

Study No. 1

Job No. 5

STUDY TITLE: Investigation of benthic populations of the coastal bays

JOB TITLE: The diurnal use of a low tide emergent shoal by benthic invertebrates, motile invertebrates and finfish.

JOB OBJECTIVE: To document seasonal, tidal(by depth) and diurnal use of a low tide emergent coastal bay shoal by predatory motile invertebrates and finfish for the purpose of forage. The forage is considered to be composed primarily of benthic invertebrates. Data to determine diversity of all species concerned, biomass and forage potential.

PROCEDURE: Sampling would center on a shoal 1,800 m. south of the Ocean City inlet in Sinepuxent Bay, adjacent to Assateague Island. (Figure 1) The shoal, formed by sand overwash across the island, is situated at the mouth of a shallow embayment and is relatively stable. The eastern slope of the shoal is gradual and contributes to the formation of a shallow embayment between itself and the barrier island. The western slope of the shoal drops off steeply into the bay channel where depths vary from 2.4 m. to 4.3 m.

To obtain the most accurate assessment of such shoal use, all conditions of time and tide should be sampled. However, given the limitations of personnel and equipment, only optimum conditions, that is, those occurring during spring tides, will be examined.

PROCEDURE (cont'd.): To establish the sampling areas, two steel reference posts will first be driven into the island south of the shoal. Then, during a spring tide, additional steel posts will be driven into the shoal at hourly intervals, marking the progress of the incoming tide up the shoal face. (Figure 2) A hand-bearing compass will be used at the site of the reference posts to keep all shoal posts in alignment. (Note: the steel posts used will be a traditional 2.0 m. "T" post used for fencing. This is the only marker which will last at least one year and be relatively tamper-proof. At the termination of the study, all posts will be removed.) Once set, the posts will then form six bands or "lanes" of tide position as represented in Figure 2.

The sampling procedure will involve the use of a 15 m. bag seine of . 64 cm. mesh, a benthic grab (Ekman or Ponar) and a 5 m. trawl net. Sampling will take place at high tide. The 15 m. seine will be bridled down to a 9 m. width and pulled for a distance of 30 m. within each lane. At the end of each pull, the net will be pulled up a portable wooden incline to minimize catch loss and deposited in a suitable container. This method will yield six seine samples, one from each lane. All finfish and shellfish caught will be identified, measured for individual lengths, grouped and weighed by species for biomass determinations. Suitable individuals of as many species as possible will be removed and stomach contents examined for the presence and number of recognisable and/or identifiable benthic organisms. This procedure will be carried out on each of the six seine samples as each represents a different depth and different period of exposure.

A benthic grab sample of approximately 6,300 ml. volume will be taken at the center of each lane, the sediment being rinsed through a 1.0 mm. Nalgene sieve and the residue stained with Rose Bengal and preserved (after refrigeration to reduce preservation shock) in

PROCEDURE (cont'd.): 10% buffered formalin. All organisms will be separated, counted and identified in accordance with procedures established for the 1981 Benthic Study.

For the purpose of comparison, a trawl sample run of at least 100 m. in length will be taken immediately adjacent to the shoal in the channel area. Trawl samples will receive the same treatment as the seine samples.

As the time of feeding could significantly affect the seine catches, two seine samples are proposed during the spring tide week. One to begin when the high tide occurs in the early morning (after sunrise) and the other to begin when the high tide occurs in the early afternoon. The trawl sample will follow this same schedule however the benthic sampling series will only be performed during the early morning sampling period.

The entire series of seine, trawl and benthic sampling will be performed seasonally - spring, summer and fall, generally following the 1981 Benthic Study sampling schedule although with adjustments to spring tide occurrences (see calendar) Data will be compiled seasonally with a final year comparison of all data.

Figure 3 represents the species caught by trawl and seine combined during the years 1973 to 1979.

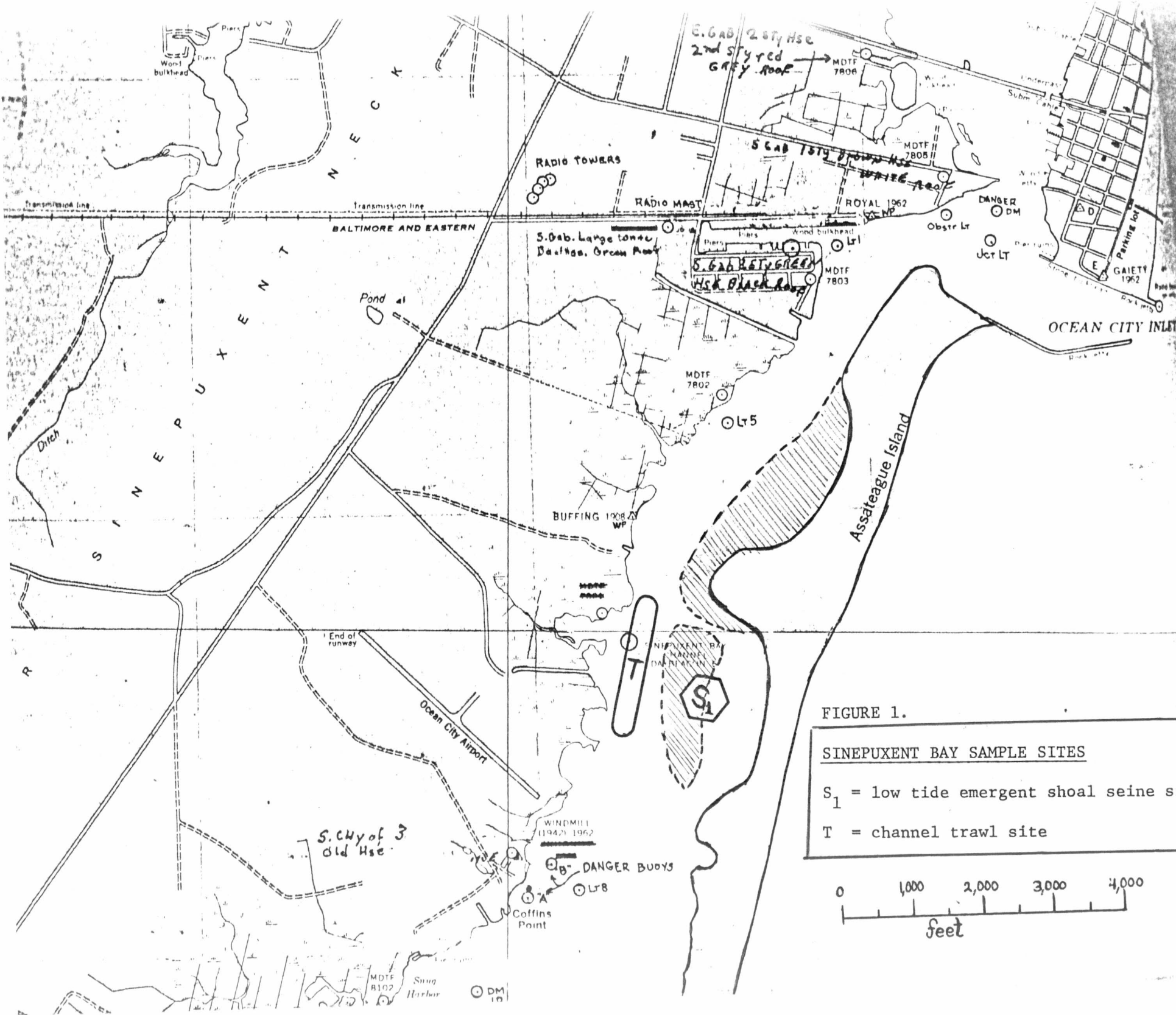


FIGURE 1.

SINEPUXENT BAY SAMPLE SITES

S₁ = low tide emergent shoal seine site

T = channel trawl site

A horizontal number line representing distance in feet. The line starts at 0 on the left and ends at 4,000 on the right. Major tick marks are labeled at 0, 1,000, 2,000, 3,000, and 4,000. Between each major tick mark, there are two smaller, unlabeled tick marks, dividing each 1,000-foot segment into three 500-foot segments. The word "feet" is written below the line.

FIGURE 2.

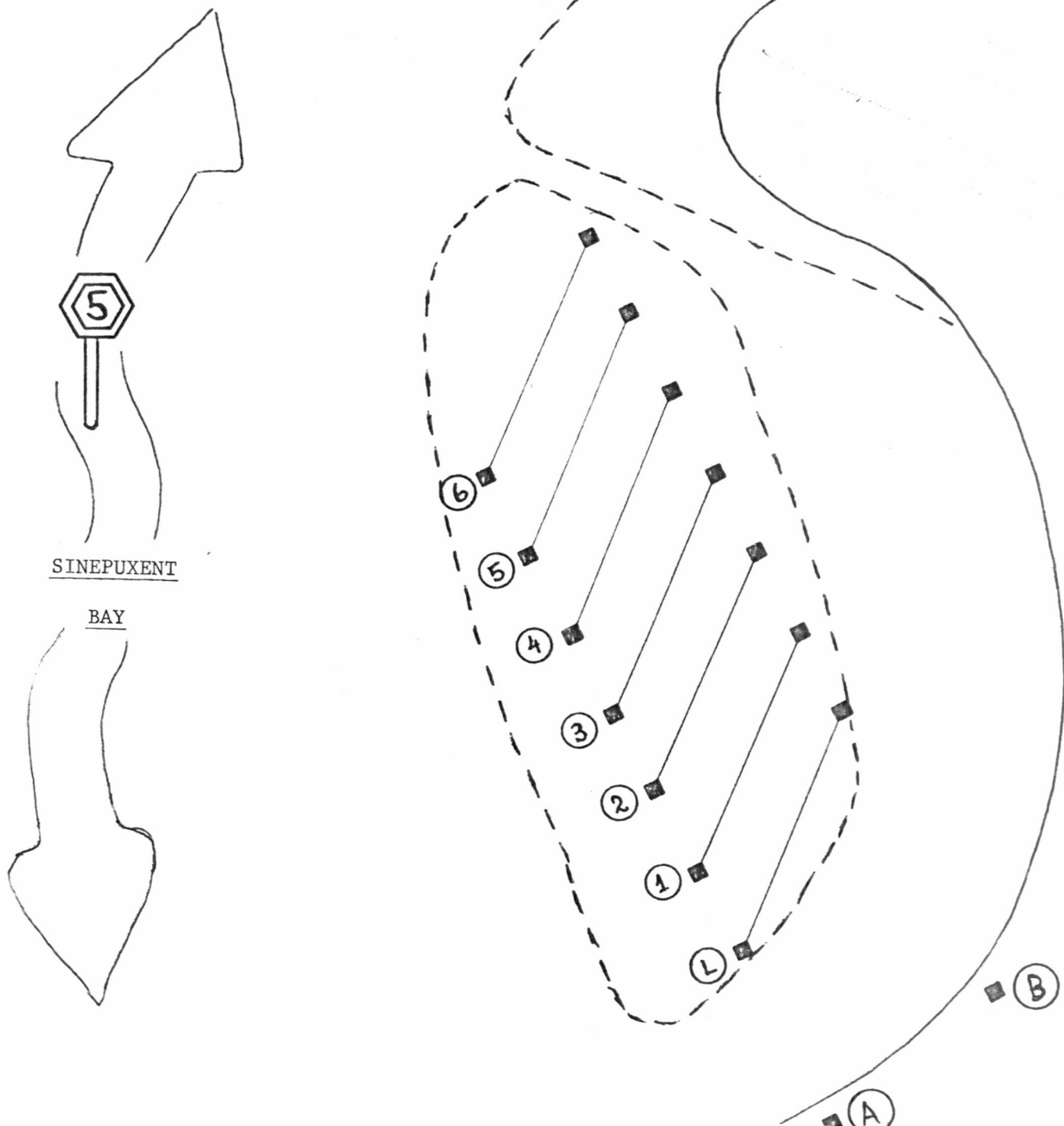
SINEPUXENT BAY SHOAL SAMPLE SITE

- L low water level (low tide)
- 1 first hour water level
- 2 second hour water level
- 3 third hour water level
- 4 fourth hour water level
- 5 fifth hour water level
- 6 sixth hour water level (high tide)

A & B reference markers

- - - low tide emergent shoal line

ASSATEAGUE ISLAND



SINEPUXENT BAY, #2-#5B TRAWL

Composite data 1973-1979

Species List

- *1. Ocean jellyfish
- 2. Ctenophora spp.
- *3. Sulphur sponge
- 4. Bloodworm (Glycera spp.)
- 5. Atlantic horseshoe crab (Limulus polyphemus)
- 6. Sand shrimp (Crangon septemspinosus)
- *7. Pink shrimp
- 8. Mantis shrimp (Squilla empusa)
- 9. Penaeid shrimp (Penaeus spp.)
- 10. Blue crab (Callinectes sapidus)
- 11. Lady crab (Ovalipes ocellatus)
- 12. Hermit crab (Pagurus spp.)
- 13. Rock crab (Cancer irroratus)
- 14. Spider crab (Labinia spp.)
- 15. Mud crab (Panopeus spp.)
- 16. Starfish (Asterias forbesii)
- *17. Squid
- 18. Southern stingray (Dasyatis americana Hildebrand and Schroeder)
- 19. Smooth dogfish (Mustelus mustelus Linnaeus)
- 20. Seahorse (Hippocampus hudsonius DeKay)
- 21. Cusk eel (Pissola marginata DeKay)
- 22. Common anchovy (Anchoviella mitchilli Cuvier and Valenciennes)
- 23. Bluefish (Pomatomus saltatrix Linnaeus)
- 24. Summer flounder (Paralichtys dentatus Linnaeus)
- 25. Window-pane flounder (Lophopsetta maculata Mitchill)
- 26. Four-spot flounder (Paralichtys oblongus Mitchill)
- 27. Tonguefish (Symphurus plaguosa Linnaeus)

SINEPUXENT BAY, #2-#5B, cont.

28. Common killifish (Fundulus heteroclitus Linnaeus)
29. Menhaden (Brevoortia tyrannus Latrobe)
30. Atlantic silverside (Menidia menidia Linnaeus)
31. Sea trout (Cynoscion regalis Bloch and Schneider)
32. Black sea bass (Centropristis striata Linnaeus)
33. Lizard fish (Synodus foetens Linnaeus)
34. Puffer (Sphaeroides spp.)
35. Northern puffer (Sphaeroides maculatus Bloch and Schneider)
36. Northern sea robin (Prionotus carolinus Linnaeus)
37. Spot (Leiostomus xanthurus Lacépède)
38. Northern porgy (Stenotomus chrysops Linnaeus)
39. Silver hake (Merluccius bilinearis Mitchill)
40. Northern kingfish (Menticirrhus saxatilis Bloch and Schneider)
41. Northern pipefish (Syngnathus fuscus Storer)
42. Ling (Urophycis chuss Walbaum)
43. Croaker (Micropogon undulatus Linnaeus)
44. Four-spire stickleback (Apeltes quadracus Mitchill)
45. Common jack (Caranx hippos Linnaeus)
46. Needlefish (Scomberesox saurus Walbaum)
47. Halfbeak (Hyporhamphus unifasciatus Ranzani)
48. Pinfish (Lagodon rhomboides Linnaeus)