



Buckhorn Creek, Alafia Watershed, Hillsborough County
WBID 1635
April 8, 2009 and October 20, 2009

Purpose

Two biological assessments were performed on Buckhorn Creek in order to gain further information on the biological health of the watershed for use in Florida's Watershed Management and Biocriteria programs.

The assessment method used, the Stream Condition Index (SCI), was developed by FDEP to determine the ecological integrity of aquatic macroinvertebrate communities, which in turn reflects the general health of the stream. The SCI is based on ten measurements of the aquatic macroinvertebrate community structure, eight of which decrease in response to human disturbance, and two metrics (% very tolerant and % dominant) that increase with greater human disturbance. As described in DEP SOP LT 7000, the SCI score ranges and categories are: (68-100) Exceptional; (35-67) Healthy; and (0-34) Impaired. As part of numeric nutrient criteria development, EPA considered an SCI score of 40 or higher to fully meet the expectation of a healthy, well-balanced community. Each SCI includes assessment of stream habitat, conducted per DEP SOP FT 3100.

A full evaluation requires two temporally independent bioassessments. In order to be considered impaired, a site must have two consecutive failing SCI scores.

Watershed Characteristics

Buckhorn Creek is a second order stream that flows southwest to the Alafia River in the Bloomingdale area of Hillsborough County (Figure 1). Several small springs flow into the creek along its length (Figure 2). The upper watershed is heavily urbanized, but the lower section where it enters the Alafia is natural and undisturbed. This property is owned by Mosaic Phosphate Company, which holds a water withdrawal permit from the springs. The sampling site was located in Buckhorn Creek 70 meters below the confluence of the southernmost spring run. Tides from Hillsborough Bay via the Alafia River Estuary affect the lower part of Buckhorn Creek during seasons of low rainfall.

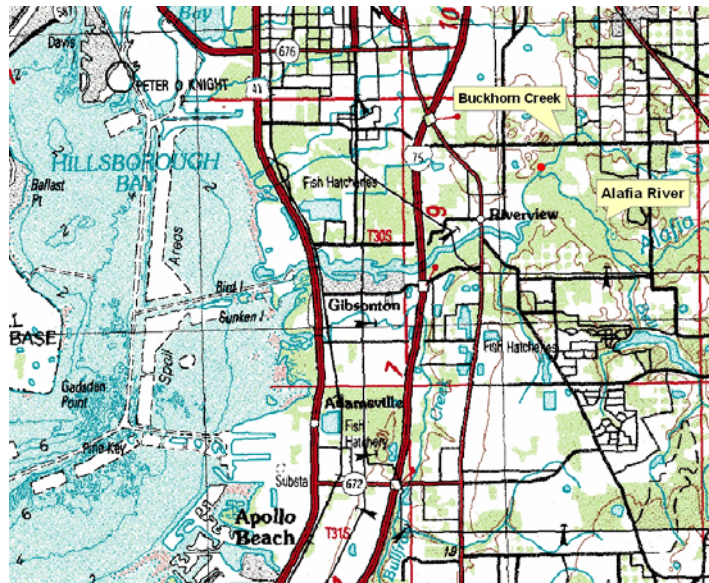


Figure 1. Geographic location of Buckhorn Creek

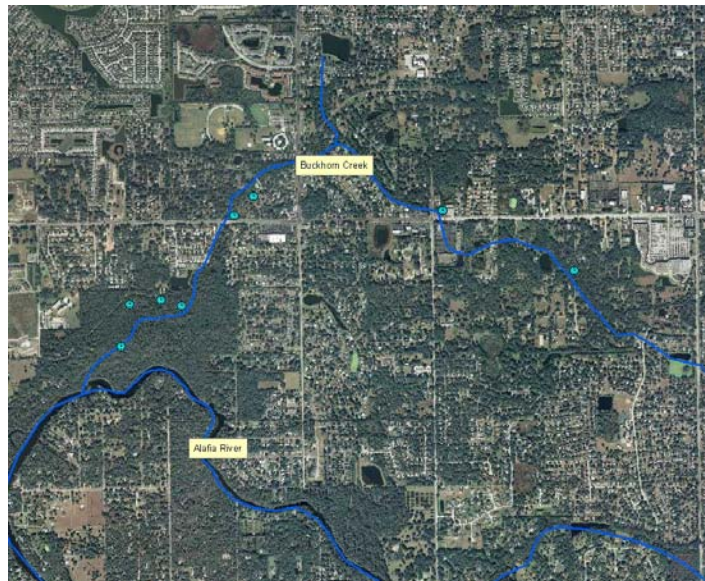


Figure 2. Aerial of Fishhawk Creek showing spring locations

Results

The in-stream habitat in Buckhorn Creek at this location was predominantly sandy bottom with 27% substrate available for invertebrate and fish use (snags, roots, leaves and rock). The habitat scores were 140 and 128 on 4/8/09 and on 10/20/09, respectively, both of which are in the optimal category. The stream was shallow and flowing rapidly. Because the land is managed for ground water renewal, this section of the stream had an extensive riparian zone. The riparian zone provides a buffer for storm water runoff inputs, and serves as a source of food and physical substrates for fish and invertebrates.

Water quality parameters are summarized in Table 1. Dissolved oxygen (DO) was less than 5 mg/l, probably due to low DO ground water introduced from the springs. The slightly elevated conductivity may be due to the spring water or tidal influences.

Date	Time	Temperature (deg. C)	Conductivity (umho/cm)	Dissolved Oxygen (mg/l)	pH (SU)	Clarity	color	Water velocity (mg/l)
4/8/09	1205	23.69	487	4.68	7.74	Clear	Clear	0.28
10/20/09	1125	23.39	497	4.31	7.56	Clear	Clear	0.33

Table 1. Physicochemical data results.

Due to the occasional tidal influences, the Stream Condition Index interpretation framework is not appropriate at this location in Buckhorn Creek. The occasional influx of oligohaline water resulted in a paucity of freshwater organisms; a mix of salt tolerant freshwater species and a few brackish water species. The amphipod, *Gammarus cf. tigrinis* was particularly abundant, and the polychaete, *Dipolydora socialis* was also collected. Both species are often common in oligohaline waters.

Significance

This area in Buckhorn Creek is tidally influenced, meaning that DEP's calibrated freshwater assessment tool, the Stream Condition Index, is not an appropriate method. Evidence (presence of marine taxa) indicates that periodic high tides introduce salty water, thereby limiting the colonization of a stable and diverse freshwater macroinvertebrate community. DEP has not yet developed biological assessment tools for these conditions.

Suggestions

The headwaters of Buckhorn Creek receive stormwater runoff from residential development. Rain and household water mixed with urban pollutants can result in storm water of undesirable quality entering the stream. These potential pollutants may include oil and other automobile fluids, paint and construction debris, yard and pet wastes, pesticides and litter. Untreated urban runoff may contaminate streams, rivers and bays, and also may harm aquatic life. Use of stormwater runoff Best Management Practices (BMPs) should be expanded in the Buckhorn Creek watershed. Although observations suggest that Hillsborough and local municipalities have BMPs in place in some areas, additional improvements could include engineering retrofits, riparian zone stabilization vegetative swales, and created wetlands. Home owners can also reduce stormwater runoff pollution by limiting lawn fertilization and removing yard waste so that it does not enter the stream with stormwater runoff.

References

Stream Condition Index (SCI) Report - Fore, L. et al. 2007. Development and Testing of Biomonitoring Tools for Macroinvertebrates in Florida Streams.

http://publicfiles.dep.state.fl.us/dear/sas/sopdoc/sci_final.pdf

DEP-SOP-001/01, FT 3000 Aquatic Habitat Characterization.

<http://publicfiles.dep.state.fl.us/dear/sas/sopdoc/2008sops/ft3000.pdf>

DEP-SOP-002/01, LT 7000 Determination of Biological Indices.

<http://publicfiles.dep.state.fl.us/dear/sas/sopdoc/2008sops/lt7000.pdf>

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