STREAM ECOSUMMARY

Deep Creek at C.R. 315
(WBID 2730)
January 12, 2011

DEP conducted water quality and biological sampling at Deep Creek in Putnam County on January 12, 2011. Deep Creek was sampled as part of the strategic monitoring plan (SMP) for the Ocklawaha basin to verify a potential dissolved oxygen (DO) impairment. Overall, the water quality and macroinvertebrate community data indicated that the stream met expectations for a healthy, well-balanced stream.

Background

Although healthy, well-balanced stream and river communities may be maintained even with some level of human disturbance, human 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 (F.A.C.), 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 are 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 January 12, 2011 by the DEP Central District Office. Surface water samples were collected for analysis of fecal coliform bacteria (FC), biochemical oxygen demand (BOD), nutrients, chlorophyll-*a*, phaeophytin-*a*, color, alkalinity, turbidity, total dissolved solids (TDS), total suspended solids (TSS), total organic carbon (TOC), sulfate, chloride, and fluoride; 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 7200, the SCI score ranges and categories are: (68-100) Exceptional; (35-67) Healthy; and (0-34) Impaired. As part of numeric nutrient criteria development, DEP and EPA have concluded that a balanced faunal community is achieved if the average score of at least two temporally independent SCIs, performed at representative locations and times, is 40 or higher, with neither of the two most recent SCI scores 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).

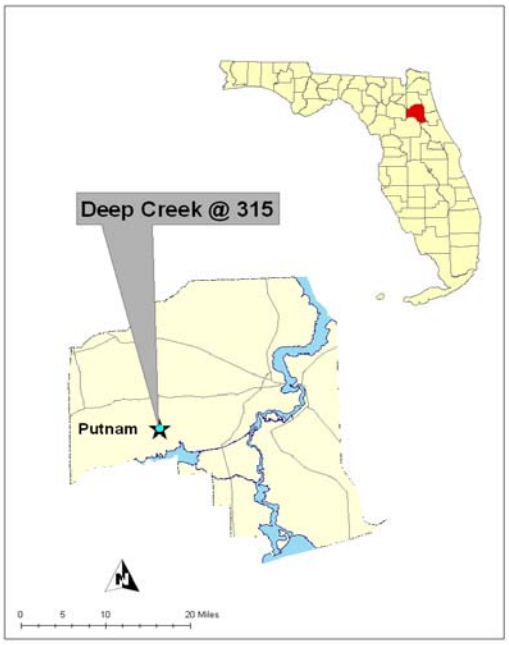


Figure 1: Location of the Deep Creek at C.R. 315 in Putnam County

Site Information

Deep Creek was sampled at C.R. 315 in Putnam County (Figure 1). In this area, the average width of the stream was 5 meters and the average depth was 0.4 meters. The sample site had an average velocity of 0.20 m/s. The stream bottom consisted mostly of sand, silt and muck. The shoreline plant community consisted of cabbage palm, cypress, water oak, red maple, sweetgum, saw palmetto, golden club, and smilax (Figure 2). The aquatic plant community consisted of small areas of spatterdock. No exotic invasive plant species were identified during this assessment (www.FLEPPC.org).



Figure 2. Stream Condition Index transect at Deep Creek on January 12, 2011

Results

Water Quality

The water quality samples collected on January 12, 2011 complied with applicable water quality criteria. The DO, total nitrogen (TN), and total phosphorus (TP) values met the water quality standards outlined in Chapter 62-302, F.A.C. (Table 1).

In addition, five more water quality samples were collected throughout 2011 for the strategic monitoring plan. DO values ranged from 6.73 mg/L to 8.61 mg/L and met the Chapter 62-302, F.A.C., limits of ≥ 5.0 mg/L.

Table 1. Water quality results from 1-12-2011 at Deep Creek (STORET #: 20020144)

Analyte	Result	Remark	Applicable Class III Water Quality Criteria
Field Temperature (°C)	13.8		
Field pH (SU)	7.1		Within Range
Field Dissolved Oxygen (mg/L)	9.73		≥ 5.0 (mg/L)
Field Specific Conductance (µmhos/cm)	156		Not to exceed 50% of background or 1275 µmhos/cm
Secchi Depth (m)	VOB		
Alkalinity (mg $CaCO_3$/L)	70		Shall not be depressed below 20 mg CaCO3/L
Turbidity (NTU)	0.40		
Total Dissolved Solids (mg/L)	86		
Total Suspended Solids (mg/L)	4	U	
Chloride (mg/L)	5.3		
Fluoride (mg/L)	0.083	I	
Sulfate (mg/L)	3.0		
True Color (PCU)	22		
Chlorophyll-*a* (µg/L)	0.55	U	
Phaeophytin-*a* (µg/L)	0.40	U	
Total Organic Carbon (mg C/L)	2.5	I	
Total Phosphorus (mg/L)	0.016		≤ 0.12 mg/L*
Orthophosphate (mg P/L)	0.012		
Nitrate+Nitrite (mg/L)	0.017		
Ammonia (mg/L)	0.010	U	
Total Kjeldahl Nitrogen (mg/L)	0.12	I	
Total Nitrogen (mg/L)	0.13		≤ 1.54 mg/L*
Fecal Coliform (cfu /100 mL)	218	B	
Biochemical Oxygen Demand (mg/L)	0.70	I	

* F.A.C. Chapter 62-302 Surface Water Quality Standards - DRAFT

B – Results based on colony counts outside the acceptable range

I- The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit

U - Indicates that the compound was analyzed for but not detected

VOB – Secchi disk was visible on bottom of stream

Habitat Assessment

The Stream and River Habitat Assessment score was 138, which is in the "Optimal" category. Three productive macroinvertebrate habitats were sampled: fallen trees (snags), leaf packs, and roots originating from the stream banks. Substrate availability scored in the marginal category due to a low but typical total percent habitat of 10% of which,

less than 25% of the productive habitats were smothered with sand or silt. Otherwise, the stream had natural sinuosity, an adequate diversity of depths, and showed little evidence of physical alterations. The bank stability, riparian zone buffer width and vegetation quality components all scored perfect scores in the optimal category indicating that riparian disturbance is low in this watershed.

Stream Condition Index

The SCI score for this site was 81 out of a possible 100 points, corresponding with an “Exceptional" designation. In this sample, many water quality sensitive macroinvertebrate groups were present including mayflies, caddisflies, dragonflies, damselflies, dobsonflies, mites, and aquatic beetles. The macroinvertebrates collected in this sample represent the expected macroinvertebrate diversity for a healthy, stream community.

Conclusions

The water quality data from this sampling event met all applicable water quality criteria including the dissolved oxygen criteria. The “Exceptional” SCI and “Optimal” Habitat Assessment data indicate that Deep Creek is functioning as a healthy, well-balanced stream.

Follow up on Deep Creek

Another Habitat Assessment and Stream Condition Index were conducted on Deep Creek on April 19, 2011. The Habitat Assessment score was 128, in the “Optimal” category, and the SCI score was 72, corresponding with another “Exceptional” designation. These data confirm that Deep Creek meets the expectations for a healthy, well-balanced stream.

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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http://www.dep.state.fl.us/central/Home/Watershed/default.htm

DEP Biological Assessment Resources:
http://www.dep.state.fl.us/water/bioassess/index.htm