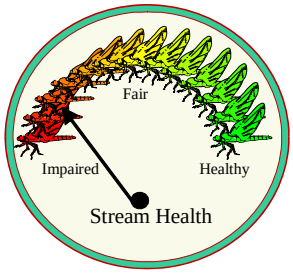


EcoSummary

Wakulla Springs

11/1/2007



Background

The Florida DEP Bureau of Laboratories conducts quarterly sampling of the Wakulla River within the boundaries of Wakulla Springs State Park, at a site located just below the tour boat turn-around area. Data from these efforts are 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 November 1, 2007 as part of the quarterly monitoring program. Water chemistry samples were collected for ammonia, nitrate-nitrite, total Kjeldahl nitrogen (TKN), total phosphorus, Enterococci, Escherichia coli, fecal coliform, total coliform, and other analyses; see Figure 2. Habitat assessment, and benthic macroinvertebrate Stream Condition Index (SCI) sampling were also conducted.

Figure 1: Map of the Wakulla Springs Area



Results

The nitrate-nitrite concentration in Wakulla Springs (0.48 mg/L) was higher than the values found in 80% of Florida streams (0.32 mg/L or lower); see Figure 2. Ammonia and total phosphorus concentrations were below Practical Quantitation Limits, and the TKN concentration was below the Method Detection Limit. Since the sampling site is about a mile downstream from the spring boil, nutrients are expected to be lower than those at the boil due to uptake by the heavy growth of vegetation in the river.

Enterococci and *Escherichia coli* concentrations complied with the EPA single-sample guideline values for "designated beach areas." Fecal and total coliform levels complied with Class III water quality standards.

The thresholds for interpreting the Stream Condition Index values have recently been revised according to the EPA Biological Condition Gradient (BCG) conceptual model. In addition, the laboratory methodology used to evaluate the macroinvertebrate samples taken for the SCI was also revised to reduce variability associated with SCI results. In the SCI 2004 method, a single sub-sample of 100 individuals was identified and scored, while in the new SCI 2007 method, two separate sub-samples of 150 individuals are analyzed, and the two resulting SCI scores are averaged. The SCI 2007 produces a more robust evaluation since the decision thresholds are based on the BCG, and the examination of two separate aliquots reduces error. Note that the sampling method and the ten metrics used for calculating the score remain exactly the same. The SCI 2007 went into effect August 1, 2006. In Figure 3, the new thresholds have been retroactively applied to the scores acquired before this date.

The SCI score (18) for Wakulla Springs was in the "Impaired" range. The low SCI score is potentially related to periodic habitat smothering and low dissolved oxygen levels associated with excess *Hydrilla* growth. Previous diel dissolved oxygen measurements have shown night time DO levels below 3.0 mg/L, in the vicinity of the sampling site, during periods when *Hydrilla* was abundant. This phenomenon is related to respiration and decomposition of the *Hydrilla*. Although there were no diel dissolved oxygen measurements associated with this sampling, it is possible that low night time dissolved oxygen continues to stress the invertebrate community.

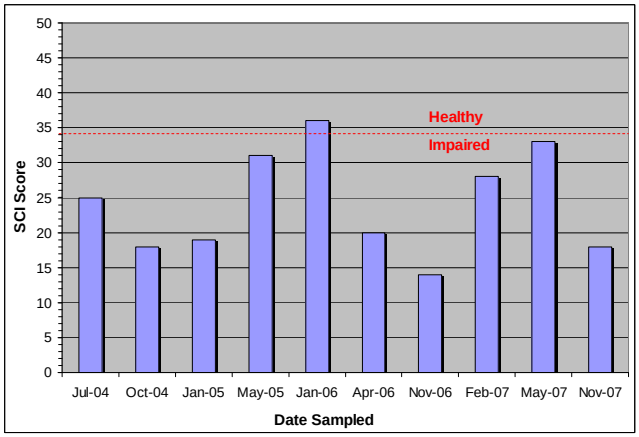
The Habitat Assessment score (143) was in the "Optimal" range. Diatoms, with some blue-green and green algal taxa, dominated the periphyton community. In conclusion, elevated nitrate-nitrite concentrations and excessive *Hydrilla* growth continue to be the main issues of concern in Wakulla Springs.

Figure 2: Data Table

WAKULLA SPRINGS			
Sampling Date	11/1/2007	**Field Data**	
Macroinvertebrate Data		Habitat Assessment Score	143
SCI Score	18 A	Temperature (deg. C)	20.9
SCI Evaluation	Impaired	pH	7.4
Chemistry Data		Dissolved Oxygen (mg/L)	4.4
Turbidity (NTU)	0.45	Specific Conductance (umhos/cm)	331
Color (PCU)	15	**Bacteria Data**	
Ammonia (mg/L)	0.010 I	*Escherichia coli* (col/100 mL)	12 B
Nitrate-Nitrite (mg/L)	0.48	*Enterococci* (col/100 mL)	22 B
TKN (mg/L)	0.16 U	Fecal Coliforms (col/100 mL)	14 B
Total Phosphorus (mg/L)	0.03 I	Total Coliforms (col/100 mL)	110

"U"=Below Method Detection Limit; "I"=Below Practical Quantitation Limit; "B"=Results based on colony counts outside the acceptable range; "A"= Value reported is the average of two or more determinations

Figure 3: SCI Scores Over Time



FOR MORE INFORMATION, CONTACT:
Emily Peffer, FDEP Environmental Assessment
2600 Blair Stone Road MS#6511 Tallahassee, FL 32399-2400
(850) 245-8071 Emily.Peffer@dep.state.fl.us