



Mill Creek Eglin Golf Course below Trout Lake, Okaloosa County August 13, 1998

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

Purpose

A bioassessment was performed at this Mill Creek site to assess the impacts of the golf course to its biota and wildlife habitat. It was conducted to assist Eglin Air Force Base's Jackson Guard's project monitoring the Federally endangered Okaloosa Darter, found only in streams in the Niceville area.

Background

Mill Creek at the bioassessment site (Lat. 30° 31' 22.9" Long. 86° 29' 11.4") is a second order stream originating in steepheads east of Highway 85 in the Niceville city limits, west of Okaloosa-Walton Community College. Mill Creek flows into Choctawhatchee Bay via Boggy Bayou. This site drains the Gulf Coast Flatwoods subecoregion (75a).



Results

The BioRecon indicated an impaired biological community. All 3 biological indicators failed thresholds established for a healthy aquatic wildlife community:

Biometrics	Values	Thresholds
Taxa Richness	14	≥24
Florida Index	4	≥22
EPT	4	≥17

The aquatic wildlife community was dominated by pollution tolerant species. Canopy removal and dams in the lower Creek elevated water temperatures (27.5 °C) compared to upstream at hole #13 (23.5°C). The area's sand hill seepage slope features allow fertilizer applied to the golf course to rapidly percolate into the ground and surface waters. A severe drought in the Florida panhandle during the past 2 years has reduced leachate from applied nutrients. Higher concentrations of fertilizer could be expected to leach from the golf course during normal to high rainfall years. Water quality tests indicated an increase of total nitrogen in Mill Creek below the Trout Lake impoundment (0.59mg/l) compared to upstream above the golf course (0.03mg/l). Conductivity at this site increased to 45.5 umho/cm from 20.7 umho/cm above the golf course, which indicate leaching of dissolved salts. Trout Lake impoundment had a filamentous alga bloom and mowed greens for riparian zones. The nitrogen tied up in these plant materials decays to form the organic sediment deposits found below the golf course down to Highway 20. The natural stream channel in lower Mill Creek was eliminated and its former forested riparian zone

converted to a stagnant cattail swamp. Aquatic habitats (2% coverage) were limited by sediment smothering (98%). Sheet flow, 50 meters in width, replaced the natural stream channel. The riparian zone quality rated marginal, as disruption in the community was evident by the dominance of cattail and presence of invasive exotics (Chinese tallow, torpedo grass) in place of the natural forested buffer.



Significance

This Mill Creek 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 fertilizer impacts (algae and cattail blooms) were evidence of cultural eutrophication causing Mill Creek to exceed its total maximum daily load for nutrients. Mill Creek's organic wasteload is deposited in Boggy Bayou and Choctawhatchee Bay. Increased water temperature from removing canopy cover, nutrient, and sediment loading affected the federally endangered Okaloosa Darter, which inhabits Mill Creek. Continued nutrient loading to Boggy Bayou could lead to cultural eutrophication problems such as fish kills and algal blooms which have occurred in Jose Bayou and Bayou Texar.

Suggestions

Restore Mill Creek to a single narrow sinuous channel from the existing shallow sheet flow. Add habitat such as large woody debris that would enhance the stream reach's biota diversity and productivity. Proper placement of large pine logs along the stream bank would restore depths creating additional root and aquatic vegetation habitats favored by Okaloosa darters. Maintain greater than 18 meters of riparian buffer zones. The buffer zones provide the necessary shade, food and habitat (woody debris/leaf fall) and filter fertilizers and pesticides to protect Mill Creek's fish and wildlife. Restore native emergent vegetation buffer zones along the golf course water boundaries to reduce nutrient loading. Buffer zones are important since the area's sand soils do not have the capacity for nutrient uptake. Restoring the stream by dam removal would benefit the watershed's endangered Okaloosa darter. **For more information, contact Donald Ray, FDEP Northwest District, 160 Governmental Center, Pensacola, FL 32501 (850) 595-8300 x1126 or SC 695-8300**