A site map can be viewed by clicking on the report site name.

EcoSummary

Fairground Branch below Auto Shred Landfill

May 20, 2003

IMPAIRED

FLORIDA AMBIENT

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.

Introduction



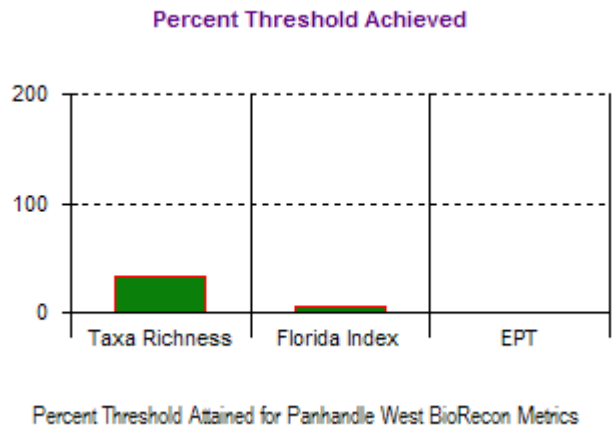
A bioassessment (BioRecon) was performed at this site (STORET station 33010124) to assess the impacts of Auto Shred Landfill facility to the biota and wildlife habitat in Fairgrounds Branch. This bioassessment was in technical support of a compliance action by the FDEP Northwest District's Waste Management Solid Waste Section. Fairgrounds Branch at the bioassessment site below Auto Shred landfill is located about a third of a mile due west of Mobile Highway, north of the Fairgrounds in Escambia County (Latitude North 30 degrees 28 minutes 55.1 seconds; Longitude West 87 degrees 19 minutes 1.3 seconds). The sample site is approximately 600 feet down gradient and due north of the Auto Shed landfill. It is a first to second order stream at the sample site

and its most distant headwaters originate about 2500 feet upstream above an old County borrow pit/landfill. Many springs flow along the steep gradients of upper Fairgrounds Branch. Fairgrounds Branch flows to Perdido Bay via Eight Mile and Eleven Mile Creek and drains the Gulf Coast Flatwoods of subecoregion 75a.

Results and Discussion

The BioRecon below the Auto Shred landfill indicated a severely impaired biological community. All 3 biological indicators failed thresholds established for a healthy aquatic wildlife community:

Biometrics	Value	Threshold
Taxa Richness	8	>= 24
Florida Index	1	>= 22
EPT	0	>= 17



The stream invertebrate community was dominated by pollution tolerant organisms, which included midges (bloodworms), worms, and beetles. Mayflies, stoneflies, and caddisflies, the normal components of a healthy stream were absent. The habitat assessment rated on the low end of suboptimal (99 out of 160 points or 62%). It would have rated a high optimal except that the iron/sulfur (Fe/S) bacteria bloom caused the lowest possible score (1) for substrate diversity, substrate availability, and habitat smothering. Fe/S bacteria covered virtually 100% of stream habitats leaving sheen on the water and sediments. When the Fairgrounds Branch's sediments were disturbed during sampling, water became very turbid with precipitated Fe/S bacteria as the flocculent sediments re-suspending rapidly into the water column. Iron was detected in Auto Shred's monitoring wells during June 2002 sampling event (highest well concentration was 19 mg/l at MW-6A, background well MW-5 at 1.12 mg/l). Surface water collected by facility monitoring during December 2002 reported elevated iron concentrations (31 mg/l at SW-1, Class III Surface Water Quality Standards for iron is 1 mg/l) in proximity to Fairgrounds Branch, prompting the request for this BioRecon. An adjacent homeowner's private well was also contaminated approximately eight years ago with iron and manganese, which brought about the home's connection to the public water supply. Aluminum and

manganese were not on the list of monitored parameters; however, they would be expected contaminates from automobile shredding waste. During rainfall events, the sediments and turbidity, as well as the documented iron and expected aluminum and manganese pollution loads, will eventually be transported from Fairgrounds Branch in the headwaters of Eight Mile Creek (a water body on the 1998 303(d) impaired waters list) to Perdido Bay. The sediments smother habitat necessary for productive aquatic systems. Turbidity clouds water over submerged aquatic vegetation resulting in its demise. Research has shown that iron is a contributor to algal bloom conditions, including red tide, in marine waters. Perdido Bay experienced fish kills caused by red tide blooms during 1996. Dissolved aluminum has been shown in field and laboratory experiments to have negative biological effects on aquatic organisms, such as reduced fish spawning and toxicity. Aluminum mobilization in acidic waters is thought to be an important contributory factor in the decline of fisheries in North America. Aluminum in an acidic groundwater can enter a stream and precipitate if the pH is above 5.5 standard units (s.u.) causing a physical toxicity to fish and coating the stream substrate. At pH 5.5 to 7 s. u., fish and invertebrates may be stressed due to aluminum adsorption onto gill surfaces and subsequent asphyxiation. Aluminum can impair ion regulation and augment the toxicity at pH 4.5 to 5.5 s. u. At the time of the BioRecon, pH measured 6.2 s.u. in this stream section. In addition to the Auto Shred landfill, the USGS topographic quadrangle indicated a mining pit, now a closed county landfill, located in the eastern headwaters of the many springs and tributaries along Fairgrounds Branch. Also, a private mining pit was located in the headwaters to the south. The numerous tributary streams following land contours are typical of hilly Florida panhandle watersheds (Fairgrounds Branch elevations range from approximately 20 to 100 feet above sea level).

Conclusions

The Fairgrounds Branch site did not meet Class III State Water Quality Standards 62-302 for recreation and the propagation and maintenance of a healthy, well-balanced population of fish and wildlife. The iron/sulfur bacteria bloom (note photograph) created by materials leaching from the Auto Shred landfill was the main contributor to this stream not meeting State designated use. Organic deposition from the Fe/S bacteria smothered wildlife habitat, which impaired the stream's fish and wildlife nursery function. Constituents in landfill leachate could cause chronic or acute toxicity to aquatic life in Fairgrounds Branch. The landfill leachate negatively impacted Fairgrounds Branch's fish and wildlife, through habitat smothering, organic loading and limited macro benthos. Historically, many landfills in the Northwest Florida began as pits excavated to mine clay, gravel, and sand for area road construction. These old mining pits were usually developed by excavating a headwater stream hillside to find the clay/gravel/sand material. This mining was commonly conducted without providing riparian buffer zones or using Best Management Practices to protect the watershed from erosion. Unfortunately, many of these old "borrow" pits dug into springs and groundwaters are now used as landfills. The area's naturally acid groundwater dissolves metals and other landfill material and transports these contaminants down gradient through

springs or groundwater to seep into Florida's surface waters. Landfill practices that could reduce water pollution to Florida panhandle streams include: locate landfills sufficiently far away from springs, streams, and high gradient areas; isolate existing landfill leachate onsite to prevent groundwater contamination that can migrate to State Waters through onsite springs; and maintain a greater than 18 meter buffer zone along riparian zones to stabilize groundwater levels and prevent sediment runoff.

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