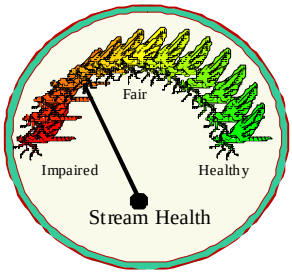


EcoSummary

Wekiwa Springs

11/2/2006



Background

Florida DEP's Division of Recreation and Parks selected Wekiwa Springs for biological and water quality monitoring. Data from these efforts will be used for documenting conditions within the park and for making resource protection decisions. Wekiwa Springs State Park is located in Orange County, Florida (Figure 1). The Wekiva River begins in the park and then flows northeast into the St. Johns River. Wekiwa Springs is a Floridan Aquifer-dominated system and is known for its recreational and aesthetic qualities.

Water chemistry samples were taken for ammonia, nitrate-nitrite, total Kjeldahl nitrogen (TKN), total phosphorus, color, turbidity, *Enterococci*, *Escherichia coli*, fecal coliform, and total coliform analysis; see Figure 2. Habitat assessment and benthic invertebrate Stream Condition Index (SCI) sampling were also conducted.

Figure 1: Map of the Wekiwa Springs Area



Results

The nitrate-nitrite concentration (0.89 mg/L) at the sampling site was higher than the values found in 90% of typical Florida streams (0.64 mg/L or less). Elevated nitrate-nitrite levels in Wekiwa Springs are related to nitrogen loading in the recharge basin. The TKN concentration was below the practical quantitation limit, and ammonia was undetected. The total phosphorus concentration (0.15 mg/L) was slightly higher than average for typical Florida streams.

Escherichia coli counts complied with the EPA single-sample guideline value of 235 CFU/100 mL for "designated beach areas", but *Enterococci* counts exceeded the guideline value of 61 CFU/100 mL. Some species of *Enterococci* are known to be naturally free-living in warm waters, so the use of *Enterococci* as a human waste indicator may not be appropriate. Since the holding times for bacterial analyses were exceeded, these bacteria results may be unreliable.

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 uncertainty associated with SCI results. In the SCI 2004 method, a single group of 100 individuals was sub-sampled, identified, and scored, while in the new SCI 2007 method, two separate groups 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.

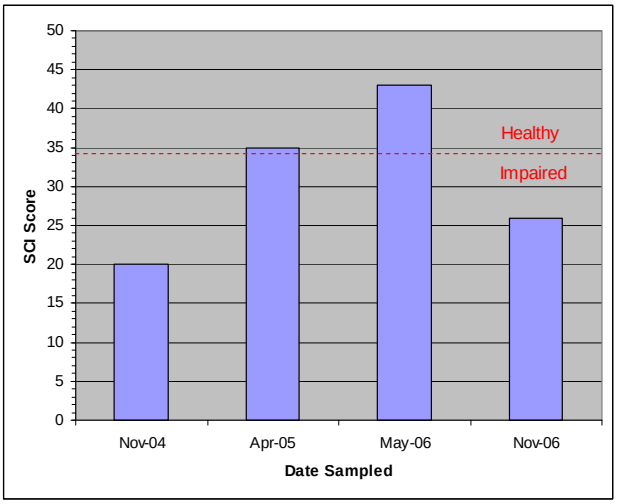
The SCI score (26) was in the "impaired" category, probably due to the period naturally low dissolved oxygen (2.8 mg/L). The overall habitat assessment score (140) was in the "optimal" range. In conclusion, elevated nitrate-nitrite levels and an impaired macroinvertebrate community were the main issues of concern in Wekiwa Springs.

Figure 2: Data Table

WEKIWA SPRINGS			
Sampling Date	11/2/2006	**Field Data**	
Macroinvertebrate Data		Habitat Assessment Score	140
SCI Score	26 A	Temperature (deg. C)	23.6
SCI Evaluation	Impaired	pH	7.6
Chemistry Data		Dissolved Oxygen (mg/L)	2.8
Turbidity (NTU)	0.25	Specific Conductance (umhos/cm)	338
Color (PCU)	5	**Bacteria Data**	
Ammonia (mg/L)	0.01 U	*Escherichia coli* (col/100 mL)	102 Q
Nitrate-Nitrite (mg/L)	0.89	*Enterococci* (col/100 mL)	132 BQ
TKN (mg/L)	0.088 I	Fecal Coliforms (col/100 mL)	26 BQ
Total Phosphorus (mg/L)	0.15	Total Coliforms (col/100 mL)	230 BQ

"U"= Below Method Detection Limit; "I"= Below Practical Quantitation Limit; "B"= Based on colony counts outside the acceptable range; "Q"= Outside of holding time; "A"= Value reported is the mean of two or more determinations

Figure 3. SCI Scores Over Time



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