A Report by the Ecosystem Management Water Quality Assessment Section
#98-017

Frye Canal, Manatee County
Gamble Creek Basin
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 Ecosystem Management and Biocriteria programs.

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

Frye Canal is located in northeastern Manatee County. It is the channelized mid-portion of Gamble Creek, which flows to the Manatee River. The sampling site is shown in Figure 1. It is sandy-bottomed and straight, with a natural riparian zone. Water velocity is fairly rapid, and there is adequate instream habitat, including aquatic vegetation, submerged roots and snags. Agriculture is the dominant land use in the basin, primarily cattle range with a smaller amount of citrus and row crops. No permitted domestic or industrial waste discharges occur in the watershed.

Results

At the time of sampling, the stream was quite shallow. The water was clear and its velocity was 0.25 m/s. Dissolved oxygen was 6.8 mg/l. Conductivity was 412 umho/cm. pH was 7.5 SU and temperature was 25.3 ^{o} C. The habitat assessment score, 107, was in the mid-optimal range (Fig. 2). Water chemistry results are shown in Figure 3. Total Nitrogen was not elevated, particularly ammonia- N, as compared to typical values statewide[2]. Total Phosphorus appeared to be moderately elevated, although may be typical of the high phosphatic deposits in the area. Both total and fecal coliforms were moderately high but did not exceed State standards for a single day level. Turbidity

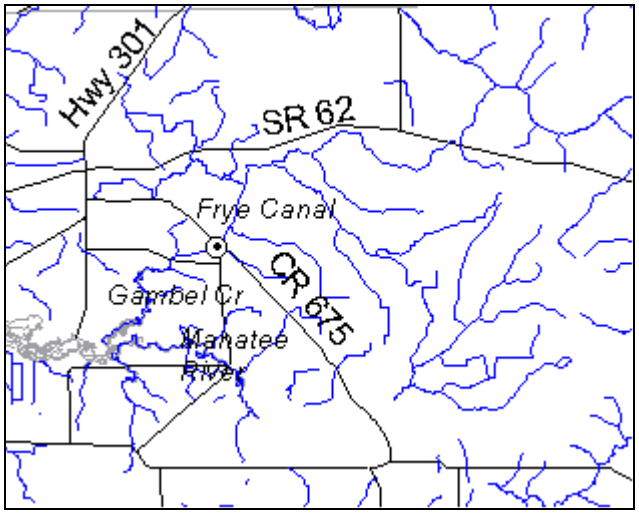

Fig. 1. Site location

and total suspended solids were relatively low.

The Stream Condition Index rating was 28 out of a possible 33, in the 'excellent' range. This indicates that the stream supported a 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 Frye Canal was not carrying a high nutrient load to the Manatee River, but did carry moderate levels of coliforms, at the time of sampling.** Dissolved oxygen was above the state standard of 5 mg/l. Turbidity was not elevated. Further downstream, in Gamble Creek proper, high Ammonia-N and coliforms were sampled on the same day (please see EMWQAS #98-015).

Significance and Suggestions

The chemical parameters analyzed indicated that low levels of nutrients and moderate levels of coliforms were being introduced into Frye Canal, although excessive amounts were found in the basin further downstream on the same day. 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

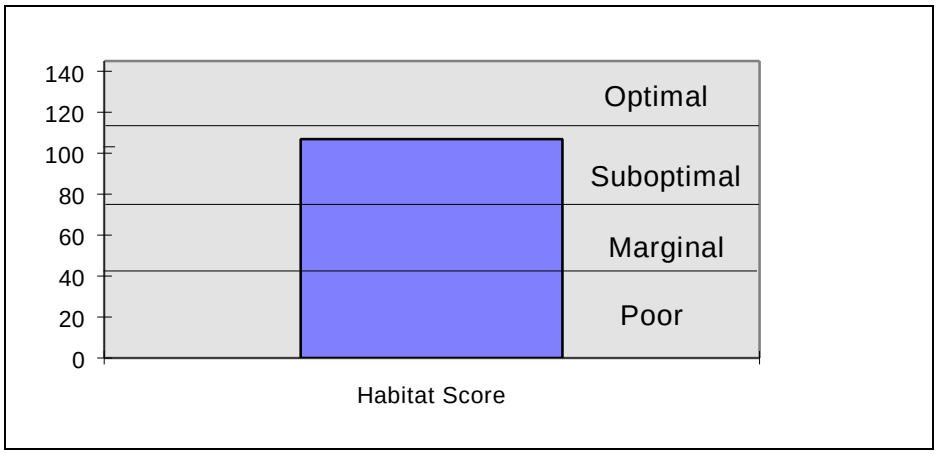

Figure 3. Water Chemistry results

Chloride	Sulfate	Ammonia-N	Nitrate-Nitrite	Kjeldahl Nitrogen	Total Phos-phorus
mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
18	110	0.02	0.18	0.5	0.29

Turbidity	Total Suspended Solids	Total Coliforms	Fecal Coliforms
NTU	mg/l	#colonies/100 ml	#colonies/100 ml
1.2	1	980	720

[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 values for Florida's lakes, streams and Estuaries. Standards and Monitoring Section. Bureau of Surface Water Management.

EMWQAS # 98 - 015. Gamble Creek, Manatee County. FDEP Tampa