EcoSummary

Pine Forest Lane Branch below Tindle Enterprises Clay Mine

February 3, 2008

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.



Introduction

A BioRecon was conducted at this site to assess the impacts of the Tindle Enterprises sand mine operation on the biota and wildlife habitat in Pine Forest Lane Branch (un-named stream on the USGS map - name chosen because Pine Forest Lane was the only mapped landmark). This bioassessment was in technical support of an enforcement case (Consent Order OGC #08-0823-66-DF) by the FDEP Northwest District Submerged Lands Environmental Resource Permitting (SLERP) program.

Watershed Characteristics

The bioassessment site at Pine Forest Lane Branch (Lat 30 degrees 36 minutes 20.8 seconds Long -86 degrees 03 minutes 26.4 seconds) was located less than 7 miles southeast of De Funiak Springs in Walton County, north of Rock Hill Road. The sample reach (STORET 32020251) was directly below a gully discharging turbid waters and sediment runoff from a sand mine dug into a hillside. The Pine Forest Lane Branch watershed drains hilly land of subecoregion 65f (Southern Pine Plains and Hills). This second order stream flows to Mill Creek, Bruce Creek, and Choctawhatchee River before entering Choctawhatchee Bay. Land use in the Pine

Forest Lane Branch watershed according to Northwest Florida Water Management District maps (1995) was Pine plantations, shrub and brushland, upland pine forest, mixed hardwood and pine forest, wetland mixed forest, freshwater marshes, extractive (mining), commercial and services, electricity transmission lines, roads, and low density residential areas.

Results

The bioassessment indicated an impaired biological community, scoring only two out of 10 for the BioRecon Score. The site failed all six biological indicator thresholds established for a healthy aquatic wildlife community:

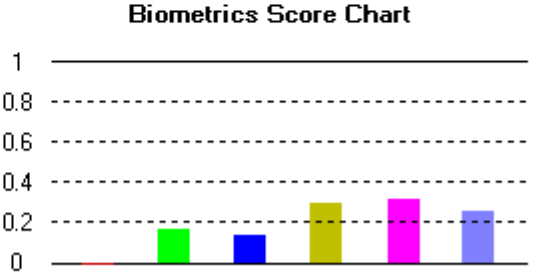
Biometrics	Metric Score
# TOTAL TAXA	0
# EPHEMEROPTERA TAXA	0.17
# TRICHOPTERA TAXA	0.14
# LONG-LIVED TAXA	0.3
# CLINGER TAXA	0.32
# SENSITIVE TAXA	0.26
TOTAL METRIC SCORE :	1.19
/ Correction Factor :	0.6
= BIORECON SCORE :	2

○ Pass 6 - 10
◉ Fail 0 - 5

PINE FOREST LANE BRANCH BELOW TINDLE ENTERPRISES CLAY MINE

BioRegion : Panhandle West

Sample Date : Feb 03, 2008



Just 26 total benthic macroinvertebrates were found in the 100-meter sample reach below the sand mine blowout due to the severe sedimentation from that smothered stream habitat. For comparison, over 129 organisms were collected in the background 100-meter reach a few meters above this site. The downstream Total Taxa richness was ten compared to 29 taxa found a few meters upstream in the background. Only two mayfly Ephemeroptera Taxa (mayfly) and one Trichoptera Taxa (caddisfly) were collected downstream while six mayfly taxa and five caddisfly taxa were found upstream. Three Long-Live Taxa were collected downstream while seven were found upstream. Clinger Taxa had five present downstream and nine upstream. Five Sensitive Taxa were found downstream compared 11 were collected upstream. The EPT (mayflies, stoneflies, and caddisflies), the basis for a well-balanced Florida panhandle stream community had only five of these clean-water indicators downstream compared to 13 collected upstream in the background. The Florida Index, another measure of sensitive taxa was lowered to six downstream compared to 15 upstream. Stoneflies, the most important clean water indicator comprised of only three specimens downstream while 18 were collected upstream.

The Habitat Assessment rated marginal (53%), downgraded by poor conditions of Habitat Smothering (near 100%), Substrate Availability, Substrate Diversity, and Bank Stability. The habitat smothering increased downstream of this reach so that much of the riparian forest was destroyed by sediment deposition. The sediment deposition extended into the slope forest killing some of the Beech/Magnolia forest including mature four inch diameter mountain laurel. Riparian Zone Vegetation Quality rated

suboptimal. Artificial Channelization, Riparian Buffer Zone Width, and Water Velocity rated optimal.

The dissolved oxygen (DO) concentration was 8.76 mg/l with the percentage DO saturation at 86.Both were comparable to the upstream site. Water temperature was 15.3 degrees centigrade, also similar to the background, as was the pH at 4.08 standard units.

Sediment and water oils were absent. Sediments and water had an odor of iron. The water was clear, but turbid after disturbance. Iron/sulfur bacteria was common. Periphyton was rare and macrophytes absent. Fish were rare as only one madtom was observed. One salamander also was seen. The rainfall recorded at Eglin Air Force Base from 2005 to 2008 has been below normal. Annual 2008 rainfall was slightly below normal to date.

Conclusions

This Pine Forest Lane Branch site below Tindle Enterprises 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 BioRecon scored only two out of 10 while the background a few meters upstream scored six out of 10. The major reason for biological impairment of stream health was the lack of habitat due to smothering by mine sediment runoff. This site had less than 1% available habitat compared to 65% habitat including woody debris, leaf pack/mats, and undercut banks/roots in the background reach a few meters above this site. Sediment impacts from the mine runoff extended downstream in Mill Creek and Bruce Creek. An increase in muddy conditions downstream at Bruce Creek State Road 81 was reported. The Northwest District Total Maximum Daily Load (TMDL) water quality monitoring team made this observation during their 2008 Choctawhatchee basin sampling.
Large woody debris, the most important fish and wildlife habitat in panhandle streams had less than 0.5% coverage compared a 13% coverage (reduced by logged riparian zone during the past 30 years) in the background reach. Proper addition of large woody debris (mature pine lasts longest) to create up to 40% coverage in the flowing stream channel would re-create additional riffle and pool habitat. Adding large conifer snags would be the easiest method to restore Pine Forest Lane Branch with riffles that re-expose buried logs by flushing sand and clay deposited by mining activities. Large pine logs work best for long-term bank stabilization and habitat creation while decaying hardwoods are preferred as food material for aquatic invertebrates. The reestablishment of natural hydrological conditions and restoration of the watershed's native Beech/Magnolia slope forest with mountain laurel understory and the Sweet Bay/Blackgum riparian forest buffer zone would improve Pine Forest Lane Branch health's. Native riparian and transitional streamside forest provide food and habitat (woody debris, leaves, root wads, terrestrial wildlife) for the stream's fish and wildlife. In addition to the canopy cover's shade cooling the water, which increases the dissolved oxygen concentration, the streamside forest anchors the stream banks, and contributes large snags that create riffles/pools vital to a healthy stream community.
Both Pine Forest Lane Branch and Mill Creek below the Tindle Enterprises mine discharge should have bioassessments (Stream Condition Index-SCI) conducted to monitor the effectiveness of the stream restoration efforts. Upstream sites in Pine

Forest Lane Branch and Mill Creek should be use as the baseline for the SCI samples with all four sites sampled annually until the mine affected sites return to background conditions found above the discharge.

For more information, please contact
Donald H. Ray
Northwest District Office
160 Government Center, Pensacola, FL 32502
(850) 595-8300 (Suncom 695-8300 x 1126)
E-mail: donald.ray@dep.state.fl.us

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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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