



**A Report by the Ecosystem
Management Water Quality
Assessment Section
#98-007**

**Limestone Creek, Hardee County
February 25, 1998
Charlotte Harbor EMA**

Purpose *Biorecon: A rapid, cost-effective screening method for identification of biological impairment.*

A Biorecon was performed on Limestone Creek in order to gain further information on the biological health of the watershed for use in the administration of Florida's Ecosystem Management and Total Maximum Daily Loads programs. Macroinvertebrate samples were also collected for the calculation of the Stream Condition Index¹. Surface water samples were also collected for analysis of parameters of concern.

Methods

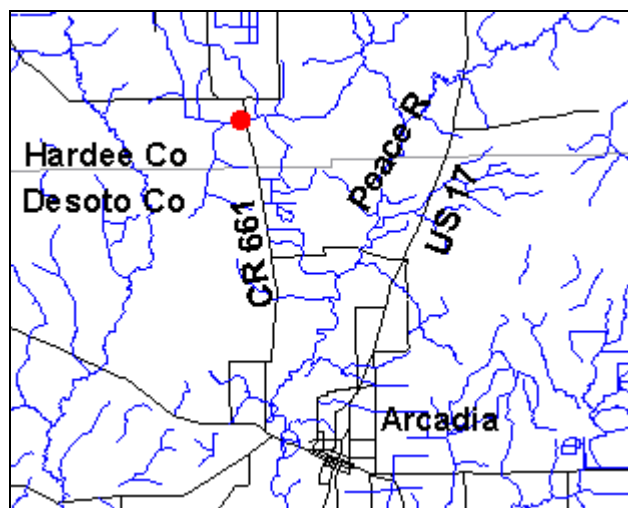
Biorecons are based on three measurements of the aquatic invertebrates present in the stream: the total number of different species (Total Taxa), the number of 'good water quality' indicator species (Florida Index) and the total number of Ephemeroptera (mayflies), Plecoptera (stoneflies) and Trichoptera (caddisflies) species present. A stream scoring above the threshold value for all three of these measurements is considered healthy. If two of the values are reached, the stream's health may be considered ecologically suspect. If one or none of the thresholds are reached, an impaired condition is concluded.

Basin Characteristics

Limestone Creek is located in southeastern Hardee County, on CR 661 just south of the town of Limestone. It is a small stream that flows into the Peace River. The sampling site is shown in Figure 1. It is a sandy-bottom stream that runs through pastureland, and there is not much littoral zone on either side. Water velocity is fairly rapid and the available instream habitat for macroinvertebrate colonization consists primarily of aquatic vegetation and tree roots. Agriculture is the dominant land use in the basin, primarily cattle range with a small amount of citrus. No permitted domestic or industrial waste discharges occur in the watershed.

Results

The stream was clear and its velocity was 0.33 m/s. Dissolved oxygen was 7.71 mg/l. Conductivity was 130 umho/cm. pH was 6.85 SU and temperature was 16.64 °C. The habitat assessment score, 83, was in



the low suboptimal category (Fig. 2), largely due to the altered riparian zone. Water chemistry results are shown in Fig. 3. Nutrient levels were not particularly elevated at the time of sampling, with the exception of orthophosphate, but this may be typical due to the naturally occurring phosphatic deposits in the area. Coliforms and turbidity were moderate, as compared to typical values statewide.² Total suspended solids were slightly high and may suggest bank use by cattle.

This site on Limestone Creek did not exceed the thresholds for total taxa and Florida Index (Fig 3), although the values were borderline. The Stream Condition Index rating was 29, in the 'good' range. This suggests that the stream supported a marginally healthy invertebrate community.

Suggestions

The water chemistry analysis did not indicate excessive nutrient loading at the time of sampling. The marginal invertebrate assemblage may be the result of habitat quality, particularly low diversity of instream substrates. However, it is possible that pesticides and/or herbicides used in agricultural production, which can be toxic to invertebrates, are present in the runoff. It is therefore recommended that these parameters be investigated. Limestone Creek flows into the Peace River, which flows into Charlotte Harbor, where any accumulated pollutants may result in degraded water quality. The development of best management practices for cattle ranges, citrus groves and other agricultural activities, in all the tributaries of the Peace River, is important when managing the ecological integrity of the Charlotte Harbor ecosystem.

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

Fig. 1. Site location

Figure 2. Habitat Score

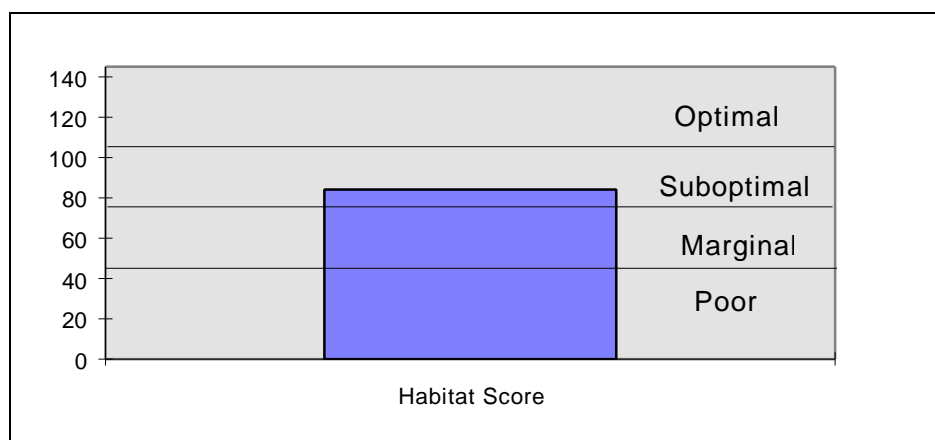
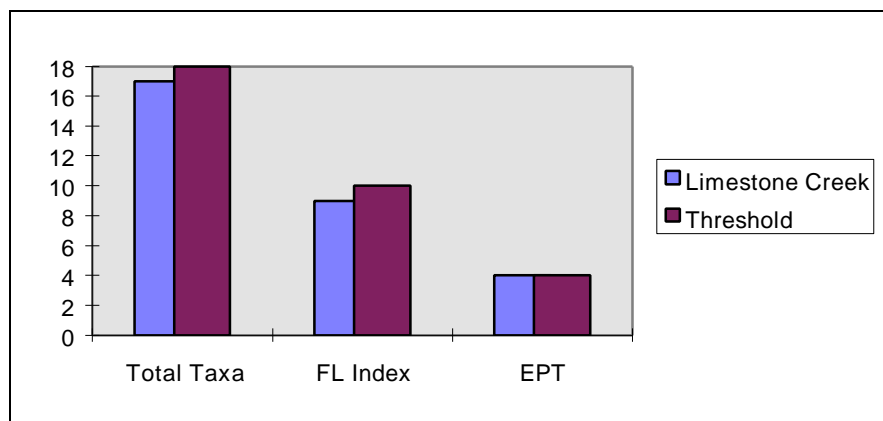


Figure 3. Water Chemistry results

Chloro- phyll-a	Chloride	Sulfate	Ammonia- N	Nitrate- Nitrite	Kjeldahl Nitrogen	Total Phos- phorus	Ortho- phosphate	Total Organic Carbon
Tg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
1.12	12	15	0.035	0.022	1.0	0.27	0.16	18

Turbidity	Total Suspended Solids	Total Coliforms	Fecal Coliforms
NTU	mg/l	#colonies/100 ml	#colonies/100 ml
4.3	9	700	108

Figure 3. Biorecon results



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.