EcoSummary

Alligator Creek below Crabtree Church Road

February 23, 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 bioassessment was performed to verify biological impairment documented by a 1997 Alligator Creek BioRecon. This site failed two of three biometrics of that 1997 BioRecon, which was conducted to assess the health of the biota and wildlife habitat in Alligator Creek to assist an Escambia County dirt road paving project. For this reason, Alligator 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, a TMDL will be developed, as provided in Subsection 403.067(2) in Florida Statutes, to determine reductions in the pollutant to obtain the water body's designated use.

Watershed Characteristics

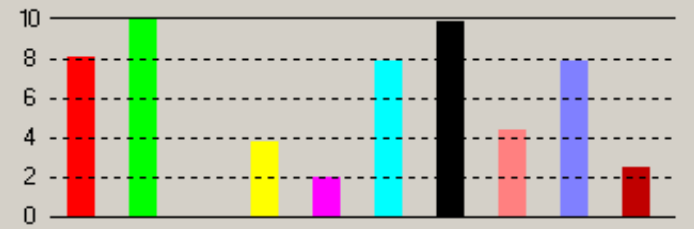
Alligator Creek (STORET 33010115) at the bioassessment site (latitude North 30 degrees 43

minutes 58.6 seconds longitude West 87 degrees 24 minutes 40.7 seconds) is a fourth order stream that drains the Southern Pine Plains and Hills of subecoregion 65f. Its headwaters begin just east of County Road 97, about four miles northwest of Molino, Escambia County. This area of the watershed is predominantly agriculture with increasing urban growth spreading from Pensacola. Much of the watershed's former riparian wetlands have been farmed with original stream channels dredged to drain the land. Numerous sites on Alligator Creek's tributaries have been dammed to create impoundments. The watershed flows into Perdido River near Barrineau Park, then Perdido Bay and is designated Class III waters for recreation and maintenance of a healthy, well-balanced aquatic wildlife community.

Results

The SCI Final Score indicated a biological community with a fair condition Metric Score of 63 of a possible 100 index points. The individual Metric Score of the Core Metrics rated poor to very poor for five out of ten biological indicator thresholds established for a healthy aquatic wildlife community:

ALLIGATOR CR @ CRABTREE CHURCH RD



BioRegion : Panhandle West

Sample Date : Feb 23, 2005

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

Core Metrics	Value	0 - 10 Points	Metric Score
# TOTAL TAXA	43	16 - 49	8.18
# EPHEMEROPTERA TAXA	7	0 - 6	10
# TRICHOPTERA TAXA	0	0 - 7	0
# CLINGER TAXA	6	0 - 15.5	3.87
# LONG-LIVED TAXA	1	0 - 5	2
# SENSITIVE TAXA	15	0 - 19	7.89
% DOMINANT TAXON	10.09	43 - 10	9.97
% SUSPENSION FEEDERS / FILTERERS	20.64	1 - 45	4.46
% TANYTARSINI	12.84	0 - 26	7.96
% VERY TOLERANT	13.76	36 - 0	2.52
		TOTAL METRIC SCORE :	56.85
		/ Correction Factor :	0.9
		= SCI FINAL SCORE :	63

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

Trichoptera (caddisflies), an important fish food, were conspicuously missing from this site rating a very poor metric score. Caddisflies, along with mayflies and stoneflies are the best indicators of a well-balanced aquatic insect community that populate Perdido Basin streams. The # Clinger Taxa and % Suspension Feeders/Filterers were few in numbers to rate low on their metric scores. Only one Long-Lived Taxa was collected, representing a poor metric score. The more tolerant short-lived true flies (Dipterans) comprised 58% taxa present to add to a poor metric score for % Very Tolerant. However, these 25 dipteran taxa boosted the % Dominant Taxon to a good metric score. The # Total Taxa and % Tanytarsini (Dipterans) only rate good because of the high number of short-lived Dipterans present. The good metric score for # of Ephemeroptera (mayflies), and # Sensitive Taxa may indicate some recovery from the artificial channelization upstream at the bridge. Water quality parameters seemed typical of the Perdido Basin streams except for ammonia (0.044 mg/l), bottom dissolved oxygen (DO) concentrations (5.67 mg/l), and percent DO saturation (59 %). Water quality monitoring results must be interpreted with care, as no other water quality samples were listed in STORET national database for Alligator Creek. The ammonia concentration was elevated and bottom DO/DO percent saturation were depressed in comparison to area streams. The ammonia maybe from animal carcasses dumped at the site, as it was too early in the season for farm and yard fertilizer application. The DO was affected by organic decomposition caused by dredging around the bridge. This hydrological alteration of the natural stream channel reduced Alligator Creek's water velocity. This allowed organic sediment deposition, which created an oxygen demand that lowered DO concentrations. The low percent DO saturation in this winter sample would indicate a potential DO violation of the State Water Quality Standards (5 mg/l) during warmer months. This site appeared to be serving as a local dumping ground. Rotting deer carcasses, full garbage bags, tires, tire strips, couch (note it in the photograph), and copy machine toner cartridges, were discarded in the stream and its wetland riparian zone. An upstream dam failure was observed in the attached 2004 aerial photograph on Alligator Creek's major tributary, about a mile northeast of this SCI monitoring site. Much of the failed dam sediments filled wetlands just below the impoundment, however fine organic sediments would be expected to affect this Alligator Creek site at Crabtree Church Road. Sedimentation was a severe problem prior to paving Crabtree Church Road. Dirt road sediment and agricultural runoff were observed smothering 88% of fish and wildlife habitat during 1997 before the road was paved. The 2005 Habitat Assessment rated marginal at 61% due to poor ratings of Available Substrate (4%) and Habitat Smothering (94%) by sand/silt. Left bank Riparian Buffer Zone Width rated marginal. Substrate diversity and Bank Stability rated suboptimal. Water Velocity, right bank Riparian Buffer Zone Width, Riparian Zone Vegetation Quality, Bank Stability, and Artificial Channelization at this reach rated optimal.

Significance

Biological impairment at this site was not verified by this SCI, although scoring poor or very poor on five out of ten biometrics negatively affected Alligator Creek's propagation and maintenance of a healthy, well-balanced population of fish and wildlife. The wildlife community structure was shifted from the sensitive caddisfly and stonefly community that naturally comprise Perdido Basin stream samples to a wildlife population of short-lived true flies. Impacts to stream health in the Alligator Creek watershed include dams and nonpoint source runoff from agriculture, urban

development, and silviculture. Dams not only inflicted damage from catastrophic failure, but also have an increased negative affect on watershed water quality as they age. Nonpoint source runoff also causes added impacts to stream water quality over time after forest removal and increased coverage of imperious surfaces.

Suggestions

Restore Alligator Creek's stream sinuosity and width/depth ratio to natural conditions near the bridge. This will increase fish and wildlife habitat availability along with water velocity, which will improve DO. Implement water quality monitoring for Alligator Creek since data is lacking for public health and growth management decisions. Prevent garbage dumping into Alligator Creek and its riparian zone at this site. Design development's stormwater runoff infrastructure to allow natural detention and water quality treatment before discharging to Alligator Creek. Restore altered stream channels by removing the watershed's man-made dams. Restore the natural stream corridor's riparian buffer zones along Alligator Creek and its tributaries. Maintain a minimum 18-meter riparian buffer zone along this stream corridor. Alligator 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 excess nutrients. This manual by the Natural Resources Conservation Service, Washington, DC contains field-tested methods and approaches.

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