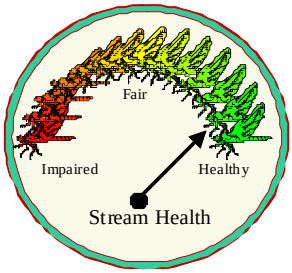


EcoSummary

Juniper Springs

11/1/2007

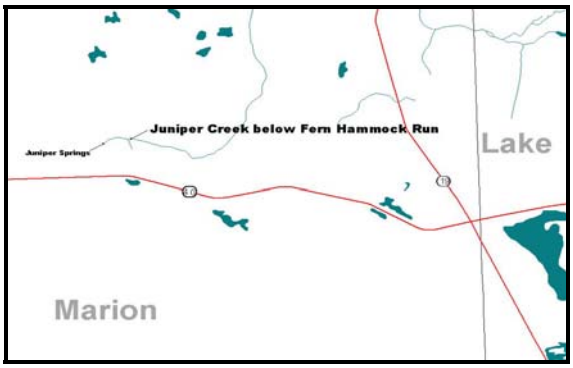


Background

Florida DEP's Division of Water Resource Management selected Juniper Springs for biological and water quality monitoring as part of the Springs Initiative. Data from these efforts will be used for documenting conditions within springs throughout Florida and for making resource protection decisions. Juniper Springs Recreation Area is located in Marion County, Florida, in the Ocala National Forest; see Figure 1. Juniper Creek, which flows from Juniper Springs to Lake George, is a popular canoeing creek known for its aesthetic qualities.

Samples were collected from Juniper Springs in Juniper Creek downstream from the confluence with Fern Hammock Creek on November 1, 2007. Water chemistry samples were taken for ammonia, nitrate-nitrite, total Kjeldahl nitrogen (TKN), total phosphorus, *Escherichia coli*, *Enterococci*, fecal coliform, and total coliform analyses; see Figure 2. Habitat assessment and benthic macroinvertebrate Stream Condition Index (SCI) sampling were conducted.

Figure 1: Map of the Juniper Springs Area



Results

The nitrate-nitrite concentration (0.069 mg/L) in Juniper Springs was lower than average for Florida streams, and much lower than most Florida springs. The total phosphorus level was below the Practical Quantitation Limit, and the ammonia and TKN concentrations were below the Method Detection Limits.

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 (see Fig. 2). 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 of 53 for Juniper Springs was in the "healthy" range, and the Habitat Assessment score (140) was in the "optimal" range. This suggests the previous failure may have been an anomaly, possibly related to physical habitat disturbance from recreational use (e.g., canoeing).

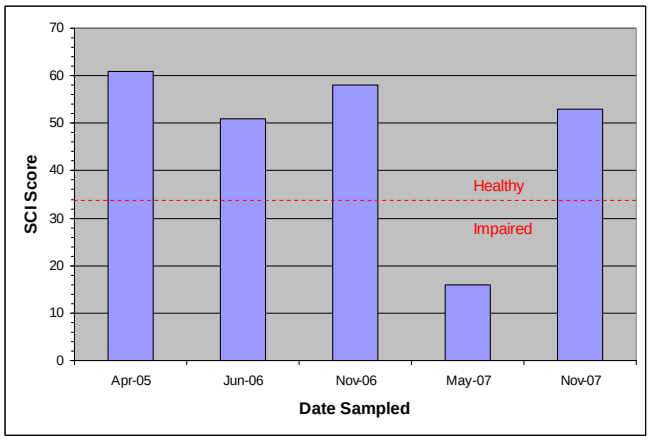
In conclusion, biological and water quality parameters indicate that Juniper Springs is ecologically healthy. This system can continue to be used to help define biological and water quality expectations in minimally disturbed springs in Florida.

Figure 2: Data Table

JUNIPER SPRINGS			
Sampling Date	11/1/2007	**Field Data**	
Macroinvertebrate Data		Habitat Assessment Score	140
SCI Score	53 A	Temperature (deg. C)	22.23
SCI Evaluation	Healthy	pH	8.26
Chemistry Data		Dissolved Oxygen (mg/L)	8.03
Turbidity (NTU)	0.55	Specific Conductance (umhos/cm)	130
Color (PCU)	10	**Bacteria Data**	
Ammonia (mg/L)	0.010 U	*Escherichia coli* (col/100 mL)	160 BQ
Nitrate-Nitrite (mg/L)	0.069	*Enterococci* (col/100 mL)	300 BQ
TKN (mg/L)	0.080 U	Fecal Coliforms (col/100 mL)	290 BQ
Total Phosphorus (mg/L)	0.028 I	Total Coliforms (col/100 mL)	200 BQ

"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; "Q"=Outside of holding time

Figure 3: SCI Scores Over Time



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