STREAM ECOSUMMARY

Oldfield Creek above Tar Kiln Rd

February 28, 2012 and September 19, 2012

DEP conducted water quality and biological sampling at Oldfield Creek approximately 300 meters above Tar Kiln Road in Duval County on 02/28/2012 and on 9/19/2012 to assess attainment of designated uses. DEP determined that Oldfield Creek was impaired for dissolved oxygen (DO), but found no causative agent. The Stream Condition Index (SCI) was used to determine if the waterbody met its designated use despite this lower DO. The SCI needs to pass or fail two out of three sampling events to make this determination. It passed during both of these temporally independent sampling events. 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 02/28/2012 and 9/19/2012 by biologists from the DEP Northeast District Office. Surface water samples were collected for analysis of nutrients, chlorophyll *a*, BOD, color, turbidity, and fecal coliforms, 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).

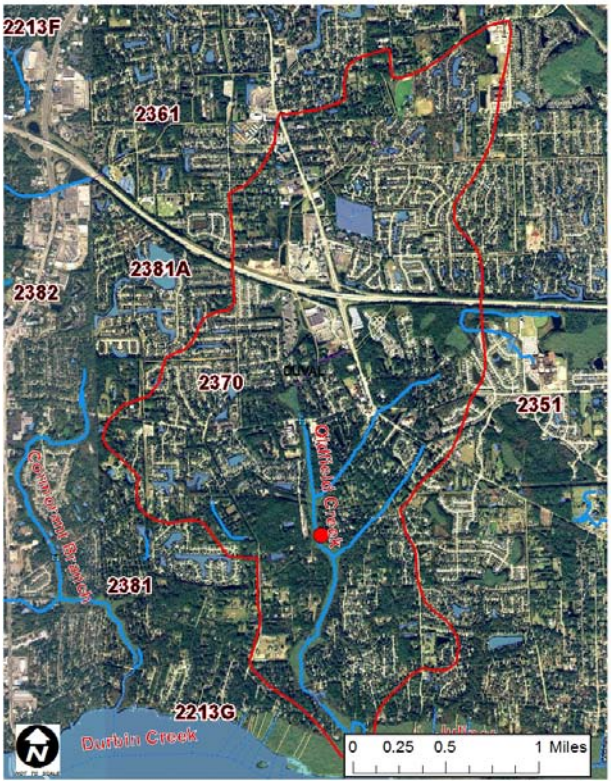


Figure 1. Location of Oldfield Creek above Tar Kiln Road in Duval County

Site Information

The Oldfield Creek watershed (WBID 2370) covers an approximate area of 4.5 mi^2 in Duval County (Figure 1). The site is located 300 meters above Tar Kiln Road. The Landscape Development Intensity Index score of 5.94 suggest a significant human influence on land use within the watershed. Aerial photographs and direct observations confirm that the majority of the watershed land use was commercial and high density residential. At the sample location the riparian zone width was greater than 18 meters on both banks with a good mix of wetland plants (Figure 2).



Figure 2. Stream Condition Index site for Oldfield Creek above Tar Kiln Road on 02/28/2012

Results

Water Quality

The water quality samples complied with most water quality criteria (Table 1). However, the DO of 4.54 mg/L on 2/28/2012 and 4.87 mg/L on 9/19/2012 were both below the current state standard for Class III waters of 5.0 mg/L.

Table 1. Water quality results at Oldfield Creek above Tar Kiln Road

Analyte	Result 2/28/2012	Result 9/19/2012	Class III Water Quality Criteria
Field Temperature (°C)	17.98	24.7	
Field pH (SU)	6.94	7.48	
Field Dissolved Oxygen (mg/L)	4.54	4.87	≥ 5.0
Field Specific Conductance (µmhos/cm)	355	308	
Alkalinity (mg $CaCO_3$/L)	80	84	
Color (PCU)	29	59	
Chlorophyll *a* (µg/L)	0.99	2.0	
Total Phosphorus (mg/L)	0.082	0.10	≤ 0.12*
Nitrate+Nitrite (mg/L)	0.1	0.19	
Ammonia (mg/L)	0.043	0.040	
Total Kjeldahl Nitrogen (mg/L)	0.35	0.51	
Total Nitrogen (mg/L)	0.45	0.70	≤ 1.54*

* Federally promulgated numeric nutrient criteria for Northeast nutrient region

Habitat Assessment

The stream and river habitat assessment score was 118 on 2/28/2012 and 125 on 9/19/2012, which places this creek in the "Optimal" range. . The altered land use in the watershed led to reductions in the habitat smothering score, artificial channelization, and reduced water velocity.

Stream Condition Index

The SCI scores for this site were 50 on 2/28/2012 and 38 on 9/19/2012 (out of a possible 100 points). Therefore, Oldfield Creek passed the SCI with an average score of 44 (with no score below 35), corresponds to a "Healthy" designation.

Conclusions

According to these results and the biological health assessment criteria, Oldfield Creek is considered to meet designated uses and can be delisted as impaired.

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