STREAM ECOSUMMARY

Perdido River below Barrineau Park Road

January 5, 2012

DEP conducted Stream Condition Index (SCI) biological and water quality sampling at Perdido River below Barrineau Park Road in Escambia County (Figure 1) on January 5, 2012 to assess attainment of designated uses. This site had been chosen as a Stream Condition Index Benchmark site. These sites have consistently high SCI scores (≥ 58) and are being used to assure compliance with Quality Assurance objectives. Overall, the data indicated that the stream easily met the DEP expectations for a healthy, well-balanced stream.



Figure 1. Stream Condition Index site for Perdido River below Barrineau Park Road on 01/5/2012.

Background

Although healthy, well-balanced stream and river communities may be maintained with some level of human activity, such activities may result in waterbody degradation. Human stressors may include increased inputs of nutrients, sediments, and/or pesticides from watershed runoff, adverse hydrologic alterations, undesirable removal of habitat or riparian buffer vegetation, and introduction of nuisance (generally exotic) plants and animals. DEP has methods to evaluate if human activities have resulted in the condition where a particular waterbody has exceeded water quality criteria (Chapter 62-302, Florida Administrative Code), including whether adverse impacts to biological communities have occurred. DEP water quality standards are designed to protect designated uses of the waters of the state (*e.g.,* recreation, aquatic life support), and exceedances of these standards is associated with interference with the designated use. The Stream Condition Index (SCI) assesses how closely the macroinvertebrate community (*e.g.,* aquatic insects, clams, crayfish) of a stream resembles the macroinvertebrate community of an undisturbed or "reference" condition. The stream and river habitat assessment evaluates the availability and quality of habitat for macroinvertebrates, and can help diagnose the cause of a low SCI score.

Methods

This stream was sampled January 5, 2012 by the DEP Northwest District Office. Surface water samples

were collected following DEP Standard Operating Procedures (SOPs, see http://www.dep.state.fl.us/water/sas/qa/sops.htm for details). Sampling and analyses met FDEP quality assurance/ quality control standards (see http://www.dep.state.fl.us/water/sas/qa/index.htm) The Stream Condition Index (SCI) was sampled per DEP SOP FS7420 and calculated per DEP SOP LT7200. The SCI consists of collecting macroinvertebrates via 20 D-frame dipnet sweeps (0.5 m in length) in the most productive habitats in a 100 m reach of stream. The organisms are sub-sampled, and identified to the lowest practical taxonomic level. The SCI is composed of ten metrics, eight of which decrease in response to human disturbance, with two metrics (% very tolerant and % dominant) increasing in response to human disturbance. According to DEP SOP LT 7000, the SCI score ranges and categories are: (68-111) Exceptional; (35-67) Healthy; and (0-34) Impaired. Proposed biological health assessment criteria state that a site is considered to meet designated uses if the average of the two most recent SCI scores is 40 or higher and neither of those scores is less than 35. The Stream and River Habitat Assessment was conducted per DEP SOP FT 3100. The Habitat Assessment is a rapid field method in which a sampler scores eight in-stream and riparian components to estimate the influence of habitat factors on the resident aquatic organisms. Habitat Assessment scores range from 11-160 and overall habitat quality is assigned to one of four categories: Optimal (120-160 points), Suboptimal (80-119 points), Marginal (40-79 points), and Poor (11-39 points).

Site Information

This site (Lat/Long N30.6895 W-87.4371) is located approximately 220 meters below the Barrineau Park Bridge and about 100 meters above the railroad trestle (Figure 2).

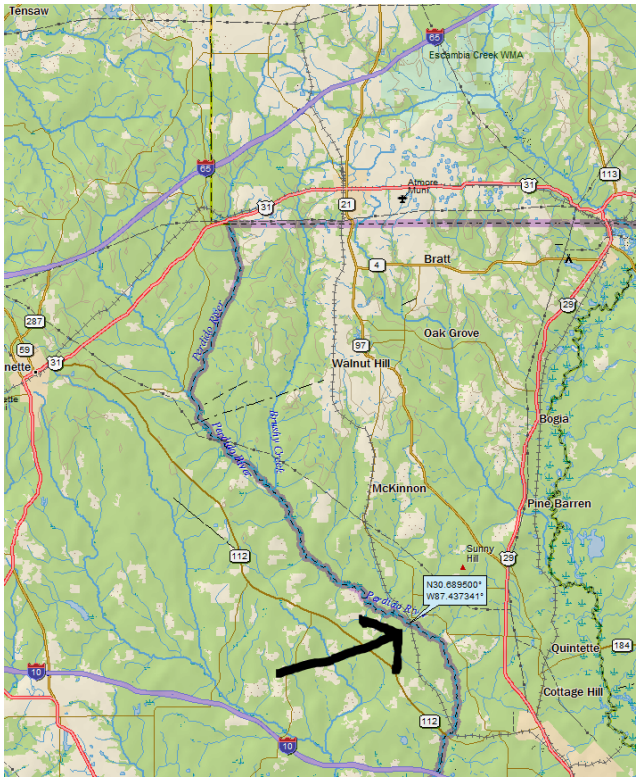


Figure 2. SCI sample location of Perdido River below Barrineau Park Road in Escambia County.

Eight SCIs were previously collected at a site just upstream of the Barrineau Park Road Bridge (STORET #3542) by DEP contractors (Northwest Florida Water Management District) from 2005 to 2011. Scores ranged from 54 to 81 with an average score of 62. A 1989 DEP Hester-Dendy artificial substrate sample (same site different STORET # 33010002) found a diverse benthic community. The first stonefly record of the genus *Isogenoides* (*varians*) (Figure 3) for Florida was discovered at this site in 2010 http://www2.pms-lj.si/illiesia/papers/Illiesia08-01.pdf. In addition, other gravel-dwelling species that are rare in Florida, (stoneflies *Alloperla prognoides*, *Haploperla brevis,* and dragonfly *Ophiogomphus australis)* were new County records collected at and above this site in the Perdido River http://www2.pms-lj.si/illiesia/papers/Illiesia06-19.pdf.



Figure 3. New Florida Stonefly record of *Isogenoides varians*.

Results

Water Quality

The water quality samples complied with all Class III water quality criteria (Table 1). Nutrients are low, which is typical of the sand and gravel aquifer of the Panhandle. The dissolved oxygen saturation was above 90%. The high dissolved oxygen concentration and fast stream velocity support the 6 taxa of pollution-sensitive indicating stoneflies collected in this SCI sample.

Table 1. Water quality results from January 5, 2012 at Perdido River below Barrineau Park Road.

Analyte	Result	Remark	Applicable Class III Water Quality Criteria
Field Temperature (°C)	10.38		
Field Dissolved Oxygen (mg/L)	10.46		≥5.0
% Dissolved Oxygen Saturation	93.5		
Specific Conductance (µmhos/cm)	30		Not to exceed 50% of back-ground or 1275 µmhos/cm
Color (PCU)	15	Q	
Turbidity (NTU)	1.5	AQ	
Total Suspended Solids (mg/l)	3	I	
Total Phosphorus (mg/L)	0.013		*<0.06 mg/L
Nitrate+Nitrite (mg/L)	0.33		
Ammonia (mg/L)	0.01	U	
Total Kejldahl Nitrogen (mg/L)	0.08	U	
Total Nitrogen (mg/L)	0.41		*<0.67 mg/L
Organic Carbon (mg/L	2.1	I	

A – Average of two values
I – Result was between the method detection limit (MDL) and the practical quantitation limit (PQL)
Q – Sample was analyzed beyond its holding time
U – Compound was analyzed for but not detected
* Federally promulgated numeric nutrient criteria for Panhandle West nutrient region

Habitat Assessment

The stream and river habitat assessment score was 113 in the suboptimal range. Substrate Diversity, Water Velocity, and Riparian Vegetation Quality (Atlantic white cedar forest) rated optimal. Artificial Channelization and Bank Stability rated suboptimal. Substrate Availability (5%), Habitat Smothering, and Riparian Zone Buffer Width rated marginal. The few habitats available (5%) were productive. The channel had been straightened historically (log transport, bridge & trestle construction). Attempts are being made to prevent local erosion from recreational use. The fast water velocity has mitigated some of the sediment problems caused by human activities.

Stream Condition Index

The SCI score for this site was 91 out of a possible 100 points, corresponding with a “Exceptional" designation. The most sensitive aquatic insect orders of mayflies (Ephemeroptera), stoneflies (Plecoptera), and caddisflies (Trichoptera) (EPT) made up 52% of the 290 organisms randomly sorted from the sample. A high percent of EPT is typical from the least-impacted panhandle streams. The EPT comprised 27 of the 59 taxa in the sample.

Periphyton

Attached algae were rare and consisted of diatoms and the red filamentous algae *Batrachospermum*, which grow in low nutrient conditions. Some growth of algae (typically diatoms) is expected in a fully functioning stream, but an over abundance of algae (especially filamentous algae) may reduce habitat quality (from smothering) and lead to excess organic matter production (and decomposition), which can harm fish and invertebrates.



Figure 4. Perdido River below Barrineau Park Road gravel riffle habitat of rare Florida species.

Stream gravel habitat is rare in Florida (Figure 4). Its protection would preserve rare species that contribute to Florida's wildlife diversity. Human activities, including agriculture, silviculture, mining, roads, and land development could result in sediment inputs and/or other pollutant loading if Best Management Practices are not followed

Thank you for your interest in conserving the water quality of Florida's streams and rivers. Please contact us if you have any questions.

Contact and resources for more information

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DEP biological assessment resources:
http://www.dep.state.fl.us/water/bioassess/index.htm