EcoSummary

Gap Lake, Washington County
September 7, 1994

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

Purpose

As part of the development of lake biocriteria in the state, an intensive biological, physical and chemical assessment of this lake was conducted. This lake supports a biologically diverse community and is of high water quality. As such, it is considered a reference lake.

Background

The watershed of this lake is characterized by the presence of relict sand dunes forming ridges reaching elevations of approximately 200 feet. The topography is karst and comprises one of the highest concentrations of natural lakes in the panhandle. Thus, watersheds are connected due to this physiography. Cypress swamps are characteristic of much of the land below 100 feet. The surface water input to this lake occurs primarily by rainfall; however, it does drain a small area to the north and northeast. Much of this area is cypress swamp on slightly higher elevation, but below 100 foot elevation. The southern one-half is characterized by relatively high banks with adjacent uplands established in a mature live oak and magnolia woodland. These steep banks are of easily erodible material. Due to the predominately rural location, human encroachment was minimal at time of assessment.

Results

To date, results of physicochemical and biological assessments indicated Gap Lake has good water quality. The sampled biological community (primarily composed of insects) was diverse (41 taxa). However, a drop in taxa and change in benthic community composition were detected, as compared to an assessment conducted last winter. Due to the natural physical characteristics of this lake, i.e.,

shallow and transparent, conditions of high thermal conductance (thus associated lower dissolved oxygen on bottom) from surface to bottom of the water column prevailed. These were considered the primary factors affecting the benthos (organisms living on the lake bottom). The relatively elevated pH of 5.0 was considered an indicator of decomposition (oxidation) of plant material. This, coupled with summer water temperature (28.7 C) regime and subsequent reduction of dissolved oxygen (3.5 mg/L on the bottom), created a naturally stressful environment for relatively high oxygen demanding organisms (e.g., Hexagenia spp.). A proportionate drop of DO on the surface was also measured (6.5 mg/L), compared to the winter assessment. Species life histories (which few are known to completion) and seasonality may contribute to these shifts between winter and summer index periods in shallow Florida lakes. Various nutrient assays indicated a system with limited nutrient availability. Nitrate-nitrite was <4.0 ug/L and correspondingly low chlorophyll a (<5.0 ug/L) levels were measured. Related to algal production (and the presence of chlorophyll a) is the Secchi measurement, an indication of the transparancy of the water column. This measurement was >4.7 m (extent of water depth).

Significance

This lake serves as an environment of low human impact and thus provides a reservoir of biological diversity. The low population density and minimal loss of native vegetation in the watershed provides a significant buffer to nonpoint source runoff, especially nutrients, bacteria and sediment. Once the water quality and biological integrity is lost in a lake, it is lost for decades (perhaps permanently), even if the pollution source is abated. This lake provides baseline data necessary to compare other like environments to measure varying degrees of impact.

Suggestions

Good stewardship of the watershed is paramount to the maintenance of the water quality and biological integrity of this lake. Periodic monitoring of the lake to detect early degradation of water quality is encouraged.

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