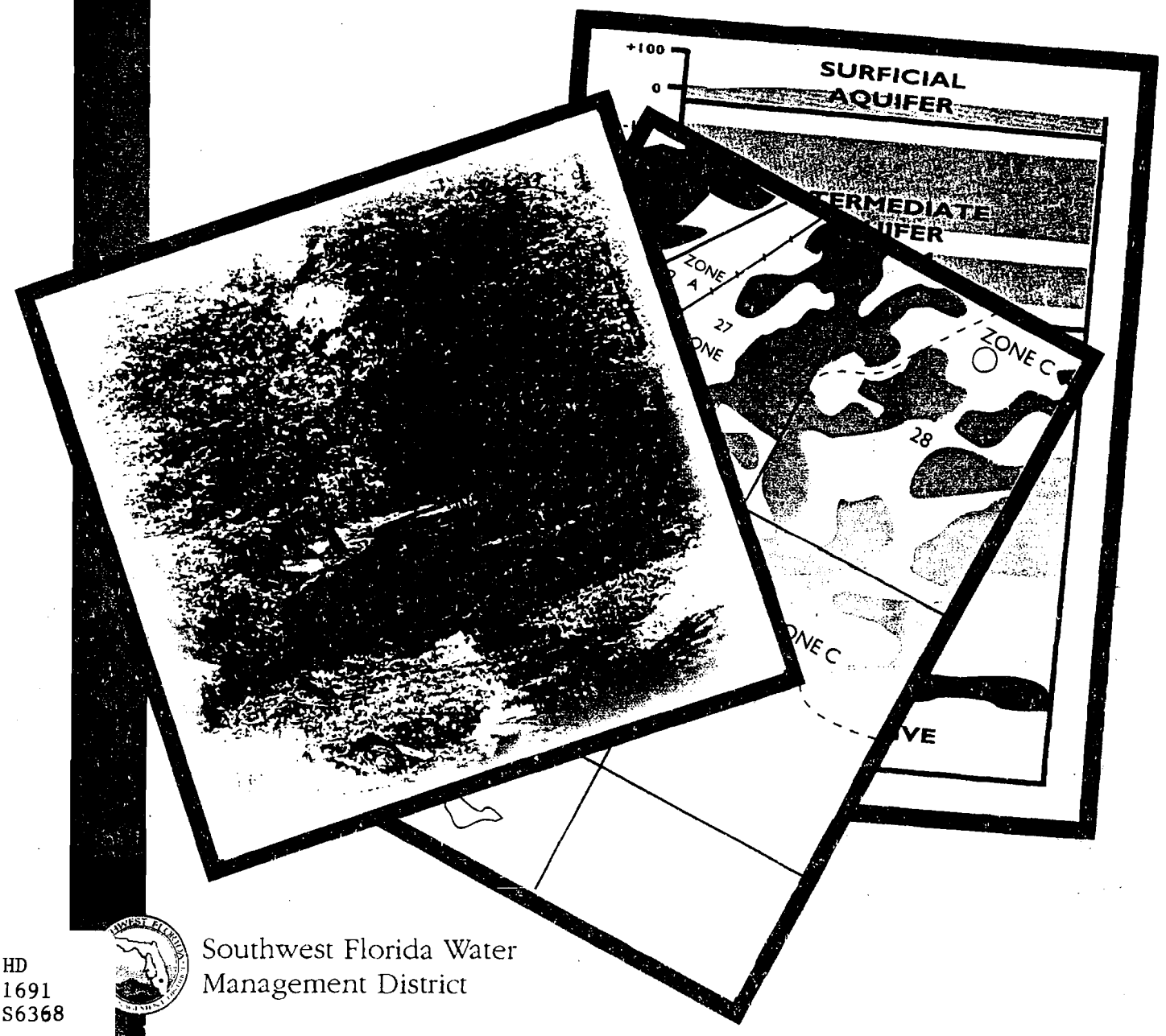
Save Our Rivers/Preservation 2000
Water Management Lands Trust Fund

Annutteliga Hammock

Resource Evaluation



Southwest Florida Water
Management District

RESOURCE EVALUATION OF THE

ANNUTTELIGA HAMMOCK

(Save Our Rivers Program)
(Preservation 2000)

JUNE 1996

PREPARED BY STAFF OF THE

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LAND USE TASK FORCE RECOMMENDATIONS

In the opinion of the staff, Land Use Task Force (LUTF), the Annutteliga Hammock Project area provides regional and local benefits for water management, water resource protection and protection of natural systems. In consideration of the findings from the resource evaluation report, it is the recommendation of the LUTF to initiate the following:

- Advance the proposed acquisition project (30,295 acres) to Group A in the District's Save Our Rivers/Preservation 2000 Five-Year Acquisition Plan and pursue acquisition.

- Where feasible, pursue joint acquisition/funding of priority areas identified by the Department of Environmental Protection's Conservation and Recreation Lands (CARL) Program and Hernando County Environmentally Sensitive Lands Program. Additionally, pursue delegation of land management activities where appropriate.

- By January 1997, evaluate for and identify less-than-fee acquisition opportunities as determined from a water resource, ecological and land management standpoint.

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PREFACE

Section 373.59, Florida Statutes, provides that monies from the Water Management Lands Trust Fund shall be used for acquiring the fee or other interest in lands necessary for water management, water supply, and the conservation and protection of water resources, except that such monies shall not be used for the acquisition of rights-of-way for canals or pipelines. Lands acquired shall be managed in such a way as to restore and protect their natural state and condition where practicable. Additionally, they shall be available for public recreation where it is consistent with the purposes for which they were acquired.

In June of 1990, the Legislature enacted the Florida Preservation 2000 Act (Section 259.101, Florida Statutes) which broadens the scope and criteria of the Water Management Lands Trust Fund. Section 259.101, Florida Statutes, requires proceeds of bonds deposited in the Preservation 2000 Trust Fund pursuant to the Florida Preservation 2000 Act shall be spent only on projects which meet at least one of the established criteria (see page ix).

The following report is an evaluation to determine whether the subject lands qualify for acquisition under the Save Our Rivers program or Preservation 2000, and a review of the water management benefits that would be attained if acquired. It is based on the criteria contained in Sections 373.59 and 259.101, F.S.

In performing this SOR/P2000 evaluation, District Staff has used the best available information derived from existing literature and direct field observations. The report is not intended to be a comprehensive evaluation of the water management elements regarding the subject lands. Use of this report and the data contained herein for purposes other than evaluation of lands for purchase with SOR and Preservation 2000 funds may be inappropriate.

EVALUATION

CRITERIA FOR ACQUISITION

Sections 373.59 and 259.101, F.S., establish and broaden the Water Management Lands Trust Fund to provide for acquisition of lands necessary for water management, water supply and the conservation and protection of water resources. In addition, Section 373.59 states that following acquisition, these lands "shall be managed and maintained in an environmentally acceptable manner, and to the extent practicable, in such a way as to restore and protect their natural state and condition". Guided by Section 373.59, District staff developed a list of criteria, representing seven water management benefits, which will be used to select sites for further study and possible purchase. The criteria are as follows:

SOR CRITERIA

1. Natural Flood Control and Water Detention and/or Retention: The floodplain associated with the site boundaries; the site's ability to keep or retain water which is then dissipated by evaporation, transpiration or percolation rather than leaving the site as runoff.

2. Preservation and/or Restoration of Natural Systems: The potential to preserve the site in an unaltered natural condition or return/restore it to a natural functioning ecologic/hydrologic/hydraulic system.

3. Water Conveyance: The manner in which water is transported through the site; the ability of the site to transport flood flows.

4. Structural Flood Control: The potential for the site to be used in conjunction with dikes, levees and control structures to reduce the severity of flooding through the impoundment of runoff.

5. Water Quality Enhancement: The processes functioning within the site which will benefit or influence the quality of the water leaving the site over that entering the site.

6. Recharge: The ability of a site to replenish the water supply of a ground water source.

7. Potable Water Supply: The existing or potential ability of a site to function as a potable water source.

P2000 CRITERIA

✓ A significant portion of the land in the project is in imminent danger of development; in imminent danger of loss of its significant natural attributes, or in imminent danger of subdivision which will result in multiple ownership and may make acquisition of the project more costly or less likely to be accomplished;

✓ Compelling evidence exists that the land is likely to be developed during the next 12 months, or appraisals made during the past 5 years indicate an escalation in land value at an average rate that exceeds the average rate of interest likely to be paid on the bonds;

✓ A significant portion of the land in the project serves to protect or recharge ground water and to protect other valuable natural resources or provide space for natural resource-based recreation;

✓ The project can be purchased at 80 percent of appraised value or less; or

✓ A significant portion of the land in the project serves as habitat for endangered, threatened, or rare species or serves to protect natural communities which are listed by the Florida Natural Areas inventory as critically imperiled, or rare, or as excellent quality occurrences of natural communities.

The above criteria or water management benefits are addressed under several major categories for evaluation and discussion purposes.

1. Water Management/Water Resources: Drainage basin hydrology, conveyance, natural flood control, water retention/detention, structural flood control, water supply, preservation of existing supplies, potential water supplies and recharge.

2. Environmental Conditions and Assessment: Natural/ecological conditions of the area, water quality preservation/ enhancement, wildlife resources, ecological functions and values of the area, maintenance and self-perpetuation of the site, and preservation and restoration of natural systems.

It is believed that an evaluation addressing these topics will assess each proposed acquisition's contribution to water management, the conservation and the protection of water resources, water supply considerations, and protection of natural systems.

INTRODUCTION

The Annutteliga Hammock project has been evaluated for acquisition under the Save Our Rivers and Preservation 2000 (SOR/P2000) programs. This report is an abbreviated version of the standard SOR/P2000 resource evaluation report and relies primarily on information from reports [Fretwell (1985) , SWFWMD (1987), FDEP (1993) and Wharton (1987)] that cover the project region and the project area itself.

Located in southern Citrus and northern Hernando Counties, the Annutteliga Hammock project encompasses approximately 30,295 acres within the District's Coastal Rivers Basin. The project is located generally within a regional area located between Homosassa Springs to the northwest, the Withlacoochee State Forest (Citrus Management Area) to the northeast, Brooksville to the southeast and Weekiwachee Springs to the southwest. Major roads within this region include U.S. 19, which is the project's western boundary and U.S. 98 which runs diagonally from northwest to southeast through the central portion of the project area (Figure 1).

As shown on Figure 1, the project area consists of the original project area and a proposed addition. The original project area consists of two large land areas totaling approximately 28,597 acres. The addition area (1,698 acres) was added to connect the two separate land areas of the original project area and to form a continuous corridor to public lands along the coast to the west of the project area and interior to the east. The original project area reflects the areas being considered for acquisition by the Florida Department of Environmental Protection (FDEP) under their Conservation and Recreation Lands (CARL) acquisition program. Additionally, a portion of the project (Horse Lake Hammock) has been identified as the highest priority acquisition area by Hernando County under their Environmentally Sensitive Lands Program (E. Kelly, pers. comm., 1996).

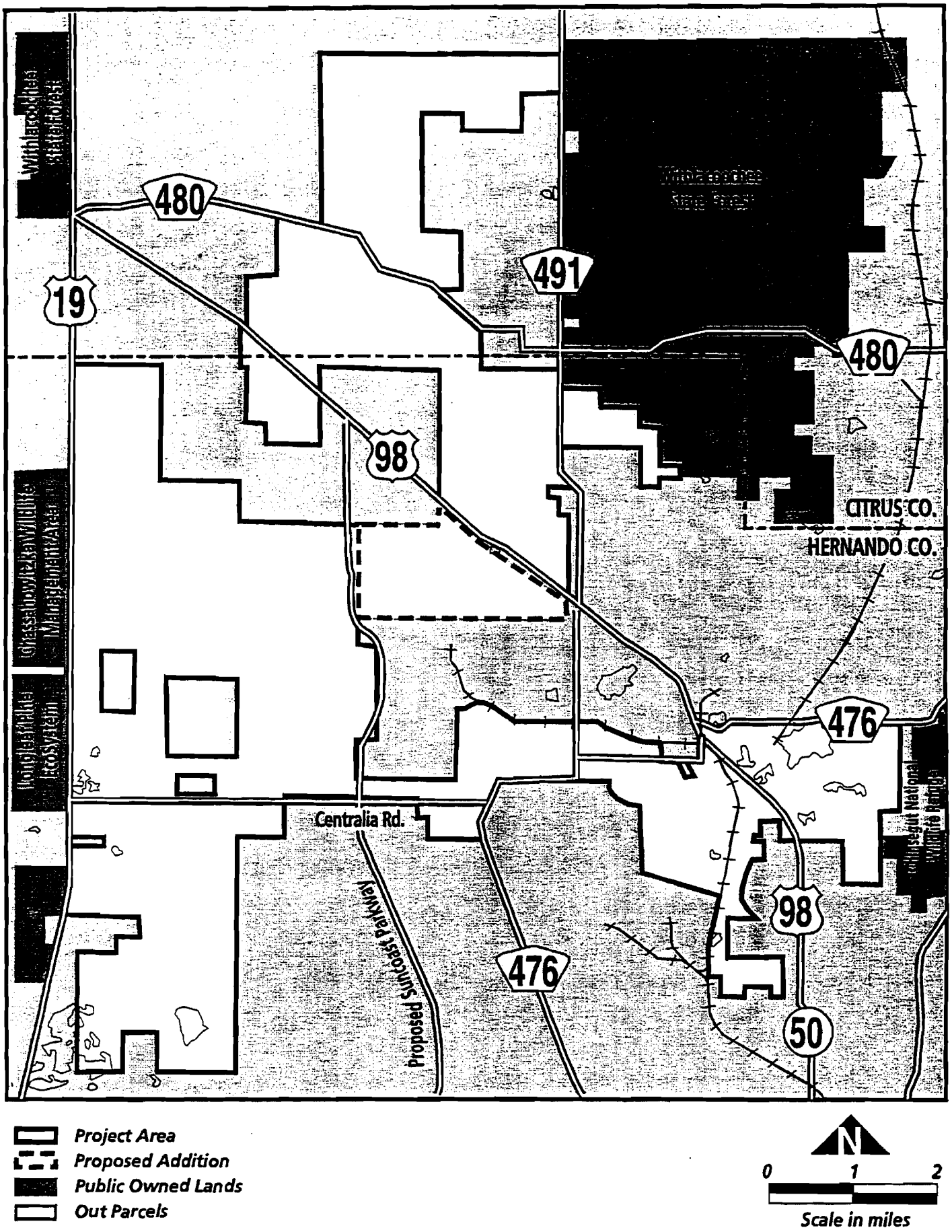

Figure 1. Location map of the proposed Annutteliga Hammock SOR/P2000 Project.

The Annutteliga Hammock project was named for its historic geographic location and setting within the Annutteliga Hammock area of the Big Hammock region. The Big Hammock is the most southerly, extensive body of hammock land within peninsular Florida, encompassing an estimated 200 square mile section of west-central Florida. The Big Hammock region is among Florida's most significant and earliest known national geographic features. The Annutteliga Hammock is located within the northern half of Big Hammock (Figure 2). Historically it was among the largest contiguous bodies of upland temperate hammock in Florida, extending over a 32 square mile area (20,000 acres) in Hernando County northwest (and including a small portion) of Brooksville (Wharton, 1987).

The Annutteliga Hammock project area supports an important and unique assemblage of high quality temperate upland hardwood forest and exceptional caliber sandhills along the Brooksville Ridge. The core Annutteliga Hammock area within the southeastern portion of the project represents a distinctive subtype of upland hardwood forest that is highly unusual, aesthetically pleasing, biogeographically significant and nearly extirpated. Because of current land use activities in and around Brooksville, fragmentation of this unique landscape has occurred, threatening the natural ecological values of this region. Preservation of the remaining large contiguous areas of the hammock region will protect some of the best remaining examples of those community subtypes that are the most endangered or rarest along the Brooksville Ridge (DEP, 1993).

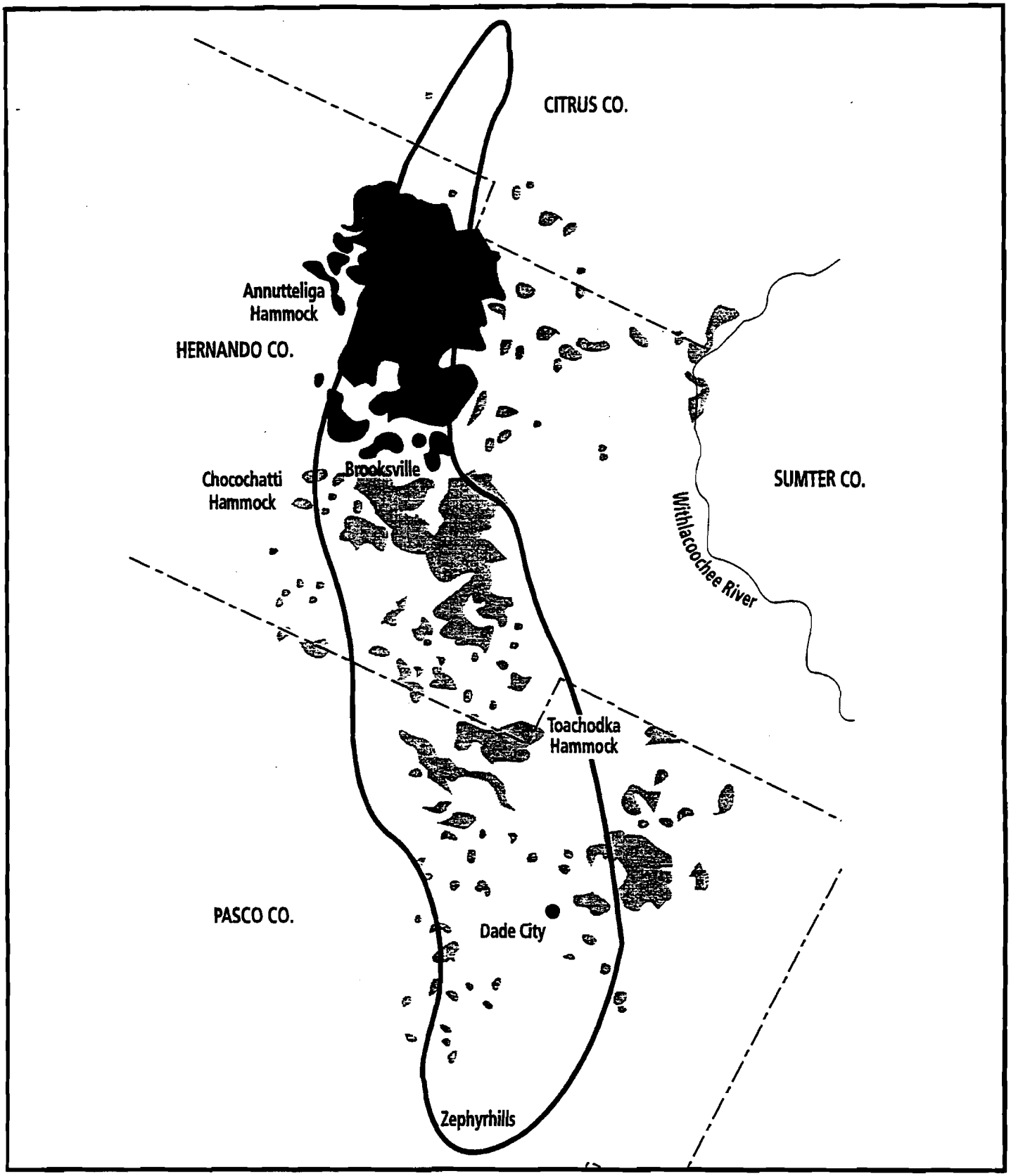

Figure 2. Predevelopment extent of Annutteliga, Chocochatti, and Toachodka Hammocks and outter hammocks of the big hammock region. (Wharton, 1987)

SURFACE WATER CONDITIONS

Soils and topography are major factors shaping surface water drainage, especially within the project area and the surrounding region. The project area is located within the Brooksville Ridge, a relic dune system and regionally dominant topographic feature that greatly influences surface water drainage (Figure 3). The edges of the Ridge are characterized by deep, sandy soils pocketed with depressions and sinkholes. The surface contour is irregular due to karst activity and elevations may vary over 100 feet in short lateral distances. Within the project area, elevations range from 75 to about 270 feet above the National Geodetic Vertical Datum (NGVD).

Typical of the Brooksville Ridge, soils within the project area consist mainly of well-drained and somewhat poorly-drained soils. The portion of the project located just east of U.S. 19 consists of generally well-drained soils that support longleaf pine and turkey oak communities. Some of the sandhills also support sand pine scrub. Because of the permeability of these soils and the general lack of a confining layer between the surficial soils and the limestone of the underlying Floridan aquifer system, there is a high recharge potential in this area, estimated to be 15 to 20 inches per year. Moving further inland, the principal soils are somewhat poorly drained and generally support hardwood forests and mesic hammock communities. These soils are generally not very permeable, however there is a high potential for recharge to the Floridan aquifer system in these areas due to the presence of sinkholes which can channel water into the underlying aquifer.

Surface water drainage within the project area is internal, which is typical in karst terrain such as the Brooksville Ridge area. Rainfall percolates through sand and clay to recharge the Floridan aquifer system. After heavy rainfall, small intermittent streams flow to sinkholes where the water either percolates rapidly or ponds to form prairie lakes. During wet periods, flooding may occur if the rate of rainfall exceeds the rate of percolation, or if the potentiometric surface of the aquifer rises to or above the bottom of sinkholes.

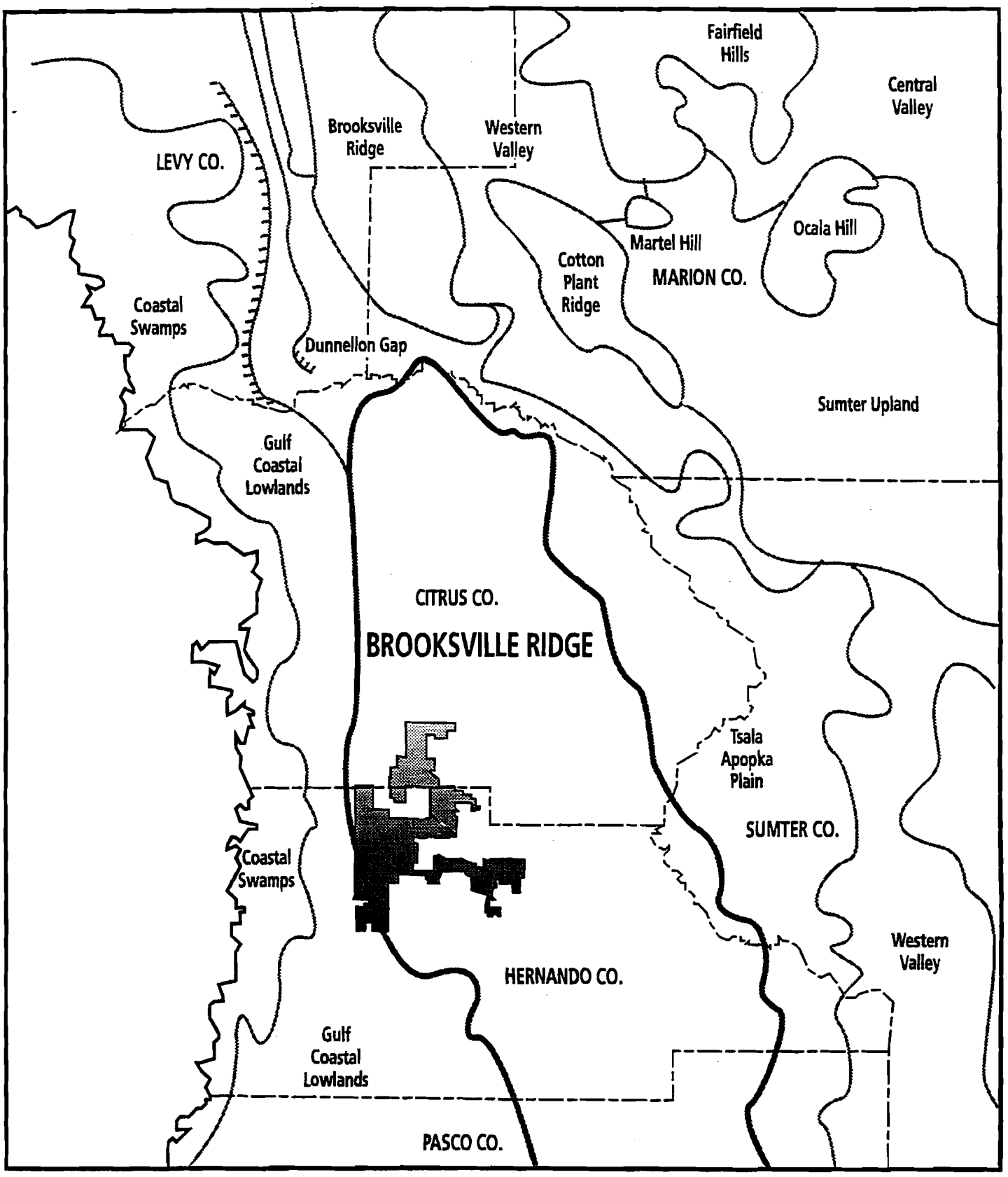

Figure 3. Location of the Annutteliga Hammock project area in relation to the Brooksville Ridge. (modified from SWFWMD, 1987)

Because the region is internally drained, there are no major streams within the project area. Within the surrounding region, the Withlacoochee and Little Withlacoochee Rivers, located to the east of the project area, are the only perennial streams inland from the coast. Other perennial streams are those that are fed by springs along the coast such as the Chassahowitzka River located to the west of the northern project area and the Weekiwachee River located to the west of the southern project area.

The only relatively permanent surface water features within the project area are lakes. Some lakes within the region appear to be surface expressions of ground water tables perched on impermeable materials such as clay. Others are directly connected to the Floridan aquifer system through sinkholes and reflect the potentiometric surface of the aquifer. Lakes that have a direct connection with the Floridan aquifer could be potential sources of contamination to the underlying aquifer system if land uses adjacent to the lake or in the immediate watershed degrade lake water quality.

GROUND WATER CONDITIONS

The Annutteliga Hammock project area is located within the Northern West-Central Florida Ground-Water Basin (NWCFGWB). The NWCFGWB is approximately 4,500 square miles in extent and includes all of Hernando, Citrus and Sumter counties and major areas of Alachua, Levy, Marion, Lake, Polk, Putnum and Pasco counties (Figure 4). Within the project area, water recharged to the Floridan aquifer flows generally to the northwest towards the coast from potentiometric highs located inland in the Green Swamp and Pasco County (Figure 5). Discharge from the Floridan aquifer occurs predominantly through spring flow. It also occurs through upward leakage to the water table when the potentiometric surface is higher than the water table, lateral outflow to the Gulf and pumpage.

The ground-water system in the project area consists of the surficial and Floridan aquifers. The surficial aquifer is discontinuous below the project area and the surrounding region. Where present, the aquifer consists primarily of deep sands and clay. Due to the presence of clay in the surficial aquifer, the water table can be perched in these areas on a seasonal basis. Below the surficial aquifer is a clay confining unit that separates the surficial from the underlying Floridan aquifer, but because of a system of solution features and fractures, good hydraulic connection and direct recharge to the Floridan aquifer system occurs. The Floridan aquifer consists of a thick sequence of carbonate rocks (limestone and dolomite) and is the principal aquifer system and major source of water for consumptive use in the NWCFGWB. Throughout the area the Upper Floridan acts primarily as a semi-confined aquifer when the overlying clay layer is present. Where the confining clay layer is absent, the aquifer acts as unconfined. Because of the presence of solution features which provide direct connection with the surficial aquifer, it is susceptible to contamination.

The Brooksville Ridge is considered an area of high recharge to the Floridan aquifer (Figure 6). High recharge areas are generally a combination of where the confining unit is absent or very discontinuous, where the water table is at a significantly greater elevation than the potentiometric surface of the Floridan, and where the aquifer system is overlain with

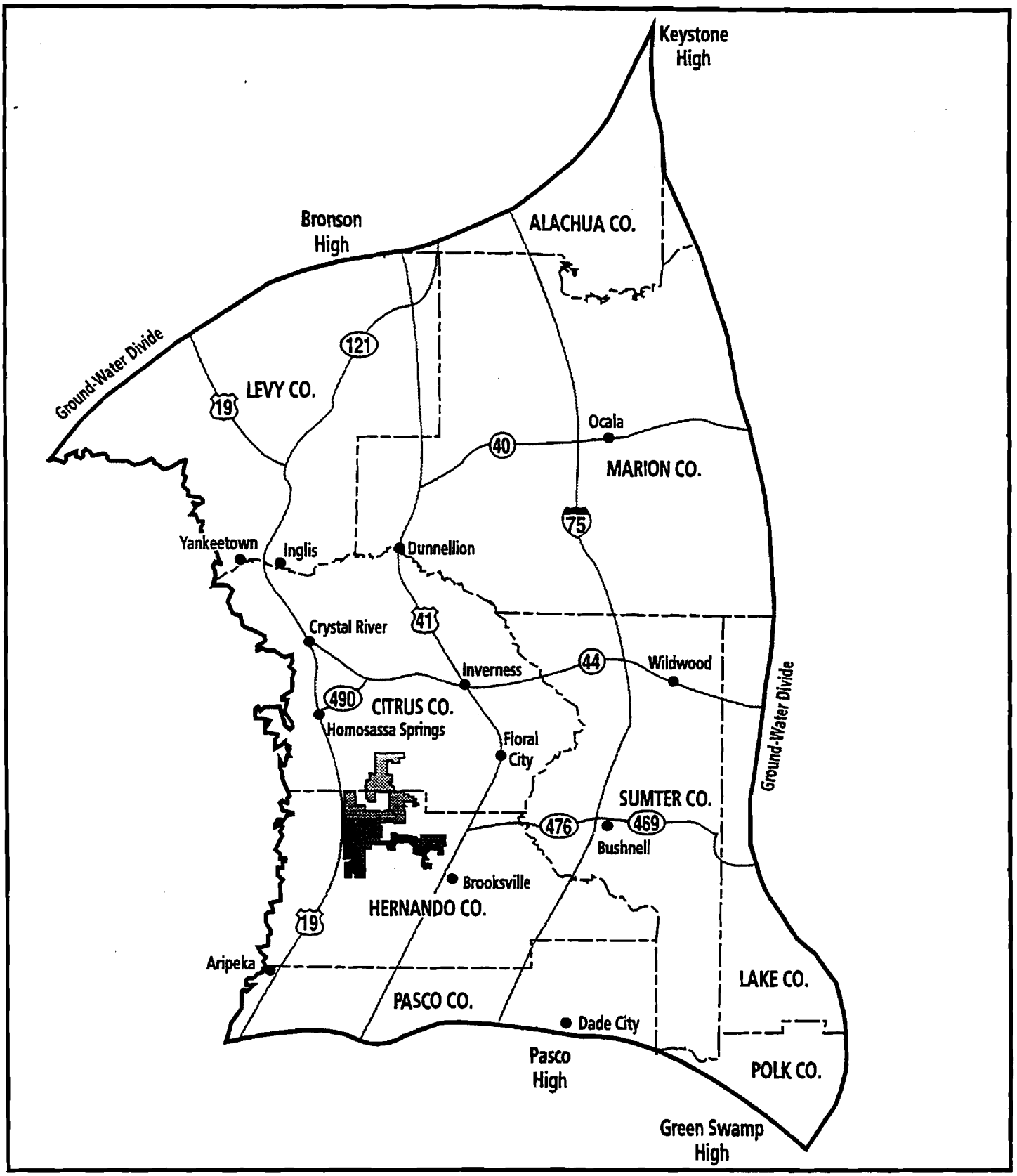

Figure 4. Location map of the Annutteliga Hammock project area in relation to the Northern West-Central Florida Ground-Water Basin. (modified from SWFWMD, 1987)

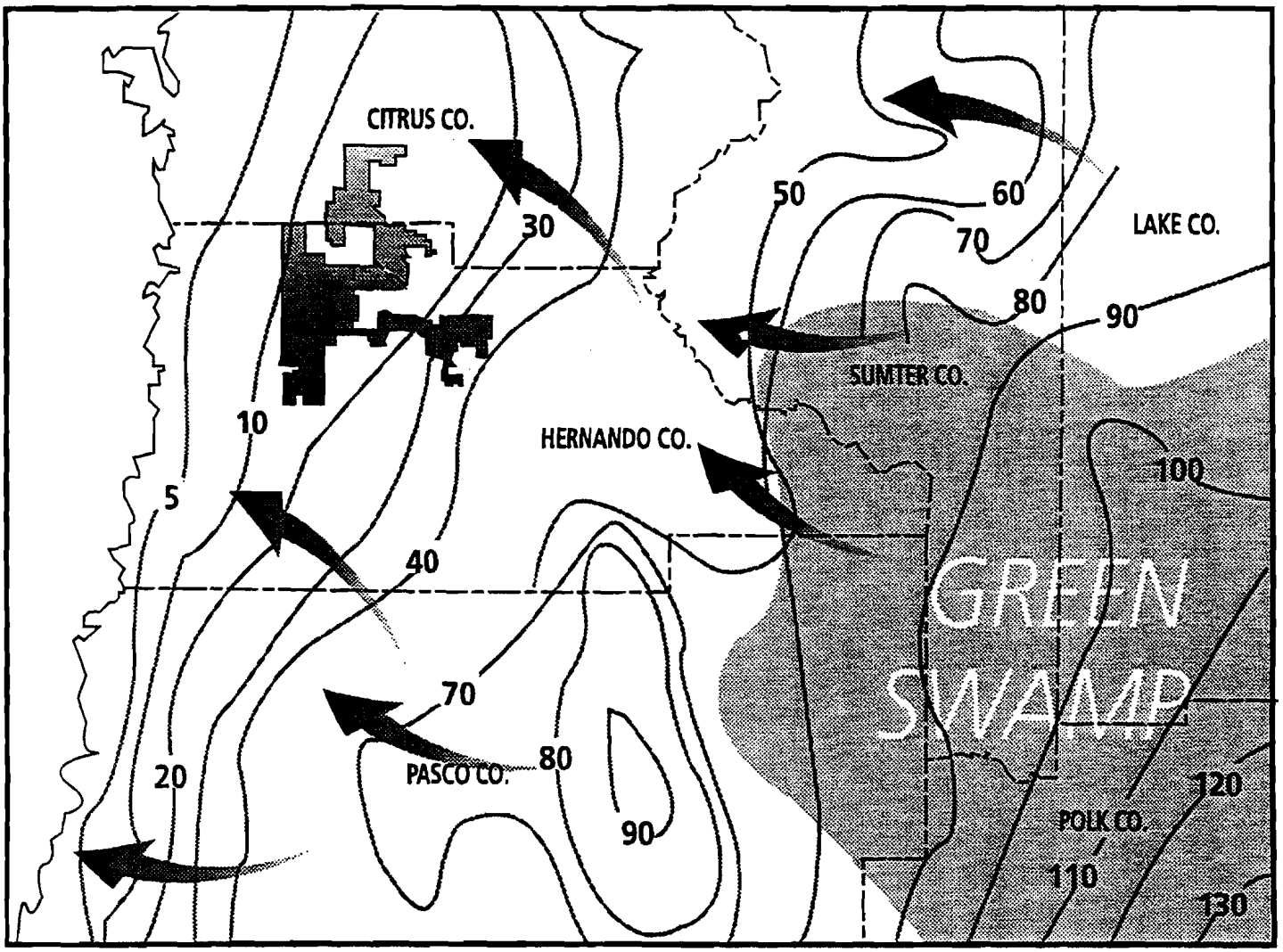

Figure 5. Potentiometric Surface of the Upper Floridan Aquifer in the Vicinity of the Annutteliga Hammock project area showing ground-water flow paths from September 1982. (modified from SWFWMD, 1987)

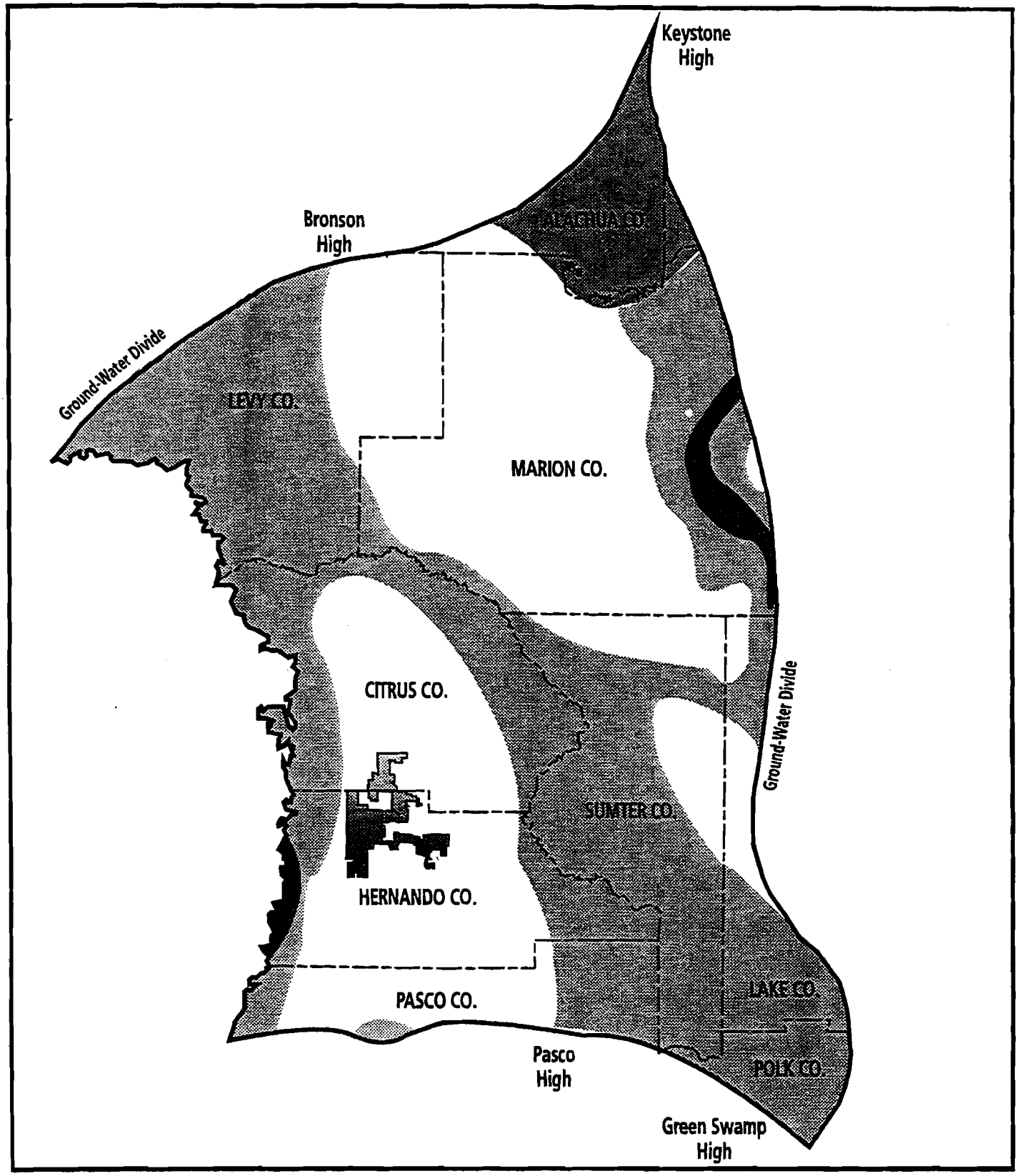

Figure 6. Location of the Annutteliga Hammock Project Area in relation to the generalized recharge areas in the Northern West-Central Florida Ground-Water Basin. (modified from SWFWMD, 1987)

relatively permeable soils or connected via sink holes. Recharge rates within the project area and nearly all of the Brooksville Ridge area vary from 8 to 22 inches per year. These estimated values represent some of the highest in the District.

ENVIRONMENTAL CONDITIONS

PLANT COMMUNITIES AND LAND USE

To identify the various plant communities and land cover types within the project area, the Florida Land Use, Cover and Forms Classification System (FLUCFCS)(Fla. Dept. of Transportation, 1985) was used. Data from the District's Geographic Information System (GIS) were used to generate a color map based on the FLUCFCS (Figure 7). The map delineates the distribution and areal extent of dominant plant communities and land cover types within the project area. It should be noted that the minimum mapping unit for uplands is five acres and for wetlands is a half acre. Approximate acreages and percent coverage were calculated for the various plant communities and land cover types within the project area and are shown in Table 1.

Table 1. Acreages of Plant Communities and Land Cover Types within the Annutteliga Hammock Project.

CLASSIFICATION	ACREAGE	PERCENTAGE OF TOTAL
UPLANDS		
Longleaf Pine - Xeric Oak	9,538.48	31.49
Open Land	6,750.55	22.28
Hardwood - Conifer Mixed	5,967.32	19.70
Crop and Pastureland	1,907.30	6.30
Upland Coniferous Forest	1,600.45	5.28
Residential/Urban	1,070.73	3.53
Other Open Land	844.33	2.79
Transportation/Utilities	528.23	1.74
Pine Flatwoods	346.68	1.14
Extractive	202.07	0.67
Specialty Farms	118.04	0.39
Disturbed Land	66.44	0.22
Shrub and Brushland	39.88	0.13
SUBTOTAL UPLANDS	28,980.50	95.66 %

Annutteliga Hammock SOR/P2000 Project

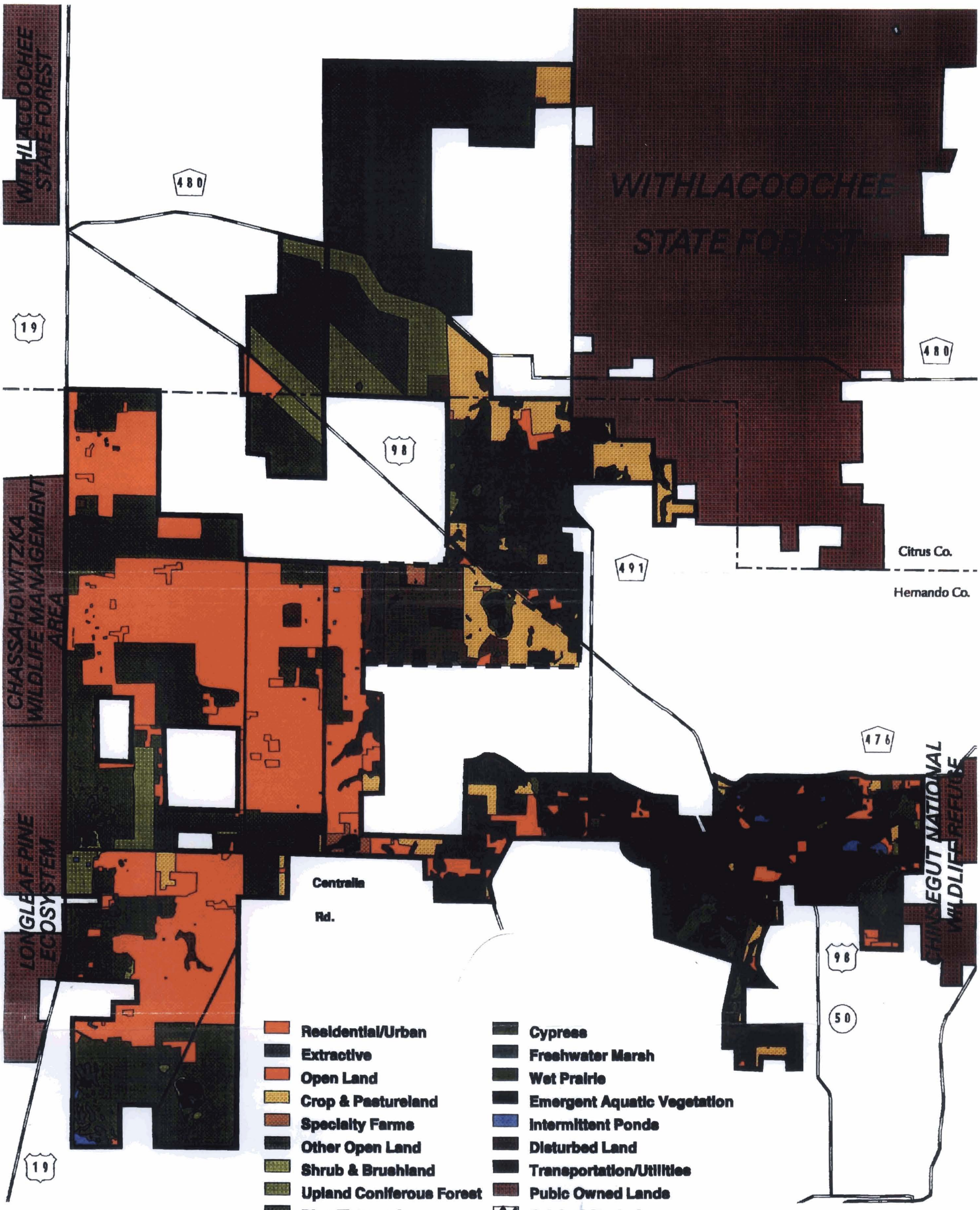

Figure 7: Plant Communities and Land Cover Types within the Annutteliga Hammock Project

Table 1. (continued) Acreage of Plant Communities and Land Cover Types within the Annutteliga Hammock Project.

CLASSIFICATION	ACREAGE	PERCENTAGE OF TOTAL
WETLANDS		
Freshwater Marsh	488.85	1.61
Stream and Lake Swamp	318.94	1.05
Emergent Aquatic Vegetation	209.63	0.69
Wet Prairie	141.25	0.47
Open Water	94.75	0.31
Cypress	32.65	0.11
Intermittent Ponds	28.18	0.09
SUBTOTAL WETLANDS	1,314.25	4.33 %
TOTAL	30,294.75	99.99 %

The Annutteliga Hammock project area covers approximately 30,300 acres of primarily xeric and mesic uplands. The project area is dominated by two natural communities, sandhill and upland hardwood forest. The upland hardwood forests of the Annutteliga Hammock are the focal point of the project. There are also substantial areas of the imperiled sandhill community included within the boundaries. A naturally occurring interface or ecotone between the sandhills and upland hardwood forest was once well developed along a topographic and presumably soil and moisture (and fire) gradient for several miles within the central sections of the project (now interrupted by limerock mining). The juxtaposition of these two communities adds significantly to the biological diversity encompassed by the project.

The upland hardwood forest (hardwood - conifer mixed classification in Table 1) is principally confined to the eastern third of the project. The total acreage of upland hardwood forest is approximately 5,967 acres or almost 20 percent of the project area. These forested areas occur on markedly high topography, typically 100 to 200 feet above mean sea level (msl), consisting of numerous ridges and high knolls. This is in contrast to the more western

sandhills that generally develop (in this area) on slightly rolling hills between 50 and 100 feet above msl. The plant species composition of these unique forests has a decidedly more temperate aspect than other communities found this far south in Florida (although forests of somewhat similar composition may reach as far south as the Hillsborough River State Park in northern Hillsborough County). Several areas of upland hardwood forest are of exceptionally high quality consisting of excellent stands of older growth trees with high species diversity and contain well developed vegetational strata as expected for this community type.

The sandhill plant community dominates the project overall, totaling approximately 16,289 acres or almost 54 percent. The project includes what are probably the most outstanding sandhills remaining outside of public ownership (or currently on acquisition lists) in peninsular Florida. The sandhill areas are identified as the longleaf pine - xeric oak and open land classifications. Sandhill areas identified as longleaf pine - xeric oak are areas in natural condition. Those identified as open land are undeveloped platted subdivisions. Within the open land areas, roads (predominantly unpaved/dirt roads) traverse this largely intact natural sandhill community. The bulk of the sandhill acreage in the northern and western portions of the project encompasses areas which are well developed along the southwestern slope of the Brooksville Ridge. Overall, the sandhills of this region of the state, and particularly those within the boundaries of the project, are of exceptional quality. Some areas consist of nearly pristine sandhill areas with a luxuriant and completely intact groundcover maintained by recent and frequent late winter fires.

Other upland forested plant communities within the project consist of sand pine forest and pine flatwoods. Sand pine forest (upland coniferous forest classification) totals approximately 1,600 acres or just over 5 percent of the project and occurs primarily within the western and northern portions of the project area. The majority of the sand pine areas are planted forests which occur over what was once improved pasture on former sandhill sites. A few small areas of sand pine scrub exist within the southern portion of the project. These areas represent relatively natural sand pine scrub forests typical of those that occur within the region. Pine flatwoods make up a smaller component of the project, totaling approximately

347 acres or 1 percent. Dotted throughout the project, most of the pine flatwoods areas are relatively small in size.

Forested and non-forested wetlands as well as open water features are found widely throughout the two predominant natural upland communities of the project. Together these wetland areas total approximately 1,314 acres or just over 4 percent of the project area. These areas subtly intergrade with the surrounding uplands and therefore have indistinct boundaries. This complex array of communities includes stream and lake swamp, cypress, freshwater marsh, wet prairie, emergent aquatic vegetation, open water and intermittent ponds. These normally wet/aquatic systems add diversity to the mosaic of communities within the project area and provide important wildlife habitat for the imperiled vertebrate fauna of the region. Most of the areas are good to high quality, with a few of them appearing as outstanding to nearly pristine water bodies.

A relatively small portion of the project consists of altered lands, totaling 4,737 acres or almost 16 percent overall. A major portion of this acreage consists of improved pastures and other agricultural lands (other open land classification). Remaining altered lands within the project consist of residential areas, roads and utility corridors, limerock mines, specialty farms, and disturbed lands.

WILDLIFE

The extensive sandhill portion of the project supports populations of many rare animals (endangered, threatened or species of special concern (ssc) according the FGFWFC) that are characteristic of this habitat. Gopher tortoises (ssc) are abundant and both Sherman's fox squirrels (ssc) and southeastern American kestrels (threatened) were observed in the project area. Reliable reports indicate the occurrence of eastern diamondback rattlesnakes and eastern indigo snakes (threatened) as well. It is likely that gopher tortoise burrow associates such as the Florida mouse (ssc), Florida gopher frog (ssc) and Florida pine snake (ssc) are also present. Fewer rare animals are expected within the Annutteliga Hammock itself, although Cooper's hawks and a number of small mammals are likely. The juxtaposition of

these major habitat types increases the overall habitat diversity of the project, making it more valuable as a regional wildlife resource area.

According to an analysis of the project relative to the work of Cox *et al.* (1994), approximately 7 percent of the project overlaps with the Strategic Habitat Conservation Area map for this region and 54 percent overlaps with the focal species map. Approximately 46 percent of the project is ranked as Class II or III which means that it provides important habitat for 5 or more focal species in these areas. Focal species occurrences in the project area include Sherman's fox squirrel (ssc), Florida sandhill crane (threatened), burrowing owl (ssc), southeastern American kestrel (threatened), limpkin (ssc), mottled duck, gopher tortoise (ssc), leitheuser's cave crayfish, Cooper's hawk, American swallow-tailed kite, hairy woodpecker and Florida black bear (threatened). Three rookeries are located nearby which support white ibis (ssc), snowy egrets (ssc), great egrets, green-backed herons, little blue herons (ssc) and great blue herons. Wetlands and ponds within the project are used by these species for foraging.

Regarding the Florida black bear, the project is adjacent to a stretch along U.S. 19 that has been identified by the FGFWFC as a chronic black bear roadkill area. This area is 4 highway miles in length with its southern portion beginning 5.3 miles north of S.R. 50 and extending both north and south of Centralia Road. It appears that there may be a bear movement corridor between Chassahowitzka Swamp and Annutteliga Hammock at this general location. It is expected the sandhills and upland hardwood forests of the project provide both a movement corridor for these wide ranging mammals as well as important habitat for this imperiled black bear population.

SUMMARY OF ECOLOGICAL VALUES

Well over half (54 percent) of the Annutteliga Hammock project is covered in sandhill, much of which is in excellent condition. The upland hardwood forests of the Hammock proper, which covers 20 percent of the area, has a composition similar to more northern forests around Tallahassee, Gainesville, or Ocala. In fact, several northern trees reach their southern limits near this area. Only 16 percent of the area is disturbed. Five listed animals are already known to inhabit the project and several more are likely inhabitants. The project is adjacent to an area of high black bear mortality on U.S. 19 and may help preserve a corridor for their movement. Because most of the project is located within a dry and sandy region, wetlands and open water areas account for only 4 percent of the project. This region is also a high recharge area to the Floridan Aquifer. Diverse geological formations underlie the area, ranging from sands and clays to limestone, and distinctive historic dunes, remnants of a former shoreline, form the land surface in western parts of the area (DEP, 1993).

In addition to the project's ecological values and benefits, the project also provides a corridor connection to large areas of public lands located to the west and east. To the west of the project, across U.S. 19, are the Chassahowitzka National Wildlife Refuge, the Chassahowitzka Swamp CARL project and the Longleaf Pine Ecosystem CARL project. These public lands are included within an expansive corridor (over 100,000 acres) of natural Gulf coastal plant communities that encompass District lands (Chassahowitzka River and Coastal Swamps, Homosassa Tract and Weekiwachee Riverine System) and other public lands as well as lands proposed for acquisition that extends from southern Citrus County to southern Hernando County. To the east, the project is contiguous with the Citrus Tract of the Withlacoochee State Forest, a large land area located within south-central Citrus County.

In consideration of the project's ecological and hydrological resources, preservation of the project area would provide the highest level of protection for surface and ground water resources, in particular high recharge areas, and valuable habitats for a variety of common and rare wildlife. These regional benefits for water management and water resource protection meet the acquisition criteria of the SOR/P2000 programs.