EcoSummary

Stream Condition Index Report

Bear Creek (Walton County) east of Willie B. Parker Road
February 28, 2013



Figure 1. Stream Condition Index site for Bear Creek on February 28, 2013.

DEP conducted water quality and biological sampling at Bear Creek (Walton County) at a station located 250 m east of Willie B. Parker Road on February 28, 2013 (STORET # 32010089). The stream was listed on the strategic monitoring plan for the Choctawhatchee River Basin for biology, based on the results of a previous BioRecon in 2000, which rated Bear Creek as "impaired" (Ray 2000). The Stream Condition Index method conducted during this sampling event was used to assess the current attainment of designated uses.

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 on February 28, 2013 by the DEP Northwest District Office. Surface water samples were collected for analysis of nutrients, chlorophyll *a*, color, following DEP Standard Operating Procedures (SOPs, see http://www.dep.state.fl.us/water/sas/sop/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: (68-100) Exceptional; (35-67) Healthy; and (0-34) Impaired. EPA approved 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).

The BioRecon is the initial screening tool for streams, intended to rapidly assess a site to prioritize it for more intensive sampling (see http://www.dep.state.fl.us/water/bioassess/methods.htm#BioRecon for more information).

Site Information

The SCI site is located 5 miles northwest of DeFuniak Springs, 0.7 miles south of Interstate 10 in Walton County (N30° 44' 8.48", W86° 13" 30.72"). It is a 2nd order sand and gravel stream at this location in the Southern Pine Plains and Hills Ecoregion (65f). Bear Creek is one of the many tributaries of Alaqua Creek (see Figure 2 map inset). Alaqua Creek contains as many as 78 taxa or sensitive habitats listed by the Florida Natural Areas Inventory's (FNAI), many of which are threatened and endangered. For example the Mountain Laurel (*Kalmia latifolia*)

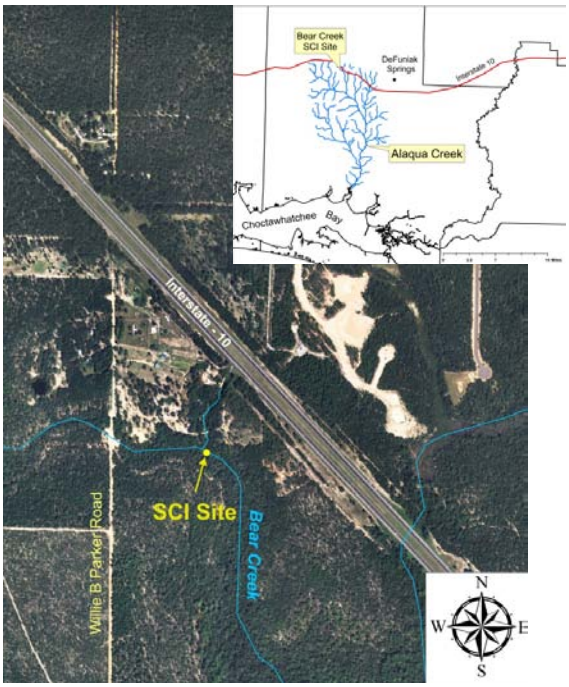


Figure 2. Location of Bear Creek SCI in Walton County February 28, 2013.

(Figure 3), listed as threatened, was observed in several locations along Bear Creek.

A study conducted in an upstream tributary to Bear Creek on October 3, 2000 found extensive habitat smothering associated with soil erosion/deposition due to land clearing activities. The habitat smothering was likely the most influential factor leading to an "impaired" rating of the upstream tributary. This current study, conducted February 28, 2013, is located downstream from the impaired site within the larger main channel of Bear Creek.



Figure 3 Kalmia latifolia a Florida native shrub observed on Bear Creek listed as Threatened.

Results

Water Quality

The water quality samples complied with water quality criteria (Table 1). All field measurements were values typical of sandhill streams in this region.

Table 1. Water quality results from February 28, 2013 at Bear Creek.

Analyte	Result	Remark	Applicable Class III Water Quality Criteria
Field Temperature (°C)	16.5		
Field pH (SU)	6.08		
Field Dissolved Oxygen (mg/L)	8.84		
Field Dissolved Oxygen (% Saturation)	90.5		≥ 67
Field Specific Conductance (µmhos/cm)	19		

Alkalinity (mg $CaCO_3$/L)	1.1		
Color (PCU)	18		
Chlorophyll a (µg/L)	0.76	U	
Total Phosphorus (mg/L)	0.006	U	* 0.06
Nitrate+Nitrite (mg/L)	0.12		
Ammonia (mg/L)	0.011	I	
Total Kejldahl Nitrogen (mg/L)	0.15	I	
Total Nitrogen (mg/L)	0.281		* 0.67
Fluoride (mg F/L)	0.035	U	< 10.0
Total Organic Carbon (mg/L)	2.1		
Sulfate (mg SO4/L)	2.1		
Turbidity (NTU)	6.3		
Total Suspended Solids (mg/L)	8	I	
Total Dissolved Solids (mg/L)	15	U	

*Numeric nutrient criteria for Panhandle West nutrient region.

U – Analyzed for but not detected.

I – Reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

Habitat Assessment

The stream habitat assessment score was 127 which is in the optimal range. Average water velocity was measured at an optimal level (0.31 m/s). Fish and aquatic insects require sufficient water velocity to maintain various aspects of their life cycles (feeding, recruitment, respiration, etc.). Roots and undercut banks (7% of the total area) provided a productive habitat for fish and substrate for aquatic insects. Several partially buried logs and roots were also observed (Figure 4). Habitat smothering from sand and silt led to a marginal score for substrate availability, likely related to an unpaved road and abandoned sand pit upstream. Substrate availability was 10% and three productive habitats were present, including snags, leaf packs and roots. Habitat diversity is important for supporting a diverse macroinvertebrate assemblage.

Stream Condition Index

The SCI score for this site was 58 out of a possible 100. This rates the assessment site to a Category 2 - "Healthy" designation. A total of 29 taxa were collected; notably absent were members of the *Tanytarsini* tribe. The sensitive caddisfly, *Diplectrona*, was dominant which is typical of healthy first and second order streams.



Figure 4. Habitat smothering in Bear Creek, February 28, 2013.

Conclusion

Although the water quality and macroinvertebrate community data indicated a healthy, well-balanced stream, some actions could be taken to further enhance the stream community. For example, paving the dirt road to the upper stream approach and restoring the upstream burrow pit would greatly reduce sedimentation, leading to reduced habitat smothering and potentially, a more diverse fauna.

Literature Cited

Ray, D. 2000. Bear Creek below Interstate 10 near Mile Marker 78, Walton County October 3, 2000. Ecosummary.

Thank you for your interest in maintaining the water quality of Florida's streams and rivers. Please feel free to 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

Please contact Devan Cobb for archived Ecosummaries, 850-245-8321, Devan.R.Cobb@dep.state.fl.us.