

# Middle St. Johns River Basin Surface Water Improvement and Management Plan

January 2002

St. Johns River Water Management District  
Palatka, FL

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## EXECUTIVE SUMMARY

### Overview

Under the Surface Water Improvement and Management (SWIM) Act of 1987, water management districts prioritize water bodies based on their need for protection and/or restoration. The St. Johns River Water Management District (SJRWMD) ranked the Middle St. Johns River Basin (MSJRB) as the 5th priority SWIM Program. Numbers 1 through 4 are current SWIM Programs. The Middle St. Johns River Basin will be considered one entire management unit as we implement the SWIM Program. This program will address both the causes and effects of surface water quality in the Middle Basin.

The purpose of the MSJRB SWIM Plan is to set forth a realistic course of action, identifying the projects and the effort needed to accomplish them, consistent with the levels and trends of SWIM funding. Through the forum of a MSJRB Working Group, local governments and stakeholders were requested to provide listings of reports and related studies for the portions of the MSJRB within their jurisdiction, to be used for development of an initial reconnaissance report (URS 2001). The Reconnaissance Report, completed in April 2001, was used as a resource guide in development of the MSJRB SWIM Plan by a team of SJRWMD staff members and outside consultants. Input on the draft SWIM Plan was solicited for, and provided by government and agency stakeholders (Appendix 1) and other interested parties, through a series of meetings held throughout the MSJRB. This document represents the culmination of that effort.

### Middle Basin Summary

The Middle Basin consists of five major planning units that contain 104 watersheds described by the St. Johns River Water Management District (SJRWMD) as “7.5-minute quad basins”. The MSJRB includes several major tributaries and their drainage basins including Econlockhatchee, Deep Creek, Lake Jesup, Lake Monroe, and Wekiva. Listed below is a brief summary of each planning unit:

The **Econlockhatchee River** planning unit is located within Central Florida, in portions of Osceola, Orange, and eastern Seminole counties. It covers 173,142 acres, or 270 square miles in area. The Econlockhatchee River drains large marsh areas with high organic content and low pH levels. The upper Econlockhatchee River has high levels of total nitrogen and total phosphorous content with low dissolved oxygen (DO) and low pH levels near the headwaters. Urban runoff and continuing effects of previous wastewater effluent discharges impact The Little Econlockhatchee River.

The **Deep Creek** Planning Unit is located within Central Florida, in portions of south Volusia, the northwest corner of Brevard County, and northeastern Seminole counties. It covers 175,453 acres, or 274 square miles in area. Most of the Deep Creek unit is within the 100-year floodplain and is largely undeveloped. FDEP identifies Deep Creek and Lake Harney as non-attainment water bodies (303d waters) impacted by agriculture. The parameters of concern include coliforms, iron, lead, dissolved oxygen, cadmium, silver, and nutrients. Unlike the more urbanized areas in

the Middle Basin, the Deep Creek region offers a unique opportunity to apply SWIM's "Protection" standard to water bodies in this basin.

The **Lake Jesup** Planning Unit is 92,808 acres, or 145 square miles in area. It is located in Central Seminole County (Figure 4) and extends approximately seven miles upstream into the central part of Orange County, in the northern metropolitan area of Orlando. Lake Jesup is hydraulically connected to the St. Johns River by an outlet channel by the SR 46 bridge and causeway. Lake Jesup is hypereutrophic and nearly devoid of submerged aquatic vegetation, having excessive concentrations of phosphorous and nitrogen, extensive organic muck deposits, and declining fish populations. High nutrient and sediment loading levels, combined with poor lake circulation, have resulted in degraded water quality. Lake Jesup is identified as a water body (303d water) having poor water quality. The water quality parameters of concern in Lake Jesup are the high levels of un-ionized ammonia and nutrients (FDEP 1998).

The **Lake Monroe** Planning Unit is 88,938 acres, or 139 square miles in area, and located in the northwestern part of Seminole County and southwestern Volusia County. The Lake Monroe watershed is heavily developed, although wetlands exist on the east and west shores of the lake. It is within the highest growth potential area of Seminole County. Lake Monroe exhibits eutrophication and is listed as not meeting water quality standards (303d water) by FDEP. The water quality parameters of concern in Lake Monroe are low DO, high nutrients, lead, un-ionized ammonia and selenium levels.

The **Wekiva River** Planning Unit is located within portions of Orange, Seminole, Lake, and Marion counties. It is the largest planning unit in the MSJRB, covering 240,722 acres, or 376 square miles in area. FDEP identifies the Little Wekiva River, Wekiva Springs, Rock Springs Run, and Carpenters Branch tributary in north Apopka as non-attainment water bodies. Parameters of concern include DO, nutrients, biochemical oxygen demand, and coliforms. The Little Wekiva River exhibits extreme erosion and sedimentation caused by high flows and velocities during major storm events.

Overall, there are eighteen water bodies within the Middle Basin (listed below) that are shown on the FDEP 303(d) list.

<b>Econlockhatchee Unit</b>	<b>Lake Jesup Unit</b>	<b>Wekiva River Unit</b>
Crane Strand	Gee Creek	Carpenter Branch
Little Econlockhatchee	Lake Jesup	Rock Springs Run
Long Branch	Soldier Creek Reach	Little Wekiva Canal
Econlockhatchee River		Little Wekiva River
	<b>Lake Monroe Unit</b>	Wekiva Spring
<b>Deep Creek Unit</b>	Lake Monroe	Blackwater Creek
Lake Ashby	Ravenna Park Ditches	
Lake Harney	St. Johns River	

### **Plan for Restoration**

The basic strategy of restoring, protecting and managing the surface water resources of the Middle St. Johns River Basin is through the use of a prioritized, objective, applied, sustainable, ecosystem or watershed approach with periodic public review and input. The Middle St. Johns River Basin SWIM plan is organized around a hierarchical system of initiatives, strategies and action steps. In this system, goals are broad-based and identify objectives of SJRWMD. The plan focuses on four primary initiatives:

1. Water quality enhancement, with emphasis on nutrient loading reduction and lake protection.
2. Watershed master planning with emphasis on completing hydrologic models of sub-basins.
3. Stormwater retrofitting of areas built prior to 1983.
4. Compliance and rule enforcement of existing permitted stormwater systems.

A number of strategies and associated action steps were developed to fulfill these initiatives. The strategies for each initiative are listed as follows:

#### **Water quality**

- Design and implement an integrated water quality monitoring network
- Water quality modeling
- Prioritization of surface waters to implement water quality enhancement opportunities

#### **Watershed master planning**

- Examine existing watershed master plan coverage and determine where gaps exist
- Assist in the development and design of master plans and hydrologic models where gaps exist
- Partner with local governments to implement existing plans

#### **Stormwater retrofitting.**

- Prioritized stormwater retrofit program

#### **Compliance and rule enforcement**

- Implement compliance monitoring programs
- Assess and manage resources and funding to support the requirements of current and emerging National Pollution Discharge Elimination System (NPDES) and Total Maximum Daily Load (TMDL) regulations and Pollution Load Reduction Goals (PLRGs)

In addition to the activities defined in this SWIM plan, local government has a role in maintaining water quality in the MSJRB through the improvement and maintenance of projects under their jurisdiction. Ongoing capital improvement programs are costly, but necessary, and provide a good example of local governments' commitment to good water quality. These local governments have identified over \$156 million in their 5-year capital

improvement programs, summarized in Appendix 5, which would directly benefit the MSJRB.

The successful implementation of this plan is going to require staff resources and dedicated funding. To accomplish all of the action steps in this ambitious endeavor, it is estimated that it will cost \$97.8 million over the next five years to complete.

The following table shows funding estimates by initiative.

Initiative	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
Water Quality	\$160K	\$455K	\$625K	\$625K	\$625K
Watershed Master Planning	\$50K	\$50K	\$200K	\$700K	\$700K
Stormwater Retrofit	\$225K	\$20.55M	\$25.5M	\$25.5M	\$20.5M
Compliance and Rules Enforcement	\$278K	\$275K	\$275K	\$275K	\$275K
<b>Totals</b>	<b>\$713K</b>	<b>\$21.33M</b>	<b>\$26.6M</b>	<b>\$27.1M</b>	<b>\$22.1M</b>

## INTRODUCTION

### **The SWIM Act**

In recognition of the need to place additional emphasis on the restoration, protection and management of the surface water resources of the State, the Florida Legislature, through the Surface Water Improvement and Management (SWIM) Act of 1987, directed the State's water management districts to "design and implement plans and programs for the improvement and management of surface water" (Section 373.451, Florida Statutes). The SWIM legislation requires the water management districts to protect the ecological, aesthetic, recreational, and economic value of the State's surface water bodies, keeping in mind that water quality degradation is frequently caused by point and non-point source pollution, and that degraded water quality can cause both direct and indirect losses of aquatic habitats.

Under the SWIM Act, water management districts prioritize water bodies based on their need for protection and/or restoration. This prioritization process is carried out in cooperation with the Florida Department of Environmental Protection (FDEP), the Department of Agriculture and Consumer Services (DACS), the Department of Community Affairs (DCA) and local governments. The St. Johns River Water Management District (SJRWMD) ranked the Middle St. Johns River Basin (MSJRB) as the 5th priority SWIM Program. Numbers 1 through 4 are current SWIM Programs. In its SWIM priority planning process (SJRWMD 1992a), SJRWMD stated that any future SWIM Programs would be initiated in the order listed, beginning with number 5. The Middle St. Johns River Basin is the first entire management unit that SJRWMD will implement as a SWIM Program. Management Units are defined by SJRWMD as groups of sub-basins, which will be managed as a unit rather individually (SJRWMD 1992a). Thus, this program will address both the causes and effects of surface water quality in the entire Middle Basin.

Following the selection of the priority water bodies, and in accordance with the SWIM Act, a SWIM Plan must be drafted, reviewed and approved before State SWIM funds can be spent on restoration, protection or management activities. The purpose of the MSJRB SWIM Plan is to set forth a realistic course of action, identifying the projects and the effort needed to accomplish them, consistent with the levels and trends of SWIM funding. The law also requires that the plans must be updated at a minimum of once every three years. The evolution of the SWIM Plan for the MSJRB is discussed in the following section.

### **The MSJRB SWIM Plan Evolution**

Through the forum of a MSJRB Working Group, local governments and stakeholders were requested to provide listings of reports and related studies for the portions of the MSJRB within their jurisdiction, to be used for development of an initial reconnaissance report (URS 2001). Four meetings were held with the Working Group to describe the objectives of the reconnaissance and discuss regional issues. Working Group members were contacted or individually interviewed to provide key information, identify ongoing programs, and summarize local issues related to water quality, water quantity and flood control, water supply, and ecology. Locations within each sub-basin were identified where conditions are

representative of issues or problems in those sub-basins. Some of these locations were visited in the field to document existing conditions and further describe the issue.

The Reconnaissance Report, completed in April 2001, was used as a resource in development of the MSJRB SWIM Plan. A team of SJRWMD staff members and outside consultants developed a draft SWIM Plan using the information in the reconnaissance report as a primary resource. Input on the draft SWIM Plan was solicited for, and provided by government and agency stakeholders (Appendix 1) and other interested parties, through a series of three workshops held throughout the MSJRB. This document represents the culmination of that effort.

## **Acknowledgements**

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## SECTION A. DESCRIPTION OF THE WATER BODY SYSTEM

### A.1. General Overview

The Middle St. Johns River Basin (MSJRB) extends from the inflow of the Econlockhatchee River upstream of Lake Harney northward to the confluence with the Wekiva River, just south of Deland (Figure 1). The MSJRB includes several major tributaries and their drainage basins including Econlockhatchee, Deep Creek, Lake Jesup, Lake Monroe, and Wekiva. The basin area encompasses over 1,200 square miles and sizable portions of Lake, Volusia, Seminole and Orange counties, and much smaller parts of Marion and Brevard counties. The Middle Basin is comprised of a variety of landscapes, including highly urbanized areas such as the northeastern portion of Orlando, rapidly urbanizing areas such as Winter Park, as well as largely undeveloped areas such as the Deep Creek Basin. Lakes Jesup, Monroe, and Harney are the three major lakes in the basin.

The Middle Basin consists of five major planning units that contain 104 watersheds described by the St. Johns River Water Management District (SJRWMD) as “7.5-minute quad basins”. The quad basins are outlined in the SJRWMD Technical Publication SJ97-1, “*Surface Water Drainage Basin Boundaries St. Johns River Water Management District: A Reference Guide.*” The five planning unit areas are listed in Table 1.

**Table 1. Planning Units In The Middle St. Johns River Basin**

Number	Planning Unit Name	Area (acres)	Area (mi <sup>2</sup> )
4A	Econlockhatchee River	173,142.7	270.5
4B	Deep Creek	175,453.6	274.2
4C	Lake Jesup	92,808.5	145.0
4D	Lake Monroe	88,937.8	139.0
4E	Wekiva River	240,722.5	376.1
Total		771,065.1 ac	1,204.8 mi <sup>2</sup>
Reference: SJRWMD Technical Publication SJ97-1.			

A 1994 study by the Florida Fish and Wildlife Conservation Commission (FFWCC, formerly known as the Florida Game and Freshwater Fish Commission) identified several portions of the MSJRB as being regional spots of high biological diversity and supporting habitat for numbers of important species. The MSJRB contains habitat for Florida black bear, American swallow-tailed kite, southern bald eagle, and a number of wading birds.

### A.2. Hydrography

The St. Johns River flows northward from the Upper St. Johns River Basin in Brevard County into the Middle Basin. From the upper basin the river flows past its confluence with the Econlockhatchee River, through Lake Harney and the Deep Creek tributary, past the mouth of Lake Jesup, through Lake Monroe, and to a point of confluence with the Wekiva River. North of the Wekiva River, the St. Johns River leaves the Middle Basin and enters the Lake George Basin.

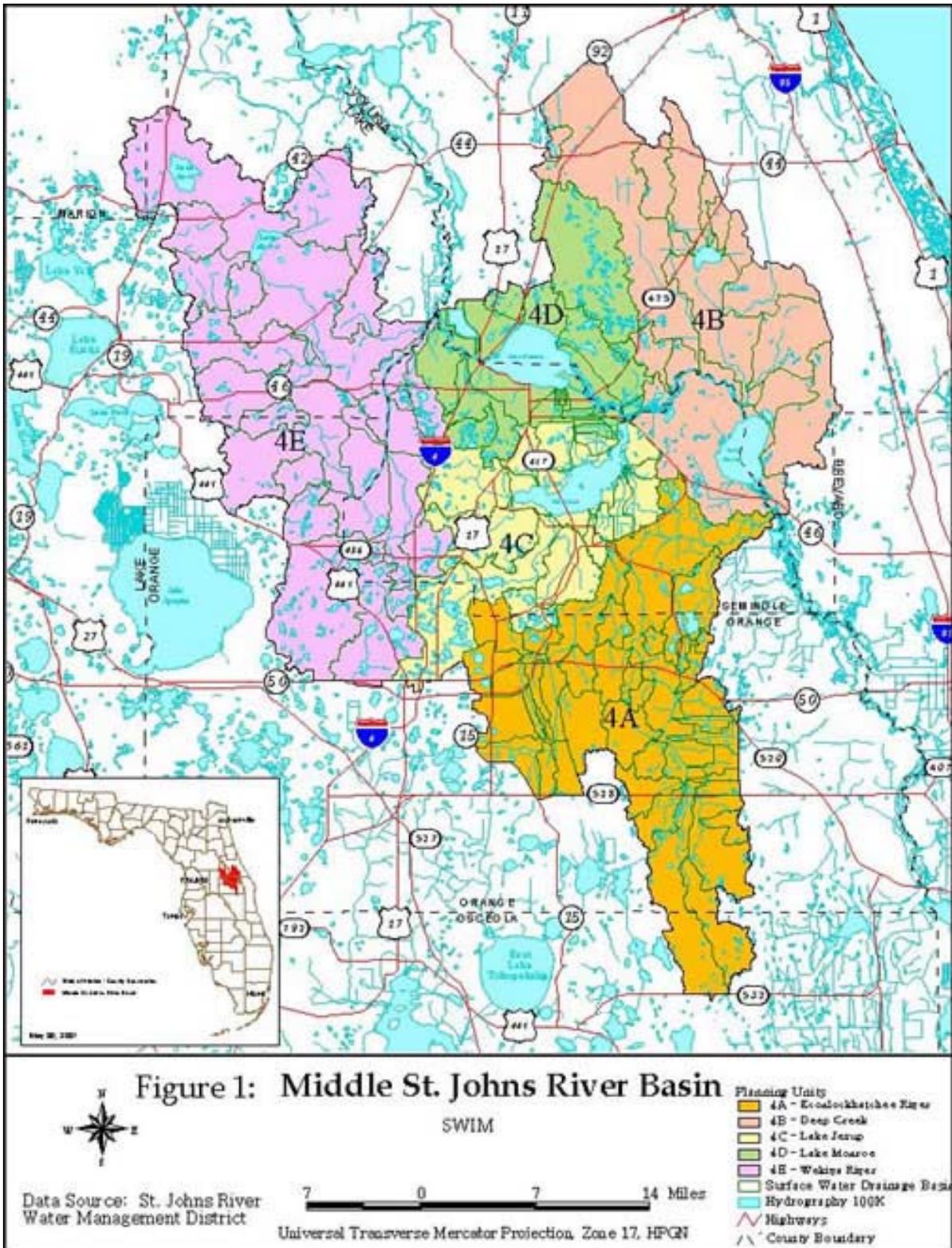


Figure 1. MSJRB Basin Map

### **A.2.1. Water Quality**

Within each Planning Unit description, various comparisons are made for water quality using three different indices, known as the Water Quality Index (WQI), the Trophic State Index (TSI), and the Stream Condition Index (SCI).

The Water Quality Index (WQI) represents an average of six water quality index categories (clarity, dissolved oxygen, oxygen demand, nutrients, bacteria, and biological diversity). The Florida Department of Environmental Protection (FDEP) developed the WQI. It is a percent value ranging from 0-100, with low WQI values representing the best quality, and high WQIs having the worst quality (Hand et al. 1988). Over the years, FDEP has modified the WQI to accommodate blackwater streams and springs.

The Trophic State Index (TSI) is a water quality parameter ranging from 0-100 on a log scale, especially developed for Florida lakes (Huber et al., 1982) but is also used for estuaries as a measure of the degree of eutrophication, or nutrient enrichment of a water body. Historic TSI calculations included secchi disk transparency values in addition to chlorophyll *a* and total nitrogen and phosphorus concentrations. However, the calculation method has been revised by FDEP within the last year to provide consistent TSI values without the inclusion of a transparency value. Here again, low values indicate good water quality while high values indicate poor water quality.

Finally, the Stream Condition Index (SCI) is an assessment tool developed by the FDEP to determine the biological condition of a stream. The SCI is used in monitoring efforts and is an aggregation of seven different measures of the macro-invertebrate community structure. Sampling consists of 20 sweeps of the most productive habitats found in a 100-meter stretch of stream using a dip net. Organisms collected are brought back to the laboratory for identification. The higher the diversity of taxa of organisms, the better the condition of the stream.

These water quality indices are developed from water quality surveys required by the federal Clean Water Act to determine whether state waters are of sufficient quality to meet their designated uses. The results of these surveys are reported to the USEPA in a biennial report called the 305(b) report (FDEP 2000a). Results from the 305(b) report are then used to prepare biennial 303(d) lists of potentially impaired waters. Note that a WQI presented in the 305(b) report for a water segment could represent anywhere from only one category to all six. Consequently, some care must be exercised if WQIs within or between watersheds are compared. Table 2 is provided to show the Middle Basin 1998 303(d) list.

SJRWMD maintains a sampling program in the Middle Basin that expands on the sampling conducted by FDEP. Figure 2 shows the SJRWMD water quality monitoring locations in the MSJRB.

**Table 2. Middle Basin 303(d) Listed Water Bodies\***

<b>Water Body Name</b>	<b>Water Body ID</b>	<b>Priority</b>	<b>TMDL Year</b>	<b>Parameters</b>	<b>Counties</b>
<b>Econlockhatchee</b>					
Crane Strand Drain	3014	High	2004	Dissolved Oxygen, Nutrients, Biochemical Oxygen Demand	Orange, Seminole
Little Econlockhatchee	3001	Low	2008	Dissolved Oxygen, Coliforms, Nutrients, Biochemical Oxygen Demand	Orange, Seminole
Long Branch	3030	High	2002-2004	Dissolved Oxygen, Coliforms, Iron, Nutrients, Biochemical Oxygen Demand, Turbidity	Orange
Econlockhatchee River	2991A	Low	2008	Dissolved Oxygen, Coliforms, Nutrients, Lead, Biochemical Oxygen Demand, Mercury (Based on Fish Consumption Advisory)	Seminole
<b>Deep Creek</b>					
Lake Ashby	2925	Low	2008	Coliforms, Iron, Lead, Cadmium, Silver	Volusia
Lake Harney	2964A	Low	2008	Dissolved Oxygen, Nutrients, Cadmium, Silver	Volusia
<b>Lake Jesup</b>					
Gee Creek	2994A	Low	2008	Coliforms, Nutrients, Lead	Seminole
Lake Jesup	2981	High	2004	Un-ionized Ammonia, Nutrients	Seminole
Lake Jesup	2981A	High	2004	Dissolved Oxygen, Nutrients	Seminole
Soldier Creek Reach	2986	Low	2008	Dissolved Oxygen, Coliforms, Nutrients, Lead	Seminole
<b>Lake Monroe</b>					
Lake Monroe	2893D	Low	2008	Dissolved Oxygen, Nutrients, Lead, Un-ionized Ammonia, Selenium	Seminole
Ravenna Park Ditches	2962	Low	2008	Dissolved Oxygen, Coliforms, Nutrients, Iron, Turbidity	Seminole
St. Johns River	2893C	Low	2008	Dissolved Oxygen, Lead, Nutrients, Total Suspended Solids, Biochemical Oxygen Demand	Seminole
<b>Wekiva River</b>					
Carpenter Branch	2993	Low	2008	Dissolved Oxygen, Coliforms, Nutrients	Orange
Rock Springs Run	2967	High	2004	Dissolved Oxygen, Coliforms, Nutrients, Biochemical Oxygen Demand	Orange
Little Wekiva Canal	3004	Low	2008	Dissolved Oxygen, Nutrients, Biochemical Oxygen Demand	Orange
Little Wekiva River	2987	Low	2008	Coliforms, Nutrients	Seminole
Wekiva Spring	2956C	High	2004	Nutrients, Coliforms	Seminole
Blackwater Creek	2929A	Low	2008	Dissolved Oxygen, Nutrients, Iron, Lead, Cadmium, Selenium, Zinc	Lake

\*extracted from the 1998 303(d) list that was approved by EPA

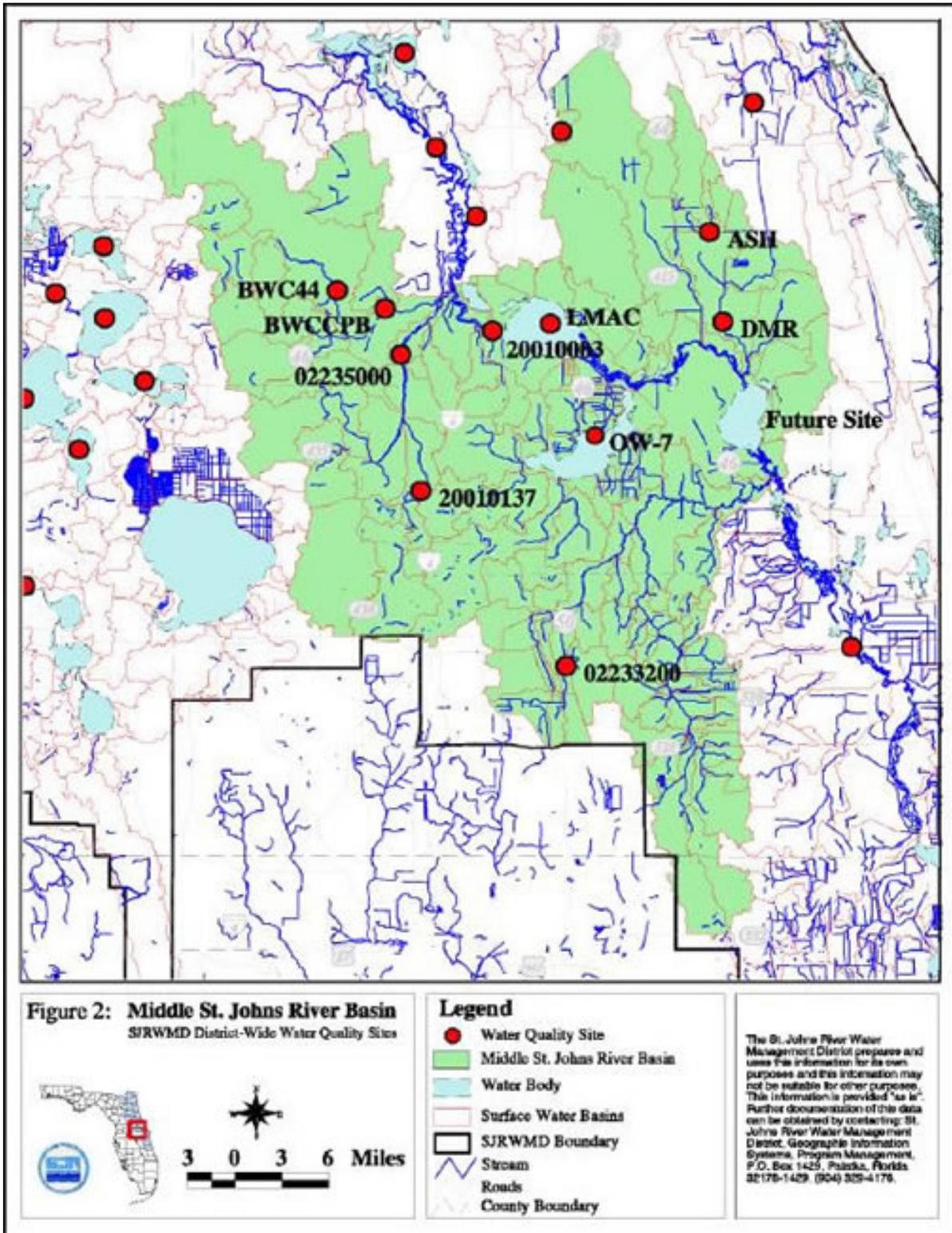


Figure 2. Water Quality Monitoring Sites

A detailed description of each planning unit is provided in the following Sections A.3 through A.7. A map of the planning unit accompanies each Section. Note that the scale varies from map to map.

### **A.3. ECONLOCKHATCHEE RIVER UNIT: Planning Unit 4A**

#### **A.3.1 Introduction**

The Econlockhatchee River Planning Unit is located within Central Florida, in portions of Osceola, Orange, and eastern Seminole counties (Figure 3). Local municipalities and residential areas in this planning unit include portions of Orlando, Oviedo, Winter Park, Casselberry, Bithlo, and Wedgefield. The Econlockhatchee River Planning Unit is comprised of the Econlockhatchee River watershed and the Little Econlockhatchee River watershed. The Econlockhatchee River is 35.8 miles long with a contributing area of approximately 173,143 acres that is comprised mostly of the western slope of the St. Johns River valley between Orlando and Bithlo.

The Econlockhatchee River, a typical blackwater system, originates in extensive flat lowland in northern Osceola County, known as the Econlockhatchee Swamp. Blackwater systems usually have acidic, highly colored, slowly moving waters containing few sediments. These systems typically drain acidic flatwoods or swamps and are low in biological productivity (FDEP 2000a). The Econlockhatchee River exhibits intermittent flow south of the Beeline Expressway, and continues northward through eastern Orange County into southeastern Seminole County, then eastward into the St. Johns River, south of Lake Harney. It is the second largest tributary to the St. Johns River.

The Econlockhatchee River has a narrow border of significant wetlands, with pine flatwoods adjacent to the river corridor. The headwater area contains wetlands that are more expansive and flatwoods that are interspersed with agriculture, small patches of hardwood forest and longleaf pine. The basin is predominantly composed of poorly drained soils and a high water table, with very little high recharge area.

The Little Econlockhatchee River is a major tributary to the Econlockhatchee River that originates in the relatively high lands of central Orange County on the eastern edge of the Orlando metropolitan area. It is approximately 14.8 miles long with a drainage area of 45,420 acres. Other major tributaries to the Econlockhatchee include Mills Creek, Silcox Branch, Mills Branch, Long Branch, Hart Branch, Cowpen Branch, Green Branch, Turkey Creek, Little Creek, and Fourmile Creek.

The Econlockhatchee River is designated by the State of Florida as an Outstanding Florida Water (OFW). At a program level, an OFW designation is applied to waters that are deemed worthy of a special protection because of their natural attributes. While nearly 90% of OFWs are within state or federally managed areas such as parks, national seashores, national wildlife refuges, marine sanctuaries, wild and scenic rivers, aquatic preserves, etc., water not under state or federal management may also be designated as OFW. These are called "Special Water" OFWs.

For a water to be designated as a “Special Water” OFW, the Environmental Regulation Commission (ERC) must make two “findings”. The ERC must find “that the waters are of exceptional recreational or ecological significance and that the environmental, social, and economic benefits of the designation outweigh the environmental, social and economic costs” (62-302.700(5), *F.A.C.*). The ERC concurred that the Econlockhatchee River met the findings necessary for OFW designation and the Econlockhatchee River “Special Water” OFW became effective June 18, 1992. It includes the Econlockhatchee River, the Little Econlockhatchee, Econlockhatchee River Swamp, and a number of tributaries.

### **A.3.2. Historical Uses**

Prior to the past two decades, the Econlockhatchee River Planning Unit remained in relatively pristine condition. There were limited impacts due to development, with the exception of numerous auto salvage yards. The majority of activities in the upper Econlockhatchee River watershed up to the 1970’s had been grazing and some citrus groves.

In direct contrast, the Little Econlockhatchee River has been one of the most heavily impacted waterways within SJRWMD. Many miles of the original tributaries and mainstem were channelized, creating a network of drainage ditches that convey runoff from the Orlando metropolitan area into the lower reaches of the Little Econlockhatchee River, then to the Econlockhatchee River, and ultimately to the St. Johns River. The ditching is significant and was done to lower levels in the groundwater table.

Prior to 1983, the Little Econlockhatchee received significant effluent from up to 12 wastewater treatment plants. However, a new regional wastewater facility was constructed and a number of smaller facilities (including these 12) were connected to the regional facility. At one point, the Little Econlockhatchee River was considered to be the most significant source of nutrients to the St. Johns River. However, water quality improved once the discharges were discontinued.

### **A.3.3. Current Uses**

The expansion of urban areas is occurring throughout the basin where formerly there were only two distinct residential areas, Bithlo and Wedgefield.

In most, if not all areas of the Little Econlockhatchee River, extensive urbanization has occurred along the channelized portions of the stream within the natural floodplain.

The Econlockhatchee River sub-basin is classified by SJRWMD as containing a regionally significant habitat in need of special consideration in land acquisition planning, future land use designations, and regulations for new development in order to avoid further adverse impacts. Residential development done prior to 1983 has resulted in reduction of wetland and upland habitats throughout the Econlockhatchee River sub-basin. In response, special basin permitting criteria for new development have been adopted by SJRWMD for the Econlockhatchee River and its tributaries. There has also been a significant amount of land acquired for public conservation purposes.

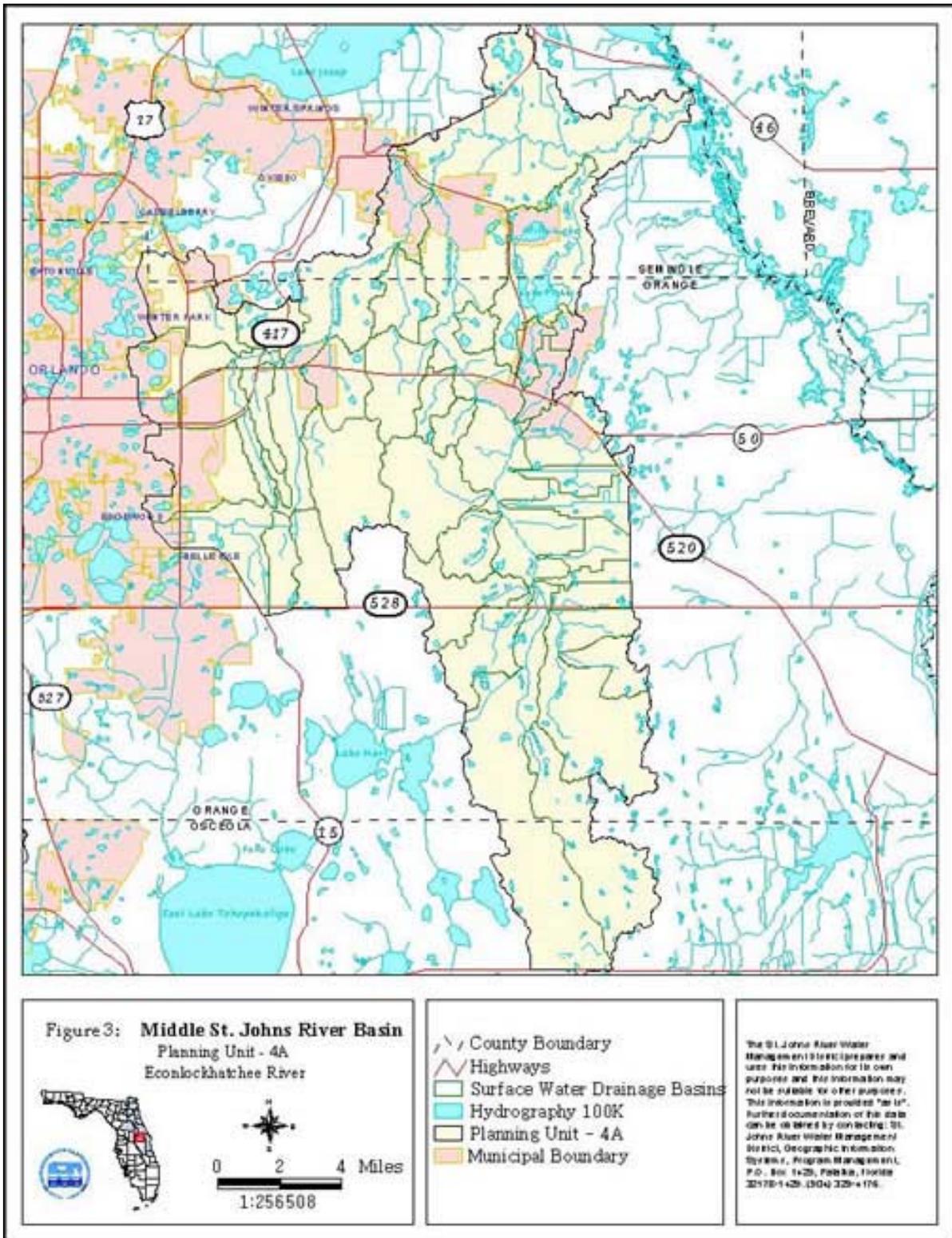


Figure 3. Econlockhatchee River Planning Unit Map

**A.3.4. Conditions leading to the need for restoration and protection**

The Econlockhatchee River drains large marsh areas with high organic content and low pH levels. The upper Econlockhatchee River has high levels of total nitrogen and total phosphorous content with low dissolved oxygen and low pH levels near the headwaters. Water quality in the upper Econlockhatchee River improves downstream from the headwaters. Water quality in the lower Econlockhatchee River also improves downstream, with biological oxygen demand (BOD) levels decreasing. Nitrogen concentrations decrease downstream, but phosphorus levels do not.

Urban runoff and continuing effects of sediment load from previous wastewater effluent discharges impact the Little Econlockhatchee River. Dissolved oxygen levels decrease and BOD and nitrogen levels increase downstream from the headwaters. Phosphorous levels increase initially, then decrease further downstream.

A recent study by FDEP identified high coliform bacteria throughout most of the river and high nutrient levels in the downstream areas (FDEP, 2000b). The FDEP year 2000 305(b) report shows Long Branch and Crane Strand Drain as having poor water quality.

The District Water Management Plan (DWMP) of May 2000 assesses the river to be of fair water quality with a “stable” trend. The only degrading water quality issue was a decreasing dissolved oxygen trend in the St. Johns River immediately downstream of the confluence with the Econlockhatchee River, previously reported by CDM (1996).

## **A.4. DEEP CREEK UNIT: Planning Unit 4B**

### **A.4.1. Introduction**

The Deep Creek Unit is actually an aggregate of smaller basins, located in Central Florida in portions of south Volusia, the northwest corner of Brevard County, and northeastern Seminole counties (Figure 4). The contributing area of the Deep Creek planning unit is approximately 175,454 acres or 274 square miles.

Lake Ashby, located within the Deep Creek planning unit, is located north of Lake Harney and connects to the south, to the St. Johns River through the Lake Ashby and Deep Creek tributaries. Volusia County operates a park on Lake Ashby that includes a boardwalk, picnic areas, and camping facilities. Like most of the Deep Creek planning unit, the Lake Ashby area remains undeveloped. Volusia County is actively seeking additional public owned lands in the environmentally significant area known as the Volusia Corridor, which includes some lands around Lake Ashby.

### **A.4.2. Historical Uses**

The primary historical land use has been pastureland, logging, and large acreage tracts for homesteads. Most of the Deep Creek planning unit is within the 100-year floodplain and is largely undeveloped.

### **A.4.3. Current Uses**

The majority of the Deep Creek planning unit is still used for agricultural and pastureland purposes. Residential lots are mainly zoned a minimum of 5 acres. Although mostly undeveloped, development pressures are beginning to exist in the Deep Creek sub-basin. A several-thousand acre annexation is planned by the City of Deltona to add commercial and industrial areas to the city. In addition, transportation improvement concepts are being evaluated which include the paving of new east-west roadways across the county. There has also been a recently permitted new development adjacent to Lake Ashby.

### **A.4.4. Conditions Leading to the Need for Restoration and Protection**

The water quality status appears to be good within the Deep Creek planning unit, and improving downstream along the St. Johns River. However, SJRWMD identified a potential degradation trend in Lake Ashby (SJRWMD 2000).

Water quality data obtained in the Deep Creek planning unit by Volusia County show a decrease in Dissolved Oxygen (DO) levels in the St. Johns River from the confluence with Lake Harney to the vicinity of a residential subdivision known as Lemon Bluff. Total Phosphorus (TP) levels also increase downstream toward Lake Jesup indicating a reduction in water quality.

FDEP identifies Deep Creek and Lake Harney as potentially impaired water bodies (303d waters). Water quality parameters of concern in Deep Creek are the high levels of coliform bacteria, iron, lead, cadmium, and silver. In Lake Harney, the parameters of concern are low dissolved oxygen levels, nutrients, cadmium, and silver levels (FDEP 1998).

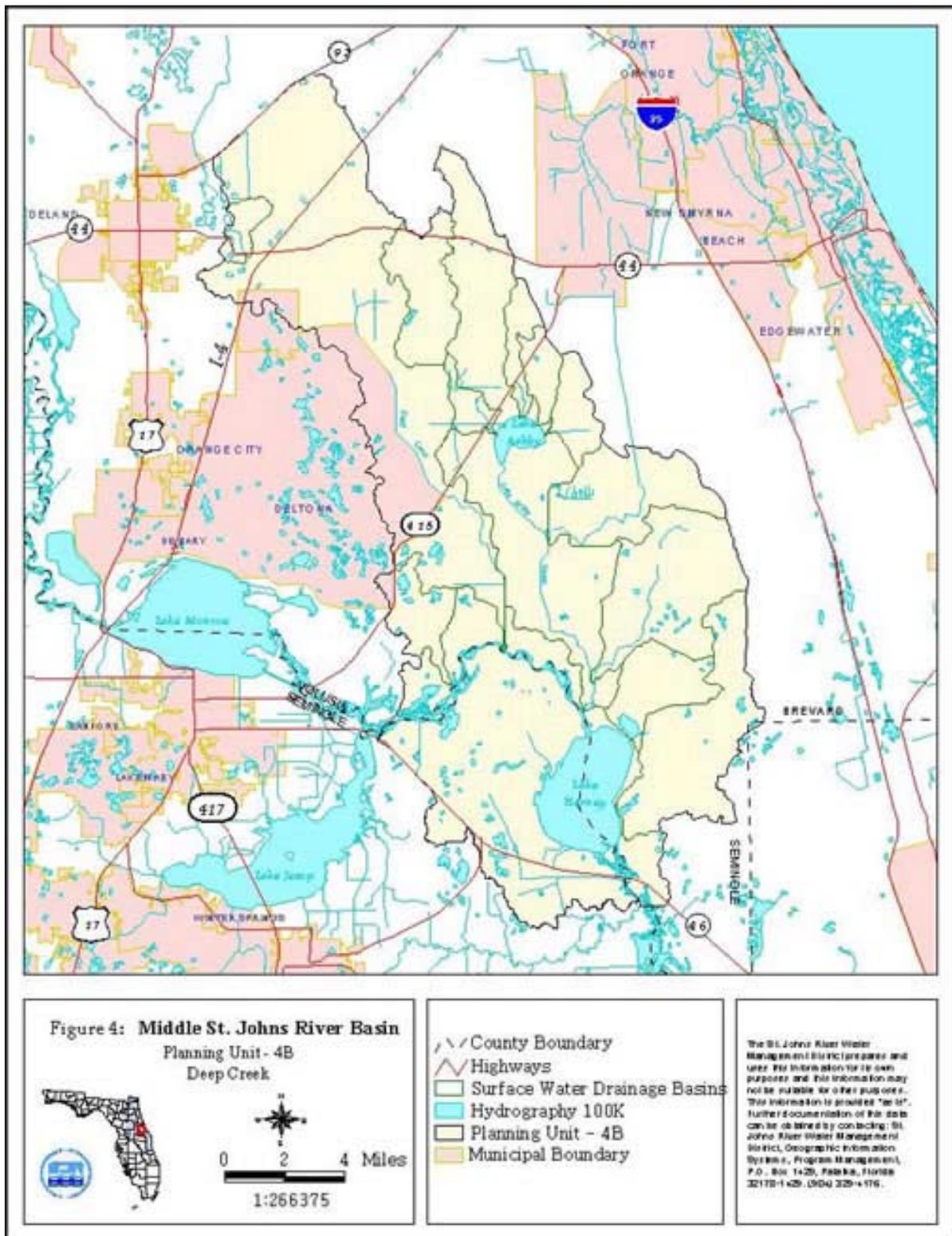


Figure 4. Deep Creek Planning Unit Map

## **A.5. LAKE JESUP UNIT: Planning Unit 4C**

### **A.5.1. Introduction**

The Lake Jesup planning unit is located in Central Seminole County (Figure 5) and extends approximately seven miles upstream into the central part of Orange County, in the northern metropolitan area of Orlando. Sanford, Lake Mary, Longwood, Winter Springs, Oviedo, Casselberry, Maitland, Eatonville, Winter Park, and Orlando are partly or wholly within this sub-basin. The Lake Jesup planning unit is approximately 92,808 acres or 145 square miles in size. Lake Jesup is hydraulically connected to the St. Johns River by an outlet channel by the SR 46 bridge and causeway.

Lake Jesup has a surface area of approximately 16,000 acres that includes open water and floodplain area. The Lake Jesup floodplain functions as wintering areas for migratory sandhill cranes and provides habitat for nesting bald eagles. American alligators are abundant in Lake Jesup. River otters are present in the tributaries and ospreys can be found around the lake.

Soil and sediments around Lake Jesup consist primarily of poorly drained black muck overlying brown and dark gray sandy clay. These soils are easily saturated and stay saturated for extended periods of time (SJRWMD, 1999).

The major tributaries in the Lake Jesup planning unit are Gee Creek, Soldier Creek, Howell Creek, and Six Mile Creek. The entire planning unit consists of 13 sub-basins.

### **A.5.2. Historical Uses**

In the 1800's steamboats journeyed out from the St. Johns River to at least four busy landings on Lake Jesup (Belleville, 2000). In the 1930's the Army Corps of Engineers built a navigational canal to improve accessibility to the lake for barge traffic. This canal, combined with the SR 46 causeway built across the western end of the lake in the 1950's, effectively short-circuited the river's connection to the lake.

Lake Jesup's floodplain was historically modified for pasture creation, and crops, with nutrient-laden runoff contributing to water quality decline in the lake.

In the past, seven secondary wastewater treatment plants discharged into three Lake Jesup tributaries (3 on Howell Creek, 3 on Gee Creek, and 1 on Soldier Creek) until 1983. This contributed to an accumulation of a thick layer of nutrient laden organic muck on the lake bottom. These discharges were later directed outside the watershed or switched to zero discharge management. However, sediments may remain a source of nutrients to the overlying waters (SJRWMD, 1992b).

### **A.5.3. Current Uses**

Rapid growth is taking place near Lake Jesup's southeastern shore. Residential and other development related categories have increased and agricultural and open land has decreased in the last 10 years. Nearly two million people are predicted to live in the vicinity of the lake

by the year 2010. As a result, there is also development pressure along the northern shore on the outskirts of Sanford, in addition to the current growth along the southern shore area.

A former Navy base in WWII, now known as the Sanford International Airport, is located on the northwest shore. This airport has future expansion plans to increase the size of the airport and runways to accommodate larger planes, which may have impacts on land adjacent to the lake.

#### **A.5.4. Conditions Leading to the Need for Restoration and Protection**

Lake Jesup is hypereutrophic and nearly devoid of submerged aquatic vegetation, having excessive concentrations of phosphorous and nitrogen, extensive organic muck deposits, and declining fish populations. High nutrient and sediment loading levels, combined with poor lake circulation have resulted in degraded water quality. This is likely the result of previous wastewater treatment plant effluent, nonpoint source runoff from urban areas in Winter Springs, Casselberry, and Sanford, and agricultural activities (FDEP 1997). Also, during wet weather, the City of Sanford is permitted to discharge from its effluent spray fields into Lake Jesup. The lake is characterized by frequent algal blooms and fish kills.

Lake Jesup is identified as a potential impaired water body (303d water) having poor water quality. The water quality parameters of concern in Lake Jesup are the high levels of un-ionized ammonia and nutrients (FDEP 1998).

Of all tributaries monitored by FDEP, the Black Hammock area of the Lake Jesup planning unit contained the highest concentrations of nutrients and low dissolved oxygen levels. The FDEP has found that the main ecological problems with the streams in the Black Hammock area are related to the prevalent agricultural operations in the sub-basin. Water laden with nutrients and pesticides is intercepted by these streams and conveyed directly into Lake Jesup (FDEP 1997).

There have been a number of hydrologic changes to the watersheds discharging into Lake Jesup, especially associated with urbanization of the area. Significant hydraulic changes were also made to the natural river channels between the St. Johns River and Lake Jesup. Historically, the connection between the St. Johns River and Lake Jesup consisted of both river channels and floodplain marsh.

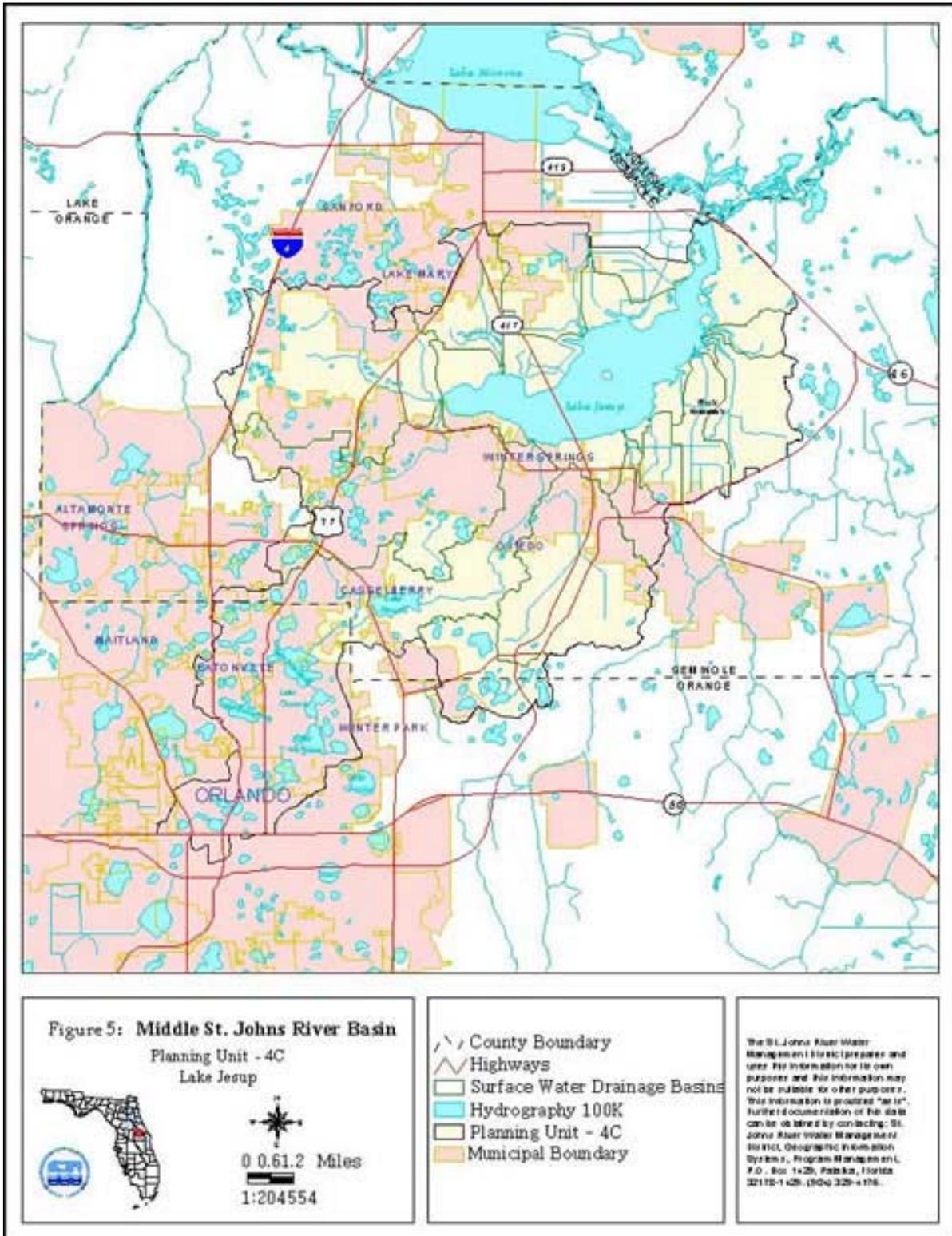


Figure 5. Lake Jesup Planning Unit Map

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## **A.6. LAKE MONROE UNIT: Planning Unit 4D**

### **A.6.1. Introduction**

The Lake Monroe planning unit (Figure 6) is 88,938 acres, or 139 square miles in area, and located in the northwestern part of Seminole County and southwestern Volusia County. Lake Monroe is one of the three major lakes in the Middle Basin. It is a “river run” lake, that is the lake is an enlargement of the river channel itself, and the river runs through the lake. The lake is 6 miles long, about 4 miles wide and 7 feet deep on average, with a surface area of 9,406 acres, representing 11% of the planning unit.

The major tributaries are Bethel Creek, and the DeBary Drain.

### **A.6.2. Historical Uses**

The south shore of Lake Monroe is occupied by the City of Sanford, and is at the headwaters of the commercially navigable portion of the St. Johns River. With the advent of commercial steamboat service in the mid 1800's, Lake Monroe became an important distribution point for goods essential for the growth of Central Florida (Belleville 2000).

### **A.6.3. Current Uses**

The Lake Monroe watershed is heavily developed, although wetlands exist on the east and west shores of the lake. It is within the highest growth potential area of Seminole County. A large amount of acreage in the I-4/SR 46 corridor is designated as higher intensity planned development that allows industrial, office, commercial and multifamily developments. Mixed land uses in the Sanford area lie immediately south of Lake Monroe. Extensive residential areas exist in DeBary and Deltona, northwest and northeast of Lake Monroe, respectively.

The southern shoreline has been sea walled and a portion of Hwy 17/92 is immediately adjacent to the sea walled area. There are no treatment areas for road runoff in this area.

### **A.6.4. Conditions Leading to the Need for Restoration and Protection**

Lake Monroe exhibits eutrophication and is listed as a potentially impaired water body (303d water) by FDEP. The water quality parameters of concern in Lake Monroe are low DO, high nutrients, lead, un-ionized ammonia and selenium levels (FDEP 1998). The lake currently receives wastewater discharges from Deltona. The City of Sanford, which formerly discharged into Lake Monroe, has shifted to water reuse and is expanding its effluent spray-fields.

Lake Monroe is just upstream of a segment of the St. Johns River that is part of the Wekiva River State Aquatic Preserve, a portion of which includes part of the St. Johns River.

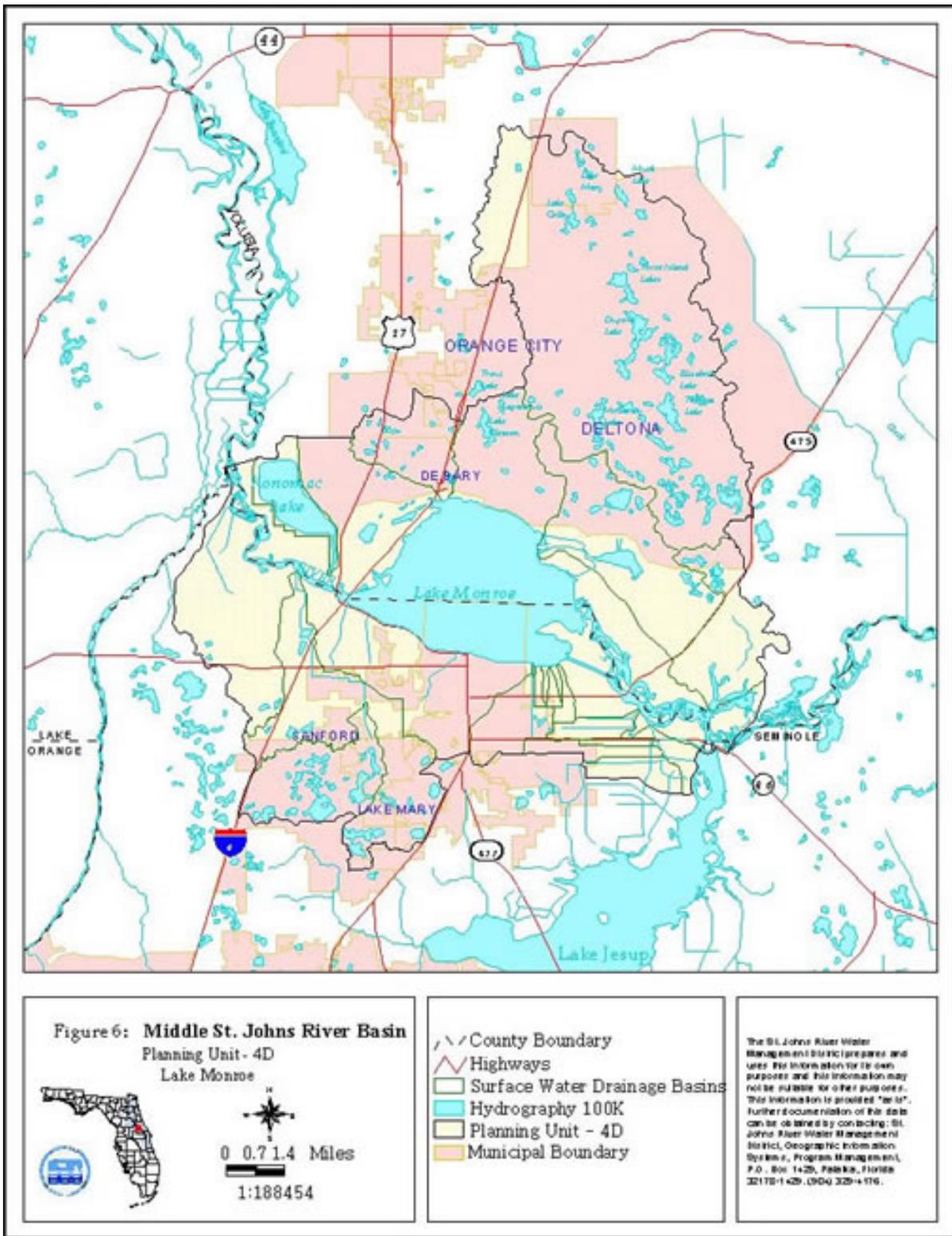


Figure 6. Lake Monroe Planning Unit Map

## **A.7. WEKIVA RIVER UNIT: Planning Unit 4E**

### **A.7.1. Introduction**

The Wekiva River planning unit is located within portions of Orange, Seminole, Lake, and Marion counties (Figure 7). Local municipalities and urbanized areas within this unit include Lake Mary, Apopka, Altamonte Springs, Maitland, Eatonville, Winter Park, Orlando, Orlovista, and Mt. Plymouth. The Wekiva River planning unit has a drainage area of 240,722.5 acres or more than 376 square miles.

The Wekiva River forms at the confluence of Wekiva Springs Run and Rock Springs Run and continues for approximately 14.2 miles before entering the St. Johns River. The Wekiva River planning unit contains both spring-fed and blackwater streams. The inflow from springs is very significant in this unit. The soil characteristics are very sandy, with a large portion occurring in an area of high aquifer recharge.

The Wekiva and Little Wekiva Rivers, except for the Little Wekiva River upstream of SR 434, have been designated “Outstanding Florida Waters” by the state under Rule 62-302.700(9)(i), Florida Administrative Code. The Wekiva River has also been designated by both the Federal government as a Wild and Scenic River, and by the State as a Scenic and Wild River. In 1988, the Florida Legislature passed the Wekiva River Protection Act, which created controls to deter wetland losses and authorized local governments to create rules to protect habitat and treat runoff. The Wekiva River has special basin criteria for environmental resource permits (ERPs) that are regulated by SJRWMD.

The Little Wekiva River watershed is approximately 11% of the Wekiva River planning unit. Major lakes in this planning unit include Lawne Lake, Lake Orlando, Lake Fairview, Bear Lake, Lake Lotus, and Spring Lake.

The major tributaries of the Wekiva River are the Little Wekiva River, Rock Springs Run, and Blackwater Creek.

### **A.7.2. Historical Uses**

Over 20 archaeological and historical sites occur in the Wekiva area from Rock Springs to the St. Johns River and are recorded on the State of Florida’s Master Site File. Development of the area began in 1820’s with the advent of steamboat and barge travel on the river. From the 1880’s to the present, tourism has been an important industry in the area.

### **A.7.3. Current Uses**

Almost half of the Wekiva River unit is protected through public ownership. The Wekiva Basin GEOPark, Seminole State Forest, Ocala National Forest, state reserves, and the Wekiva-Ocala Greenway Conservation and Recreation Lands (CARL) project are examples of these publicly-owned lands. The area located west and north of downtown Orlando is highly urbanized and contains the most dense development and large amount of impervious area at the southern end of the sub-basin. Upland forests with some agricultural use predominate along the northern reaches of the Wekiva River.

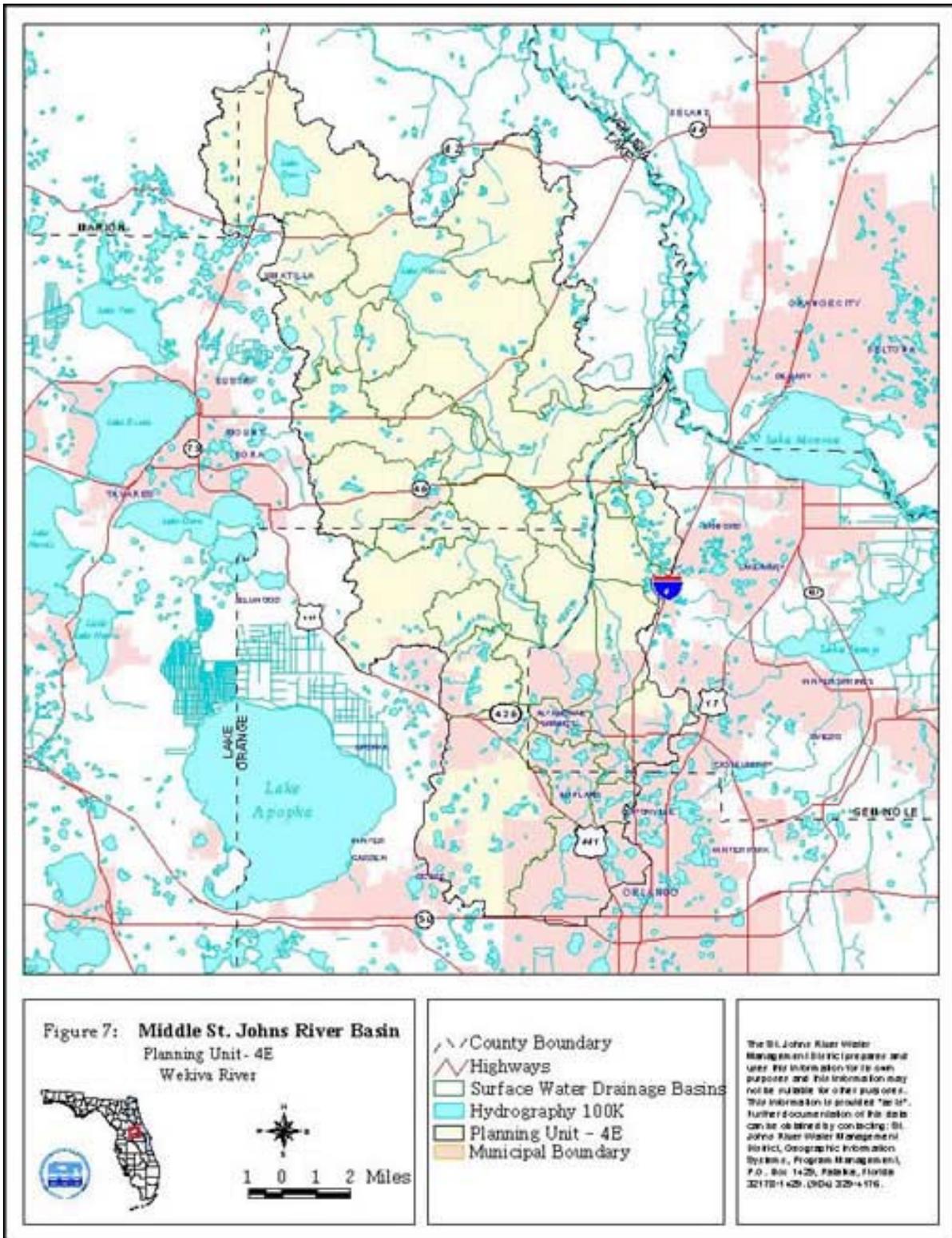


Figure 7. Wekiva River Planning Unit Map

#### **A.7.4. Conditions Leading to the Need for Restoration/Protection**

In general, the main stem of the Little Wekiva River is relatively clear but can become turbid during periods of high flow. DO concentrations are often less than state water quality standards. BOD concentrations are high in general, but not as high as the BOD measured in the main stem of the Little Wekiva River in Orange County. The Little Wekiva planning unit is highly developed, with much of the river having been channelized, and the floodplain filled prior to stormwater regulations. Excess flows from the large amount of impervious area have increased flow rate, velocity, flood stages, and pollutant load.

The water quality parameters of concern in the Wekiva River planning unit are the high levels of coliform bacteria and nutrients as measured in Wekiva Springs and the Little Wekiva River (FDEP 1998). One recent study of the sub-basin with 10 sites sampled in January and September of 1999 found excellent results based on SCI ratings but identified high nitrate-nitrite concentrations and high algal growth potential in half the sites (FDEP 2000b).

FDEP identifies the Little Wekiva River, Wekiva Springs, Rock Springs Run, and Carpenters Branch tributary in north Apopka as potentially impaired water bodies. The water quality parameters of concern in the Little Wekiva River and Wekiva Springs are high levels of coliform bacteria and nutrients. In Rock Springs Run, the parameters of concern are dissolved oxygen, coliform bacteria, nutrients, and BOD (FDEP 1998).

The Little Wekiva River exhibits extreme erosion and sedimentation caused by high flows and velocities during major storm events. In addition to the pollutant loading associated with urban stormwater runoff, high channel velocities have caused scouring of the riverbed and banks, adding an increased sediment load to the stream. This erosion impacts water quality with turbidity, and also impacts the ecosystem both from the scouring destruction and sediment deposition that inundates native vegetation.

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## SECTION B. LAND USES WITHIN THE MSJRB

### B.1. Land Use and Land Cover

Historically, the predominant land uses in the MSJRB were silviculture and agriculture. Urban and suburban land uses have become predominant with continued expansion of the Orlando metropolitan area. Table 3 shows the percentages of land use and land cover for each planning unit in the Middle Basin, based on 1995 land use data.

The Lake Monroe and Lake Jesup planning units are the most urbanized, having 22.7% and 25.7% respectively in medium and high density residential development. By contrast, Deep Creek Unit has no medium or high density residential development.

Agriculture (excluding rangeland) is a major land use in both the Econlockhatchee Unit where it accounts for 12.7% of the cover and the Wekiva River planning unit where it accounts for 15.1%.

Wetlands are a major land cover in all planning units in the MSJRB, ranging from 18.6% of the cover in Lake Jesup to 31.4% of the cover in Deep Creek. However, between 1984 and 1995 there has been significant loss of wetlands throughout the MSJRB. The greatest losses were in the Lake Jesup planning unit, with 1,677 acres of wetlands lost, and in the Econlockhatchee planning unit, with 1,097 acres of wetlands lost.

**Table 3. Major Categories of Land Use and Land Cover in the MSJRB**

	<b>Econlockhatchee River</b>	<b>Deep Creek</b>	<b>Lake Jesup</b>	<b>Lake Monroe</b>	<b>Wekiva River</b>
<b>Land Uses</b>					
Low Density Residential	4.8%	5.5%	6.9%	7.9%	7.8%
Medium Density Residential	6.5%	0	19.8%	20.9%	11.3%
High Density Residential	6.6%	0	5.9%	1.8%	2.2%
Agricultural	12.7%	8.5%	7.4%	7.4%	15.1%
<b>Land Cover</b>					
Wetlands	26.0%	31.4%	18.6%	19.3%	21.2%
Upland forest	19.0%	29.6%	6.5%	14.2%	22.6%
Rangeland	10.4%	0	0	3.35	7.2%
Open Water	0	6.4%	13.8%	0	0
Other	14.0%	18.6%	21.1%	25.2%	12.6%
Totals	100%	100%	100%	100%	100%

### **B.2. Point Sources of Pollution**

Prior to 1983, the major point sources of pollution in the MSJRB were from sewage treatment plants. Currently, point source dischargers include domestic and industrial wastewater facilities that are regulated through the NPDES program described in B.4, below.

### **B.3. Non-point Sources of Pollution**

Non-point sources of pollution in the basin, which can degrade ground as well as surface water quality, include stormwater runoff or leaching of pollutants into groundwater from agriculture, silviculture and urban/suburban land uses, atmospheric deposition, and septic tanks. Septic tanks are prevalent in the basin and can be a source of nutrients (nitrogen and phosphorus), pathogens and other pollutants that can pose a threat to public health. Surface waters can be adversely affected directly by system drainfields washed away by floodwaters or via runoff from areas where system failures result in ponding of untreated or inadequately treated wastewater on the ground. Surface waters can be adversely affected indirectly through seepage of groundwaters contaminated by system discharges (DWMP 2000a)

### **B.4. Permitted Discharge Activities**

There are a number of domestic and industrial wastewater facilities in the MSJRB with NPDES permits to discharge to surface waters, including the Little Econlockhatchee River. The volume of discharges to surface waters from these facilities compared to their permitted capacities varies, with some facilities discharging to surface water only during wet weather conditions and others discharging to surface waters exclusively (DWMP 2000a).

### **B.5. Surface Water Discharge Facilities Operating with a Permit**

The Clean Water Act requires wastewater dischargers to have a permit establishing pollution limits, and specifying monitoring and reporting requirements. Appendix 2 lists surface water discharge facilities currently operating with a permit. There are seven domestic and fourteen industrial wastewater facilities within the MSJRB that are permitted through the National Pollutant Discharge Elimination System (NPDES) program to discharge to surface waters. The industrial discharges consist of 7 concrete batch plants, 3 petroleum cleanup discharges, a single power plant cooling water discharge, and 3 groundwater remediation projects for constituents other than petroleum. In addition, the Orange County Landfill has produced a ground water/stormwater discharge that flows into a canal leading to the Econlockhatchee River. FDEP is working with SJRWMD, the Orlando Utilities Commission, and Orange County to have this water utilized as cooling water as part of the expansion of the Curtis Stanton power plant.

The NPDES program for wastewater discharges has been in existence at EPA since the 1970's and was delegated to Florida in 1995, Phase I of the NPDES stormwater permitting program began at EPA in 1990 and was delegated to the state of Florida in October 2000. The pretreatment program governs industrial wastewater discharges to municipal wastewater plants. Industrial facilities may also qualify for NPDES permits for discharge to surface waters.

NPDES permits regulate household and industrial wastes that are collected in sewers and treated at municipal wastewater treatment plants. Permits regulate discharges with the goals

of 1) protecting public health and aquatic life, and 2) assuring that every facility treats wastewater.

**B.6. Surface Water Discharge Facilities Operating Without a Permit**

According to information provided by FDEP there are currently no point-source surface water discharge facilities in the Middle Basin operating without a permit.

**B.7. Multi-Sector Generic Permit (MSGP)**

Industrial facilities not covered by an NPDES permit are currently covered under the federal multi-sector general permit for stormwater discharge associated with industrial activity. There are currently 158 MSGP permittees in the MSJRB, listed in Appendix 3.

**B.8. Municipal Separate Storm Sewer Systems (MS4s)**

The NPDES stormwater program regulates point source discharges of stormwater from certain municipal and industrial sources, including certain construction activities. Designated large and medium municipal separate storm sewer systems, or MS4s, these facilities were previously required by EPA to obtain NPDES permits. There are currently seventeen facilities in the MSJRB, listed in Appendix 4, with MS4 permits.

**B.9. Compliance Schedules and Recommendations for Point and Non-point Sources of Pollution Adversely Affecting the Public Interest**

The FDEP takes short-term enforcement actions against facilities, but none of the facilities within the MSJRB is under any ongoing enforcement action with a compliance schedule.

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## **SECTION C.**

### **STRATEGIES FOR RESTORATION OR PROTECTION**

The Water Resource Implementation Rule (Ch 62-40, *F.A.C.*) calls for SJRWMD to play a major role in the development of watershed-specific water quality targets and pollutant load reduction goals.

Specifically, 62-40.432, Surface Water Protection and Management states:

(2) Watershed management goals shall be developed by the District for all watersheds within the boundaries of each District and shall be consistent with the Surface Water Improvement and Management (SWIM) program and the EPA National Pollution Discharge Elimination System (NPDES) program. Watershed management goals shall be included in the District Water Management Plans.

And further:

1. The Districts shall include in adopted SWIM Plans numeric estimates of the level of pollutant load reduction goals anticipated to result from planned corrective actions included in the plan.

a. For SWIM water bodies with plans originally adopted before January 1, 1992, these estimates shall be established before December 31, 1994.

b. For SWIM water bodies with plans originally adopted after January 1, 1992, these estimates shall be established within three years of the plan's original adoption date.

2. Each District shall develop water body specific pollutant load reduction goals for non-SWIM water bodies on a priority basis according to a schedule provided in the District Water Management Plan. The list of water bodies and the schedule shall be developed by each District, giving priority consideration to water bodies that receive discharges from stormwater management systems that are required to obtain a NPDES municipal stormwater discharge permit.

3. The Districts shall consider economic, environmental, and technical factors in implementing programs to achieve pollutant load reduction goals. These goals shall be considered in local comprehensive plans submitted or updated in accordance with Section 403.0891(3)(a), *F.S.*

Specific Authority 373.026, 373.043, 373.418, 403.061, 403.087, *F.S.*

Goals of SJRWMD that apply to the Middle Basin SWIM plan include the following:

1. To preserve natural and functional components of the ecosystem while restoring, where feasible, such conditions to the degraded portions of the system;
2. To preserve, or where necessary restore, the quantity and quality of water necessary to support thriving biological communities, containing appropriate diversities of native species within the riverine and lacustrine systems of the St. Johns River Middle Basin;
3. To pursue the development and implementation of stormwater management plans for each of the tributaries within the Middle Basin (DWMP 2000a).

The basic strategy of restoring, protecting and managing the surface water resources of the Middle St. Johns River Basin is through the use of a prioritized, objective, applied, sustainable, ecosystem or watershed approach with periodic public review and input. Through prioritization, projects will be chosen which are most in need of protection and/or restoration. Sustainable restoration and enhancement techniques alone or in combination will minimize the public's financial and material liability toward the management and operation of remedial systems. An ecosystem-watershed approach will take into consideration the cause and effects of the problem within its land-based context and establish successful applications for enhancement or restoration. Listed below are SJRWMD's proposed restoration and protection initiatives, strategies, and action steps for the MSJRB.

The Middle St. Johns River Basin SWIM plan is organized around a "WHAT, HOW, WHEN" project delivery system of initiatives, strategies and action steps. In this system, goals are broad-based and identify objectives of SJRWMD. Initiatives are general categories that have been used to divide the plan into distinct subject areas (the WHAT) developed by SJRWMD staff in conjunction with the Middle Basin Advisory Committee. Strategies are more detailed descriptions of the underlying work proposed to achieve results (the HOW). They identify the approaches and methods that will be used to implement the initiatives, and possess specified objectives and a proposed timeline (the WHEN) and budget. Action steps represent specific activities suggested to reach project delivery.

As various SJRWMD staff members have observed throughout the Middle Basin, remedial and protective projects fall into a few major categories. Thus, the consensus of the Middle Basin SWIM Team is that the plan should focus on four primary initiatives:

Initiative 1 – Water quality enhancement, with emphasis on nutrient loading reduction and lake protection;

This initiative consists of three distinct but interrelated strategies: Water quality monitoring, water quality modeling for identifying and quantifying pollutant source basins and load reduction goals, and a prioritization process based on water quality enhancement opportunities for 303(d) listed surface waters in the Middle Basin.

Initiative 2 – Watershed master planning with emphasis on completing hydrologic models of sub-basins;

Watershed master planning is an evaluation of stormwater management in the geographic area and identification of problem areas, with detailed remedial actions facilitated through the completion of hydrologic models. For SJRWMD, implementation often includes assisting local governments in coordinating their plan implementation, through buying the land and providing funds for constructing the project. SJRWMD's land acquisition program, which is an ongoing program independent of the SWIM planning process, will benefit water quality through providing funds for land acquisition in priority watersheds. Details of the land acquisition program are described separately in Section F.

Initiative 3 – Stormwater retrofitting of areas built prior to 1983;

This initiative consists of development of a prioritized stormwater retrofit program, development of a special supporting land acquisition program and evaluation of available Federal and State funding sources and partnering opportunities.

Initiative 4 – Compliance and Rule enforcement of existing permitted stormwater systems;

This initiative consists of strategies to collect and evaluate compliance information from existing stormwater quality treatment systems. More stringent regulations exist for the Wekiva and Econlockhatchee River basins. Information gained from a compliance monitoring program to evaluate proper system operation can be compared with water quality monitoring results to specify where in-place treatment devices are providing the necessary pollutant reductions, and where additional treatment is needed to maintain the water resource.

In its mandate to address broad ecosystem needs the SWIM plan attempts to accomplish comprehensive protection strategies in the less developed basins; focusing intergovernmental and multi-program actions on important environmental problems; and by providing cooperative funding for projects addressing long-term water body protection and restoration goals.

## **C.1. Water Quality Initiative**

### **C.1.1. Strategy: Design and Implement An Integrated Water Quality Monitoring Network**

The purpose of this strategy is to design and implement a comprehensive water quality monitoring program within the Middle Basin that is logistically feasible and will provide useful information for developing water quality goals and verifying remedial actions. This will include participation and input from stakeholders and agencies that have responsibilities in the basin.

#### **C.1.1.1. Action Steps:**

1. The initial action step conducted under this strategy will gather and synthesize existing water quality data pertaining to the Middle Basin. Federal, state and local agencies will be queried for the availability of data. A review will also be made of current water quality data collection efforts by these agencies in the Middle Basin.
2. Based on the analysis and synthesis of existing data and current sampling programs by agencies, a long-term water quality monitoring program will be designed that is capable of providing the data needed to support an analysis of spatial and temporal trends. Care will be taken to ensure that water quality sampling will not be duplicative of existing efforts by agencies, and the monitoring program that is designed will be compatible with existing sampling networks of other agencies. As

part of cooperative sampling efforts, consideration will be given to common field and laboratory analytical methods, split sampling, etc., so that there is a high degree of confidence in the combined dataset. Information that is collected will be entered into STORET in a timely manner to allow access by other agencies and programs.

3. Once the monitoring plan is finalized and coordinated with other agencies, water quality sampling will be implemented according to the plan design. Sampling will be conducted cooperatively by local, regional, and state agencies as appropriate. Efforts will also be made to include a volunteer component, where applicable.

The data derived from this water quality monitoring network will be used to develop a water quality model for the Middle Basin. This model will be used to quantify non-point sources of pollution and assess remediation strategies. These data will be useful in calculating Pollutant Load Reduction Goals (PLRGs) and in support of impaired waters verification for the FDEP's Watershed Management Program.

### **C.1.2. Strategy: Water Quality Modeling**

The purpose of this strategy is to develop a basin-wide model that utilizes land use, water quality, water quantity, and other data to estimate, quantify and compare sources of pollution in the basin. The particular model chosen under Action Step 1 (below) must be capable of characterizing pollution loads from the tributary basins entering the mainstem of the St. Johns River. Pollution sources from sub-basin tributaries will also be estimated in the modeling process. Output from this model will assist in prioritizing areas for water quality remediation, impaired waters verification, PLRG development and conservation protection.

#### **C.1.2.1. Action Steps:**

1. The initial task will be to select the most appropriate modeling package. This may include the acquisition and review of water quality/quantity modeling efforts conducted as part of the development of MS4 permit previously identified in section B.8. Once the model has been selected it will be reviewed for data input needs. Data that are not currently available will be acquired.
2. The next task will be to run the model and perform calibration and validation. Once confidence has been established in the model, output results will be reviewed and pollution loadings compared.
3. Model output results will be reviewed and both point and nonpoint pollution sources quantified. Areas of high water quality will also be identified and may be recommended for conservation purposes.

### **C.1.3. Strategy: Prioritization of Surface Waters to Implement Water Quality Enhancement Opportunities**

There are many lakes in the Middle Basin that are excellent candidates for enhancement. Some lakes have been designated as impaired by the FDEP. Others are part of a drainage system regulated by the U.S. EPA's NPDES program and are Municipal Separate Storm Sewer Systems (MS4s). Some are recognized for possible TMDL allocations. Still, others are perceived to be in a steady decline, but are not yet "listed" by FDEP. By identifying "at risk" water bodies, enhancements will be encouraged; avoiding the TMDL process. As a result of the modeling process (C.1.2.), pollution sources will be reviewed and prioritized from a basin-wide perspective to identify areas for remediation or restoration to improve water quality. PLRGs will be estimated for highest priority basins according to a schedule developed along with the model, with emphasis on stormwater management.

#### **C.1.3.1. Action Steps:**

1. A decision-making, matrix approach will be used in assigning a surface water body a priority.
2. SJRWMD will move from the data gathering and modeling realm into adaptive management projects, using what is state-of-the-knowledge to create interventions, enhancements and restoration projects.
3. By applying the process described above, SJRWMD will design and construct various enhancement projects using appropriate technologies for implementing the goals of the SWIM plan.

## **C.2. Watershed Master Planning Initiative**

### **C.2.1. Strategy: Examine existing watershed master plan coverage and determine where gaps exist**

This strategy is essentially the evaluation of stormwater management of the watershed master planning initiative.

#### **C.2.1.1. Action Steps:**

1. A comprehensive listing of completed and pending watershed master plans will be prepared, along with the status of completion or implementation of each study. Concurrent to this effort will be the development of a consistent master planning outline that will include descriptions of stormwater issues, geographic naming conventions and GIS graphical representations.

**C.2.2. Strategy: Assist in the development and design of master plans and hydrologic models where gaps exist**

Create detailed designs and specifications for each remedial action, facilitated through the completion of hydrologic models.

**C.2.2.1. Action Steps:**

1. SJRWMD will assist local governments in the design of master plans that will address water quality improvements. This assistance may include activities such as cost-sharing, technical review, and mapping.

**C.2.3. Strategy: Partner with local governments to implement existing plans**

The purpose of this strategy is to provide assistance to local governments through such means as cost-share funding, technical assistance, legislative initiatives, mapping, and other services provided directly by or contracted through SJRWMD.

**C.2.3.1. Action Steps:**

1. SJRWMD will provide assistance to local governments based on a prioritized schedule developed by the Middle Basin technical advisory committee

**C.3. Stormwater Retrofit Initiative**

**C.3.1. Strategy: Prioritized stormwater retrofit program**

The purpose of this strategy is to design and implement a Middle Basin-wide stormwater retrofit plan. A ranking matrix will be utilized to prioritize the areas for retrofitting. The variables in the matrix will include but not be limited to: existing nutrient loading; expected retrofit system removal efficiency; design, construction, operation and maintenance costs; and receiving water body priority ranking (such as PLRGs, TMDLs/303d list). SJRWMD has initiated this strategy within the Lake Jesup basin and expects to have a preliminary assessment of 13 potential retrofit sites by the end of October 2001. Concurrently, due to the fast-paced development occurring within most of the Middle Basin area, a supporting land acquisition program and assessment of available Federal and State funding sources will be developed.

**C.3.1.1. Action Steps:**

1. Develop a ranking matrix to assist in prioritizing areas for optimal retrofit potential.
2. Develop a strategic, aggressive land acquisition plan for stormwater retrofit opportunities that encourages recharge and re-use of stormwater runoff.
3. Develop and implement a plan to seek Federal and State funding to assist in land acquisition, design, and construction of regional stormwater retrofit projects.

4. Where feasible, encourage and cost-share with local governments to install alternative stormwater treatment mechanisms, especially where land availability is limited.
5. Where possible, educate the public on the importance of reduction of “pointless personal pollution”.

## **C.4. Compliance & Rules Initiative**

### **C.4.1. Strategy: Implement existing compliance monitoring programs**

The purpose of this strategy is to collect compliance monitoring information for permitted stormwater management systems with regard to flood protection and water quality controls, to ensure they are properly operating. The effectiveness of the regulatory programs is measured, in part, through a compliance monitoring program. Compliance monitoring to verify the proper construction of new systems and the appropriate maintenance of established systems is necessary to ensure that the systems are constructed and maintained to allow for their proper function. Enforcement action may be necessary to require responsible parties to bring noncompliant systems into conformance.

#### **C.4.1.1. Action Steps:**

1. Assessment of existing non-point sources  
The purpose of this action step is to evaluate existing, permitted, nonpoint sources of water pollution and to develop a program and assign responsibilities to provide compliance or additional treatment alternatives to reduce the impact from these sources where warranted. A priority will be given to stormwater treatment systems in OFWs.
2. Coordination with local governments to establish a database  
In the compliance, inspection and enforcement effort, it is important that a logical prioritization be applied so that systems are targeted with the true benefit being realized by the impacted water body. Coordination with the local governments will serve to combine available data, reduce redundancy, and initiate a streamlined compliance monitoring program. All programs will be evaluated for effectiveness, and a shared geographic database will be developed to update and store information.
3. Establish protocols for priority watersheds  
In order to develop a streamlined system and prioritize the activities in compliance and enforcement for permitted, stormwater management systems, a protocol will be established based upon system size and type, watershed land use and density, and proximity and degree of impairment of the receiving surface water. Programs will be implemented utilizing information from all available sources, and the programs will be monitored and adjusted to develop an efficient system for compliance monitoring.

**C.4.2. Strategy: Assess and manage resources and funding to support the requirements of current and emerging National Pollutant Discharge Elimination System (NPDES) and Total Maximum Daily Load (TMDL) regulations and Pollution Load Reduction Goals (PLRGs)**

The Middle Basin Impaired Water Bodies candidates have been identified, per the FDEP 303(d) list, which must be verified before proceeding with the development of TMDLs. FDEP develops TMDLs for waters that are determined to be impaired based on the process set forth in chapter 99-223, Laws of Florida, which was passed by the 1999 Florida Legislature and signed by the Governor.

Water Management Districts are responsible for non-agricultural stormwater (unless the Department maintains that responsibility) and the Department of Agriculture and Consumer Affairs is responsible for working with farm interests and managing agricultural stormwater runoff. Of particular importance in the SWIM plan will be the focus on incentive-based voluntary approaches to address nonpoint sources. Part of the verification process in the Integrated Water Resource (IWR) Management program is the identification of management activities that are being implemented or scheduled that would address the parameters of concern. If there is reasonable assurance that water quality standards would be attained following implementation of the management activities, the water is not placed on the verified list.

FDEP uses its Watershed Management Program, an iterative five-phase cycle, to develop and implement TMDLs. The five-year cycle provides the structure for focusing resources on specific basins, verifying impaired waters, conducting targeted monitoring that will provide the data needed for model calibration and verification, and developing TMDLs for impaired waters. Basin Management Plans are a critical product of the Watershed Management Program because they provide the roadmap for implementation of the TMDLs, and will serve as the basin-specific, consensus driven implementation plan.

**C.4.2.1. Action Steps:**

1. Investigate the need for a change in SJRWMD rules to increase the protection of watersheds potentially targeted for drinking water supply, areas surrounding receiving waters that are designated as impaired waters, and high recharge areas.

Water resource restoration efforts, including development and implementation of BMPs, retrofitting, habitat protection and restoration activities, environmental infrastructure improvements, and issuance of permits provide increased protection. Specific rule revisions may not be required. However, more stringent criteria reflective of waters not meeting specific standards may be invoked as necessary. SJRWMD may recommend appropriate BMPs for agriculture and stormwater.

2. The SJRWMD will implement a special agreement with FDEP to define the role of each agency in the TMDL, Watershed Management Program process. Details of this proposed agreement are discussed in Section H of this document.

## **SECTION D. COMPLETED OR PENDING STUDIES RELEVANT TO THE MSJRB**

### **D.1. Econlockhatchee River Planning Unit**

FDEP has developed and moderates an Ecosystem Management Working Group for the Econ Basin. This Working Group is composed of local governments, SJRWMD, FDEP, advocate groups such as Audubon and Sierra Club, and residents and interested parties in the basin. The group has been very well supported by attendees and will serve as an established group to provide information and to gain input through this SWIM planning process.

Orange and Seminole Counties have each funded a comprehensive master planning initiative in their portions of the Little Econlockhatchee River basin. Effort was made to ensure consistency between the two counties so that no discrepancies exist in the plan as a result of a jurisdictional boundary. The two plans support one another and were completed during 2001. The plan addresses water quality improvements and flooding concerns. Due to the built-out nature and the flat topography of the Little Econlockhatchee River basin, many of the remediation projects will include land acquisition for the construction of large regional stormwater facilities. Also, due to the dense growth, and the continuous development pressures of this basin, limited land drives up the costs. SJRWMD is working with the counties to cost-share a stormwater quality improvement project in the Crane Strand section of the basin.

During the fiscal years 1999-2000 and 2000-2001 SJRWMD has included \$250,000 each year of ad valorem moneys to provide cooperative funding for the counties to implement projects identified in their basinwide plan. The same amount is proposed in the FY 2001-2002 budget, for a total of \$750,000 to be contributed toward the implementation phase.

The Middle Basin Initiative that was requested from the State Legislature during the 2001 session included a project listing for the Little Econlockhatchee River master plan implementation. Authorization for \$1,000,000 was received for work in this basin and will be appropriated toward projects to be completed by the counties that will provide water quality improvements.

Orange and Seminole Counties have initiated master planning efforts for the watershed that are directly associated with the main stem of the Econlockhatchee River. These master plans will address water quality, flooding, and ecosystem concerns and will include recommendations for water resource improvement projects.

### **FY2001 Legislatively-funded Projects**

#### **Little Econlockhatchee River Basin-wide Improvements**

Seminole and Orange Counties have completed a comprehensive water quality and flood remediation plan — the Little Econlockhatchee Surface Water Management Plan — for this

highly urbanized watershed. The plan includes recommendations for projects that will address the chronic water quality and flooding problems within this basin. This funding will be applied to the implementation of the projects recommended in the Little Econlockhatchee River Surface Water Management Plan. Both projects below are planned for stormwater retrofit to provide where possible that of new development and, thus, achieve up to an 80% efficiency in solids reduction in several areas.

**East Orlando Regional Retrofit System/Orange County**

The East Orlando/Azalea Park Regional Stormwater Facility is located in Orange County and within the southern and upstream portion of the Little Econlockhatchee River planning unit. This project includes the construction of a regional stormwater facility to provide water quality treatment, flow attenuation, and flood control for both the East Orlando and Azalea Park Canals. Much of the 1,481-acre watershed that contributes to this area was developed prior to current stormwater rules and does not include stormwater controls. This regional stormwater facility will include a pond to be located on approximately 88 acres, much of which is already owned by Orange County. The two canal systems are in close proximity to one another, so that a single water quality improvement and flow attenuation pond can serve both systems.

**Crane Strand System Retrofit/Seminole County**

Crane Strand is a tributary to the Little Econlockhatchee River. Most of the development within this sub-basin occurred prior to the 1980's and did not include stormwater treatment systems. Water quality evaluation sources indicate that the Crane Strand system is the third highest contributor of pollutants to the Little Econlockhatchee River of all major sub-basins. This regional project is the Little Econlockhatchee River – Crane Strand System Retrofit Project & Stormwater Park. The project will include a pollution abatement and flow attenuation facility treating stormwater and reducing flood levels in the basin for approximately 300 acres of developed area. The proposed pond location is within Seminole County, although the system will provide improvement to both counties because the configuration of the Crane Strand tributary flows back and forth between the two.

**D.2. Deep Creek Planning Unit**

The recently approved Volusia Forever program will be funded by property taxes for the purchase and improvement of environmentally sensitive lands. These lands will be acquired for water resource protection and for recreation. The water resource protection includes water supply considerations as a source of drinking water.

The Volusia County Conservation Corridor is a program with large landowners to define a conservation corridor from north to south through the center of Volusia County, mostly within the Deep Creek basin. The purpose of the corridor is to achieve goals related to wetland enhancement, floodplain restoration, and habitat preservation. This program is unfunded and a charter is in the process of being prepared that further details the goals of the corridor.

Volusia County has also initiated a small lot acquisition program to achieve goals related to wetland enhancement, floodplain restoration, and habitat preservation. The program is long-term but has limited funding. Targeted properties include old-Florida platted properties in flood prone areas.

### **D.3. Lake Jesup Planning Unit**

Concerns regarding the degraded water quality of the lake led to passage of the Lake Jesup Act in the Florida Legislature. This Act provided funding for demonstration and implementation projects seeking solutions to the problems of the lake. An example of these projects is an overall phased lake improvement program. Phase one of the program consisted of diagnostic studies of the lake and its tributaries. Phase two included projects such as lake circulation modeling and the development of a water and nutrient budget. Phase three involves the implementation of demonstration projects for nutrient load reduction and restoration methods consistent with approval of the Lake Jesup Restoration and Management Plan (1999). This document is an excellent source on the issues and data to date on Lake Jesup. A wetland restoration project encompassing approximately 1,300 acres is currently underway.

Dredging and removal of sediment by the FFWCC is scheduled to begin in FY2002-03.

Nutrient load reductions from Lake Nina and Lake Waunatta to Lake Jesup will be accomplished through retrofit and infrastructure improvements. SJRWMD is providing legislative appropriations of \$230,000 for this work.

An aquatic re-vegetation planting plan has been initiated by SJRWMD to improve fisheries habitat. This re-vegetation project at Lake Jesup will also help to determine aquatic vegetation growth patterns in various substrates.

SJRWMD has completed the design of a box culvert along SR 46 and Lake Jesup to reconnect the floodplain and provide a crossing for wildlife in partnership with the FDOT and the City of Sanford. A double concrete box culvert will be constructed approximately one mile west of the Geneva Bridge. This project will be constructed once flowage easements are provided over privately-owned lands.

SJRWMD has conducted a hydrodynamic study (Zarillo, 2000) of Lake Jesup to assess circulation patterns. This model predicts circulation patterns based on rainfall, tributary flows, wind speed and direction, evaporation and lake-bottom topography. The results of this study are critical to understand the impact of environmental factors, the SR 46 causeway, and the urban drainage into the lake.

SJRWMD has a lake sediment analysis project ongoing that consists of the collection of sediments from the bottom of Lake Jesup. The sediments are mapped and analyzed to determine their impact on water quality. In addition to the sediment project, 20 monthly water quality sampling sites on open water, tributaries and floodplain of the lake have been in place since 1995. Environmental scientists are conducting analyses to explain characteristics

of degraded quality, such as frequent algae blooms and fish kills in the lake. Water quality and water quantity models have been completed for the Howell Creek, Gee Creek, and Soldier Creek basins by Orange and Seminole counties. Through *ad valorem* and local government sources, SJRWMD is coordinating one-foot contour mapping for the Howell Creek sub-basin.

Removal of levees at the Lake Jesup Conservation Area and the North Lake Jesup Conservation Area has reconnected 3682 acres of wetlands to the lake. The wetland reconnection is to improve fisheries and wildlife habitat. Removal of the berms has also increased the storage volume of the lake, giving added flood protection to surrounding areas. Seminole County has provided additional lake access for public use and established a public park along the southwest shore.

Seminole County has initiated the early planning for a subdivision stormwater retrofit program. In Seminole County, approximately 2,058 subdivisions were platted and constructed prior to 1983, before SJRWMD's stormwater rule. Of these, approximately 1,420 plats are in the unincorporated areas of the county. The retrofit program is needed most in the Lake Jesup sub-basin but also includes other sub-basins in the county.

Florida Department of Transportation (FDOT) is in the planning phase, investigating alternatives, for the possible removal of the SR 46 causeway and elevation of a new bridge. The U.S. Army Corps of Engineers (USACE) is in the beginning stage of determining the need for additional channel cuts to provide flowage access between the lake and the St. Johns River.

### **FY2001 Legislatively-funded Projects**

#### **Lake Nina Remediation Project**

Lake Nina is a contributing surface water in the Lake Jesup planning unit. The Lake Nina project will result in the reduction of nutrients discharging into Lake Jesup. Lake Nina is a 12-acre lake with a surface runoff area of approximately 79 acres. The existing TSI for the lake indicates eutrophic conditions; the future TSI goal for the lake is mesotrophic. This requires a 15% reduction in phosphorus load to reach that goal. This sub-basin consists mainly of a 4-lane divided roadway with all of its stormwater run-off going directly into the lake. This run-off contributes approximately 25 lbs. of phosphorous per year. Instead of excavating a single portion of the adjacent park for a wet-detention system, the entire park will be re-graded so that during rain events it will serve as a treatment area. During dry weather the entire park will be open for use to the general public.

#### **Lake Waunatta Remediation Project**

Lake Waunatta is one of many Orange County lakes that has experienced extensive urbanization and altered drainage patterns in recent years. These alterations have inevitably led to an increased flow of stormwater and subsequent declining water quality within the lake. In the mid-1990's Lake Waunatta experienced high water levels during an unusual wet weather period. A basin area-wide stormwater assessment completed by Orange County in 1996 documented the need for stormwater flood controls with recommendations for further

water quality studies. Pollutants of concern to lake water quality primarily include dissolved nitrogen and phosphorus. These pollutants enter the lake by atmospheric fallout; through untreated and partially treated stormwater runoff; and from the base flow of surficial groundwater that may include contributions from treated septic tank effluent. A simplified pollutant loading model was developed for Lake Waunatta based on yearly estimated mass loadings to predict the loading of pollutants, which could enter the lake. In addition, potential pollutant loadings from onsite sewage systems (OSS) were evaluated for the immediate shoreline area of Lake Waunatta. Together, these latter two sources could potentially be controlled through engineered solutions. Based on the findings of the loading analysis, about 2,100 lbs. of nitrogen and 290 lb. of phosphorus are generated annually from runoff within the watershed. It is estimated that about 60 to 80 percent of this loading reaches Lake Waunatta. Pollutants from onsite sewage systems within the watershed potentially account for only about 15 lbs. of nitrogen and 3 lbs. of phosphorus. According to model predictions, a 20% reduction in annual loadings may improve trophic status by about 5%. Improvements to Lake Waunatta are grouped into stormwater storage improvements and long-term water quality improvements. Essentially, improved maintenance in the K-mart and Unigold Shopping Plaza ponds is believed to represent an immediate cost effective protective measure in reducing runoff volumes.

#### **Navy Canal Flood Attenuation and Retrofit Project**

A channel section of the Navy Canal flows over its banks causing flooding in the area and increasing the erosion and washouts of downstream structures. The proposed deficiency correction involves constructing a 6.4 acre wet detention pond with associated control structures north of Sand Dollar and re-grading a segment of the Navy Canal. The wet detention pond will also provide water quality treatment for the sub-basin. The total annual phosphorus reduction is projected to be 1,767 lbs. per year as a result of constructing this project. The Lake Jesup Basin Engineering Study and Drainage Inventory, used the Watershed Management Model (WMM) to evaluate the reduction potential of the proposed alternatives for the 12 USEPA indicator pollutants on a sub-basin basis.

#### **Cameron Ditch Project**

The proposed project for Cameron Ditch includes the construction of a 4-acre wet detention facility. This detention facility would provide water quality treatment for a tributary drainage area of approximately 416 acres. The reductions in pollutant loads due to the implementation of the proposed alternatives were developed using the Watershed Management Model (WMM). It is estimated that this facility will remove approximately 1,683 lbs of phosphorus per year.

#### **Other tasks include:**

- Establish nutrient goals for Lake Jesup and its tributaries by FY 04-05.
- Reduce nutrient loads in stormwater through development of stormwater parks, use of wetland treatment systems and other appropriate methods.
- Maintain the water quality sampling network for Lake Jesup and its tributaries.

#### **D.4. Lake Monroe Planning Unit**

Seminole County has completed master plans for several of the watersheds within the Lake Monroe planning unit including the Midway, Sanford, and Lake Monroe watersheds. These plans identify deficiencies in the watersheds and include recommendations for remediation projects.

The city of Deltona is in the process of developing a Watershed Management Plan to address the water quality and flood protection needs of their city.

The Middle Basin Initiative that was requested from the State Legislature during the 2001 session included a project listing for the Lake Monroe/Midway master plan implementation. Authorization for \$1,000,000 was received for work in this basin and will be appropriated toward projects to be completed by the counties that will provide water quality improvements.

Due to increased development and increased concerns about flood damage, SJRWMD requested the National Weather Service (NWS) Southeast River Forecast Center to develop and implement a flood forecast system for the Middle St. Johns River Basin. The model is being verified and is scheduled to be implemented within one year. This project applies throughout the Middle Basin but mostly affects population areas in the Lake Monroe sub-basin.

#### **FY2001 Legislatively-funded Projects**

##### **Lake Monroe Basin Watershed Plan Implementation/Seminole County**

Water quality and flooding problems are inherent within the Lake Monroe planning unit. Much of the planning unit was developed prior to the stormwater regulations and requirements of today, and there is direct discharge of untreated stormwater to Lake Monroe and the St. Johns River. Master planning efforts completed by Seminole County have identified locations for remediation projects. Within the Lake Monroe planning unit, the Midway watershed has several areas where projects have been identified to retrofit and improve the surface water quality and quantity of the watershed.

Remediation projects to solve flood problems have been identified. Flood storage and structure remediation or replacement, coupled with water quality improvements, will be implemented with this funding. A number of areas that have been selected for remediation to address the surface water needs of the Lake Monroe basin are listed below. Measures to improve water quality of the stormwater being discharged to the receiving bodies will be constructed as part to these projects.

##### **Cameron Avenue Drainage Improvements and Water Quality Retrofit Project**

The drainage sub-basin for this project receives no water quality treatment and discharges via a 36-inch pipe directly into the St. Johns River. The project involves the installation of a water quality baffle box and improvements to the secondary drainage system. The secondary drainage improvements consist of installation of one

curb inlet, curb repairs, and regrading and sodding of an existing swale/ditch. Water quality improvements will be realized through sediment and pollutant removal in the baffle box, and also with remediation of the existing swale.

**Brisson Avenue Drainage Improvements and Water Quality Retrofit Project**

The area includes Brisson Avenue at the railroad crossing and south of Celery Avenue. Drainage for the Brisson Avenue area consists of ditches and cross-drains that eventually discharge into Lake Monroe with no water quality treatment being provided. Roadway flooding in the area occurs frequently. This retrofit project involves the design and construction of a retention pond for water quality improvement, the replacement and upsizing of several culverts and cross-drains, and regrading and sodding of some of the ditches

**First Drive Drainage Improvements and Water Quality Retrofit**

Drainage for the First Drive area consists of ditches and cross-drains that eventually discharge into the St. Johns River with no water quality treatment being provided. Roadway flooding in the area occurs frequently. This project involves the design and construction of a retention pond/ sedimentation basin to retrofit the area for water quality, the upsizing of several cross-drains, and regrading and sodding some of the ditches.

**Celery Ave Regional Flood Attenuation and Water Quality Treatment Facility**

This project will provide water quality treatment by constructing a 20-acre regional stormwater retention pond serving an area that currently receives no water quality treatment and experiences erosion and flooding problems. The project sub-basin discharges into Lake Monroe and the St. Johns River. The proposed facility will provide flood protection for area homes as well as for Celery Avenue, which floods under minor storm events. The proposed facility will contain a created wetland component to further improve water quality and to enhance wildlife habitat. Additionally, a portion of this site has been identified by FDEP to have contaminated soils, therefore, an element of this project includes the delineation and remediation of the existing contaminated soils.

## **D.5. Wekiva River Planning Unit**

Work in the Little Wekiva River watershed of the Wekiva planning unit includes intensive work to address the erosion and sedimentation issues in the river. Since 1995, the Little Wekiva River Technical Working Group and SJRWMD have developed a master plan for erosion control, requested and been provided a total of \$11.95 million from the State during the years 1995, 1996, 1998, 2000, and 2001 for the implementation of the plan. An additional \$350,000 has been made available through the FDOT Mitigation Bill process. All of these funds are matched with local and regional funds as well to complete the work. Eleven projects have been constructed, four of them high priority projects, to address bed and bank stabilization and sediment removal. An additional four are in the design phase with construction anticipated in the next calendar year. One of the largest projects under design at this time is the removal of 1,700 linear feet of 12ft by 9ft pipe that was constructed in the

1970s to carry the full flow of the river. A portion of the pipe has already collapsed and caused extensive damage to several homes. Five million dollars was appropriated toward restoring this section of the river during the 2000 Legislative Session.

The Little Wekiva Technical Working Group continues to meet, and new efforts are underway to develop a basinwide master plan to address water quality and stream flow attenuation projects in the Little Wekiva River Basin. Additional concerns of the Working Group include the sedimentation within the downstream sections of the stream that has added to nuisance vegetation problems in both the Little Wekiva and the Wekiva River. An effort to document canoe usage is underway to encourage State and Federal Agencies to continue support in the maintenance of the stream, and to identify the need for parcel acquisition to provide public access for recreation.

Orange and Seminole counties have initiated the development of master plans for their portions of the watershed that contributes to the main stem of the Wekiva River.

The Middle Basin Initiative that was requested from the State Legislature during the 2000 session included a project listing for remediation of the Sweetwater Oaks/Cover Lake tributary to the Wekiva River. Authorization for \$500,000 was received for work in this tributary that was an historic discharge point for treated wastewater. The work will include water quality improvements, and native vegetation restoration and possibly some dredging.

Another project that received funding through the Middle Basin Initiative Year 2000 is within a master plan completed by Orange County for the Lakes Coroni, McCoy, and Prevatt watershed of the Wekiva. The project includes the retrofit of a stormwater treatment system known as the Votaw Road Pond. Water quality improvement will be provided as this system drains into the WekivaBasin GEOPark.

SJRWMD's Land Management Group has completed several ecosystem/water quality improvement projects in the Wekiva Basin through the FDOT Central Florida Beltway Mitigation Bill. Restoration of the STS site on the Wekiva River, an erosion control project in the Wekiva Springs State Park, Tram Road removal in the Wekiva Basin GEOPark, and potentially some additional land acquisition will be possible through the Beltway Bill.

### **FY2001 Legislatively-funded Projects**

#### **Little Wekiva River Watershed Management Implementation**

This surface water restoration project includes the design and construction of projects included in the Little Wekiva River Watershed Management Plan, which addresses the erosion and sediment transport problems within the main channel of the Little Wekiva River. The erosion problems in the Little Wekiva River have caused water quality, and environmental degradation to the downstream sections of the Little Wekiva River and to the Wekiva River system. Projects are for the structural bed and bank protection, biotechnical bank protection, grade control structures, widening and re-sloping of river sections, and the installation of sedimentation basins. Several projects have been successfully constructed and the remainder of the plan is under implementation including the projects listed below.

### **Northwestern Avenue Area/Seminole County**

The Northwestern Avenue project includes bed and bank stabilization of the Little Wekiva River at the Northwestern bridge crossing. The erosion of this portion of the river is very high, and the sediment transport to the downstream system is excessive. The bridge is at risk, and collapse would cause serious downstream impacts in addition to the impacts at the site. Protection of this section will serve to restore the grade to a manageable level and to reduce transport of sediment downstream. The project will include gabion side banks, reno mattress channel lining, and a grade control structure if necessary to stabilize that river section. The Northwestern Avenue Area project is one of a group of projects identified in the Little Wekiva River Watershed Management Plan to address the erosion and sediment transport problem. This project received funding in a previous year as well.

### **S.R. 434 Sedimentation Basin/Seminole County**

The S.R. 434 Sedimentation Basin was identified as a potential project in the Little Wekiva River Watershed Management Plan. At this point in the river, the river profile changes from a very steep gradient to a much more flattened section. With this characteristic, the area just downstream of S.R. 434 is extremely vulnerable to excess sediment deposition and filling of the river channel. This location is the most downstream point where excess sediment can be removed from the river prior to its entering the more pristine river section. The construction of a sedimentation basin will allow routine maintenance to remove the collected sediment without the destruction to the channel that would be caused by the direct removal of sediments. The Sedimentation Basin will be constructed such that the flow will be off-line from the river and will be closed from flow during maintenance. The off-line system will also provide additional treatment.

### **Riverbend Apartments/City of Altamonte Springs**

The Riverbend project is a site where severe erosion has been a problem for quite some time causing water quality degradation and adverse environmental impacts. The area was identified for an erosion control and bank stabilization project in the Little Wekiva River Watershed Management Plan. The project will include realignment of the river to re-create the more historic route, and will include bank stabilization and bed protection for the highly eroded parts. Funding is also available for this project from a previous year.

### **Other tasks include:**

- By FY 02-03, secure \$10-12 million in funding and facilitate implementation of 11 projects to reduce excessive erosion and sedimentation along seven miles of the Little Wekiva River.
- Facilitate build-out of Phase I of the Little Wekiva River Watershed Management Plan.
- Monitor biological and sediment transport changes as a result of project implementation.
- By FY 03-04, use monitoring findings to evaluate the effectiveness of the installed systems and determine their operation and maintenance requirements.

## **D.6. Land Acquisition & Management**

The acquisition of environmentally sensitive land to preserve and protect water resources is an important ongoing initiative of SJRWMD. The development of land management practices that maximize multiple uses in order to deliver the greatest public good is undertaken at appropriate sites. Some urban lands have been acquired for water resource protection and enhancement purposes.

The Middle St. Johns River Basin is a physically and biologically diverse region. However, rapid urbanization continues to threaten the natural ecosystem and to increase the extent of habitat fragmentation. SJRWMD strives to improve and protect wetlands by preserving habitats needed by wetland dependent species, and protecting recharge and runoff areas. This is accomplished by identifying environmentally sensitive areas, then submitting them for review to the state's Conservation and Recreational Lands (CARL) Program, the FFWCC, and any other available sources. These areas are prioritized according to their ecological importance and availability for purchase, or development of other types of protection such as conservation easements. If any of the identified areas are in need of restoration this will be identified at this time. Finally, SJRWMD supports ongoing acquisition programs in the purchase of identified lands and, where appropriate, add these identified areas to the SJRWMD's Florida Forever Work Plan (SJRWMD 2001a).

SJRWMD's ongoing development of land management practices to maximize multiple uses is provided where recreation, education, water quality improvement and preservation are all important land uses that are not necessarily mutually exclusive. SJRWMD reviews the land uses on existing public land and makes recommendations to public agencies concerning appropriate land management practices to maximize public use without causing environmental damage. SJRWMD also supports public agencies in their efforts to provide appropriate public access to the lakes, wetlands and streams in the Middle Basin.

Currently, approximately 15% of the Middle Basin is in public ownership. SJRWMD owns and manages 44.5 square miles and has plans to acquire 17 more. Over 119 square miles of land is owned by other public entities.

## **D.7. Public Education**

SJRWMD provides education to the public through a variety of activities, coordinated through the Office of Communications and Governmental affairs that are listed below:

1. Support Florida Yards, Neighborhoods and Ponds activities
2. Coordinate with utilities to provide brochures and /or fact sheets to their customers
3. Conduct storm drain marking and education presentations
4. Initiate stormwater pond education
5. Provide Environmental Landscaping Distance Learning classes to community colleges
6. Conduct Green Building seminars and CEU programs for contractors, builders and home buyers
7. Implement the Watershed Action Volunteer program

8. Coordinate Community Water Festivals with interested organizations
9. Provide public education through support of youth education programs

In addition to these activities SJRWMD is constantly seeking to improve public awareness by initiating new and expanded communications including working groups and outreach programs. SJRWMD also develops and maintains intergovernmental partnerships through the stormwater cost-share program, the local government monthly mailer, and coordination with legislative delegations.

### **D.7. Water Supply**

Water supply is generally outside of the scope of the SWIM planning process, however, the District Water Supply Plan (DWSP) (SJRWMD 2000b) identified several water resource development projects that may occur within the boundaries of the MSJRB, and are therefore relevant to this SWIM Plan. Projects listed in the DWSP, and in the FY 2001-2002 Water Resource Development Work Program (SJRWMD 2001b), include a wetland augmentation project at the City of Sanford wellfield, and the St. Johns River water supply project, which is an examination of using river water for water supply. This project is located on a reach of the St. Johns River just downstream of Lake Monroe.

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## **SECTION E.**

### **RESEARCH AND FEASIBILITY STUDIES NEEDED TO REACH RECOMMENDED STRATEGIES**

Listed below are the action steps that will be completed to reach the recommended strategies outlined in Section C. The action steps briefly describe the research and feasibility studies, and associated tasks to reach the targeted strategy.

#### **Water Quality Initiative (C.1.)**

##### **Strategy: Design and Implement An Integrated Water Quality Monitoring Network (C.1.1.)**

###### **Action Steps: (C.1.1.1.)**

1. The initial action step conducted under this strategy will gather and synthesize existing water quality data pertaining to the Middle Basin. Federal, state and local agencies will be queried for the availability of data. A review will also be made of current water quality data collection efforts by these agencies in the Middle Basin.
2. Based on the analysis and synthesis of existing data and current sampling programs by agencies, a long-term water quality monitoring program will be designed that is capable of providing the data needed to support an analysis of spatial and temporal trends. Care will be taken to ensure that water quality sampling will not be duplicative of existing efforts by agencies, and the monitoring program that is designed will be compatible with existing sampling networks of other agencies. As part of cooperative sampling efforts, consideration will be given to common field and laboratory analytical methods, split sampling, etc., so that there is a high degree of confidence in the combined dataset. Information that is collected will be entered into STORET in a timely manner to allow access by other agencies and programs.
3. Once the monitoring plan is finalized and coordinated with other agencies, water quality sampling will be implemented according to the plan design. Sampling will be conducted cooperatively by local, regional, and state agencies as appropriate. Efforts will also be made to include a volunteer component, where applicable.

The data derived from this water quality monitoring network will be used to develop a water quality model for the Middle Basin. This model will be used to quantify non-point sources of pollution and assess remediation strategies. These data will be useful in calculating Pollutant Load Reduction Goals (PLRGs) and in support of impaired waters verification for the FDEP's Watershed Management Program.

**Strategy: Water Quality Modeling (C.1.2.)**

**Action Steps: (C.1.2.1.)**

1. The initial task will be to select the most appropriate modeling package. This may include the acquisition and review of water quality/quantity modeling efforts conducted as part of the development of MS4 permit previously identified in section B.8. Once the model has been selected it will be reviewed for data input needs. Data that are not currently available will be acquired.
2. The next task will be to run the model and perform calibration and validation. Once confidence has been established in the model, output results will be reviewed and pollution loadings compared.
3. Model output results will be reviewed and both point and nonpoint pollution sources quantified. Areas of high water quality will also be identified and may be recommended for conservation purposes.

**Strategy: Prioritization of Surface Waters to Implement Water Quality Enhancement Opportunities (C.1.3.)**

**Action Steps: (C.1.3.1.)**

1. A decision-making, matrix approach will be used in assigning a surface water body a priority.
2. SJRWMD will move from the data gathering and modeling realm into adaptive management projects, using what is state-of-the-knowledge to create interventions, enhancements and restoration projects.
3. By applying the process described above, SJRWMD will design and construct various enhancement projects using appropriate technologies for implementing the goals of the SWIM plan.

**Watershed Master Planning Initiative (C.2.)**

**Strategy: Examine existing watershed master plan coverage and determine where gaps exist (C.2.1.)**

**Action Steps: (C.2.1.1.)**

1. A comprehensive listing of completed and pending watershed master plans will be prepared, along with the status of completion or implementation of each study. Concurrent to this effort will be the development of a consistent master planning outline that will include descriptions of stormwater issues, geographic naming conventions and GIS graphical representations.

**Strategy: Assist in the development and design of master plans and hydrologic models where gaps exist (C.2.2.)**

**Action Step: (C.2.2.1.)**

1. SJRWMD will assist local governments in the design of master plans that will address water quality improvements. This assistance may include activities such as cost-sharing, technical review, and mapping.

**Strategy: Partner with local governments to implement existing plans (C.2.3.)**

**Action Step: (C.2.3.1.)**

1. SJRWMD will provide assistance to local governments based on a prioritized schedule developed by the Middle Basin technical advisory committee

### **Stormwater Retrofit Initiative (C.3.)**

**Strategy: Prioritized stormwater retrofit program (C.3.1.)**

**Action Steps: (C.3.1.1.)**

1. Develop a ranking matrix to assist in prioritizing areas for optimal retrofit potential.
2. Develop a strategic, aggressive land acquisition plan for stormwater retrofit opportunities that encourages recharge and re-use of stormwater runoff.
3. Develop and implement a plan to seek Federal and State funding to assist in land acquisition, design, and construction of regional stormwater retrofit projects.
4. Where feasible, encourage and cost-share with local governments to install alternative stormwater treatment mechanisms, especially where land availability is limited.
5. Where possible, educate the public on the importance of reduction of “pointless personal pollution”.

### **Compliance & Rules Initiative (C.4.)**

**Strategy: Implement existing compliance monitoring programs (C.4.1.)**

**Action Steps: (C.4.1.1.)**

1. Assessment of existing non-point sources  
The purpose of this action step is to evaluate existing, permitted, nonpoint sources of water pollution and to develop a program and assign responsibilities to provide compliance or additional treatment alternatives to reduce the impact from these sources where warranted. A priority will be given to stormwater treatment systems in OFWs.

2. Coordination with local governments to establish a database  
In the compliance, inspection and enforcement effort, it is important that a logical prioritization be applied so that systems are targeted with the true benefit being realized by the impacted water body. Coordination with the local governments will serve to combine available data, reduce redundancy, and initiate a streamlined compliance monitoring program. All programs will be evaluated for effectiveness, and a shared geographic database will be developed to update and store information.
3. Establish protocols for priority watersheds  
In order to develop a streamlined system and prioritize the activities in compliance and enforcement for permitted, stormwater management systems, a protocol will be established based upon system size and type, watershed land use and density, and proximity and degree of impairment of the receiving surface water. Programs will be implemented utilizing information from all available sources, and the programs will be monitored and adjusted to develop an efficient system for compliance monitoring.

**Strategy: Assess and manage resources and funding to support the requirements of current and emerging National Pollutant Discharge Elimination System (NPDES) and Total Maximum Daily Load (TMDL) regulations and Pollution Load Reduction Goals (PLRGs) (C.4.2.)**

**Action Steps: (C.4.2.1.)**

1. Investigate the need for a change in SJRWMD rules to increase the protection of watersheds potentially targeted for drinking water supply, areas surrounding receiving waters that are designated as impaired waters, and high recharge areas.

Water resource restoration efforts, including development and implementation of BMPs, retrofitting, habitat protection and restoration activities, environmental infrastructure improvements, and issuance of permits provide increased protection. Specific rule revisions may not be required. However, more stringent criteria reflective of waters not meeting specific standards may be invoked as necessary. SJRWMD may recommend appropriate BMPs for agriculture and stormwater.

2. The SJRWMD will implement a special agreement with FDEP to define the role of each agency in the TMDL, Watershed Management Program process. Details of this proposed agreement are discussed in Section F of this document.

## **SECTION F.**

### **MEASURES NEEDED TO MANAGE AND MAINTAIN THE MSJR BASIN**

This section is provided to describe and discuss the process by which the St. Johns River Water Management District (SJRWMD) will support the Florida Department of Environmental Protection (FDEP) in the establishment Total Maximum Daily Loads (TMDLs) in the St. Johns River Middle Basin (SJRMB) by establishing pollutant load reduction goals (PLRGs) as required by Chapter 62-40.432 F.A.C.

#### **F.1. Background**

**The Middle St. Johns River Basin:** The MSJRB is geographically defined in several District planning documents, one of which is entitled *Technical Publication SJ 92-2, 1991 SWIM Priority Planning Process for the St. Johns River Water Management District, Florida*. A graphic of the Middle Basin is shown in Figure 1. As can be seen by inspection, the MSJRB spans parts of six counties (Lake, Marion, Orange, Seminole, Volusia and Osceola) and contains some of the most densely populated areas of the SJRWMD. However, the FDEP includes the Lake George Basin in its Middle St. Johns Basin.

**Federal and State Requirements:** Section 303(d) of the Clean Water Act (CWA) requires states to develop a list of waters not meeting water quality standards or not supporting their designated uses. Chapter 99-223, Laws of Florida, sets forth the process by which the list is refined through more detailed water quality assessments. TMDLs are required for the waters determined to be impaired based on these detailed water quality assessments because technology-based effluent limitations, current effluent limitations required by State or local authority, or other pollution control requirements are not stringent enough to meet current water quality standards. Florida's 303(d) list has been approved by the United States Environmental Protection Agency (EPA). EPA guidelines specify waters need not be included, or listed as verified impaired, if other federal, state or local requirements have or are expected to result in the attainment and maintenance of applicable water quality standards.

**Middle Basin "Listed" Water Bodies:** In the MSJRB there are 18 water bodies listed as potentially impaired. These water bodies correspond to those listed in the consent decree CIVIL ACTION FILE NO. 4:98CV356-WS, FLORIDA WILDLIFE FEDERATION, INC. *et al v. CAROL BROWNER et al* and are also found on the state's 1998, 303(d) list. Table 2 is provided to show those potentially impaired waters in the SJRMB along with the priority, TMDL year, and associated parameters potentially out of balance with Florida's water quality classifications and criteria. Table 2 comprises a "planning list" of priority water bodies for the SJRMB.

Waters on a planning list must meet specific thresholds and data sufficiency and quality requirements contained in Chapter 62-303, Florida Administrative Code to be verified as impaired. Once it is determined that a water body is impaired, it will remain on the state's 303(d) list and be reported to EPA.

### **F.2. How The List Is To Be Used:**

As required by the 1999 Florida Watershed Restoration Act, the planning list will be submitted to the EPA for informational purposes only and will not be used in the administration or implementation of any regulatory program. However, the list is extremely important, as it drives monitoring in the basin and is the precursor to the verified list.

The planning list is the first step of a two-step process to develop the state's 303(d) list of impaired waters. As part of the watershed management approach, these potentially impaired waters will be further assessed to verify whether they are impaired. This verification process will involve the Department with local stakeholders to collect additional data as needed to complete the assessment. Initially, monitoring will be focused on verification of any impairment.

Once the additional monitoring is completed, the data will be assessed and the Department will develop a verified list of impaired waters. This list of waters for which the Department will develop TMDLs will be adopted by Secretarial Order. Once adopted, the list will be submitted to the EPA as the state's 303(d) list for the basin.

### **F.3. The Watershed Management Program:**

The Watershed Management Program (WMP), within the context of Chapter 99-223, Laws of Florida, is based on a five-phase cycle that rotates through the state's basins every five years. The WMP is the vehicle by which the FDEP is organizing the task of administering the TMDL process statewide. Objectives of each phase of the WMP cycle are listed below:

- Phase 1 – Initial Basin Assessment
- Phase 2 – Coordinated Monitoring
- Phase 3 – Data Analysis and TMDL Development
- Phase 4 – Basin Management Plan Development
- Phase 5 – Begin Implementation of Basin Management Plan

**The Middle Basin:** All of the SJRMB is within the WMP's second rotational grouping. The second rotation of the WMP begins in the state's FY 2001 and continues until the end of FY 2005.

**The Department:** The FDEP is the lead agency responsible for the establishment of TMDLs and has organized the process into twelve steps. Some steps have been completed. Throughout the process the FDEP recognizes the need to coordinate with

local governments, water management districts, the Department of Agriculture and Consumer Services (DACs) and other interested parties. The twelve-step process is outlined below:

1. Develop a planning list of surface waters or segments for which TMDL assessments will be calculated.
2. Develop a priority ranking and schedule for analyzing the list.
3. Conduct a TMDL assessment coordinating with water management districts and other agencies.
4. Adopt by rule a methodology for determining impaired water bodies based upon objective, quantitative and credible data, studies and reports including water management districts under SS. 373.456 and PLRGs.
5. Adopt a list of those water bodies or segments for which TMDLs will be calculated (by order of the Department subject to challenge under SS. 120.569 and 120.57 and submitted to EPA).
6. The Department shall develop TMDL calculations after first coordinating with applicable local governments and water management districts. Some TMDLs may be based on PLRGs.
7. Develop allocations based on TMDL calculations (maximum amount of water pollutant from a given source or category that may be discharged in combination with other discharges).
8. TMDL calculation and allocation shall be adopted by rule, and submitted to the U.S. Environmental Protection Agency as the state's 303(d) list for the basin (403.067 (6) (d) F.S.).
9. The Department shall be the lead agency in coordinating the implementation of the TMDLs.
10. The Department may in cooperation with water management districts and other interested parties develop BMPs to reduce pollutant loads from non-point sources into the affected water body and adopt by rule. The Department of Agriculture and Consumer Services (DACs) will develop BMPs for agricultural non-point sources. (This effort will include routine tracking of the effectiveness of the BMPs, record keeping requirements, and water quality monitoring.)
11. The Department will evaluate the effectiveness of the TMDL for five years from its initiation.
12. The Department will report to the Governor and Legislature by 1/1/05, and make recommendations for statutory changes to implement the TMDLs more effectively, if needed.

#### **F.4. SJRWMD's Role In The TMDL Verification Process:**

Based on the EPA guidelines certain waters may not be included, or listed as verified impaired, if regional or local remedial or restorative programs have or are expected to result in the attainment and maintenance of applicable water quality standards. In accordance with the Florida Watershed Restoration Act, the Department will not place waters on the verified list if proposed or existing pollution control mechanisms are expected to result in the attainment of water quality standards.

**Identify “pollutant source” basins and reduce loading to potentially impaired waters:** The SJRWMD’s primary strategy for meeting the goals of the TMDL and Watershed Management process is to initiate new and / or continue existing programs aimed at reducing the discharge of stormwater pollutants to potentially impaired surface waters. Priorities will be set based on the highest pollutant contributing basins, or basins having no stormwater treatment, first for remediation. Once these remedial programs are in place (over the span of several years), monitoring will be continued to measure the effect of the pollutant load reduction strategy.

If planning and feasibility of retrofit systems for a particular listed water body results in low expectations for the success of the retrofit project, the District will report these findings to the Department so that the process for the calculation of the TMDL can commence.

The SJRWMD is conducting an assessment of potential remediation sites in selected sub-basins and will prepare descriptions for retrofit and other enhancement activities and plans in the MSJRB. This work will be completed the first year of the Middle Basin SWIM plan implementation.

**Existing, Land use, GIS:** GIS and other models will be used to identify source basins and used to prioritize remedial treatment schedules. (*Technical Memorandum No. 29, the Pollution Load Screening Model: A tool for the 1995 District Water Management Plan and the 1996 Local Government Water Resource Atlases, Christine Adamus Mundy and Martien Bergman, October, 1998.*) This model will be sub-screened to identify flows that lead to pollutants entering the St. Johns River.

**Monitoring:** SJRWMD will review the planning list of potentially impaired water bodies in the MSJRB, review the data used to produce the list, and add new data into STORET or provide to FDEP so that this new information can be used in the full assessment in the verification process. If the Department needs additional data and/or additional sites to be monitored (over and above those SJRWMD is currently monitoring) for its verification process, it can enter into a contractual agreement with SJRWMD to provide those data. Prior to implementing such a monitoring effort, the SJRWMD will review the sampling strategy with FDEP and other agencies to ensure that the information and approach is consistent with existing requirements or policies regarding the verification of BMPs.

SJRWMD will encourage local governments and other stakeholders through its existing outreach programs to participate in the strategic monitoring, including the development of the strategic monitoring plan, and conduct some of the monitoring as well. SJRWMD is aware that monitoring will be long term in the verification process and accepts the responsibility to continue monitoring water quality in the Middle Basin.

SJRWMD will monitor any sites that have been retrofitted by SJRWMD for at least five years (or as long as necessary) to determine the effectiveness of the BMP, or

pollution control strategy, employed. SJRWMD understands that long-term remedial action verification is a part of the WMP and accepts the responsibility to maintain and monitor its own projects.

**Interim PLRG for Jesup:** An interim PLRG for Lake Jesup has been calculated based on FFWCC recommendations for 30% submerged aquatic vegetation (SAV) coverage for the lake. Results of these preliminary calculations suggest that phosphorus loads be reduced by half in order to provide the light penetration needed for the establishment and maintenance of a healthy SAV community.

**Purchase lands for stormwater retrofit systems:** The District will expand its urban land acquisition activities to correspond to the needs of the listed water bodies, where appropriate. As an example, the District has developed a list of priority projects in the Lake Jesup basin to provide stormwater treatment where none presently exists in order to help meet the interim pollutant load reduction goal.

Innovative treatment systems and in-line treatment devices will be encouraged if no lands are available or land costs are prohibitive. Funding for land acquisition will be through the Florida Forever program and appropriate federal programs. Where possible, the District will partner with state and federal agencies and local governments to accomplish this strategic land acquisition program.

**Retrofit where no treatment exists:** Sub-Basins within the SJRMB will be prioritized as described above for candidacy for retrofit. Stormwater retrofit projects will rely on standard BMPs as stand alone or in treatment-train configurations. Innovative stormwater treatment devices or strategies will be considered, where appropriate.

**Assist local governments to implement stormwater master plans for water quality improvements and pollution prevention.** Local governments have completed comprehensive stormwater master plans in priority basins. The District will continue to assist these efforts to implement the plans through SWIM funding and legislative initiatives. However, this process has been very successful over the past three years and has funded several important restoration efforts on the Wekiva River system, enhancements in the Lake Jesup drainage basin, and other water quality improvements in the Econlockhatchee River and Lake Monroe basins.

**Partner with others to make water quality improvements:** The District has embarked on many cooperative agreements to implement water quality projects in the Middle Basin. Currently the District is working with the FWCC in the Lake Jesup dredging and enhancement project. This work is expected to reduce internal loadings as well as the flow of nutrients to the St. Johns River by removing phosphorus found in the flocculent sediments in the lake. This work will be performed over the next three years. The District is providing spoil deposition sites for this project.

**Utilization of public lands:** The Middle Basin contains some of the most valuable, publicly owned lands in the District. Of the entire 1,204 square-mile basin approximately 15 percent is in public ownership. The District owns 44.5 square miles; approximately 119 square miles are in other public ownership, and the District plans for an additional 17 square miles as potential acquisition in the basin. While easements and other conditions prevent the usage of some of the District's lands for stormwater treatment, others may be considered for this purpose. However, location is important, for not all priority basins are near the public lands.

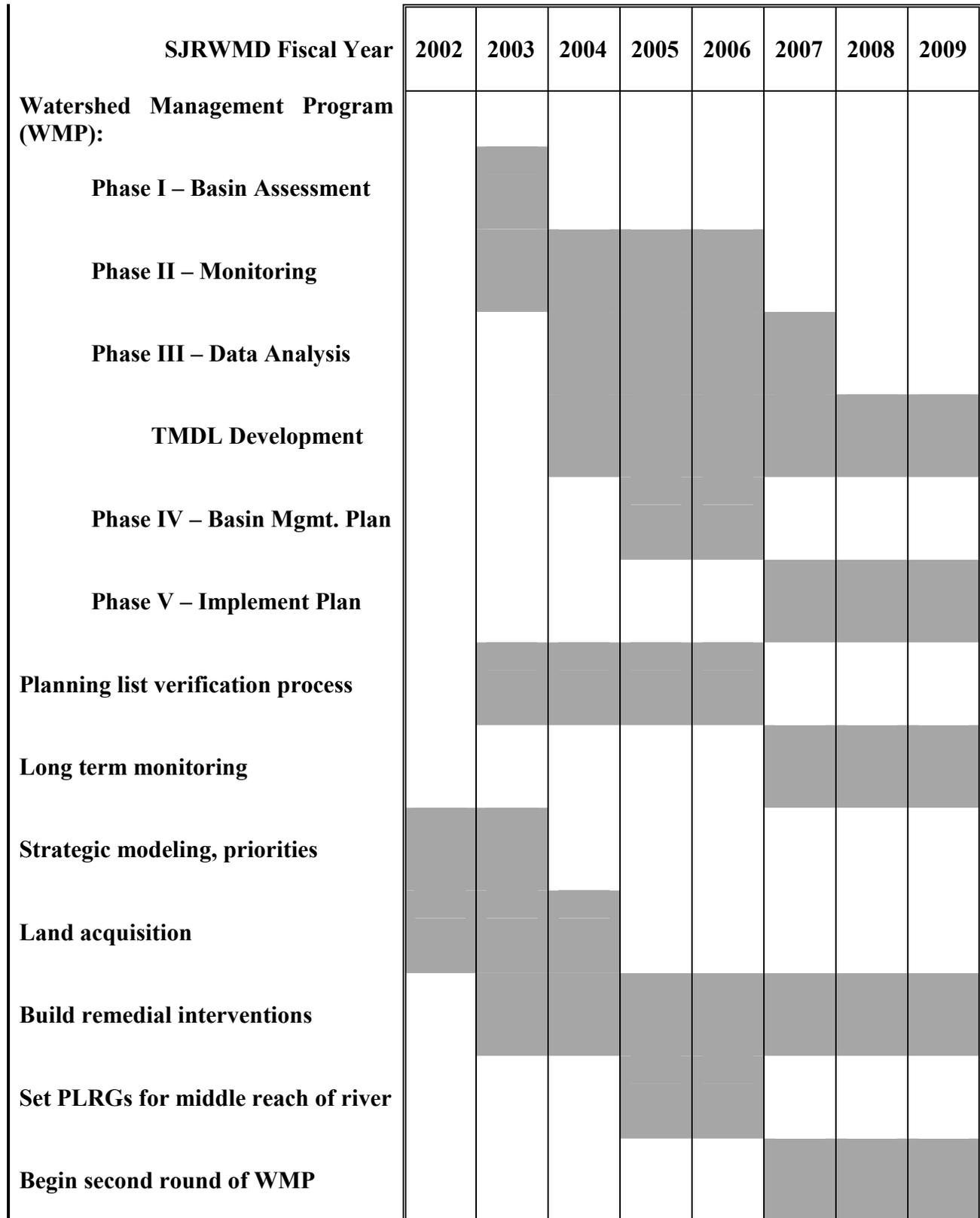
**Funding strategy:** The District will continue its existing funding strategy that involves obtaining assistance through the following sources:

- Legislative initiatives
- Ad valorem
- Grants
- Federal funding
- SWIM funding
- Partnerships

**Coordination with Lower St. Johns River TMDLs:** The District is in the process of assisting the Department in the calculation of a TMDL for the Lower St. Johns River. The District understands that the Department will set an allocation for upstream loads from the St. Johns River in 2002, which may require further reductions in pollutant loading to the middle portion of the river. Under state legislation, the TMDL would include a generalized allocation to nonpoint source categories and specific allocations to point sources in the basin. The District recognizes that the load allocation, as set forth in the Lower Basin TMDL, will have to be met by the Middle Basin. Pollutant load reduction goals for the middle reach of the river will be calculated by the District for non point source discharges that it directly regulates to correspond to that portion of the non point source allocation of the Lower Basin TMDL. The PLRG for the middle reach of the river will be completed within two years after the allocation from the Lower Basin TMDL is provided.

**Timeframes:** The following graph (Figure 8) is provided to show the District's commitment to assist the Department with upholding any applicable legislative, administrative and court decreed timeframes.

Figure 8. Duration of MSJRB TMDL and PLRG Components and Process Milestones



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## **SECTION G.**

### **SCHEDULE FOR RESTORATION AND PROTECTION**

Using the research and feasibility studies from Section E, to accomplish the Initiatives and Strategies set forth in Section C, the following schedule has been devised.

#### **Water Quality Initiative (C.1.)**

##### **Strategy: Design and Implement An Integrated Water Quality Monitoring Network (C.1.1.)**

###### **Schedule**

Action Step	Time Frame (months)
1-Gather and synthesize existing data	8
2-Design monitoring program	4
3-Implement sampling	24-60

##### **Strategy: Water Quality Modeling (C.1.2.)**

###### **Schedule**

Action Step	Time Frame (months)
1-Select appropriate modeling package	4
2-Run model and perform calibration and validation	12
3-Review model output, quantify pollution sources	9

##### **Strategy: Prioritization of Surface Waters to Implement Water Quality Enhancement Opportunities (C.1.3.)**

###### **Schedule**

Action Step	Time Frame (months)
1-Develop decision-making matrix	4
2-Develop adaptive management	12
3-Implement prioritized lake enhancement projects	12-48

## **Watershed Master Planning Initiative (C.2.)**

**Strategy: Examine existing watershed master plan coverage and determine where gaps exist (C.2.1.)**

### **Schedule**

Action Step	Time Frame (months)
1-Evaluate master plan coverage and needs	24

**Strategy: Assist in the development and design of master plans and hydrologic models where gaps exist (C.2.2.)**

### **Schedule**

Action Step	Time Frame (months)
1-Develop master plans for prioritized areas	36

**Strategy: Partner with local governments to implement existing plans (C.2.3.)**

### **Schedule**

Action Step	Time Frame (months)
1-Assist in the implementation of master plans	24

## **Stormwater Retrofit Initiative (C.3.)**

**Strategy: Prioritized stormwater retrofit program (C.3.1.)**

### **Schedule**

Action Step	Time Frame (months)
1-Prioritize areas for retrofit	12
2-Develop land acquisition plan	6
3-Implement acquisition plan	60
4-Encourage cost-sharing	60
5-Public education	60

## **Compliance & Rules Initiative (C.4.)**

**Strategy: Implement existing compliance monitoring programs (C.4.1.)**

### **Schedule**

Action Step	Time Frame (months)
1-Assessment of existing non-point sources	48
2-Establish a database	12
3-Establish protocol for priority watersheds	12

**Strategy: Assess and manage resources and funding to support the requirements of current and emerging NPDES and TMDL regulations, and PLRGs (C.4.2.)**

### **Schedule**

Action Step	Time Frame (months)
1-Review SJRWMD rules to ensure protections of watersheds	6
2-Implement special agreement with FDEP	Up to 60

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## SECTION H. FUNDING ESTIMATES

### Water Quality Initiative (C.1.)

#### Strategy: Design and Implement An Integrated Water Quality Monitoring Network (C.1.1.)

##### Funding

Action Step	Time Frame (months)	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
1-Gather and synthesize existing data	8	\$50K				
2-Design monitoring program	4	\$5K				
3-Implement sampling	24-60		\$125K	\$125K	\$125K	\$125K
	Totals	\$55K	\$125K	\$125K	\$125K	\$125K

#### Strategy: Water Quality Modeling (C.1.2.)

##### Funding

Action Step	Time Frame (months)	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
1-Select appropriate modeling package	4	\$30K				
2-Run model and perform calibration and validation	12		\$200K			
3-Review model output, quantify pollution sources	9	\$30K				
	Totals	\$60K	\$200K			

**Strategy: Prioritization of Surface Waters to Implement Water Quality Enhancement Opportunities (C.1.3.)**

**Schedule**

Action Step	Time Frame (months)	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
1-Develop decision-making matrix	4	\$25K				
2-Develop adaptive management interventions	12	\$20K				
3-Implement prioritized lake enhancement projects	12-48		\$130K	\$500K	\$500K	\$500K
	Totals	\$45K	\$130K	\$500K	\$500K	\$500K

**Watershed Master Planning Initiative (C.2.)**

**Strategy: Examine existing watershed master plan coverage and determine where gaps exist (C.2.1.)**

**Funding**

Action Step	Time Frame (months)	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
1-Evaluate master plan coverage and needs	24	\$50K	\$50K			
	Totals	\$50K	\$50K			

**Strategy: Assist in the development and design of master plans and hydrologic models where gaps exist (C.2.2.)**

**Funding**

Action Step	Time Frame (months)	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
1-Develop master plans for prioritized areas	36			\$200K	\$200K	\$200K
	Totals			\$200K	\$200K	\$200K

**Strategy: Partner with local governments to implement existing plans (C.2.3.)**

**Funding**

Action Step	Time Frame (months)	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
1-Assist in the implementation of master plans	24				\$500K	\$500K
	Totals				\$500K	\$500K

**Stormwater Retrofit Initiative (C.3.)**

**Strategy: Prioritized stormwater retrofit program (C.3.1.)**

**Funding**

Action Step	Time Frame (months)	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
1-Prioritize areas for retrofit	12	\$225K				
2-Develop land acquisition plan	6		\$50K			
3-Implement acquisition plan	60		\$20M	\$25M	\$25M	\$20M
4-Encourage cost-sharing	60		\$500K	\$500K	\$500K	\$500K
	Totals	\$0.225M	\$20.55M	\$25.5M	\$25.5M	\$20.5M

**Compliance & Rules Initiative (C.4.)**

**Strategy: Implement existing compliance monitoring programs (C.4.1.)**

**Funding**

Action Step	Time Frame (months)	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
1-Assessment of existing non-point sources	48		\$250K	\$250K	\$250K	\$250K
2-Establish a database	12	\$100K				
3-Establish protocol for priority watersheds	12	\$100K				
	Totals	\$200K	\$250K	\$250K	\$250K	\$250K

**Strategy: Assess and manage resources and funding to support the requirements of current and emerging NPDES and TMDL regulations and PLRGs (C.4.2.)**

**Funding**

Action Step	Time Frame (months)	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
1- Review SJRWMD rules to ensure protection of watersheds	6	\$50K				
2-Implement special agreement with FDEP	Up to 60	\$25K	\$25K	\$25K	\$25K	\$25K
	Totals	\$75K	\$25K	\$25K	\$25K	\$25K

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## Appendix I. Implementation Partners

SJRWMD recognizes the importance of coordination with the many government agencies and other stakeholders that may be affected by, or have some jurisdiction over resources within the MSJRB SWIM planning area. A list of those entities is provided below. A description of the responsibilities for these governmental units is given in Chapter 8 of the Year 2000 DWMP (SJRWMD, 2000a).

<b>Agencies and Stakeholders</b>	
<b>Federal</b>	
U.S. Army Corps of Engineers	U.S. Fish and Wildlife Service
U.S. Environmental Protection Agency	U.S. Forestry Service
U.S. Geologic Survey	
<b>State</b>	
Florida Department of Environmental Protection	Department of Community Affairs
Public Service Commission	Department of Health
Department of Transportation	Department of Agriculture and Consumer Affairs
Florida Fish and Wildlife Conservation Commission	
<b>Regional</b>	
SJRWMD	East Central Florida Regional Planning Council
<b>Counties</b>	
Brevard County	Osceola County
Lake County	Seminole County
Marion County	Volusia County
Orange County	
<b>Cities</b>	
Apopka	Maitland
Altamonte Springs	Mt. Dora
Casselberry	Ocoee
DeBary	Orange City
Deltona	Orlando
Eatonville	Oviedo
Lake Helen	Sanford
Lake Mary	Winter Park
Longwood	Winter Springs
<b>Unincorporated Communities</b>	
Altoona	Mt. Plymouth
Bithlo	Orlovista
Chuluota	Sorrento
Geneva	Wedgfield
<b>Stakeholders</b>	
Lake County Water Authority	Friends of Lake Jesup
Special Taxing Districts	Wekiva River Ecosystem Management Working Group
Water Control Districts	Friends of the Wekiva River
Econlockhatchee River Basin Working Group	Florida Audubon Society
Sierra Club	

**Appendix II. Surface Water Discharge Facilities Operating with a Permit**

<b>Facility</b>	<b>City</b>	<b>Planning Unit</b>
<b>Domestic Wastewater</b>		
Orange County Utilities STP	Orlando	Econlockhatchee
Park Manor Estates	Orlando	Econlockhatchee
SCES/Northwest Regional	Sanford	Wekiva River
Orlando/IronBridge WPCF	Oviedo	Econlockhatchee
Sanford/North	Sanford	Lake Monroe
Wekiva Hunt Club	Longwood	Wekiva River
Altamonte Springs/Swofford	Orlando	Wekiva River
<b>Industrial Wastewater</b>		
<b>Concrete Batch Plants</b>		
Inland Materials	Casselberry	Lake Jesup
AB Concrete	Orlando	Econlockhatchee
Cemex/Goldenrod	Orlando	Econlockhatchee
Florida Rock	Oviedo	Econlockhatchee
Cemex/Sanford	Sanford	Lake Monroe
Inland Materials	Deltona	Lake Monroe
Florida Rock/Carder Road	Orlando	Econlockhatchee
<b>Petroleum Cleanup Sites</b>		
Amoco Service Station #2093	Sanford	Lake Monroe
Ideal Store #108	Forest City	Wekiva River
Tenneco 087-08	Winter Park	Lake Jesup
<b>Power Plants</b>		
FPL Sanford Power Plant	Sanford	Lake Monroe
<b>Groundwater Remediation Projects</b>		
City Industries Superfund	Winter Park	Lake Jesup
Sprague Electronics	Longwood	Wekiva River
Rexam	Orlando	Econlockhatchee

**Appendix III. Facilities possessing MSGP Permits**

<b>Facility Name</b>	<b>City</b>	<b>County</b>
Sunflower Carriers	Deland	Volusia
A-1 Block Corp	Orlando	Orange
A-1 Auto Salvage	Apopka	Orange
Orange Co Sheriffs Office Aviation Unit	Orlando	Orange
Coreslab Structures (Orlando)	Orlando	Orange
E D Cook Lumber Co Inc	Orlando	Orange
Joe's Truck Parts Inc	Orlando	Orange
Perma-Fix Orlando Inc	Orlando	Orange
Kaley Street Transfer Station	Orlando	Orange
The Sherwin-Williams Co	Orlando	Orange
Modern Welding Co Of Fl Inc	Orlando	Orange
Air Liquide Orlando Asu	Orlando	Orange
Orlando Citation Service Ctr.	Orlando	Orange
Air Products And Chemicals Inc	Orlando	Orange
Orlando Cogen Limited Lp	Orlando	Orange
Ameristeel Corp	Orlando	Orange
Con-Way Southern Express-Nof	Orlando	Orange
Jennings Environmental Svcs	Orlando	Orange
Inland Paperboard & Packaging	Orlando	Orange
United Parcel Service Inc	Orlando	Orange
Aaron Scrap Metals	Apopka	Orange
Commercial Iron & Metal Co Inc	Orlando	Orange
Commercial Shredding Inc	Orlando	Orange
Commercial Condrey Enterprises	Orlando	Orange
Schmalbach-Lubeca Plastic Containers Orlando Plant	Orlando	Orange
Allied Septic Tank Co Inc	Orlando	Orange
Florida Coca-Cola Bottling Co	Orlando	Orange
East Side Fuel Facility	Orlando	Orange
Con-Way Southern Express Nof	Orlando	Orange
Abx Air Inc	Orlando	Orange
Florida Coca-Cola Bottling Co	Orlando	Orange
Watkins Motor Lines Inc-Orl	Orlando	Orange
Finfrock Industries Inc	Apopka	Orange
Orlando Vmf	Orlando	Orange
David Warren & Son Inc	Orlando	Orange
M A Bruder & Sons Inc	Orlando	Orange
Tg Lee Foods	Orlando	Orange
Kenan Transport Co	Orlando	Orange

**Appendix III. Facilities possessing MSGP Permits (continued)**

Constar Plastics Inc	Orlando	Orange
Leisure Bay Industries Inc	Orlando	Orange
Correct Craft Inc	Orlando	Orange
Commercial Carrier Corp	Orlando	Orange
J & B Used Auto Parts Inc	Orlando	Orange
Leisure Bay Industries Inc	Orlando	Orange
Orlando Citation Service Ctr.	Orlando	Orange
Modern Welding Co Of Fl Inc	Orlando	Orange
Perma-Fix Orlando Inc	Orlando	Orange
Seminole County Port Authority	Sanford	Seminole
Hidden Harbour Marina	Sanford	Seminole
Orlando Paving Company Asphalt Plant #3	Oviedo	Seminole
Sunniland Corporation	Longwood	Seminole
Sanford Amtrak Station	Sanford	Seminole
Seminole County Port Authority	Sanford	Seminole
Mid Flordia Lake Mary Vmf	Lake Mary	Seminole
Apac-Florida Inc, Macasphalt Division	Winter Springs	Seminole
Federal Express Corp Sfba	Longwood	Seminole
Sunniland Corporation	Longwood	Seminole
Mohawk Mfg Co	Longwood	Seminole
United Parcel Service Inc	Longwood	Seminole
Midwest Coast Transport	Sanford	Seminole
Hanson Pipe & Products Inc	Deland	Volusia
Ardmore Farms Inc	Delano	Volusia
Louis O Werneke Co Fl	Orlando	Orange
Budget Auto Parts Of Orlando	Winter Garden	Orange
Cirent Semiconductor	Orlando	Orange
Recycle America Of Orange Co	Orlando	Orange
Sunshine Materials Lockhart	Apopka	Orange
Hiawassee Asphalt Plant	Orlando	Orange
Lockhart Asphalt Plant	Orlando	Orange
Sonoco Products Company	Orlando	Orange
Ecs 50g	Orlando	Orange
Csx Intermodal	Orlando	Orange
Paper Stock Dealers Inc	Orlando	Orange
Southeastern Freight Lines Inc	Orlando	Orange
Sonoco Products Company	Orlando	Orange
Fp Spiralkote	Orlando	Orange
Consolidated Freightways-Olf	Orlando	Orange

**Appendix III. Facilities possessing MSGP Permits (continued)**

AAA Cooper Transportation	Orlando	Orange
Fmc Airline Equipment	Orlando	Orange
Addison Steel Inc	Orlando	Orange
CNF Postal Logistics-K54	Orlando	Orange
BFI Waste Sys Of North America	Orlando	Orange
West Side Fuel Facility	Orlando	Orange
Advance Cargo Of Orlando Inc	Orlando	Orange
Winter Garden Citrus Products	Winter Garden	Orange
Winter Garden Ready-Mix Plant	Winter Garden	Orange
Federal Express Corp Orla	Orlando	Orange
Executive Air Center Inc	Orlando	Orange
Ameristeel Corp	Orlando	Orange
Estes Express Lines	Orlando	Orange
Ducor International Corp	Orlando	Orange
Information Systems Center	Orlando	Orange
Pavex Corp	Winter Garden	Orange
Import Used Auto Parts	Orlando	Orange
Abf Freight System Inc	Orlando	Orange
Suncoast Heat Treat Inc	Orlando	Orange
Budget Rent A Car Systems Inc	Orlando	Orange
Ntc Orlando (010e)	Orlando	Orange
Kennedy Concrete Inc	Orlando	Orange
Foamex Lp	Orlando	Orange
West Used Auto Parts Inc	Orlando	Orange
Greyhound Lines Inc	Orlando	Orange
Michael Auto Parts Inc	Orlando	Orange
Fl Central Railroad Co	Plymouth	Orange
Comcar Leasing Inc	Orlando	Orange
Florida Rock & Tank Lines Inc	Ocoee	Orange
Macs Used Auto Parts Inc	Casselberry	Seminole
Oviedo Asphalt Plant	Oviedo	Seminole
Longwood Ready-Mix Plant	Longwood	Seminole
Orlando Sanford Authority	Sanford	Seminole
New Orleans Maintenance Term	Sanford	Seminole
Ratliff Auto Parts Inc	Sanford	Seminole
Bulk Intermodal Distribution	Sanford	Seminole
Bfi Of North America Inc	Longwood	Seminole
S&M Fabricating & Engineering	Sanford	Seminole
Ratliff Auto Parts Inc	Sanford	Seminole

**Appendix III. Facilities possessing MSGP Permits (continued)**

Siemens Stromberg Carlson	Lake Mary	Seminole
Abb Power T&D Company Inc	Sanford	Seminole
Bfi	Altamonte Springs	Seminole
Orlando Sanford Airport	Sanford	Seminole
Vertical Aviation Technologies	Sanford	Seminole
Sanford Airport Authority	Sanford	Seminole
Ranger Construction Ind Inc	Debary	Volusia
Deland Ready-Mix Plant	Deland	Volusia
Custom Dive Boats Inc	Deland	Volusia

**Appendix IV. Municipal Separate Storm Sewer Systems**

<b>Permit #</b>	<b>Municipality</b>
FLS000011 Orange	Orange County
FLS000011	City of Apopka
FLS000011	City of Eatonville
FLS000011	City of Edgewood
FLS000011	City of Maitland
FLS000011	City of Ocoee
FLS000011	City of Winter Garden
FLS000011	City of Winter Park
FLS000011	Valencia Water Control District
FLS000014 Orlando	City of Orlando
FLS000038 Seminole	Seminole County
FLS000038	City of Winter Springs
FLS000038	City of Sanford
FLS000038	City of Oviedo
FLS000038	City of Lake Mary
FLS000038	City of Longwood
FLS000038	Altamone Springs

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## Appendix V. 2001-2002 Legislative Initiative Project List

### Lake Jesup Stormwater Retrofits

**Priority Rating:** 1

**Project Partners:** Cities of Winter Springs, Maitland, and Winter Park; Seminole and Orange counties

**Project Status:** Year 3 of 8

**Description:** One key goal of the Lake Jesup restoration program is to achieve substantial nutrient load reductions. A significant proportion of the required nutrient load reductions can be achieved through the implementation of local government master stormwater management plans and other targeted stormwater treatment activities. Initial projects emphasized the Howell Creek watershed and included remediation of contributing water bodies. The following projects are in the mid to latter stages of development and construction: Howell Creek Erosion Control Project, Lake Ann Outfall, Howell Creek Tributary Erosion Control project, Lake Hayes Outfall and Red Bug/Deer Run Outfall. Second year projects are in the cities of Winter Springs, Maitland, and Winter Park.

### Lake Jesup Restoration — Tributary Stormwater Parks Assessment And Implementation

**Priority Rating:** 2

**Project Partner:** Seminole County

**Project Status:** Year 3 of 8

**Description:** The selection, initial design and preliminary construction of several regional stormwater treatment facilities in the Lake Jesup watershed are key components to restoring Lake Jesup. The regional facilities will achieve substantial nutrient load reductions, intercepting and treating storm water on several of the major tributaries. Identification and selection of the sites has begun. Land purchases are required for the majority of sites identified. A treatment-option design will follow site identification, then facility design will begin. The project contributes to targeted nutrient load reduction goals. The Gee/Solider Creek regional stormwater park is a high priority project. A large portion of the Gee Creek Basin was built prior to promulgation of stormwater regulations. Thus, water quality treatment is required. High pollutant loads have been recorded in Lake Jesup, where the Gee Creek Basin discharges. In order to provide water quality treatment within the Gee Creek Basin, a regional treatment facility is proposed in a site northeast of the intersection of County Road 419 and State Road 434. This site can provide treatment to both Gee and Soldiers creeks. The project involves land acquisition and construction of a regional treatment facility. The regional treatment facility consists of a wet detention pond, control structures and associated appurtenances. The requested funding is for design and construction.

Other projects under consideration for construction include Six Mile Creek, Florida Avenue, Brisson Avenue, the intersection of Oklahoma and Florida avenues, De Leon Street, the intersection of Oklahoma and Howard avenues, Mellonville Avenue, Cameron Ditch and Navy Canal. Cameron Ditch and Navy Canal are priority projects.

### **Sweetwater Cove Tributary To The Wekiva River Sediment Control Project**

**Priority Rating:** 3

**Project Partners:** Seminole County, Utilities, Inc.

**Project Status:** Year 2 of 3

**Description:** This surface water restoration project includes the Sweetwater Cove tributary that discharges directly into the Wekiva River in Seminole County. This portion of the Wekiva River is a Florida Department of Environmental Protection (FDEP) 303(d) impaired water body candidate. The tributary historically conveyed 1.9 million gallons of treated wastewater to the river each day. The wastewater treatment plant has since been upgraded to improve the quality of the discharge, although the sedimentation and nuisance vegetation problem within the tributary has remained uncontrolled. The total cost of the restoration is estimated to be \$2,000,000 and is intended to be phased. Phase I, which is scheduled for 2001, includes alternative evaluation and selection with final design for some elements to begin implementation of projects. The requested funding would be for Phase II — the implementation of remediation activities and the retrofit of the area to provide additional stormwater treatment for the contributing watershed.

### **Little Wekiva River Watershed Management Implementation**

**Priority Rating:** 4

**Project Partners:** Cities of Altamonte Springs and Orlando, Seminole and Orange counties

**Project Status:** Year 6 of 10

**Description:** This surface water restoration project includes the design and construction of projects included in the Little Wekiva River Watershed Management Plan, which addresses the erosion and sediment transport problems within the main channel of the Little Wekiva River. Projects will include structural bed and bank protection, biotechnical bank protection (e.g., geo-fabric, vegetation), grade control structures, widening and resloping of river sections, and the installation of sedimentation basins. Several projects have been completed, including the construction of three high priority erosion control projects and the construction of five grade control structures. Additional projects are undergoing planning and design phases, with the construction of some scheduled for late 2001.

A stormwater retrofit project will include a pond at Little Lake Fairview to serve 400 acres of highly developed area in Orlando that currently receives no stormwater treatment. This project will improve water quality discharge to the Little Wekiva River. The Little Wekiva River is listed as a 303(d) impaired water body candidate by FDEP. Additional efforts are under way in the Little Wekiva River Basin to implement water quality and flow attenuation projects that will address maintenance of erosion control efforts that have already been completed and river bank restoration using Florida native plants.

### **Little Econlockhatchee River Subbasinwide Improvements**

**Priority Rating:** 5

**Project Partners:** Seminole County, Orange County

**Project Status:** Year 4 of 10

**Description:** Orange and Seminole counties contracted cooperatively with a consultant to complete a comprehensive water quality and flood remediation plan — the Little Econlockhatchee River Surface Water Management Plan — for the highly urbanized Little

Econlockhatchee River watershed. The Little Econlockhatchee River and a tributary of this river, Crane Strand, are listed as 303(d) impaired water body segment candidates by FDEP. Crane Strand is one of the highest sources of pollutants in the subbasins. The requested funding will be applied to the implementation of the projects recommended in the Little Econlockhatchee River Surface Water Management Plan. Primary projects include regional stormwater ponds to provide treatment and attenuation for areas developed prior to stormwater rules with the highest priority project being a regional system to serve the Crane Strand watershed.

### **Lake Monroe Subbasin Watershed Plan Implementation**

**Priority Rating:** 6

**Project Partner:** Seminole County

**Project Status:** Year 4 of 8

**Description:** Seminole County has completed master plan efforts for the Lake Monroe watershed to identify remediation projects to address water quality improvements for the area. Lake Monroe is on the FDEP 303(d) list as an impaired water body candidate. Portions of the watershed discharge untreated storm water directly to Lake Monroe and are in need of treatment system retrofits, conveyance system improvements and sedimentation controls.

The project to be funded through this request, the Celery Avenue Retrofit project, is located within the Midway watershed of the Lake Monroe watershed. This project will provide water quality treatment by constructing a 20-acre regional stormwater retention pond serving an area that currently receives no water quality treatment and experiences erosion and flooding problems. The project watershed discharges into Lake Monroe and the St. Johns River. The proposed facility also will reduce flooding. The proposed facility will contain a created wetlands component to further improve water quality and to enhance wildlife habitat.

## Appendix VI. Local Government Capital Improvement Project List

One of the important roles that local government plays in maintaining water quality in the MSJRB is through the improvement and maintenance of stormwater water facilities, drainage easements, catch basins and other facilities under their jurisdiction. Ongoing capital improvement programs are costly, but necessary, and provide a good example of local governments' commitment to good water quality. Listed below, by basin location and responsible entity, are the tentative 5-year capital improvement projects of each local government in the MSJRB that related to water quality. A funding request is given for each project, if available.

<b>Wekiva River Basin</b>	<b>Entity</b>	<b>Funding Request</b>
Wekiva Basin Master Study (W-110)	Orange County	\$500,000.00
Ponkan Road and Ustler Road (W-112)	Orange County	\$202,963.00
Wekiva Basin Lake Level Study (W-119)	Orange County	\$250,000.00
Erosion & Sedimentation Mitigation (LW-001)	Orange County	\$3,737,805.00
Riverside Acres Pipe Replacement (LW-002)	Orange County	\$1,577,170.00
Big Lake Fairview and Lake Silver (LW-004)	Orange County	\$71,000.00
Little Lk Fairview Stormwater Retrofit (LW-005)	Orange County	\$1,011,981.00
Plantation Estates Drainage Plan (LW-006)	Orange County	\$660,964.00
Miscellaneous Secondary Projects (LW-010)	Orange County	\$250,000.00
L. Wekiva H2O Quality Trtmnt Program (LW-011)	Orange County	\$5,447,856.00
Little Wekiva Erosion Countermeasures	Orange County	\$2,777,000.00
Little Wekiva Erosion Countermeasures	Seminole County	\$2,322,000.00
Grade Control Structure #3 (N-43)	Seminole County	\$133,824.00
Grade Control Structure #5 (N-39)	Seminole County	\$139,200.00
Northwestern Avenue Bridge Area (N-45 to N-46)	Seminole County	\$588,084.00
Sedimentation Basin (N-43)	Seminole County	\$2,528,100.00
Basin 1602-01 Pond Retrofit	Seminole County	\$48,000.00
Basin 1603-03 Wetland/Pond Improvements	Seminole County	\$275,000.00
Basin 1607-02 Skimmer and Diversions	Seminole County	
Cove Lake Basin 1602-10 Retrofit	Seminole County	\$1,200,000.00
Cove Lake and Big Wekiva State Park Skimmer and Trash Wall	Seminole County	\$45,000.00
Lake Brantley East Side Outfall Retrofit	Seminole County	\$340,000.00
Lake Brantley Outfall	Seminole County	\$45,000.00
Lake Brantley Outfall Catchment Screens	Seminole County	\$135,000.00
Stormwater Pond Dredging and Cleaning (1602-21 to 1602-07)	Seminole County	\$20,000.00
Stormwater Canal/Pond Dredging and Cleaning (1603-05)	Seminole County	\$40,000.00
Water Quality Treatment for Basin 1602-05	Seminole County	\$85,000.00
Water Quality Treatment for Basin 1607-02	Seminole County	\$660,000.00
Little Lake Fairview Treatment System	Orlando	\$1,725,000.00
Street Sweeper Upgrades	Orlando	\$450,000.00
		<b>\$27,265,947.00</b>

<b>Lake Jesup Basin</b>	<b>Entity</b>	<b>Funding Request</b>
Howell Branch Basin Master Study (H-104)	Orange County	
Florida Avenue Regional Pond, Outfall and Conveyance System	Seminole County	\$3,500,000.00
Oklahoma Street Regional Pond, Outfall and Conveyance System	Seminole County	\$2,000,000.00
Deleon Street Pond and Conveyance System	Seminole County	\$3,190,000.00
Brisson Avenue Flood Attenuation and Water Quality Retrofit	Seminole County	\$2,700,000.00
Mellonville Ave. Flood Attenuation & Water Quality Improvements	Seminole County	\$700,000.00
Regional Pond East of Richmond Avenue	Seminole County	\$500,000.00
Navy Canal Flood Attenuation and Retrofit Project (403005X)	Seminole County	\$1,200,000.00
Six Mile Creek Regional Facility (120210C, 114005X - 122005X)	Seminole County	\$6,500,000.00
Howell Creek Retrofit: Kewannee Trail Area (Site #1)	Seminole County	\$3,000,000.00
Howell Creek Retrofit: Deer Run/Red Bug (Site #2)	Seminole County	\$2,900,000.00
Howell Creek Retrofit: Seminole Co. Water Plant (Site #3)	Seminole County	\$2,000,000.00
Howell Creek Retrofit: Area East of Dodd Road (Site #4)	Seminole County	\$3,500,000.00
Howell Creek Retrofit: Lightwood Knox Canal (Site #5)	Seminole County	\$2,500,000.00
Howell Creek Retrofit: Bear Gully Creek/Canal (Site #6)	Seminole County	\$2,200,000.00
Howell Creek Retrofit: Bear Gully Lake South (Site #7)	Seminole County	\$3,500,000.00
Howell Creek Retrofit: Bear Gully Lake West (Site #8)	Seminole County	\$2,700,000.00
Howell Creek Retrofit: Lake Ann Outfall (Site #9)	Seminole County	\$500,000.00
Gee & Soldier Creek Water Quality Retrofit: (Site #1)	Seminole County	\$2,700,000.00
Lake Jesup/Six Mile Creek Retrofit: (Site #2)	Seminole County	\$1,900,000.00
Little Lake Howell Basin Water Quality Retrofit: (Site #1)	Seminole County	\$600,000.00
Soldier Creek Basin North Water Quality Retrofit: (Site #1)	Seminole County	\$900,000.00
Soldier Creek Basin East Water Quality Retrofit: (Site #1)	Seminole County	\$600,000.00
Ivanhoe Blvd. Drainage (City of Orlando)	Orlando	\$368,000.00
Mills Avenue Retrofit	Orlando	\$77,330.00
Nina Canal Retrofits	Maitland	\$350,000.00
Lake Sybelia Retrofits	Maitland	\$385,000.00
Lake Maitland Basin Retrofits	Maitland	\$750,000.00
South Lake Jackson Retrofit	Maitland	\$250,000.00
Hill Rec Center Retrofit	Maitland	\$350,000.00
Lake Gem/Park Lake Retrofit	Maitland	\$200,000.00
Canal Sediment Dredging	Maitland	\$350,000.00
Update Stormwater Master Plan	Maitland	\$200,000.00
New York Ave sub-basin Retrofits	Winter Park	\$600,000.00
Green Cove Road Retrofits	Winter Park	\$250,000.00
McKean Circle Retrofits	Winter Park	\$50,000.00
Trisman/Lakewood Retrofits	Winter Park	\$270,000.00
Executive Drive Retention	Winter Park	\$100,000.00
Bonita Drive Retrofits	Winter Park	\$100,000.00
Dixie Parkway Retrofits	Winter Park	\$300,000.00
Pinetree Road Retrofits	Winter Park	\$400,000.00
Internal Loading Reduction Pilot Project – Lake Sylvan	Winter Park	\$25,000.00
Lake Virginia Internal Load Reduction Project	Winter Park	\$250,000.00
Landlocked Lakes Retrofit Feasibility Study	Winter Park	\$75,000.00

<b>Lake Jesup Basin (continued)</b>	<b>Entity</b>	<b>Funding Request</b>
Landlocked Lakes Retrofit Construction	Winter Park	\$600,000.00
Sterling Swamp Study	Winter Park	\$25,000.00
Palmer Avenue Retrofits	Winter Park	\$300,000.00
Lake Sue Retrofits	Winter Park	\$600,000.00
Lake Berry Retrofits	Winter Park	\$500,000.00
Alberta Drive Retrofits	Winter Park	\$300,000.00
Ditch Bank Stabilization	Winter Park	\$600,000.00
Lake Howell CDS (Sausalito Shores)	Casselberry	\$125,000.00
Piping Existing Drainage Ditch	Casselberry	\$250,000.00
Lake Howell CDS (3 <sup>rd</sup> Outfall)	Casselberry	\$125,000.00
		<b>\$58,915,330.00</b>
<b>Econlockhatchee River Basin</b>		
Bithlo Retrofits (BE-001)	Orange County	\$5,849,485.00
Bonneville Master Plan CIP (BE-002)	Orange County	\$1,914,119.00
Sunflower Trail Drainage Improvements (BE-003)	Orange County	\$1,260,500.00
Big Econlockhatchee River Basin Study (BE-004)	Orange County	\$7,744,500.00
Land Locked Lakes (BE-005)	Orange County	\$300,000.00
Miscellaneous Secondary Projects (BE-006)	Orange County	\$250,000.00
Stormwater Master Plan (Little Econ Basin) (LE-001)	Orange County	\$250,000.00
Quail Hollow Subdivision Master Drainage Plan (LE-004)	Orange County	\$750,000.00
SR 50 Small Area Study (LE-005)	Orange County	\$75,000.00
Little Lake Barton Outfall	Orange County	\$65,000.00
Miscellaneous Secondary Projects (LE-016)	Orange County	\$500,000.00
Little Econ Water Quality Treatment Program (LE-017)	Orange County	\$23,023,476.00
Ditch Bank Stabilization	Winter Park	\$500,000.00
Eastbrook & Wrenwood Heights (Crane Strand)	Seminole County	\$7,540,200.00
		<b>\$48,761,780.00</b>
<b>Deep Creek Basin</b>		
Water Quality Monitoring Program	Volusia County	
		<b>\$0.00</b>

<b>Lake Monroe Basin</b>	<b>Entity</b>	<b>Funding Request</b>
Lincoln Heights Residential Area (02-0410C,02-0406C,020404C)	Seminole County	\$1,658,000.00
Oregon Street and Michigan Avenue Area	Seminole County	\$422,000.00
Ohio, New York and Michigan Avenue (02-0222C2,-02-0225X)	Seminole County	\$875,000.00
Ohio, New York, Michigan Avenues (02-0226C-02-0228X)	Seminole County	\$3,491,000.00
Kennel Ditch (02-0634C, 02-0635BC and 02-0622X)	Seminole County	\$1,012,250.00
Elder Creek/Ditch (02-0514C, 02-0516C, 02-0524C, 02-0526C)	Seminole County	\$3,752,000.00
Jewett Ditch (02-0614C, 02-0618C and 02-0610EX)	Seminole County	\$627,000.00
Borrow Area West of I-4 (02-0316X and 02-0324X)	Seminole County	\$345,000.00
Vihlen Road (02-0368C)	Seminole County	\$2,776,000.00
Orange Boulevard (02-206C,02-220C,02-238C, 02-0246C)	Seminole County	\$1,569,000.00
Old Monroe Ditch (02-0662C- 02-0641X)	Seminole County	\$1,219,000.00
Central Florida Zoo/Jewett Ditch (02-0610C, 02-614C, 02-0604P)	Seminole County	\$850,000.00
Brisson Avenue Ditch, South of Celery (04-07-D1X & 04-D3X)	Seminole County	\$208,000.00
Celery Avenue Cross Drain (04-19-006C)	Seminole County	\$2,500,000.00
Alum Treatment for Fisher Lake	Deltona	\$43,000.00
Alum Treatment for Lake Lorraine	Deltona	\$53,000.00
Alum Treatment for Twin Oaks Lake	Deltona	\$34,000.00
Alum Treatment for Randolph Lake	Deltona	\$34,000.00
Alum Treatment for Castle Lake	Deltona	\$34,000.00
		<b>\$21,502,250.00</b>
<b>Total Local Government Capital Improvement Costs for Water Quality Improvements</b>		<b>\$156,445,307.00</b>

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