EcoSummary

FLORIDA AMBIENT

SUSPECT

"Beech" Branch " F2 site on Little River Plantation

April 14, 2004

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



A BioRecon assessment was performed at this "Beech" Branch site to assist the Northwest District's Submerged Land and Environmental Resources Program (SLERP). The bioassessment was requested as part of the review of a permit application by the Little River Plantation to impound three steephead streams that flow into Hurricane Creek in Gadsden County. Steephead stream valleys in the Northwest District contain rare and very diverse streamside forests. According to The Nature Conservancy (2004), "steephead ravines are a unique geologic feature that provides refuge for a number of rare plants and animals - some found no where else on earth." The Florida Panhandle, including the Gadsden County area is cited as one of six "hot spots of American biodiversity", with steephead ravines contributing to this designation (Nature Conservancy 2000). While considerable documentation for rare biota exists for Apalachicola drainage, little information was available for these Ochlockonee ravine watersheds. For instance, the rare Four-Toed salamander, *Hemidactylium scutatum* has been found downstream in the watershed at Lake Talquin State Forest in Gadsden County (FNAI 2001). Protection and management guidelines for the Four-Toed salamander listed by Field Guide to the Rare Animals of Florida includes: "Avoid impoundment of streams and rivers, as this floods habitats. Protect streams from degradation by siltation, pollution, and deforestation. Maintain hardwood canopy in floodplains. Eliminate or control feral hogs, which disrupt habitat and may eat salamanders"(FNAI 2001).

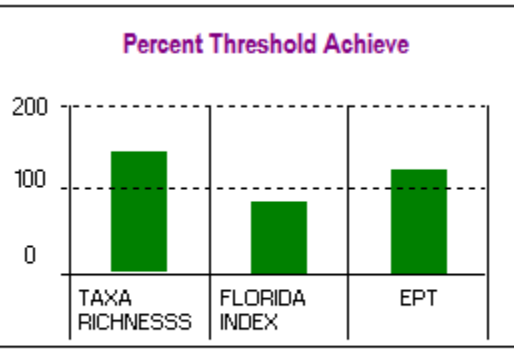
Watershed Characteristics

The bioassessment site is located approximately one mile north of Highway 90 about three miles

southeast of Quincy (Latitude 30 degrees 33 minutes 51.7 seconds North, Longitude 84 degrees 28 minutes 52.3 seconds West) in Gadsden County. "Beech" Branch at this site is a small second order stream. "Beech" Branch flows to Hurricane Creek, Little River, Lake Talquin, Ochlockonee River (an Outstanding Florida Water), and empties into Ochlockonee Bay. This site (STORET station 22020005) drains the Tifton Uplands/ Tallahassee Hills ecoregion/subregion (65h).

Results and Discussion

Biometrics	Value	Threshold
TAXA RICHNESS	34	>= 24
FLORIDA INDEX	16	>= 19
EPT	11	>= 9



Values and Percent Threshold Attained for Panhandle East BioRecon Metrics

Two of the three biological indicators passed thresholds established for a healthy benthic macro-invertebrate fauna at this "Beech" Branch site. The Florida Index (clean-water indicators) score of sixteen was just below the East Panhandle threshold of nineteen; most likely because recent feral hog rooting observed in the stream at this sample reach caused sedimentation. Water quality violations for total coliform bacteria (4900/100ml) and fecal coliform bacteria (890/100ml) were recorded, indicating hog fecal matter. This may explain an abundance of the blackfly larvae collected, as *Simulium* feeds by filtering bacteria in flowing water. However, rare benthic invertebrate specimens were included in the 34 taxa collected in this one hundred meter sample reach. The only Florida collection of *Spanglerogyrus albiventris*, a gyrindid or whirligig beetle was collected at this site swimming near rootlets growing from a stream bank. This rare whirligig beetle was originally described from just two localities in Alabama by Folkerts (1979). More recently Ciegler (2003) collected it at two sites in South Carolina. The caddisfly *Psilotreta frontalis*, has only been collected in Florida's Gadsden and Liberty Counties. These larvae are found in well-shaded, small spring-fed streams (Pescador et al 1995). Another clean-water indicator collected, the stonefly *Amphinemura*, also only has been found from small and sometimes-intermittent hardwood shaded streams. Many *Amphinemura* are restricted to small geographic regions and it is possible that undiscovered localized endemics occur within the Florida panhandle (Pescador et al 2000). Florida collections of *Amphinemura* had been made only in streams with beech in its canopy cover.

The Little River Plantation was last farmed about 50 years ago according the permit consultants. This half-century without disturbance has allowed return of a mature hardwood forest that sustains the stream's ecosystem. The re-established rich riparian soil that nurtures this healthy, now rare beech/magnolia climax slope forest has attracted feral hogs that root along the stream banks. The stream benthic habitat assessment rated a low suboptimal 68% score. Wide riparian buffers, excellent riparian zone quality, and lack of channelization rated optimal. Substrate diversity and water velocity were suboptimal. However substrate availability, habitat smothering, and bank stability rated marginal. Much of the sample reach's stream channel was covered by silt and sand from hog rooting along the banks, smothering 80% of the habitats used for aquatic life. Recently deposited sand and silt point bars with hog hoof prints were observed in the stream channel. Bank sloughing was noted along the sample reach. Logs were buried in the sand and silt smothered exposed roots. Historic logging and recent sedimentation from hog rooting along the banks of "Beech" Branch led to a lack of large woody debris that provides fish and aquatic wildlife habitat and protects the stream's natural hydrology. Only 3% woody debris was observed in the 100-meter sample reach. Research by the University of Georgia has suggested around 40% woody debris was found naturally in southeastern Coastal Plain streams (Wallace J.B. and A C. Benke 1984).

"Beech" Branch had the most optimal riparian zone quality observed during approximately 500 bioassessments conducted during the past decade by the Northwest District staff. This stream, along with its adjacent watersheds along the bluffs of Hurricane Creek, has some of the steepest topographical relief in Florida. Severe erosion commonly occurs along steep slopes on cleared land after heavy rainfall because of the panhandle's highly erodible soils. It appeared that historical erosion and gully formation probably occurred at this site after the watershed was originally logged. Portions of Gadsden County had been cleared for farming for almost 200 years. The County was formed in the 1823 and was noted for its large cotton and tobacco plantations. However, in the preceding fifty years or so, the beech/magnolia forest re-growth at this site had minimized the watershed erosion. Most recently "Beech" Branch has had localized disturbances created by feral hogs. Eglin Air Force Base has reported similar problems from hogs illegally released for hunting.

Significance

The steep bluffs and deep ravines of north Florida are some of the most significant natural features of the southeastern Coastal Plain. Much of the slope forest in the Florida panhandle has been long since impacted by silviculture, agriculture, and land development. Intensive upland silviculture was correlated with a decreased importance of beech, a species identified as a major constituent of presettlement ravine forest (Stallins and Griggs 2003). These anthropogenic disturbances have left few undisturbed slope forests, which were a rare habitat historically. The mesic hardwood community, which includes beech, was calculated to comprise only three percent of the natural forest community types found in the Northern Florida Public Land Survey records collected from 1822 to 1854 (Schwartz 1994). These streamside forests are home for many northern, rare and endemic plants and animals such as the pyramid magnolia tree identified on the Little River Plantation by the consultants. Preserving the Little River Plantation watershed's rare slope forest habitat would help protect its unique species and biological communities. Preserving the mesic hardwood forest in the Hurricane Creek watershed will also help protect the water quality of the Little River flowing to Lake Talquin, which feeds Ochlockonee River (an Outstanding Florida Water) and Ochlockonee Bay.

Suggestions

Conservation of unique bluffs and ravines has been a land management goal of the State of Florida. Preservation and protection of these tributaries to Hurricane Creek would be biologically important because of the scarcity of intact hardwood slope forest. Two simple methods could be employed to restore "Beech" Branch and adjacent tributaries with their outstanding mesic hardwood forest to a healthier stream biota. First, hunting and trapping of the feral hogs would reduce or eliminate the bank erosion and the fecal and total coliform bacteria water pollution. And second, addition of large coniferous woody debris to the streams using standard fluvial geomorphologic techniques would greatly add to its fish and wildlife biodiversity and productivity. The large woody debris also would help prevent erosion and stabilize the stream banks. "Beech" Branch could greatly surpass all three biometric thresholds after implementing these simple restoration techniques and including best management practices to protect the watershed's forest. Hurricane Creek watershed has at least 10 impoundments already affecting it. Recently built impoundments are known not only to destroy stream and hardwood forest habitat, but also to increase concentrations of methylmercury from the decomposition of flooded terrestrial material (Bodaly et al., 1997; Hecky et al., 1991). The Florida Fish and Wildlife Conservation Commission published a "limit fish consumption" advisory because of mercury for the Ochlockonee River and Lake Talquin in Gadsden County (FFWCC, 2000). Additional impoundments in the Ochlockonee basin could add to its methylmercury loading.

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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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