EcoSummary

Mill Bayou Creek above Alva Thomas Road

February 17, 2009

FAIL

ENFORCEMENT ASSMNTS

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



This bioassessment was requested by the FDEP Water Facilities Potable Water Section enforcement staff to monitor recovery of Mill Bayou Creek two years after a 2007 discharge of water containing ferric sulfate filtrate from the Bay County Utilities Service Water Treatment Plant (BCUS WTP). After the spill in 2007, BCUS WTP, as agreed to by FDEP in consent order OGC No. 08-0222-03-PW executed on November 18, 2008, opted for a "natural attenuation" restoration strategy. A 2008 BioRecon by a consultant for Bay County found essentially the same biota and also had a failed BioRecon Score of less than one as did the FDEP 2007 bioassessment performed two weeks after the spill http://water.dep.state.fl.us/eswizard/ecosummary.asp?id=756 .

Watershed Characteristics

Mill Bayou Creek at the bioassessment site (STORET 32030040) is located in Hiland Park about 1.5 miles north of Panama City in Bay County just east of U.S. Highway 231 (N30 degrees 12 minutes 30.1 seconds W85 degrees 36 minutes 2.4 seconds). It is a third order stream draining forest, residential, commercial, and industrial areas in the Gulf Coast Flatwoods Ecoregion 75a. Its headwaters originate over 2 miles upstream in

wetlands above the sample site. Mill Bayou Creek flows into Mill Bayou, North Bay just below the Deer Point Lake dam, and St. Andrews Bay before reaching the Gulf of Mexico. Mill Bayou Creek is designated Class III waters for recreation and maintenance of a healthy, well-balanced aquatic community.

The Mill Bayou Creek watershed is undergoing rapid development, which is expected to further degrade biological and water quality. The forest and wetlands that filter and convey stormwater into groundwater are being replaced with impervious surfaces. The resulting runoff from urbanization will cause additional impairment to the stream's hydrological and biological functions.

Results

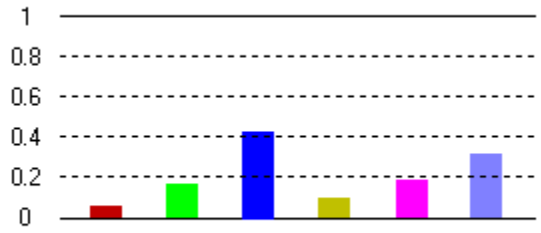
This bioassessment indicated the biological community was still severely impaired, scoring only 2 out of 10 for the BioRecon Score. This was only a slight improvement from the 1 out of 10 BioRecon Score in 2007. All 6 biological indicators again failed thresholds established for a healthy aquatic wildlife community:

Biometrics	Metric Score
# TOTAL TAXA	0.06
# EPHEMEROPTERA TAXA	0.17
# TRICHOPTERA TAXA	0.43
# LONG-LIVED TAXA	0.1
# CLINGER TAXA	0.19
# SENSITIVE TAXA	0.32
TOTAL METRIC SCORE :	1.27
/ Correction Factor :	0.6
= BIORECON SCORE :	2

○ Pass 6 - 10
◉ Fail 0 - 5

MILL BAYOU CREEK ABOVE ALVA THOMAS RD.

BioRegion : Panhandle West
Sample Date : Feb 17, 2009



The 2009 macroinvertebrate community at this Mill Bayou Creek site consisted of a total of 18 taxa in 144 individual organisms collected. Some of the macroinvertebrates had iron-like precipitate covering their exoskeletons. The site was still severely impaired, although the total taxa doubled and productivity increased 92% from the very depauperate community found in 2007 (12 macroinvertebrates collected). The long-

lived, sensitive stoneflies, abundant in clean Bay County streams were conspicuously absent. The stream velocity (0.5 meters/sec) was ideal for stoneflies and their preferred habitat (woody debris/leaf packs) was available. A South Fork Creek BioRecon sample 11.5 miles to the northeast in Bay County in the same Gulf Coast Flat Woods ecoregion draining to North Bay found 44 taxa in 155 individual organisms. Stoneflies were dominant here with 35 individuals collected (23%) including 6 taxa. Five taxa of stoneflies with 22 individuals (16%) were collected on Hester-Dendy multiplate samples in the headwaters of Bayou George Creek, the adjacent stream 8 miles to the northeast. A Moccasin Creek BioRecon site 14 miles to the north also draining into the North Bay had 25% stoneflies.

A few of the taxa collected in this stream sample are usually found in ponds. *Anax* and *Pachydiplex* are pond dwelling dragonflies. The *Anax* is the first collection in a flowing panhandle stream in 33 years of monitoring by the Northwest District. The damselfly *Enallagma*, which prefers ponds and backwaters, was common. One each of the caddisflies *Oecetis* and *Trianodes,* common in ponds and slow sections of streams were collected. Other collected macroinvertebrates common in ponds included midges, water mites, and worms, which are all ubiquitous in aquatic habitats. Collection of so many pond dwellers in a swift flowing stream suggests they were washed from upstream ponds.

The Habitat Assessment improved to 78% from 54% with significant improvements for Habitat Smothering (100% to 50%), Substrate Diversity (0 to 14), and Substrate Availability (0 to 11%). Water Velocity, Artificial Channelization, Bank Stability, Left Bank Riparian Buffer Zone Width, and Riparian Zone Vegetation Quality rated "Optimal". Substrate Diversity, and Right Bank Buffer Zone Width, rated "Suboptimal". Substrate Availability and Habitat Smothering improved to a "Marginal" rating. These improvements suggest that the habitat for the invertebrate community was adequate to find a healthy condition.

The dissolved oxygen concentration (DO) improved to 9.02 mg/l at 83% saturation. The water temperature was cooler at 11.7 degrees centigrade. The pH (5.09) was about the same. The conductivity was lowered to 68 umhos/cm. Water odors were normal without visible surface oils. (See 2007 ecosummary for comparison: http://water.dep.state.fl.us/eswizard/ecosummary.asp?id=756)

The water was clear and tannic with visibility to the bottom (Secchi 1.5 meters). However, during sample sorting, the clear stream turned an opaque light gray color from 1155 to 1300 hours. The turbidity reported to the FDEP Panama City Branch office (PCBO) manager for investigation and the PCBO found a turbidity exceedence (117 NTU versus background of 2 NTU). The slick gel-like red muck sediments that blanketed 100% of the stream channel after the 2007 spill was now at 1%, limited to

backwaters and buried under a new layer of sand. Sand now covered 89% of the channel with 4% root/undercut banks, 3.5% leaf pack/mats, and 2.5% woody material habitat. The sediments were anaerobic with a hydrogen sulfide odor in areas containing buried ferric sulfate filtrate material. Sulfate in the absence of oxygen converts to hydrogen sulfide, a toxic substance. Also, high concentrations of iron can disrupt cell membranes and DNA of aquatic life and precipitated iron smothers the gills of fish and aquatic macroinvertebrates (SETAC 2003) http://abstracts.co.allenpress.com/pweb/setac2003/document/31346 . In addition, the ferric sulfate filtrate removes contaminants (e.g. algae, bacteria, oil, and grease etc.) in the Deer Point Lake impoundment for the BCUS potable water system.

The PCBO reported a 9 inch rain event and a local resident reported the creek had flooded over the Alva Thomas Road Bridge during the past year. This spate had flushed much of the ferric sulfate filtrate material down to Mill Bayou or buried it under a new layer of sand. This homeowner living on Mill Bayou Creek at Alva Thomas Road since 1962 observed that the water was periodically cloudy during dry weather since the opening of the BCUS WTP.

Conclusions

The February 17, 2009 turbidity event is under investigation by the PCBO office and its source is yet to be officially determined. One possible source, however, is continued discharges/overflows of the BCUS WTP treatment ponds. The stormwater treatment ponds were constructed on the banks of a channelized Mill Bayou Creek tributary passing through the BCUS WTP property and the process treatment ponds at the head of a tributary that begins at facility. The ponds had been documented to overflow during 2007, 2008, and the 1990's through FDEP compliance and enforcement actions. A turbidity complaint investigation by the PCBO during February 2008 found the BCUS WTP stormwater ponds overflowed twice in one week.

A light gray residue similar to that seen during the February 17, 2009 turbidity incident was observed and photographed along the stream bank at the BCUS WTP fence line on March 17, 2009. A large pump, new berms, hay bales, and turbidity curtains were noted and photographed along the stormwater treatment ponds constructed along the creek bank during a March 17, 2009 site visit. Catastrophic bank failure from overflowing ponds can be caused by heavy rainfall events and it is a common safety precaution to drain pond water prior to predicted rainfall. A National Weather Service advisory for possible severe weather was announced on February 18, 2009. It was the previous day during dry weather conditions that the opaque light grey turbidity was observed in Mill Bayou Creek at Alva Thomas Road during the noon hour. It appears these turbidity events are human influenced discharges as they were not related to a rain event.

The Mill Bayou Creek site still did not meet Chapter 62-302, Florida Administrative Code Class III State Water Quality Standards for recreation and the propagation and maintenance of a healthy, well-balanced population of fish and wildlife. While the habitat assessment and dissolved oxygen improved over the 2007 results, biota scores had not. In view of the transient turbidity which was noted during this visit, it is reasonable to postulate that such events along with the ferric sulfate filtrate sludge may be limiting recovery of the biological community.

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