EcoSummary

Churchhouse Branch South Fork
County Road 97
March 9, 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 1995 South Fork Churchhouse Branch (WBID 357) Watershed Total Maximum Daily Load (TMDL) BioRecon at this site. It failed all three biometrics of that BioRecon conducted to assess the health of the biota and wildlife habitat in the southeast tributary Churchhouse Branch. For this reason, Churchhouse Branch 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.

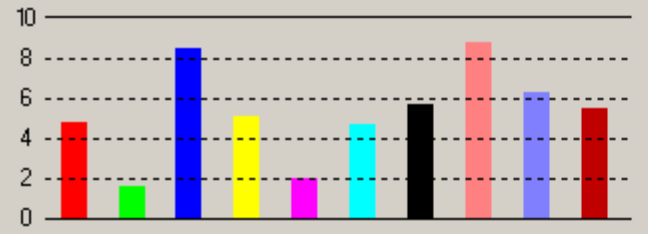
Watershed Characteristics

South Fork Churchhouse Branch (STORET 33010069) at the bioassessment site (latitude North 30 degrees 40 minutes 23.3 seconds longitude West 87 degrees 23 minutes 44.4 seconds) is a second order stream that drains the Southern Pine Plains and Hills of subecoregion 65f. This southeast tributary meets the main stem of Churchhouse Branch west of County Road 97 just north of this site. The main stem of Churchhouse Branch was hydraulically modified by a County Road culvert, which assisted dam building by beavers. 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. Its headwaters begin along east County Road 97 about 4 miles southwest of Molino, Escambia County. South Fork Churchhouse Branch's land use above west County Road 97 at the SCI site was mostly pine silviculture, a little crop and pasture land with light and medium residential area in the headwaters (see map above). Much of the watershed was clear-cut for silviculture just before the 1995 BioRecon. A former sand mine (USGS quad map) on a northeast tributary was used as a sanitary land fill (1999 FDOT map) that was converted to residential ponds. Recent plans by developers have included this watershed in a proposed community of 30,000 structures.

Results

The SCI Final Score indicated a biological community with a fair condition having a Metric Score of 59 of a possible 100 index points. Two of t he individual Metric Scores of the Core Metrics, Ephemeroptera (mayflies) and # Long-Lived Taxa, rated poor to very poor for the biological indicator thresholds established for a healthy aquatic wildlife community:

CHURCHHOUSE BR. SR97 NW OF CANTONMENT SOUTH FORK



BioRegion : Panhandle West

Sample Date : Mar 09, 2005

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

Core Metrics	Value	0 - 10 Points	Metric Score
# TOTAL TAXA	32	16 - 49	4.85
# EPHEMEROPTERA TAXA	1	0 - 6	1.67
# TRICHOPTERA TAXA	6	0 - 7	8.57
# CLINGER TAXA	8	0 - 15.5	5.16
# LONG-LIVED TAXA	1	0 - 5	2
# SENSITIVE TAXA	9	0 - 19	4.74
% DOMINANT TAXON	24	43 - 10	5.76
% SUSPENSION FEEDERS / FILTERERS	40	1 - 45	8.86
% TANYTARSINI	7	0 - 26	6.3
% VERY TOLERANT	4	36 - 0	5.53
		TOTAL METRIC SCORE :	53.44
		/ Correction Factor :	0.9
		= SCI FINAL SCORE :	59

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

Only one taxa of mayfly was present. Stoneflies, Florida's most sensitive aquatic macroinvertebrate order, were totally missing. The sensitive stonefly, mayfly, and caddisfly community that is the normal major component of healthy Perdido Basin streams comprised only 25% of the sample. However, the more tolerant short-lived true flies (Dipterans) comprised 59% of taxa present. The stoneflies and mayflies are an important fish food, and along with caddisflies, form the basis for a healthy, well-balanced aquatic wildlife community in the Perdido River basin. Shiners, salamanders, and a pygmy sunfish, were vertebrates observed in this sample reach.

The stream habitat assessment score was rated suboptimal at 79%. Substrate Availability (39% -22% roots), Water Velocity, Artificial Channelization (braided), and Riparian Zone Vegetation Quality (no invasive plants, some young Atlantic white cedar returning) rated optimal. Substrate Diversity, Habitat Smothering (40% silt), Bank Stability, and Riparian Buffer Zone Width (silviculture) scored suboptimal.

The water was tannic in color, clear (secchi visible on the bottom at 0.3 meters), had no surface oils and normal odors. Sediment odors were normal with no sediment oils or iron/sulfur bacteria observed.

Water quality parameter values appeared typical of panhandle waters except for slightly depressed dissolved oxygen (DO) saturation (78%) and DO concentration (8.2 mg/l) caused by a slightly elevated Biochemical Oxygen Demand (BOD) of 0.6 mg/l. Normal Perdido basin stream BODs are less than 0.5 mg/l. An increase in BOD consumes DO and lowers the saturation below the expected 100% reading in area streams.

PARAMETER	UNITS	Parameter
Date		3/9/2005
Water Temperature	degrees C	12.98
Turbidity	NTU	2
Color	Pt-Co	28
Dissolved Oxygen	mg/l	8.2
% DO Saturation	%	77.9
BOD 5 day	mg/l	0.6
pH	units	5.56
Residue, nonfilt.	mg/l	less than 5
Alkalinity	mg/l CACO3/L	less than 0.65
Calcium	mg/l	0.84
Fluoride	mg/l	less than 0.05
Magnesium	mg/l	0.51
Potassium	mg/l	0.71
Sulfate	mg SO4/L	2.2
Ammonia-N	mg/l	less than 0.01
Kjeldahl Nitrogen	mg/l	0.18
Total Phosphate	mg/l	less than 0.02
Total coliform	#/100 ml	72
Fecal coliform	#/100 ml	23

Significance

Biological impairment at this site was not verified by this SCI, although poor or very poor scores for 2 biometrics indicated negative effects on propagation and maintenance of a healthy, well-balanced population of fish and wildlife in Churchhouse Branch . It appeared forest re-growth after the clear-cutting observed during the 1995 bioassessment allowed some stream condition recovery. However, the wildlife community structure still had shifted from the sensitive stonefly and mayfly community that naturally comprise Perdido Basin stream samples to a population with more short-lived true flies.

Sedimentation from historical logging activities appeared as the major impairment. The stream channel was braided from sediments filling its normal course. In addition to the physical effects of sediment smothering, silt and organic material in runoff exert an oxygen demand from decay by microbial action. This increases the BOD and lowers the DO concentration in the stream. Silt had increased from 5% coverage in 1995 to 41% coverage in 2005. One observed sediment source in the sample reach was a gully created by an old logging road and/or ditch dug to drain wetland soils to grow pines. A dirt road crossing the stream (see aerial photo map above) above the sample site appears to have expanded from earlier aerial photographs and may be a source of sediments. Feral hog rooting activity was observed in the wetland soils, which could lead to mud/muck/silt and coliform runoff during rainfall events.

Additional water quality and biological impairments would have been documented if the bioassessment had been conducted on the main stem of Churchhouse Branch above or below west County Road 97. The impoundment at this site, which had been in place at least since the 1995, had altered the stream's water quality and biological condition.

It is important to protect Churchhouse Branch's stream health as massive urban growth is planned for this mostly rural watershed. Panhandle streams affected by developed lands are impaired by stormwater runoff. State and local government stormwater and wetland permitting Statutes for urban development of the watershed have not protected panhandle streams from impairment to their designated use for recreation and fish and wildlife habitat.

Suggestions

Preserve Churchhouse Branch's geomorphology by protecting the wetlands and limit the amount of impervious surfaces added to the watershed. Design existing and future stormwater runoff infrastructure to allow natural detention and water quality treatment before discharging to Churchhouse Branch. Maintain a greater than 18-meter riparian buffer zone along the stream and its tributaries. Use forestry Best Management Practices to prevent gully erosion and sediment runoff. Use bridges to span the wetland riparian zone at stream crossings instead of culverts, which alter the natural fluvial geomorphology.

The Churchhouse Branch corridor's hydrologic and geomorphic conditions along with the biological and chemical characteristics should be analyzed by local government to make appropriate decisions to protect stream health in light of planned development in the watershed. Stream Corridor Restoration: Principles, Processes, and Practices is a recommended technical reference manual that details stream corridor protection and restoration techniques that can help prevent and repair degradation 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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