EcoSummary

Elevenmile Creek @ Klondike Landfill
West of well site DW_6S & DW_6I
May 3, 2006

FAIL

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.

Purpose



A bioassessment was performed at this site to assess the impacts of theclosed Klondike Landfill on the biota and wildlife habitat in Eleven Mile Creek. A background bioassessment for comparative purposes was also performed just upstream above Highway 90. This bioassessment was in technical support of a compliance action by the FDEP Northwest District's Waste Management Cleanup Section. Monitoring reports found iron concentrations at the point of discharge of groundwater to Eleven Mile Creek exceeding the State surface water standard of 1 milligram per liter (mg/l) for iron (Florida Administrative Code Chapter 62-302). The last sampling event on file reported 16 mg/l iron at compliance well MW-5A, located just east of Eleven Mile Creek.

Watershed Characteristics

Eleven Mile Creek (STORET 33010135) at the bioassessment site (latitude North 30 degrees 29 minutes 8.4 seconds longitude West 87 degrees 20 minutes 44.5 seconds) is a fourth order stream that drains the Southern Pine Plains and Hills of subecoregion 65f. The site is just inside the Gulf Coast Flatwoods subregion 75a. The United States Geological Survey (USGS) measured flow was 66.4 cubic feet/second (cfs) recorded as

an annual mean during the 2000 water year, the most recent available data. This flow was recorded at U.S. Highway 90 less than a mile above the Klondike Landfill. Eleven Mile Creek headwaters originate from numerous hillside springs around a pulp mill site south of Escambia County Road 186. The watershed flows into Perdido Bay and since the 1970's, Eleven Mile has been designated Class III waters for recreation and maintenance of a healthy, well-balanced aquatic community. Eleven Mile Creek had national recognition for its fishing during the 1930's prior to the pulp mill being constructed in the 1940's. Eleven Mile Creek was classified as Class V for navigation, utility, and industrial use prior to the early 1970's.

Results

The BioRecon indicated a severely impaired biological community. All 6 biological indicators (biometrics) failed thresholds established for a healthy stream ecosystem:

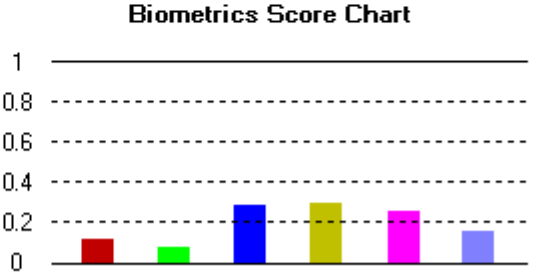
Biometrics	Metric Score
# TOTAL TAXA	0.12
# EPHEMEROPTERA TAXA	0.08
# TRICHOPTERA TAXA	0.29
# LONG-LIVED TAXA	0.3
# CLINGER TAXA	0.26
# SENSITIVE TAXA	0.16
TOTAL METRIC SCORE :	1.21
/ Correction Factor :	0.6
= BIORECON SCORE :	2

○ Pass 6 - 10
◉ Fail 0 - 5

ELEVENMILE CREEK @ KLONDIKE LANDFILL WEST OF WELL SITE DW_6S & DW_6I

BioRegion : Panhandle West

Sample Date : May 03, 2006



Eleven Mile Creek's macroinvertebrate community was severely degraded. Pollution tolerant hydropsychid caddisflies and midges were dominant. The very tolerant taxa comprised most of the sample. The Eleven Mile Creek Habitat Assessment rated between marginal and suboptimal (60%), down-graded by poor conditions of Habitat Smothering and Substrate Availability. The suspended solids loading smothered 99% of the fish and wildlife habitat. Observed sediment deposition consisting of fine organic sludge was severe. Substrate Diversity rated a marginal score. Right bank Riparian Buffer Zone Width and both bank's Riparian Zone Vegetation Quality rated suboptimal. Water Velocity, Artificial Channelization, Bank Stability, and left bank Riparian Buffer Zone Width rated optimal. Sediment odors were anaerobic with hydrogen sulfide. Water odors were chemical and pulp mill. Periphyton and iron/sulfur

bacteria were over-abundant.

Stream flow was only 41 cfs measured at the USGS gage at Highway 90 this sample date. The record low flow previously was 47 cfs. For perspective the upstream pulp mill discharge was about 30 cfs of wastewater. The dissolved oxygen (DO) concentration of 4.62 mg/l (4.3 mg/l at 0.7 meters depth) was in violation of the Florida Administrative Code 62-302.530(31), ("shall not be less than 5 mg/l"). The percent DO concentration was 54 % (50% at 0.7 meters depth). Water temperature was 23.5 degree centigrade. The DO concentration is expected drop as the water temperatures increase during June through September. Conductivity was 878 umho/cm compared to less than 50 umho/cm for area streams. The pH was 7.18, higher than the normal 5-6 standard unit range for normal background conditions. Water samples collected in a stream ("Klondike Branch") draining Klondike Landfill near monitoring well DW-6I and DW-6S had a DO of 5 mg/l, field conductivity of 495 umho/cm (557 umho/cm lab results), and pH 6.46 standard units. Both the Biochemical Oxygen Demand (4.7mg/l) and suspended solids (19 mg/l) were very high, indicating groundwater contaminations. Iron concentrations (6.76 mg/l) exceeded the State surface water standard of 1 mg/l (Florida Administrative Code Chapter 62-302). "Klondike Branch" was orange colored from a bloom of iron/sulfur bacteria with a chemical water odor typical of landfill leachate.

Significance

This Eleven Mile Creek site did not meet Class III State Water Quality Standards 62-302 for recreation and propagation and maintenance of a healthy well-balanced population of fish and wildlife. The site's macroinvertebrate community was severely degraded because industrial wastewater flow made up approximately 73% of Eleven Mile Creek at Highway 90. The pollution tolerant macro-invertebrate community essentially has not changed since biomonitoring in 1974.

Conclusions

Although iron enriched landfill leachate was found in "Klondike Branch", its impacts were not locally apparent in the Eleven Mile Creek macroinvertebrate community at this site. The severity of industrial wastewater impacts to Eleven Mile Creek masked the landfill leachate's immediate affects at this location. However, the leachate exerts a pollution load to Perdido Bay downstream. BOD and suspended solids contribute to the oxygen depletion in the Bay, while iron, a nutrient, can stimulate red tide and other algal and bacteria blooms. Streams with similar observations of landfill impacts (Niceville Okaloosa County http://water.dep.state.fl.us/eswizard/ecosummary.asp?id=629, Central Walton County http://water.dep.state.fl.us/eswizard/esdata/pdfs/149.pdf, Mudhill Washington County, http://water.dep.state.fl.us/eswizard/esdata/pdfs/191.pdf etc.) had severe biological impairment. To determine the landfill leachate's environment impacts to State Waters, a bioassessment of "Klondike Branch" would be required because of the severely polluted background condition of Eleven Mile Creek.

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For more information on the DEP Bioassessment programs, please visit
our web site at http://www.dep.state.fl.us/water/bioassess

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