EcoSummary

Gap Creek, Manatee County - Manatee River Watershed
September 30, 1998

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

Purpose

Macroinvertebrate samples were collected for an Stream Condition Index (SCI) bioassessment of Gap Creek in order to gain further information on the biological health of the watershed for use in the administration of Florida's Ecosystem Management Water Quality Assessment (EMWQAS) and Total Maximum Daily Loads programs. A field biorecon, a rapid screening method for identification of biological impairment, was also performed. Surface water samples were collected for analysis of parameters of concern. All work conducted by EMWQAS was conducted according to established DEP standard operating procedures and quality assurances plans. The SCI is based on seven measurements that assess the ecological integrity of the invertebrate community. If the Index score falls between 27 and 33, it is considered 'excellent'; if it falls between 21 and 26: 'good'; between 14 and 20: 'poor'; and between 7 and 13: 'severely degraded'. Biorecons are based on three measurements of the aquatic invertebrates present in the stream: the total number of different species (Total Taxa), the number of "good water quality" indicator species (Florida Index) and the total number of Ephemeroptera (mayflies), Plecoptera (stoneflies) and Trichoptera (caddisflies) species present. A stream scoring above the threshold value for all three of these measurements is considered healthy. If two of the threshold values are reached, the stream's health is considered ecologically suspect. If only one or none of the thresholds are reached, an impaired condition is concluded.

Background

Gap Creek, located in south western Manatee County, flows west into the Braden River south of the town of Elwood Park. The Braden River empties into the Manatee River Estuary on the eastern boundary of Bradenton. However, Gap Creek is also connected on the east to Sarasota Bay via the Pearce Canal, resulting in an unclear hydrology. Gap Creek itself has been channelized and its riparian zone cleared. The drainage basin consists primarily of cattle pasture and urban development, with a small amount of cropland . Historically, high levels of coliform bacteria have been sampled in Gap Creek. The average values of 330 samples taken at the same site from 1980 to 1987 were 5320 and 750 colonies/100 ml for total and fecal coliforms, respectively. This suggests that levels well above state water quality standards were a frequent occurence. Manatee County Environmental Action Commission (EAC) conducts on-going monitoring in the watershed. They attributed the high levels to

cattle ranging, which was the predominant land use in the watershed at that time. They also suggested that naturally occurring plant and soil bacteria, such as Klebsiella are common interferers in coliform methodology, and may result in excessive levels of coliforms that are not attributable to fecal matter.

Results

Physicochemical parameters were measured and water samples for chemical analyses were collected on the north side of the SR 70 bridge, at the same site that was sampled in the 1980s. There is currently road construction a few hundred meters downstream of the sampling site. Water velocity was sluggish and a green algal bloom of the type commonly seen associated with WWTPs was evident. The habitat score was 69 out of 160, in the low end of the marginal category, due to altered riparian zone, channelization, lack of in-stream habitat and sluggish water velocity. Dissolved oxygen was above the State standard of 5.0 mg/l (Rule 62 - 302 FAC). The total nitrogen (TN) concentration was fairly high as compared to typical values of Florida streams, at 1.9 mg/l, and ammonia and nitrates were moderately elevated (0.15 and 0.30 mg/l, respectively). The total phosphorus (TP) was relatively high at 0.56 mg/l, although TP values can be higher in south-central Florida than in stream s from other areas of the state because of the natural phosphatic deposits in the area. Turbidity and conductivity were moderately elevated (6.5 NTU and 540 umhos/cm, respectively). Both total and fecal coliforms exceeded the single day standards for Class III waterbodies (Rule 62 - 302 FAC), measuring 4850 and 1060 colonies/100 ml, respectively. Gap Creek failed all three parameters of the Biorecon, indicating an impaired macroinvertebrate community. The SCI score was 15, rating the aquatic invertebrate assemblage as poor.

Significance

The excessive levels of total and fecal coliforms suggest the contamination found in the 1980s is still a problem today. Cattle ranging is still a predominant industry in the watershed. These levels present a potential health hazard. The results of the macroinvertebrate assessments indicate ecological degradation and failure to meet designated use for Class III surface water bodies. This may be due to water chemistry or habitat and hydrological alterations, or a combination of both. Impairment to the aquatic macroinvertebrate community can result in reductions of fish and bird populations in the Braden and Manatee River watersheds.

Suggestions

An investigation in the watershed of Gap Creek should be conducted in order to determine the source and pathogenic content of the coliforms, after which the appropriate steps can be taken to end the contamination and restore the creek to ambient coliform levels. Physical restoration will be necessary in order to reestablish aquatic habitat, stabilize banks and provide a buffer to runoff.

For more information, please contact:
Peggy Morgan
DEP Southwest District 3804 Coconut Palm Drive Tampa, Florida 33619
(813) 744-6100
email: morgan_p@tpa1.dep.state.fl.us

Published by the Florida Department of Environmental Protection, Tallahassee, FL.
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