STREAM ECOSUMMARY

Peters Creek at S.R. 315

May 28, 2008

DEP conducted water quality and biological sampling at Peters Creek @ CR 315 in Clay County on May 28, 2008 to assess attainment of designated uses. This particular sampling event was initiated through a statewide stream nutrient criteria study conducted in 2008. 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 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 May 28, 2008 by biologists from the DEP Northeast District Office. Surface water samples were collected for analysis of nutrients, chlorophyll-a, phaeophytin-a, color, total suspended solids (TSS), total organic carbon (TOC) & turbidity 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: (68-100) 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).

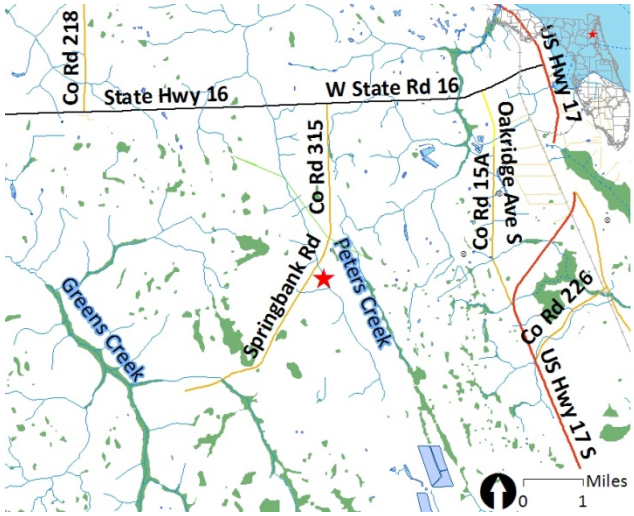


Figure 1. Location of Peters Creek @ SR 315 in Clay County.

Site Information

The Peters Creek watershed (WBID 2444) covers an area o f 14.5 mi^2. This station was a reference site for numeric nutrient criteria development based on the Landscape Development Intensity Index score of 1.21, suggesting benign human influences in the watershed. Aerial photographs and direct observations during the site visit confirmed that the majority of the watershed land use was forest/natural with some silviculture and pasture located beyond a forested riparian buffer zone. The stream is approximately 11.4 miles long and is free of permitted NPDES[1] outfalls. The section of stream selected for this survey is located upstream of state road 315. In May 2008, the stream averaged 1 m wide and 0.1 m deep. Peters Creek is listed as impaired for fecal coliform bacteria and lead. The total maximum daily load (TMDL) process quantifies the amount of a pollutant that can be assimilated in a waterbody, identifies the sources of the pollutant, and recommends regulatory or other actions to achieve compliance with applicable water quality standards based on the relationship between pollution sources and in-stream water quality conditions. TMDLs have been developed for fecal coliform bacteria and lead in Peters Creek; to view full report: http://webapps.dep.state.fl.us/DearTmdl/tmdlReportAction.do?method=report

[1] National Pollution Discharge Elimination System

Results

Water Quality

The water quality samples complied with water quality criteria (Table 1). Lead and fecal coliform bacteria were not assessed as these two parameters were not within the scope of the original study for which this data set was collected.

Table 1. Water quality results from 5/28/2008 at Peters Creek @ SR 315

Analyte	Result	Remark	Applicable Class III Water Quality Criteria
Field Temperature (°C)	19.39		
Field pH (SU)	6.00		
Field Dissolved Oxygen (mg/L)	8.21		≥5.00
Field Specific Conductance (µmhos/cm)	50		≤1275 or 50% above background
Color (PCU)	40		
TSS (mg/L)	4	U	
Turbidity (NTU)	1.3	A	≤ 29 above natural background
TOC (mg C/L)	4	I	
Chlorophyll a (µg/L)	0.55	U	
Phaeophytin-a	0.24	U	
Total Phosphorus (mg/L)	0.026	I	≤ 0.12 *
Nitrate+Nitrite (mg/L)	0.01		
Ammonia (mg/L)	0.011	I	
Total Kejldahl Nitrogen (mg/L)	0.16	I	
Total Nitrogen (mg/L)	0.181		≤ 1.54 *

* Federally promulgated numeric nutrient criteria for the Peninsula nutrient region

A- arithmetic mean of 2 determinations.

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

U- compound was analyzed for but not detected.

Habitat Assessment

The stream and river habitat assessment score was 143 (out of 160), which is in the optimal range. Four

productive aquatic habitat types were identified within the stream: leaf packs, roots/undercut banks, snags and macrophytes (specifically aquatic plants). There was minimal smothering of habitat by sediment, indicative of a system with low erosion rates (or suitable ground cover) and minimal stormwater runoff. The average water velocity was 0.3 m/sec, an optimal velocity that ensures oxygenation and food delivery throughout the stream. The floodplain and banks were minimally disturbed, contained the expected plant community and did not contain invasive plant species.

Stream Condition Index

The SCI score for this site was 92 out of a possible 100 points, corresponding with an "Exceptional" designation, with the expected community of a healthy stream. One third of the taxa collected were pollution-sensitive.

Periphyton

Very little periphyton growth was observed in Peters Creek, with none of the substrates sampled exhibiting any visible quantities of attached algae. Additionally, water quality samples did not detect chlorophyll *a* or phaeophytin (Table 1). The attached algal community in the stream consisted of 0.33% cyanobacteria (blue-green algae), 1.67% green algae, 0.33% red algae, 0.67% brown algae & 96.7% diatoms. The predominance of diatoms is common in minimally disturbed streams.

Conclusion

Because of minimal disturbance in the watershed, lack of point sources, and extensive riparian buffer zone, Peters Creek was characterized by a healthy biological community, clearly meeting its designated aquatic life support use. The previously measured fecal coliform bacteria and lead values will be addressed through the Basin Management Action Plan (BMAP) process.

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