



EcoSummary

Hicks Lake, Washington County
August 18, 1999



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

Purpose

Hicks Lake was selected as a candidate reference lake for Lake Region 65-03 (Greenhead Slope) as part of a statewide effort to develop biological criteria for lake environments. Data collected from the least impacted lakes in a given Lake Region may be used to establish biological and chemical benchmarks for similar lakes in a particular region.

Background

Hicks Lake is located in a rural area of southern Washington County, approximately 15 km south of Vernon. This region of south Washington County has sandy ridges (relict dunes) of coarse, porous sands. The primary land use in these well-drained soils of low fertility is silviculture. This lake is approximately 480 acres and is situated in a karst area with a high density of depression and solution lakes. With no outflow, there is a long residence time for water in this lake. The only development that has occurred around Hicks Lake is residential. These residences occur along the western side of the lake, are relatively sparse, and are set back from the lake. The remainder of the lake perimeter is natural, with an extensive swamp providing a good buffer for the watershed. This lake is shallow with a maximum depth of approximately 12 ft. This area is near the south-central portion of the lake. The littoral zone is extensive; the dominant plants are *Panicum* sp. and St-John's-wort.

Results

This lake assessment included data collected from physical, chemical and biological components of the environment. Nutrient analyses indicated the lake is oligotrophic (low in nutrients). Nitrite-nitrate was below detection limit of 4 ug/L as was total phosphorus, minimum detection limit of 15 ug/L. Total Kjeldahl-nitrogen was low, 0.24 mg/L. Since this assay contains organic nitrogen, it is a good indicator of nutrient enrichment from human and animal waste. Orthophosphate was also below minimum detection of 4 ug/L, as was ammonia (minimum detection limit of 10 ug/L). Reflective of these low nutrient waters, chlorophyll a was below minimum detection limit of 1.12 ug/L and algal growth potential (AGP) resulted in an alga crop less than 0.100 mg dry wt/L. The AGP assay uses the test water and it is inoculated with a specific alga in the laboratory. If the algal crop is <5.000 mg dry

wt/L, the system is unlikely to produce a nuisance algal bloom. This lake was well-mixed (not stratified) and had good dissolved oxygen concentrations near 7.0 mg/L; the water temperature was from 32 C dropping only to near 31 C near the bottom (3.5 m). Characteristic of ambient water in this region, it was soft (alkalinity <1.0 mg/L), acidic (pH of 4.8 SU) and specific conductivity was low (24 umho/cm). The water was clear (color 10 PCU), transparent (Secchi visible on the bottom at 4.1 m) and turbidity was 0.80 NTU. The benthic macroinvertebrate community was sampled using a petite ponar. Twelve grabs were collected from the sublittoral zone (defined as that region of water depth between 2-4 m). These 12 grabs were from equal twelfths distributed across the lake. The benthos was diverse, Shannon-Wiener diversity was 3.5 and evenness was 0.75 (evenness is a measure of how well (evenly) the community population is distributed among the different taxa). The worm (Oligochaeta) to midge ratio is often used to help determine biological health of lakes. This ratio was 1: 1.5, a closer ratio than usual for lakes of good water quality and clean sediments. Biological oxygen demand (BOD) was 0.88 mg/L. While in an acceptable range for ambient waters, this BOD level warrants subsequent monitoring to assure water quality maintenance. Sediment grain size analysis indicated approximately 43 % of the sediments were coarse to medium sand; only 0.53 % of the sediment sample was organic material. With but three exceptions, the sediments were aerobic at those locations sampled. Since the greatest percentage of the lake was shallow, averaging approximately 2 m, submerged aquatic vegetation was a component of 11 out of 12 sample locations. *Panicum* sp., and *Hypericum* *lissophloeus* (St. John's-wort) were the dominant plants in the littoral zone.

Significance

Hicks Lake has good water quality and biologically is diverse. However, there are two parameters in this assessment that warrants future monitoring; those are the benthic community and BOD. While the benthos has several clean water taxa present, the percentage of oligochaets (*Limnodrilus hoffmeisteri*) present in the sample indicate there may be some organic enrichment occurring. These data provide baseline information to compare with future water quality investigations.

Suggestions

Residential land use near this lake was a small percentage of the watershed. The majority of the watershed is used for silviculture, with the near lake vegetation consisting of mixed wetland forest and scrub. Continued maintenance of the littoral zone vegetation is essential in affording this lake protection from potential sedimentation from the steep gradient on the north side. Construction of a public boat ramp on this side of the lake has likely helped reduce erosion entering the lake, but further stabilization of the drainage ditches that flow into the lake is necessary to abate heavy clays and sands from reaching the lake. Periodic monitoring is encouraged for early detection of changes to water quality.

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