EcoSummary

Wakulla Springs

8/5/2003

Background

The Florida DEP Bureau of Laboratories has been conducting quarterly sampling of the Wakulla River within the boundaries of Wakulla Springs State Park, just below the tour boat turn-around area. Data from these efforts will be used for documenting conditions within the river and for making resource protection decisions. Wakulla Springs State Park is located in Wakulla County, Florida (see Figure 1). The Wakulla River begins in the park, flows south, and joins the St. Mark's River before flowing into the Gulf of Mexico. Wakulla Springs is a Floridan Aquifer-dominated system and is known for its recreational and aesthetic qualities.

Wakulla Springs was sampled on August 5, 2003 as part of the quarterly monitoring program and to determine the long-term results of the Aquathol® herbicide treatments. Water chemistry samples were taken for ammonia, nitrate-nitrite, total Kjeldahl nitrogen (TKN), total phosphorus, *Enterococci*, *Escherichia coli*, fecal coliform, total coliform, and other analyses. Habitat assessment, qualitative periphyton sampling, and benthic invertebrate stream condition index (SCI) sampling were also conducted. See Figure 2 for results of this testing and Figure 3 for the SCI trend.

Results

Ammonia and TKN levels were measured but not detected. Total phosphorus (0.04 mg /L) was just above the lower detection limit. Nitrate-nitrite concentration (0.70 mg/L) remains elevated, higher than approximately 90% of Florida streams. The sampling site is approximately a mile downstream from the spring boil, and nutrients are expected to be lower than those at the boil due to uptake by the copious growth of vegetation in the river.

In August 2003, *Enterococci* (60 CFU/100 mL) and *Escherichia coli* (120 CFU/100 mL) densities were below the EPA single-sampling guideline values for designated beach areas. Fecal coliform (136 CFU/100 mL) and total coliform (150 CFU/100 mL) levels complied with Class III water quality standards.

The stream condition index (SCI) score has dropped significantly since May 2003, now placing it in the "very poor" category. Historically, the Wakulla Springs SCI score has been in the "poor" or "very poor" range. The use of Aquathol® herbicide reduces the growth of the nuisance plant *Hydrilla*, although re-growth occurs within months of application. It is hypothesized that improvements in the dissolved oxygen regime and in-stream habitat attributable to the temporary control of *Hydrilla* results conditions favorable to macroinvertebrates, yielding improved SCI scores. When *Hydrilla* growth again reaches nuisance proportions, SCI scores decline.

The habitat assessment score (119) was in the "sub-optimal" category. The periphyton community was dominated by diatoms, including many taxa tolerant of nutrient enriched conditions.

In conclusion, nitrate-nitrite concentration remains elevated. The periphyton community also reflects nutrient enrichment. Future sampling of Wakulla Springs will continue as part of the quarterly Springs Monitoring program and to determine the long-term effects of the Aquathol® herbicide treatment.

Figure 1: Overview Map



Figure 2: Data Table

Wakulla Springs			
Sampling Date		August 5, 2003	
Macroinvertebrate Parameters		Periphyton Parameters	
SCI Score	9	% Bacillariophyceae	91.15
SCI Evaluation	Very Poor	% Chlorophyceae	1.31
Number of Taxa	11	% Cyanophyceae	7.54
EPT Index	0	Dominant Taxon	Cocconeis placentula
Florida Index	2	% Contribution Dominant Taxon	24.59
% Contribution Dominant Taxon	66.99	Physical-Chemistry Parameters	
% Diptera	18.45	Habitat Assessment Score	119
Total Number Chironomidae Taxa	1	Specific Conductance (umhos/cm)	306
%Filter-Feeders	0	Dissolved Oxygen (mg/L)	6.1
Chemistry Data		pH (SU)	7.2
Ammonia (mg N/L)	0.01 U	Temperature (deg C)	21.3
Nitrate-Nitrite (mg N/L)	0.7	Bacteria Parameters	
TKN (mg/L)	0.06 U	Enterococci (colonies/100ml)	60
Total Phosphorus (mg P/L)	0.04 I	Eschericia coli (colonies/100ml)	120
Color (PCU)	5	Fecal Coliforms (colonies/100ml)	136 B
Turbidity (NTU)	0.25	Total Coliforms (colonies/100ml)	150 B

"I"-Below Quantitation Limit; "U"- Below Detection Limit;
"B"- Based on Results Outside the Acceptable Range

Figure 3: SCI Scores Over Time



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