EcoSummary

Ten Mile Creek 50 meters North of Gallows Road
March 2, 2005

TMDL STUDIES

POOR

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 bioassessment was performed to verify biological impairment documented by a 1997 Ten Mile Creek Watershed Total Maximum Daily Load (TMDL) BioRecon. This site failed all three biometrics of that 1997 BioRecon conducted to assess the health of the biota and wildlife habitat in Ten Mile Creek. For this reason, Ten Mile Creek was included on the FDEP Basin Rotation Group 5 (Perdido Basin) Planning List of Impaired Waters. The FDEP planning list is an inventory of surface waters or segments in which impairment of one or more parameters is suspected and additional sampling is required to verify the suspected impairment(s). Stream Condition Index (SCI) assessments are required to verify biological impairment of a stream or water body segment (Rule 62-330.330). When impairment is verified, TMDLs will be developed, as provided in Subsection 403.067(2) in Florida Statutes, to determine reductions in the pollutants to obtain the water body's designated use.

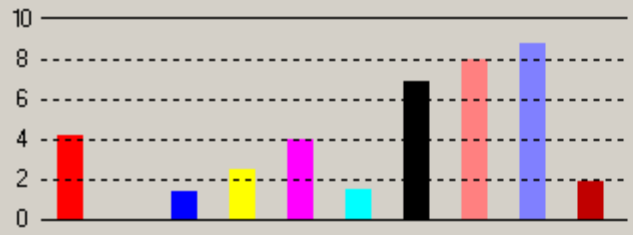
Watershed Characteristics

Ten Mile Creek (STORET 33010109) at the bioassessment site (latitude North 30 degrees 32 minutes 56.7 seconds longitude West 87 degrees 19 minutes 14.4 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 Eleven Mile Creek. Its headwaters begin along U.S. Highway 29 above Kingfield Road/CR186 north of Pensacola, Escambia County. Ten Mile Creek's land use above this SCI site below Pine Forest Road was rural 25 years ago and has experienced rapid urban sprawl.

Results

The SCI score indicated an impaired biological community with a poor condition metric score. The SCI final score of 44 of a possible 100 index points failed to meet biological indicator thresholds established for a healthy aquatic wildlife community:

TENMILE CR 50M N OF GALLOWS RD



BioRegion : Panhandle West

Sample Date : Mar 02, 2005

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

Core Metrics	Value	0 - 10 Points	Metric Score
# TOTAL TAXA	30	16 - 49	4.24
# EPHEMEROPTERA TAXA	0	0 - 6	0
# TRICHOPTERA TAXA	1	0 - 7	1.43
# CLINGER TAXA	4	0 - 15.5	2.58
# LONG-LIVED TAXA	2	0 - 5	4
# SENSITIVE TAXA	3	0 - 19	1.58
% DOMINANT TAXON	20	43 - 10	6.97
% SUSPENSION FEEDERS / FILTERERS	36.36	1 - 45	8.04
% TANYTARSINI	17.27	0 - 26	8.8
% VERY TOLERANT	17.27	36 - 0	1.93
	TOTAL METRIC SCORE :		39.57
	/ Correction Factor :		0.9

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

= SCI FINAL SCORE : 44

Ten Mile Creek's macroinvertebrate community was impaired by habitat damage and destruction from sedimentation caused by stormwater runoff. Midges and tolerant organisms replaced the sensitive stonefly, mayfly, and caddisfly community found naturally in panhandle streams. Recruitment and recolonization of these sensitive macroinvertebrates was limited because the downstream Eleven Mile Creek aquatic wildlife community has been severely degraded by paper mill waste since the early 1940's. Water quantity rather than quality had the most destructive impact to Ten Mile Creek. This was because of the increased amount of impervious surfaces in the watershed and elimination of wetlands by development projects. The larger area of impervious land surfaces decreased rainfall percolation into the watershed's groundwater. This increased stormwater runoff volume and stream flow, which caused bank erosion and channel sedimentation. Water quality parameter values appeared typical of panhandle waters, although there was a slight anthropogenic increase in a few parameters such as calcium. For comparison, see Churchhouse Branch in the chart below, which had been historically drained for silviculture and had a sanitary landfill located on its headwaters.

PARAMETER	UNITS	Ten Mile Creek	Churchouse Branch
Date		3/2/2005	3/9/2005
Water Temperature	degrees C	13.86	12.98
Turbidity	NTU	3	2
Color	Pt-Co	50	28
Dissolved Oxygen	mg/l	13.76	8.24
% DO Saturation	%	100	77.9
BOD 5 day	mg/l	0.6	0.6
pH	units	5.75	5.56
Residue, nonfilt.	mg/l	8	less than 5
Alkalinity	mg/l CACO3/L	4.7	less than 0.65
Calcium	mg/l	2.6	0.84
Fluoride	mg/l	0.05	less than 0.05
Magnesium	mg/l	0.69	0.51
Potassium	mg/l	1.1	0.71
Sulfate	mg SO4/L	3.5	2.2
Ammonia-N	mg/l	less than 0.01	less than 0.01
Kjeldahl Nitrogen	mg/l	0.24	0.18
Total Phosphate	mg/l	less than 0.02	less than 0.02
Total coliform	#/100 ml	52	72
Fecal coliform	#/100 ml	36	23

The site's Habitat Assessment rated a poor score of 41%. Water Velocity, left bank Riparian Buffer Zone Width, and Riparian Zone Vegetation Quality rated suboptimal. Substrate Diversity, Artificial Channelization, and Bank Stability were marginal. Substrate Availability, Habitat Smothering, and right bank Riparian Buffer Zone Width rated a poor score. Increased runoff volume from the watershed's increased amount of impervious surface reduced Ten Mile Creek's fish and wildlife habitat.

Significance

Biological impairment is verified by this SCI. TMDL development to reduce pollutant loading will proceed according to the Impaired Waters Rule, Chapter 62-303, Florida Administrative Code. Ten Mile Creek 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. State and local government stormwater and wetland permitting requirements for urban development of the watershed have not protected Ten Mile Creek from impairment to its designated use for recreation and fish and wildlife habitat. The first Northwest District stormwater permit requiring a retention pond was issued during the early 1980's for a subdivision adjacent to Ten Mile Creek and Pine Forest Road. The Pine Forest Road bridge over Ten Mile Creek was replaced with culverts and fill material during that time frame. This caused severe erosion from the culverts' hydraulic "cannon" affect of washing away the banks downstream of Pine Forest Road. Many Ten Mile Creek tributaries have been historically filled for subdivisions and/or impounded. A stream restoration project by Escambia County was slated for this sample site in response to a flooded home built on the channel of an upstream second order tributary.

Suggestions

Ten Mile Creek did not meet Class III State Water Quality Standards for biological health because of the large volume of stormwater runoff and physical changes it caused to the stream's geomorphology. Restoration of wetlands in the watershed and re-design of the stormwater runoff infrastructure to allow natural detention and water quality treatment before discharging to Ten Mile Creek is needed to meet State Standards. Stream channels should be restored and riparian buffer zones re-vegetated. Culverts, which affect Ten Mile Creek natural fluvial geomorphology, should be replaced with bridges that span its wetland riparian zone. Ten Mile Creek corridor's hydrologic and geomorphic conditions along with the biological and chemical characteristics in this report should be analyzed to make appropriate restoration 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 hydrological modifications. 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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