PROCEEDINGS OF THE FIRST SYMPOSIUM ON THE GEOLOGY OF THE BAHAMAS

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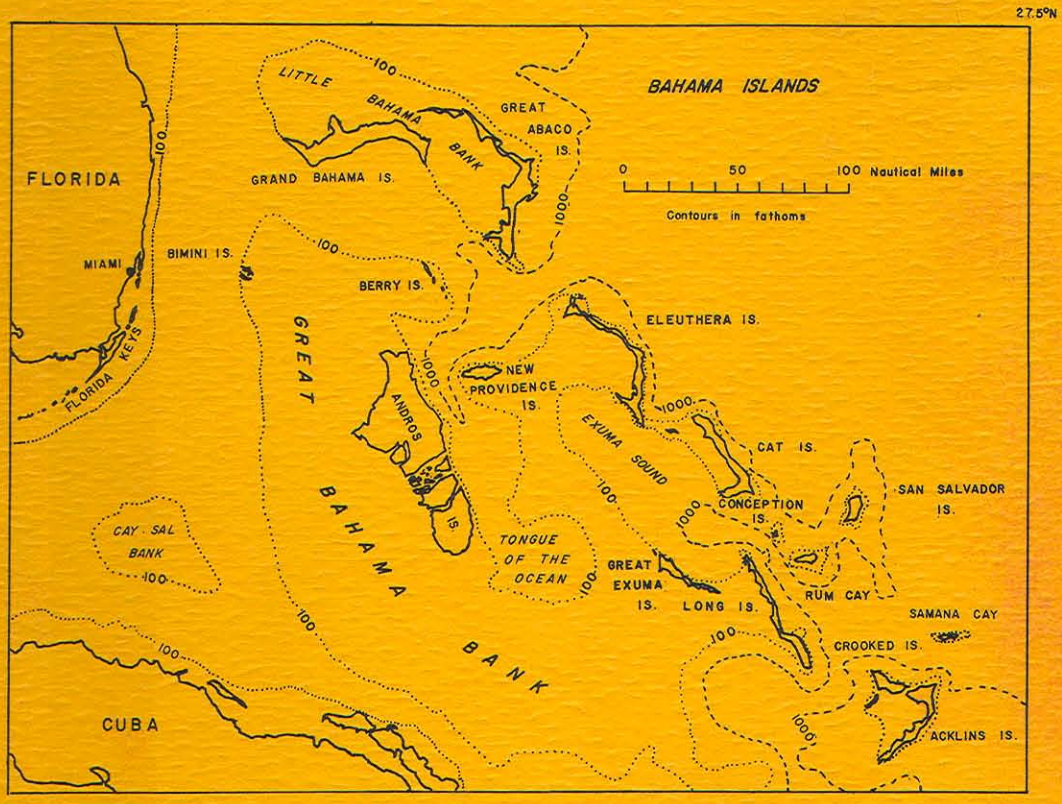

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THE DISTRIBUTION OF LIVING AND FOSSIL OSTRACODA AND THEIR USE IN THE INTERPRETATION OF THE POST PLEISTOCENE OF LITTLE LAKE, SAN SALVADOR ISLAND, BAHAMAS

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Little Lake has been isolated from the ocean by surrounding limestone bedrock since the Pleistocene. The surface of the bedrock, flooring the lake, consists of several shallow basins more or less separated by low ridges. The saline lake waters, which lie at sea level, have apparently been introduced by percolation through the porous Pleistocene bedrock. Because of its protected nature the lake has preserved a relatively complete sedimentary sequence from the time of its first flooding, by rising sea level, to the present.

Sediment surface samples, consisting of a constant volume of the uppermost centimeter of sediment, were collected and preserved in formalin for later determination of living ostracodes. Piston cores were taken through the unconsoldated sediments to Pleistocene bedrock. Cores (Fig. 1) used in this study include 1-81 through 4-81, 4, and 9. Sediment surface samples (Fig. 1) used include 1-81 through 4-81, I, and V.

Ostracoda in Sediment Surface Samples

At the time of collection in January 1981 Little Lake was slightly hypersaline (37 o/oo) and the commonest living ostracodes, in order of abundance, were Dolerocypria inopinata, Xestoleberis curassavica, Reticulocythereis multicarinata and Hemicyprideis setipunctata. Their occurrence agrees with

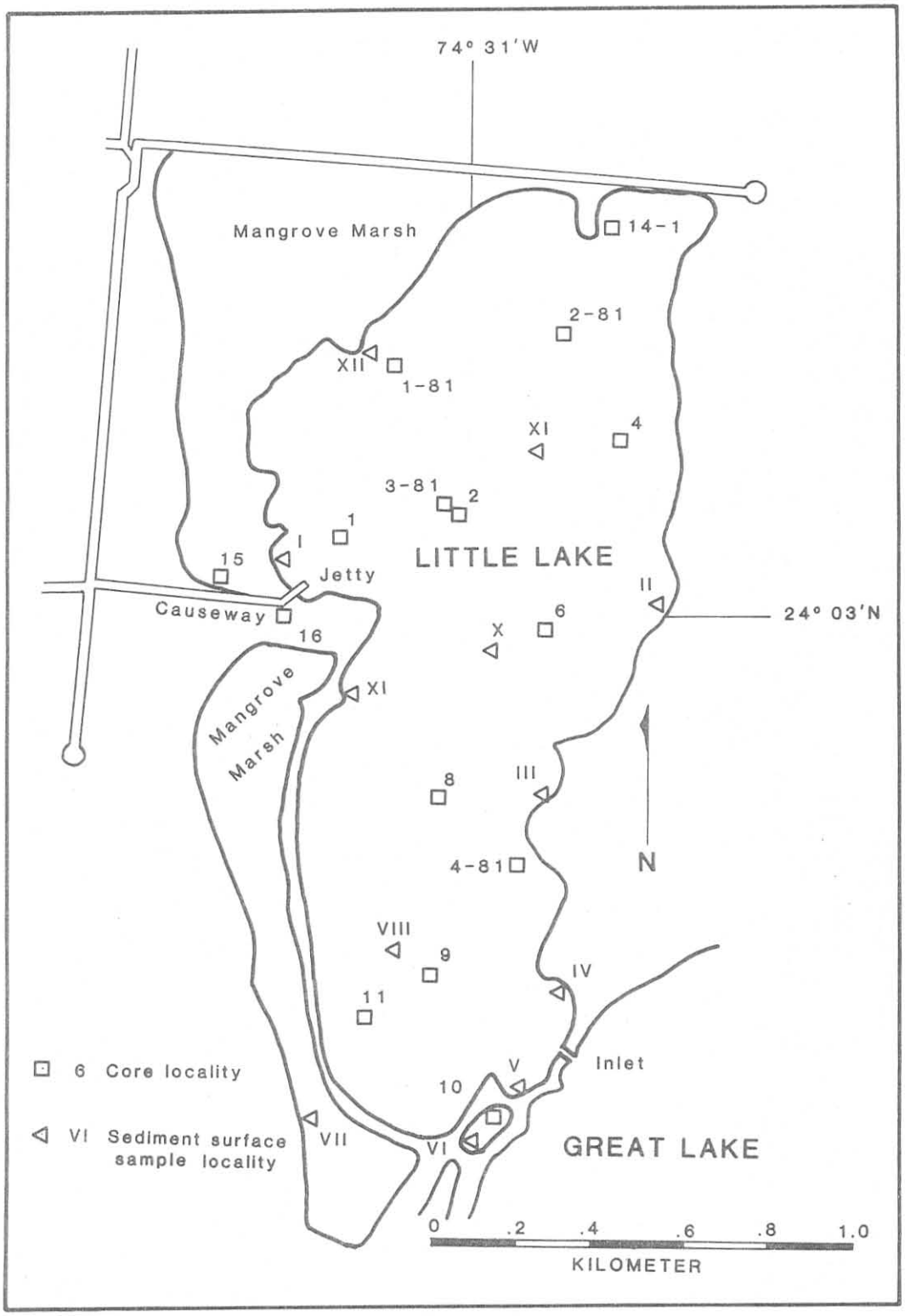

Figure 1. Core and sediment surface localities, Little Lake, San Salvador Island.

published salinity tolerances.

Post Pleistocene Ostracoda

Although all cores reflect similar ostracode sequences, core 9 (Fig. 2) has been selected as representative because it is one of the longest, has experienced little sediment loss during coring, and has a more completely preserved faunal zonation. Based on published ecological information and our observations during the past five years on San Salvador, the salinity tolerances of the 11 commonest species in Figure 2 are relatively well known. The three freshwater species are probably restricted to considrably less than 10 o/oo. Perissocytheridea bicelliforma prefers 10-20 o/oo. Cyprideis ovata, Dolerocypria inopinata and Hemicyprideis setipunctata are euryhaline, often predominating during brackish and hypersaline condtions. Loxoconcha purisubrhomboidea and Aurila floridana have similar tolerances. ranging from approximately 20-40 o/oo. Bairdia harpago and Xestoleberis curassavica have only been observed at 37.5 o/oo and 37-42 o/oo respectively.

Core 9 (Fig. 2) reveals four distinct ostracode zones. The earliest is the lower Xestoleberis zone which was initially brackish but become more saline, approaching normal marine salinity with time. Increasing salinity upwards probably reflects rising sea level causing expansion and deepening of the lake during its early history.

The overlying Cyprideis ovata zone begins with a marked freshening of the lake probably indicating a drop in sea level and thus, lake level, accompanied by increased rainfall.

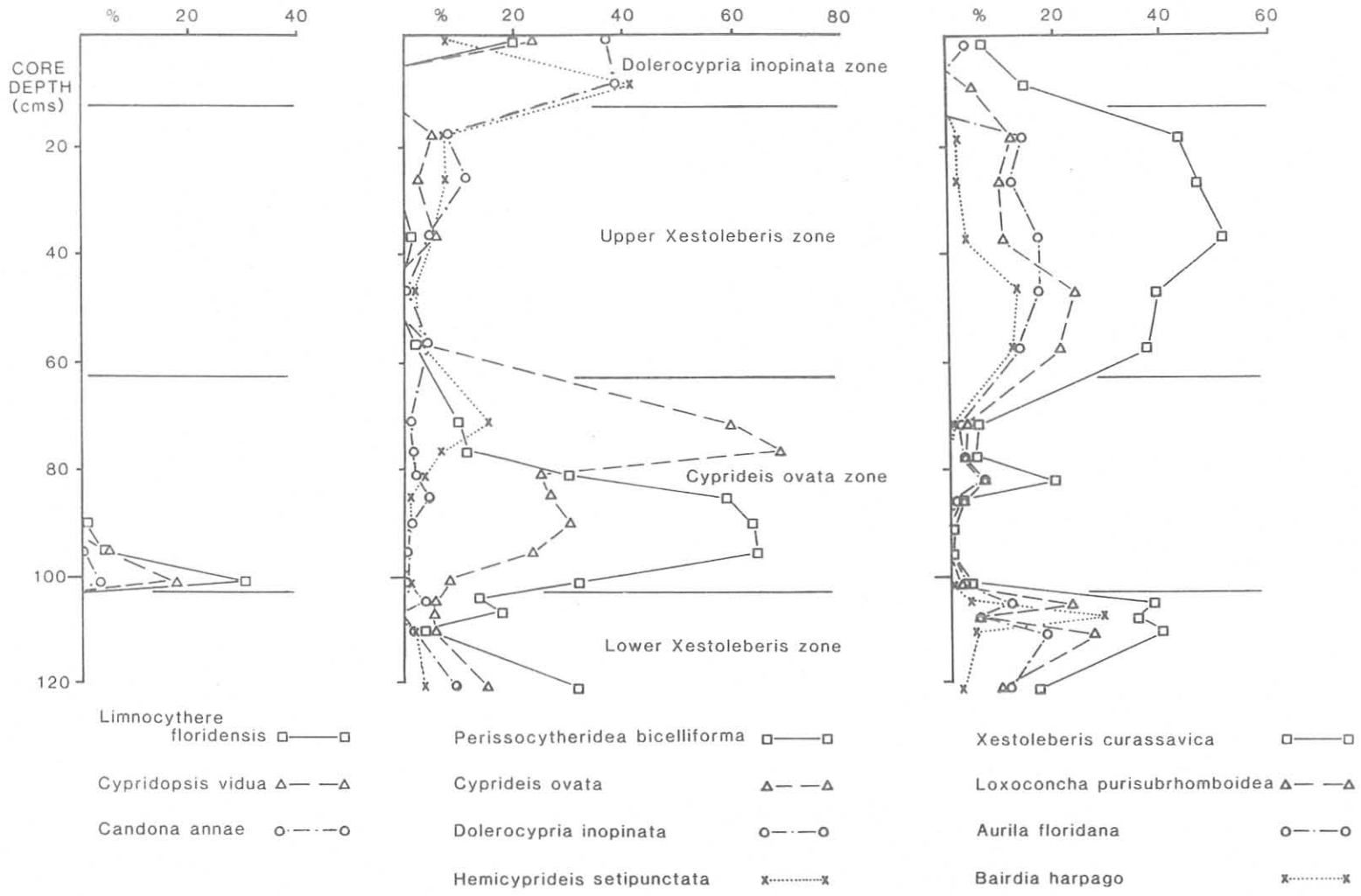

Figure 2. Distribution of the 11 most abundant species of Ostracoda in Core 9, Little Lake San Salvador Island. Fresh water species in left column brackish and euryhaline species in middle and marine species in right.

Subsequently, throughout this zone, the salinity increased, eventually limiting the brackish water ostracodes.

Salinity continued to increase, probably hovering around normal marine during the succeeding upper Xestoleberis zone. The Dolerocypria inopinata zone, marked by the decrease in marine and the resurgence of the euryhaline species, reflects the continuing trend of increasing salinity. Based on a limited number of observations, it appears that Little Lake is presently hypersaline during most, if not all, of the year.