EcoSummary

Mill Creek Eglin AFB Golf Course below 17th Hole Bridge
June 19, 2007

FLORIDA AMBIENT

FAIL

BioRecon: A rapid, cost-effective screening mechanism for identification of biological impairment

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 biological assessment monitored the stream macroinvertebrate community in Mill Creek below the Eglin Air Force Base Golf Course Hole #17 bridge for a stream restoration project. This project was designed to restore habitat for the federally listed endangered Okaloosa darter (*Etheostoma okaloosae*), which is restricted to 6 small streams draining to Choctawhatchee Bay. Over 90% of the Okaloosa darter's stream habitat is found on the Eglin Air Force Base reservation. This project is the result of a partnership between the Eglin Natural Resources Branch, the U.S. Fish and Wildlife Service (USFWS), the Three Rivers Resource, Conservation and Development Organization, the Florida Fish and Wildlife Conservation Commission and the Eglin Golf Course. http://www.eglin.af.mil/news/story.asp?id=123056415

Watershed Characteristics

Mill Creek is a second order stream at the sample site (North 30 degrees 31 minutes 55.1 seconds West 86 degrees 29 minutes 12.8 seconds) located in the Gulf Coast Flatwoods subecoregion (75a). This site (STORET 32020121) is located on Eglin's golf course at Hole #17 bridge below College Boulevard (State Road 190) in the city of Niceville. Mill Creek originates in steephead springs north of State Road 190 northwest of Okaloosa-Walton Community College and east of State Road 85. Mill Creek flows through the Eglin Golf Course and Niceville to Boggy Bayou and Choctawhatchee Bay.

Results

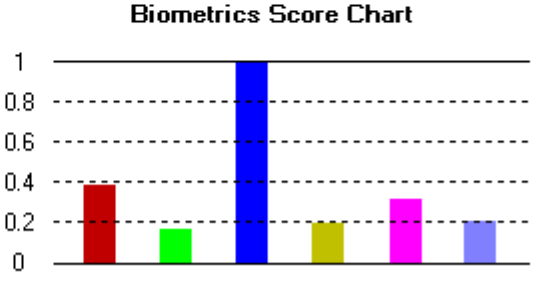
The bioassessment indicated an impaired biological community failing with a BioRecon score of 4 out 10. The site failed 5 of 6 Biometrics.

Biometrics	Metric Score
# TOTAL TAXA	0.39
# EPHEMEROPTERA TAXA	0.17
# TRICHOPTERA TAXA	1
# LONG-LIVED TAXA	0.2
# CLINGER TAXA	0.32
# SENSITIVE TAXA	0.21
TOTAL METRIC SCORE :	2.29
/ Correction Factor :	0.6
= BIORECON SCORE :	4

Pass 6 - 10
Fail 0 - 5

MILL CREEK EGLIN AFB GOLF COURSE BELOW 17TH HOLEJAX GRD STREAM RESTORATION PROJ.

BioRegion : Panhandle West
Sample Date : Jun 19, 2007



The Total Taxa (TT) 30, Florida Index (FI) 16, mayflies/stoneflies/caddis flies (EPT) 9 were significantly lower than found during 1998 (TT 47 FI 31 EPT 22) and 2000 (TT 44 FI 32 EPT 21) monitoring on the golf course at Hole #13 above College Boulevard. This contrast of biometric scores demonstrated the protection given by an 18-meter riparian buffer zone at the Hole #13 site (first yellow dot above College Boulevard on map viewed by clicking report site name title) compared to the 1-meter

or less buffer at this hole #17 site (see photo above). Tolerant taxa dominated (i.e. midges, biting flies, damselflies, and *Cheumatopysche* caddis flies) the Hole #17 site, whereas at Hole #13, more sensitive taxa (i.e. EPT) were most prevalent. Stoneflies, the panhandle's best water quality indicator were absent at Hole #17 however, 4 taxa were present and abundant upstream at Hole #13. This Hole #17 bioassessment was done in 3 replicates for the USFWS restoration study. The FDEP standard bioassessment sample reach is always 100 meters and within this reach two separate 10-meter replicates were collected for the USFWS study (Reach #4 and Reach #6). Replicate #1 (USFWS Reach #4) was the 0-10 meter reach furthest downstream and it almost completely characterized the macroinvertebrate fauna of the entire 0-100 meter restored channel sample reach (TT 26 FI 16 EPT 9). Replicate #2 (USFWS Reach #6) 50 meters upstream, the 60-70 meter sample reach was similar, but slightly lower on 2 of the 3 biometrics (TT 22 FI 15 EPT 9). Replicate #3 was the 10-60 and the 70-100 meter reaches combined, which scored slightly higher on TT and slightly lower on FI and EPT (TT 23 FI 13 EPT 8). The consistencies in the biometric scores for the individual sub-reaches of 100-meter composite sample reach demonstrated the redundancy that is characteristic of pollution tolerant stream communities.

Three young Okaloosa darters were observed in newly restored sample reach, mosquito fish, bass, spotted sunfish, and bluegill were common. Although it was encouraging to see darters migrating into this newly created stream channel, its population should be monitored for signs of stress. The Okaloosa darters had evolved in pristine ultra low conductivity/nutrient conditions of 6 area sand hill, steephead streams with near constant cool 20 degrees centigrade water temperatures characteristic of panhandle groundwater based streams. Okaloosa darters exposed to high nutrient and water temperatures present in golf course streams could be weakened enough to allow disease to develop that might be threat to this very localized population.

The Mill Creek Habitat Assessment rated marginal (50%), affected by poor conditions of Riparian Buffer Zone Width and Riparian Vegetation Quality. Substrate Diversity and Substrate Availability rated marginal. Habitat Smothering and Bank Stability rated Suboptimal. Water Velocity and Artificial Channelization rated Optimal.

The dissolved oxygen concentration (DO) at 0936 hours was 6.92 mg/l at 81% saturation. The water temperature was 23.63 degrees centigrade, pH 5.81, and conductivity was 39 umho/cm, elevated about 2 times the normal background of Eglin streams. Periphyton and aquatic macrophytes were common and Fe/S bacteria absent. Canopy cover had been removed for the golf course and was 100% open. Water odors were normal, but sediments were anaerobic from the organic matter created by the former golf course ponds at the site. The water was clear to slightly turbid after disturbance and slightly tannic in color (organic matter from the former ponds). The previous day had an inch of rain. Rainfall was about 14 inches below normal to date for 2007 and over 20 inches below normal for 2006. Both the 2000 and 2007 bioassessments were done during severe drought years.

Conclusions

This Mill Creek site on theEglin Golf Course below the Hole #17 bridge 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. However, the stream restoration work was in progress with a restored natural channel design in place. The restored streambed was stabilized by large pine logs and planted with native vegetation, which both created fish and wildlife habitat. The trees and other vegetation planted in the riparian zone will help filter golf course fertilizer/pesticide runoff. The trees will eventually provide shade to cool the stream water temperature, which increases dissolved oxygen concentrations that are vital to sensitive aquatic wildlife like darters and stoneflies. Post-channel restoration bioassessments should be made to confirm the continued recovery of the Okaloosa darter and Mill Creek's macroinvertebrate population.

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Published by the Florida Department of Environmental Protection
Tallahassee, Florida
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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