EcoSummary

Muscogee Creek above County Road 99

March 15, 2005

TMDL STUDIES

FAIR

Stream Condition Index (SCI): The standardized biological assessment tool used by FDEP biologist to indicate ecosystem health and identify impairment as compared to reference (natural) conditions of streams within the various ecoregions of Florida

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 2005 SCI was performed as a part of the FDEP Basin Rotation Group 5 (Perdido Basin) monitoring. This Group 5 Water Body Identification (WBID) 494 watershed drains a stream we call "Muscogee" Creek after the area's designation on Florida Department of Transportation and United States Geological Survey maps. A turbidity complaint during 1996-1997 had prompted compliance and enforcement procedures for dredge and fill activities by a pulp mill sludge disposal site on Muscogee Creek tributary. The Cantonment wastewater treatment facility during the early 1990's proposed to discharge its wastewater to Muscogee Creek, but was denied a permit by FDEP.

Watershed Characteristics

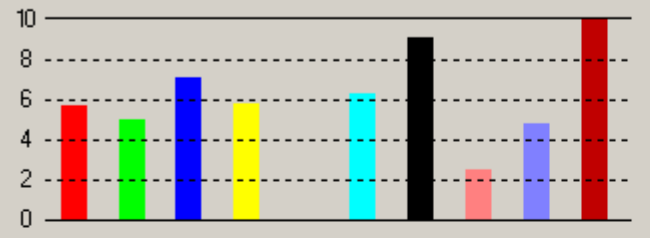
Muscogee Creek (STORET 33010114) at the bioassessment site (latitude North 30 degrees 35 minutes 21.9 seconds longitude West 87 degrees 23 minutes 44.8 seconds) is a third order stream that drains the Southern Pine Plains and Hills of

subecoregion 65f. The watershed is designated Class III waters for recreation and maintenance of a healthy, well-balanced aquatic wildlife community and flows into Perdido Bay via the Perdido River, an Outstanding Florida Water. Its headwaters begin above County Road 184 to the North, County Road 97 to the East, and Interstate-10 to the South (click on report site name to see map). Muscogee Creek's land use above this site was silviculture, pulp mill sludge disposal, and suburban/urban, associated with rapid population growth outside the Pensacola city limits.

Results

The SCI Final Score indicated a biological community with a fair condition Metric Score of 63 out of a possible 100 index points. The individual Metric Score of the Core Metrics rated very poor for # of Long-Lived Taxa and % Suspension Feeders/Filters, two of the biological indicator thresholds established for a healthy aquatic wildlife community:

MUSCOGEE CR BELOW CR99 BELOW CHAMPION FILL



BioRegion : Panhandle West

Sample Date : Mar 15, 2005

Good	73 - 100
Fair	46 - 72
Poor	19 - 45
Very Poor	0 - 18

Core Metrics	Value	0 - 10 Points	Metric Score
# TOTAL TAXA	35	16 - 49	5.76
# EPHEMEROPTERA TAXA	3	0 - 6	5
# TRICHOPTERA TAXA	5	0 - 7	7.14
# CLINGER TAXA	9	0 - 15.5	5.81
# LONG-LIVED TAXA	0	0 - 5	0
# SENSITIVE TAXA	12	0 - 19	6.32
% DOMINANT TAXON	13	43 - 10	9.09
% SUSPENSION FEEDERS / FILTERERS	12	1 - 45	2.5
% TANYTARSINI	4	0 - 26	4.88
% VERY TOLERANT	0	36 - 0	10
		TOTAL METRIC SCORE :	56.5
		/ Correction Factor :	0.9
		= SCI FINAL SCORE :	63

Macroinvertebrate Dip Net (20 sweeps, emphasizing most productive substrates)

Short-lived midges comprised over half the total individuals collected in the SCI sample. The EPT (mayflies, stoneflies, and caddisflies), the best indicators of a well-balanced aquatic insect community that populate Perdido Basin streams were only 20% of the total individuals collected. Only one specimen of the most common spring season stonefly was found. Four stonefly taxa were observed at this site during the early 1990's during monitoring for the proposed wastewater discharge. Stoneflies are Florida 's most sensitive aquatic macroinvertebrate order and an important fish food in panhandle streams. Fish were rated common as shiners, mad toms, and pygmy sunfish were observed in Muscogee Creek above the tributary draining the sludge disposal site. The % Suspension Feeders/Filters was reduced because of abundance of silt, iron/sulfur bacteria, and algae, which smothered their feeding devices (i.e. self-spun capture nets, appendages, mouth parts) and habitats.

The Habitat Assessment rated marginal (41%) from poor scores of Available Substrate (1%), Habitat Smothering (98%), and right bank Riparian Buffer Zone Width (3-6 meters). Substrate diversity rated marginal with only 2 productive habitats present. Water Velocity, left bank Riparian Buffer Zone Width, and right bank Riparian Zone Vegetation Quality rated suboptimal. Artificial Channelization, Bank Stability, and left bank Riparian Zone Vegetation Quality rated optimal.

The dissolved oxygen (DO) concentration was 7.2 mg/l with a DO saturation of 69%. Water temperature was 14.5 degrees centigrade with a pH of 5.6 standard units. Lab conductivity was 65 umho/cm, a little higher than readings typical of the Perdido River basin (less than 50 umho/cm).

Water quality parameter values appeared typical of panhandle waters, however, filamentous green algae and iron/sulfur bacteria blooms, along with organic silt smothered 98% of available habitat. This was an indication of stormwater runoff washing in nutrient loaded silt rather than continuous point source discharge to surface waters. The sediments were anaerobic with a musty and hydrogen sulfide odor. There was an abundance of iron/sulfur bacteria on the sediments with iron/sulfur bacteria sheen on the water's surface.

Significance

The wildlife community structure was shifted from the sensitive EPT community that naturally comprises Perdido Basin stream samples to a wildlife population of short-lived true flies. Nonpoint source runoff from urban development, silviculture, and sludge disposal activities, along with major sediment runoff caused by land clearing in this steep watershed, affected stream health of Muscogee Creek. Forest removal causing nonpoint source runoff and land development increasing the coverage of impervious surfaces in the watershed is expected to cause added impacts water quality. Dams in the watershed negatively affect water quality and could cause additional environmental damage through catastropic failure.

Suggestions

Maintain and restore a minimum 18-meter riparian buffer zone along Muscogee Creek's stream corridor. Design stormwater runoff infrastructure from developement to allow natural detention and water quality treatment before discharging to Muscogee Creek and its riparian zone. Protect the stream's water quality, biological integrity, hydrology, and geomorphology. This can be accomplished by requiring bridges instead of culverts for future stream road crossings, not permitting additional dams, and by removing the watershed's man-made dams. Muscogee Creek corridor's hydrologic and geomorphic conditions along with the biological and chemical characteristics should be analyzed by County officials to make appropriate watershed protection decisions. Stream Corridor Restoration: Principles, Processes, and Practices is a recommended technical reference manual that details stream corridor restoration techniques that can help improve streams considered degraded from erosion, sedimentation and excess nutrients. This manual by the Natural Resources Conservation Service, Washington, DC contains field-tested methods and approaches.

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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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