

Juniper Creek below Clay Pit B-43, Okaloosa County September 9, 1999

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

Purpose

A bioassessment was performed at this site on a Juniper Creek tributary to assess the impacts of mine pit runoff on its biota and wildlife habitat. This bioassessment was in technical support of a University of Florida grant with Eglin Air Force Base's Jackson Guard to study sedimentation impacts of mine runoff on riparian zone vegetation.

Background

The Juniper Creek tributary at the bioassessment site is a first order stream, originating about 1 mile east of State Road 85 (Lat. 30°35' 35.3" Long. 86° 30' 56.0") about 21/4 miles north of Niceville. Juniper Creek flows into Choctawhatchee Bay via Turkey Creek and Boggy Bayou. This site drains the Southern Pine Plains and Hills of subcoregion 65f.

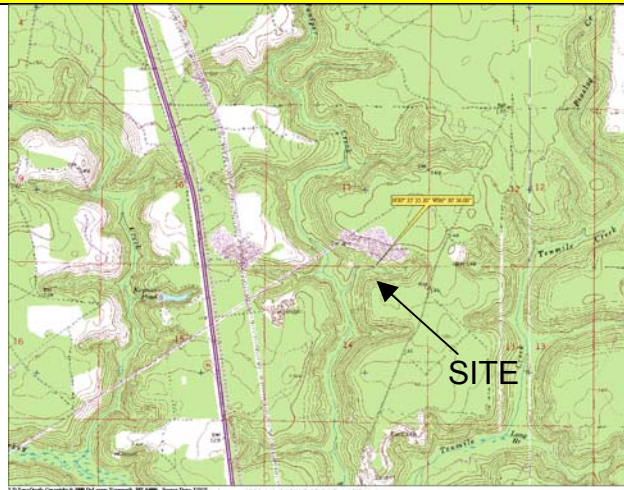


Results

The BioRecon indicated an impaired biological community. All 3 biological indicators at this Juniper Creek site failed thresholds established for a healthy aquatic wildlife community. Biometrics results from another Okaloosa County first order stream, Muddy Branch at State Road 4, are given below as a comparison.

Biometrics	Juniper Cr. Values	Muddy Br. Values	Thresholds
Taxa Richness	17	51	≥24
Florida Index	14	40	≥22
EPT	3	31	≥17

The stream community was severely limited by sediment runoff from the B-43 mining pit. The habitat assessments rated poor at 38% compared to natural conditions. A moderate bloom of iron/sulfur bacteria covered most of the stream, producing a slight sheen on the water surface. Iron/sulfur bacteria and sediments washed from the mining pit smothered 82% of the aquatic habitats, which eliminated most of the stream's wildlife diversity and productivity. The bacteria and the associated precipitated iron covered gills and bodies of the fish and wildlife. Sediments filled the stream channel to a depth of 1 meter. This left a water depth of less than 0.15 meters, much too shallow to support a fish population. The creek was severely braided from sediments filling the stream channel.



Significance

This Juniper Creek tributary site did not 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 sediment and iron/sulfur bacteria effects from the mine pit runoff contributed to this stream not meeting State designated use. Sediment deposition has reduced stream flow, which impairs the stream's fish and wildlife nursery function. Smothering from the mine pit sediment runoff had killed much of Juniper Creek tributary's wetland forest riparian buffer zone. These buffer zones provide the shade, food, habitat (woody debris/leaf fall/roots) and filtration necessary for the continued propagation of Creek's biota. Soft sandy soil, intense rainfall, and steep topographical relief make Juniper Creek highly susceptible to erosion after removal of vegetative cover. Habitat smothering from sedimentation and water pollution from the mine pit sediment runoff may negatively affect Choctawhatchee Basins' fish and wildlife. During rainfall events iron, turbidity, and sediment pollution loads are transported to Juniper and Turkey Creeks, Boggy Bayou, and Choctawhatchee Bay. Iron, plus reduced flows and sediment loading could affect the federally endangered gulf sturgeon and Okaloosa darter, which inhabit the Choctawhatchee Bay System. Iron is a contributor for red tide blooms in marine waters. Choctawhatchee Bay experienced fish kills attributed to a red tide bloom during the summer of 2000. Fish killed included the federally listed endangered juvenile gulf coast sturgeon. Shading from turbidity and sediment smothering destroy seagrass and oyster reef nursery areas in down stream estuarine waters.

Suggestions

Eglin has stabilized the mine pit, however riparian zone restoration is still needed. The Jackson Guard was continuing restoration efforts at this site. Restoring the stream's natural hydrology (i.e. depth/width ratio), maintaining a >18 meter riparian forest buffer zone and eliminating sediment runoff would allow the watershed's fish and wildlife habitat (woody debris, leaf packs, undercut banks, roots, and aquatic vegetation) to return. **For more information, contact Donald Ray, FDEP Northwest District, 160 Governmental Center, Pensacola, FL 32501 (850) 595-8300 x1126 or SC 695-8300**