EcoSummary

TMDL STUDIES

Itchepackesassa Cr upstream of Old Tampa Hwy

January 31, 2002

SUSPECT

BioRecon: A rapid, cost-effective screening mechanism for identification of biological impairment

For samples collected before June 8, 2004
All field and laboratory methods followed FDEP Standard Operating Procedures and met FDEP quality assurance/quality control standards.
For samples collected on or after June 8, 2004
All field and laboratory methods followed FDEP Standard Operating Procedures (SOPs) and met DEP quality assurance/quality control standards.

Purpose



Biological assessments were performed on Itchepackesassa Creek in order to gain further information on the biological health of the watershed for use in Florida's Watershed Management and Biocriteria programs. Because this watershed is on the State of Florida's Impaired Water Rule's Verified List for Total Maximum Daily Loading (TMDL) development, the results may also be used in determination of TMDL needs and priorities. The verified parameters of impairment are dissolved oxygen, and total and fecal coliforms. Biological methods are particularly useful in order to ascertain if low DO levels are indicative of natural conditions. If the aquatic community is not impaired, it may be concluded that low DO levels do not adversely effect the health of the system.

Two types of bioassessments developed by FDEP were utilized; Biorecon and Stream Condition Index (SCI). Biorecons are based on three measurements of the aquatic invertebrates present in the stream: the total number of different species (Total Taxa), the number of good water quality indicator species (Florida Index) and the total number of Ephemeroptera (mayflies), Plecoptera (stoneflies) and Trichoptera (caddisflies) species present (EPT). A stream scoring above the threshold value for all three of these measurements is considered healthy. If two of the threshold values are reached, the stream's health is considered ecologically suspect. If only one or none of the thresholds are reached, an impaired condition is concluded. The SCI is based on seven measurements that assess the ecological integrity of the invertebrate community. The SCIs require a greater sampling effort and are a more in-depth analysis of the entire aquatic invertebrate community. If the Index score falls between 27 and 33, it is considered excellent; if it falls between 21 and 26:

good; between 14 and 20: poor; and between 7 and 13: severely degraded.

Watershed Characteristics

Itchepackasassa Creek flows through northeastern Hillsborough County. It is a small tributary to Blackwater Creek which continues flowing to the Hillsborough River, joining the River just east of the Hillsborough River State Park. Its upper reaches drain the area around the City of Lakeland. The predominant landuse in the basin is cattle grazing, but in the headwaters industrial. commercial and urban landuses prevail. Hillsborough County acquired the major portion of the watershed downstream of Lakeland in the mid 1990s, and continues to lease the land to cattle ranchers. Itchepackesassa Creek was channelized many years ago for drainage purposes, and is beginning to return to a more natural streambed and riparian zone in some locations. There are two discharges into the headwaters in Lakeland: CSX Transportation discharges indirectly through Winston Creek, and Florida Juice discharges from October to May directly into the creek. Additionally, Plant City Waste Water Treatment Plant discharges to East Canal, which flows into Itchepackesassa Creek downstream of Knights Griffin Road.

The sampling location is in the headwaters of Itchepackesassa Creek, upstream of the Old Tampa Highway bridge in the City of Lakeland,. This is upstream of Florida Citrus, Inc.'s effluent (see the Ecosummary for Itchepackesassa Creek downstream of Kraft Rd.). Sampling was conducted in the sparsely wooded stretch that is just downstream of an open cow pasture. The creek was historically channelized, and at this location exhibits a small amount of return to natural sinuosity. It is a sandy bottom stream with a water velocity of about 0.25 m/s. The stretch flows alongside a private residence, and the riparian buffer zone is thin and contains many exotic and opportunistic shrubs and plants. Riparian zone disturbance is evident. The straightening of the channel results in frequent flooding during the rainy season, causing erosion of the banks and sediment loading into the water channel.

A biorecon was conducted on January 31, 2002. SCIs were performed on December 12, 2002 and Febuary 10, 2003. The SCIs were collected in conjunction with an intensive survey of water chemistry in the basin.

Results

Biorecon, 01/31/02 Water depth was only 0.3 m at the time of sampling. The creek had good in-stream habitat diversity, including snags, roots, leaf mats, vegetation, and shell rubble, but not very much of each. The habitat assessment score was 92 out of 160, which places it in the suboptimal category for habitat characterization. The suboptimal score was due largely to the fact that there was heavy siltation that tended to smother habitats, bank instability, reduced riparian zone and reduced in-stream habitat for aquatic invertebrates because of artificial channelization. Dissolved oxygen was 7.0 mg/l, conductivity was 254 umho/cm, pH was 7.1 SU and temperature was 21.0 deg. C.

The results of the biorecon indicated that Itchepackesassa Creek is impaired. Only one parameter exceeded its threshold value. Total taxa (25) exceeded the threshold of 18 but there were only three EPT taxa (threshold is 4) and the Florida Index taxa was only 2 (threshold is 10).

Stream Condition Index, 12/02/02 The habitat characterization was virtually identical to that done for the biorecon. However, there had been a heavy rain prior to the sampling day, and the water level and velocity were increased. Additionally, the water was quite turbid. Dissolved oxygen was 7.69 mg/l, conductivity was 187 umho/cm, pH was 7.18 SU and temperature was 16.9 deg. C.

The SCI scored an 11, which is in the very poor category. This was mainly because the invertebrate

taxa were dominated by the amphipod, *Hyalella azteca,* comprising 80% of the total number of individuals. *Hyalella azteca* is commonly dominant in areas with a lot of nutrients, and it is likely that they washed down from the aquatic vegetation upstream as the creek flowed through the cattle pasture upstream.

Stream Condition Index, 02/10/13 Once again, the habitat characterization remained unchanged. The water level was once again shin-deep, at 0.3 m. Dissolved oxygen was 9.88 mg/l, conductivity was 254 umho/cm, pH was 7.51 SU and temperature was 18.33 deg. C. The unusually high DO and the elevated pH may be indicating an algal bloom in the stream.

The SCI scored a 23, which is in the low end of the "good" category. Chironomids (midge taxa) and *Hyalella azteca* accounted for 91% of the total number of individuals, but managed to make it to the good category largely because the midges were quite diverse. Thus, the community was not dominated by a single taxa, as it was on 12/02/02.

Bioassessments performed at other locations in the Itchepackesassa watershed exhibited healthier results. These sites were further downstream from Lakeland where natural conditions have had some opportunity to return after historical channelization. These sites also have stable riparian buffer zones and faster water velocity.

Significance

The invertebrate community at this location in Itchepackesassa Creek is impaired, but the degree of impairment can vary depending on environmental conditions. In the summertime, nutrients from the cow pasture create algal blooms which affect the water quality of the stream as it flows downstream. During periods of heavy rain, rapid flooding tends to scour the in-stream habitats, displacing many organisms. Therefore, the invertebrate community has multiple sources of stress, and while during favorable conditions it can start improving, unstable environmental events do not allow for a permanent healthy and diverse fauna.

The FDEP's Impaired Waters Rule has identified dissolved oxygen as a parameter of concern for Itchepackesassa Creek. The DO measurements on the 3 sampling days were well above the State Standard of 5.0 mg/l. However, biological sampling at this site indicates that the invertebrate community is unstable. Hence, Itchepackasassa Creek does not maintain a healthty, well-balanced biological population in its headwaters.

Suggestions

The hydrology and natural habitat attributes of Itchepackesassa Creek have been altered drastically by channelization and urban development. Since Hillsborough County bought the majority of the watershed acreage outside of Lakeland, restoration projects have been initiated. Best Management Practices (BMPs) for cattle ranching are in place: the cattle are largely fenced away from the creek and a healthy buffer zone is maintained on both sides. However, there have been no improvements to the highly urbanized and industrial headwaters. The water quality of the creek appears to be most impaired by runoff from the City of Lakeland and point source discharges, and that is where restorative efforts should be focused.

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