EcoSummary

FLORIDA AMBIENT

FAIL

Kelley Branch Below the Removed Paradise Lake Dam

February 14, 2008

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.

Introduction



This biological assessment monitored downstream affects from the dam/culvert removal and re-construction of Kelley Branch's stream channel in the former impoundment on The Nature Conservancy (TNC) Apalachicola Bluffs and Ravines Preserve property in Liberty County. Kelley Branch is a steephead stream that was impounded by a dam during the 1950's. Bioassessments previously were conducted above and below the dam on January 11, 2006 to document existing conditions before dam and culvert were removed . On January 17, 2007 bioassessments monitored the affects of the lake draw-down phase. The bioassessments were conducted in support of a partnership with The Nature Conservancy (TNC), the United States Fish and Wildlife Service (USFWS), and the Florida Fish and Wildlife Conservation Commission (FWC) for a Kelley Branch Watershed Restoration Project. A FWC grant was used by TNC to remove the dam and culvert and reconnect the stream to the Apalachicola River. Information learned from this dam removal will be shared by TNC for future restoration projects.

Watershed Characteristics

The bioassessment site (Latitude 30 degrees 27 minutes 28.6 seconds North, Longitude 84 degrees 58 minutes 54 seconds West) is located less than 1 mile north of Bristol and Highway 20 in Liberty County. Kelley Branch is a third order stream at this site. The

stream originates from steepheads on the bluffs of the Apalachicola River and drains to Apalachicola Bay. This site (STORET station 31010242) is in the Tifton Uplands/ Tallahassee Hills ecoregion/subregion (65h).

Results

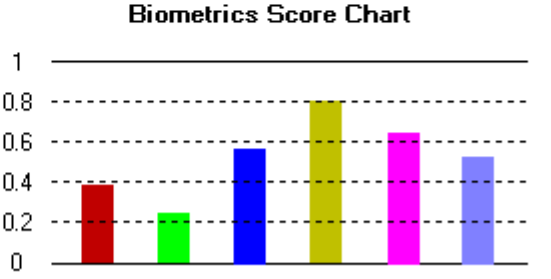
The BioRecon indicated a moderately impaired biological community with a Metric Score of 5 out of a possible ten. Five of six biological indicators (biometrics) failed thresholds established for a healthy stream ecosystem:

Biometrics	Metric Score
# TOTAL TAXA	0.39
# EPHEMEROPTERA TAXA	0.25
# TRICHOPTERA TAXA	0.57
# LONG-LIVED TAXA	0.8
# CLINGER TAXA	0.65
# SENSITIVE TAXA	0.53
TOTAL METRIC SCORE :	3.19
/ Correction Factor :	0.6
= BIORECON SCORE :	5

○ Pass 6 - 10
◉ Fail 0 - 5

KELLEY BRANCH BELOW PARADISE LAKE DAM TNC PRE-DAM REMOVAL PROJECT N OF BRISTOL

BioRegion : Panhandle West
Sample Date : Feb 14, 2008



The Kelley Branch community was affected by sedimentation impacts of the upstream construction activities while removing the dam and culvert and re-sculpturing a new stream channel through the former impoundment¿s organic silt smothered bottom. The biological community present previous to the dam removal however, only scored 4 of 10, failing all 6 biometrics.

The EPT taxa Ephemeroptera - mayfly, Plecoptera - stonefly, Trichoptera - caddis fly), indicators of healthy stream communities in the Apalachicola steephead watersheds had 11 taxa in 2008 depressed from the 18 taxa found after the draw-down before construction activities. However, this was still an improvement from the 7 EPT taxa found before the dam removal. Although the stonefly productivity decreased from 2007, its taxa increased in 2008 from 3 to 4, improved from 2 taxa with only 2 individuals found during 2006 in pre-dam removal sampling. The mayfly taxa were reduced from 7 in 2007 to 3 in 2008 with *Maccaffertium smithae* abundance in the every sample (2006, 2007, & 2008). *Maccaffertium smithae* was the only mayfly present in 2006. Caddis fly taxa had decreased by half in 2008 from 8 in 2007, back to the 4 taxa

found in 2006. The net-spinning *Hydropsyche* caddis flies that dominated below the impoundment during 2006 were still reduced in 2008 as they were in 2007.

The 2008 Habitat Assessment score dropped to a suboptimal 69% from the 2007 optimal score of 90%. The 2008 69% score was also was a decrease from optimal 88% score in 2006. Habitat smothering increased in 2008 to 92% coverage to rate Poor after achieving an Optimal score with only 10% area affected in 2007. Released construction sediments, which caused habitat smothering was the main factor that lowered the 2008 score. Substrate Availability in 2008 declined to Marginal (6) from a Suboptimal (15) rating in 2007. Substrate Diversity and Bank Stability stayed within the suboptimal range though the score dropped from the high to low in the category. Water Velocity, Artificial Channelization, Riparian Buffer Width, and Riparian Zone Vegetation Quality all continued to rate optimal.

Salamanders were still present as observed in 2007 however, fish (a madtom (*Noturus*), and a couple of shiners (*Pternotropis*)) were rarely observed in this 2008 sample. Iron/sulfur bacteria was absent in 2008, rare in 2007, but was common below the impoundment in 2006. The blue-green algal mats observed in 2006 had not reappeared. Fine silt decreased from 4% in 2006 to 1% coverage in 2007 to less than 1% in 2008. Water temperature was 13.21 degrees centigrade in 2008, 13.99 in 2007, and 13.29 in 2006. The dissolved oxygen (DO) concentration was 10.02 mg/l with a 95.9 % DO saturation. The pH was 6.57 standard units, with enough calcium buffer to make life achievable for the 4 inch long Florida pondhorn mussel, *Uniomerus caroliniana* observed during the sampling.

Conclusions

Because of recent construction activities at and above the former dam site up stream, this Kelley Branch site failed to 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. The biological impairment is expected to be short term until high stream flow hydraulically flushes the excess sediment smothering fish and wildlife habitat downstream. Large woody debris, the most important fish and wildlife habitat in panhandle streams was further reduced to 2% coverage in 2008 from the 6% found in 2007 after logs were buried by sand from the upstream restoration work. The large woody debris was already limited to 4% in 2006 because the former forest located up steam in the impounded area was cut prior to dam construction. Additionally the dam itself blocked passage of woody debris. Proper addition of large woody debris (mature pine lasts longest) to create up to 40% coverage in the flowing stream channel would re-create additional riffles and habitat. This would enhance Kelley Branch's fishery potential with riffles re-exposing buried logs by flushing sand deposited by construction activities. It is anticipated lessons that learned on the importance to control exposed soil during restoration work will be applied to future stream restoration projects.

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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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