STREAM ECOSUMMARY

Pierce Branch (LMAN14)

WBID 1732

Hillsborough County

STORET Station 24010084

Figure 1. Location of SCI site on Pierce Branch.

The Florida Department of Environmental Protection Southwest District (SWD) biologists conducted water quality and biological sampling at Pierce Branch (Fig. 1) in Hillsborough County in 2012, with the objective of gathering further information on the biological health of the watershed as part of Florida's Watershed Assessment and Total Maximum Daily Load programs. Overall, the water quality and macroinvertebrate community data indicated that the stream met expectations for a healthy, well-balanced stream.

❖ Background

The biological assessment method used was the Stream Condition Index (SCI), developed by the Florida Department of Environmental Protection (FDEP) to determine ecological integrity of aquatic macroinvertebrate communities. The SCI assesses how closely the macroinvertebrate community of a stream resembles that of an undisturbed or "reference" condition. The SCI is based on ten measurements of the aquatic macroinvertebrate community, eight of which decrease in response to human disturbance, and two metrics (% very tolerant and % dominant) that increase with greater human disturbance. According to Chapter 62-303.430, F.A.C., a site is considered to meet designated uses if the average of the two most recent SCI scores is 40 or higher with neither scoring less than 35.

Additional information collected included assessment of stream habitat, Rapid Periphyton Survey (RPS), Linear Vegetation Survey (LVS) and qualitative collection of periphyton (algae that is attached to in-stream substrates). The habitat assessment evaluates the availability and quality of in-stream habitat for macroinvertebrates, and can help diagnose the cause of a low SCI score. The RPS data measures percent cover of algae present in the stream and the collected periphyton data provides species identification. Some growth of algae (diatoms in particular) is normal in a fully functioning stream, but an over-abundance of algae (especially filamentous algae) may reduce habitat quality (by smothering) and result in the production of excess organic matter. The decomposition of surplus organic matter can reduce the oxygen content of the stream water, which can harm fish and invertebrates.

The Rapid Periphyton Survey measures the relative percentage of filamentous algae in the 100 m stream segment. The Linear Vegetation Survey provides a snapshot of the aquatic plant community (plants growing on the banks are not taken into consideration).

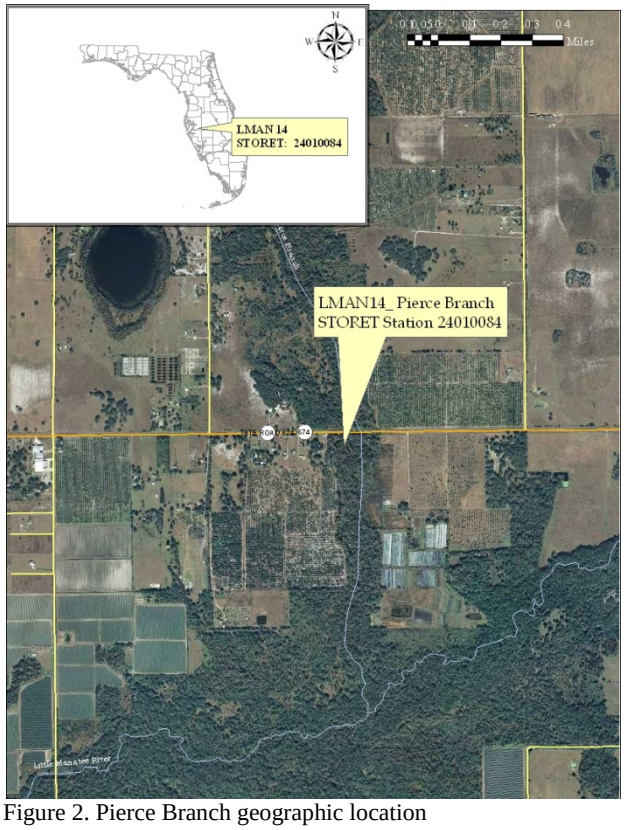

Figure 2. Pierce Branch geographic location

❖ Watershed Characteristics

Pierce Branch originates from wetlands in south-central Hillsborough County east of Wimauma and just south of State Road 674 (Figure 2). It flows for 5 miles until it

converges with the Little Manatee River. The primary land use in the basin is citrus and pasture, with a small amount of low density residential development.

❖ Methods

The site (LMAN14) is located in Pierce Branch, downstream of State Road 674 (Figure 2). The SCIs were collected by DEP Southwest District Office staff on February 22, 2012 and December 06, 2012. The SCI consists of collecting 20 D-frame dipnet sweeps (0.5 m in length) of the most productive habitats in a 100 m reach of stream. The organisms are sub-sampled, sorted, and identified to the lowest practical taxonomic level.

Periphyton (attached algae) was collected using DEP's Qualitative Periphyton Method (DEP SOP FS 7220). A total of 10 sample aliquots are apportioned across available habitats (snags, roots, leaf packs, vegetation and rock, excluding sediments) in a 100 m stream reach. To perform the method, a seasoned substrate is chosen, and algae is removed from a 9 cm diameter area and placed into a wide-mouth jar that was been filled with 100 ml of site water. Water and algae are mixed and a 4 ml aliquot is removed and placed into a centrifuge tube. Nine additional aliquots are sampled in this manner for a final volume of 40 ml.

❖ Results

The riparian zone was mostly natural and quite extensive, over 100 meters on the west and over 90 meters on the east. The in-stream habitat in this section of Pierce Branch was predominantly sandy bottom. In February and in December, there were three productive habitats comprising over 6% substrate available for invertebrate and fish use (snags, roots, and leaves). Less than 25% of the habitat was smothered by either sand or silt accumulation and water velocity was over 0.25 meters per second on both sampling days.

Table 1 summarizes the water quality measurements for February and December, 2012. Non-nutrient parameters were indicative of natural, unimpaired levels. TP and TN during these two samplings were higher than their respective Peninsula thresholds. However, for compliance with nutrient criteria, values are assessed as annual geometric means not to be exceeded more than once in a three year period (and are used in conjunction with biological information). As seen below, the flora and fauna assessment indicated that these nutrient levels supported a healthy, well balanced community.

Table 1. Water quality results for sampling events on 02/22/12 and 12/06/12 at Pierce Branch (LMAN14).

Analyte	Result 02/22/2012	Result 12/06/2012	Applicable Class III Water Quality Criteria (freshwater)
Field Temperature (°C)	20.34	19.68	
Field pH (SU)	7.22	7.26	≥6 and ≤8.5
Field Dissolved Oxygen (mg/L)	9.09	8.14	≥ 5.0
Field Specific Conductance (µmhos/cm)	190	231	Not to exceed 50% of background or 1275 µmhos/cm
Alkalinity (mg $CaCO_3$/L)	29	30	≥20
Color (PCU)	34	40	
Chlorophyll a (µg/L)	1.4	2.5	
Total Phosphorus (mg/L)	0.19	0.21	*0.12 mg/L
Nitrate+Nitrite (mg/L)	2	2	
Ammonia (mg/L)	0.03	0.01	
Total Kejldahl Nitrogen (mg/L)	0.33	0.34	
Total Nitrogen (mg/L)	2.33	2.34	*1.54 mg/L

* Chapter 62-302, F.A.C. , nutrient thresholds for the Peninsula Region, assessed as annual geometric means not to be exceed more than once in a three year period, used in conjunction for biological information.

The scores for the habitat assessment were 124 in February, and 128 in December, both of which were in the optimal range, indicating that habitat was not limiting the biological potential of the stream. Additionally, the extensive riparian zone indicates that much of the watershed has been minimally disturbed by human influences.

In February, the SCI score was 51 and in December it was 55, meeting the requirements of the FDEP's healthy status. The invertebrate community was quite diverse on both sampling dates, with several sensitive species. The riffle beetle, *Microcylloepus pusillus*, was the most abundant macroinvertebrate on both sampling dates, comprising 25.27% and 29.8% of the community in February and December, respectively.

The periphyton results indicated a healthy, well balanced algal community, supporting the ecological integrity of the stream. In February, the attached algal community in the stream consisted of 79% diatoms, 3% green algae with chlorophyll, 18% blue-green algae. In December the attached algal community in the stream consisted of 53% diatoms, 1% green algae with chlorophyll, 46% blue-green algae. The dominant diatom collected in February and December was *Planothidium apiculatum*. The most common alga that was not a diatom, in both February and December was *Schizothrix calcicola*.

In February, the Linear Stream Vegetation showed the presence of wild taro (*Colocasia esculenta),* water hemlock (*Cicuta maculata*) and dayflower (*Comelina sp*) within the stream reach. All three plants were found in December, but wild taro (*Colocasia esculenta*) was not as abundant. It is likely that it was washed out with the summer rains. Vegetation was present in low abundance (< 2 m^2 within the 100 m stretch) for both sampling events.

The Rapid Periphyton survey found no algal mats within the stream during either sampling event.

❖ Significance

TP and TN concentrations during these two samplings were higher than their respective Peninsula thresholds. However, for compliance with nutrient criteria, values are assessed as annual geometric means not to be exceeded more than once in a three year period (and are used in conjunction with biological information). As described in this report, the flora and fauna assessment indicated that these nutrient levels supported a healthy, well balanced community.

❖ Recommendations

It is recommended that continued water quality and biological sampling be performed, to determine if there are declining trends and whether the elevated TP and TN is persistent. Water quality and biological data for the Little Manatee River should be evaluated to determine if nutrient levels are negatively impacting downstream waters.

❖ References

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