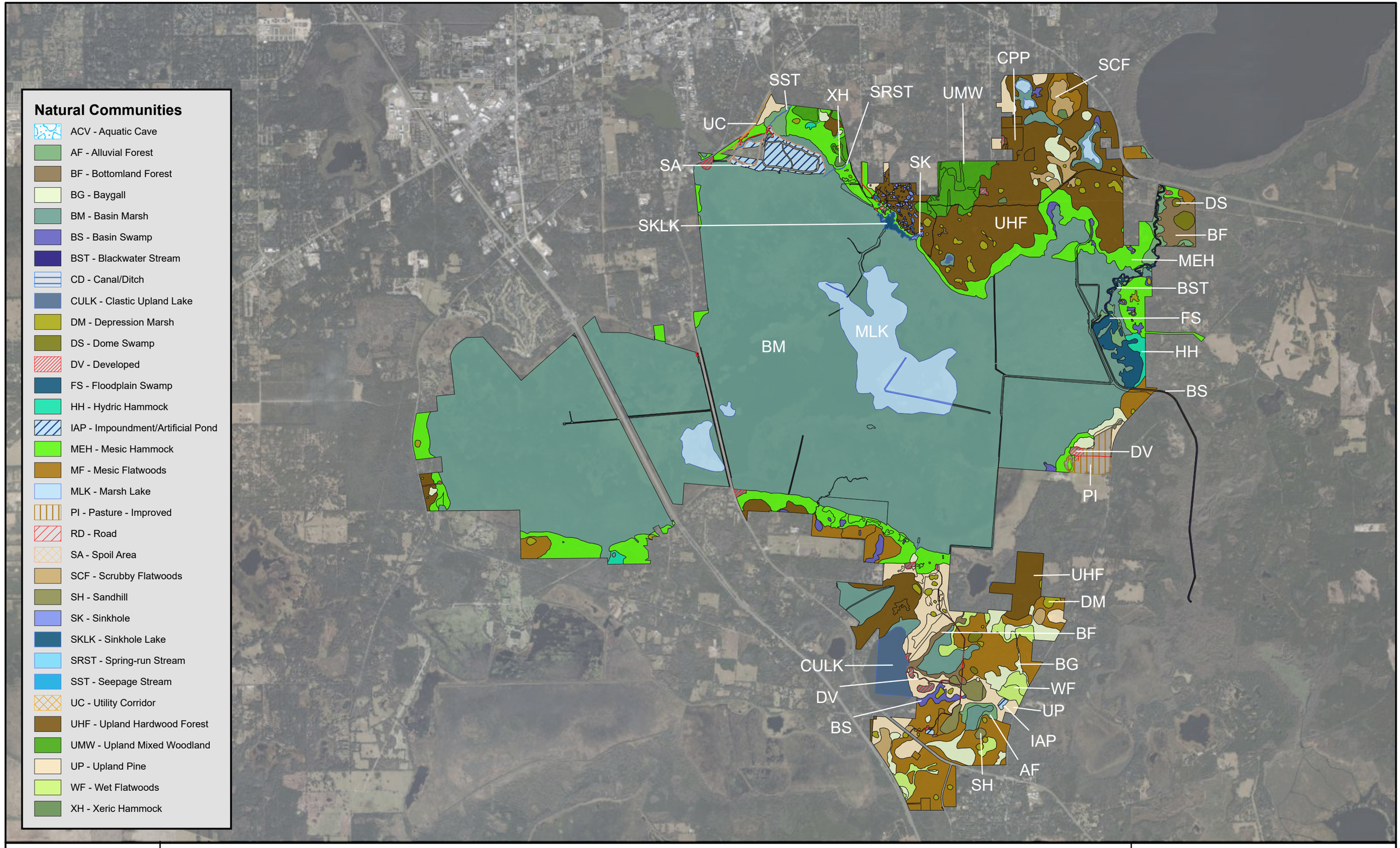
0 1 2 Miles

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

- ACV - Aquatic Cave
- AF - Alluvial Forest
- BF - Bottomland Forest
- BG - Baygall
- BM - Basin Marsh
- BS - Basin Swamp
- BST - Blackwater Stream
- CD - Canal/Ditch
- CULK - Clastic Upland Lake
- DM - Depression Marsh
- DS - Dome Swamp
- DV - Developed
- FS - Floodplain Swamp
- HH - Hydric Hammock
- IAP - Impoundment/Artificial Pond
- MEH - Mesic Hammock
- MF - Mesic Flatwoods
- MLK - Marsh Lake
- PI - Pasture - Improved
- RD - Road
- SA - Spoil Area
- SCF - Scrubby Flatwoods
- SH - Sandhill
- SK - Sinkhole
- SKLK - Sinkhole Lake
- SRST - Spring-run Stream
- SST - Seepage Stream
- UC - Utility Corridor
- UHF - Upland Hardwood Forest
- UMW - Upland Mixed Woodland
- UP - Upland Pine
- WF - Wet Flatwoods
- XH - Xeric Hammock



PAYNES PRARIE PRESERVE STATE PARK
Natural Communities - Desired Future Conditions

N

0 1 2 Miles

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.

Clastic Upland Lake

Clastic upland lakes lying partially or wholly within the park include Lake Wauberg, Melton's Pond and Chacala Pond. The western and southern portions of Lake Wauberg lie outside the park and are owned by the University of Florida and several private citizens. Melton's Pond, which lies perched on the north prairie rim near Persimmon Point, is entirely within the park. Chacala Pond, situated close to the southeastern corner of the prairie basin, is virtually all private in ownership. It receives inflow from the Sawgrass Pond-Lake Wauberg system by means of a small stream called Sawgrass Run. The clastic upland lakes are in fair to good condition.

Hydrilla (*Hydrilla verticillata*) occurs in Lake Wauberg, although not in extensive beds. Treatment was initiated with approved aquatic herbicides in the fall of 1983. The treatment was initially successful, but reinfestation has occurred.

Protection of these lakes from contaminated stormwater runoff is an important management measure as they are prone to eutrophication.

Marsh Lake

The largest marsh lake in the park is Alachua Lake. Historically, Alachua Lake has fluctuated in size, depending mainly upon variation in rainfall, flow of streams into the basin, and the capacity of Alachua Sink to drain the basin. The maximum recorded size of the lake was attained in the 1871-91 period when Alachua Sink was plugged and waters backed up to fill the entire basin. Lake level was reportedly about 64 feet MSL. During the 1998 and 2017 high water events, Alachua Lake reached nearly those levels, peaking at 61.4 feet MSL in March 1998 and again in October 2017. At that level, water began to enter the travel lanes of U.S. 441 within the basin.

A number of factors restrict the natural fluctuation of water levels in Alachua Lake. The diversion of Prairie Creek into Camps Canal essentially removed the basin's primary water source, although the park now taps some of that flow. In dry years, the inflow is often insignificant due to the positioning of the water intake gates along Camps Canal. A failed water control structure near Alachua Sink previously allowed for some manipulation of water levels, but private ownership of portions of the basin and the two highways that cut across the basin preclude flooding to optimum levels. Finally, abnormal silting of Alachua Sink may have reduced the sink's capacity to drain the basin. Alachua Lake is in good condition.

Marsh lakes also occur in the northeast portion of the park in association with Red Wolf Pond and Trout Pond, both smaller basin marsh systems. These are considered to be in good condition.

Maintenance or restoration of a natural hydrological regime is critical for management of these aquatic systems. The fluctuation of water levels is perhaps the most important management measure for the marsh lakes and surrounding basin marshes. The extreme highs and lows are more important than the averages when managing water levels. In general, the natural variation in regional precipitation, and the resulting level of the Floridan aquifer, will determine water levels in the basin. Restoration of the Sweetwater Branch sheetflow has likely affected water levels in the marsh lake on the prairie basin.

Sinkhole Lake

Alachua Sink is the park's only sinkhole lake of significant size. Unlike most sinkhole lakes, Alachua Sink receives abundant surface inflow. Outflow is through subterranean channels to the aquifer below. Bathymetric measurements of the active portion of the sink indicate that the depth is greater than -75 feet NGVD, which is over 120 feet below normal surface water levels (Ritter 1991).

Water quality in Alachua Sink was previously degraded by nutrient-enriched and silt-laden water from Sweetwater Branch. Water-hyacinths (*Eichhornia crassipes*) occur in Alachua Sink, but, at present, their density is low and they seem to be under natural control. Severe infestations such as those that occurred during cattle ranching days are no longer common. The Alachua Sink is considered to be in fair condition due to water quality concerns.

Numerous other sinkhole lakes occur within the Alachua Sink hammock. Depending on the depth of the sinkhole and the current level of the aquifer, certain sinkholes within the sinkhole field northeast of the Alachua Sink hold water for varying periods of time. Most of these sinkhole lakes are considered to be in good condition.

Sinkholes and sinkhole lakes must both be protected from unnatural levels of erosion. By their very nature, sinkholes are eroding features, and high levels of erosion can affect the water quality of sinkhole lakes. Foot and bicycle traffic can cause damage and increased erosion on the sides of sinkholes and sinkhole lakes, so it is important to restrict access to these sensitive features.

Blackwater Stream

Prairie Creek is a blackwater stream that runs through the northeastern edge of the park. Prairie Creek once flowed unimpeded from Newnans Lake across the Paynes Prairie Basin and into Alachua Lake. The construction of Camps Canal and Dike diverted the flow away from Paynes Prairie toward Orange Lake via the River Styx. Portions of the upper section of the creek near its source at Newnans Lake are privately owned. The natural hydroperiods of the creek were historically disrupted by the presence of a weir located just below Newnans Lake. The weir was removed in 1999. The park manages land leased from the SJRWMD that includes both banks of Prairie Creek on the south side of State Road 20. The Crevasse Addition includes an additional 1.7 miles of Prairie Creek. In 2021, submerged aquatic vegetation (SAV, i.e. Sagittaria kurziana) was documented in the lower end of Camps Canal, below County Road 234 (R. Owen personal communication). There was abundant limestone and karst material along the shoreline near the SAV occurrence.

Prairie Creek suffers from the same water quality issues that plague its source, Newnans Lake. The construction of Camps Canal removed the flow from 2-3 miles of Prairie Creek within the prairie basin. The condition of Prairie Creek is considered poor to fair.

Dog Branch originates from several basin swamps and flows onto the prairie basin just east of Bolen Bluff. One of the headwaters and a section of the stream that flows through uplands were recently added to the park with the Edwards Addition. This blackwater stream is considered to be in good condition.

Protection of the watersheds of the blackwater streams is a critical need for maintaining or enhancing the water quality and quantity in these systems. An increase in flow from Prairie Creek onto the prairie basin would improve conditions on the basin but would require modification of the water control system currently in place at Camps Canal.

Seepage Stream

Sweetwater Branch is a seepage stream. The stream has changed tremendously since William Bartram described it in 1774. Once following a very narrow, meandering course through the uplands before sheetflowing across the prairie, Sweetwater Branch now flows through an artificially straightened and widened channel.

The urban nature of its watershed has caused drastic changes in the hydroperiod of the stream. Normal flow volume is many times that described by Bartram since the system now continuously receives water from urban sources, including the discharge from the Main Street Water Reclamation Facility. During periods of heavy rainfall, the stream's flow increases dramatically due to urban runoff. Sweetwater Branch has been receiving nutrient-enriched and silt-laden water for many years, changing the original biota of the stream community. Storm surges carry especially high concentrations of pollutants through the system. Sweetwater Branch is considered to be in poor condition. The Sweetwater Branch/Paynes Prairie Sheetflow Restoration Project has addressed many of these issues. Additional information may be found in the *Hydrology* section.

Bartram Spring is one of the larger seepage streams along the rim of the prairie. Located west of Chacala Pond, it may have been the site of William Bartram's camp when he visited the area in 1774. This seepage area was heavily invaded by coral ardisia until recently when the area was treated under a grant from the Bureau of Invasive Plant Management. The seepage system is in good condition.

Other small seepage streams associated with seepage areas occur in scattered locations around the rim of Paynes Prairie. Many of these are too small to map. Ditching activities in the uplands may have impacted some of these seepage systems.

Protection of the watersheds of seepage streams is important in maintaining and enhancing water quality and quantity. Dramatic changes occurred where Sweetwater Branch entered the Prairie Basin with the construction of the treatment wetlands which attenuate stormwater pulses and have improved water quality. As part of this project, the Sweetwater Canal and Sweetwater Dike on the prairie basin were removed and the water exits the treatment wetland as a broad area of sheetflow.

Spring-run Stream

Boulware Spring Run is a small artesian-fed stream that enters the park just west of the entrance to the District 2 office and the La Chua trailhead. After a brief passage through the uplands, it winds through the basin and merges with the sheetflow from the Sweetwater treatment wetland. Boulware Springs, the source of the run, is contained within a city park. Boulware Springs was the original drinking water supply for the city of Gainesville. The uppermost stretch of the run passes through a subdivision located just east of the park boundary. Much of Boulware Spring Run is choked with wild taro, a non-native plant. Although some level of control has been obtained in the past using physical removal and

herbicides, the spring run within the park is constantly reinfected from a large population of wild taro located on the spring run within the adjacent subdivision. The spring run is considered to be in fair condition.

Control of non-native plant species will continue to be a priority for Boulware Spring Run. Since the headspring is located within a city park and receives some level of protection, the main impacts to water quality lie within the residential area that the stream passes through. Impacts to the stream in this area will be identified and addressed to the extent possible.

Aquatic Cave

The only known aquatic cave in the park is located near Alachua Sink. The extent of the aquatic cave system that underlies the Alachua Sink is unknown. Condition of the cave system is suspected to be fair to good.

Unlike many aquatic cave systems that serve as sources of water, the Alachua Sink cave system acts as a drain for aquatic systems. Maintenance of the water quality and quantity entering the cave system is the primary action needed to protect the cave system. The improvement of the water quality of Sweetwater Branch should help in this respect.

Abandoned Pasture

A long history of cattle production resulted in the creation of many semi-improved and improved pastures at Paynes Prairie. With the exception of the pastures at Hickory Ranch that are maintained for the Florida Cracker Cattle herd, most of these pastures were abandoned after state acquisition. The dense bahiagrass has prevented significant hardwood succession in many areas. Historically, these pastures were created in a variety of natural community types, including sandhill, upland pine, upland mixed woodland, upland hardwood forest, mesic hammock and mesic flatwoods. In some cases, they may have been used for agricultural crops prior to being converted to pastures. Bartram notes that the Native Americans had extensive fields around the rim of the prairie at the time of his visit in 1774 (Harper 1958).

Limited restoration of the upland pastures has occurred on the north rim along the Gainesville-Hawthorne State Trail with the planting of longleaf pines and wiregrass. Though restoring sandhill, upland pine and upland mixed woodland from bahiagrass pastures is difficult, restoration will proceed as funding and equipment become available. The park has access to a seed collector and a seed drill that can be used to aid in these efforts. A plan will be written for the restoration of abandoned pastures in the north rim. In the meantime, abandoned pastures will be managed with prescribed fire to discourage offsite hardwoods such as laurel oaks and sweetgums from becoming established in former fire-type communities.

Canal/Ditch

Numerous canals and ditches were constructed in the prairie basin to enhance drainage to increase cattle production as detailed in the Hydrology section. Filling of these canals using adjacent spoil material began shortly after state acquisition and continues to be a high priority for restoration of the Paynes Prairie Basin marsh.

Ditching also occurred in upland areas adjacent to the former railroad right-of-way, much of which is now part of the Gainesville-Hawthorne State Trail. Some ditching of isolated wetlands has also occurred in the uplands around the prairie basin, although many of them are not mapped.

Clearcut Pine Plantation

Areas that were formerly in planted pine plantations that were clear cut during the 2001 southern pine beetle outbreak have been mapped as clear-cut pine plantation. Some of these areas were either originally upland pine or upland hardwood forest. However, these plantations were planted on old pastures and lack significant natural community remnants.

Developed

There are many developed areas located within the park, ranging from staff residences to campgrounds, picnic areas and boat ramps. A complete list of all the developed areas may be found in the *Land Use Component*. Development is concentrated on the south side of the park near Micanopy, away from the prairie basin and rim. Limited developed areas are also located on the north rim near the Alachua Sink.

Impoundment/Artificial Pond

Several borrow areas that were used for road construction or other activities are located in the park. The ones located in flatwoods areas typically hold water at times due to the shallow water tables in flatwoods. One of these borrow pits is located within a cultural site known as Paynes Town. Part of the cultural site was damaged during excavation prior to state ownership, but much of the cultural site remains intact. Where feasible, borrow pits should be restored to their natural contours. Cost-effectiveness, return on investment and consideration of other higher priority restoration projects within the park will determine the extent of restoration measures in these borrow areas. Conversely, all of the artificial ponds in the constructed Sweetwater Wetlands Park are intentional and used as water holding and treatment cells.

Pasture—Improved

Although many disturbed areas in the park were once improved pastures, the only pastures currently managed as improved pastures are located at Hickory Ranch. These pastures are used for the maintenance of the park's herd of Florida Cracker cattle and horses.

Pasture—Semi-improved

Semi-improved pastures retain some of the native groundcover species due to an incomplete conversion to improved pasture. Some of the pasture areas on the Crevasse Addition and Edwards Addition were more recently used as pastures. These areas retain significant coverage of native grasses and forbs.

Road

All the paved roads within the park have been designated as roads. In most cases, unimproved service roads and firebreaks are not labeled as roads for the purposes of natural community mapping.

Spoil Area

Spoil areas include deposits of dredge or other spoil material. The dikes associated with the excavated canals on the prairie basin are included in this designation, as are the raised areas that divide the treatment cells in Sweetwater Wetlands Park

Successional Hardwood Forest

In most cases, the areas designated as successional hardwood forests are old fields, pastures or other cleared areas that have become dominated by laurel oaks, sweetgums, water oaks and loblolly pines. The original natural community type may be one of several upland types ranging from sandhill to upland hardwood forest. Restoration of these areas will require a concerted effort to remove offsite hardwood species and replant both canopy and groundcover species. These areas will be prioritized for restoration based on proximity to intact habitat or other restoration projects such as abandoned pasture.

Utility Corridor

Several power line rights-of-ways pass through the park. Where the groundcover vegetation has been significantly altered from the original natural community, these areas are designated as utility corridors. Where the native species have been retained, as in the power line that crosses through the basin marsh, the natural community type has been used rather than the altered landcover type.

Objective A: Maintain 6,800 acres within the optimum fire return interval.

- Action 1 - Complete mechanical fuels management projects on 340 acres of basin to remove shrub swamp and facilitate fire application.
- Action 2 - Complete mechanical fuels management on 270 acres of mesic and wet flatwoods to restore groundcover and facilitate fire application.
- Action 3 - Complete 920 linear feet of low-water crossings to provide equipment access to burn zones without compromising existing upland sheetflow and drainage.

Prescribed Fire Management		
Natural Community	**Acres**	**Optimal Fire Return Interval (Years)**
Basin Marsh	12,878	2-20
Mesic Flatwoods	1,023	2-3
Upland Pine	361	2-3
Baygall	322	25-100
Scrubby Flatwoods	160	3-8
Depression Marsh	137	2-10
Wet Flatwoods	147	2-4
Dome Swamp	42	2-10
Upland Mixed Woodland	30	2-5
Sandhill	11	2-3

Altered Landcover Types		
Abandoned Pasture	283	2-5
Pasture - Semi-improved	120	2-10
Successional Hardwood Forest	238	2-5
Annual Target Acreage*	865-3,260	
*Annual Target Acreage Range is based on the fire return interval assigned to each burn zone. Each burn zone may include multiple natural communities.		

Fire has historically been a significant force in shaping the natural Florida landscape. The fire management program at Paynes Prairie Preserve State Park is intended to restore the natural process of fire to the landscape. Upland communities are normally burned in the lightning season during the late spring and summer. However, natural lightning-caused ignitions may occur in any month of the year. In some cases, areas will be burned during the winter season to reduce fuel loads before switching to lightning season burning. Fuel loads, restoration goals and natural community type will be considered when scheduling prescribed fires.

The wetlands of the prairie basin present a challenge. During normal conditions, the basin marsh vegetation will not burn during the lightning season. It will burn when under drought stress, but managing the fire under such severe conditions is so difficult that it is usually not attempted. As a practical matter, when conditions are suitable for the basin to burn during the lightning season, the conditions are so severe that the Florida Forest Service has justifiably stopped issuing burn permits. For this reason, most prescribed fire in the basin is applied in the winter. More specifically, fires are conducted from the first killing frost, usually some time in December, until the vegetation greens up in the spring, sometime in March. Park staff will continue to investigate methods of safely applying fire to the basin in the lightning season. Fire can of course be used for management goals other than the restoration of natural processes. Fuel reduction, site preparation and other management goals are all legitimate uses of fire. Where woody vegetation that has become established due to reduced water levels, the park uses fire in the basin marsh to control invading hardwoods. This usually requires relatively frequent prescribed fires. Shorter return intervals also help to overcome the reduced effectiveness of winter burning over lightning season burns. Areas of the basin marsh that are deeper and less susceptible to hardwood invasion do not require frequent fire and would normally have a much longer fire return interval.

Burning basin marsh is not at all like upland burning. There are many years when high-water or low-water events have reduced fuels to the point that an area may not carry fire. While every effort is made to burn portions of the basin every year, the number of days with suitable weather conditions that coincide with days when sufficient staff is available is very limited. The burn window is constrained by the usual environmental and landscape variables. Two major highways bisect the basin. Both carry a heavy volume of high-speed traffic in four or six lanes. The entire north side of the basin is occupied by the city of Gainesville, the University of Florida and a large medical and health care complex. Smoke management is a top priority. However, smoke management constraints reduce the burn opportunities

within the basin. Variables such as fire intensity, available fuels, water levels and the ability to conduct a fire in a given year result in a complex mosaic of vegetation on the ecotone between the uplands and the prairie basin. This mosaic is in large part an artifact of the unique constraints of applying prescribed fire to the prairie basin.

Increased emphasis on fire management of the mesic, wet, and scrubby flatwoods communities is intended to increase the number of acres burned in these communities. A substantial number of new and reworked firebreaks have been installed in the past several years to make it easier to apply prescribed fires in these volatile fuel types. In addition, over 755 acres of mechanical treatment has been executed since 2013 in these upland communities in order to increase fire frequency and safety. The highways adjacent to the flatwoods areas make prescribed fires very difficult. To mitigate some of the smoke management hazards, the park has reduced the size of some management zones to limit the number of acres burned on a given day, so that less smoke is produced during prescribed fires.

Most of the other upland fire-adapted natural communities, including sandhill, upland pine and upland mixed woodland, were heavily impacted by agricultural pursuits over the past several hundred years. Most of these areas were converted to improved or semi-improved pastures at some point, and some have gradually succeeded to successional hardwood forests. While all of these areas benefit from prescribed fires, emphasis will be placed on burning those areas with the highest potential for successful restoration. This will primarily be those areas that retain remnant groundcover species.

Several wetland natural community types are influenced by fire in the landscape. These include baygalls, dome swamps and depression marshes. It is important to allow prescribed fires to burn into the edges of these community types to maintain natural ecotones between wetlands and uplands. Care must be taken to avoid burning into wetlands during drought conditions to avoid ground fires burning dry organic deposits long after surface fires are extinguished. Under certain weather and fuel conditions, these wetland types may burn completely through.

The annual targeted burn acreage is between 865 and 3,260 acres per year based on the range of fire return intervals for the natural communities and altered landcover types within the park. These figures are heavily weighted by the wide range of the fire return interval for the basin marsh (2 to 20 years), since the basin marsh includes over 55% of the available fire-type acreage in the park.

Many wildlife species depend on or benefit from natural and prescribed fires. Upland species like gopher tortoises, Florida pine snakes and other wildlife species require fire-maintained habitats. Fire is also an important tool in the management of wetlands, including the basin and depression marshes. Many amphibian species require ephemeral wetlands, such as depression marshes, for breeding sites. Depression marshes are maintained as open herbaceous wetlands by fire. Without periodic fire, they can suffer from hardwood invasion and become inappropriate for certain amphibian species. Likewise, the open herbaceous basin marsh is maintained by periodic fires that act in concert with periodic floods to curtail hardwood invasion. Wildlife species like the sandhill crane, whooping crane, American alligator, Florida water rat and numerous other mammals, reptiles, amphibians and birds benefit from periodic fires in the prairie's basin marsh.

Objective B: Conduct natural community restoration activities on 135 acres.

- Action 1 - Draft a restoration plan for the 190 acres of the north pastures and surroundings.
- Action 2 - Effect a stepwise restoration of upland pine or upland mixed woodland on 50 acres of abandoned pasture.
- Action 3 - Restore 85 acres of successional hardwood forest to appropriate fire-type upland habitat.

A large area of abandoned pasture and successional hardwood hammock on the north rim lays primarily in zones PP805 and PP801. These areas have a clear history of use for cattle grazing after harvest of marketable pines and other resources. The divisions and pastures are clearly visible on the earliest aerial photography from the 1940s.

The 20-acre area with remnant southern red oak and mockernut hickory will need to be surveyed for species native to that community. Invading hardwoods, such as laurel oak, will need to be treated mechanically and/or chemically. Fire will be an important part of the process to determine which, if any, groundcover species are still present. It is highly likely that native groundcover species will need to be planted here along with longleaf pines, and probably additional southern red oak and mockernut hickory.

Maintenance activities will include follow-up spraying of bahiagrass and other exotic grasses, retreatment of invading off-site hardwoods and their sprouts and prescribed fire.

The abandoned pasture will serve as a research site to determine the most effective method for removing exotic pasture grasses. It may take several years of successive herbicide treatments to remove the bahiagrass and other exotic grasses. Once this is accomplished, native groundcover restoration can begin. If the site is determined to be upland mixed woodland, wiregrass would be a minor part of the groundcover restoration. Upland pine areas would contain more of this component. This would complicate groundcover restoration because wiregrass is one of the most readily available species at this time. Groundcover seed will be harvested from other parks with these plant communities in good condition. In addition to groundcover, this site would eventually need planting of longleaf pine, southern red oak, mockernut hickory and possibly some other shrub species.

From U.S. 441 to the primitive camp, 50 acres of biomass hardwood removal has been completed in upland pine, scrubby flatwoods and mesic flatwoods. Another 65 acres is needed to begin restoration of other remnant sections of upland pine, sandhill and upland mixed woodland that currently are classified successional hardwood hammock. A restoration plan has been drafted for this area to guide these activities.

Objective C: Conduct natural community improvement activities on 30 acres.

Some of the scrubby flatwoods community is still overgrown and suffers from lack of fire. Mechanical treatment, including mowing, of this natural community will continue to allow safer use of prescribed fire. Limited planting of longleaf pines may also be included in this improvement project. Maintenance activities would include prescribed fire and supplemental planting of longleaf if needed.

Objective D: Conduct natural community improvement activities on 100 acres.

Timbering activities prior to state acquisition and, more recently, southern pine beetle outbreaks, have caused the loss of the longleaf pine component in many of the mesic and wet flatwoods communities. An increased dominance of native and off-site hardwood species is partly the result of disturbance. This in turn has affected fire behavior. Mechanical and chemical control of hardwoods may be required in some areas. Longleaf pine and wiregrass will be replanted in these communities as necessary. Maintenance activities include the continued use of prescribed fire.

IMPERILED SPECIES

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

Numerous imperiled species occur within park boundaries. The large expanse of the park and the wide range of natural communities support a diverse assemblage of species. The park not only contains widely distributed imperiled plant species such as hooded pitcher plants (*Sarracenia minor*) and brittle maidenhair fern, but also local endemics. The Alachua Sink hammock contains both the silver buckthorn and Godfrey's swamp privet. Although the swamp privet is found in other areas in the state, the silver buckthorn is only known from a handful of sites (Anderson 1997). The population of silver buckthorn on the north rim of Paynes Prairie is by far the largest of any currently known site. The park staff has mapped most of the known individuals using a mapping grade GPS and has developed a GIS coverage to track these individuals. Some individuals, particularly those near the district office, were cultivated from seed collected in the Alachua Sink hammock. Research on the distribution and taxonomic relationship of this species with other buckthorns is ongoing. Godfrey's swamp privet is much less common in the park than the silver buckthorn, but several individuals have been located and mapped. The Alachua Sink hammock is only open to ranger-guided activities to not only protect the numerous sinkholes and limestone outcrops from foot or bicycle traffic, but also to protect the imperiled plant species, including the brittle maidenhair fern. The only known location in the park for Mexican tear-thumb (*Polygonum meisnerianum*) has also been mapped using a GPS. Populations of the hooded pitcher plant have also been mapped in the past for tracking the status of the population. In 2020, Catesby's Lily (*Lilium catesbaei*) was discovered in a flatwoods section of the park near Micanopy. As growing season burns continue, the expanding population of this threatened plant will be documented.

The American alligator (*Alligator mississippiensis*) is the park's most visible imperiled species, and it does not appear to be in any danger of declining within the park. However, during extended droughts the alligator population can become very concentrated within the remaining water bodies. Crowding may cause increased stress on the animals and the low water concentrates fish and other food items, causing the alligators to feed aggressively. In the past, portions of the La Chua Trail have been temporarily closed for visitor safety reasons during these extreme events. Closure of the trail also reduces stress on alligators that normally seek to avoid human interaction. High-water events have also resulted in trail closures. Alligators need to bask to regulate body temperatures, and the last basking areas to submerge during flood events are usually on the La Chua Trail itself, creating conflict with park visitors on the trail. The first portion of the La Chua Trail in the basin was elevated on a boardwalk to reduce conflicts with

wildlife and provide access during high-water events. Elevating additional sections of the trail would further reduce conflict with wildlife and improve visitor access.

Gopher tortoises (*Gopherus polyphemus*) in the uplands of the north rim and south end of the park are also of concern. Staff counted gopher tortoise burrows on the north rim prior to the opening of the Gainesville-Hawthorne State Trail in 1990. A second burrow count and GPS mapping survey was conducted in 2004-05 on the north rim. The south end of the park was censused in 1991 and mapped using GPS in 2007.

In 1990, many of the tortoises were located near the Gainesville-Hawthorne State Trail and along the abandoned railroad berm. In many cases, the burrows are in abandoned pastures on upland pine, sandhill or upland hardwood forest soils. Poaching of gopher tortoises along the trail outside the park boundary has been documented several times in the past. Domestic dogs ranging free along the trail are also likely to predate gopher tortoises. Recreational use of the Gainesville-Hawthorne State Trail may also have an impact on the gopher tortoises adjacent to the trail. Between 1990 and 2005, there was a decrease in the number of burrows outside the park along the Gainesville-Hawthorne State Trail, perhaps due to poaching. There was also an apparent movement of burrows away from the Gainesville-Hawthorne State Trail within the park. It is likely that the increased recreational use of the trail caused the tortoises to move away from the trail. Additional recontouring and restoration of the abandoned railroad berm has the potential to impact tortoises that have burrowed into the berm. In most cases, the berm passes through upland hardwood forest or mesic hammock and the gopher tortoises have opportunistically colonized the open corridor through the Alachua Sink hammock. Restoration of upland pine and sandhills within the north rim pastures will likely benefit gopher tortoises in those areas.

Tortoise populations also apparently declined in the south end of the park between 1991 and 2007. Habitat quality has likely declined due to lack of adequate fire and southern pine beetle outbreaks. Many of the areas that support tortoises were improved pasture prior to state acquisition and have gradually become less suitable for tortoises (Snyder 2007).

According to the FWC Gopher Tortoise Survey Prioritization Blueprint for State Conservation Lands, Paynes Prairie is listed as a Prioritization Tier 1 for a Line Transect Distance Sampling survey (FWC 2018). Hopefully an LTDS survey can be conducted in the park in cooperation with FWC. Staff will continue to refer to the FWC Gopher Tortoise Management Plan (FWC 2012) to guide management of this imperiled species.

Sporadic sightings and roadkill of Florida pine snakes (*Pituophis melanoleucus mugitus*) have occurred in the north rim area of the park. Despite the relatively poor condition of the fire-adapted upland natural communities on the north rim, pocket gophers (*Geomys pinetis*) are abundant in the former pastures. Pocket gophers are a primary food source for pine snakes, and their burrow systems provide subterranean shelter for pine snakes. The greatest threat to pine snakes is mortality on roadways within and adjacent to the park. Although no sightings of eastern indigo snakes (*Drymarchon couperi*) have occurred within the park for decades, road mortality is a well-documented threat to that species as well.

The park also provides critical habitat for many imperiled bird species. Paynes Prairie is well known as a wintering ground for greater sandhill cranes (*Antigone canadensis tabida*), but it also provides important breeding and wintering habitat for resident Florida sandhill cranes (*Antigone canadensis pratensis*). In the past decade, sightings of migratory and resident whooping cranes (*Grus americana*) have become routine within the park, particularly during the winter when the migratory sandhill cranes are present. In

the spring of 2010, a pair of non-migratory whooping cranes nested within the prairie basin and hatched two chicks. Unfortunately, the chicks did not survive the perils of the prairie basin. Park staff routinely cooperates with the USFWS and the International Crane Foundation concerning the migratory whooping cranes, and with FWC concerning the resident whooping cranes. Aerial surveys and radio telemetry are used by these agencies to track the whooping cranes within the park and in surrounding areas.

Water levels greatly influence habitat use by sandhill and whooping cranes. While drying areas of the marsh and wet prairie provide feeding habitat, areas of standing water are important for overnight roosting sites and for nest sites. Fluctuations in water levels on the basin also greatly affect other wading bird species. During periods of rapidly lowering water levels, the prairie basin attracts foraging wading birds from the surrounding region. During the fall of 1999, over 650 wood storks (*Mycteria americana*) were documented foraging in Alachua Lake along with large numbers of other birds many of which were also imperiled species. High water levels have been beneficial to other birds such as limpkins and snail kites (*Rostrhamus sociabilis plumbeus*) present in the park in large numbers following the high-water period that began in 2017. Several species of imperiled wading birds routinely nest within the park. Management of the prairie basin emphasizes restoration of natural hydrological fluctuations. Populations of wood storks and other wading birds are often very dynamic in space and time and depend upon hydrological changes rather than hydrological constants.

Large feeding or breeding aggregations of wading birds often attract the attention of park visitors. To minimize the impacts of human disturbance, certain recreational trails or specific areas within the park may be temporarily closed to the public to protect imperiled species. This can be particularly important during the establishment of nesting rookeries that are prone to abandonment if disturbed during the early phases of nesting.

Several pairs of bald eagles (*Haliaeetus leucocephalus*) nest near or within the park with many other transient birds passing through. While the staff usually monitors bald eagle nests within the park, this species has been delisted and is no longer considered an imperiled species in Florida. Several imperiled bird species, including the magnificent frigatebird (*Fregata magnificens*), northern crested caracara (*Caracara plancus cheriway*) and the tern species (*Sterna* spp.) were recorded as single individuals or accidentals and do not represent resident or even seasonal populations.

Previously a rare sight at the preserve, the snail kite was recorded nesting at Paynes Prairie Preserve State Park in June 2018. This was the first recorded nesting for this species on site since 1919 (Fletcher et al. 2020). In the period from 2018-22, related surveys and Christmas Bird Counts documented up to 340 individuals and up to 74 active nests (Fletcher et al. 2022) in a single season. It is thought that the combination of the rising water in the basin combined with aggressive shrub and tree control in the marsh from 2012-17 made habitat structure for this species relatively ideal. Since 2018, the population and distribution of the bird in the basin has been determined largely by water levels. Most of the documented nests in the park are found in Carolina willow (*Salix caroliniana*) in standing water. This highly specialized predator feeds on native and invasive apple snails (Cattau et al. 2018). The high-water event triggered by Hurricane Irma in 2017 resulted in a dramatic expansion of the exotic apple snail population on the Prairie basin. Birds banded or fitted with GPS trackers at Paynes Prairie have been documented as far away as Lake Okeechobee (Fletcher 2022, Meyer and Kent 2020).

Organized bird counts that occur within the park boundaries include the Audubon Christmas Bird Count and the North American Migration Count. Numerous birdwatchers frequent the park and assist staff in monitoring avian species, particularly imperiled or accidental species. The Christmas Bird Count provides

an annual count of birds by species within the park that can be compared between years to track population trends.

Several rare species of mammals occur within the park, although significantly more occurred historically. Southern fox squirrels (*Sciurus niger niger*) and black bear (*Ursus americanus floridanus*) have been sighted sporadically on the south side of the park in the mesic flatwoods and near Hickory Ranch. Species that occurred in the park in historical times include the Florida panther (*Felis concolor coryi*) and red wolf (*Canis rufus*). Although panther or cougar sightings have been reported in the Prairie Creek area, none have been confirmed.

The round-tailed muskrat (*Neofiber alleni*) is a "species of greatest conservation need" (FWC 2011) that occurs in the basin marshes of Paynes Prairie. Staff will continue to cooperate with the FWC to monitor round-tailed muskrats.

Management of imperiled animal species will be guided by Florida's Imperiled Species Management Plan (FWC 2016), and the appropriate Species Action Plans and Species Conservation Measures and Permitting Guidelines.

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

Imperiled Species Inventory						
Common and *Scientific* Name	**Imperiled Species Status**				**Management Actions**	**Monitoring Level**
	FWC	**USFWS**	**FDACS**	**FNAI**		
PLANTS						
Brittle maidenhair *Adiantum tenerum*			LE	G5,S3	9,10	Tier 1
Southern lady fern *Athyrium filix-femina* var. *asplenioides*			LT		9,10	Tier 1
Godfrey's swampprivet *Forestiera godfreyi*			LE	G2,S2	2,10	Tier 2
Angle pod *Gonolobus suberosus*			LT		2,10	Tier 1

Imperiled Species Inventory						
Common and *Scientific* Name	**Imperiled Species Status**				**Management Actions**	**Monitoring Level**
	FWC	**USFWS**	**FDACS**	**FNAI**		
Catesby's lily *Lilium catesbaei*			LT		1,7	Tier 2
Florida spiny pod *Matelea floridana*			LE	G2,S2	1,10	Tier 1
Blueflower butterwort *Pinguicula caerulea*			LT		1,4, 10	Tier 1
Yellow butterwort *Pinguicula lutea*			LT		1,4, 10	Tier 1
Mexican tearthumb *Polygonum (Persicaria) meisnerianum*			LE	G5?T5? S1	4	Tier 2
Hooded pitcherplant *Sarracenia minor*			LT		1,4, 6,10	Tier 2
Silver buckthorn *Sideroxylon alachuense*			LE	G1,S1	2,3, 10	Tier 3
Little ladiestresses *Spiranthes tuberosa*			LT		1,6	Tier 1
INVERTEBRATES						
Dion skipper *Euphyes dion*				G5, S2S3	10,13	Tier 2
Scalloped sooty wing *Staphylus hayhurstii*				G5,S2	10,13	Tier 2
AMPHIBIANS						
Holbrook's southern dusky salamander *Desomognathus auriculatus*				G3,S1	4	Tier 2
REPTILES						
American alligator *Alligator mississippiensis*	FT(S/A)	FT(S/A)		G5,S4	4,10, 13	Tier 1
Eastern indigo snake *Drymarchon couperi*	FT	LT		G3,S2?	1,6,7	Tier 1
Gopher tortoise *Gopherus polyphemus*	ST			G3,S3	1,6,7,10,12, 13	Tier 3
Florida pine snake *Pituophis melanoleucus mugitus*	ST	UR		G4,S3	1,6,7	Tier 1

Imperiled Species Inventory						
Common and *Scientific* Name	**Imperiled Species Status**				**Management Actions**	**Monitoring Level**
	FWC	**USFWS**	**FDACS**	**FNAI**		
BIRDS						
Florida sandhill crane *Antigone canadensis pratensis*	ST			G5T2,S2	1,4,6,10,13	Tier 2
Short-tailed hawk *Buteo brachyurus*				G4G5, S1		Tier 2
Northern crested caracara *Caracara plancus cheriway*	FT	LT		G5,S2	1	Tier 2
Little blue heron *Egretta caerulea*	ST			G5,S4	4	Tier 2
Reddish egret *Egretta rufescens*	ST			G4,S2	4	Tier 2
Tricolored heron *Egretta tricolor*	ST			G5,S4	4	Tier 2
Swallow-tailed kite *Elanoides forficatus*				G5,S2	1	Tier 2
White-tailed kite *Elanus leucurus*				G5,S1	1	Tier 2
Merlin *Falco columbarius*				G5,S2		Tier 2
Peregrine falcon *Falco peregrinus*				G4,S2		Tier 2
Southeastern American kestrel *Falco sparverius paulus*	ST			G5T4, S3	1,5	Tier 2
Magnificent frigatebird *Fregata magnificens*				G5,S1		Tier 2
Whooping crane *Grus americana*	FXN	XN		G1, SNR	1,3,4,6,10, 13	Tier 3
Black rail *Laterallus jamaicensis*	FT	LT		G3,S2	1,4	Tier 2
Caspian tern *Hydroprogne caspia*				G5,S2	4	Tier 2
Wood stork *Mycteria americana*	FT	LT		G4,S2	4	Tier 2
Sooty tern *Onychoprion fuscatus*				G5,S1	4	Tier 2

Imperiled Species Inventory						
Common and *Scientific* Name	**Imperiled Species Status**				**Management Actions**	**Monitoring Level**
	FWC	**USFWS**	**FDACS**	**FNAI**		
Roseate spoonbill *Platalea ajaja*	ST			G5,S2	4	Tier 2
American avocet *Recurvirostra americana*				G5,S2	4	Tier 2
Snail kite *Rostrhamus sociabilis plumbeus*	FE	LE		G4G5,S2	4	Tier 2
Least tern *Sterna antillarum*	ST			G4,S3	4	Tier 2

Management Actions:

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

Monitoring Level:

Tier 1: Non-Targeted Observation/Documentation: includes documentation of species presence through casual/passive observation during routine park activities (i.e. not conducting species-specific searches). Documentation may be in the form of *Wildlife Observation Forms*, or other district specific methods used to communicate observations.
Tier 2: Targeted Presence/Absence: includes monitoring methods/activities that are specifically intended to document presence/absence of a particular species or suite of species.
Tier 3: Population Estimate/Index: an approximation of the true population size or population index based on a widely accepted method of sampling.
Tier 4: Population Census: A complete count of an entire population with demographic analysis, including mortality, reproduction, emigration, and immigration.
Tier 5: Other: may include habitat assessments for a particular species or suite of species or any other specific methods used as indicators to gather information about a particular species.

Objective A: Update baseline imperiled species occurrence list.

Paynes Prairie Preserve State Park, by virtue of its location near the University of Florida, has received a great deal of scientific attention since it was acquired by the state. As a result, the park has lengthy species occurrence lists, and many imperiled species have been documented and studied within the park. Staff will continue to document imperiled species and will work with researchers to expand the park's species lists.

Objective B: Monitor and document 4 selected imperiled animal species.

Gopher Tortoise

The majority of the gopher tortoise burrows were located and mapped in 1990-91 in appropriate habitats within the park. These areas were censused between 2004 and 2007 using a GPS, and a decline in the number of burrows was noted. Previous burrow counts relied on a complete census count using transects guided by GPS. Future surveys should be conducted using Line Transect Distance Sampling techniques (Smith et al 2009). As upland natural community restoration and improvement projects proceed, it will be increasingly important to track gopher tortoise numbers.

Whooping Crane

Both resident and migratory whooping cranes occur frequently at Paynes Prairie. Staff will continue to document sightings of whooping cranes, and will continue to coordinate with FWC, USFWS and International Crane Foundation monitoring programs.

Snail Kite

DRP staff will continue to cooperate with researchers from the Florida Cooperative Fish and Wildlife unit at the University of Florida. These snail kite surveys are providing a complete account of this bird and responses to habitat conditions. This will facilitate future decisions on basin marsh management at the park.

Other Imperiled Bird Species

Paynes Prairie serves as the focal point for the annual Audubon Christmas Bird Count in Gainesville. The Gainesville Christmas Bird Count has been held for over 50 years and provides data on long-term population trends. Many of the imperiled bird species are documented and censused on an annual basis during the Christmas Bird Count. DRP staff serve as team leaders for those sections of the count that lie within the park boundary.

Objective C: Monitor and document five selected imperiled plant species.

Silver Buckthorn

The population of silver buckthorn located on the north rim of Paynes Prairie will continue to be monitored. A nearly complete census of known individuals was conducted using GPS technology. The population will continue to be tracked and data will be maintained in the DRP GIS system.

Godfrey's Swamp Privet

All known individuals of Godfrey's swamp privet have also been mapped and will continue to be tracked using GPS and GIS technology.

Hooded Pitcher Plant

As restoration of the mesic and wet flatwoods proceeds at the south end of the park, it will be important to track the population of hooded pitcher plants. Most of the known populations have been mapped using GPS. As the habitats are opened with prescribed fires, it is hoped that additional populations will become apparent. Surveys will be conducted as necessary using GPS and GIS technology.

Mexican Tear-thumb

The Mexican tear-thumb within the park will continue to be monitored periodically. Previously recorded GPS locations will be revisited and additional sites will be investigated.

Catesby's Lily

The lilies within the park will continue to be monitored periodically. Previously recorded GPS locations will be revisited and additional sites will be investigated, especially in the summer following a prescribed fire.

INVASIVE SPECIES

Paynes Prairie is a complex and diverse system of uplands and freshwater wetlands. Most of the wetland areas are contained in a 16,050-acre karst polje that dominates the center of the property. Elevations from 45 feet to 151 feet ASL contribute to the bowl-like structure of the park with the upland rim containing a variety of communities including mesic hammock, sinkhole formations, upland pine, sandhill, pasture and mesic to wet flatwoods.

Over 315 acres of this upland area have been converted by past human use and are now classified as Abandoned Pasture, containing the predictable mix of invasive turfgrasses (mostly bahiagrass (*Paspalum notatum*) and centipede grass (*Eremochloa ophiuroides*) and remnant native species that often become weedy. Indeed, the effects of over 5,000 years of human occupation and use are evident in 140 known cultural resource sites, old homestead areas and pastures. Predictably, exotic plant coverage is highly variable according to this history, community structure and hydrology. A constant source of propagules comes from Gainesville's urbanized residential areas to the north or from agricultural, utility and roads/right-of-way features around the rest of the park.

Slopes featuring primarily mesic hammock, some with sinkhole features, surround the central basin marsh. These shady areas, as well as upland pine and mixed woodland that is not in target condition (hardwood invaded), host a significant infestation of coral ardisia (*Ardisia crenata*). This species is the primary target of upland plant control at Paynes Prairie. Some significant areas around the La Chua trailhead to the north and to a lesser extent at Bolen Bluff Trail have been invaded by creeping spiderwort (*Tradescantia fluminensis*). These areas total some 220 acres at up to 95% ground coverage. These populations are competing with two imperiled plants, silver buckthorn (*Sideroxylon alachuense*) and brittle maidenhair fern (*Adiantum tenerum*) that are range restricted to the karst sinkhole and limestone outcrop areas in the zones around the La Chua Trail and the District 2 office. Other disturbed upland areas have a variety of invasive plants at relatively low density, including Caesar weed (*Urena lobata*), tropical soda apple (*Solanum viarum*), cogon grass (*Imperata cylindrica*) and natal grass (*Melinis repens*).

In the transition areas from upland to basin is a band that is in continuous flux between wet and dry conditions. This basin has a long history of Chinese tallow (*Sapium sebiferum*) tree infestation and control measures. At one time, over 1,795 acres of tallow infestation was present in the park, but that number has come down significantly with several aerial treatment projects and years of ground application by the Florida Conservation Corps (FLCC) and contract efforts. The final key to control was the high-water event during 2017-18, punctuated by Hurricane Irma. The available habitat vulnerable to invasion by tallow has been reduced by over 4,000 acres due to the high-water conditions of the basin marsh. Resurveying and treating these zones as they dry out will be key to long-term control of Chinese tallow here. Another unwelcome guest in the basin edge, especially in zone 1301 behind Hickory Ranch,

is Caesarweed. The combination of ideal growing conditions, high seed production and constant disturbance from horses and bison makes this a strong population covering over 70 acres.

The prairie basin experienced a series of events starting in 2015 with the completion of Sweetwater Wetlands Park (SWP), a water quality improvement project now managed by the city of Gainesville. While successful in treating much of the nutrients and pollutants coming out of the city onto the basin, several invasive plants continue to infest zones 9, 10 and 11 along the eastern side of the U.S. 441 corridor. Invasive plants contained within the boundaries of SWP are managed by city park staff. A recent survey of 11,500 acres in the prairie basin was conducted jointly by FWC aquatics experts and FNAI. The results show Cuban bulrush (*Cyperus blepharoleptos*), water-hyacinth (*Eichhornia crassipes*), Peruvian primrose-willow (*Ludwigia peruviana*) and water lettuce (*Pistia stratiotes*) covered several hundred acres east of I-75. Cuban bulrush is a larger problem west of U.S. 441 and is the dominant cover in many areas outside of the deep-water lotus fields. Bulrush is the greatest worry because it has the ability to inhibit foraging of the endangered snail kites (*Rostrhamus sociabilis*) that are nesting on the basin (FNAI 2020). Water lettuce is a lesser issue since there are few navigation concerns on the basin, and there is currently a disagreement over how native this plant is to North America. Wild taro (*Colocasia esculenta*), another invasive species of increasing concern, is most common in the part of the basin influenced by Boulware Spring Run. A treatment plan prioritizing the most ecosystem damaging aquatic plants will be developed for the park.

Several other invasive species that are not yet widespread but increasing in number are cause for concern. These include skunkvine (*Paederia foetida*) and catclawvine (*Macfadyena unguis-cati*) in the hammocks, small-leaf spiderwort in the sinkholes and Japanese climbing fern (*Lygodium japonicum*) along the hammock-basin marsh interface. There are also some scattered remnants of cogongrass (*Imperata cylindrica*) in the park, primarily on the north rim near the La Chua Trail, the site of a former large cogongrass infestation.

The good news at Paynes Prairie is that many of the most intact plant communities, such as flatwoods, baygalls and depression marshes are virtually free of invasive plants. The invasive plant infestations only cover a little over 3,600 acres of the 21,654-acre park total. In fact, almost 2,100 acres of previously infested zones have been treated over several years and are now considered to be in maintenance condition with under 5% exotic coverage and little spread. In order to treat the remaining plant populations at least once every three years (the minimum to eliminate seeding for major invaders such as tallow tree and ardisia) park staff would need to ensure treatment of at least 1,200 gross acres per year. This is far above what the prairie has typically been able to accomplish with available resources. In lieu of this, a sectional progression approach has been implemented to treat major populations of invasive upland plants, with an annual goal of treating 600-800 acres of upland plant infestations. Some species, such as spiderwort, cogongrass, Caesarweed and natalgrass will be treated more than once per year depending on the ecology of the plant and time to reproduction. This has been effective in reducing some sections to maintenance condition even for these very prolific plants.

The challenge is that the infested acres are spread over large areas of the park, and some are difficult to access in the basin. To prevent the spread of these plants, park staff decontaminate watercraft and other vehicles that enter infested areas (including the Marshmaster) as well as use education and outreach efforts for the public and park neighbors. Plant surveys are up to date except for a very few zones, and the database and methodologies are constantly improving to get a more accurate picture of the coverage and distribution of unwanted plants on the prairie.

Invasive animal species include non-native wildlife species, free-ranging domesticated pets or livestock, and feral animals. Although the invasive animal list for the park is much less extensive than the invasive

plant list, the park does have several terrestrial or aquatic invasive animals that are of concern. The terrestrial species include the brown anole (*Anolis sagrei*), greenhouse frog (*Eleutherodactylus planirostris*), Mediterranean gecko (*Hemidactylus turcicus*), nine-banded armadillo (*Dasypus novemcinctus*), capybara (*Hydrochoerus hydrochaeris*), feral hog (*Sus scrofa*), and the occasional feral cat or dog. Invasive fish species include an armored catfish known as the brown hoplo (*Hoplosternum littorale*) and tilapia (*Tilapia aureus*).

The non-native island apple snail (*Pomacea maculata*) now infests an estimated 29 drainages in Florida, including Paynes Prairie Preserve State Park. Early records on upstream water bodies such as Newnans Lake date from as early as 2008, and in Sweetwater Wetlands Park in 2014 (FDACS). It was originally thought to be the similar channel apple snail, but genetic study has correctly identified the species now inhabiting gulf coast states (Hayes et al. 2012). The most important differences from the native Florida apple snail (*Pomacea paludosa*) are the larger size (up to 16.5-centimeter diameter shell) and primary herbivory on aquatic vascular plants, instead of the macrophytes and algae consumed by the native species. Egg masses of the island apple snail are also pink in color instead of white (FWC 2006). This species competes with the native apple snail but is also consumed by limpkins and snail kites in the basin marsh. Further study of the impacts of this species on the wetland habitats here, as well as the adaptation of native predators, are needed before any further management actions are warranted.

Unfortunately, feral hogs are now numerous in Paynes Prairie Preserve and are found in many areas, but especially in hammocks and basin edges that are not chronically inundated. High-water conditions since the 2017 precipitation events have pushed feral hogs further to the perimeter of the park, facilitating easier access and removal of these damaging invasive animals. The park has an active program of feral hog removal. Beginning in 2018, a system was devised to divide the park into sections with trapping efforts split between the U.S. Department of Agriculture, private contractors, and park staff. This system, along with the increased use of smart traps with cell cameras, has significantly increased the removal rate of feral hogs. More than 1,500 feral hogs were removed from the park from fiscal year 2018-22, representing a 140% increase over the previous five years.

Very few capybaras have been observed within the park, and none in recent years. However, there was a reproducing population documented in northern Alachua County along the upper Santa Fe River, so the park needs to be prepared to control this species if individuals are observed again. Feral dogs and cats can sometimes be problematic in the park since there is a continuous influx of these animals from surrounding urban areas. Feral and stray dogs and cats in the park are trapped and transferred to Alachua County Animal Services. Park staff sometimes removes armadillos, which may cause extensive ground disturbance and are a threat to ground nesting birds, small reptiles and amphibians, and cultural resources.

The Mediterranean gecko has an established breeding population at the District 2 administrative office near the Alachua Sink. This species rarely leaves the vicinity of human habitation (Wilson and Porras 1983), and it is not actively removed since it appears to pose little threat to surrounding natural areas. The brown anole is established at the District office and the ranger station in Micanopy. Both invasive lizards probably arrived at these sites by hitching rides on automobiles since substantial populations occur throughout urban areas of Alachua County. Brown anoles, which compete with native green anoles, are removed when encountered.

Coyotes are considered naturalized in Florida and are common in north-central Florida including the park. Currently, there are no control measures in place for them. With the extirpation of the native red wolf in the southeast, the coyote may be filling a portion of the species niche.

One of the two exotic fish species, the brown hoplo, was impacted by an extended period of freezing weather during the winter of 2009-2010. At least 100 dead brown hoplo were recovered from the Main Canal after the prolonged hard freeze. Additional specimens were found after freezes in the winter of 2010-11, so it is expected that the species can survive and repopulate after severe cold events.

Relatively few native species can be classified as nuisance species at Paynes Prairie. The American alligator, however, is of particular concern within the park. Conflicts between alligators and recreational users of the park have increased over the years as park visitation has increased and the alligator populations have rebounded.

Paynes Prairie is graced with a large and apparently healthy population of alligators. Unlike many other prairie or lake systems in the area, alligators are not methodically harvested from Paynes Prairie. To some degree, they are also provided more protection from removal under the FWC nuisance alligator program. As a result, the alligator population in the park may resemble a more natural population in terms of age structure and sex ratios than harvested populations.

Alligators are a management issue primarily in three locations: U.S. 441, Lake Wauberg and the La Chua Trail. At two sites on the park boundary, along the U.S. 441 right-of-way and at Lake Wauberg, larger alligators have been illegally poached or have been removed by FWC under the nuisance alligator program. U.S. 441 is a popular location to stop and observe wildlife, either along the road shoulder or at the observation platform. Lake Wauberg is partly managed by the University of Florida as a recreational area. Some of the removed animals were likely fed by recreational users and eventually were perceived as a threat. Park staff routinely provides interpretive programs on alligators and posts warning and interpretive signs to educate the public about the ramifications of feeding alligators. Due to public safety concerns, the removal of nuisance alligators by FWC will likely continue. Public education and increased public tolerance of large alligators may help reduce the number of complaints.

The La Chua Trail is wholly contained within the park boundary and is a very popular area for wildlife observation. Alligators are quite numerous along the trail during certain seasons and during low water events. In the past, frequent interactions between basking or nesting alligators along the trail required a great deal of mitigation by park staff or FWC personnel and law enforcement. Since the majority of this trail is currently closed due to high water conditions, the public is restricted to the raised boardwalk section, greatly reducing negative interactions with alligators and other wildlife. The long-term plan is to extend the boardwalk to allow more viewing and continue to protect both wildlife and the park visitors.

Several plant species may also be classified as nuisance species in certain situations. In fire-adapted upland communities, species such as laurel and water oaks, sweetgum and black cherry invade during periods of fire exclusion. Once established, these offsite hardwoods can further alter the natural fire regime by changing the fuel characteristics of the area through shading of herbaceous species and creating less combustible leaf litter. Restoration of natural communities such as upland pine forest, sandhills and mesic flatwoods often necessitates mechanical or chemical treatment of invasive hardwoods to restore a more natural fire regime.

Similar problems are seen in herbaceous wetland communities such as basin and depression marshes. These open wetlands are naturally maintained through a combination of fire and flooding to prevent hardwood invasion and succession to a forested wetland. Coastal plain willow, buttonbush, red maple and sweetgum have heavily invaded many of the depression marshes within the park. These same species, along with persimmon, wax myrtle and saltbush, are also constantly encroaching upon the basin marshes of the prairie basin. Prescribed burning and herbicides are the primary control measures.

Invasive Plants			
Species Name **Scientific Name - Common Name**	**FLEPPC Category**	**Distribution**	**Zone ID**
Albizia julibrissin - Mimosa	I	Single Plant or Clump	PP-1601
Ardisia crenata - Coral ardisia	I	Single Plant or Clump Scattered Plants or Clumps Scattered Dense Patches Dense Monoculture	PP-201, PP-26, PP-31, PP-11, PP-1101, PP-1102, PP-1103, PP-1104, PP-1105, PP-1306, PP-1307, PP-1308, PP-1309, PP-1311, PP-1312, PP-1402, PP-1602, PP-1701, PP-18, PP-2, PP-202, PP-32, PP-33, PP-34, PP-37, PP-39, PP-801, PP-802, PP-804, PP-805, PP-807, PP-101, PP-1201, PP-1603, PP-1701, PP-35, PP-36, PP-601, PP-801, PP-9, PP-901, PP-1202, PP-1302, PP-806
Aristolochia littoralis - Calico flower	II	Single Plant or Clump	PP-802
Begonia cucullata - Wax begonia	II	Scattered Plants or Clumps Scattered Dense Patches Linearly Scattered	PP-11, PP-1312, PP-4
Cinnamomum camphora - Camphor-tree	I	Scattered Plants or Clumps, Scattered Dense Patches	PP-101, PP-11, PP-1101, PP-1103, PP-1104, PP-1105, PP-1202, PP-1305, PP-1308, PP-1309, PP-1312, PP-202, PP-31, PP-35, PP-42, PP-601, PP-802
Colocasia esculenta - Wild taro	I	Scattered Plants or Clumps Scattered Dense Patches	PP-803, PP-1102, PP-1104, PP-1312
Dioscorea bulbifera - Air-potato	I	Single Plant or Clump Scattered Plants or Clumps Scattered Dense Patches	PP-802, PP-1104, PP-1105, PP-1308, PP-1309, PP-801
Eichhornia crassipes - Water-hyacinth	I	Scattered Plants or Clumps Scattered Dense Patches	PP-29, PP-3, PP-10, PP-11, PP-12, PP-7, PP-8, PP-803
Hydrilla verticillata - Hydrilla	I	Scattered Plants or Clumps	PP-29

Invasive Plants			
Species Name Scientific Name - Common Name	**FLEPPC Category**	**Distribution**	**Zone ID**
Imperata cylindrica - Cogon grass	I	Single Plant or Clump Scattered Plants or Clumps Scattered Dense Patches	PP-1103, PP-1308, PP-1601, PP-202, PP-1105, PP-42, PP-807 PP-1101, PP-1201
Lantana camara - Lantana	I	Scattered Plants or Clumps Scattered Dense Patches	PP-1307, PP-1309
Ligustrum lucidum - Glossy privet	I	Scattered Plants or Clumps	PP-1104, PP-802
Ligustrum sinense - Chinese privet	I	Scattered Plants or Clumps	PP-601
Ludwigia peruviana - Peruvian primrosewillow	I	Scattered Plants or Clumps Linearly Scattered	PP-1, PP-10, PP-11, PP-13, PP-6, PP-8, PP-3, PP-4
Lygodium japonicum - Japanese climbing fern	I	Single Plant or Clump Scattered Plants or Clumps Scattered Dense Patches Linearly Scattered	PP-3, PP-1308, PP-1312, PP-42, PP-601, PP-802, PP-801, PP-2
Macfadyena unguis-cati - Cat's claw vine	I	Single Plant Scattered Plants or Clumps Scattered Dense Patches or Clump	PP-26, PP-804, PP-9, PP-31, PP-601, PP-901
Melia azedarach - Chinaberry	II	Scattered Plants or Clumps	PP-3, PP-301, PP-42
Melinis repens - Natal grass	I	Scattered Dense Patches	PP-1103
Nandina domestica - Nandina	I	Scattered Plants or Clumps	PP-1101, PP-31, PP-802
Nephrolepis cordifolia - Tuberous sword fern	I	Scattered Plants or Clumps	PP-31, PP-806
Paederia foetida - Skunk vine	I	Scattered Plants or Clumps	PP-1101, PP-1312
Panicum repens - Torpedo grass	I	Scattered Dense Patches	PP-1310, PP-1312, PP-1501, PP-1602
Pistia stratiotes - Water-lettuce	I	Scattered Plants or Clumps Dominant Cover	PP-29, PP-803
Pteris vittata - Chinese brake fern	II	Scattered Plants or Clumps	PP-1602
Pueraria montana - Kudzu	I	Scattered Dense Patches	PP-1105
Ruellia simplex - Mexican petunia	I	Scattered Plants or Clumps	PP-1104

Invasive Plants			
Species Name Scientific Name - Common Name	**FLEPPC Category**	**Distribution**	**Zone ID**
Sapium sebiferum - Chinese tallow tree	I	Single Plant or Clump Scattered Plants or Clumps Scattered Dense Patches Dense Monoculture	PP-1103, PP-1303, PP-1307, PP-1311, PP-1702, PP-38, PP-1, PP-10, PP-1001, PP-101, PP-11, PP-1105, PP-12, PP-1202, PP-1301, PP-1305, PP-1308, PP-2, PP-201, PP-26, PP-3, PP-301, PP-40, PP-42, PP-5, PP-601, PP-7, PP-802, PP-804, PP-9, PP-901, PP-1201, PP-1312, PP-26, PP-4, PP-801
Sesbania punicea - Purple sesban	II	Scattered Plants or Clumps	PP-1101, PP-802
Solanum viarum - Tropical soda apple	I	Single Plant or Clump Scattered Plants or Clumps	PP-201, PP-26, PP-802, PP-1101, PP-1307, PP-1312, PP-2, PP-3, PP-301, PP-31, PP-4
Sphagneticola trilobata - Wedelia	II	Single Plant or Clump	PP-1701
Syngonium podophyllum - Arrowhead vine	I	Scattered Plants or Clumps	PP-1307
Tradescantia fluminensis - Small-leaf spiderwort	I	Scattered Plants or Clumps Scattered Dense Patches Dominant Cover	PP-1104, PP-1307, PP-1312, PP-601, PP-802, PP-806
Urena lobata - Caesar's weed	I	Scattered Plants or Clumps Scattered Dense Patches Dominant Cover Linearly Scattered	PP-11, PP-1311, PP-3, PP-802, PP-1101, PP-1301, PP-201, PP-202 PP-1202, PP-1301 PP-9
Wisteria sinensis - Chinese wisteria	II	Scattered Plants or Clumps	PP-802
Xanthosoma sagittifolium - Elephant ear	II	Single Plant or Clump Scattered Plants or Clumps Scattered Dense Patches	PP-802, PP-1104, PP-31, PP-803, PP-1312

Objective A: Annually treat 600 acres of invasive plant species.

The park will continue to implement its annual treatment plan for the basin and upland areas. That plan will clearly address treatment needs, both in the prairie basin and in the uplands, and set annual

treatment goals for each area. In addition, the park will refine the treatment plan to address the need to retreat areas with sufficient frequency to keep the most aggressive invasives from reproducing.

It is estimated that the park will need to treat about 1,200 acres of exotic plants per year in order to prevent the primary invasive species from reproducing. The park currently does not have the resources to achieve that level of treatment. However, certain actions can help make that goal more attainable. For treatment and retreatment cycles in the prairie basin, the park should focus on treating the drier areas of the basin marsh more frequently than the wetter portions. The park should also use prescribed fire more frequently to enhance traditional invasive plant treatments, particularly in the basin. This might mean burning a zone prior to or the year following an exotics treatment. The park should apply for grant funding, such as FWC weed management grants, on an annual basis.

There is a real need for research to find effective bio-control methods for many of the invasive plants in Florida. One invasive found at Paynes Prairie Preserve, the small-leaf spiderwort, is spreading throughout the sinkholes on the north rim of the prairie basin. Research is needed to find bio-control and chemical treatment methods that can effectively control the spiderwort but not harm the ferns and other native species coexisting in the sinkholes. Two other species that are relatively new occurrences at the park and need research on effective control methods are skunkvine and catclawvine. Other species at the park that would benefit from research on bio-control methods are Chinese tallowtree, Japanese climbing fern, wild taro, cogongrass, and coral ardisia.

Objective B: Survey 4800 acres of Paynes Prairie for invasive plant populations annually.

In order to guide and develop future invasive control efforts, the park must continue to update surveys in the park. In addition to general surveys, specific surveys will be conducted to facilitate and evaluate contract plant control projects on site.

To prevent new invasive plant populations from expanding, the park should survey for and map new invasive plants in every zone within the park at least twice within the next 10 years. It is important to know what invasive species are present within the park, where they are located and how severe their infestations are. It is also very important to know what zones or communities are currently free of invasives so that the park can keep those areas free of invasives. This is particularly true for high quality or ecologically important habitats. By regularly surveying these invasive free zones, staff can discover new infestations at an early stage and eliminate them before they increase significantly in size. Areas that serve as sources of particularly aggressive species, or of species that can dramatically change ecosystem function, may need to be scouted more frequently.

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

Finding new populations of invasive plants before they become established will help prevent larger infestations from happening. The focus should be on FISC Category I and II species, while at the same time keeping a watch out for new species that exhibit aggressive tendencies.

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

their equipment before entering the park. The further spread of invasives already established in the park may be avoided by making sure that staff and contractors do not move equipment from a contaminated area to an area free of invasives within the park without cleaning their equipment first.

Objective B: Continue control measures on three nuisance or invasive animal species. Remove a minimum of 250 feral hogs per year.

Feral hogs in recent years have become a significant problem at Paynes Prairie Preserve State Park. Feral hog control activities will focus on areas where hogs are causing the most damage, including any threatened cultural resources. Authorized staff and contractors, including the USDA, will participate in the feral hog removal program as resources permit. The park should have a goal of removing a minimum of 250 feral hogs per year. The park will also occasionally ask for assistance from Alachua County Animal Services in removing feral or stray cats and dogs from the park.

CULTURAL RESOURCES

Pre-Historic and Historic Archaeological Sites

Paynes Prairie Preserve State Park has 106 archaeological sites recorded within the FMSF or in preparation for submission to the FMSF. The park and some of its adjoining properties encompass highly significant prehistoric and historic era archaeological resources that merit nomination to the National Register of Historic Places as an archaeological and historic district. Because the park contains archaeological evidence for every period of the aboriginal cultural sequence from Paleoindian times through European contact, it has the potential to yield significant information about changing settlement patterns in north-central Florida (Mullins 1977).

The park also contains significant archaeological sites from the historic era. Rancho de La Chua (AL02327) is believed to be the site of Hacienda de La Chua, the largest cattle ranch in Spanish Florida, covering about 87 square miles (Baker 1993). Established before 1637, La Chua was owned by La Florida's royal treasurer, Francisco Menendez Marquez. It reached its zenith of prosperity between 1672 and 1695 and operated until the early 18th century. La Chua, like other Spanish sites in the neighboring areas of north Florida, suffered a series of attacks during the late 1600s. Various Indian tribes, the English and the French attacked Spanish Florida. French buccaneers traveled up the Suwannee, Santa Fe and Withlacoochee rivers to raid La Chua Ranch twice between 1682 and 1684 (Milanich 2006). By the end of 1706, La Chua had been abandoned (Milanich 2006).

Another historic era site, Cuscowilla, which was an early Seminole settlement in Florida, is thought to be located near present day Micanopy, but that is yet to be confirmed. William Bartram described the settlement in 1774 (Harper 1958). At that time, the chief of Cuscowilla was Cowkeeper, who was later succeeded by his nephew, King Payne. In the 1790s, the town was relocated to a site east of Lake Wauberg and renamed Paynes Town (AL00366). The Seminoles inhabited Paynes Town until 1813, when a group of soldiers from the Tennessee volunteers occupied and burned it (Blakeney-Bailey 2004). The remains of Fort Tarver (AL00522), a fortified farm or plantation site at the time of the Second Seminole War (ca. 1835), are located on the north rim of Paynes Prairie southeast of Alachua Sink (Mullins 1977). Another Second Seminole War outpost, Fort Crane, is reported in the literature (and by local informants) to be located near Rochelle on the eastern edge of Paynes Prairie, but that site has not yet been rediscovered (United States Dept. of the Army 1971?). More archival and historical research will be conducted before pursuing any subsurface archeological testing within the park.

Evidence of human occupation of Paynes Prairie and its environs throughout the 19th century includes Chimney Field (AL00506 - ca. 1850), Stafford Pond House (AL00509), and Herlong House artifacts

(AL00518b). From 1871 to 1891, when extreme flooding transformed the prairie into a lake, a ferry transported agricultural products across the basin (AL00514 Ferry Station). The remains of 19th- and 20th-century railroad lines and a tram line are located in uplands adjacent to the prairie.

These have been recorded within the FMSF as linear resource groups (AL00515, AL05203 and AL05404). Remains of homesteads from the early 20th century have been found throughout the park (AL00509, AL00533 and AL02917). In the 1920s, the prairie basin and much of its rim were purchased by Camp Ranch, Inc., and used for cattle ranching until the state purchased the property in 1970. Cultural artifacts of the cattle ranching era, including the remains of the Camp Ranch, cattle dip vats, corrals, and numerous dikes and canals are evident and have recently been recorded within the FMSF as archaeological sites or linear resource groups (AL05576, AL05577, AL05578, AL05579, AL05580, AL05581, AL05582, AL05583, and AL05584. During the 1950s and 60s, the Camp Ranch had dipped its cattle in pesticides such as arsenic to control tick infestations. Remediation of at least one of the dip vat sites began in 2017 (AL05583) by DEP at Area of Concern (AOC) No. 1. In 2021, site remediation was planned and is still in process for Area of Concern (AOC) No. 2 (AL05584) near Jackson Gap Trail (Geosyntec 2017, 2023).

Several archaeological surveys and studies have been undertaken at Paynes Prairie over the past half-century. The most important survey was the Paynes Town Seminole Project (Blakeney-Bailey 2004). Another potentially significant survey was conducted in the area that became the Sweetwater treatment wetland (Torres et al 2009). Earlier surveys at Paynes Prairie included those by Carl Clausen (1964), Sue Mullins (1976; 1977), William D. Browning and Melissa G. Wiedenfeld (1988), Philip Gerrell (1990), Henry Baker (1993), Brent Weisman (1993), Joseph Southerland (1994), Barbara Purdy (1996), Anne V. Stokes (1997), Ryan J. Wheeler (1998) and Robert Austin (1999).

Twenty-one archaeological sites, primarily 20th-century and derived from activities associated with the Camp Ranch, have been documented for the FMSF. In addition, several linear resource groups (AL05203, AL05204, AL05471 and AL05576) that document the railroads, canals and dikes of the 19th and 20th centuries have been submitted to the FMSF. Two recent additions to the park, the Williams and Crevasse properties, have had investigation, including a recent survey in 2022 (Lanning et. al, AL07467). This study confirms that Native American and historic archaeological sites occur on these properties. A predictive model was completed for the entire park in 2012 (Collins et al. 2012).

The majority of the archaeological sites at Paynes Prairie Preserve State Park are in good condition. The exceptions are sites ranked as fair: AL00365, AL00366, AL00428, AL02923 and AL05464, and those ranked as poor: AL00346, AL00350, AL00351, AL00352, AL00356, AL05471 and AL05584. All sites listed as poor have been either heavily looted or removed due to their detrimental ecological impacts, such as the case of dikes or dip vats. Some of the sites listed as fair have experienced minor looting. From time to time, looting attempts still occur at these sites.

Site AL00366 (Paynes Town) is in fair condition. A portion of this important site was damaged during the 1960s and 70s by quarrying for sand. According to Blakney-Bailey (2004), conditions within the Paynes Town site range from heavily disturbed to well preserved.

Lake Pithlachocco Canoe Site (8AL04792) was listed on the National Register of Historic Places (NRHP) on March 27, 2001, following a determination of Eligible for NRHP by the recorder and Potentially Eligible for NRHP by the State Historic Preservation Office (SHPO) based on Criterion D, since the property has yielded, or is likely to yield information important in prehistory or history. Recorders also determined Sweetwater Branch Hill (8AL00081), Old Pecan Grove (8AL00257), Woody Woodpecker

(8AL02325) and Paynes Prairie West 1 (8AL05454) Eligible for NRHP and SHPO found them Potentially Eligible for NRHP.

Paynes Town (8AL00366), Persimmon Point (8AL00454), Chimney Field Prehistoric (8AL00505), Chimney Field Historic (8AL00506), Firelane (8AL00507), Ferry Station (8AL00514), Beehive Field Village (8AL00521), Fort Tarver (8AL00522), North Beehive Field (8AL00523), Island (8AL00528), Cones Ranch (8AL02902), Watermelon Patch (8AL02906), Warner Woodruff 1 (8AL02907) and Plantation Professional Center (8AL03511) were deemed Eligible for NRHP by recorders but were Not Evaluated by SHPO.

The recorder found Paynes Prairie Disturbed (8AL05201) Ineligible for NRHP and SHPO cited Insufficient Information. Recorders and SHPO determined Sweetwater Branch Flint (8AL00080), NN (8AL00410), Jones Field (8AL00432), Small Chip (8AL03275), Paynes Prairie West 2 (8AL05455), Sweetwater Branch I (8AL05463), Camp Bridge (8AL05469) and Wildlife Research Laboratory (8AL05510) Ineligible for NRHP.

Recorders and SHPO cited Insufficient Information to determine eligibility for None (8AL00163), Rancho de La Chua (8AL02327), Waterline Flakes (8AL05202) and Sweetwater Branch II (8AL05464). Recorders recovered Insufficient Information for evaluation of Rochelle-Micanopy I (8AL00428), RR-1 South (8AL02555), Jerevan No. 1 (8AL02923) and and Williams Artifact Scatter (8AL07467) sites Not Evaluated by SHPO.

Although recorders deemed Alachua Sink (8AL00022), NN (8AL00365), Herlong House (8AL00498), Rim (8AL00499), AZ 1, 4 Field (8AL00500), Rochelle Road Garbage Pump (8AL00501), Stafford Pond House (8AL00509), Brick Dump (8AL00511), Futch Flint Field (8AL00516), Blum Jug (8AL00524) and Deer (8AL00526) Likely NRHP Eligible, the sites were not evaluated by SHPO. The recorder also deemed Troiano (8AL04777) Likely NRHP Eligible, but SHPO determined the site Ineligible for NRHP.

Melton Mound 2 (8AL00006), NN (8AL00010), Manka (8AL00023), South Paynes Prairie 8 (8AL00038), South Paynes Prairie 9 (8AL00039), South Paynes Prairie 10 (8AL00040), Paynes Prairie 6 (8AL00061), Paynes Prairie 7 (8AL00062), Jackson (8AL00077), Castle (8AL00086), Paynes Prairie 5 (8AL00136), NN (8AL00192), KJ-8 (8AL02477), KJ-9 (8AL02478), NN sites (8AL00315, 346, 350-352), Newnans (8AL00356), Bolen Bluff

(8AL00439), Road Intersection (8AL00495), Boat Ramp (8AL00496), Bath House (8AL00497), Celt (8AL00502), Cactus Field (8AL00503), Herlong House Artifacts (8AL00518b), Barn Artifacts (8AL00519b) and Queen Ester Watson Mound (8AL00520) were Not Evaluated by Recorder and Not Evaluated by SHPO.

At the Paynes Town site, protection and preservation may need to be supplemented by stabilization in areas that were historically mined for sand.

Historic Structures

At the time of this update of the management plan, Paynes Prairie Preserve State Park had 28 known historic structures recorded within the FMSF. All of these structures are 20th century or presumed to be 20th century (AL05575). The structures fall into four general categories, namely Camp Ranch, Hickory Ranch, the Wauberg buildings, and miscellaneous other residences and associated structures. Very little is known about the history of the Wauberg buildings or of Hickory Ranch, except that the Cone family owned the latter.

Eleven historic structures are associated with the Camp Ranch operation. The most significant of these are the Camp Ranch bunkhouses (AL05555, AL05560), house (AL05557), barn (AL05561), office (AL05558), railroad warehouse (AL05556) and slaughterhouse (AL05559). All were constructed in the

1940s, and all are clustered on the north rim of the prairie above Alachua Sink. AL05555 is an unusual building for Florida because the exterior material is sandstone. The Bison Pen Windmill (AL05569) is located a mile or so east of the cluster of ranch structures. It served to pump water for livestock and continued in that capacity until 1990. Another structure, this one significant for its ecological impact, is the Camps Canal Pumping Station (AL05568), which is located on the far eastern side of the prairie basin. Constructed in 1937, it once helped the Camp Ranch dewater Paynes Prairie by actively pumping water out of the prairie and into Camps Canal.

The Wauberg house, barn and livery (AL05563, AL05562 and AL05564) were built in 1940 in the Florida Vernacular style. The original use of the barn and livery continued until 1971. Park rangers now use the house as a residence. The Hickory Ranch High Barn (AL05574), Hay Barn (AL05572), Shop (AL05570) and Corn Crib (AL05573) were all built in 1949. These structures continue to be used for livestock and land management functions including hay storage. The Hickory Ranch Horse Stable (AL05571) was built in the 1960s. It continues to serve as an office and for equipment storage.

The remaining significant historic structures in the park are residences or are associated with residences. The Bolen Bluff Residence (AL05567) was built in 1940 by a local constable. The Camp Ranch moved it to its present location after 1949. It was in use as a residence until 2019 when it burned down due to a storm-related electrical fire. It was unoccupied at the time. The Kincaid Warehouse (AL05566) was built in 1940 as a warehouse and it is used as such today. It was associated with the original Kincaid House (AL02917) that was constructed around 1925. Due to their poor condition, park staff documented the house and the Kincaid Barn (AL02918A) in the 1990s and then demolished them. The New Kincaid House (AL05565), built adjacent to the original Kincaid House, still serves as a park residence.

In addition to the individual structures, the park has several linear resource groups recorded: Railroad (AL00515), Atlantic Coastline Railroad Gainesville (AL05203), Tampa Jacksonville Railroad (AL05404), Sweetwater Branch Canal (AL05471) and Camp Ranch Canal/Dike (AL05576). These all date from the late-19th century or early-20th century. Between 2012 and 2015, the Sweetwater Branch Canal and dike were removed and returned to natural grade over much of its length as part of the construction of the Sweetwater Restoration Project. A small portion of a rural historic landscape, Serenola Plantation (AL05453), extends into the park.

Most of the historic structures at Paynes Prairie Preserve State Park are in good or fair condition. Structures in poor condition include the Hickory Ranch Hay Barn Building No. 47 (AL05572), which needs a new roof and partial flooring, the Kincaid Warehouse (AL05566), which has some roof leaks and uneven flooring, and the Wauberg Livery Building No. 13 (AL05564). Other structures in poor condition include the Kincaid House (AL02917) and Kincaid Barn (AL02918A), both removed with DHR approval, the Bolen Bluff Residence (AL05567) and the PZ-2 House (AL00533), which was already dilapidated in 1976. At that time, it was recommended that no action be taken other than documentation if the structure were to be demolished, but it has not yet been demolished or officially recorded. No action has been taken to alter or repurpose the destroyed residence site at Bolen Bluff.

Eight historic structures are in fair condition. The Camp Ranch Bunkhouse 2 - Building No. 6 (AL05560) is in fair condition. Several years ago, the chimney collapsed and was removed. This building sits on a bluff overlooking Alachua Sink and is currently vacant. The Camp Ranch Slaughterhouse (AL05559), 3215 SE 35th Street (AL03833), the Wauberg Barn - Building No. 10 (AL05562), the New Kincaid House - Building No. 3 (AL05565) and the Hickory Ranch Corn Crib - Building No/ 49 (AL05573), are all in fair condition.

The Camp Ranch Barn - Building No. 17 (AL05561) is in good condition, and functions as an interpretive facility at the point where the La Chua Trail enters the prairie basin. The other Camp Ranch historic

structures located on the north rim of the prairie are in good condition except for the slaughterhouse (AL05559) and bunkhouse (AL05560), both of which are in fair condition. The Hickory Ranch Horse Stable - Building No. 46 (AL05571) and the Hickory Ranch Shop Building No. 45 (AL05570) are both in good condition following work done in recent years.

Five linear resources, one rural historic landscape and 28 historic structures located in the park have been recorded in the FMSF. Several have been formally evaluated by the State Historic Preservation Office (SHPO) for significance and determined ineligible for the National Register. These linear resources and historic structures are listed within Table 4 as "not significant" (NS) and include the Atlantic Coastline Railroad: Gainesville-Hawthorne (8AL05203), Tampa Jacksonville Railroad (8AL05404), Serenola Plantation (8 AL05453), Camp Water Trough (8AL05468), Camp Manholes (8AL05470), Sweetwater Branch Canal (8AL05471, removed) and Camp Feed Trough (8AL05472). The Kincaid House (8AL02917) and Kincaid Barn (8AL02918A) were also formally evaluated by the SHPO for significance and determined ineligible for the National Register; these two buildings have since been demolished.

3215 SE 35th St. (8AL3833) was recorded as part of a historic structure survey for unincorporated Alachua County and considered as ineligible for the National Register by the recorder but has not been formally evaluated by the SHPO. The Railroad Site (8AL00515) and PZ-2 House (8AL533) were not evaluated for significance by either the recorder or SHPO. Twenty additional historic structures (8AL05555—8AL5575) were recently recorded by park staff and have not been evaluated for significance.

Two structures, the Camp Ranch bunkhouses AL05555 and AL05560, need to be evaluated to determine what rehabilitation treatments are necessary. Plans for the Camp Ranch Barn (AL05561) include adaptive reuse as an interpretive area. BNCR and Bureau of Design and Construction (BDC) staff will assist the park in that project by providing advice and direction. A Historic Structures Report (HSR) may be warranted for the Camp Ranch buildings as a group. The park needs to determine if any or all buildings require an HSR.

Collections

The main collection is housed at the Paynes Prairie visitor venter. This facility has undergone a complete interior redesign, completed in 2020, providing a total of approximately 1,870 square feet of climate-controlled space for the collection and for interpretation of the Paynes Prairie experience. The park's formal collection contains natural resource objects such as specimens of sandhill cranes and other animals native to the prairie, as well as a few archaeological artifacts and a reproduction of Audubon's sandhill crane painting.

There is also an informal collection consisting of documents such as research studies, some books pertaining to the prairie, and original photographs by the late Dominic Martino, a former park volunteer and professional photographer. The documents are stored in the resource room at Hickory Ranch. The Audubon print is located at the visitor center. Two additional informal collection items are an antique gas pump that may date to the 1920s and a 1930s-era pickup truck. The truck is in very poor condition due to exposure to the elements. Until 2011, the pickup was parked in the woods about 500 feet from the Wauberg Barn. After recording its original location, park staff moved it into the barn to protect it from the elements. The antique gas pump is located next to the Wauberg Livery and is exposed to the weather. The park may decide to relocate it to the barn as well in order to protect it from further deterioration. Both items are photo documented annually. Park staff obtained many of the objects in the collection. The Audubon print was a donation.

The collection is exhibited at the visitor center and is stored either at the visitor center or at Hickory Ranch. The part of the formal collection that is stored in the visitor center is in good condition. Collections at both sites are housed under climate-controlled and pest-controlled conditions and are kept secure. Better storage conditions are needed for the materials kept at Hickory Ranch, however.

The natural resource items are the most significant part of the park's collection. This includes photographs by Dominick Martino. The collection is used for interpretation and to illustrate the diverse biological resources of the park. Historic documents are available to future park managers and staff as reference material.

Paynes Prairie Preserve State Park has a Scope of Collections Statement. The collections are restricted to those that support interpretation of the natural and cultural resources of Paynes Prairie. The specific themes addressed by the collection are cultural resources, geology, hydrology, ecology and recreation. The time periods covered range from Paleoindian to the present.

A collections inventory, an assessment, and a collections management plan need to be developed for the formal and informal collections. The photographs by Dominic Martino may need archival treatment.

Cultural Resources					
Site Name and FMSF #	**Culture/Period**	**Description**	**Significance**	**Condition**	**Treatment**
NN AL00010	Prehistoric with pottery	Archaeological Site	NE	G	P
Alachua Sink AL00022	Prehistoric with pottery	Archaeological Site	NR	G	P
Manka AL00023	Alachua A.D., 1250-A.D. 1600	Archaeological Site	NE	G	P
South Paynes Prairie 8 AL00038	Archaic, 8500 B.C.-1000 B.C.	Archaeological Site	NE	G	P
South Paynes Prairie 9 AL00039	Deptford, 700 B.C.-300 B.C.	Archaeological Site	NE	G	P
South Paynes Prairie 10 AL00040	Prehistoric	Archaeological Site	NE	G	P
Paynes Prairie 6 AL00061	Alachua A.D., 1250-A.D. 1600	Archaeological Site	NE	G	P
Paynes Prairie 7 AL00062	Alachua A.D., 1250-A.D. 1600	Archaeological Site	NE	G	P

Cultural Resources					
Site Name and FMSF #	**Culture/Period**	**Description**	**Significance**	**Condition**	**Treatment**
Jackson AL00077	Alachua A.D., 1250-A.D. 1600	Archaeological Site	NE	G	P
Sweetwater Branch Flint AL00080	Alachua A.D., 1250-A.D. 1600	Archaeological Site	NS	G	P
Sweetwater Branch Hill AL00081	Alachua A.D., 1250-A.D. 1600	Archaeological Site	NR	G	P
Castle AL00086	Deptford	Archaeological Site	NE	G	P
Paynes Prairie 5 Al00136	Hickory Pond, A.D. 800-1250	Archaeological Site	NE	G	P
None AL00163	Deptford	Archaeological Site	NE	G	P
NN AL00192	Deptford	Archaeological Site	NE	G	P
Old Pecan Grove AL00257	Prehistoric with pottery	Archaeological Site	NR	G	P
NN AL00315	Prehistoric with pottery	Archaeological Site	NE	F	P
NN AL00346	Weeden Island 1	Archaeological Site	NE	P	P
NN AL00350	Prehistoric with pottery	Archaeological Site	NE	P	P
NN AL00351	Weeden Island II	Archaeological Site	NE	P	P
NN AL00352	Prehistoric	Archaeological Site	NE	P	P
Newnans AL00356	Alachua A.D., 1250-A.D. 1600	Archaeological Site	NE	P	P
NN AL00365	Alachua A.D., 1250-A.D. 1600	Archaeological Site	NR	F	P

Cultural Resources					
Site Name and FMSF #	**Culture/Period**	**Description**	**Significance**	**Condition**	**Treatment**
Paynes Town AL00366	Nineteenth Century American, 1821-1899	Archaeological Site	NR	F	P
NN AL000410	Prehistoric	Archaeological Site	NS	F	P
Rochelle-Micanopy I AL00428	Alachua A.D., 1250-A.D. 1600	Archaeological Site	NE	F	P
Jones Field AL00432	Archaic, 8500 B.C.-1000 B.C.	Archaeological Site	NS	G	P
Bolen Bluff AL00439	Archaic	Archaeological Site	NE	F	P
Persimmon Point AL00454	Prehistoric	Archaeological Site	NR	G	P
Entrance Station AL00494	Archaic, 8500 B.C.-1000 B.C.	Archaeological Site	NS	G	P
Road Intersection AL00495	Indeterminate	Archaeological Site	NE	G	P
Boat Ramp AL00496	Indeterminate	Archaeological Site	NE	G	P
Bath House AL00497	Indeterminate	Archaeological Site	NE	G	P
Herlong House AL00498	Alachua A.D., 1250-A.D. 1600	Archaeological Site	NR	G	P
Rim AL00499	Archaic, 8500 B.C.-1000 B.C.	Archaeological Site	NR	G	P
AZ 1, 4 Field AL00500	Alachua A.D., 1250-A.D. 1600	Archaeological Site	NR	G	P

Cultural Resources					
Site Name and FMSF #	**Culture/Period**	**Description**	**Significance**	**Condition**	**Treatment**
Rochelle Road Garbage Pump AL00501	American, 1821-present	Archaeological Site	NR	G	P
Celt AL00502	Prehistoric	Archaeological Site	NE	G	P
Cactus Field AL00503	Indeterminate	Archaeological Site	NE	G	P
AZ-2 Dump AL00504	American, 1821-present	Archaeological Site	NS	G	P
Chimney Field Prehistoric AL00505	Cades Pond, 300 B.C.-A.D. 800	Archaeological Site	NR	G	P
Chimney Field Historic AL00506	American Acquisition/ Territorial Development 1821-45	Archaeological Site	NR	G	P
Firelane AL00507	Archaic, 8500 B.C.-1000 B.C.	Archaeological Site	NR	G	P
Night Hawk AL00508	Archaic, 8500 B.C.-1000 B.C.	Archaeological Site	NS	G	P
Stafford Pond House AL00509	American, 1821-present	Archaeological Site	NR	G	P
Stafford Pond Dump AL00510	American, 1821-present	Archaeological Site	NS	G	P
Brick Dump AL00511	American, 1821-present	Archaeological Site	NR	G	P
Palmetto AL00512	Archaic, 8500 B.C.-1000 B.C.	Archaeological Site	NS	G	P

Cultural Resources					
Site Name and FMSF #	**Culture/Period**	**Description**	**Significance**	**Condition**	**Treatment**
Sawgrass Pond AL00513	Nineteenth Century American, 1821-1899	Archaeological Site	NS	G	P
Ferry Station AL00514	American, 1821-present	Archaeological Site	NR	G	P
Railroad AL00515	American Nineteenth Century	Linear Resource Group	NE	G	P
Futch Flint Field AL00516	Archaic, 8500 B.C.-1000 B.C.	Archaeological Site	NR	G	P
Herlong House Artifacts AL00518B	American, 1821-present	Archaeological Site	NE	G	P
Barn Artifacts AL00519B	American, 1821-present	Archaeological Site	NE	G	P
Queen Ester Watson Mound AL00520	Prehistoric	Archaeological Site	NE	G	P
Bee Hive Field Village AL00521	Alachua A.D., 1250-A.D. 1600	Archaeological Site	NR	G	P
Fort Tarver AL00522	American Acquisition/ Territorial Development 1821-45	Archaeological Site	NR	G	P
North Beehive Field AL00523	Alachua A.D., 1250-A.D. 1600	Archaeological Site	NR	G	P
Blum Jug AL00524	American, 1821-present	Archaeological Site	NR	G	P
Robinson Heights AL00525	Archaic, 8500 B.C.-1000 B.C.	Archaeological Site	NS	G	P
Deer AL00526	Alachua A.D., 1250-A.D. 1600	Archaeological Site	NR	G	P

Cultural Resources					
Site Name and FMSF #	**Culture/Period**	**Description**	**Significance**	**Condition**	**Treatment**
Oak Grove Fossil AL00527	Archaic, 8500 B.C.-1000 B.C.	Archaeological Site	NS	G	P
Island AL00528	Archaic, 8500 B.C.-1000 B.C.	Archaeological Site	NR	G	P
Sink Area AL00529	Archaic, 8500 B.C.-1000 B.C.	Archaeological Site	NS	G	P
Buffalo Pens AL00530	Alachua A.D., 1250-A.D. 1600	Archaeological Site	NE	G	P
Fenceline AL00531	Archaic, 8500 B.C.-1000 B.C.	Archaeological Site	NE	G	P
PZ-2 Dumps AL00532	American, 1821-present	Archaeological Site	NS	G	P
PZ-2 House AL00533	Twentieth Century	Historic Structure	NE	P	P
Woody Woodpecker AL02325	Archaic, Early & Middle	Archaeological Site	NR	F	P
Rancho De La Chua AL02327	Twentieth Century American, 1900-present	Archaeological Site	NE	G	P
KJ-8 AL02477	Not Specified	Archaeological Site	NE	G	P
KJ-9 AL02478	Not Specified	Archaeological Site	NE	G	P
RR-1 South AL02555	Archaic, 8500 B.C.-1000 B.C.	Archaeological Site	NE	G	P

Cultural Resources					
Site Name and FMSF #	**Culture/Period**	**Description**	**Significance**	**Condition**	**Treatment**
Prairie Creek AL02561	Alachua A.D., 1250-A.D. 1600	Archaeological Site	NS	G	P
Hawthorne R&T AL02562	Alachua A.D., 1250-A.D. 1600	Archaeological Site	NS	G	P
Cones Ranch AL02902	Alachua A.D., 1250-A.D. 1600	Archaeological Site	NR	G	P
Watermelon Patch AL02906	Archaic, 8500 B.C.-1000 B.C.	Archaeological Site	NR	G	P
Warner Woodruff 1 AL02907	Prehistoric	Archaeological Site	NR	G	P
Kincaid House AL02917	c-1925	Historic Structure (removed with DHR approval, 1993)	NS	P	N/A
Kincaid Barn AL02918A	c-1925	Historic Structure (removed with DHR approval, 1993)	NS	P	N/A
Kincaid Barn Site AL02918B	Twentieth Century American, 1900-present	Archaeological Site	NE	G	P
Jerevan #1 AL02923	Twentieth Century American, 1900-present	Archaeological Site	NE	F	P
Small Chip Site AL03275	Prehistoric	Archaeological Site	NS	G	P
Plantation Professional Center AL03511	Alachua A.D., 1250-A.D. 1600	Archaeological Site	NR	G	P
Old Safe AL03515	Twentieth century American, 1900-present	Archaeological Site	NS	G	P

Cultural Resources					
Site Name and FMSF #	**Culture/Period**	**Description**	**Significance**	**Condition**	**Treatment**
3215 SE 35TH ST AL03833	Twentieth Century	Historic Structure	NE	F	P
Troiano Site AL04777	Archaic, Hickory Pond	Archaeological Site	NS	G	P
Lake Pithlachocco AL04792	Early Archaic	Archaeological Site	NR	G	P
Paynes Prairie Disturbed AL05201	Nineteenth Century American, 1821-1899	Archaeological Site	NS	G	P
Waterline Flakes AL05202	Prehistoric	Archaeological Site	NE	G	P
Atlantic Coastline Railroad: Gainesville AL05203	Twentieth Century American, 1900-present	Linear Resource Group	NS	G	P
Tampa - Jacksonville Railroad AL05404	Unspecified on form by the recorder	Linear Resource Group	NS	G	P
Water Shut Off AL05435	Unspecified	Archaeological Site	NE	G	P
Serenola Plantation AL05453	American Civil War, 1861-1865	Rural Historic Landscape Resource Group	NS	G	P
Paynes Prairie West 1 AL05454	Twentieth Century American, 1900-present	Archaeological Site	NR	G	P
Paynes Prairie West 2 AL05455	Prehistoric	Archaeological Site	NS	G	P
Sweetwater Branch I AL05463	Prehistoric	Archaeological Site	NS	G	P
Sweetwater Branch II AL05464	Archaic, 8500 B.C.-1000 B.C.	Archaeological Site	NE	F	P
Camp Water Trough AL05468	Twentieth Century, 1940s	Historic Structure	NE	G	P

Cultural Resources					
Site Name and FMSF #	**Culture/Period**	**Description**	**Significance**	**Condition**	**Treatment**
Camp Bridge AL05469	Twentieth Century American, 1900-present	Archaeological Site	NS	G	P
Camp Manholes AL05470	Twentieth Century	Historic Structure	NE	G	P
Sweetwater Branch Canal AL05471	Nineteenth & Twentieth Century	Linear Resource Group	NE	P	N/A
Camp Feed Trough AL05472	Twentieth Century, 1950s	Historic Structure	NE	P	ST
Wildlife Research Laboratory AL05510	Prehistoric	Archaeological Site	NS	G	P
Camp Ranch Bunkhouse, Building #1 AL05555	Twentieth Century	Historic Structure	NE	G	P
Camp Railroad Warehouse, Building #2 AL05556	Twentieth Century	Historic Structure	NE	G	P
Camp Ranch House, Building #4 AL05557	Twentieth Century	Historic Structure	NE	G	P
Camp Ranch Office, Building #5 AL05558	Twentieth Century	Historic Structure	NE	G	P
Camp Ranch Slaughterhouse AL05559	Twentieth Century	Historic Structure	NE	F	P
Camp Ranch Bunkhouse 2, Building #6 AL05560	Twentieth Century	Historic Structure	NE	F	P

Cultural Resources					
Site Name and FMSF #	**Culture/Period**	**Description**	**Significance**	**Condition**	**Treatment**
Camp Ranch Barn, Building #17 AL05561	Twentieth Century	Historic Structure	NE	G	P
Wauberg Barn, Building #10 AL05562	Twentieth Century	Historic Structure	NE	F	P
Wauberg House, Building #13 AL05563	Twentieth Century	Historic Structure	NE	G	P
Wauberg Livery AL05564	Twentieth Century	Historic Structure	NE	P	P
New Kincaid House, Building #3 AL05565	Twentieth Century	Historic Structure	NE	F	P
Kincaid Warehouse, Building #44 AL05566	Twentieth Century	Historic Structure	NE	P	P
Bolen Bluff Residence, Building #11 AL05567	Twentieth Century	Historic Structure	NE	P	R
Camps Canal Pumping Station, Building #20 AL05568	Twentieth Century	Historic Structure	NE	G	P
Bison Pen Windmill AL05569	Twentieth Century	Historic Structure	NE	F	P
Hickory Ranch Shop, Building #45 AL05570	Twentieth Century	Historic Structure	NE	P	P

Cultural Resources					
Site Name and FMSF #	**Culture/Period**	**Description**	**Significance**	**Condition**	**Treatment**
Hickory Ranch Horse Stable, Building #46 AL05571	Twentieth Century	Historic Structure	NE	F	P
Hickory Ranch Hay Barn, Building #47 AL05572	Twentieth Century	Historic Structure	NE	P	P
Hickory Ranch Corn Crib, Building #49 AL05573	Twentieth Century	Historic Structure	NE	F	P
Hickory Ranch High Barn, Building #50 AL05574	Twentieth Century	Historic Structure	NE	F	P
Jackson Tank AL05575	Probably Twentieth Century	Historic Structure	NE	G	P
Camp Ranch Canals/ Dikes AL05576	Twentieth Century	Linear Resource Group	NE	G	R
Kincaid Dip Vat AL05577	Probably Twentieth Century	Archaeological Site	NE	G	P
Bison Pen Dip Vat AL05578	Probably Twentieth Century	Archaeological Site	NE	G	P
South Jackson Dip Vat AL05579	Probably Twentieth Century	Archaeological Site	NE	G	P
North Jackson Dip Vat AL05580	Probably Twentieth Century	Archaeological Site	NE	G	P
West Side Dip Vat AL05581	Probably Twentieth Century	Archaeological Site	NE	G	P
Bolen Bluff Dip Vat AL05582	Probably Twentieth Century	Archaeological Site	NE	G	P
High Barn Dip Vat AL05583	Probably Twentieth Century	Archaeological Site	NE	G	P

Cultural Resources					
Site Name and FMSF #	**Culture/Period**	**Description**	**Significance**	**Condition**	**Treatment**
Jackson Gap Dip Vat AL05584	Probably Twentieth Century	Archaeological Site	NE	P	N/A
Paynes Prairie Bottle Dumps AL05585	Possibly Late Nineteenth Century & 1st Half of Twentieth Century	Archaeological Site	NE	G	P
Pitcher Pump AL05586	Possibly Nineteenth Century or Early Twentieth Century	Archaeological Site	NE	G	P
East Gate Brick Wall AL05587	Possibly Nineteenth Century or Early Twentieth Century	Archaeological Site	NE	G	P
Alachua Sink Earthen Works AL05588	Possibly Nineteenth Century or Early Twentieth Century	Archaeological Site	NE	G	P
Lithic Scatter on the Prairie AL05637	Prehistoric	Archaeological Site	NE	G	P
Half an Island AL06892	Alachua A.D, 1250-1600	Archaeological Site	NR	G	P
Moccasin Corridor AL06893	Archaic, 8500 B.C.-1000 B.C.	Archaeological Site	NE	G	P
Turkey Feather Bluff AL06894	Archaic; Twentieth Century American	Archaeological Site	NE	G	P
Dead Hog Route AL06895	Archaic, 8500 B.C.-1000 B.C.	Archaeological Site	NE	G	P
Bolen Bluff South AL06964	Middle Archaic	Archaeological Site	NE	G	P

Cultural Resources					
Site Name and FMSF #	**Culture/Period**	**Description**	**Significance**	**Condition**	**Treatment**
Wauberg Lake South 1 AL06967	Twentieth Century American; Archaic	Archaeological Site	NE	G	P
Wauberg Lake South 2 AL06968	Twentieth Century American; Archaic	Archaeological Site	NE	G	P
Williams Artifact Scatter AL07467	Twentieth Century American; Archaic	Archaeological Site	NE	G	P

Objective A: Assess/evaluate 140 of 140 recorded cultural resources in the park.

The park currently assesses its cultural resources on a regular basis. Most of the sites are in good condition. The exceptions are sites AL00365, AL00366, AL00428, AL02923 and AL05464, which are considered to be in fair condition, and sites AL00346, AL00350, AL00351, AL00352 and AL00356, which are ranked as poor. All of the poor sites and some of the fair sites have experienced episodes of looting. The sites where looting has occurred need to be assessed more frequently. As many as 20 vulnerable sites within the park are visited on a monthly basis. The use of game cameras in the future could help the park monitor those sites through remote photography.

The park will continue its regular program of assessing sites. If stabilization or preservation needs become apparent during the course of site assessments, the park will identify and prioritize the needs.

Paynes Prairie has many historic structures currently in adaptive reuse by the park. It has not yet been determined how many structures will need a Historic Structures Report (HSR). During the next 10 years, the park should remedy that situation by deciding which of the structures will need an HSR. For this process, the park could consider the Camp Ranch structures as one group. The park should complete 10 Historic Structures Reports in the next 10 years. If an HSR identifies any necessary rehabilitation or maintenance projects, the park staff will prioritize them.

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

The park needs to ensure that all currently known sites are recorded properly in the Florida Master Site File (FSMF) and that site records are updated regularly, especially when new discoveries are made. As of December 2016, park staff had updated site records for all known sites in Paynes Prairie Preserve State Park, however new unrecorded sites are probably present on the Crevasse property, which the state acquired and added to the park in late-2010.

A predictive model for locating archaeological sites within the park was completed in 2012. Paynes Prairie Preserve has a rich history of human habitation including pre-European settlements, Spanish colonial ranches and early-19th century homesteads. The predictive model indicates areas of high,

medium and low probability for the occurrence of archaeological sites. The model will also provide guidance for future development and will aid in selecting the best locations for future Phase 1 archaeological surveys. The Crevasse and Flanders additions to the park have not yet received any archaeological surveys. The predictive model will aid the park in identifying areas that are highest priority for a Phase 1 survey.

There is a need for additional research and documentation about the location of the Second Seminole War outpost, Fort Crane, which appears to be located on or near the Crevasse addition at the southeast edge of the park near Rochelle.

Over the years, the park has collected a considerable amount of information pertaining to natural resource management. The various items include Dr. Larry White's Ecosystem Analysis of Paynes Prairie (White, no date), the botanical and zoological drawings of William Bartram, and photographs, all of which need to be compiled and organized as part of the administrative and natural history heritage of the park.

The community of Rochelle borders the northeast boundary of the park. Descendants of the families who pioneered the area still live there. Interviews with members of this community could provide the park with oral history accounts that might help document some of the history of Paynes Prairie. Others with whom it might be worthwhile to conduct oral interviews are Jack Gillen, a former manager of Paynes Prairie Preserve State Park, and William Hardee, the son of a former Florida Park Service bureau chief Ellison Hardee. Will Hardee grew up on site during the early years of the park.

The park has a Scope of Collections Statement that is based on four themes: cultural resources, geology and hydrology, ecology, and recreation. These themes should guide the development of any additional collections and the acceptance of future donations. The park should review its Scope of Collections on an annual basis.

Objective C: Bring nine of 139 recorded cultural resources into good condition.

The park currently has a cyclical maintenance program for its cultural resources, particularly its historic structures. Residence buildings receive an annual walkthrough inspection. Park rangers visually evaluate buildings weekly, and any problems identified are described in a work plan.

The park currently has a monitoring program for all of its cultural resources. Staff should formalize that program by writing and adopting a clear protocol.

Because the park has so many historic structures, it is necessary to prioritize their repair in order to bring them into good condition. The ability of the park to improve these structures to a good condition will also depend on the availability of funding. Priority should be given to the following cultural resources in the park for repairs: Camp Ranch Bunkhouse 2 - Building No. 6 (AL05560), Camp Ranch Bunkhouse - Building #1 (AL05555), Wauberg Livery - Building No. 13 (AL05564), Wauberg Barn - Building No. 10 (AL05562), Hickory Ranch Hay Barn - Building No. 47 (AL05572), , Hickory Ranch Corn Crib - Building No. 49 (AL05573), Bison Pen Windmill (AL05569), and Paynes Town (AL00366).

The highest priority for repair is the Camp Ranch Bunkhouse 2 (AL05560), which was previously used as an office. The building needs to be evaluated for restoration or demolition because the structure is rapidly deteriorating. The chimney, which collapsed and was removed, does not need to be rebuilt for the building to achieve a good condition. Camp Ranch Bunkhouse (AL05555), also part of the historic Camp Ranch complex, needs repairs. The park needs to determine the original flooring material of the building. Currently, the floor is uneven concrete. It had once been covered with wood flooring, but after

termites were discovered, it was removed. The Camp Ranch Barn (AL05561) is currently used as an interpretive area on the La Chua Trail. The Wauberg Livery (AL05564) may need a new roof within 10 years. The Hickory Ranch Hay Barn (AL05572) needs a new roof and some flooring. The Bison Pen Windmill (AL05569) and Paynes Town (AL00366) are included on the list because they need stabilization. The Paynes Town site could be stabilized using some type of geofabric material covered with backfill.

LAND USE COMPONENT

VISITATION

With over 22,000 acres of diverse habitats, Paynes Prairie Preserve State Park was designated as the first preserve in the Florida state park system. The abundant wildlife is a regional draw for nature enthusiasts, and the wild and scenic landscape offers outstanding recreational opportunities for trail users. Others are drawn to the park's rich cultural elements, which include the Spanish period cattle ranch and the travels of the naturalist William Bartram, who described the prairie as the "Great Alachua Savanna."

Visitation is widely dispersed across multiple park entrance points and primarily driven by the park's extensive sinkhole valley and abundance of wildlife. Significant alligator populations, roaming bison and approximately 270 species of birds are protected within the park. Wildlife and historic livestock are managed within an array of 27 distinct natural communities.

The centerpiece of the southern end of the park is the Alachua Savannah Visitor Center, which features award-winning architecture and a nearby 50-foot observation tower allowing panoramic views of the surrounding basin. The visitor center serves as the centerpiece for park interpretation.

The visitor center area also serves as a trailhead for an extensive network of hiking options in the southern reaches of the park, including the Cone's Dike Trail, which allows access to the wetland interior, and Jackson Gap Trail, which connects Cone's Dike Trail to the Chacala Trail. The La Chua Trail, on the north rim of the park, receives robust visitation centered on a nature trail that traverses former ranch lands and provides excellent wildlife viewing. Historically the second half of the trail continued onto the prairie basin, however this segment has been closed to the public since Hurricane Irma, due to damage and potentially unsafe wildlife interactions.

The Bolen Bluff Trail allows visitor access into the basin marsh from the northbound lanes of U.S. 441, leads visitors to an elevated observation platform with panoramic views of the prairie basin. North of this use area, the Ecopassage Observation Boardwalk is heavily trafficked due to its connection to U.S. 441 and popularity as a local sunset viewing area.

Trends

Generally, the park experiences highest attendance from January through March, with lowest attendance in the summertime. The cooler winter and spring months are much more favorable for trail use, while paddling and fishing on Prairie Creek and Lake Wauberg remain popular year-round.

EXISTING FACILITIES AND INFRASTRUCTURE

Facilities and infrastructure are concentrated in several visitor and support-focused use areas, including the south entrance area, Puc Puggy Campground, Lake Wauberg use areas, visitor center area, Bolen Bluff Trail area, La Chua Trailhead area, Hickory Ranch support area, and administrative office area.

Facilities adjacent to the south entrance include an entrance station and administrative office, which accompany several support structures nearby, including paved parking areas, sheds, shelters, a residence and a horse barn.

The Puc Puggy Campground includes 35 campsites, 15 tent-only sites, two bathhouses and stabilized parking. From the campground loop, a sidewalk connection is provided to the playground at the Lake Wauberg south use area.

The southern Lake Wauberg use area includes two picnic pavilions, a wedding amphitheater, a restroom, a playground and a boat ramp, as well as a 180-space parking area. Lake Wauberg's north and south use areas are connected by a boardwalk with a fishing dock. The primary special events area for Paynes Prairie and the entrance to the nearly 1-mile Lake Trail are also found in this area.

Directly east of the Puc Puggy Campground is the Chacala Trailhead. This area has a dirt parking area, picnic tables, hitching posts, an interpretive kiosk, and the 6.5-mile Chacala Trail. One primitive camping area with three campsites, a composting restroom, non-potable water source and horse hitching area are also available for trail users.

The visitor center area provides a restroom and paved parking area with about 52 spaces. Interpretive exhibits and a theater are also available for visitors to learn about the natural features and history of the park. Cone's Dike Trail is a roughly 4-mile linear trail extending east from the visitor center into the park's marshes with use limited to biking and hiking. Jackson's Gap Trail is a roughly 1.3-mile connector between the Cone's Dike Trail and Chacala Trail. The adjacent, half-mile Wacahoota Trail leads visitors to an observation tower and lookout spot to the prairie basin. To the west, there is a residence, a storage barn, and car shelter.

The Bolen Bluff Trailhead and trail, located along the south central rim of the prairie, is a wayside use area accessed directly from the east side of U.S. 441. The trailhead consists of a semi-stabilized parking area, and basic information kiosk. The two-mile trail that stems from the trailhead leads to a low observation tower with views over the prairie basin. One mile north of Bolen Bluff is the Ecopassage Observation Boardwalk, which provides a 255-foot boardwalk and observation platform.

North of Bolen Bluff is a Florida Fish and Wildlife Conservation Commission (FWC) office with accompanying support structures, including several storage sheds, a pole barn and two paved parking areas.

The La Chua Trailhead area includes stabilized parking that is shared with Gainesville-Hawthorne State Trail users. An interpretive kiosk, a portable restroom, the Camp Ranch interpretive barn and roughly 1,000 feet of boardwalk, including overlook structures, are maintained in this area. Interpretive panels provided here enhance visitors' understanding of the area's significant natural and cultural history. The Rim Ramble Loop Trail originates at the Camp Ranch Barn interpretive area. Ranger-guided tours allow visitors to observe and learn about the park and the area's history.

The District 2 office is located within the historic Hacienda de la Chua cattle ranch. The area contains a historic administrative building, a training center, a law enforcement office, AmeriCorps offices, a residence and stabilized parking. From here, the Gainesville-Hawthorne State Trail branches east to the Alachua Lake overlook.

Two support areas are in the northeast corner of the park. One is located directly above the Gainesville-Hawthorne State Trail, which includes a residence, a pole barn, and various sheds and shelters. To the northeast is the McKenzie Property which includes three aged residences, five storage structures and a dilapidated pool house.

The Prairie Creek area, in the northeastern corner of the park, is a busy fishing destination that is accessible via the Gainesville-Hawthorne State Trail. It includes a bridge and boardwalk.

The 16-mile Gainesville-Hawthorne State Trail traverses the northern sections of the park and provides a long-distance cycling connection from Paynes Prairie Preserve State Park to downtown Gainesville and the small city of Hawthorne. Parking for the state trail and Prairie Creek is available 1.5 miles southeast of the Prairie Creek area, across from Prairie Creek Preserve.

The Hickory Ranch support area contains facilities and equipment for park operations. A maintenance shop, a residence, stables and several storage structures are present.

Facilities Inventory

Parkwide	
Gainesville-Hawthorne State Trail (mileage within the park)	5.6
South Rim Entrance	
Entrance Station	1
Storage Structure	1
Administration Office	1
Paved Parking Area (10 spaces)	1
Historic Entrance Sign	1
South Rim Entrance Support Area	
Residence	1
Garage	1
Storage Structures	3
Horse Barn	1
Puc Puggy Family Campground	
RV Campsites	35
Tent Sites	15
Bathhouses	2
Paved Parking Area (28 spaces)	1
Lake Wauberg South Use Area	
Paved Parking Areas (180 spaces)	2
Picnic Pavilions	2
Wedding Amphitheater	1
Restroom	1
BBQ Shelter	1
Playground	1
Boat Ramp	1
Boardwalk	1
Lake Wauberg North Use Area	
Bathhouse	1
Boardwalk	1
Lake Trail Mileage	0.85
Chacala Trailhead	

Chacala Trail Mileage	7.50
Primitive Campsites	3
Composting Restroom	1
Hitching Posts	3
Interpretive Kiosk	1
Dirt Parking Area (10 spaces)	1
Visitor Center Area	
Paved Parking Area (52 spaces)	1
Alachua Savannah Visitor Center	1
Observation Tower	1
Wacahoota Trail Mileage	0.50
Jackson's Gap Mileage	1.30
Jackson's Gap Restroom	1
Cone's Dike Mileage	4
Residence	1
Barns	2
Bolen Bluff Trailhead	
Stabilized Parking Area (15 spaces)	1
Interpretive Kiosk	1
Honor Box	1
Bolen Bluff Trail Mileage	2
Bench Shelter	1
Observation Tower	1
Ecopassage Observation Boardwalk	
Parking Area (6 spaces)	1
Boardwalk (length in feet)	255
Observation Platform	1
FWC Office Complex	
FWC Office	1
Pole Barn	1
Storage Structures	8
Paved Parking Area (40 spaces)	2
La Chua Trailhead	
Stabilized Parking Area (35 spaces)	1
Interpretive Kiosk	1
La Chua Trail Mileage	1.5
Portable Restroom	1
Honor Box	1
Camp Ranch Interpretive Barn	1
Boardwalk Mileage	.20
Overlooks	2
District 2 Office	
District Office	1
Training Center	1
Residence	1
Interpretive Building	1

FWC Office	1
Bunkhouse	1
BBQ Pit	1
Northeastern Support Area	
Residence	1
Storage Structures	6
Pole Barn	1
McKenzie Property	
Residences	3
Storage Structures	5
Pool House	1
Prairie Creek	
Boardwalk (length in feet)	400
Interpretive Panel	1
Hickory Ranch Support Area	
Maintenance Shop	1
Storage Structures	2
Residence	1
Barn	3
Stables	1
Cattle Coral/ Shelter	1

CONCEPTUAL LAND USE PLAN

Objectives

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

Parkwide

Objective: Improve Park Roads

Actions:

- Repair and resurface park roads.

Park staff manage over 20,000 acres with increasing urban / suburban interface. Confirming the location of park property lines based on existing surveys or completing new surveys (when necessary) should be a priority for any segment of park boundary where adjacent development is imminent. Any installation of new fencing should include agency-standardized enforceable signage.

Savannah Boulevard and Puggy Road are both in need of re-paving that should be completed during this 10-year planning cycle.

South Rim Entrance
Objective: Administrative facility improvement
Actions:

- Construct a new park administration office and remove existing structure.

The current park administration office is located adjacent to the entrance station. At high water levels, water floods the parking lot and crawl space under the structure. Surface mold and cracks linked to flood events are prevalent throughout the structure. An administrative office in a new location is proposed. Among potential alternatives, the recommended administrative office site is located to the north, on the opposite side of the entrance station within or directly adjacent to an existing paved parking area. This location is visually buffered behind a tree line and is higher and dryer than the current location.

If the proposed new administrative office is constructed in the new location, the current administration office should be removed and the area restored to a natural condition to improve aesthetics where many visitors first arrive to the park.

Puc Puggy Campground
Objective: Upgrade campground
Actions:

- Repair bathhouses.
- Install backup well.
- Improve flood prone tent sites.
- Enlarge up to four RV sites.
- Improve wayfinding signage.
- Improve site delineation.

The two bathhouses were constructed in 1986 and an inspection to address any issues is warranted. Any repairs needed to ensure proper function should be prioritized. There is also a need for a backup well system within the campground to maintain potable water both during and as a result of power outages.

To accommodate larger RVs, four sites should be enlarged and modified. If sites are enlarged, the electrical amperage for those sites should be upgraded accordingly. It is also recommended that the aprons along Puggy Road be widened to provide enough room for larger RVs to back into their campsite without rutting the adjacent natural landscape. Any narrow segments of the campground road with limited clearance (due to insufficient width or encroaching vegetation) should be addressed as well.

Significant rain events and corresponding rising waters in Lake Wauberg have previously flooded tent-only and semi-primitive campsites. All tent campsites in the Puc Puggy Campground are heavily used and some have formed rain-filled depressions, especially sites 24, 25 and 33. All tent sites should be elevated as necessary. Using natural permeable materials such as sand, or a mixture of sand and site-appropriate pea gravel as a base allows water to percolate into the ground. If basic site elevation measures are not effective, or if plans are proactively determined to be ineffective, then other measures should be considered, including the plausibility of relocating the subject tent sites to higher ground within the greater campground.

The tent campsite areas lack directional signage, resulting in makeshift pathways from the small parking areas along the road. A modest number of discretely placed directional signs should be installed to improve wayfinding. Providing a single path from the parking area to each campsite will also help visitors locate their assigned campsites. Buffers of natural vegetation between campsites should be encouraged. Split-rail fencing may also be necessary to define the limits of visitor use.

Lake Wauberg South Use Area
Objective: Renovate facilities
Actions:

- Repair boat ramp.
- Install floating dock.

The concrete boat ramp is heavily used by visitors year-round. The ramp is starting to erode, causing a deep drop off for visitors unloading their watercraft. Parallel to the improved ramp, a stabilized footpath should be constructed to avoid impacts from foot traffic in the soft soils. This path should extend to a small floating dock where paddlers and boaters can unload and temporarily dock their watercraft while parking or retrieving their vehicle.

Lake Wauberg North Use Area
Objective: Upgrade and expand visitor facilities
Actions:

- Upgrade and repair restroom.
- Develop a semi-primitive group camp.
- Provide parking accessible from Savannah Blvd.

The current restroom is in need of repairs and a shower upgrade to function as a bathhouse. As an alternative to a bathhouse, at least one outdoor shower could be installed. A design that incorporates grey water capture and retention should be considered if installing an outdoor shower. Repairs and shower upgrades to this facility are integral to the group camp development plan described below.

A semi-primitive group camp with potable water is planned at the Lake Wauberg north day use area. To provide the relative isolation germane to the camping experience, the group camp will be somewhat disjunct from the main use area. Important factors to consider regarding specific location are:

- The group camp will be reliant on the use area's existing facilities (particularly the restroom, with planned showers upgrade mentioned above). The group camp should not be located beyond reasonable walking distance of this supporting facility.

- The proposed site should be adequately buffered from the main body of the use area to provide a sense of isolation and provide security.

- To avoid user conflict within the greater Lake Wauberg use area, parking for the group camp is recommended along the edge of the abandoned pasture traversed by the Lake Trail. This unimproved or modestly stabilized parking area would be accessed from Savannah Boulevard along with some portion of the current Lake Trail/service road as to place the parking area within reasonable walking distance of the group camp.

- Currently the unimproved service road extending from Savannah Boulevard to the North Lake Wauberg restroom also serves as the Lake Trail. A separate and distinct single track trail corridor for the Lake Trail should be established to the east of the existing service road in the successional hardwood forest closer to Lake Wauberg. This will improve the quality of the trail experience and provide separation from the group camp access road.

- Specific location of the group camp should consider sheltering, aesthetics, and separation from the proposed single-track Lake Trail.

Chacala Trailhead
Objective: Improve Trailhead
Actions:
- Formalize parking area and access road.
- Provide equestrian facilities.
- Expand equestrian trail system (as feasible).

In addition to hiking and biking, the Chacala Trail permits approximately 7.5 miles of equestrian use. Trail extension, particularly for equestrian users, should be considered in conjunction with Chacala Trailhead upgrades and formalization. Upgrades should include a watering trough, parking area stabilization (pervious materials), formalization (delineation of parking spaces – individual vehicles and horse trailers), and stabilization of the access road.

Visitor Center Area
Objective: Assess and renovate
Actions:
- Conduct a structural assessment.
- Provide any repairs needed.
- Update, repair or replace interpretive exhibits.
- Conduct a structural assessment of the observation tower.
- Relocate the drain field.

Given that the visitor center is now 40 years old, a structural assessment is warranted. Needs for interpretive upgrades have been identified within the visitor center. Aging restrooms require renovation, recognizing the need for a new drainfield that must be located upslope of the current location. The drainfield should be located outside of the viewshed of visitors walking the nature path. If connection to sewer becomes a feasible alternative, this option should be prioritized.

The observation tower is a vital attribute of the visitor experience. The panoramic view of the prairie basin offered from the tower is integral to interpreting the geomorphology and important ecological processes inherent to this significant natural feature. The highly popular tower is approaching an age where a structural assessment is warranted. Any identified maintenance or repair needs identified during the assessment should be accomplished. Appropriate measures to mitigate the structure's inherent accessibility limitations should be addressed as well. Measures to provide a high quality, comparable tower experience should consider a video feed, or the development of virtual experience that might be accessible within the visitor center or on personal mobile devices.

The aging visitor center drainfield is currently adjacent to the edge of the prairie. To ensure habitat and watershed protection, the drainfield should be relocated from the edge of the prairie. An archaeological survey will determine an appropriate relocation site uphill from the basin.

Hickory Ranch Support Area
Objective: Construct support facilities
Actions:

- Install a pole barn.
- Construct an additional park residence.

This area is primarily used for staff operations, equipment storage, and wildlife/working stock management. However, it periodically serves a dual purpose as both an administrative area and a visitor services area (as a venue for special events such as stargazing). Support and visitor use areas at Hickory Ranch should be more clearly delineated. The administrative/maintenance area at Hickory Ranch would be well-served with the installation of a new pole barn. This structure would help organize the use area and provide extra storage space and protection for the district fire team. This support area is also the preferred location for construction of an additional staff residence.

La Chua Historic Site and Trail
Objective: Improve use area and natural hydrology
Actions:

- Conduct a structural assessment for Camp Ranch Barn.
- Improve appearance of Camp Ranch Barn.
- Construct a permanent restroom.
- Extend La Chua Trail boardwalk (up to approximately 900 feet along the former dike trail)
- Remove or breach remaining segments of the dike.
- Remove remnants of the former observation platform.

The Camp Ranch Barn structure has aged and exhibits fractures along the brick pavers. A structural assessment should be completed to ensure the integrity of the building. This interpretive centerpiece needs cosmetic refurbishment to improve the appearance of the site. Any repairs or renovations should restore the historic character of this structure.

A portable restroom located next to the historic Camp Ranch Barn should be replaced with a permanent facility. Placement should be sensitive to the prairie viewshed and vicinity surface waters. It is therefore recommended that the permanent restroom replace the current Clivus composting restroom located near the intersection of the Gainesville-to-Hawthorne State Trail and the La Chua Trail parking area. If feasible, the new restroom should be connected to municipal sewer and water. Any remaining portable restrooms in this use area vicinity should be removed.

The La Chua Trail has historically extended into the basin marsh (prairie). Visitors have historically been permitted to walk along the dike approximately 300 yards beyond the end of the boardwalk that ends near Alachua Sink. However, this on-grade access along the dike poses significant safety concerns due to the potential for hazardous wildlife encounters. To provide safer access, the DRP will extend the boardwalk some distance along the dike (not to exceed 300 yards). Replacing the former on-grade trail with a sufficiently boardwalk will also help avoid disturbance to wading birds and other wildlife. Portions of the remaining dike beyond the planned boardwalk extension should be removed or breached to

improve hydrology. Any remnants of the old observation platform at the end of the former trail should be removed. See Resource Management Component for more detail.

Sweetwater Wetlands Park
Objective: Trail development
Actions:

- Coordinate with Alachua County to develop loop trail.

A 700 ft. loop trail is proposed within portions of the Sweetwater Wetlands Park that may traverse Alachua County, City of Gainesville, and DRP managed parcels. This plan supports trail development that is identified and approved in the Sweetwater Wetlands Park Management Plan.

Prairie Creek
Objective: Clarify usage of the site
Actions:

- De-emphasize paddling launch.
- Coordinate with FL DOT to provide safe parking for anglers utilizing the Gainesville to Hawthorne State Trail bridge.

Prairie Creek is part of the state-designated Potano Paddling Trail, which encircles Newnans Lake. Palm Point Park, Powers Park, Kate's Fish Camp, and Owen's-Illinois Park are launch sites for the trail. An informal paddling launch is adjacent to the bridge and boardwalk. Since this area is isolated from the remainder of the park and requires a lengthy trip for park staff in the event of an emergency, and since other launch sites are available within the vicinity, the use of this paddling launch should be de-emphasized or discouraged.

There is a need to provide safe and practicable parking for anglers utilizing the Gainesville to Hawthorne State Trail bridge across Prairie Creek. The feasibility of creating a small stabilized parking area in the space between State Road 20 and the Gainesville to Hawthorne State Trail should be evaluated with FDOT.

McKenzie Property
Objective: Ensure integrity of historic structures and improve staff infrastructure
Actions:

- Conduct assessments of the historic structures.
- Provide up to four volunteer sites.
- Provide necessary AmeriCorps support structures.

Assessment of the historic structures is needed. Although some structures qualify as historic by age, the structures bear no significance that merit preservation. If feasible, the existing house should be renovated and repurposed to serve as a residence. Defunct features that do not support park operations, such as the pool, must be removed. If a structural assessment reveals that the costs of structural renovations are disproportionate to utility, then removal is appropriate to maximize use of the space where up to four volunteer sites should be created. Staff or volunteer presence in this disjunct part of the park offers boundary security and oversight for equipment storage.

Dependent on the outcomes of structural assessments, new buildings for office space and equipment storage should also be located at the McKenzie property, as both are needed to support park and district-wide program areas, including AmeriCorps operations.

Bolen Bluff

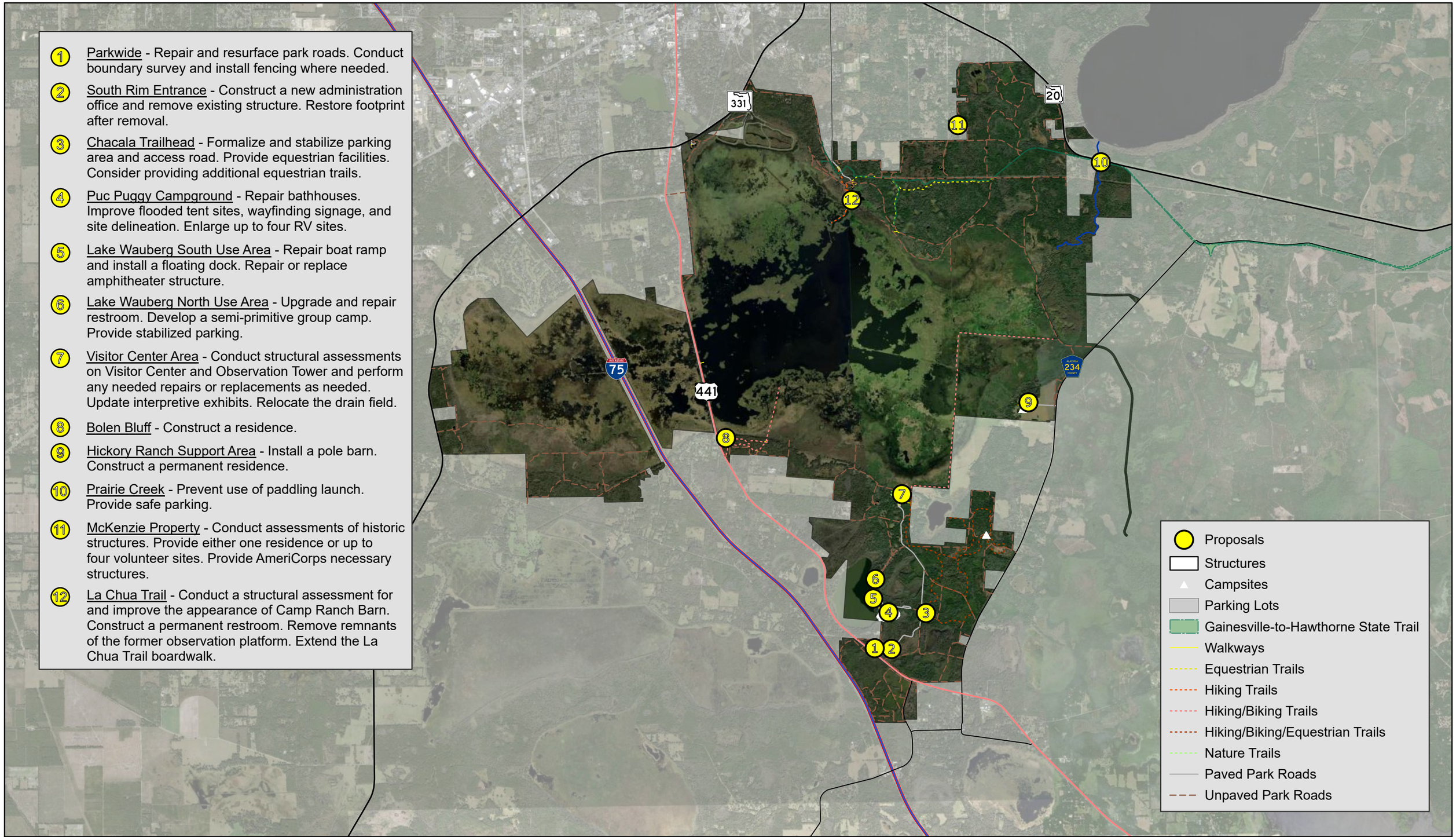
Objective: Expand support facilities

Actions:

- Construct a park residence if the McKenzie property house is not renovated for this purpose.

A staff residence constructed on the western end of the Bolen Bluff area was destroyed by a storm-related fire in 2019. Considering the expansive acreage of the park and management challenges resulting from its decentralized layout, a new residence would be operationally strategic at Bolen Bluff. Specific site selection must consider ample separation and visual buffering from the trailhead and trail.

1. Parkwide - Repair and resurface park roads. Conduct boundary survey and install fencing where needed.
2. South Rim Entrance - Construct a new administration office and remove existing structure. Restore footprint after removal.
3. Chacala Trailhead - Formalize and stabilize parking area and access road. Provide equestrian facilities. Consider providing additional equestrian trails.
4. Puc Puggy Campground - Repair bathhouses. Improve flooded tent sites, wayfinding signage, and site delineation. Enlarge up to four RV sites.
5. Lake Wauberg South Use Area - Repair boat ramp and install a floating dock. Repair or replace amphitheater structure.
6. Lake Wauberg North Use Area - Upgrade and repair restroom. Develop a semi-primitive group camp. Provide stabilized parking.
7. Visitor Center Area - Conduct structural assessments on Visitor Center and Observation Tower and perform any needed repairs or replacements as needed. Update interpretive exhibits. Relocate the drain field.
8. Bolen Bluff - Construct a residence.
9. Hickory Ranch Support Area - Install a pole barn. Construct a permanent residence.
10. Prairie Creek - Prevent use of paddling launch. Provide safe parking.
11. McKenzie Property - Conduct assessments of historic structures. Provide either one residence or up to four volunteer sites. Provide AmeriCorps necessary structures.
12. La Chua Trail - Conduct a structural assessment for and improve the appearance of Camp Ranch Barn. Construct a permanent restroom. Remove remnants of the former observation platform. Extend the La Chua Trail boardwalk.



Paynes Prairie Preserve State Park

Conceptual Land Use Plan

0 2 4 Miles

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OPTIMUM BOUNDARY

Paynes Prairie Preserve State Park is surrounded by urban and suburban development, other conservation lands, and various agricultural land uses. The 16,000-acre wet prairie and other peripheral wetlands are critical to protecting up to 1 million gallons of water per day that funnels into the Floridan aquifer at Alachua Sink. The north boundary of the park is adjacent to the City of Gainesville, which has potential to impact both the quality and quantity of surface waters entering the park.

Approximately 4,760 acres of adjacent lands have been identified for inclusion in the park's optimum boundary. These lands provide valuable watershed protection for the prairie basin. These parcels include other conservation lands, agricultural lands, and undeveloped private holding, many of which are included in Florida Forever Board of Trustees (BOT) projects.

Identified lands in vicinity of State Road 20 would protect a vital wildlife corridor from the northern park boundary to Newnans Lake. Acquisition would also enhance protection of Prairie Creek which drains Newnans Lake, one of the largest lakes in north Florida, into the park and ultimately into Orange Lake.

Parcels on the park's northern and southern boundaries, both east and west of I-75, would provide a critical buffer for stormwater entering the prairie and mitigate the threat of invasive exotic plants. With natural community restoration, stormwater runoff from impervious surfaces into high quality park wetlands cam be eliminated or reduced. This is especially important for parcels near or in between U.S. 441 and I-75 as these lands buffer the prairie from roadway stormwater. Any acquired structures would be evaluated for potential repurposing to serve park needs.

To the east of the prairie is a Florida Forever BOT project for Strategic Managed Area Lands List (SMALL) as well as the Lochloosa Wildlife Florida Forever BOT project. Conservation of these properties will help protect regional water quality and quantity. Specifically, the Lochloosa Wildlife Florida Forever BOT project will preserve large lakes, hydric flatwoods, and prairies in southeastern Alachua County that are home to imperiled wildlife species and serve as a vital component of the larger Paynes Prairie watershed.

Existing Park Boundary
Other Existing Conservation Lands

Optimum Boundary (ARC-Approved)
Optimum Boundary (Proposed Additions)
Proposed Non-DRP Conservation
Florida Forever BOT Projects

Paynes Prairie Preserve State Park

Optimum Boundary

0 1 2 Miles

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