

**A WETLAND MANAGEMENT
STRATEGY FOR THE ST. MARYS
RIVER BASIN**

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EXECUTIVE SUMMARY

INTRODUCTION

In April 1992, KBN Engineering and Applied Sciences, Inc. (KBN) was contracted by the St. Johns River Water Management District (SJRWMD) to conduct a study to develop a wetlands management strategy for the St. Marys River basin. The project was to be jointly funded by SJRWMD, the Georgia Department of Natural Resources (GDNR), and the U.S. Environmental Protection Agency (EPA).

The purpose of the project was to provide background information about the physical and biological character of the region, examine existing regulatory and management programs in place, assess land use trends, and propose recommendations for more effective long-term management. The ultimate goal is to develop a long-term strategy for protecting the basin's resources.

The methodology included the compilation and analysis of hydrologic and ecological data to identify significant environmental resources within the basin, review of planning documents to assess existing land uses and future land use trends, and compilation of relevant federal, state and local regulations regarding environmental protection and growth management.

CONCLUSIONS AND RECOMMENDATIONS

The St. Marys River basin contains a variety of different types of wetlands. These wetland types include intertidal salt marsh near the mouth of the river at Cumberland Sound, tidally influenced forested floodplains farther upstream, seepage slope forests along creeks draining high pine-covered sandhills, wet pine flatwoods, and hardwood and cypress forests of the Okefenokee Swamp.

Hydrologically, the St. Marys River basin can be divided into three subareas based on hydrologic functions:

1. A headwaters subarea with large floodplain wetlands which provide substantial storage,
2. A middle St. Marys subarea characterized by narrow floodplains confined to the main stem of the river, and
3. A lower St. Marys subarea which is tidally influenced and poorly drained.

The existing good water quality of the river is attributed to the undeveloped state of the riverbank and immediately adjacent areas. Large-tract ownership, such as silviculture and natural forest management, has preserved water quality, streambank vegetation, and remaining natural communities and wildlife, but there will be increased pressure on large landowners to subdivide, especially in Camden County, Georgia, and Nassau County, Florida. Appropriate economic incentives must be provided to encourage landowners to continue leaving these areas intact.

Although current water quality conditions are good, silvicultural activities along the river have the potential to affect water quality. High compliance with silvicultural Best Management Practices (BMPs) in both Florida and Georgia must be maintained.

The dominant land use and cover within the St. Marys River basin has been and will continue to be silviculture and upland forest, primarily managed pine forests. In addition, wetland forests are also managed for timber products. Approximately 53 percent of the basin was found to be large tracts in private ownership, primarily the timber products industry. Large tracts in public ownership account for another 20 percent of the basin, with the remaining 27 percent parcelized.

Despite the overall rural character of the basin and dominance by silvicultural land uses, significant urban expansion is projected to continue in the St. Marys-Kingsland area in Camden County due to continued growth of the Kings Bay Naval Base. Flood damage potential to the St. Marys and King Bay areas has greatly increased because of increased development. These downstream areas are protected by flood storage in the headwaters subarea of the basin.

Moderate growth is also projected to continue in eastern Nassau County in the vicinity of Yulee and Fernandina Beach. This growth will be driven in part by Kings Bay to the north and by the attraction to coastal Florida. Baker and Charlton counties are projected to remain largely unchanged and will continue to be dominated by silviculture.

The basin is mostly forested, but much of the native vegetation and habitat has been fragmented by development and silviculture, especially in uplands. Due to the intensive widespread silvicultural activities in the basin, relatively little natural pineland or xeric upland habitat remains.

Currently, the basin is under the jurisdiction of a number of federal, state and local governments and agencies which have a variety of resource protection programs in place. The existing regulations and policies of these agencies were surveyed and found to be generally adequate to address growth management and many resource protection issues. However, there are gaps in resource protection and there is no formal coordination mechanism for these existing programs.

For example, wetland protection is uneven in the basin because of differing state policies. In Florida, wetlands are protected by the Florida Department of Environmental Regulation (FDER) and SJRWMD. In Georgia, only coastal wetlands are protected by the state. On a federal level, the basin is split between two U.S. Army Corps of Engineers (USACE) districts. The St. Marys River basin lies in two separate districts of USACE, with the Georgia side in the Savannah district and the Florida side in the Jacksonville district. USACE is the only agency that regulates activities in Georgia's freshwater wetlands, since there is no state regulatory program. Coordination, enforcement and consistency are therefore more difficult than if the basin were located in a single USACE district.

Long-term protection of the basin's wetland resources will depend more on coordination of existing regulations and programs than on promulgation of new regulations. To this end, several regulatory and management alternatives are presented. These alternatives provide possible mechanisms for development of a comprehensive management program and include amendment of existing regulations, Wild and Scenic River designation under local control, formation of a locally coordinated basin review agency, consolidation of the basin under one USACE district and the promotion of public education.

In addition to regulatory and management alternatives, opportunities to protect key lands through voluntary acquisitions and easements are also discussed. The goal of these acquisitions and easements would be to maintain the existing ecological linkage system. Specific recommendations for corridors are made which call for preservation of connections from the St. Marys River basin southeast to the Nassau River, south to Upper Black Creek, and north to the Okefenokee Swamp and the Satilla River.

Finally, specific recommendations for implementation of a long-term management strategy for the St. Marys River basin are provided. These recommendations call for pursuit of Wild and Scenic

River designation under the control of a local Cooperative Management Committee. The Cooperative Management Committee would then serve as the institutional foundation directly responsible for development of the river management plan required under the Wild and Scenic River designation. The plan would include provisions for establishment of a consistent river corridor and special waters designation by both Florida and Georgia, implementation of a comprehensive land acquisition study and possible establishment of a regional land trust, and promote review of silvicultural BMPs to identify potential improvements to facilitate long-term protection of the basin's wetlands and other natural resources.

1.0 INTRODUCTION

1.1 PROJECT HISTORY

The St. Marys River and its associated wetlands are generally recognized as a significant resource to both Florida and Georgia. The St. Marys River has been described as one of the highest quality blackwater stream systems in Florida [Florida Department of Natural Resources (FDNR) 1989]. The overall quality of the St. Marys River has been attributed in large part to the lack of urban development along most of the river corridor. However, concerns have been expressed (FDNR 1989; Lynch and Baker 1988) regarding the future of the St. Marys River, as development pressures increase within the drainage basin. The recent completion of the Dames Point Bridge and the continued expansion of the Kings Bay Naval Base are examples of projects that could increase development pressure and subsequently result in detrimental land use changes within the basin.

Previous assessments of the St. Marys River (FDNR 1989; Lynch and Baker 1988) identified integrated resource management policies between Florida and Georgia as the foundation for long-term protection of the basin's natural resources. The relative lack of urban development within the basin provides a rare opportunity to develop and implement practical resource management strategies to provide such long-term protection.

As the first step in development of a management strategy for resources within the St. Marys River basin, this study was undertaken as a jointly funded effort by the U.S. Environmental Protection Agency (EPA), the Georgia Department of Natural Resources (GDNR) and the St. Johns River Water Management District (SJRWMD). The purpose of the study is to inventory the basin's resources and evaluate the effectiveness of the regulatory and planning framework currently in place. The goal of this study is to provide practical recommendations for long-term protection of the unique qualities of the St. Marys River.

While the federal government and both Florida and Georgia have various regulatory, land use planning and land acquisition programs in place, no integrated approach to protect water and related land resources currently exists. The existing good quality of the St. Marys River and the lack of urban development within the basin provide a rare opportunity to develop a meaningful long-term strategy for resource protection. Due to the basin's location in both Florida and

Georgia, implementation of such a strategy also provides a rare opportunity to foster interstate cooperation.

1.2 OBJECTIVES

In April 1992, the KBN Engineering and Applied Sciences, Inc. (KBN) project team was contracted to conduct a study to provide the basis for subsequent development of an integrated management strategy for protecting wetlands, water, and related land resources in the St. Marys River basin. The three major objectives of the study were:

1. To conduct an inventory and assessment of regionally significant wetlands, water and related land resources of the St. Marys River basin.
2. To identify and assess existing planning, regulatory and land acquisition programs which protect wetlands, water and related land resources.
3. Develop recommendations for interstate cooperation, land use, regulation, and land acquisition activities to protect wetland, water and related land resources in the St. Marys River basin.

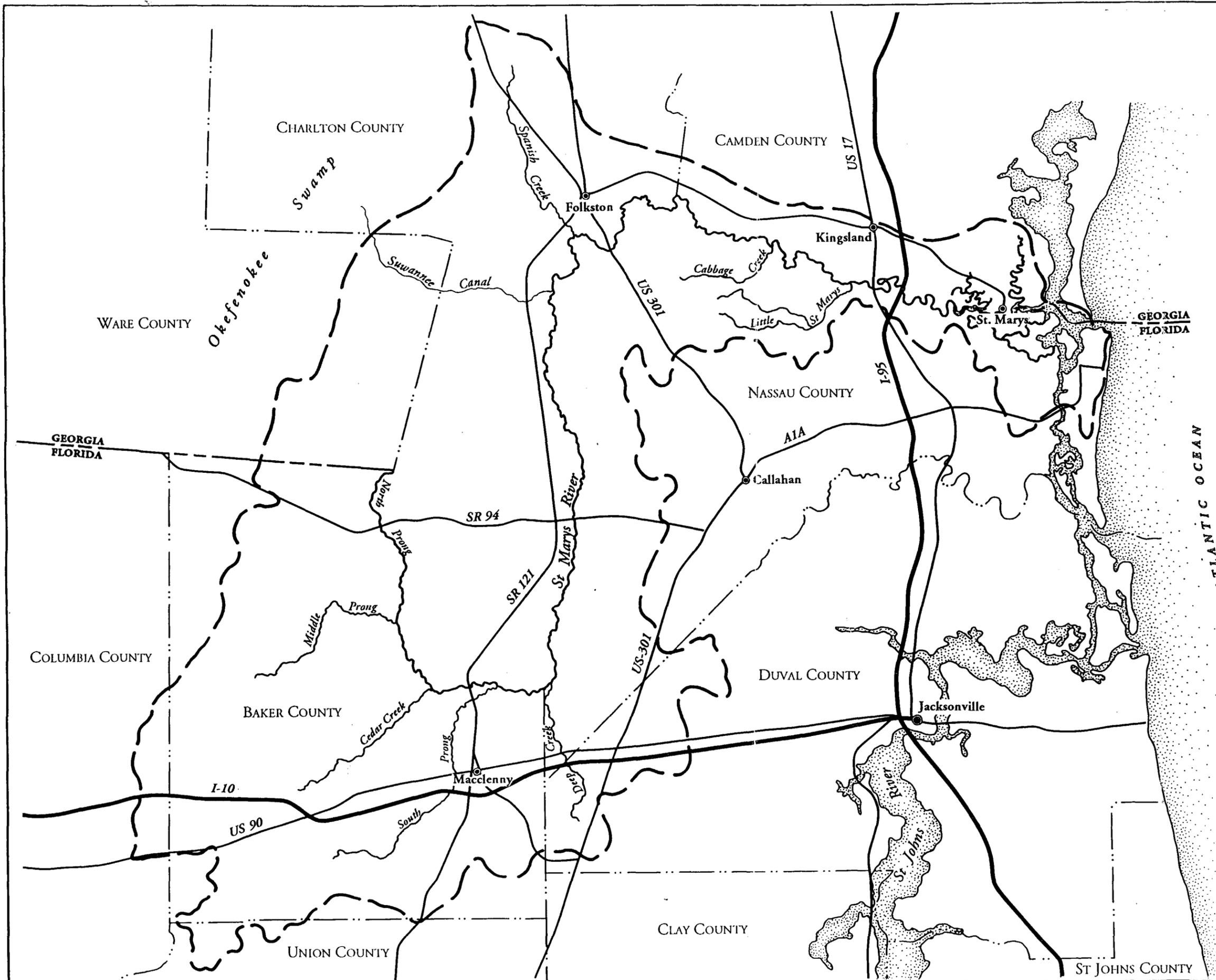
This report presents the results of the study, including an identification of basin resources (Chapter 3), assessment of land use trends (Chapter 4), description and evaluation of existing planning, regulatory and acquisition programs (Chapter 5), a summary of major issues that confront the basin (Chapter 6), regulatory and management alternatives to address these issues (Chapter 7), strategies for voluntary acquisition of lands and easements to protect key lands (Chapter 8), and recommendations for future actions (Chapter 9).

1.3 STUDY AREA

The St. Marys River is located in northeast Florida and southeast Georgia and forms a portion of the border between the two states (see Figure 1-1). The river originates in the waters of the Okefenokee Swamp and flows first south, then north and finally east for approximately 125 miles before discharging to Cumberland Sound and the Atlantic Ocean. Along its course, the river receives flow from numerous tributaries originating in extensive networks of headwater wetlands and seepage slopes.

The St. Marys River has a drainage basin approximately 1,585 square miles in size (see Table 1-1). Because the river comprises a portion of the Florida-Georgia border, the basin is

Figure 1-1
LOCATION MAP OF ST. MARYS RIVER
BASIN STUDY AREA



KEY

--- ST. MARYS RIVER BASIN BOUNDARY

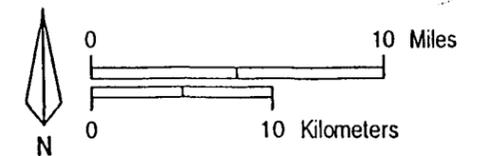


Table 1-1. Land Area of the St. Marys River Basin in Each State and County

Political Division	Basin Land Area (sq miles)	Percent of Basin
Georgia		
Camden County	101	6
Charlton County	433	27
Ware County	109	7
TOTAL	643	41
Florida		
Nassau County	349	22
Baker County	493	31
Columbia County	21	1
Duval County	69	4
Union County	10	1
TOTAL	942	59
BASIN TOTAL	1,585	100

Source: KBN, 1992.

divided between the two states. Approximately 942 square miles (59 percent) of the basin is in Florida and 643 square miles (41 percent) is in Georgia.

The St. Marys River basin extends into eight counties, three in Georgia and five in Florida. In Georgia, the basin includes portions of Camden, Charlton and Ware counties. In Florida, the basin includes portions of Baker, Columbia, Duval, Nassau, and Union counties.

While the complete drainage basin of the St. Marys River extends into eight counties in both Florida and Georgia, the primary river corridor is within only four counties. These counties consist of Camden and Charlton in Georgia and Baker and Nassau in Florida.

Approximately 7 percent of the St. Marys basin is in Ware County, Georgia. This portion lies entirely within the Okefenokee Swamp National Wildlife Refuge. Columbia, Duval and Union counties in Florida contain only small portions of the perimeter of the drainage basin. For these reasons, the study was focused primarily on the basin within Baker, Camden, Charlton and Nassau counties. This study area represents 86 percent of the basin and the entire length of the river corridor.

2.0 METHODS

2.1 HYDROLOGY - METHODS

The inventory of hydrologically important areas in the basin focused on floodplains and groundwater recharge areas. Floodplains are of regional significance because their alteration can have regional implications for local flood damage prevention, the protection of downstream areas from flooding, and water quality impacts due to erosion and filtration.

The primary maps of the 100-year floodplain are published by the Federal Emergency Management Agency (FEMA) as part of the federal flood insurance program. These maps are generally considered to be the best information source on floodplain location, and are consistent between counties and states. Since transferring information from FEMA maps for the entire basin was not within the scope of this project, the location of large floodplain areas that are contiguous with the St. Marys River and its tributaries was determined from county comprehensive plan maps of the 100-year floodplain. These comprehensive plan maps used FEMA as their original floodplain information source and allowed large floodplain areas to be identified relatively quickly. Large floodplain areas were all roughly mapped on U. S. Geological Survey (USGS) 1:100,000 topographic maps. It was decided that the method's accuracy was sufficient for a regional-scale study, although it would not be sufficient for site-specific information. A higher level of accuracy could be obtained by using individual FEMA maps for small areas.

Recharge areas are of regional significance because their wise use allows protection of drinking water supplies, which can be sensitive to pollution and over-pumping. The Floridan aquifer is the predominant large-scale water source in both the Georgia and Florida portions of the St. Marys basin. Aquifers in shallow surficial deposits also are used on a smaller scale especially to provide water for domestic uses. Recharge areas to the Floridan aquifer were identified using digital USGS data provided by SJRWMD. Surficial aquifer recharge areas were identified using SJRWMD and Georgia Geologic Survey publications (Huff and McKenzie-Arenburg 1990; Davis et al. 1990). Recharge area locations were transferred to USGS 1:100,000 maps.

Water quality information that was obtained included a listing of point sources within the basin from EPA's National Pollutant Discharge Elimination System (NPDES) permit program in Atlanta

(Region IV) and water quality assessments by the Florida Department of Environmental Regulation (FDER) and counties.

2.2 ECOLOGY - METHODS

To identify ecologically significant resources, KBN supplemented information extracted from SJRWMD land cover Geographic Information System (GIS) maps and GDNR Landsat imagery with available location data on rare natural community variations, threatened and endangered species occurrences, old-growth forests, wildlife habitats, and other ecological resources.

Information on important ecological features was sought from a variety of sources, including the following:

- Florida Natural Areas Inventory
- Florida Game and Fresh Water Fish Commission
- U.S. Fish and Wildlife Service
- Florida Museum of Natural History
- Northeast Florida Regional Planning Council
- Florida Conservation and Recreational Lands Program
- The Nature Conservancy
- The Trust for Public Land
- Planning departments of the study area counties
- The St. Marys River Management Committee
- Georgia Department of Natural Resources
- The Georgia Conservancy
- Okefenokee National Wildlife Refuge
- Southeast Georgia Regional Development Center
- Georgia Natural Heritage Inventory
- Osceola National Forest
- Florida Division of Forestry
- Florida Greenways Project
- National Park Service
- Gilman Paper Company

The Nature Conservancy's report, *Natural Areas Inventory of the St. Marys River, Florida-Georgia* (Lynch and Baker 1988), proved to be an extremely valuable source of information. KBN discovered that very little information not already adequately synthesized in this report was available and therefore based most of the ecological evaluation on its contents.

Detailed site-specific information, which was largely limited to Florida Natural Areas Inventory (FNAI) data and Florida Game and Fresh Water Fish Commission (FGFWFC) wading bird rookery locations, was recorded on 1:24,000 USGS topographic quad maps.

Important natural areas identified by The Nature Conservancy, existing preserves, regionally significant ecological features (population concentrations, for example), and lands that appeared to be in natural condition on land use maps and aerial imagery were mapped at 1:100,000. These maps were used to determine regional patterns and suggest ecological corridors.

2.3 LAND USE

Existing land uses and future trends in land use and development patterns were determined by review of comprehensive plans and other planning data. Information was also obtained from planning agency personnel with the Coastal Georgia and Southeast Georgia Regional Development Centers, Northeast Florida Regional Planning Council, GDNR, Georgia Department of Community Affairs, Florida Department of Community Affairs and the planning offices of the four counties in the study area.

Large land tracts with single ownerships were identified by review of plat data. In Florida, plat maps commercially available for real estate purposes were used to identify tracts 640 acres or larger in size. In Georgia, such commercially available plat maps are not available for the study area. Identification of large ownerships in the Georgia portion of the study area required visits to county tax assessors offices in Charlton and Camden counties. County tax maps were reviewed and ownership information transferred to USGS 1:24,000 or 1:100,000 topographic maps. This information was then digitized into a GIS.

A generalized land use and cover map was prepared by adapting digital data acquired from both Georgia and Florida. A classified Landsat image produced through the Freshwater Wetlands and Heritage Inventory Program was obtained from the GDNR. In addition, photointerpreted land use and cover data were obtained from SJRWMD. The Landsat image data was converted into a format compatible with the SJRWMD data. The two data sets were then combined. Due to differences in classification systems employed by Florida and Georgia, land cover classes were combined into eight common classes, as shown on Figure 4-1.

3.0 IDENTIFICATION OF BASIN RESOURCES

3.1 HYDROLOGY

According to the 305(b) report (FDER 1990), the St. Marys River generally has excellent water quality. Because of its extensive wetlands, the St. Marys River is a blackwater stream with naturally high color and low dissolved oxygen. Prolonged periods of low flow have occurred on the St. Marys River. The most severe period of low flow was in 1954-55 (USACE 1988), which was the year of a severe fire in the Okefenokee Swamp.

The top of the Floridan aquifer in the St. Marys basin vicinity is 200 to 500 ft below sea level (Stewart 1980). Water within the Floridan aquifer moves generally from west to east toward the coast. There are no high recharge areas to the Floridan aquifer in the St. Marys River basin. Areas with very permeable soils are likely to provide recharge for surficial aquifers (Huff and McKenzie-Arenburg 1990).

As the basin assessment progressed, it became clear that the St. Marys River basin has three subareas with distinct hydrologic attributes (Figure 3-1). These consist of a headwaters subarea, the middle portion of the basin in which the river flows northward, and the lower river to the east of Folkston. The three subareas are described more fully below.

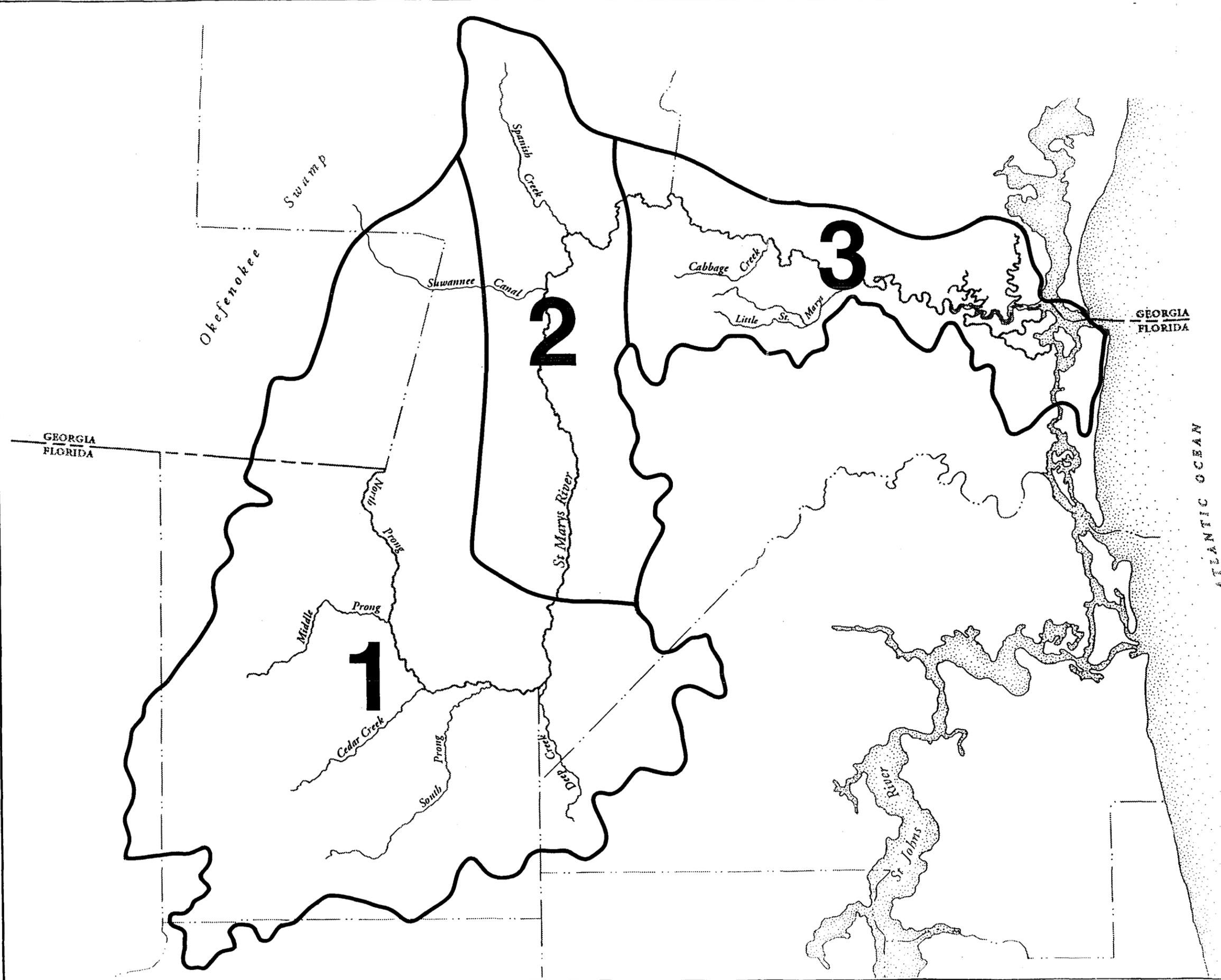
Headwaters

This subarea includes the following tributaries of the St. Marys River:

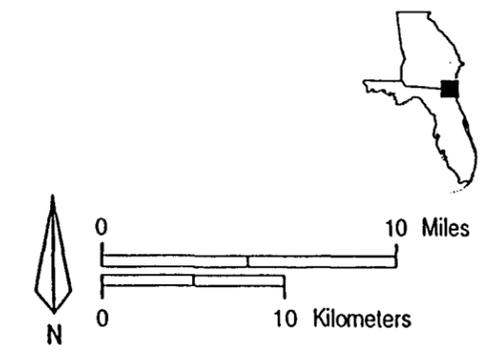
- North Prong
- Middle Prong
- Cedar Creek
- South Prong
- Deep Creek
- Baldwin Bay-Brandy Branch

The subarea includes the south and western part of the St. Marys basin and extends to the point where the river course turns northward, northeast of Macclenny. Included in this subarea are portions of the Okefenokee Swamp and the Osceola National Forest, which are predominantly

Figure 3-1
ST. MARYS RIVER BASIN SUBAREAS



- KEY**
- 1** HEADWATERS SUBAREA
 - Large floodplains in tributary headwaters
 - Important storage function for wetlands
 - Point source discharges: 1 domestic, 3 municipal/institutional
 - 2** MIDDLE ST. MARYS RIVER SUBAREA
 - Flood plains confined to river margins
 - Bluff erosion near small tributaries
 - Point source discharges: 1 domestic
 - 3** LOWER ST. MARYS RIVER SUBAREA
 - Approximately 50% floodplain
 - Tidally influenced
 - Point source discharges: 3 industrial, 4 municipal, 2 domestic



publicly owned. The eastern boundary of the subarea runs along the top of the Trail Ridge. The largest municipality in the headwaters subarea is Macclenny.

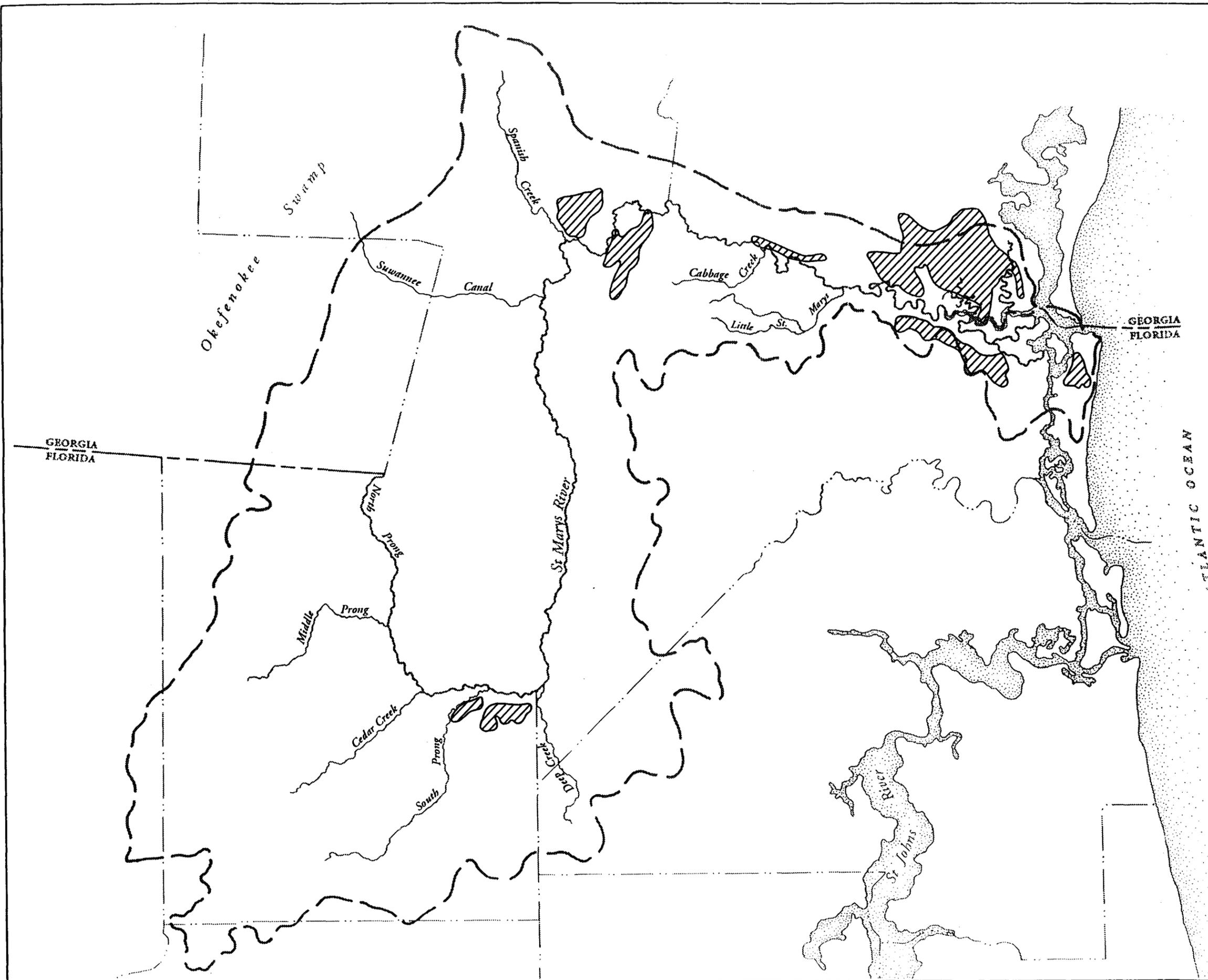
Within the headwaters subarea, floodplain widths vary from narrowly confined tributary stream margins to approximately two miles wide in the vicinity of Deep Creek and Brandy Branch. This subarea also includes large floodplain wetlands associated with the headwaters of tributary streams, such as the South Prong Swamp, an extensive floodplain system which comprises the headwaters of the South Prong of the St. Marys River. Other large floodplain wetlands in the subarea include Pinhook Swamp, Moccasin Swamp, Ellis Bay, Sparkman Bay, Mud Lake Swamp, and floodplain wetlands associated with Cedar Creek and Deep Creek.

The large floodplain wetland areas in this subarea have an important storage function for the St. Marys basin as a whole. Storage in the headwater swamps and river floodplains reduces and delays the flood peaks in downstream areas of the river. As headwater floodplain storage is reduced, flooding problems and streambank erosion may result downstream because of increased peak flood levels and velocities. Fortunately, one of the largest flood storage areas in this subarea is the Okefenokee Swamp, which is relatively well protected from floodplain alteration due to its status as a National Wildlife Refuge.

In the headwaters subarea there is a potential area of surficial recharge north of Macclenny (Figure 3-2), but soils in almost all of the headwaters subarea are relatively impermeable. Most of the headwaters subarea can be expected to provide low to medium recharge to the Floridan aquifer (Stewart 1980; Spencer 1991; SJRWMD 1992). Areas immediately adjacent to the river provide no recharge to the Floridan aquifer.

According to the 305(b) report (FDER 1990), the South Prong tributary is considered an area of concern because of high bacteria and nutrients. Compared to other subbasins of the St. Marys, the South Prong has more anthropogenic influences, especially in the vicinity of Macclenny. Two wastewater treatment plants (N.E. Florida State Hospital and City of Macclenny) discharge into Turkey Creek, which flows from east to west and joins the South Prong upstream of Macclenny. Floodplain encroachment also has been noted in the vicinity of Macclenny, and agricultural activities also may be affecting water quality.

Figure 3-2
 AREAS OF RECHARGE TO SURFICIAL
 AQUIFERS, ST. MARYS RIVER BASIN

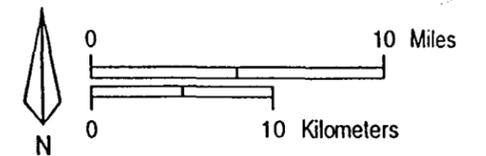


KEY

ST. MARYS RIVER BASIN BOUNDARY

RECHARGE AREA

SOURCES: Huff and McKenzie-Arenburg, 1990;
 Davis et al., 1990.



At the North Prong of the St. Marys River in Moniac there have been periods of no flow for many days in some years (USGS 1991). This suggests that water quality here may be sensitive to disturbance because of low dilution capability.

Middle St. Marys

The major tributary in this subarea is Spanish Creek. Most of the numerous tributaries in the Middle St. Marys are short and originate on the Trail Ridge. The Suwannee Canal is located in this subarea, flowing from the Okefenokee Swamp east through the Trail Ridge and joining the river in the north portion of the subarea.

In contrast to the headwaters subarea, floodplains here are largely confined to the main stem of the river. The notable exceptions are Baldwin Bay Swamp and floodplain wetlands around Deep Creek and Brandy Branch, in the southeastern part of the subarea.

There are two areas of surficial aquifer recharge to the south of Folkston (Figure 3-2). Recharge to the Floridan aquifer is low to medium in this subarea except directly adjacent to the main stem of the river. These areas provide no recharge.

This middle region of the St. Marys River has the best water quality in the basin. Median dissolved oxygen concentrations showed 79 percent saturation in ten water quality samples from the river collected between 1980 and 1986 at a station located due west of Callahan (FDER 1990). This suggests very favorable conditions for fish and other aquatic organisms. The median total suspended solids concentrations of 3 mg/L at this station also indicates excellent water quality.

Lower St. Marys

The major tributary in this subarea is the Little St. Marys River. The St. Marys River is affected by tide in much of this subarea, with tidally influenced flows measured as far as 21 miles upstream of the river mouth (USGS 1991) and reported as far upstream as Folkston and Traders Hill.

Floodplains cover much of the basin subarea, comprising approximately 50 percent of the land area. The low topography and slope of the subarea, combined with tidal effects, make this the most poorly drained of the three subareas. The area's poor drainage has limited development in

much of the lower St. Marys River, primarily due to the lack of soil suitability for septic systems in the floodplain areas. Higher banks in this area are moderately suitable for septic systems and have been developed. Kingsland has a history of flooding problems especially on Catfish, Little Catfish and May creeks (USACE 1988). In coastal portions of this subarea, however, the largest potential for flood damage is from hurricane storm surges, which could cause substantial damage even above the I-95 river crossing (USACE 1988).

Most of the lower St. Marys River subarea provides no recharge to the Floridan aquifer. Two areas of low to medium recharge to the Floridan occur in the eastern portion of the subarea, in and around Fernandina Beach and west of Chester. Several industrial water users are located in Fernandina Beach and it is possible that the withdrawal of large volumes of water is inducing recharge in the vicinity. Much of the St. Marys-Kingsland vicinity provides recharge to the surficial aquifer (Figure 3-2). Other small areas of surficial aquifer recharge lie south of the river near St. Marys.

Water quality in this reach of the river is not as good as in the middle portion of the St. Marys River, as shown by median dissolved oxygen and total suspended solids concentrations (FDER 1990). Point source discharges include wastewater treatment plants at Kingsland and St. Marys. The Gilman Paper Company discharges to the North River and is the largest user of groundwater in the basin (USACE 1988).

The Little St. Marys River and Amelia River near Fernandina Beach are mentioned as areas of concern in the 305(b) report (FDER 1990). In the Little St. Marys, limited sampling showed low dissolved oxygen and elevated nutrient concentrations, which are thought to be due to a discharge from a small wastewater treatment plant and a fruit growing company. The Amelia River is affected by numerous discharges from wastewater treatment plants and industrial facilities.

3.2 ECOLOGY

Detailed ecological descriptions of the St. Marys River basin have been published in *Natural Areas Inventory of the St. Marys River, Georgia - Florida* prepared by J. Merrill Lynch and W. Wilson Baker for The Nature Conservancy (Lynch and Baker 1988). The following is a description of the major natural communities, natural areas, and plant and animal species of conservation interest

occurring in the basin. The reader is encouraged to use the Lynch and Baker 1988 publication for more detailed descriptions of these resources.

3.2.1 NATURAL COMMUNITIES

Except as noted, the following natural community types follow the classification presented in The Nature Conservancy report (Lynch and Baker 1988). They have been grouped according to the ecological segments of the river basin (see Figure 3-1) of which they are most characteristic, but many of them also occur in other parts of the basin.

3.2.1.1 Headwaters

The headwaters of the St. Marys River lie in a relatively flat wetland region called the Northern Highlands or the Okefenokee Basin. This area is characterized by the swamp--bog--waterlily prairie wetland complexes of the Okefenokee-Pinhook system and extensive wet flatwoods.

Typical plant communities include the following:

- Carolina Bay--Shrub Bog
- Pond Pine Pocosin
- Prairie

3.2.1.2 Bluffs

The bluffs segment of the St. Marys River generally runs between the Duval Uplands and Trail Ridge. Here, sandhills and xeric flatwoods dominate the natural upland vegetation and seepage through the porous soil supports slope forests, seepage slopes, and bay swamps downslope. Plant communities include:

- Longleaf Pine/Turkey Oak Sandhill
- Live Oak--Laurel Oak Upland Forest
- Seepage Slope¹
- Bay Forest

¹Not in The Nature Conservancy table. The community is described in The Nature Conservancy site reports, but a natural community category is not provided.

3.2.1.3 Freshwater River Systems

The middle section of the St. Marys River is characterized by extensive riverine ecosystems with broad forested wetland floodplains. Natural communities include:

- Blackwater River Cypress--Gum Swamp
- Blackwater River Levee Forest
- Blackwater River Bottomland Hardwoods
- Creek Swamp
- Floodplain Lake

3.2.1.4 Flatwoods

Throughout the basin and particularly upslope of the floodplain wetlands along the river's central stretches, flatwoods dominate much of the landscape. As discussed in regards to silviculture, most of the native pinelands have been converted to pine plantation. However, remnants of the following natural communities can still be found:

- Longleaf Pine/Blackjack Oak/Wiregrass
- Longleaf Flatwoods
- Slash Pine Flatwoods
- Pond Pine Flatwoods
- Cypress Pond
- Open Depression Pond

3.2.1.5 Tidal Systems

From the Sea Islands west into the St. Marys Meander Plain is a zone of estuarine influence characterized by saltmarsh and maritime hammock. Typical natural communities are:

- Smooth Cordgrass (*Spartina alterniflora*) Marsh
- Black Needlerush (*Juncus roemerianus*) Marsh
- Sawgrass-Wild Rice (*Cladium--Zizaniopsis*) Marsh
- Wax Myrtle--Yaupon Holly-Saltbush Shrub Marsh
- Tidal Cypress--Gum--Maple Swamp Forest
- Maritime Forest

3.2.2 ANIMALS

Tables A-1 through A-5 in Appendix A list the species that characterize the fauna of the St. Marys basin. Threatened, endangered or rare animals documented within the St. Marys River basin are listed in Table A-1.

The critical habitat functions provided by the St. Marys River basin include important travel corridors for the Florida Black Bear (*Ursus americanus floridanus*), dry sandhills for the Sherman's Fox Squirrel (*Sciurus niger shermanii*), open pine habitat for the Southeastern American Kestrel (*Falco sparverius paulus*), Red Cockaded Woodpecker (*Picoides borealis*), and Gopher Tortoise (*Gopherus polyphemus*), and valuable foraging, roosting, and nesting habitat for a wide variety of wading birds. Populations of wading birds in north Florida and south Georgia are increasing, possibly as a result of the extensive habitat degradation in south Florida. As habitat degradation continues, wetland habitats in north Florida and south Georgia will continue to increase in importance for survival of wading bird populations.

3.2.3 PLANTS

The rich flora of the St. Marys region is reflected in the site descriptions provided in The Nature Conservancy report (Lynch and Baker 1988). Analysis of this report and other regional information makes it clear that protection of this flora must be based on habitat-oriented programs to an even greater extent than is normally the case in most regions. It is the native plant communities, rather than individual species, that are endangered here. The pineland groundcover is of particular concern because it tends to be extremely rich in rapidly declining species that have not yet been documented as rare enough to deserve individual conservation attention.

Numerous moderately threatened or rare plant species occur in the St. Marys basin, but very few of them are seriously endangered and none are endemic to the region. No federally endangered plants have been documented here. Table A-6 in Appendix A gives the listed species expected to occur in the St. Marys basin.

3.3 CONCLUSIONS

Review of hydrologic and ecological information on the St. Marys River basin indicates that wetlands within the basin are fundamental to maintenance of flows and water quality in the river and are an important component in the diverse habitats found in the basin. However, no discrete

wetland areas considered of exceptional significance were identified. Rather, the wetland resources of the basin that are widely distributed within a complex mosaic composed of wetlands and uplands were collectively found to be regionally significant. This mosaic is illustrated in the land use and land cover map shown on Figure 4-1. Review of this map clearly shows the complex interrelationship between the forested wetlands and upland areas. These upland areas are primarily tree plantation with some remaining areas of natural forest.

The largest expanses of contiguous wetlands shown on Figure 4-1 are represented by the non-forested wetlands of the Okefenokee Swamp and the tidal salt marshes near the mouth of the river. With the exception of these areas, the remainder of the wetlands in the basin are forested. For this reason the wetland resources of the basin are more appropriately identified in terms of functional categories, as discussed in the hydrologic component section above, than specific geographic locations.

As a result of the wide distribution of wetlands and uplands and a relative lack of urban development, good quality habitat for a wide range of plants and animals, including a number of threatened and endangered species, is found throughout the basin. Regionally, the St. Marys River basin provides significant expanses of undeveloped area that provides ecological connections between the Satilla River basin to the north, the Okefenokee Swamp system to the west, and the Upper Black Creek basin to the south. A detailed discussion of these ecological connections is provided in Section 8.0.

In addition to the overall good quality habitat found throughout the basin, Lynch and Baker (1988) identified areas of exceptional habitat along the length of the river corridor. These areas of exceptional habitat comprise the remaining high quality natural areas within the basin. Preservation of the overall habitat values of the basin will depend not only on preservation and management of the exceptional natural areas but also on management of surrounding areas so that existing ecological connections are preserved and enhanced. Therefore, a basinwide or regional perspective is necessary when discussing the habitat contributions provided by the wetland resources of the St. Marys River basin and the subsequent development of a wetland management strategy.

4.0 ASSESSMENT OF LAND USE TRENDS

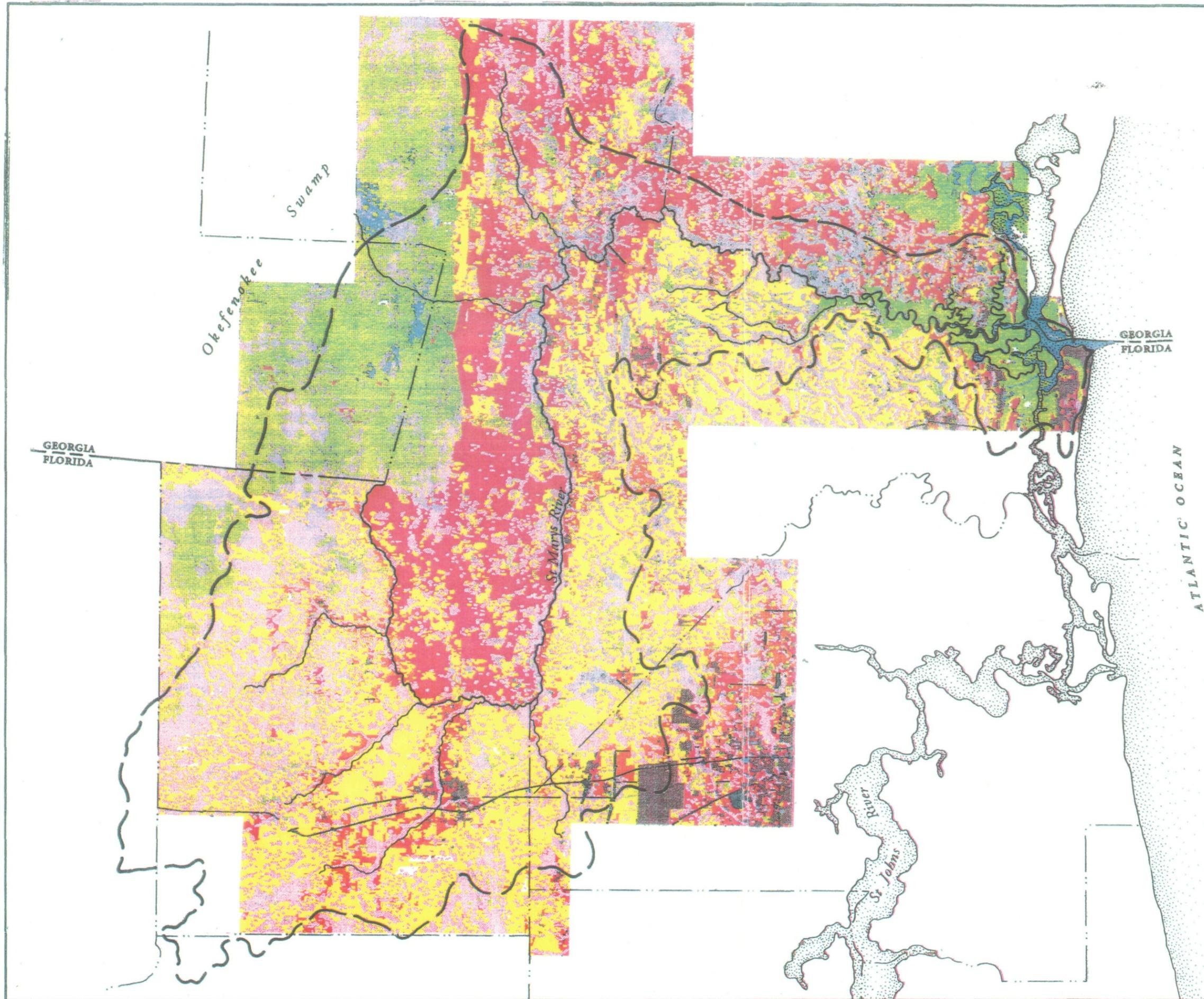
Figure 4-1 is a map showing the existing land uses and vegetative cover within the St. Marys River basin. As indicated by the map, silviculture is the dominant land use in the basin and is considered the primary management objective by landowners. Forests and timberland cover 90 percent of Baker County, 80 percent of Nassau County, 75 percent of Camden County, and 98 percent of Charlton County.

Intensive timber harvesting has occurred within the St. Marys basin since the early 1900's. The vast majority of original flatwoods have been harvested, with most of the existing forests being composed of third and fourth generation slash pine. Pinelands within the St. Marys basin are typically dominated by young, even-aged stands. While the majority of the harvested timber is pine, substantial quantities of cypress are also harvested.

Compilation of plat data revealed that a high percentage of the land in the St. Marys River basin is in large-tract ownership (Figure 4-2). These large tracts include federal, state, and private lands. The predominant land use on these large tracts is management for the production of forest products. In total, four large tracts of land are in federal ownership, and two large tracts in state ownership. Within the Florida counties of Nassau and Baker, approximately 68 percent of the total land area in the basin is in large-tract ownership. Similar to Florida, the land ownership patterns in the Georgia counties of Charlton and Camden are predominantly large-tract parcels. The portion of Ware County that is included in the St. Marys River basin is within the Okefenokee National Wildlife Refuge and, therefore, under the jurisdiction and management of the U.S. Fish and Wildlife Service.

Ownerships other than the large tracts illustrated in Figure 4-2 tend to be moderately sized, ranging from 5 to 10 acres to a half section or more. Most of the small subdivided tracts, or residential developments, are confined to areas in the vicinity of the small cities and towns.

Figure 4-1
GENERALIZED LAND USE AND COVER MAP
OF THE ST. MARYS RIVER BASIN



KEY

-  ST. MARYS RIVER BASIN BOUNDARY
-  DEVELOPED / BARREN
-  AGRICULTURE / RANGE
-  UPLAND FOREST OR TREE PLANTATION
-  UPLAND FOREST OR TREE PLANTATION
-  OPEN WATER
-  FORESTED WETLAND
-  NON-FORESTED WETLAND
-  COMMUNICATION / TRANSPORTATION

NOTE: In Florida, red = upland forest, yellow = tree plantation.
In Georgia, red = mature tree plantation and upland forest,
yellow = immature tree plantation.

SOURCES: Adapted from GDNR Freshwater Wetlands and Heritage Inventory Program Landsat Image, 1992; and SJRWMD Photointerpreted Land Use and Land Cover Data, n.d.

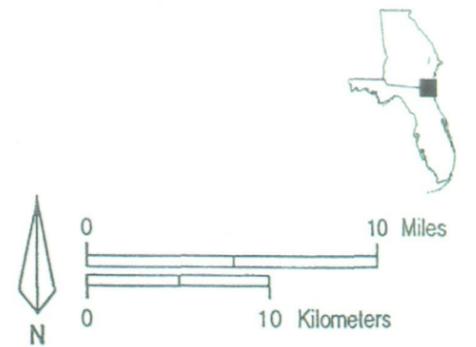
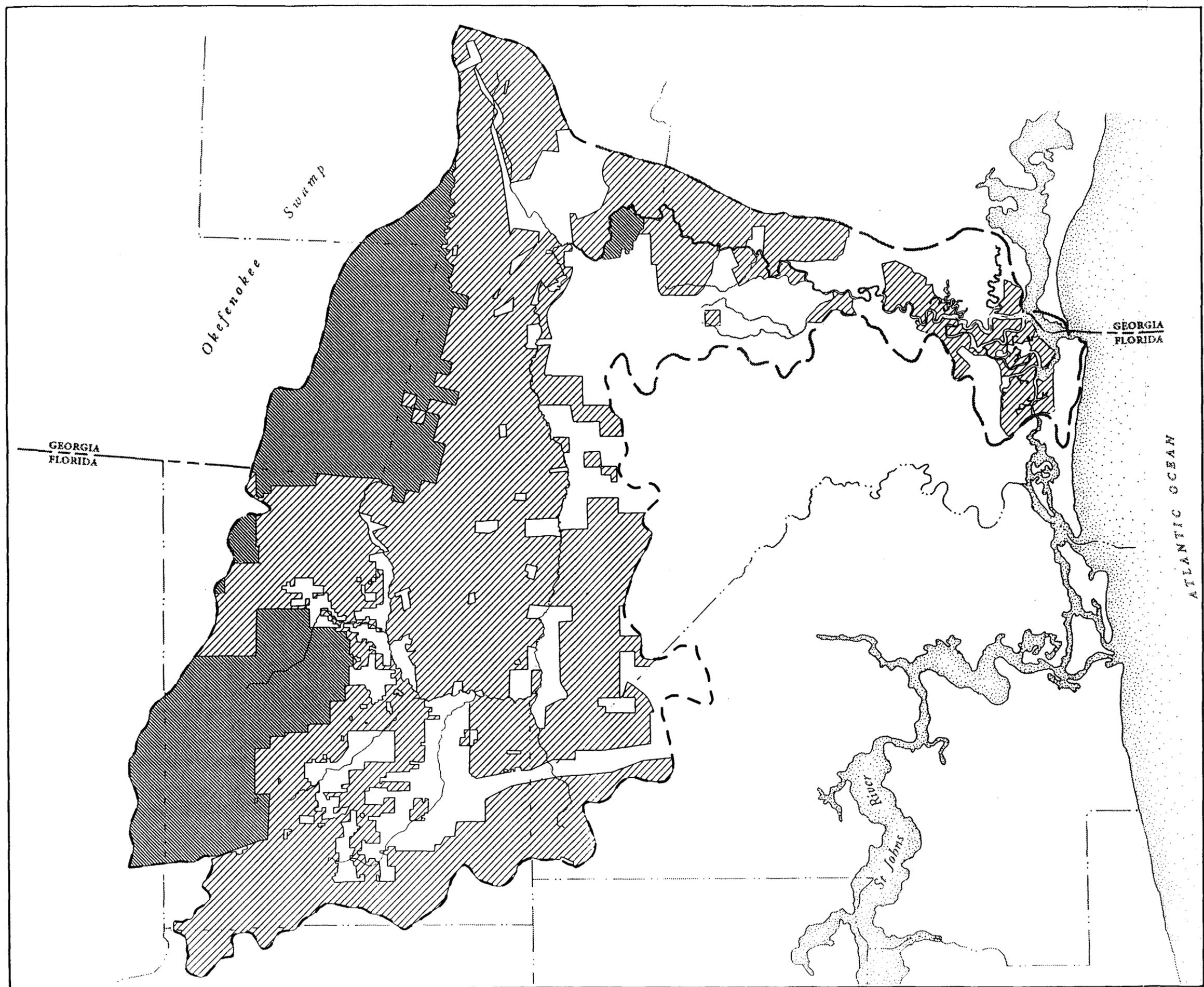


Figure 4-2
 EXTENT AND LOCATION OF LARGE TRACT
 (GREATER THAN 1 MILE SQUARE)
 OWNERSHIP IN ST. MARYS RIVER BASIN



- KEY
-  ST. MARYS RIVER BASIN BOUNDARY
 -  PUBLIC LANDS
 -  LARGE TRACT OWNERSHIP

N

0 10 Miles

0 10 Kilometers




To assess future land use trends within the four counties in the basin study area, local comprehensive plans or other available planning documents were reviewed. Planning personnel from various state, regional and local agencies were also consulted for additional information. Within Baker County, future land use trends indicate continued dominance of silviculture. Baker County experienced an approximate 21 percent population increase from 1980 to 1990, but the growth rate is expected to slow by 2005. The minimal growth in the county is expected to surround the incorporated areas and existing subdivisions and to occur along the transportation corridors. While the county is expected to grow, causing pressure to change agricultural forest land to residential and commercial development, overall forest coverage is not expected to decline appreciably. The comprehensive plan indicates that approximately 13,542 acres of land will be dedicated to improved cropland and grazing and 141,488 acres to forest and commercial timber over the next 10 years. Therefore, the growth trends within Baker County indicate a continuation of the existing agriculture and silviculture activities.

Nassau County has experienced moderate growth over the past 10-year planning period (with a current population estimate of 48,900 residents) and is projecting a population of 66,800 by 2005. The county is expected to continue to grow at a moderate rate in towns and communities and along major transportation corridors. Future changes in land use designations from rangeland, silviculture, and forest to residential, commercial, or industrial are expected to occur in the vicinity of existing communities and major transportation corridors. The two municipalities that are within the St. Marys River basin are Hilliard and Fernandina Beach. The Nassau County Comprehensive Plan indicates that approximately 9,187 acres of unincorporated county lands are anticipated to be required for residential uses and 167 acres will be needed for commercial uses.

Nassau County's growth has been attributed to the pulp industry, transportation, and tourism. Past and projected future growth trends occur as a result of economic activities to the south and north of the county. These trends are attributed to the City of Jacksonville and improved transportation to the employment centers within the city and to the development of the Kings Bay Naval Base in Camden County. The Dames Point Bridge across the St. Johns River in Jacksonville greatly enhances access to northern Duval and southern Nassau counties. A number of bridges cross the

St. Marys River. The bridges at Interstate 95 (I-95) and U.S. Highway 17 are heavily used and provide important transportation linkages.

For Nassau County as a whole, urban expansion is projected to occur in the Yulee area. Yulee is located at the intersection of U.S. Highway 17 and SR 200 and is easily accessible from I-95. Projected growth in the Yulee area is the result of improved access to Jacksonville to the south. While Yulee itself is located just outside of the St. Marys basin, urban growth in the Yulee area would be expected to spill over into nearby portions of the St. Marys basin.

The lands in Camden County that are included in the St. Marys River basin are sparsely populated except for St. Marys and Kingsland. The population in Camden County has more than doubled from 1980 to 1990 and is expected to continue to grow into the next century, mainly as a result of the Kings Bay Naval Base. The majority of the existing land use designations in the St. Marys River basin are Vacant/Undeveloped and Agriculture/Forest. Residential and Commercial land use designations in the St. Marys River basin are found in or near Kingsland and St. Marys. There are only a few small state-owned parcels in Camden County, used for recreation and historical sites.

The Kings Bay Naval Base has spurred rapid growth in the Cities of Kingsland and St. Marys. The anticipated growth in Camden County is expected to be centered around the naval base, towns and communities, and transportation corridors. The SR 40 corridor between Kingsland and the City of St. Marys has the greatest potential for urban development.

Charlton County is located west of Camden County, with the St. Marys River predominantly forming the county's eastern and southern border. The population of Charlton County has risen slightly from approximately 7,500 in 1985 to approximately 8,500 in 1990. The potential for future growth is small. The major land use in Charlton County is silviculture, and is anticipated to remain so for years to come. Nearly 98 percent (488,109 acres) of Charlton County is forested. Of this amount, nearly one-third lies within the boundaries of the Okefenokee National Wildlife Refuge. The largest municipality and the county seat is Folkston; Homeland and St. George are smaller communities within the basin. Residential development is clustered around the small communities and the major roads, with the future need for increased residential developments remaining small.

5.0 EXISTING ENVIRONMENTAL REGULATIONS, POLICIES, AND PROGRAMS

5.1 WETLAND MANAGEMENT

5.1.1 WETLAND DEFINITIONS AND EXTENT OF REGULATORY JURISDICTION

The St. Marys River basin contains a variety of different types of wetlands. These wetland types include intertidal salt marsh near the mouth of the river at Cumberland Sound, tidally influenced forested floodplains farther upstream, seepage slope forests along creeks draining high pine-covered sandhills, wet pine flatwoods, and hardwood and cypress forests of the Okefenokee Swamp.

Hydrology is a major determining factor in the formation of different wetland types. Different types of hydrology that support different types of wetlands include tidal regime, fluctuations in river water level resulting in flooding of adjacent floodplain forests, slow runoff or infiltration from areas after rainfall, high groundwater tables, and seepage of groundwater from the base of steep slopes. The frequency and duration that an area remains wet or flooded determines what type of wetland that area will support.

A number of different government agencies, including federal, state and regional agencies, regulate activities in wetlands within the St. Marys River basin (see Table 5-1). Due to differences in legislation mandating an agency's involvement in wetland regulation, and differences in rules and policies which implement wetland legislation, each of these agencies may have a different interpretation of what constitutes a wetland.

USACE is charged with regulating waters of the United States. Waters of the United States are defined in 33 CFR, Part 328, and include coastal and navigable inland waters, lakes, rivers and streams; other intrastate lakes, rivers and streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, wet meadows, and certain impoundments. While waters of the United States are not necessarily wetlands, certain wetlands are a subset of waters of the United States. In order to be more specific regarding wetlands, USACE and EPA jointly define wetlands as follows:

Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do

Table 5-1. Regulation of Wetland Alteration (Dredge and Fill) Activities

Agency	Regulation	Applicability to Land Uses		
		Silviculture	Agriculture	Urban/Industrial
Federal				
USACE ^a	Dredge and Fill			
	Rivers and Harbors Act of 1899 ^b Sections 9 and 10	NA	NA	Applies
	Clean Water Act, Section 404 ^c (33 CFR Parts 320-330)	Exempt ^d	Exempt ^d	Applies
	Fish and Wildlife Coordination Act of 1956 ^e Endangered Species Act of 1973 ^f			
State of Florida				
FDER/ SJRWMD ^g	Dredge and Fill			
	Warren S. Henderson Wetlands Protection Act of 1984 (403.92-.938, FS)	Exempt ^h	Exempt ^h	Applies
SJRWMD	Management and Storage of Surface Waters (Ch. 40C-4, Ch. 40C-40, and Ch. 40C-41, F.A.C., Sec 403, FS)	Exempt ⁱ	Exempt ⁱ	Applies
State of Georgia				
GDNR	Dredge and Fill			
	Coastal Marshlands Protection Act of 1970 ^k (GA Code 12-5-280 <i>et seq.</i>) Endangered Wildlife Act of 1973 ^l (GA Code 27-3-130 <i>et seq.</i>)	NA	NA	Applies

^a Jacksonville District in Florida, Savannah District in Georgia.

^b Prohibits unauthorized construction in or over navigable waters of the United States.

^c Governs discharge of dredged or fill material into waters of the United States.

^d 33 CFR Part 232.4(a). Exemption applies to established (i.e., on-going) farming, silviculture, or ranching operations. Activities which bring an area into farming, silviculture, or ranching use are not able to use the exemption.

^e Requires USACE to coordinate permit applications with state and federal fish and wildlife agencies.

^f For protection of endangered or threatened species.

^g Certain aspects of program delegated by FDER to SJRWMD.

^h Chapter 403.927, Florida Statutes: Exemption includes all necessary farming and forestry operations which are nominal and customary for an area, such as site preparation, clearing, fencing, contouring to prevent soil erosion, soil preparation, plowing, planting, harvesting, construction of access roads, and placement of bridges and culverts, provided such operations do not impede or divert the flow of surface waters.

ⁱ Some activities are exempt; others require notice permits or general permits.

^j Closed systems are exempt; other exemptions may also apply.

^k Within the St. Marys Basin, applies only to salt marshes within Camden County.

^l Private lands are exempt and is not to impede construction in any way.

support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

As a consequence of this definition, USACE has developed criteria by which an area may be determined to be a wetland classified as a water of the United States. In order to be classified as a wetland by USACE, an area must (1) be dominated by wetland plants, (2) have hydric (i.e., wetland) soils, and (3) display evidence of wetland hydrology. USACE has developed an extensive list of plants that indicate the presence of wetlands and established procedures for evaluating soils for hydric characteristics. In practice, areas that have both wetland plants and soils are assumed also to possess wetland hydrology.

As an agency of the federal government, USACE has wetland jurisdiction in both Florida and Georgia. However, USACE is divided into districts. The Florida side of the basin is administered by the Jacksonville District. The Georgia side of the basin is administered by the Savannah District. Both the Jacksonville District and the Savannah District are within the USACE South Atlantic Division, which is headquartered in Atlanta.

In Florida, the state government, acting through FDER, regulates activities in wetlands considered to be waters of the State. As with USACE, determination of a wetland by the state of Florida is dependent upon the dominance of listed plant species and the presence of hydric soils.

An important distinction between USACE and state of Florida methodology is that in Florida a wetland must have a direct hydrologic connection to a listed state water body such as a bay, river, stream or tributary. Such waters of the State are listed in Rule 17-301, F.A.C. (Surface Waters of the State).

While hydrologic connections may not be immediately obvious at all times, in order for a wetland to be considered a water of the state of Florida, the hydrologic connection must indeed exist. Such a connection may be direct or through an adjacent wetland or an excavated water such as a man-made lake or even a drainage ditch. Wetlands that are connected to waters of the State are within the jurisdiction of the State. Wetlands that are not hydrologically connected to a water of

the State are considered isolated and are not within the state's regulatory jurisdiction for dredge and fill activities. Cypress domes are examples of wetland areas that often are not connected to any other wetland or water body.

USACE has no requirement for hydrologic connections between wetland areas and other waters such as rivers or streams. Accordingly, USACE often will have jurisdiction over isolated wetlands that the state of Florida does not.

Another important distinction between USACE and state of Florida wetland methodology regards the lists of wetland plants used by each agency. USACE has adopted a wetland plant list that is more extensive than that utilized by Florida. An important item of the USACE list that is not present on the Florida list is slash pine (*Pinus elliottii*). Inclusion of slash pine on the USACE wetland plant list allows USACE wetland jurisdiction to extend into wet pinelands and even planted pine plantations. The absence of slash pine from the Florida list prevents the State from exerting wetland jurisdiction into areas dominated by slash pine, in most cases.

USACE's more comprehensive wetland plant list and ability to exert jurisdiction into isolated wetland areas often results in USACE having more extensive wetland jurisdiction in a given area than that exerted by the state of Florida. In some cases, areas several square miles in size may be entirely within USACE jurisdiction with little or no corresponding jurisdiction by the state of Florida.

A final consideration in discussing the extent of wetland jurisdiction in the Florida portion of the study basin involves SJRWMD. SJRWMD is one of five regional water management districts in Florida which have broad authority from the state legislature to regulate water-related activities such as drainage, flood prevention, irrigation and water supply. The St. Marys River basin is within the boundaries of SJRWMD.

Through its Management and Storage of Surface Waters (MSSW) permitting program, SJRWMD is involved in reviewing and permitting environmental impacts associated with construction of water management systems for many types of developments. Included in these reviews are

consideration of impacts to wetlands. When delineating wetlands under the MSSW program, SJRWMD uses the state of Florida's wetland plant list and/or a list of wetland soils adapted by rule for each county. However, under the MSSW rules a hydrologic connection to waters of the state is not necessary and, consequently, SJRWMD may exert wetland jurisdiction over isolated wetlands during the MSSW permitting process. Due to differences in rules used by USACE, FDER, and SJRWMD, up to three separate wetland jurisdiction lines can be delineated on a single tract of land. However, in most instances a joint USACE/SJRWMD line is used for isolated wetlands and a joint FDER/SJRWMD line for contiguous wetlands.

In addition to Florida, Georgia conducts a wetland regulatory program. However, the Georgia program, mandated through the Coastal Marshlands Protection Act of 1970, is restricted to coastal marshlands within coastal counties. Within the St. Marys River basin, this limits application of the Coastal Marshlands Protection Act to salt marshes within Camden County. Activities in freshwater wetlands further inland in Camden and Charlton counties are not regulated by the State of Georgia. However, such wetlands would still be within the jurisdiction of USACE.

5.1.2 WETLAND (DREDGE AND FILL) PERMITTING PROGRAMS

5.1.2.1 Federal

USACE has been involved in regulating certain activities in the nation's waters since 1890. Until 1968, this regulatory responsibility was primarily restricted to protection of navigation. Since that time however, judicial decisions and new legislation have led to development of a more comprehensive resource protection program.

The USACE regulatory program regulations for activities in waters and wetlands are found in 33 CFR, Parts 320-330. The titles for each individual part are listed in Table 5-2. Typical activities requiring USACE permits include construction of structures such as piers, wharves, docks, dockhouses, boat hoists, boathouses, floats, dolphins, marinas, boat ramps, marine railways, bulkheads (and backfill); construction of revetment, groins, breakwaters, levees, dams, dikes, berms, weirs, and outfall structures; placement of wires, cables or pipes in or over the water; dredging, excavation and depositing of fill and dredged material; construction of fill roads and placement of riprap.

**Table 5-2. U.S. Army Corps of Engineers Regulatory Program Regulations 33 CFR,
Parts 320-330**

Part 320	General Regulatory Policies
Part 321	Permits for Dams and Dikes in Navigable Waters of the United States
Part 322	Permits for Structures or Work in or Affecting Navigable Waters of the United States
Part 323	Permits for Discharges of Dredged or Fill Material into Waters of the United States
Part 324	Permits for Ocean Dumping of Dredged Material
Part 325	Processing of Department of the Army Permits
Part 326	Enforcement
Part 327	Public Hearings
Part 328	Definition of Waters of the United States
Part 329	Definition of Navigable Waters of the United States
Part 330	Nationwide Permits

The legislative authority for the USACE regulatory program is derived primarily from the Rivers and Harbors Act of 1899, the Clean Water Act and the Marine Protection, Research and Sanctuaries Act of 1972. These laws provide USACE with the following authorities to issue permits:

- (a) Section 9 of the Rivers and Harbors Act of 1899 (33 United States Congress [U.S.C.] 401), regulates construction of dams or dikes across navigable waters.
- (b) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403), regulates construction of structures in or over navigable waters, excavating or filling in such waters, and any other activities which may obstruct navigation. This section regulates construction of small boat structures such as piers, boat docks, moorings, and platforms.
- (c) Section 11 of the Rivers and Harbors Act of 1899 (33 U.S.C. 404), authorizes USACE to establish harbor lines waterward of which construction of piers, wharves, bulkheads and other works is prohibited.
- (d) Section 13 of the Rivers and Harbors Act of 1899 (33 U.S.C. 407), regulates discharge of refuse into navigable waters to protect anchorage and navigation.
- (e) Section 14 of the Rivers and Harbors Act of 1899 (33 U.S.C. 408), provides for temporary use of government piers and bulkheads.
- (f) Section 404 of the Clean Water Act (33 U.S.C. 1344), regulates discharge of dredged or fill material into waters of the United States.
- (g) Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972, as amended (33 U.S.C. 1413), regulates transportation of dredged material for ocean disposal.

Using these authorities, USACE may issue several kinds of permits. These permits include:

- (1) Individual permits--required for major projects, involves a project specific review and formal public notice procedures. In some cases may involve public hearings and preparation of Environmental Impact Statements.
- (2) Letters of Permission--used to authorize Section 10 activities such as minor structures and limited dredging operations with contained disposal areas.
- (3) General Permits--provide a streamlined permitting procedure for specific categories of projects which are expected to have little or no significant environmental impact. These permits are developed by USACE districts and reflect the types of minor activities common in that district. For example, the Jacksonville District has developed 42 general permits for use with private and commercial docks, riprap revetments, boat ramps and slips, outfall structures and similar activities. If an activity is covered by a general permit, an application to the USACE is not

necessary. A person utilizing a general permit must only comply with the specific requirements stated for use of that permit. In some cases pre-construction notification may be necessary.

(4) Nationwide Permits--Provide approval on a nationwide basis for a large group of minor activities such as repair of certain structures, construction of structures in residential canals, and minor road crossing fills.

The decision to issue a permit is based on a public interest review during which a number of factors are considered including: the overall need for the activity and possible alternatives; effects on wetlands, fish and wildlife habitats and threatened and endangered species; degradation of water quality; effects on historic, scenic and recreational values; potential to cause coastal erosion or shoaling; obstruction of navigation; cumulative impacts to floodplains; water supply and conservation; possible environmental benefits; and economics.

The Section 404 program for discharges to waters of the United States is the primary USACE wetland permitting program and most comprehensive in scope. Through this program the USACE regulates activities in all of the wetlands within the St. Marys basin. This permit program would apply to any project which proposed to place fill in wetland areas. Examples of such projects would be road crossings of wetland areas and commercial and residential developments which need to encroach into wetlands to create a buildable and economically viable site.

As part of the permitting process, comments are solicited from the U.S. Fish and Wildlife Service (USFWS) regarding potential adverse impacts to fish and wildlife habitat and endangered and threatened species. As with the split in the USACE districts between Savannah and Jacksonville, the USFWS districts are also split along the Florida-Georgia border within the St. Marys River basin. In Florida, the USFWS office with responsibility over the St. Marys basin is in Jacksonville. The applicable USFWS office in Georgia is in Brunswick.

Should threatened or endangered species be potentially impacted by a proposed activity, USACE is required to consult with USFWS. The proposed activity may not be authorized unless USFWS determines under the Fish and Wildlife Coordination Act and Endangered Species Act the project is not likely to jeopardize the continued existence of the threatened or endangered species or result

in the destruction or adverse modification of the habitat of such species. USFWS prepares a separate biological opinion for this determination.

The Section 10 program regulating construction of structures in navigable waters would also have wide applicability to the St. Marys River. Through the Section 10 program, structures such as boat docks and boat houses along the river and its navigable tributaries would be regulated.

Specifically exempted from the requirement for a permit under the 404 program are normal silvicultural activities such as plowing, seeding, cultivating, minor drainage, and harvesting for the production of forest products. Minor drainage does not include drainage associated with the immediate or gradual conversion of a wetland to a non-wetland. To qualify for the exemption, the activities must be part of an established (i.e., ongoing) silvicultural operation. Activities which bring an area into silviculture are not part of an established operation.

5.1.2.2 Florida

Activities in waters and wetlands in the state of Florida are regulated under the Warren S. Henderson Wetlands Protection Act of 1984. This act is found in Sections 403.92-.938 of the Florida Statutes. The implementing rule for this legislation is Rule 17-312, F.A.C., entitled Dredge and Fill Activities.

The Florida agency with the primary responsibility for carrying out the mandate of the Henderson Act is FDER. However, for the past several years, SJRWMD has been delegated much of FDER permitting authority and has been conducting much of the program. The delegation applies to projects which would require both a dredge and fill permit and a surface water management (i.e., drainage) permit. Example of such projects include residential and commercial developments and road projects.

In general, any construction in, on or over waters of the state of Florida requires a permit. Such projects include construction of jetties, breakwaters, revetments, marinas, docks, wharves, piers, marine railroads, walkways, mooring structures, boat ramps, canals, locks, bridges, causeways and any dredging and filling. A number of exemptions are provided for minor activities such as

private docks of limited size, maintenance dredging, certain boat ramps, and construction of seawalls and revetments in limited situations. In addition, a number of general permits are provided which authorize certain activities if conducted in accordance with the specific design criteria listed in the permit. General permits cover such activities as boat ramp construction, installation of riprap, certain private docks, and certain types of utility crossings.

In determining whether to issue a dredge and fill permit under the Henderson Act, the state of Florida considers a two-part test which considers water quality and public interest. A project may not cause violations of water quality standards and in some instances may cause no degradation of ambient water quality. If a project complies with water quality requirements, it must also be determined to be either clearly in or not contrary to the public interest. In determining public interest, the Henderson Act, provides similar guidelines to what USACE considers in its public interest review. In the case of the Henderson Act the public interest criteria are listed in Section 403.918, FS (criteria for granting and denying permits) and require consideration of:

1. Public health, safety or welfare and the property of others;
2. Conservation of fish and wildlife, threatened or endangered species or their habitats;
3. Navigation, flow of water, erosion, or shoaling;
4. Fishing, recreational values and marine productivity;
5. Whether the impacts of the project will be temporary or permanent;
6. Historic and archaeological resources; and
7. The current condition and relative value of functions being performed by areas affected by the proposed activity.

In the state of Florida the Henderson Act (Sections 403.91-403.929, FS) exempts farming and forestry activities from wetland permitting requirements otherwise applicable to non-agricultural activities. The exempt activities include all necessary farming and forestry operations which are normal and customary for the area, such as site preparation, clearing, fencing, contouring to prevent soil erosion, soil preparation, plowing, planting, harvesting, construction of access roads, and placement of bridges and culverts, provided such operations do not impede or divert the flow of surface water.

The silvicultural exemption in the Henderson Act defaults responsibility for agricultural operations on the water management districts under the authority of Chapter 373, FS, and implemented under Rule 40C-4 and 40C-43, F.A.C. Under Chapter 373, the presumption is made that use of Best Management Practices (BMPs) developed through the FDACS Division of Forestry will minimize impacts of the agricultural operation.

One source of debate in interpretation of the FDER agricultural exemption provided by Chapter 403, FS, is what constitutes a normal and customary agricultural operation. For example, harvesting of floodplain forest is a legitimate silvicultural activity of which the normal and customary practice is to harvest during the dry season. If logging occurs during periods of high water, regulatory enforcement action may be taken due to violations of water quality standards, primarily turbidity. As another example, logging roads constructed through wetland areas are a normal and customary practice. However, such roads need to reflect their use as logging roads and not be over-designed to accommodate a more intensive future use not related to silviculture. In other words, the exemption may not be used to construct logging roads which will in turn service a future residential development.

Section 404(b) of the Clean Water Act allows the Administrator of the EPA to transfer administration of the Section 404 permit program for discharges into certain waters of the United States to certain states. Florida is currently studying the feasibility of accepting the 404 program. If implemented, administration of the 404 program by Florida will allow consolidation of the federal and state wetland permitting programs that now function independently within Florida. Once Florida's 404 program is approved and in effect, USACE will suspend processing of Section 404 applications in the applicable waters and will transfer pending applications to the state program.

5.1.2.3 Georgia

As previously stated, Georgia's wetland regulatory program is restricted to the Coastal Marshlands Protection Act of 1970, and focuses exclusively on the coastal marshlands within coastal counties. Within the St. Marys River basin, this limits application of the Coastal Marshlands Protection Act to salt marshes within Camden County. Activities in freshwater wetlands further inland in

Camden and Charleton counties are not regulated by the State of Georgia. However, such wetlands would still be within the jurisdiction of USACE.

5.2 WATER RESOURCES

5.2.1 WATER QUALITY PROTECTION

The Federal Water Pollution Control Act, also known as the Clean Water Act, is the cornerstone legislation for the preservation and restoration of water quality in the waters of the United States. The Federal Water Pollution Control Act was initially passed in 1967 but has been amended several times over the years. It is usually titled with reference to one of its amendments, for example, the Federal Water Pollution Control Act Amendments of 1972. Other amendments were made in 1977, 1980 and 1988. Therefore, the title "Clean Water Act" or "Clean Water Act as Amended" refers to the latest amendment of the Federal Water Pollution Control Act.

Section 303 of the Clean Water Act mandates states to establish and enforce water quality standards. This mandate consists of three main components:

1. Establishment of a classification system to designate the most beneficial uses of surface waters in a state,
2. Establishment of water quality criteria which protect those beneficial uses, and
3. Establishment of antidegradation policies.

EPA is the federal agency with the responsibility for ensuring that the states comply with the mandates of the Clean Water Act (see Table 5-3). EPA must approve the water quality protection criteria established by the states. While EPA publishes recommendations for water quality standards, the states may propose more stringent limitations for approval by EPA.

In Florida, the state agency responsible for establishing and enforcing water quality standards for surface waters is FDER. FDER's rules for surface water quality standards are contained in Rule 17-302, F.A.C.

In Georgia, the state agency responsible for establishing and enforcing water quality standards for surface waters is GDNR, Environmental Protection Division (EPD). Georgia's surface water quality standards are contained in Section 391-3-6-.03.

Table 5-3. Existing Water Resource Regulations

Agency	Regulation	Applicability to Land Uses ^a		
		Silviculture	Agriculture	Urban/Industrial
Federal				
EPA	NPDES Permit (40 CFR Parts 122, 123, 124)			
	Federal Clean Water Act			
	Wastewater	NA	1	Applies
	Stormwater	Applies	Exempt	2
	Construction Stormwater	5	Exempt	3
State of Florida				
FDER	OFW Program (Ch. 17-3, Ch. 17-301, and Ch. 17-302, F.A.C.)			
	Industrial Wastewater (Ch. 17-301, Ch. 17-660, and Ch. 17-302, F.A.C.)	NA	NA	Applies
HRS	Septic Systems (Ch. 10D-6, F.A.C.)	NA	NA	Applies
SJRWMD	Consumptive Use Permit (Ch. 40C-2, F.A.C.)	NA	4	4
	MSSW (Ch. 40C-4, Ch. 40C-40, and Ch. 40C-41, F.A.C., Sec 403, FS)	5	6	Applies
	Agricultural 40C-44 Surface Water Management Systems	NA	Applies	NA
State of Georgia				
GDNR-EPD	Mountain and River Corridor Act (Ch. 391-3-16)	Applies	Applies	Applies
	Water Use Permit (Ch. 391-3-6)	4	4	4
	Industrial Wastewater (Ch. 391-3-6)			Applies

^a Applicability:

1. Required for concentrated annual feeding operations.
2. Required for industrial operations.
3. Required where operations disturb more than 5 acres of total land area.
4. Required for withdrawals >100,000 gallons per day.
5. Some activities are exempt; others require notice permits or general permits.
6. Closed systems are exempt; other exemptions may also apply.

NOTE: OFW = Outstanding Florida Waters

Classification of Surface Waters

In response to the mandate of the Clean Water Act and subsequent implementing regulations and policies of EPA, both Florida and Georgia have established classification systems for surface waters in each state. These classification systems designate specific uses for all surface waters.

In Florida, this classification system is established in Rule 17-302.400, F.A.C. (Surface Water Quality Standards). In Georgia, the classification system is established in Section 391-3-6-.03(4) (Rules and Regulations for Water Quality Control). Table 5-4 lists the classifications used in Florida and Georgia.

Most surface waters in Florida are designated as Class III, i.e., their designated use is for recreation and the propagation and maintenance of a healthy, well-balanced population of fish and wildlife. This designation, and all of the classifications, extends to the landward extent of waters of the state, as defined by Rule 17-301, F.A.C., and includes associated water bodies such as tidal creeks, coves, bays, and bayous. In other words, in Florida, a classified water body extends to the landward extent of any associated wetlands. Such wetlands may extend a great distance from what would be considered open water. Examples of such wetlands include forested floodplains of rivers, tributaries and headwater wetlands, sloughs and swamps.

With the exception of Class IV Agricultural Water Supplies, for a surface water in Florida to be classified as other than Class III, it must be expressly designated as Class I, II or V in Rule 17-302.600, F.A.C. A narrow definition is provided in Rule 17-302.600, F.A.C., for what constitutes a Class IV Agricultural Water Supply, i.e., wholly artificial secondary or tertiary canals or ditches wholly within agricultural areas, behind water control structures and permitted by a water management district. No specific designations are otherwise provided for Class IV water supplies. Confirmation that an agricultural water supply meets the Class IV definition would be required from the appropriate water management district. With the exception of a small portion of Baker County that is within the Suwannee River Water Management District, the Florida portion of the St. Marys River basin is located entirely within SJRWMD.

With the exception of some agricultural systems that may meet the Class IV definition, Baker County does not have any surface waters with any designation other than Class III. Nassau County has several water bodies that are designated as Class II (Shellfish Propagation or

Table 5-4. Beneficial Use Classifications of Surface Waters Used in Florida and Georgia

FLORIDA (Rule 17-302.400, Florida Administrative Code)

CLASS I	Potable Water Supplies (Drinking Water)
CLASS II	Shellfish Propagation or Harvesting
CLASS III	Recreation, Propagation and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife
CLASS IV	Agricultural Water Supplies
CLASS V	Navigation, Utility, and Industrial Use

GEORGIA [Section 391-3-6-.03(4)]

- (a) Drinking Water Supplies**
 - (b) Recreation**
 - (c) Fishing, Propagation of Fish, Shellfish, Game, and Other Aquatic Life**
 - (d) Agricultural**
 - (e) Industrial**
 - (f) Navigation**
 - (g) Wild River**
 - (h) Scenic River**
 - (i) Urban Stream**
 - (j) Coastal Fishing**
-

Harvesting). However, these waters are located in the Nassau River, South Amelia River, and Alligator Creek and are not located within the St. Marys River basin. Therefore, all surface waters in the St. Marys River basin within the boundaries of Florida are designated as Class III (Recreation, Propagation and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife).

In Georgia, "Surface water(s) of the State" or "surface waters" are defined in Section 391-3-6-.07 and mean any and all rivers, streams, creeks, branches, lakes, reservoirs, ponds, drainage systems, springs producing in excess of 100,000 gallons per day, and all other bodies of surface water, natural or artificial, lying within or forming a part of the boundaries of the State which are not entirely confined and retained completely upon the property of a single individual, partnership or corporation. All surface waters in Georgia are designated as for Fishing, Propagation of Fish, Shellfish, Game and Other Aquatic Life unless specifically classified as otherwise in Section 391-3-6-.03(12). Within the St. Marys River basin, all littoral waters on the ocean side of Cumberland Island have been classified as Recreation. In addition, Section 391-3-6-.03(14) also lists certain waters within the St. Marys River basin as potential shellfish areas. These areas are in the estuary area at the confluence of the St. Marys River with Cumberland Sound.

Establishing classifications for surface waters allows water quality standards to be developed which reflect the designated use of the water. Water quality classifications in Florida are arranged in order of the degree of protection required, with Class I waters having generally the most stringent water quality criteria and Class V the least. However, Class I, II and III surface waters share water quality criteria established to protect recreation and the propagation and maintenance of a healthy, well-balanced population of fish and wildlife.

In many ways the classifications and standards for Florida and Georgia are similar, reflecting their common origin in the mandate of the Clean Water Act and subsequent implementing regulations and policies of EPA. Georgia has chosen to define a larger number of more specialized categories than Florida; however, both sets of standards provide for minimum and general criteria which apply to all surface waters without regard to any particular classification, as well as additional or more stringent standards specifically established for a particular classification.

For Florida, Rule 17-302.500, F.A.C., stipulates minimum criteria which must be met for all surface waters regardless of their classification. Rule 17-302.510, F.A.C., lists general criteria also applicable to all surface waters regardless of their classification. Rule 17-302.520, F.A.C., lists thermal surface water criteria applicable to heated discharges from industrial operations. Rule 17-302.560, F.A.C., lists additional or more stringent water quality criteria specific to the Class III waters of the St. Marys River basin in Florida.

For Georgia, Section 391-3-6-.03(5) stipulates general criteria that must be met for all surface waters regardless of their classification. This section is analogous to both the Minimum Criteria and General Criteria sections in the Florida standards. Section 391-3-6-.03(6)(c) lists additional or more stringent criteria specific to "Fishing: Propagation of Fish, Shellfish, Game and Other Aquatic Life; secondary contact recreation in and on the water; or for any other use requiring water of a lower quality"; the section is applicable to the classification of waters of the St. Marys River basin in Georgia.

Water quality criteria applicable to a particular classification are designed to maintain the minimum conditions necessary to assure the suitability of the water for its designated use. In other words, the water quality standards reflect the lowest quality a water may have and still be consistent with its designated use.

Antidegradation Policies

Surface waters in both Florida and Georgia may actually have higher water quality than the minimum levels set by the water quality standards. This means that some water quality degradation may occur and the water still will meet water quality standards applicable to its designated use. In recognition of this situation, the Clean Water Act, both Florida and Georgia have established antidegradation policies in association with their water quality standards. Florida's antidegradation policy is contained in Rule 17-302.300, F.A.C.; Georgia's antidegradation policy is contained in Section 391-3-6-.03(2)(b).

Georgia's antidegradation policy states that waters that have existing water quality higher than the minimum standards will be maintained at high quality. However, new developments may be approved if a lowering of existing water quality is justified to provide necessary social or economic development. Such development would be required to protect existing beneficial uses

by providing the highest and best practicable level of treatment for any discharge. Even with development, existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.

Florida's antidegradation policy, as stated in Rule 17-302.300, F.A.C., is focused on protection of beneficial uses of waters by compliance with water quality standards and does not address waters with higher water quality than that provided through the standards. If water quality is higher than required by standards, and a proposed activity will not reduce the quality of the receiving water below the classification established for them, FDER is required to issue a permit authorizing the activity. Degradation of water quality may be allowed as long as the degradation is not so severe that standards are violated.

This concept is important to FDER when it considers permit applications for activities which may degrade water quality. Examples of such activities include discharge of effluent from a wastewater treatment plant, channel dredging, construction of a marina or bridge, or dredging and filling wetland areas for commercial development. Such activities may be authorized if there is a reasonable expectation they will not result in violations of water quality standards even though substantial degradation of water quality may result.

Special Designations of Surface Waters

While Florida's antidegradation policy allows degradation of water quality as long as standards for the applicable use classification are not violated, Florida does provide a separate mechanism through which the highest protection of water quality is afforded. This mechanism, found in Rule 17-302.700, F.A.C., provides for designation of Outstanding Florida Waters (OFWs). Within waters designated as OFWs, no degradation of water quality is allowable.

Rule 17-302.700, F.A.C., also provides for designation of Outstanding Natural Resource Waters (ONRWs). In Florida, the Everglades National Park and Biscayne National Park have been designated as ONRWs.

OFWs are waters designated by FDER as worthy of special protection because of their natural attributes. In general, an automatic designation is provided for surface waters in National Parks, Preserves, Wildlife Refuges, Seashores, Marine Sanctuaries, Estuarine Research Reserves, certain

National Monuments, and certain waters in National Forests, as well as waters in the State Park system, Wilderness Areas, and waters in areas acquired through the Environmentally Endangered Lands (EEL) Bond Program, Conservation and Recreation Lands (CARL) Program, Land Acquisition Trust Fund (LATF) Program and Save Our Coast (SOC) Program, Wild and Scenic Rivers and State Aquatic Preserves.

Waters that are not protected as above may also be designated as OFWs if they are determined to have exceptional recreational or ecological significance, by Environmental Regulatory Commission. Such OFW designations are called "Special Waters."

Specific criteria for issuance of an FDER permit or water quality certification are provided in Rule 17-4.242(2), F.A.C. (Standards Applying to Outstanding Florida Waters), for projects or activities proposed within an OFW, or which may contribute to degradation of an OFW. According to these criteria, such projects must be determined to be clearly in the public interest and not to lower existing ambient water quality.

The procedures for designation of Special Waters OFW are listed in Rule 17-312.700(4), F.A.C. In general, the process is initiated by a request to FDER for designation by an individual, citizens group, local government, or other interested entity. A study to document the recreational or ecological significance of the water is conducted, as well as at least one public workshop. Notification of local government officials, public notice and an economic impact analysis are included in the designation procedure. Should the water be found to be of exceptional recreational or ecological significance and that the environmental, social, and economic benefits of the designation outweigh the costs, the water may be officially designated as an OFW. The process generally takes approximately one year to complete.

Within the Florida portion of the St. Marys River basin, several water bodies have been designated as OFWs. These OFWs are listed in Rule 17-302.700(9) and consist of the Florida portion of the Okefenokee National Wildlife Refuge, the Middle Prong of the St. Marys River (within the Osceola National Forest), the Amelia Island State Recreation Area, and the Fort Clinch State Park Aquatic Preserve.

As discussed previously, in Florida, when considering whether or not to grant a dredge and fill permit under the provisions of the Warren S. Henderson Wetlands Protection Act, FDER is required to subject the permit application to a two-part test. This test, contained in Rule 17-312.080, F.A.C., requires (1) an evaluation of water quality impacts, and (2) consideration of the public interest.

Application of the two-part permitting test in Florida is different for OFWs and non-OFWs. In a non-OFW, under the water quality portion of the two-part test, reasonable assurance must be provided that the proposed project will not violate water quality standards. If such reasonable assurance cannot be provided, then FDER is required to deny the permit. Conversely, if it is determined that water quality standards will not be violated, and the project is also determined to be not contrary to the public interest, FDER is required to issue to permit. The two-part test is more restrictive for projects located within OFWs. Within OFWs, no degradation of ambient water quality is allowed. In addition, the project must be clearly in the public interest.

The analogue to OFWs in Georgia is the designation of water bodies as Outstanding Georgia Resource Waters (OGRWs) as provided by GDNR in Chapter 391-3-6.03(6)(g). These water bodies are designated by the state and the designation includes uses which are specified for each individual water body. OGRWs are classified as Wild Rivers and, through this classification, no alteration of natural water quality from any source is allowed. A specific OGRW designation procedure is not provided in Chapter 391-3-6; however, GDNR would be the lead agency in coordination of such a designation.

Section 401 Certification

With regard to the federal government, Section 401 of the Clean Water Act (33 U.S.C. 1341) requires any applicant for a federal license or permit, such as Section 404 wetland fill permit from USACE, to obtain a certification from the applicable state that the proposed activity will not violate that state's water quality standards. This is known as a Section 401 Certification.

Under the 401 Certification process, states must review applications for federal licenses or permits and subsequently grant or deny certification for the proposed activities. If a state denies certification, the federal agency processing the application is in turn required to deny the permit.

If a state grants water quality certification, it is assumed the proposed project will comply with that state water quality standards.

In Florida, where both a state and federal permit may be required, issuance of a dredge and fill permit under the Henderson Act constitutes the 401 Certification. USACE may not issue its permit prior to issuance of the 401 Certification.

In Georgia, when an applicant applies for a permit, such as a Section 10 or Section 404 permit from USACE, USACE forwards a copy of the application to GDNR. GDNR determines if the project will comply with Georgia's water quality standards and antidegradation policies. Notification is provided to USACE by GDNR.

NPDES Program

The Federal Clean Water Act prohibits discharge of any pollutant from a point source to navigable waters unless the discharge is authorized by the EPA through the NPDES program. A point source is a defined outfall such as a pipe, ditch or culvert. The NPDES program has recently been expanded to include regulation of stormwater as well as process wastewaters. This expansion of the scope of the NPDES program was undertaken because as point source discharges became better controlled following implementation of the Clean Water Act, it became clear that diffuse (or nonpoint) sources that include stormwater are more detrimental to water quality throughout the nation than was previously thought.

Under the NPDES program, proposed dischargers submit permit applications 180 days prior to the commencement of the discharge for new facilities, or before an existing NPDES permit expires. A draft permit is prepared by the issuing agency, based on information contained in the application and any other information that is requested by the agency. A 30-day public notice and comment period follows the issuance of the draft permit and is announced in the Federal Register and local newspapers. The permit is either issued or denied following the comment period.

EPA has encouraged delegation of the NPDES program to each state, but not all of the states have accepted delegation. In the St. Marys River basin, the state of Georgia has been delegated the authority to carry out NPDES permitting, while the state of Florida has not. This provides Georgia with more local control of NPDES permitting than Florida, at least for the permitting of

industrial and municipal wastewater discharges. However, Florida's stormwater regulations are implemented by SJRWMD, whose rules provide a more comprehensive set of guidelines for design and system performance than under NPDES. In addition, inspection and enforcement of stormwater treatment systems are done by SJRWMD as well as by EPA in the Florida portions of the basin.

In the St. Marys River basin, the list of dischargers with current NPDES permits includes three pulp and paper processors, five municipal sewage treatment plants, and an institutional sewage treatment plant (Table 5-5). The majority of these discharges are located in the lower St. Marys River subarea (Figure 3-1).

Water Quality Restoration Programs

The Surface Water Management and Improvement (SWIM) program, administered by FDER, was begun in 1987 and provides funding for restoration and conservation of surface water bodies under the Surface Water Management and Improvement Act. Each water management district has prepared a listing of water bodies to be considered by FDER for SWIM funding. Ranking of water bodies is done by considering numerous criteria, including the degree to which water quality standards are violated, current water quality conditions, threats to water supplies, the restoration plan developed by the district, and the feasibility of restoration.

Restoration efforts at Lake Apopka near Orlando are being partially funded by the SWIM program and include an 1,850-acre demonstration marsh that removes nutrients and suspended sediments from water flowing into the lake. Other SWIM projects are ongoing in the Everglades, the Indian River Lagoon, Lake Okeechobee and Lake Jackson north of Tallahassee. Because the program is relatively new, much of its funding to date has been used for the preparation of studies that address the feasibility of restoration activities, rather than actual implementation of those activities. The Florida legislature originally appropriated \$15 million for the SWIM program in 1987, but legislative support for the program has substantially diminished. The most recent SWIM appropriation was for \$3 million, and prospects for future funding appear bleak.

SJRWMD includes most of the Florida side of the St. Marys basin, although a small area of the basin in western Baker County lies in the Suwannee River Water Management District (SRWMD). The water management districts regulate the consumptive use of water and MSSW.

Table 5-5. NPDES Dischargers in St. Marys River Basin

Discharge Name	Receiving Water	Discharge Type	Location
Container Corp	Amelia River	I	Fernandina Beach
DOT Rest Area, I-10	Drainage ditch	D	Baker County
Eastwood Oaks Apartments	Polishing pond	D	Hilliard
Fernandina Beach	Amelia River	M	Fernandina Beach
Gilman Paper St. Marys	North River	I	City of St. Marys
Hilliard	Unnamed stream	M	Hilliard
ITT Fernandina	Amelia River	I	Fernandina Beach
Kingsland WWTP	Little Catfish Creek	M	Kingsland
Macclenny WWTP	Turkey Creek	M	Macclenny
Marsh Cove Apartments	Amelia River	D	Fernandina Beach
Northeast Florida State Hospital	Turkey Creek	M	Macclenny
St. Marys WWTP	St. Marys River	M	St. Marys
St. Marys Scrubby Bluff	St. Marys River	D	Kingsland
Okefenokee NWR	Okefenokee Swamp	M	Charlton County

Note: D = Domestic wastewater.
 I = Industrial wastewater.
 M = Municipal and industrial wastewater.
 WWTP = Wastewater treatment plant.

Source: EPA, 1992. Information in agency files.

Consumptive Use Permitting

Consumptive use of water is regulated by SJRWMD under Chapters 40C-2 and 40C-20, F.A.C.

Individual permits are required for the following thresholds:

1. Average annual daily withdrawals in excess of 100,000 gallons per day,
2. Withdrawal equipment with capacity of more than 1 million gallons per day,
3. Withdrawal from a combination of sources that have a combined capacity that exceeds 1 million gallons per day, and
4. Withdrawals from wells with 6 inches or greater outside diameter of the largest permanent water-bearing casing.

A general permit has been established by rule for all water users not exceeding individual threshold criteria. The general-permit-by-rule essentially allows the use of water consistent with the Water Conservation Rule (no irrigation between 10 a.m. and 4 p.m., hand-held irrigation is allowed, etc.). In cases where these rules can not be met, a variance or general permit by staff can be applied for.

Surface Water Management Programs

The permitting program for MSSW is established by Chapters 40C-4, 40C-40, 40C-41, and 40C-43, F.A.C., and is administered by SJRWMD. SRWMD administers a similar program. The permit program and application process is described in the MSSW handbook published by SJRWMD. An individual or general permit must be obtained for construction works subject to certain thresholds which include the following:

1. Impoundment of 40 or more acre-ft;
2. Project area of 40 acres or more;
3. Placement of 12 or more acres of impervious surface which constitutes 40 or more percent of the total project area;
4. Traverses a stream with a drainage area of five or more square miles upstream of the crossing;
5. Serves five or more acres of wetland directly connected to certain streams, impoundments or wetlands; or
6. Includes work in an isolated wetland.

These are general thresholds which apply to most areas of the District. The rules also establish special thresholds and performance standards for certain areas of the basin which have been determined to be especially sensitive from a water resources perspective: the Upper St. Johns River Basin, the basins of the Wekiva, Oklawaha, and Econlockhatchee rivers, and the Sensitive Karst Areas Basin in Alachua and Marion counties. Activities within these areas must satisfy specific water resource protection criteria and management standards in addition to those criteria specified in most areas of the District. These specific criteria include measures to protect groundwater recharge, net flood storage, erosion/sediment control, OFWs and their abutting wetlands, groundwater levels, riparian wildlife habitat, and karst area characteristics.

The overall objective of the MSSW program is to protect surface waters and groundwater from changes in water quality and quantity. Criteria for evaluation are contained in the MSSW handbook. Evaluation criteria include:

1. Peak rate of discharge;
2. Volume of direct runoff;
3. Floodways, floodplains, flood levels and velocities of adjacent water bodies;
4. Flows of adjacent watercourses; and
5. Wetland functions and water quality.

In addition, stormwater treatment systems are required to store and infiltrate at least the first one inch of runoff, in order to satisfy water quality criteria (40C-42). Treatment devices may consist of shallow dry basins, retention ponds, underdrained systems or swales. More stringent requirements apply in the basins mentioned above. Sediment and erosion control measures must be used to retain sediment onsite during construction.

Septic Tanks

In Florida, private septic systems are regulated by the Department of Health and Rehabilitative Services (HRS) under Chapter 10 D-6. New systems must have a 75-ft setback from the mean high water line of tidal water bodies or the ordinary high water line of non-tidal surface waters.

In Georgia, all water resource regulatory programs are administered by a single agency, GDNR's EPD. Water quality control regulations are promulgated in Chapter 391-3-6, which includes waste treatment permitting, surface water withdrawals, land disposal, public wastewater treatment plants,

and underground well injection. As mentioned previously, the federal NPDES program for regulating point-source discharges has been delegated to the state of Georgia. Since these discharges now include stormwater, a general permit program has been developed to address stormwater discharges (Chapter 391-3-6-.15). This is the closest analogue to Florida's MSSW program. However there are no performance standards that must be met by applicants for a permit, although the permit does allow enforcement action to be taken by GDNR's EPD if water quality violations occur.

Another regulatory program analogous to Florida's MSSW program is provided by the Georgia Erosion and Sediment Control Act, adopted in 1975 and amended in 1989. The Act requires a permit for land-disturbing activities, but there are many exemptions including surface mining, agriculture and forestry. Rules under the Act are enforced by GDNR's EPD, but can be delegated to cities and counties that adopt standards that meet or exceed those in the state law and rules. All sediment and erosion control plans are reviewed for approval by the appropriate Soil and Water Conservation District, assisted by the United States Department of Agriculture (USDA) Soil Conservation Service. Permits are issued by EPD, or by a city or county that has accepted delegation of the program.

New septic tank systems must be approved by the local county health department and must satisfy the requirements of the Department of Human Resources specified in its *Manual for On Site Sewerage Management Systems*. Septic systems are prohibited in floodplains, and minimum lot sizes are limited according to soil types in an area.

The Mountain and River Corridor Protection Act (MRCPA), passed by the legislature in 1991, has the potential to affect the St. Marys River. The Act would apply to the river corridor inland of the area regulated by the Coastal Zone Management program, e.g., to the west of U.S. Highway 17. The MRCPA covers perennial streams and watercourses with an average annual flow of at least 400 cubic feet per second (cfs). The St. Marys River would be covered approximately to the point of confluence of the North and South Prongs in Charlton/Baker counties, since USGS streamgage information shows an average annual discharge of 663 cubic ft/s at its streamgage north of Macclenny over a 64-year period.

Under the MRCPA, GDNR's EPD has promulgated minimum criteria for river corridor protection. The corridor is defined as the area within 100 feet (ft) of the top of the riverbank, as indicated by a break in slope. The area between the top of the bank and the river's edge is to be treated the same as the corridor itself in local comprehensive plans. Comprehensive plans must adopt the EPD's minimum protection criteria and may develop additional criteria in a River Corridor Protection Plan (RCPP). The Plan must be included in the next Comprehensive Plan, or must be separately submitted if the Comprehensive Plan has already been submitted to the Department of Community Affairs (DCA). Comprehensive plans that do not address the MRCPA leave local governments at risk for losing qualification for state grant programs.

The minimum criteria are summarized as follows:

1. Maintenance of a natural vegetative buffer, except as provided below.
2. Single-family dwellings are allowed within the 100-ft corridor, subject to the following:
 - Compliance with all local zoning regulations.
 - Minimum lot size of two acres, not including areas that lie below river banks. Only one dwelling per lot is allowed.
 - Septic tanks serving single-family dwellings may be allowed within the corridor, but drainfields may not be located within the corridor.
3. Existing industrial and commercial land uses are exempt from minimum criteria providing they do not impair drinking water quality of the river, and provided they meet all state/federal environmental rules and regulations.
4. Septic tanks and drainfields for facilities other than single-family dwellings are prohibited within the corridor.
5. RCPPs must provide for road and utility crossings, provided the crossings meet Erosion and Sedimentation Control Act and local ordinance requirements.
6. The following are acceptable uses as long as they do not impair long-term functions of the river or corridor:
 - Timber production and harvesting consistent with BMPs and which do not impair drinking water quality of the river.
 - Wildlife and fisheries management consistent with state law.
 - Wastewater treatment.

- Recreational usage consistent either with corridor maintenance or with river-dependent recreation. This would allow boat ramps and footpaths but disallow parking lots.
 - Natural water quality treatment.
 - Agricultural production/management, provided it is consistent with BMPs, does not impair drinking water quality, and is consistent with all federal/state laws.
 - Other uses permitted by FDNR or under Section 404 of the Clean Water Act (Dredge and Fill regulations).
7. Hazardous waste handling areas are prohibited within the corridor. However, port facilities are exempt provided they meet all federal and state laws for handling and transport of hazardous waste, and such wastes are handled on impermeable surfaces with spill and leak protection systems.
 8. Hazardous or solid waste landfills are prohibited within river corridors.
 9. Uses that are unapproved by local government are not acceptable within river corridors.
 10. Local governments may elect to exempt the following from their RCPP: existing uses, mining activities permitted by GDNR, utilities under certain provisions, and forestry/agricultural activities except as provided above.
 11. Vegetation disturbed by allowed activities within the corridor must be restored as quickly as possible.
 12. Construction within the corridor is prohibited except as noted above.

The minimum criteria of the MRCPA would discourage new commercial/industrial development and high-density residential development on the Georgia side of the St. Marys River, particularly since drinking water quality standards would have to be met for new discharges or stormwater. However, much of the potential of the Act to protect the river corridor will depend on implementation and enforcement by the local governments, Camden and Charlton counties. It may be possible for a sophisticated developer to overcome many of the restrictions of the Act, or to circumvent them by leaving a 100-ft buffer between the development and the river bank.

5.3 LAND USE/GROWTH MANAGEMENT REGULATIONS AND POLICIES

FLORIDA

The State of Florida exerts regulatory control over all lands within the Florida portion of the river basin through a number of regulations and programs (see Table 5-6). The responsibilities for the administration of these regulations are delegated to several state agencies and regional organizations.

The state agency specifically designated with responsibility for land use and development control within the basin is the Florida Department of Community Affairs (FDCA). FDCA is the state planning agency responsible for land planning under Chapter 163 FS and Chapter 380 FS. Chapter 163 FS is the Local Government Comprehensive Planning and Land Development Act, whereby all local governments are required to prepare, adopt, and implement a Comprehensive Plan and Land Development Regulations. Chapters 9J-5 and 9J-24, F.A.C., are the administrative rules that detail the minimum criteria needed to implement the Local Government Comprehensive Planning Act. Chapter 9J-5 outlines eight basic elements that must be included in all comprehensive plans: Capital Improvements Element; Future Land Use Element; Traffic Circulation Element; Conservation Element; Recreation and Open Space Element; Housing Element; Intergovernmental Coordination Element; and a Sanitary Sewer, Solid Waste, Drainage, Potable Water, Natural Groundwater, Aquifer Recharge Element. The regulations controlling large projects are provided under the Developments of Regional Impact (DRI), Chapter 380 FS.

REGIONAL

On a regional level, the state created 11 Regional Planning Councils (RPCs). A primary function of the RPCs is to assist FDCA in administration of comprehensive planning and growth management. The majority of the Florida portion of the St. Marys River basin is within the jurisdiction of the Northeast Florida Regional Planning Council (NEFRPC). NEFRPC has published the Northeast Florida Comprehensive Regional Policy Plan (July 1, 1987). This policy plan establishes goals and policies that influence and direct the land use activities within NEFRPC boundaries (the seven-county area of Nassau, Baker, Duval, Clay, Putnam, Flagler, and St. Johns counties), including most of the St. Marys River basin. This regional policy plan must be followed by local governments as they prepare their comprehensive plans. Land use provisions in the regional policy plan and controlled land use activities within the basin include:

Table 5-6. Agencies, Responsibilities, and Legislation That Impact Land Use in the St. Marys River Basin

Agency	Land Use Responsibility	Authorizing Legislation
Florida		
Counties and Municipalities	<ol style="list-style-type: none"> 1. Develop comprehensive plans and land development regulations 2. Review and approve DRI 3. Develop zoning and local ordinances 4. Issue local permits 	<ol style="list-style-type: none"> 1. Ch. 163 FS, 9J-5, 9J-24 F.A.C. 2. Ch. 380
DCA	<ol style="list-style-type: none"> 1. Review and approve comprehensive plans and land development regulations 2. DRI Administration 	<ol style="list-style-type: none"> 1. Ch. 163 FS, 9J-5, 9J-24 F.A.C. 2. Ch. 380 FS
DNR	<ol style="list-style-type: none"> 1. Permitting agency 2. DRI review 3. Comprehensive plan review 	<ol style="list-style-type: none"> 1. Title 16, F.A.C. 2. Ch. 380 FS 3. Ch. 163 FS
DER	<ol style="list-style-type: none"> 1. Permitting agency 2. DRI review 3. Comprehensive plan review 	<ol style="list-style-type: none"> 1. Ch. 373, 403 FS, Title 17, F.A.C. 2. Ch. 380 FS 3. Ch. 163 FS
WMD	<ol style="list-style-type: none"> 1. Water permitting agency 2. DRI review 3. Comprehensive plan review 	<ol style="list-style-type: none"> 1. Ch. 373, 403 FS; 40C-2, 40C-4, F.A.C.
RPC	<ol style="list-style-type: none"> 1. Lead agency in DRI review 2. Review local comprehensive plans 3. Develop regional comprehensive plans 	<ol style="list-style-type: none"> 1. Ch. 186 FS Ch. 380 FS 2. Ch. 163 FS 3. Ch. 380 FS
FGFWFC	<ol style="list-style-type: none"> 1. DRI Review 2. Comprehensive Plan Review 3. Commenting Agency 	<ol style="list-style-type: none"> 1. Ch. 380 FS 2. Ch. 380 FS
Georgia		
Counties and Municipalities	<ol style="list-style-type: none"> 1. Develop comprehensive plans 2. Develop land use regulations, zoning ordinances. (optional) 	<ol style="list-style-type: none"> 1. 1989 Comprehensive Planning Act Rule Ch. 110-3-2
DCA	<ol style="list-style-type: none"> 1. Review comprehensive plans 2. Assist state in long term planning goals 	<ol style="list-style-type: none"> 1. <u>1989 Comprehensive Planning Act</u>, House Bill 215, 50-8-1 OCGA Rule Ch. 110-3-2 2. <u>1989 Comprehensive Planning Act</u>, House Bill 215, 50-8-1 OCGA Rule Ch. 110-3-2

Table 5-6. Agencies, Responsibilities, and Legislation That Impact Land Use in the St. Marys River Basin

Agency	Land Use Responsibility	Authorizing Legislation
<u>Georgia</u> (continued)		
DNR	<ol style="list-style-type: none"> 1. Review comprehensive plans 2. Develop minimum planning criteria with respect to critical watershed wetlands and aquifer recharge 	<ol style="list-style-type: none"> 1. 1989 Comprehensive Planning Act 2. Ch. 12-2-8 OCGA Rule Ch. 391-3-16
RDC	<ol style="list-style-type: none"> 1. Review comprehensive plans 2. Identify regional important resources 	<ol style="list-style-type: none"> 1. 1989 Comprehensive Planning Act Rule Ch. 110-3-2 2. 1989 Comprehensive Planning Act Rule Ch. 110-3-2

Source: KBN, 1992.

- Goal 8:** Water Resources--Florida shall assure the availability of an adequate supply of water for competing uses deemed reasonable and beneficial, and shall maintain the function of natural systems and the overall present level of surface and groundwater quality. Florida shall improve and restore the quality of water not presently meeting water quality standards.
- Goal 8.3.3:** By 1995, significant wetlands should be protected through a coordinated management plan by Federal, State, regional and local governments.
- Goal 10:** Natural Systems and Recreational Land--Florida shall protect and acquire natural habitats and natural systems such as wetlands, tropical hardwood hammocks, palm hammocks, and virgin longleaf pine forests, and restore degraded natural systems to a functional condition.
- Goal 16:** Land Use--In recognition of the importance of preserving the natural resources and enhancing the quality of life of the state, development shall be directed to those areas which have in place, or have agreements to provide, the land and water resources, fiscal abilities, and services capability to accommodate growth in an environmentally acceptable manner.

NEFRPC also serves a coordination role in the DRI process (Chapter 380 FS). The thresholds for DRIs within the counties that comprise the St. Marys River basin are established by population. These thresholds are delineated in Chapter 28-24, F.A.C. These thresholds vary depending on the types of land uses intended for development. If residential developments are used as a typical development type for comparison purposes, then Baker, Bradford, and Union counties have a threshold of 250 dwelling units. Projects of this size or larger would be required to undergo regional review and approval. The threshold for Nassau County is 750 dwelling units, and Duval County has a threshold of 3,000 dwelling units.

Projects that undergo DRI review must identify the intent to develop and the expected impacts on the following environmental and physical facilities:

Vegetation and Wildlife	Stormwater Management
Wetlands	Solid Waste/Hazardous
Water	Waste/Medical Waste
Soils	Transportation
Floodplains	Air
Water Supply	Hurricane Preparedness
Wastewater Management	Housing
Police and Fire Protection	
Recreation and Open Space	
Education	
Health Care	
Energy	
Historical and Archaeological Sites	
Specialized Areas Warranted	

The review of DRIs is conducted under Chapter 120 F.S., which establishes requirements for public review and comment during the process. The reviewing agencies for a DRI include RPC, county, FDNR, FDER, water management district, FGFWFC, Florida Department of Transportation (FDOT), metropolitan planning organization, USFWS, and USACE.

The regional planning council coordinates the review and recommends development order conditions of approval to the local government with jurisdiction over the DRI. The local government is responsible for approving the project. The RPC and FDCA maintain appeal rights over the local government approval.

BAKER COUNTY

Land use regulations for Baker County include the comprehensive plan, zoning code, and development regulations. The Baker County comprehensive plan has not been approved by FDCA and is subject to revision. Under each element within the comprehensive plan, Baker County identified objectives, goals, and policies.

Future Land Use Element

The following are those land use goals or policies that are included in the Future Land Use Element of the comprehensive plan that relate directly to the St. Marys River basin.

Policy A.1.3.3 9J-5.006(3)(c)1

The County's Subdivision Regulation and Zoning Code shall be reviewed and where necessary revised to ensure that land use categories are regulated in accordance with Future Land Use Map and that controls are adopted for regulation of subdivisions and the use of land in flood prone areas.

Land use in flood prone areas shall be limited to low density residential with the height of floor level and the use of septic tanks limited to that permitted by FEMA and County Health Department Regulations.

Policy A.1.4.4 9J-5.006(3)(c)2

Areas designated as Conservation on the Future Land Use Map shall limit development as follows:

- (a) Permit only low density residential or other low intensity activity that shall be subject to standards which would prevent adverse environmental impacts.

(See Policy A.1.9.3., A., 8.)

Policy A.1.4.11 9J-5.006(3)(c)4

A 50-ft buffer or vegetation native site will be retained between the development area and the wetland portion of a site. In addition, a 50-ft set back from the waterfront will be required for all construction.

Policy A.1.4.12 9J-5.006(3)(c)4

A 50-ft buffer of vegetation, native to site, shall be required for developments located adjacent to wetlands as defined in ICC-16.0021(19) F.A.C.

Policy A.1.4.17 9J-5.006(3)(c)4

Riverfront and lakefront development shall be designed so as not to affect the water quality of adjacent waters. Design standards shall include: density; set back of buildings from water front;

set back of sanitary sewer drainfield (septic tank) from water's edge and a 20-ft vegetative buffer required between building site and water body.

Policy A.1.4.18 9J-5.006(3)(c)6

The County shall, through available state and federal programs, promote the acquisition of floodplains along the St. Marys River.

Objective A.1.8 9J-5.006(3)(b)9; F.S. 187.201(16)(b)3

Development that is adapted to natural features in the landscape such as wetlands, vegetation and habitat, and which avoids the disruption of natural drainage patterns.

Policy A.1.9.3 F.A.C. 9J-5.006(3)(c)7

Land development regulations adopted to implement this Plan shall be based on the following land uses standards:

8. Conservation

Conservation Land Use shall designate land areas of the County on which development must proceed with restrictions. These are areas which are ecologically or historically significant and so must be protected.

Conservation Element

The following are those land use goals or policies that are included in the Conservation Element of the comprehensive plan that relate directly to the St. Marys River basin.

Policy E.1.3.1 9-J5.013(2)(c)3,6

Fifty (50) foot buffers of vegetation native to the area shall be required for new development adjacent to ecological significant waterbodies as identified in the survey conducted under policy E.1.7.4. Development immediately adjacent to ecologically sensitive waterbodies shall be restricted to low density/low intensity land use and non-polluting land use activities.

Policy E.1.3.5 9J-5.013(2)(c)3,6

The county shall coordinate efforts with the Department of Environmental Regulations and the Water Management Districts to enforce requirements of wetlands mitigation practices where state agencies allow alteration of viable jurisdictional wetlands.

Policy E.1.3.4 9J-5.013(2)(c)3,6

Development Orders and permits for development in wetlands shall be specific as to controlling the density/intensity of use as well as the type of land use permitted to protect the overall integrity and quality of wetland systems such as vegetative cover, and quality and quantity of surface water, including such regional wetland sources as Pinhook swamp, Impassable Bay, Moccasin Swamp, Big Gum Swamp, and New River Swamp.

Traffic Circulation Element

The following are those land use goals or policies that are included in the Traffic Circulation Element of the comprehensive plan that relate directly to the St. Marys River basin.

Policy B.1.5.2 9J-5.007(3)(b)2

Future facility access interchanges shall not be placed or constructed in a manner that would provide access to environmental protection areas or to other areas to be conserved in order to prevent undue pressure to development of such areas.

Policy B.1.5.2 9J-5.007(3)(b)2

If no feasible alternative exists, needed transportation facility improvements may transverse areas that are environmentally and/or aesthetically sensitive; however, such access should be limited and design techniques should be used to minimize the negative impact upon the natural and community system.

Overall, the growth management tools, comprehensive plan, zoning, and development regulations that are in place in Baker County appear to be sufficient to handle the growth and development. To protect the county's natural resources, a 50-ft buffer is required for all development adjacent to wetlands. This buffer requirement would apply to the St. Marys River vegetated floodplain.

NASSAU COUNTY

Nassau County is divided into five planning districts: Yulee, Hilliard, Amelia Island, Port of Fernandina, and Callahan. A portion of each of these planning districts is located within the St. Marys River drainage basin.

Land use regulations for Nassau County include the adopted comprehensive plan, zoning code, development regulations, and applicable goals and policies. Under each element within the comprehensive plan, Nassau County identified objectives, goals, and policies.

Future Land Use Element

The following are those land use goals or policies that are included in the Future Land Use Element of the comprehensive plan that relate directly to the St. Marys River basin.

1.01.01 Protect estuaries by prohibiting sanitary sewer wastewater and stormwater discharge into Class II waters and establishing criteria for reuse as cited in Policy 1.04A.07.

1.01.02 Criteria shall be included in the Land Development Regulations to include requirements to preserve/replace the natural/native vegetation along county waterways to maintain the natural beauty of the area, to control erosion, and to retard runoff.

1.02.05 Establish the following criteria for land use development...

H. Conservation

The Conservation Land Use shall designate land areas of ecological or historical value within the County on which development must proceed with restrictions. These are areas which may be altered by development and so must be protected. Conservation lands under private ownership shall be placed under Limited Development Overlay. Conservation lands under public ownership shall be placed under a Preservation Overlay.

I. Overlays

3. Limited Development

Conservation lands placed under the Limited Development Overlay may not be developed at a density greater than 1 unit per five acres with all permitted development clustered on the portion of the site which will be least affected by construction. Where underlying land use designates a lesser density; the density of the underlying land use shall prevail.

Areas of Nassau County designated as "Conservation" land use to be included under a Limited Development Overlay, include all areas shown as wetlands on

the Future Land Use Map except for Fort Clinch State Park and Aquatic Preserve, Nassau River-St. Johns River Marshes Aquatic Preserve and Cary State Forest.

4. Preservation

This overlay will be placed on all publicly owned lands that are of significant ecological or historical value. Preservation lands include wildlife and/or vegetative habitats that are designated as endangered or threatened. No new development or expansion of existing development shall be permitted within areas designated as preservation.

Lands designated as "Preservation" include Fort Clinch State Park and Aquatic Preserve, Nassau River-St. Johns River Marshes Aquatic Preserve, Cary State Forest and all islands that consist of at least 85 percent wetlands/marsh that are adjacent to the Intracoastal Waterway, Amelia River, Bells River, Jolly River, and Lanceford Creek.

- 1.04A.02** The County shall restrict development in conservation areas to the maximum extent possible short of a "taking." Development in conservation (Limited Development) will be permitted with permitted density clustered on that portion of the parcel least affected by construction activities. Where the Future Land Use Map identifies an underlying land use of less density, the density of the underlying land use will prevail. Development will be prohibited in areas designated as Conservation (Preservation).
- 1.04A.03** c. in the case of forested wetlands consisting of cypress, hardwood swamps, bay swamps, bottomland hardwoods, implement the following management practices:
- (1) maintenance of overall wetland community integrity (i.e., wildlife, vegetative and hydrological characteristics; and
 - (2) the use of select cuts, or small clearcuts, performed in a manner which does not significantly alter overall wetland community characteristics (i.e., plant species diversity, forest composition, canopy cover, and forest age structure). Consistently with applicable law, this requirement should apply to site preparation and earth moving and ditching.

1.04A.03B In order to protect the functional viability and productivity of forested wetland systems as natural resources, silvicultural activities within forested wetlands (i) shall not significantly alter overall wetland community characteristics (e.g., hydrology, topography, plant species diversity, wetland forest composition, canopy cover, or average forest age structure); and (ii) shall not result in the conversion of existing forested wetlands into either upland systems or other types of wetlands systems, except pursuant to restorative silvicultural activities; and shall only be undertaken on those portions of the forested wetlands site on which there is no standing water.

1.04A.05 In order to protect the St. Johns Marsh and Fort Clinch State Park Aquatic Preserves, the County Commission shall adopt Policy 9.2.2.5 of the Northeast Florida Comprehensive Regional Policy Plan, which states: Developments adjacent to Class II Waters, Aquatic Preserves, and Outstanding Florida Waters should be required to provide retention or detention with filtration of the first three-quarters of an inch of runoff or the runoff from the first 1.5 inches of rainfall, should provide offline retention or offline detention with filtration of the first 0.5 inch of runoff of the total amount required to be treated; and should be required to demonstrate that the project will not result in the degradation of the water quality in Outstanding Florida Waters, Class II Waters, and Aquatic Preserves.

Conservation Element

The following are those goals or policies that are included in the Conservation Element of the comprehensive plan that relate directly to the St. Marys River basin.

6.01.05 The Land Development Regulations shall include criteria, such as reduced densities and reduced impervious services, to protect the functions of natural drainage systems and natural groundwater aquifer recharge areas, as identified by the St. Johns River Water Management District.

6.02.03 A buffer of natural vegetation as required under Chapters 373 and 403 F.S. implementing regulations and permits granted thereunder, shall be provided where wetlands occur.

- 6.03.02 Septic tanks shall be prohibited where soils are unsuitable unless adequate approved fill is supplied for the septic tank and drainfield. Land Development Regulations will be developed which require a minimum set back for septic tanks from waterbodies based on HRS minimum standards for septic tanks.

Coastal Management Element

The following are those goals or policies that are included in the Coastal Management Element of the comprehensive plan that relate directly to the St. Marys River basin.

- 5.09.07 Development Orders shall be designed to protect the type, nature, and function of floodplains, wetlands, waterways, inlets, estuaries, lakes and wildlife habitat occupied by endangered or threatened species by limiting encroachment, removal of native vegetation, pollution discharge, dredge and fill, drainage, or other impacts associated with development.

Traffic Circulation Element

The following are those goals or policies that are included in the Traffic Circulation Element of the comprehensive plan that relate directly to the St. Marys River basin.

- 2.06.01 The Amelia Island Joint Advisory Committee shall continue to serve in an advisory capacity to the Nassau County Board of Commissioners and the Fernandina Beach City Council with respect to Land Use and Transportation Planning Issues.

The comprehensive plan, zoning, and land development regulations that have been implemented in Nassau County appear to be adequate to deal with the anticipated population growth. To protect the county's resources, Nassau County established buffers for wetlands and provided setbacks for all septic tanks from water bodies.

Both Baker and Nassau Counties have planned for future growth, regulated land use, and implemented strict requirements to protect natural resources such as the St. Marys River. However, neither county has taken measures specifically to protect the St. Marys River basin. While all of the federal, state, regional, and local regulations and requirements help protect the St. Marys River basin, acknowledgement of the basin as an important resource and specific

regulations designed to protect the basin are not present. Large multiple-use developments in Nassau and Baker counties are possible but limited because of the rural character of the counties. Any large project that is proposed will be required to undergo DRI review. The DRI review process would recognize the St. Marys River as a regionally significant resource and would therefore provide a measure of protection for the river.

GEORGIA

The 1989 Comprehensive Planning Act, Official Code of Georgia Annotated (O.C.G.A.) 50-8-1 et seq. and O.C.G.A. 50-8-7, mandates comprehensive planning at the local, regional, and state level and requires the identification and nomination of regionally important resources. The 1989 Comprehensive Planning Act also created the Governor's Development Council to provide for the coordination of planning between departments, agencies, commissions, and other institutions of the state, directed by the governor.

GDCA is the state agency that oversees the development and implementation of comprehensive plans. Pursuant to O.C.G.A. 50-8-7.1, the minimum local planning standards were developed to guide local governments in developing and implementing their comprehensive plans. Chapter 110-3-2 GDCA Administrative Rule contains the minimum standards and procedures for all facets of the comprehensive planning process. GDCA and the governor established statewide goals for six topical elements to be developed in all comprehensive plans. These goals or elements are Population, Economic Development, Natural and Historic Resources, Community Facilities and Services, Housing, and Land Use.

The law also provides that the Rules for Environmental Planning Criteria developed pursuant to O.C.G.A. Chapter 12-2-8 be incorporated into the minimum planning standards. These minimum standards as set forth in the Rules for Environmental Planning Criteria deal specifically with protection of water supply watersheds, groundwater recharge areas, and wetlands.

The environmental planning criteria were developed by GDNR, and must be included in the comprehensive plan under the Natural and Historic Resources element.

The Georgia Mountains and River Corridors Protection Act is also pursuant to O.G.C.A. Chapter 12-2-8 and authorizes GDNR to develop minimum planning standards and procedures for

protection of river corridors in the state. It also requires local governments to use these standards in developing and implementing the local comprehensive plan. The method mandated for protection of river corridors is the establishment of a natural vegetative buffer area for a distance of 100 horizontal ft on both sides of the protected river. The state can not prohibit the building of single-family dwelling units, including the usual appurtenances, within the vegetative buffer area, subject to the following conditions:

1. Building must be in compliance with local regulations,
2. The dwelling unit must be located on a tract of land containing at least two acres,
3. Only one dwelling unit may be built on each tract, and
4. Septic tanks serving the dwelling unit may be located within the buffer area, but the septic tank drainfields may not be located within the buffer.

Any construction activities within the buffer area must meet the requirements of the Erosion and Sedimentation Act. Forestry and agriculture activities may not impair the drinking water standards as defined in the Clean Water Act.

REGIONAL

Under O.C.G.A. Chapter 50-8-32, the State of Georgia created 18 Regional Development Centers (RDCs) that are given the responsibility of serving the essential public interests of the state by promoting the establishment, implementation, and performance of coordinated and comprehensive planning by municipal and county governments and RDC, in conformity with the minimum standards and procedures established pursuant to the Comprehensive Planning Act. RDCs must also review the local plans for compliance with the minimum standards and procedures.

Two regional development centers have jurisdiction within the St. Marys River basin. The Southeast Georgia Regional Development Center (SEGRDC) serves Charlton and Ware counties and the Coastal Georgia Regional Development Center (CGRDC) serves Camden County.

It is the responsibility of local governments to develop their local county or municipal comprehensive plan as set forth in the Comprehensive Planning Act and to be reviewed by the appropriate RDC. The local governments must develop, establish, and implement land use regulations and a capital improvement plan consistent with the comprehensive plan.

CAMDEN COUNTY

A joint Camden County, Kingsland, St. Marys, and Woodbine Comprehensive Plan was completed in April 1992 and has been adopted. The plan only identified existing laws and regulations. During the process of developing the joint plan, there were no additional local regulations identified to protect the St. Marys River basin.

In the land use element of the comprehensive plan, goals and objectives were identified but policies were not identified. The county also identified regionally important resources, but the St. Marys River basin was not nominated. Zoning and land development regulations that help regulate land use needs were established. The natural resource element briefly mentions the St. Marys River, but does not identify the river as a Regionally Important Resource nor does it identify policies to protect the river basin.

CHARLTON COUNTY

Charlton County's comprehensive plan will not be complete for at least a year. In Charlton County, there are no zoning or land development regulations; building and septic tank permits are the only regulations in place. The county does not officially recognize the river basin as an important resource, or establish any protective measures.

CONCLUSION AND RECOMMENDATIONS

Because of the location of the St. Marys River basin within two states and four counties, there is a wide variety of land use controls and growth management strategies in effect. There are also varying degrees of development pressures that occur within the basin that potentially can impact the St. Marys River. Florida and Georgia have established regulatory agencies to implement adopted comprehensive planning and growth management legislation. However, planning and growth management laws for Florida and Georgia differ in intent and timing. Florida's first planning legislation was adopted in 1975. New legislation was adopted in 1985 that strengthened growth management provisions. Florida's growth management legislation is dynamic because it requires comprehensive plan updates every five years and because it has established committees to evaluate and improve the state's growth management system. Georgia's legislation primarily focuses on economic development, and does not require implementation of policies and land development regulations. The Georgia program is relatively new, having been adopted in 1989. Despite the differences in the planning processes, both Florida and Georgia counties have

regulatory planning and growth management tools in place to direct activities within their respective jurisdictions, based on the growth pressures experienced by the counties. The effectiveness of local government comprehensive plans within the basin are dependent upon the implementation of the plans and land development regulations, growth pressures, political support of planning and growth management, staffing, and funding of local projects.

The implementation of Florida's planning legislation has begun in Baker County with the adoption of the county's comprehensive plan. Baker County is currently developing the county's Land Development Regulations. Nassau County has completed its comprehensive plan and is currently negotiating a Stipulated Settlement Agreement with the DCA. It is unknown how both counties' comprehensive plans will be implemented. Similar to most rural counties in the state that have not yet felt tremendous growth pressures, comprehensive planning and growth management is not an issue of critical concern to local governments.

Camden County currently has established zoning and land use requirements and, in 1992, adopted a comprehensive plan in compliance with the 1989 planning legislation. Charlton County has begun to draft a comprehensive plan but has not established zoning or land use regulation; therefore, it is not known how the comprehensive plan will be implemented. The need for implementing strong growth management strategies and comprehensive plans is not recognized in these rural counties because of the limited growth pressure currently experienced within these jurisdictions. It is important to note that Nassau, Baker, Camden, and Charlton counties do not recognize the St. Marys River as a regionally significant resource.

There is a dichotomy between the growth that occurs and the regulations in place between the four counties in the basin. No single entity exists to coordinate land development activities that occur within the river basin. The following recommendations should be considered to address land use in the basin:

- Local governments should evaluate the resources of the St. Marys River basin.
- Education programs should be implemented to increase public awareness and aid in resource protection efforts.
- The inclusion of specific land use regulations for protecting the river from improper silviculture, agriculture, and development that does not adhere to BPMs or the best available technology.

- **The four local governments should identify the St. Marys River basin as a Regional Important Resource in their comprehensive plans.**
- **The formation of a basin-wide entity should be considered to provide coordinated efforts to educate the public and review the land development activities within the basin.**

5.4 LAND ACQUISITION PROGRAMS

5.4.1 FEDERAL

There has been extensive federal land acquisition in the St. Marys basin in the past, but no conservation-related programs are currently active. Aggressive federal acquisition of lands for the Okefenokee National Wildlife Refuge and the Cumberland Island National Seashore has alienated local citizens so that they are very apprehensive about federal land purchases.

If the St. Marys were to become a National Wild and Scenic River, some voluntary land acquisition might be involved. Although the Wild and Scenic Rivers program guidelines specify that such purchases only be for small tracts necessary for public access and visitor support facilities, local people are concerned eminent domain would be used to acquire additional lands.

5.4.2 FLORIDA

Florida has several voluntary land acquisition programs implemented by state and regional agencies. These programs include Preservation 2000 (P-2000), the Conservation and Recreation Lands (CARL) program, and Save Our Rivers (SOR).

5.4.2.1 Preservation 2000

Passed in 1990, this legislation authorized \$300,000,000 in bonds per year over a 10-year period to help fund new and existing land acquisition programs. This major new funding program affects all of the other major land acquisition programs in the state, including the Florida Communities Trust, CARL, and SOR. However, since there is no dedicated funding source for P-2000, the Florida Legislature must appropriate funds annually to support this program.

The St. Marys River corridor is mapped as a P-2000 Priority Acquisition Area, and lands extending southeast towards the Nassau River are mapped as P-2000 Areas of Conservation Interests.

5.4.2.2 Conservation and Recreation Lands

Begun in 1979, the CARL Program specifically purchases environmentally sensitive lands which contain natural areas of relatively unaltered flora and fauna. It also targets critical habitat of endangered or threatened species and outstanding geological features, as well as archaeological/historical sites. The Land Acquisition Advisory Council (LAAC) ranks projects in order of

priority. The program is funded by severance taxes on the phosphate industry and by documentary stamp taxes.

The criteria by which potential Environmentally Endangered Lands CARL projects are evaluated are:

1. Contains native, relatively unaltered flora or fauna representing a natural area unique to, or scarce within, a region of Florida or larger geographic area.
2. Contains habitat critical to or providing significant protection for an endangered or threatened species of plant or animal.
3. Contains an unusual, outstanding, or unique geologic feature.

Other lands proposed for CARL acquisition are evaluated on the basis of the following criteria:

1. For use and protection as natural floodplain, marsh or estuary, if the protection and conservation of such lands are necessary to enhance or protect water quality or quantity or to protect fish or wildlife habitat which cannot adequately be accomplished through local, state and federal regulatory programs.
2. For use as state parks, recreation areas, public beaches, state forests, wilderness areas, or wildlife management areas.
3. For restoration of altered ecosystems to correct environmental damage that has already occurred.
4. For preservation of significant archaeological or historical sites.

Other than Pinhook Swamp, there have been no CARL projects in the St. Marys basin.

5.4.2.3 Save Our Rivers

This program was initiated in 1982 to buy lands important for the protection of Florida's water resources. These include lands of broader ecological significance, as well as those necessary for water management, water supply, and the conservation and protection of water resources. This program is funded through documentary stamp tax collection.

Each of the five water management districts has a five-year acquisition plan that specifies the types of lands sought. SJRWMD uses the following criteria: proximity to headwaters, buffering function, water storage capacity, flood conveyance, intact natural system, groundwater recharge

protection, potential to restore critical altered wetland system, management considerations, recreation potential, development pressure, habitat for listed species or communities, and ecological considerations.

The St. Marys Conservation Area (Hercules Tract) was purchased by SJRWMD. The district is very interested in developing other St. Marys projects in cooperation with the CARL Program and others.

5.4.3 GEORGIA

5.4.3.1 Preservation 2000

Georgia's P-2000 Program began in 1991. It is much more limited than Florida's, with a goal of protecting 100,000 acres. Lands suggested for parks, natural areas, greenways, fishing and other recreation areas, and wildlife management areas are proposed to the Advisory Council on Land Acquisition and evaluated by GDNR, with reviews by other boards. Minimal public involvement in site review and selection is planned, which raises questions about the likely effectiveness of the program as currently managed.

According to the Governor's plan, increased hunting and fishing licenses will pay \$30 million of the costs and \$30 million will come from general obligation bonds, but other funding must come from private sources and existing state, federal, and private land acquisition efforts. User fees are being evaluated as a funding source.

Unaltered old-growth forests and wetlands (particularly including riverbottom hardwood forests, Carolina bays, and natural water features) are specifically sought for the Georgia P-2000 Program. Other considerations include the following:

1. Proposed wildlife management areas should have at least 2,500 acres with a possibility of adding up to 15,000 acres over time. Diverse, high-quality habitat is essential.
2. Proposed state parks should have a minimum of 1,000 acres with the possibility of acquiring up to 3,000 acres over time. The land must be scenic, with big trees and at least one significant water feature.
3. Natural areas can be any size, but they must represent one of the best two or three sites in the state for a listed species or a significant natural community. These sites are expected to be internally identified by GDNR.

No sites within the St. Marys basin have been proposed.

5.4.4 COUNTY AND LOCAL

There are no active local conservation land acquisition programs operating within the St. Marys basin, although Nassau County is working with the Florida Communities Trust to develop parks along the Nassau River and might be expected to expand such efforts into the St. Marys area in the future.

5.4.5 PRIVATE

5.4.5.1 The Nature Conservancy

The Nature Conservancy is an international conservation organization dedicated to the preservation of biodiversity. The Nature Conservancy operates through two main channels: science/research and land acquisition.

The Nature Conservancy Science Division was responsible for founding both Florida's and Georgia's heritage program databases, the Florida Natural Areas Inventory and Georgia Freshwater Wetland and Heritage Inventory Program. They also produced the *Natural Areas Inventory of the St. Marys River Basin* (Lynch and Baker 1988). Through these efforts, The Nature Conservancy has become the leading source of information on the ecological features of the St. Marys basin. Lands identified as "Standard Sites" of interest to The Nature Conservancy are described in Section 8.0 and mapped in Figure 8-1. Additional rare plant sites are described in Lynch and Baker (1988).

5.4.5.2 Trust for Public Land

The Trust for Public Land (TPL) is a national private conservation organization devoted to preserving land for people. Their activities emphasize protection and development of recreation areas, historic sites, and urban greenspace. TPL works to establish and train local land trusts, as well as to do land protection/acquisition projects. They are concerned with using creative mechanisms to protect important resources and recreation opportunities on both public and private lands.

TPL has no projects in the St. Marys basin.

5.4.5.3 Georgia Conservancy

The Georgia Conservancy is a statewide membership-based organization which addresses a broad range of environmental issues. Protection of important ecological sites has always been one of the group's main emphases.

The Georgia Conservancy is not currently involved in any specific land protection efforts in the St. Marys basin.

5.4.5.4 Local Land Trusts

Local land trusts work at a grassroots level to protect locally significant resources and landscape features through community cooperation and creative real estate and tax law techniques.

No local land trusts have been identified in the St. Marys basin. The potential for such an organization in this area is discussed in Section 9.0.

5.5 LAND MANAGEMENT PROGRAMS

5.5.1 OKEFENOKEE NATIONAL WILDLIFE REFUGE

The Okefenokee National Wildlife Refuge is under the jurisdiction of USFWS. Management goals focus on overall preservation of the refuge's resources, with emphasis on maintaining functioning, dynamic ecosystems. All plants and animals within the refuge are legally protected.

Active management practices include prescribed burning within upland and wetland communities and limited logging and timber sales for habitat restoration. The Refuge concentrates its efforts on enhancing red-cockaded woodpecker habitat through understory hardwood reduction and careful application of fire within colony sites.

While significant hydrologic and ecological resources within the Okefenokee National Wildlife Refuge are legally protected, they are still threatened by surrounding land use practices. Biologists are concerned that outside changes in drainage patterns, water dynamics, contaminants, and sediment deposition have the potential for adversely affecting the plant communities, wildlife populations and, in the long term, the natural state of the refuge as a whole.

5.5.2 OSCEOLA NATIONAL FOREST

The Osceola National Forest is owned by the United States Forest Service (USFS) and managed as a Type I Wildlife Management Area through a cooperative agreement with FGFWFC.

The majority of the Osceola National Forest has been converted to pine plantation, with slash pine replacing longleaf pine as the dominant tree species. While transition zones are generally logged, wetlands are avoided due to increased public protest. Harvesting has typically involved clearcutting. Recently, however, USFS has committed to an 80 percent reduction, nationwide, in clearcutting within national forests. Consequently, timber managers in the Osceola National Forest are implementing long-term stand rotations which favor old-growth forests. Site preparation includes shearing, chopping, plowing, bedding, and herbicide application.

Prescribed burning is usually conducted during winter months. As a result, woody plants dominate the understory, and natural groundcover is limited in much of the forest.

USFS is involved in a major red-cockaded woodpecker management program in the Osceola National Forest. Management activities include extensive monitoring, mowing and midstory removal within colony sites, placement of restrictor plates on cavity trees, and installation of artificial nest cavities.

The Osceola National Forest is also recognized as an important habitat for black bears. In order to protect local bear populations, FGFWFC recently placed a moratorium on bear hunting within the forest. It is expected that this ban will remain effective until the game commission can determine that local populations have recuperated sufficiently to support public hunting.

Large areas within the northern portion of the forest that provide critical habitat for both red-cockaded woodpeckers and black bears have been designated as wilderness areas. Forestry activities are excluded from these areas, with management focusing on wildlife habitat enhancement and preservation.

5.5.3 ST. MARYS CONSERVATION AREA

The St. Marys Conservation Area (Hercules Tract) is the only SJRWMD-owned conservation land in the basin. It is managed through a cooperative agreement with the Florida Division of Forestry. SJRWMD manages it as a Type II Wildlife Management Area with enforcement assistance from FGFWFC. Hunting and hiking are the most frequent recreational uses. FDOF is beginning restoration of pine plantations through selective logging. They are also planting longleaf pines to restore sandhill habitats that were logged prior to acquisition. Prescribed burning is conducted to maintain the integrity of the sandhills and flatwoods. Prescribed fire is also being utilized to restore seepage slopes and transition zones between wetland and upland habitats. Once restored, the St. Marys Conservation Area will be managed in a manner that will ensure the continued preservation of the natural communities.

5.5.4 PINHOOK SWAMP

The Nature Conservancy has acquired 33,000 acres in the Pinhook Swamp area and expects to acquire a total of 40,000 acres by the end of 1993. Portions of the swamp already acquired have been transferred to USFS as an addition to the Osceola National Forest.

Pinhook Swamp is being acquired in order to protect the important hydrologic relationship and wildlife corridor connecting Osceola National Forest and Okefenokee National Wildlife Refuge. Consequently, the USFS is planning to designate most of the acquired lands as a wilderness area. Under this designation, Pinhook Swamp will be managed as a preserve and will be protected from silviculture activities.

5.5.5 PRIVATE TIMBERLANDS

Silviculture is the dominant land use in the St. Marys River basin and is generally considered the primary management objective by private landowners. Intensive timber harvesting has occurred throughout the region since the early 1900's and the vast majority of original pinelands has been clear-cut at least once. Most of the forests are comprised of third and fourth generation stands characterized by young, even-aged trees.

Private timberland within the basin is divided between industrial and non-industrial landowners. Industrial timber corporations and non-industrial landowners produce pulpwood and saw timber. Both methods of production follow BMP guidelines, but the differences in management practices result in very different forest character.

5.5.5.1 Non-Industrial Forests

Non-industrial landowners producing saw timber generally employ selective harvesting, utilize natural regeneration techniques, and rotate stands on a long-term basis. Prescribed burning is typically utilized to reduce fuel loads and control hardwood invasion.

As a result, much of the non-industrial timberland is characterized by stands of older pines with relatively intact groundcover. Thus non-industrial timberland tends to maintain its natural integrity and provide habitat for rare and endangered species.

5.5.5.2 Industrial Forests

Industrial timber corporations growing pulpwood generally harvest stands when they are between 20 and 30 years of age. Pines are then mechanically replanted on sites that have undergone extensive preparation with techniques that include chopping, KG-blading, and bedding. Herbicides are used on an increasingly regular basis to manage competing vegetation. Prescribed fire is limited to site preparation and fertilizer is commonly used for promoting timber growth.

Consequently, industrial timberlands are dominated by a wide variety of even-aged stands. Over time, high tree density, lack of fire, and mechanical site preparation lead to changes in species composition found in natural cover.

Harvesting within wetlands is generally limited to hardwood and cypress swamps within flatwoods tracts. Steep slopes and access difficulty have generally protected the wetlands adjacent to the St. Marys River.

5.5.5.3 Private Preserves

There are probably a number of family and corporate landowners who voluntarily maintain portions of their lands as nature preserves. No such lands under conservation easement have been identified, but a thorough search of legal records might locate some. A regional land trust could help to promote this type of private conservation effort.

The only private preserve identified was Gilman Paper Company's White Oak Plantation, which stretches for several miles along the south bank of the St. Marys around the mouth of the Little St. Marys.

This roughly 8,000-acre area serves a wide variety of functions. It reportedly includes not only a nature preserve and commercial timberlands, but a racehorse breeding and training farm, a ballet center, a golf course, and extensive facilities for raising and studying exotic and endangered animals.

Land use/cover maps indicate that this area includes one of the basin's largest tracts of natural pineland as well as extensive acreages of floodplain swamp. No information is available regarding which of the natural lands, if any, are committed to preservation, or what management practices are used on the timberlands.

5.6 SILVICULTURAL BEST MANAGEMENT PRACTICES

In Florida, EPA and FDER have agreed that certain management measures that prevent generation of pollution should be encouraged. In the sense that these preventative management practices are the best known means to protect water resources, they are considered BMPs. Since they are also designed to conserve soil and associated nutrients, they are also considered to contribute to good overall forest management.

Similarly, Georgia created the Forestry Nonpoint Source Technical Task Force to assess the extent of pollution caused by forestry activities in Georgia. The task force recommended practices that are intended to eliminate or reduce silviculture-associated pollutants and are also referred to as BMPs.

Even though BMPs are non-regulatory, they must still be applied as performance standards by timber managers in order to comply with other regulatory programs. As long as BMPs are followed, the regulation of diffuse non-point-source pollution from maintenance activities, construction of vegetated swales and normal silvicultural operations is exempt (Riekerk 1988). Consequently, BMPs should be carefully considered when recommending management strategies for protecting regionally significant areas in the St. Marys River basin.

Both the Georgia and Florida BMPs address similar management issues and provide guidelines for reducing negative impacts associated with them. BMPs primarily focus on site preparation techniques, Streamside Management Zones, access road construction, and timber harvesting. Following is a brief discussion of the impacts associated with each of these activities, as well as BMP guidelines developed by Georgia and Florida to minimize their impacts.

5.6.1 SITE PREPARATION

When pines are harvested from an existing stand, the area to be replanted is prepared to facilitate the processes of establishment (planting) and growth of the new pine seedlings. Site preparation involves mechanical, chemical, fire or a combination of these methods in order to reduce logging debris, control competing vegetation and promote pine growth.

Site preparations differ greatly depending on site-specific characteristics. Similarly, the impact on water quality is correlated with the proximity of the practice to the water course, slope, soil

erodibility and extent of bare ground exposed by the technique utilized. BMPs are primarily concerned with where site preparation techniques occur, such as areas within Streamside Management Zones.

Mechanical site preparation, often coupled with burning, has been the most common technique utilized within the St. Marys River basin. The primary purpose of mechanical site preparation is to control vegetation competition and to concentrate organic matter at the top of the bed, which assists seedling survival. Chemical application also controls vegetation, but does not concentrate organic matter.

Chemical site preparation is often done before or shortly after pine transplantation depending on what type of herbicide is used. If initial application is ineffective, herbicide may be repeated several times within the first five years following transplantation.

5.6.2 STREAMSIDE MANAGEMENT ZONES

Both Florida and Georgia BMPs recognize that areas adjacent to streams, ponds and lakes require special management in forestry operations. Florida and Georgia BMPs have established guidelines for determining buffer widths and management practices around these areas. The primary goal is to protect the water course from excessive sediment, nutrients, logging debris, forest chemicals and temperature fluctuations which adversely affect water quality, fish and aquatic vegetation.

In Florida, an area within 300 ft of open waters of streams and lakes larger than 10 acres are referred to as the Discretionary Zone. Within the Discretionary Zone, the land immediately adjacent to the water body is referred to as the site's Streamside Management Zone (SMZ). Outward from the stream or water body, the SMZ consists of the primary and secondary SMZ. The remaining land or area of the Discretionary Zone is the area beyond the SMZ and extending to the 300-ft boundary.

The Primary SMZ is fixed at 35 ft outward from the stream or water body. Management criteria for the Primary SMZ allow selective timber harvesting that leaves a volume equal to or greater than one-half the volume of a fully stocked stand.

The Secondary SMZ has a variable width determined by the site's slope and soil erodibility. Width varies from 10 to 105 ft. Land management within this zone differs from the Primary SMZ in that complete timber harvesting is permitted. With the exception of the harvesting guideline, there are no other differences between the two SMZs.

Forestry practices that should be avoided within both SMZs include mechanical site preparation, fertilization and aerial application or mist blowing of herbicides and insecticides. Loading decks or landings should not be located within SMZs. Additionally, access roads should be avoided unless leading directly to or crossing a watercourse.

In Georgia, BMPs identify areas surrounding open water as SMZs. The SMZ is divided into two parts: (1) primary and (2) secondary. Unlike Florida, Georgia SMZ widths are predetermined by region. The entire portion of the St. Marys River basin in Georgia is located within the Lower Coastal Plain. Within the Lower Coastal Plain, SMZ width is 20 ft. No secondary SMZ is recommended. Any type of cutting practice, including clear cutting, is permitted within the Primary SMZ. Practices to be avoided include building roads or trails, unless necessary; portable sawmills and log decks; harrowing; root raking or bulldozing; gully leveling, unless immediately seeded and mulched; and leaving logging debris in the water body.

5.6.3 ACCESS ROAD CONSTRUCTION

Permanent access roads often are accompanied by adjacent ditches that drain the road surface and transport water away from the site. As described in the 1991 Georgia Compliance Survey (Mixon 1991), forest road construction has the greatest potential of delivering sediment to water bodies than has any other forest activity. It is estimated that 90 percent of sediment that reaches streams from a logging site is attributed to poor road construction and location.

Both Florida and Georgia BMPs recommend that access roads have proper drainage and water diversion measures installed to slow and divert surface water off the road. Current BMPs discuss in detail a variety of techniques which should be implemented to help eliminate sedimentation and road degradation.

BMPs recommend planning roads to avoid stream crossings and SMZs. When roads cannot be avoided within these areas, BMPs recommend crossing them at 90 degree angles in order to

minimize time spent in the stream. Ford type crossings are acceptable where stream bottoms are hard and flat.

5.6.4 TIMBER HARVESTING

The majority of environmental issues surrounding current forest practices are concerned with timber harvesting methods. Regulatory agencies, however, have primarily focused on silviculture aspects that have the greatest potential for impacting water quality (e.g., site preparation). Consequently, BMPs for timber harvesting are limited to stream bank integrity, streamflow impairment and skid trail erosion. Harvest activities are acceptable on the edge of perennial and intermittent streams.

5.6.5 BEST MANAGEMENT PRACTICES COMPLIANCE

Application of BMPs by forest managers in Florida and Georgia is reviewed on a biennial basis by the respective Division of Forestry in each state. BMPs will remain non-regulatory as long as forest managers continue to abide by them. If biennial surveys indicate that BMPs are not being practiced, EPA will recommend that a permitting program be instituted.

In 1991 FDOF conducted their sixth, and most recent, BMP compliance survey. During the 1991 survey, 150 individual forestry operations were evaluated in north and central Florida. Of the sites surveyed, 141 of 150 were in compliance with BMPs. SMZs were maintained during harvesting on 92 percent of the study sites and during site preparation on 96 percent. Forest roads were properly located on 94 percent of the study sites, and 89 percent of the stream crossings were reported as adequately stabilized (FDOF 1992).

During 1991, the Georgia Forestry Commission conducted their most recent BMP compliance survey. During the survey, 349 sites were surveyed throughout Georgia. The following results were published by the Georgia Forestry Commission (Mixon 1991). Approximately 69 percent of the sites surveyed were in compliance with road construction BMPs. Statewide, 88 percent of stream crossings were located properly. However, only 46 percent were adequately stabilized to prevent erosion from entering streams. Approximately 83 percent of harvest operations were in compliance with BMPs. Statewide compliance for site preparation activities was 94 percent. Overall compliance was rated at 86 percent. Regional compliance was best in the coastal plain (92 percent), which includes the St. Marys River basin.

6.0 SUMMARY OF MAJOR ISSUES THAT CONFRONT THE BASIN

Although many resource protection programs are currently in effect in the St. Marys River basin, there are gaps in resource protection and no formal coordination mechanism for these existing programs. Table 6-1 provides a summary of the major resource protection programs available in Florida and Georgia.

Wetland protection is uneven in the basin because of differing state policies. In Florida, wetlands are protected by FDER and SJRWMD. In Georgia, only coastal wetlands are protected by the state. On a federal level, the basin is split between two USACE districts. The St. Marys River basin lies in two separate districts of the USACE, with the Georgia side in the Savannah district and the Florida side in the Jacksonville district. USACE is the only agency that regulates activities in Georgia's freshwater wetlands, since there is no state regulatory program. Coordination, enforcement and consistency are therefore more difficult than if the basin were located in a single USACE district.

Flood damage potential to the St. Marys and King Bay areas has greatly increased because of increased development. These downstream areas are protected by flood storage in the headwaters subarea of the basin.

The dominant land use in the basin has been and will continue to be silviculture and upland forest, primarily pine plantation and managed upland forests. The good water quality of the river is attributed to the undisturbed state of the riverbank and immediately adjacent areas. There is a need to encourage landowners to continue leaving these areas intact. Although current water quality conditions are good, improper silvicultural activities along the river have the potential to affect water quality. High compliance with BMPs in both Florida and Georgia must be continued.

Large-tract ownership has preserved water quality, streambank vegetation, remaining natural communities and wildlife, but there will be increased pressure on large landowners to subdivide, especially in Camden and Nassau counties. In particular, growth in Camden County is substantially higher than for other counties and is expected to continue, especially in the Kingsland-St. Marys area, due to expansion of the Kings Bay Naval Base.

Table 6-1. Resource Protection Programs Available in Florida and Georgia

Protection Program	Governmental Protection Level	
	Florida	Georgia
Wetland Regulations	Federal, State	Federal, State (only in coastal marshes)
Water Quality Standards	State	State
Water Use Classification System	State	State
Antidegradation Policies	State	State
Special Surface Water Designations	State	State
NPDES Permitting	Federal	State
Water Body Restoration Programs	State (FDER SWIM program)	None
Consumptive Use Permits	State (SJRWMD)	State (GDNR)
Stormwater Regulations	State (SJRWMD)	None
Surface Water Management Regulations	State (SJRWMD)	None
Corridor Designation	None	State, Local (Counties)
Growth Management	Counties, State	Counties, State
Land Acquisition	State (CARL, SOR)	State (P-2000)
Endangered Species	Federal, State	Federal, State

Note: SWIM = Surface Water Improvement and Management.
 CARL = Conservation and Recreation Lands.
 SOR = Save Our Rivers.

Many current regulations exempt recreation and activities associated with developing single-family homesites for weekend use along the streambank. The cumulative impacts of increases in recreation and weekend homesites could threaten water quality and create conflicts among river users.

Although the basin is mostly forested, much of the native vegetation and habitat has been fragmented by development and silviculture, especially in uplands. There is a need to encourage landowners to leave these natural areas intact.

7.0 REGULATORY AND MANAGEMENT ALTERNATIVES

As has been discussed, a variety of regulations and programs is currently in effect in the St. Marys River basin. Long-term protection of the basin's natural resources will depend more on coordination of existing regulations and programs than on promulgation of new regulations. This section outlines specific regulatory and management alternatives to provide improved coordination and consistency among the existing regulations.

7.1 AMEND EXISTING REGULATIONS

The St. Marys River owes its good water quality in part to the fact that streambanks and floodplains are for the most part still in vegetated condition. The dominant land use, silviculture and managed upland forests, has significantly contributed to the overall good water quality. Threats definitely exist, especially changing land uses and development. Of less concern, but still important is the need to foster continued best management practices of the silvicultural lands. Existing regulations could be amended so that they establish a river corridor on both sides of the St. Marys, in which primary resource protection areas are adopted, similar to the provisions of Georgia's Mountain and River Corridor Act. The Act adopts a 100-ft vegetated buffer to be maintained, and limits the types of activities within the corridor.

Primary Resource Protection Areas (PRPAs) are the essential areas required to maintain fundamental ecological and hydrologic functions. By maintaining existing vegetation and prohibiting alteration within the PRPA, runoff from a developed area adjacent to a water body is slowed. The vegetated strip acts as a filter for pollutants, slows water velocities in sheet flow, and limits erosion and sedimentation. PRPAs can be consistent throughout an area or can vary according to the type of development activity.

An example of a PRPA that affects the basin was established by the Georgia Mountain and River Corridors Act. This Act establishes a 100-ft river corridor, beginning at the top of the riverbank, and restricts activities within this area. The Act applies to rivers with average annual flow equal to or exceeding 400 cubic ft/s, which would include much of the main stem of the St. Marys.

Although PRPAs are not applied in most areas of the SJRWMD, Chapter 40C-41 establishes Surface Water Management Basin Criteria for hydrologic basins of concern. Examples of criteria

within the Wekiva River basin include extra measures to protect wetlands and water bodies, such as a variable Riparian Habitat Protection Zone and more stringent criteria for erosion and sediment control, flood storage, recharge, and water table maintenance. Similar Riparian Habitat Protection Zones are established in Ch. 40C-41 for the Econlockhatchee River.

SRWMD's Works of the District include a 75-ft minimum setback for all major rivers. The setback can be enlarged, based on the intensity of the proposed activity. A minimum setback of 75 ft for the Suwannee River itself has its origins in the mid-1960's, when this river was being considered for Wild and Scenic River designation (Potts and Bai 1989). Although the river was not designated Wild and Scenic, the setback has been retained in the District's rules (40D-4) after adoption into local regulations by all of the counties along the river.

Since a 100-ft PRPA has already been established for the Georgia side of the river, amendments to Florida regulations that would establish a similar corridor should be considered. The most suitable amendments would be to Chapter 40C-41, which could designate the Florida portion of the St. Marys River basin as a special hydrologic basin, with basin-specific criteria that might include PRPAs. Other criteria could include more stringent requirements for stormwater control systems and more stringent floodplain storage criteria, such as requiring compensating storage for fill in the 100-year floodplain. This is currently required in the Wekiva River and Econlockhatchee basins. Thresholds that trigger permits could also be amended so that more development projects would be reviewed under the MSSW program. Both states should consider extending the corridor protection concept to tributaries of the St. Marys River.

In Florida, MSSW criteria require that there be no net reduction in flood storage within a 10-year floodplain. Local floodplain ordinances are also promulgated and enforced in accordance with enrollment in the federal Flood Insurance Program (FIP). However, these regulations allow some filling in the 100-year floodplain, and may allow filling in floodways in some cases.

In Georgia, the only floodplain regulations in effect are in local FIP ordinances similar to the local ordinances in Florida. Therefore, in Georgia there is little to prevent floodplain storage loss, while in Florida there is protection against flood storage loss within 10-year floodplains. However, the large flood storage areas in the headwaters subarea are nearly all located in Florida or in the Okefenokee Swamp. Flood storage in floodplains located in other subareas of the basin have

lower regional value for protecting downstream areas and are considered to be adequately protected by local ordinances. This means that amending local or state regulations in Georgia to include more flood storage protection would not produce basin-wide changes in flood storage protection.

7.2 NATIONAL WILD AND SCENIC RIVER DESIGNATION

In 1968, Congress passed the Wild and Scenic River Act (Public Law 90-542). The act designated several rivers for immediate protection and authorized the study of additional rivers for inclusion in the federally protected system.

In 1990, Congress passed Public Law 101-364, which authorized the National Park Service (NPS) to study the St. Marys River to determine the river's eligibility for National Wild and Scenic designation. NPS began examining the St. Marys River in January 1991.

In August 1991, NPS requested that the County Commission Chairman in each of the four study area counties appoint three to five representatives to serve on a study advisory group to assist NPS. The County Commissions had created the St. Marys River Management Committee (SMRMC) to explore local options for protecting the river immediately prior to the NPS request. Once formed, the committee concentrated on local management issues and alternatives and never accepted the responsibility of the Wild and Scenic River Advisory Committee.

Local environmental interests formed a group known as the Friends of the St. Marys. The primary focus of this group is to support designation of the St. Marys River as part of the National Wild and Scenic River System.

In September 1991, NPS published a preliminary eligibility determination report (NPS 1991). Preliminary studies indicate that a total of 71 river miles (RM), from approximately 1 RM upstream of Flea Hill/Kings Ferry to the confluence of the Middle and North Prongs (upstream of the McClenny Bridge), are eligible for National Wild and Scenic designation.

As discussed in the preliminary report, the St. Marys River must be determined both eligible and suitable in order to be designated wild and scenic. An array of alternatives will be considered as the NPS study continues in order to determine if the river is suitable. Alternatives being examined

by NPS include a Federal management alternative, a State management alternative, and an alternative for protection at the local level. If no feasible alternative for managing the river under a national wild and scenic designation is acceptable to the local community, the river will be considered unsuitable for designation or recommended for state designation.

Regardless of which alternative (Federal, State, or local management) is implemented, National Wild and Scenic designation would permanently preclude any Federal water resource development projects within the river that would result in direct and adverse impacts to those natural attributes which qualify it as a component of the system. Direct shoreline restrictions would extend only to Federal or Federally assisted areas.

Summarized as follows is a description of the alternative strategies for managing the St. Marys River under National Wild and Scenic designation.

Federally Managed Wild and Scenic River

Under Federal management, designated portions of the St. Marys River would be managed by NPS as a national wild and scenic river. NPS would be required to develop a comprehensive river management plan and a land protection plan for the river. NPS would manage the river in a manner which would assure that the river and a narrow visual corridor along both banks remain relatively unchanged. NPS would also manage public use of the river and provide recreational opportunities in a manner which would not impact detrimentally on the natural and cultural values of the St. Marys.

During preliminary studies, NPS concluded that existing regulations pertaining to wetland, floodplains, erosion, sedimentation, and water quality appear to provide sufficient shoreline protection. Consequently, land acquisition would primarily involve dispersed sites for access and visitor support facilities. A full-time staff would be hired by NPS to operate facilities and enforce regulations in designated portions of the river.

Federal management of the river as a national park would not prohibit growth and development within the river area. Development would simply have to occur in an environmentally sensitive manner and follow guidelines established in the comprehensive river management plan.

State Managed Wild and Scenic River

Under State management, the St. Marys River would be managed through a cooperative management agreement between FDNR and GDNR. The river would be managed in the same manner as the Federal management alternative. Florida and Georgia, however, would have the opportunity to develop the comprehensive river management plan and land protection plan as long as it remained consistent with the Wild and Scenic Rivers Act. Under state management, the Federal government would expect some, if not all, funding on the state level.

State management may provide the opportunity to better address the needs and concerns of the local community. Neither Florida nor Georgia, however, has expressed interest in accepting management responsibilities for a National Wild and Scenic River designation. Additionally, difficulties may arise in developing a cooperative agreement between the two states since regulations affecting the St. Marys River vary greatly between the two. State management would necessarily be expected to address both local and Federal concerns, which could ultimately serve to complicate matters.

There currently exists strong opposition by local residents to National Wild and Scenic designation of the St. Marys River. Primary concerns include the use of eminent domain, over-regulation, and loss of local control. There also exist concerns about the retained right to continue current practices such as hunting and fishing along the river corridor.

Locally Managed Wild and Scenic River

Under local management, the St. Marys River would be managed as a National Wild and Scenic River by a local cooperative management committee. The committee would be responsible for developing a comprehensive river management plan incorporating the ideas, viewpoints and needs of the local community. NPS would establish strict guidelines for creating the committee in order to ensure that it accurately reflects the interests of the entire community. The membership of the committee would represent local landowners and commercial interests, local government, state government, NPS, recreational interests, and conservation organizations.

The Upper Delaware River serves as an excellent example of how a National Wild and Scenic River Designation can be utilized to promote and enforce local river protection. Similar to the St. Marys River, the Upper Delaware falls under the jurisdiction of several States and numerous

counties. While adequate state and local regulations exist, the problem lies in cooperation for basin-wide management. Additionally, the river is located primarily within private lands, resulting in strong opposition to outside (Federal) control.

The Upper Delaware River was designated as a National Wild and Scenic River in 1978. The final management plan for the river was completed in 1986. The majority of management responsibilities were delegated to a local Citizen Advisory Council, which has a full-time staff supported by NPS funds. The management plan was prepared by a private consulting firm, selected by the Council and paid with NPS funds.

A similar approach could be applied to the St. Marys River. NPS funding and technical assistance would be utilized to support the Cooperative Management Committee, to develop a comprehensive management plan and to assist local river protection efforts. Under local management, designation could be accomplished with little or no shoreline acquisition. Indeed, the local cooperative management committee would have the ability to shape legislation for designating the river by removing condemnation authority and establishing a ceiling on acquisition funds.

In essence, the Federal government would provide the means necessary for establishment of a local cooperative authority which would be responsible for developing and implementing a comprehensive river management plan which specifically addressed the concerns of local citizens. Once the river was designated as a National Wild and Scenic River, Federal involvement would be limited to reviewing proposed management plans to ensure that they adequately address protection of the river's natural resources.

The success of Wild and Scenic River Designation in protecting the St. Marys River natural integrity would be directly determined by the effectiveness of the comprehensive river management plan. The management plan should address the concerns of local residents and satisfy the national interest while maintaining effective river management. The development of the management plan should be carefully considered in order to avoid creating another layer of regulations and associated bureaucracy further complicating management of the river. Indeed, the management plan should focus on coordinating existing agencies and governments and current regulations.

The management plan also provides an effective manner in which to address local concerns regarding property rights. Key provisions in the management plan could include protection against over-regulation, retaining local control, continuation of traditional activities (hunting, fishing) and protection against eminent domain. In fact, NPS has offered the people of the St. Marys River area the opportunity of developing a management plan prior to designation in order to guarantee that they retain local control of the river.

In summary, National Wild and Scenic River Designation of the St. Marys River would provide an excellent means of coordinating management and allowing for the protection of the river and a narrow visual corridor. If the local management alternative were chosen, a substantial amount of funding could potentially be made available to assist local protection efforts.

From a basin-wide management perspective, National Wild and Scenic River designation has its limitations since it only addresses the river corridor. Once the local Cooperative Management Committee is established, however, there would exist an effective means of protecting significant ecological and hydrologic resources throughout the rest of the basin by coordinating existing agencies, governments and regulations.

7.3 LOCALLY COORDINATED BASIN REVIEW AGENCY

If Wild and Scenic River designation is not accomplished, there still may be an opportunity for local coordination of management through a watershed association that keeps track of activities that might affect the river. The association would be run as a nonprofit agency and might receive funding from counties, corporations, private donors and foundations. As a nonprofit agency, it would be run by a board of directors and could have a small full-time or part-time staff. Although such a group would have no regulatory authority, it could serve as an advocate and "watchdog" for the St. Marys River, participating in the existing regulatory process and commenting on proposed projects.

7.4 CONSOLIDATE BASIN UNDER JURISDICTION OF ONE USACE DISTRICT

The St. Marys basin is currently divided between two USACE districts. The Georgia portion of the basin is under the jurisdiction of the Savannah District. The Florida portion of the basin is under the jurisdiction of the Jacksonville District. Both of these districts are within the South Atlantic Division of USACE, headquartered in Atlanta.

As discussed under the regulatory section, the USACE districts bear the primary responsibility for processing of federal permit applications for activities in waters and wetlands. Project review with a basin wide perspective would be facilitated by consolidating review authority into one USACE district. Due to the proximity of the Jacksonville District to the St. Marys basin and since 59 percent of the basin lies within Florida, consolidating review authority with the Jacksonville District would be most appropriate. The agreement should include a provision requiring notice to both Florida and Georgia of any permit applications within the basin.

Consolidation of review authority into the Jacksonville District could be implemented by a memorandum of agreement between the two districts. Such an agreement is not unprecedented. A similar agreement has been in effect for a number of years between the Jacksonville District and the USACE Mobile District headquartered in Mobile, Alabama. Technically, the Mobile District includes the majority of the Florida panhandle, extending to the Aucilla River east of Tallahassee. In order to consolidate permit review into one district, the Jacksonville District assumed responsibility for that portion of the Mobile District within Florida. However, the ultimate feasibility of this alternative must await the result of any delegation of the USACE 404 program to the state of Florida.

7.5 PUBLIC EDUCATION

Public education efforts directed at recreational users and shoreline property owners can be effective in altering human behavior that affects water bodies. The aims of public education might include increasing awareness of human activities that affect water quality, such as septic system maintenance, fertilizer use, high motorboat speeds, and small-scale vegetation clearing. Public forums concerning the future of the St. Marys River could serve an educational function as well as increasing communication and consensus between inhabitants of the basin and recreational users. Another target population for education efforts is large-tract landowners, who would benefit from information on management and preservation possibilities for native vegetation communities and wetlands. Effective implementation of this alternative would depend on identification of an appropriate organization to sponsor and promote a public education program.

7.6 PROMOTE IMPROVEMENTS IN FOREST MANAGEMENT

Any regional management program will have to recognize the dominance of silviculture in both the land use and economics of the St. Marys region. With the exception of Okefenokee National

Wildlife Refuge, Pinhook Swamp and the St. Marys Conservation Area, silviculture is the primary management objective for most lands within the St. Marys Basin. Consequently, policies and practices pertaining to silviculture have great impact on the significant hydrologic and ecological features within the basin.

Silvicultural BMPs have been developed in order to set standards for conducting forestry related activities. Timber managers must adhere to BMPs to comply with other regulatory programs. Studies have shown that implementation of silvicultural BMPs were very effective in preventing serious degradation of stream water quality (Lynch and Corbett 1990). The practices employed were the maintenance of buffer strips on both sides of perennial streams, completion of harvesting in an area before proceeding to a new area, inspections, prohibition of skidding over perennial streams, prohibition of logging during excessively wet periods, and posting of a performance bond by the contractor. BMPs for the St. Marys River Basin might be improved by including inspections and posting of performance bonds.

Recent surveys of forestry practices indicate that herbicides are gaining popularity as an alternative to mechanical site preparation in order to minimize soil disturbance. A review of the fate and environmental risks associated with the use of herbicides used in forestry (Michael 1990) found that herbicides can contaminate surface waters to varying degrees depending on application rate, method of application, method of formulation and site specific characteristics. Protecting SMZs has been found to greatly reduce stream and lake contamination. Research should be done to define the role of SMZs in reducing stream contamination in habitats typical of the St. Marys Basin so that SMZ width can be prescribed on a site-specific basis.

Studies of clearcuts on three forested watersheds in Bradford County, Florida (Riekerk 1983), found that water quality impacts were proportional to the severity of devegetation and site disturbance. Florida and Georgia BMPs which provide water quality protection measures when working near water courses should be revised to account for the extent of clearcutting. Such revisions could include the type of harvesting and site preparation used. For example, acreage to be cleared at one time could be limited in relation to the impacts associated with the techniques to be utilized.

BMPs should be developed to guide vegetation clearing within certain distances from wetlands and/or within environmentally significant areas in order to lessen negative edge effects. Additionally, primary streamside management zones should be classified as no-cut zones in order to maintain adequate buffers and ecological corridors along perennial streams and lakes.

While best management practices for forested wetlands have been established by Georgia, they are not specifically addressed by Florida BMPs. The Florida Division of Forestry has published management guidelines for forested wetlands in Florida and should adopt them as BMPs.

As currently written, BMPs focus on water quality issues and address wildlife and habitat needs only incidentally. Many plant and animal species within the St. Marys River basin, including some listed species, are adversely affected by routine forest management practices. For instance, the Florida Black Bear (*Ursus americanus floridanus*), Red-cockaded Woodpecker (*Picoides borealis*), Sherman's Fox Squirrel (*Sciurus niger shermanii*) and Gopher Tortoise (*Gopherus polyphemus*) are animals that are particularly vulnerable to habitat loss and fragmentation.

Revised BMPs should be developed with specific attention given to wildlife. Silviculture practices that maintain suitable wildlife habitat by managing for old growth, uneven-aged timberstands through selective cutting, natural regeneration, and lightning season burning should be encouraged. Such BMPs should address issues such as the minimum width of leave strips tolerated by different species and the effects of various herbicide treatment programs on groundcover biodiversity.

Short-term rotation eliminates the natural succession of aging forests. Pine plantations lack the diversity associated with mature ecosystems. Natural forests support multiple-aged stands that support various arrays of wildlife populations. Indeed, the majority of pinelands present in the basin may be unable to support dynamic functions inherent in mature forests that are necessary for supporting specific arrays of wildlife populations. Many species of wildlife, including flying squirrels, several bat species, pileated and red-cockaded woodpeckers, numerous cavity-nesting birds, and a number of amphibians, require mature forests. Mechanisms should be established to assure that patches of forest scattered throughout the St. Marys River basin are allowed to mature naturally in order to provide adequate habitat for wildlife associated with such systems.

Fire management programs should be carefully evaluated and mechanisms should be instituted to encourage use of prescribed burning programs appropriate to natural native ecosystems. Fire is essential to the perpetuation of the majority of plant communities in the St. Marys River basin. Historically, the role of fire in this region was solely dependent on the frequency and intensity of lightning, but now the management role of fire is largely controlled by man through the use of prescribed burning. Due to increasing population and transportation corridors, prescribed fire use is limited.

Fire exclusion can have drastic effects on natural communities. The heavy fuel build-up that results from infrequent burning sets the stage for catastrophic wildfires. If a severe fire does not devastate an unburned site, shrubs will dominate the understory and flowering grasses and herbs will die out, which generally results in degradation of wildlife habitat. Gradually, without other management attention, hardwoods will invade and convert the stand into a hammock forest.

Unfortunately, use of fire in pineland management has decreased dramatically in the St. Marys basin in recent years. In Nassau County, for example, less than 300 acres were burned by FDOF on both public and private land during 1991 (pers. comm., Michael Goodchild, Nassau County forester). On lands managed by the timber industry, prescribed burning is used to some extent in site preparation of recently clearcut areas, but application of fire for other purposes is minimal and not expected to maintain habitat quality adequately.

Most of the St. Marys River basin supports short-rotation timber crops that are mechanically planted on intensively prepared sites. This results in limited susceptibility to hardwood invasion or excessive fuel load accumulation. Consequently, prescribed fire is not considered to be a necessary management practice and the herbaceous flora, original wildlife habitat values, and overall integrity of the pinelands are seriously threatened on a regional scale.

Neither the Florida nor Georgia BMP manuals devote sufficient discussion to the value of prescribed burning in silviculture. BMPs should recommend prescribed burning be attempted as often as practicable under existing limitations. Consideration should be given to the proper use of prescribed fire, with special attention to season of burn and value to wildlife. BMPs should require that forest managers include appropriate burn plans within their management plans.

Improved BMPs and associated regulations must be carefully developed to protect adequately the basin's natural resources while still providing an economically feasible environment for silviculture.

8.0 PROTECT KEY LANDS THROUGH STRATEGIC ACQUISITIONS AND EASEMENTS

In addition to regulatory and management alternatives, implementation of an effective land acquisition program is also an effective mechanism for providing for long-term protection of wetlands and related resources within the St. Marys River basin. This section describes the need for and opportunities associated with land acquisition and provides recommendations for focusing future study priorities.

8.1 NEEDS AND OPPORTUNITIES

Since most of the St. Marys basin is in silviculture, it is important to establish a network of natural lands as a framework for maintenance of natural ecological processes. Such an ecological linkage system would provide for wildlife movements and long-term genetic exchanges between populations as well as serve as a source for animals and plants to colonize sensitively managed timberlands.

The framework for such a corridor system should be designed to:

1. Protect key resources to the maximum extent feasible,
2. Link existing preserves within the basin,
3. Maximize opportunities for enhancing ecological connections with important natural systems in surrounding regions, and
4. Facilitate appropriate coordination with development of scenic and resource-based recreation corridors.

A creative mix of land protection techniques will be needed to protect a properly integrated network of ecological lands. Outright public acquisition will probably be feasible in some situations, but cooperative agreements with private landowners will be more appropriate in others. Creation of a regional land trust to coordinate land protection efforts and develop innovative strategies is strongly recommended.

8.2 KEY RESOURCES

From a hydrologic viewpoint, protection priorities are highest for headwater and riverine floodplains and for upland areas that provide recharge to surficial aquifers.

Analysis of habitat and land use maps, aerial photos, FNAI, The Nature Conservancy data, and other ecological data revealed that the most threatened habitats within the basin are:

1. Slope forests and seepage slopes,
2. Sandhills and related xeric habitats,
3. Maritime forests,
4. High quality natural pinelands (with old-growth longleaf pines and/or diverse native groundcover),
5. Coastal marshes, and
6. Forested wetlands.

Forested wetlands are not so scarce or immediately threatened, but KBN considers them key resources in need of protection because they have important flood storage and habitat values and they could be vulnerable to intensive logging should timber harvesting technology and/or economics change.

8.3 ECOLOGICAL CONNECTIONS

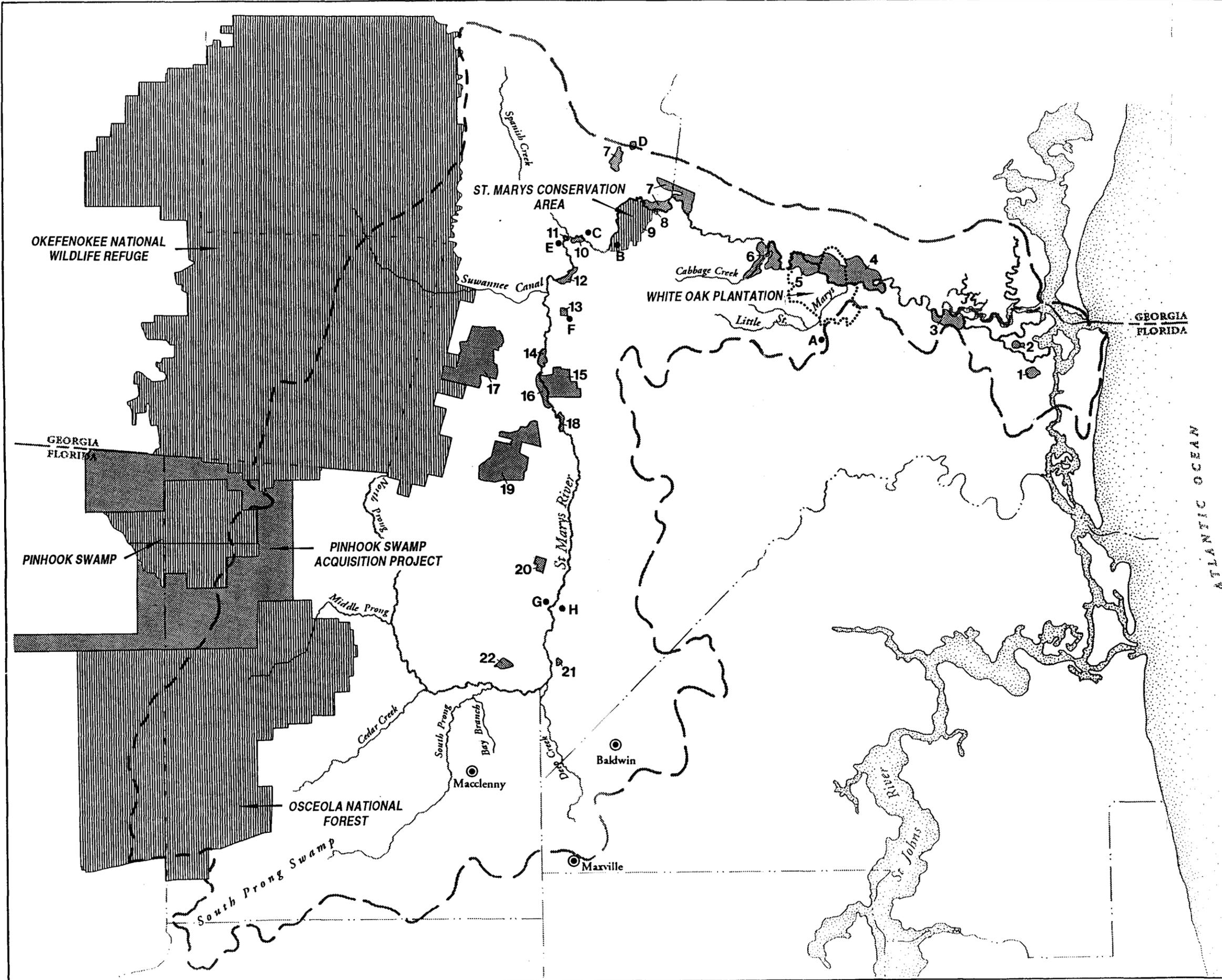
Figure 8-1 shows existing preserves within the basin and lands that The Nature Conservancy has identified as of high ecological value (Lynch and Baker 1988). Figure 8-2 suggests ecological linkages between these areas and important natural areas in adjacent regions.

The backbone of an ecological linkage system for the St. Marys basin should be the river corridor itself. The following discussions outline how other important areas might tie into the river corridor to form a basic framework for such a system.

Southeast to the Nassau River

KBN's Nassau River and Lower St. Johns River Basins Land Acquisition Study (KBN, 1992) identified an area along the Nassau River between Callahan and Yulee and south of A1A as a SJRWMD land acquisition priority. This site, labelled as the Upper Nassau River Priority Site on Figure 8-2, links into the Timucuan Ecological and Historical Preserve to the east and, potentially, through greenways through the Whitehouse and McGirts Creek areas, into the Black Creek system to the southwest.

Figure 8-1
PUBLIC LANDS AND AREAS OF
CONSERVATION INTEREST



- KEY**
- ST. MARYS RIVER BASIN BOUNDARY
 - PUBLIC LANDS
 - AREAS OF CONSERVATION INTEREST
- Priority Natural Areas (Standard Sites) Identified by the Nature Conservancy
- 1 Johnson Neck
 - 2 Martin's Island
 - 3 Reids Bluff / Roses Bluff
 - 4 Kinsland Swamp
 - 5 Gilman Swamp
 - 6 Cabbage Bend Swamp
 - 7 Varn Tract
 - 8 Prospect Landing Ravine
 - 9 St. Marys Conservation Area (Hercules Tract — already acquired)
 - 10 Railroad Slopes and Floodplain
 - 11 Moody Landing Floodplain
 - 12 Brush Creek — Little Dunn Creek
 - 13 Section 33 Pond
 - 14 Section 40 Slope Forest
 - 15 Toledo Flatwoods (Florida)
 - 16 Toledo Floodplain
 - 17 Toledo Flatwoods (Georgia)
 - 18 Stave Branch Slopes
 - 19 Boone Creek Longleaf Flatwoods
 - 20 Schoolhouse Bay Flatwoods
 - 21 Stokes Tract
 - 22 Stokesville Flatwoods
- Rare Plant Sites Identified by the Nature Conservancy
- A Evergreen Hill
 - B Boulogne Slopes
 - C Folkston Bog
 - D Highway 252 *Ctenium*
 - E Trader's Hill *Hexastylis*
 - F Dunn Creek *Hartwrightia*
 - G St. George *Hartwrightia*
 - H Highway 121 *Hartwrightia*

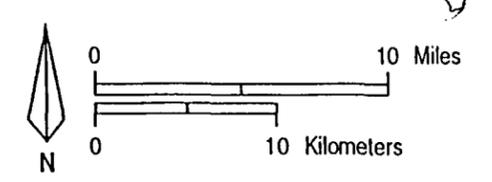
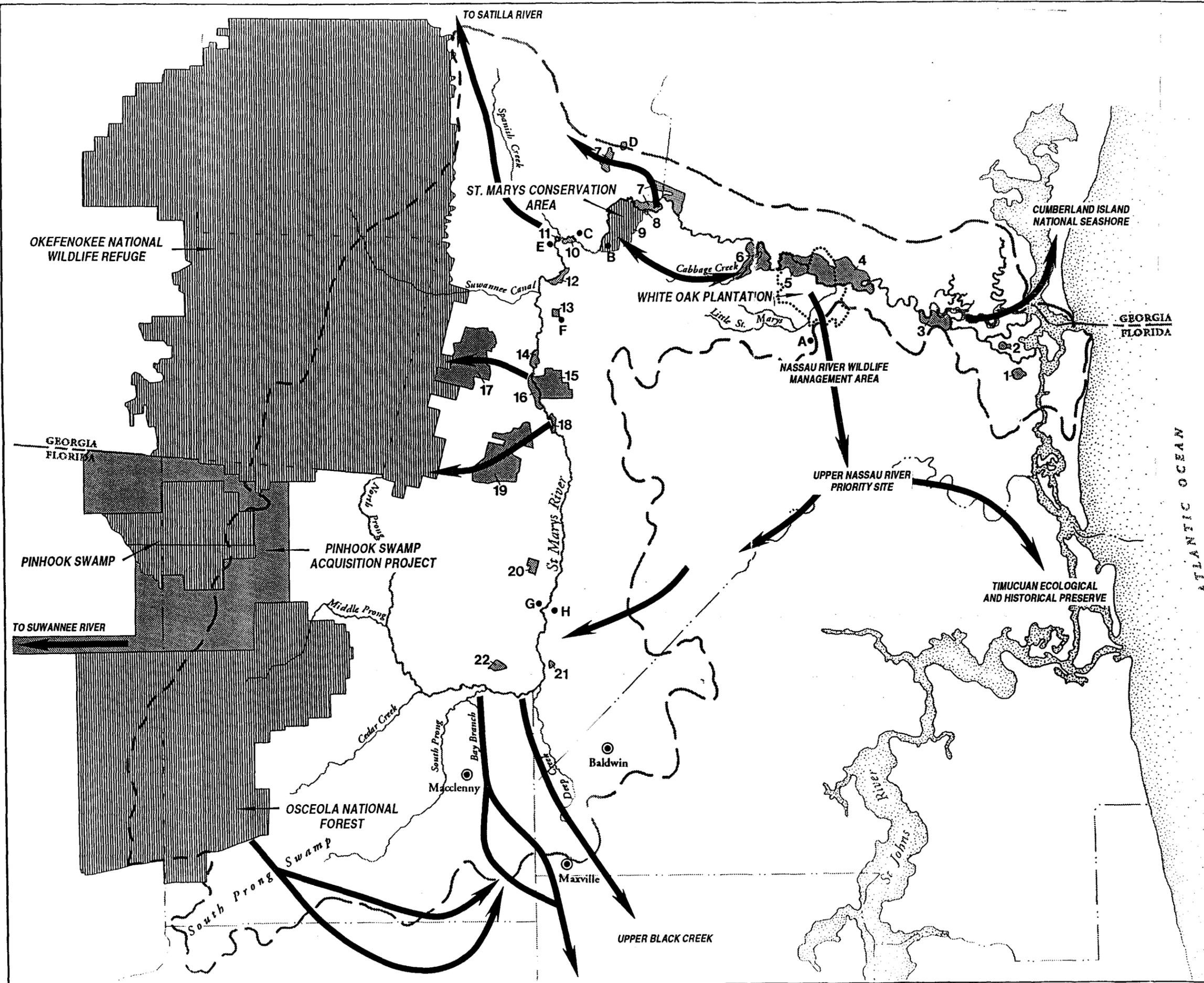


Figure 8-2
POTENTIAL ECOLOGICAL CORRIDORS IN
THE ST. MARYS REGION



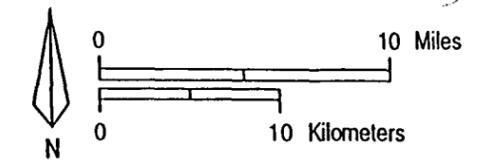
- KEY**
- ST. MARYS RIVER BASIN BOUNDARY
 - POTENTIAL CORRIDOR
 - PUBLIC LANDS
 - AREAS OF CONSERVATION INTEREST

Priority Natural Areas (Standard Sites) Identified by the Nature Conservancy

- 1 Johnson Neck
- 2 Martin's Island
- 3 Reids Bluff / Roses Bluff
- 4 Kinsland Swamp
- 5 Gilman Swamp
- 6 Cabbage Bend Swamp
- 7 Varn Tract
- 8 Prospect Landing Ravine
- 9 St. Marys Conservation Area (Hercules Tract — already acquired)
- 10 Railroad Slopes and Floodplain
- 11 Moody Landing Floodplain
- 12 Brush Creek — Little Dunn Creek
- 13 Section 33 Pond
- 14 Section 40 Slope Forest
- 15 Toledo Flatwoods (Florida)
- 16 Toledo Floodplain
- 17 Toledo Flatwoods (Georgia)
- 18 Stave Branch Slopes
- 19 Boone Creek Longleaf Flatwoods
- 20 Schoolhouse Bay Flatwoods
- 21 Stokes Tract
- 22 Stokesville Flatwoods

Rare Plant Sites Identified by the Nature Conservancy

- A Evergreen Hill
- B Boulogne Slopes
- C Folkston Bog
- D Highway 252 *Ctenium*
- E Trader's Hill *Hexastylis*
- F Dunn Creek *Hartwrightia*
- G St. George *Hartwrightia*
- H Highway 121 *Hartwrightia*



The Upper Nassau River Priority Site could be linked northward through the Nassau River Wildlife Management Area (which is ITT-owned and leased by FGFWFC, rather than state-owned) and Gilman's White Oak Plantation into the St. Marys corridor. Such a connection could include the extensive natural pinelands on White Oak Plantation and floodplain wetlands along Mills Creek and in Spell Swamp, Mann Swamp, and Plummer Swamp in the Nassau River Basin. In addition, floodplain wetlands in Wilder Swamp and White Oak Swamp, and along the St. Marys and Little St. Marys would also benefit.

Since the width and integrity of the ecological corridor along the St. Marys may be compromised through the middle reaches by development around Flea Hill - Kings Ferry, connections through this area might be strengthened by establishing natural corridors from White Oak Plantation westward towards the St. Marys Conservation Area along the Little St. Marys and/or Cabbage Creek.

South to Upper Black Creek

Figure 8-2 indicates several potential corridors linking the southern portion of the basin to the Upper Black Creek area. Since the Upper Black Creek CARL Project is the northernmost terminus of a critical ecological linkage being developed to connect southward to the Ocala - Wekiva region, it is extremely important that it be effectively linked with the Osceola - Pinhook - Okefenokee systems to the north. The southwestern region of the St. Marys River basin is especially important to the black bear and the red-cockaded woodpecker, so protecting additional lands in this area would be very beneficial to these species. In addition, Bartram's ixia, a threatened plant species found only in north-central Florida, has been documented in this basin and should be addressed in preserve design.

While opportunities for completing an additional corridor east of Baldwin appear feasible on maps, they are extremely limited. Any potential corridor will likely be limited to a narrow greenway due to expanding suburban development and the limitations of using Cecil Field and Whitehouse Field (which are military bases) in a conservation project. The limitations raise the importance of protecting connections from the southernmost end of the St. Marys corridor southwest towards Upper Black Creek.

As shown on Figure 8-2, potential linkages between the southern portion of the basin and the Upper Black Creek area include:

1. South from the St. Marys corridor along Deep Creek, then eastward north of Maxville;
2. South from the St. Marys corridor just east of Macclenny through Bay Branch, Barber Bay, and along Turkey Creek into the New River Swamp, then eastward south of Maxville; and
3. Southeast from the Osceola National Forest through South Prong Swamp, then east through New River Swamp and/or Lake Butler Wildlife Management Area.

North to the Okefenokee Swamp and the Satilla River

The most obvious link between the St. Marys River and the Okefenokee Swamp is the river corridor itself where the river flows out of the swamp north of Moniac. Other linkages should also be maintained, however.

The Nature Conservancy identified two significant natural areas, labelled as sites 17 and 19 on Figure 8-1, around which an ecological corridor should be built to connect the St. Marys River to the Okefenokee Swamp. The Nature Conservancy identified these as the best remaining examples of Trail Ridge pinelands. Since these are family-held private timberlands that are not for sale, a financially equitable cooperative agreement with the landowner will be essential. Respect for the landowner's concerns is especially significant here because it is clear that the quality of the habitat is a result of many years of progressive timber management.

The Waycross/Ware County Planning Commission is currently developing a preliminary proposal for a scenic and recreational greenway along U.S. Highway 1 between Waycross and Folkston with a linkage to the Satilla River corridor to the north. Although north of the study area, this greenway could be linked to the St. Marys River basin through a greenbelt routed east and/or west around Folkston, perhaps via a corridor along Spanish Creek taking in the natural uplands along the east slope of Trail Ridge south of Mattox. Smaller linkages could be created across the Trail Ridge to tie this corridor into the Okefenokee Swamp.

8.4 IMPORTANT SITES

The Nature Conservancy has conducted a thorough search for significant ecological sites (Lynch and Baker 1988) within the basin. These sites are identified and described in Appendix B. They should be considered in further preserve/corridor design and land acquisition planning efforts.

8.5 PRIORITIES

8.5.1 PROTECT THE ST. MARYS BLUFFS CORRIDOR

The obvious backbone for an ecological corridor system for the St. Marys Basin runs along the south-north stretch of the river from the SR 121 bridge north of Macclenny to the St. Marys Conservation Area southeast of Folkston. This corridor is a key ecological linkage and it incorporates many of The Nature Conservancy's sites (Lynch and Baker 1988) and includes slope forests, seepage slopes, and xeric habitats as well as significant wetlands and pinelands. Because high ground comes close to the river here and small ownerships are relatively numerous, it is also the segment of the river most susceptible to degradation by riverfront development. Therefore, developing a strategy to mix acquisitions, easements, and restoration projects to create continuous ecological and recreational corridors along both sides of this stretch of the river is the highest land protection priority in the basin. Such a preserve corridor should be designed to take advantage of opportunities to protect important habitats and enhance linkages and should not be restricted to a given width of river buffer.

Identifying important tracts with willing sellers and using them as the basis for a joint SOR-CARL project for the Florida side of the river and a P-2000 Proposal for the Georgia side would probably be the best way to begin this effort.

8.5.2 CONDUCT A LAND ACQUISITION PLANNING STUDY TO IDENTIFY APPROPRIATE TRACTS FOR PUBLIC PURCHASE AND FOR EASEMENT NEGOTIATION

As part of the land acquisition process, more detailed study is needed to refine the ecological corridors suggested in this report and develop specific land protection projects. The Cooperative Management Committee should sponsor such a detailed study through the management plan and seek cooperative state funding. Studies should include a cultural resource study to evaluate opportunities for preserving archaeological, historical, and scenic resources and a recreational study to assess the potential and demand for resource-based recreation opportunities.

8.5.3 ESTABLISH A REGIONAL LAND TRUST FOR THE ST. MARYS BASIN

Local land trusts are the fastest growing type of conservation organization in the United States because they offer citizens the opportunity to work cooperatively to solve land protection problems while utilizing local insights and maintaining local control. Land trusts work creatively to use legal mechanisms, real estate techniques, tax strategies, and appropriate agency assistance to meet land protection needs on a case-by-case basis. Such an organization is ideally suited to address conservation needs while still providing for local control. The Trust for Public Land (TPL) can assist in establishment of a local group.

9.0 RECOMMENDATIONS

In Sections 7.0 and 8.0, various planning, regulatory, acquisition and management alternatives for providing a long-term strategy for protecting the basin's resources are presented and the advantages and disadvantages of each are discussed. Implementation of an effective strategy, however, will require a commitment to a definite course of action by a stable institutional entity. The following recommendations propose such an entity and the actions it should implement and coordinate to facilitate long-term protection and management of the natural resources of the St. Marys River basin.

9.1 PURSUE NATIONAL WILD AND SCENIC RIVER DESIGNATION

National Wild and Scenic River designation with the local management alternative should be implemented. The local management alternative would prevent loss of local control over the river, and Federal funding would be made available to assist local protection efforts. Under local management, designation can be accomplished with little or no shoreline acquisition. Federal involvement would be limited to establishing the local Cooperative Management Committee and reviewing proposed management plans to ensure that they adequately protect natural resources. Designation would provide the means for effective local coordination and management of the St. Marys River.

The local Cooperative Management Committee would be responsible for development of the management plan required for Wild and Scenic River designation. Therefore, the plan can reflect local desires and concerns. The Cooperative Management Committee and management plan that it produces will serve as the institutional means to provide for coordination and effective application of the various policies in effect in the basin.

In organizing the Cooperative Management Committee, consideration should be given to the diverse interests of persons affected by long-term management of the basin. At a minimum, membership on the committee should include representatives from the four counties involved. These county representatives could be county commissioners or persons appointed by the county commissions. The committee should also include representatives of the major state government resource management agencies, such as GDNR and SJRWMD. Silviculture interests should be represented, possibly by either state or industry foresters. A citizen-at-large member from both

Florida and Georgia would serve to round out the committee. This representative could be appointed to the position by the respective state governors. Term limits, perhaps two to four years, should be established for members to serve on the committee.

If a locally managed Wild and Scenic River designation is not pursued, it is recommended that an alternative local management committee be instituted through interstate and interlocal agreements. Such an alternative local committee could pursue implementation of the management recommendations discussed below. Long-term success of the alternative local committee would depend largely on a secure source of funding, such as would be provided under the Wild and Scenic River designation.

Further recommendations for specific issues to be addressed in the Wild and Scenic River management plan are discussed below.

9.2 ESTABLISHMENT OF A CONSISTENT RIVER CORRIDOR AND SPECIAL WATERS DESIGNATION

The Cooperative Management Committee and the SJRWMD should study the Georgia Mountain and River Corridors Act (MRCA) and consider similar measures regarding river corridors that could be enacted in Florida. The MRCA will include a 100-ft setback from the river on the Georgia side. A similar setback enacted on the Florida side of the river would ensure that both banks of the river are similarly protected. In addition, both Florida and Georgia agencies should consider extending the corridor protection concept to large tributaries of the St. Marys River. The MRCA also requires counties to develop river corridor protection plans. The Cooperative Management Committee can provide assistance to Camden and Charlton Counties and ensure consistency among the protection plans.

In addition to establishment of a consistent river corridor on both sides of the river, a consistent water quality protection policy should be incorporated into the management plan. Such policies should seek to protect the existing ambient water quality which is currently higher than the use classification for both states. Within Florida, these measures might include designating the St. Marys River as an OFW, or including it in Chapter 40C-41, F.A.C., as a hydrologic basin with special thresholds and a higher level of protection for water bodies, floodplains and wetlands. Within Georgia, designation as an Outstanding Georgia Resource Water would provide protection

analogous to Florida's OFW program. The Cooperative Management Committee, through the management plan, would provide the incentive for the special designation in each state.

The Cooperative Management Committee would also serve as the focal point for public education efforts directed at recreational users and shoreline property owners. The primary aims of the program should be to increase awareness of human activities that affect water quality, such as septic system maintenance, fertilizer use, erosion due to high motorboat speeds, and small-scale vegetation clearing. The management plan should also address such recreational uses.

Other possible education efforts could include periodic workshops on management of the river, and a program to inform large-tract forest landowners about management and preservation possibilities for native vegetation communities.

9.3 PROTECT KEY LANDS THROUGH STRATEGIC ACQUISITIONS AND EASEMENTS

True long-term protection and management of resources on a regional scale will invariably include an acquisition component. The Cooperative Management Committee can provide the focal point for coordinated voluntary land acquisitions and procurement of protective easements in the basin. This action will provide the opportunity expansion of locally sponsored protective measures beyond the immediate river corridor.

Land acquisition programs currently exist in both Florida and Georgia. The framework for application of these programs to the specific needs of the St. Marys basin should be addressed in the management plan. While the sites identified in The Nature Conservancy Report (Lynch and Baker 1988) can serve as a starting point, a comprehensive land acquisition planning study to identify appropriate tracts for public purchase and for easement negotiation should be undertaken. In addition, establishment of a regional land trust should be considered by the committee.

9.4 PROMOTE IMPROVEMENTS IN FOREST MANAGEMENT

Any regional management program will have to recognize the dominance of silviculture in both the land use and economics of the St. Marys region. Silvicultural BMPs have been developed in order to set standards for conducting forestry related activities. Timber managers must adhere to BMPs to comply with other regulatory programs. Therefore, the Cooperative Management

Committee should consider differences in BMPs between Florida and Georgia and identify opportunities for potential improvements to facilitate long-term wetland protection.

9.5 DO NOT PURSUE CONSOLIDATION OF BASIN INTO ONE USACE DISTRICT

Until a final determination regarding delegation of the USACE 404 wetland permitting program to the state of Florida is made, consolidation of the basin into the USACE Jacksonville district should not be actively pursued. If Florida were to assume responsibility for the 404 program from the USACE Jacksonville district, Florida would certainly not have authority to review projects in the Georgia portion of the basin. Responsibility for projects in Georgia probably would return to the Savannah district.

As an alternative the Cooperative Management Committee should review and comment to the appropriate agency on any application proposing projects in the basin. Both the USACE and SJRWMD permit processes already incorporate public notice and review procedures. The Cooperative Management Committee should make a formal agreement with these agencies to provide comments on proposed projects.

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APPENDIX A
ANIMAL AND PLANT SPECIES OF THE ST. MARYS RIVER BASIN

Table A-1. Endangered, Threatened, and Rare Vertebrate Animals of the St. Marys River Basin

Scientific Name	Common Name	Global Ranking	TNC		USFWS Status	FGFWF Status	CGA Status
			State Ranking				
			FL	GA			
<u>Fish</u>							
<i>Acantharchus pomotis</i>	Mud Sunfish	G5	S3	S3	—	—	—
<i>Acipenser brevirostrum</i>	Shortnose Sturgeon	G3	S2	S2	E	E	E
<i>Acipenser oxyrinchus</i>	Atlantic Sturgeon	G3	S2	S3	T	SSC	—
<i>Enneacanthus chaetodon</i>	Blackbanded Sunfish	G5	S3	S1S2	—	—	—
<i>Fundulus chrysotus</i>	Golden Topminnow	G5	—	S3	—	—	—
<i>Fundulus cinguiatus</i>	Banded Topminnow	G5?	S?	S3	—	—	—
<i>Lepisosteus platyrhincus</i>	Florida Gar	G5	—	S3?	—	—	—
<i>Lucania parva</i>	Rainwater Killifish	G5	—	S1	—	—	—
<i>Notropis emiliae</i>	Pugnose Minnow	G5	—	S3	—	—	—
<i>Umbra pygmaea</i>	Eastern Mudminnow	G5	S3	S3	—	—	—
<u>Amphibians and Reptiles</u>							
<i>Ambystoma cingulatum</i>	Flatwoods Salamander	G4?	S?	S3	T(S/A)	SSC	—
<i>Ambystoma tigrinum</i>	Eastern Tiger Salamander	G5	S3	S5	—	—	—
<i>Crotalus horridus</i>	Canebrake Rattlesnake	G5	S3	S5	—	—	—
<i>Drymarchon corais couperi</i>	Eastern Indigo Snake	G4T3	S3	S3	T	T	T
<i>Gopherus polyphemus</i>	Gopher Tortoise	G2	S2	S2	C2	SSC	—
<i>Kinosternon bauri</i>	Striped Mud Turtle	G5	S?	S2S3	—	E	—
<i>Lampropeltis calligaster</i>	Mole	G5	S2S3	S5	—	—	—
<i>Notophthalmus perstriatus</i>	Striped Newt	G3	S3	S2	—	—	—
<i>Ophisaurus compressus</i>	Island Glass Lizard	G4	—	S2	C2	—	—
<i>Pseudemys nelsoni</i>	Florida Red-bellied Turtle	G5	S?	S3	—	—	—
<i>Rana areolata</i>	Gopher Frog	G5	S3	S2S3	C2	SSC	—
<i>Stereochilus marginatus</i>	Many-lined Salamander	G4G5	S1	S4	—	—	—
<u>Birds</u>							
<i>Accipiter cooperii</i>	Cooper's Hawk	G4	S3?	S3S4	—	—	—
<i>Almophila aestivalis</i>	Bachman's Sparrow	G3	S?	S3	C2	—	—
<i>Ammodramus maritima pelonota</i>	Smyrna Seaside Sparrow	G4T2Q?	S2?	S5	C2	—	—
<i>Aramus quarauna</i>	Limpkin	G5	S3	S1S2	—	SSC	—
<i>Charadrius melodus</i>	Piping Plover	G2	S2	S1S2	T	T	—
<i>Cistothorus palustris griseus</i>	Worthington's Marsh Wren	G5T3	S2	S5	—	SSC	—
<i>Elanoides forficatus</i>	Swallow-tailed Kite	G5	—	S2	—	—	—
<i>Falco peregrinus</i>	Peregrine Falcon	G3	S2	S1	—	—	—
<i>Grus canadensis pratensis</i>	Florida Sandhill Crane	G5T2T3	S2S3	S2	—	T	—
<i>Haematopus palliatus</i>	American Oystercatcher	G5	S3	S2S3	—	SSC	—
<i>Haliaeetus leucocephalus</i>	Bald Eagle	G3	S2S3	S2	E	T	E
<i>Lateralus jamaicensis</i>	Black Rail	G3	S3?	S2?	—	—	—
<i>Mycteria americana</i>	Wood Stork	G5	S2	S2	E	E	—
<i>Nycticorax nycticorax</i>	Black-crowned Night Heron	G5	S3?	S3S4	—	—	—

Table A-1. Endangered, Threatened, and Rare Vertebrate Animals of the St. Marys River Basin

Scientific Name	Common Name	Global Ranking	TNC		USFWS Status	FGFWF Status	CGA Status
			State Ranking				
			FL	GA			
Birds (continued)							
<i>Nycticorax violaceus</i>	Yellow-crowned Night Heron	G5	S3?	S3S5	—	—	—
<i>Pandion haliaetus</i>	Osprey	G5	S3S4	S3	—	—	—
<i>Pelecanus occidentalis</i>	Brown Pelican	G5	S3	S2	—	SSC	E
<i>Picoides borealis</i>	Red-cockaded Woodpecker	G2	S2	S2	E	T	E
<i>Plegadis falcinellus</i>	Glossy Ibis	G5	S2	S2S3	—	—	—
<i>Rhychops niger</i>	Black Skimmer	G5	S3	S4	—	—	—
<i>Sterna antillarum</i>	Least Tern	G4	S3	S3S4	—	T	—
<i>Sterna maxima</i>	Royal Tern	G5	S3	S5	—	—	—
<i>Sterna nilotica</i>	Gull-billed Tern	G5	S?	S3	—	—	—
Mammals							
<i>Condylura cristata</i>	Star-nosed Mole	G5	—	S3?	—	—	—
<i>Myotis grisescens</i>	Gray Bat	G2	S1	S1	E	E	E
<i>Lasiurus inatermedius</i>	Yellow Bat	G4	S3	S2S3	—	—	—
<i>Neofiber alleni</i>	Round-tailed Muskrat	G3?	S3?	S3	C2	—	—
<i>Plecotus rafinesquii</i>	Southeastern Big-eared Bat	G4	S3?	S3S4	C2	—	—
<i>Sciurus niger shermani</i>	Sherman's Fox Squirrel	G5	S3	S5	C2	SSC	—
<i>Trichechus manatus</i>	Florida Manatee	G2?	S2	S1S2	E	E	E
<i>Ursus americanus floridana</i>	Florida Black Bear	G5	S3	S4	C2	T ^a	—

^a Applicable only to the subspecies *A. o. desotoi*.

^b Not applicable in Baker and Columbia counties and Apalachicola National Forest.

Note: USFWS Ranks

- C1 = candidate for federal listing, with enough substantial information on biological vulnerability and threats to support proposals for listing.
- C2 = candidate for listing, with some evidence of vulnerability, but for which not enough data exist to support listing.
- CE = commercially exploited.
- E = endangered.
- FGFWFC Ranks
- SSC = species of special concern.
- T = threatened.
- T(S/A) = threatened due to similarity of appearance.

TNC Global Ranks

- G1 = globally endangered.
- G2 = globally threatened.
- G3 = globally of concern.
- G4 = globally apparently secure.
- G5 = globally demonstrably secure.
- G#/Q# = questionable species.
- G#/T# = rank of taxonomic subgroup.
- G? = not yet ranked (temporary).

FNAI State Ranks

- S1 = regionally endangered.
- S2 = regionally threatened.
- S3 = regionally of concern.
- S4 = regionally apparently secure.
- S5 = regionally demonstrably secure.
- U = insufficient information available for ranking.

Source: Lynch and Baker, 1988.

Table A-2. Fishes of the St. Marys River Basin

Scientific Name	Common Name
<i>Petromyzon marinus</i>	Sea Lamprey
<i>Acipenser brevirostrum</i> ^a	Shortnose Sturgeon
<i>Acipenser oxyrinchus</i> ^a	Atlantic Sturgeon
<i>Lepisosteus osseus</i>	Longnose Gar
<i>Lepisosteus platyrhincus</i> ^a	Florida Gar
<i>Amia calva</i>	Bowfin
<i>Anguilla rostrata</i>	American Eel
<i>Alosa aestivalis</i>	Bluejack Herring
<i>Alosa sapidissima</i>	American Shad
<i>Umbra pygmaea</i> ^a	Eastern Mudminnow
<i>Esox americanus</i>	Redfin Pickerel
<i>Esox niger</i>	Chain Pickerel
<i>Notemigonus cyrsoleucas</i>	Golden Shiner
<i>Notrois sp.</i>	Shiner Sp.
<i>Notropis chalybaeus</i>	Ironcolor Shiner
<i>Notropis emiliae</i> ^a	Pugnose Minnow
<i>Notropis hypselopterus</i>	Shellfin Shiner
<i>Notropis maculatus</i>	Taillight Shiner
<i>Notropis petersoni</i>	Coastal Shiner
<i>Erimyzon sucetta</i>	Lake Chubsucker
<i>Minytrema melanops</i>	Spotted Sucker
<i>Ictalurus catus</i>	White Catfish
<i>Ictalurus natalis</i>	Yellow Bullhead
<i>Ictalurus nebulosus</i>	Brown Bullhead
<i>Ictalurus punctatus</i>	Channel Catfish
<i>Noturus gyrinus</i>	Tadpole Madtom
<i>Noturus leptacanthus</i>	Speckled Madtom
<i>Aphredoderus sayanus</i>	Pirate Perch
<i>Strongylura marina</i>	Atlantic Needlefish
<i>Cyprinodon variegatus</i>	Sheephead Minnow
<i>Fundulus chrysotus</i> ^a	Golden Topminnow
<i>Fundulus cingulatus</i> ^a	Banded Topminnow
<i>Fundulus lineolatus</i>	Lined Topminnow
<i>Leptoucania ommata</i>	Pigmy Killifish
<i>Lucania parva</i> ^a	Rainwater Killifish
<i>Gambusia affinis</i>	Mosquito Fish
<i>Heterandria formosa</i>	Least Killifish
<i>Poecilia latipinna</i>	Sailpin Molly
<i>Labidesthes sicculus</i>	Brook Silverside
<i>Morone saxatilis</i>	Striped Bass
<i>Acantharchus pomotis</i> ^a	Mud Sunfish
<i>Centrarchus macropterus</i>	Flier Sunfish
<i>Elassoma okefenokee</i>	Okefenokee Pygmy Sunfish
<i>Elassoma zonatum</i>	Banded Pygmy Sunfish
<i>Enneacanthus chaetodon</i> ^a	Blackbanded Sunfish
<i>Enneacanthus gloriosus</i>	Bluespotted Sunfish

Table A-2. Fishes of the St. Marys River Basin

Scientific Name	Common Name
<i>Enneacanthus obesus</i>	Banded Sunfish
<i>Lepomis auritus</i>	Redbreast Sunfish
<i>Lepomis gulosus</i>	Warmouth
<i>Lepomis macrochirus</i>	Bluegill
<i>Lepomis marginatus</i>	Dollar Sunfish
<i>Lepomis microlupus</i>	Redear Sunfish
<i>Lepomis punctatus</i>	Spotted Sunfish
<i>Micropterus salmoides</i>	Largemouth Bass
<i>Pomoxis nigromaculatus</i>	Black Crapple
<i>Etheostoma fusiforme</i>	Swamp Darter
<i>Mugil cephalus</i>	Striped Mullet
<i>Trinectes maculatus</i>	Hogchoker
<i>Goblonellus shufeldti</i>	Freshwater Goby
<i>Lutjanus giseus</i>	Gray Snapper
<i>Euclnostomus argenteus</i>	Spotfin Mojarra
<i>Paralichthys lethostigma</i>	Southern Flounder

^a Listed species. See Table A-1.

Source: Lynch and Baker, 1988.

Table A-3. Amphibians and Reptiles of the St. Marys River Basin

Scientific Name	Common Name
<u>Salamanders</u>	
<i>Ambystoma cingulatum</i> ^a	Flatwoods Salamander
<i>Ambystoma opacum</i>	Marbled Salamander
<i>Ambystoma talpoideum</i>	Mole Salamander
<i>Ambystoma tigrinum</i> ^a	Eastern Tiger Salamander
<i>Amphiuma means</i>	Two-toed Amphiuma
<i>Desmognatrus auriculatus</i>	Southern Salamander
<i>Eurycea bislineata</i>	Southern Two-lined Salamander
<i>Eurycea quadridigitata</i>	Dwarf Salamander
<i>Notophthalmus perstriatus</i> ^a	Striped Newt
<i>Notophthalmus viridescens</i>	Central Newt
<i>Plethodon glutinosus</i>	Slimy Salamander
<i>Pseudobranchius branchus</i>	Narrow-striped Dwarf Siren
<i>Pseudotriton montanus</i>	Rusty Mud Salamander
<i>Siren intemedia</i>	Eastern Lesser Siren
<i>Siren lacertina</i>	Greater Siren
<i>Stereochilus marginatus</i> ^a	Many-lined Salamander
<u>Frogs</u>	
<i>Acris gryllus</i>	Southern Cricket Frog
<i>Bufo quercicus</i>	Oak Toad
<i>Bufo terrestris</i>	Southern Toad
<i>Gastrophryne carolinensis</i>	Eastern Narrow-mouthed Toad
<i>Hyla chrysoscelis</i>	Gray Treefrog
<i>Hyla Cinerea</i>	Green Treefrog
<i>Hyla crucifer</i>	Spring Peeper
<i>Hyla Femoralis</i>	Pine Woods Treefrog
<i>Hyla gratiosa</i>	Barking Treefrog
<i>Hyla squirella</i>	Squirrel Treefrog
<i>Limaoedus ocularis</i>	Little Grass Frog
<i>Pseudacris nigrita</i>	Southern Chorus Frog
<i>Pseudacris ornata</i>	Ornate Chorus Frog
<i>Rana areolata</i> ^a	Florida Gopher Frog
<i>Rana catesbeiana</i>	Bullfrog
<i>Rana clamitans</i>	Bronze Frog
<i>Rana grylio</i>	Pig Frog
<i>Rana heckscheri</i>	River Frog
<i>Rana sphenocephala</i>	Southern Leopard Frog
<i>Rana virgatipes</i>	Carpenter Frog
<i>Scaphiopus holbrooki</i>	Eastern Spadefoot Toad
<u>Turtles</u>	
<i>Chelydra serpentian</i>	Common Snapping Turtle
<i>Delrochelys reticularia</i>	Florida Chicken Turtle
<i>Gopherus polyphemus</i> ^a	Gopher Tortoise
<i>Kinostern bauril</i>	Striped Mud Turtle

Table A-3. Amphibians and Reptiles of the St. Marys River Basin

Scientific Name	Common Name
<u>Turtles</u> (continued)	
<i>Kinostern subrubrum</i>	Eastern Mud Turtle
<i>Pseudemys floridana</i>	Florida Cooter
<i>Pseudemys nelsoni</i> ^a	Florida Red-bellied Turtle
<i>Sternotherus minor</i>	Loggerhead Musk Turtle
<i>Sternotherus odoratus</i>	Stinkpot Turtle
<i>Terrapene carolina</i>	Florida Box Turtle
<i>Trachemys scripta</i>	Yellow-bellied Turtle
<i>Trionyx ferox</i>	Florida Softshell Turtle
<u>Lizards</u>	
<i>Anolis carolinensis</i>	Green Anole Lizard
<i>Cnemidophorus sexlineatus</i>	Six-lined Racerunner
<i>Eumeces egregius</i>	Northern Mole Skink
<i>Eumeces fasciatus</i>	Five-lined Skink
<i>Eumeces Inexpectatus</i>	Southeastern Five-lined Skink
<i>Eumeces laticeps</i>	Broad-headed Skink
<i>Ophisaurus attenuatus</i>	Eastern Slender Grass lizard
<i>Ophisaurus compressus</i>	Island Glass Lizard
<i>Ophisaurus ventralis</i>	Eastern Glass Lizard
<i>Sceloporus undulatus</i>	Southern Fence Lizard
<i>Scincella laterale</i>	Ground Skink
<u>Snakes</u>	
<i>Agkistrodon piscivorus</i>	Florida Cottonmouth
<i>Cemophora coccinea</i>	Northern Scarlet Snake
<i>Coluber constrictor</i>	Southern Black Racer
<i>Crotalus adamnateus</i>	Eastern Diamondback Rattlesnake
<i>Crotalus horridus</i> ^a	Canebrake Rattlesnake
<i>Diadophis punctatus</i>	Southern Ringneck Snake
<i>Drymarchon corais couperi</i> ^a	Eastern Indigo Snake
<i>Elaphe guttata</i>	Corn Snake, Red Rat Snake
<i>Elaphe obsoleta</i>	Yellow Rat Snake
<i>Farancia abacura</i>	Eastern Mud Snake
<i>Farancia erytrogramma</i>	Rainbow Snake
<i>Heterodon platyrhinos</i>	Eastern Hognose Snake
<i>Heterodon simus</i>	Southern Hognose Snake
<i>Lampropeltis calligaster</i> ^a	Mole Snake
<i>Lampropeltis getulus</i>	Florida Kingsnake
<i>Lampropeitis triangulum</i>	Scarlet Kingsnake
<i>Liodytes alleni</i>	Striped Swamp Snake
<i>Masticophis flagelium</i>	Eastern Coachwhip
<i>Micrurus fulvius</i>	Eastern Coral Snake
<i>Nerodia cyclopion</i>	Green Water Snake
<i>Nerodia erythrogaster</i>	Red-bellied Water Snake

Table A-3. Amphibians and Reptiles of the St. Marys River Basin

Scientific Name	Common Name
<u>Snakes (continued)</u>	
<i>Nerodia fasciata</i>	Banded Water Snake
<i>Nerodia taxispilota</i>	Brown Water Snake
<i>Opheodrys aestivus</i>	Rough Green Snake
<i>Pituophis melanoleucus</i>	Florida Pine Snake
<i>Regina alleni</i>	Striped Crayfish Snake
<i>Regina rigida</i>	Eastern Glossy Crayfish Snake
<i>Rhadinaea flavilata</i>	Pine Woods Snake
<i>Seminatrix pygaea</i>	North Florida Black Swamp Snake
<i>Sistrurus muliarius</i>	Dusky Pigmy Rattlesnake
<i>Storeria dekayi</i>	Florida Brown Snake
<i>Storeria occipitomaculata</i>	Florida Red-bellied Snake
<i>Tantilla relicta</i>	Florida Crowned Snake
<i>Thamnophis sauritus</i>	Peninsula Ribbon Snake
<i>Thamophis sirtalis</i>	Eastern Garter Snake
<i>Virginia striatula</i>	Rough Earth Snake
<i>Virginia valeriae</i>	Eastern Smooth Earth Snake

^a Listed species. See Table A-1.

Source: Lynch and Baker, 1988.

Table A-4. Probable Breeding Birds of the St. Marys River Basin

Common Name	Common Name	Common Name
Pled-Billed Grebe	American Woodcock	Brown-headed Nuthatch
Brown Pelican ^a	Laughing Gull	Carolina Wren
Double-crested Cormorant	Gull-billed Tern ^a	Marsh Wren ^a
American Anhinga	Royal Tern ^a	Blue-gray Gnatcatcher
Least Bittern	Sandwich Tern	Eastern Bluebird
Great Blue Heron	Least Tern ^a	Wood Thrush
Great Egret	Black Skimmer ^a	American Robin
Snowy Egret	Rock Dove	Gray Catbird
Little Blue Heron	Mourning Dove	Northern Mockingbird
Tricolored Heron	Common Ground-dove	Brown Thrasher
Cattle Egret	Yellow-billed Cuckoo	Loggerhead Shrike
Green-backed Heron	Eastern Screech Owl	European Starling
Black-crowned Night-Heron ^a	Great Horned Owl	White-eyed Vireo
Yellow-crowned Night-Heron ^a	Barred Owl	Yellow-throated Vireo
White Ibis	Common Nighthawk	Red-eyed Vireo
Glossy Ibis ^a	Chuck-will's-widow	Northern Parula
Wood Stork ^a	Chimney Swift	Yellow-throated Warbler
Wood Duck	Ruby-throated Hummingbird	Pine Warbler
Black Vulture	Belted Kingfisher	Prairie Warbler
Turkey Vulture	Red-headed Woodpecker	Prothonotary Warbler
Osprey ^a	Downy Woodpecker	Swainson's Warbler
Swallow-tailed Kite ^a	Hairy Woodpecker	Common Yellowthroat
Mississippi Kite	Red-cockaded Woodpecker ^a	Hooded Warbler
Bald Eagle ^a	Northern Flicker	Yellow-breasted Chat
Cooper's Hawk ^a	Pileated Woodpecker	Summer Tanager
Red-shouldered Hawk	Eastern Wood-Pewee	Northern Cardinal
Red-tailed Hawk	Acadian Flycatcher	Blue Grosbeak
Wild Turkey	Great Crested Flycatcher	Indigo Bunting
Northern Bobwhite	Eastern Kingbird ^a	Painted Bunting
Black Rail ^a	Gray Kingbird	Rufous-sided Towhee
Clapper Rail	Purple Martin	Bachman's Sparrow ^a
King Rail	Northern Rough-winged Swallow	Field Sparrow
Common Moorhen	Barn Swallow	Seaside Sparrow ^a
Purple Gallinule	Blue Jay	Red-winged Blackbird
Limpkin ^a	American Crow	Eastern Meadowlark
Sandhill Crane ^a	Fish Crow	Boat-tailed Grackle
Wilson's Plover	Carolina Chickadee	Common Grackle
Killdeer	Tufted Titmouse	Brown-headed Cowbird
American Oystercatcher ^a	White-breasted Nuthatch	Orchard Oriole
Willet		House Sparrow

^a Listed species. See Table A-1.

Source: Lynch and Baker, 1988.

Table A-5. Mammals of the St. Marys River Basin

Scientific Name	Common Name
<i>Didelphis virginiana</i>	Virginia Opossum
<i>Sorex longirostris</i>	Southern Shrew
<i>Blarina carolinensis</i>	Southern Short-tailed Shrew
<i>Cryptotis parva</i>	Least Shrew
<i>Scalopus aquaticus</i>	Eastern Mole
<i>Condylura cristata</i> ^a	Star-nosed Mole
<i>Myotis grisescens</i> ^a	Gray Bat
<i>Myotis austroriparius</i>	Southeastern Bat
<i>Pipistrellus subflavus</i>	Eastern Pipistrelle
<i>Plecotus rafinesquii</i> ^a	Rafinesque's Big-eared Bat
<i>Eptesicus fuscus</i>	Big Brown Bat
<i>Lasiurus cinereus</i>	Hoary Bat
<i>Lasiurus borealis</i>	Red Bat
<i>Lasiurus seminolus</i>	Seminole Bat
<i>Lasiurus Intermedius</i> ^a	Yellow Bat
<i>Nycticeius humeralis</i>	Evening Bat
<i>Tadarida brasiliensis</i>	Brazilian Free-tailed Bat
<i>Dasyus novemcinctus</i>	Nine-banded Armadillo
<i>Sylvilagus floridanus</i>	Eastern Cottontail
<i>Sylvilagus palustris</i>	Marsh Rabbit
<i>Sciurus carolinensis</i>	Gray Squirrel
<i>Sciurus niger shermani</i> ^a	Sherman's Fox Squirrel
<i>Glaucomys volans</i>	Southern Flying Squirrel
<i>Geomys pinetis</i>	Southeastern Pocket Gopher
<i>Castor canadensis</i>	Beaver
<i>Neotoma floridana</i>	Eastern Woodrat
<i>Sigmodon hispidus</i>	Hispid Cotton Rat
<i>Reithrodontomys humulis</i>	Eastern Harvest Mouse
<i>Oryzomys palustris</i>	Marsh Rice Rat
<i>Peromyscus polionotus</i>	Oldfield or Beach Mouse
<i>Peromyscus gossypinus</i>	Cotton Mouse
<i>Ochrotomys nutallii</i>	Golden Mouse
<i>Microtus pinetorum</i>	Pine Vole
<i>Neofiber alleni</i> ^a	Round-tailed Muskrat
<i>Mus musculus</i>	House Mouse
<i>Rattus rattus</i>	Black or Roof Rat
<i>Rattus norvegicus</i>	Norway Rat
<i>Myocastor coypus</i>	Nutria
<i>Ursus americanus floridanus</i> ^a	Florida Black Bear
<i>Procyon lotor</i>	Raccoon
<i>Mustela vison</i>	Mink
<i>Mustela frenata</i>	Long-tailed Weasel
<i>Mephitis mephitis</i>	Striped Skunk
<i>Lutra canadensis</i>	River Otter
<i>Urocyon cinereoargenteus</i>	Gray Fox

Table A-5. Mammals of the St. Marys River Basin

Scientific Name	Common Name
<i>Vulpes vulpes</i>	Red Fox
<i>Canis latrans</i>	Coyote
<i>Felis rufus</i>	Bobcat
<i>Trichechus manatus</i> ^a	Florida Manatee
<i>Sus scrofa</i>	Feral Hog
<i>Odocoileus virginianus</i>	White-tailed Deer

^a Listed species. See Table A-1.

Source: Lynch and Baker, 1988.

Table A-6. Rare, Threatened, and Endangered Plants of the St. Marys River Basin

Scientific Name	Common Name	TNC Global Ranking	State Ranking		USFWS	FGFWFC Status	GA Status
			FNAI	GFWHIP			
<i>Balduina atropurpurea</i>	Purple Balduina	G2G3	S2	S?	3C	N	—
<i>Befaria racemosa</i>	Tarflower	G?	S?	S1?	—	—	—
<i>Calamovilfa curtissii</i>	Sand Grass	G1G2	S1S2	—	C2	CE	—
<i>Ctenium floridanum</i>	Florida Orange Grass	G2Q	S2	S?	3C	N	—
<i>Euphorbia exserta</i>	Euphorb	G3?	S3?	S?	—	—	—
<i>Hartwrightia floridana</i>	Hartwrightia	G2	S2	S1	C2	CT	T
<i>Hexastylis arifolia</i>	Heartleaf	G5	S3	S?	N	CT	—
<i>Lachnocaulon beyrichianum</i>	Southern Bog-Button	G2G3	S?	S?	—	—	—
<i>Linum westii</i>	Wests' Flax	G2	S2	—	C2	CT	—
<i>Litsea aestivalis</i>	Pondspice	G4G5	S2	S?	C2	CT	T
<i>Peltandra sagittifolia</i>	Soonflower	G3G4	S3	S?	N	N	—
<i>Pycnanthemum floridanum</i>	Florida Mountain-Mint	G3	S3	—	3C	N	—
<i>Rhapidophyllum hystrix</i>	Needle Palm	G3	S?	S?	—	—	—
<i>Rhynchospora punctata</i>	Pineland Beakrush	G1?	AU	S1	C2	N	—
<i>Sarracenia psittacina</i>	Parrot Pitcherplant	G3G5	S2	S?	—	—	T
<i>Salpingostylis coelestina</i>	Bartram's Ixia	G2	S2	—	PE	CE	—
<i>Uvularia floridana</i>	Florida Merrybells	G?	S1	S?	N	N	—
<i>Verbesina heterophylla</i>	Variable-leaf Crowbeard	G2	S2	—	C1	N	—
<i>Vernonia pulchella</i>	Ironweed	G2G4	S?	S?	—	—	—
<i>Xyris drummondii</i>	Drummond's Yellow-eyed Grass	G3	S2	S?	C2	N	—
<i>Aristida rhizomophora</i>	Florida Threeawn	G2G3	S2S3	—	N	N	—
<i>Asolepias viridula</i>	Southern Milkweed	G2	SL	—	C1	CT	—
<i>Drosera intesmedia</i>	Spoor-leaved Sundew	G5	S3	—	N	CT	—

Note: USFWS Ranks

- C1 = candidate for federal listing, with enough substantial information on biological vulnerability and threats to support proposals for listing.
- C2 = candidate for listing, with some evidence of vulnerability, but for which not enough data exist to support listing.
- CE = commercially exploited.
- E = endangered.
- FGFWFC Ranks
- SSC = species of special concern.
- T = threatened.
- T(S/A) = threatened due to similarity of appearance.

TNC Global Ranks

- G1 = globally endangered.
- G2 = globally threatened.
- G3 = globally of concern.
- G4 = globally apparently secure.
- G5 = globally demonstrably secure.
- G#/Q# = questionable species.
- G#/T# = rank of taxonomic subgroup.
- G? = not yet ranked (temporary).

FNAI State Ranks

- S1 = regionally endangered.
- S2 = regionally threatened.
- S3 = regionally of concern.
- S4 = regionally apparently secure.
- S5 = regionally demonstrably secure.
- U = insufficient information available for ranking.

Source: Lynch and Baker, 1988.

APPENDIX B
NATURAL AREAS IDENTIFIED BY THE NATURE CONSERVANCY

APPENDIX B

Natural Areas identified by The Nature Conservancy (Lynch and Baker 1988).

Site Number 1--Johnson Neck Natural Area

Nassau County, Florida

525 acres

Priority B

Excellent examples of maritime forest, estuarine tidal marsh; important feeding habitat for a number of wading birds including the wood stork.

Site Number 2--Martin's Island Natural Area

Nassau County, Florida

105 acres

Priority B

Excellent example of maritime forest; contains an active nesting colony of great blue herons and great egrets.

Site Number 3--Reids Bluff/Roses Bluff Natural Area

Nassau County, Florida

1,069 acres

Priority A

Last undeveloped bluff on lower St. Marys River; excellent example of longleaf pine sandhill community disjunct from other sandhill habitats; site contains populations of gopher tortoise and Bachman's sparrow as well as a number of other game and nongame wildlife species.

Site Number 4--Kingsland Swamp Natural Area

Camden County, Georgia

Priority A

3,300 acres

Priority A

Excellent example of an unusual bog forest community located in the alluvial floodplain of the St. Marys River; important habitat for black bear and other wide ranging mammals; also contains examples of tidal cypress-gum swamp forest; the type locality for Kingsland mucky peat, an unusual organic soil.

Site Number 5--Gilman Swamp Natural Area

Nassau County, Florida

981 acres

Priority A-B

Excellent example of tidal freshwater cypress-gum swamp forest; important habitat for black bear population.

Site Number 6--Cabbage Bend Swamp Natural Area

Nassau County, Florida

1,340 acres

Priority A-B

Excellent examples of tidal freshwater cypress-gum swamp forest and blackwater river bottomland hardwood forest; habitat for black bear and other wildlife species.

Site Numbers 7A, 7B, 7C--Varn Tract Natural Areas

Camden and Charlton Counties, Georgia

7A = 968 acres, 7B = 315 acres, 7C = 360 acres, Total = 1,643 acres

Priority A

Excellent examples of longleaf pine mesic flatwood communities including various subtypes with unusual species assemblages; habitat for the red-cockaded woodpecker and the gopher tortoise; site 7A and 7B also include significant acreage of tidal freshwater swamp forest community and examples of flood plain lakes.

Site Number 8--Prospect Landing Ravine Natural Area

Nassau County, Florida

12 acres

Priority B

Contains a high-quality mesic slope forest community containing populations of two listed plant species, *Hexastylis arifolia* and *Rhapidophyllum hystrix*.

Site Number 9--Hercules Tract Natural Area

Nassau County, Florida

1,180 acres

Priority A-B

Site contains the most extensive example of the sandhill natural community with natural groundcover vegetation known in the St. Marys River area; also excellent examples of the floodplain swamp forest and slope forest communities; habitat for gopher tortoise and fox squirrel; important wildlife habitat.

Status: Intact. Acquired by SJRWMD and managed by FGFWFC and FDOF.

Site Number 10--Railroad Slopes and Floodplain Natural Area

Nassau County, Florida

50 acres

Priority B

Excellent examples of dry-mesic slope forest, floodplain lake, and cypress-gum swamp forest communities.

Site Number 11--Moody Landing Floodplain Lake Natural Area

Charlton County, Georgia

45 acres

Priority A-B

One of the best examples of a natural floodplain lake containing an old-growth bald cypress stand.

Site Number 12--Brush Creek-Little Dunn Creek Natural Area

Nassau County, Florida

247 acres

Priority B

Contains good examples of floodplain forest and slope forest natural communities; also two relatively undisturbed floodplain lake communities.

Site Number 13--Section 33 Pond Natural Area

Nassau County, Florida

13 acres

Priority B

One of only a few known natural ephemeral ponds located in St. Marys River Basin; important breeding habitat for pineland amphibians.

Site Number 14--Section 40 Slope Forest Natural Area

Nassau County, Florida

160 acres

Priority A-B

Excellent example of a mesic slope forest community containing several special concern plant species; a good example of a floodplain lake.

Site Number 15--Toledo Flatwoods - Florida Natural Area

Nassau County, Florida

2,323 acres

Priority B

The most extensive stand of second-growth longleaf pine mesic flatwoods remaining in private ownership in Nassau County; provides habitat for a number of wildlife species including the Bachman's sparrow and Sherman's fox squirrel.

Site Number 16--Toledo Floodplain Natural Area

Charlton County, Georgia

404 acres

Priority A

Exceptional old-growth stand of pine-hardwood floodplain forest, not known elsewhere in St. Marys River Basin; also excellent example of old-growth floodplain swamp community.

Site Number 17--Toledo Flatwoods - Georgia Natural Area

Charlton County, Georgia

4,820 acres

Priority A

One of the largest contiguous tracts of high quality longleaf pine mesic flatwoods remaining in southeast Georgia - northeast Florida; habitat for at least five colonies of red-cockaded woodpeckers; habitat for a number of wildlife species including flatwoods salamander, Bachman's sparrow, Sherman's fox squirrel and black bear.

Site Number 18--Stave Branch Slopes Natural Area

Nassau County, Florida

115 acres

Priority B

Excellent example of mesic slope forest community with needle palm.

Site Number 19--Boone Creek Longleaf Flatwoods Natural Area

Charlton County, Georgia

4,540 acres

Priority A

One of the last large tracts of second-growth longleaf pine mesic flatwoods remaining in the region; superlative wildlife habitat values; populations of several special interest species including black bear, gopher tortoise, red-cockaded woodpecker, Bachman's sparrow, and Sherman's fox squirrel.

Site Number 20--Schoolhouse Bay Flatwoods Natural Area

Charlton County, Georgia

320 acres

Priority A-B

Excellent example of longleaf pine mesic flatwoods community; one colony of red-cockaded woodpeckers.

Site Number 21--Stokes Tract Natural Area

Nassau County, Florida

98 acres

Priority A-B

The most extensive stand of old-growth, near-virgin longleaf pine mesic flatwoods known in the St. Marys River Basin.

Site Number 22--Stokeville Flatwoods Natural Area

Charlton County, Georgia

270 acres

Priority B

An excellent example of second-growth longleaf pine mesic flatwoods; population of Bachman's sparrow; important wildlife habitat.