

Florida's Integrated Water Resource Monitoring Network

Tier 1 Status Network at the St. Johns River Water Management District / Technical Fact Sheet SJ2000-FS2

Background

As part of its commitment to enhance its water quality monitoring efforts, the Florida Department of Environmental Protection (FDEP) formed a committee known as the Integrated Water Resource Monitoring (IWRM) Committee in late 1996. The committee was charged with developing strategies and techniques for implementing an integrated monitoring plan which would combine surface water, groundwater, and biological monitoring. The U.S. Environmental Protection Agency (EPA), FDEP, the water management districts (WMDs), local governments, and municipalities were all solicited for participation in the program. In 1997, the IWRM committee decided that the most efficient form of monitoring could be achieved by establishing a three-tiered monitoring network (Table 1).

Table 1. Florida's Integrated Water Resource Monitoring network

Tier Assessment Level	Monitoring Objectives
Tier 1. Status Monitoring	Statewide assessments 305b reporting Performance-based budgeting Regional and statewide issues
Tier 2. Basin Assessment	Basin assessments Management plans Total maximum daily loads (TMDLs) Regional issues Site-specific issues
Tier 3. Regulatory	Permits Segment-specific TMDLs Action plans

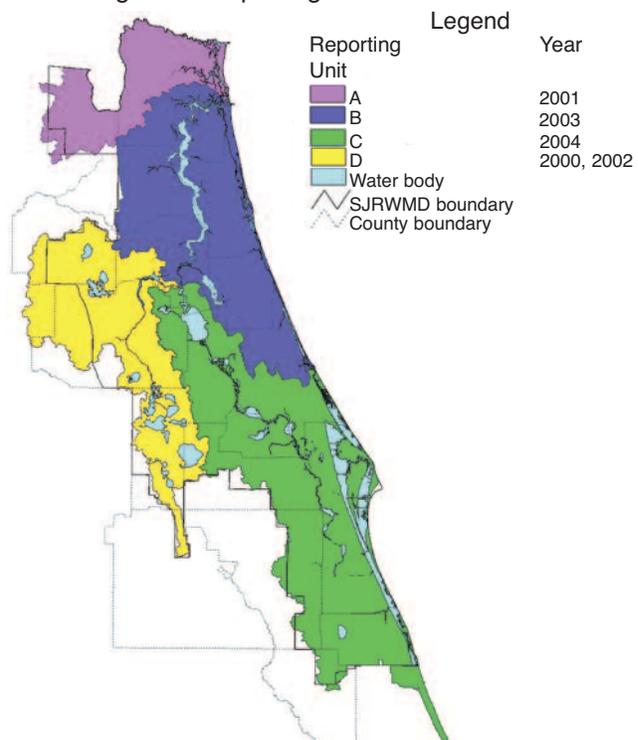
Although FDEP's Watershed Monitoring and Data Management Section serves as the primary program administrator, all WMDs in Florida are participating in some way. Whether collecting surface water samples or groundwater samples, the WMDs play a key role in ensuring the success of this new program. At the St. Johns River Water Management District (SJRWMD), the Environmental Assessment Section is responsible for surface water

sample collection, habitat assessment, and data analysis in support of tier 1 of the status network. FDEP and other agencies and programs will support tiers 2 and 3.

Design

The purpose of the status network is to characterize the status of Florida's water resources and determine if resources are changing over time. The status network is a random-sampling design based on statistical probability theory. The state was divided into 20 geographic reporting units, all of which will be sampled over a five-year period. Four reporting units are included in SJRWMD: the St. Marys and Nassau river basins (A); the lower St. Johns River and Northern Coastal basins (B); the middle and upper St. Johns River and Indian River Lagoon basins (C); and the Ocklawaha River Basin (D). In any given year, sampling will be conducted in one of the SJRWMD reporting units (Figure 1). Reporting unit D will be sampled twice during the five-year period.

Figure 1. Reporting units within SJRWMD



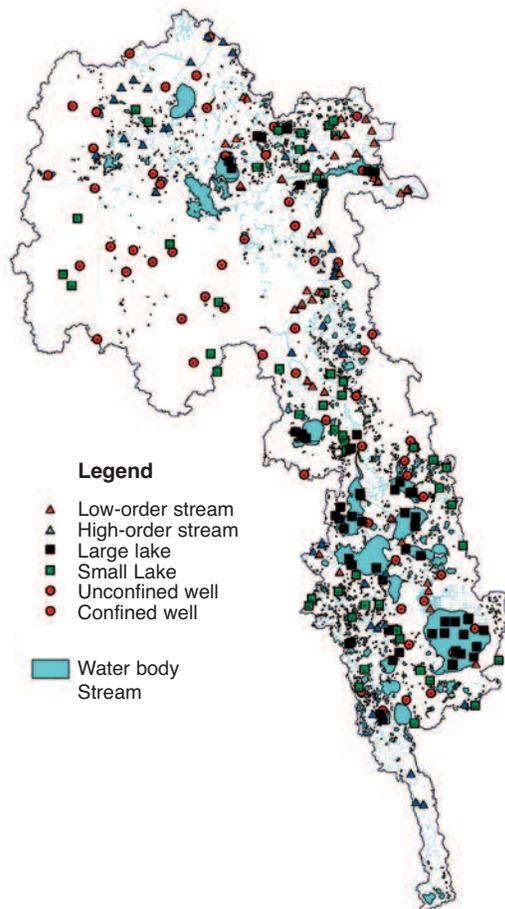
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Six resource categories are represented in this new design. These are confined aquifers, unconfined aquifers, high-order streams (Horton order greater than 4), low-order streams (Horton order 4 or less), small lakes (1-10 hectares) and large lakes (over 10 hectares). Thirty randomly selected sampling sites within each resource category will be sampled each year. Thus, there will be 180 samples annually within each reporting unit. SJRWMD will start sampling in reporting unit D, in 2000 (Figure 2).

Figure 2. Randomly selected sites in the Ocklawaha River Basin reporting unit D (Sampling years, 2000 and 2002)



Physical parameters sampled under the IWRM network include pH, conductance, salinity, dissolved oxygen, dissolved solids, Secchi depth, total suspended solids, total depth, sample depth, turbidity, color, alkalinity, and water temperature. Chemical parameters, including major ions and nutrients, and biological parameters are also sampled (Table 2). An evaluation of land surface elevation and local land use is part of the habitat assessment.

Samples will be analyzed at the FDEP Central Chemical and Biology Laboratories in Tallahassee. Results will be used to identify major threats to surface water and groundwater quality.

Table 2. Chemical and biological parameters sampled under the IWRM network

Chemical Parameters		Biological Parameters
Major Ions	Nutrients	
Calcium	Phosphorus	Chlorophyll <i>a</i>
Magnesium	Ortho-phosphate	Total coliform
Fluoride		Fecal coliform
Sodium	Organic carbon	Bio-recon
Potassium	Nitrate/nitrite	<i>E. coli</i>
Chloride	Ammonia	Enterococci
Sulfate	Kjeldahl nitrogen	Streams only: Habitat assessment Bio-recon

Network Reporting

Results from the tier 1 network sampling will mainly be reported for the 305b report. FDEP is required to produce the 305b report under the Clean Water Act. The 305b report is the primary vehicle for informing Congress and the public about water quality conditions in the state of Florida. The data may also be used for statewide assessments, performance-based budgeting, total maximum daily load (TMDL) establishment, ecosystem management needs, permitting, and the development and testing of biocriteria. Results can be used to address issues related to total stream miles, areas of support or nonsupport for designated use, and state water quality standards. For example, graphs and charts can be generated showing the cumulative frequency distribution for historical dissolved oxygen data (Figures 3 and 4).

Figure 3. Cumulative frequency distribution for dissolved oxygen in SJRWMD

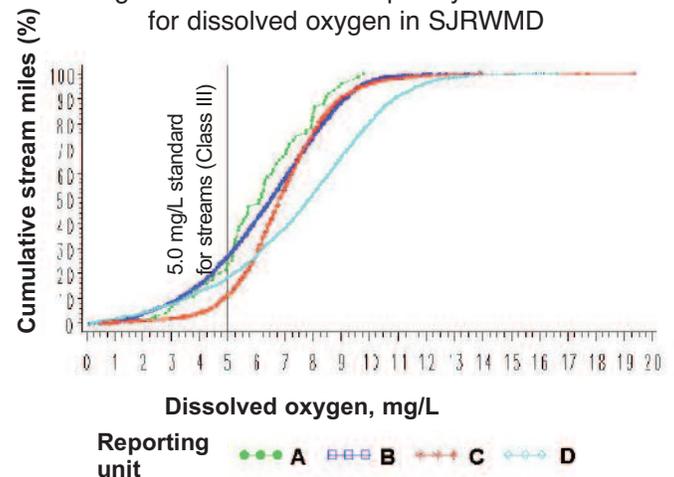
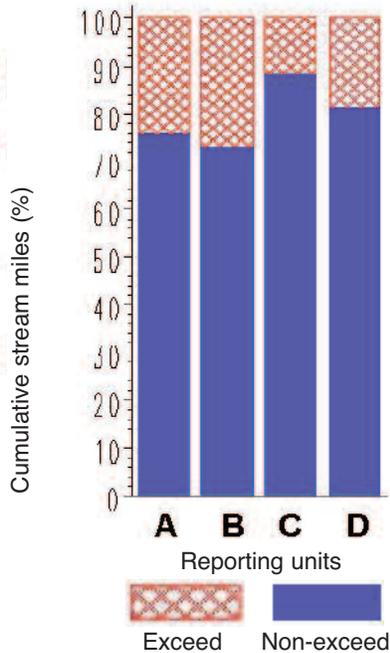


Figure 4. Percent of stream miles within SJRWMD that exceed the Class III standard for dissolved oxygen, by reporting unit



Approximately 25% of the stream miles in reporting unit B (Figure 3) have a median dissolved oxygen concentration that is less than 5 milligram per liter (mg/L), the state standard for the lowest acceptable concentration of dissolved oxygen. Approximately 10% of the stream miles in reporting unit C show median concentrations less than 5 mg/L. The other two reporting units have a percentage of stream miles between 10 and 20 percent. A related bar chart (Figure 4) can provide a good comparison of these exceedances in dissolved oxygen for the four different reporting units as well.

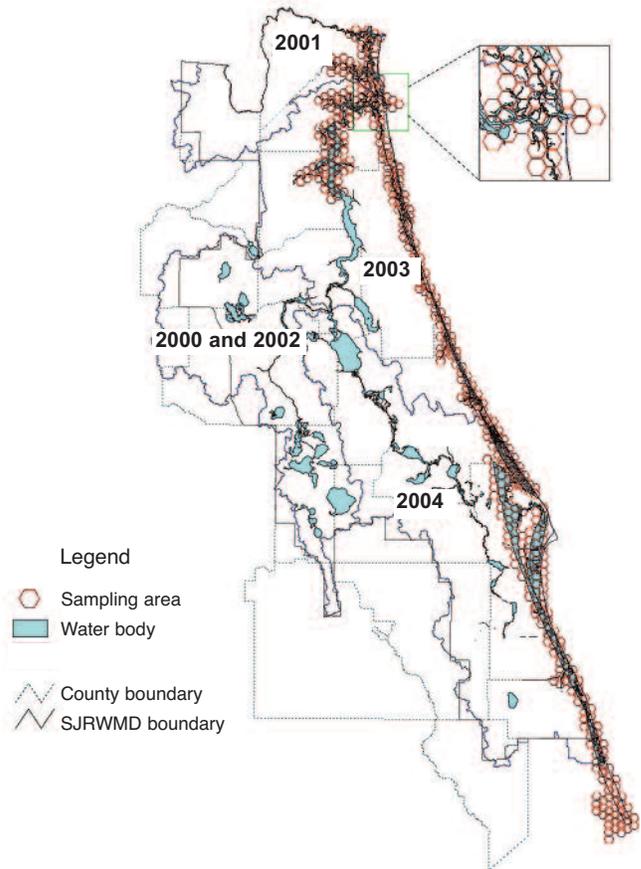
Tier 1 of the status network is designed to provide regional reference water quality. SJRWMD staff will write evaluative reports at the end of each year showing results for a specific reporting unit. A statewide assessment will be performed every five years. The use of the status network will allow larger geographic regions to be assessed for designated use. The network is appropriate for evaluation of all waters in the state which are not currently adequately covered.

Coordination with Florida's Inshore Marine Monitoring and Assessment Program

The Inshore Marine Monitoring and Assessment Program (IMAP) serves as the inshore marine equivalent of the IWRM network. IMAP is a collaborative project between EPA and the Florida Marine Research Institute (FMRI) designed to assess the ecological condition of Florida's inshore waters using a set of indicators comparable to

indicators of the status network. The IMAP sampling sites are randomly selected based on a hexagonal grid. Sampling schedules are coordinated so that the two programs are in the same regions during the same year (Figure 5). This integrated approach will allow the state of Florida to comprehensively assess the quality of its waters.

Figure 5. Scheduled sampling of IMAP regions by year and reporting unit



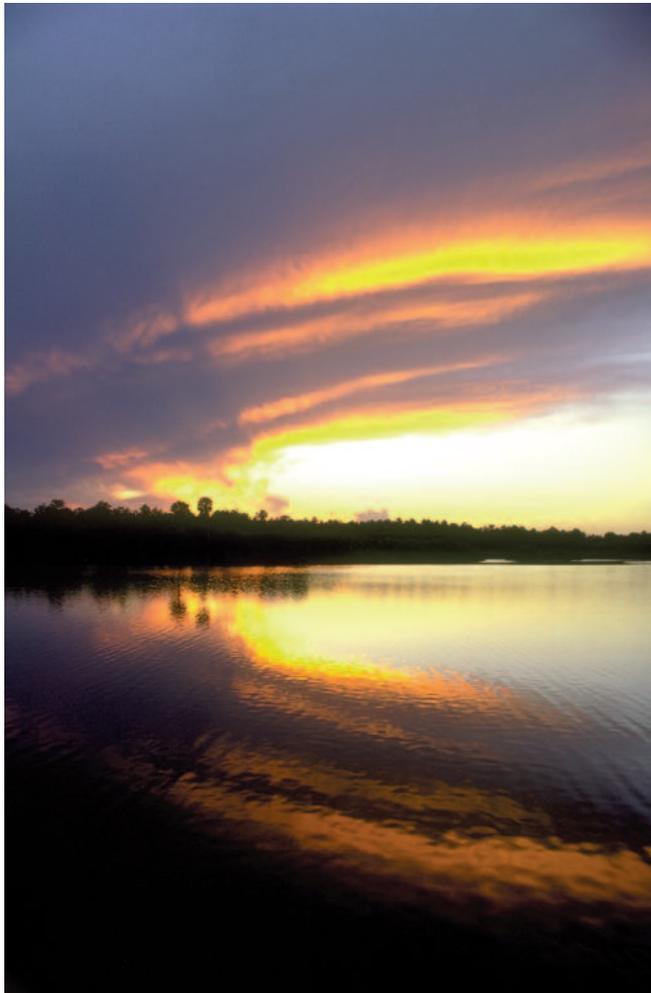
Cypress trees stand in the headwaters of the St. Johns River.

Sampling Schedule

FDEP, the WMDs, and a few counties began full-scale sampling of the status network in January 2000. FDEP will fund the network through 2004. It is anticipated that additional funding will be secured to continue the program on a long-term basis. The sampling schedule for all five years is available from FDEP's Watershed Monitoring and Data Management Section. FMRI will conduct inshore sampling funded by EPA through 2004.

The SJRWMD schedule for participation in the sampling is shown in Table 3. These time frames were chosen based on the likelihood of maximum seasonal impact on the resource during the year.

An SJRWMD employee collects a sample. SJRWMD staff follow rigid guidelines for sample collection and data quality assurance.



Sunrise over the middle basin of the St. Johns River in central Florida.

Table 3. SJRWMD sampling schedule under IWRM

Resource category	Month												
	J	F	M	A	M	J	J	A	S	O	N	D	
Confined aquifers	•	•	•										
Unconfined aquifers				•	•								
High-order streams					•	•							
Low-order streams								•	•				
Large lakes										•	•		
Small lakes						•	•						

To Learn More

For further information about the sampling schedule or program design, call:

SJRWMD Department of Water Resources
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