

Special Publication SJ93-SP5

**NASSAU RIVER AND LOWER
ST. JOHNS RIVER BASINS
LAND ACQUISITION STUDY
FINAL REPORT**

Prepared For:

**St. Johns River Water Management District
State Road 100 West
Palatka, Florida 32178**

Prepared By:

**Linda C. Duever
S. Fay Baird
David C. Heuberger**

**KBN Engineering and Applied Sciences, Inc.
1034 NW 57th Street
Gainesville, Florida 32605**

**December 1992
91192C1**

TABLE OF CONTENTS

(Page 1 of 3)

EXECUTIVE SUMMARY	ES-1
KEY TO MAJOR MAP WORK PRODUCTS	KEY-1
1.0 INTRODUCTION	1-1
1.1 <u>BACKGROUND</u>	1-1
1.2 <u>PROJECT DESIGN</u>	1-1
1.2.1 HYDROLOGY METHODS	1-6
1.2.2 ECOLOGY METHODS	1-9
1.2.3 LAND USE/REAL ESTATE METHODS	1-10
2.0 SELECTED RESOURCE STUDY AREAS AND PRIORITY SITES	2-1
2.1 <u>RSA 1--NASSAU RIVER</u>	2-1
2.1.1 SITE 1-A--UPPER NASSAU RIVER	2-1
2.1.2 SITE 1-B--CLAPBOARD SWAMP - BLACK HAMMOCK	2-6
2.2 <u>RSA 2--BLACK CREEK - ETONIAH</u>	2-10
2.2.1 SITE 2-A--UPPER BLACK CREEK (CARL)	2-10
2.2.2 SITE 2-B--ETONIAH CREEK	2-15
2.2.3 SITE 2-C--MIDDLEBURG	2-20
2.2.4 SITE 2-D--GREENS CREEK	2-25
2.2.5 SITE 2-E--ATES CREEK	2-30
2.3 <u>RSA 3--PABLO CREEK - DURBIN SWAMP</u>	2-34
2.3.1 SITE 3-A--DURBIN SWAMP	2-34
2.4 <u>RSA 4--JULINGTON-DURBIN - HALLOWES COVE</u>	2-39
2.4.1 SITE 4-A--JULINGTON-DURBIN CREEKS	2-39
2.4.2 SITE 4-B--HALLOWES COVE	2-43

TABLE OF CONTENTS
(Page 2 of 3)

2.5	<u>RSA 5--HAW CREEK</u>	2-47
2.5.1	SITE 5-A--HAW CREEK	2-47
3.0	OTHER ONGOING SJRWMD LAND ACQUISITION PROJECTS	3-1
3.1	<u>SITE O-A--BAYARD POINT</u>	3-1
3.2	<u>SITE O-B--DUNNS CREEK</u>	3-5
3.3	<u>SITE O-C--TWELVEMILE SWAMP</u>	3-9
4.0	RECOMMENDATIONS	4-1
4.1	<u>LAND ACQUISITION PRIORITIES</u>	4-1
4.1.1	RECHARGE LANDS	4-1
4.1.2	RIVERFRONT/BUFFER LANDS	4-3
4.1.3	FLOODPLAINS	4-3
4.1.4	WATER STORAGE AREAS	4-4
4.1.5	ECOLOGICAL LINKAGES	4-4
4.2	<u>OTHER RECOMMENDATIONS</u>	4-4
4.2.1	PROTECTION OF RECHARGE LANDS AND XERIC HABITATS	4-4
4.2.2	GREENWAY PLANNING IN FRAGMENTED LANDSCAPES	4-5
4.2.3	COORDINATED LAND ACQUISITION PLANNING FOR ADJACENT LANDS	4-5
4.2.4	ASSESSMENT AND INTEGRATED MANAGEMENT PLANNING FOR SJRWMD AND ASSOCIATED "PROTECTED" LANDS	4-5
4.2.5	ADDITIONAL STUDY OF TWELVEMILE SWAMP - TIGER BAY REGION	4-5
	REFERENCES	REF-1

EXECUTIVE SUMMARY

The St. Johns River Water Management District (SJRWMD) expects to spend a significant portion of the annual land acquisition budget to purchase lands of high hydrologic and ecological value in the Nassau River and Lower St. Johns River basins. To be prepared to appropriately plan land acquisition strategies, in November of 1991 SJRWMD contracted KBN Engineering and Applied Sciences, Inc. (KBN) to conduct a Nassau River and Lower St. Johns River Basins Land Acquisition Study.

KBN approached site selection as an iterative screening process incorporating increasing levels of detail at each stage. Patterns of resource distribution were first analyzed through a regional screening of the entire study area. Based on this information, broadly delineated Preliminary Resource Study Areas were selected. Then additional data was used to refine these into Resource Study Areas (RSAs), to select Priority Focus Areas within them, and finally to define boundaries for the Priority Sites recommended for district acquisition.

During the regional screening process, recharge areas and floodplain soil types were mapped on an ARC/INFO GIS system and major watersheds were examined on United States Geological Survey (USGS) topographic quadrangles. Listed species and natural community locations from the Florida Natural Areas Inventory (FNAI) data base were mapped on 1:24,000 quads and Florida Game and Fresh Water Fish Commission (FGFWFC) Landsat habitat maps were examined. Preservation 2000 Priority Areas and Areas of Conservation Interest, SJRWMD acquisition proposals, Conservation and Recreation Lands (CARL) projects, and Florida Department of Natural Resources (FDNR) and Florida Trail Association trails and proposed trails were mapped on 1:100,000 quads. These maps were compared and analyzed to define Preliminary Resource Study Areas.

The Preliminary Resource Study Areas, which were described in KBN's Preliminary Report, were: Nassau River, Whitehouse Greenway, Middleburg - Penney Farms, Goldhead - Ordway Sandhill, Pablo Creek - Durbin Swamp, Julington - Durbin Creeks Additions, Cunningham Creek - Hallowes Cove, Fishtail Swamp - Trestle Bay, Crescent Lake - Lake Disston, Big Cypress - Speckled Perch Scrub, Hull Cypress, and Silver Lake.

At the next stage, parcelization maps derived from Florida Plats books were overlaid onto SJRWMD's Florida Land Use, Cover, and Forms Classification System (FLUCFCS) land use maps. The RSA boundaries suggested by this analysis were refined in view of wetland, flooding, and habitat fragmentation concerns and information on development plans provided by regional and county planning offices.

Next, variations in habitat type, quality, condition, and viability within each RSA were related to major ownerships to define areas of particular interest. Ecological connections and watersheds were considered in selecting Priority Focus Areas from these.

Final boundary decisions for the recommended Priority Sites took into account property lines, floodplain boundaries, highway and utility plans, and management considerations.

Table 1 shows the criteria used to comparatively evaluate each Priority Site and the scores each site received. Sites are listed in north to south order. Current SJRWMD acquisition projects were evaluated along with the new sites. Their scores confirm that they are all justifiably high priorities.

In addition, five basic categories of lands of interest to SJRWMD (recharge lands, riverfront/buffer lands, floodplains, water storage areas, and ecological linkages) were considered and the most important sites for each function were identified. Etoniah Creek is the only site with significant recharge value. Bayard Point, Hallows Cove, Haw Creek, Dunns Creek, and Upper Nassau River rate highest as riverfront/buffer lands, but Durbin Swamp also has extensive stream mileage. Haw Creek, Upper Nassau River, and Twelvemile Swamp are outstanding in the floodplain category, but Durbin Swamp and Middleburg are noteworthy in that their substantial floodplain areas are upstream of development and therefore especially critical. Durbin Swamp, Twelvemile Swamp, and Haw Creek offer the greatest water storage, but Upper Nassau River and Middleburg are also valuable in this respect. The most important ecological linkage sites are those in the Upper Black Creek - Middleburg - Ates Creek - Greens Creek - Etoniah Creek complex, which is a critical link in the statewide ecological corridor system.

Table 1. Site Rating^a Based on SJRWMD Land Acquisition Criteria

	Acreage	Proximity to Headwaters	Buffering Function	Water Storage Capacity	Flood Conveyance	Intact Natural System	Groundwater Recharge Protection	Potential to Restore Wetland System	Recreational Potential	Management Considerations	Development Pressure	Habitat for Threatened/ Endangered Species	Ecological Connectedness	Total Score
Upper Nassau River	40,044	2	3	3	3	2	0	0	2	2	2	2	3	24
Clapboard Swamp--Black Hammock	4,855	1	2	3	3	2	0	1	2	2	3	2	3	24
Durbin Swamp	37,406	3	3	3	2	3	0	0	2	2	3	3	2	26
Middleburg	19,337	3	2	3	3	1	1	1	1	1	2	2	3	23
Upper Black Creek	9,311	3	2	1	1	3	1	1	3	3	2	2	3	25
Julington-Durbin Creeks	4,200	0	3	3	3	2	0	0	3	2	3	2	2	23
Twelvemile Swamp	26,315	3	1	3	2	2	1	2	2	2	2	3	2	25
Hallowes Cove	5,375	0	2	1	1	3	2	0	3	2	3	1	1	19
Greens Creek	21,828	3	2	1	1	2	2	0	3	2	2	2	3	23
Ates Creek	19,843	3	2	1	1	2	2	0	2	2	2	2	3	22
Bayard Point	18,500	3	3	3	2	2	1	2	3	2	2	2	1	26
Etoniah Creek	55,237	3	2	1	1	2	2	0	2	2	3	3	3	24
Dunns Creek	8,966	0	2	3	3	2	1	1	3	2	2	2	1	22
Haw Creek	10,490	0	2	3	1	2	0	0	2	3	1	1	2	17

^a Rating: 3 = High; 2 = Moderate; 1 = Low; 0 = None. Higher scores favor acquisition.

KBN made five general recommendations:


1. Since heavy parcelization limits the feasibility of land acquisition in high recharge/xeric habitat lands, other mechanisms for protecting these areas should be sought.
2. SJRWMD should cooperate with appropriate agencies and organizations to develop greenway corridors in the Whitehouse and Goldhead - Ordway areas and along the urban interfaces of other priority sites.
3. Land acquisition studies should be conducted along basin boundaries to plan coordination of efforts in adjacent areas.
4. Management policies and practices on both existing and proposed public lands should be evaluated and programs should be adjusted to assure that acquisition plans are based on valid management assumptions and that land management efforts effectively protect important resources.
5. More detailed studies should be conducted in the Twelvemile Swamp - Tiger Bay area (Map 6 in Appendix A) to define appropriate focus areas for land acquisition efforts.

KEY TO MAJOR MAP WORK PRODUCTS

Two sets of hand-drawn USGS quad-based maps KBN produced in the course of the Nassau River and Lower St. Johns River Basins Land Acquisition Study were submitted to SJRWMD at the conclusion of the study. Although these were developed as working maps rather than explanatory graphics, District staff felt they would be useful in orienting readers to the priority site locations and requested that copies of the 1:100,000 map sections surrounding the priority sites accompany the final report. In interpreting these maps, it is important to remember that they are rough working maps that reflect only the current stage of land acquisition planning analysis. Many of the boundaries indicated will be altered as field information is gathered, decision-making processes proceed, and circumstances change.

The following key should be helpful in interpreting the maps:

LEGEND

	RESOURCE STUDY AREA BOUNDARIES	(Yellow with black outline)
	PRIORITY FOCUS AREAS	(Orange)
	PRIORITY SITE BOUNDARIES	(Orange within black outline)
	FGFWFC WILDLIFE MANAGEMENT AREAS	(Purple)
	PLANNING BOUNDARIES FOR DESIGNATED, BUT NOT ENTIRELY ACQUIRED, PRESERVE LANDS (TIMUCUAN ECOLOGICAL AND HISTORICAL PRESERVE)	(Light green with dashed lavender outline)
	SJRWMD AND CARL ACQUISITION PROJECTS	(Light green with red outline)
	EXISTING TRAILS	(Pink line)
	PROPOSED TRAILS	(Dashed pink line)
	ADDITIONAL EXISTING OR UNDER CONSTRUCTION HIGHWAYS	(Reddish brown line)
	PROPOSED HIGHWAYS	(Dashed reddish brown line)
	PLANNED TRANSMISSION LINES, GAS LINES, ETC.	(Dashed magenta line)
	POTENTIAL ECOLOGICAL LINKAGES	(Broad green dashed line or arrow)
	OTHER SPECIAL DISTRICTS (CEDAR SWAMP MANAGEMENT AREA)	(Reddish orange outline)

The following items are mapped only on 1:24,000 USGS quads:

LEGEND

	FLOODPLAIN BOUNDARIES	(Blue line)
	DEVELOPED OR HIGHLY DISTURBED LANDS	(Grey shading)
	HIGHLY PARCELIZED LANDS	(Grey diagonal lines)
	BOUNDARIES OF MAJOR (A SECTION OR MORE) OWNERSHIPS	(Dark grey line)
	DRIs AND OTHER PLANNED DEVELOPMENTS	(Dark brown diagonal lines)
	DATA ON LISTED SPECIES AND NATURAL COMMUNITIES	(Dark green)

1.0 INTRODUCTION

1.1 BACKGROUND

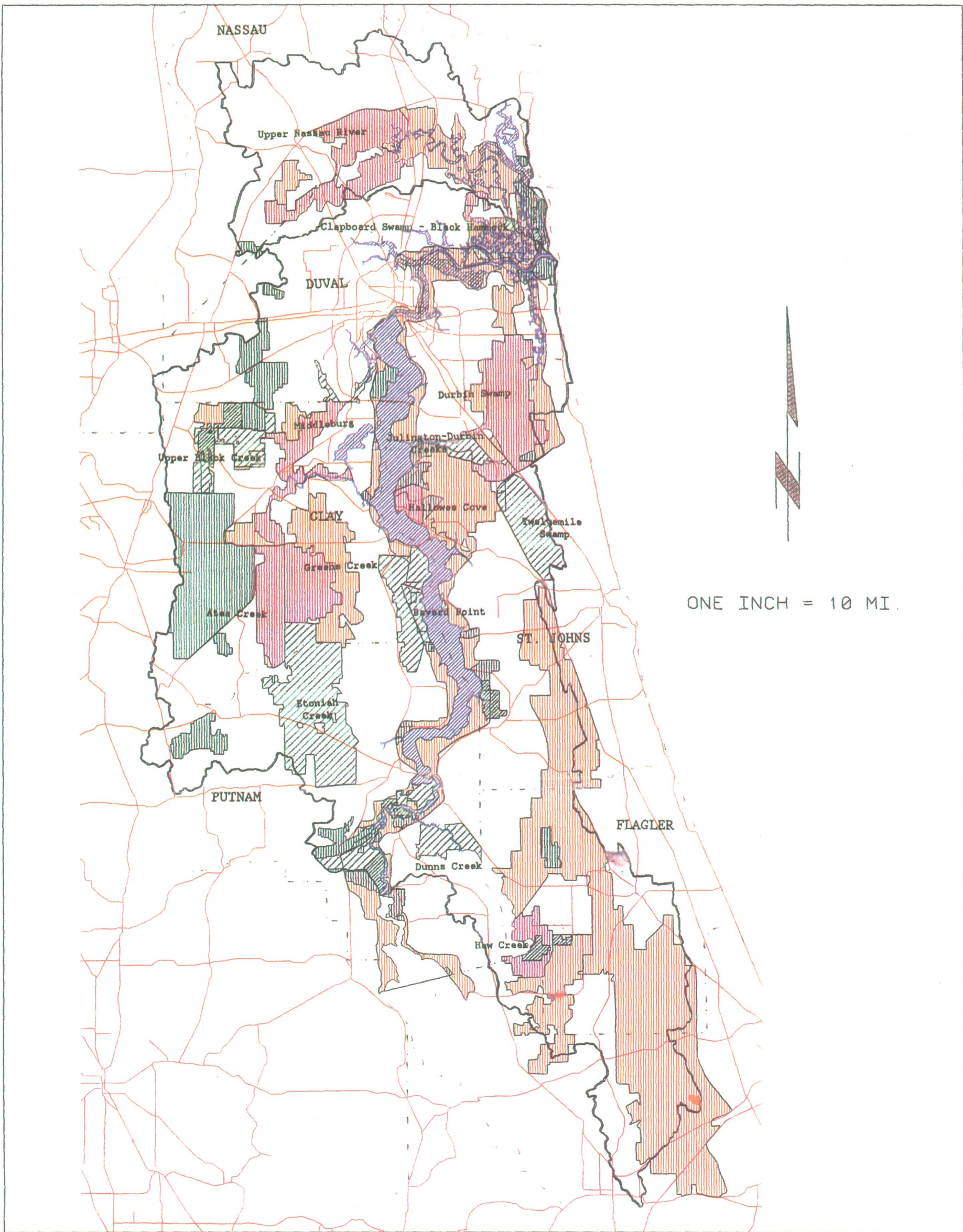
Over the next few years, the St. Johns River Water Management District (SJRWMD) expects to spend a significant portion of its annual land acquisition budget to purchase lands of high hydrologic and ecological value in the Nassau River and Lower St. Johns River basins (see Figure 1-1). To be prepared to appropriately plan land acquisition strategies for these basins, in November of 1991 SJRWMD contracted KBN Engineering and Applied Sciences, Inc. (KBN) to conduct a Nassau River and Lower St. Johns River Basin Land Acquisition Study. This report presents the results of that study.







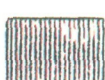

1.2 PROJECT DESIGN

The Project Design involved four stages including Regional Screening, Resource Study Area Identification, Resource Study Area Evaluation, and Site Prioritization. In general, the project design first involved analyzing regional patterns of resource distribution on maps of the entire study area. Based on this information, broadly delineated preliminary resource study areas were selected. Additional data was then used to refine these study areas, to select priority focus areas within these areas and, finally, to define boundaries for the Priority Sites to be recommended for district acquisition. KBN approached the study as an iterative screening process incorporating increasing levels of detail at each stage.

Specifically, the regional screening was conducted to locate areas of interest to be defined as Resource Study Areas (RSAs) for further study. This involved mapping readily available data on recharge, floodplains, habitats, rare species locations, and existing and proposed conservation lands. KBN and SJRWMD staffs met and reviewed these maps, reached consensus, and identified general RSAs which should be investigated further. Additional data on wetlands, flooding problems, land use patterns, parcelization, conservation projects, and development plans was used to define boundaries for the RSAs and suggest priority focus areas within them.

The RSAs are shown in Appendix C, indicated in Figure 1-1, and marked in yellow on the maps in Section 2. The RSAs, which are described and evaluated in Appendix C, were Nassau River, Whitehouse Greenway, Middleburg - Penney Farms, Goldhead-Ordway Sandhill, Pablo Creek - Durbin Swamp - Julington-Durbin Creeks Additions, Cunningham Creek - Hallows Cove,



- | | | | | | |
|---|----------------------|--|--------------------------------|---|----------|
|  | RESOURCE STUDY AREAS |  | CARL AND POTENTIAL ACQUISITION |  | WATER |
|  | PRIORITY SITES |  | DISTRICT OWNED |  | ROADWAYS |
|  | RIVERFRONT TRACTS |  | OTHER PUBLIC LANDS | | |

Fishtail Swamp - Trestle Bay, Crescent Lake - Lake Disston, Big Cypress - Speckled Perch Scrub, Hull Cypress, and Silver Lake.

More specific effort was made to ascertain whether any riverfront tracts might merit inclusion. A new RSA buffering the St. Johns River was mapped and all large ownerships within it were evaluated. This analysis, which produced no new recommendations, is presented in Appendix B. The tracts examined are shown in Figure 1-1.

Since ongoing land acquisition projects were to be evaluated alongside new proposals in the final analysis, the RSAs were expanded to take in those nearby. Middleburg - Penney Farms was absorbed into Black Creek - Etoniah. Pablo Creek - Durbin Swamp - Julington - Durbin Creeks Additions and Cunningham Creek - Hallowes Cove were regrouped into Pablo Creek - Durbin Swamp and Julington-Durbin - Hallowes Cove. Crescent Lake - Lake Disston was renamed Haw Creek. And, Fishtail Swamp - Trestle Bay, Big Cypress - Speckled Perch Scrub, and Hull Cypress were combined with Twelvemile Swamp as Twelvemile - Tiger Bay.

Maps of the RSAs were circulated to planners and conservationists throughout the study area to solicit their input (Appendix A).

After examination of more detailed information including data on streams and watersheds, FEMA floodplain boundaries, habitat condition, major ownerships, property lines, highway and utility proposals, and management concerns, KBN selected the Priority Sites recommended for district acquisition. The sites selected are listed in Table 1-1 and described in Section 2. They are indicated in Figure 1-1 and shown in orange on the maps in Section 2. (Note that SJRWMD's Cedar Point project is encompassed by the Clapboard Creek - Black Hammock Site.)

Maps of the entire study area were prepared and drawn on USGS 1:100,000 quads. These maps show public lands, land acquisition proposals, RSAs, priority sites, and potential corridors. More detailed maps on 1:24,000 USGS quads show the area around each priority site with the above information plus floodplain boundaries and notes on parcelization, land use, ecology, and major ownerships.

Prioritization of sites involved rating sites according to district land acquisition criteria to produce Table 1-2 (Task 7). Sites were evaluated in terms of five basic categories of SJRWMD interest:

Table 1-1. Selected Resource Study Areas and Priority Sites

RSA 1--NASSAU RIVER

SITE 1-A--UPPER NASSAU RIVER

SITE 1-B--CLAPBOARD SWAMP - BLACK HAMMOCK

RSA 2--BLACK CREEK - ETONIAH

SITE 2-A--UPPER BLACK CREEK

SITE 2-B--ETONIAH CREEK

SITE 2-C--MIDDLEBURG

SITE 2-D--GREENS CREEK

SITE 2-E--ATES CREEK

RSA 3--PABLO CREEK - DURBIN SWAMP

SITE 3-A--DURBIN SWAMP

RSA 4--JULINGTON-DURBIN - HALLOWES COVE

SITE 4-A--JULINGTON-DURBIN CREEKS

SITE 4-B--HALLOWES COVE

RSA 5--HAW CREEK

SITE 5-A--HAW CREEK

ONGOING SJRWMD LAND ACQUISITION PROJECTS

SITE O-A--BAYARD POINT

SITE O-B--DUNNS CREEK

SITE O-C--TWELVEMILE SWAMP

Table 1-2. Site Rating^a Based on SJRWMD Land Acquisition Criteria

	Acreage	Proximity to Headwaters	Buffering Function	Water Storage Capacity	Flood Conveyance	Intact Natural System	Groundwater Recharge Protection	Potential to Restore Wetland System	Recreational Potential	Management Considerations	Development Pressure	Habitat for Threatened/ Endangered Species	Ecological Connectedness	Total Score
Upper Nassau River	40,044	2	3	3	3	2	0	0	2	2	2	2	3	24
Clapboard Swamp-Black Hammock	4,855	1	2	3	3	2	0	1	2	2	3	2	3	24
Durbin Swamp	37,406	3	3	3	2	3	0	0	2	2	3	3	2	26
Middleburg	19,337	3	2	3	3	1	1	1	1	1	2	2	3	23
Upper Black Creek	9,311	3	2	1	1	3	1	1	3	3	2	2	3	25
Julington-Durbin Creeks	4,200	0	3	3	3	2	0	0	3	2	3	2	2	23
Twelvemile Swamp	26,315	3	1	3	2	2	1	2	2	2	2	3	2	25
1-5 Hallows Cove	5,375	0	2	1	1	3	2	0	3	2	3	1	1	19
Greens Creek	21,828	3	2	1	1	2	2	0	3	2	2	2	3	23
Atcs Creek	19,843	3	2	1	1	2	2	0	2	2	2	2	3	22
Bayard Point	18,500	3	3	3	2	2	1	2	3	2	2	2	1	26
Etoniah Creek	55,237	3	2	1	1	2	2	0	2	2	3	3	3	24
Dunns Creek	8,966	0	2	3	3	2	1	1	3	2	2	2	1	22
Haw Creek	10,490	0	2	3	1	2	0	0	2	3	1	1	2	17

^a Rating: 3 = High; 2 = Moderate; 1 = Low; 0 = None. Higher scores favor acquisition.

recharge lands, riverfront/buffer lands, floodplains, water storage areas, and ecological linkages. Each site is discussed in relation to each criterion in Section 2.

Figure 1-2 summarizes the specific types of information brought into play during focusing, refining, and evaluating process. The specific efforts that went into these phases of the study are discussed below by discipline area: hydrology, ecology, and land use.

1.2.1 HYDROLOGY METHODS

For the hydrologic regional screening process, KBN obtained GIS digital data on hydrography, soils, recharge, and watersheds from SJRWMD.

A SJRWMD GIS map showing areas of high, low/medium, and no recharge to the Florida aquifer at a scale of 1:500,000 was replotted at a scale of 1:100,000 for use in evaluating groundwater recharge protection potential. (The information used was developed for the district by USGS and is under revision. When the new GIS mapping is in final form, SJRWMD should re-evaluate proposed priority sites in terms of recharge value.)

Mapping floodplains on a regional scale posed more of a challenge because SJRWMD was in the process of digitizing floodplain maps from the Federal Emergency Management Agency (FEMA) while the study was underway, but this information was not yet available. It was judged impractical to use actual FEMA maps during the regional screening because of the large land area under consideration. KBN and SJRWMD therefore agreed to use soils to identify areas with a high likelihood of containing floodplains in the regional screening phase, and to consult FEMA maps later during the evaluation of specific focus areas.

Since soils are classified into four hydrologic classes, "A" through "D", according to their runoff characteristics, producing a map of "D" soils located immediately adjacent to hydrographic features was considered to be a reasonable approximation of floodplain mapping at the scale for regional screening "A" soils have the highest infiltration rates and therefore generate little runoff, while "D" soils have the lowest infiltration rates and are the most floodprone. The soils information used to produce the maps consisted of a digitized version of the USDA Soil Conservation Service's State Soil Geographic Data Base (STATSGO). STATSGO was designed for use in large-scale planning and monitoring projects, and consists of generalized county soil survey information at a scale of 1:250,000 (USDA SCS, 1991). STATSGO map units represent

PRIORITY SITE SELECTION PROCESS

STUDY AREA: Nassau River and Lower St. Johns River Basin

- Hydrological studies and recharge areas, potential floodplain soils, major watersheds
- Ecological studies: habitats, occurrences of rare species and communities
- Land use studies: landscape patterns, trail/greenway plans, conservation projects

PRELIMINARY RESOURCE STUDY AREAS:

- Hydrological studies: wetlands, flooding problems
- Ecological studies: habitat fragmentation
- Land use studies: land use maps, parcelization, boundaries of existing and proposed preserves, development plans

REFINED RESOURCE STUDY AREAS:

- Hydrological studies: streams, sinkholes
- Ecological studies: habitat type/condition/viability, ecological connections
- Land use studies: major ownerships

PRIORITY SITE FOCUS AREAS:

- Hydrological studies: floodplain boundaries
- Ecological studies: management considerations
- Land use studies: property lines, highway and utility proposals

PRIORITY SITES:

- Evaluation according to SJRWMD criteria

Figure 1-2 PRIORITY SITE SELECTION PROCESS



soils that have similar characteristics. Each map unit contains a number of distinct soil types, which are assigned attributes that include hydrologic group. For example, one map unit may consist of five soil types, each with its own hydrologic group. STATSGO includes a listing of map units with percent composition of the areal extent of soils within the units, based on statistical analyses of the soils in the region. By consulting a listing of the map units with the percent composition of soil hydrologic groups, it can be determined which map units predominantly consist of "D" soils. To select soils that would be included in the mapping, a list of map units was generated and sorted according to percent composition of soils. If a map unit consisted of 70% or greater areal extent of D soils, it was retained for floodplain mapping. GIS software was used to "union" these map units with hydrographic features, producing a map of areas that were considered likely to contain floodplains.

The final regional hydrology map showed floodplain areas and hydrography combined with recharge characteristics and watershed sub-basins at 1:100,000. This information was used to select and refine Resource Study Areas and to select Priority Site Focus Areas.

Additional hydrological data was prepared for use in defining Priority Site boundaries and in future site acquisition planning. Miles of river frontage and miles of streams were measured using a map wheel on the 1:100,000 USGS base maps. The measurements should be regarded as only approximate at this scale, but can be used to provide comparisons between priority sites. Information on the CARL sites was extracted from CARL proposals and did not always include river frontage and creek/stream miles.

The 1:100,000 recharge map was overlaid on the Priority Site maps to permit estimation of the percent of the site providing low/medium recharge to the Floridan aquifer. (There were no high recharge areas within the Priority Sites.)

To evaluate the value of priority sites relative to floodplain protection, FEMA floodway and flood insurance rate maps were examined and areas within the 100-year floodplain were transcribed onto 1:24,000 quad sheets. FEMA maps do not always show floodplains on small streams; these "limit-of-study" areas are shown on KBN's maps as breaks in the line that denotes the 100-year floodplain.

The FEMA maps show wide floodways on some streams in priority areas; these are indicated by notes on the 1:24,000 maps. The "floodway" is defined as "the channel of a watercourse, plus any adjacent floodplain areas that must be kept free of encroachment in order to convey the 100-year flood without substantial increases in flood stages" (SJRWMD, 1990). Because floodways provide such high flood conveyance, they are more stringently protected from a regulatory standpoint than floodplains; generally, no development is permitted within floodways.

The SJRWMD acquisition criteria that relate most specifically to hydrology are proximity to headwaters, water storage capacity, flood conveyance, and groundwater recharge protection. Each priority site was evaluated under these criteria using the maps described above. Priority sites are described and evaluated in Section 2.0.

1.2.2 ECOLOGY METHODS

For the regional screening phase, data on locations of important species and natural communities was obtained from FNAI, FGFWFC, and the Florida Museum of Natural History, and important habitat areas were marked on the 1:100,000 maps. KBN then examined FGFWFC Landsat habitat maps, land use maps, and various aerial photographs and topographic maps to become familiar with large blocks of natural habitat and regional landscape linkages. Areas of interest were sketched onto 1:100,000 USGS topographic maps for consideration as Preliminary Resource Study Areas.

To define the boundaries of the Preliminary Resource Study Areas and create refined Resource Study Areas, maps and aerial photographs of edges of large habitat blocks were examined. Boundaries were refined to reflect the influence of evident patterns of fragmentation and degradation that would affect the site-specific merits of the habitats involved. For example, pine plantations were generally excluded from broad tracts where high quality flatwoods groundcover was a major feature, but included within narrow ecological linkages where seepage streams were the natural community of most concern.

Additional research, including an information request letter sent to a mailing list of regional experts and knowledgeable citizens (Appendix A) was used to clarify ecological patterns within each Resource Study Area. Areas of particular resource value emerged from this information and these were defined as Priority Focus Areas.

Management considerations were taken into account in refining boundaries to create Priority Sites from Priority Focus Areas. Where the edge of the area lay near a highway, for example, the road was used as the site boundary.

Intactness of the natural systems, habitat and biodiversity values, and ecological connectedness were assessed to evaluate each site and determine acquisition priorities. Additional detail from FNAI records, CARL files, and numerous other sources was used to document site values.

1.2.3 LAND USE/REAL ESTATE METHODS

At the regional screening stage, existing and proposed parks, trail/greenway systems, and development areas were generally mapped on the 1:100,000 USGS topographic maps with the ecological data.

Once Preliminary Resource Study Areas had been selected, Florida Plats map books were used to delineate parcelized areas within and around each site. Site boundaries recommended from the hydrological and ecological viewpoints were refined to largely exclude heavily parcelized lands and to mesh with the boundaries of preserves and current acquisition projects.

Major ownerships were taken into account in delineating Priority Focus Areas.

Wherever feasible, Priority Site boundaries were constructed to follow property lines and/or existing or proposed highways. Development plans on or near Priority Focus Areas were investigated and Priority Site boundaries were adjusted to mesh with them wherever this could be done without sacrificing significant ecological values.

Recreational potential was considered in evaluation of each Priority Site.

2.0 SELECTED RESOURCE STUDY AREAS AND PRIORITY SITES

2.1 RSA 1--NASSAU RIVER

2.1.1 SITE 1-A--UPPER NASSAU RIVER

LOCATION/DESCRIPTION: Located in Nassau and Duval Counties. Extends south from Nassau Wildlife Management Area to Jacksonville International Airport. Connects with Timucuan Ecological and Historical Preserve to the east, incorporating lands surrounding upper Nassau River floodplain and Thomas Creek.

QUADS: Bryceville, Callahan, Dinsmore, Italia, Trout River.

SIZE: 40,044 acres

NUMBER OF OWNERSHIPS: 25

MAJOR OWNERS: Champion International, Container Corporation, ITT Rayonier, St. Joseph Land and Development.

HYDROLOGIC FEATURES:

This site includes nine miles of the Nassau River, over 20 miles of Thomas Creek, eight miles of Alligator Creek, eight miles of Boggy Branch, six miles of Mills Creek, four miles of Plummer Creek, less than a mile of Ben Branch, and less than a mile of Tom Mann Swamp Creek, as well as several miles of unnamed tributary streams.

More than 75% of the priority site is floodplain.

The site is in an area of no recharge to the Floridan aquifer.

ECOLOGICAL FEATURES: This site is primarily comprised of the Nassau River floodplain. Expansive salt marshes characterize the eastern portions of the site. The central and western portions of the site include numerous tributary floodplains which are generally dominated by forested wetlands. There are still substantial areas of flatwoods (some xeric and grading into sandhill) on the south side of Nassau River. The majority of uplands in the northern portion of

the priority site are dominated by pine plantation interspersed with small isolated patches of flatwoods.

The Upper Nassau River is important to manatees. There are active red-cockaded woodpecker colonies in this vicinity, but no on-site records have been mapped at FNAI. Little documentation of other wildlife is available until the FGFWFC maps for this area are released.

HISTORY/LAND USE: Most of the site's natural pinelands have been converted to pine plantation, particularly on the north side of Nassau River. Urbanization spreading from Jacksonville has fragmented habitat along the southern and western edges of the priority site.

REASONS FOR SELECTION: Major floodplain. Valuable extension of ecological corridor linking Timucuan Preserve with natural areas north and west towards the St. Marys River system. Substantial remnants of natural pineland.

RATIONALE FOR PROPOSED BOUNDARIES: Expanding development associated with Jacksonville precluded extension of the priority site to the south and west. Timucuan Ecological and Historical Preserve and Nassau River - St. Johns Marshes Aquatic Preserve defined the boundary on the east. Nassau Wildlife Management Area and Highway A1A define the boundary on the north.

APPLICABILITY OF SJRWMD ACQUISITION CRITERIA:

Proximity to Headwaters: Includes some headwaters of Thomas Creek.

Buffering Function: Good potential buffers for Thomas Creek and Nassau River from expected urbanization northwest of Jacksonville.

Water Storage Capacity: High. Numerous floodplains around tributary streams. Most of the eastern portion of the priority site is floodplain.

Flood Conveyance: High, especially for Thomas Creek which has a wide floodway.

Intact Natural System: Moderate. Pine plantations coupled with development have seriously fragmented habitats.

Groundwater Recharge Protection: No recharge to the Floridan aquifer.

Potential to Restore Critical Altered Wetland System: None known.

Recreation Potential - Moderate to high. Well suited for canoeing, hiking, horseback riding, and other outdoor activities.

Management Considerations: Adjoins Timucuan Preserve and overlaps Nassau River Wildlife Management Area, so NPS and/or FGFWFC might be willing to manage.

Development Pressure: Overall, moderate, but uplands on south side of river are undergoing rapid development. Pinelands here are very vulnerable to urbanization, which could fragment the site.

Habitat for Endangered or Threatened Species or Communities: Low. Little documented.

Ecological Connectedness: High

ACQUISITION FACTORS/COMMENTS: P-2000 Area of Conservation Interest. The majority of floodplain wetlands probably have a sufficient hydroperiod to be relatively well protected from development by engineering and regulatory factors. Timucuan Ecological and Historical Preserve and Nassau River - St. Johns Marshes Aquatic Preserve may adequately protect salt marshes and adjoining lands and/or may present cooperative purchasing and management opportunities.

Upland habitats in southern portions of the priority area, particularly along major roads, may provide important buffers, but are vulnerable to development and may prove to be costly.

Remaining flatwoods are at risk for conversion to pine plantation.

RECOMMENDATIONS: This site should be linked northward and westward to the St. Mary's corridor through linkages defined through the current Wetland Management Strategy for the St. Marys River Basin study. Acquisition efforts should focus first on natural pinelands on the south

side of the river. Priorities and boundaries should be refined based on FGFWFC species/habitat maps when they become available.

INFORMATION SOURCES: Florida Natural Areas Inventory, Land Acquisition Advisory Council (LAAC), Conservation and Recreation Lands (CARL), Soil Conservation Service, Florida Division of Forestry, National Park Service, Florida Park Service, Florida Game and Freshwater Fish Commission, Florida Plats, St. Johns Soil and Water Conservation District, FEMA-FIRM maps, Spencer 1991.

Site 1-A UPPER NASSAU RIVER



0 5.0 Miles

0 5.0 Kilometers

NASSAU WILDLIFE
MANAGEMENT AREA

UPPER NASSAU RIVER

UPPER NASSAU RIVER

UPPER NASSAU
RIVER

Jacksonville

JACKSONVILLE
INTERNATIONAL AIRPORT

Jacksonville
International Airport

Beeghly
Heights

Duval

Oceanway

San Marco

Polly Town

Eastport

Radio Tower

Dunn Creek

Caney Creek

Seaboard

Line

Trout

Keene

Plummer

Dinmore

Cary

Lookout

Radliff

Callahan

Crawford

Hero

Hedge

Halfmoon Island

Parson Island

Tyler

Seaboard

Line

Trout

Keene

Plummer

Dinmore

Cary

Lookout

Radliff

Callahan

Crawford

Hero

Hedge

Halfmoon Island

Parson Island

Tyler

Seaboard

Line

Trout

Keene

Plummer

Dinmore

Cary

Lookout

Radliff

Callahan

Crawford

Hero

Hedge

Halfmoon Island

Parson Island

Tyler

Seaboard

Line

Trout

Keene

Plummer

Dinmore

Cary

Lookout

Radliff

Callahan

Crawford

Hero

Hedge

Halfmoon Island

Parson Island

Tyler

Seaboard

Line

Trout

Keene

Plummer

Dinmore

Cary

Lookout

Radliff

Callahan

Crawford

Hero

Hedge

Halfmoon Island

Parson Island

Tyler

Seaboard

Line

Trout

Keene

Plummer

Dinmore

Cary

Lookout

Radliff

Callahan

Crawford

Hero

Hedge

Halfmoon Island

Parson Island

Tyler

Seaboard

Line

Trout

Keene

Plummer

Dinmore

Cary

Lookout

Radliff

Callahan

Crawford

Hero

Hedge

Halfmoon Island

Parson Island

Tyler

Seaboard

Line

Trout

Keene

Plummer

Dinmore

Cary

Lookout

Radliff

Callahan

Crawford

Hero

Hedge

Halfmoon Island

Parson Island

Tyler

Seaboard

Line

Trout

Keene

Plummer

Dinmore

Cary

Lookout

Radliff

Callahan

Crawford

Hero

Hedge

Halfmoon Island

Parson Island

Tyler

Seaboard

Line

Trout

Keene

Plummer

Dinmore

Cary

Lookout

Radliff

Callahan

Crawford

Hero

Hedge

Halfmoon Island

Parson Island

Tyler

Seaboard

Line

Trout

Keene

Plummer

Dinmore

Cary

Lookout

Radliff

Callahan

Crawford

Hero

Hedge

Halfmoon Island

Parson Island

Tyler

Seaboard

Line

Trout

Keene

Plummer

Dinmore

Cary

Lookout

Radliff

Callahan

Crawford

Hero

Hedge

Halfmoon Island

Parson Island

Tyler

Seaboard

Line

Trout

Keene

Plummer

Dinmore

Cary

Lookout

Radliff

Callahan

Crawford

Hero

Hedge

Halfmoon Island

Parson Island

Tyler

Seaboard

Line

Trout

Keene

Plummer

Dinmore

Cary

Lookout

Radliff

Callahan

Crawford

Hero

Hedge

Halfmoon Island

Parson Island

Tyler

Seaboard

Line

Trout

Keene

Plummer

Dinmore

Cary

Lookout

Radliff

Callahan

Crawford

Hero

Hedge

Halfmoon Island

Parson Island

Tyler

Seaboard

Line

Trout

Keene

Plummer

Dinmore

Cary

Lookout

Radliff

Callahan

Crawford

Hero

Hedge

Halfmoon Island

Parson Island

Tyler

Seaboard

Line

Trout

Keene

Plummer

Dinmore

Cary

Lookout

Radliff

Callahan

Crawford

Hero

Hedge

Halfmoon Island

Parson Island

Tyler

Seaboard

Line

Trout

Keene

Plummer

Dinmore

Cary

Lookout

Radliff

Callahan

Crawford

Hero

Hedge

Halfmoon Island

Parson Island

Tyler

Seaboard

Line

Trout

Keene

Plummer

Dinmore

Cary

Lookout

Radliff

Callahan

Crawford

Hero

Hedge

Halfmoon Island

Parson Island

Tyler

Seaboard

Line

Trout

Keene

Plummer

Dinmore

Cary

Lookout

Radliff

Callahan

2.1.2 SITE 1-B--CLAPBOARD SWAMP - BLACK HAMMOCK

LOCATION/DESCRIPTION: Extends northward from the Pelotes Island Preserve, connecting to the Timucuan Ecological and Historical Preserve and Nassau River - St. Johns River Marshes Aquatic Preserve, encompassing lands surrounding portions of Clapboard and Pumpkin creeks including the southern tip of Black Hammock Island (Cedar Point).

QUADS: Eastport, Mayport.

SIZE: 4,855 acres.

NUMBER OF OWNERSHIPS: 12

MAJOR OWNERS: Lacy Mahon, North Shore Corporation, Verdie Forest, Inc.

HYDROLOGIC FEATURES:

This site does not have any frontage directly on the St. Johns or Nassau Rivers, but it has extensive interface with the saltmarsh system at the mouths of the rivers. The site incorporates three miles of Clapboard Creek, less than a mile of Bogey Branch, less than a mile of Fitzpatrick Creek, and less than a mile of Pumpkin Hill Creek.

More than 75% of the priority site is floodplain.

The site is in an area of no recharge to the Floridan aquifer.

ECOLOGICAL FEATURES: This site is characterized by maritime hammock and pine flatwoods surrounded by saltmarsh. Clapboard Creek lies within a forested wetland corridor which connects the maritime hammock in the southern portion of the site to flatwoods in the northern portions. Cut-over pine plantation bordering Clapboard Creek on the west was included as a buffer.

This site includes at least two rookery sites and is near several others. At least one of these has been utilized by wood storks in recent years. Data suggests that usage of these rookeries is erratic.

HISTORY/LAND USE: Development on Black Hammock Island and urbanization spreading from Jacksonville have fragmented habitat within this area. Much of the pinelands immediately west of the site have been converted to agriculture and pine plantations. This area has numerous archaeological sites, including Indian mounds and plantation ruins.

REASONS FOR SELECTION: Ecological connection linking relatively isolated Pelotes Island Preserve and Cedar Point Florida Communities Trust Project to larger natural systems. Protects scarce maritime hammock from strong development pressure. Buffers estuary and protects substantial floodplain wetlands important to wading birds.

RATIONALE FOR PROPOSED BOUNDARIES: Surrounding land uses determined the boundaries for this site. Pelotes Island Preserve, Timucuan Ecological and Historical Preserve, and Nassau River - St. Johns River Marshes Aquatic Preserve define the northern, southern, and eastern boundaries. The remaining boundaries were determined by development in the center and to the west of the site. All relatively undisturbed lands available for connecting Cedar Point and the Pelotes Island Preserve to protected areas in the north were incorporated into this priority site.

APPLICABILITY OF SJRWMD ACQUISITION CRITERIA:

Proximity to Headwaters: Includes headwaters of Clapboard Creek and Pumpkin Hill Creek.

Buffering Function: Limited potential buffering function for future urbanization north of Jacksonville.

Water Storage Capacity: High, since much of the priority site is floodplain.

Flood Conveyance: High, since area is relatively near the mouth of the Nassau River and floodplain is wide.

Intact Natural System: Moderate. Only isolated patches of uplands remain.

Groundwater Recharge Protection: Little or no recharge protection.

Potential to Restore Critical Altered Wetland System: Unlikely.

Recreation Potential: Moderate, but valuable due to proximity to population. Stretches of upland suitable for hiking and streams and tidal channels suitable for canoeing. Good potential for picnicking and interpretation.

Management Considerations: Overlaps Timucuan Preserve. NPS has agreed to manage Cedar Point in cooperation with the City of Jacksonville and would probably be interested in additional lands as well.

Development Pressure - Moderate to high. The maritime hammock at Cedar Point is extremely vulnerable.

Habitat for Endangered or Threatened Species or Communities - Moderate. Maritime hammock remnants are important. Valuable habitat for wading birds, including wood storks.

Ecological Connectedness: Excellent. Site was designed to provide this.

ACQUISITION FACTORS/COMMENTS: P-2000 Area of Conservation Interest. The majority of floodplain wetlands probably have a sufficient hydroperiod to be relatively well protected by engineering and regulatory factors. Nassau River - St. Johns River Marshes Aquatic Preserve and Timucuan Ecological and Historical Preserve may adequately protect adjoining lands and/or present cooperative opportunities.

RECOMMENDATIONS: Cooperate with FCT and NPS. Consult wading bird biologists to determine precise locations of rookeries and most valuable configuration to protect them as they are most likely to develop/shift. Do field inspection to refine acquisition boundaries; SJRWMD field personnel suspect that some areas excluded on the basis of excess parcelization and development are not yet too fragmented. Work with Jacksonville Electric Authority to define southwestern boundary; some of this area is committed to landfill expansion.

INFORMATION SOURCES: Florida Natural Areas Inventory, Land Acquisition Advisory Council (LAAC), Conservation and Recreation Lands (CARL), Soil Conservation Service, Florida Division of Forestry, National Park Service, Florida Park Service, Florida Game and Freshwater Fish Commission, Florida Plats, St. Johns Soil and Water Conservation District, FEMA-FIRM maps, Spencer 1991, Florida Communities Trust.

2.2 RSA 2--BLACK CREEK - ETONIAH

2.2.1. SITE 2-A--UPPER BLACK CREEK (CARL)

LOCATION/DESCRIPTION: The Upper Black Creek CARL priority site is located in northern Clay County, extending southward from Cecil Field Naval Air Station, and encompassing lands north of Camp Blanding and west of Middleburg.

QUADS: Fiftone, Jacksonville Heights, Middleburg SW.

SIZE: 9,311 acres

NUMBER OF OWNERSHIPS: 4

MAJOR OWNERS: Dorothy Sandridge, Gilman Paper Company, S.B. Jennings, Jr.

HYDROLOGIC FEATURES:

This site encompasses six miles of the North Fork of Black Creek, two miles of Yellow Water Creek, two miles of Big Branch, one mile of Mill Branch, and stretches of numerous unnamed tributary streams. The site includes the entire Mill Branch and Big Branch watersheds.

Less than 25% of the site is floodplain.

Approximately 25-50% of the site is in low to medium recharge areas.

ECOLOGICAL FEATURES: Sandhills dominate the uplands, which also incorporate mesic and wet flatwoods and some upland mixed forest. Botanically diverse seepage slope communities border an extensive blackwater stream system. Baygalls and cypress domes are scattered through the area.

This is a biologically interesting area with many uncommon species, a number of which are disjunct from Panhandle populations with northern affinities. The aquatic system associated with Black Creek, the seepages and the wet flatwoods are particularly rich in such plants, fishes, and other organisms. Several rare plant species have been identified within this priority site including Bartram's ixia, bearded grass-pink, blue butterwort, and hooded pitcher plant. This site is particularly valuable for Bartram's ixia, which is endemic to this region of northeastern

Florida. FNAI has documented red-cockaded woodpeckers and eastern indigo snakes within the area. The Black Creek region also supports three endemic insects and the endemic Black Creek crayfish. Additionally, the aquatic communities associated with the Black Creek system represent the northern limit for two fishes, the peninsular endemic Micropterus pictus and the intergrade pickerel.

HISTORY/LAND USE: This site is currently managed for timber resources. Logging activities and poor management practices, including fire exclusion, have somewhat degraded portions of this site. Some small areas have been converted to pine plantation. This site is within close proximity to Middleburg, an area which is experiencing rapid growth.

REASONS FOR SELECTION: This area is especially important to the protection of the Black Creek system its distinctive associated fauna and flora as well as serving as a regional ecological connection. The habitat variety and topographic relief give it aesthetic appeal and recreational potential.

RATIONALE FOR PROPOSED BOUNDARIES: Boundaries were developed by the Land Acquisition Advisory Council. Eastern and southern boundaries were determined by the presence of expanding subdivisions. The northern boundary was developed to facilitate negotiations with land owners and to incorporate portions of the Yellow Water River wetland system.

APPLICABILITY OF SJRWMD ACQUISITION CRITERIA:

Proximity to Headwaters: Includes Mill Branch and Big Branch drainage areas and headwaters of the North Fork of Black Creek.

Buffering Function: Moderate buffering function for Camp Blanding.

Water Storage Capacity: Low. Floodplains are generally confined to stream margins.

Flood Conveyance: Low. Streams are narrow.

Intact Natural System: Moderate to high. Wetland systems in good condition. Upland systems generally not too degraded with exception of several areas which have been converted to pasture

and pine plantation. Most of the site would benefit from a prescribed burn program. Uncontrolled access has resulted in much trash dumping and all-terrain vehicle use.

Groundwater Recharge Protection: Southwestern leg and northeast corner of area are in areas of low to medium recharge to the Floridan aquifer. Remainder of area is considered to provide no recharge.

Potential to Restore Critical Altered Wetland System: Minor restoration opportunities.

Recreation Potential - High ground well suited for hunting, horseback riding, hiking, and camping. Good canoeing streams. Much local interest as there are few recreational opportunities in Clay County.

Management Considerations: DOF will be the lead management agency according to an agreement initiated August, 1992. The area will be managed as a Type 1 Wildlife Management Area according to an agreement with FGFWFC initiated September, 1991. The area needs controlled access, law enforcement, and a prescribed fire program.

Development Pressure: LAAC considers moderate, but the site is close to Middleburg, a community which is expanding rapidly.

Habitat for Endangered or Threatened Species or Communities: High. Seepage slope communities are scarce. Several endemic, disjunct, and/or rare species occur onsite.

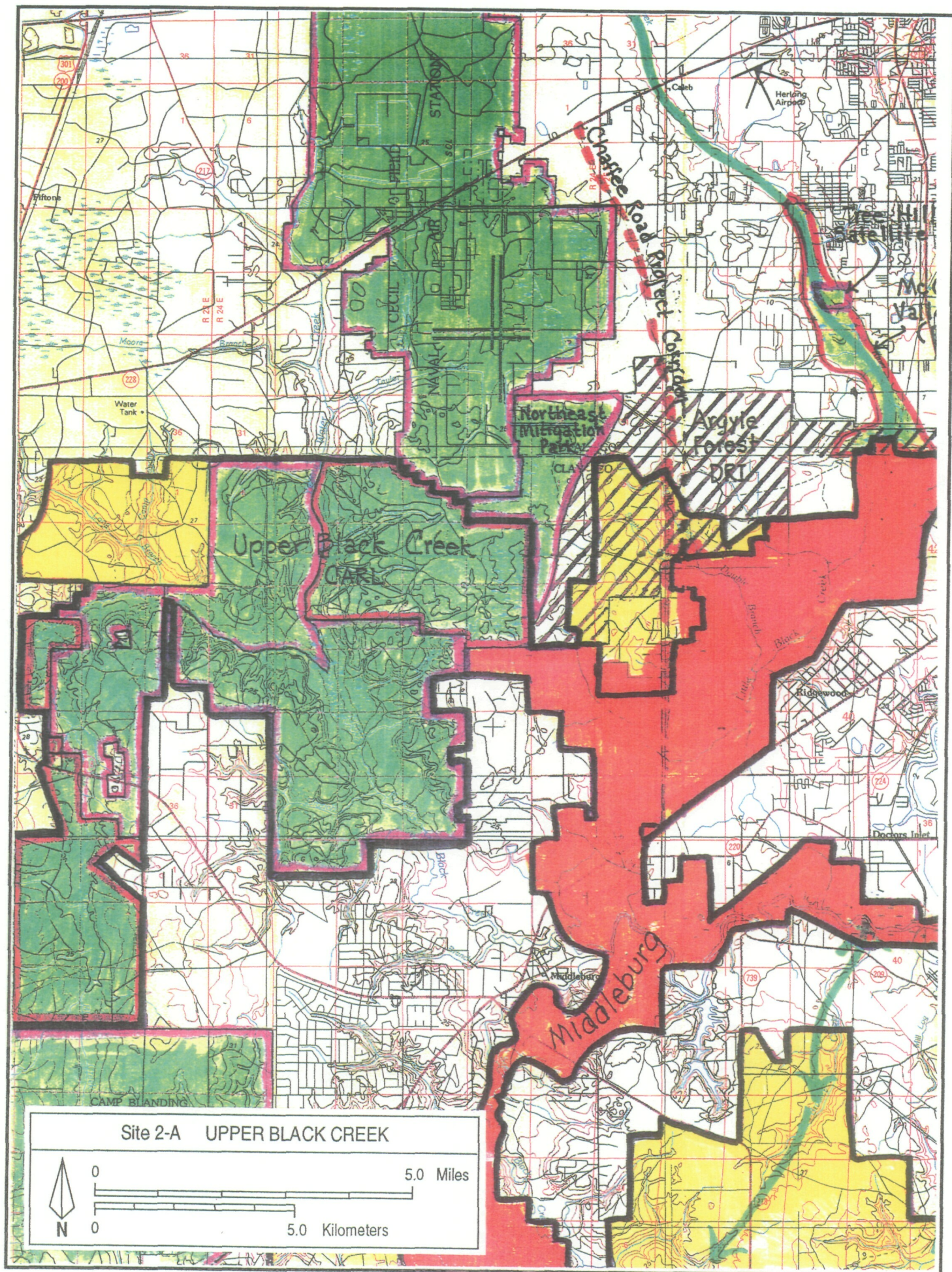
Ecological Connectedness: Critical connection for statewide ecological linkage network.

ACQUISITION FACTORS/COMMENTS: Approximately 13,500 acres within the Upper Black Creek priority area have been acquired by SJRWMD, and an additional 9,311 acres are planned for joint acquisition by the district and FDNR. TNC has assisted the state in purchasing lands in this area. The Florida Trail Association (FTA) acknowledges the importance of this landscape linkage and regards it as a possible route for the Florida Trail. To mitigate for wetland impacts associated with transmission line construction, Seminole Electric Cooperative proposes to acquire a portion of the 637-acre Huntley tract and deed this property to SJRWMD.

Potential threats to this area include the sale and possible urban development of the 26,000-acre Gilman Paper Company tract in the vicinity of the South Fork of Black Creek, the expansion of SR 21, and the possible construction of the proposed Jacksonville - Tampa Toll Road and accompanying bullet train.

RECOMMENDATIONS: SJRWMD should continue to actively pursue acquisition of remaining lands in this area.

INFORMATION SOURCES: Florida Natural Areas Inventory, Land Acquisition Advisory Council (LAAC), Conservation and Recreation Lands (CARL), Soil Conservation Service, Clay Soil and Water Conservation District, Florida Division of Forestry, Clay County Planning and Zoning Department, The Nature Conservancy.



2.2.2 SITE 2-B--ETONIAH CREEK

LOCATION/DESCRIPTION: Etoniah Creek CARL priority site is located in southern Clay and northern Putnam counties, five miles west of Palatka. It extends southward from the Ates Creek and Greens Creek priority sites, incorporating lands surrounding the Florida Trail and the proposed Palatka-Navair Rail Trail.

QUADS: Baywood, Gold Head Branch, Rice Creek.

SIZE: 55,237 acres

NUMBER OF OWNERSHIPS: 47

MAJOR OWNERS: Georgia Pacific, Manning Family, Putnam Associates LTD (Deltona), Union Camp.

HYDROLOGIC FEATURES:

This site encompasses nine miles of Etoniah Creek, six miles of Rice Creek, three miles of Falling Branch, and numerous tributaries to Rice Creek Swamp. It includes the headwater areas of Etoniah Creek, Rice Creek, and Falling Branch, as well as frontage on Georges Lake. Falling Branch and other streams in this area have eroded headward to create deep sand ravines similar to the Panhandle's steephead ravines.

Less than 25% of the priority site is floodplain.

Low to medium recharge areas comprise more than 75% of the site.

ECOLOGICAL FEATURES: This priority site consists of several large tracts of xeric uplands in varying degrees of naturalness, along with a blackwater creek system. Uplands range from undisturbed sandhill to improved pasture, but large areas of sandhill still retain native wiregrass groundcover. In many areas of the site, prescribed fire has maintained an open understory and typical sandhill fauna. Most of the original pine flatwoods have been disturbed, with the exception of a large area of wet flatwoods on the Manning tract.

Etoniah Creek, a tributary of the St. Johns River, is a shallow blackwater stream which meanders through sandy upland habitat. Etoniah Creek joins Rice Creek to form Rice Creek Swamp, an important area for wildlife. Slope forest and seepage slope communities border Etoniah Creek. Many rare and disjunct species are expected to occur along the creek system.

Several rare plant species have been located on the site. These include Bartram's Ixia, scrub holly, and silkbay. Recently a new species of woody mint, Conradina etonia, was discovered in the Etoniah priority site. Listed animal species observed on the site include the Black Creek crayfish, dusky shiner, gopher frog, gopher tortoise, eastern indigo snake, Florida pine snake, Florida scrub jay, Florida sandhill crane, bald eagle, red-cockaded woodpecker, little blue heron, snowy egret, tri-colored heron, Florida mouse, Sherman's fox squirrel, and Florida black bear.

HISTORY/LAND USE: Approximately 40 percent of the site has been disturbed. Much of the original pine flatwoods has been converted to pine plantation. Creek bottoms, ponds and bayheads generally are the only unplanted areas within the pine plantations. Portions of Etoniah Creek were channelized in the late 1800's. Other disturbed areas consist of hay fields, pastures, residential development, powerlines, roads, railways and borrow pits.

REASONS FOR SELECTION: Critical greenway for both ecological and recreational connections. Valuable as recharge area. Unusual ravine/seepage communities. Extensive good xeric habitat.

RATIONALE FOR PROPOSED BOUNDARIES: The priority site boundaries were determined by the Land Acquisition Advisory Council for the Etoniah Creek CARL project.

APPLICABILITY OF SJRWMD ACQUISITION CRITERIA:

Proximity to Headwaters: Includes headwater areas of Etoniah Creek, Rice Creek, Georges Lake.

Buffering Function: Moderate importance as buffer for headwater streams.

Water Storage Capacity: Low for streams in area, may be some storage in headwater swamps.

Flood Conveyance: Low. Streams are narrow.

Intact Natural System: Moderate.

Groundwater Recharge Protection: Most of the area is in a low to medium recharge area for Floridan aquifer, except the southeastern portion which is in an area of no recharge.

Potential to Restore Critical Altered Wetland System: None identified.

Recreation Potential: Moderate, much of the site is in silviculture. Hunting, camping, horseback riding, and swimming would be appropriate. A major segment of the Florida Trail crosses the site.

Management Considerations: DOF has been proposed as the lead management agency.

Development Pressure: High. Extensive upland areas are highly desirable for development purposes. A platted, but as yet undeveloped, subdivision and two DRIs consisting of 17,000 acres are being considered on portions of the priority site.

Habitat for Endangered or Threatened Species or Communities: High. Numerous rare species occur on site, including a new species of mint, known only to occur within the proposed priority site.

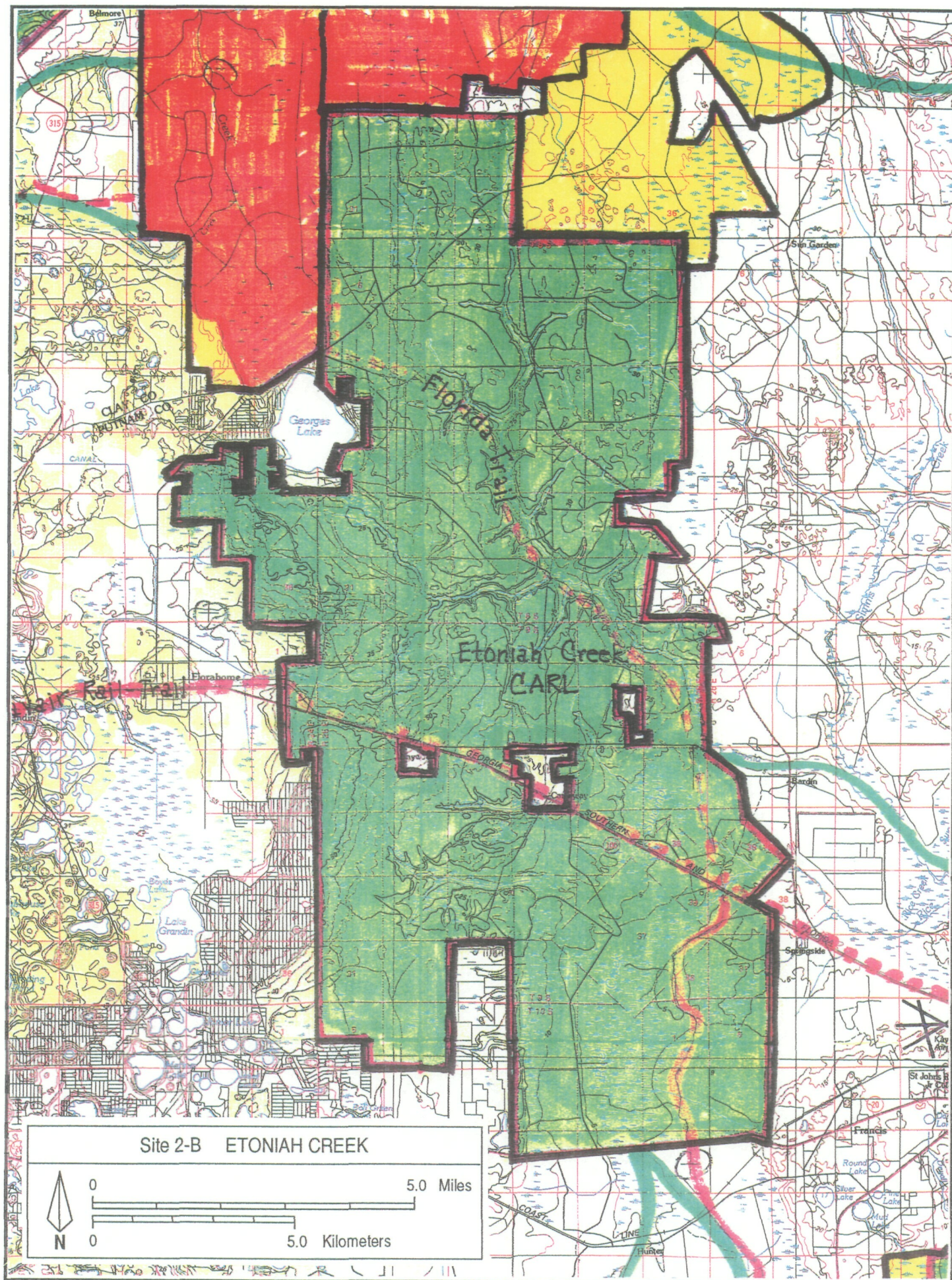
Ecological Connectedness: High. This area is a critical link in the ecological corridor connecting the Wekiva - Ocala systems to the south with the Pinhook - Okefenokee systems to the north.

ACQUISITION FACTORS/COMMENTS: This priority site is part of a large-scale acquisition project designed to protect important tracts of endangered upland ecosystems as well as to serve as a critical connector in the state wildlife corridor system.

RECOMMENDATIONS: SJRWMD should continue to strongly support acquisition of lands in this area.

INFORMATION SOURCES:

Florida Natural Areas Inventory, Land Acquisition Advisory Council (LAAC), Conservation and Recreation Lands (CARL), Soil Conservation Service, Clay Soil and Water Conservation District, Florida Division of Forestry, SJRWMD, Spencer 1991.



2.2.3 SITE 2-C--MIDDLEBURG

LOCATION/DESCRIPTION: Located in Clay County. Extends north from Ates and Greens Creek priority sites to the Northeast Mitigation Park. Connects to Upper Black Creek priority site on the west and Crossings DRI conservation areas on Fleming Island to the east via lands buffering Black Creek.

QUADS: Jacksonville Heights, Kingsley, Middleburg, Middleburg SW, Orange Park, Penny Farms.

SIZE: 19,337

NUMBER OF OWNERSHIPS: 45

MAJOR OWNERS: Gilman Paper Company, Frank T. Spencer.

HYDROLOGIC FEATURES:

This site includes nine miles of Little Black Creek, five miles of the Ortega River, one mile of the North Fork of Black Creek, and numerous small unnamed tributary streams.

25-50% of the site is floodplain.

Low to medium recharge areas comprise less than 25% of the site.

ECOLOGICAL FEATURES: The Middleburg priority site is characterized by forested stream corridors and associated seepage slopes and floodplain swamps. Some small patches of wet flatwoods grading to xeric flatwoods and sandhill occur in the northern portion of the site, with occasional stands of hardwood forest bordering the creeks. Relatively small patches of pine plantation are interspersed throughout the site. This is a biologically interesting area with many uncommon species, a number of which are disjunct from Panhandle populations with northern affinities. The aquatic systems associated with Black Creek are particularly rich in such species. This area is important to the endangered Bartram's ixia and provides an important corridor for black bear populations. Listed plants recorded from this site include pondspice, hartwrightia, St. Johns Susan, and Florida mountain mint. There is a wading bird rookery in the extreme northeast corner. Gopher tortoises have been documented onsite.

HISTORY/LAND USE: Extensive residential development, associated with the rapidly expanding Middleburg area, has severely fragmented the priority site, restricting the viable natural areas to stream corridors. The majority of tracts which have not been developed for residential use have been converted to pine plantation and agriculture.

REASONS FOR SELECTION: This priority area is especially important as a regional ecological connection. This site provides the only means of connecting natural areas north and south of Middleburg to the St. Johns River and the Upper Black Creek site. It provides a critical backup to the tenuous ecological connection between Etoniah Creek and Upper Black Creek through Camp Blanding.

RATIONALE FOR PROPOSED BOUNDARIES: Boundaries were dictated by existing development. The proposed boundaries incorporate all remaining significant natural lands throughout the Middleburg area.

APPLICABILITY OF SJRWMD ACQUISITION CRITERIA:

Proximity to Headwaters: Includes headwaters of Little Black Creek.

Buffering Function: Moderate buffering function between town of Middleburg and Black Creek.

Water Storage Capacity: High. There are wide floodplains (1/2 to 1 mile wide) and wetlands between Middleburg and Doctors Lake, as well as along Little Black Creek.

Flood Conveyance: Higher than most in the Black Creek system. Floodways are associated with much of the creek in this priority site.

Intact Natural System: Moderate to low. Severely fragmented by development.

Groundwater Recharge Protection: Most of the site is in an area of no recharge to the Floridan aquifer.

Potential to Restore Critical Altered Wetland System: Some opportunities.

Recreation Potential: Low. The site is primarily forested wetland.

Management Considerations: This site incorporates the proposed McGirts Creek Valley Park and the Tree Hill Satellite Preserve so the City of Jacksonville is likely to be interested in managing at least portions of it.

Development Pressure: Moderate. Upland areas are extremely vulnerable to development. Wetlands appear to be relatively well protected by regulatory factors.

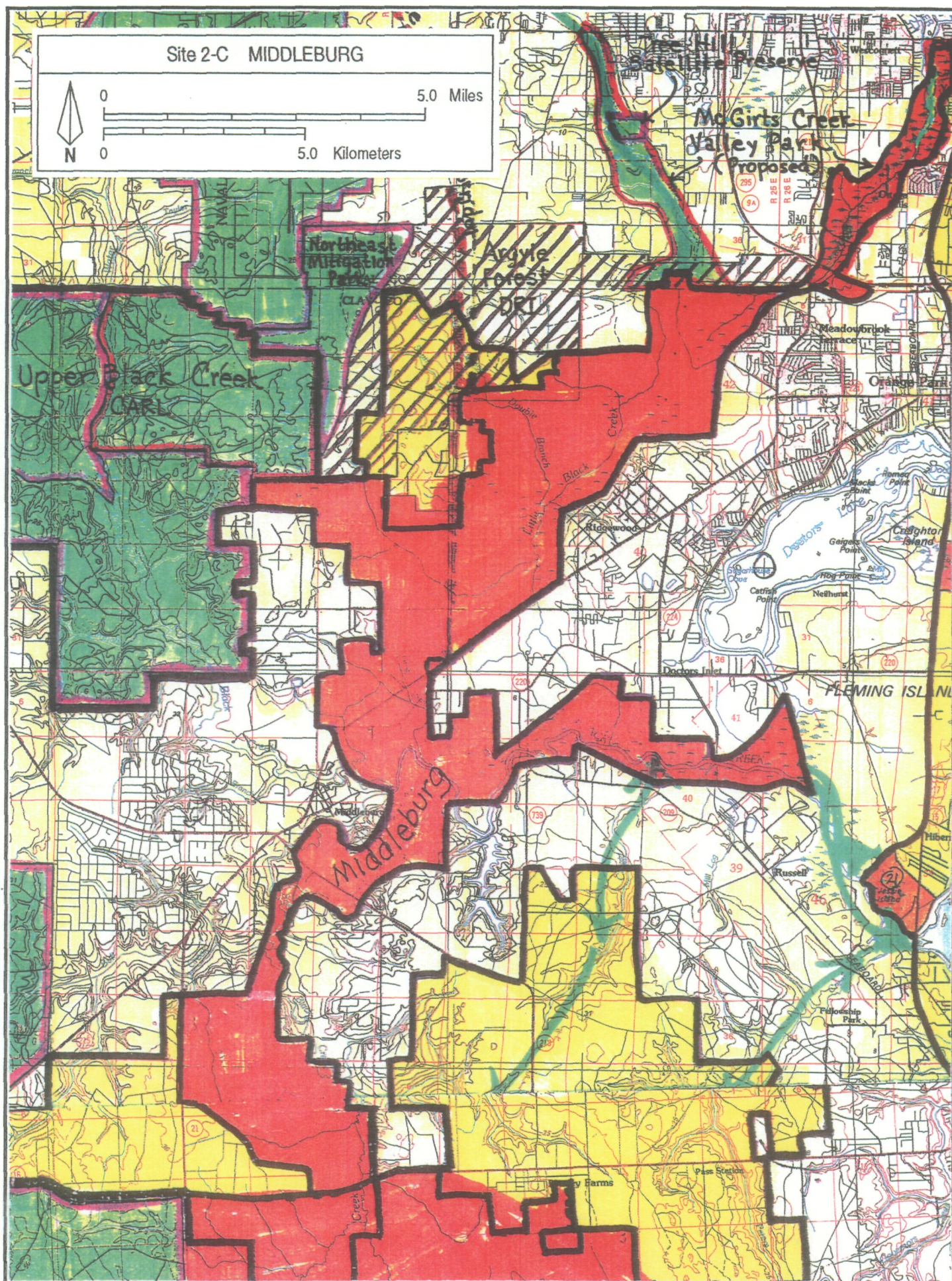
Habitat for Endangered or Threatened Species or Communities: Moderate. Several endemic, disjunct and rare species occur within the area. Seepage slope communities are becoming scarce.

Ecological Connectedness: Excellent. Site was designed to serve this function.

ACQUISITION FACTORS/COMMENTS: Efforts should be coordinated with activities on behalf of the McGirts Creek Valley Park Proposal. Portions of this site are P-2000 Areas of Conservation Interest. The Northeast Mitigation Park and Argyle Forest DRI abut this priority site on the north, and The Crossings DRI lies to the east on Fleming Island. The proposed SECI-Keystone/Firestone 230-KV Transmission Line corridor crosses through the northwest portion of this site.

RECOMMENDATIONS: SJRWMD should pursue acquisition of this site in coordination with the City of Jacksonville. A greenways planning study should address linkage of this area northwestward through McGirts Creek Valley to tie into Whitehouse area greenways connected to natural areas to the north and the Jacksonville - Baldwin Rail Trail. Inclusion of enough upland to incorporate a recreational trail should be attempted. Refine Middleburg, Ates Creek, and Greens Creek sites based on FGFWFC species/habitat maps when they become available. Consider an additional alternative connection linking Little Black Creek southward through Bradley Creek toward Green Creek; this could preserve and connect largest Bartram's ixia populations. Because this area is already so fragmented and the remaining connections are narrow, key linkage parcels should be bought quickly.

INFORMATION SOURCES: Florida Natural Areas Inventory, Land Acquisition Advisory Council (LAAC), Conservation and Recreation Lands (CARL), Soil Conservation Service, Clay Soil and Water Conservation District, Florida Division of Forestry, SJRWMD, FEMA-FIRM maps, Spencer 1991, Bergman 1992.



2.2.4 SITE 2-D--GREENS CREEK

LOCATION/DESCRIPTION: Located in Clay County. Extends north from the Etoniah Creek CARL Proposal to the Middleburg Priority Site. Connects to Ates Creek Priority Site on the west. Incorporates the Greens Creek system and adjacent lands.

QUADS: Penney Farms, Rice Creek.

SIZE: 21,828 acres.

NUMBER OF OWNERSHIPS: 5

MAJOR OWNERS: Union Camp, Rienhold Corporation.

HYDROLOGIC FEATURES:

This site includes ten miles of frontage on Greens Creek and numerous small unnamed tributaries.

Less than 25% of the site is floodplain.

Low to medium recharge areas comprise 50-75% of the site.

Flooding is reportedly a problem in the Middleburg vicinity near the confluence of the North and South Forks of Black Creek (Bergman 1992). The most recent example was in September 1988 along the east bank of the South Fork. Protecting upstream areas from development through land acquisition could help limit worsening of the flooding situation.

ECOLOGICAL FEATURES: This priority site includes extensive tracts of flatwoods and sandhills, as well as significant forested stream corridors lined with seepage wetlands. There are scattered areas of hardwood forest. This is a biologically interesting area with many uncommon species, a number of which are disjunct from panhandle populations with northern affinities. Gopher tortoises, hartwrightia, and St. Johns Susan have been recorded within the site. Red-cockaded woodpeckers, kestrels, and scrub jays have been reported from adjacent lands. This area provides important bear habitat. There are large populations of Bartram's ixia onsite.

HISTORY/LAND USE: Residential development and agriculture associated with Penney Farms is rapidly expanding to the south. Several small areas have been converted to agriculture and large areas of flatwoods have been planted to pine plantation. The groundcover is still in reasonably good condition over much of the site.

REASONS FOR SELECTION: This area is valuable as a regional ecological connection. It offers an opportunity to protect downstream areas (Middleburg) from flooding that might result from residential development or continuing conversion to pine plantation/agriculture.

RATIONALE FOR PROPOSED BOUNDARIES: Boundaries were designed to be of sufficient size to incorporate the Greens Creek system and extend to the Etoniah and Ates Creek priority sites.

APPLICABILITY OF SJRWMD ACQUISITION CRITERIA:

Proximity to Headwaters: Includes Greens Creek headwaters.

Buffering Function: Moderate value as buffer for Greens Creek headwaters.

Water Storage Capacity: Low. Floodplains in the priority site are relatively narrow and confined to stream margins. However, numerous isolated floodplains (unconnected to streams) provide water storage that may reduce flood peaks and volumes in the streams.

Flood Conveyance: Low.

Intact Natural System: Medium. There is very little development within the area other than forestry activities, which are extensive.

Groundwater Recharge Protection: There is an area of no recharge near the confluence of Greens and Ates Creeks, but the rest of the site provides low to medium recharge.

Potential to Restore Critical Altered Wetland System: Unlikely.

Recreation Potential: High. Well suited for hunting, horseback riding, hiking and camping. There is much local interest as there are few recreational opportunities in Clay county.

Management Considerations: Could be managed as an extension of the state forest proposed for Etoniah Creek.

Development Pressure: Moderate to low. The site is owned by large timber companies. Natural pinelands are at risk for conversion to pine plantation.

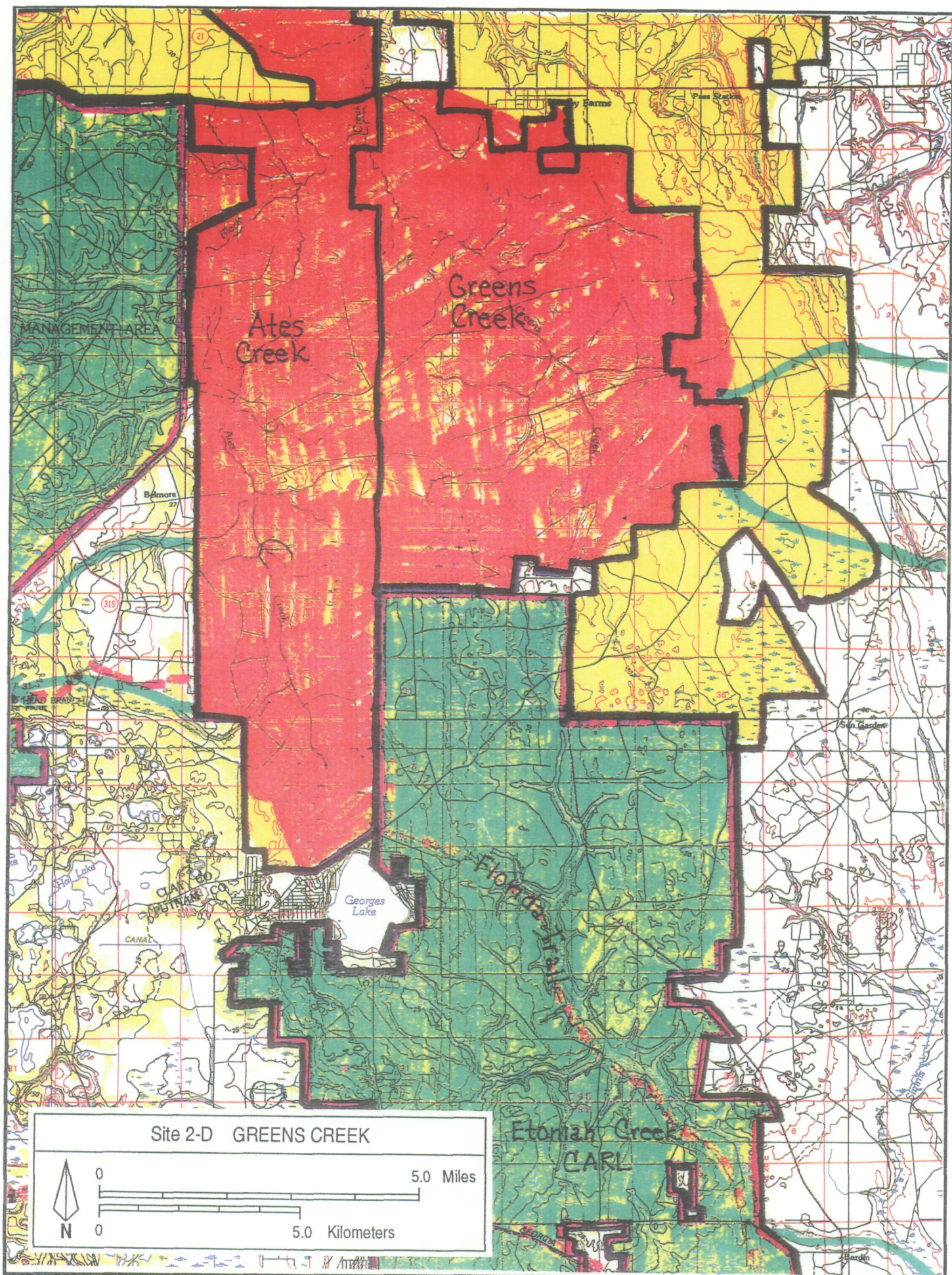
Habitat for Endangered or Threatened Species or Communities : Medium. Seepage communities and pinelands with restorable wiregrass groundcover are becoming scarce. Many rare species are likely on this site, but few have been documented.

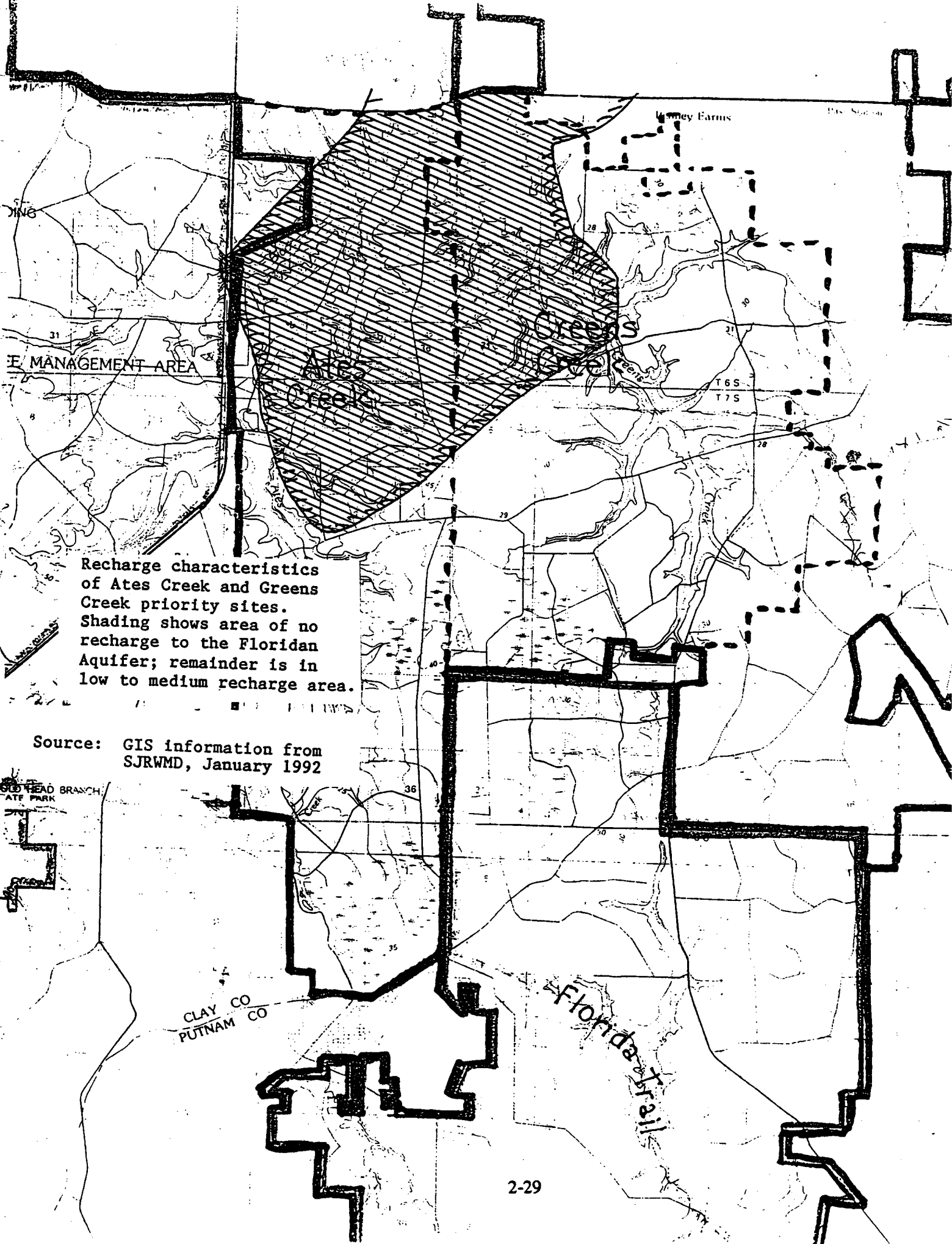
Ecological Connectedness: Medium High. This site can serve important functions in connecting the Etoniah Creek and Middleburg systems, but the Greens and Ates creeks priority sites have been designed so that either alone could minimally address this need.

ACQUISITION FACTORS/COMMENTS: Areas of the site are P-2000 Areas of Conservation Interest. There may be potential for establishing corridors through the largely developed lands to the east to link this priority site with SJRWMD's Bayard Point project.

RECOMMENDATIONS: SJRWMD should pursue longterm plans for acquisition of this site and/or Ates Creek. Plans should be refined based on FGFWFC species/habitat maps when they become available.

INFORMATION SOURCES: Florida Natural Areas Inventory, Land Acquisition Advisory Council (LAAC), Conservation and Recreation Lands (CARL), Soil Conservation Service, Clay Soil and Water Conservation District, Florida Division of Forestry, SJRWMD, FEMA-FIRM maps, Spencer 1991, Bergman 1992.





Recharge characteristics of Ates Creek and Greens Creek priority sites. Shading shows area of no recharge to the Floridan Aquifer; remainder is in low to medium recharge area.

Source: GIS information from SJRWMD, January 1992

2.2.5 SITE 2-E--ATES CREEK

LOCATION/DESCRIPTION: Located in Clay County. Extends north from Etoniah Creek priority site to Middleburg priority site. Bordered on the west by Camp Blanding and on the east by Greens Creek Priority Site. The Florida Trail crosses the southern part of this site.

QUADS: Gold Head Branch, Kingsley, Penney Farms, Rice Creek.

SIZE: 19,843 acres.

NUMBER OF OWNERSHIPS: 5

MAJOR OWNERS: Gilman Paper Company.

HYDROLOGIC FEATURES:

This site incorporates ten miles of Ates Creek, eight miles of the South Fork of Black Creek, and numerous small unnamed tributaries.

Less than 25% of the priority site is floodplain.

Low to medium recharge areas comprise 50-75% of the site.

Flooding is reportedly a problem in the Middleburg vicinity near the confluence of the North and South Forks of Black Creek (Bergman 1992). The most recent example was in September 1988 along the east bank of the South Fork. Protecting upstream areas from development could help to limit worsening of the flooding situation.

ECOLOGICAL FEATURES: This site contains significant forested stream corridors bordered by seepage slope communities associated with Ates Creek. A relatively large area of flatwoods mixed with hardwood hammock occurs in the southern portion of this site. This is a biologically interesting area similar to the Greens Creek priority site. There is a strong likelihood that uncommon species, a number of which may be disjunct from panhandle populations with northern affinities, occur on the site. Gopher tortoises, Bartram's ixia, hartwrightia, St. Johns Susan, and pondspice have been documented.

HISTORY/LAND USE: The bulk of this site has been converted to pine plantation. Development is expanding from the south and west. Some small areas of agriculture occur throughout the southern portion of the site.

REASONS FOR SELECTION: Extensive seepage wetlands likely to have rare/disjunct species. Important landscape connection linking Etoniah Creek to natural areas to the north; especially valuable as a bear corridor. Opportunity to protect downstream areas from flooding.

RATIONALE FOR PROPOSED BOUNDARIES: Boundaries determined by Etoniah Creek CARL Proposal to the south, Greens Creek Priority Site to the east, Middleburg Priority Site to the north and Camp Blanding to the west.

APPLICABILITY OF SJRWMD ACQUISITION CRITERIA:

Proximity to Headwaters: Includes headwaters of Ates Creek.

Buffering Function: Moderate value as buffer for Ates Creek headwaters.

Water Storage Capacity: Low. Floodplains are relatively narrow and confined to stream margins. However, numerous isolated floodplains (unconnected to streams) provide water storage that may reduce flood peaks and volumes in streams.

Flood Conveyance: Low.

Intact Natural System: Moderate to low. Uplands are primarily pine plantation.

Groundwater Recharge Protection: There is an area of no recharge near the confluence of Greens and Ates Creeks. Low to medium recharge in the remainder of the priority site. (See map in Greens Creek description.)

Potential to Restore Critical Altered Wetland System: Unlikely.

Recreation Potential: Moderate. Much of the site is in silviculture and not very varied or scenic. Hunting, hiking, camping, horseback riding, swimming, and some canoeing could be conducted here. Route for Florida Trail is important.

Management Considerations: Could be managed as state forest in conjunction with Etoniah Creek.

Development Pressure: Moderate.

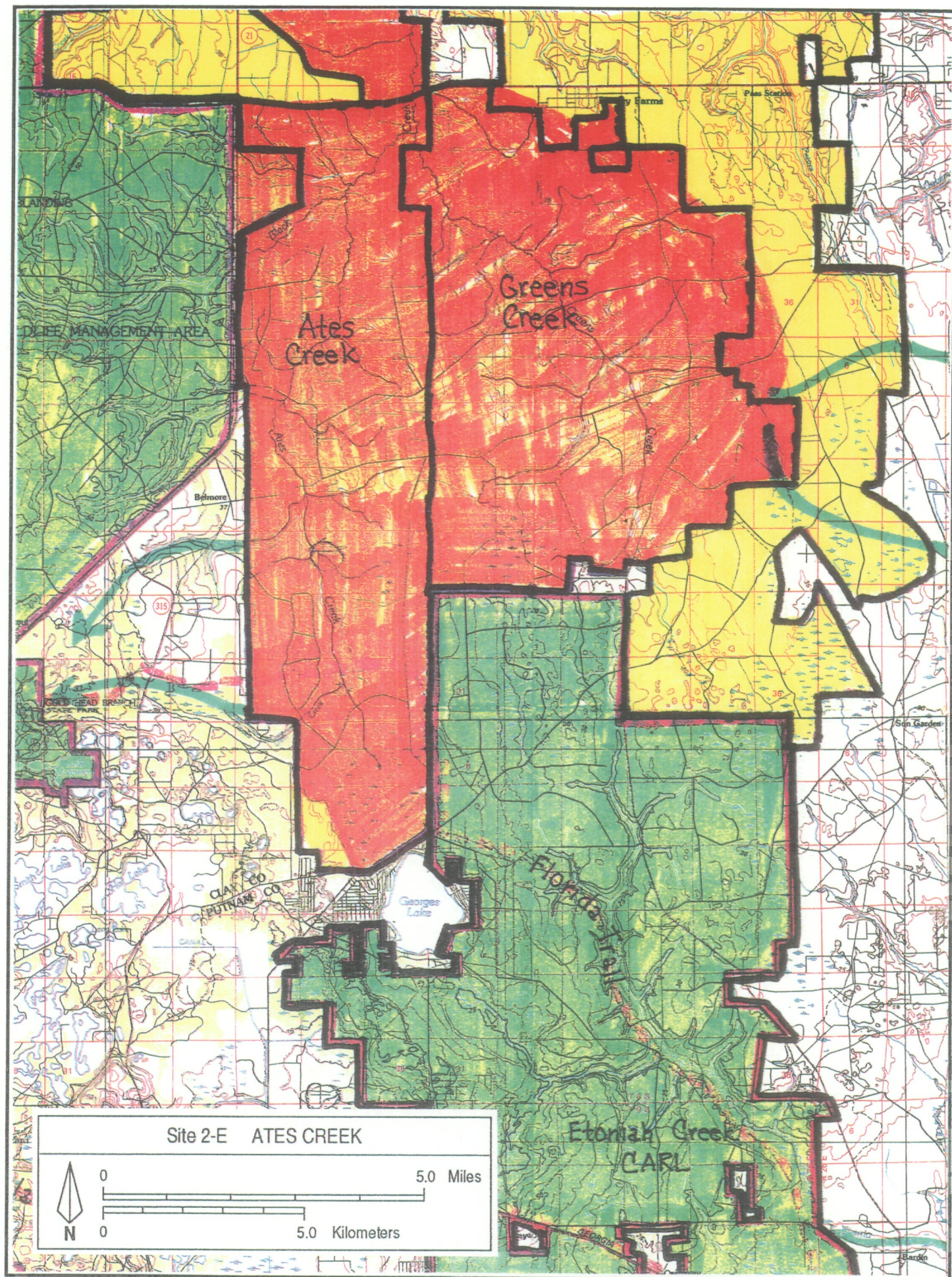
Habitat for Endangered or Threatened Species or Communities: Moderate to high. Rare species likely in seepage communities, but extensive pine plantations limit possibilities in upland habitats.

Ecological Connectedness: High. This site is within the critical ecological linkage between Etoniah Creek and Upper Black Creek.

ACQUISITION FACTORS/COMMENTS: Portions of this priority site are mapped as P-2000 Priority Acquisition Area. There may be potential for establishing corridors through the developed lands to the west to link this site with Gold Head Branch State Park along the Florida Trail and/or other routes.

RECOMMENDATIONS: SJRWMD should pursue acquisition of Ates Creek and/or Greens Creek. Plans should be refined based on FGFWFC species/habitat maps when they become available.

INFORMATION SOURCES: Florida Natural Areas Inventory, Land Acquisition Advisory Council (LAAC), Conservation and Recreation Lands (CARL), Soil Conservation Service, Clay Soil and Water Conservation District, Florida Division of Forestry, FEMA-FIRM maps, Spencer 1991, Bergman 1992.



2.3 RSA 3-PABLO CREEK - DURBIN SWAMP

2.3.1 SITE 3-A-DURBIN SWAMP

LOCATION/DESCRIPTION: Located in Duval and St. Johns Counties. Extends south from Highway 90 to the Twelvemile Swamp CARL Project and southwest to the Julington - Durbin Creeks Priority Site, incorporating Durbin Swamp and surrounding lands.

QUADS: Arlington, Bayard, Durbin, Jacksonville Beach, Orangedale, Palm Valley.

SIZE: 37,406 acres.

NUMBER OF OWNERSHIPS: 13

MAJOR OWNERS: DDI, James Davis, Skinner et al., WW Cummer.

HYDROLOGIC FEATURES:

This site includes six miles of Pablo Creek, four miles of Big Davis Creek, four miles of Durbin Creek, two miles of Cedar Swamp Creek, three miles of Boggy Branch, and one mile of Milldam Branch.

25-50% of the priority site is floodplain.

There are no recharge areas.

Flooding problems such as excessive flow velocities and overtopping of bridges reportedly occur along Julington Creek and Big Davis Creek (Bergman 1992).

ECOLOGICAL FEATURES: The majority of this site (especially the northern portion) is a remarkably undeveloped mosaic of swamp, flatwoods, and sandhill/scrub communities. FNAI and FGFWFC reports indicate that numerous rare species utilize the Durbin Swamp region. Bears, fox squirrels, red-cockaded woodpeckers, indigo snakes, and gopher tortoises all utilize the site, and panthers have been reported. The site includes a rookery (FGFWFC #594004) used by wood storks as well as great egrets, white ibis, anhingas, little blue herons, great blue herons, tri-colored herons, and cattle egrets. A spotted turtle was recorded about a mile to the southwest of the site. Bartram's ixia occurs in the southwestern portion of the site.

HISTORY/LAND USE: A moderate proportion of the pinelands have been converted to pine plantation; most of these are in the southern part of the site. There are also a few small agricultural areas. To the north and west, suburban development has fragmented natural habitats. Several highways are planned for this area. They have been taken into account in site boundary delineation and mapped on the 1:24,000 quad sheets.

REASONS FOR SELECTION: Relatively intact natural systems, including extensive wetlands providing important floodwater storage upstream of development. Important to several declining species that require large habitat areas. Valuable as landscape connection and segment of Jacksonville greenbelt.

RATIONALE FOR PROPOSED BOUNDARIES: The northern boundaries of the site were determined by expanding development from Jacksonville. The Department of Transportation 9A project corridor established the western boundary. The extent of Durbin Swamp determined the eastern boundary and Durbin and Big Davis Creek corridors were delineated for the southwestern connections to the Julington - Durbin Creeks priority site.

APPLICABILITY OF SJRWMD ACQUISITION CRITERIA:

Proximity to Headwaters: Includes headwaters of Pablo Creek, Big Davis Creek and Durbin Creek.

Buffering Function: Major buffering function for urbanizing areas especially to the west.

Water Storage Capacity: High. Much of the priority site is floodplain wetland with high storage capacity in topographic depressions. Numerous floodplain areas are isolated from streams.

Flood Conveyance: Moderate. There are floodways associated with Pablo Creek and Big Davis Creek, but most of the streams are small.

Intact Natural System: High. This site has large expanses of natural habitat in good condition.

Groundwater Recharge Protection: Located in an area of no recharge to the Floridan aquifer.

Potential to Restore Critical Altered Wetland System: Unlikely.

Recreation Potential: Moderate to high, Numerous outdoor activities are suitable for this site including hiking, camping, and horseback riding.

Management Considerations: Could be managed in conjunction with Julington - Durbin Creeks or Twelvemile Swamp. Management must emphasize rare species protection and, since the species of concern are vulnerable to shooting and harassment, forestry and hunting must be carefully managed/restricted.

Development Pressure: Moderate to High. Urban development threatens the north and west boundaries of the site, while conversion to pine plantation threatens the upland habitats.

Habitat for Endangered or Threatened Species or Communities: High. Extensive habitat important to several declining species with large home ranges.

Ecological Connectedness: Medium. Potentially valuable connection between Timucuan Preserve and Julington - Durbin and Twelvemile Swamp areas.

ACQUISITION FACTORS/COMMENTS: Durbin Swamp is a P-2000 Priority Acquisition Area. The surrounding lands and Pablo Creek are mapped as P-2000 Areas of Conservation Interest. The NEFRPC has identified Cedar Swamp as a special management area. Durbin Swamp should be linked to the Timucuan Preserve to the north and to the Julington - Durbin and Twelvemile Swamps and beyond to the south via broad greenways. The City of Jacksonville owns approximately 1,000 acres in the southern end of the priority site. The site was originally purchased for the proposed Durbin Creek Landfill, but this plan has been abandoned. Two DRIs, Mayo Clinic and Windsor Park, are located along the northwest margin of the site. Preliminary information suggests that the habitats on these sites are worth preserving, but field surveys would be needed to determine whether they are so valuable that it is essential to include these peripheral areas if great cost and effort is required.

RECOMMENDATIONS: Pursue acquisition of this site as a high priority. Confirm and protect old longleaf with red-cockaded woodpeckers west of Windsor Park DRI as soon as possible (FNAI EOR #.199). Refine boundaries and priorities based on FGFWFC species/habitat maps when they become available.

INFORMATION SOURCES: Florida Natural Areas Inventory, Land Acquisition Advisory Council (LAAC), Conservation and Recreation Lands (CARL), Soil Conservation Service, Florida Division of Forestry, National Park Service, Florida Park Service, Florida Game and Freshwater Fish Commission, Florida Plats, St. Johns Soil and Water Conservation District, Northeast Florida Regional Planning Council, FEMA-FIRM maps, Spencer 1991, Bergman 1992.



2.4 RSA 4--JULINGTON-DURBIN - HALLOWES COVE

2.4.1 SITE 4-A--JULINGTON-DURBIN CREEKS

LOCATION/DESCRIPTION: Located in Duval and St. Johns Counties, this priority site incorporates Julington and Durbin Creeks and surrounding areas. It includes the Julington - Durbin CARL Project.

QUADS: Bayard, Orangedale.

SIZE: 4,200 acres

NUMBER OF OWNERSHIPS: 8

MAJOR OWNERS: General Development Corporation, Applebaum Trust.

HYDROLOGIC FEATURES:

This site include six miles of Durbin Creek and three miles of Julington Creek. Julington Creek is tidally influenced to approximately one mile upstream of the confluence with Durbin Creek.

More than 50% of the priority site is floodplain.

The site is in an area of no recharge to the Floridan aquifer.

Flooding problems in this area include excessive flow velocities and overtopping of bridges along Julington Creek.

ECOLOGICAL FEATURES: This site is characterized by flatwoods and scrub/sandhill systems laced with extensive floodplain swamps. The area is of local significance to Duval County, since relatively intact habitats are rare in this urbanized county. Both Julington and Durbin Creeks provide nursery, feeding and refuge areas for manatees. Bald eagles have nested in the area in the past, and there are active eagle nests immediately south of the site. Ospreys are common throughout the area. Bears range through the area and the eastern portion of the site is especially valuable to fox squirrels. Numerous rare plant species have been identified on the site including pine lily, variable-leaf crownbeard, and three populations of Bartram's Ixia.

HISTORY/LAND USE: Substantial development borders the site on the north and west. Remaining adjacent lands have been converted to pine plantation. A DRI involving 9,800 dwelling units has been approved for the south side of Durbin Creek. A powerline ROW crosses the east side and hosts a number of rare plant species.

Aerial photography indicates that this site was once a high-quality longleaf pine - sandhill community which graded into flatwoods and herbaceous isolated wetlands. The majority of the mature pine was cut in the mid-1900's. Most of the site has been mechanically planted with slash and sand pine.

REASONS FOR SELECTION: This site represents one of the last remaining natural areas along Julington and Durbin Creeks. It is valuable for flood storage, as creek buffer, and for protection of wetland functions and xeric habitat.

RATIONALE FOR PROPOSED BOUNDARIES: Boundaries were established by the Land Acquisition Advisory Council. The boundaries include SJRWMD's current Julington - Durbin acquisition project as well as an addition to the south of Durbin Creek recommended by FNAI.

APPLICABILITY OF SJRWMD ACQUISITION CRITERIA:

Proximity to Headwaters: Does not include headwater areas of Julington or Durbin Creeks.

Buffering Function: Valuable in buffering St. Johns River from rapid urbanization of Julington and Durbin Creek basins.

Water Storage Capacity: High in floodplains adjacent to streams.

Flood Conveyance: High.

Intact Natural System: Medium. The uplands have suffered from fire exclusion and poor management.

Groundwater Recharge Protection: Located in an area of no recharge to the Floridan aquifer.

Potential to Restore Critical Altered Wetland System: Unlikely.

Recreation Potential: High. Camping, picnicking, bicycling, hiking, camping, boating and horseback riding are all suitable for this site, which is located in close proximity to Jacksonville residential areas.

Management Considerations: Much of the upland vegetation on the study site has been altered by past management practices. Some of these areas will require significant restoration efforts while other areas can be easily restored with the implementation of a sound prescribed fire program. Without the implementation of a comprehensive restoration plan followed by continued physical management, the upland communities will cease to be ecologically viable.

Development Pressure: Active residential development threatens the natural attributes of the site as well as the water quality of the two creeks associated with the site.

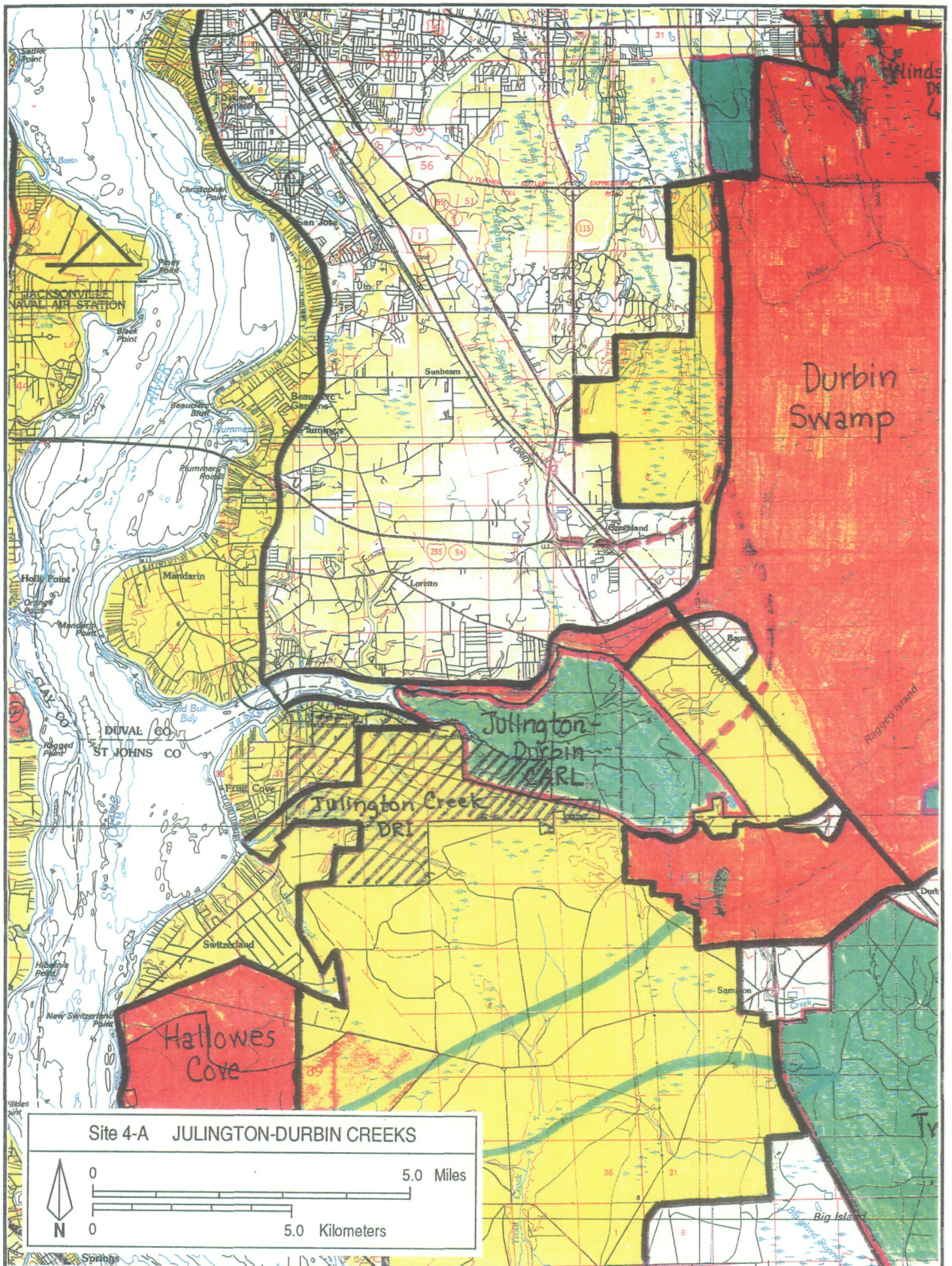
Habitat for Endangered or Threatened Species or Communities: Medium. Several rare species and communities occur on this site, but no longer offers the expanses of quality habitat that would make it of prime value.

Ecological Connectedness: Valuable as connection between Durbin Swamp and St. Johns River.

ACQUISITION FACTORS/COMMENTS: Both the Florida Department of Natural Resources and SJRWMD are interested in acquiring the site. A large DRI is proposed for the area north of Durbin Creek.

RECOMMENDATIONS: SJRWMD should continue to strongly support acquisition of this site.

INFORMATION SOURCES: Florida Natural Areas Inventory, Land Acquisition Advisory Council (LAAC), Conservation and Recreation Lands (CARL), Soil Conservation Service, Florida Division of Forestry, National Park Service, Florida Park Service, Florida Game and Freshwater Fish Commission, St. Johns Soil and Water Conservation District, St. Johns Comprehensive Plan, Spencer 1991, Bergman 1992.



Site 4-A JULINGTON-DURBIN CREEKS



0 5.0 Miles
0 5.0 Kilometers

2.4.2 SITE 4-B-HALLOWES COVE

LOCATION/DESCRIPTION: Located in St. Johns County. Extends south from Switzerland to Orangedale along the St. Johns River. Includes Hallowes Cove and Popo Point.

QUADS: Fleming Island.

SIZE: 5,375 acres.

NUMBER OF OWNERSHIPS: 7

MAJOR OWNERS: Gulfstream Land and Development Corporation, Midland Airport Property Management, PRN Investments, St. Joe Paper Company, Switzerland Sod Farms.

HYDROLOGIC FEATURES:

This site has six miles of St. Johns River frontage and incorporates one mile of Kentucky Branch and two miles of Orange Grove Branch.

Less than 25% of the priority site is floodplain.

Low to medium recharge areas comprise 100% of the site.

ECOLOGICAL FEATURES: This site is an extensive tract of undisturbed flatwoods with forested wetlands bordered by hardwood forest along the riverfront. There is a small area of pinelands in the southwest corner of the site that has been converted to pine plantation. Several rare plants have been recorded from flatwoods in this vicinity. This section of the St. Johns River is especially important to manatees. An eagle nest has been documented onsite.

HISTORY/LAND USE: This site has remained reasonably undisturbed. Several small isolated residential areas have been developed along the St. Johns riverfront. There is a small airport in the north-central portion of the site, but it is apparently abandoned, and (with the exception of the actual runway) the site remains generally undisturbed. Expansive pine plantations border the site on the east and residential development borders the site on the north and south. The William Bartram Scenic Highway goes through this area.

REASONS FOR SELECTION: This is a large block of relatively natural land highly vulnerable to urban expansion. Rare plant records suggest diverse groundcover. Valuable river buffer.

RATIONALE FOR PROPOSED BOUNDARIES: The boundary was designed to include all natural lands within the area. Development determined boundaries on the north and south.

APPLICABILITY OF SJRWMD ACQUISITION CRITERIA:

Proximity to Headwaters: No headwaters are included in site.

Buffering Function: Good potential buffering function for St. Johns River as development spreads south from Julington-Durbin Creek area.

Water Storage Capacity: Low. Priority area has low relief and relatively little storage in floodplain and wetland areas. Floodplains are predominantly located around Hallows Cove, Popo Point, and the headwaters of Orange Grove Creek.

Flood Conveyance: Low. Small floodways are associated with Orange Grove Branch and Kentucky Branch.

Intact Natural System: High. Expansive tract of flatwoods that appear to be in good condition.

Groundwater Recharge Protection: Located in an area of low to medium recharge to the Floridan aquifer, giving the site moderate value for groundwater protection.

Potential to Restore Critical Altered Wetland System: Unlikely.

Recreation Potential: High. Well suited for horseback riding, hiking and camping.

Management Considerations: Could be managed in conjunction with Julington - Durbin or Twelvemile CARL lands.

Development Pressure: High. One of the few riverfront areas in St. Johns County that has not been developed.

Habitat for Endangered or Threatened Species or Communities: Moderate. Good habitat quality, but habitat diversity is limited and types are not unusual, so potential for rare species is not great.

Ecological Connectedness: Weak.

ACQUISITION FACTORS/COMMENTS: The Save the Manatee Club and the Switzerland Community proposed the Hallows Cove area to the Land Acquisition Advisory Council in 1990. This large, relatively intact natural area is vulnerable to development and is one of a few remaining extensive natural areas bordering the river in St. Johns County.

The St. Johns County Comprehensive Plan proposes a four-lane highway which will extend northeast from Highway 13 in Hallows Cove to the St. Johns - Duval County line in expectation of rapid growth in the Hallows Cove area, but this proposed highway is not indicated in FDOT's Multi-Year Capital Fund Program Report.

Several developments of regional impact (DRI) have been proposed in the Hallows Cove priority site. St. Johns Forest DRI and St. Johns Harbor DRI recently were not approved. St. Johns Creek DRI has been proposed but no development issue has been ordered. Julington Creek DRI has been approved.

RECOMMENDATIONS: SJRWMD should pursue acquisition of this site in cooperation with local communities and developers. Refine boundaries and plan linkages based on FGFWFC species/habitat maps when they become available.

INFORMATION SOURCES: Florida Natural Areas Inventory, Land Acquisition Advisory Council (LAAC), Conservation and Recreation Lands (CARL), Soil Conservation Service, Florida Division of Forestry, National Park Service, Florida Park Service, Florida Game and Freshwater Fish Commission, St. Johns Soil and Water Conservation District, St. Johns Comprehensive Plan, FEMA-FIRM maps, Spencer 1991, Bergman 1992, Murphy and Johnson 1988.

Site 4-B HALLOWES COVE

0 5.0 Miles

0 5.0 Kilometers

N



2.5 RSA 5-HAW CREEK

2.5.1 SITE 5-A-HAW CREEK

LOCATION/DESCRIPTION: Located in Flagler and Volusia Counties. Incorporates lands surrounding Haw Creek State Park and Dead Lake. A large portion of the site borders Crescent Lake.

QUADS: St. Johns Park, Seville.

SIZE: 10,490 acres

NUMBER OF OWNERSHIPS: Approximately 8 (Flagler has no plat book).

MAJOR OWNERS: Estuary Corporation, Hudson Pulp and Paper Company.

HYDROLOGIC FEATURES:

This site includes five miles of lakefront on Crescent Lake and three and a half miles on Dead Lake. It incorporates less than a mile of Haw Creek.

More than 75% of the site is floodplain.

The site is located in an area of no recharge to the Floridan aquifer.

Crescent Lake, along with other water bodies in the vicinity, is subject to extensive flooding under conditions of high lake levels combined with high groundwater levels and high rainfall.

ECOLOGICAL FEATURES: Most of this site is sawgrass marsh and cypress and mixed hardwood swamp. Some patches of pine flatwoods and hardwood forest occur in the northern portion of the site. Several relatively small areas along Crescent Lake in the northwest have been converted to farmland in the northwest portion of the site along Crescent lake.

HISTORY/LAND USE: Most parts of this site have remained undisturbed. St. Johns Park, a small town northeast of Dead Lake, fragments the northwestern portion. Several tracts of farmland occur along the eastern edge of Crescent Lake.

REASONS FOR SELECTION: Extensive wetlands. Important buffer area for Crescent and Dead Lakes. Potential significance as an ecological connection.

RATIONALE FOR PROPOSED BOUNDARIES: Proposed boundaries were developed to include floodplain wetlands associated with Crescent Lake and Haw Creek State Park. Agriculture and pine plantation determined the boundaries.

APPLICABILITY OF SJRWMD ACQUISITION CRITERIA:

Proximity to Headwaters: There are no headwaters in the site.

Buffering Function: This site has moderate buffer value in protecting the St. Johns River from development in the intensely parcelized area northeast of St. Johns Park.

Water Storage Capacity: High. Most of priority site is in floodplains and shallow waterbodies.

Flood Conveyance: Low. The streams are relatively narrow.

Intact Natural System: Medium. The wetlands are relatively intact, but most of the associated uplands have been converted to agricultural uses.

Groundwater Recharge Protection: None.

Potential to Restore Critical Altered Wetland System: No opportunities have been identified.

Recreation Potential: Moderate. Most of the site is wetland, but there is some upland access to the St. Johns River.

Management Considerations: Could easily be added to adjacent Haw Creek State Park.

Development Pressure: Very low.

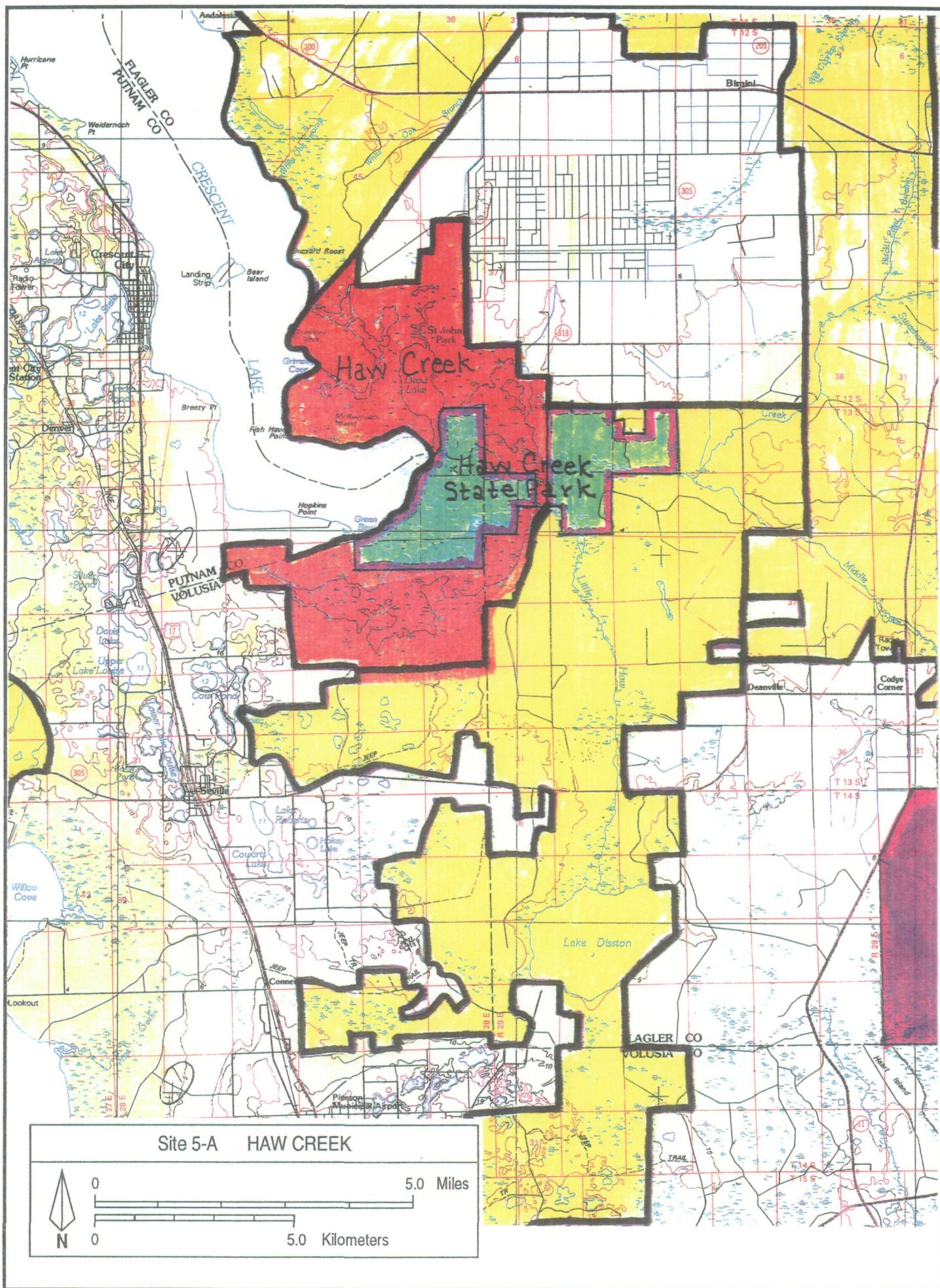
Habitat for Endangered or Threatened Species or Communities: Low. Only moderate habitat variety. No rare habitats or species documented.

Ecological Connectedness: Moderate. This site forms part of a significant ecological corridor along the east shore of Crescent Lake. There are potential linkages to the northeast, southeast, and southwest.

ACQUISITION FACTORS/COMMENTS: This is a P-2000 Area of Conservation Interest. The bulk of the site is floodplain wetlands which should be relatively well protected from development by regulatory factors.

RECOMMENDATIONS: SJRWMD should pursue longterm plans for acquisition of this site.

INFORMATION SOURCES: Florida Natural Areas Inventory, Land Acquisition Advisory Council (LAAC), Conservation and Recreation Lands (CARL), Soil Conservation Service, Florida Division of Forestry, National Park Service, Florida Park Service, Florida Game and Freshwater Fish Commission, Florida Plats, SJRWMD, FEMA-FIRM maps, Spencer 1991, Bergman 1992.



3.0 OTHER ONGOING SJRWMD LAND ACQUISITION PROJECTS

3.1 SITE O-A-BAYARD POINT

LOCATION/DESCRIPTION: The Bayard Point Project Area is located between U.S. 17 and the west bank of the St. Johns River, and extends south from S.R. 16 to Cedar Creek. The majority of the project area is within Clay County, with 3,840 acres in Putnam County.

QUADS: Green Cove Springs, Picolata, Bostwick, Riverdale

SIZE: Approximately 18,500 acres

NUMBER OF OWNERSHIPS: 20+

MAJOR OWNERS: Hall, Georgia Pacific, Williams

HYDROLOGIC FEATURES: The project area contains approximately 10 miles of frontage on the St. Johns River, with at least that much on tributaries and drainages feeding the river. Approximately 35 percent of the area lies within the 10 year floodplain.

ECOLOGICAL FEATURES: Riverine corridor, with large areas of floodplain forest/hydric hammock. Upland pine forests have had minimal disturbance during regeneration. Project area includes substantial acreages of drainage creeks and associated vegetative communities.

HISTORY/LAND USE: Rural land use, primarily under low intensity silviculture activities and some cattle production. Increasingly, land is being parcelized for scattered residential sites (primarily mobile homes). County roads and a railroad line traverse portions of the area.

REASONS FOR SELECTION: St. Johns River frontage, intact systems, floodplain characteristics, encroaching development.

RATIONALE FOR PROPOSED BOUNDARIES: Based on preliminary assessment of ownerships and resource features; boundaries need further revision.

APPLICABILITY OF SJRWMD ACQUISITION CRITERIA:

Proximity to Headwaters - Cedar and Clarkes Creek headwaters with numerous feeder streams and creeks contributing to the St. Johns River.

Buffering Function - Serves a major buffering function in an urbanizing area.

Water Storage Capacity - Approximately 35 percent of this project area lies within the 10 year floodplain of the St. Johns River.

Flood Conveyance - The hardwood swamps provide significant flood storage potential along the river.

Intact Natural System - Existing land uses are primarily agriculture and rural residential development. Floodplain forests, other wetlands, and hardwood hammocks are fairly intact. Most pine forests have not been intensively managed or altered, although some uplands have been converted to pasture. Implementing a natural fire regime would restore most of the communities affected by cultural activities.

Groundwater Recharge Protection - Low potential.

Potential to Restore Critical Altered Wetland System - Overall, there is little need to conduct restoration, as large-scale changes to natural hydrology have not occurred. There are specific areas where restoration could address localized changes to hydrology.

Management Considerations: Clay County supports this project. The Division of Forestry currently assists or leads management of other district properties where protecting water resource values are a high priority. Management options will be explored with other agencies as acquisition of core parcels proceeds. The proximity to district headquarters and existing staff expertise warrant consideration of lead management by the district.

Recreation Potential The location of this project area offers outdoor recreational opportunities for an increasingly urban area. Cooperative environmental education opportunities exist with the school systems. Recreational activities could include fishing,

canoe trails, hiking, nature study, birding, horseback riding, and environmental education/interpretive facilities. Under an existing agreement, the Florida Trail Association can provide assistance in establishing and maintaining hiking trails.

Development Pressure: Moderate. Increase is expected as Jacksonville continues to grow. Green Cove Springs functions as a Jacksonville 'bedroom community'.

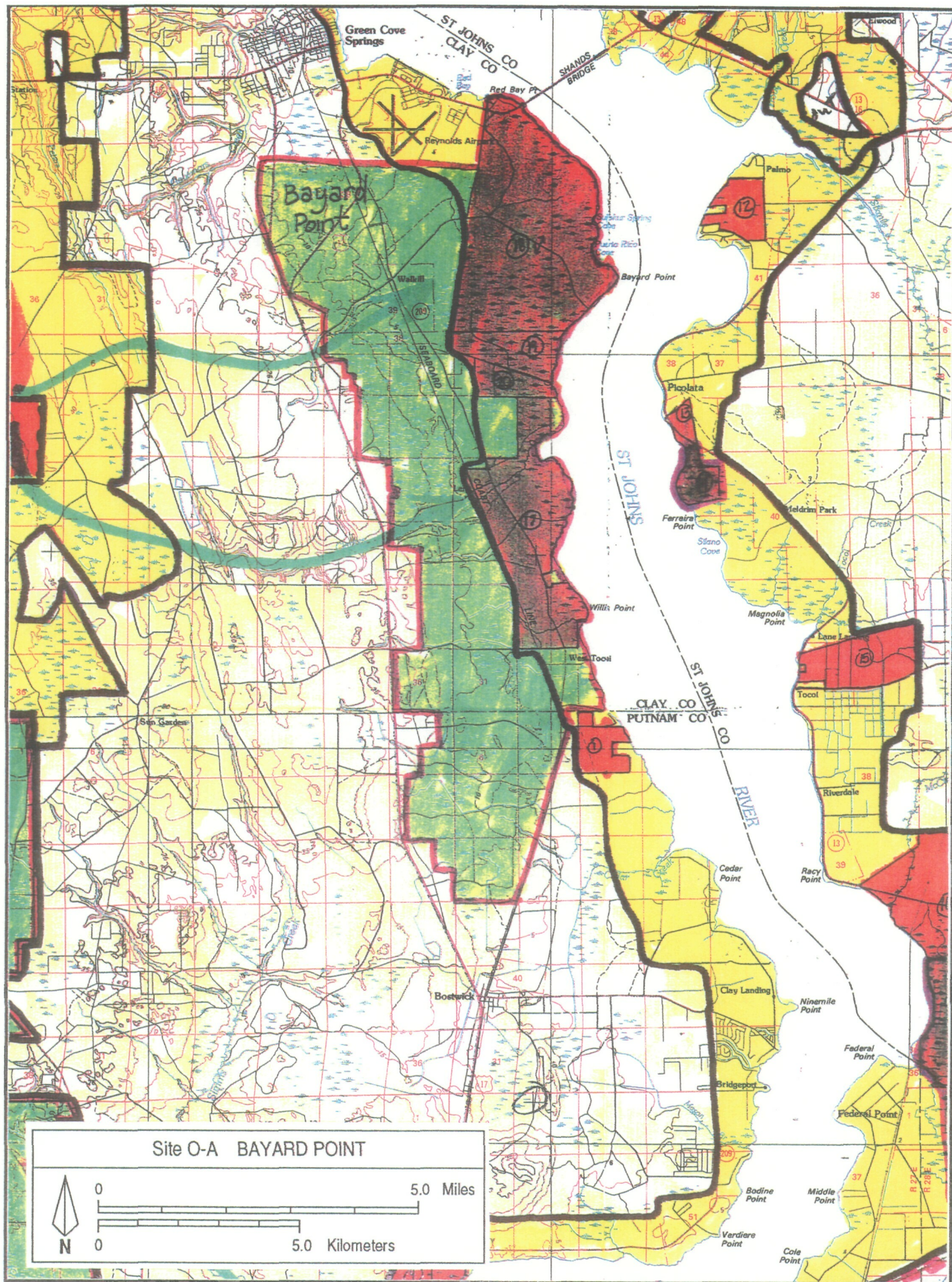
Habitat for Listed Species or Communities: Floodplain marsh and forest; bald eagle, manatee, shortnose sturgeon, and sea lamprey listed by FNAI.

Ecological Connectedness: Low to moderate. Best alternative would be linking the project area with natural areas to the west.

ACQUISITION FACTORS/COMMENTS: The District added this project area to the Five Year Plan in January, 1992. Acquisition of a core parcel was approved September 1992. Negotiations are ongoing with a second owner.

RECOMMENDATIONS: SJRWMD should continue to strongly support this project.

INFORMATION SOURCES: SJRWMD Staff, FNAI, Clay County



3.2 SITE O-B--DUNNS CREEK

LOCATION/DESCRIPTION: In southeastern Putnam County, just north of Crescent Lake. The project area is about 8 miles south of Palatka.

QUADS: San Mateo, Satsuma

SIZE: 8,966 acres

NUMBER OF OWNERSHIPS: 9

MAJOR OWNERS: Tilton, Kaye, Johnson

HYDROLOGIC FEATURES: The project encompasses a portion of Dunns Creek, and includes adjacent floodplain areas. The area has steep ravines and higher elevations with moderate groundwater recharge characteristics. Site-specific information suggests that the sand ridges provide 2 to 10 inches/year recharge to the Floridan aquifer.

ECOLOGICAL FEATURES: The project area includes longleaf pine/turkey oak/wiregrass sandhills, xeric hammock, sand pine scrub, swamp, and frontage along Dunns Creek and Crescent Lake. The diversity of habitat types provides excellent wildlife habitat. Gopher tortoises and scrub jays have been recorded in the project area. Manatees are occasionally seen in the creek.

HISTORY/LAND USE: The predominant land uses in the area are agricultural and rural residential. The local comprehensive plan designates the project area as Conservation (wetlands) and Agriculture Protection Area. Development in the wetlands is prohibited, the latter designation requires restrictive uses.

REASONS FOR SELECTION: Nominated by the NEFRPC to the CARL program for acquisition. Important recharge area, habitat diversity, water resource values.

RATIONALE FOR PROPOSED BOUNDARIES: Based on the approved Project Assessment and Project Design reports prepared by CARL staff, with district assistance.

APPLICABILITY OF SJRWMD ACQUISITION CRITERIA:

Proximity to Headwaters: Does not apply.

Buffering Function: Provides protection from development, includes floodplain communities that buffer St. Johns River.

Water Storage Capacity: Approximately 50 percent of the project area is wetlands, providing storage.

Flood Conveyance: Provides outlet from Crescent Lake to the St. Johns River.

Intact Natural System: Existing land uses are primarily agriculture and rural development. Wetlands and uplands are relatively intact. Most pine forests have not been intensively managed or altered, although there is potential for silvicultural activities to be intensified. Prescribed fire would help restore the character of the natural communities.

Groundwater Recharge Protection: Low to moderate. GIS information indicates the site is located in an area of no recharge to the Florida aquifer, but SJRWMD site-specific information shows some recharge potential.

Potential to Restore Critical Altered Wetland System: Low potential. Significant changes to natural hydrology have not occurred.

Management Considerations: The area is proposed for DNR management as a State Park.

Recreation Potential: The project area could support camping, boating, hiking, fishing, nature study, and environmental education opportunities.

Development Pressure: Putnam County is not experiencing strong growth at this time. Substantial areas of surrounding lands have undergone conversion to mobile home subdivisions.

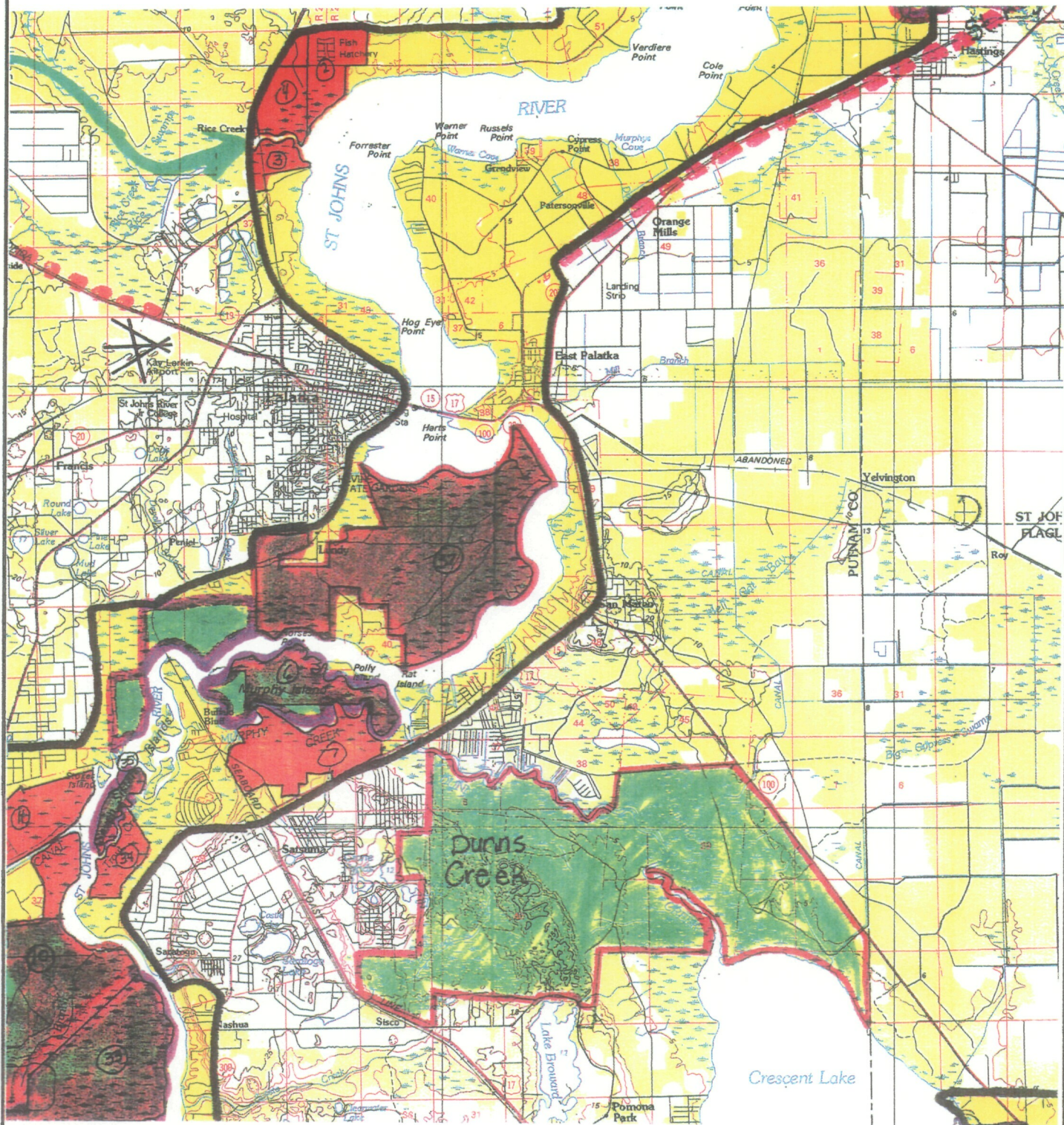
Habitat for Listed Species or Communities: Floodplain forest, sandhill, scrub, and seepage stream; manatees and gopher tortoises are known from the site.

Ecological Connectedness: Limited potential.

ACQUISITION FACTORS/COMMENTS: 1992 CARL ranking is #53. P-2000 criteria regarding recharge are applicable, and should increase ranking. The district has agreed to a partial shared acquisition approach with the state. Specifically, the district has targeted those lands east of Dunns Creek (Tilton properties) for acquisition. Identified in the SJRWMD Five Year Plan.

RECOMMENDATIONS: SJRWMD should continue to strongly support this project.

INFORMATION SOURCES: CARL planning and assessment reports, SJRWMD staff.



Site O-B DUNNS CREEK



0
0

5.0 Miles

5.0 Kilometers

3.3 SITE O-C--TWELVEMILE SWAMP

LOCATION/DESCRIPTION: The Twelvemile Swamp Project Area is located in central St. Johns County, approximately 10 miles west of St. Augustine. The project area consists of a large wetland basin surrounded largely by planted pine.

QUADS: Durbin, Bakersville, St. Augustine

SIZE: Approximately 26,315 acres

NUMBER OF OWNERSHIPS: 23

MAJOR OWNERS: Cummer Trust

HYDROLOGIC FEATURES: The project area forms the headwaters of six major tributary systems, four of which ultimately discharge to the St. Johns River. The drainage system of the area remains relatively intact despite silviculture activities, and contributes to stream flow, particularly during low flow periods. A well field for St. Augustine is immediately adjacent to the project area. Recharge is probably low.

ECOLOGICAL FEATURES: Natural communities present include bottomland forest, floodplain swamp, mesic flatwoods, depression marsh, dome swamp, and scrubby flatwoods. The large wetland expanse near the center of the project supports a diversity of wildlife. Species include the Florida black bear and gopher tortoise. The site also has a wading bird rookery.

HISTORY/LAND USE: Predominant land use is forested wetlands, slash pine flatwoods, and pine plantations. Hardwoods and cypress have been harvested at least twice in the past, and are currently under regeneration. Site development has been limited to construction of access roads and associated borrow ditches. The uplands are managed intensively for pulp production. There are some cattle on the pastures. Container Corporation has a long-term timber lease on the property, with hunting rights on an annual basis.

REASONS FOR SELECTION: Headwaters of four St. Johns River tributaries, extensive wetland system, rural/urban development approaching.

RATIONALE FOR PROPOSED BOUNDARIES: Based on the approved Project Assessment and Project Design reports prepared by CARL staff, with District assistance.

APPLICABILITY OF SJRWMD ACQUISITION CRITERIA:

Proximity to Headwaters - Headwaters of six major tributaries; four of which flow to the St. Johns River.

Buffering Function - Limited.

Water Storage Capacity - High storage due to low elevations and extremely flat topography.

Flood Conveyance - Floodwaters would be attenuated by the system due to its large size and dense vegetation, thereby providing a natural flood control function.

Intact Natural System - Much of the tract has been altered by extensive silvicultural uses. The large wetland expanse in the center of the area is relatively undisturbed. The surface water drainage system is also relatively intact.

Groundwater Recharge Protection - Low potential.

Potential to Restore Critical Altered Wetland System - High potential for restoring localized damaged areas by removal and/or alteration of the existing logging roads and adjacent ditches.

Management Considerations: The Division of Forestry is to provide lead management as a state forest. Reforestation, restoration of natural communities through prescribed fire, harvest of plantations, and removal of exotics are the key management concepts.

Recreation Potential The project could accommodate nature study, hiking, bicycling, birding, horseback riding, camping, and hunting.

Development Pressure: Fairly high. The population of St. Johns County continues to grow, and the project site is surrounded by approved developments of regional impact.

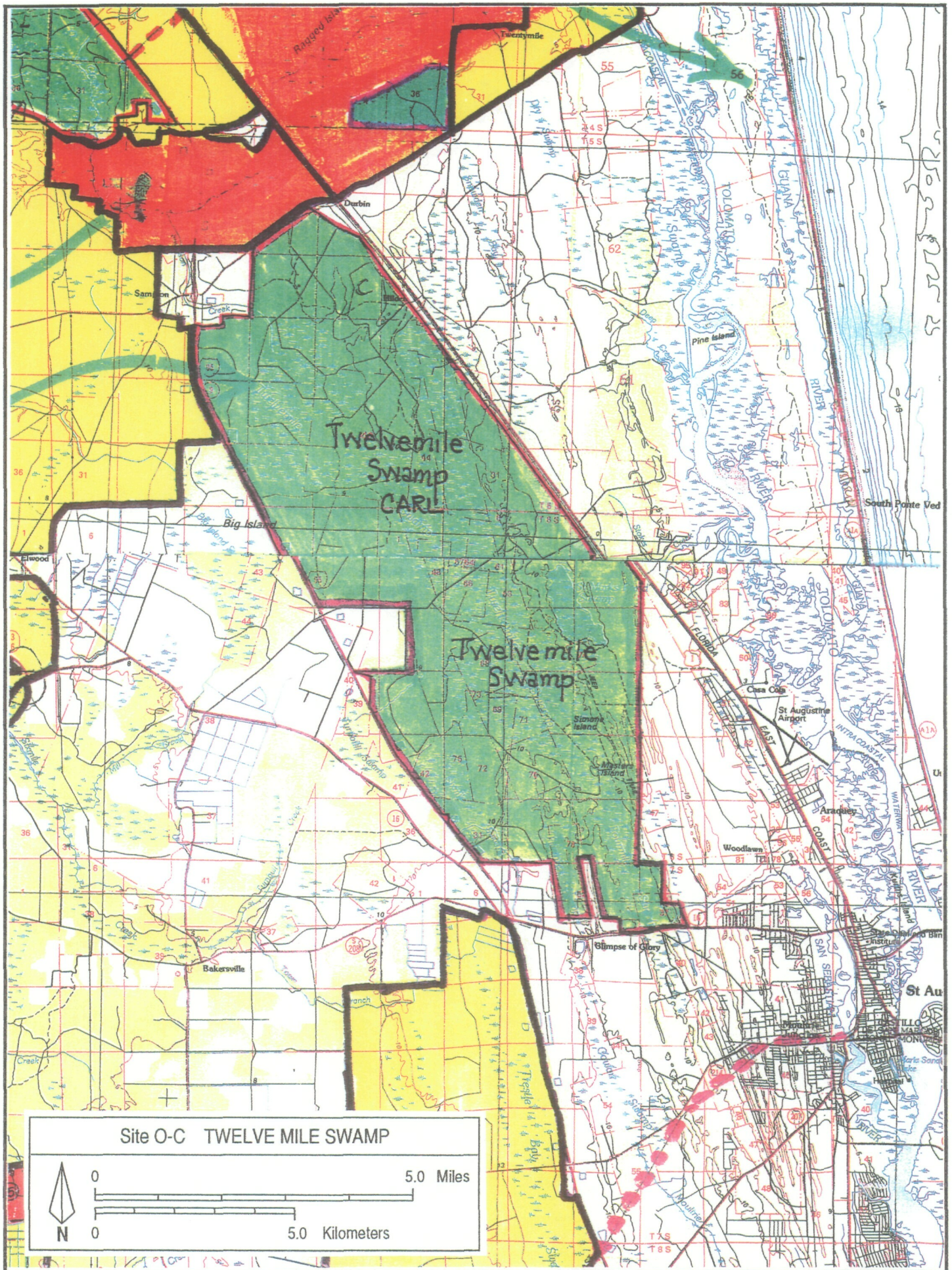
Habitat for Listed Species or Communities: Florida black bear, several listed wading bird species and a rookery site, wet flatwoods, hydric hammock, and depression marsh occur onsite.

Ecological Connectedness: Similar systems extend further south, but fall outside this basin.

ACQUISITION FACTORS/COMMENTS: CARL ranking for 1992 is #70. The District has agreed to share acquisition costs with the state, and the project is identified in the District's Five Year Plan.

RECOMMENDATIONS: SJRWMD should continue to strongly support this project.

INFORMATION SOURCES: CARL planning and assessment reports, SJRWMD staff.



4.0 RECOMMENDATIONS

4.1 LAND ACQUISITION PRIORITIES

KBN recommends that SJRWMD pursue acquisition of all the priority sites as funds and cooperative opportunities become available. The scores presented in Table 4-1 may be used to guide priority decisions.

The proposed boundaries are preliminary. The ideal tracts for purchase will probably vary somewhat from those currently mapped as more information becomes available through the acquisition process. It will be important to reassess relative site values if there are substantial boundary changes which include or exclude significant resources.

KBN's analyses confirmed that the lands already in the district land acquisition process (Etoniah Creek, Upper Black Creek, Bayard Point, Julington- Durbin Creeks, Dunns Creek, Twelvemile Swamp, and Cedar Point, which lies within Clapboard Swamp - Black Hammock) are indeed top choices in terms of hydrological/ecological values. It makes sense for SJRWMD to continue strongly supporting these projects.

Of the new priority sites, Durbin Swamp emerged as outstanding from both the hydrological and ecological viewpoints. Upper Nassau River and Middleburg rate very high hydrologically. Greens and Ates Creeks have moderately high values for both hydrological and ecological features.

The Upper Black Creek - Middleburg - Ates Creek - Greens Creek - Etoniah Creek complex and connections to the northwest into the St. Marys Basin constitute a critical link in the statewide conservation corridor system. Natural lands are already reduced to narrow bands in parts of this area and development is progressing rapidly. Therefore time is of the essence in land acquisition here.

The relative values of the sites in regard to key aspects of site evaluation are discussed below.

4.1.1 RECHARGE LANDS

No high recharge areas were identified as acquisition priorities because no large tracts of natural land remain in high recharge areas of the study basins.

Table 4-1. Site Rating^a Based on SJRWMD Land Acquisition Criteria

	Acreage	Proximity to Headwaters	Buffering Function	Water Storage Capacity	Flood Conveyance	Intact Natural System	Groundwater Recharge Protection	Potential to Restore Wetland System	Recreational Potential	Management Considerations	Development Pressure	Habitat for Threatened/ Endangered Species	Ecological Connectedness	Total Score
Upper Nassau River	40,044	2	3	3	3	2	0	0	2	2	2	2	3	24
Clapboard Swamp-Black Hammock	4,855	1	2	3	3	2	0	1	2	2	3	2	3	24
Durbin Swamp	37,406	3	3	3	2	3	0	0	2	2	3	3	2	26
Middleburg	19,337	3	2	3	3	1	1	1	1	1	2	2	3	23
Upper Black Creek	9,311	3	2	1	1	3	1	1	3	3	2	2	3	25
Julington-Durbin Creeks	4,200	0	3	3	3	2	0	0	3	2	3	2	2	23
Twelvemile Swamp	26,315	3	1	3	2	2	1	2	2	2	2	3	2	25
Hallowes Cove	5,375	0	2	1	1	3	2	0	3	2	3	1	1	19
Greens Creek	21,828	3	2	1	1	2	2	0	3	2	2	2	3	23
Ates Creek	19,843	3	2	1	1	2	2	0	2	2	2	2	3	22
Bayard Point	18,500	3	3	3	2	2	1	2	3	2	2	2	1	26
Etoniah Creek	55,237	3	2	1	1	2	2	0	2	2	3	3	3	24
Dunns Creek	8,966	0	2	3	3	2	1	1	3	2	2	2	1	22
Haw Creek	10,490	0	2	3	1	2	0	0	2	3	1	1	2	17

^a Rating: 3 = High; 2 = Moderate; 1 = Low; 0 = None. Higher scores favor acquisition.

Etoniah Creek, Upper Black Creek, Greens Creek, Ates Creek, and Hallows Cove all have some low-medium recharge areas, but none of these sites has enough for this to be a significant factor in site ranking.

4.1.2 RIVERFRONT/BUFFER LANDS

All of the sites have stream or river frontage, although Hallows Cove is the only new site directly on the St. Johns River. Haw Creek has substantial frontage on Crescent Lake. The Clapboard Swamp-Black Hammock Site has frontage along Clapboard Creek and has important potential to prevent intense development on an upland area immediately adjacent to salt marshes along the lower St. Johns River. The other site in the Nassau River basin, Upper Nassau River, has very strong river front and buffer values because it includes three major tributaries (Thomas Creek, Alligator Creek, and the Nassau River) at the point where they merge to form the main channel of the Nassau River, in an area west of Jacksonville that is developing.

Of sites already in the district land acquisition process, Bayard Point is outstanding in terms of riverfront/buffer values. It offers both extensive frontage directly on the St. Johns River and substantial mileage of small tributary streams. Dunns Creek has frontage on both sides of the Crescent Lake outlet.

4.1.3 FLOODPLAINS

All of the proposed sites contain floodplain, but five are especially noteworthy because of the combination of water storage and flood conveyance values. The two Nassau River sites contain extensive floodplain areas and river channel areas. The Middleburg and Julington-Durbin Creek sites also have extensive floodplain areas and streams and are located in and upstream of developed areas that have histories of flooding problems. Therefore, acquisition of these two sites offers some opportunity for preventing any worsening of these problems. Finally, the Dunns Creek site contains floodplains adjacent to Dunns Creek, the Crescent Lake outlet, and Crescent Lake.

Haw Creek, Durbin Swamp, and Twelvemile Swamp are noteworthy also because they contain extensive floodplains. The Haw Creek site is almost entirely floodplain. Durbin Swamp and Twelvemile Swamp contain extensive floodplain wetlands and are upgradient of developed areas.

4.1.4 WATER STORAGE AREAS

Since all of the sites contain floodplain, all have at least some value for flood storage. All of the sites mentioned in the previous section can be considered especially significant for flood storage because they contain extensive floodplain areas. Haw Creek and Dunns Creek provide long-term storage in floodplains adjacent to the St. Johns River. Similarly, there is value for long-term water storage next to the creeks and rivers in the Upper Nassau River, Middleburg (Black Creek), and Julington-Durbin Creek sites.

4.1.5 ECOLOGICAL LINKAGES

The complex formed by Upper Black Creek, Middleburg, Ates Creek, Greens Creek, and Etoniah Creek constitutes a critical link in the statewide ecological corridor system. Etoniah Creek and Upper Black Creek are the most essential elements of this connection, followed by Ates Creek, then Middleburg.

Upper Nassau River has important ecological linkage potential. It could be very valuable in linking the St. Marys and Black Creek systems and tying them into the coastal systems north of Jacksonville.

Durbin Swamp and Twelvemile Swamp are links in the potential chain of natural areas connecting the Timucuan Ecological and Historical Preserve to wetlands just inland of the coastal ridge southward into Volusia County and beyond.

Clapboard Swamp - Black Hammock provides valuable linkages on a smaller scale, connecting the Pelotes Island Preserve and isolated upland portions of Timucuan with other natural lands.

4.2 OTHER RECOMMENDATIONS

4.2.1 PROTECTION OF RECHARGE LANDS AND XERIC HABITATS

Since land acquisition on the usual scale does not appear feasible as a mechanism for protection of high recharge areas and associated scrub and sandhill habitats in this study area, it is imperative that SJRWMD pursue other alternatives for preventing continued degradation of the highly parcelized Goldhead - Ordway RSA. Regulations, easements, management agreements, sinkhole buffers, landowner education, and a greenway/small tract network with creative fire management are among the directions that should be explored.

4.2.2 GREENWAY PLANNING IN FRAGMENTED LANDSCAPES

In coordination with 1,000 Friends of Florida's Florida Greenways Program, local land trusts, and other interested parties, SJRWMD should pursue development of greenway networks, particularly in the Whitehouse Greenway RSA, the Goldhead - Ordway RSA, and the urban interfaces of the priority sites.

Two current opportunities are obvious: 1) The Florida Greenways Program is pursuing grant funding for a greenways regional case study for northeast Florida and this effort might meet with more rapid success if the district were to become an active partner; and 2) Janis Fleet & Associates are developing a Master Recreation Development Plan for the City of Jacksonville and SJRWMD might find it beneficial to become involved in the greenways planning aspect of this study.

4.2.3 COORDINATED LAND ACQUISITION PLANNING FOR ADJACENT LANDS

Specific studies should be conducted to plan land acquisition strategies along the boundaries of the Nassau River and Lower St. Johns River basins (and others). There is serious danger that studies focused on individual basins will result in neglect of borderlands or false assumptions about the appropriate priorities for making ecological and recreational linkages across hydrologic and political boundaries.

4.2.4 ASSESSMENT AND INTEGRATED MANAGEMENT PLANNING FOR SJRWMD AND ASSOCIATED "PROTECTED" LANDS

Current land acquisition planning tends to be based on shaky assumptions about the ecological and hydrological values of public lands. Both longterm management policies and day-to-day actualities on such lands need to be carefully evaluated or SJRWMD may purchase ecological corridors that dead end into bombing ranges or intensively managed pine plantations. Military lands are especially of concern and Camp Blanding in particular should be scrutinized as a current priority.

4.2.5 ADDITIONAL STUDY OF TWELVEMILE SWAMP - TIGER BAY REGION

From SJRWMD's Twelvemile Swamp acquisition project southward through Flagler County and into the Tiger Bay area of Volusia County is an extensive complex of flatwoods riddled with cypress swamps. This region seems quite similar to central Florida's hydrologically and ecologically critical Green Swamp, but data on it are sparse. Available information is summarized in Appendix C in the discussions of Crescent Lake-Lake Disston, Big Cypress-Speckled Perch Scrub, and Hull Cypress Swamp.

KBN recommends that more extensive studies, including field work and aerial surveys, be conducted to define the areas of greatest value within this region. Such studies should then become the basis for a proposal for acquisition of a system of ecological connections linking Twelvemile Swamp to Tiger Bay and tying this north-south system into the coastal preserves to the east and Crescent Lake/Deland Ridge systems to the west at appropriate points.

REFERENCES

(Page 1 of 2)

- Baldwin, R., C.L. Bush, R.B. Hinton, H.F. Huckle, P. Nichols, F.C. Watts, and J.A. Wolf. 1977. Soil Survey of Volusia County, Florida. USDA, Washington D.C. 207 p.
- Bergman, M.J. 1992. Volume 2 of the lower St. Johns River basin reconnaissance: surface water hydrology. Technical Publication SJ 92-1, St. Johns River Water Management District, Palatka, FL.
- Clay County, Florida. 1987. Plat Directory. Florida Plats, Clermont, FL. 96.
- Duval County, Florida. 1988. Plat Directory. Florida Plats, Clermont, FL. 136 p.
- FEMA, 1983. Flood insurance rate map, Clay County, FL (unincorporated areas).
- FEMA, 1986. Flood insurance rate map, Flagler County, FL (unincorporated areas).
- FEMA, 1989. Flood insurance rate map, City of Jacksonville, FL, Duval County.
- FEMA, 1990. Flood insurance rate map, Volusia County, FL (unincorporated areas).
- FEMA, 1992. Flood insurance rate map, Nassau County, FL (unincorporated areas).
- FEMA, 1992. Flood insurance rate map, St. Johns County, FL (unincorporated areas).
- Florida Department of Natural Resources and Land Acquisition Advisory Council. 1991. Annual Report of the Conservation and Recreation Lands Program. Tallahassee, FL. 390 p.
- Florida Department of Natural Resources and Land Acquisition Advisory Council. 1992. Annual Report of the Conservation and Recreation Lands Program. Tallahassee, FL. 390 p.
- Murphy, J. and M. Johnson. 1988. Hallowe's Cove: An Evaluation of the Ecosystem. Senior Seminar paper for Dr. Carole Demort. Unpublished.
- Nassau County, Florida. 1988. Plat Directory. Florida Plats, Clermont, FL. 80.
- Putnam County, Florida. 1988. Plat Directory. Florida Plats, Clermont, FL. 104 p.
- Readle, Elmer. 1981. Soil Survey of St. Johns County, Florida. USDA, Washington D.C. 196 p.
- SJRWMD, 1990. Applicant's handbook, Management and Storage of Surface Waters. St. Johns River Water Management District, Palatka, FL.
- Soil Conservation Service. 1974. Soil Survey - Special Advanced Report for City of Jacksonville, Duval County, Florida: Maps and Interpretations. USDA, Washington D.C. 37 p.

REFERENCES
(Page 2 of 2)

- Spencer, S. 1991. Protection of ground water recharge through land acquisition. St. Johns River Water Management District, Palatka, FL.
- St. Johns County, Florida. 1987. Plat Directory. Florida Plats, Clermont, FL. 88 p.
- Stem, L.T., H.D. Dollar, D.A. Howell, D.L. Lewis, C.A., and Wettstein, H. Yamataki. 1978. Soil Survey of City of Jacksonville, Florida. USDA, Washington D.C. 111 p.
- USDA SCS, 1991. State Soil Geographic Data Base (STATSGO) Data Users Guide. Draft. USDA SCS National Soil Survey Center, Lincoln, Nebraska.
- Volusia County, Florida. 1987. Plat Directory. Florida Plats, Clermont, FL. 192 p.
- Watts, F.C. 1987. Soil Survey of Nassau County, Florida. USDA, Washington D.C. 219 p.