SECTION 2. NATURAL RESOURCES

General

Brooker Creek Preserve is approximately 55% uplands and 45% wetlands. The upland areas are predominantly pine flatwoods with some areas of hammocks, sandhills, and disturbed communities. The wetlands consist of channels of Brooker Creek proper, bottomland hardwoods, cypress domes and strands, hardwood and mixed wetland forests, borrow pit lakes, and marsh/wet prairies.

Topography

The Preserve falls within the Ocala Uplift physiographic district's Tampa Plain, a lowland characterized by karst features related to the occurrence of the Tampa Limestone (Brooks 1981). Two subdivisions of the Tampa Plain occur on the Preserve. The Odessa Flats, which occurs north of a line tracking northwest from Keystone Road at the Preserve's east boundary to the northwest corner of Section 11 (T27S/R16E), is a poorly dissected low sand plain associated with the Anclote River watershed. In the Preserve, this subdivision is characterized by flatwoods and swamps with low sandhills intermingling in the eastern half. Elevations (Figure 19) here range from 15' to 40' above sea level and local relief is more pronounced. To the south lies the Tarpon Basin, an erosional basin partially backfilled with late Pleistocene sediments. Within the Preserve, this subdivision is dominated by flatwoods and extensive swamps with a few relatively small patches of sandhills in the northeast corner. Elevations range from 10' to 35' above sea level. The sandhills crosscut the eastern portions of both the Odessa Flats and the Lake Tarpon Basin and comprise a major portion of a small sandhill district that straddles the Pinellas – Hillsborough county line and extends approximately three miles north-south by one to two miles east-west.

Soil Types

Soil data were obtained from the 2007 USDA/NRCS Soil Survey (Figure 20) and then grouped into three categories: xeric, mesic, and hydric. Xeric soils occur at the highest elevations and correspond to sandhill, xeric hammock, and old field communities. Mesic soils correlate to pine flatwoods and mesic hammock communities. Hydric soils are associated with various wetland habitats including, but not limited to, cypress domes and strands, hardwood and mixed wetland forests, and fresh and saltwater marshes. Natural plant communities found on each soil type within the Preserve can be found in the following descriptions.

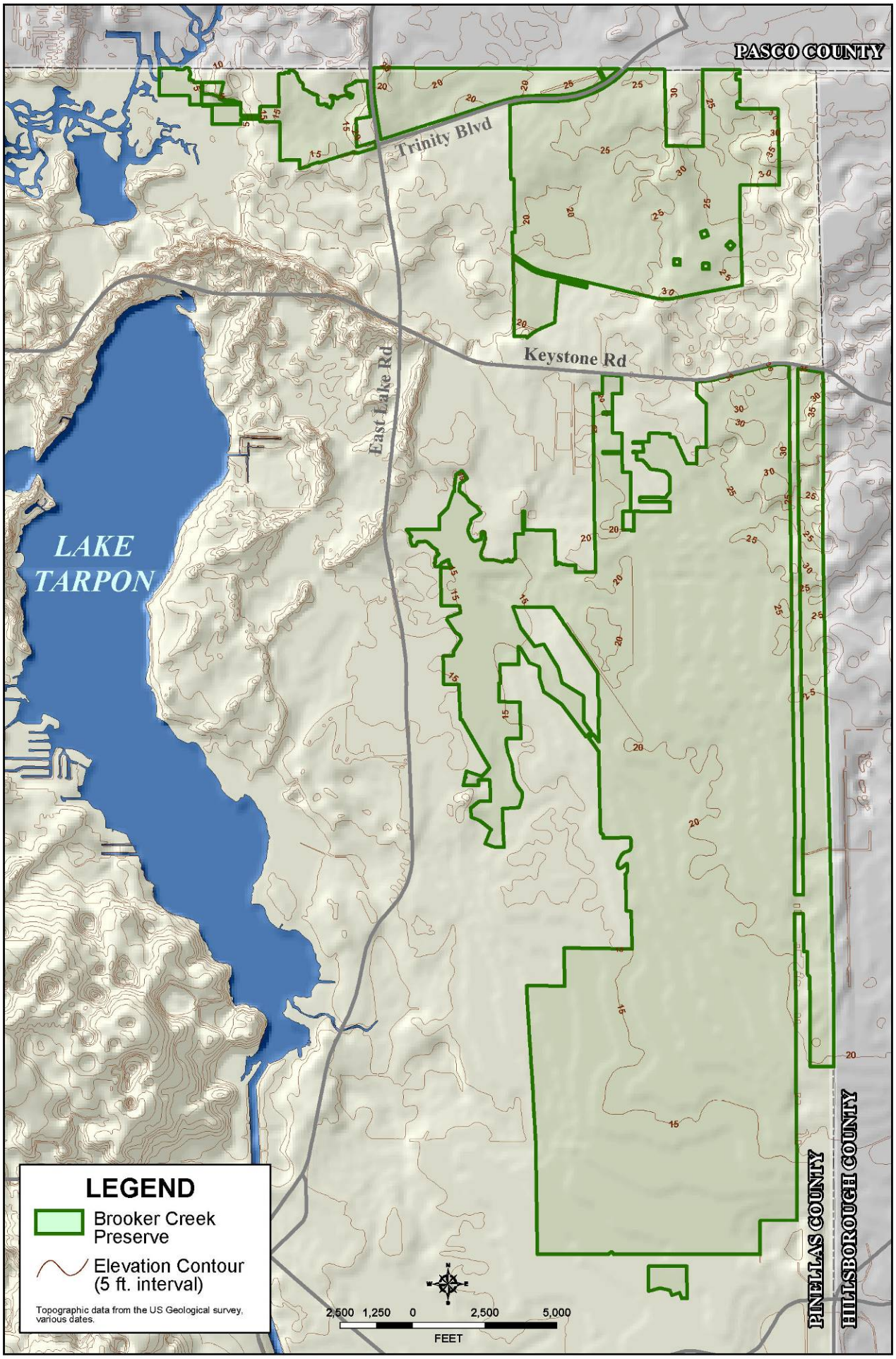

Figure 19. Topographic Map of Brooker Creek Preserve

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Xeric Soils

Adamsville soils (0 to 5 percent slopes) are somewhat poorly drained and have a high density of fine sand that allows for rapid permeability. The high water table averages approxomately 3 feet below the surface from June through November. The landforms on this soil type are knolls and low ridges. The plant communities found on the 36 acres of Adamsville soil in Brooker Creek Preserve are xeric hammock, sandhill, and old field.

Tavares soils (0 to 5 percent slopes) are moderately well-drained and have a high density of fine sand that allows for rapid permeability. The high water table averages approximately 5 feet below the surface from June to December. The landforms on this soil are knolls and low ridges. The plant communities found in the 186 acres of Tavares soils in Brooker Creek Preserve are sandhill, xeric hammock, and old field.

Mesic Soils

Basinger soils are poorly drained and have a high density of fine sand that allows for rapid permeability. The high water table inundates the surface seasonally from June through February. The landforms on this soil type are sloughs. This soil type in general does not meet the definition of hydric soils; however, onsite verification is needed to determine if specific areas of this soil type should be classified as hydric. The plant communities found on the 420 acres of Basinger soil in Brooker Creek Preserve are wetland forested mixed, flatwoods, pine plantations, and old field.

EauGallie soils are poorly drained and have a high density of fine sand that allows this soil to have a moderately rapid to rapid permeability. The high water table average approximately 1 foot below the surface from June through October. The landform on this soil type is flatwoods. The plant communities found on the 239 acres of EauGallie soils in Brooker Creek Preserve are flatwoods, freshwater marshes, and wet prairies.

Immokalee soils are very poorly drained and a high density of fine sand that allows this soil to have a moderately rapid to rapid permeability. The high water table averages approximately 1 foot below the surface from June through November. The landform on this soil type is flatwoods. The plant communities found on the 44 acres of Immokalee soils in Brooker Creek Preserve are mesic and hydric flatwoods.

Myakka soils are poorly drained and have a high density of fine sand that allows for moderately rapid to rapid permeability. The high water table averages approximately 1 foot below the surface from June through November. The landform on this soil type is flatwoods. The plant communities found on the 3,010 acres of Myakka soils in Brooker Creek Preserve are flatwoods and forested mixed wetlands.

Pineda soils are poorly drained and have a high density of fine sand that allows for moderately slow to rapid permeability. The high water table inundates the surface seasonally from June through October. This soil type in general does not meet the definition of hydric soils; however, onsite verification is needed to determine if specific

areas of this soil type should be classified as hydric. The landform on this soil type is flatwoods. The plant communities found in the 86 acres of Pineda soils on Brooker Creek Preserve are wetland forested mixed, cypress domes, and flatwoods.

Wabasso soils are very poorly drained and have a high density of fine sand, clay, and loam in the subsoil that creates a slow to rapid permeability. The high water table averages approximately 1 foot below the surface from June to October. The landform on this soil is flatwoods. The plant communities found on the 40 acres of Wabasso soils in Brooker Creek Preserve are mesic flatwoods, open land, and wetland forested mixed.

Hydric Soils

Anclote fine sand, depressional is very poorly drained and has a high density of fine sand in the soil composition that allows for rapid permeability. The high water table can flood 2 feet above the soil surface seasonally from June to December. The landforms on this soil type are depressions, drainage ways, and swamps. The plant communities found on the 3,310 acres of Anclote fine sand in Brooker Creek Preserve are forested mixed wetland, bottomland forest, cypress strands, cypress domes, and freshwater marshes.

Basinger fine sand, depressional is very poorly drained and has a high density of fine sand that allows this soil to have a rapid permeability. The high water table can flood 2 feet above the soil surface seasonally from June through February. The landforms on this soil type are depressions and swamps. The plant communities found on the 496 acres of Basinger soils in Brooker Creek Preserve are forested mixed wetland, cypress domes, and flatwoods.

Felda fine sand, depressional is very poorly drained and has a high density of fine sand that allows this soil to have a moderately rapid to rapid permeability. The high water table inundates the surface seasonally from June through March. The landforms on this soil type are drainage ways and sloughs. The plant communities found on the 89 acres of Felda fine sand soils in Brooker Creek Preserve are forested mixed wetland, cypress domes, and freshwater marshes.

Manatee loamy fine sand is very poorly drained and has a high density of loamy fine sand that allows for moderate permeability. The high water table inundates the surface seasonally from June through October. The landforms that form on this soil type are depressions, drainage ways, and flood plains. The plant communities found on the 37 acres of Manatee loamy fine sand soils in Brooker Creek Preserve is forested mixed wetland.

Placid fine sand, depressional is very poorly drained and has a high density of fine sand that allows for rapid permeability. The high water table can flood 2 feet above the soil surface seasonally from June through March. The landforms on this soil are depressions and swamps. The plant communities found on the 35 acres of Placid fine sand are wet prairies, forested mixed wetland, cypress domes, and freshwater marshes.

Samsula muck is very poorly drained and has a high density of fine sand covered by muck that allows for rapid permeability. The high water table floods 2 feet above the soil surface seasonally from June through October. The landforms on this soil are depressions and swamps. The plant communities found on the 63 acres of Samsula muck soils in Brooker Creek Preserve are freshwater marshes, cypress domes, and old field.

Wulfert muck, very frequently flooded is very poorly drained and has a high density of muck covering fine sand that allows for rapid permeability. The high water table inundates the surface throughout the year. The landform on this soil is tidal marsh. The plant community found on the 91 acres Wulfert muck in Brooker Creek Preserve is tidal marsh.

Water Resources

The Preserve is located within seven drainage basins (Figure 21). Five of the basins lie within two larger watersheds. Over 60% of the Preserve falls within the Brooker Creek watershed that includes the Brooker Creek and Unnamed Ditch drainage basins. The Anclote River watershed encompasses the Anclote River, Duck Slough and the Hollin Creek basins that account for almost 25% of the Preserve. The remaining part of the Preserve falls with the Double Branch and Moccasin Creek basins that both outfall into Tampa Bay.

There are several named channels within the Preserve (Figure 22). While there are some areas of well-defined channels, most are large sheet flowing basin and strand swamps. Channel A is considered the main channel of Brooker Creek. The other channels connect to Channel A, in various locations, before the creek outfalls into Lake Tarpon.

The Pinellas County Department of Environmental Management's Water Resources Management Section has been collecting ambient water quality data throughout the County since 1990. While there are no sites located within the Preserve proper, currently two collection sites are found on Brooker Creek's Channel A. One site is located less than one mile upstream of the Preserve and the other is downstream within the Tarpon Woods subdivision. The 2003-2006 report indicates impairments in both dissolved oxygen and pH.

Plant Communities and Cover Types

Several plant communities are found in Brooker Creek Preserve (Figure 23). They are predominately mesic flatwoods, strand swamps, and basin swamps with smaller communities aggregated throughout. All plant communities were classified using the system described by Florida Natural Areas Inventory and the Florida Department of Natural Resources (FNAI, 1990). These natural community types are characterized by vegetation composition, land form, and fire periodicity.

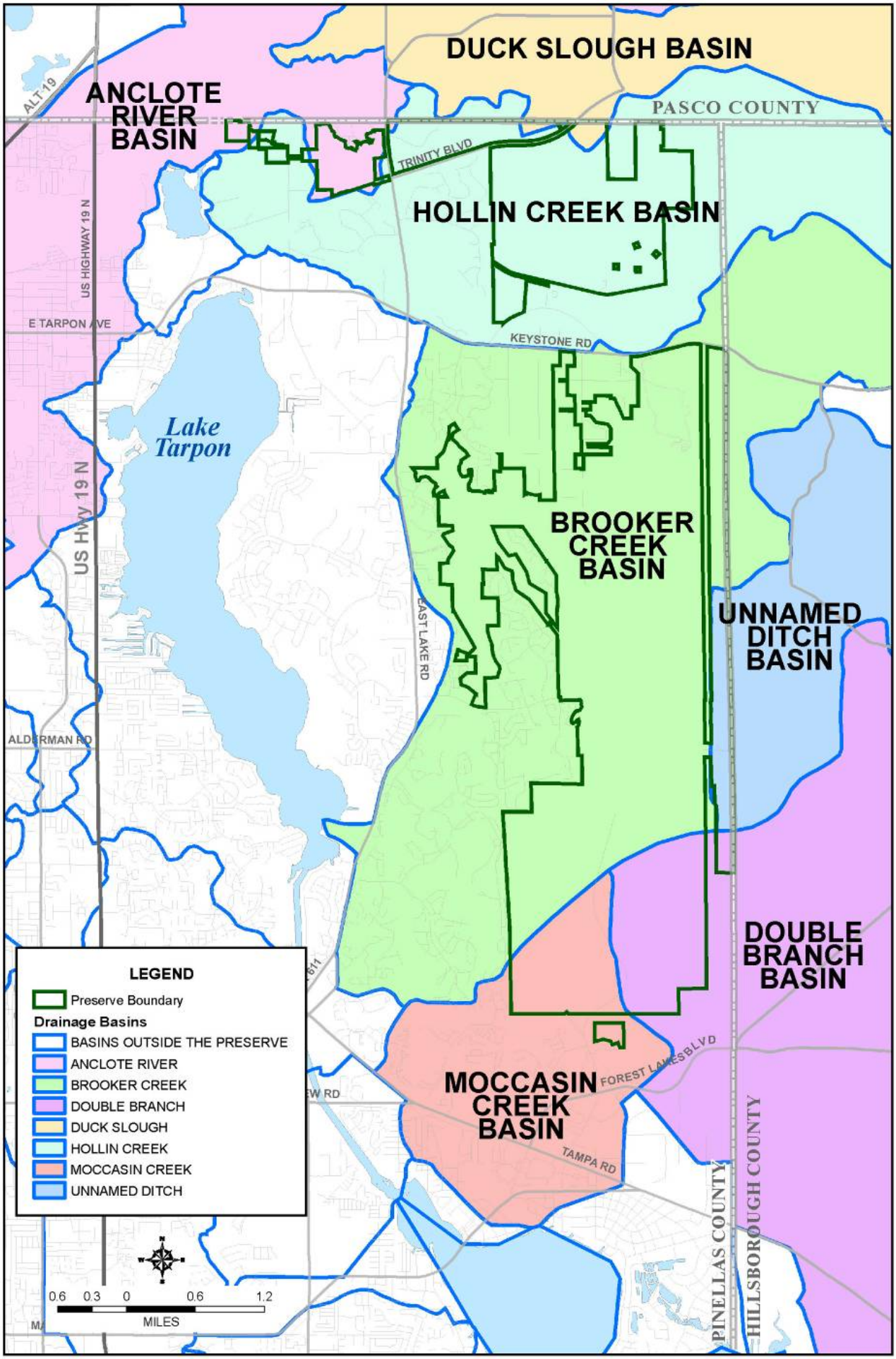

Figure 21. Brooker Creek Preserve Drainage Basins

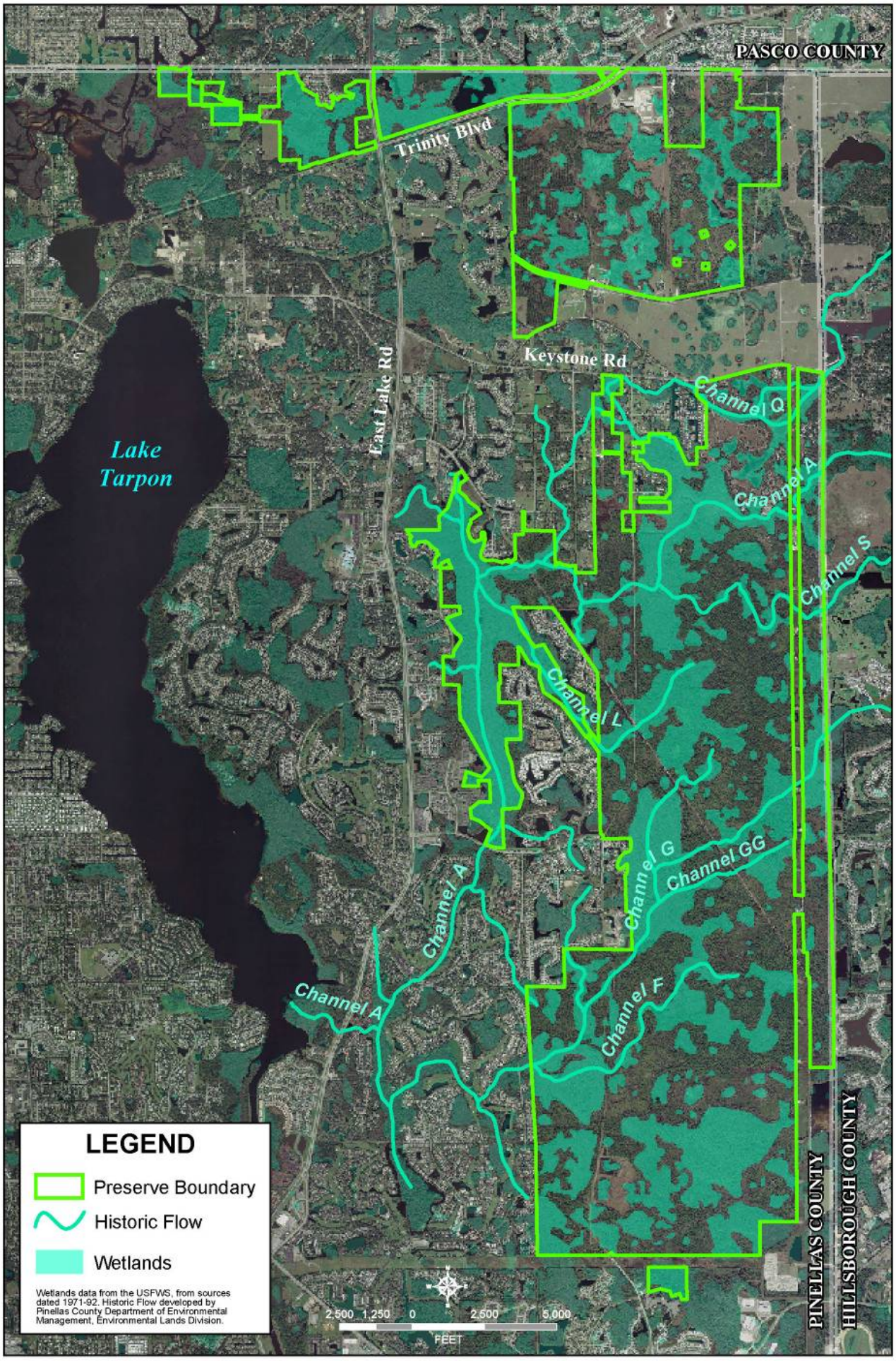

Figure 22. Historic Flow within Brooker Creek Preserve

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Xeric Hammock (~230 acres)

This community is an advanced successional stage of sandhill, and representatives are found in small patches from the mid to north sections of Brooker Creek Preserve on Adamsville and Tavares soils. The high, well-drained soils suggest that more sandhill communities could exist in the northern parts of Brooker Creek Preserve. However, since fire has been excluded for many years, these xeric hammock areas are now dominated by successional species. Xeric areas where fire exclusion approaches 30 years begin to take on hammock-like conditions. A xeric hammock that has formed on sandhill soils is typically characterized by an overstory of turkey oak, sand live oak, and longleaf pine mixed with other successional hardwood species. Hammock canopies are dense and thus prohibit much understory growth. Consequently, fuel loads are gradually reduced and fire is less likely to occur. The dominant flora normally found in this community in Brooker Creek Preserve is live oak (*Quercus virginiana*), sand live oak (*Quercus geminata*), laurel oak (*Quercus laurifolia*), turkey oak (*Quercus laevis*), longleaf pine (*Pinus palustris*), persimmon (*Diospyros virginiana*), beautyberry (*Callicarpa americana*), and saw palmetto (*Serenoa repens*). The fauna normally found include black racer, turkey, white-tailed deer, and pygmy rattlesnake.

Strand Swamp (~1270 acres)

The strand swamps are the second largest natural community in Brooker Creek Preserve. They are found on Anclote fine sand, Basinger fine sand, Felda fine sand, Pineda soil, and Placid fine sand, where low-lying landscapes create a long hydroperiod. Species in this community must handle the stress of being inundated over 250 days a year. Select species in this community use advantageous root structures like prop roots for stabilization in loose soils and pneumatophores to obtain oxygen above the water levels. The dominant canopy species is bald-cypress (*Taxodium distichum*). Other flora normally found in this community are red maple (*Acer rubrum*), red bay (*Persea borbonia*), wax myrtle (*Myrica cerifera*), and buttonbush (*Cephalanthus occidentalis*). Common faunal species include white-tailed deer, cottonmouth, gray squirrel, and raccoon.

Basin Marsh (~700 acres)

This community is found throughout the Preserve on Anclote fine sand, Basinger, EauGallie, Felda fine sand, Myakka, Placid fine sand, and Samsula muck. The low-lying landscape in this community creates a long hydroperiod where the average inundation of soils is approximately 200 days a year. Depending on the shrub density, a basin marsh can burn as often as every 3 years during the dry season. This frequency helps maintain a healthy diversity of herbaceous species. This is a mostly tree canopy-free community that allows for a high density of shrub and herbaceous species. Vegetation such as coastal plain willow (*Salix caroliniana*), groundsel tree (*Baccharis halimifolia*), elderberry (*Sambucus nigra*), spikerush (*Eleocharis* spp.), and common reeds dominate the basin marshes in the Preserve. Common fauna are bull frog, pig frog, leopard frog, great blue heron, great egret, and snowy egret.

Mesic Flatwoods (~3500 acres)

This natural community dominates the uplands throughout Brooker Creek Preserve. Over 40% of the Preserve is covered by mesic flatwoods that are found on Basinger, EauGallie, Immokalee, Myakka, and Pineda soils. Some of the flatwood communities in the Preserve have been disturbed by agricultural uses and fire suppression. In the northern part of the Preserve many of the flatwoods were cleared and converted to grazing pasture, then later planted as pine plantations. In other areas of the Preserve, mesic flatwoods have not burned in more than 20 years and have begun to succeed into hardwood communities. To maintain structure and biodiversity, mesic flatwoods require burning every 1 to 8 years. The dominant vegetation found in the flatwoods throughout Brooker Creek Preserve is slash pine (*Pinus elliottii*), saw palmetto (*Serenoa repens*), blueberry (*Vaccinium* spp.), St. Johns-wort (*Hypericum* spp.), staggerbush (*Lyonia fruticosa*), and gallberry (*Ilex glabra*). The fauna normally found include gopher tortoise, black racer, turkey, pine warbler, white-tailed deer, and pygmy rattlesnake.

Sandhill (~220 acres)

This community makes up a very small percentage of the uplands in Brooker Creek Preserve and is found on Adamsville and Tavares soils. These high, well-drained soils create a xeric environment with highly-leached soils and poor nutrient content. The open canopy of longleaf pines and turkey oaks in this community allows for a high diversity of flora in the herbaceous level. The sparse canopy is directly correlated with the high frequency of fires in this community. The fire periodicity in this habitat should be every 2 to 5 years to prevent succession into a hardwood hammock. In the northern part of Brooker Creek some of the sandhill communities have been lost to agricultural development when they were cleared for grazing pasture land. The dominant flora normally found in sandhills include longleaf pine (*Pinus palustris*), turkey oak (*Quercus laevis*), bluejack oak (*Quercus incana*), persimmon (*Diospyros virginiana*), gopher apple (*Licania michauxii*), wiregrass (*Aristida stricta* var. *beyrichiana*), and golden-aster (*Pityopsis graminifolia*). Fauna found in this natural community can include white-tailed deer, turkey, gopher tortoise, spadefoot toad, and eastern diamondback rattlesnake.

Tidal Marsh (~15 acres)

Tidal marshes are located in the northwest section of Brooker Creek Preserve. These natural communities are found on the very frequently flooded Wulfert muck soils. In the Preserve, the tidally influenced Anclote River flows through this natural community. The plants found growing here must tolerate extreme tidal and salinity fluctuations. The typical vegetation includes black needle rush (*Juncus roemerianus*), smooth cordgrass (*Spartina alterniflora*), and saltworts (*Batis maritima*). Faunal species that take residence include shrimp, blue crab, oysters, and snook.

Wet Flatwoods (~140 acres)

This community is found in transition areas adjacent to bottomland forests and strand swamps in the Preserve. Wet flatwoods are located on Anclote fine sand, Basinger, EauGallie, Myakka, Pineda, and Wabasso soils. This community has an open canopy similar to mesic flatwoods and is dominated by slash pine. The landscape is low-lying and can be inundated during Florida's wet months. Typical vegetation includes slash pine (*Pinus elliottii*), saw palmetto (*Serenoa repens*), gallberry (*Ilex glabra*), greenbrier (*Smilax* spp.), and sedges (*Cyperus* spp.). Fauna normally found include white-tailed deer, bobcat, cotton rat, pygmy rattlesnake, and red-shouldered hawk.

Basin Swamp (~1060 acres)

The basin swamps are the third largest community in Brooker Creek Preserve. They are found on Anclote fine sand, Basinger, EauGallie, Felda fine sand, Manatee loamy fine sand, Myakka, Pineda, Samsula, and Wabasso soils. The topography of this community is found on the lower-level landscapes that can be inundated up to 10 months a year. Fire is still an important factor, despite these long hydroperiods. Like most other communities in Brooker Creek Preserve, succession into a hardwood community will occur in the absence of fire. The fire periodicity range from as short as 5 years to as long as 150 years. Flora normally found are red maple (*Acer rubrum*), swamp redbay (*Persea palustris*), loblolly bay (*Gordonia lasianthus*), buttonbush (*Cephalanthus occidentalis*), and wax myrtle (*Myrica cerifera*). Common fauna include cottonmouth, hawk, turkey, gray squirrel, raccoon, river otter, bobcat, and white-tailed deer.

Bottomland Forest (~840 acres)

Bottomland forests are found in the lower-level landscapes of the Preserve. They are found on Anclote fine sand, Basinger, Myakka, Placid fine sand, and Samsula muck soils. Bottomland forest buffers the main creek channels that run throughout the Preserve. This natural community has a dense canopy that consists of various deciduous species. This closed canopy leads to low diversity on the forest floor. This is one of the few communities in Brooker Creek Preserve that can be maintained without a regular fire cycle. Common flora include water oak (*Quercus nigra*), live oak (*Quercus virginiana*), red maple (*Acer rubrum*), cabbage palm (*Sabal palmetto*), loblolly bay (*Gordonia lasianthus*), dahoon holly (*Ilex cassine*), and wax myrtle (*Myrica cerifera*). Cottonmouth, red-tailed hawk, turkey, opossum, gray squirrel, raccoon, bobcat, and white-tailed deer are some of the wildlife species normally found in this community.

Unclassified Habitats

Some acres in the Preserve do not fall under any of the Florida Natural Areas Inventory classifications. These includes 54 acres of borrow pits in the south end of Brooker Creek Preserve and the Four Lakes Hammock area. There are also about 1.5 acres of coastal creek in the northwest Brooker-Anclote Corridor.

Listed Species

Several listed floral and faunal species have been documented on Brooker Creek Preserve (Appendix 14). Presently, there are 12 state endangered, threatened, or commercially exploited plants along with 17 state endangered, threatened, or species of special concern wildlife species. The classification endangered represents species, subspecies, or isolated populations so few or depleted in numbers or so restricted in range that it is in imminent danger of extinction. The classification threatened represents species, subspecies, or isolated populations facing a very high risk of extinction in the future. Species of special concern are species, subspecies, or isolated populations facing a moderate risk of extinction in the future. The rankings for these species have been designated by the Florida Fish and Wildlife Conservation Commission. The main cause for a listing of a species in Florida is directly related to the loss and destruction of its habitat.

Invasive Exotic Species

Flora

The Florida Fish and Wildlife Conservation Commission defines an exotic species as one that was introduced into Florida by human activity and is free-ranging in an area to which it was not native in pre-Columbian times. Exotic flora in natural areas can have detrimental effects to the native flora and fauna (Lurks and Langeland, 1998). The areas in the Preserve with the most prevalent densities are access roads, firebreaks, and areas where human activities have disturbed the soils (Appendix 15). Exotic flora distribution is caused by wind-born dispersal, birds consuming fruits and seeds, inflow of surface water from outside the Preserve, and various construction projects within the Preserve.

Brazilian pepper (*Schinus terebinthifolius*), Cogon grass (*Imperata cylindrica*), Torpedo grass (*Panicum repens*), and Chinese tallow (*Sapium sebiferum*) are the most prevalent of the 35 Category I or II species that have been observed in the Preserve. Category I species are defined by the Florida Exotic Pest Plant Council as species that are invading and disrupting native plant communities. Category II species are defined as species that have shown a potential to disrupt native plant communities (Lurks and Langeland, 1998).

Fauna

Exotic fauna in natural areas can prey on or displace native species or destroy native plant species or natural plant communities. Some of these exotic species can be found anywhere within the Preserve while others are limited to the boundaries. Exotic faunal species that have been document on the Preserve include:

Brown anoles (*Anolis sagrei*) have been found near developed and ruderal areas throughout the Preserve. Research has shown that this species is a stronger competitor than and sometimes predator of the native green anole (*Anolis carolinensis*).

Cuban treefrogs (*Osteopilus septentrionalis*) are another exotic that is a predator of some native amphibians. Its prey includes squirrel treefrogs (*Hyla squirella*), green treefrogs (*Hyla cinerea*), and southern leopard frogs (*Rana sphenocephala*). This species is normally found near the borders and in developed areas within the Preserve.

Greenhouse frogs (*Eleutherodactylus planirostris*) are another exotic frog found inside Brooker Creek Preserve. This species has been observed in the northeast section of the Preserve in mesic flatwoods and succeeding sandhill habitats. The Greenhouse frog is currently not considered to be a major threat to native fauna in the Preserve.

Feral pigs (*Sus scrofa*) were at one time found in the Preserve in the xeric hammocks and ruderal areas north of Keystone Road. They have not been observed in the Preserve since 2004. This species is known for its destructive feeding habits that destroy native flora.

Mexican bromeliad weevils (*Metamasius callizona*) have been found in most of the successional sandhill and xeric hammock habitats throughout Brooker Creek Preserve. This exotic species of weevil is a destructive herbivore of the endangered giant airplant (*Tillandsia utriculata*) and cardinal airplant (*Tillandsia fasciculata*). Today, there is no accepted management practice for the eradication of this species. Research at regional universities is currently underway on the use of biological controls (i.e. parasitic flies) to eradicate this species.

Muscovy ducks (*Cairina moschata)* are occasionally seen near the edges of the Preserve. Golf courses that border the eastern section of the Preserve have most likely been the reason for the sightings of this species in the area. The native range of the Muscovy is Central and South America. The Muscovy is a nuisance species and has not become established enough to displace other native fauna.

Walking catfish (*Clarias batrachus*) has been found just south of Keystone Road in the northeast section of the Preserve. Its introduction most likely originated from the population documented in Hillsborough County. The specimens that were found have been removed, though it may have established within the Preserve.