



EcoSummary

Mulehead Pond, Calhoun County
September 13, 1995



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

Purpose

Mulehead Pond was selected as a candidate reference lake in Lake Region 65-03 (Greenhead Slope) as part of a statewide effort to develop biological criteria for lake environments. Data collected from the best attainable lakes in each lake region may be used to set standards for least impacted lakes in that region and as benchmarks for all similar lakes in that particular region.

Background

Mulehead Pond is located in rural northwest Calhoun County, approximately 35 miles south of Cottondale. This lake covers a little more than 30 acres and has no surface flow in or out of the lake, resulting in a long residence time for the water. This lake is probably a solution lake that formed when the limestone was dissolved and collapsed, forming a basin that is groundwater fed. The surrounding land is in multiple ownership with four houses on the uplands. These houses are located on the western area of the lake. The lake is situated on a relatively flat area at about 200 ft elevation. The primary surrounding land use is silviculture. However, the littoral zone and surrounding uplands are relatively intact with native vegetation. The littoral zone is dominated by cypress and St. John's-wort. This pond is used for recreation, such as boating, swimming and fishing.

Results

Various water quality tests and measurements were made, complimenting the biological data. Nutrient analyses showed that the water was low in nutrients, total phosphorus was 7 ug/L, orthophosphate was below laboratory detection limit of 4 ug/L and total nitrogen was quite low, 0.324 mg/L. Chlorophyll a and algal growth potential assays reflected these low nutrient data, 1.82 ug/L and 0.140 mg dry wt/L, respectively. The algal growth potential assay provides a good analysis of the presence of required nutrients for algal production. Transparency was very good with the Secchi disk visible to 6.0 m. Specific conductivity (26 umho/cm) reflected the good water quality of the lake; the pH was typically low at 4.58 SU. Alkalinity was below detection limit of 1.0 mg/L CaCO₃. Dissolved oxygen (DO) was good throughout most of the water column (>6.0 mg/L) with the water temperature ranging from near 29 degrees C to just below 21 degrees C near the bottom (9.3 m). The lake was stratified below 4.7 m;

DO was <1.0 mg/L at the bottom. The benthic macroinvertebrate community was sampled using a petite ponar. The lake was divided into twelfths with the benthos sampled from the sublittoral zone. This zone is defined by DEP SOP as the area between 2 m - 4 m deep. The benthic community was very diverse, the Shannon-Wiener diversity was 4.34 and evenness was 0.67 (evenness is essentially a measure of how well (evenly) the community population is distributed among the different taxa). Typically, the worm to midge ratio is a good community composition indicator of biological health. This index was 1:8.6, which indicated a good balance between these taxa. The Hulbert Index is a biotic index that lists taxa according to their sensitivity to pollution (primarily organic enrichment); this index was developed from data gleaned from Florida lakes. Approximately one-third of taxa from this lake assessment was either Class A or B pollution sensitive taxa. None of the areas sampled were anaerobic. The sediment was composed primarily of sand, with lesser amounts of silt/clay, CPOM (coarse particulate organic matter) and SAV (submerged aquatic vegetation). Burrowing mayflies were present in the lake. These large insects are sensitive to oxygen depletion and are thus good biological monitors. Total and fecal coliform bacteria were virtually nonexistent at 1 colony/100 mL.

Significance

Mulehead Pond is biologically diverse and has excellent water quality. This lake is in a rural, sparsely developed area and is in a nearly natural condition. These data provide reference baseline information for questions of environmental concerns that may arise if the surrounding land is developed. This lake is also important in that it provides a reference to measure similar lakes that may be impacted and thus determine the relative degree of impairment.

Suggestions

Development is inevitable as the panhandle population grows and less land is available near the coast. It becomes imperative that stewardship of the area has a prominent role when development is considered. An adequate buffer that leaves intact the natural shoreline around the circumference of the lake should be incorporated into any development near the lake. The good stand of cypress, St. John's-wort and native herbaceous vegetation filter both sediments and nutrients. These plants are very important contributors of the good water quality and habitat of the environment and should be left intact. Periodic monitoring is encouraged for early detection of environmental degradation.

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