LAKE OKEECHOBEE MACRO-INVERTEBRATE ASSESSMENT PROJECT

Mandate:

Comprehensive Everglades Restoration Plan (CERP),
Lake Okeechobee Watershed Protection Program (LOWPP)

Background:

These projects deal with macroinvertebrates, animals that provide a critical food resource for fish and wildlife in the Lake. The species composition and ecological value of macroinvertebrate communities is sensitive to changes in water quality. Hence, these communities are widely used as biological indicators of water pollution. Because they are critical to the health of the lake, macroinvertebrates are identified as a priority performance measure in both the Comprehensive Everglades Restoration Program (CERP) and the Lake Okeechobee Watershed Protection Plan (LOWPP).

Project Overview:

The back-pumping macroinvertebrate biomonitoring study examined the macro-invertebrate community at the south end of the lake, at two non-impacted reference sites and at two sites impacted by flow from the S2 and S3 pump stations during emergency flood control and water supply back-pumping events. Back-pumping occurred between June - Sept 2001, and samples were collected between April - Sept in both 2001 and 2002, from Hester-Dendy artificial substrates deployed at all four locations. Species composition and abundances were determined and compared among pre-back-pumping, back-pumping and post-back-pumping periods. The results of this study suggested that during the period of backpumping, the macroinvertebrate community composition changed more at the two impact sites while there was little change in the communities at the reference sites. These results suggested that backpumped water may have influenced the macroinvertebrate communities at the impact sites and were published in the March 2008 issue of Water Research.

The benthic macroinvertebrate study is a three-year (2005-2008) monitoring program in the pelagic and nearshore areas of the lake. Benthic samples were collected twice each year (February and August) by the Florida Fish and Wildlife and Conservation Commission at the

same sites monitored during 1969-70 and 1987-1996. Sampling has been completed and a final report is expected in August 2008. We plan to continue this study; but budgetary restrictions have made the future status of this project uncertain at this time.

Application of the Results:

Results of the 2001-2002 two-year study provided insight into the potential ecological effects of back-pumping water into Lake Okeechobee for emergency water supply. The results indicated that higher Specific conductance and lower dissolved oxygen and pH at the impact sites may have influenced the macroinvertebrate community composition, especially in the region near the S3 pump station. However, the macroinvertebrate community at all sites was dominated throughout the study by pollution tolerant oligochaetes (worms) and larval midge fly taxa that feed on decomposed organic matter.

Results of the current benthic monitoring program will provide a current baseline against which long-term Post CERP restoration project changes in the macroinvertebrate community can be measured. This baseline is important to gauge improvements in biological conditions in response to expected changes in hydrology and water quality brought about by CERP and other lake and watershed restoration projects. Since 1970, the macroinvertebrate community has been increasingly dominated by pollution-tolerant taxa, especially pollution-tolerant worms, while the percentage of midge fly taxa that reflect a less organic-pollution enriched lake has decreased. These changes in the macroinvertebrate community may be influencing the taxonomic structure of the fish community. Macroinvertebrate abundances and community diversity also appear to be increasing following Hurricane Francis, Jeanne and Wilma in 2004-05.