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

**Purpose**

A field biorecon, short for bioreconnaissance, was performed in English Creek in order to gain further information on the ecological health of the watershed for use in the administration of Florida's Ecosystem Management Water Quality Assessment (EMWQAS) and Total Maximum Daily Loads programs. Surface water samples were also collected. All work conducted by EMWQAS was conducted according to established DEP standard operating procedures and quality assurance plans. 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. 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.

**Background**

English Creek is a sandy bottomed stream located in west-central Polk County and east-central Hillsborough County, on the border of the 2 counties. It flows into the North Prong of the Alafia River south of Hwy 60 in Hillsborough County. The drainage basin consists primarily of residential development, citrus groves and agriculture (mainly cattle). Historical water quality has revealed moderately high nutrients and fecal coliforms.
Results

The sample site was located upstream of the Coronet Street bridge. English Creek is a sandy-bottomed stream, with overlying muck and silt. At the time of sampling, it was sluggish and slightly turbid. The banks were moderately unstable and the majority of instream habitats were smothered. The riparian zone was quite extensive and natural, except for a section on the left bank. There was a fair amount of instream habitat, including snags, leaf mats and roots. The habitat score was 107 out of 160, placing it in the suboptimal category. Dissolved oxygen was above the State Standard of 5.0 mg/l (Rule 62 - 302 FAC), at 6.38 mg/l. Both total nitrogen (TN) and total phosphorus (TP) were excessive (2.8 and 1.6 mg/l, respectively), nitrate comprising the majority of TN (2.2 mg/l). Total and fecal coliforms were not in violation of the single day standard (Rule 62 - 302 FAC), but were excessive (1360 and 580 colonies/100 ml, respectively). The Biorecon easily surpassed all the thresholds for the three parameters, indicating a healthy aquatic invertebrate community, despite the nutrient and coliform loading.

Significance

The excessive levels of total and fecal coliforms and nitrates are most likely due to free use of the stream by cows, although there may also be septic systems in the area. The high concentration of TP may be a result of a discharge from Coronet, Inc., an animal-feed additive producing plant. The facility normally keeps their wastewater in holding ponds, but has a permit to discharge as needed during wet weather. These high levels of nutrients, while they may not present a health hazard, have the potential to stimulate algal blooms and vegetative overgrowths that may result in an imbalance of fauna and flora, periodic dissolved oxygen depletion and eutrophication. This may not be evident in the Alafia River until it reaches the estuary where velocity decreases and nutrients can accumulate in the sediments. The results of the biorecon assessment indicated that, at the time of sampling, English Creek met designated use for Class III surface water bodies. Coronet, Inc.'s discharge has had a history of toxicity and therefore may have periodic impacts on the macroinvertebrate community, but there was no evidence of impact at the present time.

Suggestions

The coliform and nitrate contamination can be mitigated by fencing cattle out of the stream. The cattle may also contribute to sediment loading and thereby smothering of instream macroinvertebrate habitat. Coronet, Inc., has been working to reduce the phosphate levels in their intermittent discharge. They are also investigating the source of their effluent toxicity and assessing the possible impacts on the aquatic community.
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For more information on the DEP Bioassessments program, please visit our website at http://www2.dep.state.fl.us/water/Slerp/bio/

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