

ABSTRACT

Biological, physical and chemical parameters of the waters of Discovery Bay were monitored monthly between September 1995 and August 1996. Initially the Bay was sampled using thirteen stations which was revised to ten stations in June 1996. This was done because of the perceived homogeneity in water characteristics. Station depths ranged from three (3) metres to a depth of fifty (50) metres.

Phytoplankton biomass as chlorophyll *a* and phaeopigments in size fractions, productivity, species composition, population abundance, frequencies of occurrence, community similarity and harmful phytoplankton species, were the biological parameters used to determine the water quality of Discovery Bay. The biological data were supported by monitoring physical and chemical parameters contemporaneously. Physical parameters monitored were, rainfall, temperature, salinity, dissolved oxygen, pH and light extinction coefficient. The chemical parameters were, dissolved inorganic nitrogen as nitrate (nitrate + nitrite) and dissolved inorganic phosphorus as ortho - phosphate (PO_4^{3-}). Over one hundred and thirty (130) species of phytoplankton were found in the waters of Discovery Bay. This was a gross underestimation as the picoplankton size fraction could not have been identified by light microscopy. Picoplankton size fraction accounted for approximately 43 % of the biomass. Of the over one hundred and thirty (130) species found, eleven (11) were found to be harmful species. These species although not in concentrations to be of an immediate threat have the potential to cause a range of economic losses and

health problems.

The waters of Discovery Bay are stable, well mixed and oligotrophic with a tendency to become mesotrophic in localized areas. There were no clearly defined seasons for the parameters measured, however, rainfall had an impact on nutrient concentrations within the Bay which in turn impacted on total biomass (Chl *a*) and phaeopigment concentrations. There were spatial patterns, with the eastern, southeastern, western and southwestern sections of the Bay being areas most affected. There were no vertical differences in temperature, pH and phosphates. All other parameters measured showed vertical variation. When compared with waters along the Hellshire coastline of similar biomass or dominant size fractions, the Discovery Bay waters were more efficient in carbon fixed per unit Chl *a* and had a higher primary productivity. The productivity of the Bay is nitrate limited.

Based on the results obtained Port Rhoades is not the major source of contaminant(s) affecting the waters of Discovery Bay. Other sources included, Puerto Seco beach, Portside Villas, Columbus Park, Discovery Bay Marine Laboratory, surface runoff and upwelling zones particularly on the western side of the Bay.

The Bay is not as polluted as previously speculated, however, there are indications that this could change. Therefore precautions should be taken to monitor developments along the coastline so as to prevent adverse effects or maintain and, or improve the existing water quality within the Bay.