THE EFFECT OF A SALINITY GRADIENT ON THE BENTHIC MACROINVERTEBRATE COMMUNITIES OF SPANISH AND BUFF BAY RIVERS AND THE RECOVERY OF THESE ORGANISMS FROM MAJOR DISTURBANCE EVENTS

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ABSTRACT

The effect of a salinity gradient on the benthic macroinvertebrate communities of Spanish and Buff Bay Rivers and the recovery of these organisms from major disturbance events

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An estuary is a partially enclosed body of water of variable salinity with a freshwater inflow at one end and seawater introduced by tidal action at the other. The estuarine environment is more extreme, and undergoes more violent fluctuations than open sea or freshwater habitats. Jamaican estuaries have not been studied to any great extent.

This investigation first seeks to test the validity of the term estuary on the lower sections of Jamaican rivers by demonstrating the existence of a salinity gradient. The effect of this salinity gradient on the benthic macroinvertebrate community was then determined. The recovery/ recolonization process following major scouring events, such as flooding and dredging, was also determined.

Eight sites on the lower sections of Spanish and Buff Bay Rivers were visited twice per month (whenever possible) and at each site qualitative and quantitative samples of benthic macroinvertebrates were taken as well as water samples for analysis of physico-chemical parameters. The types and numbers of organisms found at each site were compared against rainfall data, salinity/ distance from the sea and comparisons were also made between dredged and non-dredged sites. The succession pattern of Spanish River was also examined.

This study found that Spanish River did not exhibit characteristics of a true estuary but rather that of a semi-estuarine pool due to factors such as a sand bar at the mouth of the estuary as well as a low tidal range. Buff Bay River, on the other hand, did not exhibit any characteristics of an estuary. It was also found that the numbers and density of taxa collected, as well as diversity calculated from Spanish River, decreased with increasing specific conductivity. Specific

conductivity also had an effect on the distribution of the taxa and, based on this, the taxa collected could be placed into three distinct groups, i.e., a euryhaline group, a stenohaline group and a group of taxa that thrived in the mid to lower salinity ranges. When there were no significant differences between specific conductivities, as was the case at the Buff Bay River sites, the factors listed above did not differ at the sites sampled. This study also found that significant amounts of rainfall resulted in a decrease in number and densities of taxa and torrential rainfall initiated a succession pattern that was similar to the patterns observed in other studies (i.e., filter feeders/ deposit feeders first, grazers intermediate, and lastly, predators and shredders). Also, the dredging event on Spanish River did not seem to be intensive enough to cause significant changes in the benthic macroinvertebrate community.

Keywords: Jamaican rivers, estuaries, disturbance, succession, benthic macroinvertebrates