

ABSTRACT

During the period October 1999 and October 2000, nine mangrove lagoons of varying salinities and pollution levels along the southeastern coast of Jamaica between St. Catherine and St. Thomas were studied. Physicochemical and biological parameters, specifically phytoplankton, were monitored with the aim of determining the reliability of phytoplankton as an index to determine mangrove lagoon water quality. Parameters sampled were salinity, dissolved oxygen (DO), pH, redox potential, temperature, light extinction, phytoplankton biomass as chlorophyll *a* and phaeopigments in size fractions and species abundance and distribution.

Three were dominated by dinoflagellates and six by diatoms.

Physicochemical parameters proved unreliable in categorising different water quality types but indicated that an area was experiencing some stress or extreme condition. Physicochemical data could be most accurately interpreted only when done in conjunction with site history information while some phytoplankton data could accurately identify and water quality types independent of site history.

Phytoplankton species composition was not very reliable in water quality determination. The dominance of diatoms and dinoflagellates indicated areas of high or low variability but not necessarily the same water quality type. Phytoplankton cell density and percentage size fractions proved

helpful in grouping similar water quality types, however both indices had their shortfalls. Cell densities were observed to be very high at Hunts Bay (HB) and Galleon East (GE) which may have been due to numerous freshwater phytoplankton being present or the site responding to high nutrients by cell proliferation. Variations in chlorophyll *a* biomass were found to be most accurate in categorising water quality types.

Phytoplankton biomass as chlorophyll *a* grouped the stations sampled into four water quality groups. These were oligotrophic ($<1.0 \text{ mgm}^{-3}$), mesotrophic (1.0 to 2.5 mgm^{-3}) and two categories of eutrophic sites. Eutrophic one (2.5 to 6.5 mgm^{-3}) and eutrophic two ($> 6.5 \text{ mgm}^{-3}$).

Using the phytoplankton biomass categories, data classified Wreck Bay (WB), as oligotrophic, Bowden Bridge (BB), Galleon East (GE) and Bowden West (BW) as mesotrophic, Galleon West (GW), Yacht Club (YC) and Salt Pond (SP) as eutrophic one and Hunts Bay (HB) as eutrophic two.

Therefore, while both sets of parameters proved useful the biological were found to be better at indicating varying water qualities.