STREAM ECOSUMMARY

Alaqua Creek below Forest Oak/Eglin Road 200
February 26, 2006

DEP conducted BioRecon biological sampling at Alaqua Creek below Forest Oak/Eglin Road 200 in Walton County (Figure 1.) on February 26, 2006 to assess attainment of designated uses.

Figure 1. Location of Alaqua Creek below Forest Oak/ Eglin Road 200 in Walton County.



This site (Figure 2.) had been monitored as a reference stream since 1992.A bioassessment was done here for a 1982 Biological, Water and Sediment Quality Monitoring of the Choctawhatchee River Basin and Estuaries report by DEP. The macroinvertebrate community and water quality data indicated that on February 26, 2006 this Alaqua Creek site exceeded expectations for a healthy, well-balanced stream. It had (as of May 2012) the highest BioRecon scores in Florida for EPT -mayflies, stoneflies, caddisflies (41), tied for first for Florida Index -clean water indicators (50), and third for Total taxa (69).

Figure 2. BioRecon Index site for Alaqua Creek below Forest Oak/ Eglin Road 200 on 02/26/ 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. DEP 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. DEP 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 February 26, 2006 by the DEP Northwest District Office. Surface water samples were collected for analysis following DEP Standard Operating Procedures (SOPs, see http://www.dep.state.fl.us/water/sas/qa/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 DEP SOP FS7410 and calculated per DEP BioRecon_2004 scoring. Biological Reconnaissance (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 Oligochaeta, Chironomidae, and Acarina) 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 DEP 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

This site (Lat/Long N30° 36′ 55″ W-86° 9′ 50.2″) is located on the Eglin Air Force Base weapons testing range about 2 miles southwest of DeFuniak Springs

This station (STORET # 32010021) has been biologically sampled 20 times since 1992. It was originally sampled in 1982 and again in 1983 under STORET station # 32010015. Alaqua Creek at this location is a 4th order stream, draining the Southern Pine Plains and Hills ecoregion (65f). Alaqua Creek headwaters originate in DeFuniak Springs west to Mossy Head below I-10 and flows to Choctawhatchee Bay via Alaqua Bayou. Gulf Sturgeon may utilize the area as juveniles have been observed in Choctawhatchee Bay fish kills in Jolly Bay east of Alaqua Bayou and to the west in Rocky Bayou. Land-use in the watershed included forest, silviculture, field/pasture, agriculture, residential, commercial, industrial, and military weapons testing.

Results

Water Quality

The water quality samples complied with all water quality criteria (Table 1). Nutrients (Nitrogen & Phosphorus are very low, typical of the sand and gravel aquifer of the Panhandle. The % dissolved oxygen saturation above 90% is the reason that 10 Taxa of clean-water indicating stoneflies were collected in the BioRecon sample.

Table 1. Water quality results from February 21, 2006 at Alaqua Creek Forest Oak/Eglin Road 200.

Analyte	Result	Remark	Applicable Class III Water Quality Criteria
Field Temperature (°C)	14.26	Normal	
Field pH (SU)	6.49	Normal	
Field Dissolved Oxygen (mg/L)	9.67	Normal	≥5.0
% Dissolved Oxygen Saturation	93.2	Normal	
Specific Conductance (µmhos/cm)	25.7	Normal	Not to exceed 50% of background or 1275 µmhos/cm
Alkalinity (mg $CaCO_3$/L)	3	Normal	
Color (PCU)	50	Normal	
Chloride (mg/l)	3	Normal	
Fluoride	0.050U	Not detected	
Calcium (mg/l)	1.7	Normal	
Magnesium (mg/l)	0.58	Normal	

Potassium (mg/l)	0.34	Normal	
Sodium (mg/l)	1.77	Normal	
Sulfate (mg/l)	1.6	Normal	
Chlorophyll a (µg/L)	5U	Normal	
Total Phosphorus (mg/L)	0.02U	Not detected	*0.06 mg/L
Nitrate+Nitrite (mg/L)	0.079	Normal	
Ammonia (mg/L)	0.016 I	Near detection limit	
Total Kejldahl Nitrogen (mg/L)	0.19 I	Near detection limit	
Total Nitrogen (mg/L)	0.269	Normal	*0.67 mg/L
Organic Carbon (mg/L	0.19 I	Near detection limit	

* Federally promulgated numeric nutrient criteria for Panhandle West nutrient region

Habitat Assessment

The stream habitat assessment scored 119 in the Suboptimal range, 1 point below Optimal. Water Velocity, Artificial Channelization, Riparian Buffer Zone Width, and Riparian Zone Vegetation Quality rated Optimal. Substrate Diversity and Substrate Availability scored Suboptimal. Habitat Smothering (70%) and Bank Stability rated Marginal. A climax forest of beech and mountain laurel was observed at the site. This excellent wildlife habitat still occupied parts of the riparian zone slopes. Increased development with impervious surfaces around DeFuniak Springs and local clear-cutting for silvicuture operations had increased runoff volume. This has caused bank erosion problems that smothered habitats with sand and silt. Previously present gravel substrate was buried beneath this finer sediment.

BioRecon Index

The BioRecon_2004 score for this site was 10 out of a possible 10 points. This passed all six 2004 biometric thresholds, which rated a “Pass“ designation. The Total Taxa was 68, the FI was 50, and the EPT was 41. This would rate “Exceptional" in comparison with Statewide BioRecons. Excellent water quality, riparian vegetation and local riparian buffer zone width provided habitat for the diverse fauna of clean-water indicators. The sensitive species (30) included 10 stonefly Taxa that made up 22% of this sample. Mayflies were 35% and caddisflies 10% of the sample for a total of 67% EPT. A Stream Condition Index sample done at the same time scored 84 and had 18% stoneflies, 28% mayflies, and 8% caddisflies or 54% EPT. The abundance stoneflies reflect the low nutrient conditions and the 93% dissolved oxygen saturation normal for the western Panhandle streams. One stonefly, *Haploperla brevis* that lives in gravel riffles was the first of the Family Chloroperlidae collected for Florida (1992). A rare for Florida stonefly, *Tallaperla cornelia*, a leaf-shredder common in the Appalachian Mountains was collected here in 1982. It lives in first order tributaries with beech forest canopies as does *Amphinemura nigritta* also found here in 1982. Another rare leaf-shredding stonefly, *Allocapnia* that inhabit first order streams was found here during a Florida A&M University grant study.

Periphyton

Attached algae were common in the stream. The periphyton consisted of diatoms, the red algae *Batrachospermum*, which grow in low nutrient conditions, and some filamentous cyanobacteria (blue-green algae). 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.

Field Observations

Liverworts, mosses, and sponges, typical of clean streams were observed on substrates. Fish were common including darters, madtoms, pygmy sunfish, and salamanders.

Thank you for your interest in conserving 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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DEP biological assessment resources:
http://www.dep.state.fl.us/water/bioassess/index.htm