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National Marine Fisheries Service
Southeast Fisheries Center
Pascagoula Facility
P O Drawer 1207
Pascagoula, MS 39568-1207

NOAA Ship CHAPMAN Cruise 85-07 (8)
9/22-10/30/85

## INTRODUCTION

The NOAA Ship CHAPMAN departed Pascagoula, MS on September 22, 1985 to assess 13 deep water reeffish sites off Puerto Rico, Culebra, St. Thomas, St. Johns and St. Croix Islands (Figure 1); and to provide fishing and platform support for a cooperative submersible study. The submersible study was part of a joint research project between the National Marine Fisheries Service, Southeast Fisheries Center, Mississippi Laboratories, the University of Puerto Rico, Sea Grant Program, Mayaguez, Puerto Rico, the Department of Conservation and Cultural Affairs of the U.S. Virgin Islands, CODREMAR of the Commonwealth of Puerto Rico, and the Caribbean Fisheries Management Council. Harbor Branch Foundations' R/V SEWARD JOHNSON and the Research Submersible JOHNSON SEA-LINK were used for the visual survey of selected study sites. Habitat, faunal components, and species reaction to passive fishing gear were evaluated.

Fishing gear included bottom and offbottom longlines, Florida fish traps, University of Puerto Rico (UPR) fish and shrimp traps, and a 42-ft shrimp trawl.

The cruise terminated October 30 in Pascagoula, MS. Port calls included: Mayaguez, PR September 29 to pick up one cruise participant and additional fishing gear; Guanica, PR on the evenings of October 4, 5, 6 during adverse weather; Charlotte Amalie, St. Thomas, Virgin Islands October 14 and 15; and Mayaguez, PR October 22 to drop off one cruise participant and to unload and transfer equipment and specimens.

## OBJECTIVES

1) Categorize deep-water benthic habitats around Puerto Rico and the U. S. Virgin Islands in terms of bottom type, topography and faunal components.

2) Map and survey dive areas using echo sounders to define

potential dive sites.

3) Provide quantitative abundance indices of fishes and invertebrates within each habitat type based on catch rate.

4) Provide specimens caught in traps, trawls, and bottom longlines to UPR researchers.

5) Provide trap and longline catch per unit effort data for comparison with submersible population numbers from each habitat, and for comparison with historical catch effort data to evaluate population trends.

6) Locate Fish Attraction Devices (FAD's) deployed, in 1984 south of St. Johns and east of St. Croix to assess the condition of the structures and their potential for attracting fish.

GEAR

Bottom Longline: A standard bottom longline set consisted of 50 hooks and 100 fm of ground line constructed of twisted Iceline. Monofilament gangions were 2.5-ft in length with No. 7 circle tuna hooks attached to 3/8-in ground line with AK snaps. Bottom longline sets soaked 2 hr and squid were used as bait.

Offbottom Longlines: Offbottom longlines consisted of 100 fm of floating polypropylene mainline and 20 evenly spaced 8-ft PVC Kali poles. Poles were weighted at the bottom and had 4-in plastic floats at the tops to maintain them in an upright position. Each pole had 5 evenly spaced No. 7 circle tuna hooks on 8-in monofilament gangions. Squid were used as bait and sets soaked for 2 hr. Bottom and offbottom longlines were joined together for 200 fm sets for comparative purposes. They are shown in this report as separate sets.

Florida Fish Traps: Three Florida fish traps were attached 50-ft apart along a bottom line and were buoyed at one end with a single buoy. The traps were 2 X 2 X 4-ft with a single funnel. Squid were used as bait.

UPR Fish and Shrimp Traps: Three fish and two shrimp traps were attached to the Florida fish trap sets via an additional 100 fm of groundline. In sites deeper then 300 fm, UPR fish and shrimp traps were set without Florida fish traps. Shrimp traps were 1.5 X 1.5 X 4-ft with a 2-in funnel at each end. A covering of burlap was placed over most of each trap. UPR fish traps were of 3 sizes: large,

1.5 X 5 X 6-ft; medium, 10-in X 3 X 4-ft; and small, 10-in diameter minnow traps. All traps were double funneled. Squid, fish, and shark were used as bait.

Trawls: Forty two-ft four seam semi-balloon shrimp trawls were used with 8-ft by 40-in wooden chain doors and a 180-ft bridle.

## ENVIRONMENTAL DATA COLLECTION

Expendable bathythermographs (XBT) were shot at each sampling site to provide temperature profiles. Other environmental data taken included air temperature, barometric pressure, sea color, sea condition, and wind speed and direction. All environmental data have been placed into the permanent Pascagoula environmental data file.

## RESULTS

Inclement weather and lost time required several modifications to the original cruise schedule. Station 11 (Figure 1) was dropped and the standard sample of four bottom and offbottom longlines and four trap sets were reduced at stations 3 and 13. Despite adverse weather conditions, 171 stations were completed, including 49 bottom and 48 offbottom longline, 45 Florida fish trap, 13 UPR shrimp trap, 13 UPR fish trap, and three shrimp trawl stations. Total combined catch from all stations was 1,144 lb of which 465 lb came from bottom and 278 lb from offbottom longlines, 208 lb from Florida fish traps, 121 lb from UPR fish traps, 23 lb from UPR shrimp traps, and 49 lb from three shrimp trawl stations.

Bottom and Offbottom Longlines: Longlines were fished along the north, south, and west coasts of Puerto Rico; north of St. Thomas; south of St. Johns; and east of St. Croix between 27 and 384 fm. Catch by longline gear is shown on Table 1. Dominant snapper species, by weight, were queen snapper (*Etelis oculatus*) and by number wenchman snapper (*Pristipomoides macrophthalmus*) (Table 1). By weight, yellowedge (*Epinephelus flavolimbatus*) and misty grouper *mystacinus*) were dominant on bottom and off- bottom gear respectively, with the rock hind (*E. adscensionis*) caught most frequently. Smooth dogfish (*Mustelus canis*) and Cuban dogfish (*Squalus cubensis*) were the most frequently caught sharks. Catches throughout the cruise of all species were generally poor. Red and rock hind (*Epinephelus guttatus*) and (*E. adscensionis*) were taken most frequently at Escollo Grappler, east of St. Croix and northwest of Puerto Rico. Snapper catches were highest south of St. John, east of St.

Croix and north of St. Thomas Islands. Catch composition of snapper and grouper was similar between bottom and offbottom longlines. Shark and other species caught were dissimilar with fewer species caught on offbottom longlines. Distribution of effort by gear and depth is shown on Table 2.

Florida Fish Traps: Forty-five trap sets, catching primarily snapper, were made in 25 to 242 fm (Table 2). The silk snapper was dominant by weight, and the vermilion snapper (*Rhomboplites aurorubens*) by number (Table 3). Traps were soaked for 12 hr, with the exception of two trap sets which soaked 24 hr. The extended soak period did not appreciably improve catch rates.

University of Puerto Rico Fish Traps: Thirteen UPR fish trap sets were made between 125 and 394 fm (Table 3). One large misty grouper, weighing 40 lb, was taken in 242 fm northeast of the entrance to San Juan harbor. The dominate species caught in these traps was the giant isopod *Bathynomus giganteus* (Table 4).

University of Puerto Rico Shrimp Traps: Thirteen UPR shrimp trap stations were completed between 113 and 394 fm (Table 2). The dominate species, by number, were *Heterocarpus ensifer* and *Heterocarpus laevis* (Table 5). Fewer *Bathynomus* and fish species were taken in these traps than in the UPR fish traps (Tables 4 & 5).

Shrimp Trawl: Three trawl stations were completed between 273 and 307 fm south of Guanica, PR. One trawl tore after hitting a bottom obstruction and only portions of the body and bag were recovered. Trawl caught specimens are listed on Table 6. Several trawl caught species were used to verify video records and identification of fishes and invertebrates observed from the submersible.

Fish Attraction Devices (FADs):

Bottom echo tracings and the sonar search failed to locate either FAD site.

## Cruise Participants

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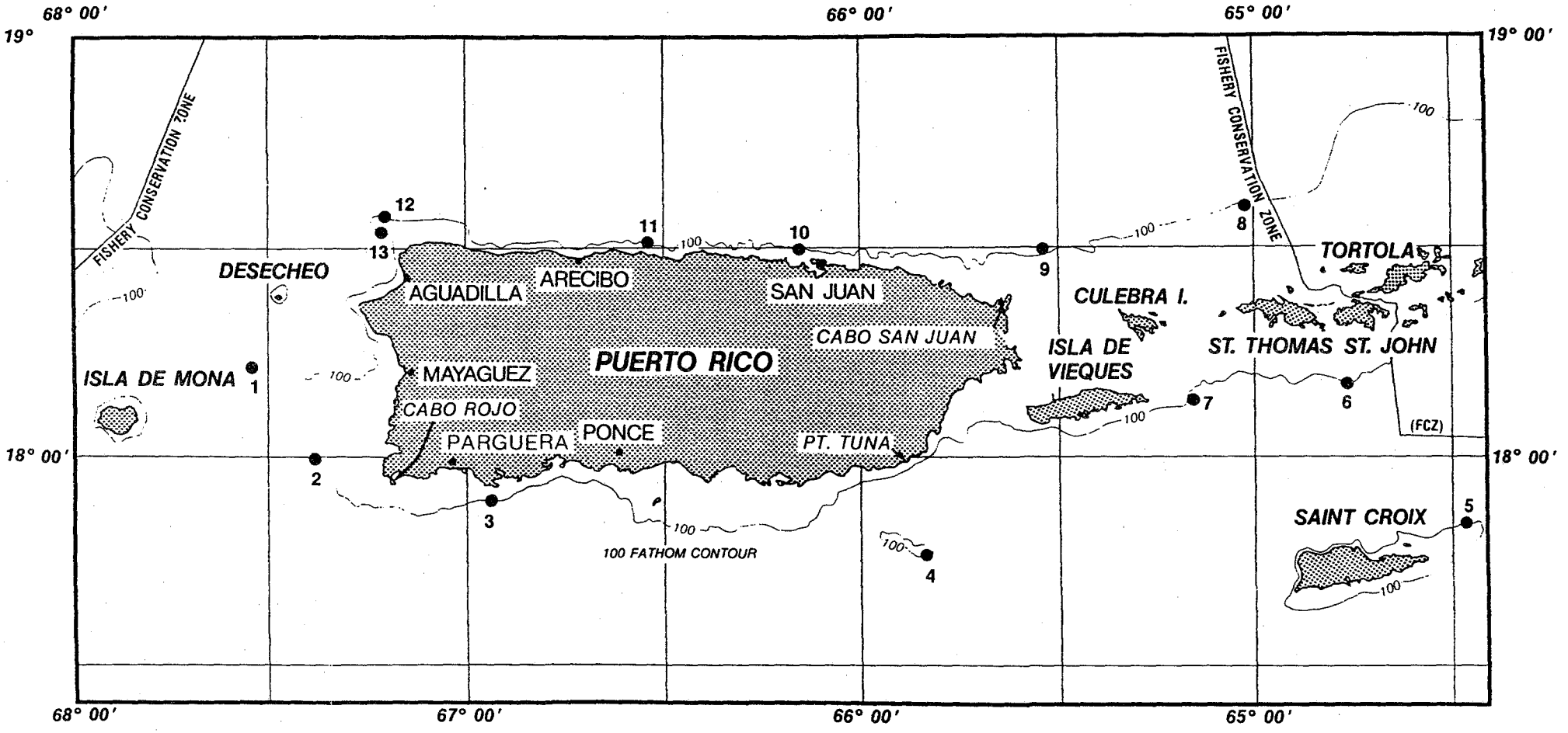
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FISHERY CONSERVATION ZONE
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ARECIBO
SAN JUAN
CABO SAN JUAN
PUERTO RICO
MAYAGUEZ
CABO ROJO
PARGUERA
PONCE
PT. TUNA
CULEBRA I.
ISLA DE VIEQUES
TORTOLA
ST. THOMAS
ST. JOHN
(FCZ)
SAINT CROIX
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Table 1. Number and weight (lb) of all specimen taken with bottom and offbottom longlines.

| Species | Bottom Longline No. | Bottom Longline Wt. | Offbottom Longline No. | Offbottom Longline Wt. |
|---|---|---|---|---|
| Snapper | | | | |
| *Apsilus dentatus* | 7 | 33 | 3 | 12 |
| *Etelis oculatus* | 8 | 53 | 9 | 51 |
| *Lutjanus buccanella* | 2 | 9 | 1 | 17 |
| *Lutjanus vivanus* | 4 | 12 | - | - |
| *Pristipomoides macrophthalmus* | 13 | 26 | 13 | 22 |
| *Rhomboplites aurorubens* | 1 | 1 | - | - |
| Grouper | | | | |
| *Epinephelus* sp. | - | - | 1 | 11 |
| *Epinephelus adscensionis* | 6 | 10 | 9 | 9 |
| *Epinephelus flavolimbatus* | 1 | 23 | - | - |
| *Epinephelus fulvus* | - | - | 2 | 3 |
| *Epinephelus guttatus* | 4 | 11 | 2 | 5 |
| *Epinephelus mystacinus* | 1 | 20 | 1 | 17 |
| Sharks | | | | |
| *Carcharhinus plumbeus* | - | - | 1 | 13 |
| *Centrophorus granulosus* | 3 | 28 | 5 | 43 |
| *Heptranchias perlo* | 1 | 2 | - | - |
| *Hexanchus griseus* | 1 | 7 | - | - |
| *Hexanchus vitulus* | 1 | 25 | - | - |
| *Mustelus canis* | 12 | 80 | 3 | 12 |
| *Squalus asper* | 1 | 19 | - | - |
| *Squalus cubensis* | 20 | 79 | 10 | 37 |

Table 1. (Cont'd)

| Species | Bottom Longline No. | Bottom Longline Wt. | Offbottom Longline No. | Offbottom Longline Wt. |
|---|---|---|---|---|
| Other | | | | |
| *Canthidermis* sp. | 2 | 7 | - | - |
| *Caranx lugubris* | - | - | 1 | 7 |
| *Caulolatilus cyanops* | 1 | 1 | - | - |
| Crinoidea | 3 | 1 | - | - |
| *Gymnothorax conspersus* | 1 | 4 | 1 | 2 |
| *Gymnothorax moringa* | 1 | 1 | - | - |
| *Gymnothorax ocellatus* | 1 | 1 | - | - |
| *Gymnothorax* sp. | 1 | 2 | 1 | 2 |
| Madreporaria | 4 | 4 | - | - |
| *Malacanthus plumieri* | - | 1 | - | 2 |
| *Ophichthus* sp. | 2 | 4 | - | - |
| Ophiuroidea | 3 | 1 | 1 | 5 |
| Polychaeta | 1 | 1 | - | - |
| *Seriola dumerili* | - | - | 1 | 8 |

Table 2. Distribution of effort, by set and depth increments for bottom longlines, offbottom longlines, Florida fishtraps and Puerto Rico fish traps.

| Fathoms | Bottom Longlines | Offbottom Longlines | Florida Fish Traps | Puerto Rico Fish Traps |
|---|---|---|---|---|
| 21-30 | 1 | 1 | 1 | 0 |
| 31-50 | 4 | 4 | 6 | 0 |
| 51-60 | 2 | 2 | 1 | 0 |
| 61-70 | 2 | 2 | 3 | 0 |
| 71-80 | 1 | 1 | 0 | 0 |
| 81-90 | 0 | 0 | 0 | 0 |
| 91-100 | 3 | 3 | 1 | 0 |
| 111-130 | 7 | 7 | 7 | 1 |
| 131-150 | 3 | 3 | 2 | 0 |
| 151-170 | 6 | 6 | 7 | 0 |
| 171-190 | 7 | 7 | 5 | 0 |
| 191-210 | 1 | 1 | 1 | 0 |
| 211-230 | 7 | 8 | 8 | 4 |
| 231-250 | 4 | 2 | 3 | 4 |
| 251-270 | 0 | 0 | 0 | 0 |
| 271-290 | 0 | 0 | 0 | 0 |
| 291-310 | 0 | 0 | 0 | 0 |
| 311-330 | 0 | 0 | 0 | 1 |
| 331-350 | 0 | 0 | 0 | 1 |
| 351-370 | 0 | 0 | 0 | 0 |
| 371-390 | 1 | 1 | 0 | 1 |
| 391-410 | 0 | 0 | 0 | 1 |

Table 3. Number and weight (lb) of all specimens taken with Florida fish traps.

| Species | No. | Wt. |
|---|---|---|
| Snapper | | |
| *Lutjanus buccanella* | 3 | 4.0 |
| *Lutjanus vivanus* | 45 | 90.0 |
| *Pristipomoides aquilonaris* | 1 | 1.0 |
| *Pristipomoides macrophthalmus* | 24 | 40.0 |
| *Rhomboplites aurorubens* | 55 | 37.0 |
| Grouper | | |
| *Epinephelus adscensionis* | 3 | 5.0 |
| Serranidae | 1 | 1.0 |
| Sharks | | |
| *Squalus cubensis* | 3 | 2.0 |
| Other | | |
| *Antigonia capros* | 1 | 0.1 |
| *Balistes vetula* | 1 | 2.0 |
| *Cidaris* sp. | 1 | 0.3 |
| *Conger triporiceps* | 2 | 5.0 |
| Crinoidea | 4 | 0.2 |
| *Decodon puellaris* | 2 | 1.0 |
| Echinodermata | 7 | 11.0 |
| Echinoidae | 1 | 0.1 |
| gorgonian | 1 | 0.2 |
| *Holocentrus ascensionis* | 6 | 4.0 |
| *Holocentrus rufus* | 1 | 1.0 |
| *Mithrax* sp. | 2 | 1.0 |
| Ophiuroidea | 3 | 0.3 |
| Paguridae | 4 | 0.2 |
| *Plectrypops* sp. | 1 | 1.0 |
| *Stenocionops* sp. | 1 | 0.1 |
| *Stenorynchus* sp. | 1 | 0.1 |

Table 4. Number and weight (lb) of all specimens taken with University of Puerto Rico fish traps.

| Species | No. | Wt. |
|---|---|---|
| Snapper | | |
| *Pristipomoides macrophthalmus* | 3 | 5 |
| Grouper | | |
| *Epinephelus mystacinus* | 1 | 40 |
| Shark | | |
| *Centrophorus granulosus* | 1 | 7 |
| *Scyliorhinus* sp. | 1 | 2 |
| *Squalus cubensis* | 3 | 4 |
| Other | | |
| amphipod | 1 | 0.1 |
| *Aristaeomorpha foliacea* | 9 | 0.5 |
| *Bathynomus giganteus* | 108 | 55.0 |
| *Carangidae* | 1 | 0.1 |
| *Gymnothorax* sp. | 2 | 5.0 |
| *Heterocarpus ensifer* | 41 | 1.5 |
| *Heterocarpus laevis* | 6 | 0.4 |
| *Myxinidae* | 1 | 0.3 |
| *Plesionika* sp. | 7 | 0.2 |
| *Plesiopenaeus edwardsianus* | 6 | 0.2 |

Table 5. Number and weight (lb) of all specimens taken with University of Puerto Rico shrimp traps.

| Species | No. | Wt. |
|---|---|---|
| *Bathynomus giganteus* | 14 | 5.2 |
| Crinoidea | 2 | 0.1 |
| *Dardanus* | 3 | 0.1 |
| echinoderm | 1 | 0.1 |
| *Eunephrops* sp. | 2 | 0.1 |
| *Gymnothorax conspersus* | 3 | 8.0 |
| *Gymnothorax* sp. | 1 | 2.0 |
| *Heterocarpus ensifer* | 97 | 1.3 |
| *Heterocarpus laevis* | 31 | 0.2 |
| Myxinidae | 10 | 5.0 |
| Ophiuroidea | 1 | 0.1 |
| Paguridae | 4 | 0.3 |
| *Parapandalus* sp. | 3 | 0.2 |
| Penaeidae | 1 | 0.1 |
| *Porcellana* sp. | 1 | 0.1 |
| Sipunculida | 1 | 0.1 |

Table 6. Number and weight (lb) of all specimens taken during trawling.

| Species | No. | Wt. |
|---|---|---|
| Fish | | |
| *Bathyclupea* sp. | 3 | .1 |
| *Bathypterois* sp. | 1 | .2 |
| *Chaunax pictus* | 7 | 6.9 |
| Chimaeridae | 1 | 1.0 |
| *Cyttopsis roseus* | 1 | .3 |
| Gonostomatidae | 1 | .1 |
| Halosauridae | 2 | .3 |
| *Hollardia* sp. | 2 | .3 |
| *Lophiodes* sp. | 2 | 3.1 |
| Macrouridae | 1 | .1 |
| Merlucciidae | 1 | .1 |
| Muraenesocidae | 1 | .2 |
| Myctophidae | 5 | .1 |
| Neoscopelidae | 8 | 1.0 |
| Ogcocephalidae | 5 | .1 |
| Ophidiidae | 11 | .9 |
| *Poecilopsetta* sp. | 3 | .2 |
| *Polymixia nobilis* | 9 | 3.2 |
| *Scyliorhinus* | 3 | .9 |
| *Steindachneria* | 2 | 1.4 |
| Trachichthyidae | 3 | .1 |
| Crustacea | | |
| Anomura | 5 | .1 |
| *Aristaeomorpha foliacea* | 33 | .1 |
| *Bathynomus giganteus* | 1 | .3 |
| *Calappa* sp. | 2 | .1 |
| *Eugonatonotus crassus* | 1 | .1 |
| Galatheidae | 80 | .9 |
| Glyphocrangonidae | 27 | .4 |
| *Heterocarpus ensifer* | 38 | .8 |
| *Heterocarpus laevis* | 1 | .1 |
| Majidae | 1 | .1 |
| *Oplophorus* sp. | 6 | .1 |
| *Oplophorus gracilirostris* | 7 | .2 |
| Paguridae | 16 | .4 |
| *Penaeus* sp. | 103 | 4.7 |
| *Plesionika longipes* | 30 | .7 |
| *Squilla* | 2 | .1 |

Table 6. (Cont'd)

| Species | No. | Wt. |
|---|---|---|
| Other | | |
| Actiniaria | 2 | .1 |
| Amphineura | 23 | .1 |
| Asteroidea | 20 | .4 |
| Brachyura | 1 | .1 |
| Cidaridea | 5 | .6 |
| Echinoderma | 17 | .3 |
| Gastropoda | 27 | 3.2 |
| Holothuroidea | 11 | 5.5 |
| *Mellita* sp. | 6 | 3.0 |
| Mollusca | 12 | .4 |
| Ophiuroidea | 267 | 1.3 |
| Scaphopoda | 5 | .1 |
| Sipunculida | 2 | .1 |
| Xenophora | 35 | 4.0 |
| Zoantharia | 1 | .1 |