EcoSummary

Garnier Creek Fort Walton Beach, Okaloosa County, above State Road 189

TMDL STUDIES

July 15, 2003

GOOD

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.

Introduction



This site failed all three biometrics of a 1998 BioRecon and historically reported bacteria sample results above the total coliform bacteria water quality standard. Coliform bacteria were the nonpoint pollution concern that originally listed Garnier Creek for Total Maximum Daily Load (TMDL) study in 1996. For these reasons, Garnier Creek was included on the FDEP Basin Rotation Group 3 (Choctawhatchee Basin) Planning List of Impaired Waters. The FDEP planning list is an inventory of surface waters or segments for 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 the Florida Statutes, to determine reductions in the pollutant to obtain the water body's designated use. This 2003 SCI was performed in partnership with the United States Fish and Wildlife Service (USFWS) to verify biological impairment documented by a 1998

Garnier Creek BioRecon at this same site (see ftp://ftp.dep.state.fl.us/pub/water/eco/tmdlgarnierc.pdf) For quality assurance and comparative purposes a BioRecon was also conducted along with this 2003 SCI assessment.

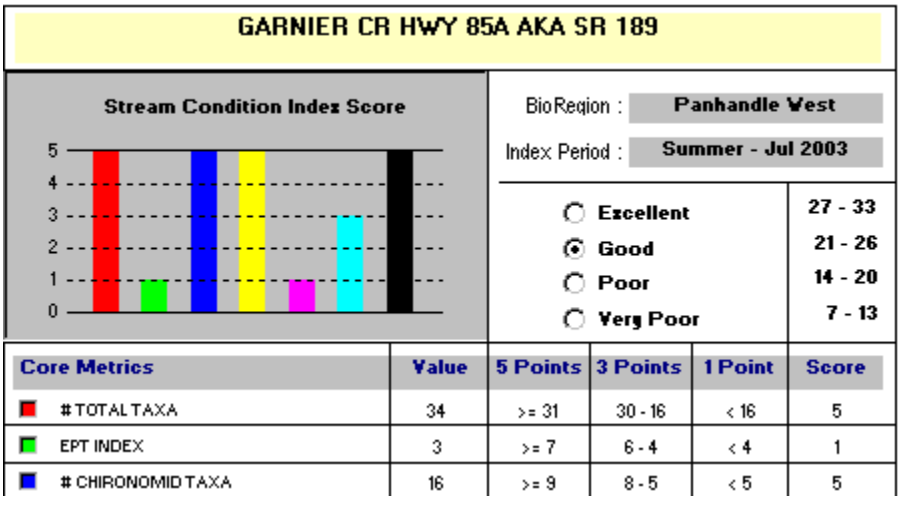
Watershed Characteristics

Garnier Creek is located in Okaloosa County north of Fort Walton Beach, and flows to Choctawhatchee Bay via Garnier Bayou. The sample site (STORET 32010005) is located (latitude North 30 degrees 28 minutes 50 seconds longitude, West 86 degrees 35 minutes 7.2 seconds) just above State Road 189. This subecoregion 75A watershed drains predominantly silviculture lands on Eglin Air Base?s weapons test range. Eglin's wastewater treatment plant sprayfield is located in the drainage. Cleared land for Eglin's Field #4 and major electrical transmission lines crossing Gainer Creek are potential nonpoint sources of runoff impacts. The watershed's soils are typically sandy and well drained. Air Force and Okaloosa County officials are currently considering home construction for military families near Garnier Creek. This could significantly change the watershed's land use. Garnier Creek is designated Class III waters for recreation and maintenance of a healthy, well-balanced aquatic community.

Results and Discussion

The FDEP SCI scoring is in the process of being converted through a study funded by an USEPA grant to a more statistically robust SCI_6 that compares biological condition to a human disturbance gradient (HDG). The new SCI scoring procedure records this site as poor (45 out of 100). The original SCI scoring system indicated a good condition with a score of 25 in contrast to the updated SCI_6 and the 2 failed BioRecon assessments shown below.

Original SCI Scoring System



Core Metrics	Value	5 Points	3 Points	1 Point	Score
# TOTAL TAXA	34	>= 31	30 - 16	< 16	5
EPT INDEX	3	>= 7	6 - 4	< 4	1
# CHIRONOMID TAXA	16	>= 9	8 - 5	< 5	5

# CHIRONOMID TAXA	16	>= 9	8 - 5	< 5	5
% DOMINANT TAXON	16.04	<= 22	23 - 61	> 61	5
% DIPTERA	55.66	-	<= 50	> 50	1
FLORIDA INDEX	14	>= 16	15 - 8	< 8	3
% SUSPENSION FEEDERS / FILTERERS	19.34	>= 12	11 - 6	< 6	5
Macroinvertebrate Dip Net (20 sweeps of most productive substrates)			SCI TOTAL SCORE :		25

SCI_6 Biometrics

Biometrics	Value	Score
% Very Tolerant	6.6	4.37
% Tanytarsini	30	10
% Filterers	19	4.17
% Dominant taxon	16	8.17
# Trichoptera taxa	0	0
# Ephemeroptera taxa	3	5
# Clinger taxa	5	3.23
# Sensitive taxa	5	2.63
# Long-lived taxa	1	2
Total taxa	34	5.45
SCI_6 Interim score	45	= Poor
Good	=	100 - 74
Fair	=	73 - 47
Poor	=	46 - 20
Very Poor	=	19 - 0

Macroinvertebrate communities at the site above State Road 189 were sampled on 08/04/98 and 7/15/03 from in-stream habitats by the FDEP BioRecon method. Both BioRecon indicated impairment to the Garnier Creek biological community. All 3 biological indicators failed to meet thresholds established for healthy aquatic ecosystems during 1998 and 2 out 3 failed in 2003:

BioRecon Biometrics	1998 Value	2003 Values	Interim Thresholds
Taxa Richness	21	27	> 24
Florida Index	13	10	> 22
EPT	5	9	> 17

Total coliform bacteria appeared elevated during 1998 and 2003 (1180 and 850 colonies/100 ml), but were within the water quality standard of a one-time count of 2,400-colonies/100 ml. However, the monthly average

water quality standard is 1000 colonies/100 ml, and the results suggest that repeated sampling during either of those months might have yielded an exceedance of the monthly water quality standard. Recent examination of the national water quality database, STORET, did not find reported total coliform bacteria count of 2,400-colonies/100 ml at any time that listed this site in 1996. Nitrite-nitrate concentrations were elevated (0.70 and 0.50 mg/l in 1998 and 2003 respectively). This could indicate the watershed's groundwater maybe affected by the Eglin wastewater facility. The lower nitrite-nitrate concentrations in 2003 might be due to dilution from the high rainfall amounts from Tropical Storm Bill during late June and early July, just prior to this biological assessment. This area had experienced a record drought during the 1998 May/June period with a hot July with scattered thundershowers. During June 2003 record rainfall was measured (14.48 inches at Eglin compare to normal 5.71 inches), at least temporarily breaking the area's 5-year drought. For July 2003 rainfall at Eglin was 12.86 inches (normal 7.8 inches), half of it falling during the first week associated with Tropical Storm Bill. The habitat assessment of the site rated 64% in 1998 and 66% in 2003. A score of 65% is an interim biometric threshold. Substrate availability was slightly reduced from 16% coverage in 1998 to 12% in 2003. Water velocity improved slightly due to the increased rainfall from 1998 to 2003. Habitat smothering increased to 88% in 2003 from 83% coverage of habitats with mud/muck/silt during 1998. The sediments had an anaerobic odor during both the 1998 and 2003 physical characterizations. The dissolved oxygen concentration decreased significantly from 7.24 mg/l in 1998 to 5.2 mg/l in 2003 (Water Quality Standard is 5 mg/l). An iron/sulfur bacteria growth was only observed under low flow conditions of the 1998 assessment.

Conclusions

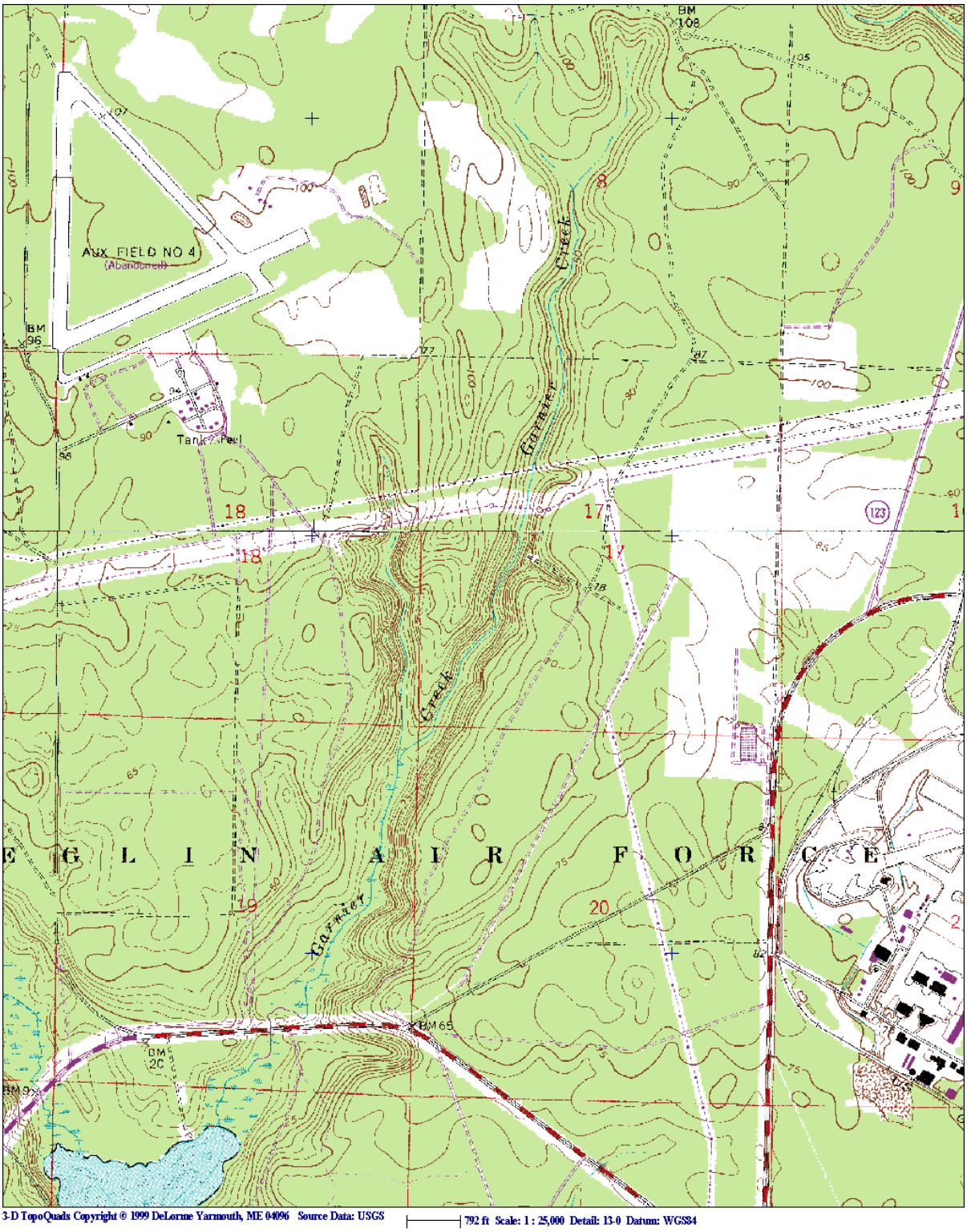
Although the obsolete SCI score characterized Garnier Creek in good biological condition, the 2 BioRecons, the updated SCI_6 scoring, physical/chemical characterization, and habitat assessment indicated this site did not meet Class III State Water Quality Standards 62-302 for recreation and the propagation and maintenance of a healthy, well-balanced population of fish and wildlife. Physical parameters such as habitat smothering with fine organic matter appeared to be caused by excessive loading from anthropogenic sources. Elevated coliform bacteria and nitrite-nitrate sources might be associated with Eglin's wastewater sprayfield located upstream from the sampling site. Typically the area's quartz sand soils (with high infiltration capacity) do not allow long water retention time, and are therefore not conducive to nutrient removal before reaching the water table. It is recommended that Garnier Creek be included on the verified list based on the observed biological effects.

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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

Garnier Creek Fort Walton Beach, Okaloosa County, above State Road 189



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792 ft Scale: 1 : 25,000 Detail: 13-0 Datum: WGS84