



EcoSummary

Hurricane Lake, Okaloosa County
August 20, 1996



Lake Condition Index: A developmental biological assessment tool used by FDEP biologists to indicate ecosystem health and identify impairment in Florida Lakes.

Purpose

Hurricane Lake was selected for assessment for two primary reasons, compare data from reservoirs to natural lakes in the panhandle and assess the chemical and biological state of this small reservoir that is managed as a fishery by the Florida Fish and Wildlife Conservation Commission (F&WCC). This reservoir is located in Lake Region 65-01 (Western Highlands). It is considered a "test lake" due to the suspected impairment of the system, not only due to it being an artificial lake, but also because of the intensive management applied to this water body.

Background

Hurricane Lake is located in rural northwest Okaloosa County, approximately 10 miles northeast of Munson. This reservoir was constructed in 1971 and opened to fishing in 1973. The dam impounded the headwaters of Hurricane Creek, a tributary of Blackwater River. Hurricane Lake covers 318 acres in the Blackwater River State Forest. Outdoor activities such as fishing, camping and hiking are popular uses associated with this developed recreation area. The littoral zone is primarily void of macrophytes and about one-half of the shore is mowed grass for shoreline fishing and campground maintenance; the balance is primarily in southern pine (longleaf and slash). Lake fisheries management is focused on stimulating primary production in the reservoir by applications of liquid fertilizer (10-30-40) during the growing season when there are no algal blooms. The pH is also amended to near neutral, or higher, by liming and adding limestone. Oyster shell and lime rock is used primarily to create substrate and encourage effective spawning of sunfish.

Results

Water quality and biological condition of Hurricane Lake was assessed through collecting data for numerous parameters. Nutrient analyses showed this lake with high levels of total phosphorus (60 ug/L). Total Kjeldahl-nitrogen was high at 0.99 mg/L; nitrite-nitrate was low at 5.0 ug/L. Two biological assays directly related to the fertility of water reflected the high phosphorus levels, chlorophyll a (32.08 ug/L) and AGP (algal growth potential) (14.381 mg dry wt/L). Chlorophyll a is an indirect measure of the abundance of algae in a water body; high levels of this pigment indicate a

bloom. The AGP assay uses the test water to grow a species of alga to determine the potential bioamass production in those waters. A biomass of 5.0 mg dry wt/L or less provides reasonable assurance that the waters will not produce nuisance levels of algae. The Secchi depth was 1.5 m deep which is typical of eutrophic (fertile) waters. The dissolved oxygen (DO) level was 9.10 mg/L and dropped to 0.28 mg/L at the bottom (6.3 m). This reservoir was stratified; the well-mixed water was shallow and stagnant water was identified below 3 m. Both specific conductance (110 umho/cm) and pH (8.81 SU) was high. These two parameters were much higher than background levels in the region. The invertebrate community (benthos) living on or in the sediment of the lake was simple (as contrasted to complex) and reflective of the artificial environment created by impounding the stream. The community was represented by five taxa, with nearly 90 % of the community population dominated by one species, a phantom midge. These findings are consistent with an organically enriched water body. The Shannon-Wiener diversity was 0.69 and evenness was 0.30 (evenness is a measure of how well (evenly) the community population is distributed among the different taxa). The substrate was primarily sand with less than 2 % sediments composed of organic material.

Significance

A comprehensive chemical and biological assessment was needed to obtain data that may direct fisheries management and water quality concerns toward a comprehensive approach, integrating both. Given the growing use of this and similar locations, it is imperative that all concerns are addressed in a management plan; a one issue focus must be replaced by multiple considerations that address both resource management and water quality concerns.

Suggestions

A yearlong study (February 2000 - January 2001) has been initiated cooperatively between DEP and F&WCC to obtain chemical and biological data in two managed reservoir watersheds, including this one. This study will collect data from a reservoir (test) under typical management and another reservoir (control) where management practices (fertilization) are suspended. Recommendations will be made based on those findings.

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