Long-Term Monitoring of Seagrasses in the Florida Keys

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This proposal describes the continuation of the long-term monitoring of seagrass beds in the Florida Keys National Marine Sanctuary (FKNMS). This program was designed to address the following objectives: 1) Define the present distribution of benthic communities within the FKNMS; 2) Provide high-quality, quantitative data on the status of the seagrasses within the FKNMS; 3) Quantify the importance of seagrass primary production in the FKNMS; 4) Define the baseline conditions for seagrass communities; 5) Determine relationships between water quality and benthic community status; and 6) Detect trends in the distribution and status of benthic communities.

In this project two sampling strategies are used: 1) semi-synoptic maps of indicator parameters are generated through sampling ca. 350 randomly-located points in a 19,000 km^2 area that includes the FKNMS and the region of shallow coastal water to the north of the Sanctuary, south of Cape Romano, and west of Everglades National Park; and 2) quarterly sampling of fixed transects at 30 permanent monitoring sites in the FKNMS. Indicators of the status of the seagrass communities assessed include species composition, cover and abundance of macrophyte communities, elemental content of seagrass leaves, stable isotopic composition of seagrass leaves, seagrass physiological status as measured by PAM fluorometry, seagrass morphology, and seagrass growth rate. Reasons for selection of these indicators are given in the proposal.

At the permanent sites, quarterly measures of these indicators have been made since winter of 1995. At the present time, rates of change of the permanent stations have been slow, except for three sites which have been severely impacted by hurricanes in the monitoring period. The slow rates of change indicate the need for monitoring for long periods to be able to detect net change; the fact that storms have affected 10% of these randomly selected locations indicates that all stations are needed in order to assure long-term records in the absence of storm-induced disturbance.

Synoptic mapping was carried out during the years 1996-2000. In 2003, the 300 stations originally surveyed in 1996 will be revisited, in 2004 the stations visited in 1997 will revisited, etc. This will allow for over 1000 pairwise measurements of the magnitude and direction of change in seagrass communities in the region. Further effort will be devoted to describing the very-nearshore seagrass communities that are likely to be the first affected by human activity. Lastly, statistical models describing the relationships between seagrass habitat status and water quality will be developed in conjunction with the water quality monitoring program for the FKNMS.