A Pictorial Guide to the Epibenthic Megafauna of the *Lophelia* Coral Conservation Area Identified from In Situ Benthic Images

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ABSTRACT

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During a 2002 benthic drop/drift camera survey of the easternmost portion of the Scotian Shelf, the reef-forming stony coral *Lophelia pertusa* / *Desmophyllum pertusum* was scientifically documented in Canadian waters for the first time. A follow-up camera survey of the area, known as the Stone Fence, was conducted in 2003 within and beyond the known location of a *L. pertusa* reef. Extensive bottom trawl damage to the reef was recorded, resulting in the creation of a 15-square-kilometre *Lophelia* Coral Conservation Area (LCCA) in 2004 in which bottom-contact fishing is prohibited. Subsequent benthic camera surveys monitoring the area's biodiversity and the reef's recovery were carried out in 2009 and 2015. This report summarizes the epibenthic megafauna found from a randomly-selected subset of the images collected. In total, 249 taxa were recorded, 188 of which were identified to one of the following phyla or phyla groupings: Annelida, Arthropoda, Brachiopoda, Bryozoa, Chordata, Chordata/Porifera, Cnidaria, Echinodermata, Mollusca, Nemertea, and Porifera. Where possible, taxa were identified to lower taxonomic levels; often class, order, or family. Each taxon entry includes a representative image, a written description, and associated identification numbers from the World Register of Marine Species and the Integrated Taxonomic Information System databases. The report is intended to support present and future analyses of both the biodiversity associated with *L. pertusa* and its recovery in the LCCA. It may also serve as a taxonomic guide for image analyses of northwest Atlantic fauna.

RÉSUMÉ

Korabik, M., Baker, E., Beazley, L., Thompson, S., Bouchard Marmen, M. and Kenchington, E. 2021. A Pictorial Guide to the Epibenthic Megafauna of the *Lophelia* Coral Conservation Area Identified from In Situ Benthic Images. Can. Tech. Rep. Fish. Aquat. Sci. 3430: v + 142 p.

Lors d'un relevé de la zone benthique réalisé en 2002 à l'aide d'une caméra de type «chute/dérive» dans la partie est du plateau néo-écossais, le corail dur formateur de récif *Lophelia pertusa* / *Desmophyllum pertusum* a été scientifiquement documenté pour la toute première fois dans les eaux canadiennes. Une étude de suivi par caméra a été menée en 2003 dans cette région appelée Stone Fence, à l'emplacement connu du récif de *L. pertusa* et dans les environs. Il a alors été constaté que le chalutage de fond avait causé des dommages majeurs au récif, ce qui a engendré en 2004 la création de la zone de conservation des coraux *Lophelia* (ZCCL) interdisant les activités de pêche entrant en contact avec le fond sur une superficie de 15 km^2. En 2009 et en 2015, deux autres relevés benthiques par caméra ont été réalisés afin de surveiller le rétablissement du récif et d'étudier la biodiversité lui étant associée. Le présent rapport présente la mégafaune benthique recensée à partir d'un sous-ensemble d'images sélectionnées aléatoirement. Au total, 249 taxons ont été répertoriés, dont 188 appartenant à un des embranchements ou groupes d'embranchements suivants : Annelida, Arthropoda, Brachiopoda, Bryozoa, Chordata, Chordata/Porifera, Cnidaria, Echinodermata, Mollusca, Nemertea et Porifera. Dans la mesure du possible, les taxons ont été identifiés à un niveau taxonomique inférieur, tel que la classe, l'ordre ou la famille. Chaque taxon mentionné dans ce rapport est accompagné d'une image représentative, d'un texte descriptif ainsi que des numéros d'identification associés aux bases de données du Registre mondial des espèces marines et du Système d'information taxonomique intégré. Ce rapport vise à appuyer les analyses en cours et futures de la biodiversité liées à *L. pertusa* et à son rétablissement dans la ZCCL. Il pourra également servir de guide taxonomique pour les analyses d'images de la faune de l'Atlantique Nord-Ouest.

INTRODUCTION

In 2002, Fisheries and Oceans Canada (DFO) discovered reefs of *Lophelia pertusa*[1] while conducting a benthic drop/drift camera survey on board the Canadian Coast Guard Ship (CCGS) *Hudson* at the Stone Fence on the Scotian Shelf (Buhl-Mortensen et al., 2017; Beazley et al., 2021). As a colonial species, *L. pertusa* is capable of forming dense reefs, some of which are up to 40 metres in height and several kilometres long (Davies et al., 2008). By adding structural complexity to benthic ecosystems, these reefs provide habitat to numerous motile and sessile species (including those of commercial importance) in the form of feeding, breeding, and nursery grounds, as well as prey refugia (Mortensen et al., 2001; Fosså et al., 2002). As a result, *L. pertusa* reefs are often associated with productive fishing sites, and act as carbon cycling hot spots along continental shelf edges (Van Oevelen et al., 2009). However, their slow growth (maximum 26 mm y^{-1}) renders them extremely vulnerable to destructive fishing practices such as bottom trawling (Gass & Roberts, 2006), with recovery estimated to take many decades to centuries (Fosså et al., 2002).

The 2002 discovery, which marked the first scientific documentation of *L. pertusa* reefs in Canadian waters, was followed by a drop-camera survey in 2003 during which extensive trawl damage to the reef complex was observed (Buhl-Mortensen et al., 2017). In response, DFO created the *Lophelia* Coral Conservation Area (LCCA) in June 2004 (https://www.dfo-mpo.gc.ca/oceans/ceccsr-cerceef/measures-mesures-eng.html, accessed 14 December, 2020). Encompassing a 15-square-kilometre area around the remaining reef complex, the LCCA is closed to all bottom fishing and exists with the dual objectives of protecting the reef from further destruction and promoting *L. pertusa* recovery. In addition, the area around the LCCA (44 square kilometres in total) has been

[1] A stony coral (order Scleractinia) belonging to family Caryophylliidae, *L. pertusa* has been synonymised with *Desmophyllum pertusum* in recent years based on molecular data (WoRMS, 2020). However, some taxonomic experts have cautioned that the stark morphological differences between the two species casts some doubt on this synonymy (*D. pertusum* is solitary, while *L. pertusa* is colonial), and that the molecular data are not yet sufficient to justify the genus transfer (Cairns, 2019 in WoRMS, 2020). Therefore, the name *L. pertusa* is used in this report.

designated an Ecologically and Biologically Significant Area (EBSA), indicating that it is a site of ecological and/or biological importance that may require heightened caution in management (Figure 1; King et al., 2016).

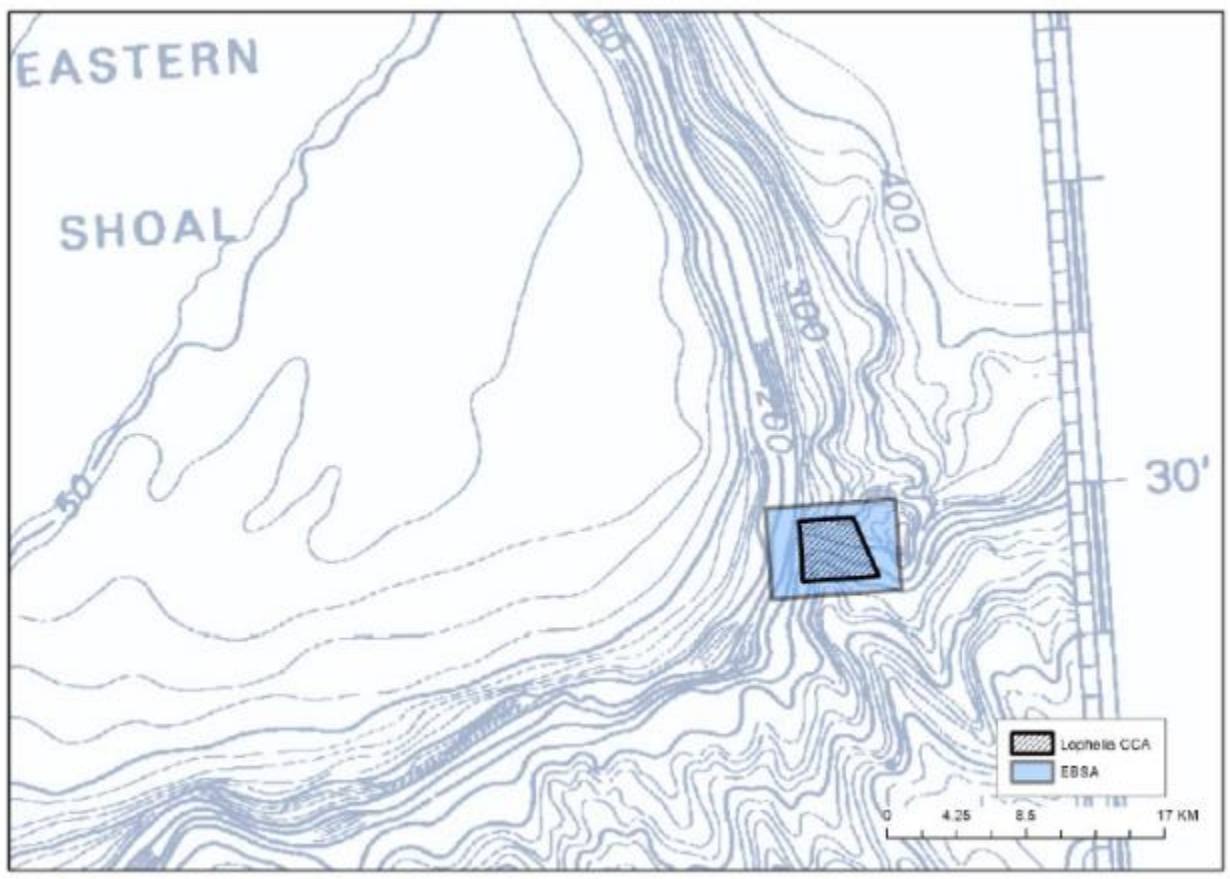


Figure 1: The Stone Fence Ecologically and Biologically Significant Area (EBSA) marked in blue, with the *Lophelia* Coral Conservation Area (LCCA) shown in hashed lines (from King et al., 2016).

Since the LCCA's establishment, two drop/drift camera surveys have been conducted in the Stone Fence area with the intent of monitoring *L. pertusa* recovery. In 2009, a camera survey was carried out exclusively within the LCCA to examine the reef complex. Data from this mission were then used to generate the *Lophelia* Reef Footprint (LRF), an area within the LCCA encompassing all records of live and dead *L. pertusa*. In 2015, DFO conducted a more comprehensive examination of the area within and outside of the LCCA, including within the LRF. Beazley et al. (2021) analyzed the data extracted from benthic images collected in 2003, prior to the establishment of the LCCA, and in 2009,

and 2015, in order to evaluate the effectiveness of the LCCA in terms of its success in facilitating the recolonization and recovery of its target species, *L. pertusa*, and in conserving local benthic biodiversity.

This report provides a summary of the epifaunal biodiversity found on 27 image transects (11 in 2003, 4 in 2009, and 12 in 2015) surveyed with drop/drift cameras deployed from CCGS *Hudson*. A total of 195 images (44 from 2003, 20 from 2009, and 131 from 2015) were analysed using the protocols established in Beazley and Kenchington (2015). The report consists of an inventory of the taxa found in the images, with taxonomic descriptions and representative images provided for each entry. The World Register of Marine Species (WoRMS) AphiaID and Integrated Taxonomic Information System (ITIS) Taxonomic Serial Number (TSN) are included for each taxon, where possible. In addition, an overview of the image collection and analysis methodologies is presented, and protocol details that differ from those of Beazley and Kenchington (2015) are discussed. We provide the names, representative images and standardised abundances of the taxa analysed in Beazley et al. (2021), in support of that study and of future biodiversity analyses pertaining to the LCCA. The cross-linkage between names and their images is important to document as it is the key needed for others to be able to review and repeat the analyses. The report may also act as a taxonomic reference guide for current and future image analyses in the North Atlantic.

MATERIALS AND METHODS

Study Area

Image data were collected from the Stone Fence, located along the easternmost edge of the Scotian Shelf at the mouth of the Laurentian Channel, which is a glacial trough linking the Atlantic Ocean to the Gulf of St. Lawrence (King et al., 2016). Wave patterns found on the bottom indicate that the area is subject to strong currents and sediment transport (Buhl-Mortensen et al., 2017). The Stone Fence's substrate consists of glacial deposits of sand and gravel, along with larger rocks and the numerous boulders that gave rise to its name (Buhl-Mortensen et al., 2017; Beazley et al., 2021). In addition, *L. pertusa* rubble and living remnants of the reef complex are found in the area, particularly within the LCCA (Beazley et al., 2021).

The sampling locations varied with the survey year (Figure 2). In 2003, sampling occurred across the Stone Fence and in the adjacent Laurentian Channel (Buhl-Mortensen et al., 2017). By 2009, the LCCA had been established, and the survey took place exclusively within that zone. In 2015, three spatial strata were defined: 1) inside the LRF (Inside Reef), 2) inside the LCCA but outside of the LRF (Inside Closure), and 3) outside of the LCCA (Outside Closure). The survey sampled the areas within and outside of the LCCA that had been surveyed in previous survey years, to enable comparison of biodiversity over time between two strata: the protected area (within the LCCA) and non-protected areas (outside of the LCCA) (Beazley et al., 2021). The 2015 survey also targeted the LRF (Beazley et al., 2021). Figure 2 shows the locations of the image transects in relation to the LRF, LCCA, and surrounding area.

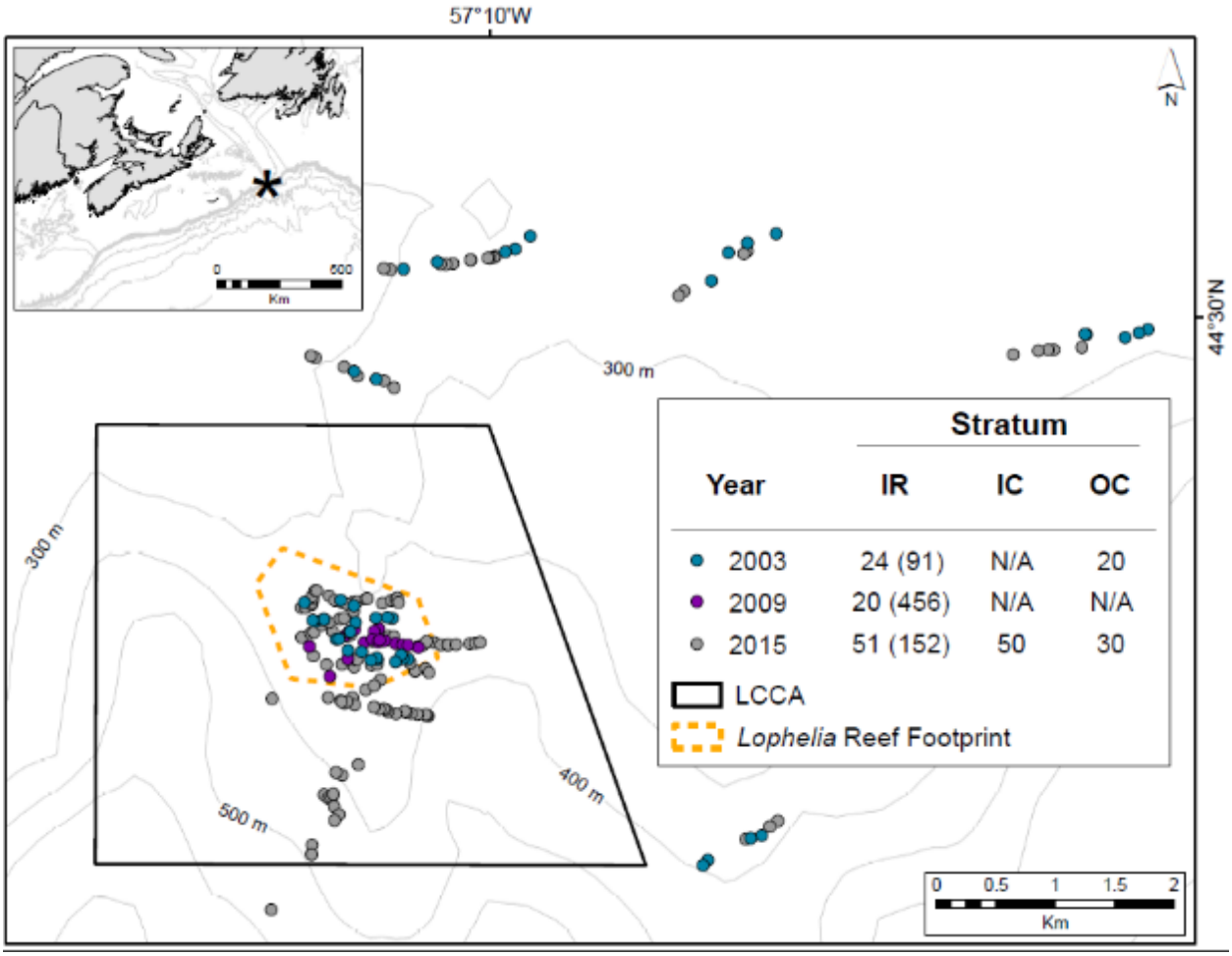


Figure 2: Locations of benthic image sampling in 2003, 2009, and 2015, showing the LRF and the LCCA. (The location of the Stone Fence is shown by a star in the inset.) The table shows the number of images, from each year and stratum (Inside Reef IR; Inside Closure IC; Outside Closure OC), randomly selected and analyzed for all epibenthic megafauna, and (in parentheses) the number of images analyzed for *L. pertusa* recruits.

Image Data

Image Acquisition

The images examined in this report came from transects that typically ranged between 1-2 km in length and 300-400 m in depth. For additional information regarding transects, see Table 1 below.

Images were collected using winch-controlled drop/drift cameras developed in-house at the Bedford Institute of Oceanography (BIO), but these systems varied between sampling years (Beazley et al., 2021). In 2003 and 2009, Campod was used, while in 2015 the images were collected using the 4K-Camera (4KCam) (Figure 3).

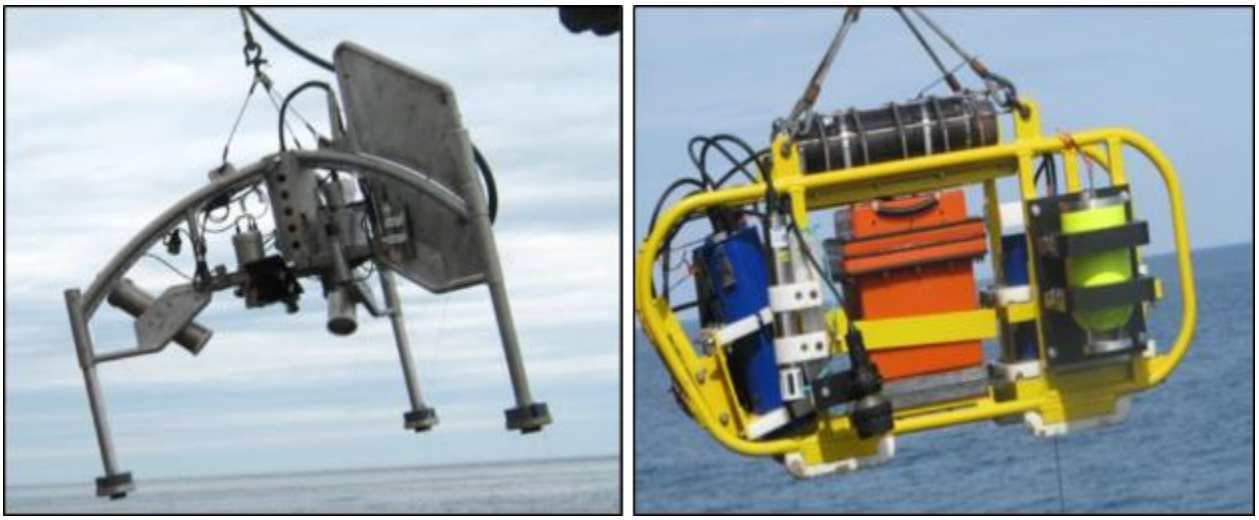


Figure 3: The Campod (left) and 4KCam (right) drop/drift camera systems used to obtain benthic imagery from within and outside of the LCCA in 2003, 2009, and 2015.

Table 1: Station names and collection information pertaining to the image transects examined from the 2003, 2009, and 2015 CCGS Hudson benthic image surveys.

Survey Year	Transect Name	Station Name	Julian Day & GMT (start)	Start Latitude	Start Longitude	Start Depth (m)	End Latitude	End Longitude	End Depth (m)	Dive Length (km)	Total # Images
2003	CON 084	CP024-03 6	271125409	44.47420	-57.17491	335	44.48586	-57.18887	316	2.175	16
	CON 087	CP27-03	271202958	44.46555	-57.12859	291	44.45336	-57.1544	654	2.605	6
	CON 088	CP028-03 21	271223849	44.50288	-57.08960	472	44.49710	-57.11297	344	2.299	5
	CON 093	CP033-03 14	272090559	44.50653	-57.13573	339	44.50218	-57.14532	345	1.317	9
	CON 094	CP034-03 9	272102521	44.50693	-57.15841	327	44.50296	-57.18297	302	2.447	5
	CON 095	CP035-03 7	272121501	44.49471	-57.17492	306	44.49630	-57.18241	303	0.946	2
	CON 098	CP038-03 6	272172543	44.47315	-57.17216	373	44.47594	-57.19507	506	2.747	25
	CON 099	CP039-03 SF6	272201509	44.47701	-57.17139	298	44.48303	-57.19292	382	2.121	14
	CON 101	CP041-03	272232412	44.47515	-57.17359	312	44.47763	-57.19245	448	1.708	6
	CON 102	CP042-03	273002740	44.47611	-57.17828	283	44.47736	-57.19553	480	1.498	4
	CON 105	CP045-03 6	273042350	44.47752	-57.17351	276	44.47526	-57.18457	352	1.345	10
2009	CON 50	SF09_10	202191450	44.47684	-57.17956	288	44.47541	-57.18820	414	0.971	121
	CON 52	SF09_08_a	202211642	44.47631	-57.17818	282	44.47021	-57.18573	353	0.925	213
	CON 54	SF09_05/SF09_04	203000211	44.47299	-57.16859	369	44.47346	-57.17067	351	1.198	134
	CON 55	SF09_11_b	203031852	44.47558	-57.17971	289	44.47420	-57.16961	347	0.860	196
2015	CON 001	SF_IR_1	154185726	44.47867	-57.18905	417	44.47853	-57.17866	286	1.2	84
	CON 004	SF_IR_3	155034055	44.47599	-57.18318	345	44.47520	-57.16741	335	1.3	199
	CON 005	SF_IR_2_2	155050657	44.47530	-57.18739	391	44.47823	-57.17624	362	1.1	119
	CON 006	SF_IR_4	155064929	44.47378	-57.18539	361	44.47230	-57.17169	347	1.4	203
	CON 007	SF_IR_5	155083123	44.47483	-57.16972	322	44.47040	-57.18252	329	1.2	182
	CON 010	SF_IC_3	155114713	44.46960	-57.17311	402	44.47090	-57.18968	362	1.3	41
	CON 011	SF_IC_2	155134702	44.46672	-57.17820	370	44.45433	-57.18880	567	2.3	67
	CON 014	SF_OC_1	156053448	44.49451	-57.17675	302	44.49833	-57.18896	300	1.0	73
	CON 015	SF_OC_2	156072911	44.50448	-57.16604	296	44.50369	-57.17866	306	1.1	69
	CON 016	SF_OC_3	156094925	44.50568	-57.13740	324	44.50151	-57.14662	286	0.9	28
	CON 017	SF_OC_04	156111337	44.49765	-57.10325	354	44.49707	-57.11176	341	0.7	32
	CON 018	SF_OC_05	156124515	44.46237	-57.13408	401	44.45867	-57.14295	381	0.9	32

Campod is a tripod camera system capable of operating down to depths of 650 m (Beazley and Kenchington, 2015). The system collects both continuous forward- and downward-facing video footage and downward-facing still images as it drifts over the seafloor. The still images are collected at user-determined intervals, and may be obtained while Campod drifts or by landing the system on the seafloor on its tripod feet (Figure 3). Campod's live video feed permits the collection of scheduled and opportunistic photographs, in contrast to the 4KCam, which is a blind drop camera system (Beazley and Kenchington, 2015). The 4KCam consists of a high-resolution digital camera and high-speed flashes housed in an aluminum roll cage. The camera is triggered to take photographs when an attached weight makes contact with the seabed, and it is operable down to depths of 4,000 metres. As camera types and resolution changed between sampling years, the corresponding image quality was impacted. See Table 2 for additional information concerning camera specifications.

Table 2: Technical specifications for the Campod and 4KCam systems deployed within and outside of the LCCA in 2003, 2009, and 2015.

Details	2003 Campod	2009 Campod	2015 4KCam
Forward-facing Video Camera	Sony XC-999	Sony XC-999	N/A
Downward-facing Video Camera	Sony 3-CCD High Resolution	Sony DXC-950	N/A
Still Image Camera	35 mm Nikon F4 with 250-exposure film pack	Digital Nikon D300 12.3-megapixel	Digital Canon EOS Rebel T2i 12-megapixel
Scale	N/A	10-cm calibrated laser beams	Camera weight/shackle
Image Resolution	72 DPI	300 DPI	72 DPI

The intervals at which images were collected varied with the sampling year. Images were collected opportunistically along each transect in 2003. In 2009 and 2015, they were collected at 30-second and 1-minute intervals, respectively. Once collected, the images were assigned a unique file name and stored for subsequent analysis. For further details pertaining to the gear and protocols used to collect the images, see Beazley and Kenchington (2015).

Image Processing

Once collected, all images were categorised according to their sampling year (2003, 2009, or 2015) and location (within the LRF, within the LCCA but outside the LRF, and outside of the LCCA). Images that were too dark (in which the seabed was not visible), out of focus, or obscured by sediment clouds were not analysed. In addition, any photographs from 2003 and 2009 in which Campod had not landed on the bottom were excluded in an effort to standardise the images' fields of view. All images were batch processed in Adobe Photoshop with a 4x3 grid dividing the image into 12 square cells (labeled A through L), each containing a 1-cm scale bar (Figure 4). Prior to analysis, each image was sharpened using the 'Sharpen More' feature, and their brightness and contrast were manipulated using the 'Autocorrect' feature in Adobe Photoshop. (Note that the Inside Closure stratum (i.e., within the LCCA but outside the LRF), while not analysed in Beazley et al. (2021), is included in this report.)

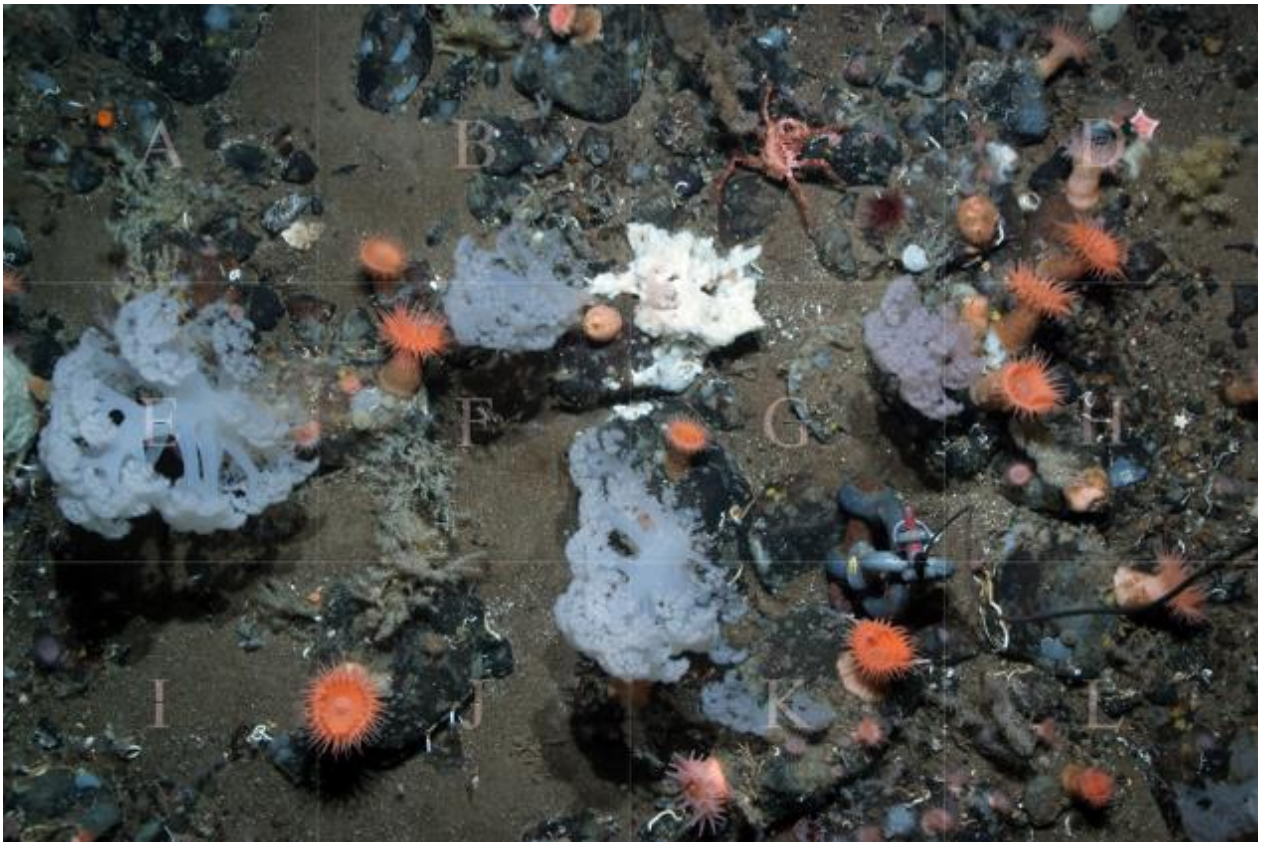


Figure 4: Image collected outside of the LCCA in 2015 with the 4KCam, and superimposed with a grid and 1-cm scale bars (in black at the centre of the letter labels). The image has been autocorrected and sharpened for megafauna analysis.

The scale bars were created by relating an object or distance of known length to its mean pixel length in 50 randomly-selected images from each sampling year. The number of pixels equal to 1 cm was then determined by dividing the object's mean pixel length by its known length in centimetres. This ratio was used to obtain the scale bars and the average area covered in each image in order to a) ensure that only fauna greater than 1 cm in length were recorded, and b) standardise the megafauna data to number of individuals found per square metre. For further information concerning this procedure, see Beazley and Kenchington (2015). Because no size references were included in the 2003 photographs, 20 images of bucket lids of known diameter that were taken by Campod on deck were used to determine the average area covered in each image, and to generate the scale bars. In 2009, the scale bars and average area were both calculated from the 10-centimetre calibrated laser beams. In 2015, a lead disc weight (10 cm in diameter) was

used for the first three transects. During the fourth one, the disc was lost, and replaced with interlocked shackle-weights (shackle pin 2.15 cm in diameter) for the remainder of the sampling period (Figure 5). The shackles were used in the scale bar calculations described above.

Figure 5: Examples of the lead weight (left) and interlocked shackles (right) used in the 1-cm scale bar calculations for the 2015 Stone Fence image analysis.

Image Analysis

Over 1,300 viable images were collected across all three sampling years. Because preliminary assessments of the images indicated that their abundance and diversity of megafauna were too great to be efficiently analysed, photos from each year and location stratum were randomly selected for imagery analysis. This report deals exclusively with the data from this subset of images.

Data extraction from the images was conducted according to the protocols established in Beazley and Kenchington (2015). Within each grid cell of each photograph, all epibenthic megafauna greater than 1 cm were identified to the lowest possible taxonomic level. Individuals smaller than 1 cm were also recorded if they could be confidently identified as juveniles of larger taxa. Where possible, identifications were supported by examinations of specimens collected from previous research missions in the Stone Fence area, along

with advice from taxonomic experts. However, when image resolution and/or organisms' orientations in images made it difficult to observe the finer-scale features that differentiate species and/or genera, the organisms were classified into mutually-exclusive morphotype categories to the lowest possible taxonomic level, typically the class, order, or family (e.g. Actiniaria (O.) sp. 1). All taxa identified above the genus level include an abbreviation of the taxa level in parentheses next to their name as follows: (P.) = phylum, (C.) = class, (S.C.) = subclass, (I.C.) = infraclass, (O.) = order, (Sub. O.) = suborder, (F.) = family, (Sub. F.) = subfamily. Biogenic structures (casings, filaments, shell hash, and tubes) and anthropogenic structures (rope) were also identified and recorded, but are not included in this report.

Any organisms that could not be clearly identified, due to poor image quality or the orientation of the organism, were classified as 'Unidentified'. Each 'Unidentified' taxon was given a number in order to separate them into distinct morphological groups (e.g. Unidentified sp. 1, Unidentified sp. 2, etc.).

Note that any colonial organisms observed were recorded as a single individual. This was done to maintain consistency in organism counts across the dataset, as poor image quality in earlier sampling years, organism orientation, and/or unfamiliar taxa rendered colonial organisms difficult to reliably identify.

Upon analysis, each image was assigned a substrate classification, according to the primary substrate/substrate mix contained within it (Beazley et al., 2021). Substrate types are characterised as one or more of the following: *Lophelia* rubble, boulders, cobbles, pebbles, gravel, and soft substrate. Note that the sizes of boulders, cobbles, and pebbles are based on the Wentworth scale. Table 3 provides a list of substrate types and their descriptions. See Appendix A for representative images of each substrate type.

Adobe Photoshop CS2 was used to analyse nearly all of the 2015 images; two 2015 images and all of the 2009 and 2003 images were analysed with Adobe Photoshop CC 2017. To prevent learner bias, all images were analysed in a random order obtained using the Microsoft Excel RAND function. Analysis was carried out from left to right, top to

bottom, beginning with Cell A and concluding with Cell L (Figure 4). Images were magnified to 100% for analysis, with the exception of those obtained in 2003. The 2003 images were magnified to 250% due to their smaller size and poorer resolution, and identifications were subsequently verified by zooming out to the 'Fit Screen' magnification of 181.25%.

Table 3: Substrate classifications and descriptions associated with community analysis of Stone Fence images.

Substrate Classification	Description
100%_LopheliaRubbleCover	Complete or near-complete coverage of *Lophelia pertusa* rubble.
LopheliaRubble_Boulder/Cobble_Mix	Up to 50% *Lophelia* rubble cover and 50% boulder/cobble cover.
Boulder/Cobble_Mix	Hard substrate present with boulders. Some dead *Lophelia* may be scattered throughout.
Cobble/Pebble/Gravel_Mix	Hard substrate present with no boulders.
Soft_Substrate	100% or nearly 100% soft substrate with the occasional cobble/pebble.

Taxa names and counts were recorded in three Microsoft Access databases (one database for each sampling year) in which information regarding the names of taxa, their associated phylum names, and taxa counts associated with each image were stored. In each database, a customised photo form and taxonomy form were used to input data concerning names of taxa and counts (Figure 6). Each database contains the following: an Analysis table, where the taxa names and counts associated with the grid cells of each image are stored, a Taxa List table, where the taxonomic hierarchies of the taxa are stored, a Photo table, where information regarding the images is stored, and tables pertaining to image area and statistical analysis factors. In addition, all three databases contained an 'Across Year Comparison' table. This table provided the names associated with taxa that were grouped for analyses, as well as their names within each year's

dataset (see Data Summaries section below). For more information regarding the database structure, see Beazley and Kenchington (2015).

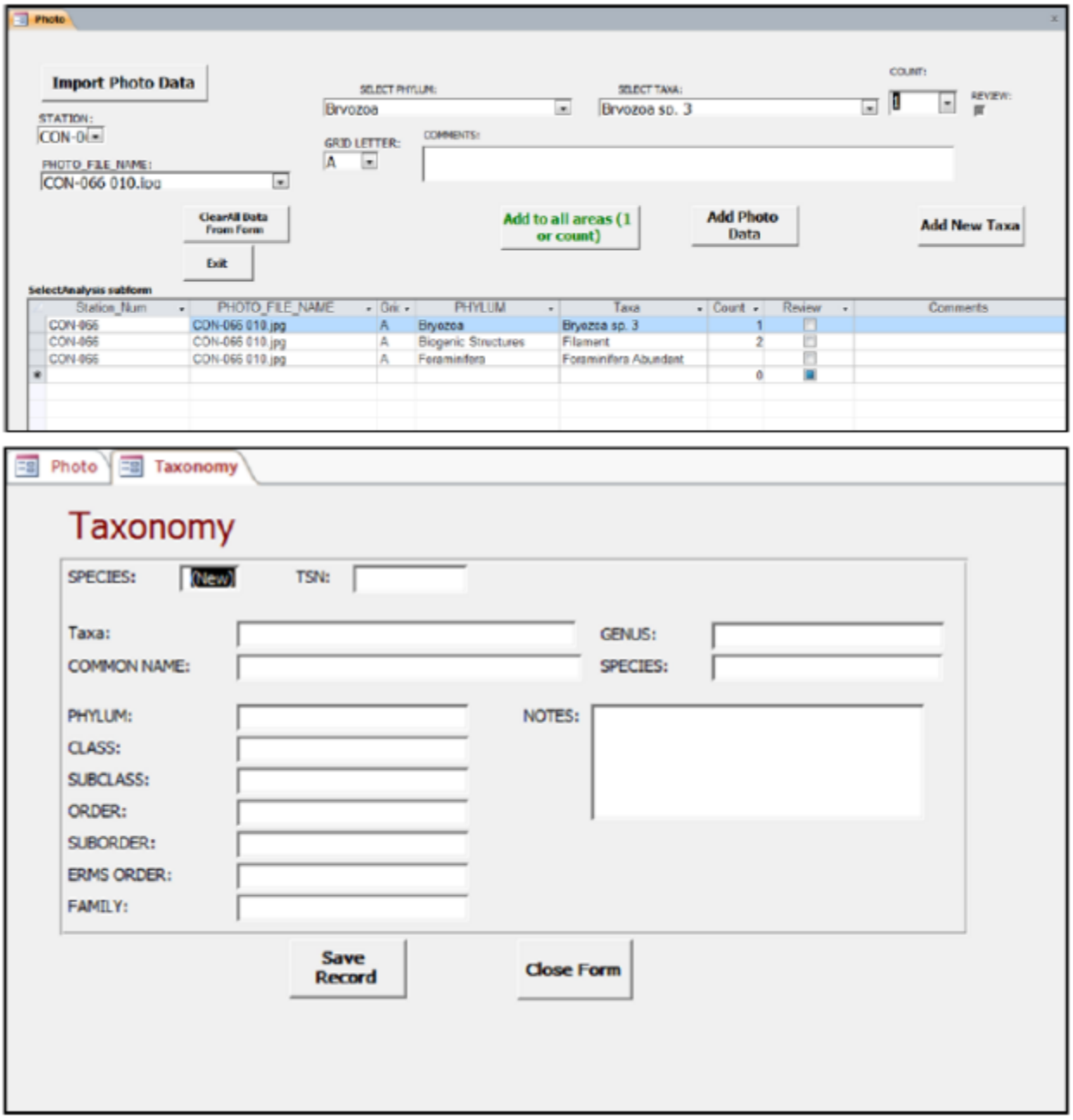


Figure 6: The photo form (top) and taxonomy form (bottom) used to input taxon name and count data during image analysis.

An array of taxonomic references were consulted to aid with identification. These included, but were not restricted to: Sponges of the British Isles (Ackers et al., 2007),

Guide to Identification of Marine and Estuarine Invertebrates (Gosner, 1971), A Practical Guide to the Marine Animals of Northeastern North America (Pollock, 1998), Epibenthic Megafauna of the Flemish Pass and Sackville Spur (Northwest Atlantic) Identified from *In Situ* Benthic Image Transects (Beazley and Kenchington, 2015), Thesaurus of Sponge Morphology (Boury-Esnault and Rutzler, 1997), Systema Porifera (Hooper and Van Soest, 2002), and Coral, Sponge, and Other Vulnerable Marine Ecosystem Indicator Identification Guide, NAFO Area (Kenchington et al., 2015). The World Register of Marine Species (WoRMS) (http://www.marinespecies.org) and the Integrated Taxonomic Information System (ITIS) (https://www.itis.gov) were also used to confirm taxon names.

Data Summaries

Due to the differences in gear type and image resolution documented above, some taxa could not be consistently identified across all sampling years, which has implications for any statistical analyses undertaken using this dataset (Beazley et al., 2021). Taxonomic classifications were typically more refined for fauna found in images from 2009 and 2015, and coarser in those found in 2003; this corresponds to improvements in camera technology over time. Where taxa cannot be compared reliably between the sampling years, the 2009 and/or 2015 data have been incorporated into coarser taxonomic groups to ensure that their resolution matches that of the 2003 data. Taxa have also been grouped for analyses when they are considered too cryptic to be reliably classified across all photographs. This is true of sponges (Porifera), which are difficult to consistently identify from images alone and are often placed into morphological groupings based on similar superficial features for analyses (e.g., Massive-Fig Porifera spp.). The terminology for the Porifera morphotype groupings was taken primarily from Ackers et al.(2007). For a list of the grouped taxon names (where the grouping differs from the taxonomic identification presented in this report), see Appendix B.

RESULTS

Community analysis of megafaunal occurrence and abundance was carried out on a total of 195 images collected from 27 photo transects sampled over three years from three different spatial strata. Images from within the LRF were designated Inside Reef (IR), images from outside of the LRF but within the LCCA were considered Inside Closure (IC), and images from outside of the LCCA were considered OC photos (Table 4).

Table 4: The transects and number of images associated with each spatial stratum (Inside Reef, Inside Closure, and Outside Closure) from each sampling year.

Year	Stratum	Transects	Number of Images
2015	IR	CON 1 CON 4 CON 5 CON 6 CON 7	51
	IC	CON 4 CON 6 CON 7 CON 10 CON 11	50
	OC	CON 11 CON 14 CON 15 CON 16 CON 17 CON 18	30
2009	IR	CON 50 CON 52 CON 54 CON 55	20
2003	IR	CON 084 CON 098 CON 099 CON 101 CON 102 CON 105	24
	OC	CON 087 CON 088 CON 093 CON 094 CON 095	20

The images from 2003 are divided between two spatial strata, Inside Reef (IR) and Outside Closure (OC). In 2009, images were only collected from within the reef (Inside Reef). The 2015 images were collected from the Inside Reef, Inside Closure (IC), and Outside Closure strata.

Across all surveys, 249 taxa were recorded and 188 were identified to at least the phylum level. Among the identified taxa, 10 phyla are represented. The proportions of taxa associated with each phylum are shown in Figure 7, for the entire dataset (all three sampling years and spatial strata) and within each sampling year and spatial stratum. Phylum Porifera contains the most taxa, followed by Cnidaria and Echinodermata, respectively. All phyla were represented in each sampling year X spatial stratum combination, with the exception of Nemertea, which was absent from 2009 IR and 2003 OC, and the Chordata/Porifera group, which was not found in the 2003 data (Figure 7). The 61 taxa that could not be assigned to a phylum were recorded as 'Unidentified' in the database. Only the 34 unidentified taxa that could be confidently identified as living megafauna (rather than potentially being dead organisms, biogenic structures, or rocks) are included in Figure 7 and in this report.

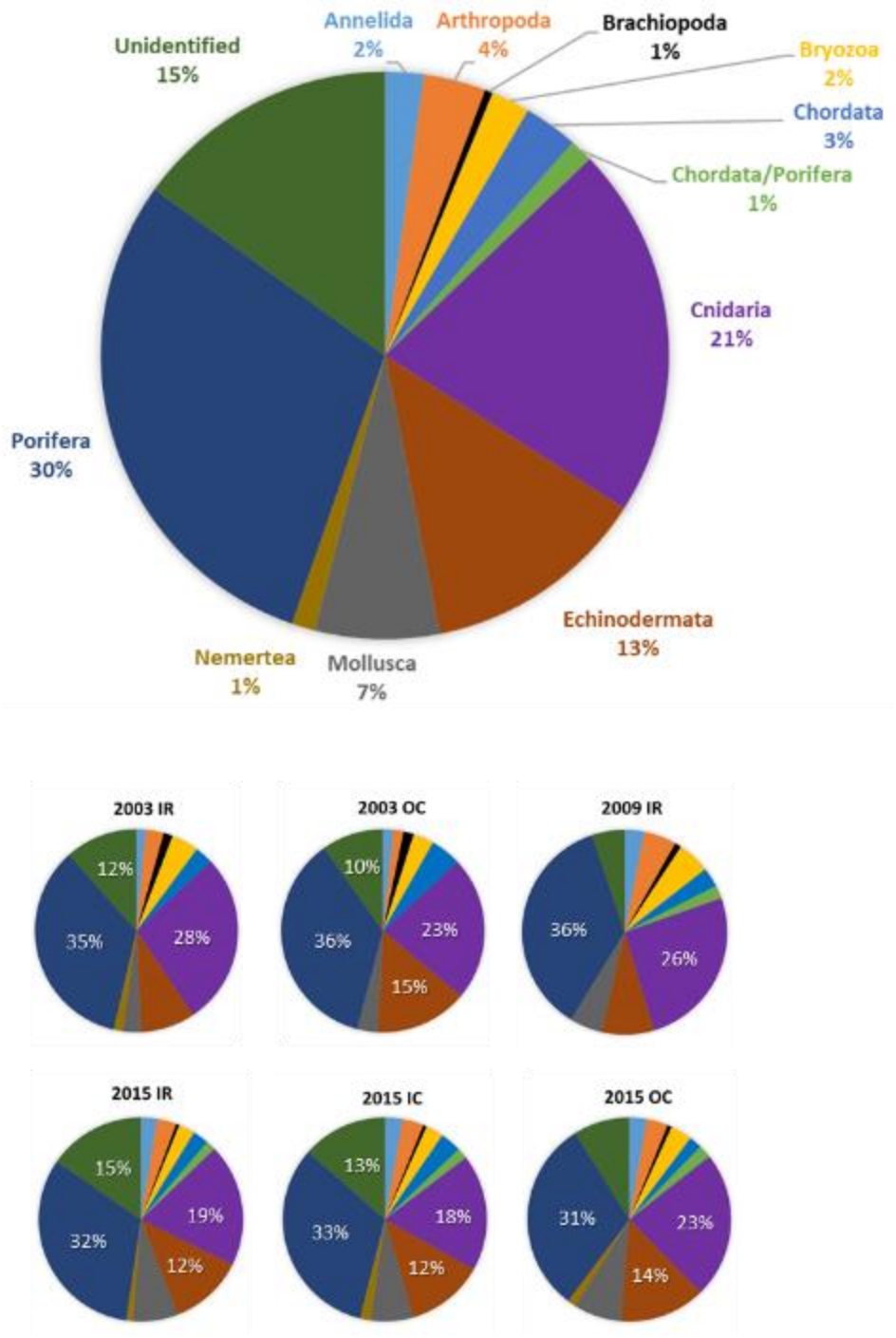


Figure 7: The proportional contribution of each phylum and/or group to the total number of taxa observed in the dataset. The pie chart at the top shows the proportions across all years and all spatial strata. The smaller charts on the bottom show the proportions for each sampling year and spatial stratum, with percent values ≥ 10% displayed.

CATALOGUE OF EPIBENTHIC MEGAFAUNA

In this section, the megafauna analyzed by Beazley et al. (2021) (188 identified taxa and 34 unidentified taxa) are presented, each with a description, representative image or images with 1-cm scale bars (unless otherwise noted), and relevant taxonomic authorities. Most taxa images come from the 2015 dataset; those that do not are labeled with their collection year. Where possible, WoRMS AphiaIDs and ITIS TSNs are included. The taxa are grouped first by phylum, which are presented in alphabetical order. Within their phyla, the taxa are organised by taxonomic hierarchy, with the most-refined classifications within each group or level presented first. Taxa that share a taxonomic hierarchy level are organised alphabetically and, if they share the same taxonomic category (e.g., Sabellida (O.) sp. 1 and Sabellida (O.) sp. 2) then they are organised numerically. For some taxa, numerals may be skipped; this is a reflection of taxonomic name changes and/or consolidation during image analysis. Note that this report is intended as an identification guide for the image data sets from the LCCA, rather than a taxonomic authority. Please refer to original species descriptions and taxonomic keys when identifying organisms.

Tables presenting the total abundances for all taxa in the report are located at the beginning of each phylum's page(s). The abundance values presented have been standardised to 1 m^2 using the mean image area values calculated for each sampling year. For the 2003 images, the mean (± standard deviation) area was 0.580 ± $6.64x10^{-3}$ m^2. In 2009, the mean image area was 0.60 ± 0.11 m^2. For the 2015 images, it was 0.86 ± 0.09 m^2. For each sampling year, the raw taxa counts have been divided by the corresponding mean image area to scale their values up to abundances per 1 m^2.

PHYLUM ANNELIDA

The Annelida comprised 2% of the total number of taxa identified from the images (Figure 7). Taxa could only be identified to the level of family or order (Table 5), with serpulids being the most abundant. The Serpulidae are a family of sessile, tube-building worms in the class Polychaeta.

Table 5: Abundance of taxa belonging to phylum Annelida, standardised to 1 m^2. Note that IR = Inside Reef, IC = Inside Closure, and OC = Outside Closure.

Taxa	2015			2009	2003	
	IR	IC	OC	IR	IR	OC
Polynoidae (F.) sp. 1	2	1	0	0	0	0
Polynoidae (F.) sp. 2	27	14	16	2	0	0
Serpulidae (F.) spp.	2141	2708	1708	1083	729	535
Sabellida (O.) sp. 1	8	6	3	17	0	0
Sabellida (O.) sp. 2	1	2	1	0	0	0

ITIS TSN 64397

Family Polynoidae Kinberg, 1856

WORMS AphiaID 939

Polynoidae (F.) sp. 1

Light-pink scale worm. Chaetae visible and appear off-white in colour. Possibly *Lepidonotus squamatus*.

Polynoidae (F.) sp. 2

Scale worm. Purple in colour, often fading to pink towards the anterior end. Chaetae not clearly visible but are implied to be present by the off-white outline of main body.

ITIS TSN 555671

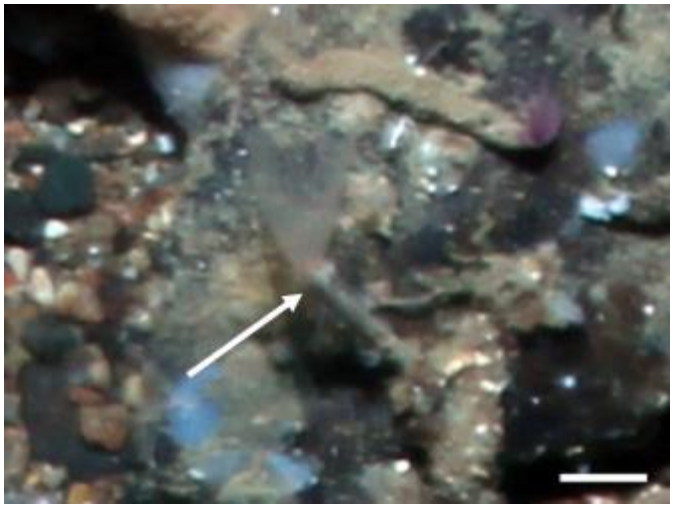
Order Sabellida Levinsen, 1883

WORMS AphiaID 901

Serpulidae (F.) spp.

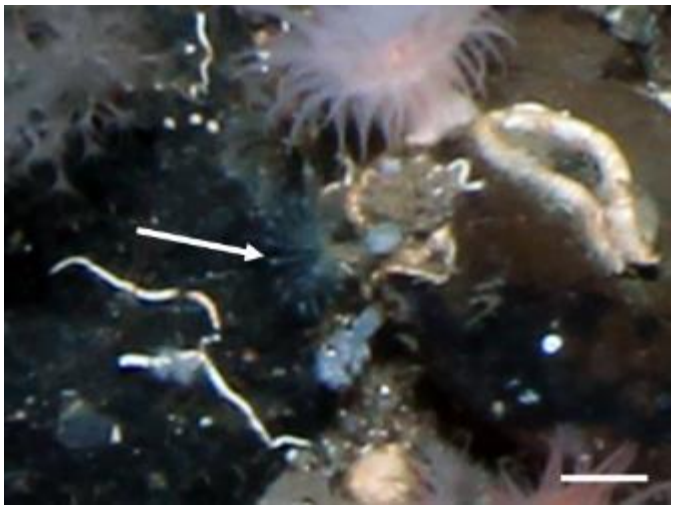
AphiaID: 988 / ITIS TSN: 68232

Tube-dwelling polychaete found on rock or soft sediment, often in large clusters. Plumes occasionally visible. Tube is white, indicating a calcareous origin. Tube diameter ranges in thickness from ~1 mm to 4 mm.



Sabellida (O.) sp. 1

Erect, tube-dwelling polychaete with tentacles emerging from the anterior end. Tan- coloured tube is fairly straight and smooth, indicating a sediment or detritus origin. Tentacles usually light brown to pink in colour.



Sabellida (O.) sp. 2

Tube-dwelling polychaete. Tube short and not highly visible. Plume distinct and slightly iridescent at its terminal ends.

PHYLUM ARTHROPODA

The Arthropoda comprised 4% of the total number of taxa identified from the images (Figure 7). With the exception of the king crab *Lithodes maja*, taxa were identified to the level of family, order, sub-class, or class and were more frequently reported in 2015 (Table 6).

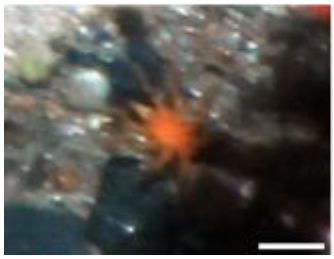
Table 6: Abundance of taxa belonging to phylum Arthropoda, standardised to 1 m^2. Note that IR = Inside Reef, IC = Inside Closure, and OC = Outside Closure.

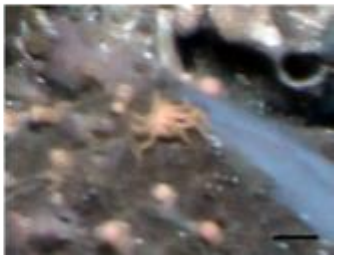
Taxa	2015			2009	2003	
	IR	IC	OC	IR	IR	OC
Pycnogonida (C.) Type 1	20	10	0	7	0	0
Pycnogonida (C.) Type 2	6	1	2	5	0	0
Lithodes maja	0	0	1	0	0	0
Pandalidae (F.) spp.	14	28	1	7	3	2
Malacostraca (C.) sp. 1	0	1	0	3	3	0
Isopoda (O.) spp.	27	19	2	8	0	0
Cirripedia (Sub.C.) sp. 1	2	0	0	0	0	0
Cirripedia (Sub.C.) sp. 2	5	3	6	0	0	0

ITIS TSN 83545

Class Pycnogonida Latreille, 1810

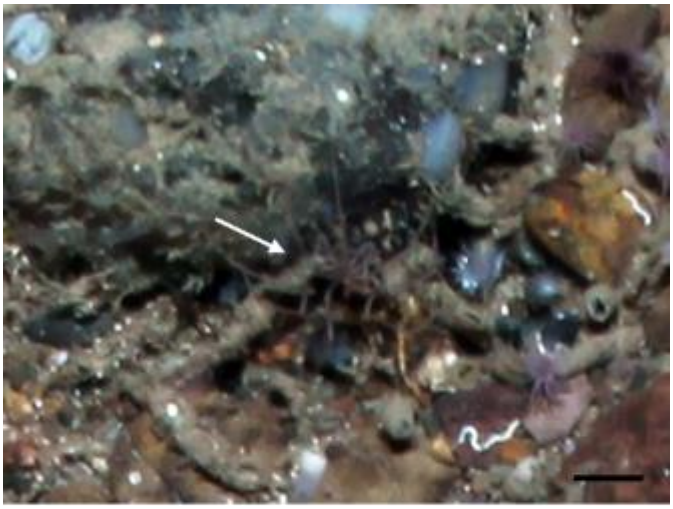
WORMS AphiaID 1302

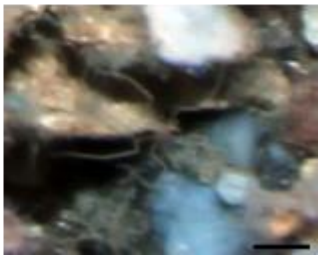




Pycnogonida (C.) Type 1

Group composed of several species of sea spider similar in shape and colour (orange) that are not consistently distinguishable due to orientation and/or obstruction. Legs short and thorax/abdomen thick relative to Pycnogonida (C.) Type 2. The species *Pycnogonum litorale* is possibly present.





Pycnogonida (C.) Type 2

Group composed of several species of sea spider similar in shape and colour (purple or tan). Legs long and thin and thorax/abdomen small compared to Pycnogonida (C.) Type 1. Species of the genus *Nymphon* likely present.

ITIS TSN 89787

Class Malacostraca (Latreille, 1802)

WORMS AphiaID 1071

Lithodes maja
Linnaeus, 1758

AphiaID: 107205 / ITIS TSN: 97943

Red-orange king crab, with 3 pairs of pereiopods a pair of legs modified with chelae at the anterior end. Legs and abdomen are covered with spines, which is characteristic of king crabs.

Pandalidae (F.) spp.

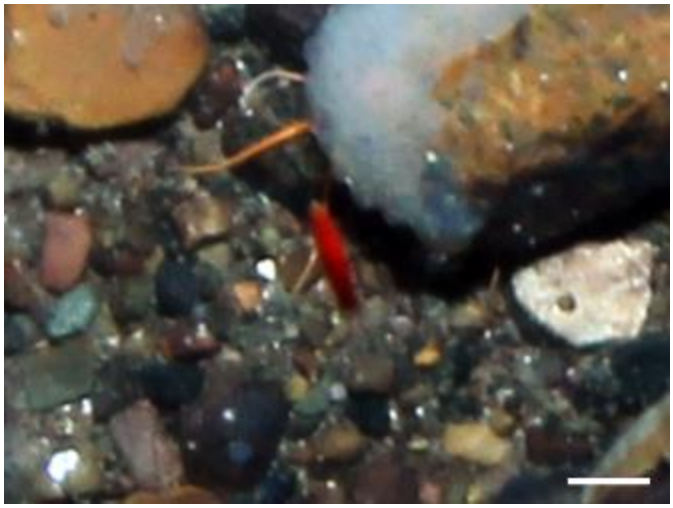
AphiaID: 106789 / ITIS TSN: 96965

Characterized by large eyes, a fairly prominent rostrum and three pairs of walking legs. Carapace is fairly small and abdomen is segmented. Colouration ranges from white to red with some individuals appearing semi-translucent.

ITIS TSN 89787

Class Malacostraca Latreille, 1802

WORMS AphiaID 1071



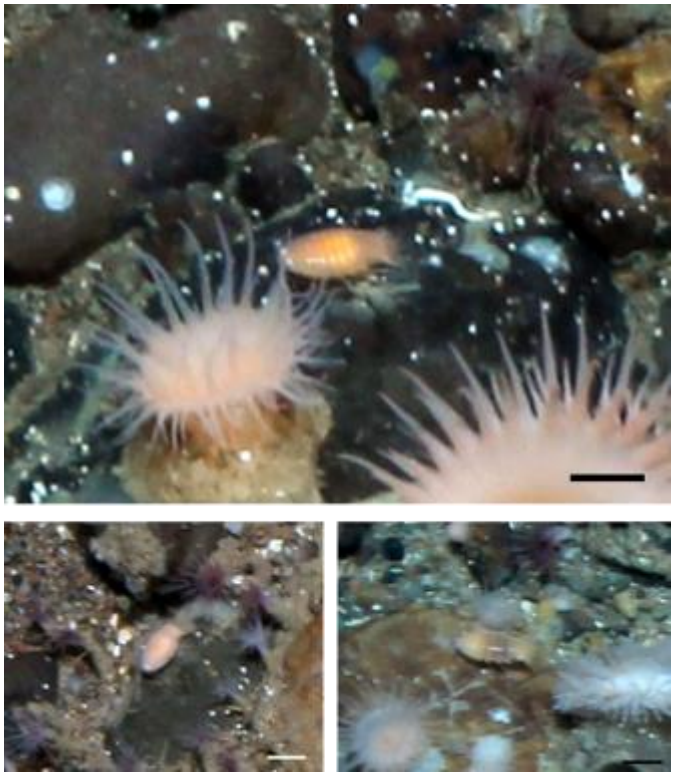
Malacostraca (C.) sp. 1

Small (>1 cm), bright red, shrimp-like crustacean. Eyes not visible. Only 1 record.

ITIS TSN 92120

Order Isopoda Latreille, 1817

WORMS AphiaID 1131



Isopoda (O.) spp.

Group contains several species of isopods with overlapping plates. Pleotelson often faintly visible. Likely comprised of individuals from genera *Rocinella* and *Aega*.

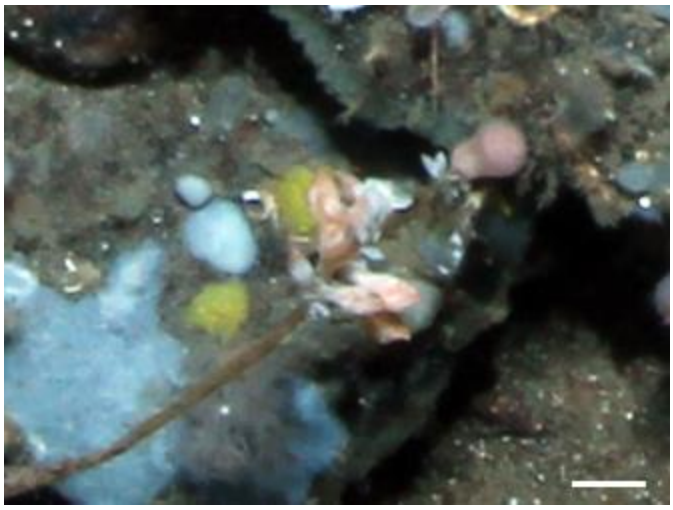
ITIS TSN 89433

Subclass Cirripedia Burmeister, 1834

WORMS AphiaID 1082

Cirripedia (Sub. C.) sp. 1

Large barnacle with black cirri. Possibly *Arcoscalpellum michelottianum*.



Cirripedia (Sub. C.) sp. 2

Small, peach-coloured barnacles found attached to stalks (often Leptothecata sp. 1). Likely members of the orders Lepadiformes or Scalpelliformes.

PHYLUM BRACHIOPODA

The Brachiopoda comprised 1% of the total number of taxa identified from the images (Figure 7). Taxa could only be identified at the level of phylum and were more frequently reported in 2015 (Table 7). *Terebratulina septentrionalis* is known from the area and likely to be present.

Table 7: Abundance of taxa belonging to phylum Brachiopoda, standardised to 1 m^2. Note that IR = Inside Reef, IC = Inside Closure, and OC = Outside Closure.

Taxa	2015			2009	2003	
	IR	IC	OC	IR	IR	OC
Brachiopoda (P.) spp.	454	365	44	128	15	10

ITIS TSN 156775

Phylum Brachiopoda Duméril, 1805

WORMS AphiaID 1803

Brachiopoda (P.) spp.

Unknown brachiopods. Several species presumed to be present. Groove apparent in some species, but not observed, or obstructed by orientation in others. Likely *Terebratulina septentrionalis*.

PHYLUM BRYOZOA

The Bryozoa comprised 2% of the total number of taxa identified from the images (Figure 7). Taxa could only be identified at the level of phylum and were more frequently reported in 2009 and 2015 (Table 8).

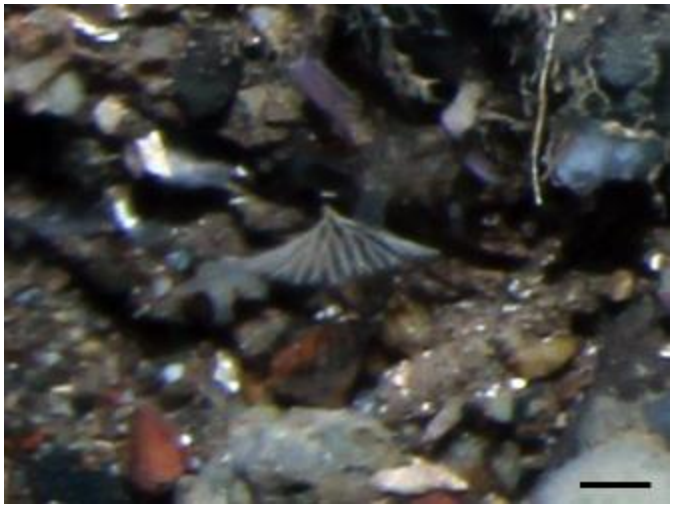
Table 8: Abundance of taxa belonging to phylum Bryozoa, standardised to 1 m^2. Note that IR = Inside Reef, IC = Inside Closure, and OC = Outside Closure.

Taxa	2015			2009	2003	
	IR	IC	OC	IR	IR	OC
Bryozoa (P.) sp. 1	51	79	18	118	14	2
Bryozoa (P.) sp. 2	146	79	3	10	3	0
Bryozoa (P.) sp. 4	158	228	27	36	0	0
Bryozoa (P.) sp. 5	23	15	13	5	0	0
Bryozoa (P.) spp.	138	58	13	103	28	5

ITIS TSN 155469

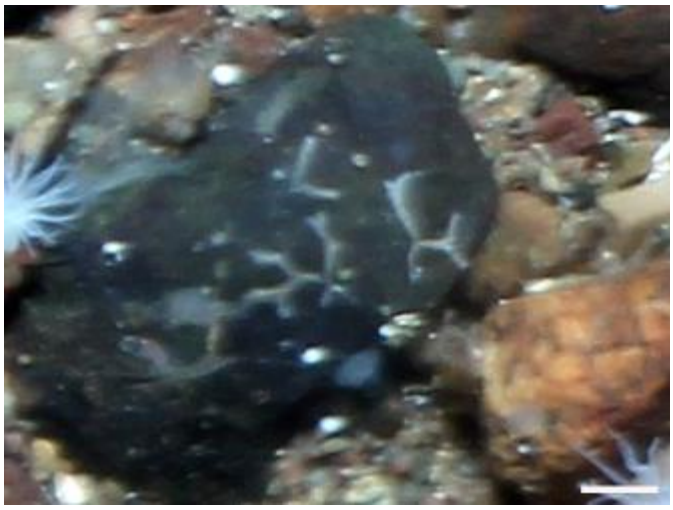
Phylum Bryozoa

WORMS AphiaID 146142



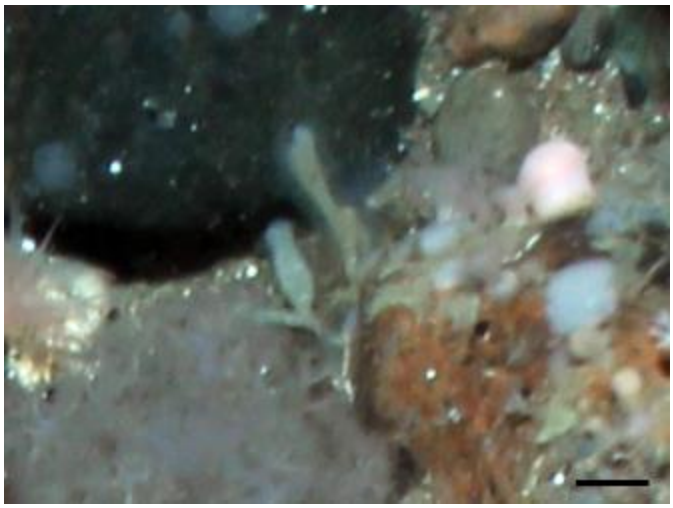
Bryozoa (P.) sp. 1

Small, erect and fan-shaped with thin, flat braches. Branching dichotomous. White to tan in colour.



Bryozoa (P.) sp. 2

Thin, white/off-white branching bryozoan. Appears flat against rock.



Bryozoa (P.) sp. 4

Tan/green erect bryozoan. Branches are broad and flat, and bulbous at their terminal ends. Observed attached to hard substrate.

ITIS TSN 155469

Phylum Bryozoa

WORMS AphiaID 146142

Bryozoa (P.) sp. 5

White, erect, fan-shaped bryozoan. Branches are short, thin and branch dichotomously.

Bryozoa (P.) spp.

Erect bryozoans. Their colour is white to off-white, differentiating them from Bryozoa (P.) sp. 4, and they are longer and broader when compared Bryozoa (P.) sp. 5.

PHYLUM CHORDATA

The Chordata comprised 3% of the total number of taxa identified from the images (Figure 7). Ascidiaceans were the most abundant taxa (Table 9).

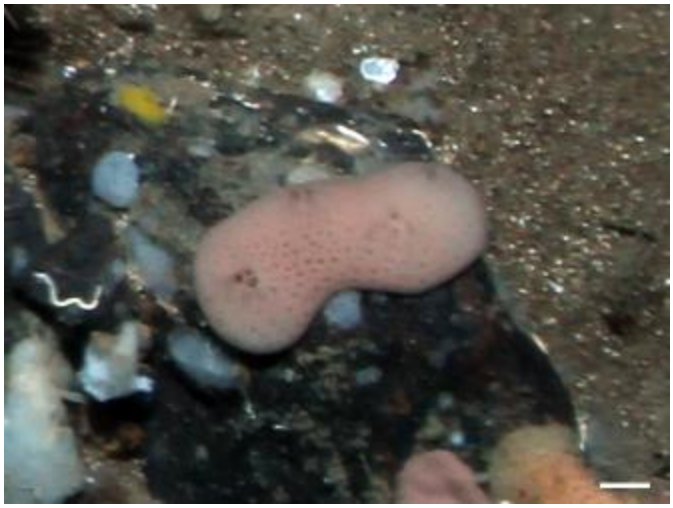
Table 9: Abundance of taxa belonging to phylum Chordata, standardised to 1 m^2. Note that IR = Inside Reef, IC = Inside Closure, and OC = Outside Closure.

Taxa	2015			2009	2003	
	IR	IC	OC	IR	IR	OC
Didemnidae (F.) sp. 1	0	1	0	0	0	0
Didemnidae (F.) sp. 2	12	68	2	7	9	24
Ascidiacea (C.) sp. 3	2	1	0	0	0	0
Ascidiacea (C.) spp.	163	281	123	25	17	21
Sebastes spp.	12	1	5	15	0	5
Scorpaeniformes (O.) sp. 1	1	0	0	0	0	0
Actinopterygii (C.) sp. 1	0	1	0	0	0	0

ITIS TSN 159047

Family Didemnidae Giard, 1872

WORMS AphiaID 103439



Didemnidae (F.) sp. 1

Cushion to globular colonial tunicate. Pink in colour. Body is porous, which is visible under a soft, semi-translucent layer. Multiple siphons are present. Only 1 record.

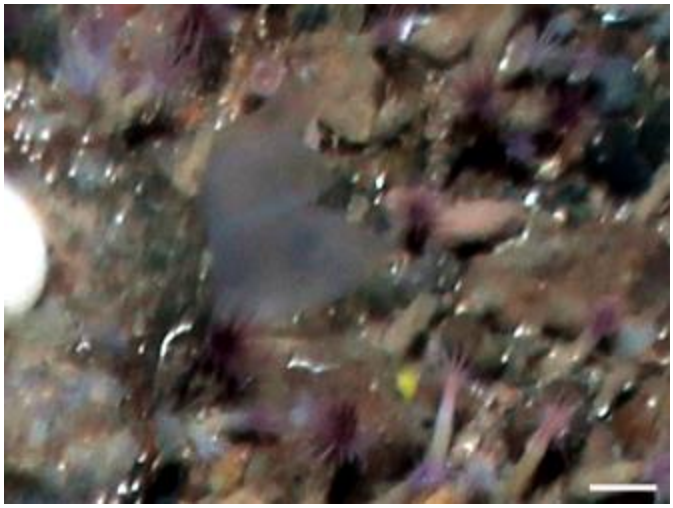
Didemnidae (F.) sp. 2

White, globular to lobate colonial tunicate. Surface is rigid and highly porous, displaying a distinct net-like pattern. Usually one ‘chimney-like’ siphon is present per globe, when multiple globes/lobes are present.

ITIS TSN 158854

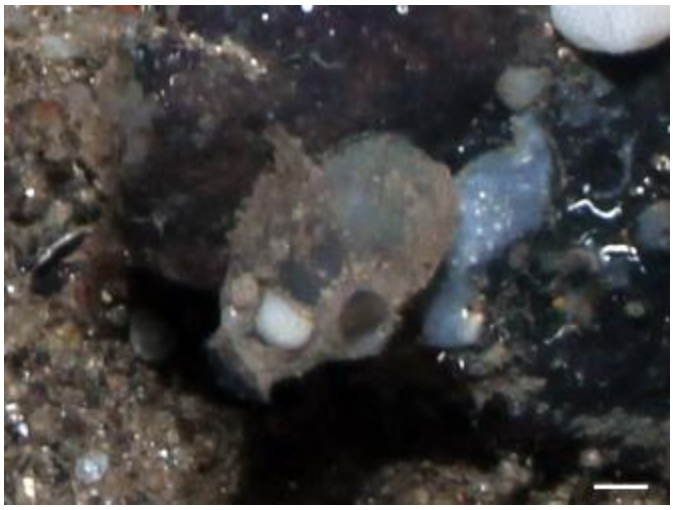
Class Ascidiacea Blainville, 1824

WORMS AphiaID 1839



Ascidiacea (C.) sp. 3

Semi-translucent, colonial, tube-shaped ascidian. Blue-grey and semi-translucent, hollow tubes. Specimens were blurry, negating further identification.



Ascidiacea (C.) spp.

Solitary globular-shaped ascidians. Brown to tan in colour and semi-translucent. Likely multiple species present. Some are flat and brown to semi-translucent in colour, while others are larger and more translucent. Sometimes two siphons are clearly visible.

ITIS TSN 161061

Class Actinopterygii

WORMS AphiaID 10194

Sebastes spp.
Cuvier, 1829

AphiaID: 126175 / ITIS TSN: 166705

Redfish. Varies in colour between solid red and red with lighter bands. Spiny dorsal fin rays and fairly rounded pectoral fins. Several species are suspected to be present in the region.

Scorpaeniformes (O.) sp. 1

AphiaID: 10329 / ITIS TSN: 166702

Mottled purple/grey fish with light and dark bands. Large eyes anteriorly-positioned and rounded pectoral fins. A well-defined triangular head and a tapered body suggest this specimen is a member of Family Cottidae.

Actinopterygii (C.) sp. 1

Dark blue fish with a horizontal banding, which is darker in colour. Number of dorsal and pectoral fins is unknown due to position and lighting.

CHORDATA / PORIFERA

The Chordata/Porifera comprised 3% of the total number of taxa identified from the images (Figure 7). This grouping for the two phyla, Chordata and Porifera, was created because it was not possible to determine whether the taxa were didemnid tunicates or sponges from the images alone. None of these taxa were observed in 2003 (Table 10).

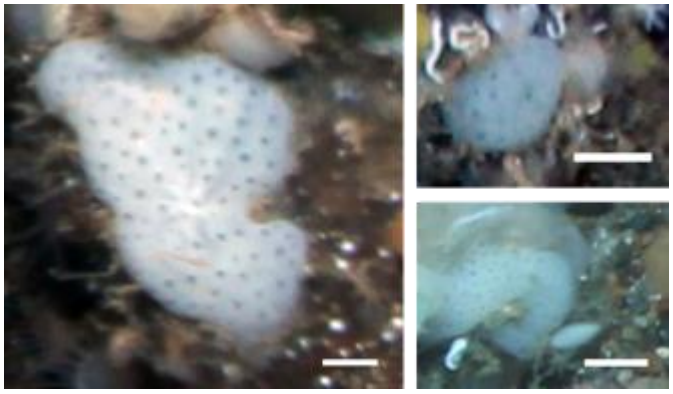
Table 10: Abundance of taxa belonging to the group Chordata / Porifera, standardised to 1 m^2. Note that IR = Inside Reef, IC = Inside Closure, and OC = Outside Closure.

Taxa	2015			2009	2003	
	IR	IC	OC	IR	IR	OC
Didemnidae / Porifera Type 1	40	108	49	53	0	0
Didemnidae / Porifera Type 2	7	5	4	3	0	0
Didemnidae / Porifera Type 3	9	20	1	0	0	0

ITIS TSN N/A

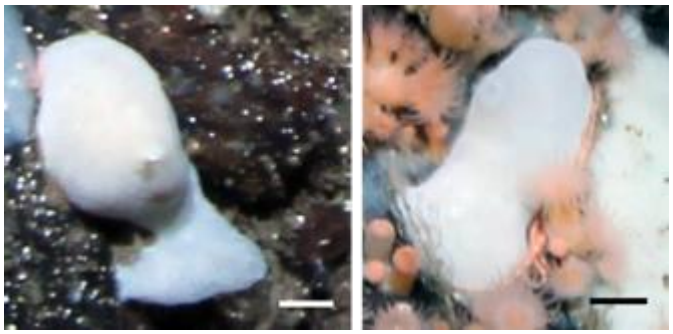
Chordata / Porifera

WORMS AphiaID N/A



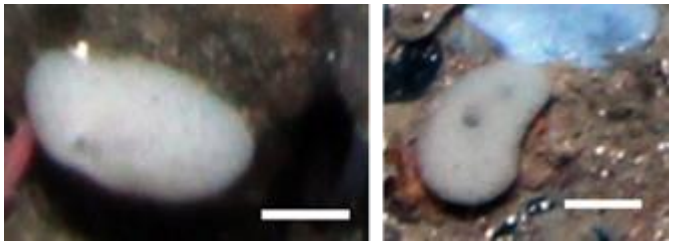
Didemnidae / Porifera Type 1

Round and laterally-spreading organism, white/off-white in colour, with numerous small pores, often surrounding one or two larger ones. May be a sponge or a didemnid tunicate.



Didemnidae / Porifera Type 2

Globular and opaque, mostly smooth but with some stippling present. Colour is white to pale peach. Possibly a sponge or didemnid.



Didemnidae / Porifera Type 3

Surface smooth, and dotted with small oscula and several larger oscula. White in colour. May be a sponge or a didemnid.

PHYLUM CNIDARIA

The Cnidaria comprised 21% of the total number of taxa identified from the images, second only to the Porifera in the documented taxon diversity across the data set (Figure 7). Cerianthid anenomes were the most abundant and greatly increased in density over the sampling periods (Table 11).

Table 11: Abundance of taxa belonging to phylum Cnidaria, standardised to 1 m^2. Note that IR = Inside Reef, IC = Inside Closure, and OC = Outside Closure.

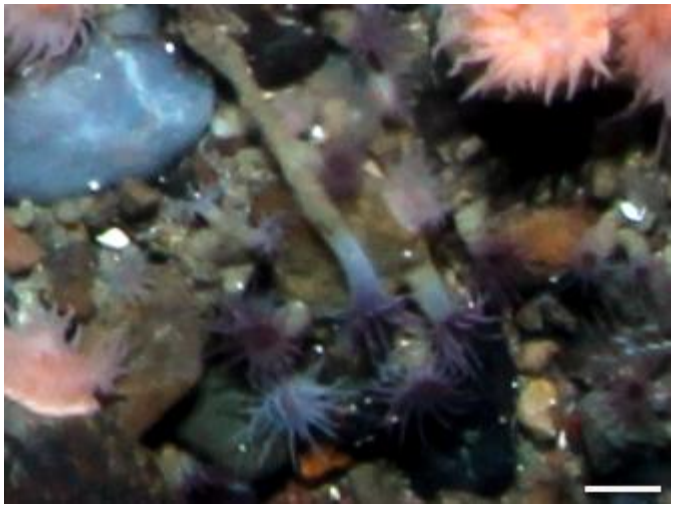
Taxa	2015			2009	2003	
	IR	IC	OC	IR	IR	OC
Ceriantharia (Sub.C.) sp. 1	19645	10851	194	6895	542	19
Ceriantharia (Sub.C.) sp. 2	15	7	1	0	0	0
Ceriantharia (Sub.C.) sp. 3	51	20	45	5	0	0
Ceriantharia (Sub.C.) sp. 4	2	2	6	0	2	2
cf. *Ptychodactis patula*	0	0	5	2	0	0
Hormathiidae (F.) sp. 3	3	4	4	2	3	10
Hormathiidae (F.) spp.	463	899	1198	157	236	612
Actiniaria (O.) sp. 1	2789	464	948	78	62	22
Actiniaria (O.) sp. 4	20	23	7	10	5	0
Actiniaria (O.) sp. 5	74	142	82	0	2	0
Actiniaria (O.) sp. 6	5	3	3	0	2	3
Actiniaria (O.) sp. 13	7	24	1	17	0	0
Actiniaria (O.) sp. 14	1	0	0	0	0	0
Actiniaria (O.) sp. 16	9	6	1	0	0	0
Actiniaria (O.) sp. 18	2	0	0	0	0	0
Actiniaria (O.) sp. 19	17	41	4	3	0	0
Actiniaria (O.) sp. 22	3	0	0	0	0	0
Actiniaria (O.) sp. 26	0	0	28	0	0	0
Actiniaria (O.) sp. 29	40	26	32	0	0	0
Actiniaria (O.) sp. 30	0	0	6	0	0	0
Actiniaria (O.) sp. 31	0	0	0	2	0	0
Actiniaria (O.) spp.	701	136	136	225	403	284
cf. Corallimorpharia (O.) spp.	91	68	18	22	5	2
Lophelia pertusa / *Desmophyllum pertusum*	Recruits: 7 Mounds: 6	0	0	0	0	0
Anthomastus / *Pseudoanthomastus* sp. 1	22	548	5	5	0	9
Nephtheidae (F.) spp.	318	193	326	156	120	122
Acanthogorgia armata	63	7	307	0	0	22
Keratoisis grayi	0	3	1	0	0	0

Paragorgia arborea	6	2	1	2	2	0
Primnoa resedaeformis	29	1	2	25	3	0
Alcyonacea (O.) sp. 2	21	12	1	13	0	3
Halipteris finmarchica	1	0	1	0	0	0
Pennatulacea (O.) sp. 2	1	0	1	0	0	0
Anthoathecata (O.) sp. 1	8	1	0	0	0	0
Anthoathecata (O.) sp. 2	0	0	0	10	0	0
Anthoathecata (O.) Type 1	13	0	0	5	2	0
Leptothecata (O.) sp. 1	57	29	26	17	3	2
Leptothecata (O.) sp. 2	15	11	2	3	0	0
Leptothecata (O.) sp. 3	1	2	3	0	0	0
Leptothecata (O.) sp. 6	54	9	5	8	3	0
Leptothecata (O.) sp. 8	7	1	0	0	0	0
Hydrozoa (C.) sp. 1	1	1	0	8	0	0
Hydrozoa (C.) sp. 6	12	3	6	0	0	0

ITIS TSN 51984

Subclass Ceriantharia Perrier, 1893

WORMS AphiaID 1361



Ceriantharia (S.C.) sp. 1

Tube-dwelling anemone that varies in colour from white to pink to dark purple. May be raised with the tube visible or appear buried. Tentacles short relative to tube length; centre usually darker in colour than the tentacles.

Ceriantharia (S.C.) sp. 2

Large, white, erect tube-dwelling anemone with long tentacles. Always observed from the side. Found in gravel substrate.

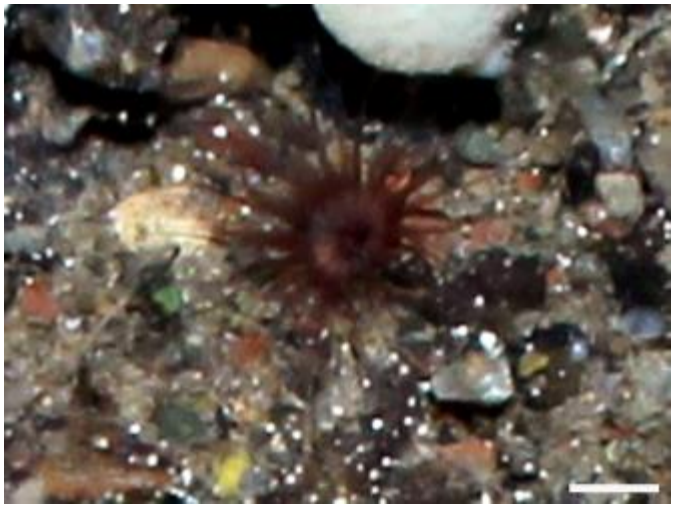
Ceriantharia (S.C.) sp. 3

Tube-dwelling anemone with tube always found buried in the substrate. Oral tentacles dark purple in colour. Long, thin marginal tentacles arranged in a single plane, white or light purple in colour and semi-translucent.

ITIS TSN 51984

Subclass Ceriantharia Perrier, 1893

WORMS AphiaID 1361



Ceriantharia (S.C.) sp. 4

Tube-dwelling anemone dark red in colour. Oral disc is larger than Ceriantharia (Sub.C.) sp. 3. Oral tentacles lighter in colour. Dark centre and numerous very long, thin marginal tentacles.

ITIS TSN 52485

Order Actiniaria Hertwig, 1882

WORMS AphiaID 1360

cf. *Ptychodactis patula* Appellöf, 1893

AphiaID: 101020 / ITIS TSN: 612081

Large anemone, white and slightly iridescent in colour. Tentacles are never fully retracted and a frilled structure is attached to the siphonoglyph. Column appears to have stripes or grooves.

Hormathiidae (F.) sp. 3

AphiaID: 100672 / ITIS TSN: 52651

Large anemone (scale bar is 5 cm). Oral disc is very large and usually folded with relatively short tentacles arranged in two rows. Column is mostly smooth, orange to white in colour. Possibly *Phelliactis americana*. (Note: the scale bar in the bottom right is 5 cm.)

Hormathiidae (F.) spp.

AphiaID: 100672 / ITIS TSN: 52651

Large, orange-pink anemone. Column can be smooth, ridged or 'bumpy' and is often covered with detritus. Three rows of fairly short tentacles. Possibly includes *Actinauge cristata*, *Hormathia digitata*, and *Hormathia nodosa*.

ITIS TSN 52485

Order Actiniaria Hertwig, 1882

WORMS AphiaID 1360

Actiniaria (O.) sp. 1

White to pink anemone anchored on hard substrate. Protruding mouth, wide cup and short column. Tentacles arranged in at least two rows.

Actiniaria (O.) sp. 4

Anemone with 12 long, orange tentacles. Small oral disc with a protruding mouth. Column is not visible. Possibly from family Edwardsiidae or *Peachia parasitica*.

Actiniaria (O.) sp. 5

Anemone with bright orange oral disc and tentacles. Short, beige column with a wide basal attachment area. Wide cup relative to tentacles. Tentacles are long, thin and arranged in at least two rows.

ITIS TSN 52485

Order Actiniaria Hertwig, 1882

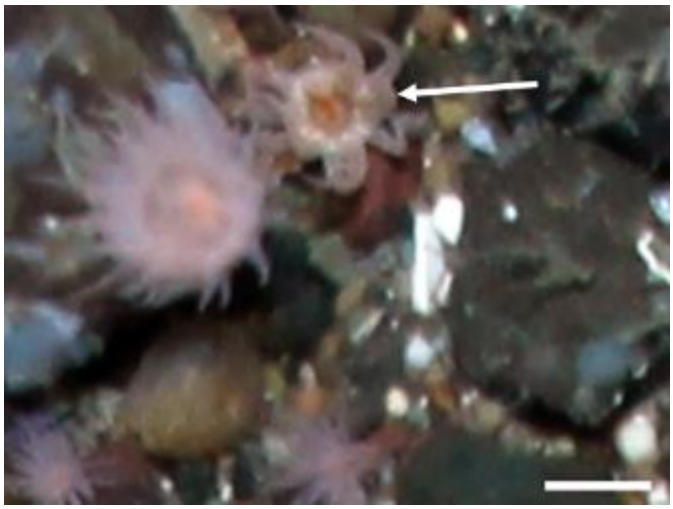
WORMS AphiaID 1360

Actiniaria (O.) sp. 6

Large (~10 cm wide), peach-pink coloured anemone. Body is short relatively to its width and tentacles are thick and bulbous, with white tips. Possibly from genus *Urticina* or *Stomphia*.

Actiniaria (O.) sp. 13

Small pink anemone attached to rock. Tentacles are thin and long relative to cup and paler than centre. Mouth appears to have a ‘mottled’ pattern.



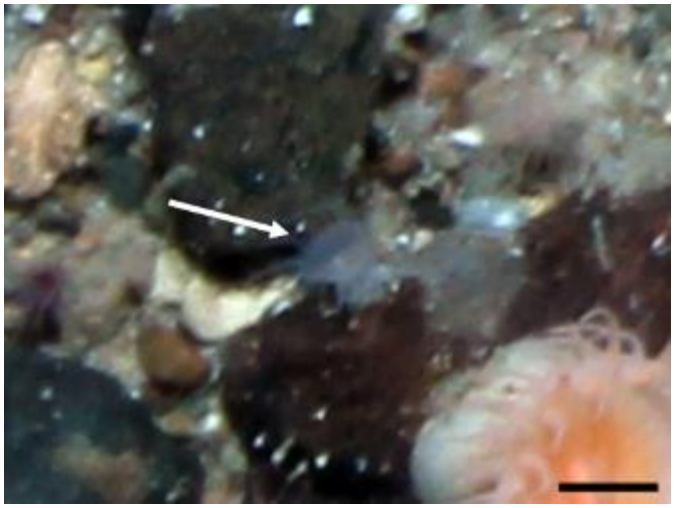
Actiniaria (O.) sp. 14

Pale pink anemone. Column not visible but is likely short. One row of relatively thick tentacles. Protruding mouth with a ring of white around it. Unique record.

ITIS TSN 52485

Order Actiniaria Hertwig, 1882

WORMS AphiaID 1360



Actiniaria (O.) sp. 16

Small anemone; semi-translucent to pale pink in colour. Relatively wide oral disc with a short column and long thin tentacles.

Actiniaria (O.) sp. 18

Pink anemone attached to rock. Very short column. Large oral disc with a darker protruding mouth. Tentacles arranged in two rows.

Actiniaria (O.) sp. 19

Very small (~1 cm) anemone attached to hard substrate. Narrow oral disc with a white centre and a short column. Long, semi-translucent tentacles.

ITIS TSN 52485

Order Actiniaria Hertwig, 1882

WORMS AphiaID 1360

Actiniaria (O.) sp. 22

Numerous long, thin purple tentacles. Small oral disc, column not seen. Possibly a cerianthid.

Actiniaria (O.) sp. 26

Medium-sized anemone with a white oral disc and pink-purple tentacles. Distinct lines radiate from mouth to the outer edge of the oral disc. Long marginal tentacles appear to be arranged in at least 3 rows. This anemone is only found outside the *Lophelia* Coral Conservation Area.

Actiniaria (O.) sp. 29

Medium-sized, dark red anemone. Two rows of short tentacles arranged around a fairly wide oral disc. Short column that appears covered in detritus.

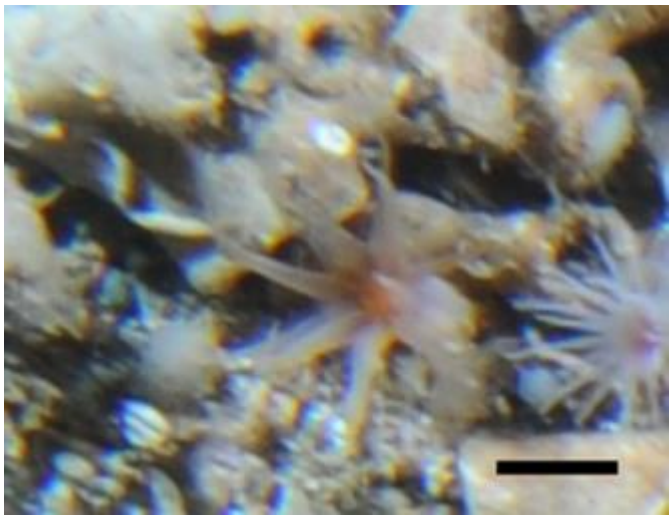
ITIS TSN 52485

Order Actiniaria Hertwig, 1882

WORMS AphiaID 1360

Actiniaria (O.) sp. 30

Large, light pink anemone with thick, long tentacles. Found on hard or soft substrate. Resembles anemones from the genus *Bolocera*.



Actiniaria (O.) sp. 31

Small pale pink anemone with thick, translucent tentacles. Oral disc appears darker than the tentacles, and is orange in colour. Found on cobble substrate. Unique record.

Year Collected: 2009

Actiniaria (O.) spp.

Taxon includes multiple species of the order Actiniaria that were difficult to distinguish, primarily due to their contracted state. Group is comprised of mostly small individuals that range in colour from orange to pink. Column is always smooth.

ITIS TSN 52460

Order Corallimorpharia Carlgren, 1943

WORMS AphiaID 1362

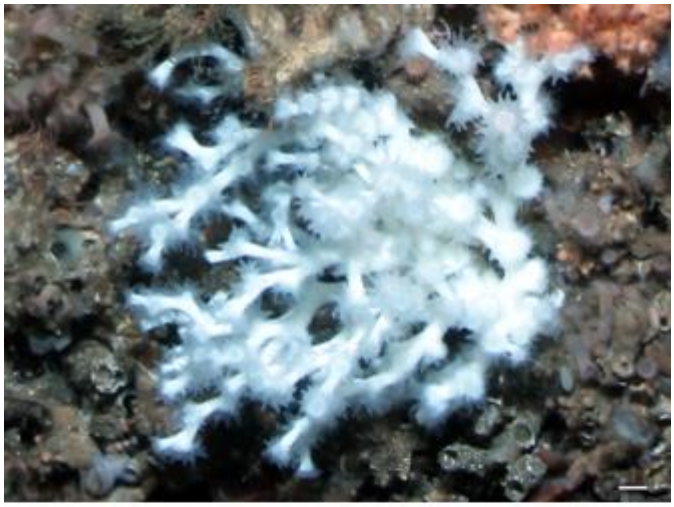
cf. Corallimorpharia (O.) spp.

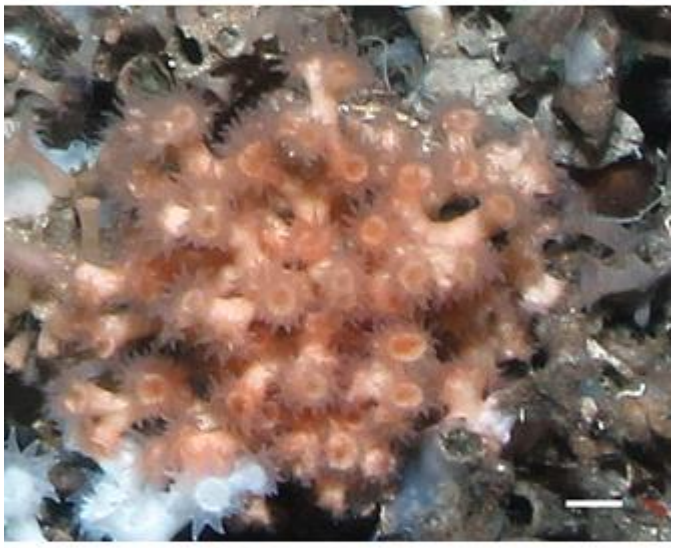
Solitary coral anemone. White to yellow in colour, with semi-translucent tentacles. Tentacles are fairly short and stubby and are white at the tips.

ITIS TSN 52839

Order Scleractinia Bourne, 1900

WORMS AphiaID 1363





Lophelia pertusa / Desmophyllum pertusum

Linnaeus, 1758

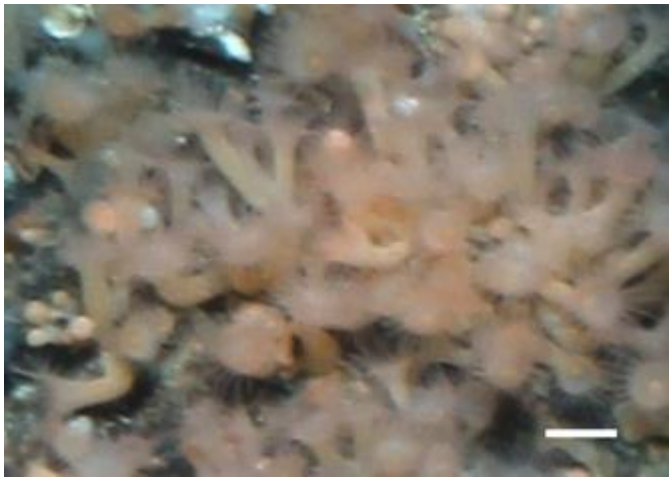
AphiaID: 135161 / 1245747
ITIS TSN : 53706 / N/A

Reef-building coral. Corallites with defined sclerites are found in an alternating arrangement on terminal branches. Colour is variable between colonies. Typically colonies are white, but pink colonies are also present in this area (see middle image). Recruits (bottom image), dead rubble and consolidated bioherms have also been observed.

ITIS TSN 52431

Order Zoantharia Gray, 1832

WORMS AphiaID 607338



Zoantharia (O.) sp. 1

Colonial zoanthids with polyps comprised of one row of marginal tentacles. Found on hard substrate and occasionally on the skeletons of dead gorgonian-type corals. Recorded when present in images, as individuals are too numerous to count.

ITIS TSN 52016

Order Alcyonacea Lamouroux, 1812

WORMS AphiaID 1365

Anthomastus/ Pseudoanthomastus sp. 1

Verrill, 1878 /
Tixier-Durivault & d'Hondt, 1974

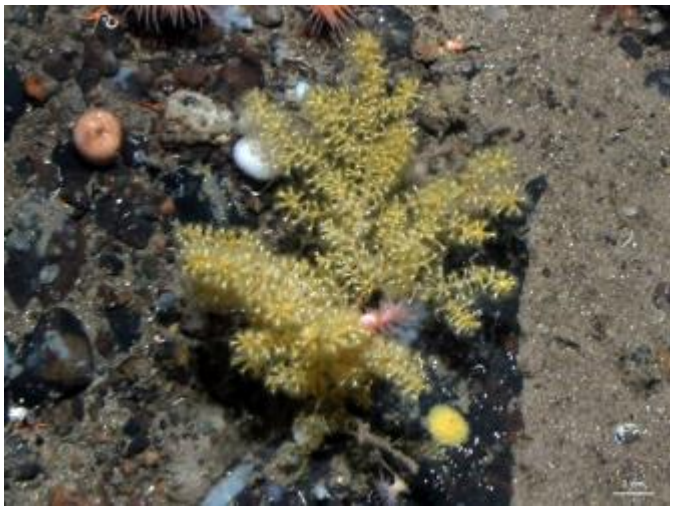
AphiaID: 125285 / 267770
ITIS TSN: 52030 / N/A

Group possibly represents several species of "mushroom coral" from genus *Anthomastus* and/or *Pseudoanthomastus*.

Nephtheidae (F.) spp.

AphiaID: 146762 / ITIS TSN: 52034

Group is comprised of true, cauliflower-like soft corals that range in colour from white to pink to purple. Possibly a combination of the following species: *Duva florida, Drifa glomerata* and *Gersemia fruticosa*. (Note: scale bar is 5 cm in this image.)



Acanthogorgia armata

Verrill, 1878

AphiaID: 125348 / ITIS TSN: 52119

Bushy gorgonian coral. Found in colours ranging from yellow to blue-purple.

ITIS TSN 52016

Order Alcyonacea (Lamouroux, 1812)

WORMS AphiaID 1365

Keratoisis grayi
Wright, 1869

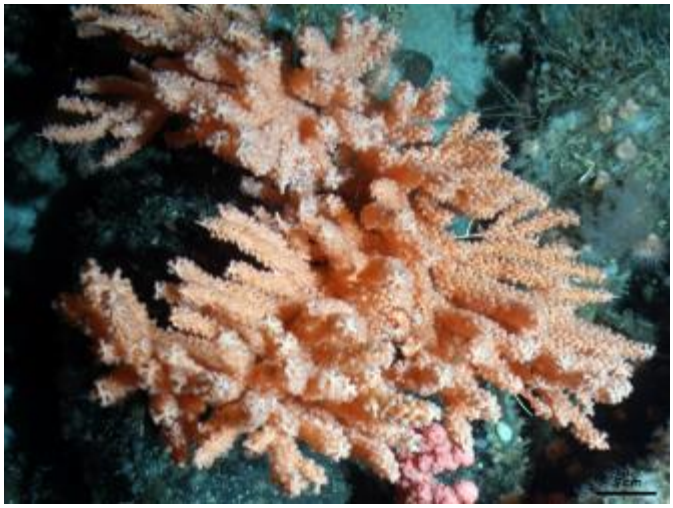
AphiaID: 125376 / ITIS TSN: N/A

Large bamboo coral with pink polyps and a white skeleton. Gorgonin internodes clearly seen on the skeleton.

Paragorgia arborea
Linnaeus, 1758

AphiaID: 125418 / ITIS TSN: 52108

Large “bubble-gum” coral. Usually found as fan-shaped colonies; recruits also present. Colour ranges from entirely pink to red-orange to white.



Primnoa resedaeformis
Gunnerus, 1763

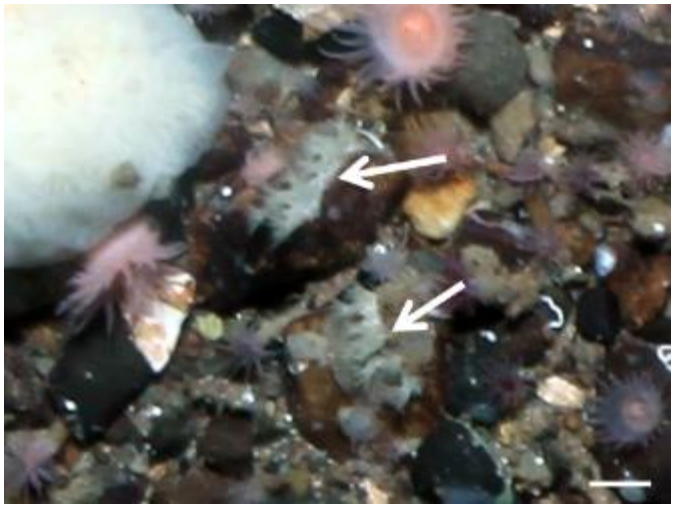
AphiaID: 125411 / ITIS TSN: 52307

Large “sea corn” coral. Bushy colonies. Polyps orange in colour.

ITIS TSN 52016

Order Alcyonacea Lamouroux, 1812

WORMS AphiaID 1365



Alcyonacea (O.) sp. 2

Soft coral with large polyps and long tentacles. No stalk visible. White in colour. Possibly from family Clavulariidae.

ITIS TSN 52348

Order Pennatulacea Verrill, 1865

WORMS AphiaID 1367

Halipteris finmarchica
Sars, 1851

AphiaID: 128509 / ITIS TSN: 719237

Erect and whip-like sea pen. Peduncle anchored in soft sediment. Multiple rows of dark red polyps on the rachis (lateral side).

Pennatulacea (O.) sp. 2

Small white sea pen. Axial skeleton appears thin. Polyp ‘leaves’ are feathery and appear ‘webbed’. Peduncle anchored in soft sediment.

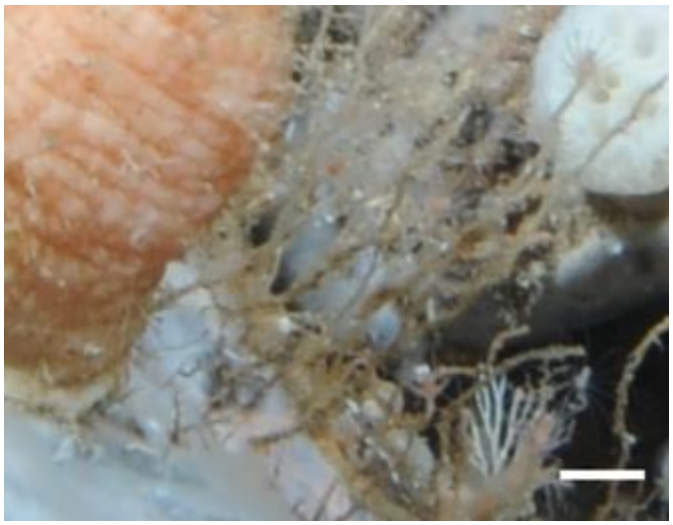
ITIS TSN 718925

Order Anthoathecata Cornelius, 1992

WORMS AphiaID 13551

Anthoathecata (O.) sp. 1

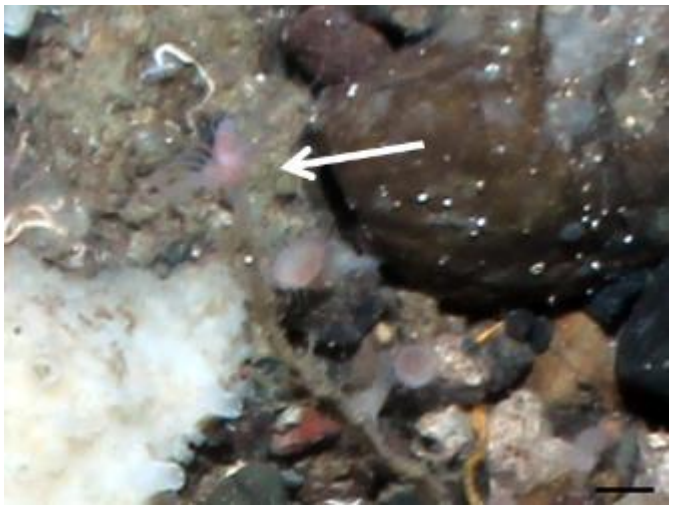
Long thin tan coloured stalk. A small, thin, flower-shaped polyp at the apical tip. Could be a juvenile of Anthoathecata (O.) Type 1.



Anthoathecata (O.) sp. 2

Multiple tan-coloured stalks that appear rough in texture. They are thicker than those of Anthoathecata (O.) sp. 1. Each stalk is topped by a single polyp with fine tentacles.

Year Collected: 2009



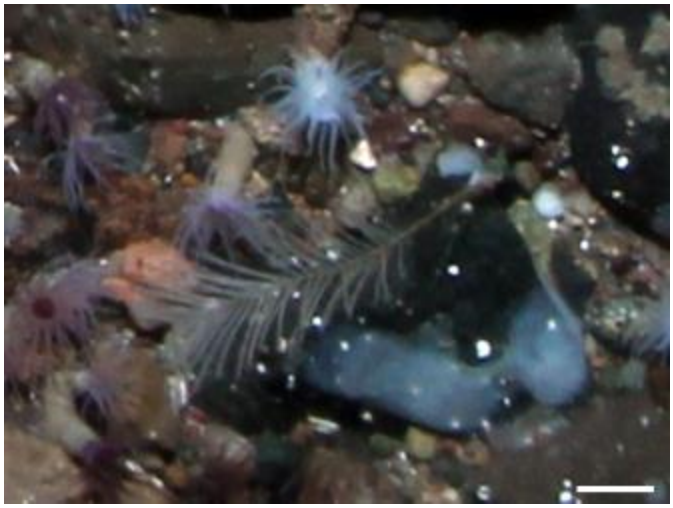
Anthoathecata (O.) Type 1

Solitary hydroid with sediment-coloured stem and a large pink terminal hydranth. Long, thin tentacles surround the polyp. Possibly a species of *Corymorpha*.

ITIS TSN 718926

Order Leptothecata Cornelius, 1992

WORMS AphiaID 13552

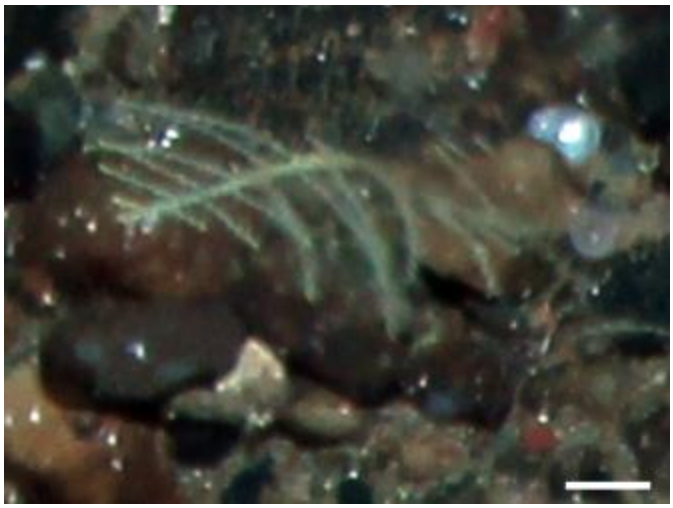


Leptothecata (O.) sp. 1

Tan pinnate hydroid. All branches arranged on a single plane and not staggered. Branches are feathery in appearance. Main stem thicker than branches.

Leptothecata (O.) sp. 2

Pinnate hydroid with all branches arranged in a single plane and slightly staggered. Tan in colour. Very thin branches. Branches have white at their base.



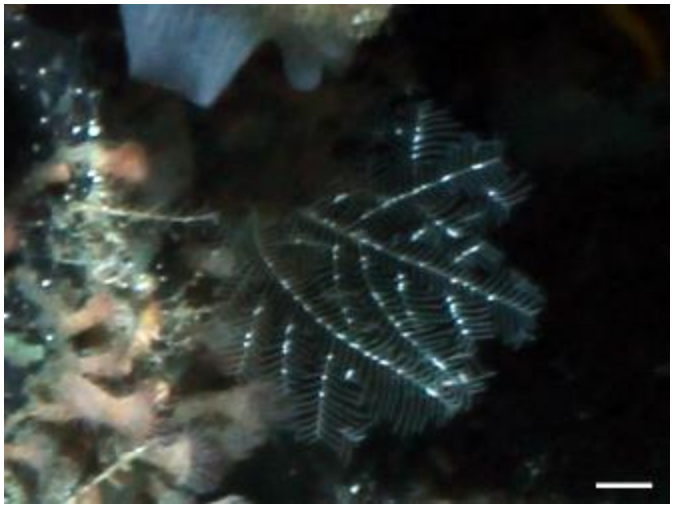
Leptothecata (O.) sp. 3

Pinnate hydroid, light yellow in colour. Branches either bent or not all on a single plane. Main stem is thicker than branches.

ITIS TSN 718926

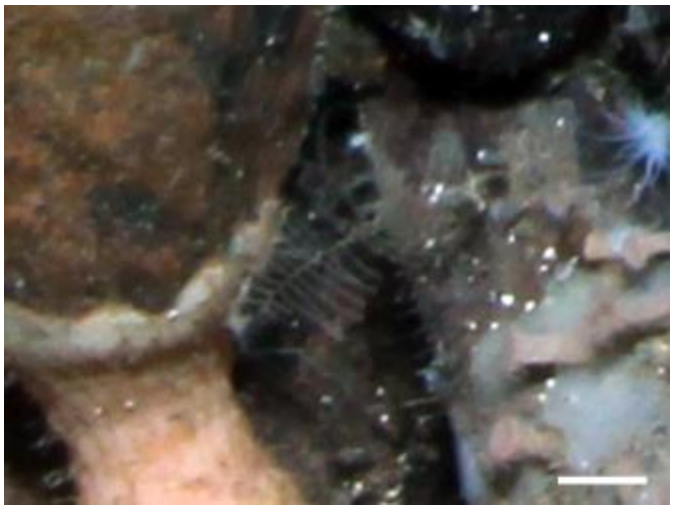
Order Leptothecata Cornelius, 1992

WORMS AphiaID 13552



Leptothecata (O.) sp. 6

Light beige, fan-shaped hydroid. Branching dichotomous. Outer edges are often curled slightly due to current.



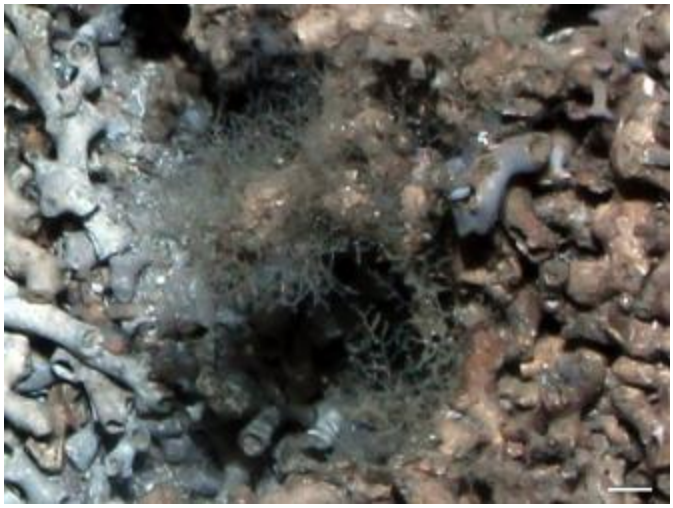
Leptothecata (O.) sp. 8

Pinnate colony; all branches arranged on a single plane and staggered. Branches thin and tan in colour. Main stalk is not thicker than branches.

ITIS TSN 48739

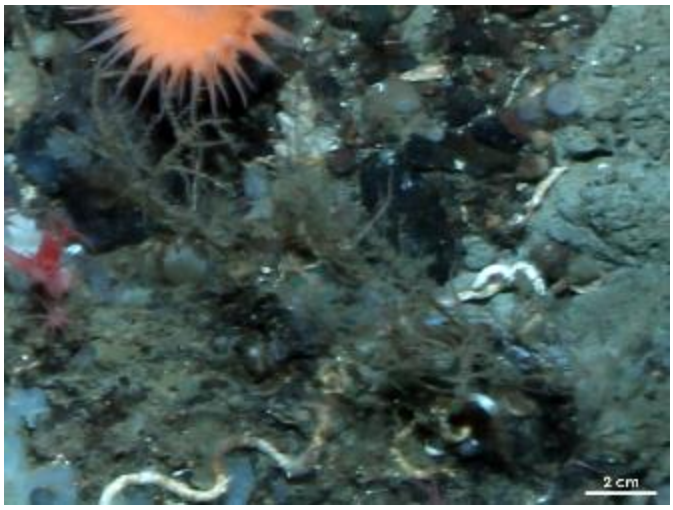
Class Hydrozoa Owen, 1843

WORMS AphiaID 1337



Hydrozoa (C.) sp. 1

Bushy hydroid. Tan in colour. Secondary branches are staggered and short.



Hydrozoa (C.) sp. 6

Tan hydroid with numerous axial branches, which are lined with very short secondary branches. Secondary branches are staggered.

PHYLUM ECHINODERMATA

The Echinodermata comprised 13% of the total number of taxa identified from the images (Figure 7). Ophiuroids were the most abundant and increased in density over the sampling periods (Table 12).

Table 12: Abundance of taxa belonging to phylum Echinodermata, standardised to 1 m^2. Note that IR = Inside Reef, IC = Inside Closure, and OC = Outside Closure.

Taxa	2015			2009	2003	
	IR	IC	OC	IR	IR	OC
Novodinia americana	10	3	3	5	0	7
Henricia sp. 1	7	6	2	2	2	5
Henricia sp. 2	1	8	6	2	0	3
Ceramaster granularis	0	1	8	0	2	5
Hippasteria phrygiana	1	0	3	0	0	0
Tremaster mirabilis	0	1	2	0	0	0
Porania (Porania) pulvillus	1	1	0	0	0	0
Asteroidea (C.) sp. 1	2	2	1	0	2	0
Asteroidea (C.) sp. 2	1	1	0	0	0	0
Asteroidea (C.) sp. 3	1	0	0	0	0	0
Asteroidea (C.) sp. 4	0	1	1	0	0	2
Asteroidea (C.) sp. 5	0	0	1	0	0	0
Asteroidea (C.) sp. 6	0	1	0	0	0	0
Gorgonocephalus sp. 1	0	0	2	3	0	2
Ophiuroidea (C.) sp. 2	6	3	1	0	0	0
Ophiuroidea (C.) sp. 4	19	0	0	0	0	0
Ophiuroidea (C.) sp. 7	10	1	26	0	0	0
Ophiuroidea (C.) sp. 8	13	30	5	0	0	0
Ophiuroidea (C.) sp. 9	26	6	4	0	0	0
Ophiuroidea (C.) sp. 10	14	0	0	0	0	0
Ophiuroidea (C.) sp. 12	5	0	0	0	0	0
Ophiuroidea (C.) sp. 15	1	2	0	0	0	0
Ophiuroidea (C.) sp. 17	5	27	15	0	0	0
Ophiuroidea (C.) sp. 20	1	1	0	0	0	0
Ophiuroidea (C.) sp. 32	2	2	2	0	0	0
Ophiuroidea (C.) spp.	95	111	35	28	2	3
Ophiuroidea_obstructed	720	702	362	104	117	26
Comatulida (O.) spp.	15	35	6	3	2	12
Psolus sp. 1	34	7	1	2	0	0

ITIS TSN 156862

Class Asteroidea de Blainville, 1830

WORMS AphiaID 123080

Novodinia americana
Verrill, 1880

AphiaID: 178261 / ITIS TSN: 989873

Multi-armed sea star. Always found with a white oral plate and inner part of arms. Apical tips of arms always a characteristic orange colour.

Henricia sp. 1
Gray, 1840

AphiaID: 123276 / ITIS TSN: 157152

Yellow sea star with five slender arms that curl upwards at the tips. Disc small relative to arm length. Surface smooth.

Henricia sp. 2
Gray, 1840

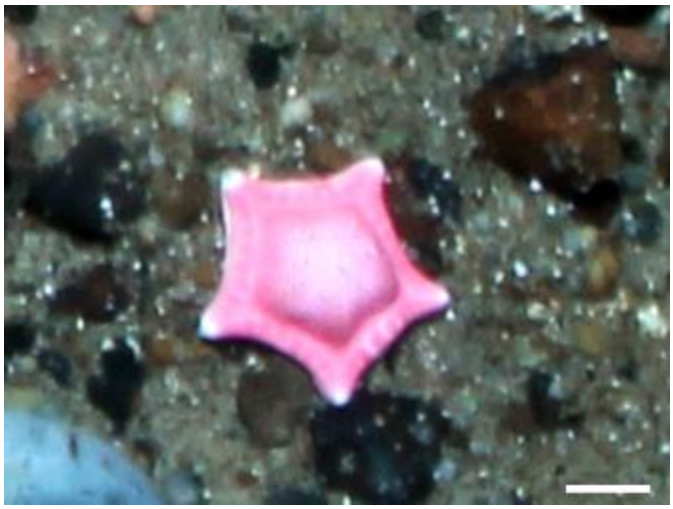
AphiaID: 123276 / ITIS TSN: 157152

Five-armed sea star. Arms long and fairly thin relative to disc. Varies in colour from purple to white. Arms curl upwards at the tips.

ITIS TSN 156862

Class Asteroidea de Blainville, 1830

WORMS AphiaID 123080



Ceramaster granularis
Retzius, 1783

AphiaID: 124020 / ITIS TSN: 156997

Bright pink sea star. Wide body with interconnected, reduced arms. Central body is raised while the rest of the body is flat, with the exception of the tips of the arms, which are white in colour.

Hippasteria phrygiana
Parelius, 1768

AphiaID: 124043/ ITIS TSN: 157008

Characteristic blunt spines present on the edges and aboreal side of the body. Colour ranges from bright to light orange.

Tremaster mirabilis
Verrill, 1880

AphiaID: 124002 / ITIS TSN: 990610

Robust orange sea star. Small ossicles clustered around the central radiating out towards its five arms. Smooth tissue connects the arms creating its pentagonal shape.

ITIS TSN 156862

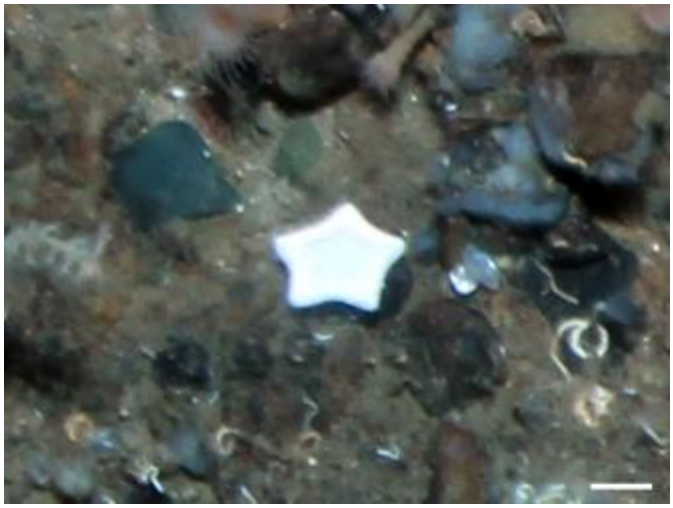
Class Asteroidea de Blainville, 1830

WORMS AphiaID 123080

Porania (Porania) pulvillus
O.F. Müller, 1776

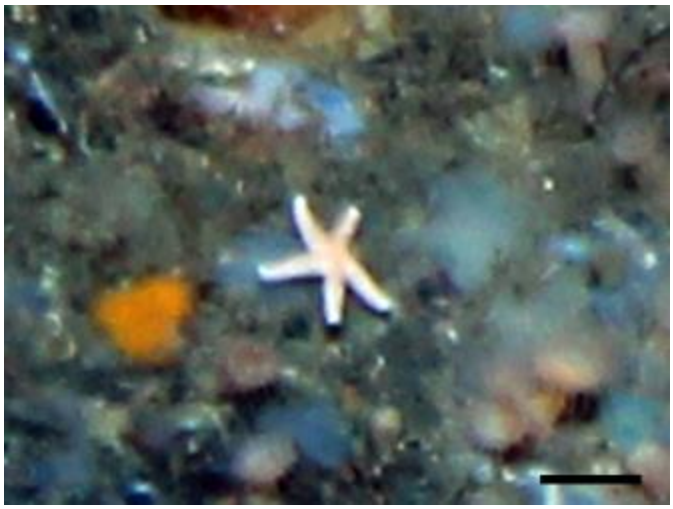
AphiaID: 125166 / ITIS TSN: 157145

Cushion starfish with a bright purple surface. Patterns of on the aboral side with white spots and bands that fan out from the centre. Arms lined with two rows of small ossicles.



Asteroidea (C.) sp. 1

Five-armed sea star with a large central disc. Arms short relative to central disc. Surface smooth, with suggestion of a thicker, lighter band around the perimeter of the aboral surface. Possibly *Poraniomorpha (Poraniomorpha) hispida* or *Ceramaster granularis*.



Asteroidea (C.) sp. 2

Long-rayed sea star. Orange to light orange in colour. 5 arms and a light coloured underside. Possibly juveniles of *Henricia* sp. 2.

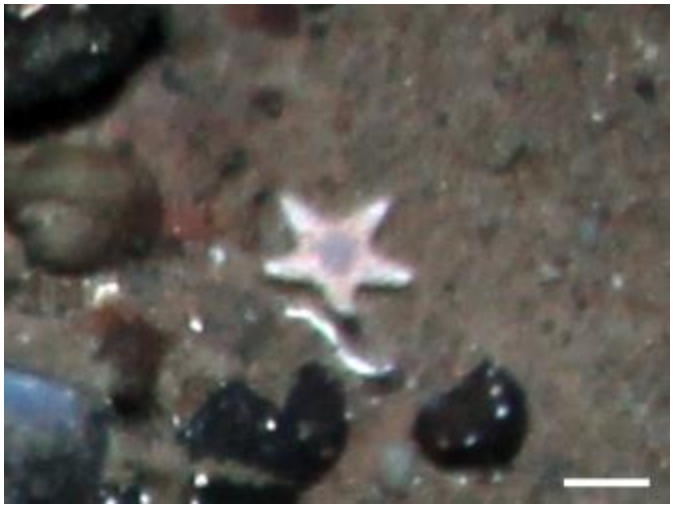
ITIS TSN 156862

Class Asteroidea de Blainville, 1830

WORMS AphiaID 123080

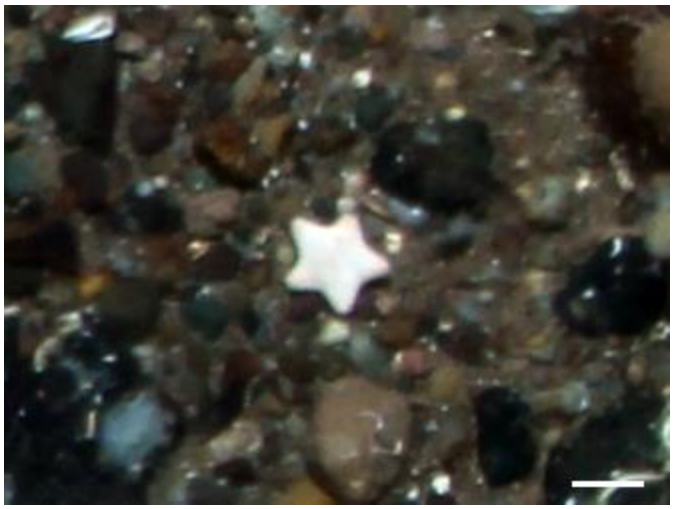
Asteroidea (C.) sp. 3

Five-armed, long rayed sea star. Light orange arms moving to dark orange towards the centre. Noticeable spines seen along the sides of arms. Possibly *Lophaster furcifer*.



Asteroidea (C.) sp. 4

Five-armed sea star. Purple centre surrounded by light orange around the base of the arms. Arms lighten to white near the apical tips.



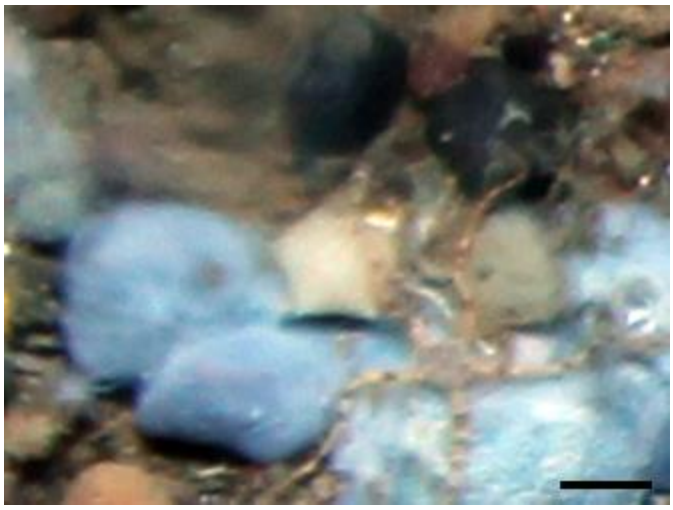
Asteroidea (C.) sp. 5

Small, five-armed sea star with relatively large central disc and reduced arms. Tips of arms light orange in colour. Possibly belongs to genus *Pteraster*.

ITIS TSN 156862

Class Asteroidea de Blainville, 1830

WORMS AphiaID 123080



Asteroidea (C.) sp. 6

Short-rayed, five-armed sea star with a large central disc. Arms very short. Surface appears smooth. Possibly a species of genus *Pteraster* (different from Asteroidea (C.) sp. 5).

ITIS TSN 157325

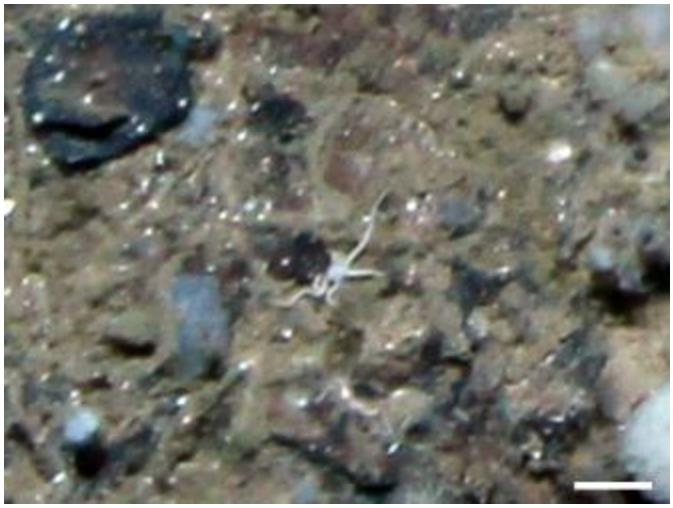
Class Ophiuroidea Gray, 1840

WORMS AphiaID 123084

Gorgonocephalus sp. 1
Leach, 1815

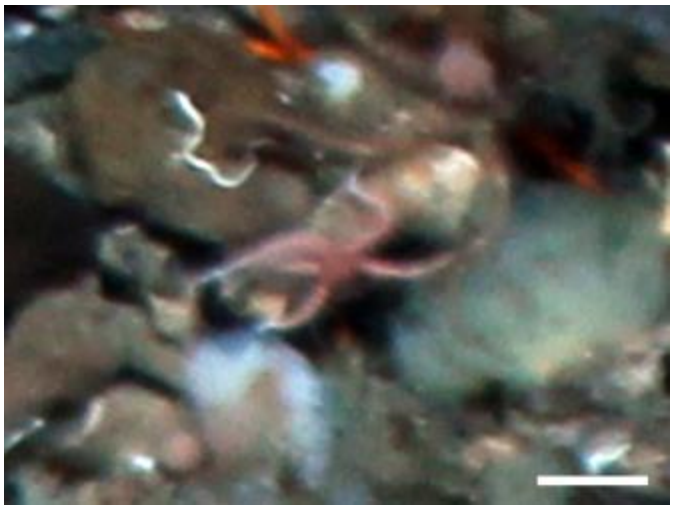
AphiaID: 123586 / ITIS TSN: 157359

Five thin, whip-like flexible arms that emerge from the central disc. Those arms branch and intertwine. Orange in colour.



Ophiuroidea (C.) sp. 2

Small, light purple/white brittle star. Disc darker and quite small relative to arms. Possibly juvenile *Ophiomusa lymani*.



Ophiuroidea (C.) sp. 4

Red five-armed brittle star. Arms appear to have spines and are slightly lighter in colour than central disc.

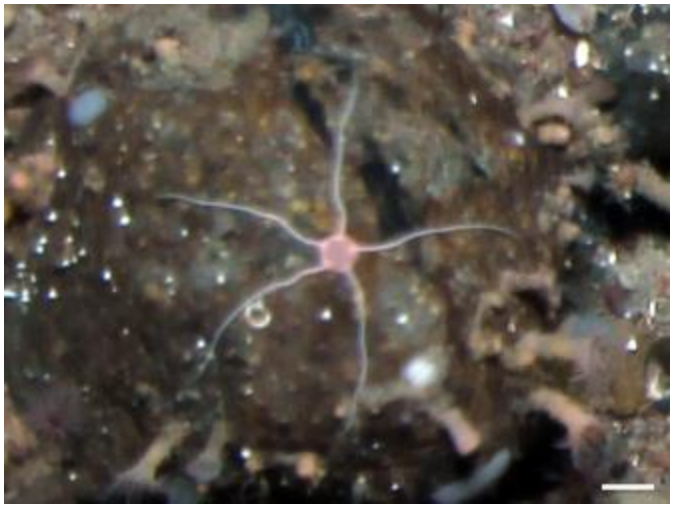
ITIS TSN 157325

Class Ophiuroidea Gray, 1840

WORMS AphiaID 123084

Ophiuroidea (C.) sp. 7

Six-armed brittle star. Disc dark purple in colour with white arms. Possibly *Ophiacantha anomala*.



Ophiuroidea (C.) sp. 8

Five-armed brittle star. Central disc red-purple in colour. Arms very long and thin relative to disc.

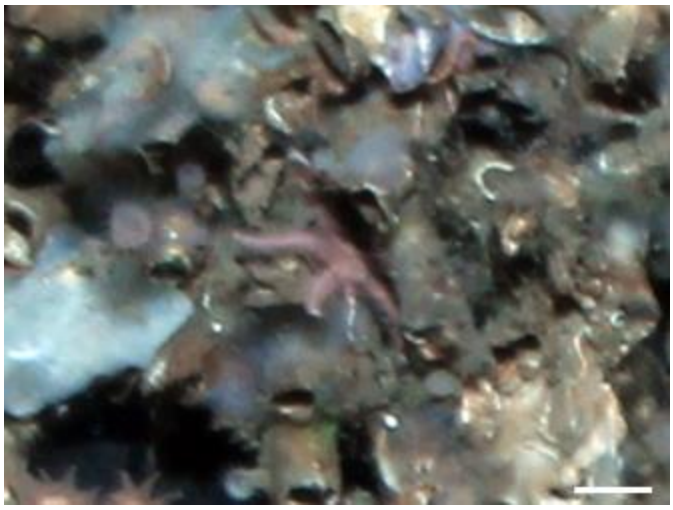
Ophiuroidea (C.) sp. 9

Five-armed brittle star. Scarlet to orange in colour. Arms have prominent spines. Smaller individuals appear ‘velvety’. Possibly *Amphiura otteri*.

ITIS TSN 157325

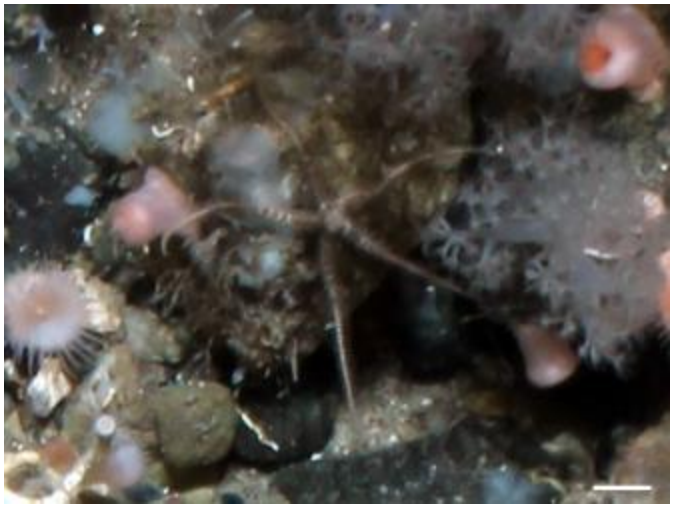
Class Ophiuroidea Gray, 1840

WORMS AphiaID 123084



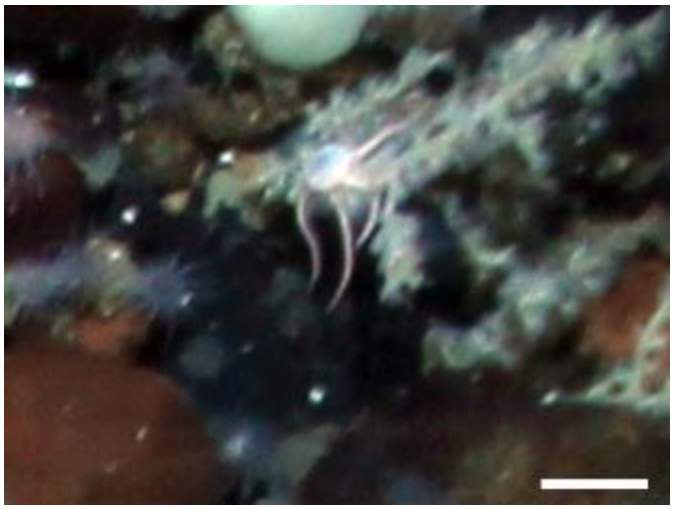
Ophiuroidea (C.) sp. 10

Red-purple brittle star. Arms quite thick (for their length) compared to other species. Central disc large relative to arms and pentagonal with rounded edges.



Ophiuroidea (C.) sp. 12

Five-armed brittle star. Arms long relative to disc and light brown in colour. Distinct banding present on the inner section of the arms. Disc circular.



Ophiuroidea (C.) sp. 15

Five-armed brittle star. Arms thin and light orange in colour. Disc circular and light orange with a distinct purple centre.

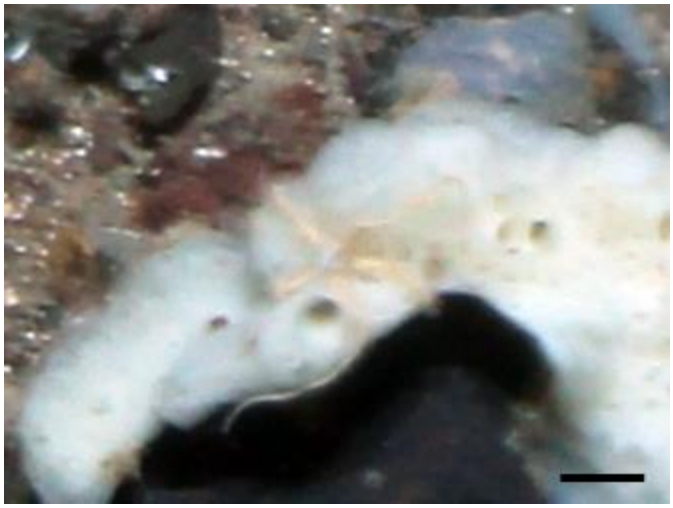
ITIS TSN 157325

Class Ophiuroidea Gray, 1840

WORMS AphiaID 123084

Ophiuroidea (C.) sp. 17

Five-armed brittle star, bright orange in colour. Arms thin, smooth and long relative to disc. Disc rounded pentagonal in shape.



Ophiuroidea (C.) sp. 20

Five-armed brittle star, pale yellow in colour. Rounded pentagonal disc. Disc fairly small relative to arm length. Arms thin.

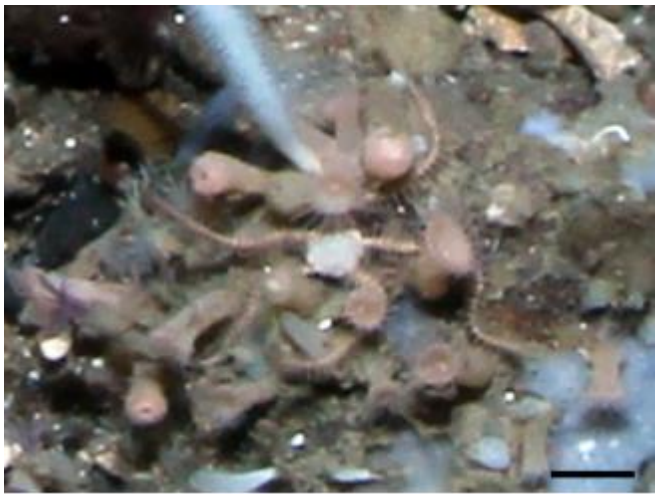
Ophiuroidea (C.) sp. 32

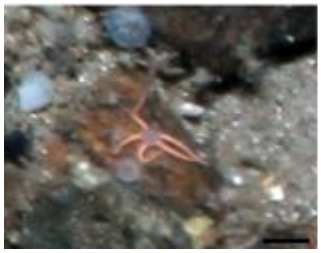
Five-armed brittle star. Bright red in colour with long arms relative to disc size. Disc pentagonal and darker red than the arms.

ITIS TSN 157325

Class Ophiuroidea Gray, 1840

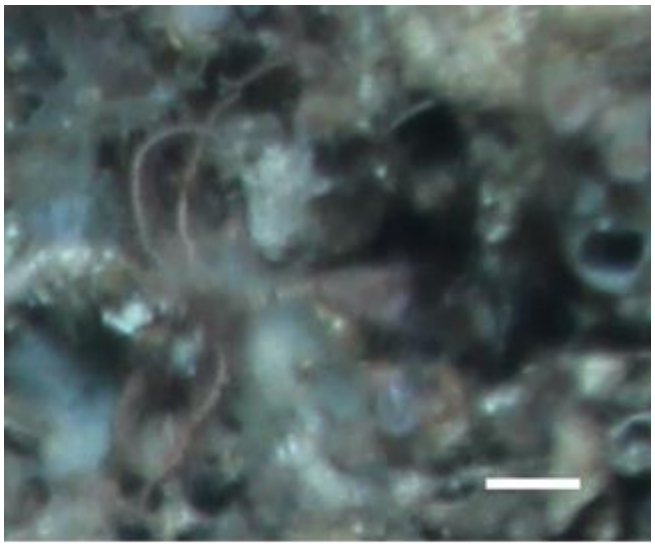
WORMS AphiaID 123084

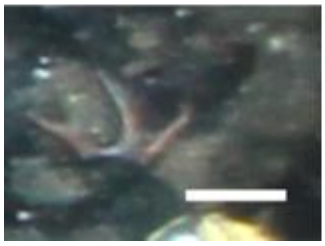




Ophiuroidea (C.) spp.

This group consists of brittle stars that cannot be assigned to a morphotype group due to their lack of distinctive features; either due to their configuration in the image, their size, or image quality.





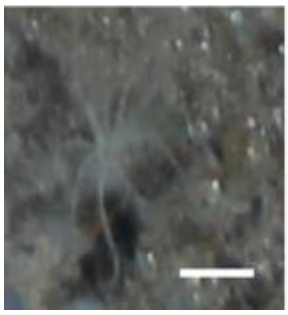
Ophiuroidea_obstructed

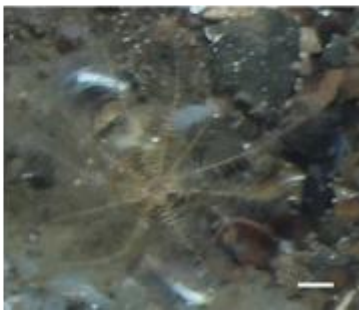
This group contains brittle stars with obscured or indistinct arms and/or central discs.

ITIS TSN 158541

Class Crinoidea Miller, 1821

WORMS AphiaID 123081





Comatulida (O.) spp.

Unstalked crinoids. Most are tan/beige in colour and have 10 banded arms that curl upwards.

ITIS TSN 158140

Class Holothuroidea

WORMS AphiaID 123083

Psolus sp. 1
Oken, 1815

AphiaID: 146121 / ITIS TSN: 1077949

Small, white sea cucumber with filamentous tentacles.

PHYLUM MOLLUSCA

The Mollusca comprised 7% of the total number of taxa identified from the images (Figure 7). Jingle shells (Anomiidae) and chitons (Polyplacophora) were the most abundant and increased in density over the sampling periods (Table 13).

Table 13: Abundance of taxa belonging to phylum Mollusca, standardised to 1 m^2. Note that IR = Inside Reef, IC = Inside Closure, and OC = Outside Closure.

Taxa	2015			2009	2003	
	IR	IC	OC	IR	IR	OC
Anomiidae (F.) sp. 1	119	146	33	33	0	2
Bivalvia (C.) sp. 1	1	1	1	0	0	0
Octopodoidea (S.F.) sp. 1	0	0	1	0	0	0
cf. *Neptunea* sp. 1	2	0	1	2	0	0
Buccinidae (F.) sp. 1	3	7	0	0	0	0
Buccinidae (F.) sp. 2	1	0	1	0	0	0
Boreotrophon cf. *clathratus*	8	6	9	7	2	0
Boreotrophon cf. *truncatus*	0	1	1	0	0	0
Trochidae (F.) sp. 1	7	1	2	2	0	0
Flabellinidae (F.) sp. 1	2	1	0	0	0	0
Nudibranchia (O.) sp. 1	8	7	1	0	0	0
Nudibranchia (O.) spp.	10	11	2	0	0	0
Gastropoda (C.) sp. 1	1	3	0	0	0	0
Gastropoda (C.) sp. 2	1	0	0	0	0	0
Polyplacophora (C.) sp. 1	82	107	22	10	2	3
Polyplacophora (C.) sp. 2	1	1	0	0	0	0

ITIS TSN 79118

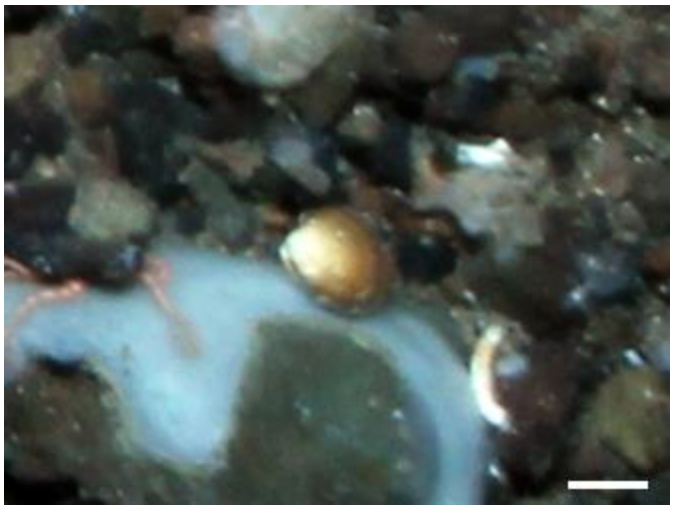
Class Bivalvia Linnaeus, 1758

WORMS AphiaID 105

Anomiidae (F.) sp. 1

AphiaID: 214 / ITIS TSN: 79790

Slightly hemispherical to flat and disc shaped. Semi-translucent around the edges and more opaque and white in the centre.



Bivalvia (C.) sp. 1

Bivalve shells either partially buried or found on gravel substrate. Textured banding from light to brown visible on shells. Possibly from genus *Astarte.*

ITIS TSN 82326

Class Cephalopda Cuvier, 1795

WORMS AphiaID 11707

Octopodoidea (S.F.) sp. 1

AphiaID: 14672 / ITIS TSN: N/A

Octopus with small ‘warty’ tuber visible on the mantle and head. Tentacles fairly short and tightly curled. Dark red to purple in colour. Probably either *Graneledone verrucosa* or a member of genus *Bathypolypus*.

ITIS TSN 69459

Class Gastropoda Cuvier, 1797

WORMS AphiaID 101

cf. *Neptunea* sp. 1
Röding, 1798

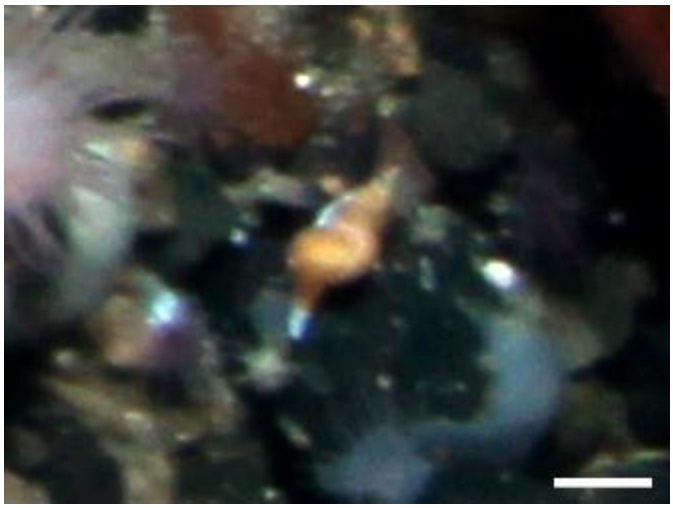
AphiaID: 137710 / ITIS TSN: 73975

Shell consists of multiple whorls. The lowest whorl is composed of multiple shades of pink, while the upper whorls are off-white in colour. Sculpturing prominent. Foot dark purple in colour.

Buccinidae (F.) sp. 1

AphiaID: 149 / ITIS TSN: 73726

White to pale peach in colour. Elongated shell and prominent spire, which tapers towards the apex.



Buccinidae (F.) sp. 2

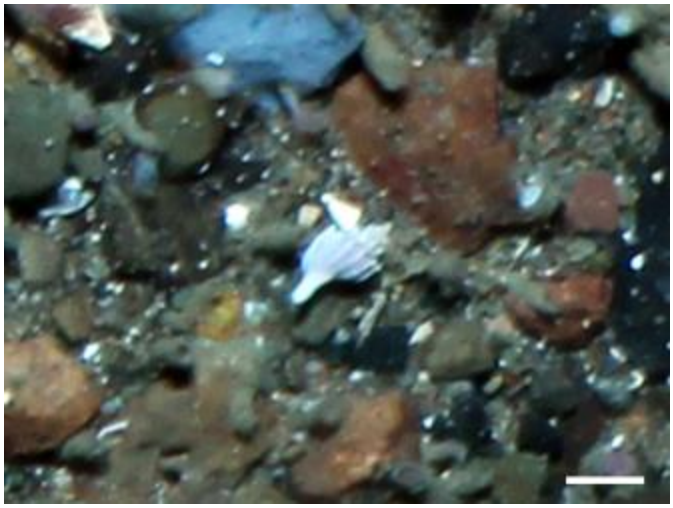
AphiaID: 149 / ITIS TSN: 73726

Brown-orange to bronze in colour. Elongated shell and prominent spire, which tapers towards the apex. Anterior canal appears large due to shell's morphology, but unable to be properly seen.

ITIS TSN 69459

Class Gastropoda Cuvier, 1797

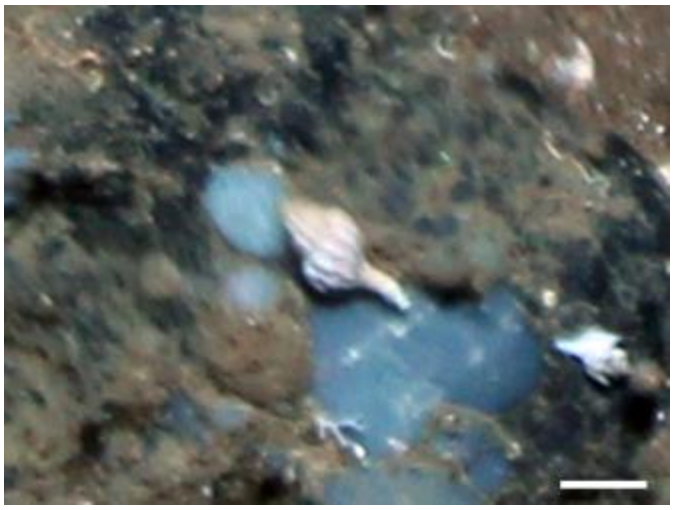
WORMS AphiaID 101



Boreotrophon cf. *clathratus* Linnaeus, 1767

AphiaID: 146732/ ITIS TSN: 73331

Small shell with a crested spire. At least 3 whorls on spire.



Boreotrophon cf. *truncatus* Strøm, 1768

AphiaID: 146733 / ITIS TSN: 73335

Medium-small brown-red shell with at least three whorls on spire. Sculpturing prominent.

Trochidae (F.) sp. 1

AphiaID: 443 / ITIS TSN: 69794

Round, light grey, slightly iridescent shell with horizontal sculpturing. At least two, likely three, whorls on spire.

ITIS TSN 69459

Class Gastropoda Cuvier, 1797

WORMS AphiaID 101

Flabellinidae (F.) sp. 1

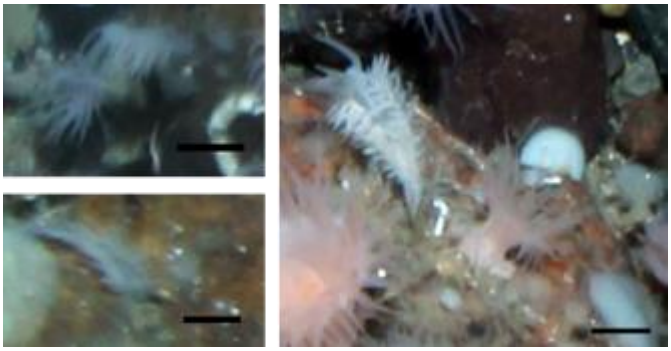
AphiaID: 190 / ITIS TSN: 78644

Thin white body. Pink cerata cover body except on the head. Appears to have two or three anterior tentacles. Body tapers noticeably at the posterior end.

Nudibranchia (O.) sp. 1

AphiaID: 1762 / ITIS TSN: 78156

White-bodied nudibranch. Pink cerata with white tips cover body except head. Appears to have 1 pair of anterior tentacles.



Nudibranchia (O.) spp.

AphiaID: 1762 / ITIS TSN: 78156

White-bodied nudibranchs. Several species presumed present. Peach cerata cover body except head. Appears to have one pair of anterior tentacles. Similar to Nudibranchia (O.) sp. 1, but cerata lack white tips. Likely a member of Family Flabellinidae.

ITIS TSN 69459

Class Gastropoda Cuvier, 1797

WORMS AphiaID 101

Gastropoda (C.) sp. 1

Elongate shell. Off-white base with a light brown spire. At least six whorls on spire.

Gastropoda (C.) sp. 2

Small white shell with at least three whorls on spire. Sculpturing prominent.

ITIS TSN 78807

Class Polyplacophora Gray, 1821

WORMS AphiaID 55

Polyplacophora (C.) sp. 1

Small chiton (~ 1-1.5 cm) on rock. Vales white or brown in colour.

Polyplacophora (C.) sp. 2

Large (nearly 4 cm) chiton on rock with vales white and brown in colour. Thick girdle, light brown in colour and textured, likely ornamented with spicules.

PHYLUM NEMERTEA

The Nemertea comprised 1% of the total number of taxa identified from the images (Figure 7). Three species of these ribbon worms were distinguished but classification could only be taken to the level of phylum (Table 14).

Table 14: Abundance of taxa belonging to phylum Nemertea, standardised to 1 m^2. Note that IR = Inside Reef, IC = Inside Closure, and OC = Outside Closure.

Taxa	2015			2009	2003	
	IR	IC	OC	IR	IR	OC
Nemertea (P.) sp. 1	9	6	0	0	0	0
Nemertea (P.) sp. 2	5	8	2	0	3	0
Nemertea (P.) sp. 3	0	3	1	0	0	0

ITIS TSN 57411

Phylum Nemertea

WORMS AphiaID 152391

Nemertea (P.) sp. 1

White-blue ribbon worm. Segmentation not apparent.

Nemertea (P.) sp. 2

Pink ribbon worm. Segmentation not apparent. Aboral side appears white, but is never fully visible.

Nemertea (P.) sp. 3

Orange ribbon worm, curled up. Segmentation not apparent. Not all features could be detected due to its curled state.

PHYLUM PORIFERA

The Porifera was the most diverse phylum in these data and comprised 30% of the total number of taxa identified from the images (Figure 7). The cushion and thin sheet morphotypes were abundant and all taxa increased in abundance over time (Table 15).

Table 15: Abundance of taxa belonging to phylum Porifera, standardised to 1 m^2. Note that IR = Inside Reef, IC = Inside Closure, and OC = Outside Closure.

Taxa	2015			2009	2003	
	IR	IC	OC	IR	IR	OC
Cladorhizidae (F.) sp. 1	88	40	0	36	12	19
Cladorhizidae (F.) sp. 2	0	0	3	2	0	0
Cladorhizidae (F.) sp. 3	25	20	0	5	3	0
Hymedesmia sp. 1	1	2	0	0	0	0
Hymedesmiidae (F.) sp. 1	84	194	81	78	0	0
Hymedesmiidae (F.) sp. 4	13	26	13	8	0	0
Hymedesmiidae (F.) sp. 11	84	113	36	25	2	3
Poecilosclerida (O.) sp. 1	1	2	0	0	0	0
Poecilosclerida (O.) sp. 2	35	3	1	31	3	14
Tentorium semisuberites	29	24	3	8	5	3
cf. *Polymastia andrica*	39	22	7	13	3	2
cf. *Polymastia uberrima*	29	11	1	13	9	3
cf. *Weberella bursa*	41	12	0	18	10	14
Polymastiidae (F.) sp. 4	10	4	0	5	0	0
Polymastiidae (F.) sp. 10	23	15	1	2	0	0
Polymastiidae (F.) sp. 18	0	2	0	0	0	0
Polymastiidae (F.) sp. 19	5	0	0	0	0	0
Polymastiidae (F.) sp. 20	0	0	0	0	2	0
Polymastiidae (F.) Type 3	13	5	1	0	5	0
Stylocordyla borealis / *Rhizaxinella* sp. 1	2	0	0	0	0	0
Tetillidae (F.) spp.	121	263	32	909	14	12
Astrophorina (S.O.) sp. 1	1	2	0	0	0	0
Astrophorina (S.O.) sp. 2	3	0	1	0	0	0
Asconema foliatum	1	8	19	15	2	0
Porifera (P.) sp. 62	15	6	8	13	0	0
Porifera Thin Sheet Type 1	4551	4338	1774	881	563	882
Porifera Thin Sheet Type 2	199	127	205	28	2	0
Demospongiae (C.) sp. 1	3	2	0	0	3	0
Demospongiae (C.) sp. 2	30	23	7	0	0	5
Demospongiae (C.) sp. 3	3	6	0	0	0	2

Demospongiae (C.) sp. 7	6	17	5	0	0	0
Demospongiae (C.) sp. 8	271	711	288	50	60	103
Demospongiae (C.) sp. 9	19	20	1	0	0	0
Demospongiae (C.) sp. 10	10	7	2	0	0	7
Demospongiae (C.) sp. 11	39	46	2	0	0	0
Demospongiae (C.) sp. 20	37	41	7	17	0	7
Demospongiae (C.) sp. 21	14	14	7	86	0	9
Demospongiae (C.) sp. 22	8	6	0	0	0	0
Porifera (P.) sp. 31	88	89	79	7	28	5
Porifera (P.) sp. 35	87	37	9	10	2	0
Porifera (P.) sp. 43	10	22	2	0	0	0
Porifera (P.) sp. 149	16	0	0	0	0	0
Porifera Cushion spp.	4301	2928	806	931	528	392
Demospongiae (C.) sp. 12	165	185	26	38	0	0
Demospongiae (C.) sp. 13	7	11	5	7	0	0
Demospongiae (C.) sp. 15	1	0	0	0	0	0
Demospongiae (C.) sp. 16	17	51	0	12	2	7
Demospongiae (C.) sp. 17	3	6	3	2	0	0
Demospongiae (C.) sp. 18	19	7	5	0	0	0
Demospongiae (C.) sp. 24	21	32	11	2	5	3
Demospongiae (C.) sp. 25	62	84	11	0	0	7
Demospongiae (C.) sp. 31	6	4	1	0	0	0
Demospongiae (C.) sp. 33	1	2	0	0	0	0
Demospongiae (C.) sp. 36	88	67	12	0	0	0
Porifera (P.) sp. 63	8	2	0	0	0	0
Demospongiae (C.) sp. 19	9	23	14	0	0	0
Demospongiae (C.) sp. 26	14	40	6	8	0	0
Demospongiae (C.) sp. 27	1	0	0	0	0	0
Demospongiae (C.) sp. 28	17	10	7	18	0	0
Demospongiae (C.) sp. 30	218	218	21	12	17	33
Demospongiae (C.) sp. 34	0	0	17	0	0	0
Porifera (P.) sp. 165	6	7	1	0	0	0
Demospongiae (C.) sp. 35	18	27	3	0	0	0
Porifera (P.) sp. 12	134	69	9	61	2	5
Porifera (P.) sp. 114	23	16	3	0	0	0
Porifera (P.) sp. 119	7	29	0	0	0	0
Porifera (P.) sp. 155	2	2	0	5	0	0

ITIS TSN 48262

Family Cladorhizidae Dendy, 1922

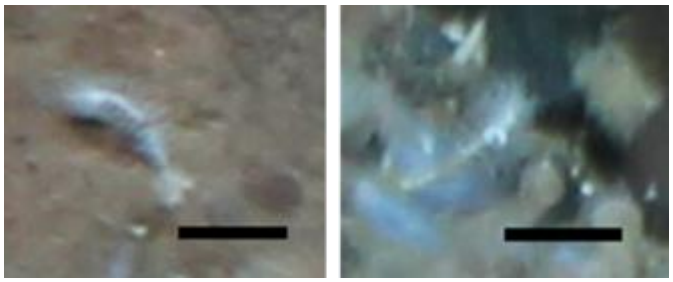
WORMS AphiaID 131644

Cladorhizidae (F.) sp. 1

Long, thin, erect white sponge. Stalk appears ‘fuzzy’, because of protrusions coming out of stem. If clear enough, instead of ‘fuzzy’ can see small spicules protruding from stalk. Often has a slightly bulge at the apical tip. Likely *Lycopodina lycopodium*.

Cladorhizidae (F.) sp. 2

Erect and branching carnivorous sponge; white in colour.



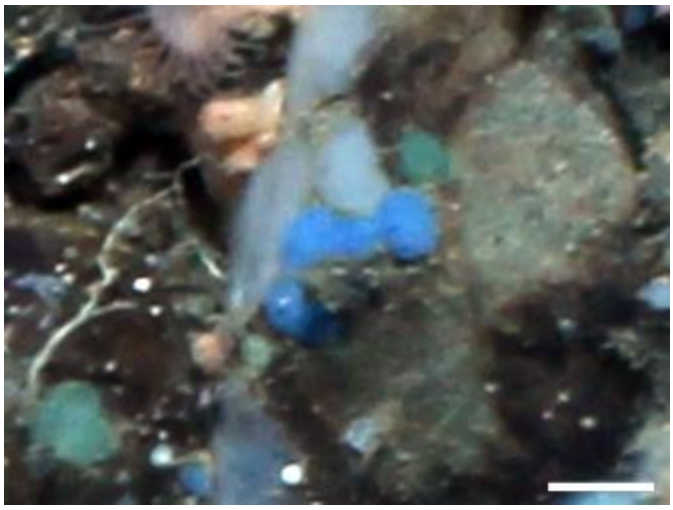
Cladorhizidae (F.) sp. 3

Small carnivorous sponge with white stalks that display feather-like branching.

ITIS TSN 48301

Family Hymedesmiidae Topsent, 1928

WORMS AphiaID 131655

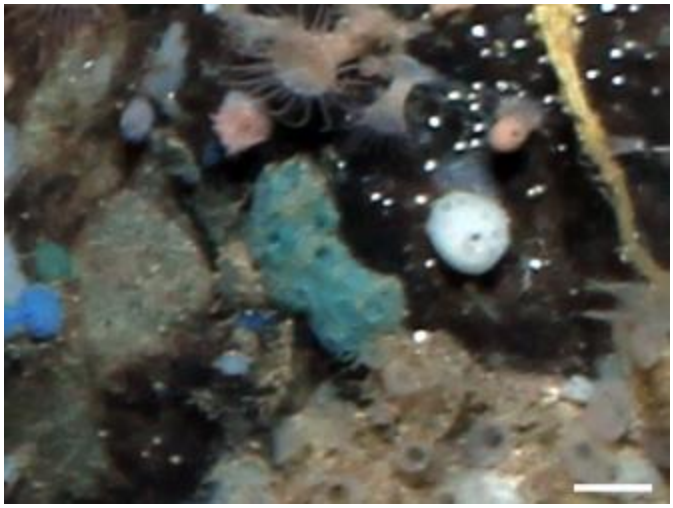


Hymedesmia sp. 1

Bowerbank, 1864

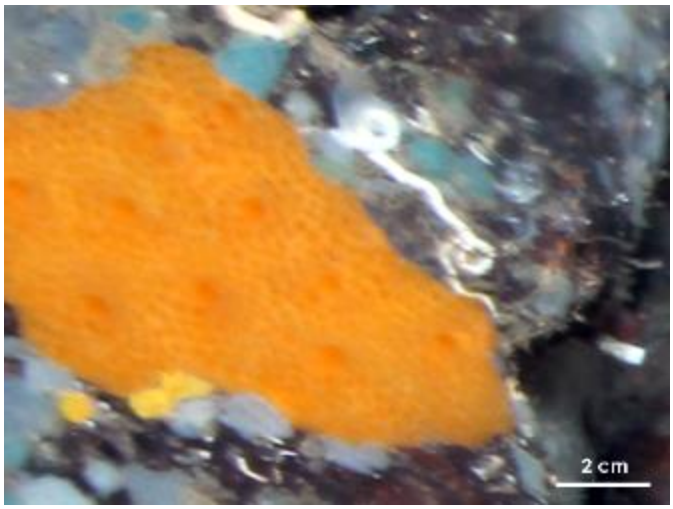
AphiaID: 131950 / ITIS TSN: 48056

Characteristic bright blue colour.



Hymedesmiidae (F.) sp. 1

Green to teal-coloured cushion sponge with pore sieves.



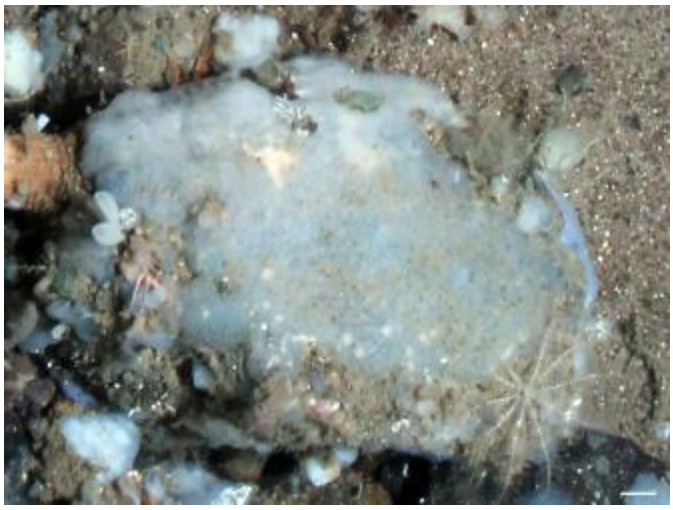
Hymedesmiidae (F.) sp. 4

Yellow cushion encrusting sponge with large pore sieves.

ITIS TSN 48301

Family Hymedesmiidae Topsent, 1928

WORMS AphiaID 131655



Hymedesmiidae (F.) sp. 11

Cushion sponge with chimney oscula. Pores are visible, and sometimes sediment-covered.

ITIS TSN 47862

Order Poecilosclerida Topsent, 1928

WORMS AphiaID 131599

Poecilosclerida (O.) sp. 1

Massive sponge, pale yellow in colour, with clearly-defined pores. The oscula are prominent and have raised edges. A thin outer membrane appears to be present. Possibly belongs to genus *Melonanchora* or *Mycale*.

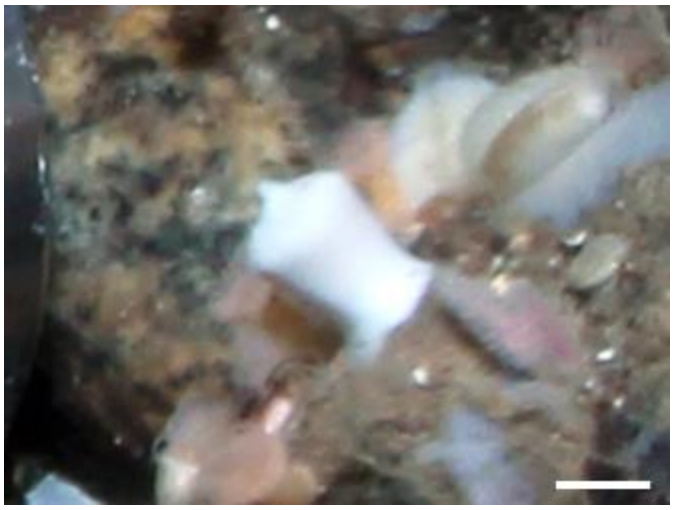
Poecilosclerida (O.) sp. 2

White/off-white massive sponge with defined grooves. Large deep oscula with raised edges. Likely *Mycale (Mycale) lingua.*

ITIS TSN 48505

Family Polymastiidae Gray, 1867

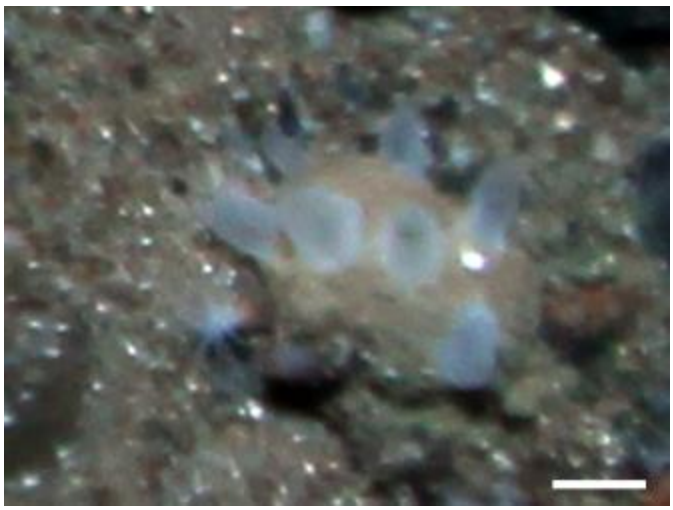
WORMS AphiaID 131673



Tentorium semisuberites
Schmidt, 1870

AphiaID: 134224 / ITIS TSN: 48497

Cylindrical sponge, white or off-white in colour, with a single papilla on the crown. Found attached to hard substrate.



cf. *Polymastia andrica*
de Laubenfels, 1949

AphiaID: 157415 / ITIS TSN: N/A

Sponge partially-buried or covered in sediment. The papillae are white/white-blue in colour and appear hollow and semi-translucent. The papillae are usually found in rows, and are generally even in size.

cf. *Polymastia uberrima*
Schmidt, 1870

AphiaID: 134214 / ITIS TSN: N/A

Hemispherical sponge with a slightly convex upper surface. The upper surface is dominated by one large central papilla, surrounded by several smaller ones. A crown of spicules surrounds the base.

ITIS TSN 48505

Family Polymastiidae Gray, 1867

WORMS AphiaID 131673

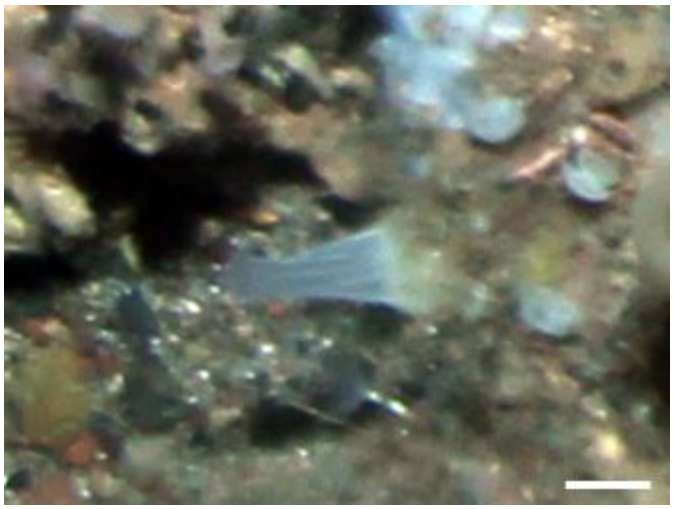
cf. *Weberella bursa*
Linnaeus, 1758

AphiaID: 134232 / ITIS TSN: N/A

Large, globular, dense sponge. Numerous very short papillae cover the entire surface. Many papillae appear fairly wide, though many are not and are likely closed. Large pores visible beneath the surface.

Polymastiidae (F.) sp. 4

White/white-blue, semi-translucent papillae protruding from a white-bodied sediment-covered sponge. The papillae are quite long, often as long or longer than the body height, and the tips of the papillae are often tapered.



Polymastiidae (F.) sp. 10

Small white body, mostly sediment-covered. Long, single, semi-translucent papilla. Papilla tapers towards the tip before widening slightly. Possibly juveniles of *Polymastia uberrima*, *Polymastia andrica* or a species of *Sphaerotylus*.

ITIS TSN 48505

Family Polymastiidae Gray, 1867

WORMS AphiaID 131673

Polymastiidae (F.) sp. 18

Spherical to globular off-white sponge with short numerous papillae. Likely juvenile *Weberella bursa* or *Polymastia thielei.* Thought not to be juvenile *P. uberrima* because of absence of marginal hispid collar.

Polymastiidae (F.) sp. 19

Small, globular sponge, off-white in colour, with several wide and translucent papillae. Pores are prominent on the sponge's surface.

Polymastiidae (F.) sp. 20

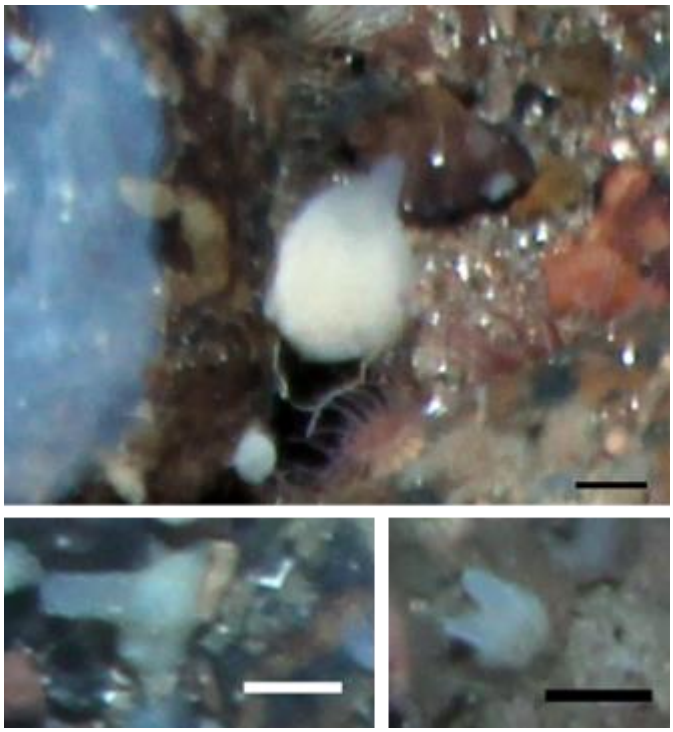
Massive-globular sponge, off-white/tan in colour, with numerous conical papillae. Possibly *Weberella bursa*.

Year Collected: 2003

ITIS TSN 48505

Family Polymastiidae Gray, 1867

WORMS AphiaID 131673



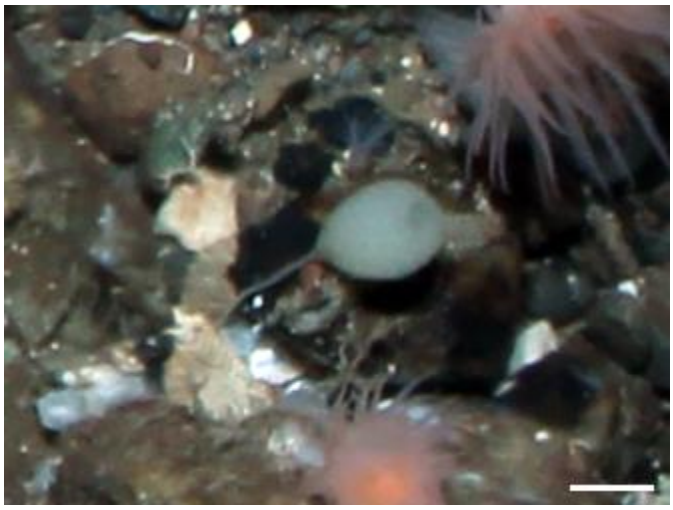
Polymastiidae (F.) Type 3

Group of globular off-white sponges with at least two prominent papillae that cannot be differentiated into finer taxonomic groupings.

ITIS TSN N/A

Order Suberitida Chombard & Boury-Esnault, 1999

WORMS AphiaID 845509



Stylocordyla borealis / Rhizaxinella sp. 1

Lovén, 1868 / Keller, 1880

AphiaID: 134240 / 132071
ITIS TSN: 204074 / 659300

Stalked sponge with oval body at the end of the stalk. Single apical osculum on main body.

ITIS TSN N/A

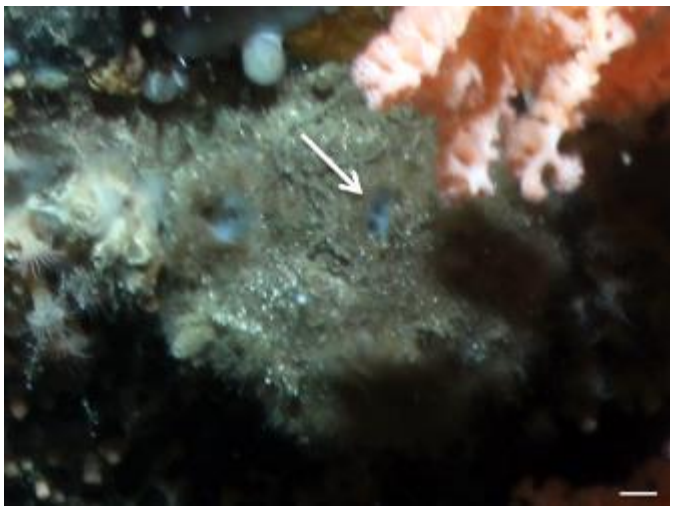
Order Tetractinellida Marshall, 1876

WORMS AphiaID 597812

Tetillidae (F.) spp.

AphiaID: 131683 / ITIS TSN: 48596

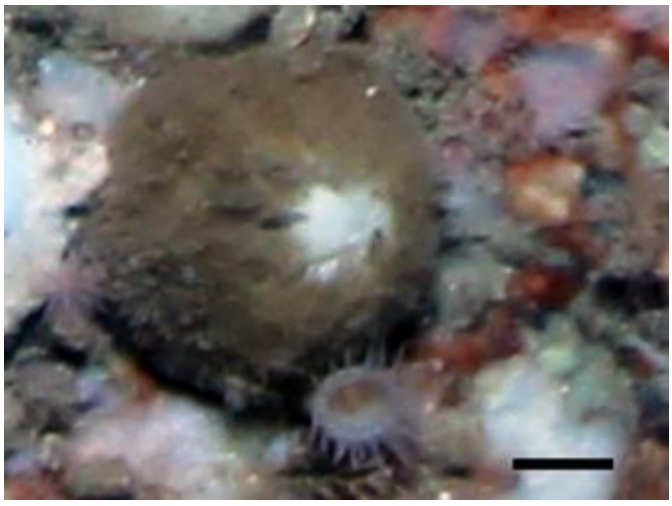
White sponge. Globular to cylindrical with a slightly narrower base than top. Very porous surface on top. Some with suspected papillae/chimney oscula. Could be multiple species.



Astrophorina (S.O.) sp. 1

AphiaID: 131602 / ITIS TSN: N/A

Sediment-covered sponge with massive-lobose morphology. Osculum visible (arrow).



Astrophorina (S.O.) sp. 2

AphiaID: 131602 / ITIS TSN: N/A

Sponge is massive-globular. It appears sediment-covered or hispid over most of its surface, with a small exposed area on the crown that may contain an oscular opening.

ITIS TSN 659654

Asconema Kent, 1870

WORMS AphiaID 132122

Asconema foliatum
Fristedt, 1887

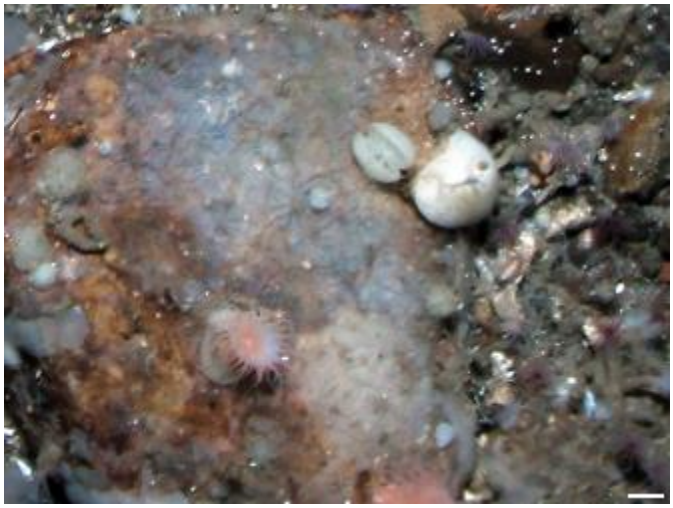
AphiaID: 172017 / ITIS TSN: N/A

Thin-walled sponge that is white to off-white in colour. The habit consists of funnel-shaped projections with fluted openings. Smaller individuals are often hispid, while larger individuals are not.

ITIS TSN 46861

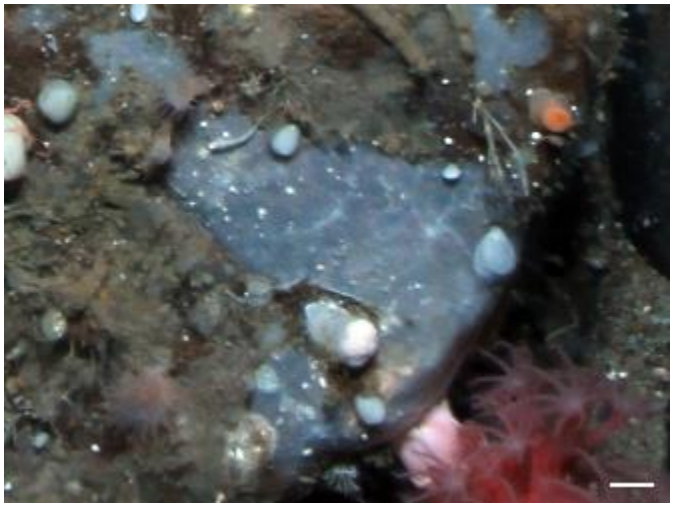
Phylum Porifera Grant, 1836

WORMS AphiaID 558



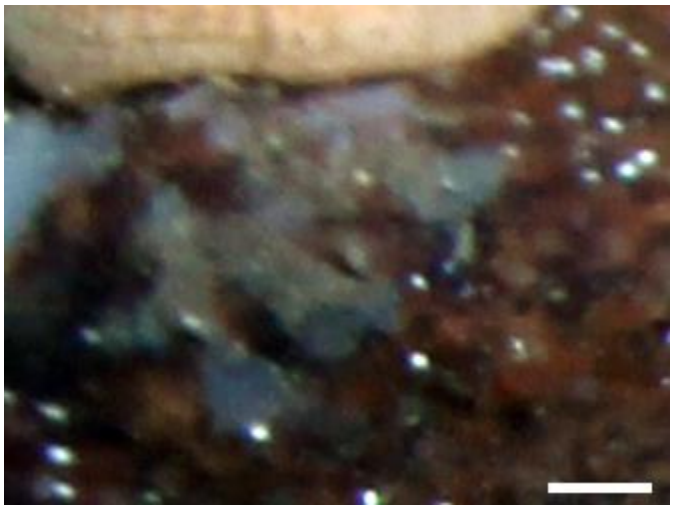
Porifera (P.) sp. 62

Distinct venation pattern and cushion-encrusting morphology. Colour ranges from off-white to blue-white and reddish-brown. Oscula visible some with pronounced chimneys.



Porifera Thin Sheet Type 1

Sponge translucent and white to blue-white in colour, with some venation present. Surface appears relatively smooth.



Porifera Thin Sheet Type 2

Lateral growth, >3 mm thick with sediment covering most of the surface.

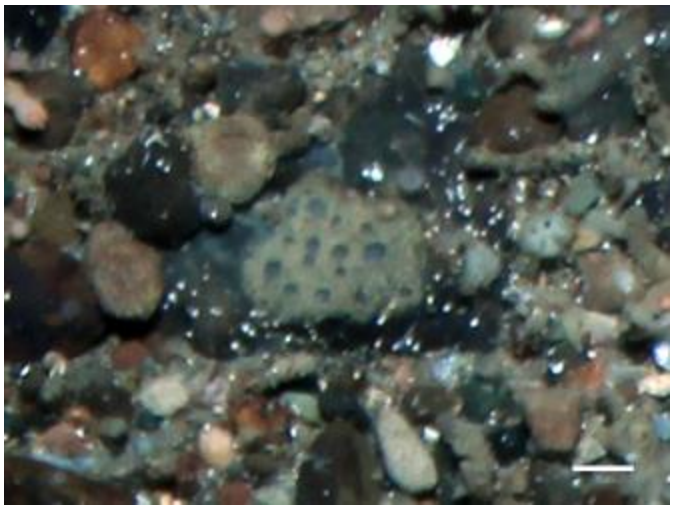
ITIS TSN 47528

Class Demospongiae Sollas, 1885

WORMS AphiaID 164811

Demospongiae (C.) sp. 1

White, semi-translucent sponge with fairly large chimney oscula, and a verrucose surface.



Demospongiae (C.) sp. 2

Blue thin encrusting sponge with sediment covering the surface except for its large pores.

Demospongiae (C.) sp. 3

Cushion morphology. Sponge white to off-white in colour with thin spikes covering the surface.

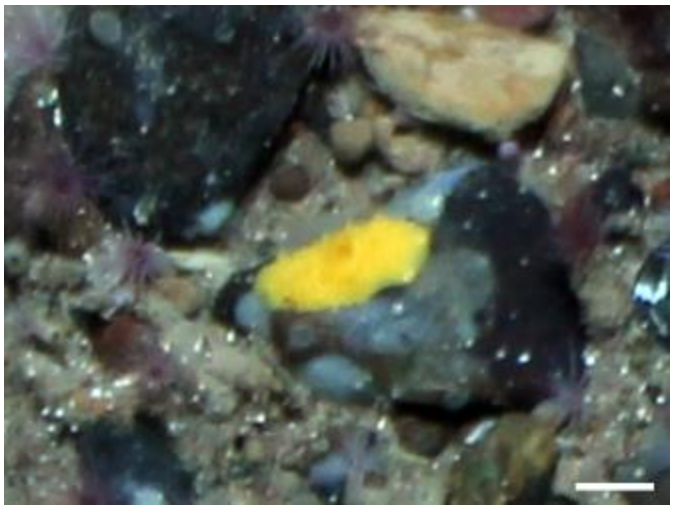
ITIS TSN 47528

Class Demospongiae Sollas, 1885

WORMS AphiaID 164811

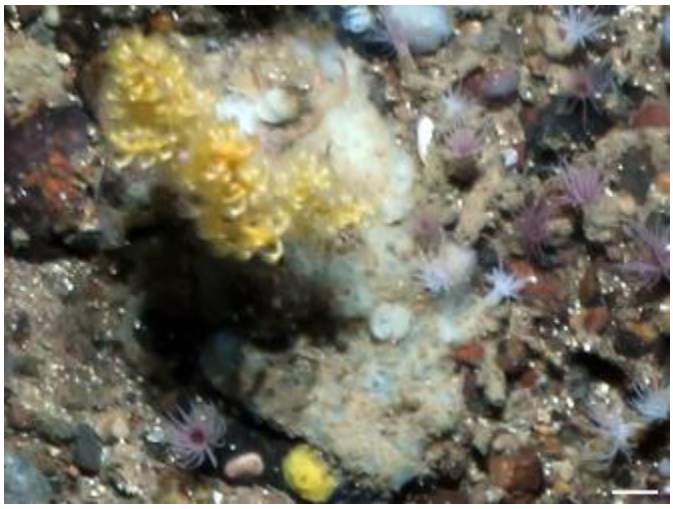
Demospongiae (C.) sp. 7

White, thicker cushion sponge with numerous flat oscula, and a thin layer of sediment or a sediment-coloured irregular pattern on the surface of the sponge.



Demospongiae (C.) sp. 8

Cushion sponge encrusting on rock. Yellow in colour with a few oscula visible.



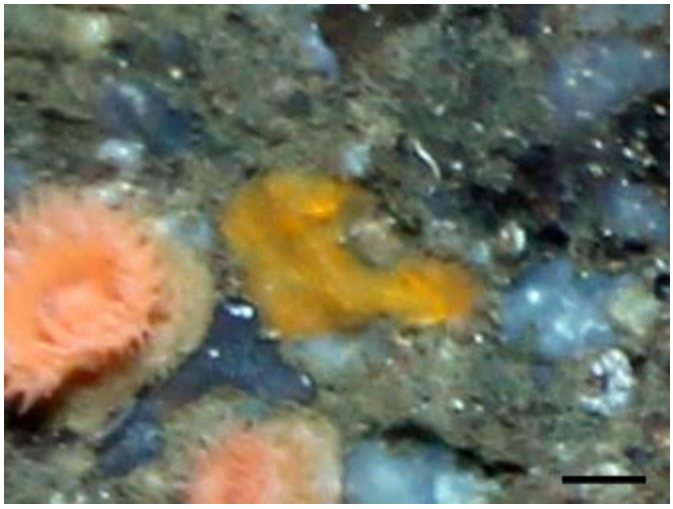
Demospongiae (C.) sp. 9

Off-white, often with a slight blue tinge. Cushion to massive morphology. Numerous deep oscula and often with slight lines/venation. Sediment-covered.

ITIS TSN 47528

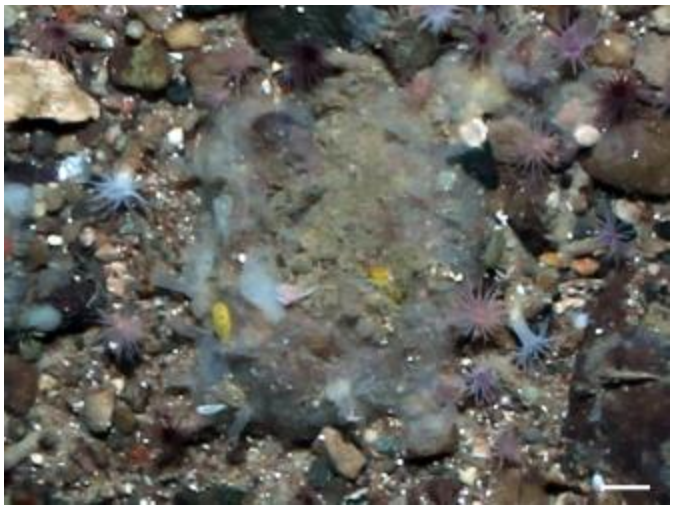
Class Demospongiae Sollas, 1885

WORMS AphiaID 164811



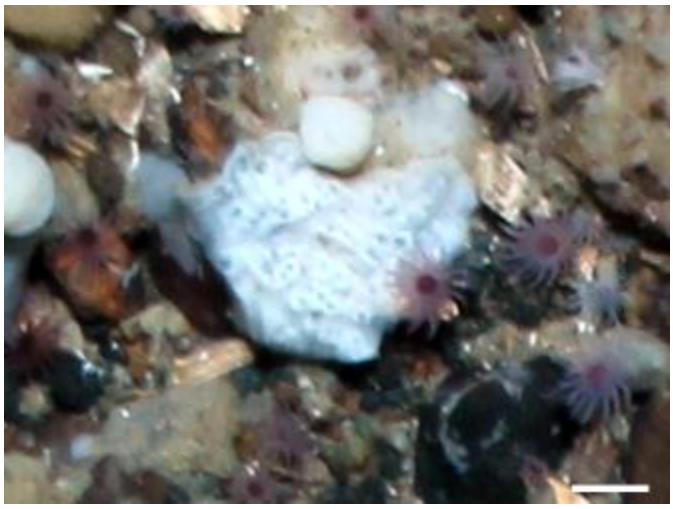
Demospongiae (C.) sp. 10

Orange encrusting sponge. Oscula visible on surface.



Demospongiae (C.) sp. 11

Cushion morphology. Cloudy, off-white, semi-translucent with several relatively long protrusions. Surface not smooth, and the sponge grows in an irregular shape.



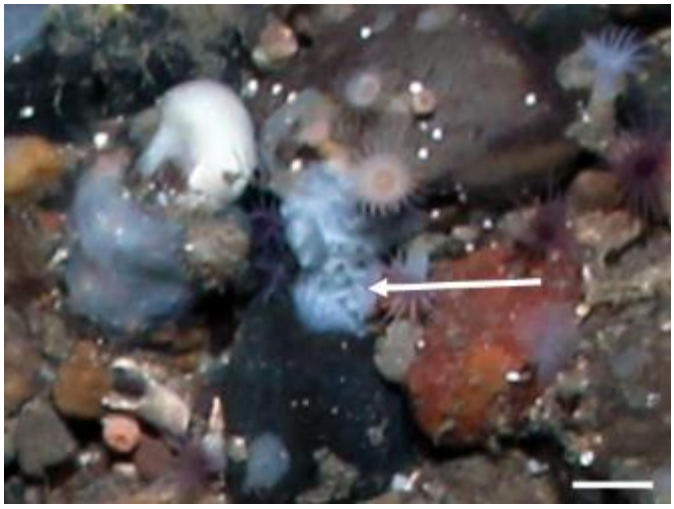
Demospongiae (C.) sp. 20

White, opaque sponge. Fairly small, but deep oscula. Edges of sponge ruffled/uneven with a semi-translucent membrane around the ruffled edges.

ITIS TSN 47528

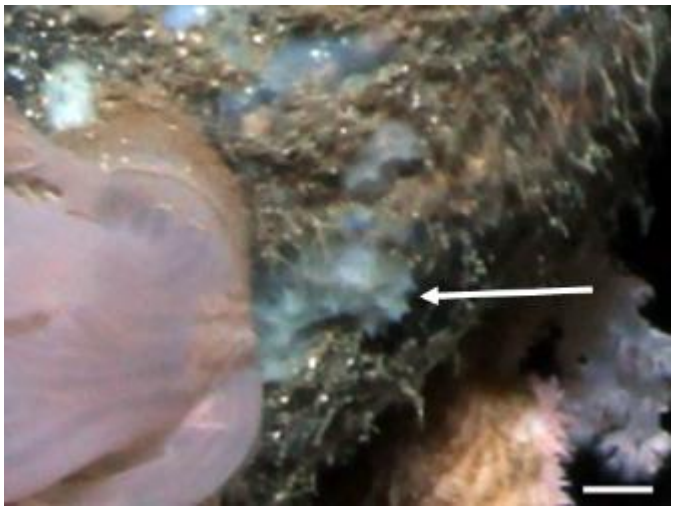
Class Demospongiae Sollas, 1885

WORMS AphiaID 164811



Demospongiae (C.) sp. 21

White, laterally-spreading sponge that is often partially-translucent. Has ridges, or numerous small lobed protrusions.



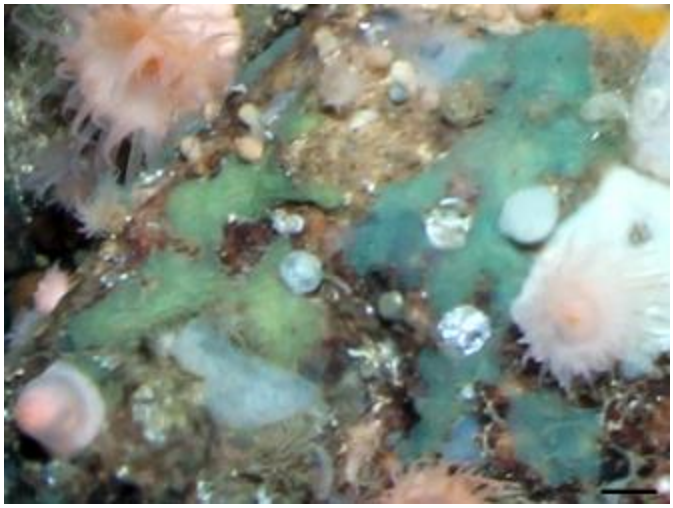
Demospongiae (C.) sp. 22

Sponge's growth is predominantly lateral, and specimens are conulate (have distinctive pyramidal cone-shaped projections).

ITIS TSN 46861

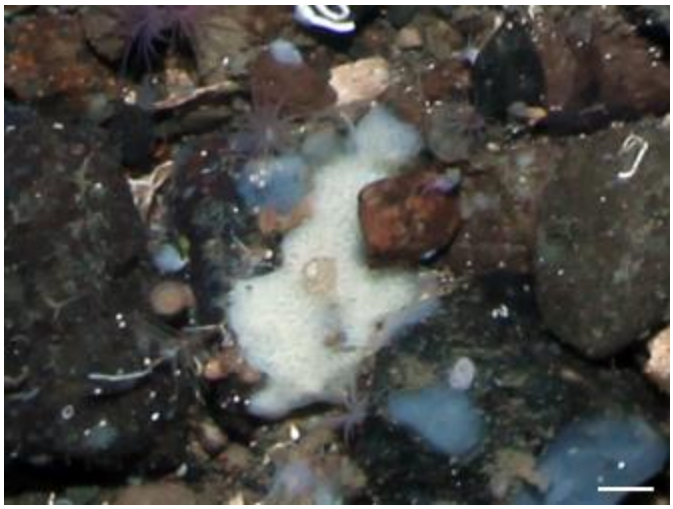
Phylum Porifera Grant, 1836

WORMS AphiaID 558



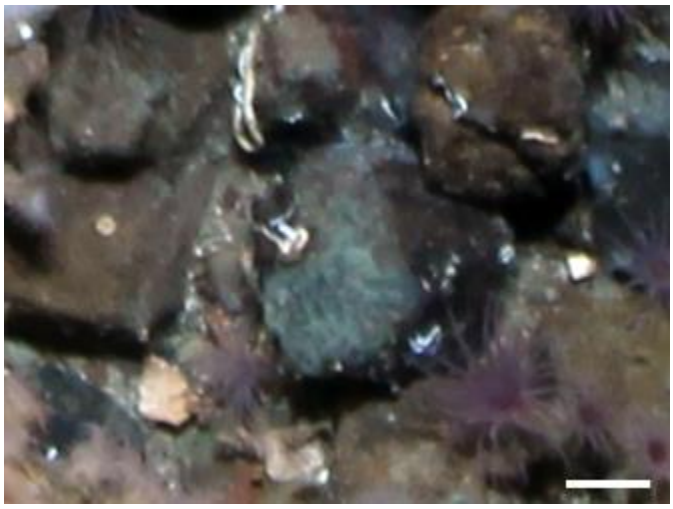
Porifera (P.) sp. 31

Bright green to teal-green cushion sponge, probably not a hymedesmiid. Pores are present, but it is not clear whether they are pore sieves.



Porifera (P.) sp. 35

White, opaque, cushion encrusting sponge. Fairly large oscula with distinct edges visible.



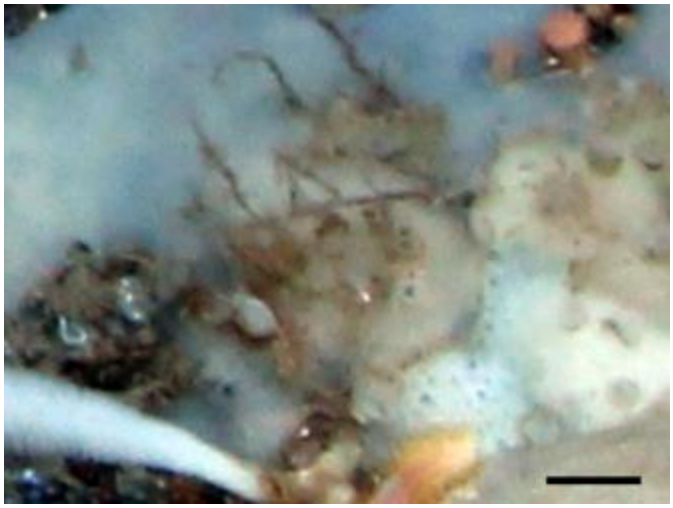
Porifera (P.) sp. 43

Grey to green in colour, with a bumpy/dappled surface.

ITIS TSN 46861

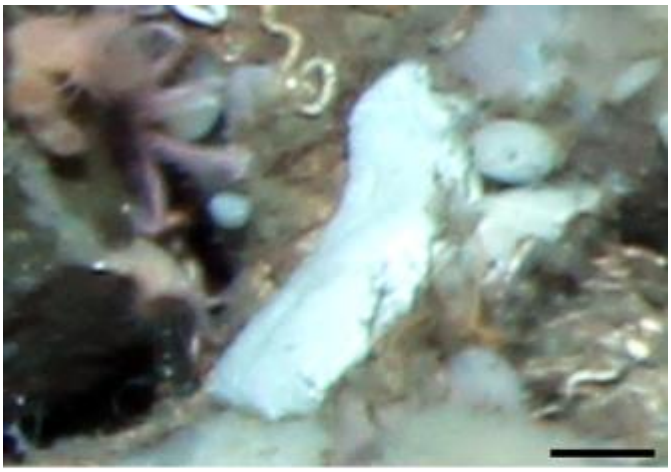
Phylum Porifera Grant, 1836

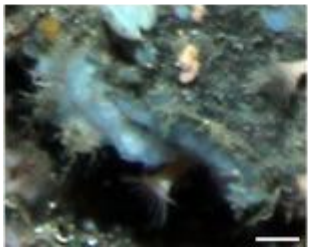
WORMS AphiaID 558



Porifera (P.) sp. 149

Off-white cushion sponge. Surface appears slightly ‘fuzzy’. Distinctly raised edges around the pores.





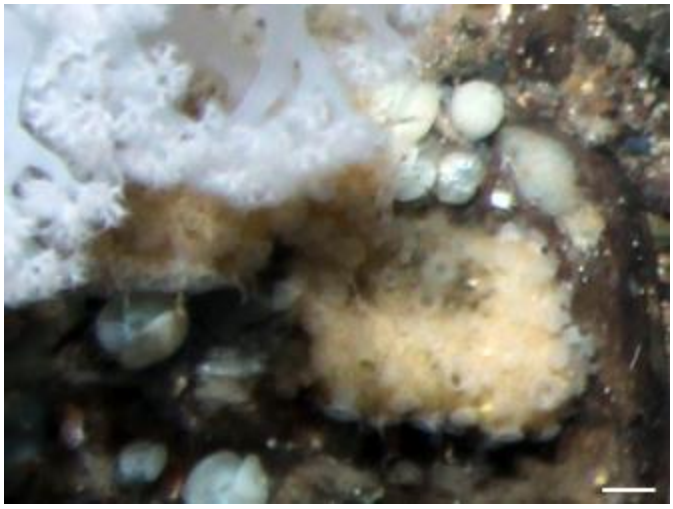
Porifera Cushion spp.

Sponges characterised by a clump or sheet-like morphology that appear deeper than 3 mm. They are typically white or off-white in colour and have indistinct features.

ITIS TSN 47528

Class Demospongiae Sollas, 1885

WORMS AphiaID 164811



Demospongiae (C.) sp. 12

Semi-translucent chimney oscula, protruding from sediment covered mass.

Demospongiae (C.) sp. 13

White, massive sponge with numerous irregular projections. Oscula/pores visible.

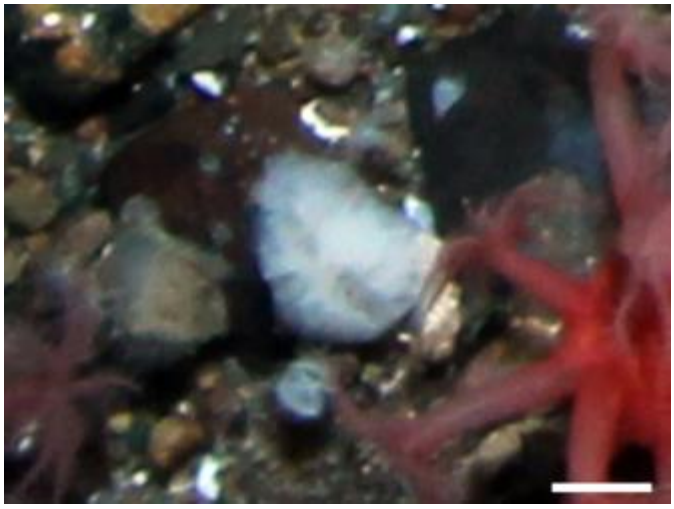
Demospongiae (C.) sp. 15

Off-white globular to lobate sponge. Large deep depression on the surface. Oscula prominent and positioned around the edges of the sponge.

ITIS TSN 47528

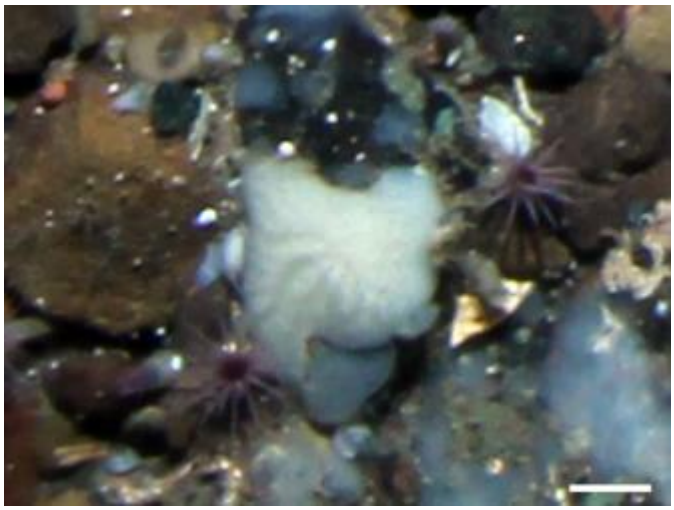
Class Demospongiae Sollas, 1885

WORMS AphiaID 164811



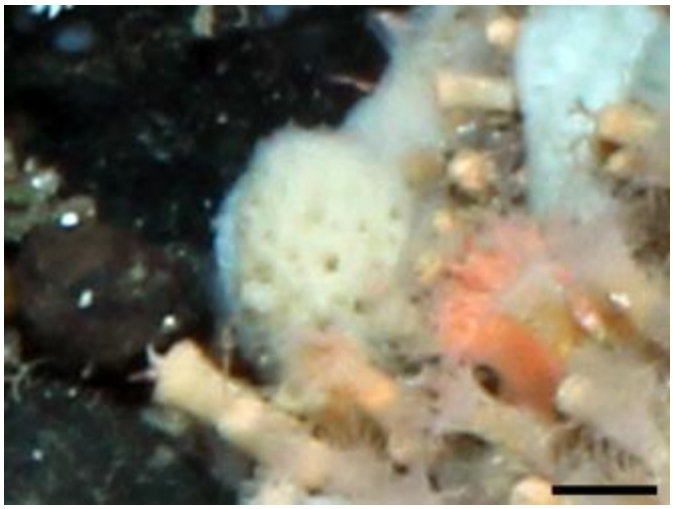
Demospongiae (C.) sp. 16

Opaque white sponge with ruffled edges and a semi-translucent layer. Lacks distinct deep oscula. Semi-translucent layer seems to encompass all of the sponge, not just the edges.



Demospongiae (C.) sp. 17

White thick cushion to massive sponge. Opaque with venation/canal patterns visible. Oscula visible.



Demospongiae (C.) sp. 18

Globular, off-white sponge with large deep pores. Surface appears slightly hispid.

ITIS TSN 47528

Class Demospongiae Sollas, 1885

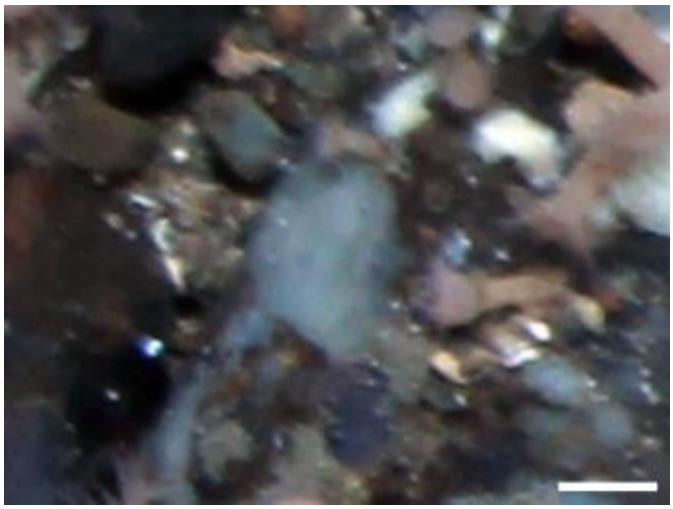
WORMS AphiaID 164811

Demospongiae (C.) sp. 24

Cushion to globular in morphology. Off-white to beige in colour. Cylindrical, short, semi-translucent to more opaque oscular chimneys cover the surface. Most of the oscular chimneys are regular in size, with a few noticeably larger ones.

Demospongiae (C.) sp. 25

White to off-white in colour. The sponge is completely opaque, and its surface is hispid, or ‘fuzzy’.



Demospongiae (C.) sp. 31

Grey/semi-translucent in colour, with a relatively smooth surface. Often with at least one opening (either osculum or pore) on the crown surface.

ITIS TSN 47528

Class Demospongiae Sollas, 1885

WORMS AphiaID 164811

Demospongiae (C.) sp. 33

Opaque, white/off-white, and globular in shape with several small lobe-like projections. A prominent osculum is found at the centre of the crown.

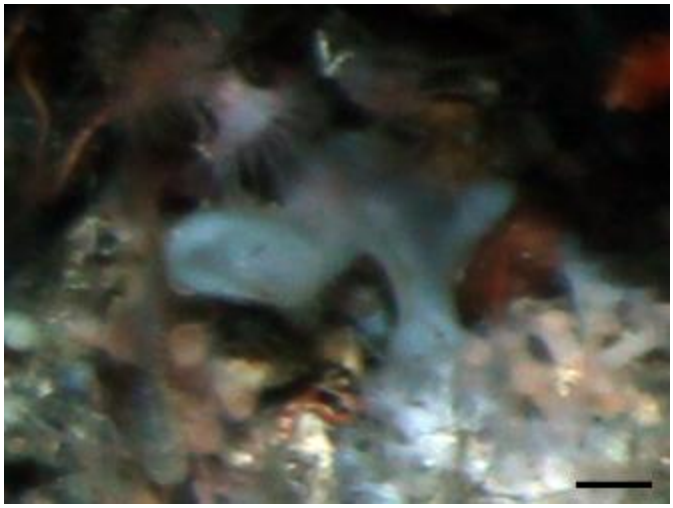
Demospongiae sp. 36

White to off-white in colour. Cushion to massive sponge with large oscula. Outer layer is usually a bit semi-translucent. Numerous semi-translucent, chimney oscula.

ITIS TSN 46861

Phylum Porifera Grant, 1836

WORMS AphiaID 558



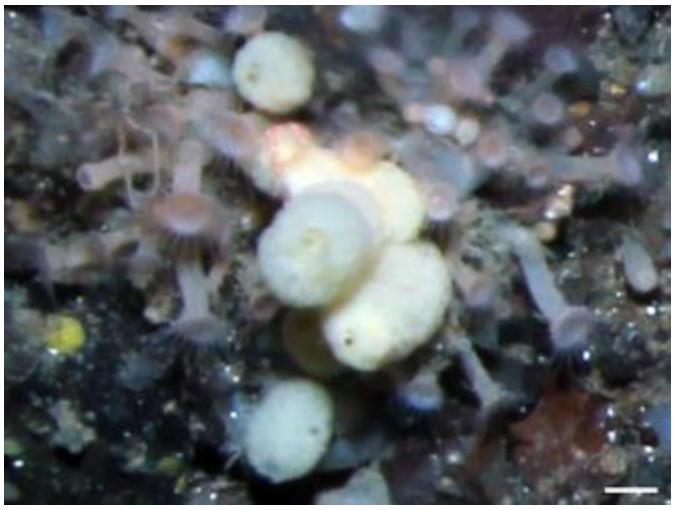
Porifera (P.) sp. 63

White/cream, massive sponge with large, deep oscula visible on surface.

ITIS TSN 47528

Class Demospongiae Sollas, 1885

WORMS AphiaID 164811

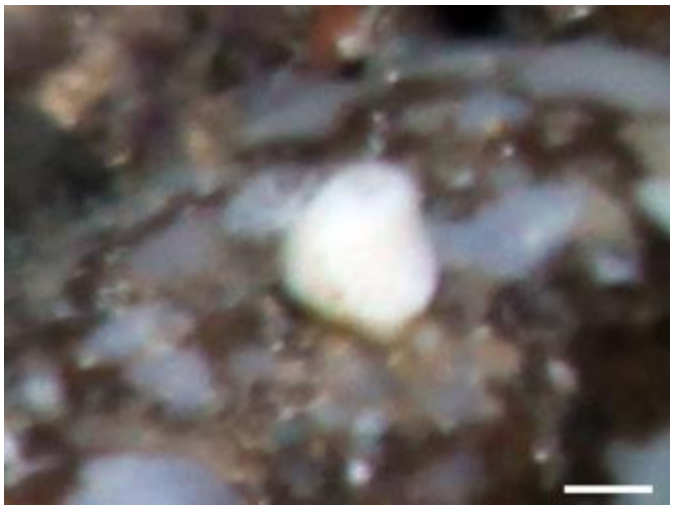


Demospongiae (C.) sp. 19

Globular, with fuzzy surface and deep holes that protrude.

Demospongiae (C.) sp. 26

Globular/ball-shaped sponge. Small oscular chimneys with fluted edges cover surface. Deep osculum on uppermost surface. Similar to Demospongiae sp. 7 from Flemish Pass.



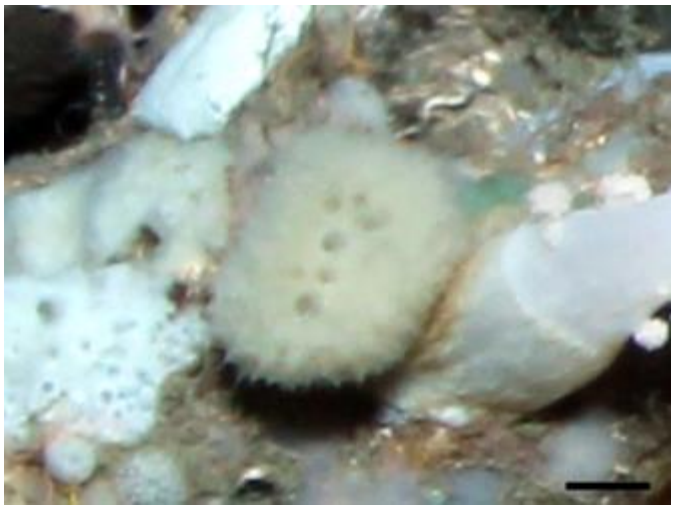
Demospongiae (C.) sp. 27

White pear-shaped sponge with a deep oscule with raised edges at the tip.

ITIS TSN 47528

Class Demospongiae Sollas, 1885

WORMS AphiaID 164811

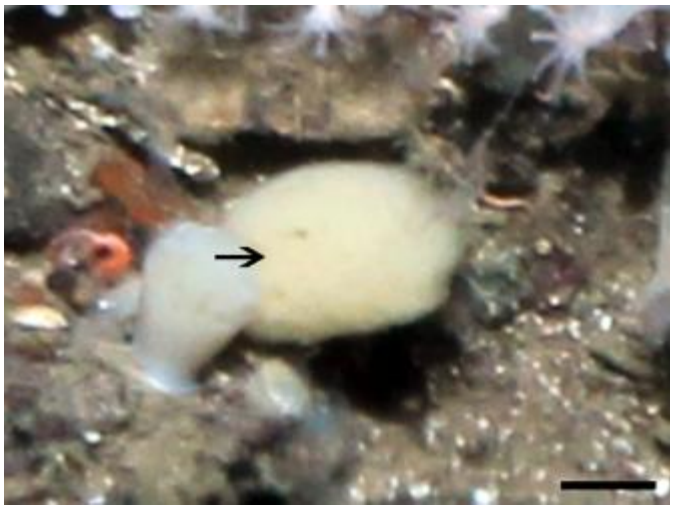


Demospongiae (C.) sp. 28

Globular off-white sponge. Surface is not smooth or spiny. Oscula visible. Likely genus *Melonanchora*.

Demospongiae (C.) sp. 30

Small, irregularly-rounded sponge with smooth surface and one prominent osculum at the centre of the crown. Smaller oscula and/or pores are also visible around it. Possibly a polymastiid.



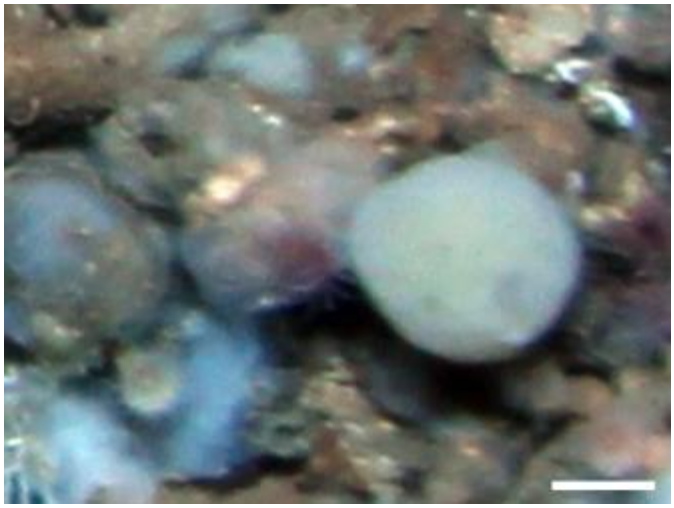
Demospongiae (C.) sp. 34

Small, rounded sponge, white/off-white in colour, with at least one opening (osculum or pore) visible on the surface. Possibly an adult form of Demospongiae (C.) sp. 30, or a tetillid.

ITIS TSN 46861

Phylum Porifera Grant, 1836

WORMS AphiaID 558



Porifera (P.) sp. 165

Small globular sponge with one or a few small chimney oscula.

ITIS TSN 47528

Class Demospongiae Sollas, 1885

WORMS AphiaID 164811

Demospongiae (C.) sp. 35

Stalked sponge with small, rounded, cloud-like projections. A juvenile is shown here: as they mature, their branching pattern becomes more complex.

ITIS TSN 46861

Phylum Porifera Grant, 1836

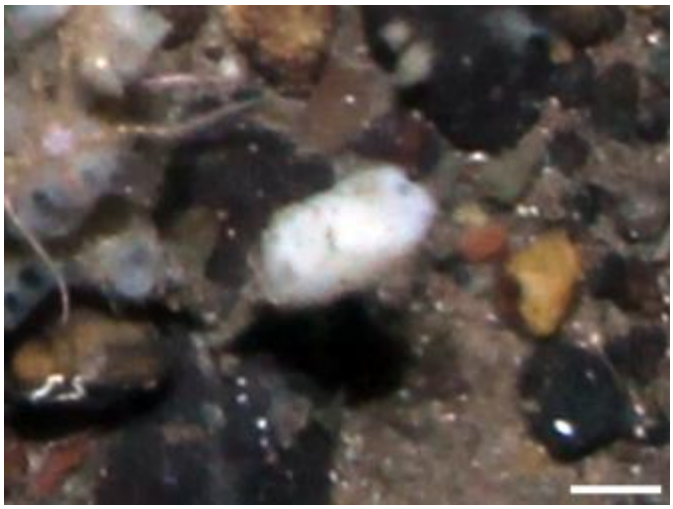
WORMS AphiaID 558

Porifera (P.) sp. 12

Tubular, white to off-white sponge with a single apical osculum. A stalk/peduncle is sometimes visible.

Porifera (P.) sp. 114

Tubular, pedunculate sponge supported by a thin, pale yellow stalk. White to off-white in colour. Ovate-shaped with a single apical osculum.



Porifera (P.) sp. 119

Ovate, pedunculate sponge with a long brown stalk. White in colour. Surface is hispid, or ‘fuzzy’.

ITIS TSN 46861

Phylum Porifera Grant, 1836

WORMS AphiaID 558

Porifera (P.) sp. 155

White pedunculate sponge. Stalk is fairly long compared to body size, and thick: at least the width of the basal portion of the sponge. Large apical oscula present.

UNIDENTIFIED TAXA

Unidentified taxa (Table 16) comprised 15% of the total number of taxa identified from the images (Figure 7).

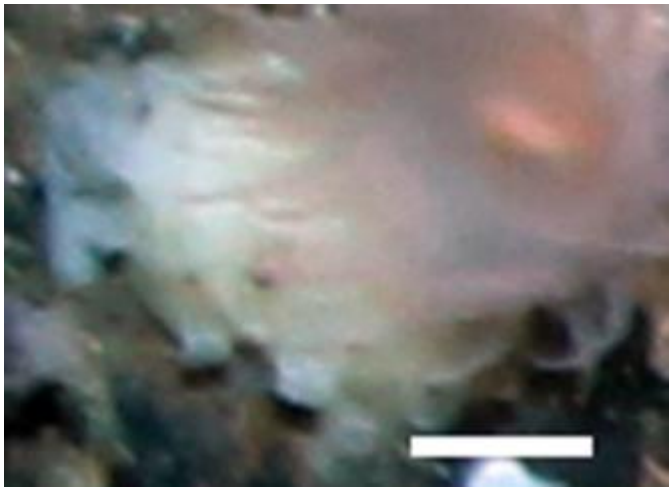
Table 16: Abundance of unidentified taxa, standardised to 1 m^2. Note that IR = Inside Reef, IC = Inside Closure, and OC = Outside Closure.

Taxa	2015			2009	2003	
	IR	IC	OC	IR	IR	OC
Unidentified 3	2	0	0	0	0	0
Unidentified 4	1	0	0	0	0	0
Unidentified 17	21	12	2	8	0	0
Unidentified 18	532	165	35	78	0	3
Unidentified 20	2	0	0	0	0	0
Unidentified 25	0	1	0	0	0	0
Unidentified 28	6	0	0	0	0	0
Unidentified 30	3	2	0	2	0	0
Unidentified 33	31	219	42	0	9	2
Unidentified 34	3	2	5	0	2	2
Unidentified 37	12	6	0	0	3	7
Unidentified 48	5	6	0	0	0	0
Unidentified 51	45	20	1	0	2	0
Unidentified 55	0	1	0	0	0	0
Unidentified 57	6	2	0	0	0	0
Unidentified 77	1	7	5	0	0	0
Unidentified 85	3	0	0	0	0	0
Unidentified 87	16	9	0	30	14	2
Unidentified 91	58	39	2	0	0	0
Unidentified 103	1	1	0	0	0	0
Unidentified 120	7	4	1	0	0	0
Unidentified 123	1	0	0	0	0	0
Unidentified 138	13	4	4	0	3	0
Unidentified 139	26	14	0	28	0	0
Unidentified 144	1	0	0	0	0	0
Unidentified 150	1	0	0	0	0	0
Unidentified 157	9	2	1	0	0	0
Unidentified 161	1	1	1	0	20	0
Unidentified 165	0	11	0	0	0	0
Unidentified 166	1	0	0	0	0	0
Unidentified 167	1	0	0	0	0	0
Unidentified 168	1	0	0	0	0	0
Unidentified 170	1	1	1	0	0	0
Unidentified 1132	6	3	2	8	3	12

Unidentified Taxa

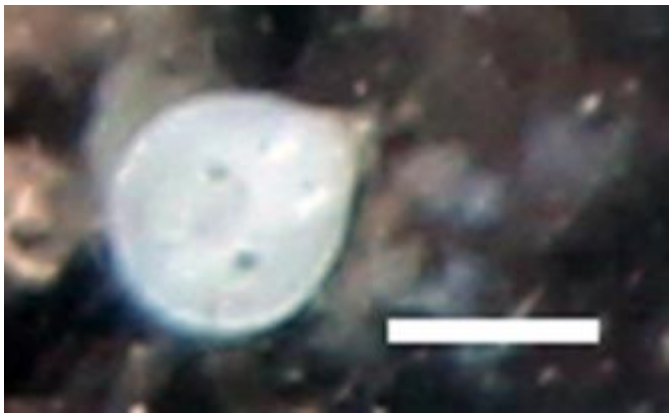
Unidentified 3

White, erect, dichotomously branching stalk with tufts (possibly polyps) at the tips. Possibly similar to Alcyonacea (O.) sp. 6.



Unidentified 4

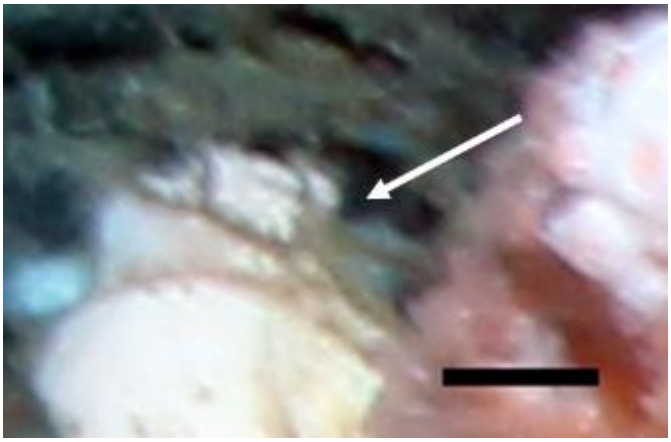
Off-white and bulbous structure with tube-like projections.



Unidentified 17

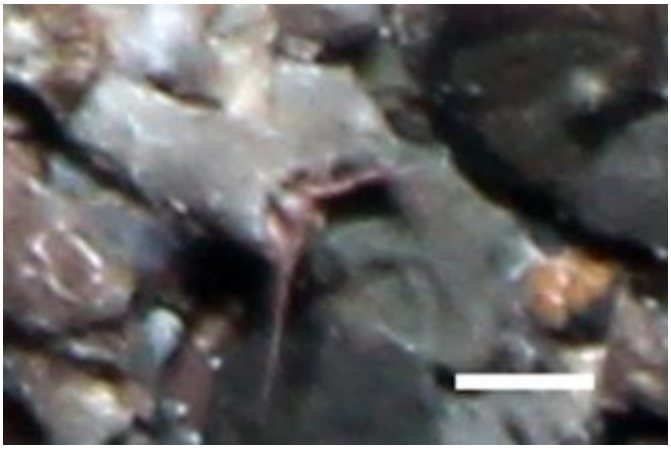
White, flat, and disc-shaped with holes.

Unidentified Taxa



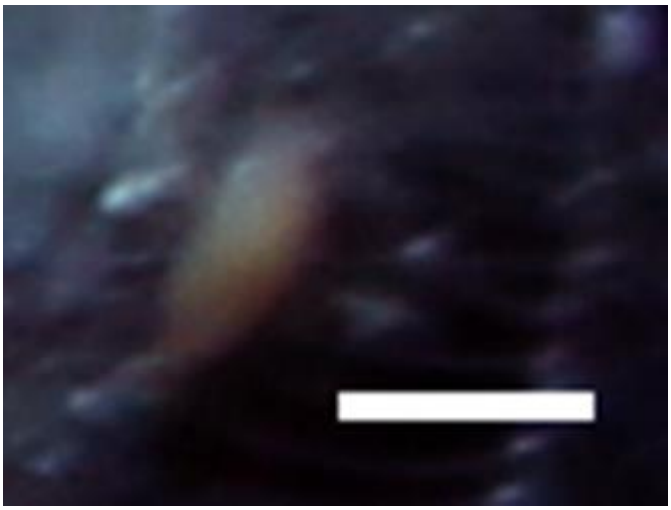
Unidentified 18

Off-white to taupe to light-brown coloured stalks. Some display branching, some are wavy, some are erect, and others are flat on rocks. Some suspected to by hydroids and dead bryozoans.



Unidentified 20

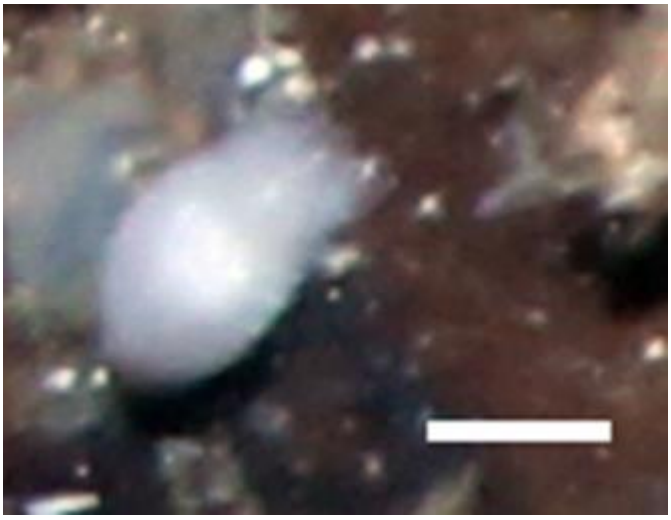
Red, thin appendages. Organism appears to be living inside *Lophelia* rubble.



Unidentified 25

Rounded cylindrical organism with a small apical opening.

Unidentified Taxa

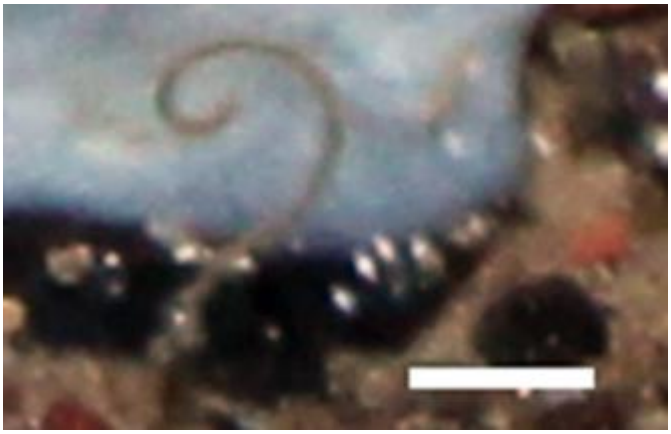


Unidentified 28

White, bulbous, cylindrical organism. Edge at the top appears slightly more translucent and centre is a brighter white.

Unidentified 30

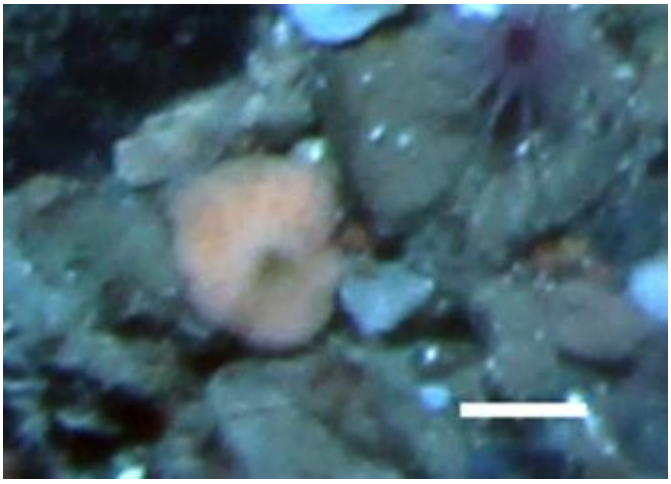
White, bud-shaped and branching at one end. Might be broken off from something else.



Unidentified 33

Curved erect stalk, tan-brown in colour.

Unidentified Taxa

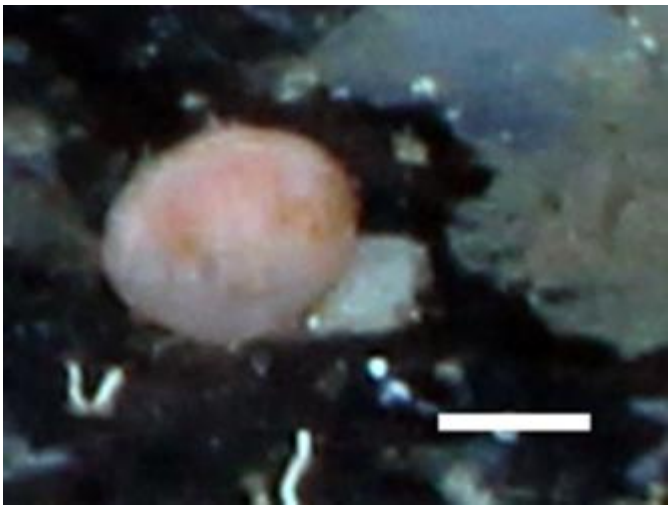


Unidentified 34

Orange-peach blob-like organism on rock. Appears to have some dimension.

Unidentified 37

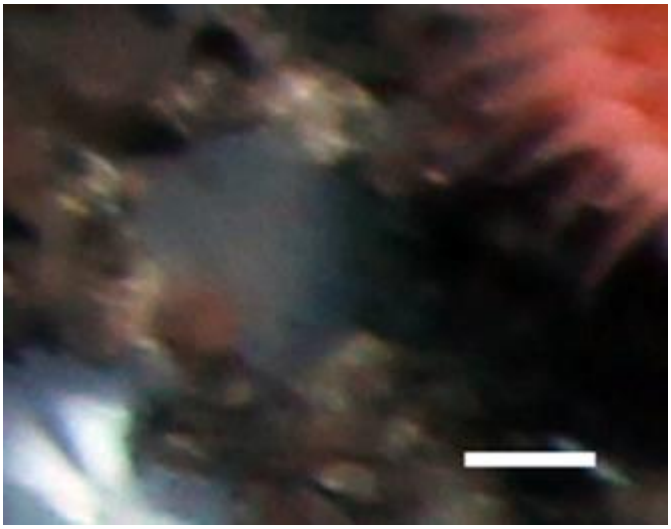
Red-orange worm. Possibly a nemertean.



Unidentified 48

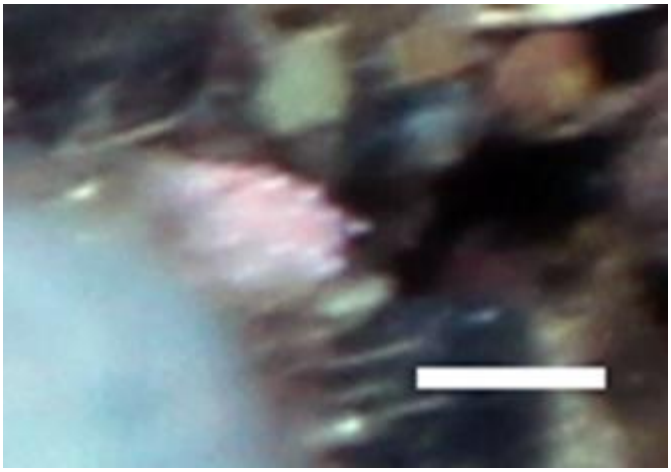
Peach object, irregularly-shaped.

Unidentified Taxa



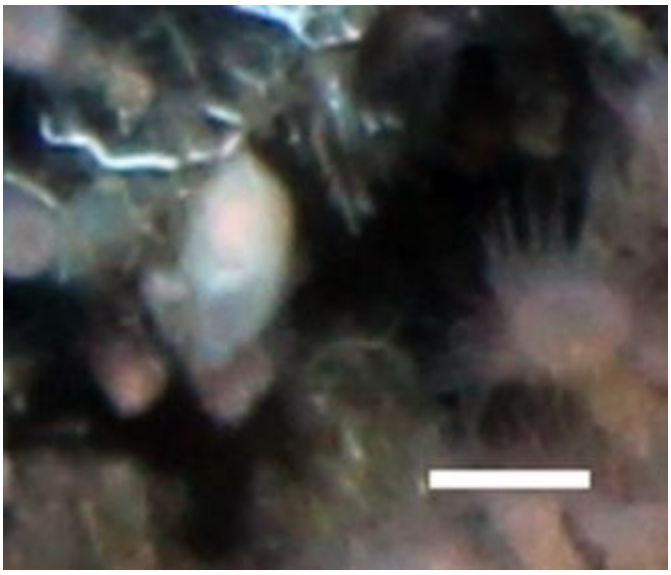
Unidentified 51

Oblong-shaped, grey, translucent to semi-translucent. Possible ascidian.



Unidentified 55

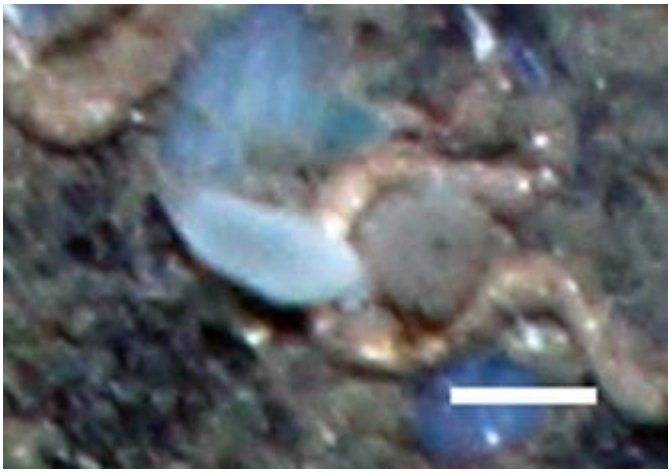
Pink organism. Small ‘frilly’ serrations around the edges. Likely a partially-retracted actiniarian.



Unidentified 57

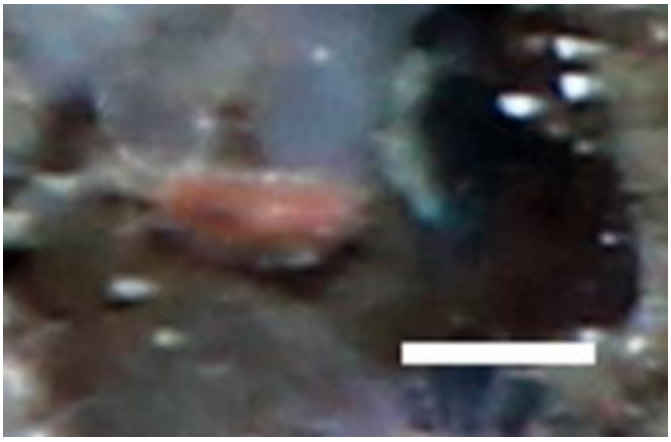
White to off-white semi-translucent erect cylindrical organism.

Unidentified Taxa



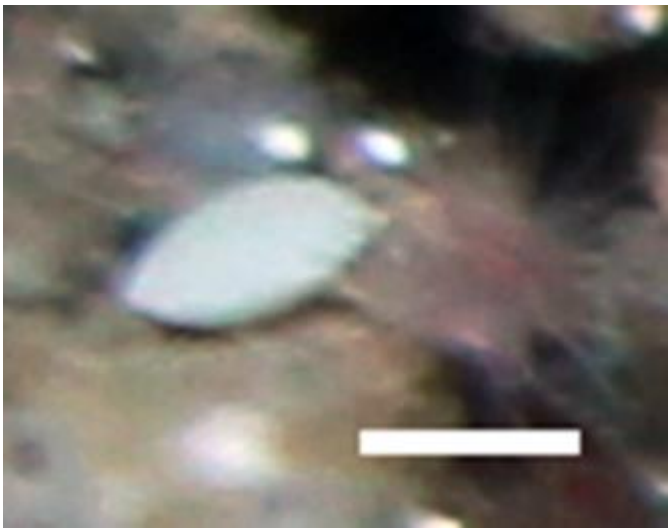
Unidentified 77

White tubular structures, likely papillae.



Unidentified 85

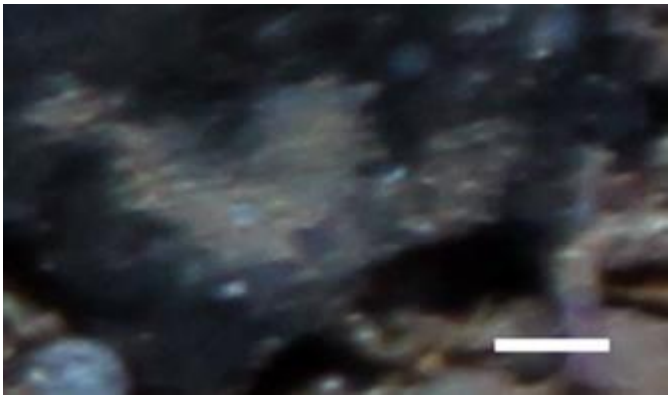
Oblong peach-pink organism with suggestion of tentacles around the edges. Possibly belongs to family Polynoidae.



Unidentified 87

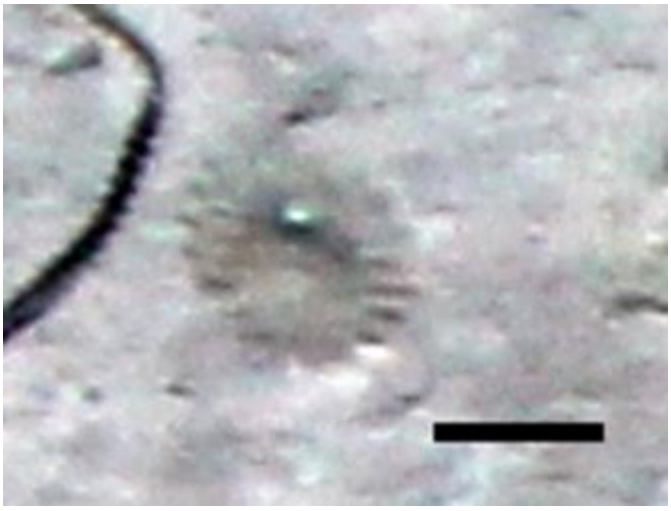
Oblong, smooth, white structures, possibly brachiopods.

Unidentified Taxa



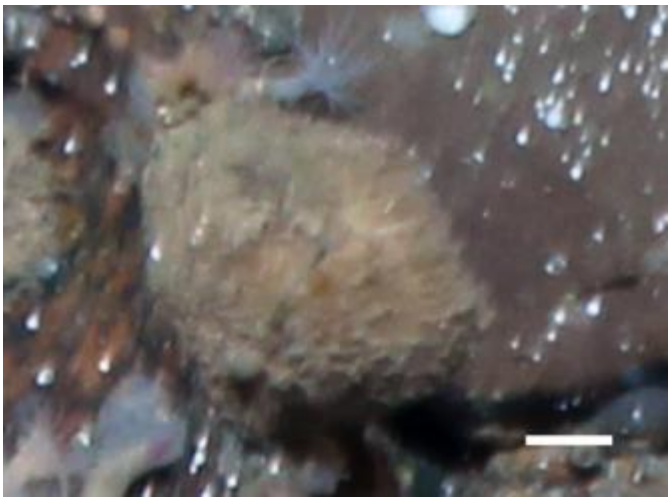
Unidentified 91

Grey to brown to greenish mat or film. Appears to have a bumpy surface. Possibly a sponge with large ‘chimneys’.



Unidentified 103

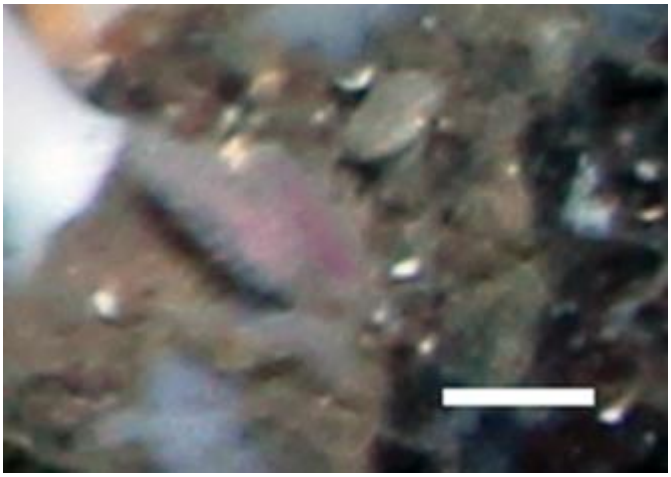
Likely the plume of a burrowed annelid or a cerianthid.



Unidentified 120

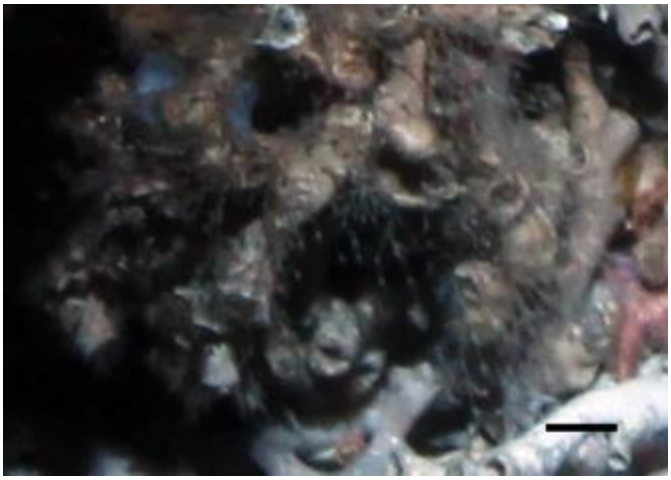
A spherical, sediment-covered object. Possibly an ascidian, or an actiniarian anemone.

Unidentified Taxa



Unidentified 123

Small, pink structure with suggestion of tentacles.



Unidentified 138

Thin, branching main stalk with numerous delicate secondary branches. White, bushy tufts protrude from the stalk.

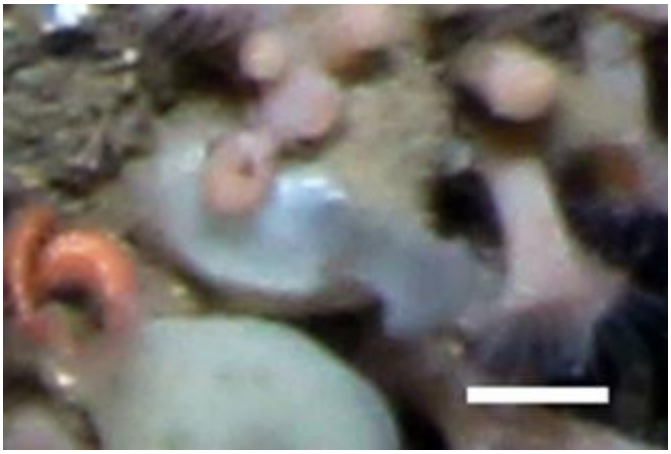
Unidentified 139

Small, round, and white, with numerous spines or tentacles protruding radially.

Unidentified Taxa

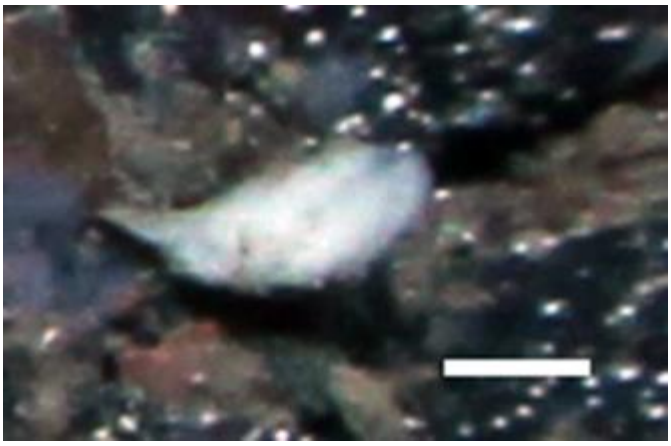
Unidentified 144

Orange oblong organism, ventral side flattened. Appears to have plates or banding on the dorsal surface, and caps at the ends.



Unidentified 150

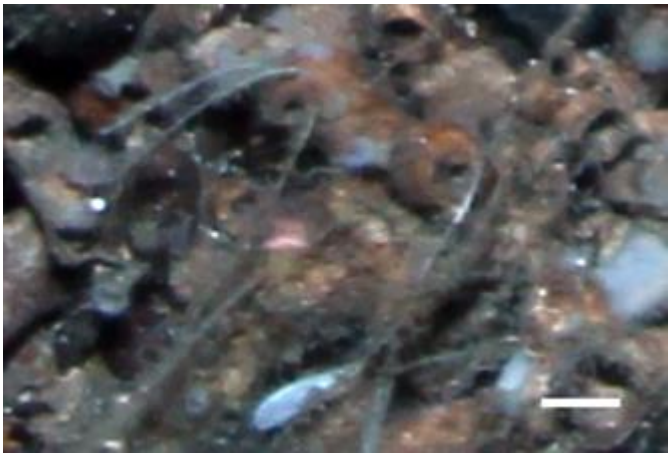
Oblong white structure with translucent papilla-like appendage.



Unidentified 157

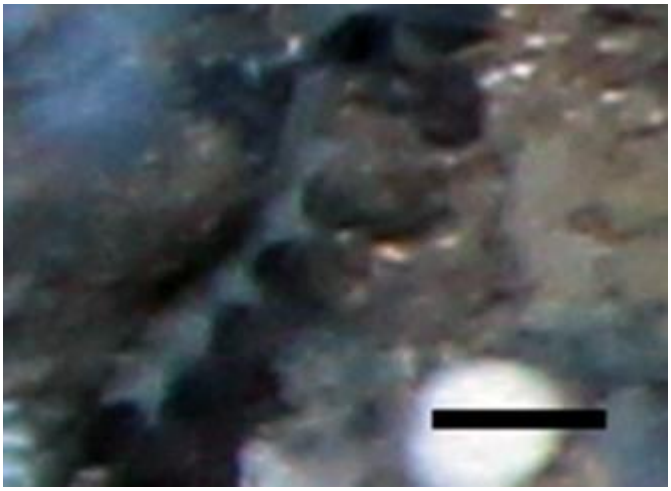
Stalked sponge-like organism with elongated oval body. Appears to have a slit at the apical end. White in colour. Surface hispid. Stalk thicker and shorter.

Unidentified Taxa



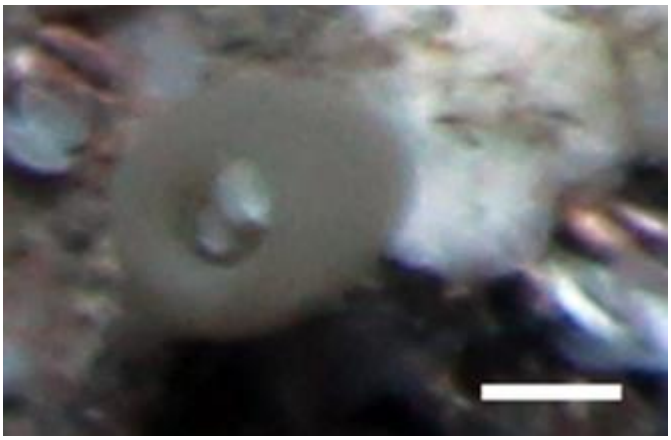
Unidentified 161

Bushy, branching, grey/tan in colour, with small numerous protrusions coming from the branches.



Unidentified 165

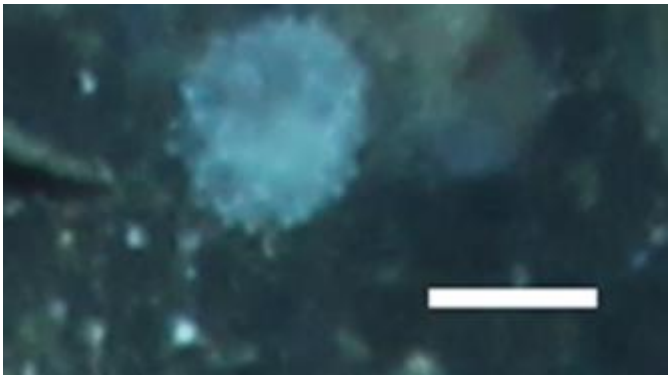
Small, delicate-looking polyps thought to be emerging from the green-grey mass beneath them.



Unidentified 166

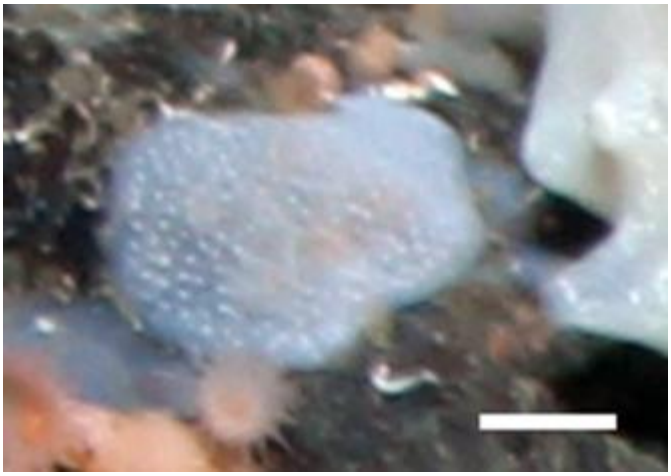
Hollow cylindrical sponge with thick walls and a white centre. Surface of walls appears ‘fuzzy’.

Unidentified Taxa



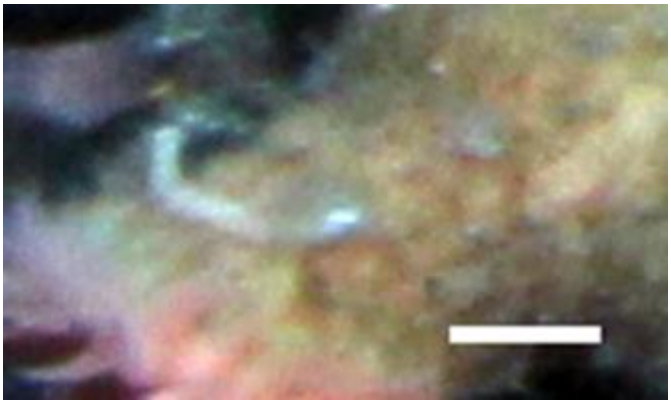
Unidentified 167

Semi-translucent round, thick cushion (<10 mm) with white-tipped spines.



Unidentified 168

White, semi-translucent film with white specks.



Unidentified 170

Fleshy, irregularly-shaped tube. Tube occasionally covered in sediment or detritus. Identified due to fleshy colour. Possibly an annelid or a nemertean.

Unidentified Taxa

Unidentified 1132

Grey, translucent, stringy, film-like substance.

LIMITATIONS AND RECOMMENDATIONS

The taxa identifications presented above represent the authors' best efforts to identify and classify the epibenthic megafauna found during image analysis. However, taxonomy is a dynamic field and taxa names and/or taxonomic hierarchies may change in the future as new information emerges concerning their classification. Users of this report should always consult the WoRMS and ITIS databases to obtain the most current names for the taxa shown here. As no targeted grab samples of fauna were collected, the taxa in this report were identified from still images alone. Therefore, their identification was based on examinations of their external features, and was dependent on their configurations in the images, as well as camera angle and image quality. It is possible that taxonomic identifications were more refined in images with higher resolution. As camera resolution improved with time, it is likely that taxa were overlooked and/or classified as 'Unidentified' in images from earlier sampling years due to poorer image quality. Learner bias may have impacted the identifications as well, although the images were analysed in a random order in an attempt to mitigate this. Ideally, high-resolution cameras will continue to be used in future surveys of the area, and targeted grab samples would be collected to verify identifications.

ACKNOWLEDGEMENTS

We would like to thank the commanding officers and crew of the Canadian Coast Guard Ship *Hudson*, and all participating science staff for the successful collection of data at sea. We thank Robert Benjamin and Cam Lirette (DFO) for processing the navigational data associated with the collected images. We thank Javier Murillo (DFO) for his advice on the taxonomic identification of megafauna. We thank Javier Murillo and Kevin Jacobs (DFO) for their review of this manuscript. This project was funded through DFO's Strategic Program for Ecosystem-Based Research and Advice (SPERA) project "Evaluation of the Effectiveness of a Coral Conservation Area after a Decade of Closure to Bottom-Contact Fishing Gears" led by E. Kenchington, and "Evaluation of the Effectiveness of a Coral Conservation Area after a Decade of Closure to Bottom-Contact Fishing Gears and Exploration of Coral Community Distribution for Significant Benthic Area Planning" led by L. Beazley and E. Kenchington.

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APPENDIX A: REPRESENTATIVE IMAGES OF SUBSTRATE CLASSIFICATIONS

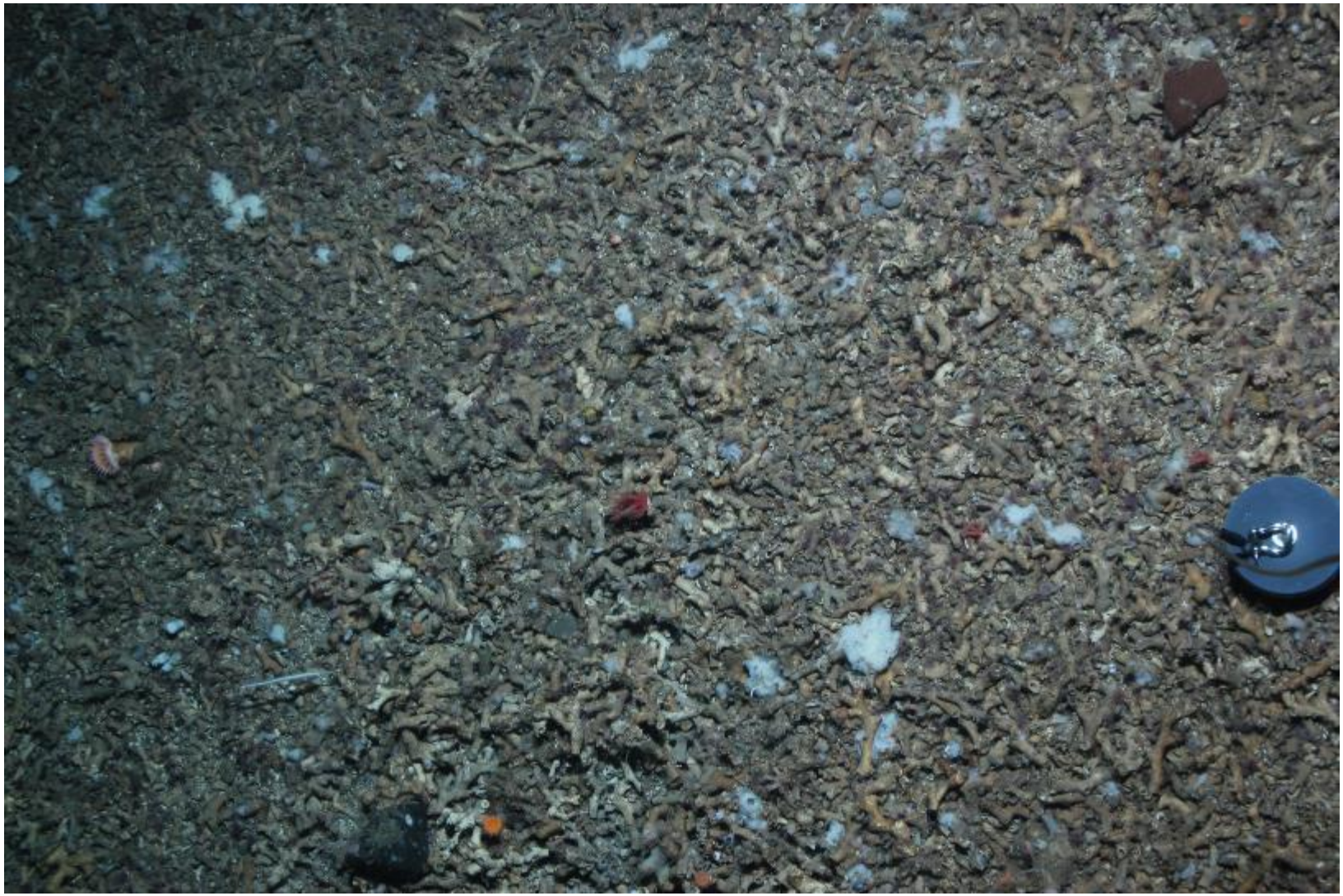

Figure A1: Representative image of the ‘100%_LopheliaRubbleCover’ substrate type. (Photo: SF_IR_1_5_092.jpg)

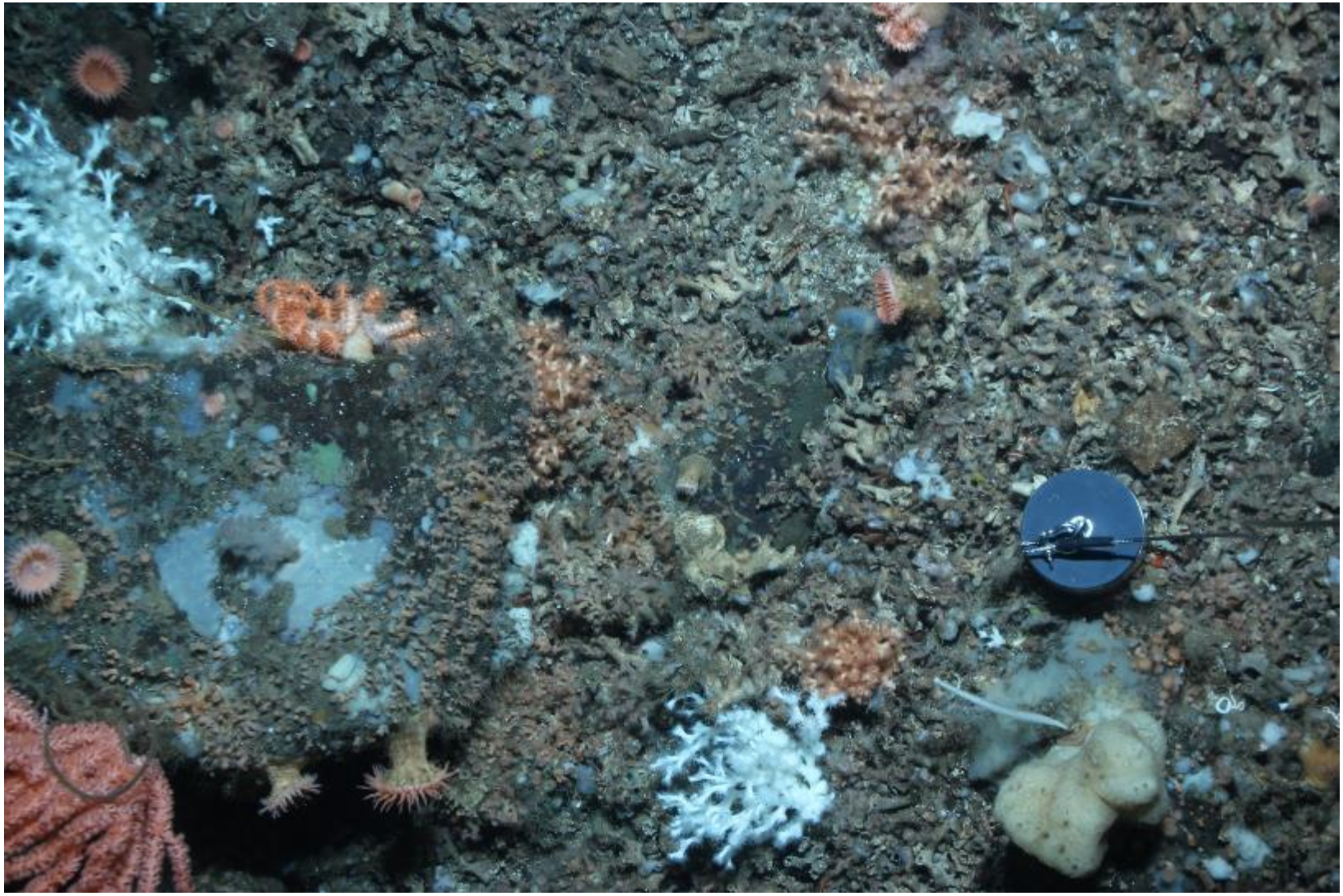

Figure A2: Representative image of the ‘LopheliaRubble_Boulder/Cobble_Mix’ substrate type. (Photo: SF_IR_1_5_078.jpg)

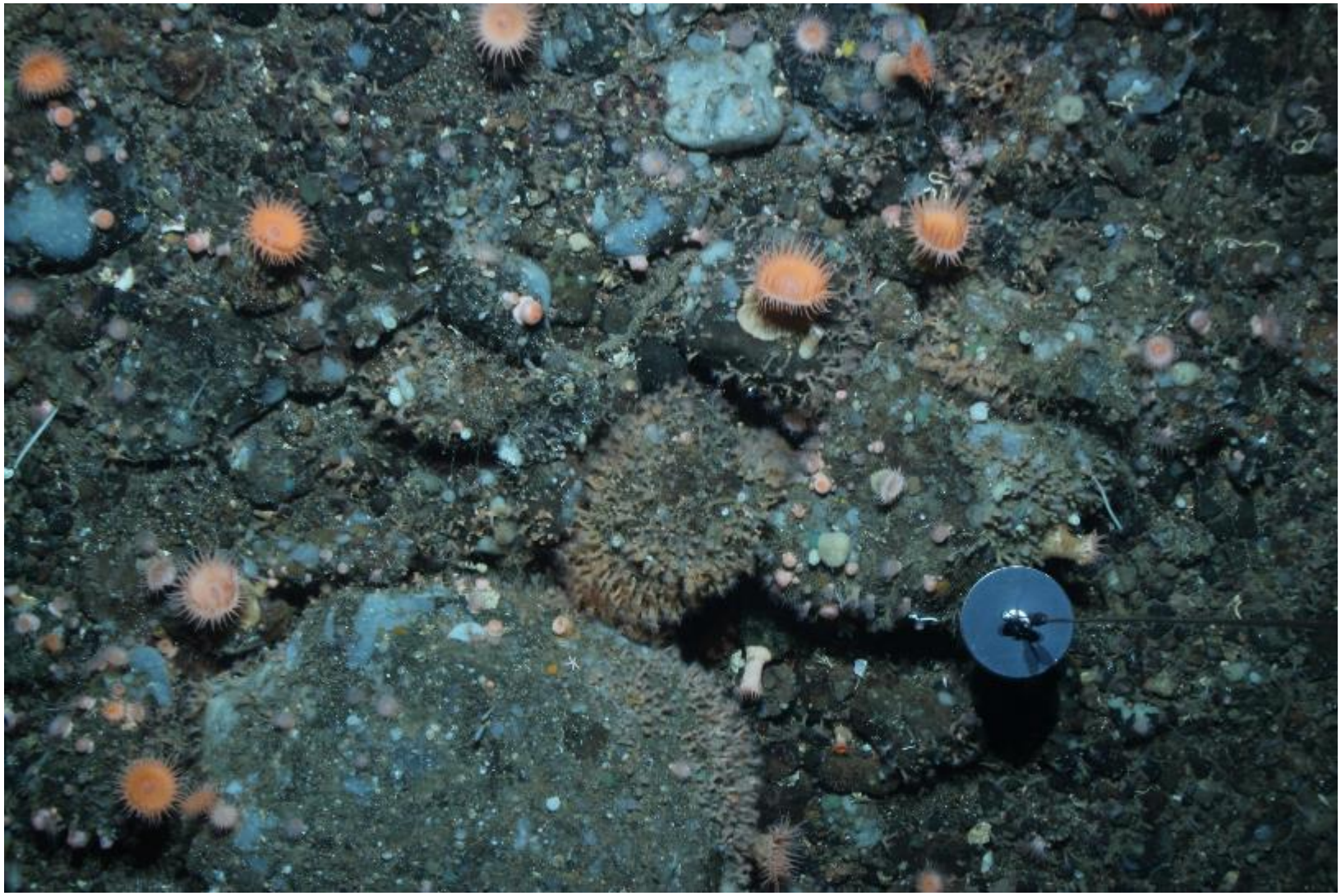

Figure A3: Representative image of the ‘Boulder/Cobble_Mix’ substrate type. (Photo: SF_IR_3_S_184.jpg)

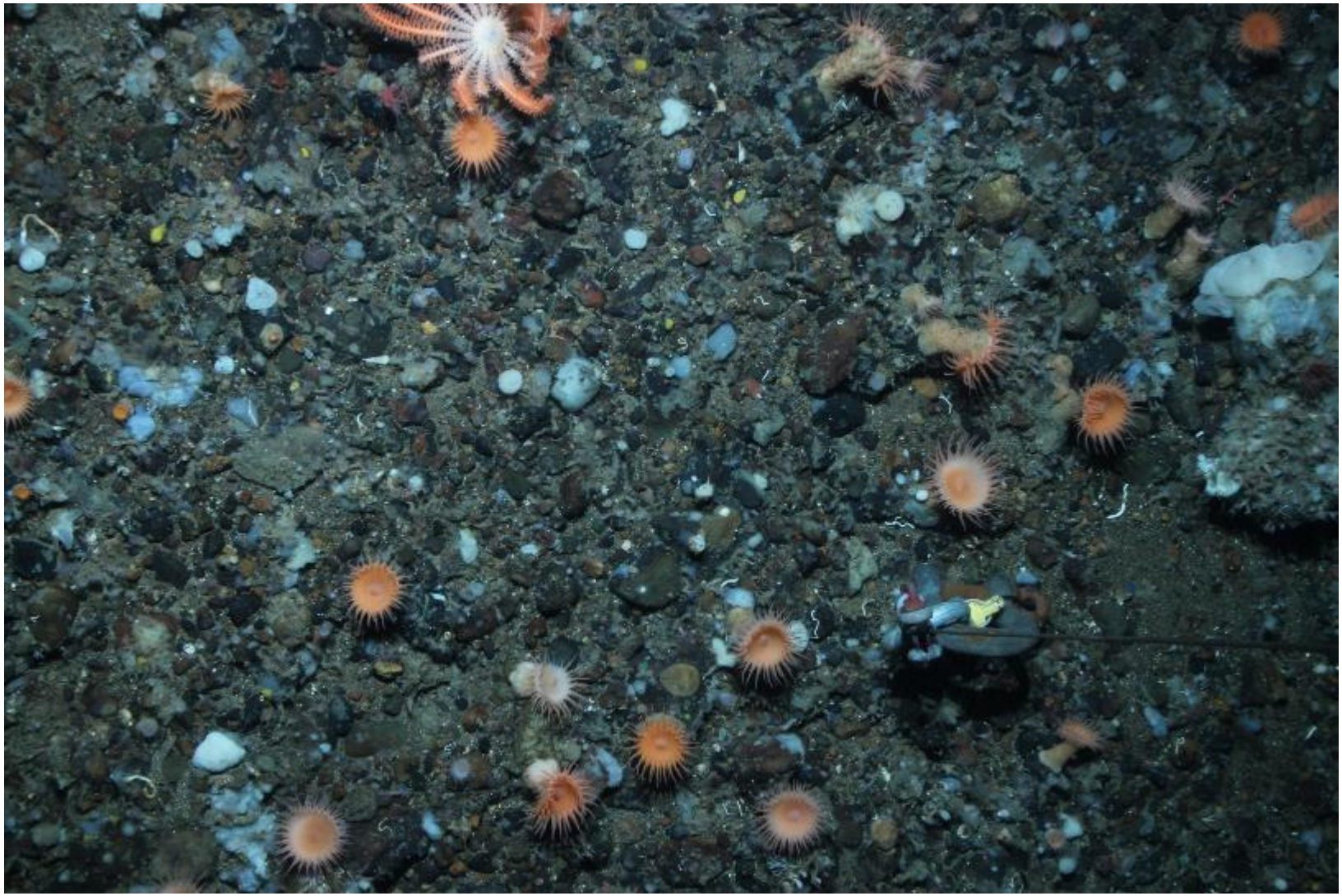

Figure A4: Representative image of the ‘Cobble/Pebble/Gravel_Mix’ substrate type. (Photo: SF_IC_3_S_028.jpg)

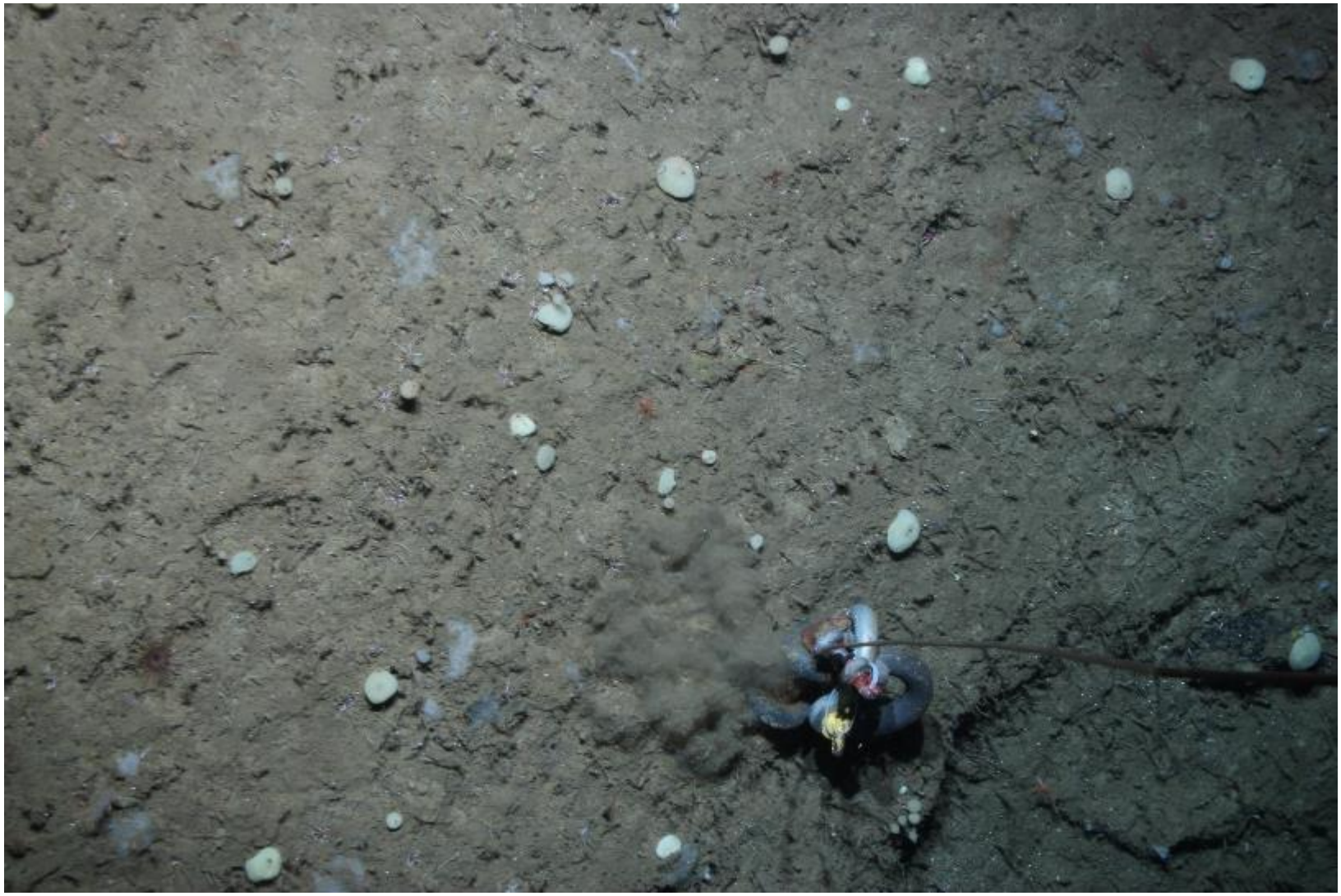

Figure A5: Representative image of the ‘Soft_Substrate’ substrate type. (Photo: SF_IC_2_E_070.jpg)

APPENDIX B: TAXONOMIC GROUPING FOR DATA SUMMARIES

Table B1: Inventory of taxa that have been grouped for data summaries, including the taxon names within each given year, and their grouped name ('Taxa For Across Year Analysis ').

Phylum	Taxa For Across Year Analysis	2015 Original	2009 Original	2003 Original
Bryozoa	Bryozoa (P.) spp.	Bryozoa (P.) sp. 5	Bryozoa (P.) sp. 5	Not present
Bryozoa	Bryozoa (P.) spp.	Bryozoa (P.) sp. 1	Bryozoa (P.) sp. 1	Bryozoa (P.) sp. 1
Bryozoa	Bryozoa (P.) spp.	Bryozoa (P.) spp.	Bryozoa (P.) spp.	Bryozoa (P.) spp.
Cnidaria	Actiniaria (O.) spp.	Actiniaria (O.) sp. 1	Actiniaria (O.) sp. 1	Actiniaria (O.) sp. 1
Cnidaria	Actiniaria (O.) spp.	Actiniaria (O.) spp.	Actiniaria (O.) spp.	Actiniaria (O.) spp.
Cnidaria	Actiniaria (O.) spp.	Actiniaria (O.) sp. 18	Not present	Not present
Cnidaria	Actiniaria (O.) spp.	Actiniaria (O.) sp. 16	Not present	Not present
Cnidaria	Actiniaria (O.) spp.	Actiniaria (O.) sp. 14	Not present	Not present
Cnidaria	Actiniaria (O.) spp.	Actiniaria (O.) sp. 13	Actiniaria (O.) sp. 13	Not present
Cnidaria	Actiniaria (O.) spp.	Actiniaria (O.) sp. 22	Not present	Not present
Cnidaria	Actiniaria (O.) spp.	Not present	Actiniaria (O.) sp. 31	Not present
Cnidaria	Hormathiidae (F.) spp.	Hormathiidae (F.) spp.	Hormathiidae (F.) spp.	Hormathiidae (F.) spp.
Cnidaria	Hormathiidae (F.) spp.	Actiniaria (O.) sp. 5	Not present	Actiniaria (O.) sp. 5
Cnidaria	Leptothecata (O.) spp.	Leptothecata (O.) sp. 1	Leptothecata (O.) sp. 1	Leptothecata (O.) sp. 1
Cnidaria	Leptothecata (O.) spp.	Leptothecata (O.) sp. 8	Not present	Not present
Echinodermata	Asteroidea (C.) spp.	Asteroidea (C.) sp. 1	Not present	Asteroidea (C.) sp. 1
Echinodermata	Asteroidea (C.) spp.	Asteroidea (C.) sp. 5	Not present	Not present
Echinodermata	Asteroidea (C.) spp.	Asteroidea (C.) sp. 6	Not present	Not present
Echinodermata	Ophiuroidea (C.) spp.	Ophiuroidea_obstructed	Ophiuroidea_obstructed	Ophiuroidea_obstructed
Echinodermata	Ophiuroidea (C.) spp.	Ophiuroidea (C.) sp. 32	Not present	Not present
Echinodermata	Ophiuroidea (C.) spp.	Ophiuroidea (C.) sp. 20	Not present	Not present
Echinodermata	Ophiuroidea (C.) spp.	Ophiuroidea (C.) sp. 8	Not present	Not present
Echinodermata	Ophiuroidea (C.) spp.	Ophiuroidea (C.) sp. 17	Not present	Not present
Echinodermata	Ophiuroidea (C.) spp.	Ophiuroidea (C.) sp. 9	Not present	Not present
Echinodermata	Ophiuroidea (C.) spp.	Ophiuroidea (C.) sp. 10	Not present	Not present

Echinodermata	Ophiuroidea (C.) spp.	Ophiuroidea (C.) spp.	Ophiuroidea (C.) spp.	Ophiuroidea (C.) spp.
Echinodermata	Ophiuroidea (C.) spp.	Ophiuroidea (C.) sp. 2	Not present	Not present
Echinodermata	Ophiuroidea (C.) spp.	Ophiuroidea (C.) sp. 4	Not present	Not present
Echinodermata	Ophiuroidea (C.) spp.	Ophiuroidea (C.) sp. 15	Not present	Not present
Echinodermata	Ophiuroidea (C.) spp.	Ophiuroidea (C.) sp. 12	Not present	Not present
Mollusca	Polyplacophora (C.) spp.	Polyplacophora (C.) sp. 2	Not present	Not present
Mollusca	Polyplacophora (C.) spp.	Polyplacophora (C.) sp. 1	Polyplacophora (C.) sp. 1	Polyplacophora (C.) sp. 1
Porifera	Polymastiidae (F.) Type 1	Polymastiidae (F.) Type 3	Not present	Polymastiidae (F.) Type 3
Porifera	Polymastiidae (F.) Type 1	Polymastiidae (F.) sp. 19	Not present	Not present
Porifera	Polymastiidae (F.) Type 1	Polymastiidae (F.) sp. 4	Polymastiidae (F.) sp. 4	Not present
Porifera	Polymastiidae (F.) Type 1	cf. Weberella bursa	cf. Weberella bursa	cf. Weberella bursa
Porifera	Polymastiidae (F.) Type 1	Polymastiidae (F.) sp. 18	Not present	Not present
Porifera	Porifera (P.) sp. 31	Hymedesmiidae (F.) sp. 1	Hymedesmiidae (F.) sp. 1	Not present
Porifera	Porifera (P.) sp. 31	Porifera (P.) sp. 31	Porifera (P.) sp. 31	Porifera (P.) sp. 31
Porifera	Porifera Cushion spp.	Demospongiae (C.) sp. 31	Not present	Not present
Porifera	Porifera Cushion spp.	Hymedesmiidae (F.) sp. 11	Hymedesmiidae (F.) sp. 11	Hymedesmiidae (F.) sp. 11
Porifera	Porifera Cushion spp.	Demospongiae (C.) sp. 7	Not present	Not present
Porifera	Porifera Cushion spp.	Porifera Thin Sheet Type 1	Porifera Thin Sheet Type 1	Porifera Thin Sheet Type 1
Porifera	Porifera Cushion spp.	Porifera (P.) sp. 62	Porifera (P.) sp. 62	Not present
Porifera	Porifera Cushion spp.	Porifera Cushion spp.	Porifera Cushion spp.	Porifera Cushion spp.
Porifera	Porifera Cushion spp.	Demospongiae (C.) sp. 1	Not present	Demospongiae (C.) sp. 1
Porifera	Porifera Cushion spp.	Demospongiae (C.) sp. 25	Not present	Demospongiae (C.) sp. 25
Porifera	Porifera Cushion spp.	Demospongiae (C.) sp. 22	Not present	Not present
Porifera	Porifera Cushion spp.	Demospongiae (C.) sp. 16	Demospongiae (C.) sp. 16	Demospongiae (C.) sp. 16
Porifera	Porifera Cushion spp.	Demospongiae (C.) sp. 9	Not present	Not present
Porifera	Porifera Cushion spp.	Demospongiae (C.) sp. 3	Not present	Demospongiae (C.) sp. 3
Porifera	Porifera Cushion spp.	Not present	Demospongiae (C.) sp. 14	Demospongiae (C.) sp. 14
Porifera	Porifera Cushion spp.	Demospongiae (C.) sp. 17	Demospongiae (C.) sp. 17	Not present
Porifera	Porifera Cushion spp.	Porifera (P.) sp. 149	Not present	Not present
Porifera	Porifera Cushion spp.	Porifera (P.) sp. 43	Not present	Not present
Porifera	Porifera Cushion spp.	Porifera (P.) sp. 35	Porifera (P.) sp. 35	Porifera (P.) sp. 35
Porifera	Porifera Cushion spp.	Demospongiae (C.) sp. 21	Demospongiae (C.) sp. 21	Demospongiae (C.) sp. 21

Porifera	Porifera Cushion spp.	Demospongiae (C.) sp. 20	Demospongiae (C.) sp. 20	Demospongiae (C.) sp. 20
Porifera	Porifera Cylindrical spp.	Porifera (P.) sp. 114	Not present	Not present
Porifera	Porifera Cylindrical spp.	Porifera (P.) sp. 12	Porifera (P.) sp. 12	Porifera (P.) sp. 12
Porifera	Porifera Cylindrical spp.	Porifera (P.) sp. 155	Porifera (P.) sp. 155	Not present
Porifera	Porifera Massive-Fig spp.	Tetillidae (F.) spp.	Tetillidae (F.) spp.	Tetillidae (F.) spp.
Porifera	Porifera Massive-Fig spp.	Porifera (P.) sp. 165	Not present	Not present
Porifera	Porifera Massive-Fig spp.	Demospongiae (C.) sp. 34	Not present	Not present
Porifera	Porifera Massive-Fig spp.	Demospongiae (C.) sp. 30	Demospongiae (C.) sp. 30	Demospongiae (C.) sp. 30
Porifera	Porifera Massive-Fig spp.	Demospongiae (C.) sp. 27	Not present	Not present
Porifera	Porifera Massive-Fig spp.	Demospongiae (C.) sp. 19	Not present	Not present
Porifera	Porifera Massive-Lobose spp.	Demospongiae (C.) sp. 15	Not present	Not present
Porifera	Porifera Massive-Lobose spp.	Demospongiae (C.) sp. 13	Demospongiae (C.) sp. 13	Not present
Porifera	Porifera Massive-Lobose spp.	Demospongiae (C.) sp. 36	Not present	Not present
Porifera	Porifera Massive-Lobose spp.	Demospongiae (C.) sp. 33	Not present	Not present
Porifera	Porifera Thin Sheet spp.	Demospongiae (C.) sp. 11	Not present	Not present
Porifera	Porifera Thin Sheet spp.	Porifera Thin Sheet Type 2	Porifera Thin Sheet Type 2	Porifera Thin Sheet Type 2