

INTRODUCTION

In an effort to characterize benthic infaunal and epifaunal communities along the proposed Monterey Accelerated Research Program (MARS) cable route, MBARI conducted biological surveys from October 2003 through February 2004. During these surveys, we used Remotely Operated Vehicles (ROVs) to collect video data and sediment cores for studies of infaunal diversity and abundance. For this analysis, we also incorporated data from video and sediment samples collected during a study of the former proposed MCI cable route that followed a portion of the MARS route.

METHODS

We investigated shallow (23-573 m) areas of the 52.9 km-long MARS cable route with the MBARI *R/V Point Lobos* using the *ROV Ventana*. *Ventana* is equipped with a Sony HDC-750A high definition camera with HA10X5.2 Fujinon Zoom Lens. Deeper habitats (576-972 m) were surveyed with MBARI *R/V Western Flyer* using the *ROV Tiburon*. *Tiburon* is equipped with a Panasonic WVE550 3-chip camera. Lasers mounted on the ROVs were used to define the size of the area viewed in video images. Two lasers were mounted on the ROVs with beams parallel and spaced 30.5 cm apart. We recorded over 38 hours of video using Sony Digital Betacam tapes as our recording media. Additional surveys were conducted in 1999 from 47-450 m using the 100-foot vessel *Deanna Lee* equipped with a Phantom DS4 ROV. This portion of the survey line followed the former proposed MCI cable route (Towers 2003). Personnel from Oceaneering International, Inc. operated the ROV. The Phantom was equipped with a Benthos Model 387 35-mm camera and a Simrad Color Zoom Video camera model OE1366, and two lasers spaced 30 cm apart. The video feed from the Simrad camera was analog (composite); recordings were made to digital (miniDV) tape.

Specific sampling locations were chosen along the route to target representative depths (24, 44, 47, 640, 770, 795 and 885 m), and unique substrate and habitat types (e.g. sand, mud, hard substrates). We conducted quantitative video transects and infaunal sampling at each of 11 pre-defined stations (Figure 1).

Infaunal Analysis

In order to characterize macrofaunal communities at the 24, 44, 47, 640, 770, 795 and 885m stations (Figure 1), we used the ROV to collect samples of seafloor sediments with 7.5 cm diameter push cores (0.0044 m²). Cores collected from each station were spaced

approximately five meters apart. Sediment from the top 5 cm of the core was washed gently through a 0.3 mm mesh sieve using cold seawater. Macrofauna at the 60, 90, 325 and 450 m stations (Figure 1) were collected with a Smith-McIntyre grab. This is a common grab sampler for collecting quantitative seafloor samples (Lie, 1970), which was lowered from the ship to the seafloor on a cable. The grab collects 0.1 m² of bottom sediments to a depth of ~10 cm. Sediments were washed gently through a 0.5 mm mesh sieve using cold seawater.

All organisms were relaxed using a 7% solution of magnesium chloride (MgCl₂), and subsequently preserved in a 4% formaldehyde (10% formalin) solution for several days. Samples were then rinsed with de-ionized water and stored in 70% ethanol.

High-resolution dissecting microscopes equipped with high intensity fiber optic light sources were used to sort the sieved sample materials. Samples were sorted into 1-dram shell vials with airtight plastic lids. Labels were prepared with underwater paper that is not affected by water or preservatives. Each label contained the name of the project, station and replicate number, and date. Animals in each sample were identified to species or the lowest practical taxonomic category. We calculated the mean abundance and number of unique taxa for each station.

Epifaunal Analysis

Video footage was annotated and analyzed to assess megafaunal communities present on the seafloor along the proposed route. We define megafauna as epifaunal animals large enough to be seen on our video recordings, a distinction that provides almost no overlap with the macrofauna portion of the study. All available video footage was annotated using MBARI's computer annotation application Video Information Capture with Knowledge Inferencing (VICKI). We annotated most portions of the video in an outline format as defined below. Video transects surrounding sampling stations were annotated quantitatively.

ROV Surveys of Megafaunal Abundance

Outline video annotation entails the identification of discernable animals at nearly double speed. We identified each unique species and noted them at regular intervals in a semi-quantitative (quantitative relative to other organisms) manner. This mode of annotation also consisted of the characterization of major habitats and geological features.

Quantitative Video Transects Annotations performed for quantitative video transects used to estimate the diversity and abundance of benthic megafauna included every epifaunal organism large enough to be seen on video. Taxonomic identification was performed to the lowest practical taxonomic level. Because identification of organisms from video can be difficult, we were conservative in our assignment of taxonomic names. To avoid bias in counts of the number of organisms due to field of view distortion, animals in the upper 1/3 of the field of view were not counted. We used the presence of lasers in the lower 2/3 of the screen as a guide for counting animals.

To assess the patchiness and dispersion of megafauna, transects at each station (Figure 1) were subdivided into 25 m subsections, which were considered as replicate sample units. The length of replicates was determined using several criteria: 1) maximizing the number of replicates within each transect, 2) minimizing the number of replicates with zero taxa, and 3) choosing a replicate size above the resolution of ROV navigation. Organisms were grouped into major taxonomic groups, within which the abundance and number of lesser taxa were determined for each 25m replicate along each transect. The mean and variance of the number and abundance of taxa were determined for each major group along each transect.

RESULTS AND INTERPRETATION

Infaunal Analysis

A total of 67 push cores and nine Smith-McIntyre grab samples were collected (Table 1). A complete list of all infaunal species found and their depths of occurrence are shown in Appendix 1.

Polychaete worms were the dominant group both in abundance (Table 2) and taxa richness (Table 3) at most depths. Note that sample size and sieve size were larger for the 60, 90, 325 and 450 m stations (Table 2, Table 3). Abundant polychaetes included *Magelona hartmanae*, *M. sacculata* and *Scoletoma luti* (25 m), *Chaetozone lunula*,

Aricidea (Acmira) catherinae, and *Mediomastus* spp. (44 m), *A. catherinae* (47 m), *Sternaspis* nr. *fossor* (60 m), *Mediomastus* spp. and *Spiophanes berkeleyorum* (90 m), *Sphaerosyllis ranunculus* (325 m), *Onuphidae* spp., *Protodorvillea gracilis* and *S. ranunculus* (450 m) and *Cossura pygodactylata* (885 m). Oligochaetes dominated at the 885 m station.

Gammarid amphipods were the most abundant organism at the 640 m (*Ampelisca unsocalae*, *Lepidepecreum serraculum* and *Tiron biocellata*), 770m (*A. unsocalae*, *Photis typhlops* and *Byblis barbarensis*), and 795 m (*L. serraculum* and *A. unsocalae*) stations, and most speciose at 640 and 770 m (Table 2, Table 3). Gammarids were relatively abundant (one the top five most abundant taxonomic groups of animals) at all stations.

Other relatively abundant animals include Bivalves (44, 47, 60, 90, 640 m), Nemertea (44, 47 m), Ostracods (44, 47, 325 m), and Ophuroids (60, 90, 450 m)(Table 2). Caprellids (*Tritella tenuissima*) and Tanaids were abundant at the 325 and 450 m stations. Taxa diversity for Gastropods was relatively high at the 60, and 90 m stations, and for Ophuroids at 90 and 325 m (Table 3). Isopods and Tanaids were diverse at 325 m.

Benthic Megafaunal Analysis

ROV Surveys for Megafaunal Abundance

We surveyed 70.2 km of benthic habitat during this investigation (Table 4). Some of the 52.9 km proposed MARS cable route was overlapped during 15 ROV dives (Figure 1, Table 4). The majority of the route passes over Quaternary Marine Sediments, with a small portion crossing Purisima Formation (Figure 2). Thirty-nine hours of video footage were annotated and analyzed.

A list of all megafaunal taxa found on the proposed MARS route is in Appendix 2. Some species were not represented in quantitative video samples. This appendix also shows the depth(s) at which each taxa was encountered.

There was a gradient in the distribution and abundance of benthic megafauna from the shallow, energetic (sand ripples) stations dominated by mobile megafauna and accumulations of drift kelp and other debris, to less physically disturbed (by wave action) sites on the continental shelf (60 – 139 m) that included higher densities of sessile sediment-dwelling megafaunal invertebrates, notably the seapens *Ptilosarcus gurneyi* and *Pennatula* sp. Due apparently to chronically higher rates of erosion, the substratum on

continental shelf break and upper slope are often rock outcrops, which house a variety of sessile invertebrates and serve as physical structure favored by various mobile fishes and invertebrates. Sedimentary substratum returns deeper (>450 m) on the continental slope where seapens once again are conspicuous members of the benthos, which also includes a variety of anemones and holothurians. The relative abundance of fishes declines with depth, as invertebrates become more abundant.

Soft Sediment Habitats (Sand, Sandy-Mud, Mud)

Between 10-24 m, there was poor visibility and a rippled sand bottom, with large areas with shell hash, sparse drift kelp and no visible fauna. Other areas in this depth range included patchy accumulations of brown, green and red algae with occasional *Cancer* crabs, seastars, polychaete worms (*Diopatra ornata*), and small flatfish (*Citharichthys* spp.)(Appendix 2).

At 25-39 m, sand with drift kelp and gastropods were the dominant seafloor features, plus sparse sea pens, flatfish, seastars and drifting eel grass (Appendix 2). Between 40 and 59 m there were abundant Ceriantharid anemones, flatfish (*Citharichthys* spp.), the seastar *Luidia foliolata* and the seapen *Stylatula elongata*; the substrate here was silty mud with fine grain sand. From 60 to 139 m, the seastar *Rathbunaster californicus* was very abundant. Flatfish, and the seapens *P. gurneyi* and *Pennatula* sp. were also common. At 140-200 m *R. californicus* was the dominant organism. A few species of rockfish, flatfish, and holothurians were present, but not abundant. Shell hash was locally dense in some areas between 175-191 m.

There was a large aggregation of hermit crabs at 474 m. From 450-599 m the seapen *Halipteris californica* was the dominant organism. The *Liponema brevicornis* (an anemone), the Pacific Whiting *Merluccius productus*, and the flatfish *Microstomus pacificus* were also present in high abundance. At depths over 600 m seapens *Halipteris californica*, and *Umbellula magniflora* dominated. The crab *Chionoecetes tanneri*, the rockfish *Sebastolobus*, gastropods and small Mesomyarian anemones were very common (Appendix 2).

Hard Substratum Habitats (Anthropogenic, Rocky Outcrop, and Eroded Surfaces)

Structures at the Kaiser (National Refractories) outfall (12.5 m water depth) and the Duke Energy outfall (18.7 m water depth) supported communities of the small corallimorph *Corynactis californica* and large anemones (*Metridium farcimen*).

Rock outcrops occurred occasionally from 90-139 m and more frequently between 280-449 m. The substrate surface appeared eroded at around 425m. These hard substrata were mixed with areas of thick sediment supporting typical soft-bottom species like *Allocentrotus fragilis* (urchin), *Parastichopus leukothele* (holothurian), *M. productus*, and *R. californicus*, numerous rays (primarily *Raja rhina*), catsharks, and several species of flatfish (Appendix 2). Species associated with hard substrata were also present in high numbers. Organisms we encountered exclusively on hard substrata include Porifera (encrusting and vase sponges), *M. farcimen*, small unidentified anemones, *Anthomastus ritteri*, *Laqueus californianus* (brachipods), the crinoid *Florometra serratissima*, gorgonians, *Gorgonocephalus eucnemis* (basket stars), the holothurian *Pslous squamata*, and rockfishes *Sebastes elongatus*, *Sebastes rufus*, and those of the *Sebastes* complex. Hard substrata are present on 10% of the proposed route (5,200 m) (Figure 3). Three scarps are over 1 meter in height (Figure 3).

Quantitative Transects

Within the ROV survey areas, we analyzed 10 quantitative transects ranging from 250 to 1675 m (Table 1). The total footage covered 7,825 m of benthic habitat. The length of each transect was based on visibility and the amount of uninterrupted footage available. Quantitative transects were not possible at 25 m due to low visibility.

Seapens (Pennatulacea) were the most abundant and most species diverse megafaunal organism on the proposed MARS cable route (Table 5, Table 6). A dense assemblage of *H. californica* was present at 885 m; this species was also very abundant at the 640 and 795 m stations. *U. magniflora* was very abundant at all stations from 640 to 885 m. In shallower water (47, 60 and 90m), *Sebastes jordani* was present in high numbers.

Other relatively abundant organisms (top five most abundant taxa) included gastropods (44, 47 and 450 m), ceriantharids (47, 450, and 640 m), *R. californicus* and *A. fragilis* (325 m), the anemone *Liponema brevicornis* (450 m), *Sebastolobus*, *C. tanneri* (640, 795 m) and the holothurian *Pannychia moseleyi* (885 m) (Table 5).

Sponges (Porifera) were only found on hard substrates from 90 to 450 m (Table 5). Anemones (Actinaria) were observed at most stations as were crabs (Brachyura), and seastars (Asteroidea). Corallimorphs were found primarily at deeper depths.

Due to poor visibility, none of the fishes at the 44 m station were identifiable to species. Pleuronectiformes (unidentifiable flatfish) and flatfish from the families Bothidae and Pleuronectidae) were found at all stations (Table 5, Table 6). Bothids were most abundant at the 60 and 90 m. Hagfish (Myxinidae) were consistently present from 450 to 885 m. Sebastolobus (Scorpaenidae) was present from 640 to 885 m. Zoarcids were represented at all stations from 325 to 885 m.

The highest total megafaunal abundance/m was at the 885 m station and 325 m stations (Figure 5A), where invertebrates taxa (mainly seapens) accounted for the majority of the megafauna observed (Figure 5). The richness of megafaunal taxa was greater at mid depths for both invertebrates and demersal fishes, with the highest diversity at the 325 m stations (Figure 5B). A higher number of invertebrate taxa were present at all depths except at the 60 m station where more species of demersal fish were present.

SUMMARY AND DISCUSSION

A total of 39 hours of video, 67 push cores and nine Smith-McIntyre grabs were collected from 11 stations. A cumulative distance of 70.2 km of seafloor was surveyed, with the entire 52.9 km route being observed at least once. The majority of the route was comprised of sand, sandy-mud and mud. There were mixed soft and hard substratum habitats between 280-450 m, comprising approximately 10% of the proposed route.

Polychaete worms were the most abundant and species diverse group of infaunal organism. Seapens were present on a large portion of the route and we found in high density in many areas. Most of the fauna on the cable route are sedentary or functionally sedentary (i.e. very limited mobility). There are large numbers of suspension and filter feeders.

Avoidance of the ROV by some invertebrates and especially fishes may have led to a conservative bias for taxa richness, while attraction to the ROV lights may have overrepresented it. Adams et al. (1995) found that Pacific whiting (*Merluccius productus*) was strongly attracted to an ROV while sablefish (*Anoplocoma fimbria*) and catsharks (Scyliorhinidae) showed a strong avoidance response. All three of these fishes were represented in our study.

All raw data are available upon request.

References Cited

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- Lie, U. and D.S. Kisker. 1970. Species composition and structure of benthic infaunal communities off the coast of Washington. Journal of Fisheries Research Board Canada. 27: 2273-2285.
- Towers, S. 2003. Principal Senior Biologist, North State Resources Environmental Consulting, 5000 Bechelli Suite 203 Redding, CA 96002.

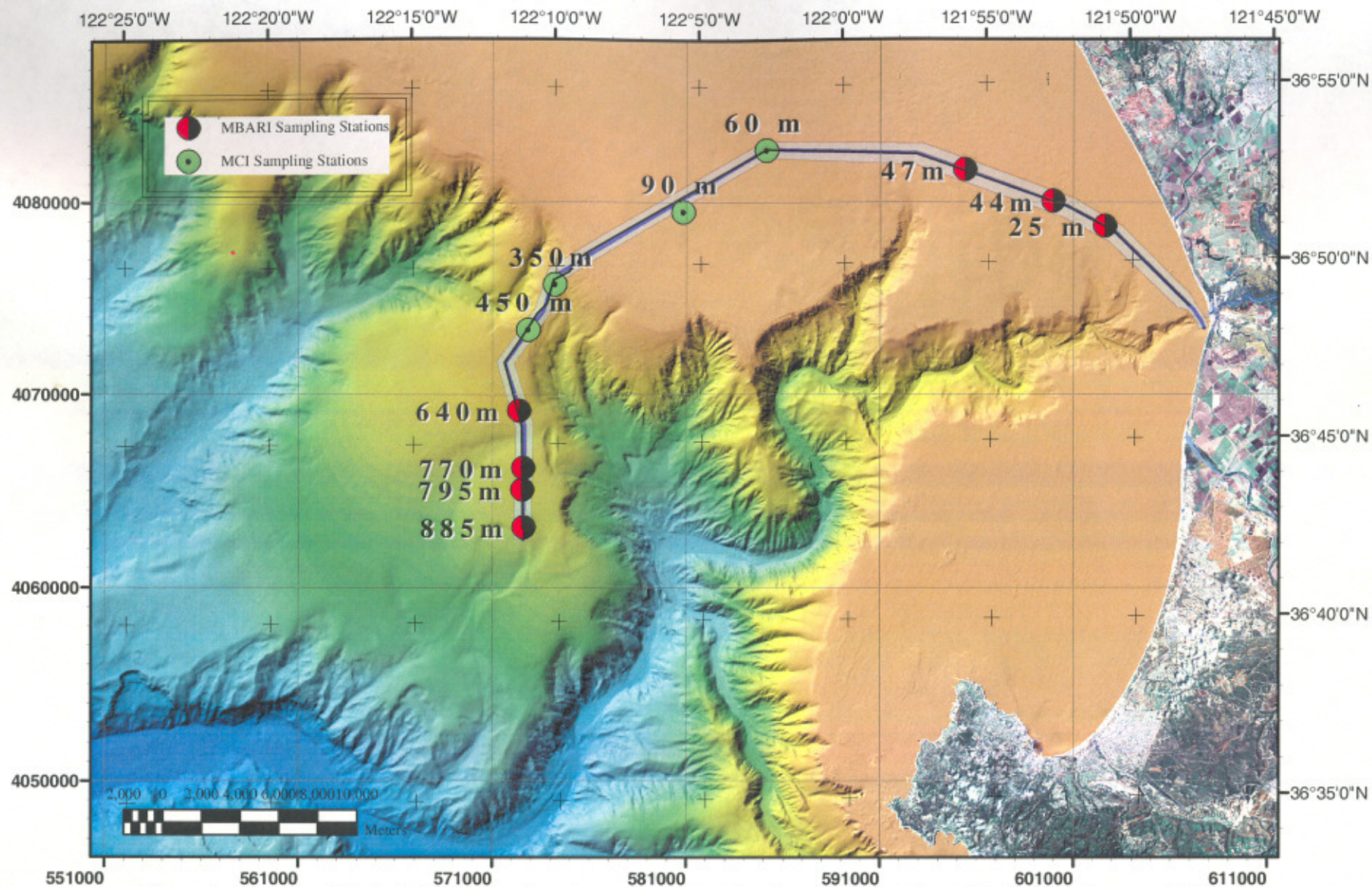


Figure 1. Locations of biological sampling along the proposed MARS cable route. MBARI used the ROV's Tiburon and Ventura to survey the seafloor and collect infaunal grab samples. MCI stations were surveyed in 1999 using ROV Remora and a Smith-McIntyre Grab for infaunal samples.

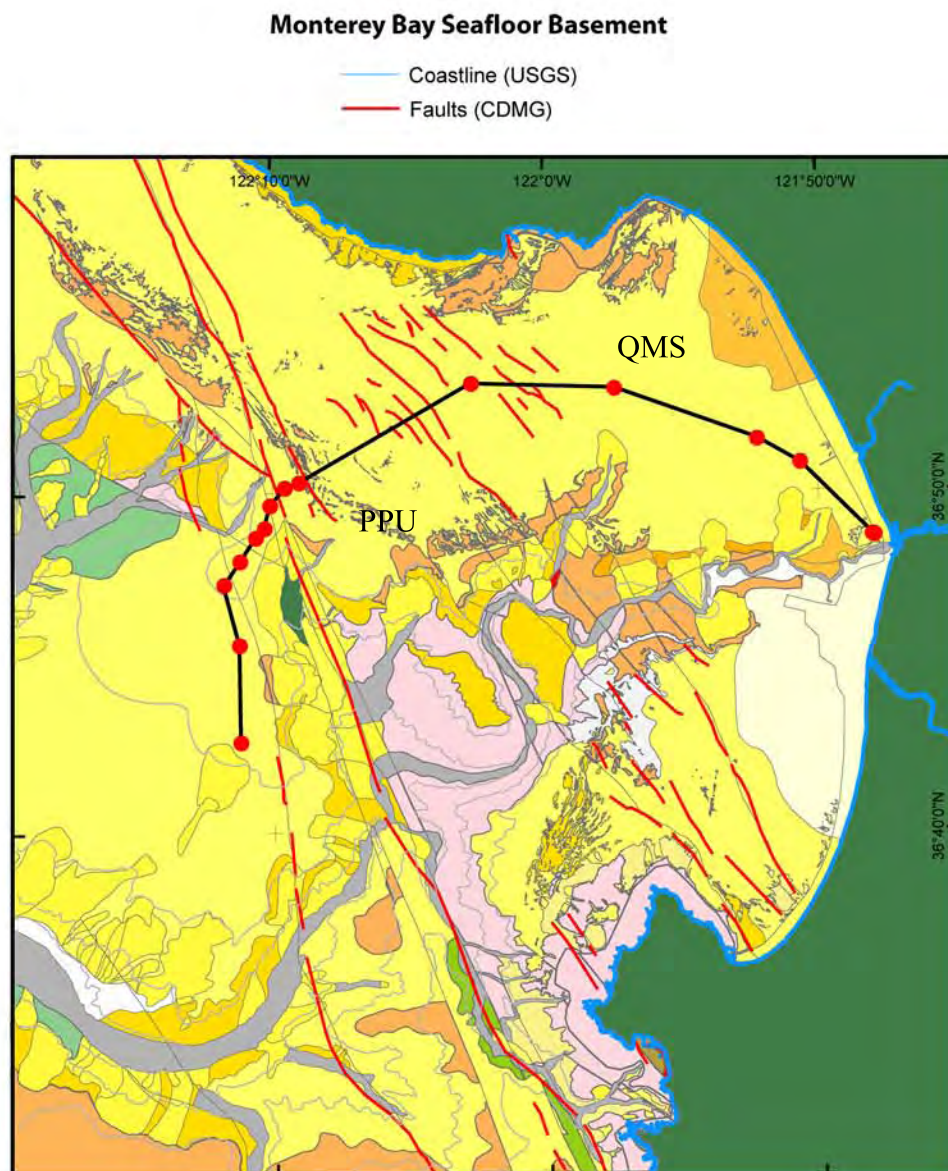


Figure 2. Geological features of the Monterey Bay. The proposed MARS route (black line) passes over mostly Quaternary Marine Sediments (yellow, QMS). A small portion passes over Purisima Formation (orange, PPU). Red circles depict biological sampling stations.

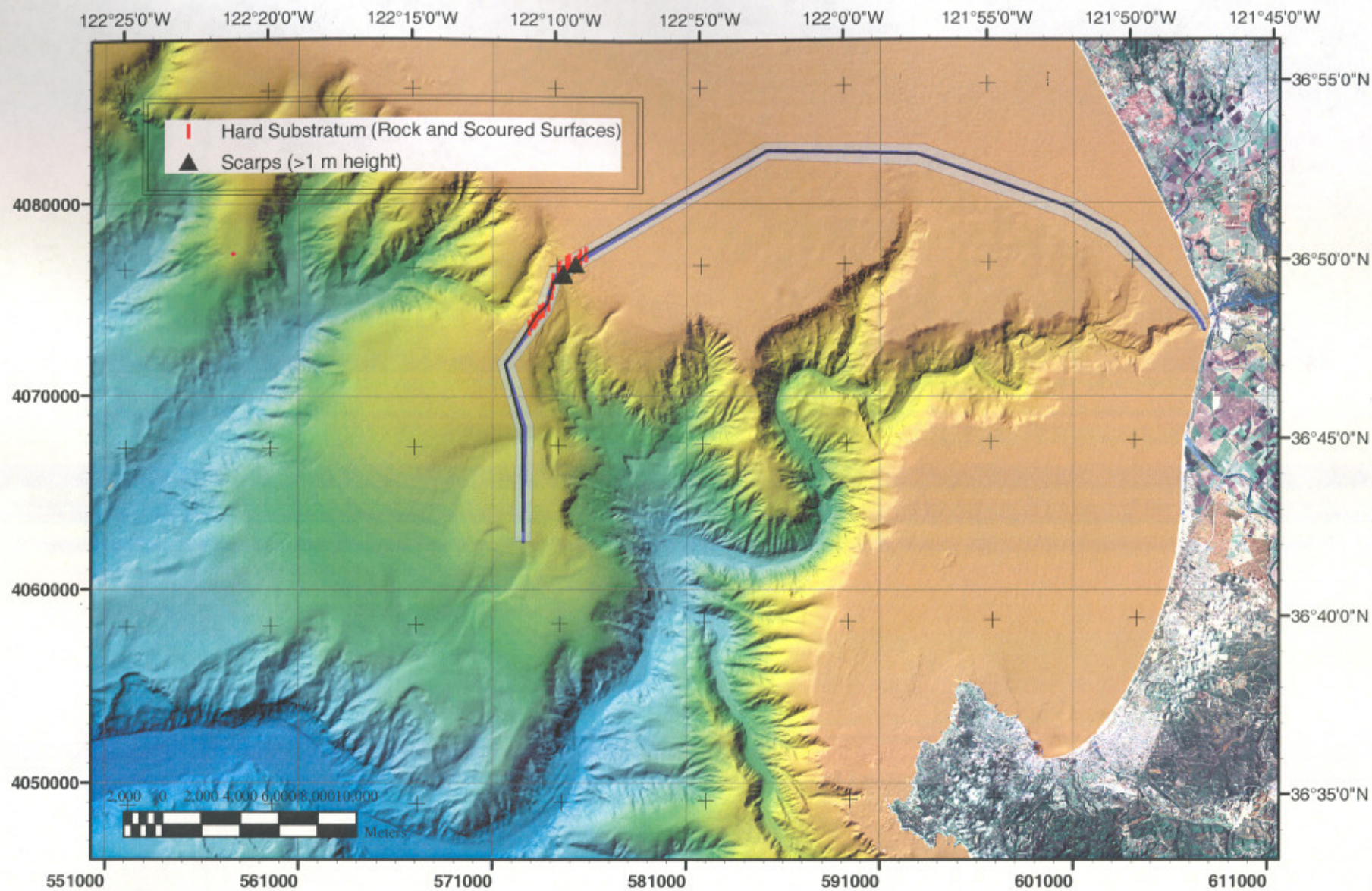


Figure 3. Areas of the proposed route where hard substratum occurs. These data are from video observations of the route. This section of the route is mixed, having both sediment-covered surfaces and rocky outcrops or scoured surfaces. We encountered three scarps over one-meter in height. The remainder of the route is comprised of sand, muddy sand, or mud.

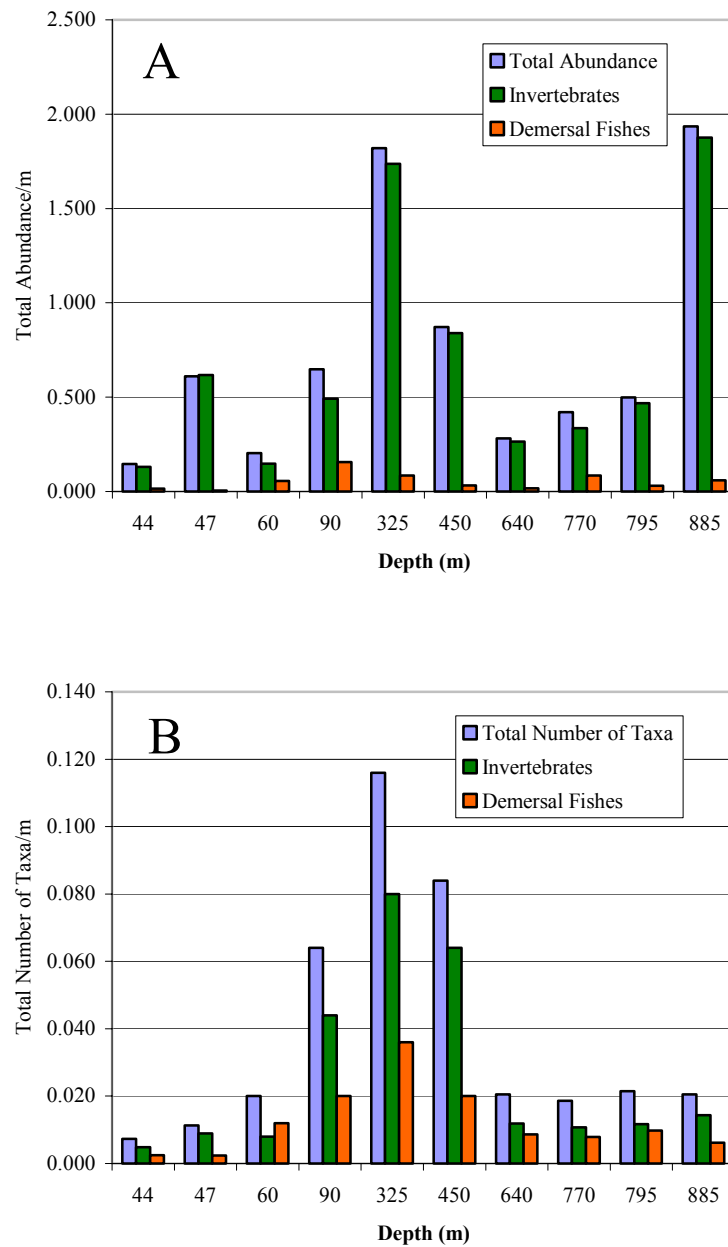


Figure 4. A) Total megafaunal abundance/m and B) total number of taxa/m by depth for invertebrates and demersal fishes present on the proposed MARS route.

Table 1. Coordinates and depths for infaunal sediment samples and quantitative video transects along the proposed MARS route.

Date	Station (depth)	Latitude (W)	Longitude (N)	# Push Cores/ Total area (m ²)	# Smith-McIntyre Grabs/ Total area (m ²)	Quantitative Survey Length (m)	Number of 25 m video replicates
10/10/2003	25 m	36.849640	-121.848950	9 / 0.0397		*	*
10/14/2003	44m	36.861540	-121.878820	9 / 0.0397		825	33
10/14/2003	47m	36.876470	-121.929850	9 / 0.0397		1675	67
6/2/1999	60 m	36.886717	-122.044750		3 / 0.300	250	10
6/14/1999	90 m	36.858033	-122.093250		2 / 0.200	250	10
7/12/1999	350m	36.824900	-122.168070		2 / 0.200	250	10
8/29/1999	450 m	36.803833	-122.183670		2 / 0.200	250	10
10/27/2003	640m	36.765760	-122.189050	9 / 0.0397		925	37
10/15/2003	770m	36.738890	-122.187020	11 / 0.0489		1400	56
10/13/2003	795m	36.728710	-122.187690	10 / 0.0442		1025	41
10/13/2003	885m	36.711160	-122.186920	10 / 0.0442		975	39
Total				67 / 0.2961	9 / 0.9000	7825	313

*quantitative video transect not possible due to poor visibility

Table 2. Mean and total abundances for infaunal samples. Samples were 7.5 cm diameter push cores (0.3 mm sieve) or 0.1 m² Smith-McIntyre grab samples (*, 0.5 mm sieve).

Taxonomic Group	25 m n= 9	44 m n= 9	47 m n= 9	60 m n =*3	90 m n =*2	325 m n =*2	450 m n =*2	640 m n= 9	770 m n= 11	795 m n= 10	885 m n= 10
Cnidaria											
Anthozoa											
Mean Abund.	0.00	2.00	0.56	0.00	0.00	0.00	0.00	0.00	0.27	0.50	0.20
Standard Dev.	0.00	1.73	1.01	0.00	0.00	0.00	0.00	0.00	0.47	1.08	0.42
Cnidaria											
Mean Abund.	0.00	0.00	0.00	8.00	0.50	40.00	1.50	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.00	0.00	11.31	0.71	18.38	2.12	0.00	0.00	0.00	0.00
Nemertea											
Mean Abund.	0.78	2.89	3.00	6.50	3.50	12.00	4.50	0.22	0.64	0.50	1.70
Standard Dev.	1.64	3.02	2.12	0.71	4.95	8.49	4.95	0.44	0.67	0.53	1.64
Sipuncula											
Mean Abund.	0.00	0.00	0.00	0.00	1.00	12.00	2.00	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.00	0.00	0.00	0.00	5.66	2.83	0.00	0.00	0.00	0.00
Echiura											
Mean Abund.	0.00	0.22	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10
Standard Dev.	0.00	0.44	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.32
Annelida											
Oligochaeta											
Mean Abund.	0.00	0.00	0.00	0.00	1.50	54.00	30.50	0.00	0.00	0.10	0.40
Standard Dev.	0.00	0.00	0.00	0.00	0.71	42.43	12.02	0.00	0.00	0.32	1.26
Polychaeta											
Mean Abund.	13.78	38.56	41.56	283.50	318.50	473.50	455.50	3.22	6.09	5.30	8.10
Standard Dev.	5.40	7.57	12.74	19.09	57.28	149.20	130.81	4.52	2.84	2.06	3.11
Arthropoda											
Caprellida											
Mean Abund.	0.00	0.22	0.11	0.00	0.50	390.50	24.00	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.44	0.33	0.00	0.71	470.23	14.14	0.00	0.00	0.00	0.00
Cumacea											
Mean Abund.	0.00	1.56	3.11	6.50	7.00	8.00	9.00	0.67	0.36	0.70	0.20
Standard Dev.	0.00	1.33	2.47	6.36	4.24	1.41	12.73	0.87	0.67	1.25	0.42
Decapoda											
Mean Abund.	0.00	0.00	0.00	1.00	0.00	1.50	0.00	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.00	0.00	0.00	0.00	2.12	0.00	0.00	0.00	0.00	0.00
Gammaridea											
Mean Abund.	0.11	2.44	3.78	16.50	26.50	401.50	37.50	18.67	15.09	8.60	0.30
Standard Dev.	0.33	2.35	1.20	4.95	4.95	218.50	7.78	11.12	5.66	4.60	0.48
Isopoda											
Mean Abund.	0.00	0.56	0.44	8.00	5.50	41.00	1.00	0.00	0.00	0.00	0.00
Standard Dev.	0.00	1.01	0.53	1.41	6.36	22.63	1.41	0.00	0.00	0.00	0.00
Ostracoda											
Mean Abund.	0.00	2.22	4.22	0.00	7.00	116.50	11.50	0.11	0.09	0.50	0.00
Standard Dev.	0.00	1.79	3.42	0.00	2.83	58.69	10.61	0.33	0.30	0.85	0.00
Pycnogonida											

Table 2. Mean and total abundances for infaunal samples. Samples were 7.5 cm diameter push cores (0.3 mm sieve) or 0.1 m² Smith-McIntyre grab samples (*, 0.5 mm sieve).

Taxonomic Group	25 m n= 9	44 m n= 9	47 m n= 9	60 m n =*3	90 m n =*2	325 m n =*2	450 m n =*2	640 m n= 9	770 m n= 11	795 m n= 10	885 m n= 10
Mean Abund.	0.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.00	0.00	1.41	1.41	0.00	0.00	0.00	0.00	0.00	0.00
Tanaidacea											
Mean Abund.	0.00	0.56	0.33	0.00	0.50	113.00	3.50	0.22	0.00	0.10	0.20
Standard Dev.	0.00	1.13	0.50	0.00	0.71	35.36	0.71	0.44	0.00	0.32	0.42
Mollusca											
Aplacophora											
Mean Abund.	0.00	0.11	0.67	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.33	0.71	2.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Polyplacophora											
Mean Abund.	0.00	0.00	0.00	0.00	0.00	9.00	8.50	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.00	0.00	0.00	0.00	8.49	2.12	0.00	0.00	0.00	0.00
Gastropoda											
Mean Abund.	0.00	1.00	0.56	23.50	34.50	6.00	5.00	0.00	0.00	0.00	0.00
Standard Dev.	0.00	1.32	0.73	4.95	9.19	1.41	7.07	0.00	0.00	0.00	0.00
Bivalvia											
Mean Abund.	0.00	7.33	4.78	87.00	20.50	3.50	7.00	0.33	0.18	0.30	0.00
Standard Dev.	0.00	4.87	2.99	15.56	19.09	3.54	4.24	0.50	0.40	0.48	0.00
Scaphopoda											
Mean Abund.	0.00	0.56	0.33	33.00	2.50	0.00	0.50	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.73	0.50	4.24	3.54	0.00	0.71	0.00	0.00	0.00	0.00
Phoronida											
Phoronida											
Mean Abund.	0.11	0.78	1.22	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Standard Dev.	0.33	1.39	2.64	4.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Echinodermata											
Ophiuroidea											
Mean Abund.	0.00	1.00	0.44	92.00	19.50	63.00	12.00	0.00	0.00	0.00	0.00
Standard Dev.	0.00	1.00	0.73	29.70	26.16	14.14	9.90	0.00	0.00	0.00	0.00
Echinoidea											
Mean Abund.	0.00	0.11	0.00	1.00	2.00	4.00	0.50	0.11	0.00	0.10	0.10
Standard Dev.	0.00	0.33	0.00	0.00	1.41	1.41	0.71	0.33	0.00	0.32	0.32
Holothuroidea											
Mean Abund.	0.00	0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.10
Standard Dev.	0.00	0.00	0.00	0.00	0.00	2.83	0.00	0.00	0.00	0.00	0.32
Hemicodata											
Enteropneusta											
Mean Abund.	0.11	0.00	0.11	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Standard Dev.	0.33	0.00	0.33	0.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Abundance (area m²)	134 (0.0395)	559 (0.0395)	588 (0.0395)	1147 (0.3000)	904 (0.2000)	3511 (0.2000)	1230 (0.2000)	212 (0.0395)	250 (0.0483)	167 (0.0439)	114 (0.0439)

Table 3. Mean and total number of taxa for infaunal samples. Samples were 7.5 cm diameter push cores (0.3 mm sieve) or 0.1 m² Smith-McIntyre grab samples (*, 0.5 mm sieve).

Taxonomic Group	25 m n= 9	44 m n= 9	47 m n= 9	60 m n =*3	90 m n =*2	325 m n =*2	450 m n =*2	640 m n= 9	770 m n= 11	795 m n= 10	885 m n= 10
Cnidaria											
Anthozoa											
Mean # Taxa	0.00	1.11	0.33	0.00	0.00	0.00	0.00	0.00	0.27	0.20	0.20
Standard Dev.	0.00	0.78	0.50	0.00	0.00	0.00	0.00	0.00	0.47	0.42	0.42
Cnidaria											
Mean # Taxa	0.00	0.00	0.00	0.33	0.50	1.00	0.50	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.00	0.00	0.58	0.71	0.00	0.71	0.00	0.00	0.00	0.00
Nemertea											
Mean # Taxa	0.33	1.00	1.11	0.67	0.50	1.00	1.00	0.22	0.55	0.50	0.70
Standard Dev.	0.50	0.71	0.33	0.58	0.71	0.00	0.00	0.44	0.52	0.53	0.67
Sipuncula											
Mean # Taxa	0.00	0.00	0.00	0.00	1.00	1.00	0.50	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.00	0.00	0.00	0.00	0.00	0.71	0.00	0.00	0.00	0.00
Echiura											
Mean # Taxa	0.00	0.22	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10
Standard Dev.	0.00	0.44	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.32
Annelida											
Oligochaeta											
Mean # Taxa	0.00	0.00	0.00	0.00	1.00	1.00	1.00	0.00	0.00	0.10	0.10
Standard Dev.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.32
Polychaeta											
Mean # Taxa	10.00	18.56	21.22	38.33	62.00	52.00	48.00	2.78	4.18	4.60	4.90
Standard Dev.	2.50	2.51	4.06	33.29	12.73	4.24	1.41	4.41	1.66	1.71	2.08
Arthropoda											
Caprellida											
Mean # Taxa	0.00	0.22	0.11	0.00	0.50	1.50	2.00	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.44	0.33	0.00	0.71	0.71	0.00	0.00	0.00	0.00	0.00
Cumacea											
Mean # Taxa	0.89	0.00	1.22	1.33	2.50	3.00	0.50	0.56	0.36	0.70	0.20
Standard Dev.	0.60	0.00	0.67	1.53	0.71	0.00	0.71	0.73	0.67	1.25	0.42
Decapoda											
Mean # Taxa	0.00	0.00	0.00	0.67	0.00	0.50	0.00	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.00	0.00	0.58	0.00	0.71	0.00	0.00	0.00	0.00	0.00
Gammaridea											
Mean # Taxa	0.11	2.00	3.00	3.33	10.50	16.00	8.00	5.67	5.36	3.50	0.30
Standard Dev.	0.33	1.66	0.50	3.06	2.12	0.00	1.41	2.40	1.21	1.08	0.48
Isopoda											
Mean # Taxa	0.00	0.44	0.44	2.33	2.00	7.00	1.00	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.73	0.53	2.08	1.41	1.41	1.41	0.00	0.00	0.00	0.00
Ostracoda											
Mean # Taxa	0.00	1.11	1.11	0.00	2.50	4.50	1.00	0.11	0.09	0.30	0.00
Standard Dev.	0.00	0.60	0.60	0.00	0.71	0.71	0.00	0.33	0.30	0.48	0.00

Table 3. Mean and total number of taxa for infaunal samples. Samples were 7.5 cm diameter push cores (0.3 mm sieve) or 0.1 m² Smith-McIntyre grab samples (*, 0.5 mm sieve).

Taxonomic Group	25 m n= 9	44 m n= 9	47 m n= 9	60 m n =*3	90 m n =*2	325 m n =*2	450 m n =*2	640 m n= 9	770 m n= 11	795 m n= 10	885 m n= 10
Pycnogonida											
Mean # Taxa	0.00	0.00	0.00	0.33	0.50	0.00	0.00	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.00	0.00	0.58	0.71	0.00	0.00	0.00	0.00	0.00	0.00
Tanaidacea											
Mean # Taxa	0.00	0.33	0.33	0.00	0.50	7.00	2.50	0.22	0.00	0.10	0.20
Standard Dev.	0.00	0.71	0.50	0.00	0.71	0.00	0.71	0.44	0.00	0.32	0.42
Mollusca											
Aplacophora											
Mean # Taxa	0.00	0.11	0.56	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.33	0.53	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Polyplacophora											
Mean # Taxa	0.00	0.00	0.00	0.00	0.00	1.00	1.50	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.00	0.00	0.00	0.00	0.00	0.71	0.00	0.00	0.00	0.00
Gastropoda											
Mean # Taxa	0.00	0.67	0.56	5.00	6.50	4.00	1.50	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.87	0.73	4.36	0.71	1.41	2.12	0.00	0.00	0.00	0.00
Bivalvia											
Mean # Taxa	0.00	3.22	2.67	8.67	7.00	1.50	3.00	0.33	0.18	0.30	0.00
Standard Dev.	0.00	0.83	0.87	7.57	2.83	0.71	1.41	0.50	0.40	0.48	0.00
Scaphopoda											
Mean # Taxa	0.00	0.44	0.33	1.33	0.50	0.00	0.50	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.53	0.50	1.15	0.71	0.00	0.71	0.00	0.00	0.00	0.00
Phoronida											
Phoronida											
Mean # Taxa	0.11	0.33	0.33	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Standard Dev.	0.33	0.50	0.50	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Echinodermata											
Ophiuroidea											
Mean # Taxa	0.00	0.56	0.33	3.00	4.50	5.00	3.50	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.53	0.50	2.65	4.95	0.00	0.71	0.00	0.00	0.00	0.00
Echinoidea											
Mean # Taxa	0.00	0.11	0.00	0.67	1.00	2.00	0.50	0.11	0.00	0.10	0.10
Standard Dev.	0.00	0.33	0.00	0.58	0.00	1.41	0.71	0.33	0.00	0.32	0.32
Holothuroidea											
Mean # Taxa	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.10
Standard Dev.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.32
Hemicodonta											
Enteropneusta											
Mean # Taxa	0.11	0.00	0.11	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Standard Dev.	0.33	0.00	0.33	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Taxa (area m²)	45 (0.0395)	111 (0.0395)	112 (0.0395)	136 (0.3000)	154 (0.2000)	150 (0.2000)	104 (0.2000)	34 (0.0395)	36 (0.0483)	38 (0.0439)	31 (0.0439)

Table 4. Biological survey coordinates and distances along the proposed MARS route. Organisms occurring in these areas were documented from video footage.

Date	Latitude (W)	Longitude (N)	Beginning Depth (m)	Survey Length (m)
			Ending Depth (m)	
10/10/2003	36.845840	-121.842580	23.2	2,876
10/10/2003	36.858940	-121.870410	35	
10/14/2003	36.803880	-121.807500	27.1	16,027
10/14/2003	36.884050	-121.956960	37	
10/28/2003	36.841400	-122.144410	114.8	12,213
10/28/2003	36.886220	-122.019310	48.4	
6/17/1999	36.884062	-122.051267	42	3,854
6/17/1999	36.893967	-122.009817	67	
6/16/1999	36.859510	-122.098870	83	2,261
6/16/1999	36.870008	-122.077137	92	
10/14/2003	36.803150	-121.805360	116.7	75
10/14/2003	36.802670	-121.805940	123.9	
10/15/2003	36.730590	-122.187940	278.9	2,079
10/15/2003	36.749320	-122.187380	758.6	
10/16/2003	36.812280	-122.178430	322.8	4,650
10/16/2003	36.842280	-122.142040	113.1	
6/19/1999	36.824847	-122.168367	310	409
6/19/1999	36.821260	-122.169428	330	
6/19/1999	36.821260	-122.169428	420	967
6/19/1999	36.813192	-122.173523	450	
10/17/2003	36.811620	-122.176930	369.4	4,601
10/17/2003	36.771700	-122.190860	572.8	
10/27/2003	36.771410	-122.191570	576.1	2,474
10/27/2003	36.749280	-122.188220	704.2	
10/13/2003	36.707220	-122.194180	972.2	2,745
10/13/2003	36.731430	-122.187850	794.9	
2/23/2004	36.803807	-121.85625	322.4	8,917
2/23/2004	36.838517	-122.15252	126.2	

Table 4. Biological survey coordinates and distances along the proposed MARS route. Organisms occurring in these areas were documented from video footage.

2/24/2004	36.886018	-122.01973	52.3	6,084
2/24/2004	36.884401	-121.95729	39.2	
Total				70,232

Table 5. Mean and total abundance of megafauna identified from video surveys along the proposed MARS cable route. Each video sample (n) was 25 m in length.

Taxonomic Group	44 m n= 33	47 m n= 67	60 m n=10	90 m n=10	325 m n=10	450 m n=10	640 m n= 37	770 m n= 56	795 m n= 41	885 m n= 39
--Porifera										
Mean Abund.	0.00	0.00	0.30	1.40	1.20	1.80	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.00	0.50	2.40	3.50	2.30	0.00	0.00	0.00	0.00
--Cnidaria										
Actinaria										
Mean Abund.	0.00	0.12	0.00	0.20	1.40	1.30	0.14	1.27	0.54	2.21
Standard Dev.	0.00	0.44	0.00	0.40	1.40	1.30	0.35	1.70	0.81	2.81
Ceriantharia										
Mean Abund.	0.00	1.09	0.00	0.10	0.40	10.40	0.76	0.00	0.00	0.00
Standard Dev.	0.00	1.24	0.00	0.30	0.70	6.50	1.19	0.00	0.00	0.00
Corallimorpharia										
Mean Abund.	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.93	0.24	0.18
Standard Dev.	0.00	0.00	0.00	0.00	0.70	0.00	0.00	1.19	0.58	0.45
Pennatulacea										
Mean Abund.	0.30	8.22	3.20	10.70	0.00	0.00	4.76	2.54	9.61	40.49
Standard Dev.	0.47	6.28	5.00	5.80	0.00	0.00	3.24	3.44	9.70	53.90
--Annelida										
Polychaeta										
Mean Abund.	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
--Arthropoda										
Brachyura										
Mean Abund.	0.18	0.09	0.00	0.10	0.10	0.00	0.00	1.30	0.73	0.67
Standard Dev.	0.39	0.29	0.00	0.30	0.30	0.00	0.00	1.14	1.00	0.87
--Mollusca										
Gastropoda										
Mean Abund.	2.67	4.28	0.00	0.00	0.00	2.60	0.73	0.55	0.02	0.05
Standard Dev.	1.49	3.21	0.00	0.00	0.00	2.40	0.93	0.83	0.16	0.32
Nudibranchia										
Mean Abund.	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bivalvia										
Mean Abund.	0.00	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Standard Dev.	0.00	1.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Octopoda										
Mean Abund.	0.00	0.10	0.00	0.00	0.00	0.10	0.00	0.02	0.00	0.00
Standard Dev.	0.00	0.31	0.00	0.00	0.00	0.30	0.00	0.13	0.00	0.00

Table 5. Mean and total abundance of megafauna identified from video surveys along the proposed MARS cable route. Each video sample (n) was 25 m in length.

Taxonomic Group	44 m n= 33	47 m n= 67	60 m n=10	90 m n=10	325 m n=10	450 m n=10	640 m n= 37	770 m n= 56	795 m n= 41	885 m n= 39
--Echinodermata										
Asteroidea										
Mean Abund.	0.12	0.13	0.00	1.00	1.00	1.50	0.00	0.09	0.07	0.03
Standard Dev.	0.42	0.34	0.00	1.40	2.00	1.10	0.00	0.29	0.26	0.16
Forcipulatid										
Mean Abund.	0.00	0.01	0.00	0.30	30.30	0.00	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.12	0.00	0.50	25.30	0.00	0.00	0.00	0.00	0.00
Paxillosida										
Mean Abund.	0.00	0.15	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.40	0.00	0.30	0.00	0.00	0.00	0.00	0.00	0.00
Spinulosida										
Mean Abund.	0.00	0.00	0.00	0.00	0.60	0.30	0.00	0.96	0.10	0.03
Standard Dev.	0.00	0.00	0.00	0.00	0.70	0.70	0.00	1.55	0.30	0.16
Valvatida										
Mean Abund.	0.00	0.04	0.00	0.20	0.90	0.10	0.03	0.00	0.00	0.00
Standard Dev.	0.00	0.21	0.00	0.40	0.80	0.30	0.16	0.00	0.00	0.00
Ophuroidea										
Mean Abund.	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.07	0.03
Standard Dev.	0.00	0.00	0.00	0.00	0.00	0.30	0.00	0.00	0.26	0.16
Strongylocentrotidae										
Mean Abund.	0.00	0.00	0.00	0.00	10.80	0.00	0.05	0.27	0.27	0.05
Standard Dev.	0.00	0.00	0.00	0.00	8.00	0.00	0.23	0.56	0.67	0.22
Holothuroid										
Mean Abund.	0.00	0.00	0.00	0.10	1.30	0.00	0.00	0.02	0.00	0.00
Standard Dev.	0.00	0.00	0.00	0.30	1.00	0.00	0.00	0.13	0.00	0.00
Elasipodida										
Mean Abund.	0.00	0.00	0.00	0.00	0.30	0.00	0.05	0.00	0.00	3.18
Standard Dev.	0.00	0.00	0.00	0.00	0.70	0.00	0.23	0.00	0.00	18.06
--Vertebrata										
Rajidae										
Mean Abund.	0.00	0.01	0.00	0.10	0.00	0.10	0.00	0.02	0.00	0.00
Standard Dev.	0.00	0.12	0.00	0.30	0.00	0.30	0.00	0.13	0.00	0.00
Scyliorhinidae										
Mean Abund.	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.02	0.05	0.00
Standard Dev.	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.13	0.22	0.00
Agonidae										
Mean Abund.	0.00	0.00	0.00	0.00	0.60	0.00	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.00	0.00	0.00	0.90	0.00	0.00	0.00	0.00	0.00

Table 5. Mean and total abundance of megafauna identified from video surveys along the proposed MARS cable route. Each video sample (n) was 25 m in length.

Taxonomic Group	44 m n= 33	47 m n= 67	60 m n=10	90 m n=10	325 m n=10	450 m n=10	640 m n= 37	770 m n= 56	795 m n= 41	885 m n= 39
Anoplopomidae										
Mean Abund.	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.00	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.00
Alepocephalidae										
Mean Abund.	0.33	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Standard Dev.	0.92	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bothidae										
Mean Abund.	0.00	0.00	0.50	1.60	0.00	0.00	0.00	0.02	0.00	0.00
Standard Dev.	0.00	0.00	0.70	1.70	0.00	0.00	0.00	0.13	0.00	0.00
Embiotocidae										
Mean Abund.	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.00	0.00
Liparididae										
Mean Abund.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.02	0.00
Standard Dev.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.16	0.00
Macrouridae										
Mean Abund.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00
Standard Dev.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.00
Merlucciidae										
Mean Abund.	0.00	0.00	0.00	0.00	0.30	0.00	0.16	0.02	0.10	0.03
Standard Dev.	0.00	0.00	0.00	0.00	0.50	0.00	0.44	0.13	0.30	0.16
Moridae										
Mean Abund.	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.02	0.13
Standard Dev.	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.16	0.34
Myxinidae										
Mean Abund.	0.00	0.00	0.00	0.00	0.00	0.10	0.05	0.04	0.07	0.05
Standard Dev.	0.00	0.00	0.00	0.00	0.00	0.30	0.23	0.19	0.26	0.22
Ophidiidae										
Mean Abund.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00
Standard Dev.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00
Osteichthyes										
Mean Abund.	0.00	0.04	0.60	1.30	0.00	0.10	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.21	1.00	1.20	0.00	0.30	0.00	0.00	0.00	0.00
Pleuronectidae										
Mean Abund.	0.00	0.00	0.00	0.00	0.20	0.00	0.11	0.09	0.00	0.03
Standard Dev.	0.00	0.00	0.00	0.00	0.40	0.00	0.31	0.29	0.00	0.16

Table 5. Mean and total abundance of megafauna identified from video surveys along the proposed MARS cable route. Each video sample (n) was 25 m in length.

Taxonomic Group	44 m n= 33	47 m n= 67	60 m n=10	90 m n=10	325 m n=10	450 m n=10	640 m n= 37	770 m n= 56	795 m n= 41	885 m n= 39
Pleuronectiformes										
Mean Abund.	0.03	0.04	0.30	0.60	0.40	0.10	0.00	0.32	0.07	0.00
Standard Dev.	0.17	0.21	0.50	0.90	0.70	0.30	0.00	0.61	0.26	0.00
Scorpaenidae										
Mean Abund.	0.00	0.00	0.00	0.00	0.20	0.00	0.03	1.34	0.29	1.15
Standard Dev.	0.00	0.00	0.00	0.00	0.40	0.00	0.16	1.34	0.51	1.90
Zoarcidae										
Mean Abund.	0.00	0.00	0.00	0.00	0.40	0.40	0.05	0.46	0.12	0.10
Standard Dev.	0.00	0.00	0.00	0.00	0.20	0.70	0.23	0.76	0.40	0.38
Total Abundance/m	0.145	0.611	0.204	0.648	1.820	0.872	0.281	0.421	0.499	1.935
Invertebrates	0.131	0.617	0.148	0.492	1.736	0.840	0.264	0.336	0.468	1.876
Demersal Fishes	0.015	0.005	0.056	0.156	0.084	0.032	0.017	0.085	0.030	0.059

Table 6. Mean and total number of taxa for megafauna identified from video surveys along the proposed MARS cable route. Each video sample (n) was 25 m in length.

Taxonomic Group	44 m n= 33	47 m n= 67	60 m n=10	90 m n =10	325 m n =10	450 m n =10	640 m n= 37	770 m n= 56	795 m n= 41	885 m n= 39
--Porifera										
Mean # Taxa	0.00	0.00	0.00	0.30	0.44	0.80	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.00	0.00	0.48	0.53	0.79	0.00	0.00	0.00	0.00
--Cnidaria										
Actinaria										
Mean # Taxa	0.00	0.09	0.00	0.20	0.78	1.80	0.14	0.73	0.41	0.95
Standard Dev.	0.00	0.29	0.00	0.42	0.67	0.42	0.35	0.80	0.59	1.00
Ceriantharia										
Mean # Taxa	0.00	0.58	0.00	0.10	0.33	1.10	0.43	0.00	0.00	0.00
Standard Dev.	0.00	0.50	0.00	0.32	0.50	0.32	0.50	0.00	0.00	0.00
Corallimorpharia										
Mean # Taxa	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.52	0.20	0.15
Standard Dev.	0.00	0.00	0.00	0.00	0.33	0.00	0.00	0.50	0.40	0.37
Pennatulacea										
Mean # Taxa	0.30	0.94	0.78	1.10	0.00	0.00	1.57	1.07	1.27	1.13
Standard Dev.	0.47	0.30	0.44	0.32	0.00	0.00	0.69	0.71	0.87	0.95
--Annelida										
Polychaeta										
Mean # Taxa	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.00	0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00
--Arthropoda										
Brachyura										
Mean # Taxa	0.18	0.09	0.00	0.10	0.11	0.00	0.00	0.71	0.44	0.44
Standard Dev.	0.39	0.29	0.00	0.32	0.33	0.00	0.00	0.46	0.50	0.50
--Mollusca										
Gastropoda										
Mean # Taxa	0.94	1.03	0.00	0.00	0.00	0.80	0.49	0.36	0.02	0.05
Standard Dev.	0.24	0.43	0.00	0.00	0.00	0.42	0.51	0.48	0.16	0.32
Nudibranchia										
Mean # Taxa	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bivalvia										
Mean # Taxa	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Octopoda										
Mean # Taxa	0.00	0.10	0.00	0.00	0.00	0.10	0.00	0.02	0.00	0.00
Standard Dev.	0.00	0.31	0.00	0.00	0.00	0.32	0.00	0.13	0.00	0.00

Table 6. Mean and total number of taxa for megafauna identified from video surveys along the proposed MARS cable route. Each video sample (n) was 25 m in length.

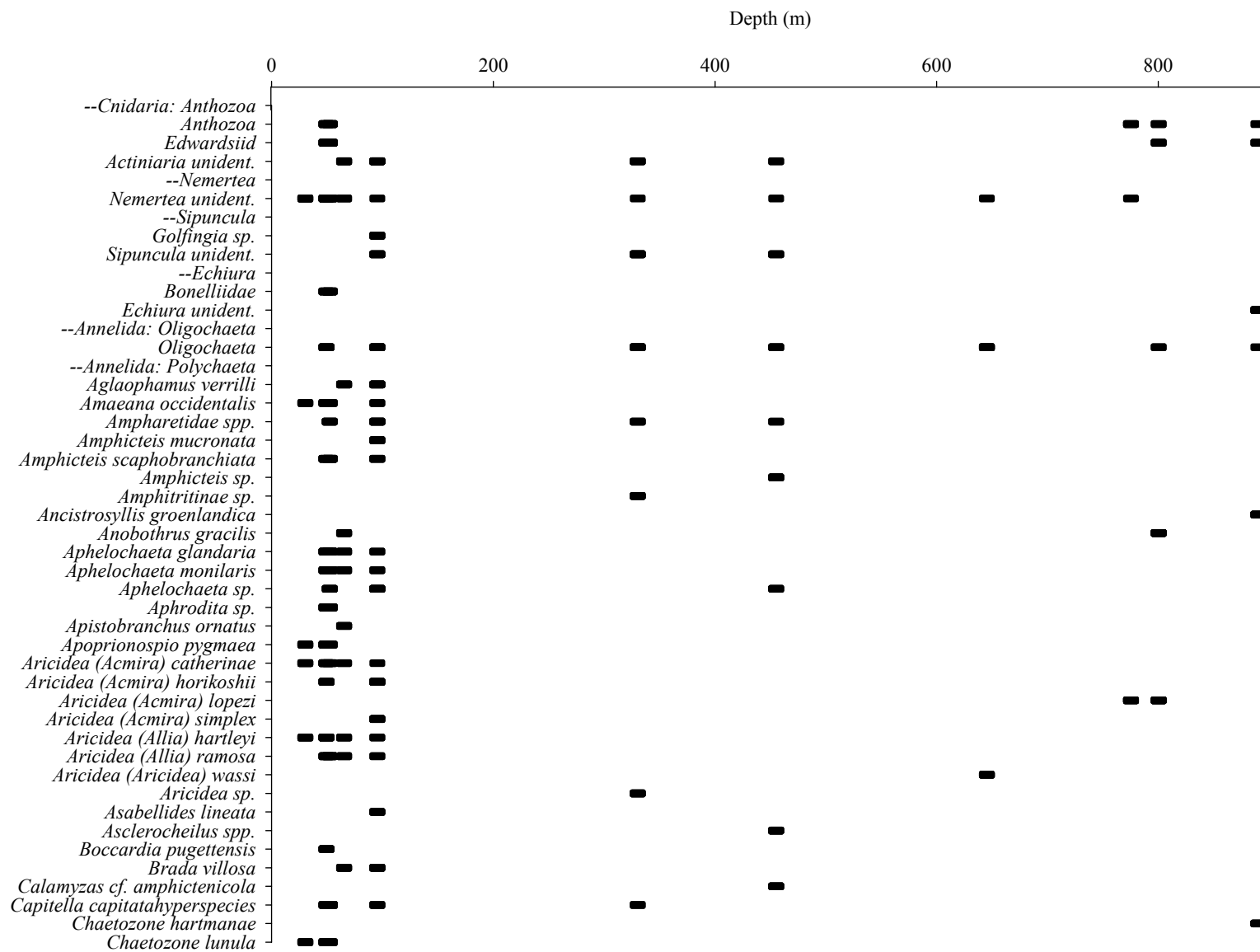
Taxonomic Group	44 m n= 33	47 m n= 67	60 m n =10	90 m n =10	325 m n =10	450 m n =10	640 m n= 37	770 m n= 56	795 m n= 41	885 m n= 39
--Echinodermata										
Asteroidea										
Mean # Taxa	0.09	0.13	0.00	0.20	0.44	0.80	0.00	0.09	0.07	0.03
Standard Dev.	0.29	0.34	0.00	0.42	0.53	0.42	0.00	0.29	0.26	0.16
Forcipulatida										
Mean # Taxa	0.00	0.01	0.00	0.30	1.00	0.00	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.12	0.00	0.48	0.00	0.00	0.00	0.00	0.00	0.00
Paxillosida										
Mean # Taxa	0.00	0.13	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.34	0.00	0.32	0.00	0.00	0.00	0.00	0.00	0.00
Spinulosida										
Mean # Taxa	0.00	0.00	0.00	0.00	0.44	0.20	0.00	0.54	0.10	0.03
Standard Dev.	0.00	0.00	0.00	0.00	0.53	0.42	0.00	0.60	0.30	0.16
Valvatida										
Mean # Taxa	0.00	0.04	0.00	0.20	0.78	0.10	0.03	0.00	0.00	0.00
Standard Dev.	0.00	0.21	0.00	0.42	0.67	0.32	0.16	0.00	0.00	0.00
Ophiuroidea										
Mean # Taxa	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.07	0.03
Standard Dev.	0.00	0.00	0.00	0.00	0.00	0.32	0.00	0.00	0.26	0.16
Strongylocentrotidae										
Mean # Taxa	0.00	0.00	0.00	0.00	1.00	0.00	0.05	0.21	0.17	0.05
Standard Dev.	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.41	0.38	0.22
Holothuroid										
Mean # Taxa	0.00	0.00	0.00	0.10	0.22	0.00	0.00	0.02	0.00	0.00
Standard Dev.	0.00	0.00	0.00	0.32	0.44	0.00	0.00	0.13	0.00	0.00
Elasipodida										
Mean # Taxa	0.00	0.00	0.00	0.00	0.89	0.00	0.05	0.00	0.00	0.21
Standard Dev.	0.00	0.00	0.00	0.00	0.60	0.00	0.23	0.00	0.00	0.41
--Vertebrata										
Rajidae										
Mean # Taxa	0.00	0.01	0.00	0.10	0.00	0.10	0.00	0.02	0.00	0.00
Standard Dev.	0.00	0.12	0.00	0.10	0.00	0.10	0.00	0.13	0.00	0.00
Scyliorhinidae										
Mean # Taxa	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.02	0.05	0.00
Standard Dev.	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.13	0.22	0.00
Agonidae										
Mean # Taxa	0.00	0.00	0.00	0.00	0.60	0.00	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.00	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.00

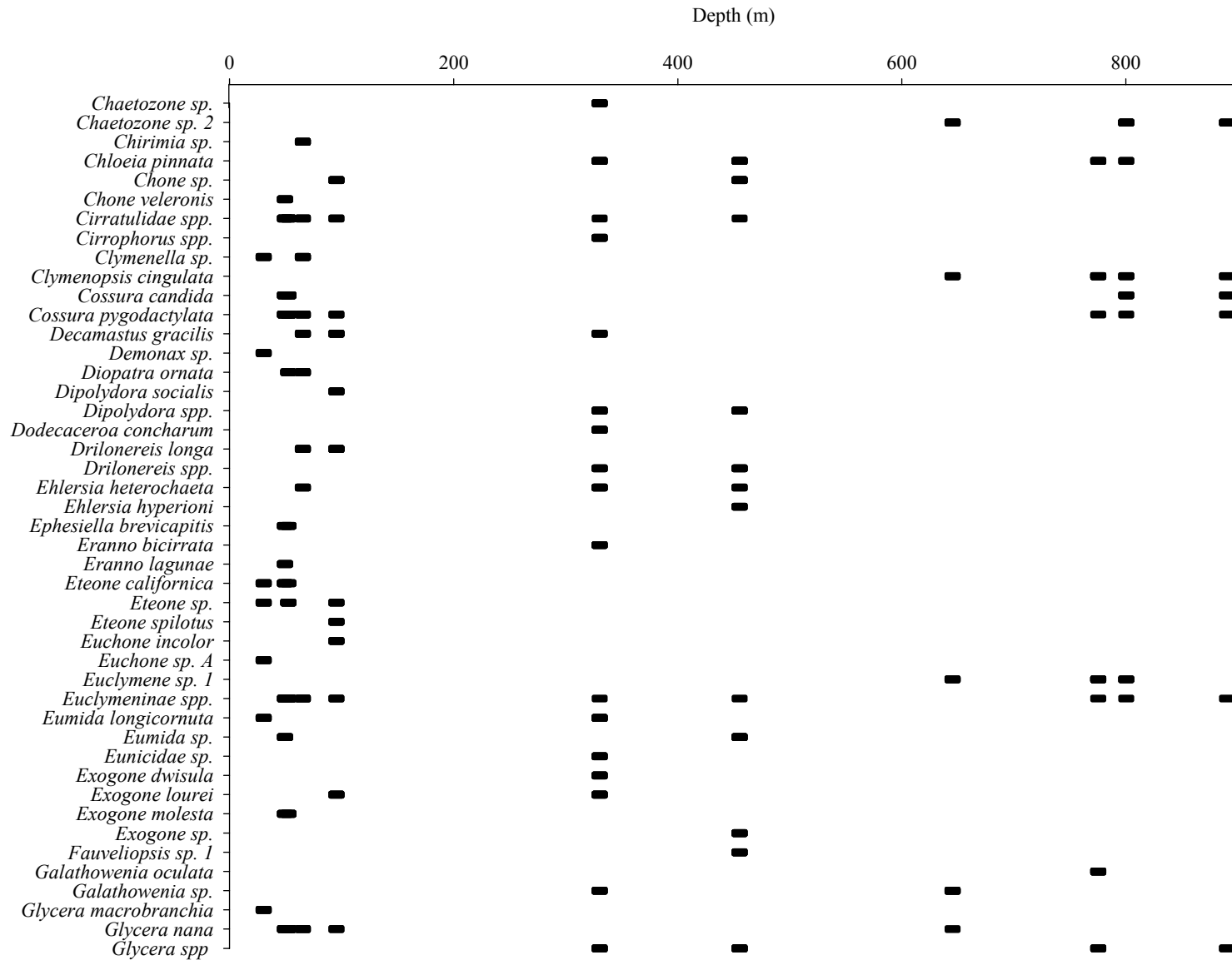
Table 6. Mean and total number of taxa for megafauna identified from video surveys along the proposed MARS cable route. Each video sample (n) was 25 m in length.

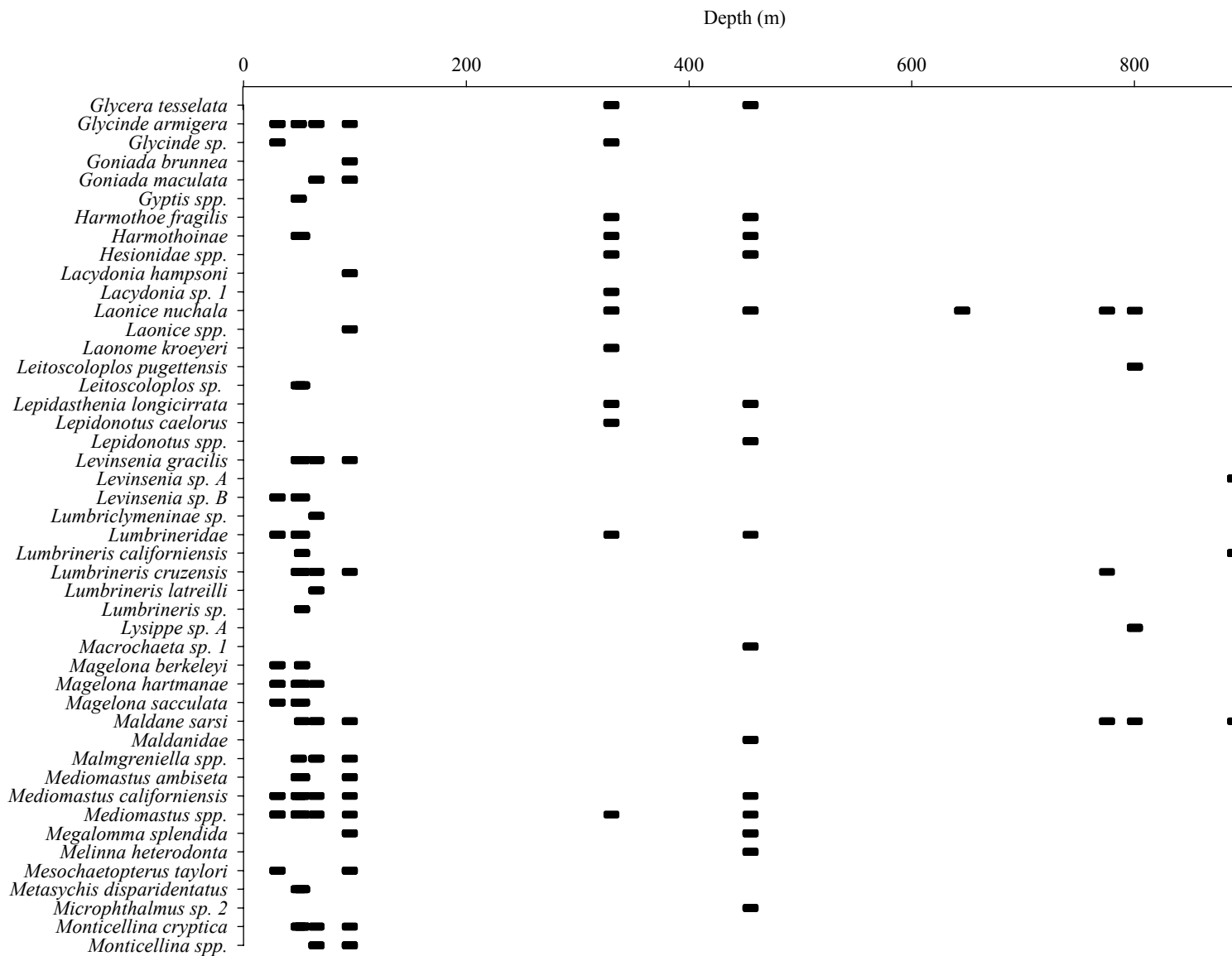
Taxonomic Group	44 m n= 33	47 m n= 67	60 m n =10	90 m n =10	325 m n =10	450 m n =10	640 m n= 37	770 m n= 56	795 m n= 41	885 m n= 39
Anoplopomidae										
Mean # Taxa	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00
Alepocephalidae										
Mean # Taxa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.02	0.00
Standard Dev.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.37	0.16	0.00
Bothidae										
Mean # Taxa	0.15	0.03	0.50	1.60	0.00	0.00	0.00	0.00	0.00	0.00
Standard Dev.	0.36	0.17	0.20	0.50	0.00	0.00	0.00	0.00	0.00	0.00
Embiotocidae										
Mean # Taxa	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00
Liparididae										
Mean # Taxa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.02	0.00
Standard Dev.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.16	0.00
Macrouridae										
Mean # Taxa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00
Standard Dev.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.00
Merlucciidae										
Mean # Taxa	0.00	0.00	0.00	0.00	0.30	0.00	0.14	0.02	0.10	0.03
Standard Dev.	0.00	0.00	0.00	0.00	0.20	0.00	0.35	0.13	0.30	0.16
Moridae										
Mean # Taxa	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.02	0.13
Standard Dev.	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.16	0.34
Myxinidae										
Mean # Taxa	0.00	0.00	0.00	0.00	0.00	0.10	0.05	0.04	0.07	0.05
Standard Dev.	0.00	0.00	0.00	0.00	0.00	0.10	0.23	0.19	0.26	0.22
Ophidiidae										
Mean # Taxa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00
Standard Dev.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00
Osteichthyes										
Mean # Taxa	0.00	0.04	0.60	1.30	0.00	0.10	0.00	0.00	0.00	0.00
Standard Dev.	0.00	0.21	0.30	0.40	0.00	0.10	0.00	0.00	0.00	0.00
Pleuronectidae										
Mean # Taxa	0.00	0.00	0.00	0.00	0.20	0.00	0.11	0.09	0.00	0.03
Standard Dev.	0.00	0.00	0.00	0.00	0.10	0.00	0.31	0.29	0.00	0.16

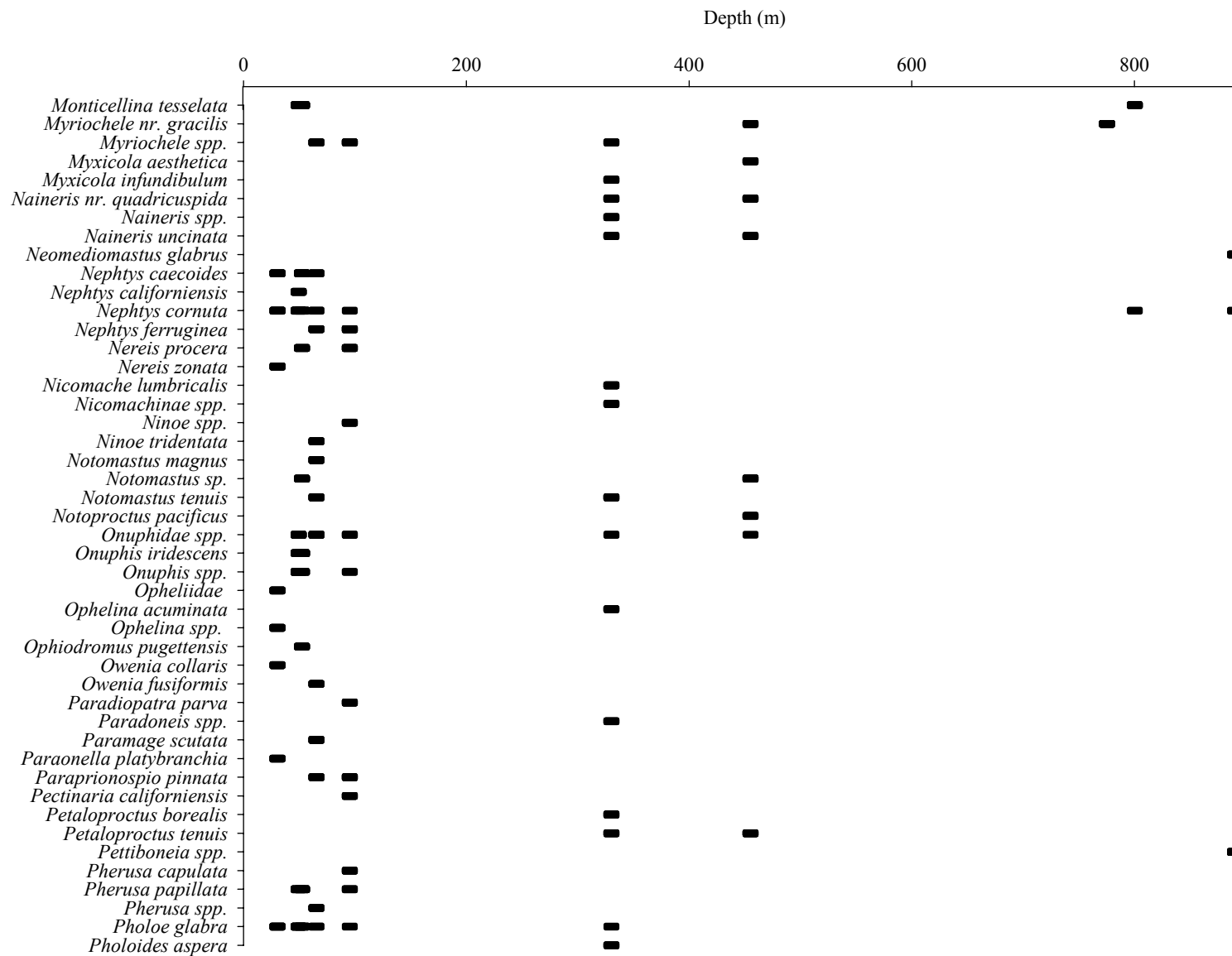
Table 6. Mean and total number of taxa for megafauna identified from video surveys along the proposed MARS cable route. Each video sample (n) was 25 m in length.

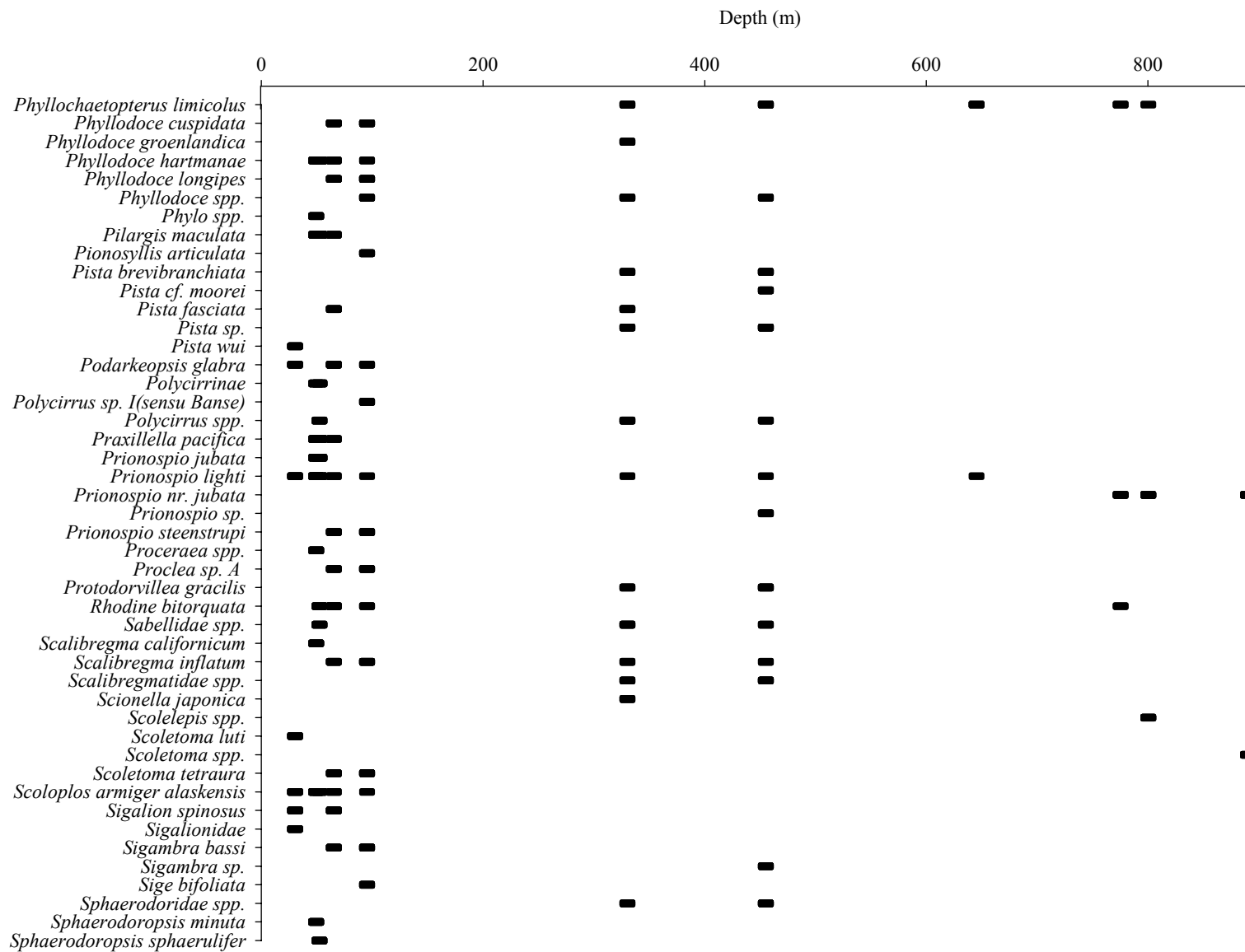
Taxonomic Group	44 m n= 33	47 m n= 67	60 m n=10	90 m n=10	325 m n=10	450 m n=10	640 m n= 37	770 m n= 56	795 m n= 41	885 m n= 39
Pleuronectiformes										
Mean # Taxa	0.03	0.04	0.30	0.80	0.40	0.10	0.00	0.27	0.07	0.00
Standard Dev.	0.17	0.21	0.20	0.30	0.20	0.10	0.00	0.45	0.26	0.00
Scorpaenidae										
Mean # Taxa	0.00	0.00	0.00	0.00	0.20	0.00	0.03	0.64	0.27	0.41
Standard Dev.	0.00	0.00	0.00	0.00	0.10	0.00	0.16	0.48	0.45	0.50
Zoarcidae										
Mean # Taxa	0.00	0.00	0.00	0.00	0.40	0.40	0.05	0.36	0.10	0.08
Standard Dev.	0.00	0.00	0.00	0.00	0.20	0.20	0.23	0.48	0.30	0.27
Total Taxa/m	0.007	0.011	0.020	0.064	0.116	0.084	0.021	0.019	0.021	0.021
Invertebrates	0.005	0.009	0.008	0.044	0.080	0.064	0.012	0.011	0.012	0.014
Demersal Fishes	0.002	0.002	0.012	0.020	0.036	0.020	0.009	0.008	0.010	0.006

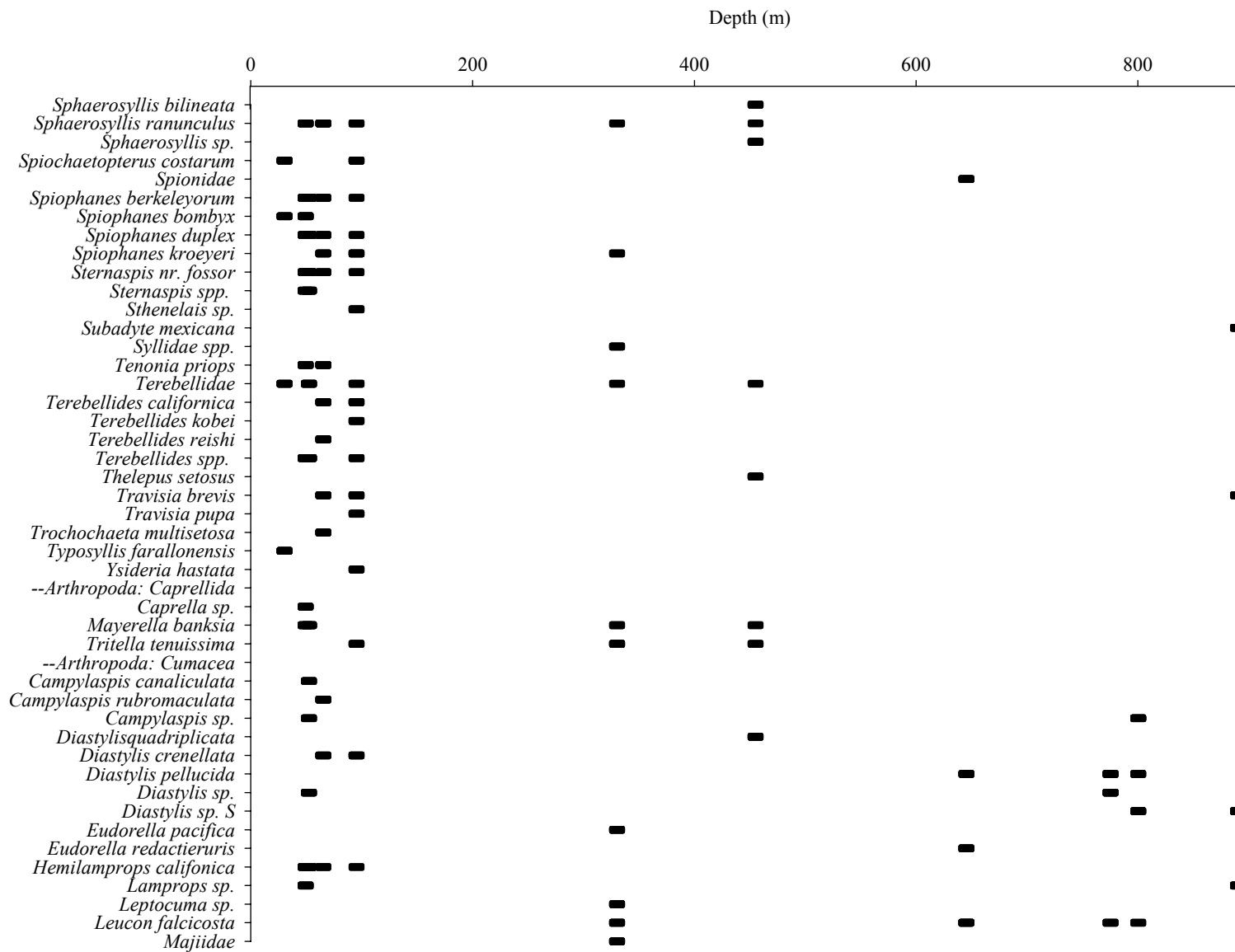


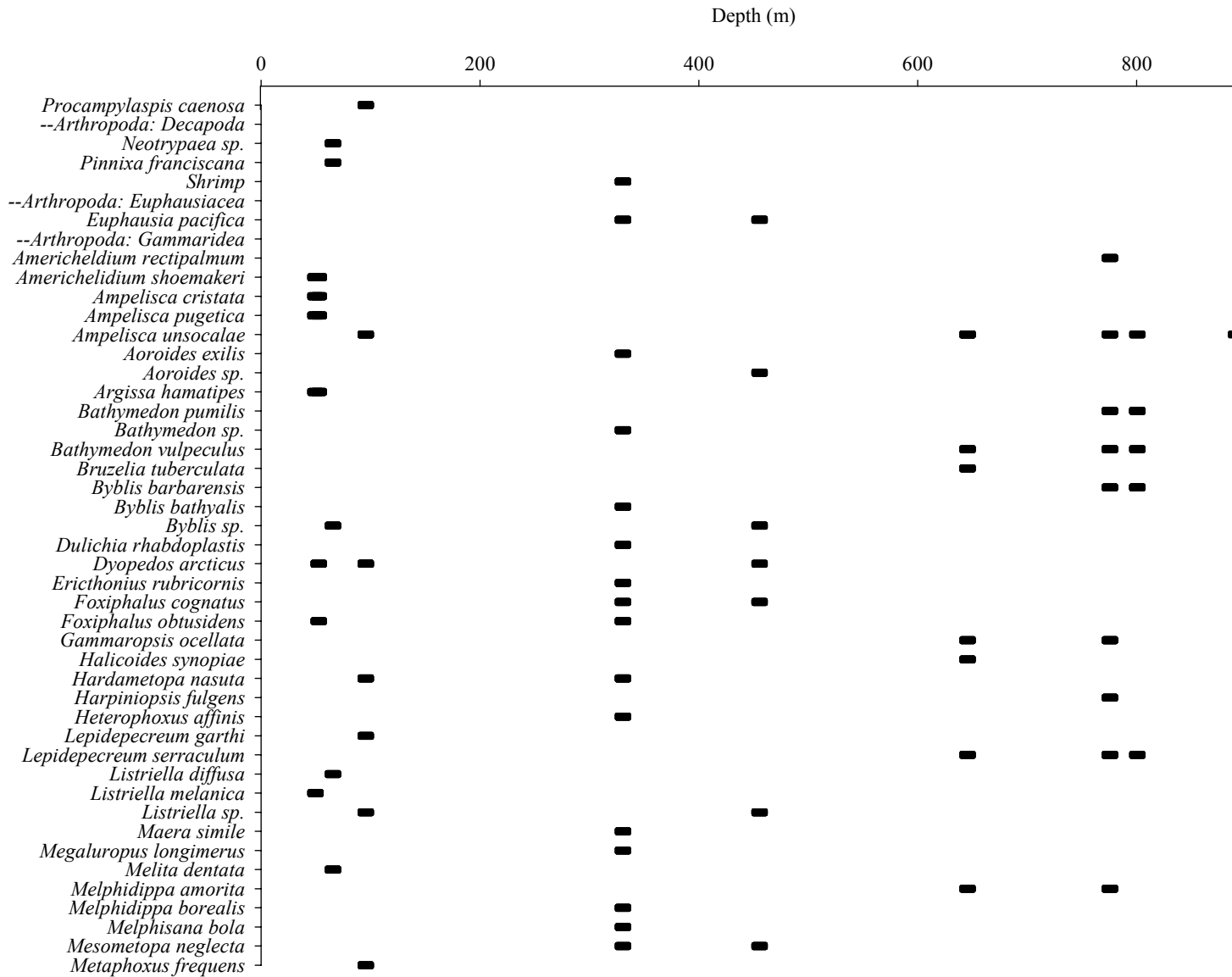


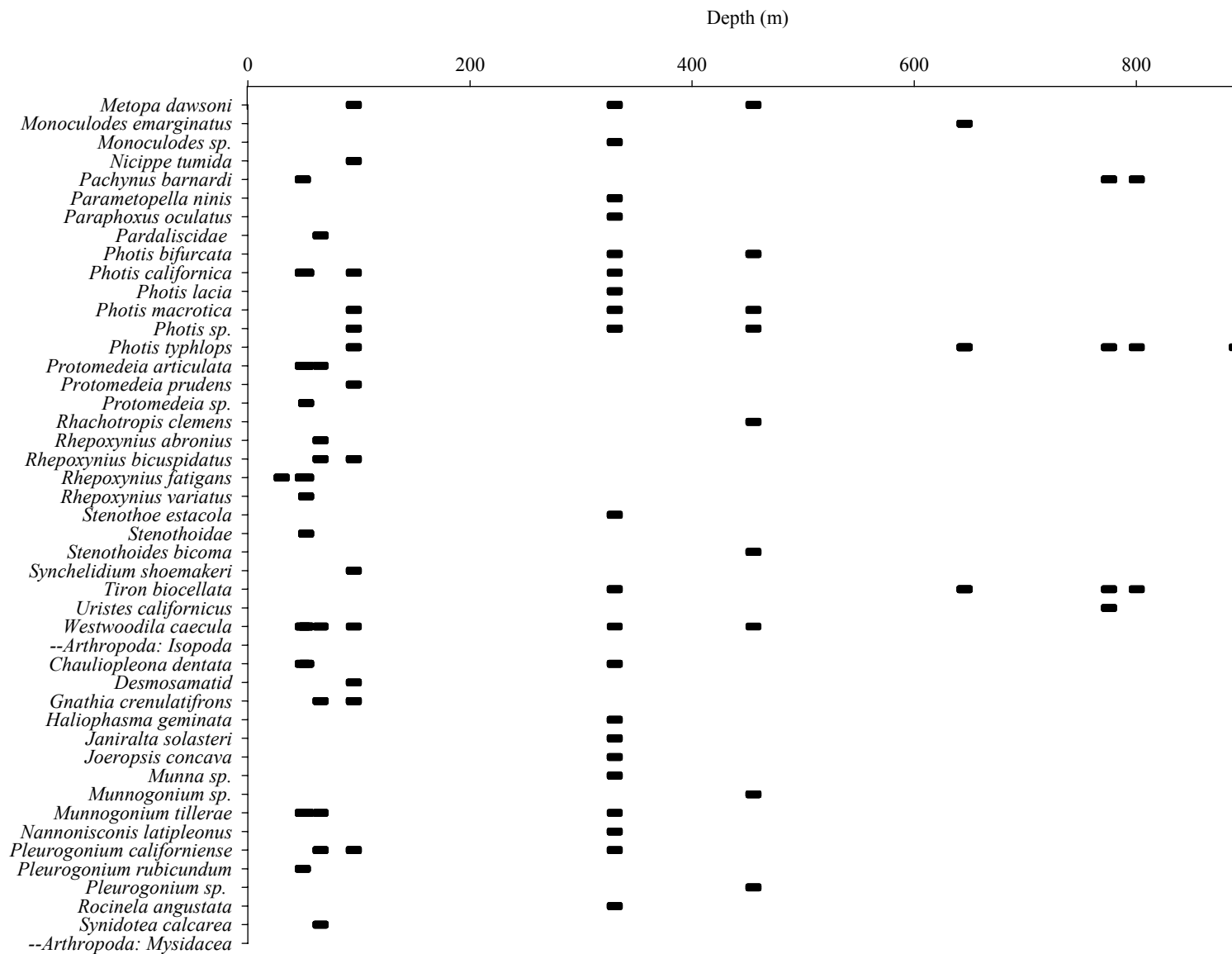


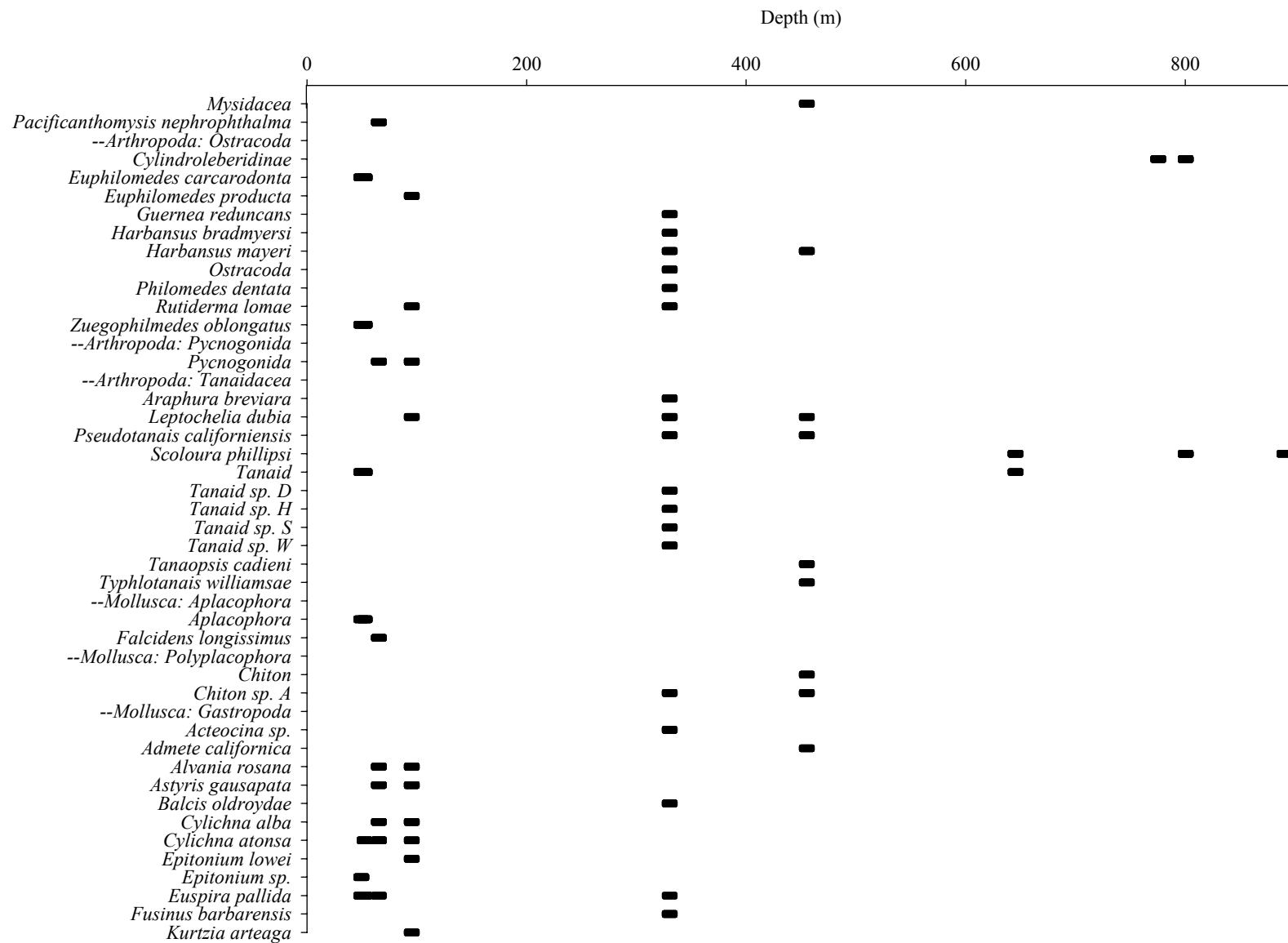


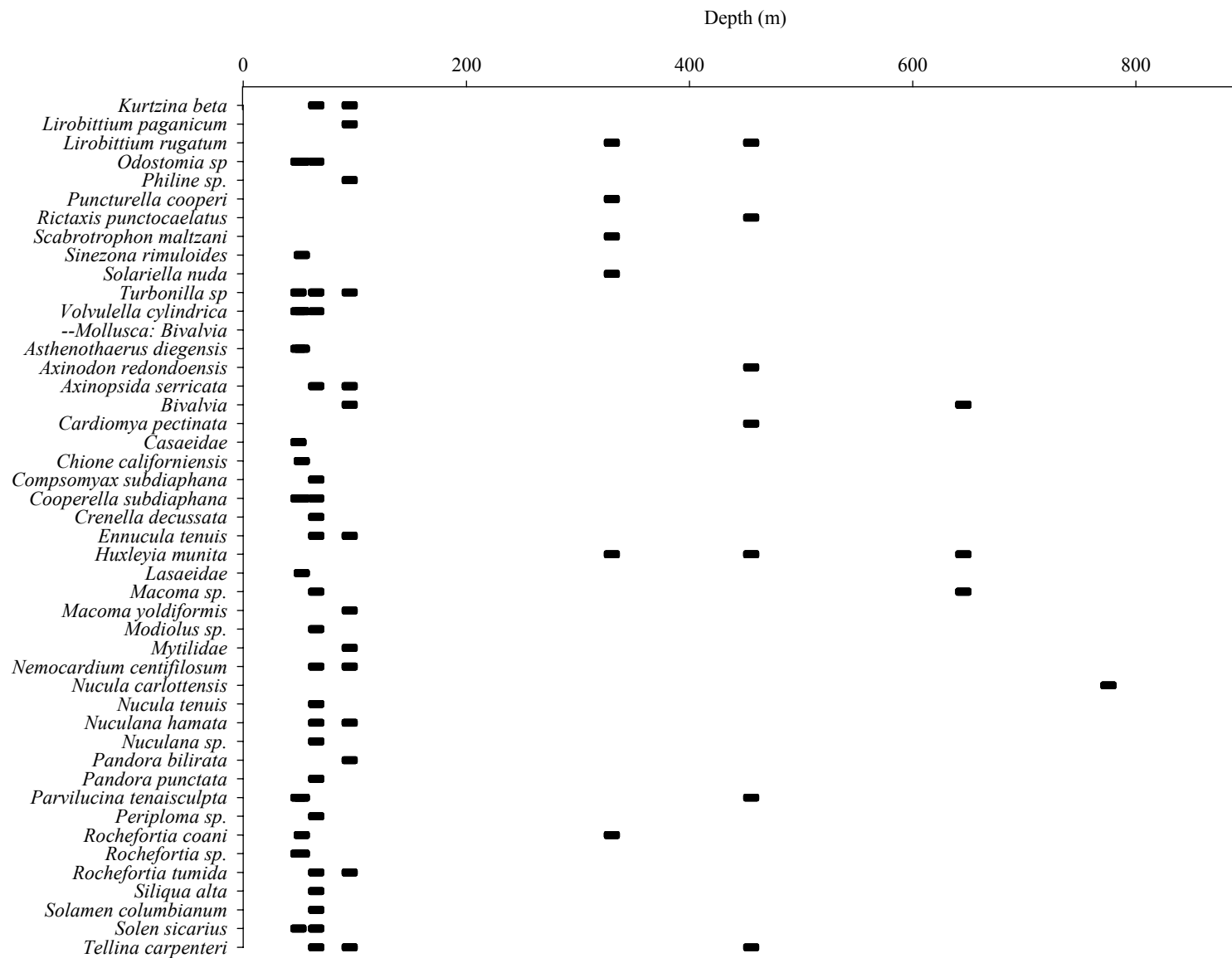


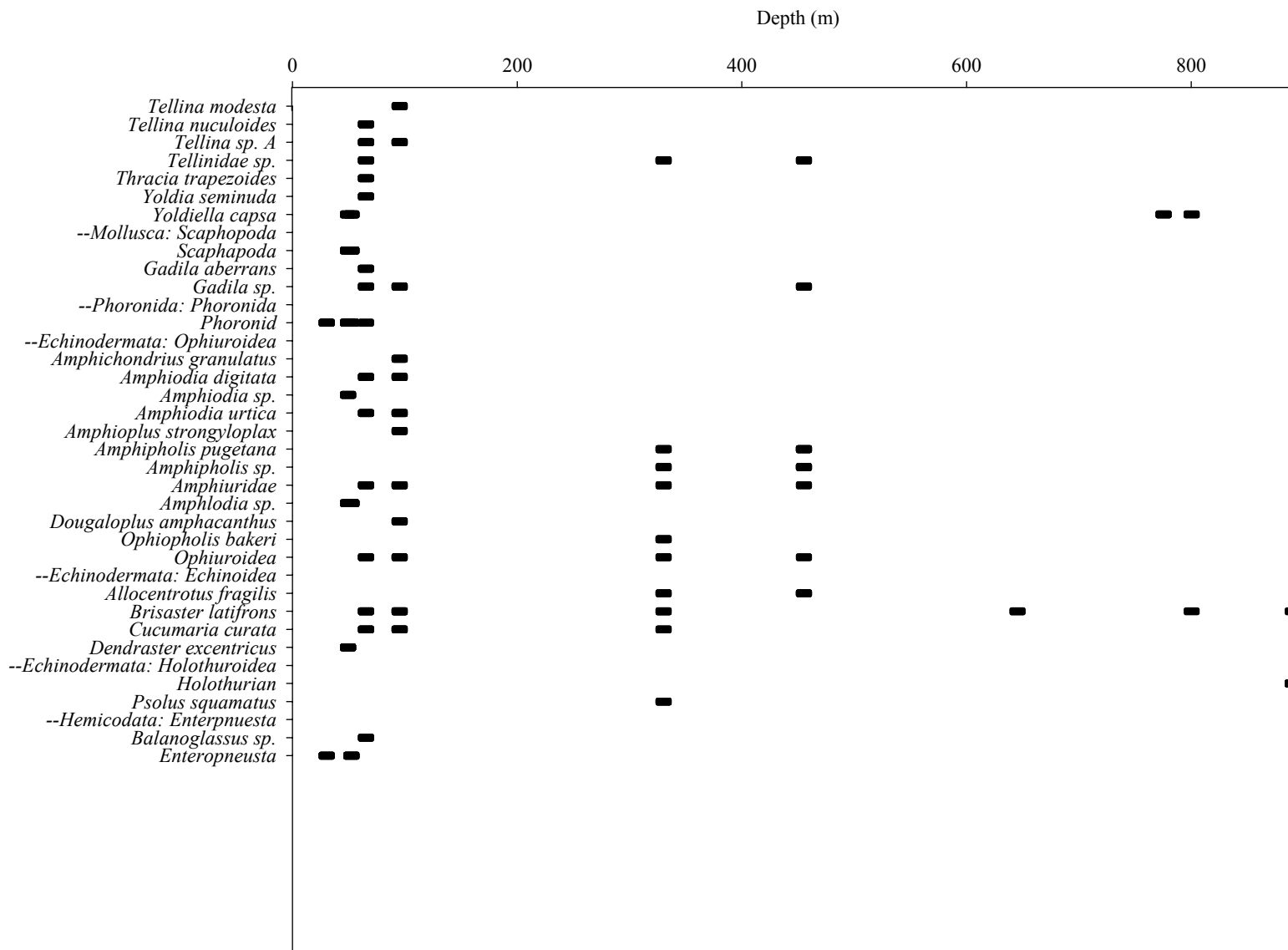


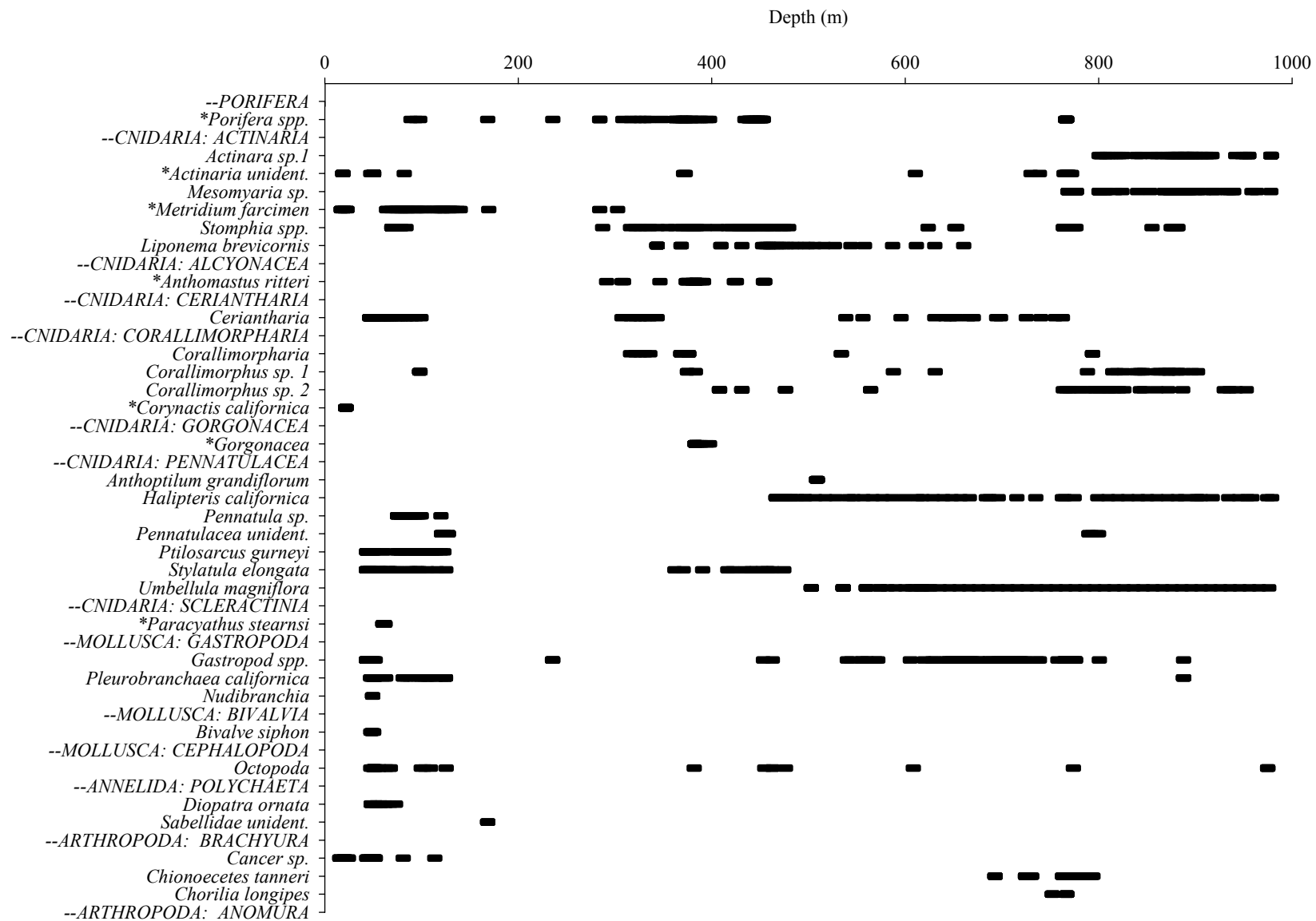


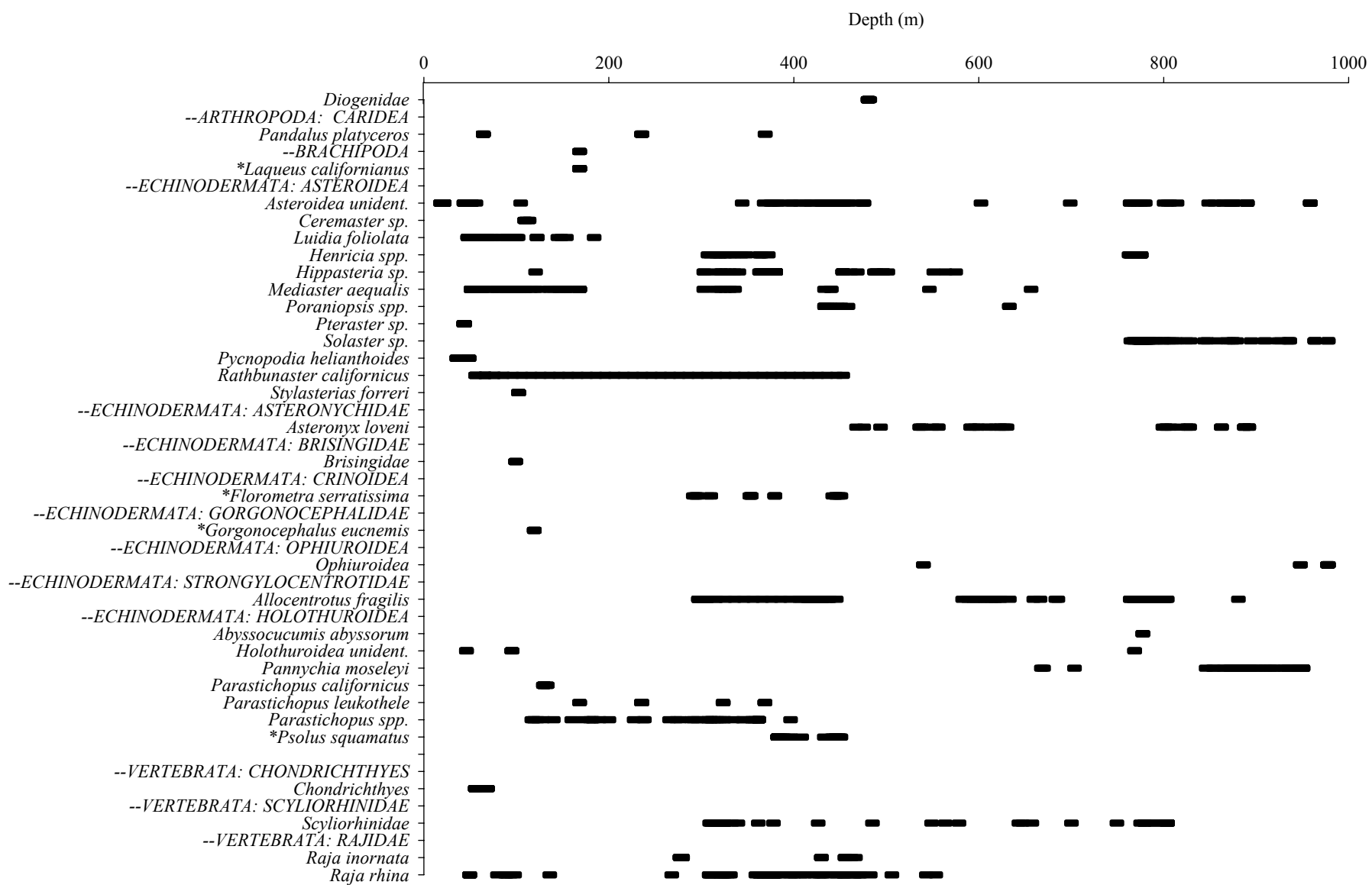


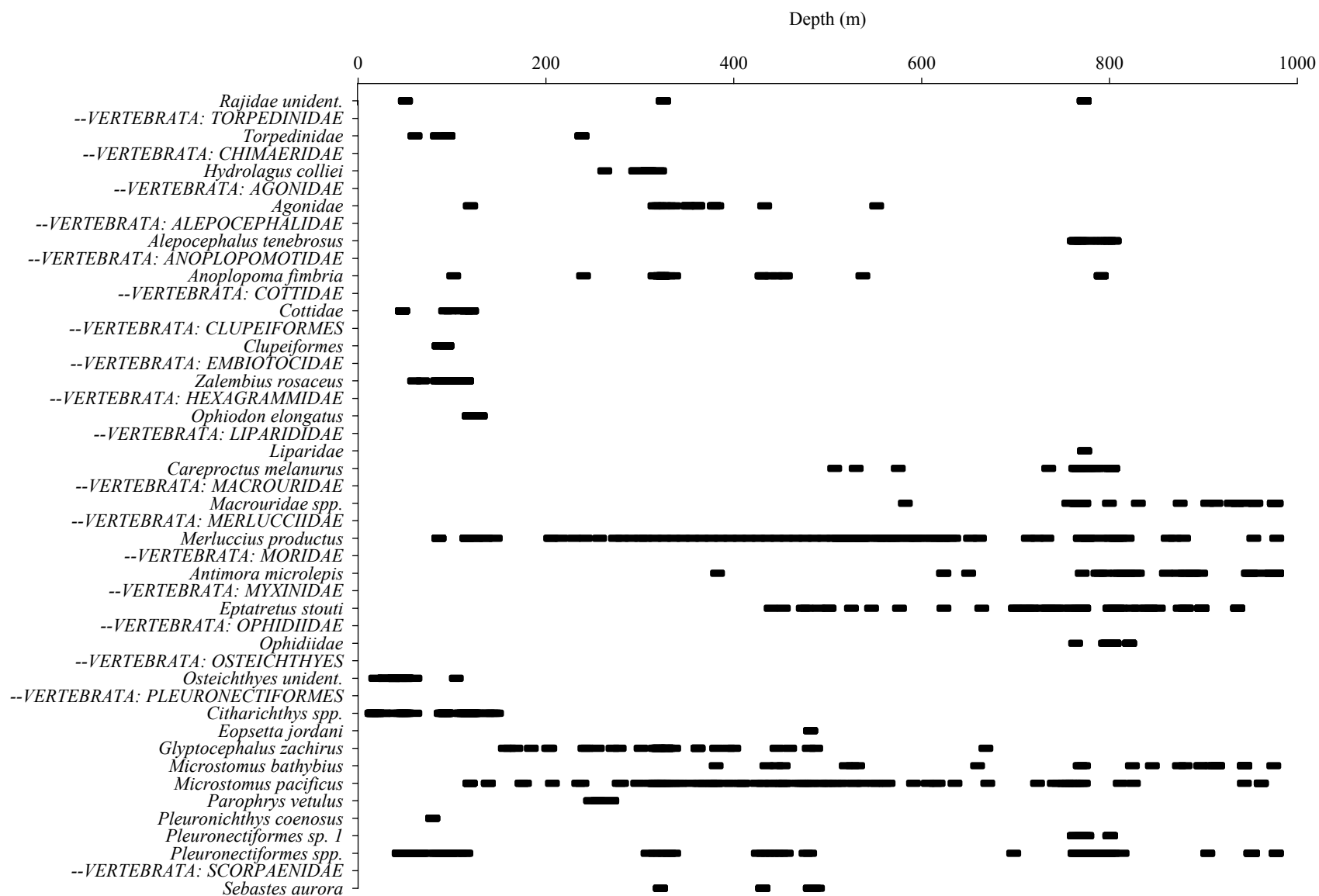


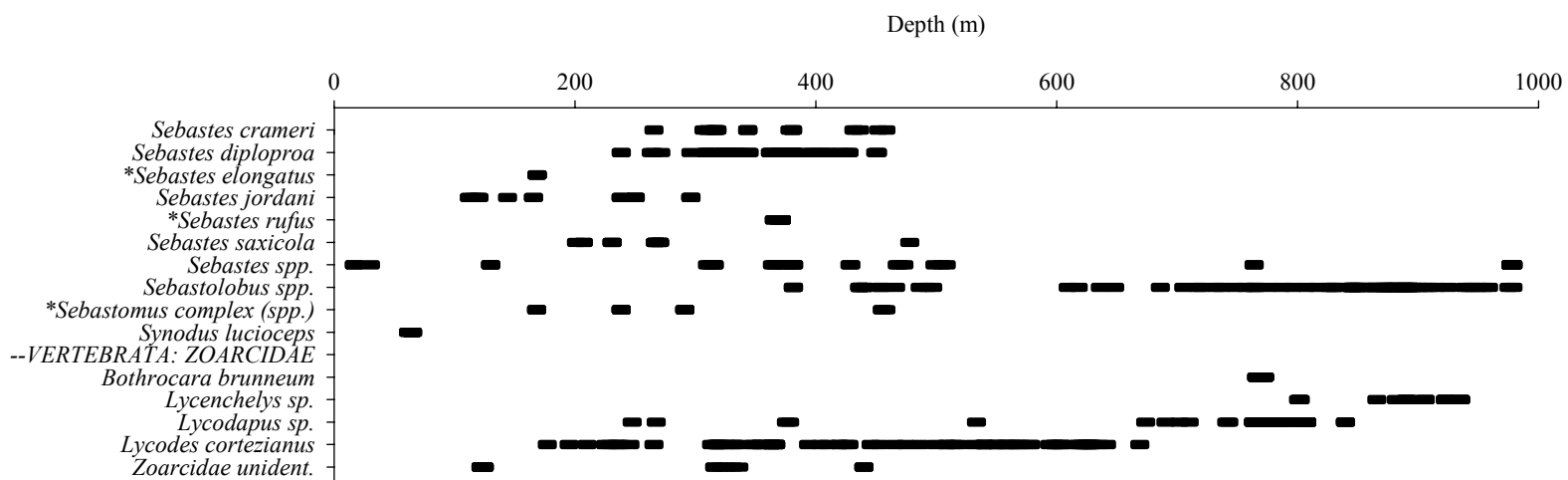












* these taxa live predominantly on hard substratum (rock, scoured surfaces and anthropogenic surfaces)