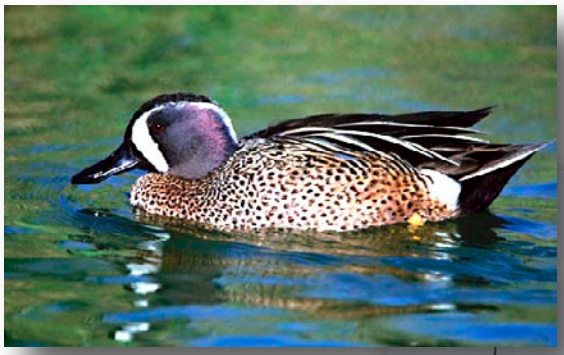
Upper St. Johns River Basin

Surface Water Improvement and Management Plan

March 21, 2007



ST. JOHNS RIVER WATER MANAGEMENT DISTRICT

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Cover photographs
American Alligator (*Alligator mississippiensis*), Blue winged Teal (*Anas discors*), Common rotifer (*Brachionus sp*.), S-96 Water Control Structure

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Overview

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). 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.

Recognizing the need for continued protection and restoration the St. Johns River Water Management District (SJRWMD) approved the Upper St. Johns River Basin (USJRB) as a priority waterbody in October 2005. This USJRB SWIM Plan has been prepared in accordance with the SWIM Act, which mandates that a SWIM Plan must be drafted, reviewed and approved before State SWIM funds can be spent on restoration, protection or management activities.

Upper St. Johns River Basin Summary

The Upper St. Johns River Basin (USJRB) extends from the headwaters of Ft Drum Creek northward to its confluence with the Econlockhatchee River, a distance of over 110 river miles (Figure 1). The river drops an average of only 1 foot per 5 river miles. This slight gradient and large floodplain allows the Upper St. Johns River and surrounding marshes to function as a water storage area, serving as a natural regulator of high and low water stages.

The western side of the basin is defined by the Osceola Ridge, which rises 60 to 80 feet above sea level. The basin extends along the western edge of Brevard and Indian River counties and occupies small portions of both eastern Orange and Seminole counties. Forty-six blackwater streams flow east from the ridge into the Upper St. Johns River. Historically, these tributaries naturally overflowed into adjacent swamps and marshes, and the river channel. The eastern side of the watershed is separated from the coastal basin by the Atlantic Coastal Ridge, which extends along the eastern edges of both Indian River and Brevard counties. The east side of the river valley is relatively flat, and originally supported a densely vegetated marsh. Several areas that historically drained to the St. Johns River have been diverted to the Indian River Lagoon Basin through canals cut through the Atlantic Coastal Ridge. The most notable diversions are the C-1 and C-54 canals, and the area drained by the Indian River Farms Water Control District.

There are several shallow lakes in the basin. These include Blue Cypress, Hell'n Blazes, Sawgrass, Little Sawgrass, Washington, Winder, Florence, Poinsett, and Puzzle lakes. Lakes in the basin comprise approximately 42 square miles or 2.4 percent of the total basin area. Lake Washington is important as the primary public water supply for the City of Melbourne.

Upper St. Johns River Basin Project

In 1948 the U.S. Congress authorized the Central and Southern Florida Flood Control Project and the Florida Legislature created the Central and Southern Florida Flood Control District (CSFFCD) to act as the local sponsor for the federal flood control project. In 1954 the Act was amended to include project works within the USJRB portion of the larger flood control project. In coordination with the CSFFCD, the U.S. Army Corps of Engineers (USACE) Jacksonville District prepared a project plan that was completed in 1957. A modified plan was adopted in 1962, and initial construction of the project began in 1966 (USACE 1991).

In 1977, local sponsorship for the project was transferred from the CSFFCD to SJRWMD. SJRWMD has designed an innovative plan with USACE to revitalize the river's flow by restoring drained marshlands, plugging canals and building reservoirs.

Conditions leading to the need for restoration and protection

In September 2003, FDEP published a USJRB status report that provided a *Planning List*, or preliminary identification, of potentially impaired waterbodies within Basin. This year (2006) FDEP has completed the USJRB Assessment Report that presents the results of additional data gathered during Phase 2 of the cycle.

FDEP's assessment shows that nine waterbodies or waterbody segments (Table ES-1) in the Upper St. Johns River Basin are impaired for nutrients and dissolved oxygen and require the development of Total Maximum Daily Load allocations. TMDLs for three of the waterbody segments; 2893L, 2893Q, and 2893X, have already been developed by FDEP.

Table ES-1. FDEP 303(d) Verified Listed Waterbodies for the USJRB

WBID	Water Body Name	Priority	Parameter(s)	TMDL Development" Year
3073	Crabgrass Creek	Medium	Copper, Coliforms, Nutrients (chlorophyll*a*	2008, 2009(Copper)
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2893L	St. Johns River above Lake Poinsett	High	DO, Nutrients (Historical Chlorophyll*a*	2004
2893I	St. Johns River above Puzzle Lake	Medium	DO, Nutrients (Historical Chlorophyll*a*	2008
2983Q	Lake Hell'n Blazes	High	DO, Nutrients (TSI)	2004
2893X	St. Johns River above Sawgrass Lake	High	DO, BOD	2004
3108C	Three Forks	Medium	DO	2009
28931	Sawgrass Lake	Medium, Low	DO, Mercury (Fish)	2009, 2011(Mercury)
28935	St. Johns River above Puzzle Lake	Medium	DO	2009

Other potential impaired waterbodies include Tosohatchee and Jim creeks. Both are potentially impaired because of low Dissolved Oxygen levels. Jim Creek is additionally potentially impaired because of failed biological assessments.

Analyses conducted by the SJRWMD also indicate that water bodies in the USJRB are impaired by high nutrient concentrations. Pollutant load reduction goals were set to prevent dominance of cyanobacteria by achieving concentrations of total phosphorus $\leq$ 100 ug/L.

Overall Management Strategy

The basic strategy of restoring, protecting and managing the surface water resources of the Upper 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 USJRB SWIM Plan is organized around a project delivery system of goals, initiatives, strategies and action steps.

In this system, the *Goals* are broad-based and identify the objectives of SJRWMD, as stated above. *Initiatives* are general categories of problem areas developed by SJRWMD staff. *Strategies* are detailed descriptions of the underlying work proposed to achieve results. They identify the approaches and methods that will be used to implement the initiatives. *Action Steps* represent specific activities under each strategy suggested to reach project delivery. The *Action Steps* briefly describe the research and feasibility studies and associated tasks to reach the targeted *Strategy* as required the Florida Administrative Code. Each *Action Step* includes a schedule for completion and an estimate of the funding requirements needed to accomplish the *Action Step*. These *Action Steps*, as well as the *Strategie*s and *Initiatives* referenced above, are not mutually exclusive, and may be undertaken concurrently, and/or sequentially.

The USJRB SWIM Plan focuses on two primary initiatives:

Initiative 1 – Water quality

> This initiative consists of two closely related strategies – monitoring water quality and plankton communities, and projects to improve water quality to meet designated uses and project goals.

Initiative 2 – Habitat Assessment, Protection and Restoration

> This initiative consists of strategies to gather and assess data on habitat and species needed to develop a comprehensive plan for monitoring biologic conditions in the basin to ensure achieving the overall biological goal of the Upper Basin Program that is the preservation of biodiversity and restoration of the productivity of economically important species.

In its mandate to address broad ecosystem needs, the USJRB SWIM Plan attempts to accomplish comprehensive protection strategies within the USJRB and introduce sustainable restoration strategies for resources or resource areas that are proven to be degraded. The intent is to also provide cooperative funding for projects addressing long-term waterbody protection and restoration.

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 Initiative

- Monitor water quality and plankton communities and assess trends.
- Improvement and Maintenance of Surface Waters

Habitat Assessment, Protection and Restoration Initiative

- Hydrologic monitoring
- Develop hydrologic models which can accurately predict water levels for the current and future basin conditions based on the historical rainfall data.
- Assess biological resources of the basin and initiate monitoring to track changes.
- Acquire and restore lands necessary for flood protection, water quality improvement and water supply.

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 full implementation of the USJRB SWIM Plan will cost $30.27 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	$6.89M	$6.39M	$6.31M	$4.01M	$3.96M
Habitat Assessment, Protection, and Restoration	$0.501M	$0.847M	$0.615M	$0.527M	$0.210M
Totals	**$7.39M**	**$7.24M**	**$6.93M**	**$4.54M**	**$4.17M**

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.

Recognizing the need for continued protection and restoration the St. Johns River Water Management District (SJRWMD) approved the Upper St. Johns River Basin (USJRB) as a priority waterbody in 2005. This USJRB SWIM Plan has been prepared in accordance with the SWIM Act, which mandates that a SWIM Plan must be drafted, reviewed and approved before State SWIM funds can be spent on restoration, protection or management activities.

Acknowledgements

The USJRB SWIM planning project was managed and edited by Mary Ann Lee Ph.D., Technical Program Manager, and Hector Herrera, P.E., Senior Project Manager for SJRWMD. Denis W. Frazel, Ph.D. (Frazel, Inc.), assisted with the development and preparation of the USJRB SWIM Plan through the collaborative efforts of SJRWMD staff. Special thanks are due to the following SJRWMD staff for their individual and collective efforts:

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SECTION A.
DESCRIPTION OF THE WATER BODY SYSTEM

A.1. Upper St. Johns River Basin

A.1.1. Introduction

The Upper St. Johns River Basin (USJRB) extends from the headwaters of Ft Drum Creek northward to its confluence with the Econlockhatchee River, a distance of over 110 river miles (Figure 1). The river drops an average of only 1 foot per 5 river miles. This slight gradient and large floodplain allows the Upper St. Johns River and surrounding marshes to function as a water storage area, serving as a natural regulator of high and low water stages.

The western side of the basin is defined by the Osceola Ridge, which rises 60 to 80 feet above sea level. The basin extends along the western edge of Brevard and Indian River counties and occupies small portions of both eastern Orange and Seminole counties. Forty-six blackwater streams flow east from the ridge into the Upper St. Johns River. Historically, these tributaries naturally overflowed into adjacent swamps and marshes, and the river channel. The eastern side of the watershed is separated from the coastal basin by the Atlantic Coastal Ridge and extends along the western edges of both Indian River and Brevard counties. The east side of the river valley is relatively flat, and originally supported a densely vegetated marsh.

There are several shallow lakes within the basin.. These include Blue Cypress, Hell'n Blazes, Sawgrass, Little Sawgrass, Washington, Winder, Florence, Poinsett, and Puzzle lakes. Lakes in the basin comprise approximately 42 square miles or 2.4 percent of the total basin area. Lake Washington is important as the primary public water supply source for the City of Melbourne.

Over 280 species of wildlife have been documented as occurring, or having the potential to occur, in the Upper Basin. For many years, the Upper Basin wetlands were considered among the best wintering waterfowl habitat in the state. The chain of lakes that flowed through the marshes supported an exceptional fishery, with more than 50 species of fish recorded from the area. As a consequence of its rich fishery and expansive wetland habitats, the Upper Basin supported large breeding colonies of wading birds such as snowy egrets, wood storks, and white ibis (SJRWMD 1993).

During the past 50 years extensive alterations to the river system have occurred. By the early 1970's, 62 percent of the 100-year floodplain, and 42 percent of the annual floodplain had been diked, drained, and converted to agricultural production. By 1983, only 35 percent of the original floodplain remained, and drainage patterns had been severely altered. These activities significantly impacted the hydroperiod of the basin by reducing water retention times and accelerating flows.

As a result, the land's natural ability to provide flood control and maintain water quality has been compromised, and significant declines in wildlife and fish populations have occurred. Remaining wetlands were degraded by alterations in hydrology and increases in nutrients

caused by stormwater runoff. In addition, inter-basin diversions of fresh water to the Indian River Lagoon, combined with stormwater runoff, often caused sudden and sustained decrease in salinity, resulting in adverse impacts to the Lagoon (Lowe, et al. 1984).

Although the Upper St. Johns River has been severely affected by development, it remains an ecosystem of state-wide and national significance. The Upper Basin contains the largest freshwater marsh in the region, and is one of the largest in the state. Duck counts can exceed 10,000, while sport fishing continues as a regionally important recreational activity. Significant wading bird rookeries are present. Perhaps most importantly, the Upper Basin remains a significant area for preservation of biological diversity, as evidenced by the number of endangered species present. Several habitats found within the basin - floodplain marsh, floodplain swamp, scrub, and blackwater stream - are considered imperiled statewide.

A.1.2. Historical Uses

The Upper Basin originally encompassed over one million acres, including nearly 400,000 acres of floodplain marsh that formed the headwaters of the river. In addition, this complex and diverse ecosystem represented a mosaic of interconnected habitat types including floodplain wetlands, river channel, shallow lakes, mesic flatlands, and xeric uplands. The ecological integrity of this riverine ecosystem is dictated primarily by hydrologic influences (i.e. water level fluctuation and flow), which result from seasonal rainfall patterns. Small variations in topography, in conjunction with seasonally fluctuating water levels, create hydrologic conditions suitable for a number of plant communities.

In the late 1800s, ambitious pioneers began implementation of reclamation efforts including water management “improvements” to control floods and drain extensive areas of the upper St. Johns River marshlands for agricultural production and private development. A large drainage system in northwestern Indian River County was one of the first significant water management works constructed in the USJRB. A road grade and a drainage canal—the Fellsmere Canal—were constructed across the marsh to connect the hamlet of Fellsmere with the small outpost of Kenansville. Other canals followed, cutting through a low coastal land ridge that separated waters in the USJRB from the Indian River Lagoon—one of the most biologically diverse estuaries in North America. Through these canals, large amounts of freshwater were diverted from the St. Johns River watershed to the Indian River Lagoon and the Atlantic Ocean. As more dikes were constructed and large pumping stations were installed to meet private flood protection needs, thousands of acres of nutrient-rich floodplains were opened for agricultural production.

Within seven decades, about 70% of the fertile wetlands had been converted into agricultural fields to support the production of citrus, row crops, and beef cattle. Loss of wetland habitat due to floodplain encroachment practices (e.g., farming) greatly reduced floodplain storage and conveyance capacity in the river and severely altered the natural hydrologic and ecological regime of the marsh ecosystem. The impact of lost floodplain storage and conveyance capacity was especially acute after major storms in the 1920s and 1940s resulted in devastating floods in the central and southern parts of Florida. Thus, the need for a massive flood control project became important during the 1940s.

The history of modern public flood control projects in Florida formally began in 1948 when the U.S. Congress authorized the Central and Southern Florida Flood Control Project and the Florida Legislature created the Central and Southern Florida Flood Control District (CSFFCD) to act as the local sponsor for the federal flood control project. The original congressional act, which did not include areas within the USJRB, was amended in 1954 to include project works within the USJRB portion of the larger flood control project. In coordination with the CSFFCD, the U.S. Army Corps of Engineers (USACE) Jacksonville District prepared a project plan that was completed in 1957. A modified plan was adopted in 1962, and initial construction of the project began in 1966 (USACE 1991).

Under the 1962 plan, flood stages would be reduced in the upper reaches of the St. Johns River by diverting large amounts of water during major storm events from the St. Johns River to the Indian River Lagoon via the C-54 canal (Sebastian Canal). Upstream of C-54, flood stages would be attenuated by the detention and storage of surface water runoff in large upland reservoirs located west of the river valley. By 1969, the C-54 canal was fully operational and a major upland levee and reservoir system (L-73 and associated structures) was near completion.

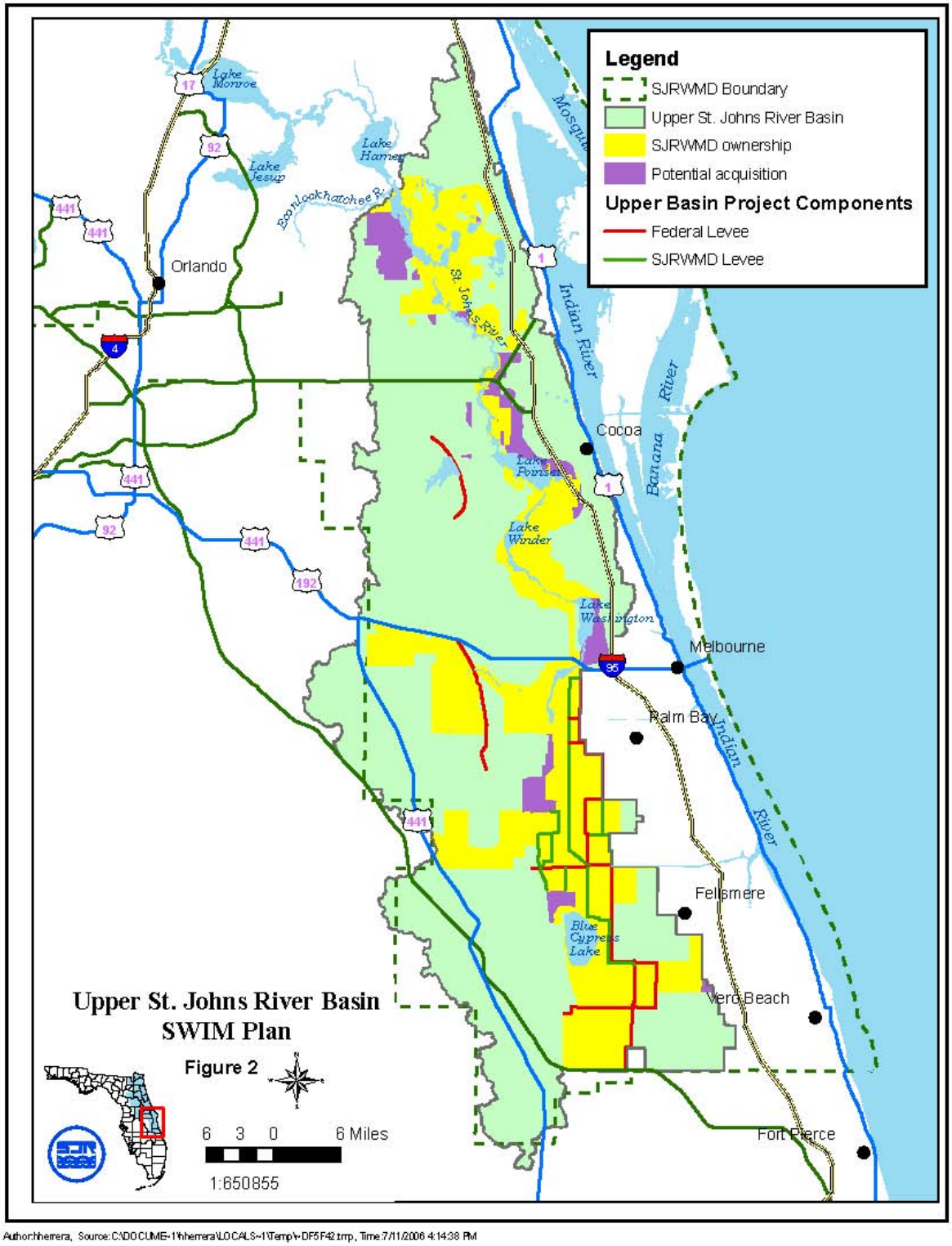
Passage of the federal National Environmental Policy Act of 1969 required that an Environmental Impact Statement (EIS) be prepared for federally funded water projects. In 1970, USACE began preparation of the required EIS for the USJRB Project. Early findings indicated potentially serious adverse environmental impacts, and in 1972 construction within the USJRB was halted pending completion of a more comprehensive EIS. The state of Florida determined that the original project design was unacceptable because of the potential for significant environmental degradation to the upper St. Johns River ecosystem, and in 1974 the state withdrew its formal sponsorship of the project.

In 1977, local sponsorship for the project was transferred from the CSFFCD to SJRWMD. SJRWMD has designed an innovative plan with USACE to revitalize the river's flow by restoring drained marshlands, plugging canals and building reservoirs.

A.2.3. Current Uses

The current USJRB Project is a large, multipurpose, public water project. The project design represents a “semistructural” approach to water management, which attempts to balance flood control and environmental goals. The project is semistructural because it relies less on artificial controls and more on the function of the natural floodplain to store floodwaters. Figure 2 shows the major canals and levees within the project area. While maintaining its primary flood control objectives, the USJRB Project also provides for habitat restoration and benefits for protecting water quality and agricultural water supply.

The project has the capacity to use more than 160,000 acres of existing or former floodplain marsh for stormwater storage. When not storing floodwaters, the project is managed to



restore and preserve historical wetland functions of the basin including flow augmentation to the St. Johns River during low flow periods. It contains a mix of headwater and floodplain marsh interspersed with shallow lakes and bordered by gently sloping upland areas. The Upper Basin is distinct in the range of habitats it supports and the connectivity of these

habitats over a large spatial and hydrologic gradient. It is currently one of the largest wetland restoration projects in the country.

The sheer scope of the Upper Basin project requires ongoing teamwork among USACE, SJRWMD and other state environmental agencies and interest groups. To meet the project's land requirements, the District has acquired real estate at fair market value. USACE performs the engineering design and manages construction of the project. Operation and maintenance of the Upper Basin lies with SJRWMD.

A.1.4. Conditions leading to the need for restoration and protection

By the early 1970s, 62 percent of the marsh had been drained for agricultural and flood control purposes. Canals were constructed to divert floodwaters from the basin to the Indian River Lagoon. Water elevations within the Basin were controlled through a network of privately-owned levees and structures. Most of the basin was bordered by levees that protected large tracts of land under use by agricultural interests. Water within these levees was in turn controlled by pump and/or gravity drainage structures.

Impacts included a loss of water storage areas, diminished water quality, excessive freshwater going into the Indian River Lagoon, and significant decreases in fish and wildlife populations. Channelization and drainage of the area caused declines in wading bird and waterfowl usage. Fish kills in the basin lakes increased in frequency and sport fish populations declined. Plant community shifts due to altered hydroperiods and increased nutrients were also observed, and the surface area of some lakes declined due to increased sedimentation (Miller et al. 1998).

A.2. Hydrology

Historically, rainfall entered the headwater marshes and moved downstream as sheetflow. Much of the marshland south of U.S. Highway 192 was drained for agriculture, and a large portion of floodwaters were diverted to the Indian River Lagoon. Drainage of the marshes altered their hydrology (FDEP 2003). The timing, magnitude, and duration of high and low flood events were altered, so that the marshes held less water for less time with greatly reduced dry season flows (Miller et al. 1998).

A well-defined river channel does not appear until 30 miles downstream above Lake Hell n' Blazes (Miller et al., 1998). Lakes Hell n' Blazes, Sawgrass, and Washington also have peat bottoms. From Lake Winder north to Lake Poinsett, the river becomes more channelized, with a firm, sandy bottom. North of Lake Poinsett, the river flows through a wide valley dotted by palmetto islands and marshes. The river meanders through a highly braided channel, exhibiting a wide range of fluctuations in water levels. Farther downstream in the area of Puzzle Lake, relict saline ground water contributes to stream flow. Salinity in the river can be as high as 10 to 11 parts per thousand (DeMort, 1991).

Major tributary streams are Taylor Creek, Jane Green Creek, Cox Creek, Wolf Creek, Blue Cypress Creek, and Fort Drum Creek. Drainage modifications were made in many of the

tributaries as part of earlier U.S. Army Corps of Engineers (USACOE) flood control plans. The L-73 Levee and several gated spillway structures were constructed, as part of the original 1962 project, along the western upland boundary of the St. Johns River. The purpose of the L-73 Levee was to create several connected upland reservoirs from tributary watersheds. When construction was halted in 1972 the levee had only been completed across Jane Green Creek and Taylor Creek to create the Jane Green Creek Detention Area and Taylor Creek Reservoir, but only the Taylor Creek Reservoir was operational (Sterling and Padera, 1998).

The USJRB Project now includes about 100 miles of levees, 8 large-capacity gated spillway structures, and 18 smaller water control structures. The project area is designed to accommodate the drainage of surface waters from over half of the 2,000-mi^2 watershed of the upper St. Johns River. The major hydrologic features include four large Marsh Conservation Areas (MCAs) and 16,000 acres of Water Management Areas (WMAs).

The four large MCAs, composed of existing and restored marshes, are designed to provide temporary storage of floodwaters generated from adjacent upland areas. Storing water in these areas reduces the need to discharge potentially damage quantities of freshwater to the Indian River Lagoon.

The WMAs are located on former agricultural lands within the existing river valley. Because of significant soil subsidence on these lands the WMAs are deep water reservoirs operated to provide long-term irrigation water supply and temporary flood storage of agricultural pump and gravity discharges. The WMAs are intended to improve water quality conditions by separating agricultural water from better quality water in the St Johns River marsh.

A.2.1. Water Quality

Under Section 303(d) of the Clean Water Act, each state must prepare a list of waters that are not of sufficient quality to meet their designated uses and establish Total Maximum Daily Loads (TMDLs) for those waters on a prioritized schedule. These lists are required to be submitted to EPA for review and approval every April of even-numbered years, that is, every 2 years. It is those water bodies in the USJRB that appear on the 303(d) list that will automatically receive the highest priority for establishment of TMDLs (total maximum daily loads) for restoration and protection. TMDLs establish the maximum amount of pollutants a water body can assimilate without exceeding water quality standards. The Florida Watershed Restoration Act, Chapter 99-223, Laws of Florida, addresses processes for refining the list and for calculating and allocating TMDLs. According to EPA guidelines, waters expected to attain and maintain applicable water quality standards through other Federal, State, or Local requirements do not need to be included on the 303(d) list. (www.dep.state.fl.us/water, Eric Livingston, FDEP, personal communication). Further details on the TMDL process in the USJRB are provided in Section D.

In 1998, EPA approved Florida's 1998 303(d) Impaired Waters List, which was based on existing, readily available data or best professional judgment However in 1999, the Florida Watershed Restoration Act, Section 403.067, F.S. was enacted by the Florida Legislature.

This law requires FDEP to adopt by rule, a scientific methodology for analyzing environmental data and determining whether a water body is impaired or healthy. All water bodies on the 1998 303(d) List are required to be either 1) verified as impaired, 2) de-listed as they are meeting water quality standards, or 3) placed on a planning list if insufficient data exists.

In September 2003, FDEP published a USJRB status report that provided a *Planning List*, or preliminary identification, of potentially impaired waterbodies within Basin. This year (2006) FDEP has completed the USJRB Assessment Report that presents the results of additional data gathered during Phase 2 of the cycle. The report contains a *Verified List* of impaired waters that was adopted by Secretarial Order on June 17, 2005, and was submitted to the U.S. Environmental Protection Agency (EPA) in the summer of 2005. TMDLs must be developed and implemented for these waters, unless the impairment is documented to be a naturally occurring condition that cannot be abated by a TMDL or unless a management plan already in place is expected to correct the problem. The *Verified List* also constitutes the Group 3 basin-specific 303(d) list of impaired waters, so called because it is required under Section 303(d) of the Clean Water Act.

FDEP's assessment shows that nine waterbodies or waterbody segments in the Upper St. Johns River Basin are impaired and require the development of TMDLs. Table 1 lists by waterbody ID(WBID), the listed impaired waterbody, the primary pollutants of concern and the proposed TMDL development year. TMDLs for three of the waterbody segments; 2893L, 2893Q, and 2893X, have already been developed by FDEP. Other potential impaired waterbodies in the planning unit include Tosohatchee and Jim Creek. Both are potentially impaired because of low DO levels. Jim Creek is additionally potentially impaired because of failed biological assessments.

Table 1. FDEP 303(d) Verified Listed Waterbodies for the Upper St. Johns River Basin

WBID	Water Body Name	Priority	Parameter(s)	TMDL Development" Year
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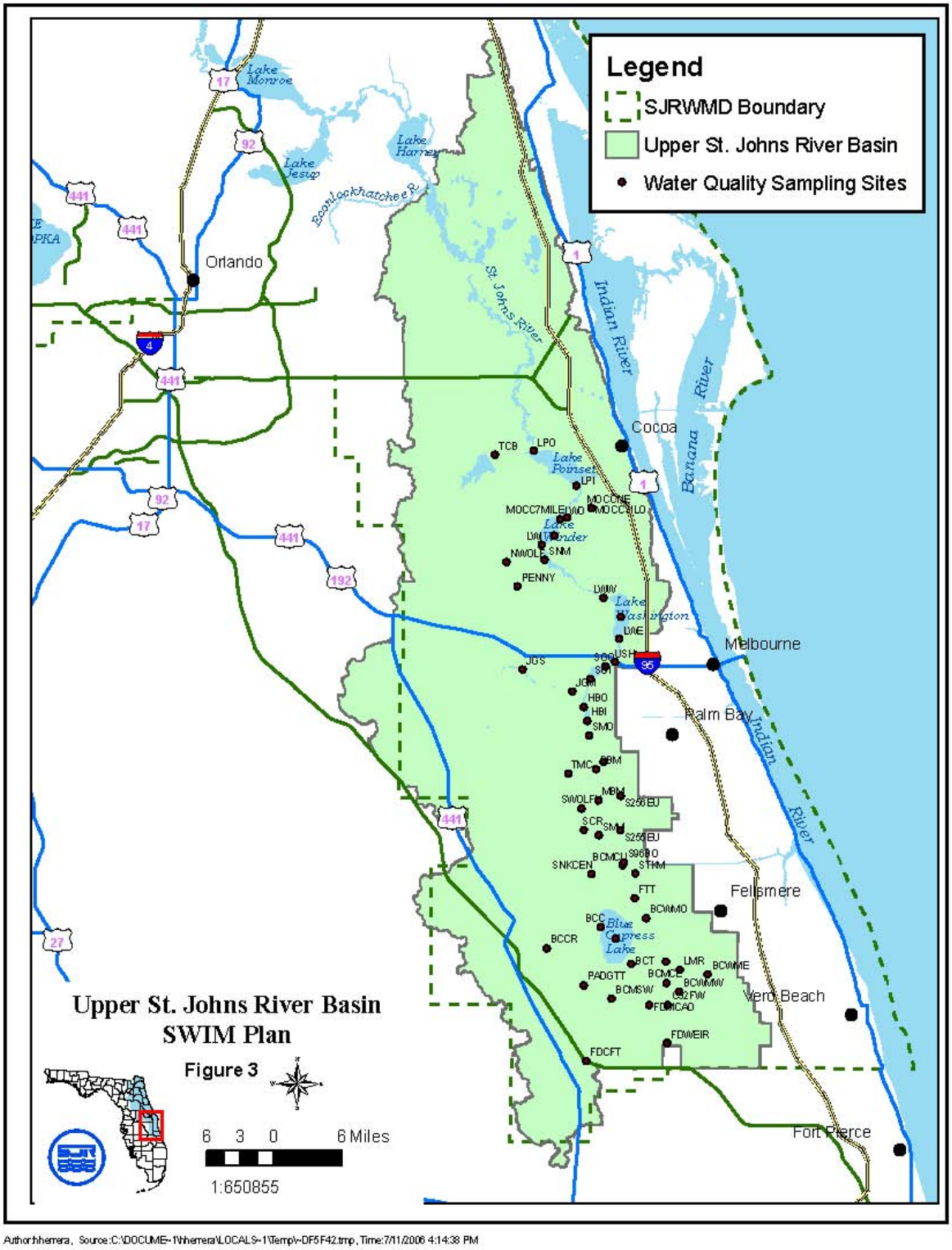
28931	Sawgrass Lake	Medium, Low	DO, Mercury (Fish)	2009, 2011(Mercury)
28935	St. Johns River above Puzzle Lake	Medium	DO	2009

SJRWMD maintains a sampling program in the USJRB. Figure 3 shows the monitoring locations.



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A.3. Land Acquisition

The acquisition of environmentally sensitive land to preserve and protect water resources is an important ongoing initiative of SJRWMD. The Division of Land Acquisition uses Florida Forever funds, the primary state funding source for land acquisition, for water resource development and restoration projects and for acquisition of land for non-structural flood protection and conservation. SJRWMD also uses ad valorem and mitigation funds for acquisition.

SJRWMD has some form of interest in approximately 640,000 acres of land (through ownership, management, or conservation easement rights). More than 260,000 acres of the SJRWMD lands occur within the USJRB (Hall et al. 2005), and further acquisitions are planned.

A.4. Water Supply

The Upper St. Johns River from SR 60 to Lake Washington has a surface water quality designation of Class I (potable water supply) in recognition of the importance of Lake Washington as a drinking water source for Melbourne. Downstream of Lake Washington the remainder of the Upper Basin has a designation of Class III. The water supply potential of areas further upstream, such as the Fellsmere Water Management Area, is being considered. Use of these areas for water supply may also require that they meet Class I standards.

The Taylor Creek Reservoir is located in Orange and Osceola counties near the St. Johns River and State Road 520. The reservoir was designed to provide flood control and water supply in the upper St. Johns River drainage basin. The reservoir receives drainage inflow from about 60 square miles of watershed. Water from the reservoir then flows into Taylor Creek, which empties into the St. Johns River about 4.3 miles downstream.
The city of Cocoa began using the reservoir for water supply in 1999, withdrawing approximately 10 million gallons per day (mgd) from the reservoir to supplement its groundwater sources.

SJRWMD is investigating ways to optimize the Upper St. Johns River Basin Project in such a way that will maintain flood control and environmental restoration goals and will maximize the amount of water available from the St. Johns River for the Taylor Creek project.

Although water supply is generally outside of the scope of the USJRB SWIM Plan, there are concerns about the cumulative impacts of groundwater and surface water withdrawals on wetland area, as well as the maintenance of water quality for water supply in Lake Washington. In the event of water supply issues in the USJRB, the USJRB program manager will coordinate with SJRWMD's Department of Resource Management, which is responsible for consumptive use permitting and water use regulation.

A.5. Completed or Pending Upper St. Johns River Basin Studies

A variety of studies and plans have been done that address water quality, hydrology, and ecosystems in the USJRB. A list of recent publications on the St. Johns River that are relevant to the USJRB, are included as an addendum to the Bibliography.

A.6. Current Restoration or Protection Projects

SJRWMD has restoration and protection projects currently underway that will benefit the USJRB. These projects include:

- Adaptive Management—This project will evaluate the hydrological and biological impacts of project operation and maintenance in order to assess the best management approaches to achieve the program goals.
- Banjo Groves Restoration—This project will restore the complex mosaic pattern of prior converted wetlands (323 acres) by removing citrus trees, filling internal ditches and degrading the perimeter levee in order to achieve hydrologic reconnection.
- Fellsmere Water Management Area – This project, located on the eastern side of the basin adjacent to the existing St. Johns Water Management Area, will construct a water management area on a site currently used for pasture, citrus, sod and row crop. This water management area will serve to improve water quality, reduce freshwater discharges to the Indian River Lagoon, provide flow augmentation during low flow periods to downstream reaches of the St. Johns River, water supply and restore wetland habitat.

SECTION B.
LAND USES AND REGULATED ACTIVITIES WITHIN THE USJRB

B.1. Land Use and Land Cover

The USJRB Project area is almost wholly contained within Indian River and Brevard counties. The evaluation of the land use and land cover for the USJRB is thus confined to Indian River and Brevard counties.

Based on 1996 land use data from Indian River County (Table 2) and 2005 data from Brevard County (Table 3), the predominant land uses in the USJRB outside of the project area are agriculture, comprising 56% and 32% of the land area, respectively. Urban and suburban development, which includes residential, commercial and industrial land uses, comprises 22% and 13% of the land areas in the two counties, respectively. Indian River County has 22% of the land in conservation and Brevard County has 39% of the land in conservation.

Table 2. Major Categories of Land Use and Land Cover in Indian River County for 1996 (Indian River County Comprehensive Plan)

	(1996)	
Land Use/Land Cover Category	Acreage	%
Urban and Suburban	71,320	21
Agriculture	182,454	55
Recreational and open land	3,084	1
Public Conservation	67,229	20
Public Facilities	4,946	.2
Vacant or Other	3,050	.1
Total Unincorporated	332,083	100%

Table 3. Major Categories of Land Use and Land Cover in Brevard County for 2005 (Brevard County Comprehensive Plan)

	(2005)	
Land Use/Land Cover Category	Acreage	%
Urban and Suburban	50,180	12
Agriculture	134,163	32
Recreational and open land	7,434	.2
Public Conservation	164,241	38
Public Facilities	5,068	.1
Vacant or Other	66,126	15
Total Unincorporated	427,212	100%

Source: Brevard County Property Appraiser Data, Brevard County Planning and Zoning Office, data reported in the 2006 Brevard County Evaluation and Appraisal Report

B.2. Point Sources of Pollution

In October 2000, the U.S. Environmental Protection Agency (EPA) authorized FDEP to implement the National Pollutant Discharge Elimination System (NPDES) stormwater permitting program in the State of Florida (with the exception of Indian country lands). The NPDES stormwater program regulates point source discharges of stormwater from certain municipal and industrial sources, including certain construction activities.

Municipal Separate Storm Sewer Systems (MS4)
Designated large and medium municipal separate storm sewer systems, or MS4s, are a publicly-owned conveyance or system of conveyances (i.e., ditches, curbs, catch basins, underground pipes) that are designed for the discharge of stormwater to surface waters of the state. An MS4 can drain, and be operated by, municipalities, counties, drainage districts, colleges, military bases, or prisons, to name a few examples. These facilities were previously required by EPA to obtain NPDES permits prior to delegation to the state. In the state of Florida, Phase II permitting was completed in 2003, and the permitted program should be implemented by 2008. DEP's authority to administer the NPDES program is set forth in Section 403.0885, Florida Statutes (*F.S.*).

> Brevard and Indian River counties are listed on the the FDEP web site at http://www.dep.state.fl.us/water/stormwater/npdes/docs/Phase_II_MS4_list.pdf as having NPDES permits for their MS4s as of January 2004. The permit number for Brevard County is FLR04E052. The permit number for Indian River County is FLR04E68. These permits conditionally authorize Brevard and Indian River counties to discharge stormwater to “the Waters of the United States.” Additionally, the County is required to inspect and monitor industrial and construction activities for permit compliance.
>
> Under the NPDES General Permit for Storm Water Discharges Associated with Industrial and Construction Activities, EPA requires the development and implementation of a Storm Water Pollution Prevention Plan (SWP3) designed to reduce pollution at the source.

Domestic and Industrial Wastewater Facilities
Within Brevard County, there are currently 26 wastewater facilities permitted by the Florida Department of Environmental Protection including domestic wastewater treatment facilities and industrial wastewater facilities (http://www.dep.state.fl.us/water/wastewater). The wastewater facilities included 11 domestic wastewater facilities, 4 industrial wastewater facilities and 11 concrete batch plants. Within Indian River County there are 11 wastewater generating facilities, including 2 domestic wastewater facilities, 4 industrial wastewater facilities, and 5 concrete batch plants.

The domestic wastewater treatment plants generate secondarily treated wastewater that may be permitted to be disposed of in many ways including: surface water discharge; deep well injection; land application; re-use (treated to a higher standard); intermittent surface water discharge; or a combination of these. Intermittent surface water discharge generally means

the wastewater is contained within an isolated pond and only reaches surface waters of the state through ground water seepage and transmission, or during a significant storm event. Other types of discharge that occur to a lesser extent are: surface water discharge, land application, deep well injection, and re-use.

B.3. Non-point Sources of Pollution

Non-point sources of pollution in the Basin, which can degrade ground and surface water quality, include stormwater runoff or leaching of pollutants into groundwater fromurban/suburban and agricultural land uses, atmospheric deposition, and septic tanks. Septic tanks, or Onsite Sewage Treatment and Disposal Systems (OSTDS) are prevalent in some areas of the Basin and are considered a potential 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. From the period 2000-2005 the Florida Department of Health reported 4644 OSTDS repair permits for Brevard, and Indian River counties (Table 4) and 9,093 new installation permits (Table 5).

Table 4. Septic Tank Repairs for the period 2000-2005

COUNTY	2000-01	2001-02	2002-03	2003-04	2004-05	All Years
Brevard	427	407	131	275	234	1474
Indian River	711	606	707	667	479	3170
TOTAL	1138	1013	838	942	713	4644

Source: (http://www.doh.state.fl.us/environment/ostds/statistics/repairs.htm)

Table 5. New Septic Tank Installations for the period 2000-2005

COUNTY	2000-01	2001-02	2002-03	2003-04	2004-05	All Years
Brevard	1455	1774	142	1515	1715	5241
Indian River	609	634	725	944	940	3852
TOTAL	2064	2408	867	2459	2655	9093

Source: (http://www.doh.state.fl.us/environment/ostds/statistics/NewInstallations.htm).

SECTION C.
GOALS, INITIATIVES, AND STRATEGIES FOR RESTORATION OR PROTECTION

The Water Resource Implementation Rule (Ch 62-40, F.A.C.) calls for SJRWMD to implement protection measures as appropriate to enhance or preserve surface water resources.

Specifically, 62-40.425 *F.A.C.* Watershed Management states:

(1) A comprehensive watershed approach provides an important tool for managing the cumulative impacts of human activities. Where possible, the Department and Districts shall promote a watershed management approach for addressing water quality, water supply, natural systems, and floodplain management and flood protection issues, and shall encourage the development of comprehensive watershed management plans.

(2) It shall be a goal of watershed management programs to protect, preserve and restore the quality, quantity, and environmental values of surface and ground water resources; to prevent existing environmental, water quantity, and water quality problems from becoming worse; to reduce existing flooding problems; improve existing water quality; promote and protect the availability of sufficient water for all existing and future reasonable-beneficial uses and natural systems, and preserve or restore natural systems.

(3) As part of SWIM plans or other watershed management plans, programs, or rules, the Department, water management districts, Department of Agriculture and Consumer Services, and local governments are encouraged to implement protection measures as appropriate to enhance or preserve surface water resources. Protection measures shall be based on scientific evaluations of targeted surface waters and the need for enhancement or preservation of these surface water resources. Protection measures shall include a combination of nonstructural pollution prevention best management practices and structural best management practices.

Specific Authority 373.026(7), 373.036(1)(d), 373.043, 373.171 FS. Law Implemented 373.023, 373.026, 373.036(1)(d), 373.171, 373.1961, 373.223, 373.418, 373.451, 373.453, 403.064, 403.067, 403.0891 FS. History–New 5-7-05.

Surface water management goals of SJRWMD that apply to the Upper St. Johns River Basin SWIM plan include the following:

- To preserve natural and functional components of the ecosystem while restoring, where feasible, those conditions and components of the degraded portions of the system;
- To preserve or restore, the quantity and quality of water necessary to support thriving biological communities, containing appropriate diversities of species native to the Upper St. Johns River Basin;

The mission of the USJRB Plan is thus to preserve and protect the ecosystem and the contributing drainage area consistent with the goals of the St. Johns River Water

Management District. This mission will be accomplished through the use of a prioritized, objective, sustainable, ecosystem or watershed approach with periodic public review and input. Through prioritization, projects will be chosen which address resources 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 these systems. An ecosystem-watershed approach will not be limited to investigations in the river and adjacent wetlands. Rather it will take into consideration the cause and effects of the problem within its land-based context across the drainage basin and establish successful applications for enhancement or restoration.

The USJRB SWIM plan is organized around a system of goals, initiatives, strategies and action steps. In this system, the *Goals* are broad-based and identify the objectives of SJRWMD, as stated above. *Initiatives* are general categories of problem areas developed by SJRWMD staff. *Strategies* are detailed descriptions of the underlying work proposed to achieve results. They identify the approaches and methods that will be used to implement the initiatives. *Action Steps* represent specific activities under each strategy suggested to reach project delivery. The *Action Steps* briefly describe the research and feasibility studies and associated tasks to reach the targeted *Strategy* as required the Florida Administrative Code. Each *Action Step* includes a schedule for completion and an estimate of the funding requirements needed to accomplish the *Action Step*. These *Action Steps*, as well as the *Strategie*s and *Initiatives* referenced above, are not mutually exclusive, and may be undertaken concurrently, and/or sequentially.

The consensus of the USJRB SWIM Plan Team is that the plan should focus on two primary initiatives:

Initiative 1 – Water quality

This initiative consists of two closely related strategies – monitoring water quality and plankton communities, and projects to improve water quality to meet designated uses and project goals.

Initiative 2 – Resource Assessment, Protection and Restoration

This initiative consists of strategies to gather and assess data on habitat and species needed to develop a comprehensive plan for monitoring biological conditions in the basin to ensure achieving the overall biological goal of the Upper Basin Program which is the preservation of native biodiversity and restoration of native levels of productivity of economically important species.

In its mandate to address broad ecosystem needs, the USJRB SWIM Plan attempts to accomplish comprehensive protection strategies within the USJRB and introduce sustainable restoration strategies for resources or resource areas that are proven to be degraded. The intent is to also provide cooperative funding for projects addressing long-term waterbody protection and restoration.

C.1. Water Quality Initiative

C.1.1. Strategy: Monitor water quality and plankton communities and assess trends.

USJRB and its tributaries have been extensively monitored for water quality for the last 35 years and the network of sampling stations is assessed annually to ensure the data are useful for achieving established goals. The existing water quality monitoring program consists of three types of stations. Data from ambient monitoring stations is used to generally characterize water quality in the USJRB, and identify water quality problems and trends; loading stations provide information on water quality coming into the river from tributaries. Operational sampling is done in areas such as restoration sites where the data are used to make operational and management decisions about the sites.

Sampling and analysis of planktonic communities are an important adjunct to water quality monitoring in the USJRB. Plankton are the base of the aquatic food chain and the composition of plankton communities can be affected by water quality. Changes in plankton communities due to poor water quality can have effects throughout the aquatic ecosystem.

The purpose of this strategy is to provide timely and accurate data on water quality and plankton communities throughout the basin. These data will be used to assess trends, identify problems, and determine if project goals are being met.

C.1.1.1. Action Steps:

1. Monitoring. A network of water and plankton sampling stations has been established throughout the basin. This network, together with the analytes tested for, and the sampling frequency will be reviewed to ensure the continuing provision of information useful for assessing water quality relative to project goals.

2. Improve the existing water quality models and investigate additional water quality models. Water quality models are needed to test different proposals to improve water quality, predict the effect of project operation and evaluate the impact of land use changes in the basin. Because of the complexity of water quality, and the variety of uses for these models, several different models will be developed. Some will focus on particular water quality issues, such as dissolved oxygen levels, and others will be more general. The USJRB Framework Water Quality Model was completed in 2005.

3. Complete a basin-wide analysis of water quality trends. Problems areas will be identified focused on attainment of established TMDLs and PLRGs.

C.1.2. Strategy: Improvement and Maintenance of Surface Waters

Many areas in the USJRB require water quality protection and/or improvement. Some areas have been designated as impaired by the FDEP and TMDLs have been established, and a concentration goal (PLRG) for phosphorous which will meet the TMDL has been accepted. Other problem areas will be identified as described in C.1.1.1.3. Improvement projects will

be proposed to avoid the application of the TMDL process to these areas. Pollution sources will be reviewed and prioritized from a basin-wide perspective to identify areas for restoration to improve water quality.

Maintenance of the many drainage canals and tributaries in the USJRB is generally focused more on flood protection than on water quality. Awareness of BMPs and carefully regulated maintenance schedules and procedures are simple means for municipalities to reduce sediment transport, and minimize water quality impacts to receiving water bodies.

C.1.2.1. Action Steps:

1. Work with FDEP in the development of a Basin Management Action Plan (BMAP) to meet established TMDLs. FDEP will take the lead in organizing stakeholders in the basin and developing a BMAP. SJRWMD is an important stakeholder in this basin because of the large amount of District-owned land. Additionally SJRWMD will serve as an important source of technical data for the development of this plan. The BMAP process will help identify if drainage canals are creating water quality problems, and where appropriate, encourage municipalities to use recognized BMPs to reduce sediment transport.

2. Collect and assess information on dissolved oxygen (DO) in the basin to determine if impairments exist or if a Site Specific Alternative Criterion is appropriate. Low DO levels have been identified as an impairment by FDEP. However , DO may be naturally low in this area during some seasons. A program to collect long-term DO measurements together with related hydrologic, chemical and biologic data is on-going in SJRWMD. These data will help determine whether the low DO is a natural condition and, if so, what levels are needed to support indigenous aquatic species.

3. Construct and operate Fellsmere Water Management Area so as to meet the established concentration goal for phosphorous in the downstream lakes. In addition to providing agricultural water supply, and restoring habitat, this project will provide water quality treatment to agricultural discharges. Without this project, modeling suggests that the concentration goal for phosphorus will not be met consistently in the downstream lakes.

4. Collect and assess data on sediment nutrient levels. Sediments are the major source of nutrients to marsh plants, and one of the principal drivers of vegetation change. A basin-wide “snapshot” of sediment nutrient levels can be used to help prioritize water quality problem areas and in the development of solutions. Additionally these data can be used to predict the path of recovery as nutrients in the water column are decreased.

5. Construct a berm along the C-52 in Blue Cypress Water Management Area West in order to improve water quality and protect habitat. The degradation of water quality in the C-52 Canal and the consequent spread of *Typha* (cat-tails) into the adjacent

Ansin Tract were recently documented. The construction of a berm along the east side of the C-52 will help keep the nutrient rich water confined to the canal.

6. Prioritize problem areas identified in C.1.2 and develop projects to improve water quality.

7. Operate and manage Sawgrass Lake Water Management Area (SLWMA) to reduce phosphorus and meet TDMLs in downstream lakes. Sawgrass Water Management Area is a treatment wetland constructed to treat discharge from the C-1 Canal which is being re-diverted to the Upper Basin by the C-1 Rediversion Project. In order to ensure that water quality in the USJRB is not degraded by this re-diversion, hydrology and vegetation in SLWMA will be managed to maximize phosphorus removal, and water quality will be monitored.

C.2. Habitat Assessment, Protection and Restoration Initiative

C.2.1 Strategy: Hydrologic monitoring.

The purpose of this strategy is to provide timely and accurate information on hydrologic conditions throughout the basin. These data are used in an adaptive management framework to make management decisions. These data are also used to assess whether hydrologic conditions meet the established Environmental Hydrologic Criteria (Miller, et al. 2003) which address long-term hydrologic conditions necessary to meet project goals.

C.2.1.1. Action Steps:

1. Review hydrologic data collection network to identify any data gaps. Although an extensive network of hydrologic monitoring stations already exists in the basin, it is generally focused on water control structures. Additional stations may be needed, particularly in areas where projects are proposed to change hydrologic conditions in order to meet environmental hydrologic criteria.

2. Assess project hydrology to determine how well the environmental hydrologic criteria are being met. The criteria are long term averages; however analyses of shorter term data sets are valuable in assessing whether there are any major problems. Several project areas, as discussed below, are known not to meet established criteria. This assessment will review the remaining project areas and result in identification and prioritization of problem areas.

3. Construct the Fort Drum hydrologic improvements and monitor hydrology to determine if environmental hydrologic criteria are being met. This project area has not drained as designed and for over ten years has been subjected to high stable water levels. In order to restore and preserve the complex mosaic of habitats on this site, it is necessary to solve these drainage problems. A first step is the creation and maintenance of two ditches. Once these ditches have been constructed, on-going monitoring will be done to assess whether hydrologic goals have been achieved.

4. Initiate project to decrease hydroperiods in Jane Green Swamp (Bull Creek Wildlife Management Area). Monitor hydrology to determine if area is meeting environmental hydrologic criteria. Water levels in Jane Green Swamp have been excessively high due to the high sill elevation of the S-161 structure. The US Army Corps of Engineers, who constructed the structure, has designed a modification to the structure to lower the control elevation. Until this modification can be constructed, SJRWMD will install a pump and operate it to decrease the hydroperiods at lower elevations. Additionally, SJRWMD will engage in biological monitoring to investigate whether there is regeneration of hardwood swamp tree species under the new hydrological conditions.

5. Construct hydrologic improvements in the St. Johns Marsh Conservation Area (SJMCA). Hydrologic modeling has shown that SJMCA is likely to suffer from overdrainage once the USACE project is completed. In order to avoid this problem, plugs will be constructed in the major canals which traverse this marsh area. Hydrodynamic modeling will be conducted to determine the appropriate design and location for these plugs.

C.2.2. Strategy: Revise the existing Hydrological Simulation Program Fortran (HSPF) hydrologic models, which can predict water levels for current and future basin conditions based on the historical rainfall data.

Hydrologic modeling is a key to assessing project operation, developing operation schedules to meet environmental goals, and designing projects to improve water quality.

C.2.2.1. Action Steps:

1. Revise the upper basin HSPF hydrologic model. The framework model is completed but some work remains in incorporating flows from different project areas, and from outside District-owned land.

2. Using modeled predictions, assess how well each project area will meet Environmental Hydrologic Criteria under the existing flood control regulation schedule. Where criteria are not met, Zone B or low flow structure operation schedules will be developed.

C.2.3. Strategy: Assess biological resources of the basin and initiate monitoring to track changes.

The purpose of this strategy is to develop and initiate a system to monitor a few key indicators of the biological health of the Upper Basin. These indicators are termed biological metrics and are groups of species, such as wading birds, which indicate by their number and composition a biologically diverse and healthy ecosystem. Changes in a metric, such as a decline in number or diversity of wading birds, suggest some problem in the ecosystem. These metrics will be the focus of the monitoring efforts. Data from the monitoring will be

used to determine if the biological goal of the project to protect biological diversity is being met.

C.2.3.1. Action Steps:

1. Complete development of a biological database which will provide access and organization to the diverse biological data which has been and will be collected in the Upper Basin. Once the database is developed and tested, existing biological data will be prepared and loaded.

2. Collect and analyze data on wading bird use of the Upper St. Johns River Basin. Wading birds are an important indicator of the health of the wetland ecosystem. Regular censuses of bird number, foraging patterns and nesting are used to monitor project success.

3. Complete vegetation mapping and spatial analyses of habitats in District-owned lands in the Upper Basin. Because of the large spatial scale, vegetation and habitat changes are best tracked through mapping from aerial photographs. This mapping will occur on a regular basis. Spatial analysis techniques will be used to identify and evaluate the changes which have occurred.

4. Initiate data collection and analyses of remaining biological metrics. Additional metrics, in addition to wading birds and plant communities, are needed to assess project success and identify potential problems. These metrics have been identified (Hall, 2004), now, data collection and analysis must be initiated.

5. Develop scientific information necessary to provide recommendations on leasing SJRWMD lands for grazing. Leasing appropriate SJRWMD land for grazing is an established land management strategy in the Upper Basin. However the determination of which lands are appropriate for grazing, and what sorts of environmental changes might be expected from the practice are not well-known. This action step will develop the information needed to make wise resource management decisions concerning this practice.

6. Review fire records for the basin and assess the role of the prescribed fire program in achieving biological goals. There has been an active prescribed fire program on District land in the Upper Basin for more than 10 years. Although some small scale analyses have been done, there has been no basin-wide assessment of the effect of fire and fire management.

C.2.4. Strategy: Acquire and restore lands necessary for flood protection, water resource protection, and water supply.

A considerable amount of land in the Upper Basin has been acquired by SJRWMD, both to meet the needs of the USJRB project, and to achieve environmental goals. Further land acquisition is likely to be confined to opportunities that may arise.

C.2.4.1. Action Steps:

1. Complete the restoration of Banjo Groves.

2. In the area north of USACE project, acquire all available lands within the 10-year floodplain. Such acquisition will provide flood protection as well as restoration opportunities.

3. Continue to acquire lands throughout the basin, as opportunities arise, in order to meet project goals. Once opportunities for acquisition have been recognized, staff will assess restoration strategies that would be appropriate for the site.

SECTION D.
MEASURES NEEDED TO MANAGE AND MAINTAIN THE UPPER ST. JOHNS RIVER BASIN

This section is provided to describe and discuss the process by which SJRWMD will support FDEP in the establishment of TMDLs in the USJRB as required by Chapter 62-40.432 F.A.C.

D.1. Background

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.

USJRB "Listed" Water Bodies: Table 1 is provided to show the verified impaired waters in the USJRB Waters on the verified list occur on the state's 303(d) list and will be reported to EPA.

D.2. 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 Department: 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.
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.

D.3. The Role of SJRWMD 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, FDEP 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 primary strategy of SJRWMD 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 within the USJRB.

Existing Land use, GIS: GIS based tools will be used as appropriate to prioritize remedial treatment schedules.

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

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

SECTION E.
SCHEDULE & FUNDING REQUIREMENTS FOR RESTORATION AND PROTECTION

Using the "Strategies for Restoration or Protection" to accomplish the Initiatives and Strategies set forth in Section C, the following schedule and funding requirements have been devised.

In addition to this schedule, a program review will be undertaken every 3 years by SJRWMD to evaluate the outcome of ongoing and completed projects and Action Steps within each Initiative. The intent of this review is to identify opportunities to refine and enhance the SWIM Plan.

Water Quality Initiative (C.1.)

C.1.1. Strategy: Monitor water quality and plankton communities and assess trends.

Schedule & Funding (dollars shown in thousands)

Action Step	Time Frame (months)	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
1-Monitoring	60	$130	$130	$135	$140	140
2- Modify the existing water quality models and or develop additional water quality models.	48	$25	$25	$25	$25	
3-Complete a basin-wide analysis of water quality trends	24	$30	$30			
	Totals	$185	$185	$155	$165	$140

C.1.2. Strategy: Improvement and Maintenance of Surface Waters

Schedule & Funding (dollars shown in thousands)

Action Step	Time Frame (months)	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
1- Work with FDEP in the development of a Basin Management Action Plan (BMAP) to meet established TMDLs	24	$25	$25			
2- Collect and assess information on dissolved oxygen (DO) to determine if impairments exist or if a Site Specific Alternative Criteria is appropriate.	36	$90	$90	$60		
3- Construct and operate Fellsmere	60	$6,000	$6,000	$6,000	$3,750	$3,750

Water Management Area so as to meet the established concentration goal for phosphorous in the downstream lakes.						
4- Collect and assess data on sediment nutrient levels.	48	$20	$20	$20	$20	
5- Construct a berm along the C-52 in Blue Cypress Water Management Area West in order to improve water quality and protect habitat.	12	500				
6- Prioritize problem areas identified in C.1.2 and develop projects to improve water quality	60	$30	$30	$30	$30	$30
6- Operate and manage SLWMA to meet TMDLs in downstream lakes	60	$45	$45	$45	$45	$45
	Totals	$6,710	$6,210	$6,155	$3,845	$3,825

Habitat Assessment, Protection and Restoration Initiative (C.2.)

C.2.1 Strategy: Hydrologic monitoring

Schedule & Funding (dollars in thousands)

Action Step	Time Frame (months)	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
1- Review hydrologic data collection network to identify any data gaps.	6	$10				
2- Assess project hydrology to determine how well the environmental hydrologic criteria are being met	36	$30	$30	$30		
3- Initiate project to decrease hydroperiods in Jane Green Swamp (Bull Creek Wildlife Management Area).	48	$200	$200	$200	$200	
4-Construct the Fort Drum hydrologic improvements and monitor hydrology.	48	$20	$20	$20	$20	
5-Design and construct SJMCA hydrologic improvements	36			$60	$100	$100
	Totals	$260	$250	$310	$320	$100

C.2.2. Strategy: Develop hydrologic models which can accurately predict water levels during both high flow and low flow periods

Schedule & Funding (dollars in thousands)

Action Step	Time Frame (months)	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
1- Revise the upper basin hydrologic model	**48**	**25**	**25**	25	25	
2- Using modeled predictions, assess Environmental Hydrologic Criteria	36	30	30	30		
	Totals	$55	$55	$25	$25	

C.2.3. Strategy: Assess biological resources of the basin and initiate monitoring to track changes

Schedule & Funding (dollars in thousands)

Action Step	Time Frame (months)	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
1- Complete development of a biological database	60	$30	$30	$15	$15	$15
2- Collect and analyze data on wading bird use of Upper Basin habitats.	60	$60	$60	$65	$65	$70
3- Complete vegetation mapping and spatial analyses to monitor vegetation change in the basin	36		$140	$140	$90	
4- Initiate data collection and analyses of remaining biological metrics.	24			$60	$60	
5- Develop scientific information necessary to provide recommendations on leasing SJRWMD lands for grazing	24	$20	$30			
6- Review fire records for the basin and assess the role of the prescribed fire program in achieving biological goals	24	$15	$15			
	Totals	$125	$275	$280	$230	$85

C.2.4. Strategy: Acquire and restore lands necessary for flood protection, water resource protection and water supply

Schedule & Funding (dollars in thousands)

Action Step	Time Frame (months)	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
1- Complete the restoration of Banjo Groves	24	61.3	267.8			
2- In the area north of USACE project, acquire all available lands within the 10-year floodplain	60	TBD	TBD	TBD	TBD	TBD
3- Continue to acquire lands throughout the basin, as opportunities arise, in order to meet project goals	60	TBD	TBD	TBD	TBD	TBD
	Totals	$61.3	$267.8			

TBD = To be determined

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ADDENDUM

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Appendix I. Governmental Units & 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 USJRB SWIM planning area. Governmental units that have jurisdiction over the USJRB and its drainage basin include Federal and State agencies and SJRWMD. Table 4 lists all agencies and stakeholders.

Agencies and Stakeholders	
Federal	
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	Natural Resources Conservation Service
National Oceanic & Atmospheric Administration	
State	
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	
Regional	
SFWMD	Florida Inland Navigation District
North Central Florida Regional Planning Council	
Municipal	
Brevard County	Indian River County
Orange County	Seminole County
Unincorporated Communities	
None	
Stakeholders	
St Johns Water Control District	Fellsmere Water Control District
Delta Farms	SunAg, Inc.
Deseret Ranch	St. Johns River Alliance

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