TMDL STUDIES

EcoSummary

Lake Lena Run TP-110, Thornhill Dr
January 31, 2005

FAIR

Stream Condition Index (SCI): The standardized biological assessment tool used by FDEP biologist to indicate ecosystem health and identify impairment as compared to reference (natural) conditions of streams within the various ecoregions of Florida

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



A biological assessment was performed on Lake Lena Run in order to gain further information on the biological health of the watershed for use in Florida 's Watershed Management and Biocriteria programs. Because this watershed is on the State of Florida 's 303(d) List for Total Maximum Daily Loading (TMDL) development, the results may also be used in determination of TMDL needs and priorities.

The assessment method used, the Stream Condition Index (SCI), was developed by FDEP to determine the ecological health of streams and rivers. The SCI is based on ten measurements that assess the ecological integrity of the aquatic macroinvertebrate community. The Index score falls between 1 and 100; a score of 80 and above is indicitive of pristine, completely unimpaired conditions. A score below 35 is considered severely impaired.

Watershed Characteristics

Lake Lena Run is located in Auburndale, in central Polk County. Itoriginates at the southern discharge point of Lake Lena and flows through urban, agricultural and mined land and into Lake Hancock . Most of the stream length has been channelized. Lake Lena Run receives surface water discharges from Florida Distillers and the City of Auburndale Wastewater Treatment Plant in its upper reaches. Lake Lena and the upper reaches of Lake Lena Run are heavily urbanized and industrialized, but the lower reaches have more natural landuse, as well as cropland, pastureland and a small amount of phosphate mining.

Lake Lena Run has been placed on the 303(d) list due to the following parameters of concern: dissolved oxygen, total and fecal coliform bacteria, nutrients, turbidity, and total suspended solids, based on water quality data from 82 historical (1970 to 1983) observations and eight (8) observations from 1992. Currently, it is on the Impaired Water Rule (IWR) planning list for biology, dissolved oxygen and fecal coliforms. It is on the IWR Verified List for dissolved oxygen (DO) because values frequently fall below the State Standard of 5.0 mg/l

The sampling site was upstream of the bridge crossing Thornhill Rd, which is quite a ways downstream of Lake Lena and the discharge points of both Florida Distillers and the Auburndale WWTP. A second location further upstream in the watershed was sampled the same day (see separate report).

Results

The primary landuse in the vicinity of the sampling site was crop and pastureland, from which the stream was fairly well buffered by natural wetland and forest, although several exotic species were present. The stream was predominantly sandy bottom with minimal substrate available for invertebrate and fish use (7% snags, roots, vegetation and leaves). It had been historically channelized; there

were no pools present and smothering of habitat was apparent. The water was shallow and flowing swiftly at 0.33 m/s.

The SCI score was 52, indicating a fairly healthy macroinvertebrate community. Table 1 shows, most notably, very few pollution-tolerant were present. There were three species of mayflies(Ephemeroptera), and two caddisfly (Trichoptera) species. Mayflies and caddisflies are also among the more sensitive invertebrates, but the species found here are considered fairly tolerant of pollution. Only one species of sensitive taxa was collected.

Table 1.

# Ephemeroptera	% Suspension and Filter Feeders	# Long-Lived Taxa	# Clinger Taxa	% Dominant Taxa	# Sensitive Taxa	% Tanytarsini	Total # Taxa	% Tolerant Taxa	# Trichoptera Taxa
3	53.9	0	4	40.5	1	43.1	22	3.45	2

The DO measurement was above the 5.0 mg/l State Standard (Table 2). All other physicochemical metrics were within normal values.

Table 2.

Time	Temperature (deg. C)	Conductivity (umho/cm)	Dissolved Oxygen (mg/l)	pH (SU)	Clarity	color	Water velocity (mg/l)
1200	17.01	265	8.06	7.3	clear	tannic	0.33

Significance

Biological sampling at this location indicates that the invertebrate community is fairly healthy Hence, Lake Lena Run maintains a well-balanced biological population after emerging from Lake Lena Run. However, it should be noticed that few sensitive species and no long-lived species were collected. This may be indicating periodic impacts due to polluted stormwater runoff or point source discharge issues.

A biological assessment performed further upstream at US 92 on the same day (see separate report) concluded that the biological community was severely impaired at that location. The bioassessment at Thornhill Rd suggests that the aquatic macroinvertebrates had recovered further downstream, most likely due to decreased impact of crop and pastureland, compared to urbanism and industrialism, and more natural riparian buffer zone.

A bioassessment performed on 3/16/99 resulted in an SCI score of 58, also in the fairly healthy range.

Suggestions

The hydrology and natural habitat attributes of Lake Lena Run have been altered drastically by channelization and urban development. After the stream exits Lake Lena, the biological community is severely impaired, but appears to improve further downstream from Aburndale where the land use changes to cropland and cow pasture. Although receiving a score that exceeds the severely impacted range, there were virtually no sensitive species found, indicating that the stream is impacted and should be periodically sampled to ensure it is not further impaired.

There have been no improvements to the highly urbanized and industrial headwaters. The water quality of the creek appears to be most impaired by runoff from the City of Auburndale and point source discharges, and that is where restorative efforts should be focused. Stormwater runoff Best Management Practices (BMPs) need to be expanded by the private sector as well as public agencies. These improvements include engineering retrofits, riparian zone stabilization vegetative swales, and created wetlands. Due to the fact that most of Lake Lena is surrounded by privately owned homes, the water quality is particularly affected by private citizens. Homeowners can reduce stormwater runoff pollution by limiting lawn fertilization and removing yard waste so that it does not enter the lake or stream with stormwater runoff. The restoration and maintainance of the natural vegetation in the riparian zone helps by increasing nutrient uptake and stabilizing the lake edge.

Few Best Management Practices (BMPs) for cattle ranching are in place: there is evidence of frequent cattle usage. Although a fairly healthy buffer zone is maintained on both sides of the creek, much understory is missing, replaced by exotic and opportunistic species. Fencing the cattle away from the stream would ease this impact

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