

Research Projects of Ted DeWitt

Undertaken at Lameshur Bay, St. John, U.S.V.I.

July 1 - August 31, 1985

Introduction:

During July and August 1985, I pursued three research projects at the Virgin Islands Ecological Research Station on Lameshur Bay, St. John, U.S.V.I. These projects were (1) an investigation of amphipod and tanaid (Crustacea) herbivory of filamentous algae raised on plastic screens, (2) shell utilization by hermit crabs, and (3) a survey of the population densities, species composition, and size-frequency distribution of conchs in the three bays near the V.I.E.R.S. These projects are described in detail below.

Several people were involved in this research, and I wish to acknowledge and thank them for their help. The staff of V.I.E.R.S. (Kirsten Canoy, Vincent Powell, and George Mathies) were particularly helpful in providing laboratory and boat facilities. Dr. Caroline Rogers of the Virgin Islands National Park helped arrange permits to conduct this research and generously provided maps of the marine environments of Lameshur Bay. My teaching and research colleagues Rich Aronson and Don Levitan were eager field assistants and friendly critics of all phases the research. And, finally, I wish to thank the twenty-one School for Field Studies students who helped gather much of these data during two Coral Reef Ecology courses.

1. The effects of herbivory by small peracarid crustaceans on the primary productivity of algal turf communities. A major maricultural research program in the Caribbean, headed by Dr. Walter Adey of the Smithsonian Institution, seeks to utilize the fast growing, filamentous algae as the food source for commercially important invertebrates and fish. These algal species usually form a dense mat, or algal turf, in shallow, high energy waters on bare hard substratum. Ecologically, algal turfs are the first successional occupants of shallow water disturbed areas, and the persistence of these turfs can regulate the rate at which corals and other sessile invertebrates colonize newly opened substrate. Other than the rapid growth rates of these algal species, little is known of the ecological processes that regulate the productivity and persistence of these ephemeral communities. This is particularly true for the role of herbivores which could either stimulate the growth of the turf, graze turfs to local extinction, or selectively remove

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3. Population Survey of the Conchs, Strombus gigas and S. costatus, in Greater Lameshur, Little Lameshur, and Europa Bays: The queen and milk conchs, Strombus gigas and S. costatus respectively, are economically important fishery species in the Caribbean. Unfortunately, these species have been severely overfished on most islands, including St. John. As a contribution to a larger survey of these species being run by the Virgin Islands National Park Service and Virgin Islands Division of Fish and Wildlife, the students and faculty of the July and August courses surveyed the conch populations in the three bays near VIERS, Greater and Little Lameshur, and Europa Bays. The survey technique was to swim 3 m wide compass transects (while on SCUBA) across a bay and count and identify each conch encountered in each transect. Two or three transects were run on each compass swim. Transects were run across three different parts of both Greater and Little Lameshur Bays, once across Europa Bay, and once across the mouths of all three bays (from Tektite Pt. to the tip of White Pt.). A total of 19 3 m wide transects were run during the July course. In August, we ran 4 3 m wide transects across the middle and mouth of Greater Lameshur Bay, and measured the maximum lengths and widths of all of the conchs within the transects. These transects are marked on the map (Fig. 1) accompanying this report.

The predominant conch in these bays was the Milk Conch, Strombus costatus; very few Queen Conch were encountered. The population density of conchs increased with water depth, with the greatest numbers being encountered on the algal-sand plain in Greater Lameshur Bay (12-14 m depth) and across the mouths of all three bays in ca. 20 m of water (see Table 1A). The largest conchs were found on the cross-bays transect, but we were unable to measure these individuals. (See Table 1B). Very few conch were larger than 11 cm long, which is far smaller than a recommended, edible size (greater than about 20 cm). A few larger conch can be found in deep water grass beds and sand channels, but most of the population of Milk and Queen Conchs in these bays are pre-reproductive individuals, too small for eating.



Table 1. Conch Survey at Lameshur Bay, St. John, USVI

A. Population Density Transects

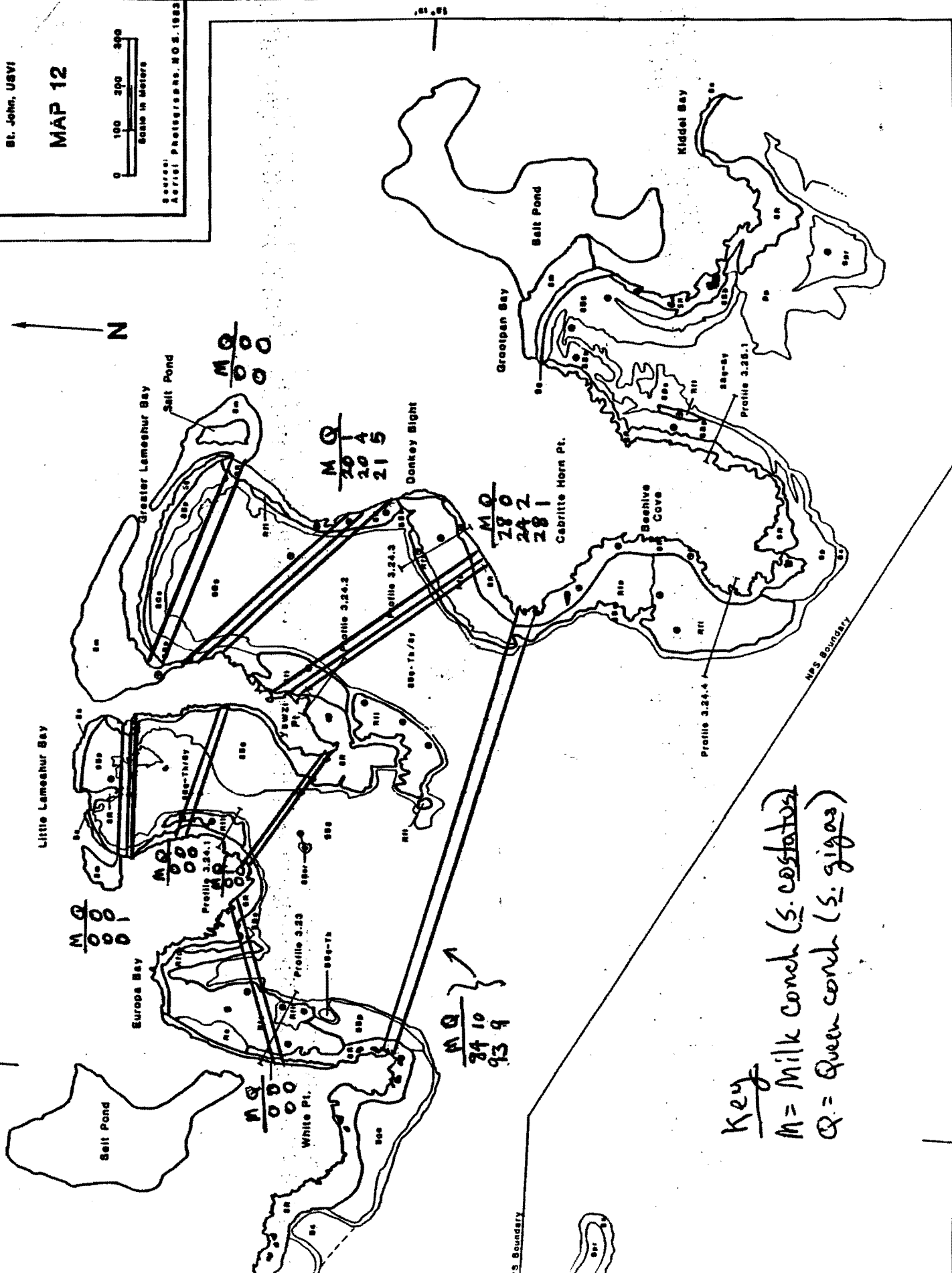
<u>Location</u>	<u>Transect Length (m)</u>	<u>Density (mean, SD)</u>
Europa Bay	378	0
Little Lameshur		
Inner	265	0.0002 (0.00043)
Middle	305	0
Mouth	294	0.0003 (0.00045)
Greater Lameshur		
Inner	452	0
Middle	508	0.026 (0.0028)
Mouth	520	0.031 (0.0017)
Across all Bays	1023	0.032 (0.0018)

B. Body Sizes of Conchs in Greater Lameshur Bay

	<u>No. Conch</u>	<u>Length (mean, SD)</u>	<u>Width (mean, SD)</u>
<u>Mid Bay</u>			
Milk Conch	50	11.55 (1.31)	9.10 (1.10)
Queen Conch	2	10.30 (0.42)	7.50 (0.71)
<u>Mouth</u>			
Milk Conch	44	10.84 (1.39)	8.77 (1.17)
Queen Conch	7	9.26 (2.91)	6.31 (1.87)



Source:
Aerial Photographs, M.O.S. 1983



Key
M = Milk conch (*S. costatus*)
Q = Queen conch (*S. gigas*)