

## ABSTRACT

### THE ECOLOGY OF A JAMAICAN COASTAL LAGOON SYSTEM (1984-1987) FOLLOWING AN ENGINEERING MODIFICATION

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The small, shallow mangrove-lined Great Salt Pond coastal lagoon is situated near Hellshire, an arid region of Jamaica's south coast. It has a history of hypersalinity brought on by the closing of its barrier following extended periods of low rainfall. To prevent the establishment of hypersaline conditions and accompanying mass mortality of lagoon fauna, a permanent marine inlet was constructed in 1975.

The aim of the research was to characterize the lagoon ecosystem one decade after the lagoon was permanently opened to the sea and to establish whether the construction of the inlet had achieved the goal of stabilizing the lagoon ecosystem. Several physico-chemical parameters were monitored inside the lagoon for up to twenty-two months, and at the marine inlet over five separate tidal cycles. Lagoon bathymetry, sediments and biota were also studied.

Results indicated that the composition of lagoon sediment had altered and there was evidence of shoaling. Benthic infauna was sparse and other animal populations were moderate in size and diversity.

Temporal and spatial variation in physico-chemical parameters was moderate. Fifteen-month ranges for various dissolved nutrients were: phosphate  $0.13 - 0.58 \mu\text{mol l}^{-1}$ , nitrate -  $0.13-1.64 \mu\text{mol l}^{-1}$ , and nitrite -  $0.07-3.0 \mu\text{mol l}^{-1}$ . Nutrient levels were highest at stations located near the inlets. Although nutrient levels increased noticeably after torrential rainfall in mid-1986, concentrations returned to pre-flood levels within three months.

Measurements at the marine inlet over several tidal cycles indicated that the lagoon exported nutrients to the nearshore intermittently. Mean net fluxes recorded were: phosphate -  $0.02 \pm 0.03 \text{ kgs}^{-1}$ , nitrate  $0.021 \pm 0.03 \text{ kgs}^{-1}$ , nitrite  $\pm 0.007 \pm 0.01 \text{ kgs}^{-1}$ .

The construction of the permanent inlet has stabilized environmental conditions inside the lagoon. Increases in the resource potential of the lagoon have been less than expected due to the system's shallowness and sensitivity to ecological perturbation. Further multidisciplinary research will enhance knowledge of the structure and function of the lagoon.