AUCILLA RIVER SYSTEM

SURFACE WATER IMPROVEMENT AND MANAGEMENT PLAN

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SUWANNEE RIVER WATER MANAGEMENT DISTRICT APRIL 1991

SURFACE WATER
IMPROVEMENT AND MANAGEMENT PLAN

AUCILLA RIVER SYSTEM

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I. EXECUTIVE SUMMARY

A. PURPOSE. The purpose of the Suwannee River Water Management District (SRWMD) Surface Water Improvement and Management (SWIM) program for the Aucilla River system is to provide the framework for a coordinated, interagency approach to the protection of basin surfacewater resources and related aquatic habitats.

B. PRIORITY ISSUES. Priority issues to be identified by the SWIM planning process for the Aucilla River include:

Definition of existing conditions;

Identification and reduction of the impacts of point and nonpoint sources of pollution and minimizing the degradation of aquatic habitats; and

Maintenance of the ecological integrity of the natural systems associated with the aquatic ecosystems of the basin.

C. STRATEGIES. Since the overall water quality of the Aucilla River is good, the emphasis of the SWIM program will be towards protection from degradation by identifying those land uses which have or may impact surfacewater quality. Specific management strategies have been identified for the SWIM program for the basin that will establish a comprehensive monitoring network to examine 1) changes in land use within the basin, 2) water quality parameters to characterize the river and identify impacts, and 3) the plant and animal communities that comprise the various ecosystems of the river system.

The integration of these three strategies will help identify the causes of water quality problems, locate environmentally sensitive areas, and provide technical information through supporting watershed management. A comprehensive data base for the basin is essential for development of a sound management plan and management strategies to implement the SWIM protection emphasis for the Aucilla River. Additional emphasis will be placed on identifying those land uses which have impacted or may impact surfacewater quality and working through interagency coordination with regulatory and land management agencies and local governments to reduce impacts to surface water.

Programs that will implement the protection and management strategies for the basin will include:

Resource Monitoring. Projects in this program will collect the data needed to make sound management decisions.

Resource Planning. Projects in this program will investigate, analyze, provide data, and report on processes in the basin; - investigate specific impacts; and support efforts to adaress those impacts.

Program Implementation. This program will actually apply the data and results of monitoring and planning efforts to management of the SWIM priority waters. Key elements in this program include:

Public Education. An informed public is perhaps the most basic necessity for the protection and preservation of surface waters. Projects in this program will concentrate on public education and on providing concerned members of the public with an avenue for participation in the surface water management process.

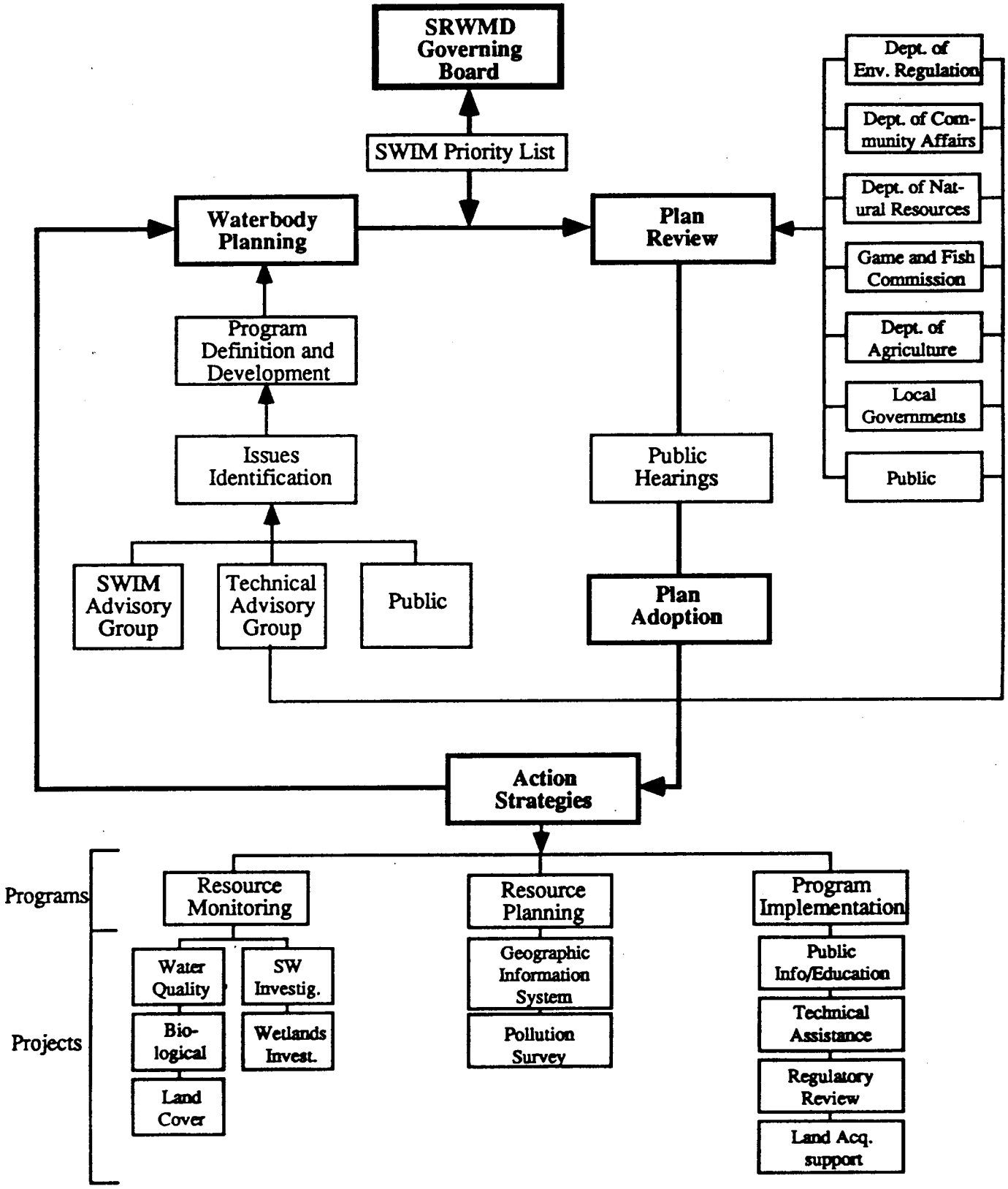
Local Government Technical Assistance.Providing local units of government with the data and expertise needed to make sound land use decisions.

Regulatory Review. A number of factors relevant to the protection of basin surfacewater resources fall under the jurisdictional responsibilities of other agencies. The SRWMD will endeavor to work with these agencies to achieve the goals and objectives of the SWIM plan for this basin.

Land Acquisition. Technical data developed through the SWIM program will aid evaluation of lands for acquisition under the Water Management Lands Trust Fund Program. Projects within this program will provide guidance to the Acquisition program for the Aucilla River Basin.

Figure 1 presents the organizational diagram of the Suwannee River Water Management District's SWIM Program components, including the above programs and their interaction within the general organization of the SRWMD.

Figure 1: SRWMD SWIM Organizational Framework



II. BACKGROUND INFORMATION

The SWIM Act, Section 373.451, Florida Statutes, was passed into law by the Florida Legislature, effective July 1, 1987. The general purpose of the Act is to restore or protect the quality of surface waters in the State of Florida and to provide an on-going planning and coordination mechanism to maintain surfacewater quality. The Legislature delegated the responsibility of evaluating, prioritizing, and developing management plans for the state's surface waters to the five water management districts, in cooperation with other state agencies.

Two principle factors are recognized within the Act as contributing to the decline in the ecological, aesthetic, recreational, and economic value of the state's surface waters. Point and nonpoint sources of pollution, and the destruction of the natural systems which protect and purify surface waters and provide habitat for fish and wildlife are problems to be addressed through the SWIM program.

The Florida Department of Environmental Regulation (DER) is responsible for general supervision of all aspects of the SWIM program, including the review of each water management district's annual surfacewater priority list, the development of management plans and proposed revisions, and the program monitoring necessary to ensure the implementation of each SWIM program. To assist in this process, DER adopted Rule 17-43, Florida Administrative Code (F.A.C.), which provides a uniform format for surfacewater priority lists, management plans, and the procedures for administering program funds.

Although the water management districts of the state play the major role in the development and implementation of the SWIM program, the SWIM Act is intended to be a cooperative effort among several state agencies. Prior to the adoption of each management plan by the SRWMD's Governing Board, each plan proposal will be sent to the SWIM advisory groups which include representatives from DER, Department of Agriculture (DOA), Department of Natural Resources (DNR), Florida Game and Fresh Water Fish Commission (FGFWFC), and local units of government for review (see Appendix A). Review, adoption, and revision procedures will follow DER Rule 17-43 requirements. In addition to public participation on SWIM advisory groups, plans will be presented at public meetings within communities in close proximity to each priority water.

District SWIM Goals for Management

The SRWMD advocates a regional approach to water management. The need for a regional approach to water quality issues is based on one simple fact: surfacewater bodies, groundwater aquifers, and

their related natural systems are not confined to political jurisdictions. The lands that drain into a water body, defined as the watershed or basin, are often comprised of the jurisdictions of many levels of government. Unless all the levels of government within a basin are in close cooperation, the overall quality of a water body cannot be assured. Therefore, the management of these systems must extend beyond political jurisdictions.

In recognition of the importance of natural systems in protecting surfacewater quality, the following goals have been established for the SRWMD SWIM program for the Aucilla River:

1. To protect the ecological integrity of natural surfacewater systems;

2. To enhance the environmental, aesthetic, scenic, and recreational value of surfacewater systems;

3. To reduce the impact of point and nonpoint sources of pollution on water quality, fish, and wildlife;

4. To preserve habitat for native plants, fish, and wildlife, including threatened and endangered species; and

5. To promote the wise public use of surface waters and the accrual of economic benefits consistent with protection and restoration objectives.

District SWIM Objectives for Management

The objectives of the District SWIM plans for the priority water bodies are intended to be developed, implemented, and revised on an annual basis. To achieve the above goals, the following objectives have been identified for the SWIM *planning* process for the Aucilla River Basin. These objectives constitute initial *planning* efforts, and represent the District's emphasis for the first two to three years. These objectives are:

1. Defining existing conditions in the basin through the development of baseline studies in land cover and use, water quality, and aquatic biology;

2. The collection, structuring, and analysis of the necessary data for establishing and supporting management initiatives;

3. Identification of protection, restoration, and management issues specific to the Aucilla River Basin;

4. The development, implementation, and monitoring of management plans which address the above issues through interagency and intergovernmental coordination at the state, regional, and local levels;

5. The revision of SWIM management plans and the priority list accordingly.

Planning for District surface waters is a three step process. First, an evaluation of the District's surface waters is conducted to develop a **priority list** of those systems needing restoration or protection. Second, once this list has been developed, **management plans** are to be written for priority waters to restore and/or protect water quality. Third, management plans **will** be **implemented and monitored**, including annual evaluations and modifications as needed.

In.1990, the SRWMD revised its SWIM Priority List. The most notable change from the original 1987 SWIM Priority List was the inclusion of the Steinhatchee River as part of the Coastal Rivers Basin and the addition of the Aucilla and Waccasassa rivers as fifth and sixth, respectively, on the District's Priority List. Using the criteria set forth by DER, the following water bodies were prioritized by the SRWMD in cooperation with DER, DNR, FGFWFC, and local units of government.

Priority Water 1: *Suwannee River System* (including all major tributaries except the Santa Fe), an Outstanding Florida Water, selected because of the high quality of the system and the threat of pollution from point and nonpoint sources of pollution and development in environmentally sensitive areas;

Priority Water 2: Santa *Fe River System* (including all tributary streams and lakes Sampson, Rowell, Crosby, Hampton, Altho, Santa Fe, and Little Santa Fe), an Outstanding Florida Water, selected because of high fish and wildlife values and potential threats from nonpoint sources in the basin;

Priority Water 3: *Coastal Rivers Basin* (including the Econfina, Fenholloway, and Steinhatchee rivers, and Spring Warrior and Sanders creeks), selected because of high fisheries and recreational values and threats from nonpoint sources in the basin;

Priority.Water 4: *Alligator Lake*, selected because of degraded water quality, concern over possible connection to the groundwater system, recreational demands, and urbanization of the basin.

Priority Water 5: *Aucilla River* (including the Wacissa River), selected because of unique Outstanding Florida Water river system, with high fish, wildlife, and recreational values, and a portion of the river corridor threatened by development;

Priority Water 6: *Waccasassa River* (including tributaries), selected because of relatively undisturbed condition of the coastal river with high fish, wildlife, and estuary values.

A portion of the river has been designated as an Outstanding Florida Water.

Since land use is a key determinant in the quality of a basin's water bodies, much of the responsibility for surfacewater protection lies with local governments. Generally, local land use decisions govern the type and density of development within a basin. Since there may be a number of local jurisdictions within a basin, regional and state agencies should influence local land use decisions that could affect the water bodies. It is only through the assistance of regional and state agencies that the regional protection of natural resources can be addressed.

Interagency coordination, coupled with local government assistance and public information, is the cornerstone of the SWIM process. The SRWMD established a SWIM Technical Advisory Group (TAG) to identify regional management issues, exchange data and information, and review management proposals. The TAG is comprised of representatives from the SRWMD, DER, FGFWFC, DNR, the Department of Agriculture and Consumer Services, Division of Forestry (DOF), the North Central Florida Regional Planning Council (NCFRPC), the U.S. Department of Agriculture, Soil Conservation Service (SCS), the United States Geological Survey (USGS), the Army Corps of Engineers (COE), the Florida State University (FSU), and the University of Florida (UF).

To receive public input, the SRWMD presented the priority list and management plans at public meetings scheduled throughout the District. Public hearings and meetings were held in the major cities located near water bodies to allow local elected officials and the general public the opportunity to review and comment on SWIM program proposals.

The local units of government within the SRWMD region historically have not had an active land use planning mechanism. Most of the local governments have no planning staff or agency and only limited land use controls. This situation has sufficed for most localities until recently. Mandates of the 1985 Local Government Comprehensive Planning and Land Development Regulation Act (Ch. 163, F.S.) now require a more integrated planning approach at the state, regional, and local level. Local government comprehensive plans and land development regulations are required to provide for the protection of ground and surface waters and their related natural systems. It is essential that the SRWMD SWIM plans be written from the onset for the purpose of being incorporated into local and regional plans and regional programs, and that coordination be maximized to increase the efficiency and effectiveness with which the planning efforts are implemented.

The combination of the above factors--the need for a regional approach to resource management, land use demands, and the overall planning needs of the region--serves to emphasize the relevance and importance of the SWIM planning process.

Location and Size

The Aucilla River originates in Brooks County in southern Georgia, and flows southward approximately 69 miles to the Gulf of Mexico (Figure 2). The Aucilla River lies within and forms the natural boundary between Jefferson, Madison, and Taylor counties. From the Georgia-Florida state line to where U.S. Highway 90 crosses the Aucilla, the river does not have a well defined channel, and flows in a valley approximately one mile wide, of lakes, marshes, and sinkholes. During periods of high rainfall, the river overflows this channel and broadens to cover the entire valley, giving it the appearance of a lake. South of U.S. 90, the river becomes entrenched in surficial sediments and a well defined channel conveys runoff from the surrounding terrain.

Further downstream, the river flows in a steep walled valley cut into the Suwannee Limestone. At this point, the Aucilla River, which is frequently lined by outcropping dolomitized limestone, is well known for its karst features, white water shoals, and limestone rapids. Below Lamont, near the Scanlon gauging station, the river goes underground and flows through a series of solution features. The river reemerges and rises in the vicinity of Nutall Rise, where it is joined by the spring-fed Wacissa River. In the area where the rivers join, the river and the floodplain broaden as the river proceeds on a southerly course to its confluence with Apalachee Bay in the Gulf of Mexico.

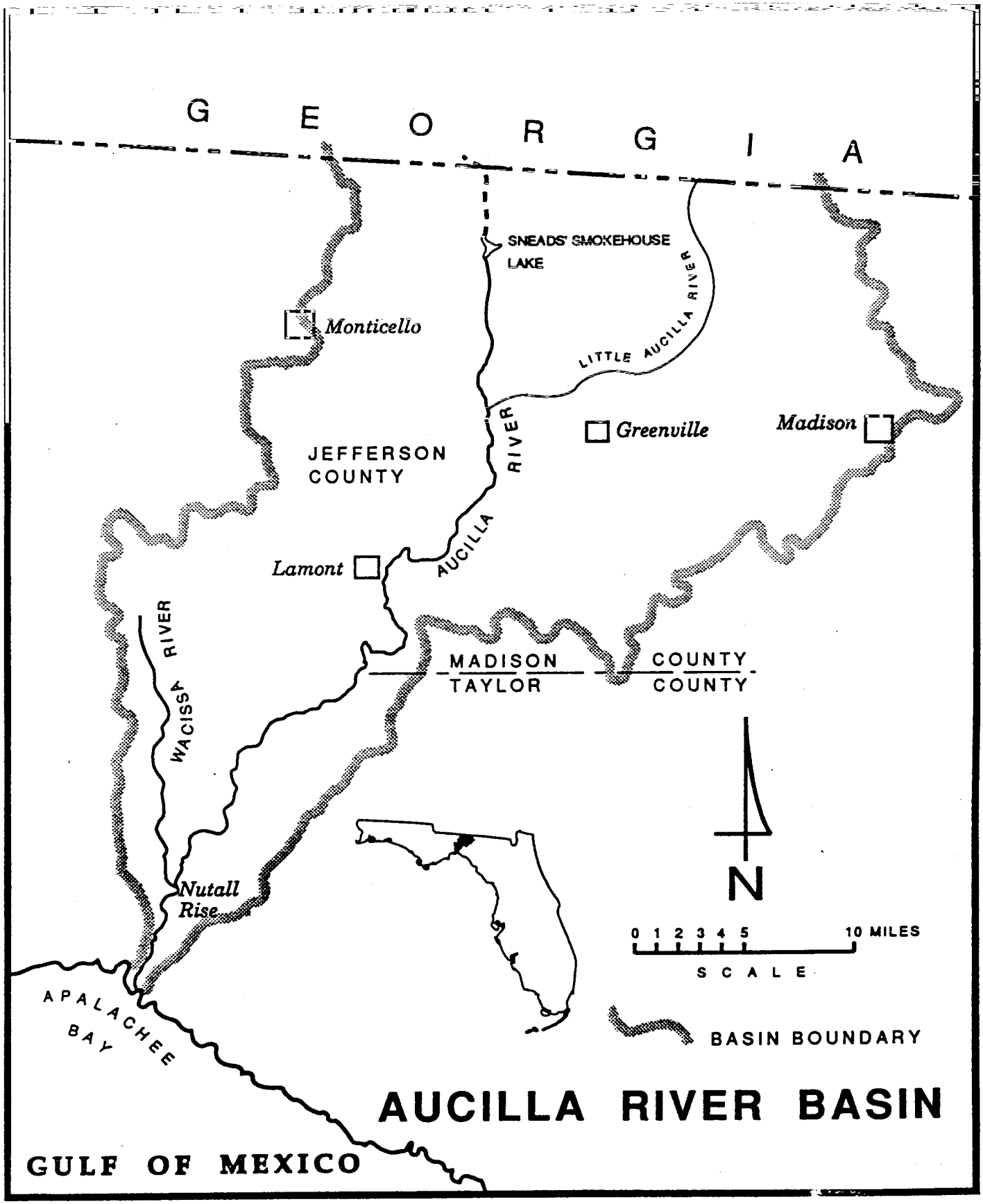
The Aucilla and Wacissa rivers have been designated as Outstanding Florida Waters (DER) and as a State Recreational Canoe Trail (DNR). The final three miles of the river's corridor lies within the confines of the protected St. Marks National Wildlife Refuge. The entire coastline of the basin and Apalachee Bay lie within the Florida Big Bend Coastal area, a coastal area of low-energy beach represented by salt marshes, flats, and prevalent oyster bars at the mouth of the Aucilla River.

The full extent of the Aucilla River Basin encompasses 544,867 acres draining a basin of approximately 733 square miles. The river drains extensive hardwood swamp forest and wetland areas in the northern highlands and coastal lowlands and is characteristically a blackwater river, charged by tannic and organic acids and high color values from drainage of swamps and marshes.

Climate

The climate of the Aucilla River Basin is humid and subtropical, with an average annual temperature of about 68 degrees Fahrenheit. The months of June through August are typically the warmest months, and December and January are usually the coldest. The mean minimum temperature for January is 38 degrees and the mean

Figure 2: Location Map of the Aucilla River Basin



maximum for July is 90 degrees. The growing season averages 270 days per year.

The average annual rainfall in the Aucilla Basin is 57 inches, with most of the precipitation falling during the wet months of June through September. Much of the summer rainfall is in the form of intense afternoon and evening thundershowers of short duration and associated with localized convectional thunderstorms. The months of October and November typically are the driest, with an average of about two inches per month. Rainfall during winter and spring is less intense, of longer duration, and spread more evenly throughout the basin.

Physical Settina of the Aucilla River Basin

Physiography and Topography

The Aucilla River Basin lies within the Northern Highlands and Gulf Coastal Lowlands physiographic regions. The Northern Highlands physiographic division in the Aucilla River watershed is further subdivided into the Tallahassee Hills, which are erosional remnant hills and ridges with elevations up to 260 feet NGVD. The Tallahassee Hills subregion covers the largest area in the basin and includes an area extending south from the Florida-Georgia state line to the southern part of Jefferson County at a well-defined southward facing escarpment known as the Cody Scarp. The Cody Scarp is evident in the south part of the basin, running approximately on an east west line across the community of Wacissa. From this point at the Cody Scarp to the coastline, the Gulf Coastal Lowlands comprise the remainder of the Aucilla River Basin. The Gulf Coastal Lowlands extend from the Cody Scarp to the coastline and is composed of three marine terraces and shorelines the Wicomico, Pamlico, and Silver Bluff that range from 10-45 feet in altitude and were formed during interglacial stages of sea level rise during the Pleistocene (Ice Age) Epoch. The present coastline of the Aucilla River Basin is a low or zero energy shore line. It is a very irregular saltmarsh and is dissected by several streams that originate at the inner edge of the coastal marshes. The absence of sand beaches and barriers along the coastline is attributed to the lack of wave activity and sand supply.

The topography of the Aucilla River Basin is predominantly erosional remnants of upland hills and ridges of the Tallahassee Hills that range from 45-160 feet above mean sea level in the upper two thirds of the basin. The lower one third of the basin consists of coastal lowland swamp and coastal marsh wetland with land surfaces ranging from sea level at the coast to more than 40 feet above mean sea level as the basin rises in elevation following the ancient Pamlico and Wicomico shore line and terraces northward to the Cody Scarp. The topography of the Aucilla Basin is dissected by the nearly level to gently sloping river valley lowlands of the Aucilla and Wacissa River valley floodplains.

In the Tallahassee Hills portion of the basin, clayey sediments 30 to 200 feet thick overlie the limestones. The topography is a combination of gully-eroded stream valley and depressions resulting from limestone solution subsidence that lends the rolling and pronounced topography to this *area* of the basin. Lakes have formed in the beds of many small streams that have cut through the overlying clayey clastic sediments, into the porous soluble limestone below. The resistance to percolation of rainfall by clay soils in the Northern Highlands soils has developed a rolling and relieved topography from the scouring action of surface runoff. Lake basins have formed from the downward and lateral solution of ground water and is the reason for the many karstic origin depressions in the Madison and Jefferson County portion of the basin lying in the Tallahassee Hills.

Hydrogeology

Four basic geological formations are present in the Aucilla River Basin. They are: the Suwannee Limestone, the St. Marks Formation, the Hawthorn Formation, and the Miccosukee Formation. A fifth layer is the Pleistocene sand deposits which, in varying thicknesses, cover most of the Suwannee Limestone south of the Cody Scarp.

In the Aucilla River Basin, the Floridan Aquifer is Oligocene age Suwannee Limestone. According to Burnson (1982), the Floridan Aquifer in the Aucilla River Basin exists in the northern basin above Lamont as a confined artesian aquifer system. Below the Cody Scarp and extending to the coast the Floridan exists as an unconfined aquifer. In the Coastal Lowlands portion of the basin, the Floridan is under water table conditions. The absence of a significant thickness of overburden allows rainwater to directly infiltrate the aquifer, allowing the river corridor to function as a recharge area. River corridors may function as both points of local recharge and discharge, depending on the relationship between the river stage and the potentiometric surface of the aquifer. When the potentiometric surface is the higher of the two, springs and seeps may discharge into the river corridor.
This is evidenced in the Wacissa River where 12 named springs form the river's headwaters and comprise the first magnitude Wacissa springs group. Springs are also present along the Aucilla River southward from Nutall Rise to the Gulf of Mexico. Rivers tend to occupy zones of structural weakness, and acidic surface waters often increase the porosity of limestones in these areas through dissolution. Greater dissolution of limestone occurs in this portion of the river through contact with acidic ground and surface waters. Near the confluence of the Wacissa and Aucilla rivers, the Wacissa becomes a multi-channeled stream. Bedrock in this area is dolomitized and silicified and offers considerable resistance to erosion; consequently, the stream, in seeking zones of less resistance, has formed multi-channels. The Aucilla is also unique in that, in its lower segment, it has a series of

sinkholes and, at one point, goes underground into a solution feature and reemerges down river in the vicinity of Nutall Rise.

In the Northern Highlands portion of the basin, the water table aquifer is confined and based in clay beds of the Hawthorn Formation (Burnson 1982). Water levels in this aquifer are usually at, or near, the surface. Water table recharge is direct via rainfall, and discharge may be downward or lateral to swamps, lakes, and streams. Significant recharge occurs in this part of the basin where overburden is leaky, discontinuous, or absent. Recharge to the Floridan Aquifer occurs along the Aucilla River and in swamp areas where leakage occurs through the overlying sediments of the Hawthorn and Miccosukee Formations.

The Suwannee Limestone is covered in the lower third of the basin by a thin veneer of Pleistocene sand. From just below Lamont to just north of Nuttal Rise, it is almost continually exposed along the banks of the Aucilla River either as silicified boulders, or as massive dolomite beds. Both the silicified boulders and dolomitized limestone beds form rapids along this segment of the river. The Suwannee Limestone is also exposed in the bed of the Wacissa River, from just below its headwaters, near the town of Wacissa, to the confluence with the Aucilla River above Nuttal Rise. Geologic cross sections show that the Suwannee Limestone is continuous under most of the basin. Outcrops of dolomitized Suwannee Limestone also form the bottom of the Gulf of Mexico and is exposed in outcroppings off the coast of Jefferson and Taylor counties. In the northern Highlands portion of the basin, the Aucilla lies in the Hawthorn Formation underlain by a thin bed of St. Marks Formation and Suwannee Limestone. Below the Cody Scarp, the Suwannee Limestone is covered unconformably by Pleistocene deposits and scattered outliers of the Hawthorn Formation. It is here that the Aucilla River cuts steep walled river valley and channels into the underlying Suwannee Limestone.

Surfacewater Characteristics

The Aucilla River is the largest surfacewater stream in the basin. Originating in Brooks County, Georgia, the river flows through an area of hardwood forests and lowland swamps for 69 miles to the Gulf of Mexico. The river is fed by several tributary streams, all of which drain extensive upland swamps and wetlands. Tributary streams of the Aucilla are, from north to south, Little Aucilla River, Gum Creek, Wolf Creek, Raysor Creek, Beasley Creek, Jones Mill Creek, and Cow Creek. The major tributary to the Aucilla is the Wacissa River. Near the community of Wacissa, the Wacissa River headwaters originate from a group of twelve named springs of the first-magnitude Wacissa Springs Group. The clear, spring-fed waters of the Wacissa and are shallow and swift moving in some **areas.** The Wacissa River does not have defined banks but appears as a wide flowing valley lined by dense river swamps and trees. As the spring-fed waters of the Wacissa near the Aucilla, it becomes stained by tannic acids. Tributaries to the Wacissa are Welannee Creek and Low Creek.

Two prominent surfacewater lakes that exist in the upper basin are Windom Lake and Sneads Smokehouse Lake. Windom Lake is located in the northeast corner of Jefferson County near the Georgia border and is about 129 acres in size, at 125 feet. above mean sea level. Sneads Smokehouse Lake (created by a dam on the Aucilla) is located just south of Lake Windom and nears 100 acres in size. In the lower basin, 3.5 miles southwest of Lamont, Lake Iamonia, lying at 64 feet above MSL and covering 164 acres, is a prominent surfacewater feature.

The average discharge of the Aucilla River for the period 1976-89, as measured by the USGS gauging station, 14 miles upstream from the mouth at the Scanlon gauging station, was 567 cubic feet per second (c.f.s) (see Table 1). Upstream at a second USGS gauging station, .6 miles southeast of Lamont, the average discharge over the period between 1950-79 was 340 cfs. A maximum peak discharge of 11,500 cfs was recorded at the Lamont station in 1973. The Wacissa River flows at an average rate of 360 cfs. Peak river ,flows typically occur in the winter, during frontal rain events, and in September, towards the end of the summer wet season.

Table 1. Discharge data for the periods of record for the Aucilla River discharging to the Gulf of Mexico within the basin. Data adapted from USGS (1989).

RIVER (STATION)	P.O.R (yrs)	MEAN DISCHARGE (cfs)	**MAX.** DISCHARGE (cfs)	MIN. DISCHARGE (cfs)
Aucilla River (near Scanlon FL.)	13 **1976-89**	567	7,460	31
Aucilla River (at Lamont FL.)	29 1950-79	340	11,500	0-river dry

Locations in parentheses indicate locations of discharge stations where data were collected. Periods of record were not the same for each station. Maximum discharges are *highest* recorded for the period of record.

The Aucilla River is a blackwater river characterized by teacolored water with a high content of particulate and dissolved organic matter derived from the drainage of hardwood swamp forests and marshes. Based on water quality data compiled by the DER 305(b) report, the river has good water quality overall (Figure 4) with few sources of pollution. The river's water quality meets Class III standards for water bodies intended for recreation, and propagation and maintenance of a healthy, well-balanced population of fish and wildlife. The river currently meets Class III standards with good water quality (1990 305(b) Report, DER).

The upper reaches of the Aucilla River originate in swampy areas that are naturally low in pH and dissolved oxygen. The Little Aucilla has low DO, pH, and slightly elevated nutrient levels and results in a water quality index rating of fair. An industrial point source is located above this area; however, the water quality problems could be of natural origin (DER 1988 305b Report). All reaches of the Aucilla River below this area show levels of pH and DO consistent with unpolluted flowing streams. The Wacissa River is designated an Outstanding Florida Water and also has good water quality.

Sediment discharge as measured by the USGS for the Aucilla River 14 miles upstream from the mouth, indicates the relationship between stream discharge and sediment loading (see Figure 3). Sediment loading contributions may occur from eroding cropland and forestry operations in the Aucilla River Basin. Its impact on water quality will be a focus of the SWIM water quality monitoring program. In 1987, the United States Department of Agriculture Soil Conservation Service estimated that some 4,096 tons of topsoil sediment would reach the Aucilla River from severely eroding cropland in the basin. The same report estimated an additional 33,600 tons-of sediment would be deposited to stream systems, wetlands and natural lakes in the Aucilla River Basin. Agricultural and silvicultural impacts in the upper basin may also contribute to increased loadings of suspended solids to the river. Future forestry and agricultural operations occurring in the basin may constitute a potential source of nonpoint pollution to the Aucilla River. These activities in the basin will have to be monitored closely to reduce future sediment loading to the river. Potential impacts of nonpoint pollution will be addressed as the water quality and biological monitoring programs are implemented.

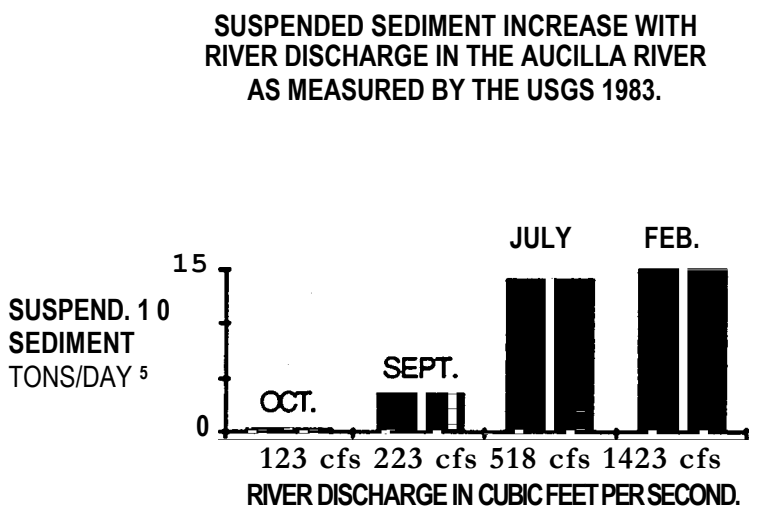


Figure 3. Suspended sediment loading to the Aucilla River.

Current knowledge of water quality in the Aucilla River, however, is very general due to limited long-term monitoring in the basin. The SRWMD has not monitored water quality in the Aucilla River. Past water quality data will be compiled as part of the District's SWIM effort to identify nonpoint sources of pollution and to establish ambient water quality profiles. In 1991, DER *will* monitor a network on the Aucilla and Little Aucilla rivers. If these stations are maintained beyond 1991, at a frequency comparable to the existing SWIM networks in other basins of the District, efforts *will* be made to establish data transfer and analysis mechanisms rather than to duplicate monitoring programs.

Water quality monitoring efforts were conducted by DER as part of the Big Bend Coastal Area Basin Assessment during FY 1987-88. Preliminary results according to DER indicate excellent water quality. The data resulting from this effort will be utilized by the District to better define existing water quality conditions in the basin. These data *will* be useful to help determine the extent and location of land uses that impact water quality. Water quality data has been collected by DER and USGS for the basin. The baseline and historical significance of these data will serve as a benchmark to compare future monitoring and preservation efforts.

Soils

The soils of the Aucilla River Basin are currently being mapped as part of the detailed comprehensive soil survey by the U.S. Department of Agriculture, SCS. Special consideration will be given to identify and locate soils in the basin that are highly erodible, so that future forestry and agricultural operations and land uses can take these features into account to prevent erosion and siltation impacts to the river.

The detailed soil survey mapping units from the SCS comprehensive soil survey *will* be compiled for each basin and digitized into the District's Geographical Information System (GIS) database during the first year of the SWIM program for the Aucilla River Basin. This database will be used for analysis of sensitive areas and erosion potential of agricultural lands to better preserve the integrity of soils and determine the development suitability of activities in the Aucilla River Basin.

The major soils associations of the basin are described below. SOILS OF

THE RIDGES, LOW RIDGES, AND BROAD FLATS.

Chipley-Alpine-Ortega: Nearly level to gently rolling, somewhat poorly drained to excessively drained soils.

Albany-Plummer-Blanton: Nearly level to gently sloping, poorly drained and moderately well drained soils.

SOILS OF THE ROLLING UPLANDS

Orangeburg-Dothan-Fuquay: Nearly level to rolling, well drained soils, loamy to sandy throughout.

Orangeburg-Face ville-Dothan: Gently undulating to rolling, well drained loamy to sandy soils with a loamy to clayey subsoil.

Dothan-Orangeburg-Red Bay: Nearly level to sloping, well drained sandy and loamy soils with loamy subsoils.

Leon-Mascotte-Rutledge: Nearly level, poorly drained soils with weakly cemented sandy subsoil, underlain by loamy subsoil.

Ardilla-Leefield-Stinson: Nearly level to gently sloping, somewhat poorly drained and moderately well drained sandy soils with loamy subsoils.

SOILS OF THE RIVER DRAINAGES, DEPRESSIONS, AND SWAMPS.

Surrency-Pelham-Pamlico: Nearly level, very poorly drained sandy and organic soils.

Byars-Pelham-Leefield: Nearly level to gently sloping, very poorly drained to somewhat poorly drained soils along drainageways; with sandy or clayey subsoils.

Plummer Flooded: Nearly level, poorly drained soils that are sandy to a depth of 68 inches and loamy below.

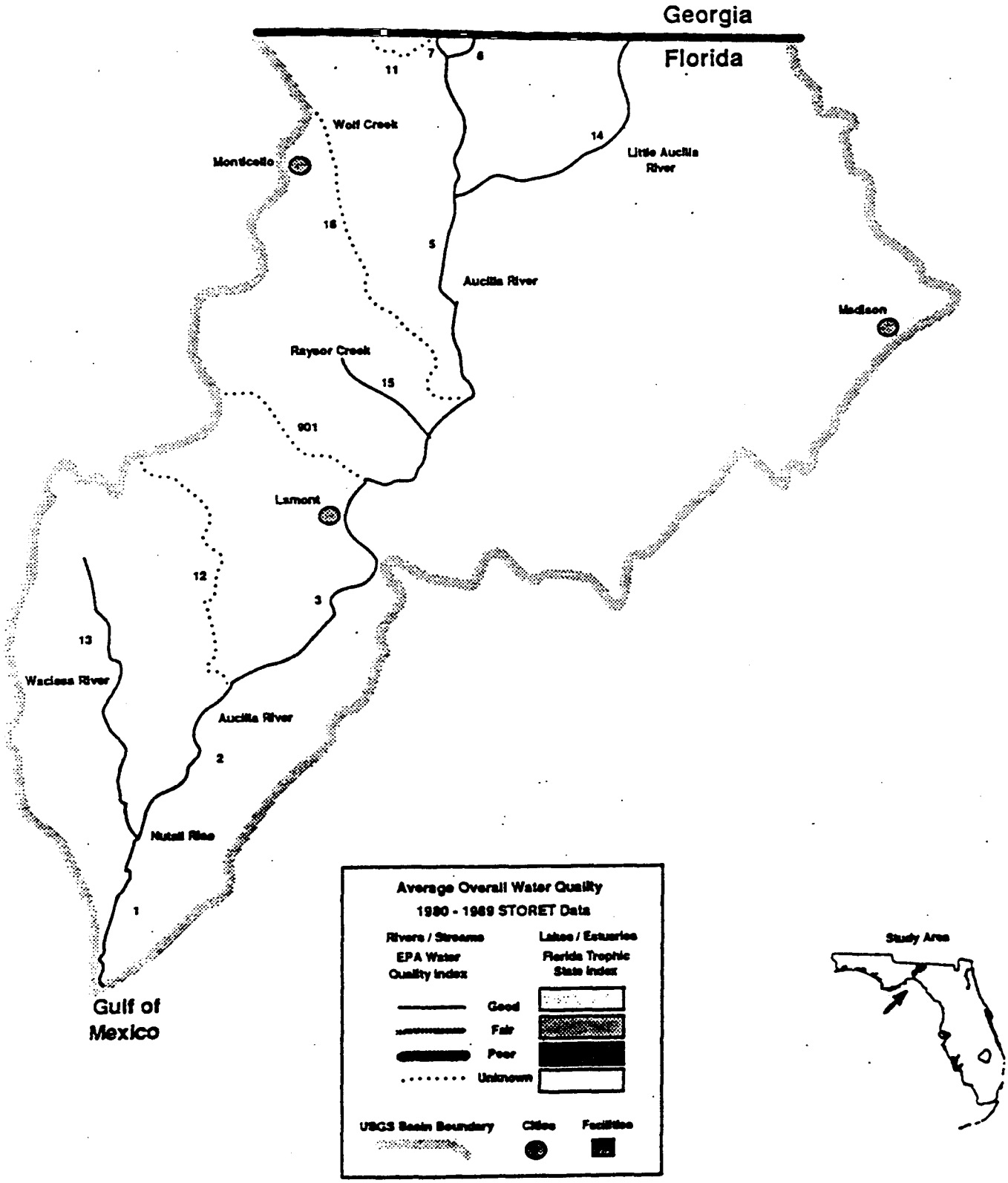
SOILS OF THE FRESHWATER SWAMPS AND COASTAL MARSHES.

Freshwater Swamp: Nearly level poorly drained soils subject to prolonged flooding.

Freshwater Swamp-Shallow to limestone: Nearly level, very poorly drained soils, shallow to limestone, subject to prolonged flooding.

Saltwater Marsh and Swamp: Nearly level very poorly drained soils subject to frequent flooding by tidal waters and somewhat excessively drained sandy soils.

Figure 4. Overall Surfacewater Quality of the Aucilla River Basin.



Source: 1990 DER Water Quality Asaosmeent 305b Report PAGE

Ecological Features

A diverse range of habitat types is found in the Aucilla River Basin. Discussion in this section will focus particularly on the aquatic and wetland habitats, since these are most directly related to water quality and to fish and wildlife resources which depend upon the availability of suitable aquatic habitat.

Aquatic Ecosystems

The three major aquatic ecosystems in the basin are the riverine, lacustrine (lake), and coastal ecosytems. The roles these fulfill in the basin include:

1. Fish and Wildlife Habitat

2. Floodwater Storage and Attenuation

3. Protection of Water Quality

4. Economic Benefits (commercial and recreational fisheries, etc.)

The riverine ecosystems of the basin consist of the Aucilla River itself and its tributary streams. Major features associated with the river and its tributaries which contribute to their ecological value include the riparian (river-bank) and floodplain swamp forests and various natural features associated with the river channel. The riparian and floodplain swamps of the basin include cypress dominated systems in the headwater portions of the river (e.g., around Sneads Smokehouse Lake); mixed bottomland hardwood forests in the middle reaches and tributaries (vegetated with cypress, black gum, water hickory, river birch, red maple, willow, sweetgum and ash); and hydric hammocks in the lower basin dominated by various types of broad-leaved deciduous hardwoods (gum, tupelo, maple and oak), cabbage palm, red cedar, and cypress. These forests contribute leaf litter to the streams, which constitute an important basic food source in the aquatic food chain of the river. River channel features include:

the littoral (submerged bank) areas--which may provide important fisheries habitat;

snag areas--submerged logs and brush which have been shown to be important habitat areas for riverine invertebrates, particularly in black-water rivers like the Aucilla;

shoal areas--which are known to support abundant and diverse populations of benthic invertebrates. Some of the shoal areas along the middle portion of the Aucilla River are vegetated with submergent plants, such as strap-leaf sagittaria (Sagittaria *kurziana*), which adds to their habitat value;

in the clear water of the Wacissa River, beds of submergent aquatic vegetation are important river channel habitat, plants such as eelgrass *(Vallis-neria americana),* strap-leaf sagittaria, coontail *(Ceratophyllum sp.),* and southern naiad *(Najas guadalupensis)* are found in these beds.

Sampling of benthic invertebrate populations at two riverine sites in the basin was conducted in 1987-1989 by DER; a main stem site on the Aucilla River (at U.S. 19/27) and a site on the Little Aucilla River. Both of these were freshwater sites. Invertebrate taxa richness at the river mainstem site was 104 species in 1988. This is comparable to other unpolluted streams along this area of the coast. Taxa richness at the Little Aucilla River site was somewhat less (49 species), suggesting some type of water quality degradation (L. Banks, DER, Jacksonville office, pers. comm.). The river would benefit from additional studies of its aquatic communities.

Lakes, or lacustrine systems, are the second major type of freshwater aquatic ecosystem in the basin. Lakes are found scattered throughout the basin. Two of the larger lakes in the basin are Lake Iamonia and Sneads Smokehouse Lake (actually a portion of the Aucilla River). These lake systems exhibit variable limnological characteristics, principally depending upon the physiographic region in which they are located (Canfield, 1981). Lakes located in the Tallahassee Hills physiographic region, in the north portion of the basin, are generally characterized as acidic, soft-water lakes of low mineral content (Canfield, 1981). Most of these lakes are moderately productive, oligo-mesotrophic or mesotrophic systems (Canfield, 1981). Lakes located in the lower portion of the basin, in the coastal lowlands physiographic region, tend to exhibit highly variable water quality and trophic state characteristics (Canfield, 1981), depending upon localized geology and the water source for an individual lake. Other than a limited amount of water quality sampling, lakes in this basin have been poorly studied, and aspects of their biology are unknown.

Coastal aquatic habitats in the basin include the estuary of the Aucilla River and the contiguous coastal marine waters of Apalachee Bay. Major coastal aquatic habitats include oyster reefs, brackish water submerged vegetation beds, salt and brackish marshes (discussed below), seagrass beds and unvegetated flats areas. McNulty, et al. (1972) provided some information on coastal resources, including locations of oyster beds, seagrass, and marsh habitat mapping data.

Seagrass areas are prominent submerged features in Apalachee Bay; the embayment which forms the estuarine area fed by the St. Mark's, Aucilla, Econfina, and Fenholloway rivers. Zimmerman and Livingston (1979) characterized these habitats. Dominant seagrasses inshore are shoal grass *(Halodule wrightii),* widgeon grass *(Ruppia maritima)* and Halophila *engelmannii.* Offshore areas

are dominated by manatee grass *(Syringodium filiforme)* and turtle grass *(Thalassia testudinum).* Other components of the grassbed flora include various species of siphonaceous algae (Halimeda, Caulerpa, and others) and red drift algae *(Gracilaria spp., Digenia simplex, Laurencia poitei).* McNulty, et al. (1972) and the Florida Marine Research Institute (K. Haddad, pers. comm.) provided mapped data on seagrass acreage in the area. Livingston (1984) summarized nine years of research in Apalachee Bay seagrass beds. He noted that the structure of the fish communities in Apalachee Bay were highly dependent upon the submerged grass beds. Relatively minor alterations in coastal water quality led to considerable changes in grass-bed structure, with corresponding changes in the fish community (Livingston, 1984). The fish and wildlife value of seagrass beds in Florida has been well documented and is summarized by Zieman (1982).

Additional coastal aquatic habitats include limited areas of oyster bars/reefs and limestone outcroppings ("hard bottom"). Some of the hardbottom areas may be colonized by various species of sessile marine invertebrates, including soft corals *(Leptogorgia sp.),* sponges, bryozoans, various molluscs and barnacles. These areas provide additional fisheries habitat and are the preferred habitat of selected fish species of commercial or recreational importance (sheepshead, snappers, and red drum).

Palustrine Habitats (Wetlands)

Palustrine habitats are a major component of the land cover in this basin. This basin contains a wide variety of wetland types, including:

a. forested wetlands dominated by bald or pond cypress *(Taxodium distichum or T.ascendens,* respectively).

b. forested wetlands dominated by various types of broadleaf evergreen hardwoods (including sweet bay, *Magnolia virginiana,* southern magnolia, *M. grandiflora,* and loblolly bay, *Gordonia lasianthus).*

c. forested wetlands dominated by various types of hardwoods, including broad-leaved deciduous hardwoods (oaks, various gums, river birch, red maple) and broad-leaved evergreens, such as the bays.

d. herbaceous marshes, ranging from sedge bogs, through wet prairies (vegetated with *Pontedaria, Sagittaria spp.,* sawgrass and other sedges and grasses) to permanently flooded marshes dominated by floating leaved aquatics such as Nymphaea and Nuphar.

e. oligohaline marshes vegetated by sawgrass, bulrushes *(Scirpus* spp.), and needlerush *(Juncus roemerianus)*

f. coastal salt marshes vegetated by smooth cordgrass *(Spartina alterniflora)*, needlerush and marsh hay cordgrass *(S. patens)*

These wetland resources fulfill a variety of functions including fish and wildlife habitat, flood storage, runoff filtration, coastal storm surge buffering and nursery areas for economically important species (commercial and recreational fisheries and game species). Wharton, et al. (1982) and Crance and Ischinger (1989) summarized *information* on the fish and wildlife value of southeastern U.S. forested wetlands. Characterization and discussions of the value of coastal wetlands in the area is provided in Subrahmanyam and Drake (1975), Subrahmanyam, et al. (1976) and Weinstein (1979). Mapped information on wetland acreage was summarized by the National Oceanic and Atmospheric Administration (NOAA) in 1986 for coastal areas, by the U.S. Fish and Wildlife Service, National Wetlands Inventory and by a recent land cover mapping effort conducted by the SRWMD.

Transitional and Terrestrial Habitats

The transitional habitats (those ecotone areas between wetland and upland communities) and the terrestrial habitats of the basin serve a variety of roles for basin wildlife and people. Major transitional habitat types include:

Coastal wet prairie/flatwoods areas. These areas, located landward of the coastal marshes, are vegetated with *Spartina* bakeri, various sedges, cabbage palm, red cedar, slash pine *(Pinus elliotii)*, salt bushes *(Baccharis* spp.) and wax myrtle.

Lowland hardwood hammocks. These areas are landward of forested riparian swamps and along the landward edge of forested wetland areas. They are vegetated with live and laurel oak, pignut hickory, loblolly pine, cedar, and cabbage palm.

These transitional areas provide additional landscape diversity and serve to protect the integrity of the adjacent wetlands.

Upland or terrestrial habitats in the basin include a variety of forest types, ranging from eastern deciduous hardwood forests in the northern portions of the basin to pine flatwoods elsewhere. Smaller areas of the basin are vegetated with more xeric plant communities such as longleaf pine sandhill, xeric hammocks and mixed upland forests.

Wildlife and Protected Species

Wildlife use of the resources of the basin is considered to be high, due to the relatively undeveloped nature of the area. A number of species with protected status are known to utilize the basin. For purposes of the SWIM planning process, "protected status" includes species listed as endangered, threatened, or

under review for listing by the U.S. Fish and Wildlife Service; those listed as endangered, threatened or species of special concern by the **FGFWFC**; plant species listed as endangered, threatened, or rare in the Preservation of Native Florida Flora Act; and species listed in the six-volume series "Rare and Endangered Biota of Florida", published by the Florida Committee on Rare and Endangered Plants and Animals (FCREPA). A detailed listing of these types of species is provided in **FGFWFC** (1990). A listing of selected vertebrate species which have been observed or reported from the basin is provided in Table 2. Note that this list is not intended to be exhaustive but simply to point out some of the more familiar species.

Table 2. List of protected species and their status which have been observed or reported to occur in the Aucilla River Basin.

English names only are used. E = endangered; T = threatened; UR = under review; SSC = species of special concern. * - documented breeding sites in basin.

SPECIES	STATUS (federal;state)	
American alligator	T	SSC
Alligator snapping turtle	UR	SSC
Bald eagle*	E	T
Swallow-tailed kite	UR	
Snowy egret		SSC
Tricolor heron		SSC
Reddish egret	UR	SSC
Little blue heron		SSC
Limpkin	-	SSC
Florida sandhill crane		T
Gulf sturgeon	UR	T
Wood stork	E	E
Brown pelican		SSC
Florida mouse	UR	SSC
Black Bear	UR	T
West Indian manatee	E	E

Basin Demographic and Economic Profile

The Aucilla River Basin is sparsely populated, with the majority of the population in and around the Aucilla River existing in the small towns or settlements of Lamont, Aucilla, Wacissa, Wakeenah, Nutall Rise, Thomas City, Dills, and Ashville. The incorporated communities of Greenville and Madison in Madison County, and Monticello in Jefferson County, make up the largest population centers in the basin with a combined 1987 population estimate of

7,474. The 1980 population of the basin was estimated to be 10,696 persons, approximately 5.4 percent of the SRWMD total population. The projected 1990 population for the Aucilla River Basin was estimated to reach 12,664 (SRWMD 1980). Madison, Taylor, and Jefferson counties exhibited low to moderate growth rates from 1980 to 1987 and this trend is likely to continue at a similar pace.

Population density in the basin is among the lowest in the state. The average gross density for the basin, expressed in persons per square mile, was 18 in 1980. The 1988 density was estimated at 20 persons per square mile, indicating an average annual increase of about 2.5 percent. This density places the basin in 59th place in the state's density ranking. The lowest ranking in the state is Liberty County at 67th place, with a density of six persons per square mile (BEBR 1988).

Average population increase for the three counties was approximately 10 percent over the 1980 population, or an increase of 4,428 (BEBR, 1988). Population growth for the county was well behind the 24 percent increase for all of Florida during the same period (FSA, 1988). These figures include the total county area, and it must be recognized that the population residing in the basin is likely to increase at a slower rate due to the undeveloped nature of the area. The population is expected to remain very rural in character with growth centered around the urbanized areas of Monticello in the extreme northwest of the basin in Jefferson County, and in the urban corridor between Madison and Greenville in Madison County. In 1987, 76% of Jefferson, 69% of Madison, and 55% of Taylor county residents lived in the unincorporated rural areas of these counties (BEBR, 1987). Few homes exist along the banks of the Aucilla River with most of the river corridor remaining largely undeveloped and free of residential structures. In addition, large landholdings by silvicultural interests as well as state, federal, and water management district conservation and preservation use landholdings restrict the availability of land in the basin.

COUNTY	TOTAL FOREST PRODUCTS INCOME	TOTAL FARM PRODUCTS INCOME
JEFFERSON	$ 130,586	$210,712
TAYLOR	$2,910,189	$ 2.0, 261
MADISON	$ 220.189	$320.628

Table 3. Total Forest and *Farm* Products Income by County - 1984 Data adapted from Florida Statistical Abstract 1988.

Historically, the economy of the Aucilla River Basin in Jefferson, Taylor, and Madison counties has been agriculturally oriented with activities including row and truck crops, dairies, other

livestock, and timber production. Crops produced are: watermelons, soybeans, corns, peanuts, small grain, fallow, and nut crops. Light industries in the basin include pulpwood and saw timber operations. The predominant land use in the basin presently exists primarily as silviculture and forestry activities. Forestry accounts for the largest land use in the three county area, although farm products income is a major part of the local economy in Jefferson and Madison counties (see Table 3). Principle timber products harvested in this area are used for conversion to lumber, logs, and pulpwood.

Table 4. Agricultural Land Use by acre for the three counties in the Aucilla River Basin.

COUNTY	TOTAL COUNTY	CROPLAND	PASTURELAND	FORESTLAND
	ACREAGE	ACRES	ACRES	ACRES
JEFFERSON	389,760	69,183	18,000	258,890
MADISON	454,400	85,000	45,000	287,961
TAYLOR	677,120	16.922	150,000	501,000

Data adapted from Florida Statistical Abstract, 1988

Timber is a highly developed and extensively used economic resource in the basin. Silviculture is the predominant land use in the basin with the Procter and Gamble and St. Joe Paper Companies being the largest landowners along the Aucilla. Silviculture production is the largest land use in the basin as illustrated by acreages presented in Table 4. The pine plantations being managed by silvicultural interests are comprised primarily of slash pine, which is used for a variety of wood and cellulose products.' Figure 5. illustrates the timber produced in the three counties for the most recent year that data has been compiled for the year (1984). Pulpwood production accounts for 56-57 percent of timber use in Madison and Jefferson counties. The remaining 43-44 percent of these counties' timber production is used for saw timber. Taylor County uses 85 percent of its silvicultural production for pulpwood.

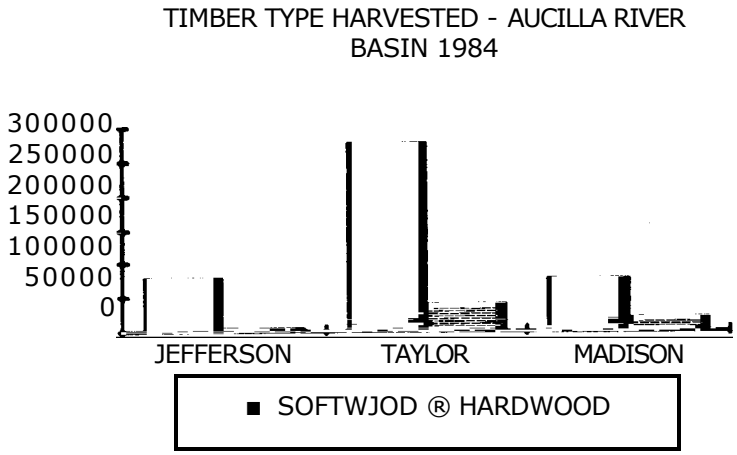


FIGURE 5. Timber type harvested 1984 from Jefferson, Madison, and Taylor counties. Data are volume in thousands of cubic feet. Adapted from Florida Statistical Abstract, 1988.

Recreational fishing is important to fishermen who enter Apalachee Bay and the St. Marks National Wildlife Refuge through the Aucilla River below Nuttal Rise. Recreational fishing in the rivers and lakes of the basin is important, with 1,457 pleasure boats being registered in Madison and Jefferson counties and a total of 25 commercial boats. In neighboring Taylor and Wakulla counties, a total of 715 commercial boats were registered in 1986 and may be used in a limited way in Apalachee Bay near the river's mouth. Very little is known of the magnitude of sport fisheries in the basin. In 1981, the FGFWFC reported that 56.0 percent of the fish in the Aucilla by number were sport fishes.

Commercial fishing is also important along the coast with commercial scalloping, blue crabs, and saltwater mullet harvesting being the principal species harvested. Commercial shrimp boats also frequent the deeper water of Apalachee Bay and sport fishing off the reefs is also popular. There are no water dependent or water related uses in the coastal zone except for commercial and recreational fishing in the Aucilla River and St. Marks National Wildlife Refuge.

Basin Land and Resource Use Patterns

Land Uses

Land uses within the Aucilla River Basin consist primarily of cropland and pastureland, and forestry in the upper basin. The Federal Government and the State of Florida own much of the coastal marshes and bottomland hardwood forests in the coastal lowlands portion of the basin. Much of the land along the Aucilla River is owned by Procter and Gamble Cellulose and the St. Joe Paper Companies, and its use is for commercial silvicultural operations. Commercial silvicultural landholding accounts for as much as 74 percent of t?-ie total land area of the basin. This land

exists as pine flatwoods, upland hardwood, swamp, and forested wetland.

Inland of the river corridor in Jefferson and Madison counties, agriculture in the form of row crops and pastureland is a prevalent land use. Soil productivities are very high for cropland in these two counties and this is reflected in the fact that up to 28 percent of the total land area in the two-county area is devoted to cropland-and pastureland acreage. Silviculture interests in the basin plan to use their landholdings for timber production and reforestation while maintaining a natural buffer along the river as dictated by adherence to BMPs.

Over 100,000 acres of land in the lower basin, below U.S. 98, lie in the Aucilla Wildlife Management area, which is managed by the FGFWFC as a conservation and recreation land use. Almost all of the Wacissa River corridor is managed as part of the wildlife Management Area. South to the Gulf of Mexico, the remainder of the basin lies within the St. Marks National Wildlife Refuge and has been designated as and is protected by the Federal Government as wilderness. The SRWMD has acquired 1,899 acres of floodplain property that is managed for conservation land use. Urban uses within the corridor are restricted to the small village of Lamont, homes and fish camps at Nuttal Rise, and small private landholdings scattered along the river corridor. The community at Lamont has the greatest potential for residential landholdings and development. Residential development has taken place along the river; however, no major urban areas exist within the river corridor.

As a whole, recent land use and land cover information within the Aucilla River Basin is not available at a level of detail sufficient for determining potential sources of pollution. Recent land cover information was developed by the SRWMD in 1988/1989 using LANDSAT Thematic Imagery Mapping. This information will be put into a digital format readable by the District's GIS, and subsequently into the SWIM data base. The land use/cover monitoring program will provide a basinwide perspective on the type and pattern of land cover and use, as well as providing detailed, current data. Special emphasis will be placed on three areas: the communities along the river corridor since they can most directly impact the river, the large acreages in the basin that are presently in silvicultural use, and high aquifer recharge areas and pollution potential areas that are managed in intensive agriculture and dairy operations and future industrial parks.

Water Use

The Aucilla River is a very popular canoeing river in Florida's Big Bend, offering a challenging series of rapids to the experienced canoeist. The river forms the political boundary between Jefferson, Madison, and Taylor counties, and historically from 1100 to 1700 A.D., the river separated the Apalachee Indians from the Ustaga tribe. The surface waters of the Aucilla are used

extensively for recreational fishing and boating. Several sport fisheries camps and a county and state owned boat ramp provide access to the river. The Wacissa River corridor is also widely used for all types of passive recreation, including canoeing and boating. Public access to the river is at Nuttal Rise where the river joins the Aucilla and a state-owned access at Goose Pasture. A county-maintained park exists at the head springs near the village of Wacissa. The Wacissa Springs group is a popular area for recreation. Both the Aucilla and the Wacissa have been designated as Outstanding Florida Waters by DER and as State Recreational Canoe Trails administered by DNR. Canoe trails as designated by DNR are given to rivers noted for their outstanding scenery and "almost pristine conditions." The rivers also serve as a recreational passage to the St. Marks National Wildlife Refuge and Apalachee Bay.

The primary source of potable water in the basin is ground water from the Floridan Aquifer. Wells tapping the Floridan Aquifer supply most of the water for public, domestic, irrigation, and industrial needs. The greatest water use in Jefferson and Madison counties is for agricultural and irrigational uses (Figure 6), with an increasing demand for residential water use as the next largest demand. The SRWMD is currently developing an expanded water use tracking and monitoring program. This water use program will aid charting changes and demands in domestic and public, agricultural, and forestry uses of ground water in the basin.

AGRICULTURAL, PUBLIC SUPPLIED AND TOTAL GROUNDWATER WITHDRAWALS
IN MILLION GALLONS PER DAY BY COUNTY - 1985

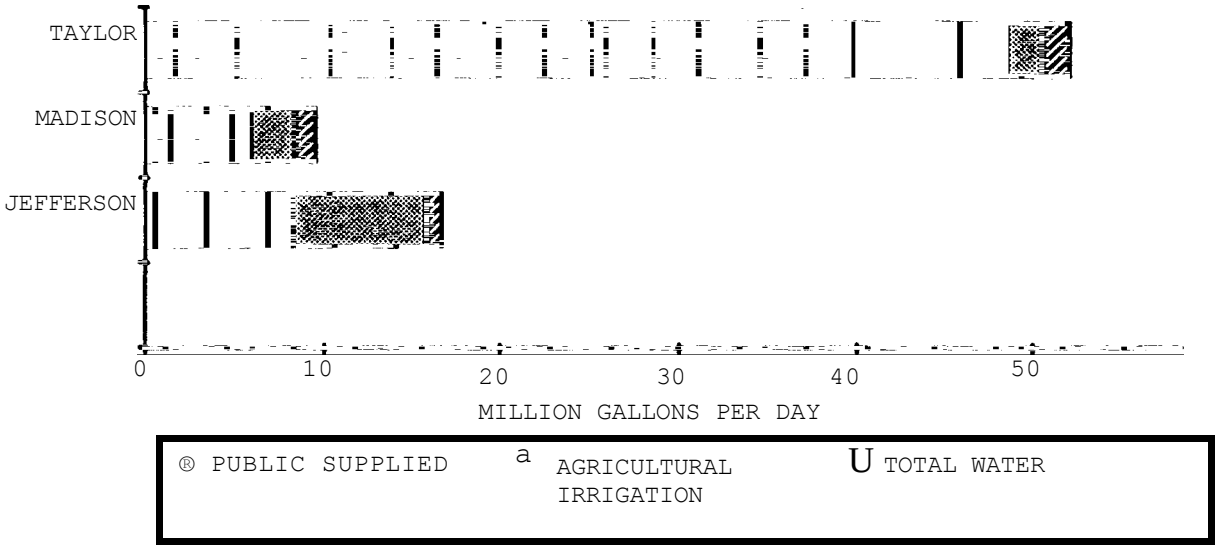


Figure 6. Total Groundwater Withdrawals by County. Data adapted from USGS Water Withdrawals, Uses and Trends in Florida 1985. Note: Total groundwater withdrawals for Taylor County include Commercial-Industrial withdrawals of 48.63 mgd for pulp mills not in the Aucilla River Basin.

The Aucilla and Wacissa river's undeveloped and pristine natures lend to a wealth of biological values. The natural state of the rivers provide habitat for an abundance of wildlife. Many species depend on riparian corridors and swamp areas for forage, travel, cover, and habitat. Near the mouth, where the habitat is protected by the St. Mark's National Wildlife Refuge, there are known concentrations of Bald Eagles, wading birds, waterfowl, shorebirds, and Mississippi Kites. Wildlife along the Wacissa is also plentiful and a *known concentration* area for wading birds and reptiles and amphibians. The coastal marsh and submerged grass beds along the coast are known to fulfill important ecological roles as nursery areas for many fishery species of economic importance.

Other Management Initiatives

Other management initiatives in the basin (beyond SWIM) are oriented towards preservation of the coastal resources of the basin, and the *conservation* and preservation of lands along both the Aucilla and Wacissa River corridors. The majority of the coastal area in the basin is contained in the St. Marks National Wildlife Refuge. This extensive federally protected area extends from Apalachee Bay in the Gulf of Mexico to some 2-4 miles up river and stretches the whole coastline length of the basin in Jefferson and Taylor counties. The refuge is designated wilderness with no development permitted.

Above St. Marks National Wildlife Refuge lies the 172,541 acre Aucilla Wildlife Management area contained within Jefferson and Taylor counties, and to the west Wakulla County. Approximately 74,077 acres are in Jefferson County and bordered to the south by St. Marks Wildlife Refuge. The area is a cooperative conservation and public hunting area owned by the St. Joe Paper Company, Procter & Gamble Cellulose (formerly Buckeye Cellulose), the *Container* Corporation of America, the U.S. Fish and Wildlife Service, and the Nature *Conservancy.* The lower half of the Wacissa River corridor is contained in this management area.

North of the Wildlife Management area to the head springs of the Wacissa River, approximately 20,258 acres border the Aucilla and Wacissa river corridors in the Wacissa and Aucilla River Sink (CARL Project). At present, 13,179 acres of this project have been acquired from the Nature *Conservancy* and borders the springfed Wacissa River. The *remaining* 7,400 acres border the Aucilla River Sinks, an area in which the Aucilla River disappears into sinkholes and subterranean karst solution features and reemerges again. When fully acquired, the project will be managed for *conservation* use with a public passive recreation emphasis.

North of the Aucilla River Sink's acquisition area to Lamont at US 19-27, the SRWMD has identified 3,123 acres in the Aucilla Corridor tract. This acquisition proposal compliments the lands identified in the CARL Aucilla Sink project. To date, the SRWMD has acquired 1,221 acres of the corridor and 622 acres on the

Upper Aucilla known as the Sneads Smokehouse Lake tract. An additional 156-acre tract on Ward Island was recently purchased by the District and will be managed for preservation along with the surrounding St. Marks Wildlife Refuge.

The coastal area of the basin is also a part of the Big Bend Seagrasses Aquatic Preserve which was added to the DER Outstanding Florida Waters list in 1986. The Big Bend Seagrasses Preserve is also a candidate for nomination as a National Marine Sanctuary (Cristie, 1989). The National Marine Sanctuaries Program was created to "identify marine areas of special national significance due to their resource or human-use values, and to provide authority for comprehensive conservation and management of such areas where existing regulatory authority is inadequate to assure coordinated conservation and management." "National significance" is determined by assessment of the "conservation, recreational, ecological, historical, research, educational, or aesthetic qualities" of a marine area. Existing National Marine Sanctuaries in Florida are all located in the Keys (Key Largo NMS, Looe Key NMS, Alligator Key NMS).

Local Government Resource Protection Mechanisms

The local units of government within the Aucilla River Basin historically have not had an active land use planning mechanism. Most of the local governments have no planning staff or agency and only limited land use controls. This situation has sufficed for most localities until recently. Mandates of the 1985 Local Government Comprehensive Planning and Land Development Regulation Act (Ch. 163, F.S.) now require a more integrated planning approach at the state, regional, and local level. Local government comprehensive plans and land development regulations are required to provide for the protection of ground and surface waters and their related natural systems. In March of 1990, Jefferson County submitted its comprehensive plan to satisfy requirements of the Growth Management Act. Also in the basin Taylor County submitted its plan in late 1989. Taylor County's plan, as of January 1991, has still not been found to be in compliance. The comprehensive plan for Madison County is scheduled for March of 1991. In conjunction with the comprehensive plan, each local government is to adopt or amend (within one year of plan submittal) and enforce land development regulations that are consistent with and will implement their adopted comprehensive plan. without land development regulations the counties in the Aucilla River Basin have in the past not had effective nor enforceable land protection measures in place.

Basically the land development regulations will describe the strategy for implementing the goals, objectives, and policies found in the comprehensive plans, and will describe how the programs, activities, and land development regulations will be carried out. Primarily the land development regulations will provide resource protection mechanisms for land subdivision and use, drainage and stormwater management, and protection of

environmentally sensitive lands including rivers and wetlands. The review of these land development regulations and assistance to counties in putting these resource protection mechanisms in place will be the focus of the Local Government Technical Assistance program for the Aucilla River Basin as well as the reporting on the effectiveness of resource protection measures at the county level.

Governmental Units with Jurisdiction in the Basin

A listing of government agencies and their authority is found in Appendix A.

List of Studies, Past and Current, of the Aucilla Basin River

A bibliography of resources information from studies previously conducted in or adjacent to the Aucilla River Basin is listed in Appendix B.

III. PRIORITY ISSUES AND ANALYSES,

A priority issue for the Aucilla River Basin is to conduct a basinwide assessment to determine the condition of basin waters and related natural resources. A second issue will be to evaluate potential changes to river basin hydrology and the impact of nonpoint pollution sources on the basin's water quality.

Priority issues to be identified by the SWIM planning process for the Aucilla River include:

Definition of existing conditions;

Identification and reduction of the impacts of point and nonpoint sources of pollution and minimizing the degradation of aquatic habitats; and

Maintenance of the ecological integrity of the natural systems associated with the aquatic ecosystems of the basin.

Basin wide management issues of concern to the Aucilla River Basin include:

1. Impact on basin surfacewater resources:

   a. Water quality impacts from point and non-point sources of pollution.

   b. Erosion and sediment loading impacts to rivers, lakes and streams in the watershed.

c. Impacts to wetland areas from habitat and flow alterations associated with area land use operations.

d. Hydrologic alterations from land use activities

e. Flood control and stormwater management efforts in the City of Greenville to a tributary of the Little Aucilla River, could result in impacts to the Aucilla.

2. Impacts to fish and wildlife and their habitats:

a. Destruction of aquatic habitats.

b. Exotic weed encroachment into river habitat.

Specific management issues that may be identified from the basinwide assessment may include: sedimentation impacts from agricultural operations and eroding cropland in the upper basin, hydrologic and sedimentation impacts from forestry operations basinwide, exotic weed control, and future land development along the river corridor.

Programs and tasks identified under the three programs, Resource Monitoring, Resource Planning, and Program Implementation are proposed to address impacts and alterations on surfacewater resources and fish and wildlife habitats. The above management issues will be identified and protection measures identified by the goals and objectives of the Waccasassa River Basin SWIM Plan. The integration of these guiding protection and preservation measures with specific programs and tasks is detailed in Table 5.

Location and Origin of Known Pollution Sources *Point*

Sources

A point source of pollution can be described as a discrete, definable source such as an outfall pipe from industry or sewage treatment plant. These sources are permitted by federal and state agencies and have a known discharge location. Also, their contribution to water quality degradation is more direct and easily defined. Control of point source pollution usually involves technical or mechanical means, such as higher levels of treatment or increased filtration.

The Aucilla River Basin has one known point source of discharge permitted by DER (Surface Water Discharge Detail Report, 10/22/90, DER). This point source is the Monticello Sewage Treatment Plant which discharges to Wolf Creek Swamp along with a separate discharge from a correctional facility. No known impacts from this discharge are known at this time. The Pollution Source Survey described under the Resource Planning Program will address and investigate impacts from this discharge as well as coordinate DER or District monitoring to determine impacts from this site.

Nonpoint Sources

Nonpoint sources of pollution can be defined as a dispersed source of pollution, or a source that cannot be pinpointed to one specific outflow pipe. Stormwater runoff from urban areas, roads, construction sites, agricultural and silvicultural areas, landfills, leaking underground storage tanks, and septic tank leachate are examples of potential nonpoint sources of pollution. Approaches to controlling pollution from nonpoint sources involve the application of Best Management Practices (BMPs) or land use *planning,* as opposed to the technological remedies that are used for point sources.

The two predominant nonpoint sources in the basin are sedimentation and hydrologic impacts from commercial forestry operations and diffuse overland runoff from agricultural operations in the basin. The principle land use in the Aucilla River Basin is forestry. Forest management activities in the basin include road construction, timber harvesting, site preparation, and tree planting. The potential for nonpoint source pollution exists for many aspects of forestry operations, but is most often associated with roads. Consequently, the major pollutant from forestry *nonpoint* source pollution is sediment, resulting from erosion. The land use monitoring program that is proposed as a component of the protection strategy will allow for the identification of potential sources of forestry nonpoint pollution. The water quality and biological monitoring **will** help identify any impacts that may result from these activities. Monitoring the effectiveness of voluntary BMPs will be an important management issue in the basin.

The second largest land use in the Aucilla River Basin is agriculture, with significant agricultural operations existing in the upper two thirds of the basin in Madison and Jefferson counties that eventually drain into the Aucilla River. In 1987 the USDA Soil Conservation Service, in cooperation with the local Soil Conservation District and the Jefferson County Board of County Commissioners, prepared a protection plan for the Aucilla River watershed. A key finding of that plan was that excessive erosion was occurring on 8,115 acres of cropland in Jefferson County. It was also estimated that 4,096 tons per year of sediment was being contributed to the Aucilla River from eroding croplands in the basin. This plan was developed by USDA SCS for the purpose of reducing erosion by accelerating conservation practices being applied to erosive croplands.

The erosion problem in Madison County is similar. An estimated 10,000 acres of erodible cropland in that county that was signed up under the 1985 Farm Bill for conversion from erodible cropland to pastureland and for the application of conservation practices. Both counties should have additional acreages of erodible cropland

to sign up for conservation practices under the upcoming 1990 Farm Bill.

The DER Florida Nonpoint Source Assessment (1988) states that North of US 19/27, the Aucilla River has suspected use impairments from agricultural activities which are producing excessive turbidity, algae blooms, odor, and a declining fishery. Major potential contaminants of water from agricultural operations include: suspended solids, nutrients, oxygen demand, and pesticides. The land use monitoring program that is proposed as a component of the protection strategy will allow for the identification of potential sources of agricultural nonpoint pollution. Water quality and biological monitoring will help identify any impacts that may result from these activities. Coordination of SWIM efforts with the USDA SCS and the county Soil and Water Conservation District on implementing and monitoring the effectiveness of agricultural BMPs and the Federal Conservation Reserve Program (CRP), is an important management issue.

A potential nonpoint source of pollution in the Aucilla watershed area is from septic tanks and rural sanitary pit privies. With the exception of the cities of Monticello, Greenville, and Madison, none of the communities located within the Aucilla drainage basin are served by central wastewater treatment facilities. The reliance of these communities on on-site treatment of wastes (septic tanks and sanitary pit privies) located at Lamont and other residential spots along the river has the potential of adding septage effluent to the river during periods of high water. It is anticipated that the water quality monitoring program will help identify nutrient and bacterial problems in the river and, by combining the efforts of the land use and biological monitoring programs, the source(s) can be identified for remedial action.

The water quality monitoring program conducted under SWIM in this basin will help identify nutrient and bacterial problems in the rivers and by combining these efforts with those of other agencies (e.g., DER, DNR, the Florida Department of Health and Rehabilitative Service [HRS], which regulates septic systems), the source(s) can be identified for corrective action. HRS, in cooperation with the SRWMD, is conducting a survey of septic systems on the Suwannee River. Similar surveys should be conducted in the Aucilla River area.

The extent of localized stormwater runoff in the basin requires further investigation. Urban runoff from the town of Greenville is suspected of causing water quality problems in a tributary of the Little Aucilla (DER Nonpoint source assessment 1988). Several pollutants are associated with stormwater runoff, including sediments, nutrients, oil/greases, and pesticides.

Additional nonpoint sources that are in need of identification and monitoring are beyond the scale of the land use inventory effort described above. Many of these potential and actual sources, such

as underground petroleum storage tanks, abandoned landfills, and small-scale hazardous waste users and generators, are being studied Ly state, regional, and (possibly) local agencies. The data colle=:ed in these efforts should be included in the SWIM process as they relate to actual or potential threats to surfacewater quality.

Aquatic Habitat Protection

The protection of aquatic habitats with high fish and wildlife value is an important issue in the basin SWIM planning process.

A principle aquatic habitat protection need for the Aucilla and Wacissa rivers is the control and reduction of exotic aquatic weeds in the river corridor. The wider portions of the Wacissa River have a major problem with the spread and infestation of the persistent aquatic weed, Hydrilla. Much of the river's sand and limestone bottom, naturally abundant with eel grass has been overtaken by a dense mat of Hydrilla. Several exotic botanical species also inhabit the Aucilla River, such as Soft Rush, Brazilian Elodea, Alligator-Weed, Azolla and Floating WaterHyacinth. These species present a significant problem by impeding water flow and displacing native habitat. These *infestations* can have a detrimental effect on the river's aquatic flora and eventually dominate the entire water body. The DNR is the lead agency in the control of aquatic plants. Close interagency cooperation will be necessary between the SWIM program and Bureau of Aquatic Plant Management (DNR) to assess the extent of the problem in the basin and to execute control measures.

A second habitat protection need is prevention of channel modifications to the river and preservation of littoral areas along rivers. Although not extensive, the desire for recreational and residential access to *inland* waterways has encouraged the use of dredging and filling practices to create artificial waterways and as sources of fill to raise adjacent lands. A dam in the upper portion of the river creates the Sneads Smokehouse Lake and two man-made dams that have eroded to create small drops one mile below U.S. 27. The only known channel modifications are the dam near Welaunee Creek and the Slave Canal, a reclusive but defined canal built by human labor, which joins the Wacissa and Aucilla rivers. These canals are susceptible to pollution from septic tanks and changes in turbidity, and siltation. At this time, there are not extensive areas of dredge and fill with the exception of minor violations and past activities. The entire coastline of the basin is mostly salt marsh, with no beach as such, and the majority of this area is in Federal ownership. This protected area is to be preserved and protected and, as such, no development is expected.

Other aquatic habitat protection issues include preservation and protection of valuable in-stream habitats such as snag and shoal areas. As noted above, these areas are '¯nown to be areas of high benthic invertebrate production or biomass, making these areas

valuable fisheries areas due to this invertebrate food source for fishes. The small tributary streams of the major rivers and smaller tidal creeks also deserve special consideration as they appear to provide c.¯.tical nursery habitat for juvenile fish and shellfish **(FGFWFC**, 1989; Tampa Bay Regional Planning Council, 1985; Rozas and Odum, 1987; Mense and Wenner, 1989). Finally, **evaluation of the** effects of timber production practices on wetland communities in the basin needs to **be a consideration.** They also suggested (based on the results of other studies) that there may be long-term changes in forested wetland communities as a result of commercial forestry operations. Most ***significantly,*** they state (p. 47):

> "Our results indicate that, even in the absence of any direct attempts to alter hydrologic conditions in wetlands, short term vegetation changes occur in wetlands following **harvest and *conversion* of adjacent** flatwoods to plantations."

Point and Nonpoint Sources Operating Without Permit(s)

There are no known point sources operating without a permit within the Aucilla River Basin. *Nonpoint* sources within the basin are largely exempt from permitting (i.e. agricultural and silvicultural activities being conducted in accordance with approved BMPs. The other nonpoint sources mentioned above are subject to various permitting programs (gasoline storage tanks, hazardous waste generators, etc.). The only known source in the basin is a contamination site at a service station near Wacissa. DER is responsible for the *contamination* assessment and groundwater remediation at this site. The three monitoring programs will be able to assist in locating any impacting nonpermitted uses.

Point and Nonpoint Sources Operating With a Temporary Permit

There are no known sources of pollution currently operating with a temporary operating permit, as documented by the Surface Water Discharge Daily Report, 7/24/90, DER.

Sources Currently Violating Effluent Limits or water Quality Standards

Any sources currently violating effluent limits or water quality standards within the basin are currently unknown.

Other Permitted Discharge Activities

Other permitted discharge activities within the basin are currently unknown, if any exist. The major exception to this is the Department of Transportation's road drainage system in the basin including several bridges that cross the river at Route 146,

U.S. 90, Interstate 10, U.S. 27, Route 14, and U.S. 98. The land use monitoring program will ic:ntify transportation corridors and points of discharge into surface waters.

***Management Zfforts of Governmental Units in the* Basin**

The administration of the St Mark's National Wildlife Refuge by the Dept. of the Interior and management of the Aucilla Wildlife Management area by the FGFWFC and a draft management plan for the Big Bend Seagrasses Aquatic Preserve, are the major known natural resource management efforts presently being conducted within the basin.

***State of* Knowledge *about the* Basin**

The discussions above provide a general overview of the state of knowledge of the basin. Studies conducted within the basin or in adjacent, similar areas of the Florida Big Bend coast provide data useful to management efforts in the basin; however, this area has not been as *intensively* studied as many other coastal areas of the state (e.g., Apalachicola River/Bay; the Indian River system, Tampa Bay and its surrounding watershed). Additional information on the hydrology, geology, and ecology of the basin would be helpful, including:

1. An understanding of sediment transport by by the rivers and sediment movement patterns.

2. Information on productivity of various wetland communities with documented fish and wildlife value (e.g., tidal and brackish marshes).

Development Pressure

For a number of reasons, the basin has grown at a low to moderate rate and has not attracted the intensive development pressure experienced by other inland and coastal areas of Florida. Major reasons include: ownership of large tracts of land by timber interests, the lack of sandy accessible beaches attractive to visitors, large extent of floodprone lands, and the general remoteness of the area. Lack of suitable coastal land (salt marsh) for development and the Federal Government's ownership of the coastal lands in the St Marks Wildlife Refuge certainly has limited growth in the coastal area.

Most development occurs in and around the county seat of Monticello in the northwestern area of the basin and in the Madison to Greenville corridor in the northeast. Other development occurs near the unincorporated towns near the Aucilla River. Lending to future development of the **area are major** transportation corridors. Jefferson and Madison counties have major east-west roads, U.S. 90 and Interstate 10, in the upper basin and U.S. 27 runnin; through the middle of the basin.

Residential areas and central water sewage and growth areas are likely to be extended along these trans.. Dortation corridors. Also, both counties are actively working to .¯.ttract new commerce and light industry to the areas. With development pressure occurring in neighboring Leon and Wakulla counties to the west, the most likely area for development in the basin will be spill over to Jefferson County from the west.

Currently, the State of Florida is experiencing phenomenal population growth; it is estimated that an average of 800 persons move to the state per day. In 1990, the state of Florida became the third most populous state in the nation. During 1970-1988 Jefferson County alone grew by 39.5 percent, during the same time period the state grew by 88.2 percent.. Most of Florida's new residents settle in the more heavily urbanized south and central portions of the state in close proximity to the coastal areas. However, due to uncrowded conditions and low crime rates, new .residents seeking quality retirement are *increasingly* being drawn to northern Florida. Potential threats may arise from the growth of small communities and subdivisions near the river. Recently, in June of 1990, a developer announced plans to develop a 550-acre riverfront leisure retreat across from the St. Marks Wildlife Refuge on the Taylor County side of the Aucilla.

Riverfront and rural residential development is the major development activity with a potential for a significant direct impact to the river. The most significant land use problem area is runoff from agricultural and forestry operations. Strict adherence to BMPs and riverine buffer areas will be necessary to prevent such impact. Future appropriate recreational access and activities should require formal protection plans and inventory of impacts to biological communities.

PROTECTION AND RESTORATION STRATEGIES,

The District's SWIM planning process will integrate data collected from a variety of work programs: Resource Monitoring (which includes water quality, biological, and land cover monitoring), Special Studies (surfacewater and biological investigations), and Resource Planning efforts. The resulting information will be used to identify threats to surfacewater quality from point and nonpoint sources of pollution as well as the identification of environmentally sensitive areas. In addition, as a result of the findings of the three monitoring programs, alternative land use strategies will be determined for those areas found to be contributing to water quality problems. The *findings* of these studies will provide the basis for the mitigation, reduction, and elimination of pollution sources through such projects as local government technical assistance programs (e.g., stormwater management guidelines). Table 5 provides an overview of the interaction of the goals and objectives identified in Section I

with the strategies, programs, and projects described in this section.

There are three levels of analysis identified in the District's SWIM management process: *basinwide*, *study area*, and *impact area.* Each level increases the intensity of study, proceeding **from a** generalized monitoring approach to a more specific analysis. Corresponding management efforts generally follow similar levels of intensity, basinwide efforts may be oriented mainly towards policy development, study area efforts towards policy and regulation, and impact area efforts may be directed at specific permitting and enforcement efforts.

The *basinwide* level of management effort uses data collected on a regional or subregional scale. These types of data include water quality or aquatic biological data from a regional network of monitoring stations established over an entire basin. Land use ,and land cover mapping data collected on this scale were developed in 1988/1989 with SWIM funds. These maps provide land cover classified to Level III using the Florida Land Use, Cover and Forms Classification System. The land cover information was derived from satellite imagery supplemented by aerial photography and digitized into the District's ARC-INFO GIS. As land cover types are quantified at the basin and sub-basin level, the *changing* patterns of land cover can be monitored over time.

The *study area* level of management will, at a minimum, be one mile landward of the 100-year floodplain of each river and its tributaries in the basin. Lake study areas are generally defined by the lake's basin. Coastal areas are established by the county utilizing FEMA (Federal Emergency Management Agency) Coastal High Hazard Zones and Category 1. hurricane impact areas. Study areas will be examined in further detail to determine which areas are: 1) essentially undisturbed and serve to protect surfacewater quality, 2) in transition from undisturbed to more intensive use, and 3) developed and actually or potentially contributing to the degradation of water quality and aquatic habitats.

Within this area, studies will be more intensive and will concentrate on determining the impacts of specific areas contributing non-point source pollution on surfacewater resources; monitoring issuance of permits for commercial septic tanks, underground storage tanks, hazardous waste generators, landfills, surfacewater discharge locations, and public water supply wells; and developing population estimates and projections to identify potential water quality impacts. Over time, the size and extent of the study area may change resulting from these studies.

Impact ***areas will*** be identified within particular study areas which are either directly contributing to water quality problems

AUCIU A RIVER BASIN

OCALS POR NUCILLA RPVER BASIN	O UECfIVES FOR BASH	PRO 3VUS	PB). ECIS TA"
1. Protect ecological kntagdy of suhce-water systems	A. De" existing conditions hrough the development a base** sardles a the basin	Resource Monitoring a. Baseline water quality and aquatic biologic* moMlodng ate develop permn mom rework	1. Review past basin analysis 2. Expand monllodnp nekm to *see" water *Aft Impacts. 3. Develop owrviaw report a basin using ads" dale 4. Coord %ft development a mor t " wIth Com agendas
		b. Land covsrAand use moni- toring	1. Develop land coverAre data base at basin, subbasln, county and study area levels 2. Develop a' ton 1 data bases sunenadrisg soft and topo kMonnabon on basin 3. Wen" and Irxorporals ad. d*" date
	B. Structure and Collect the hydrologic responses b durpes management Initiatives	Resource Monitoring a. Surfacewatsr Investigations	1. Determins.tend use alterations necessary data t support and 2. Ut lIze hydrologic Inve$tigations to apprise need for Improved sINJagrlc. BMP's in he basin.
		b. Biological Investigations	1. Develop wetland community vegetation monitoring plan 2. Evaluate condition and changes b natural community structure
2. Enhance environmental, artistic, of sur. two waters	A. Structure and Coined the necessary data b support management initiatives	Resource Monitoring a. Surfacewatst Invrtigato ns SeADors sow k. and recreatkxnal values	
		b. Biological Investigations	See ore
		Resource Planning c. GIS Databaas Development	1. Integrate water qua*. biological, tend ooverAue and other date Into Geographic Inbrn aft System dalaboas for analysis
	B. Identify protection, rest- fadNtlas In basin Issues	Resource Planning a. Pollution Source Survey	1. IdentIy surfaoewater and oration and management stormwater 2. Identify point and nonpoint sources of pollution 3. Conduct 1leldworl to Identity point sources In non compliance.

TABLE 5. Overview of Aucilla River Basin SWIM Plan.

GOALS FOR AUCILLA RIVER SAM TA"	OBJECTIVES FOR BASIN	PFIO 311"	PROJECTS
2. Enhance Srwkomuntal, asslhsllc, sowdc, and nasallonsl values of sun-lace wows			4. Locate rssfdenIhIArrban areas not served by central eewape treatrnent faoNWs
			6. Map the above kMonnaMon In a Geographic inbrmmon Syswn
C. Develop, knptemant *NW.* monitor management plans) fo the basin	Program Implernentaton	a. Interagency coordnsMan	1. Using resole of regulatory rwlew. knplsmarrt and bring basin BMP* into aonnpNsnae agrloulturaV slvbultwal BMP~s basin wkb.
			2. knMlrs or encourage snbrosmant action or develop model programs or regulation
b. Local Gownrnsnt TediU	1. knoorporals SWIM gods and Assistance		obfsclIves Into dlsMot review of Local Campslwnely Pl$_{ans}$
			2. Develop and didlbute work products to local government for Incorporation km land developameot mgulatlons.
		c. Land Acquisition Assistance	1. Develop inschanisawnsens to provide Information to district Land Aoqusldon Departnent b guide acquisition eBOrl
3. Reduce impacts of point and nonpolnt sources of pollution	*AL* stuck" and Collect ft necessary data b support management initiatives	Resource Monitoring	a. Surfacewater Investigations 1. Identify point and nonpoi nt sources of pollution.
		b. Biological Investigations	i. Identify knpacb card changes to the blologicel community.
	Resource Planning	c. GIS Datat>•ee Development	1. Integrate and analysis of land cover land use and agrlcJallv. in basin
B. Identity protection, rest-Oration and management	Resource Planning	a. Pollution Source Survey	I. Identify point and nonpoknt saxcss of pollution.
suss	b. Regulatory Review	1. Identity and review /sdsral, state, regional and bad rubs and regulations which protect surface wave.	
			2. Identify' need *for* nnodlcedoo to existing regulation or development of new regulations

TABLE 5. Overview of Aucilla River Basin SWIM Plan.

PROJECTS	O L3 FORhLJCM .AFINER BPSIN TAM		O6JECiN FOR BASM	PFCGP#"
	C. Develop. implement and monitor management plans) br the basin	Program Implementation a. interagency coordnadon		1. Cooperate what apnndas basinwkle to use agrIduIMc. Management prances.
			b. Local Government Tedxnial Assistance	1. ktoorporala SWIM goals and objectives ktb dIPiot review of Local Co npushemfve Perms
4. Preserve habitat for emotive bra red fauna, ktddng endarngeeed and thwtensd species	A. Structure and Coiled dw necessary data b support management Initiatives	Resource Monitoring ng a. Lard cover/land use moni- toring		3. Identify WW' toorporale ad ddonal hablW dahbaass lift Gls and analysis of areas meeting native habllat polsctrort
	B. Identify protection, rest- oration and management issues	Resource Planning a. GIS Database Development		1. integrate OIS analysis Into tend use and rtrnag rent dsdston melting.
	C. Develop, Implement and monitor management plan(s) for the bash	Program Implementation a Local Government Tetncal Assistance		1. incorporate land use protection measures k* county oomprelnnslvo plans and land development reps.
			b. Land Aoquillon Assistance	1. Identify area for acquWdon.
			c. Public information and Education	1. Develop program for public awareness/parddpadon of surface water protection issues.
5. Promote public use of surface waters consistent with protection and restoration	A. Identify protection, rest- oration ate management	Resource Planning lard use and management decision makktg. goals and 04sotbee	a. GIS Database Development	1. Integrals GIS analysis Into Issues
	B. Develop, implement and monitor management plans) for the basin	Program Implementation a. Local Government Tednnical Assistance		1. Incorporate hand use protection measures Into county compshsnstve plans and lard development rags,
			b. Lard Acquisition Assistance	1. Identify areas for acquisition.
			c. Pubic Information and Education	1. Develop program for public awarensss/pwddpabon of sutacs water protection issues.

or have the potential to do so. Examples include waterfront residential subdivisions, critically eroding areas, agricultural areas without runoff controls and identified point sources (permitted or unpermitted). These areas will be evaluated for the type and degree of threat they impose (e.g., contaminated stormwater runoff, erosion and sedimentation, floodplain development, effluent impacts) as a precursor for the development of protection or restoration strategies.

Following is a listing of specific programs and projects scheduled for implementation for years one through three of the Aucilla River SWIM Plan. Table 6. provides a project time line for completion of projects for the Aucilla River Basin SWIM plan. Priority activities scheduled to be completed during the first year of the Aucilla River Basin SWIM program are marked as first year priority activities in Table 6. and also indicated as such in the text. Activities to be completed for succeeding years of the SWIM program are also shown on the time line and their accomplishment will depend on future staff time and SWIM funding.

Table 6. Aucilla River Basin SWIM Plan Project Time line.

S= STARTUP C=COMPLETION I=INITIATED

AUCILLA RIVER BASIN SWIM PLAN PROJECT TIMELINE

PROJECT TIMELINE	1ST YEAR PRIORITY ACTIVITY.	1990 INITIATED AND ONGOING	1991 J F M A M J J A S O N D	1992 J F M A M J J A S O N D	1993 J F M A M J J A S O N D
PROGRAM: RESOURCE MONITORING					
PROJECT 1.1 WATER QUALITY & BIOLOGICAL MONITORING					
TASK 1.1.1	• • • • • • • •		S - - - - - - - - -	- - - - - - - - - C	
TASK 1.1.2	• • • • • • • •		I - - - - - - - - - - - - - -	- -	- C
TASK 1.1.3				S - - - -	- - - - - - - - - - - - - - - - - C
TASK 1.1.4				S - - - -	- - - - - - - - - - - - - - - - - C
PROJECT 1.2 LAND COVER / LAND USE MONITORING					
TASK 1.2.1			S - - - - - - -	- - - - - - - - - - - - - - C	
TASK 1.2.2				S - - - - - - - - - - - - - - - - - -	- - - - - - C
PROJECT 1.3 SURFACEWATER INVES. HYDROLOGIC STUDY					
TASK 1.3.1				S - - - - - - - - -	- - - - - - - - - - - - - - - - - C
PROJECT 1.4 WETLAND VEGETATION COMMUNITY MONIT.					
TASK 1.4.1			S - - - -	- - - - C	
TASK 1.4.2				S - - - - - - - -	- C
PROGRAM: RESOURCE PLANNING			1991 J F M A M J J A S O N D	1992 J F M A M J J A S O N D	1993 J F M A M J J A S O N D
PROJECT 2.1 GIS DATABASE DEVELOPMENT					
TASK 2.1.1			S - - - -	- - - - - - - - - - C	
TASK 2.1.2				S - - - - - - - - - - - - - - - - C	
TASK 2.1.3	• • • • • • • •		S - - - - - - -	- - - - - - - - - - - - - - C	
TASK 2.1.4	• • • • • • • •	I - - - - -	- - - - - - - - - - - - - - - -	- - - - - - - - - - - - - - - -	- - - - - C
PROJECT 2.2 POLLUTION SOURCE SURVEY					
TASK 2.2.1				S - - - C	
TASK 2.2.2				S - - C	
TASK 2.2.3			S -	- - - - - - - - - - C	
TASK 2.2.4				S - - -	- - - - C
TASK 2.2.5					S - - - - - - C
TASK 2.2.6					S - - - C
TASK 2.2.7				S - - - -	- - - - - - - - C
PROGRAM: PROGRAM IMPLEMENTATION			1991 J F M A M J J A S O N D	1992 J F M A M J J A S O N D	1993 J F M A M J J A S O N D
PROJECT 3.1 PUBLIC INFORMATION & EDUCATION					
TASK 3.1.1		I - - - - -	- - - - - - - - C		
TASK 3.1.2	• • • • • • • •		S - - - - - - - - C		
TASK 3.1.3				S -	- - - - C
TASK 3.1.4			S - - - -	- -	- - - - - - - C
PROJECT 3.2 LOCAL GOVERNMENT TECHNICAL ASSIST.					
TASK 3.2.1	• • • • • • • •	I - - - - -	- -	C	
TASK 3.2.2			S - - - - - - - -	- - - - - - - - - - - - - - - -	- - - - C
PROJECT 3.3 REGULATORY REVIEW					
TASK 3.3.1				S - - - - - - - C	
TASK 3.3.2				S - - - - - - - - - - - - - - - - - - C	
PROJECT 3.4 COORDINATE WITH LAND ACQUISTION PLAN.					
TASK 3.4.1			S - - - - - - -	- -	- C
PROGRAM: WATERBODY PLANNING					
PROJECT 4.1 AUCILLA SWIM PLAN					
TASK 4.1.1	• • • • • • • •	I - - - - -	- - - - - - - - C		

1. RESOURCE MONITORING

The Resource Monitoring Program is one of the key components of the District's preservation-based SWIM strategy. The overall goals of the Resource Monitoring Program are to:

1. Provide data for the management of surfacewater quality through determining long-term trends in water quality, aquatic communities, and land cover/land use;

2. Providing a means for continuous water quality monitoring to assess the effects of management efforts;

3. Better understand the District's surface waters by conducting monitoring within an hypothesis-testing framework;

4. Determine the most cost effective ways to obtain the information needed to monitor SWIM priority waters effectively.

Program: Resource Monitoring

Element: Baseline Monitoring

Project 1.1: Water Quality and Biological Monitoring

Waters Included: Aucilla and Wacissa rivers, Cow, Jones Mill, Beasley, Wolf, and Gum creeks, and coastal waters of Apalachee Bay

Project Dates: January 1991 to January 1992 and ongoing

The immediate objectives of the baseline monitoring program are to establish ambient water quality conditions, to identify areas of degraded water. quality, to identify point and nonpoint source pollution impacts, and to acquire a more complete understanding of the composition and abundance of the aquatic biota in the basin waters identified above and the natural and man-caused stresses which influence them.

The basin network will be designed to monitor the following potential spatial and temporal water quality trends:

long-term changes in the amount of freshwater inflow, sediment transport, or other water quality component from land use activities in the basin;

non-point effects associated with developed land uses in the basin including domestic wastewater discharges, shore line alterations and agricultural uses.

to assist in correlating water quality with quantity of flow fo: determination of minimum flows in rivers and minimum 1- Tels in lakes.

Data from the monitoring network will be evaluated on a quarterly basis. In addition to providing general information on water quality, these data may directly prompt specific actions when either of two conditions are noted:

1. exceedance of surfacewater quality standards; and/or

2. a suspected decreasing trend in water quality for specific parameters.

The specific actions triggered by the above conditions may include:

statistical confirmation of suspected trends;

further data collection or investigation to identify the source;

notification of pertinent regulatory agency if problem may be associated with a known point source; and/or

enlistment of other state agencies and/or local governments to plan nonpoint source control.

During 1991, DER Northeast District is planning a water quality assessment in the Aucilla River Basin. This assessment will monitor a total of five stations in the Little Aucilla River watershed and five stations on the Aucilla River for chemical, microbiological, and macroinvertebrate parameters. Results of this water quality monitoring and existing data will be accessed and analyzed to determine impacts and trends in these surface waters.

During the first year of the SWIM planning process in the Aucilla River Basin, existing data and previous studies conducted in the basin will be reviewed in order to develop a baseline water quality and biological monitoring network for the waters named above. Following this review of existing data, a monitoring network will be developed to establish a consistent sampling location on the river system and serve to continue and enhance the past efforts of several agencies, particularly the USGS efforts and DER's water quality assessments.

It is expected that this monitoring network will be implemented as needed in the second and third year of the SWIM program to gain a more comprehensive picture of water quality changes and impacts in the basin.

This effort will involve some preliminary sampling and field assessments in addition to literature reviews. The list of

parameters which till be employed for the ongoing monitoring is listed in Table 7. Depending upon funding, the types of questions being asked and 'he intensity of the monitoring program, all of these parameters may not be sampled at any one time.

Monitoring approaches for each of the types of aquatic ecosystems discussed in the Background Information Section (rivers, lakes, and coastal waters) will differ. For these reasons, the District may employ separate contractors to conduct monitoring in each of these systems. Aspects of monitoring approaches for each system will include:

Rivers. In rivers, the major physical factor which must be considered in a sampling program is the flow of water. Water quality samples should be taken at sites concurrently with flow measurements (or should be collected from stations which have been rated for the stage/discharge relationship). Only in this manner ·can meaningful data be collected which provide a true picture of trends over time in the river. The SRWMD is moving towards integrating flow and water quality measurements in its SWIM monitoring efforts. River flows and current velocity during seasonal flood events may be the major controlling factor for biotic communities at these times. This needs to be considered in any biological sampling program. Biological sampling may also have to be "stratified" horizontally to sample the various microhabitats in the river system (snags, soft bottom areas, shoal areas) in order to obtain a more complete picture of the composition of the biota.

Lakes. Because of the tendency for lakes to thermally stratify during warmer weather, a single water quality sample taken at a lake station (e.g., at surface or mid-depth) may not adequately characterize the water column at that site. For this reason, stratified vertical water quality sampling in lakes will be conducted; chemistry samples will be taken at least from surface and bottom locations at each station. Parameters measured in situ with meters (conductivity, DO, temperature) will be measured at least at one meter depth intervals from surface to bottom. Phytoplankton samples will be depth-integrated composite samples. The existence and intensity of thermal stratification in the lakes of the basin are unknown at this time. Because most of the lakes in the basin are relatively small, shallow systems, the degree to which they stratify may be slight. Until data can be collected which indicate this, the approach described above will be taken for lake sampling in the basin in order to characterize lakes as completely as possible.

Coastal waters. Like lakes, coastal waters may exhibit a considerable degree of vertical stratification in the water column, although in this case salinity, as well as temperature, plays an important role in developing this. This "salt wedge" effect in estuaries is well known, and this must be taken into consideration in sampling programs. Water chemistry samples need

Table 7. Surfacewater Qv-.lily Monitoring Network Parameters. ----------

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Field Measurements

Sample depth
Total depth
Velocity
Lake or river stage
Temperature pH
Dissolved Oxygen
Turbidity Salinity
Specific conductance
Transparency

Basic *Physical/Chemical*

Color
BOD5
Suspended solids, total
Dissolved solids, total
Chloride
Fluoride
Sulfate
Nitrate-nitrite nitrogen
Total Kjeldahl nitrogen
Ammonia nitrogen Total
phosphate Orthophosphate
Alkalinity
Chlorophyll-a
Sulfate
Total organic carbon

Sediments

Metals (Pb, Cd, Zn, Cu,
Cr, Hg, Al, Ag, As, Ni)
Total *phosphate*
Organic content
Grain size distribution

Biological

Benthic invertebrates
(Qualitative) Benthic
invertebrates
(Quantitative)
Periphyton
Phytoplankton
Macrophytes
Fisheries and Wildlife

Bacteriological

Total coliform Fecal
coliform Fecal
streptococcus

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to be taken from surface and bottom locations at each site and in situ parameters should be measured at least at surface, mid-depth, and bottom. Biological sampling needs to take into account differences in habitat structure, such as occurrence of vegetation, type of sediment, tidal regime, predation, and other factors.

All environmental monitoring projects conducted by the SRWMD under the SWIM program will have a Quality Assurance (QA) Project Plan. Each QA Project Plan will be a separate document covering all

field and laboratory measurements of chemical, physical, and biological parameters and will con,fnrm in content with "DER Guidelines for Preparing Quality Assurance Plans" (DER - QA001/85). Each QA Project Plan will be submitted prior to the initiation of the project. Quarterly reporting on the performance of measurement systems and data quality will be included in the "Quarterly Progress Report" on District SWIM activities. As program projects are completed, a final QA report will be issued which summarizes quarterly information. Copies of the quarterly and final QA reports will be sent to DER's Quality Assurance Section, Division of Administrative and Technical Services.

Project Tasks

Task 1.1.1: Review existing literature to determine previously sampled station sites, parameters sampled, etc. Develop conceptual monitoring network in waters noted above. ***First year SWIM priority activity.***

Task 1.1.2: Conduct preliminary field work to verify/further develop the proposed basinwide water quality/aquatic biological monitoring network. Conduct preliminary sampling as needed in these efforts. Cooperate and assist in DER water quality assessment for the Aucilla River Basin in 1991. ***First year SWIM priority activity.***

Task 1.1.3: Develop an overview report of the basin using existing data and any data collected in reconnaissance efforts conducted under Task 2.

Task 1.1.4: Develop Scope of Work for monitoring project for budget development, interagency technical review, and implementation.

Program: Resource Monitoring

Element: Baseline Monitoring

Project 1.2: Land Cover/Land Use Monitoring

Waters Included: Aucilla and Wacissa rivers, Cow, Jones Mill, Beasley, Wolf and Gum creeks, and coastal waters of Apalachee Bay.

Project Dates: Initiated 1990 and Continuing

Land use is of primary consideration in the SWIM planning process and the maintenance of water quality. Most land uses and the alteration of land cover features are the principle sources of nonpoint pollution in the form of sediments, nutrients, and contaminants that result from agricultural and forestry operations in the basin. A current land cover data base, from which general land use information can be obtained, was developed in 1988-1989

using LANDSAT Satellite imagery. A land co ¯r data base allows potential nonpoint sources of pollution to identified and monitored. This land cover data base will ~~ updated every five years.

In 1990-1991, the land cover data collected using **SWIM funds for** the basin will be analyzed to determine regional distributions of land cover in the basin, and to identify critical habitat, important natural systems, and other environmentally sensitive areas. In *conjunction* with the data generated by the water quality and biological monitoring programs, the land cover data will also be used as a *component* of watershed models to estimate impacts on surfacewaters. The data, analyses, and maps generated by the land cover monitoring program will be summarized at the basinwide, study area, and county levels for the SWIM priority water basins.

.Other data coverages which may be added to the GIS in the future will include the location of critical habitat areas (e.g., locations of wading bird rookeries from FGFWFC information, other FGFWFC habitat mapping data), subdivisions, and population distribution.

Project Tasks

Task 1.2.1: Develop land cover data base for the basin at the basinwide, sub-basin, county, and study area levels using the land cover data collected in 1988-1989. Produce maps at selected levels.

Task 1.2.2: Using the land cover/land use database, identify agricultural cropland and forest land with soils and topography that are susceptible to erosion and within the river's impact area that are or may contribute to water quality problems.

PROGRAM: Resource Monitoring

Element: Surfacewater Investigations

Project 1.3: Surfacewater Investigations/Hydrologic Studies

The purpose of the Surfacewater *Investigations* Program is to conduct the specific studies necessary to collect data to support specific management initiatives. Projects conducted in this program would typically be conducted at the study area or impact area level of analysis. As an example, simulations could be used to calculate watershed runoff quantity and pollutant loadings from nonpoint sources. Studies and modeling could also be performed to understand major physical processes, salinity changes and pollutant concentrations in estuarine waters due to changes in freshwater inflow quantity and quality. This will permit the evaluation of both current and projected land use and management practices within the basin. Output from the model would provide

information on the river, estuarine, and biotal responses **to a** variety of planning issues.

Goals of the Surfacewater Investigations Program inciude:

1. Better understand and quantify the relationship between surface and ground water in the basin.

2. Develop an understanding of the relationship between river flow and water quality in streams of the basin.

3. Develop an understanding of watershed hydrologic responses for the streams of the basin and determine the impacts of land use/land cover alterations on these responses.

4. Develop an understanding of the degree of groundwater surfacewater interaction in the Aucilla River Basin and quantify this interaction to determine effects on water quality.

Task 1.3.1: Develop a study to address the impact of land use activities on hydrology and water quality and the degree of groundwater interaction and its effect on water quality.

PROGRAM: Resource Monitoring

The overall goal of the Biological Investigations Program is to identify and monitor the components of the natural communities of the Aucilla and Wacissa River system, including identifying the major habitat types, vegetative cover and productivity, and invertebrate, fishery, and wildlife species. This approach will be conducted within a framework of hypothesis testing in order to answer questions regarding the forces structuring the natural communities of the aquatic systems in the basin.

Program: Resource Monitoring

Element: Biological Assessment

Project 1.4: Wetland Vegetation Community ***Monitoring***

Waters Included: Aucilla and Wacissa rivers, Cow, Jones Mill, Beasley, Wolf, and Gum creeks, and coastal waters of Apalachee Bay.

Project Dates: September 1991 to September 1992 and Ongoing

Monitoring of various wetland communities to collect basic plant community data (species composition, cover, density, and **basal area) over a** long period of time can provide a useful indicator of the overall condition of a water body. Because of the link between hydrology and wetlands, these data may indicate subtle changes in hydrology caused by cumulative land use charges.

Task 1.4.1: During the first year of the Aucilla River Basin SWIM efforts, potential areas for the establishment of monitoring plots will be identified. Implementation would take place in :he second year.

Task 1.4.2: Permanent monitoring plots will be established in representative wetland communities (hardwood swamps, fresh and saltwater marshes, and seagrass beds). Data collected would include basal area, density, percent cover, canopy height and structure, and species composition. Data would be collected on a quarterly schedule.

2. RESOURCE PLANNING

The overall goal of the Resource Planning Program has four major components:

1. To develop an ongoing District-wide SWIM data base which will include land cover, soils, topography, population distribution, water quality, biological, and pollution source data;

2. To identify through SWIM studies existing and potential threats to surfacewater bodies, including point and nonpoint sources of pollution and the destruction of the natural systems which serve to protect and enhance water quality;

3. To disseminate SWIM data and information to various federal, state, and local governments and other interested parties to assist in their efforts in natural resource protection; and

4. To enhance the District's involvement in local and regional land use decisions and permitting activities as they pertain to surface waters and their related natural systems.

PROGRAM: Resource Planning

Element: Database Development Project

2.1: GIS Database Development

Waters Included: Aucilla and Wacissa rivers, Cow, Jones Mill, Beasley, Wolf and Gum creeks, and coastal waters of Apalachee Bay.

Project Dates: Initiated 1990 and ongoing 1991/92

A large and varied body of data will be generated by the programs outlined in this management plan, including water quality, biological, and land use data. The overall objective for all SWIM programs within the District is the integration of these data to permit surfacewater quality management. Consistency and flexibility will be necessary components of a data management system.

The District is currently upgrading its computing and data management facilities. Main data storage will be on a SUN Microsystems fileserver. The data base manager **will be** ORACLE software. Interface with the main data base will occur through a variety of pc work stations (SPARC, IBM, Apple Macintosh). Analytical capabilities will be provided with the Statistical Analysis System (SAS) on a pc platform. Graphics capability will be provided with SAS Graphics or the GRAPHER software package.

Additionally, the SRWMD is expanding the use of GIS technology in its programs. Personnel on the SWIM planning staff will be trained in the use of ARC-INFO software to enhance use of GIS in the SWIM planning process. This will enhance the ability to produce maps and conduct geographic analyses.

Additional data will be collected and digitized into the District's GIS data base in 1990-1991. These data will include soils information (based on the new soil surveys being completed by the SCS) and topography (off the U.S. Geological Survey 7.5 minute topographic map series).

Projects to be conducted this first year for the Aucilla River Basin planning effort will be:

Water Quality and Biological Database Development

Task 2.1.1: Integrate water quality, biological, land cover/use, and other data into the GIS database for environmental analysis and impact area assessment.

Task 2.1.2: Using existing data, develop a computer data base of water quality and aquatic biological information for water bodies in the basin which have been sampled in the past.

GIS Database Development

Task 2.1.3: Develop land cover data base for the basin at the basinwide, sub-basin, county, and study area levels using the land cover data collected in 1988-1989 (also listed as a Task under Resource Monitoring/Land Cover, above). **First year SWIM priority activity.**

Detailed Soil Survey Database Development

Task 2.1.4: Develop additional "layers" in the SRWMD GIS data base for the basin at the above levels. ***First year SWIM priority activity.*** In 1990-1991, these will be:

a. Soils. Soils information from recently completed detailed soil surveys will be digitized into the SRWMD GIS data base

b. Topography. Topographic contour information will be digitized into the GIS data base from the USGS 7.5 minute quadrangle series.

c. Hydrography. Lakes, rivers, basin areas, coastlines and other hydrologically related information database will be modified for the Aucilla River Basin.

Program: Resource Planning

Element: Interagency Coordination

Project 2.2: Pollution Source Survey

Waters Included: Aucilla and Wacissa rivers, Cow, Jones Mill, Beasley, Wolf and Gum creeks, and coastal waters of Apalachee Bay.

Project Dates: 1991/1992 and ongoing

During the first year of the SWIM planning process for the Aucilla River Basin, specific impact areas which represent threats to water quality will be identified. Point sources operating without a permit will be identified through field surveys and coordination with regulatory agencies. Potential and existing nonpoint sources of pollution will be identified through land cover information, field surveys, and coordination with other agencies (e.g. DER, DOF, SCS). Once these areas are identified, the regulatory framework will be reviewed to determine whether enforcement activity under existing programs can be used to bring the source into compliance, or if additional regulations or programs are needed. This information will also be used in watershed modeling efforts.

Using the study areas developed during the first year and the preliminary information gathered in the water quality and biological monitoring programs, the land uses with greatest potential for contributing to the degradation of water quality can be delineated. This will identify the major potential nonpoint sources of pollution within the basin. Once these sources are identified, they will be evaluated under existing regulations or programs to determine: 1) the extent of (or degree of potential for) surfacewater pollution, 2) whether they should become

Project Tasks

Task 2.2.1: Identify surfacewater and stormwater management facilities within the basin, levels of treatment, discharge point(s), and the land use and area served by the facility.

Task 2.2.2: Within the study area, identify point sources and major potential nonpoint sources of pollution through existing state and local permit data and other available means. This information will include underground storage tanks, sewage treatment facilities, package treatment plants, hazardous waste generators, landfills, and public water supply wells. The identification of major potential nonpoint sources will focus on agricultural, silvicultural, and construction activities, as well as urban areas without sufficient stormwater treatment.

Integral to the development and maintenance of this data will be the documentation of existing permit procedures, permit information available/needed, data exchange mechanisms and the interagency and local agreements necessary to keep the data updated.

Task 2.2.3: Conduct field studies to locate point sources operating without permits and coordinate with field personnel from various state and local agencies to locate such sources.

Task 2.2.4: Using land cover and land use information, locate areas of concentrated residential (and related) uses not served by a central sewage treatment facility. Estimate the density of septic tanks, and, using soils and water quality data, determine existing threats or the potential for surfacewater contamination.

Task 2.2.5: Map the resulting information gathered in Tasks 1 through 4 and enter into the GIS/SWIM data base.

Task 2.2.6: Using the results from the regulatory framework review, determine if the identified sources can be controlled under existing rules or if new regulations or programs should be developed and implemented.

Task 2.2.7: Initiate or encourage enforcement activities or the establishment of model programs or regulations to reduce and eliminate the impacts of the nonpoint sources. This task will incorporate the results of the regulatory framework review undertaken in the first year.

3. PROGRAM IMPLEMENTATION

The implementing function of the SWIM program is comprised of five components: interagency coordination, technical assistance, public education, restoration activities and land acquisition. The problems leadiTtg to the need for protective or restorative strategies are to ')F addressed through any one or a combination of

these five components. This portion of the overall SWIM program for the Aucilla River Basin will be concerned with the actual application of the data and results of Resource Monitoring and Resource Planning studies to effect protection and management of the surfacewater resources of the basin.

Program" **Program Implementation**

Element: **Public Information and Education**

Project 3.1: **Public Information**

Waters Included: Aucilla and Wacissa rivers, Cow, Jones *Mill,* Beasley, Wolf and Gum creeks, and coastal waters of Apalachee Bay.

Project Dates: 1991/1992 and ongoing

A key to having a successful *SWIM* program is in having wide-based community support both at local and regional levels. Governmental agencies alone cannot successfully implement such a broad program, even if all emphasis is placed in a regulatory framework. Informing the public about the environment and the positive or negative impact that they, as individuals, can have on it is critical to sustaining the environment of the Aucilla River Basin.

The purpose of the public education program is twofold: to disseminate information gained through the *SWIM* process and to provide an input mechanism to the planning and programmatic phases of SWIM for the general public. The Public Education Program will consist of a series of public hearings conducted annually in each priority water basin, water body news releases, and informational brochures. This program will expand to include active informative, educational, and participatory events and programs.

This element of the program implementation portion of the Aucilla River SWIM plan will provide a mechanism to fund various types of public information efforts within the basin. Currently, the District has employed a staff person in its *communication* department whose job **will** involve environmental education. It is likely that the SWIM program will provide some financial and personnel assistance to projects developed by this staff person.

Task 3.1.1: In 1990/1991, the District will provide funding to DER for use in the production of a state-wide overview of the SWIM program.

Task 3.1.2: The District is presently updating its SWIM brochure for District-wide public school distribution in the Aucilla River Basin. This will be a first step in public awareness of surfacewater protection in the basin. ***First year SWIM priority activity.***

Task 3.1.3: Through a "River Watch" or similar program, develop a mechanism for public participation in the SWIM program for the basin.

Task 3.1.4: In 1991/1992, the District, through the services of the newly staffed Environmental Education Coordinator, will develop an environmental education element for use in area schools.

Program: Program Implementation

Element: Intergovernmental Coordination

Project 3.2: Local Government Technical Assistance

Waters Included: Aucilla and Wacissa rivers, Cow, Jones Mill, Beasley, Wolf and Gum creeks, and coastal waters of Apalachee Bay.

Project Dates: Initiated 1990 and ongoing 1991

Implementing the protection and restoration strategies for surfacewater bodies is the vital link in the SWIM process. The key to successful implementation of these strategies is through controlling the activities that have the greatest impact on surfacewater quality: land use and changes in land cover. Since local units of government have the most direct voice in land use decisions, the coordination of SWIM activities with local government comprehensive planning and land development regulation is necessary to succeed in achieving the goals of the SWIM program. The information developed through the SWIM programs will allow the District to provide technical assistance to local governments in making land use decisions that could impact surfacewater resources. Principle goals of this element are:

1. To disseminate SWIM data and information to various federal, state, and local governments and other interested parties to assist in their efforts in natural resource protection; and

2. To enhance the District's involvement in local and regional land use decisions and permitting activities as they pertain to surface waters and their related natural systems.

The objective of this element is to establish an ongoing program to implement the goals and objectives of the SWIM program at the local government level.

For those counties which choose to participate, a county SWIM coordination committee would provide a means to disseminate technical information developed through SWIM programs to local Dfficials, businesses, and interested parties. This coordination ^r--Tit.tee would be comprised of the actors involved in local land

use recommendations (e.g., county planner, engineer, sanitarian, bui:' d*:.-ig official).

Project Tasks

Task 3.2.1: Incorporate considerations developed in the SWIM program into the District's review of the local government comprehensive plans and land development regulations. ***First y.ar SWIM* priority activity.**

Task 3.2.2: Develop work products (maps, reports, etc.) for distribution to local governments for use in implementation of their comprehensive plans and land development regulations.

Program: Program Implementation

Element: Interagency Coordination

Project 3.3: Regulatory Review

Waters Included: Aucilla and Wacissa rivers, Cow, Jones Mill, Beasley, Wolf, and Gum creeks, and coastal waters of Apalachee Bay.

Project Dates: 1991/1992 and ongoing

In addition to local government coordination, the regulatory framework related to the surfacewater resources of the District will be reviewed and evaluated. This regulatory framework review will focus on identifying deficiencies and weaknesses in existing programs and to recommend alternatives for correcting identified deficiencies. The TAC interagency group will be an integral part of interagency coordination for the Aucilla River Basin SWIM plan. The review and evaluation will include state, regional, and local regulatory programs as well as existing best management practices (BMPs) as they apply to agriculture and forestry operations.

Task 3.3.1: A major task under this project will be the integration of the land use/cover monitoring program with the USDA SCS Conservation Reserve Program selection process for erosive croplands that may impact the basins, streams, and rivers. It will also be necessary to coordinate water quality monitoring trends with the SCS to further identify agricultural impact areas.

Task 3.3.2: Monitor the extent and effectiveness of the Conservation Reserve Program and basinwide conservation practices and implementation of agricultural BMPs in the basin with the USDA local soil and water conservation county office and coordination with DER, the DOF, the TAC

Program: **r..; gram Implementation**

Element: Lan Acquisition Assistance

Project 3.4: Coordinate with Land Acquisition Planning Waters

Included: Aucilla and Wacissa rivers. Project Dates: 1991/1992 and

ongoing

The acquisition of lands needed for the protection of surface and groundwater resources is a major component of the overall mission of the SRWMD. Most of the land acquisition efforts of the water management districts in Florida are funded through the Water Management Lands Trust Fund. Each water management district must, on an annual basis, prepare a five-year plan outlining the process for identification, prioritization, purchase, and management of lands purchased with these funds.

The District's primary emphasis in the land acquisition program is the purchase of riverine floodplain lands. While SWIM funds are not intended for acquisition of lands, the identification of sensitive and critical areas for acquisition is an important part of the SWIM preservation strategy. These riverine floodplain lands have considerable value in the maintenance of water quality. The SRWMD has identified in the District's 1989-1990 Land Acquisition and Management Plan, a 3,123-acre tract for acquisition in the lower Aucilla Basin. The corridor starts at US 19-27 near Lamont and proceeds south to the District's Middle Aucilla tract and continues to the Nature Conservancy/ CARL acquisition project on the Aucilla. This corridor contains bottomland hardwoods, cypress swamp, upland hardwood, and pine flatwood habitat. In the Wacissa watershed, the Wacissa Planning area is an identified 1,565-acre corridor that originates near the town of Wacissa and ends at the boundary of the Nature Conservancy CARL acquisition project. The corridor is within the Aucilla Wildlife management area and is a clear spring-fed river system with broad bottomland hardwoods and river swamp.

Task 3.4.1: During the first year of the SWIM *planning* effort in the basin, additional areas which could be evaluated for acquisition will be identified and relayed to the SRWMD Land Acquisition and Management Department for incorporation into the Land Acquisition and Management Plan. The GIS data base developed in tasks above will be an important component of this effort. Biological surveys of the basin will provide *information* on areas needed for preservation/conservation of protected species, areas of particularly unique or high quality habitat, etc. which might be purchased by other agencies or groups (Nature Conservancy, **DNR, FGFWFC)** responsible for the protection of those natural resources.

4. WATERBODY PLANNING

Waterbody planning includes those activities involved with the ongoing SWIM planning riocess as it affects the Aucilla River Basin. In 1990, initial preparation of the SWIM plan for this basin was initiated. Following approval of this plan, the annual review and evaluation of the Aucilla River Basin SWIM plan and the implementation of programs, projects, and tasks for the purposes of task and project refinement, problem identification and resolution of identified problems will be an ongoing process for this basin.

Program: Waterbody Planning

Element: Aucilla SWIM Plan

Project 4.1: Plan Development and Annual Review

Project Dates: 1990/1991 and ongoing

Project Tasks:

Task 4.1.1: The Aucilla River Basin SWIM plan development and the periodic review and modification of the SWIM plan for the basin is essential to make this SWIM program effective. This periodic evaluation of the plan and the overall program by District SWIM staff will help ensure that the program can respond to changing conditions and needs. Included under this task is the initial plan development for year one, annual plan review, evaluation of implementation, plan-revisions and ongoing watershed planning. A small component of this task for the first year of SWIM is the integration of this waterbody planning effort into the District's SWIM video. ***First* year *SWIM priority activity.***

BUDGETARY REQUIREMENT

A preliminary budget for the above outline of programs and tasks is presented in Appendix C.

FEASIBILITY ANALYSIS

The guiding principle of the Aucilla River SWIM plan is protection of water quality and the functioning of the natural systems of the river system. This strategy is preferable to restoration efforts both economically and environmentally. Preventing problems and identifying sources of pollution and taking preventative action **will** be the strategy of the first and second **year SWIM programs** for the Aucilla River Basin. The three programs, Resource Monitoring, Resource Planning, and Program Implementation will provide detection and guidance for protection of the river's natural systems. Preservation will be achieved through establishing an ongoing, comprehensive monitoring system for water quality, land use/land cover, and the system's biota.

The economic feasibility of ach¯:-•'ing the goals of the Aucilla SWIM plan is high; costly future restoration efforts will be offset by early detection and prevention. The feasibility of preserving the character and function of the river system is high given the relatively undeveloped nature of most of the river corridor. Recreational use of the Aucilla-Wacissa system is high providing a positive public awareness and economic impact on surrounding communities. The environmental feasibility of preserving the good quality of the surface waters and associated habitats is high through the comprehensive monitoring program being developed during the first year of SWIM and through providing technical assistance to local governments and other agencies. Local government land use controls required by the Growth Management Act that are presently being formulated by Jefferson, Madison, and Taylor counties also increase the feasibility of achieving conservation goals. Technical assistance provided by the District during the development of land development regulations by these counties will ensure consistency with the District's SWIM Protection efforts. The feasibility of monitoring the success of protection efforts in the basin is also high based on the quality of data to be collected under the District's quality assurance program.

The SRWMD will focus first and second year efforts in the Aucilla River Basin on compiling existing data, determining water quality impacts, and analysis of land use/cover and related spatial databases. In subsequent years, new data collection and specific management plans and strategies will be initiated in the basin.

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Appendix A: LIST OF GOVERNMENTAL AGENCIES WITH JURISDICTION IN THE BASIN

Following is a listing of all federal, state, regional, and local governments exercising jurisdiction over the Aucilla River's. Basin system and the lands within one mile of the system.

Federal Agencies

Army Corps of Engineers (navigation, wetlands, and dredge/fill permitting)

Department of Commerce, National Marine Fisheries Service and National Oceanic and Atmospheric Administration (regulation of commercial fisheries, commenting agency on Corps dredge and fill permits, administration of National Marine Sanctuaries and Estuarine Research Reserves)

Department of the Interior, U. S. Fish and Wildlife Service (protection of federally listed endangered and threatened species, management of St. Mark's National Wildlife Refuge, commenting agency on Corps dredge and fill permits)

Environmental Protection Agency (NPDES, other permitting activities)

United States Department of Agriculture, Soil Conservation Service (administration of the Agricultural Conservation Reserve program, cost sharing for agricultural conservation programs and implementation of BMPs).

State Agencies

Florida Department of Natural Resources (State Parks and lands, sovereign lands leasing, aquatic weed control, Florida Marine Patrol. Big Bend Seagrasses Aquatic Preserve management, shellfish harvesting regulations)

Florida Department of Environmental Regulation (NPDES water quality certifications, dredge and fill permitting, surface and groundwater quality monitoring, point source discharge permitting, solid and hazardous waste)

Florida Department of Transportation (State and Federal roads and bridges and their associated drainage systems)

Florida Department of Health and Rehabilitative Services (Septic tank and other on-site sewage disposal system regulation and permitting)

Florida Game and Fresh Water Fish Commission (administration of wildlife management areas, protection of freshwater fish and wildlife resources, law enfor-.-ement)

Florida Department of Agriculture, Division of Forestry (forestry operations, management of state forests)

Florida Department of Community Affairs (Areas of critical state concern, developments of regional impact, review of local comprehensive plans and land development regulations)

Regional Agencies

Suwannee River Water Management District (surfacewater structure permitting, water well construction, surface water management, consumptive use permitting, artificial recharge)

North Central Florida Regional Planning Council (Developments of regional impact, Federal A-95 review, comprehensive regional policy plans, technical assistance to local governments)

Local Governments

The management responsibilities of county government relating to or impacting on water quality are land use controls, public facilities construction and operation, comprehensive plan development, county roads and drainage systems, and the issuance of development orders and construction permits.

Counties

The Aucilla River Basin encompasses portions of Jefferson, Madison, and Taylor counties.

Cities

Incorporated municipalities in the basin are: the cities of Madison, Greenville, and Monticello. The unincorporated communities in the basin are: Lamont, Aucilla, Wacissa, Wakeenah, Thomas City, Dills, Ashville, Capps, Cabbage Grove, and Scanlon.

App.ndix B: LISTING OF STUDIES, PAST AND CURRENT, OF TUE AUCILLA RIVER BASIN SYSTEM

Note that this listing includes studies conducted in **areas** outside of the Aucilla River Basin area but within the Florida Big Bend physiographic region (e.g., Crystal River, the Cedar **Keys area).** The results of these studies are considered applicable to similar habitat types within the area defined in this SWIM plan.

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