STREAM ECOSUMMARY

Moultrie Creek upstream of S.R. 207

February 13, 2012

DEP conducted water quality and biological sampling in Moultrie Creek upstream of S.R. 207 in St Johns County on February, 13 2012 to assess attainment of its designated use and as part of the Stream Condition Index (SCI) Quality Assurance (QA) program.

In 2009, DEP instituted a re-auditing procedure for analysts who passed their original SCI audit more than five years ago. The re-auditing process involves passing a web-based test and conducting a SCI at a site with a small amount of variability and scoring within an acceptable range (± 13 points of the median SCI score). (These sites are referred to as a "SCI benchmark" sites.) This site was a potential benchmark site, but was not ultimately included due to the large range in scores across multiple sampling events and years. In addition, DEP periodically collects duplicate SCIs in order to the estimate of variability associated with a SCI at a given site and as another way to ensure that samplers are performing the method correctly. The duplicates for this particular event were 79 and 82, respectively, demonstrating a small degree of variation between SCI scores.

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, and 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 13, 2012 by biologists from the DEP Northeast District Office. Surface water samples were collected for analysis of nutrients, chlorophyll a, color, etc.; 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).

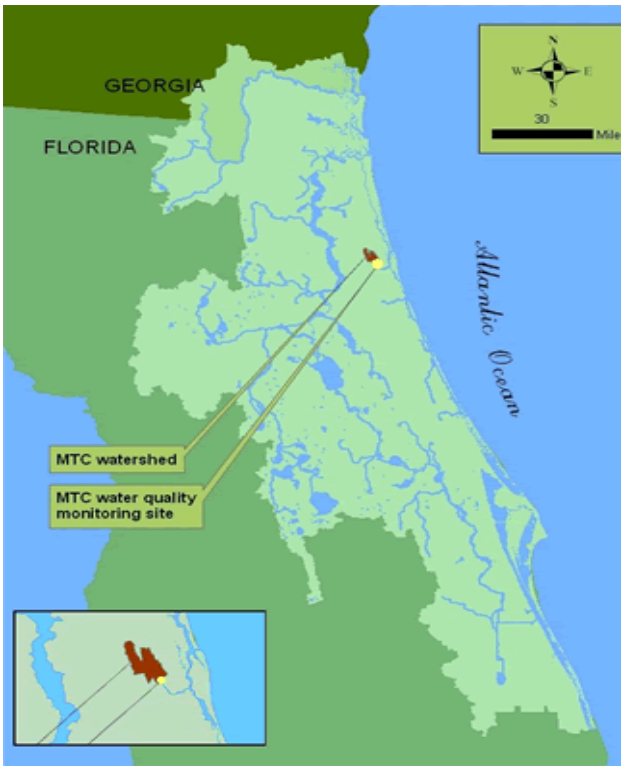


Figure 1. Location of Moultrie Creek in St Johns County.

Site Information

Moultrie Creek is located in eastern St. Johns County and originates in Cowan Swamp emptying into the Matanzas River. The creek was sampled upstream of the S.R. 207 bridge. Moultrie Creek is on the 2008 verified impaired waters list for fecal coliform and is scheduled for a TMDL in 2017. SCIs scored in the "Good" range in 2000 and in the "Poor" range in 2005. Additional SCIs were required to determine whether improving trends were consistent over time.

A summary of historical data shows the major ion concentrations high enough to result in moderately hard water. The median dissolved oxygen concentration just above the DEP standard for Class III surface waters. The water is moderately buffered and slightly acidic. When compared to other streams, total organic carbon concentrations and color are elevated, resulting in lower Secchi depths. Total suspended solids, turbidity, total phosphorus, and chlorophyll-*a* concentrations are lower than average.

Additional information can be found at the St. Johns River Management District website: http://www.sjrwmd.com/watershedfacts/factPages/MTC.html

Results

Water Quality

The water quality samples complied with water quality criteria. The dissolved oxygen, pH, alkalinity, total nitrogen, and total phosphorus values meet the water quality standards outlined in Chapter 62-302, F.A.C. (Table 1).

Table 1. Water quality results from February 13, 2012 at Moultrie Creek.

Analyte	Result	Remark	Applicable Class III Water Quality Criteria
Field Temperature (°C)	7.9		
Field pH (SU)	7.81		Within Range
Field Dissolved	9.23		≥5.00

Oxygen (mg/L)			
Field Specific Conductance (µmhos/cm)	410		≤1275 or 50% above background
Alkalinity (mg $CaCO_3$/L)	110		>20
Color (PCU)	62		
Chlorophyll a (µg/L)	1.1	U	
Total Phosphorus (mg/L)	0.013		≤ 0.12 *
Nitrate+Nitrite (mg/L)	0.004	U	
Ammonia (mg/L)	0.011		
Total Kejldahl Nitrogen (mg/L)	0.33		
Total Nitrogen (mg/L)	0.33		≤ 1.54 *

* F.A.C Chapter 62-302 Surface Water Quality Standards – DRAFT
U-Indicates that the compound was analyzed for but not detected.

Habitat Assessment

The stream and river habitat assessment score was 129, which is in the "Optimal" range. There were four productive habitats present which included snags, roots, leaf, and aquatic vegetation. Wide riparian zones (> 18m) limit sedimentation and sufficient water velocity is critical for maintaining high dissolved oxygen concentrations that fish and aquatic insects require. Habitat diversity and integrity is essential to a diverse macroinvertebrate assemblage.

Stream Condition Index

The water quality and macroinvertebrae community data indicated that the stream met expectations for a health, well-balanced stream. The SCI scores for were 79 and 82 for the duplicate sample out of a possible 100 points. The score for both samples correspond with an "Exceptional" or Category I designation. A robust biological community was represented with few very tolerant species.

Conclusion

Moultrie Creek was characterized by a healthy biological community, clearly meeting its designated aquatic life support use. The duplicate sample was similar indicating the sampling team's techniques were consistent and that when performed correctly and under appropriate conditions, the SCI is an excellent tool for determining the health of streams and rivers in Florida.



Figure 2. Stream Condition Index site for Moultrie Creek.

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