A Report by the Ecosystem Management Water Quality Assessment Section
#98-015

Gamble Creek, Manatee County
September 2, 1997
Tampa Bay EMA

Purpose

Biological and chemical sampling were performed on Gamble Creek in order to gain further information on the biological health of the watershed for use in Florida's Ecosytem Management and Biocriteria programs. Because this watershed is on the 1998/99 303(d) list for Total Maximum Daily Loading (TMDL) determination, the results may also be used in determination of TMDL needs and priorities.

Methods

Macroinvertebrate samples were collected for the calculation of the Stream Condition Index[1]. Surface water was also sampled for selected chemical analyses, and physicochemical parameters were measured.

Basin Characteristics

Gamble Creek is located in northeastern Manatee County. It is a small stream that flows into the Manatee River. The sampling site is shown in Figure 1. At this site, It is a sandy-bottom stream with a natural riparian zone. Water velocity is fairly rapid, and there is plentiful instream habitat, including vegetation, shell rubble, roots and snags. Agriculture is the dominant land use in the basin, primarily cattle pasture and row crops with a small amount of citrus. No permitted domestic or industrial waste discharges occur in the watershed.

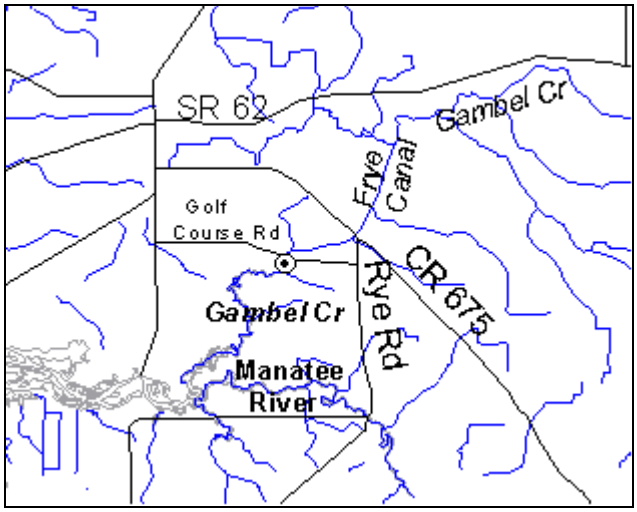

Fig. 1. Site location

Results

At the time of sampling, the stream was quite shallow. The water was clear and its velocity was 0.33 m/s. Dissolved oxygen was 4.03 mg/l. Conductivity was 482 umho/cm. pH was 7.26 SU and temperature was 25.80 ^{o} C. The habitat assessment score, 123, was in the mid-optimal range (Fig. 2). Water chemistry results are shown in Figure 3. Total Nitrogen was extremely elevated, particularly ammonia- N, as compared to typical values statewide[2]. Orthophosphate also appeared to be greatly elevated, although the holding time for this parameter had expired. Both total and fecal coliforms exceeded the State standards for a single day level. Turbidity and total suspended solids were relatively low.

The Stream Condition Index rating was 23 out of a possible 33, in the 'moderately good' range. This indicates that the stream supported a fairly healthy macroinvertebrate community.

The measurements identified as parameters of concern in the 303(d) TMDL list were dissolved oxygen (DO), coliforms, turbidity and nutrients. **The water chemistry analyses indicated that Gamble Creek was carrying a high nutrient and coliform load to the Manatee River at the time of sampling.** Dissolved oxygen was below the state standard of 5 mg/l, which is not that unusual for southwestern Florida streams in summer, but it is lower than other streams in the vicinity sampled in September, 1998.

Significance and Suggestions

The chemical parameters analyzed indicated that very high levels of nutrients and coliforms were being introduced into the stream, most likely due to agricultural activities, particularly local cattle pastures. These levels did not result in an obviously degraded macroinvertebrate community at the time of sampling. However, Gamble Creek flows into Manatee River and estuary, where accumulated nutrients may result in degraded water quality, including algal blooms and associated oxygen depletion. Coliforms may pose both environmental and health risks. Gamble Creek should be a high priority for a TMDL study, investigating nutrients, DO and coliforms.

The development of best management practices for cattle ranges, citrus groves and other agricultural activities, in all the tributaries of the Manatee River, is important when managing the ecological integrity of the greater Tampa Bay ecosystem.

For more information, contact Peggy Morgan, FDEP Southwest District, 3804 Coconut Palm Dr., Tampa, FL 33619; (813) 744 - 6100

Figure 2. Habitat Score

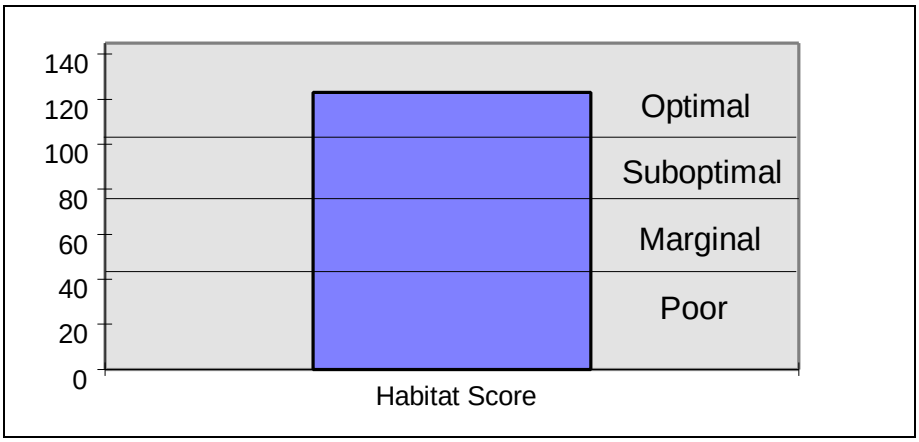

Figure 3. Water Chemistry results

Chloride	Sulfate	Ammonia-N	Nitrate-Nitrite	Kjeldahl Nitrogen	Total Phos-phorus
mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
27	92	3.7	0.51	5.0Q	2.0Q

Turbidity	Total Suspended Solids	Total Coliforms	Fecal Coliforms
NTU	mg/l	#colonies/100 ml	#colonies/100 ml
3.5	4	3000	1140

"Q" indicates the sample was out of holding time when analyzed.

[1]State of Florida Department of Environmental Protection. 1993. Standard Operating Procedures Manual (Draft). Benthic Macroinvertebrate Sampling and Habitat Assessment Methods: 1. Freshwater Streams and Rivers. FDEP Contract No. WM385. EA Engineering, Science and Technology, Inc., Carrollton, Texas.

[2] State of Florida Department of Environmental Protection. 1989. Friedemann, M. and J. Hand. Typical water quality valies for Florida's lakes, streams and Estuaries. Standards and Monitoring Section. Bureau of Surface Water Management.