STREAM ECOSUMMARY

Wolftrap Branch below North River Road
January 31, 2006

FDEP conducted biological monitoring at Wolftrap Branch in Santa Rosa County on January 31, 2006 to assess potential stream improvement associated with closure of North River Road by the Blackwater River State Forest (BRSF) (**Figure 1).** It was hypothesized that the closure of this highly eroded logging road, which was also used for recreational off-road driving, would lead to improved stream condition **(Figures 1 and 2)**.



Figure 1. North River Road crossing site at Wolftrap Branch on January 31, 2006.

Overall, the macroinvertebrate community and water quality data indicated that the stream had improved after restoration activities and now met expectations for a healthy, well-balanced stream. A pre-road closure BioRecon taken on August 10, 1999, did not meet standards for healthy well-balanced fish and wildlife populations (for a copy of that and other Ecosummary reports contact Devan Cobb Devan.R.Cobb@dep.state.fl.us).



Figure 2. North River Road Closure sign on 01/31/2006.

Background

Although healthy, well-balanced stream and river communities may be maintained with some level of human activity, such activities may result in waterbody degradation. Human stressors may include increased inputs of nutrients, sediments, and/or pesticides from watershed runoff, adverse hydrologic alterations, undesirable removal of habitat or riparian buffer vegetation, and introduction of nuisance (generally exotic) plants and animals. FDEP has methods to evaluate if human activities have resulted in the condition where a particular waterbody has exceeded water quality criteria (Chapter 62-302, Florida Administrative Code), including whether adverse impacts to biological communities have occurred. FDEP water quality standards are designed to protect designated uses of the waters of the state (*e.g.*, recreation, aquatic life support), and exceedances of these

standards is associated with interference with the designated use. The Biological Reconnaissance (BioRecon) assesses how closely the macroinvertebrate community (e.g., aquatic insects, clams, and crayfish) of a stream resembles the macroinvertebrate community of an undisturbed or "reference" condition. The stream and river habitat assessment evaluates the availability and quality of habitat for macroinvertebrates, and can help diagnose the cause of a low BioRecon score.

Methods

This stream was sampled on 01/31/2006 by the FDEP Northwest District Office following FDEP Standard Operating Procedures (SOPs, see http://www.dep.state.fl.us/water/sas/sop/sops.htm for details). Sampling and analyses met FDEP quality assurance/ quality control standards (see http://www.dep.state.fl.us/water/sas/qa/index.htm) The BioRecon was sampled per FDEP SOP FS7410 and calculated per FDEP BioRecon_2004 scoring (FDEP SOP LT7100). BioRecon is a rapid community based biological assessment of stream health using benthic macroinvertebrates sampled via four sweeps of a D-frame dip net, with organisms (excluding worms, midges, and mites) identified to the lowest practical taxonomic level. The BioRecon_2004 is composed of six metrics, which decrease in response to human disturbance. These include Total # of Taxa, Ephemeroptera Taxa, Trichoptera Taxa, Long-Lived Taxa, Clinger Taxa, and Sensitive Taxa. The BioRecon rating categories were: "Pass" 6-10 score, "Fail" 0-5. The Stream and River Habitat Assessment was conducted per FDEP SOP FT 3100. The Habitat Assessment is a rapid field method in which a sampler scores eight in-stream and riparian components to estimate the influence of habitat factors on the resident aquatic organisms. Habitat Assessment scores range from 11-160 and overall habitat quality is assigned to one of four categories: Optimal (120-160 points), Suboptimal (80-119 points), Marginal (40-79 points), and Poor (11-39 points).

Site Information

Wolftrap Branch (STORET #33030106) at the bioassessment site (**Figure 3**) (N 30° 43' 57.9 " W -86° 50' 2") is a second order stream. It is a tributary to the Blackwater River, which is classified as Outstanding Florida Waters (OFW). The Blackwater River flows into Pensacola Bay via Blackwater and East Bays. The Yellow River Marsh along Blackwater Bay is a State Aquatic Preserve and also listed as an OFW, as is the Blackwater River State Park, which is located about 2

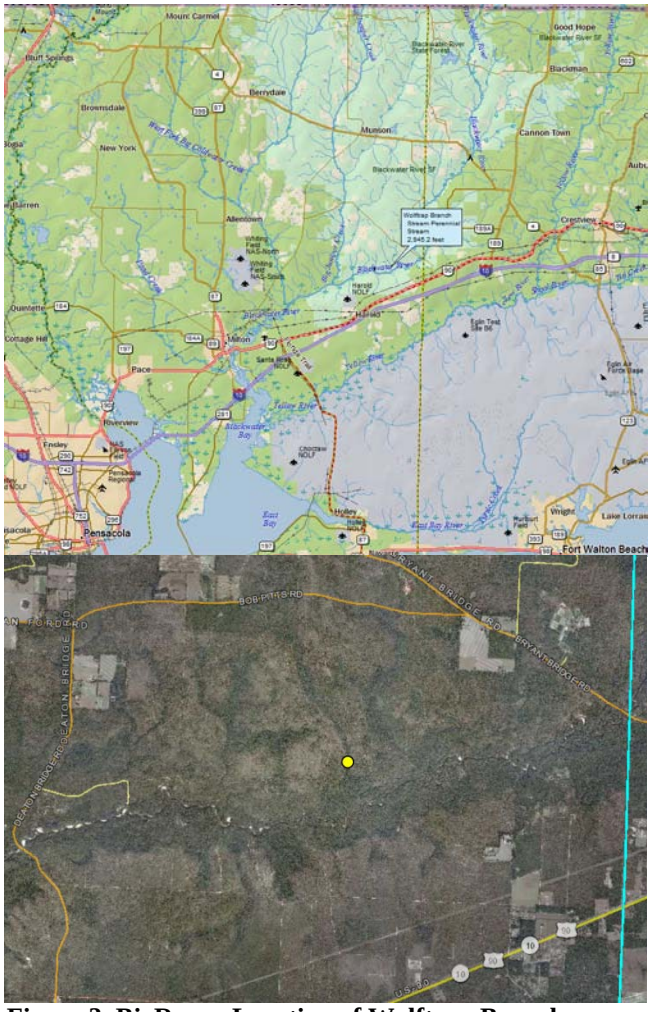


Figure 3. BioRecon Location of Wolftrap Branch (yellow dot) Blackwater River State Forest (shaded blue on topography map) in Santa Rosa County, aerial flight dates November 2006.

miles downstream of Wolftrap Branch. The site is located about 12 miles northeast of Milton. Wolftrap Branch drains the southern pine plains and hills of subecoregion 65f. A FDEP Section 319 grant to the Florida Division of Forestry funded closing and repairing roads to prevent sediment runoff from affecting streams in the BRSF watershed. http://water.epa.gov/polwaste/nps/success319/Section319III_FL.cfm#2. Completion of the restoration work was delayed from 1999 to 2006 due to vandalism and BRSF management changes. Previous attempts to conduct a post-restoration BioRecon had to be aborted because road barriers were destroyed and bypassed, and physical damage and erosion was still evident. Vehicle traffic across the streambed continued into the summer of 2005 **(Figure 4)**. On January 31, 2006, berms had been destroyed or bypassed by four wheel drive vehicles, and there was recent evidence of vehicle traffic in the stream **(Figure 5)**.



Figure 4. Wolftrap Branch un-stabilized road approach 07/05/2005 with clay fill material.



Figure 5. January 31, 2006 Recent 4-WD vehicle traffic around berms into Wolftrap Branch.

Florida Natural Area Inventory (FNAI) listed species in the area include the Diminutive Clubtail *Gomphus westfalli*, and Stonefly *Leuctra cottaquilla* found in the Wolftrap Branch. *Leuctra cottaquilla* was collected during this sampling event. The FNAI listed Stonefly *Perlinella zwicki*, Zigzag Blackwater River Caddisfly *Agarodes ziczac*, Panhandle Lily *Lilium iridollae*, White-top Pitcherplant *Sarracenia leucophylla*, Spoon-leaved Sundew *Drosera intermedia*. Florida Flame Azalea *Rhododendron austrinum* Gopher Tortoise *Gopherus polyphemus* and Red-cockaded Woodpecker *Picoides borealis* are found in the local area. Pescador's Bottle-Cased Caddisfly *Oxyethira pescadori*, Peters' Caddisfly *Cheumatopsyche petersi*, Floridian Finger-net Caddisfly *Chimarra florida*, Little-entrance Oxyethiran Microcaddisfly *Oxyethira janella*, Elerob's Microcaddisfly *Oxyethira elerobi*, and Mayfly *Baetisca escambiensis* were found at the Blackwater River State Park. *Chimarra* larvae were abundant in this sample and could possibly be *C. florida*. All these FNAI listed rare species could be expected to be found in the Wolftrap Branch watershed.

Results

Water Quality

The water quality parameter results were typical of sand and gravel Panhandle streams (Table 1). The water temperature (13.87°C) reflected the influence of groundwater during base flow conditions. The moderate pH (5.56 SU) and very low specific conductance (6 µmhos/cm) were typical of the quartz sand and gravel aquifer in the western Florida Panhandle. The percent dissolved oxygen saturation (88) at the slower flowing road crossing complied with the water quality criterion of 67%.. Just below the crossing, an excellent thalweg stream velocity (0.5 meters/ second) provided near maximum re-aeration. Fecal and total coliform bacteria (3 and 168 per 100ml) were much lower than found in nearby Riley Branch in 1999, when there was cattle grazing in the watershed (fecal coliform 600 per 100ml and total coliform 7500 per 100ml); range cattle have since been removed from the watershed

Table 1. Water quality results at Wolftrap Branch below North River Road on 01/31/2006.

Analyte	Result	Applicable Class III Water Quality Criteria
Field Temperature (°C)	13.87	
Field pH (SU)	5.56	
Field Dissolved Oxygen (mg/L)	9.1	≥5.0
% Dissolved Oxygen Saturation	87.9	≥67
Field Specific Conductance (µmhos/cm)	6	Not to exceed 50% of background or 1275 µmhos/cm
Fecal Coliform Bacteria (#/100m/L)	3	
Total Coliform Bacteria (#/100m/L)	168	

Habitat Assessment

The stream habitat assessment scored 82 in the lower suboptimal range (**Figure 7**). This was an improvement over the 65 marginal rating of the 1999 stream habitat score. Only Water Velocity was Optimal, Substrate Diversity (3 productive habitats) Substrate Availability (16%), and Habitat Smothering (50%) was Suboptimal. Artificial Channelization, Bank Stability, and Riparian Zone Vegetation Quality were Marginal. The Riparian Buffer Zone Width was Poor (riparian zone burned, killing the Atlantic white cedar forest to within 1 to 2 meters of the stream). The straight stream channel appeared to have been

dug after road sediment runoff filled the original streambed. The original sinuous Wolftrap Branch streambed was just east and at a lower elevation than the existing channel. Habitat smothering decreased from 91% during 1999 in the sample reach below North River Road to 50% in 2006 about 6 months after the last attempt at road closure. The 2006 sedimentation was still severe in the lower 50 meter sample reach with no smothering in the upper 50 meters in the riffles below the road. The orange colored clay road fill material brought in prior to 1999 for road maintenance (**Figure 4)** had washed down stream of the sample reach. This left natural white quartz sand and some gravel in 2006 (**Figures 6 and 8)**.

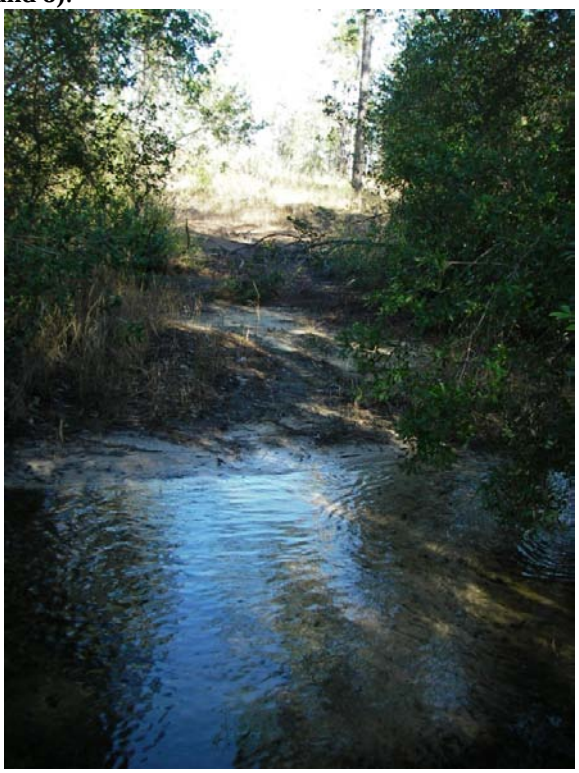


Figure 6. Wolftrap Branch un-stabilized road approach 01/31/2006. Note orange clay fill material from Figure 4 now absent.

BioRecon Index

The 2006 BioRecon_2004 score for this site was 7 out of a possible 10 points compared with 2 of 10 in 1999. The 2006 BioRecon 2004 score resulted in a "Pass" designation compared to a "Suspect" in 1999. The available substrate slightly increased from 9% in 1999 to 16% in 2006. The 2006 BioRecon biometrics also showed slight improvement (Taxa 33, Sensitive Taxa 13, EPT 16) compared to the sampling conducted on 08/10/1999 (Taxa 26 [*Rheotanytarsus* was counted separately from Chironomidae in 1999 sample], Sensitive Taxa 12, EPT 12). The filter-feeders decreased (45% in 1999 to 35% in 2006) after the reduction of suspended solids and bacteria from road runoff and cattle waste. The rest of the biometrics were similar for both samples. The EPT, mayflies (Ephemeroptera), stoneflies (Plecoptera), and caddisflies (Trichoptera) are the more sensitive orders of the stream community. The EPT made up 55% of the 2006 sample compared to 48% in 1999. The EPT normally comprise about 50% of the aquatic macroinvertebrate in the healthiest Panhandle streams. Stoneflies, the most sensitive to pollution had 3 species during both 2006 from 1999 samples.



Figure 7. Wolftrap Branch healthy riffle habitat 01/31/2006.

Periphyton

The attached algal community in the stream consisted of mainly diatoms with small clumps of filamentous red algae *Batrachospermum* common in clean panhandle streams during winter **(Figure 8)**. The abundant growth of algae (including Cyanobacteria) found on August 10, 1999, was no longer present, possibly due to the removal of cattle from the Wolftrap Branch watershed. Some growth of algae (typically diatoms) is expected in a fully functioning stream, but an over abundance of algae (especially filamentous algae) may reduce habitat quality (from smothering) and lead to excess organic matter production (and decomposition), which can harm fish and invertebrates.



Figure 8.. Small clump of red filamentous algae at road crossing 01/31/2006.

Conclusions

The closing of the North River Road over Wolftrap Branch (**Figure 1**) was a positive benefit to the health of the stream biota. The stream macroinvertebrate community improved after sedimentation was reduced and habitats improved due to the road closure. The fish and wildlife community should continue to recover. The smothered habitats will again become available over time after the significant reduction of road sediment runoff. Re-growth of the burned riparian forest will provide additional food and habitat for the stream wildlife community. Turbidity and sediments in Wolftrap Branch were reduced after discontinuing the practice of dumping clay fill on the road crossing. Leaves, wood, and some vegetation were starting to cover the bare soil on the closed road approach to Wolftrap Branch (**Figures 1 and 6)**. Berms and log check dams installed on the closed road nearer to the stream approach would have been effective in preventing erosion.

Thank you for your interest in maintaining the water quality of Florida's streams and rivers. Please feel free to contact us if you have any questions.

Contact and resources for more information

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FDEP biological assessment resources:
http://www.dep.state.fl.us/water/bioassess/index.htm