EcoSummary

Lake Francis in Highlands County

June 8, 2004

VERY GOOD

TMDL STUDIES

Lake Condition Index (LCI): A developmental biological assessment tool used by FDEP biologist to indicate ecosystem health and identify impairment in Florida lakes

For samples collected before June 8, 2004
All field and laboratory methods followed FDEP Standard Operating Procedures and met FDEP quality assurance/quality control standards.
For samples collected on or after June 8, 2004
All field and laboratory methods followed FDEP Standard Operating Procedures (SOPs) and met DEP quality assurance/quality control standards.

Purpose

The objective of this investigation was to evaluate the biological condition of Lake Francis, using the Florida Lake Condition Index (LCI).



Watershed Characteristics

Lake Francis (539 ac) is located approximately 1 km west of Route 27, 4 km north of the Town of Lake Placid in Highlands County. Landuse within 500 m of the lake is primarily grove (42%) and residential (29%). Upland groves surround much of the lake, and a small canal system connects to the north. Twenty percent of the watershed remains natural as marsh and wet forest in the western sector; remaining lakefront is about 90% developed with primarily single-family housing. Because of this development the natural buffer of shorefront vegetation has been largely replaced by grass sod. The lake receives a portion of overflow water from Lake June-in-Winter via Jack Creek to the southwest, and outflows to the northwest via Jack Creek where a water control structure is present. Lake Francis is connected via canal to adjacent Red Water Lake.

Results

The pH of Lake Francis was 7.4, and water clarity was good, with a Secchi depth of 2.7 m. The primary nutrients, nitrite-nitrate and phosphorous, were at undetectable levels.

Francis had a rich phytoplankton community, 52 taxa. The three most dominant taxa were the greens *Chlorella* and *Selenastrum*, and the bluegreen *Synechocystis* . Density was very low, 547 cells/ml. AGP was low (1.7 mg dry wt./L), and chlorophyll *a* concentration was at an undetectable level.

A diverse macroinvertebrate community (27 taxa), dominated by chironomid midges, occupied the sublittoral zone, a zone uniformly characterized by silty sand, fine particulate organic matter, and two types of submerged vegetation (*Nitella* - stonewort, and *Sagittaria subulata* - dwarf arrowhead). The dominant species (those accounting for 5% or more of the total number) included the amphipod *Hyalella azteca*, the grass shrimp *Palaemonetes paludosus*, the case-building caddisfly *Oecetis porteri*, two true midges (*Cladotanytarsus* sp. A Epler, *Dicrotendipes* sp. B Epler), a biting midge (Ceratopogonidae), and two phantom midges (*Chaoborus* spp.). Based on the average summer benthic density of 3935/m^2 for Highlands County lakes, the density in Lake Francis was very low, 653 individuals/m^2. Shannon-Weaver diversity was very high at 4.15. Dissolved oxygen concentration near the bottom of the sublittoral zone averaged 8.0 mg/L.

Lake Francis scored 78 points (out of a possible 140 points) on the habitat assessment, which evaluates seven parameters: Secchi depth, in-lake vegetation quality, stormwater inputs, bottom substrate quality, lakeside adverse human alterations, upland buffer zone quality, and adverse watershed landuse. Four assessment categories are recognized: Optimal, suboptimal, marginal, and poor. Francis' 78 points place the lake in the low end of the suboptimal category overall.

Significance

The biological condition of Lake Francis was very good, scoring 75 points. [The "very good" category is defined as scores equal to or greater than 50.]

Suggestions

Because lakefront is residentially developed, lakeside property owners can lessen the impact to their lake by reducing or even eliminating the use of pesticides, herbicides, and inorganic fertilizers - all of which can be carried into the lake during storm events. Restoration of shoreline vegetation, and preservation of that which remains, would be beneficial as well.

For more information, please contact
Robert Rutter
South District Branch Office
28000 A-10 Airport Road, Punta Gorda, FL 33982
(941) 575-5810 (Suncom 765-5810)
E-mail: robert.rutter@dep.state.fl.us

Published by the Florida Department of Environmental Protection
Tallahassee, Florida
For more information on the DEP Bioassessment programs, please visit
our web site at http://www.dep.state.fl.us/water/bioassess

Lake Francis in Highlands County

