

***In situ* Image Guide to the Fauna of the Laurentian Channel Marine Protected Area**

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IN SITU IMAGE GUIDE TO THE FAUNA OF THE LAURENTIAN CHANNEL MARINE
PROTECTED AREA

by

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ABSTRACT

Command, R.J., Neves, B.M., Nozères, C., Hayes, V., Dinn, C., de Mendonça, S.N., Boulard, M., Lawton, P., Rodriguez, E., and Janes, J. 2024. *In situ* Image Guide to the Fauna of the Laurentian Channel Marine Protected Area. Can. Tech. Rep. Fish. Aquat. Sci. 3635: v + 178 p.

In 2017 and 2018, Fisheries and Oceans Canada (DFO) co-led multidisciplinary expeditions onboard the Canadian Coast Guard Ships (CCGS) *Martha L. Black* and *Hudson* to the Laurentian Channel Marine Protected Area (MPA – Area of Interest at the time). One of the objectives of these expeditions was to collect seafloor imagery in support of baseline data collection for the MPA. Benthic surveys were conducted using the remotely operated vehicle (ROV) ROPOS (2017) and the drop-camera system Campod (2018). Images from these surveys were utilized to develop a seafloor imagery identification guide to the epibenthic megafauna of the Laurentian Channel MPA. We analyzed 2422 Campod downward-looking images using the open-source image annotation platform BIIGLE to inventory the observed taxa and to select representative images, in combination with supplementary ROPOS imagery. This guide was developed to facilitate species identification from imagery and to increase consistency in imagery analysis annotation, particularly for use in the monitoring of benthic communities in the Laurentian Channel MPA.

RÉSUMÉ

Command, R.J., Neves, B.M., Nozères, C., Hayes, V., Dinn, C., de Mendonça, S.N., Boulard, M., Lawton, P., Rodriguez, E., and Janes, J. 2024. *In situ* Image Guide to the Fauna of the Laurentian Channel Marine Protected Area. Can. Tech. Rep. Fish. Aquat. Sci. 3635: v + 178 p.

En 2017 et 2018, Pêches et Océans Canada (MPO) a codirigé des expéditions multidisciplinaires à bord des navires de la Garde côtière canadienne (NGCC) *Martha L. Black* et *Hudson* dans la zone de protection marine (ZPM – zone d'intérêt à l'époque) du chenal Laurentien. L'un des objectifs de ces expéditions était de collecter des images du fond marin à l'appui de la collecte de données de base pour la ZPM. Des relevés benthiques ont été réalisés à l'aide du véhicule sous-marin télécommandé (ROV) ROPOS (2017) et du système de caméra déposée Campod (2018). Les images de ces relevés ont été utilisées pour développer un guide d'imagerie pour l'identification de la mégafaune épibenthique de la ZPM du chenal Laurentien. Nous avons analysé 2 422 images de Campod orientées en vue verticale à l'aide de la plateforme d'annotation d'images BIIGLE pour inventorier les taxa observés et sélectionner des images représentatives, en combinaison avec des images supplémentaires de ROPOS. Ce guide a été élaboré pour faciliter l'identification des espèces à partir de l'imagerie et pour accroître la cohérence des annotations d'analyse des images, particulièrement pour une utilisation dans le suivi des communautés benthiques dans la ZPM du chenal Laurentien.

1 INTRODUCTION

The Laurentian Channel Marine Protected Area (MPA) is a deep submarine valley MPA located in the Northwest Atlantic that was officially designated in 2019 with the primary objective of conserving biodiversity through the protection of key species and their habitats, ecosystem structure and function, and through scientific research (DFO 2019). Specifically, the MPA has six main conservation objectives:

1. To protect corals, particularly significant concentrations of sea pens, from harm due to human activities (*e.g.*, fishing, oil and gas exploratory drilling, submarine cable installation and anchoring).
2. To protect Black Dogfish (*Centroscyllium fabricii*) from human induced mortality (*e.g.*, bycatch in the commercial fishery).
3. To protect Smooth Skate (*Malacoraja senta*) from human induced mortality (*e.g.*, bycatch in the commercial fishery).
4. To protect Porbeagle sharks (*Lamna nasus*) from human induced mortality (*e.g.*, bycatch in the commercial fishery, seismic activities).
5. To promote the survival and recovery of Northern Wolffish (*Anacharhicas denticulatus*) by minimizing risk of harm from human activities (*e.g.*, bycatch in the commercial fishery) in the Laurentian Channel.
6. To promote the survival and recovery of Leatherback Sea Turtles (*Dermochelys coriacea*) by minimizing risk of harm from human activities (*e.g.*, entanglement in commercial fishing gear, seismic activities).

Fisheries and Oceans Canada (DFO) is currently developing a Management Plan for the Laurentian Channel MPA to work towards these objectives. As the lead federal authority for the MPA, DFO is responsible for managing, regulating and enforcing regulations, and monitoring the Laurentian Channel MPA as mandated under the “Oceans Act. S.C.” (1996) and the “Fisheries Act. R.S.C.” (1985), as well as other relevant legislation.

The main focus of this document is to support scientific monitoring and research related to objective 1 (to protect corals, particularly significant concentrations of sea pens). Monitoring surveys targeted at sea pens can also record the presence of other focal fauna, such as fish, sharks, and skates, to aid in understanding their occurrence and distribution within the MPA, although some of these are not encountered as often. Supporting objective 1 includes considering the functional role of sea pens which are habitat-forming organisms that enhance local epifaunal (Baillon et al. 2014) and infaunal (Miatta and Snelgrove 2022) biodiversity, provide shelter and nursery habitats for fish and invertebrates (Baillon et al. 2012), and may contribute to seafloor nutrient cycling through sediment bioturbation and oxygenation (Miatta and Snelgrove 2022), and by increasing sedimentation by altering near-bottom water flow (Tissot et al. 2006). Thus, this document serves as a catalogue of epifaunal taxa found in and around sea pen habitats in the Laurentian Channel MPA.

While specific scientific monitoring guidance and protocols are still being developed, several potential indicators of the status of sea pens in Canada have been proposed, including monitoring sea pen biomass, abundance and density, size distribution, taxonomic diversity and richness, and spatial distribution (Kenchington et al. 2010; Lewis et al. 2016; DFO 2021; Miatta and Snelgrove 2022). Although DFO scientific trawling (multispecies surveys) has enabled opportunistic data collection on sea pen diversity and biomass in the MPA (Baillon et al. 2012; Murillo et al. 2018; De Mendonça and Metaxas 2021), bottom trawls are not optimized for this task. The catchability of many benthic epifaunal invertebrates varies with the type of trawl footgear (Freese et al. 1999), and more specifically, Kenchington et al. (2011) indicated that the Campelen trawl used in DFO's fish stock assessment surveys has an accuracy for presence of only 5% for sea pens in the region. In addition, bottom trawls cause physical disturbance in soft-sediment ecosystems and sensitive benthic areas containing organisms that are fragile and sensitive to sedimentation (e.g., corals and sponges).

Seafloor imagery (*i.e.*, photos and videos) has been suggested as an alternative to trawling, and is considered a preferred method for assessing epibenthic biodiversity in sensitive areas, such as those containing cold-water corals and sponges (Long et al. 2020; De Mendonça and Metaxas 2021). De Mendonça and Metaxas (2021) found that drop camera and ROV imagery provided higher and more accurate abundance estimates for sea pens than trawls, possibly because some sea pens can withdraw rapidly into the sediment and avoid capture (Ambroso et al. 2013, 2021; Chimienti et al. 2018), among other things. Despite these benefits, underwater imagery has some important limitations. Video transects generally cover less area than trawls, have a limited field of view, and may not capture sufficient morphological detail with which to identify specimens to lower taxonomic levels, such as genus or species. Indeed, in many cases the attribution of a species name depends on examination of a physical specimen and/or molecular analyses (Durden et al. 2016). However, reducing the impact of data collection, especially in MPAs and near sensitive benthic areas, remains a considerable advantage of video surveys.

Underwater imagery surveys are becoming increasingly common for scientific research as a less-invasive monitoring tool. Indeed, many image-based catalogues have been developed to suit scientific and management objectives (Howell et al. 2019). To keep pace with this development and maximize the effectiveness of underwater imagery surveys, standardized protocols and regional identification guides are needed to facilitate taxonomic identification from imagery and to increase the accuracy and consistency of image-based identifications. This identification guide was developed to assist with the identification of epibenthic and demersal megafauna from the Laurentian Channel MPA from seafloor images. We acknowledge that this guide is not entirely comprehensive and that additions and updates to the species list are expected in the future. A list of regional guides pertaining to identification of physical specimens is provided in Table 3.

2 METHODS

Taxa included in this guide were mostly identified from still images captured during Campod drop camera (2018) transects in the Laurentian Channel MPA. In addition, images collected using the remotely operated vehicle (ROV) Remotely Operated Platform for Ocean Science or "ROPOS" in 2017 were also included to represent some taxa not observed in Campod images. Here, we briefly outline our approach to identification using imagery and recommend a cautious approach.

An approach to assigning confidence levels and uncertainty to taxonomic identification based on *in situ* imagery is currently under development (Command et al. *in prep*).

2.1 DATA COLLECTION

The Laurentian Channel is a deep-water submarine valley extending from the mouth of the Saguenay River at the St. Lawrence Estuary to the edge of the continental shelf off the south coast of Newfoundland (DFO 2019). The depth of the MPA ranges from 116-491m, with the deepest part located at the basin of the Laurentian Channel and the shallowest part at the northeast of the MPA at the Burgeo and St. Pierre Banks (DFO 2019). Deeper parts of the MPA consist of mud and clay substrates, while sandy-gravel and small boulders characterize the shallower banks (DFO 2019; Lacharité et al. 2020).

Seafloor images and videos from ROPOS (2017) and Campod (2018) were captured from 11 sampling stations within the MPA (Figure 1). The ROPOS ROV was equipped with a forward-facing Insite Pacific Zeus-Plus HD video camera and a downward-facing Insite Pacific Mini-Zeus HD video camera. Each camera was equipped with a pair of scaling lasers that projected green dots onto the seafloor, spaced 10 cm apart. At each station in 2017, ROPOS videos were collected at eight 400-m parallel transects (four pairs of two), spaced 10 m apart (within pairs) and 200 m apart (between pairs) (De Mendonça and Metaxas 2021). In 2018, the Campod drop camera system was used to collect still images from three of the same, and eight new, sampling stations (De Mendonça and Metaxas 2021). Campod was equipped with a downward-looking Nikon D810 camera, as well as scaling lasers positioned to project green dots at 10 cm apart. At each station in 2018, Campod images were collected every 10 seconds along one to three (depending on the station) 1 km parallel transects 200 m apart (De Mendonça and Metaxas 2021). Campod was also equipped with a downward facing HD video camera for imagery collection, and a forward-facing video camera that was used for navigation. While video cameras also enabled identification of epibenthic megafauna *in situ*, still images collected from Campod were used in this guide to optimize image quality (except where a taxon was only observed by the navigation camera).

2.2 IMAGE ANNOTATION

Still images collected from Campod were annotated using the web-based image annotation platform BIIGLE (Langenkämper et al. 2017). A 4-step annotation protocol was developed, and will be briefly outlined here; the full details of the protocol will be made available as a Canadian Manuscript Report of Fisheries and Aquatic Sciences (Command et al. *in prep*).

First, suitable images were selected for annotation. Images were excluded if they met any of the following criteria: A) Campod was not close enough to the seabed (e.g., image too dark, organisms appear too small to be identified), B) the image was obscured (e.g., suspended sediment), C) image was out of focus, D) both laser points were not visible in the frame, precluding calculation of spatial scale.

Second, the laser points were annotated and the distance between them was measured in pixels

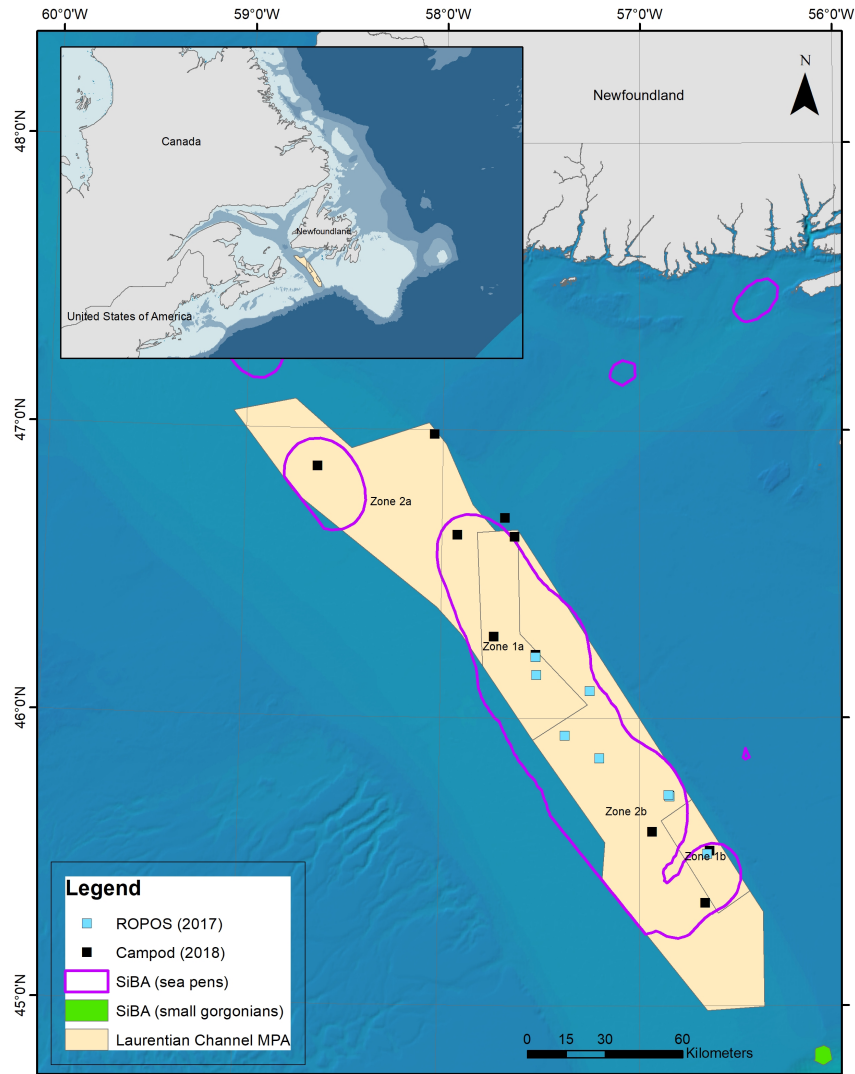


Figure 1. Map of the Laurentian Channel Marine Protected Area (MPA) delineating the MPA and the locations where ROPOS (2017) and Campod (2018) imagery was collected.

and converted to metric units based on the known distance between the laser points (10 cm).

Third, all identifiable organisms were assigned a label representing the lowest taxonomic or morphologic level for which the annotator was confident. Some groups for which taxonomic labels could not be reliably assigned using imagery alone (e.g., most Porifera), were denoted by assigning morphotype labels (e.g., “Encrusting, white” and “Encrusting, yellow” to differentiate white encrusting sponges from yellow ones; “SM sp.1” denoting similar-looking sponges in the Solid/Massive functional group). Annotations were performed by the same individual (R. C.) for consistency.

Finally, annotations were reviewed by taxonomic experts to verify identifications. A representative subsample of images were extracted for each morphotype/taxon and were further scrutinized to

identify morphological characteristics that may distinguish groups. These characteristics were informed, supported, and cross-referenced with taxonomic documents, identification guides, and other literature sources to determine the best characteristics for each taxon.

2.3 IDENTIFICATION CONFIDENCE AND OPEN NOMENCLATURE

A specimen in the field of view cannot be identified to species level with complete certainty from imagery alone. Where common specimens are routinely collected, or preserved in a collection, high-confidence identification from imagery sources is facilitated. On the other hand, uncommon morphotypes or species that may appear different underwater compared to *ex situ*, may be more difficult to identify. Further, some specimens may require higher level taxonomic identification when species-level identifiers are not seen, or when morphology alone is an insufficient descriptor (Durden et al. 2016). For example, we may know *a priori* that a taxon cannot be identified beyond a particular level using imagery alone because the distinguishing characters (*i.e.*, anatomical structures, genetics) cannot be observed in an image. Alternatively, we may have another *a priori* reason for identification at a particular rank, such as time constraints or lack of domain-specific expertise on the part of the annotator. Further still, a taxon that is typically identifiable may be partially obscured or photographed in an unusual orientation where their diagnostic characters are not visible; it may be necessary to roll-up an identification to a higher rank in these cases. The reason behind each decision is different and influences the rank at which a particular specimen may be identified, and whether it is possible to identify the specimen to a lower rank or not.

When a specimen cannot be identified to the species level, the reason for stopping at a higher rank should be recorded along with the identification. Further, some specimens at higher ranks may be grouped together to indicate some morphological relationship that distinguishes the group from another at the same rank (*e.g.*, Ophiuroidea sp.1, Ophiuroidea sp.2). Standardized nomenclature is therefore necessary to distinguish between morphologically similar taxa (*i.e.*, morphotaxa) within a higher rank, and to denote the reason for stopping an identification at a particular level. The International Code of Zoological Nomenclature (International Commission on Zoological Nomenclature [ICZN] 1999) governs conventional Linnaean taxonomy. Names that do not comply with the code are not governed the same way, and have been divided into three groups of names: open nomenclature, temporary names for taxa not yet described, and 'mixed-lists' consisting of a mix of traditional Linnaean names and informal names (Minelli 2019). Historically, the organization of informal names and the use of open nomenclature has been inconsistent, leading to confusion and disorder. However, with the increasing use of in situ imagery for scientific studies, baseline biodiversity surveys, and monitoring MPAs and other effective area-based conservation measures (Durden et al. 2016), there is a great deal of interest and a need to develop reference guides and databases using underwater imagery (Howell et al. 2019), and to standardize the use of code non-compliant taxonomic nomenclature in image-based identifications (Horton et al. 2021).

In addition to standardizing naming conventions, common terms to describe biodiversity information are needed to align image-based identifications with FAIR (Findability, Accessibility, Interoperability, Reusability) data principles (Schoening et al. 2022). One such standard, Darwin Core, has been widely adopted as a collection of nomenclature for biodiversity research that

describes broad facets of biodiversity data, including geological context, taxonomic data, and information about how and where an organism was identified (Wieczorek et al. 2012). Here, we use Darwin Core fields to standardize the display of taxonomic data and to capture the uncertainty associated with each entry in the guide. For each entry, we display the taxonomic ranks and sub-ranks alongside the `scientificName`, which includes the authority where appropriate. For each entry that was not identified to species, we also included an open nomenclature sign in the `identificationQualifier` field (following Horton et al. (2021)) to indicate the level of certainty associated with each taxon based on the images reviewed for this guide. The open nomenclature signs used in the guide are outlined in Table 1.

Table 1. List of Open Nomenclature signs used in this guide and their definitions after Horton et al. (2021)

Open nomenclature sign	Definition	Example use
Species (sp.)	The taxon cannot be identified to the species level (sp.)	The sign 'sp.' follows the rank for which the identification is certain. For example, a fish of the genus <i>Lycodes</i> may be labeled as <i>Lycodes</i> sp. because the characteristics are not visible to distinguish to species. The use of 'sp.' on its own is discouraged; it is recommended that it be followed with another open nomenclature sign denoting the reason for stopping the identification. Thus, the organism should be labeled as <i>Lycodes</i> sp. indet. (see <i>indet.</i> below).

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Open nomenclature sign	Definition	Example use
Species plural (spp.)	A taxa could represent multiple species within a higher rank that cannot be distinguished, or a species complex (spp.).	The sign 'spp.' also follows the rank for which the identification is certain, but its use is context-dependent. For example, a fish of the genus <i>Sebastes</i> may be labeled as <i>Sebastes</i> spp. because species of this genus overlap in range and are impossible to distinguish from an image. Obviously a single specimen can only be one species, but the species cannot be determined from an image. Thus, the organism should be labeled as <i>Sebastes</i> spp. <i>indet.</i> (see <i>indet.</i> below). 'Spp.' may also be used in the context of an image identification guide where the taxonomic label represents several images that may be distinct species, but for which identification cannot be certain beyond a higher level. For example, genera of soft-corals in the order Malacalcyonacea cannot always be reliably distinguished from imagery alone, and thus in some cases are labeled Malacalcyonacea spp. <i>indet.</i> in this guide.
<i>Indeterminabilis (indet.)</i>	Taxon cannot be identified beyond this level because the characteristics are not visible (i.e., characteristic obscured in image, a physical specimen is required for microscopy or genetics).	The sign <i>Indet.</i> follows the rank to which identification cannot be completed. For example, in the case of an organism identified as <i>Anthoptilum</i> spp. <i>indet.</i> , the genus <i>Anthoptilum</i> can be distinguished, but that the species cannot.
<i>Stetit (stet.)</i>	Taxon may be identifiable beyond this level, but there is an <i>a priori</i> reason to stop (i.e., time-consuming, not an expert).	The sign <i>stet.</i> follows the rank at which the identification was stopped. For example, cerianthid anemones are taxonomically challenging, though some morphological distinctions are possible from imagery. We decided to stop at subclass Ceriantharia, but distinguish morphospecies, e.g., Ceriantharia sp.1 <i>stet.</i>

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Open nomenclature sign	Definition	Example use
<i>Incerta (inc.)</i>	Taxon has been identified to lowest possible level, but some uncertainty remains	The sign <i>inc.</i> follows the rank to which identification is uncertain. For example, individuals of <i>Flabellum (Ulocyathus)</i> can hybridize, making it difficult to tell apart species in imagery, though sometimes it is possible. <i>F. (Ulocyathus) angulare inc.</i> and <i>F. (Ulocyathus) macandrewi inc.</i> are used to indicate uncertainty at the species level.
<i>Confer (cf.)</i>	Taxon has been identified to the lowest possible level, but the annotator cannot be certain of the identity until a more detailed comparison with reference material can be made (i.e., consulting an expert, examining a physical specimen).	The sign <i>cf.</i> precedes the level for which the identification is uncertain, and indicates that further examination is required. For example, sponges require close-up examination of microscopic structures to identify species, although some morphologies are distinct. <i>Polymastia cf. uberrmia</i> indicates that the genus is certain, but further studies (i.e. compare with physical specimen) are required to confirm the identity.

2.4 LIMITATIONS OF *IN SITU* IMAGERY

In this guide, we present a description for each identified specimen and the morphological characteristics useful for identification in an *in situ* image. Taxonomic keys and formal species descriptions/diagnoses are generally based on physical specimens, and may include a number of diagnostic characters that distinguish a particular taxon. However, *in situ*, it is highly likely that only a few key features may be visible, and in some cases there may be none.

A particular challenge are those groups whose diagnoses rely on minute differences in anatomical structures. Soft corals of the order Malacalcyonacea are one such group; four species have been identified from physical samples collected in the Laurentian Channel region: *Gersemia fruticosa* (Sars, 1860), *Gersemia rubiformis* (Ehrenberg, 1834), *Duva florida* (Rathke, 1806), and *Drifa glomerata* (Verrill, 1869). These corals are found attached to hard substrata, with the exception of *Gersemia fruticosa*, which has adapted a modified sediment pouch to anchor itself in soft sediments - a potentially useful character to distinguish specimens in imagery (Deichmann, 1936). However, in an *in situ* image it might be challenging to determine whether a coral is anchored in soft sediments or attached to a hard substrate that is covered in sand or mud (Figure 2). Further, even upon close examination using microscopy, species within these genera are difficult to distinguish and upcoming taxonomic changes are expected in light of new molecular techniques (B.Neves, pers. comm.). When identifying specimens using imagery

alone, it is prudent to take a cautious approach and roll-up identification to a higher rank for which confidence may be higher.

Groups that can only be distinguished by comparative genetics also pose a challenge for imagery identification. For example, sea pens in the genus *Anthoptilum* hold their bodies in a distinctive 'question mark' shape, and are easily distinguishable from other sea pens in the region (Figure 2). Two species of *Anthoptilum* are thought to be abundant in the Laurentian Channel: *A. grandiflorum* (Verrill, 1879) and *A. murrayi* (Kölliker, 1880). However, recent genetic work has indicated that the genus *Anthoptilum* in this region might host more than two species, which might be difficult to distinguish via morphology alone, indicating the need for physical specimens to confirm identification (B. Neves, unpublished data). Given this *a priori* knowledge, the most confident *in situ* identification for the genus *Anthoptilum* is *Anthoptilum* spp. indet., where the open nomenclature sign 'indet.' signals that the identification cannot proceed beyond the genus level (Table 1). An exception to this scenario would be if the specimen of interest has been collected or if eDNA samples from the sampling location are available to support the presence of such species in the same location at the same time.



Figure 2. *In situ* images of soft coral (probably *Gersemia* sp. indet.) (left) and *Anthoptilum* sp. indet. (right) taken from ROPOS in 2017 (Credit: CSSF-CHONe-DFO).

In other cases, an image may be too blurry to see any distinguishing characteristics. It may be tempting to assign a name to a specimen because it appears to resemble a familiar taxon. However, in practice, this can be a dangerous and misleading endeavour if there are no characteristics upon which to base an identification.

We can neither confidently nor reasonably identify beyond a particular taxonomic rank in the cases described above. However, the production of identification guides with examples such as this report, the storage of images online for consultation like BIIGLE (Langenkämper et al. 2017), and public sharing of such resources (e.g., the [Marine Life of the Northeast Pacific project on iNaturalist](#)) will lead to future revisions of rank from experts and related surveys, as has occurred on platforms such as iNaturalist (<https://inaturalist.ca/observations/116332393>).

3 HOW TO USE THIS GUIDE

This guide consists of seven sections, one for each of the phyla: Arthropoda, Chordata, Cnidaria, Echinodermata, Mollusca, and Porifera. We have also included a miscellaneous / other section for groups with fewer unique taxa, unidentified but frequently occurring specimens, and a few interesting extras. A key to the guide explaining the organization and components of each taxonomic entry can be found on page 16. We have also included a library of symbols on page 17 that indicate the level of caution to use when identifying a particular organism from imagery. Although many taxa present in the Laurentian Channel MPA are also present in other regions (e.g., Gulf of St. Lawrence, Scotian Shelf, Labrador Sea), this guide was developed to support *in situ* identification of epibenthic and demersal fauna from seafloor imagery collected from the

Laurentian Channel MPA. *In situ* images used throughout the guide were collected by Campod and are credited to CHONe-DFO, unless otherwise specified.

4 LIST OF TAXA

The taxa presented in this guide can be found in Table 2 and are ordered by phylum in order of appearance in the fossil record. Within each phylum, taxa are ordered alphabetically by class, then subclass, order, and so on. Within each taxonomic rank, taxa are ordered from most-specific to least specific (i.e., within the order Actiniaria, the species-level identifications precede the family-level identifications). Due to difficulty in identifying sponges *in situ*, we used morphotypes (e.g., Encrusting, Round) in place of scientific names in cases where an image may resemble multiple taxonomic groups. This was done to indicate a reduced level of confidence in the taxonomic identification of certain groups, while acknowledging that organisms can still be identified by their morphology in an informative way. It should be acknowledged that benthic megafauna from the Laurentian Channel MPA have been video surveyed by other authors in the past (e.g., Miles and Edinger, 2016 (unpublished DFO report), Lacharité et al. 2020; De Mendonça and Metaxas 2021; Miatta and Snelgrove 2022; Boulard et al. 2023). While the list of taxa is expected to overlap between these studies and the present study, at this time the morphotaxon names used in those publications might not necessarily match the present list. A first attempt to collate the morphotaxa names used across these publications is presented in Table 4. In the future we hope to develop a standardized list of morphotaxa that considers all previously and currently published names in a consistent format. We have used Darwin Core fields (e.g., scientificName, verbatimIdentification, identificationRemarks, identificationQualifier) to increase consistency with organisms identified elsewhere (Wieczorek et al. 2012).

Table 2. List of taxa

Phylum	Taxa	Pages
Porifera		18
	<i>Polymastia uberrima</i>	20
	Polymastiidae sp.1	21
	Polymastiidae sp.2	22
	Polymastiidae sp.3	23
	Polymastiidae sp.4	24
	Polymastiidae	25
	<i>Stylocordyla borealis</i>	26
	White encrusting	27
	Yellow encrusting	28
	White massive	29
	Round	30
	White finger-like	31
	Small barrel	32
	Cnidaria	
<i>Actinoscyphia</i>		40
<i>Actinostola callosa</i>		41
<i>Actinauge cristata</i>		42
<i>Liponema multicornis</i>		43
Actiniidae sp.1		44

Continued on next page ...

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Phylum	Taxa	Pages
	Actiniidae sp.2	45
	Actiniaria sp.1	46
	Actiniaria sp.2	47
	Actiniaria sp.3	48
	Actiniaria sp.4	49
	Actiniaria sp.5	50
	Ceriantharia sp.1	51
	Ceriantharia sp.2	52
	<i>Flabellum (Ulocyathus) alabastrum</i>	53
	<i>Flabellum (Ulocyathus) macandrewi</i>	54
	<i>Flabellum (Ulocyathus)</i>	55
	Zoantharia	56
	Hexacorallia sp.1	57
	<i>Duva florida</i>	58
	<i>Gersemia</i>	59
	Malacalcyonacea sp.1	60
	<i>Heteropolypus</i>	61
	<i>Anthoptilum</i>	62
	<i>Balticina finmarchica</i>	63
	<i>Funiculina quadrangularis</i>	64
	<i>Kophobelemnion</i>	65
	<i>Pennatula aculeata</i>	66
	<i>Ptilella grandis</i>	67
	<i>Protoptilum carpenterii</i>	68
	Pennatuloida sp.1	69
	Rhodaliidae	70
	Anthoathecata sp.1	71
	<i>Solmissus</i>	72
	<i>Periphylla periphylla</i>	73
	<i>Aurelia aurita</i>	74
Arthropoda		75
	<i>Munidopsis curvirostra</i>	77
	<i>Lithodes maja</i>	78
	<i>Hyas araneus</i>	79
	<i>Pontophilus norvegicus</i>	80
	<i>Pasiphaea multidentata</i>	81
	Caridea sp.1	82
	<i>Pagurus</i>	83
	<i>Syscenus infelix</i>	84
	<i>Aega psora</i>	85
	Pantopoda	86

Continued on next page ...

... Continued from previous page

Phylum	Taxa	Pages
Mollusca		87
	<i>Illex illecebrosus</i>	87
	<i>Stoloteuthis leucoptera</i>	88
	<i>Rossia palpebrosa</i>	89
	<i>Bathypolypus bairdii</i>	90
	<i>Arrhoges occidentalis</i>	91
	Naticidae	92
	<i>Buccinum</i>	93
	Buccinidae	94
	<i>Margarites costalis</i>	95
	<i>Scaphander punctostriatus</i>	96
	Gastropoda sp.1	97
	<i>Astarte</i>	98
	<i>Similipecten greenlandicus</i>	99
	<i>Dendronotus</i>	100
	Fionoidea sp.1	101
	Neoloricata	102
Echinodermata		106
	<i>Pseudarchaster parelii</i>	111
	<i>Psilaster andromeda</i>	112
	<i>Ctenodiscus crispatus</i>	113
	<i>Henricia</i>	114
	<i>Ceramaster granularis</i>	115
	<i>Hippasteria phrygiana</i>	116
	<i>Poraniomorpha</i>	117
	<i>Diplopteraster multipes</i>	118
	<i>Ophiura sarsii</i>	119
	<i>Amphiura</i>	120
	Ophiuroidea sp.1	121
	Ophiuroidea sp.2	122
	<i>Brisaster fragilis</i>	123
	Elpidiidae	124
Chordata		123
	<i>Pollachius virens</i>	125
	<i>Gadus morhua</i>	126
	<i>Enchelyopus cimbrius</i>	127
	<i>Nezumia bairdii</i>	128
	<i>Merluccius bilinearis</i>	129
	<i>Phycis chesteri</i>	130
	<i>Urophycis tenuis</i>	131
	<i>Lophius americanus</i>	132

Continued on next page ...

... Continued from previous page

Phylum	Taxa	Pages
	<i>Dibranchus atlanticus</i>	133
	<i>Glyptocephalus cynoglossus</i>	134
	<i>Hippoglossus hippoglossus</i>	135
	<i>Sebastes</i>	136
	<i>Anarhichas lupus</i>	137
	<i>Cryptacanthodes maculatus</i>	138
	<i>Paraliparis</i>	139
	<i>Lycenchelys verrillii</i>	140
	<i>Lycodes esmarkii</i>	141
	<i>Lycodes</i>	142
	<i>Melanostigma atlanticum</i>	143
	<i>Centroscyllium fabricii</i>	144
	<i>Squalus acanthias</i>	145
	<i>Amblyraja radiata</i>	146
	<i>Malacoraja senta</i>	147
	<i>Myxine limosa</i>	148
	Teleostei sp.1	149
	Actinopteri	150
	Ascidiacea sp.1	151
	Ascidiacea sp.2	152
	Ascidiacea sp.3	153
Other		154
	<i>Aphrodita hastata</i>	155
	Serpulidae	156
	Bryozoa	157
	Nemertea sp.1	158
	Undetermined sp.1	159
	Undetermined sp.2	160
	Undetermined sp.3	161
	Undetermined sp.4	162
	Algal detritus	163
	Anthropogenic debris	164

Key to the Guide

Taxonomic ranks, including sub-ranks where appropriate.

Phylum Cnidaria **Class Anthozoa** **Subclass Octocorallia**
Order Scleralcyonacea **Superfamily Pennatuloidea** **Family Kophobelemnidae**

Darwin Core field indicating either:

- 1) **identificationQualifier**: the identifier's uncertainty about the identification (see Table 1).
- 2) **verbatimIdentification**: the label assigned to the taxa during identification, if different than the scientificName

This field is empty for taxa that are identified to the species level with high confidence.

Darwin Core field **scientificName**. May also include morphospecies names (e.g., *Porifera* sp.1). This field is the lowest recommended taxonomic or morphospecies name.

Kophobelemnon Asbjörnsen, 1856

WoRMS AphiaID: 128492

identificationQualifier: sp. indet.

Common name, morphotype, or functional group

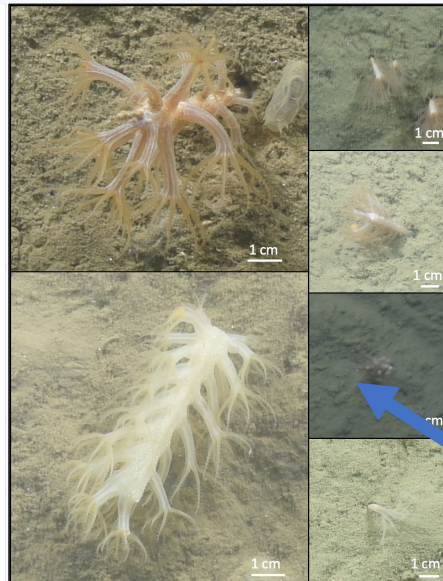
Description: Large polyps arranged along two sides of rachis (biserially) and vary in colour from brownish to pale and white. Number of polyps varies; peduncle completely buried and not seen *in situ*. Colonies can partially or completely withdraw into the sediment and appear to have less polyps than what they have.

Key characteristics: Colonies are short, with very large polyps (in comparison to most other sea pens). Polyps often in close proximity to the substrate.



ID Note: ID to genus.

Remarks: Possibly the species *K. stelliferum*, which has been reported in the region based on physical specimens. However, the possibility of having other species cannot be excluded. Recent seafloor imagery has indicated that the genus seems to be more common than previously thought. Squat lobsters are commonly seen near these sea pens.



S
E
A
P
E
N
S

In situ imagery: best-possible photo to see key characteristics, lower-quality "most-likely observed" photos, interesting varieties

Symbol indicating if the taxa can be identified to species using imagery

Physical description of taxa, with key characteristics for identification using imagery, notes or things to look out for.

Page number corresponding to table of contents

58

Symbol library



→ ID to species may be challenging from imagery



→ ID to species possible from imagery



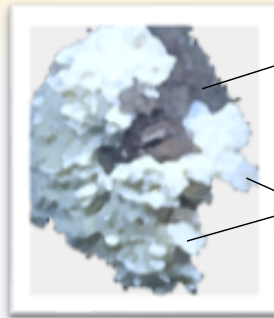
→ ID beyond this taxonomic rank not possible from imagery alone



Phylum Porifera

Sponge morphologies

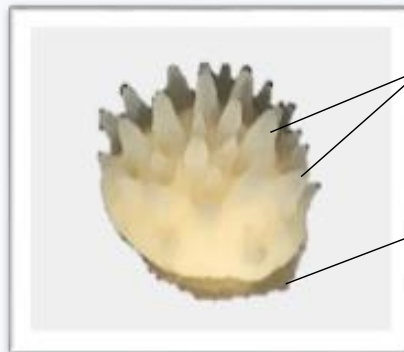
Encrusting



Substrate

Sponge (with projections)

Round with projections

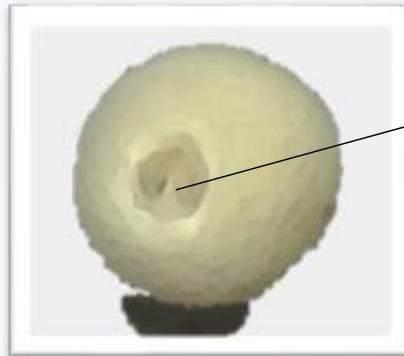


Papillae

Collar

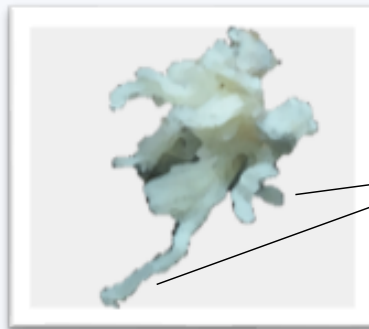
Round

(Small ball, large osculum)



Osculum

Finger-like



Finger-like projections

Stalked



Stalk

Phylum Porifera

Class Demospongiae

Subclass Heteroscleromorpha

Order Polymastiida

Family Polymastiidae

Polymastia uberrima (Schmidt, 1870)

WoRMS AphiaID: 132046

identificationQualifier: sp. inc.

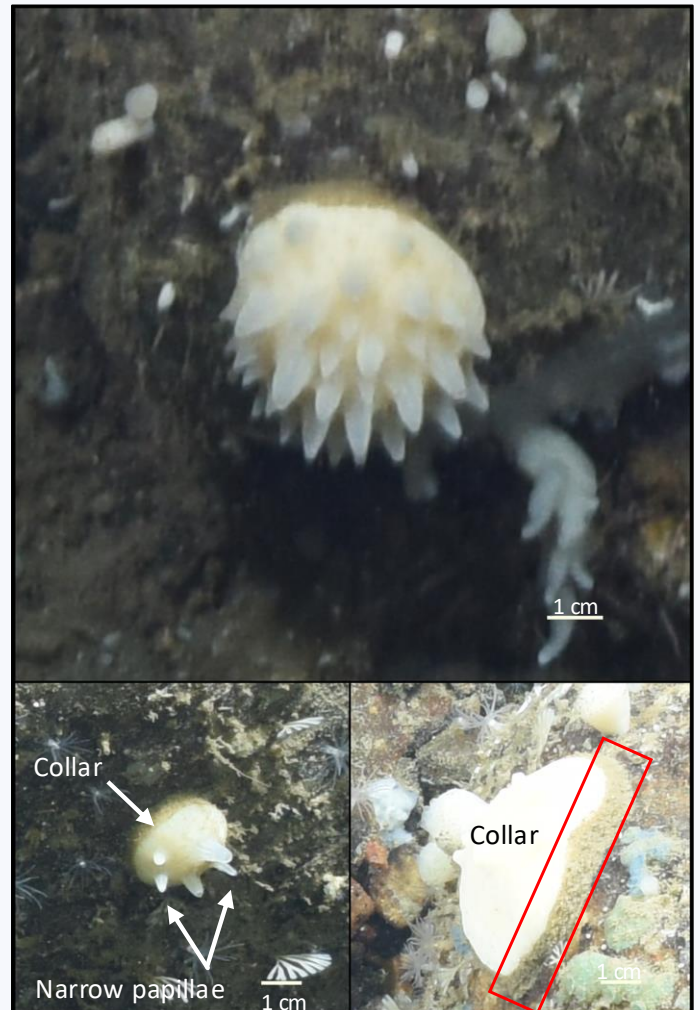
Description: Round body with narrow finger-like projections (papillae), looks like an inflated glove. Number of projections varies.

Key characteristics: Brown slightly fuzzy collar at base.



ID Note: If collar and narrow papillae are visible, ID to species. Otherwise, ID to family Polymastiidae.

Remarks: *Polymastia uberrima* has been confirmed to be present in the Newfoundland and Labrador region. Despite its distinct characteristics (e.g. collar), identification can only be confirmed with a physical specimen.



Round with projections

Polymastiidae sp.1

WoRMS AphiaID: 131673

identificationQualifier: gen. indet.

Description: Round body, though shape is oblong compared to other Polymastiidae. Has wide finger-like projections (papillae). Number of projections varies.

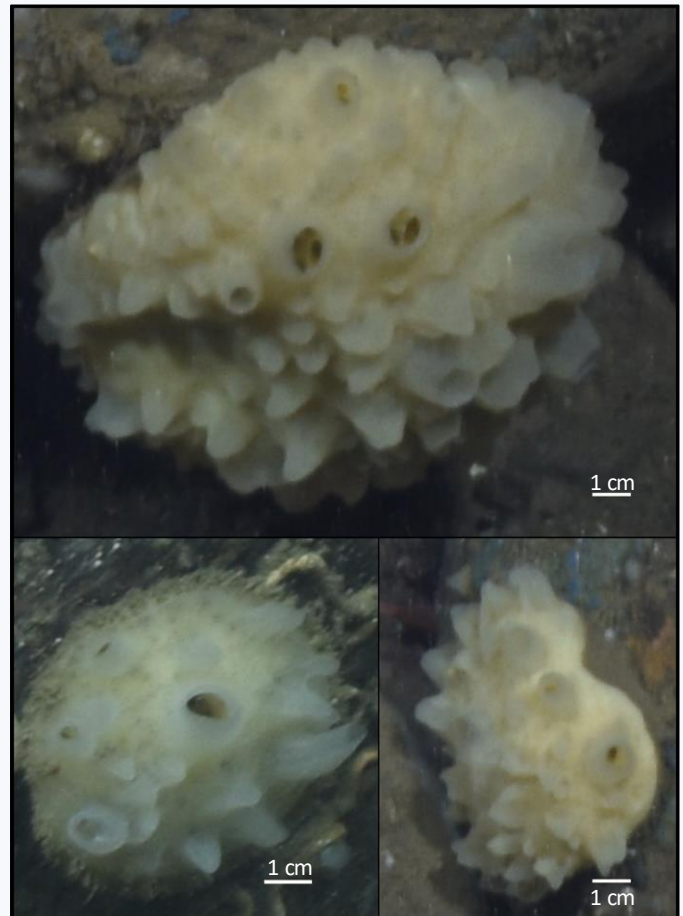
Key characteristics: Abundant wide-based papillae of different sizes.



ID Note: Requires visual examination of collar and/or spicule microscopy. ID to family Polymastiidae.

Remarks: Resembles *Sphaerotylus capitatus*, which has been identified from a physical sample collected Northwest of the Laurentian Channel in the Gulf of St. Lawrence. Wide papillae collapse after collection – see Dinn 2020.

Polymastid sponges are generally round-spherical with papillae that range in length, width, and number. Genera and species within this family look similar to one another and cannot be reliably distinguished from imagery alone.



Round with projections

Polymastiidae sp.2

WoRMS AphiaID: 131673

identificationQualifier: gen. indet.

Description: Mud covered sponge with few long papillae. Very thick collar, papillae may be partially retracted.

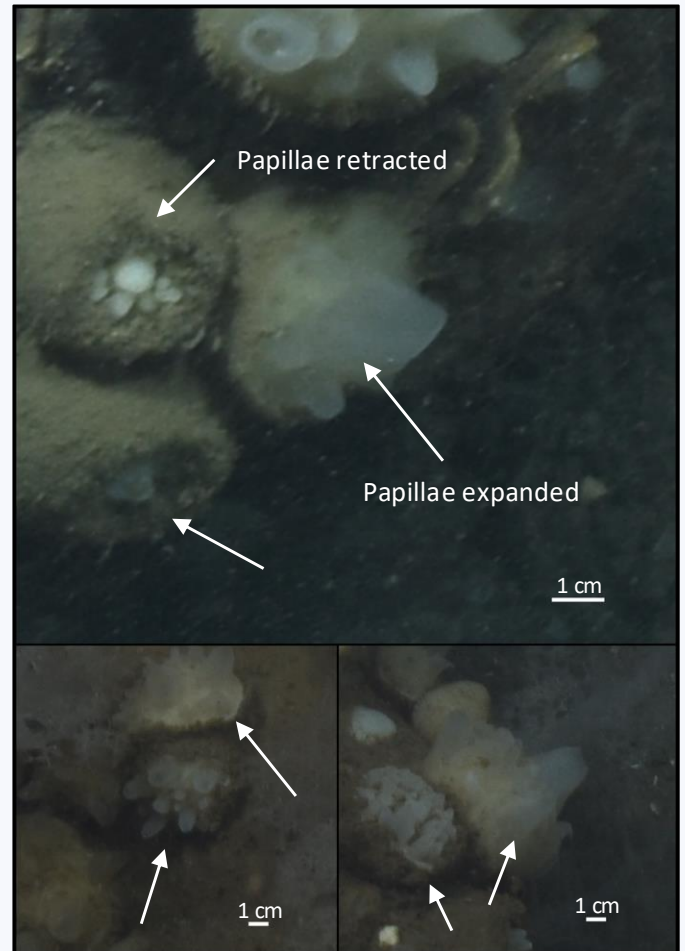
Key characteristics: Papillae wide and long, thick mud-covered collar.



ID Note: Requires visual examination of collar and/or spicule microscopy. When in doubt, ID to family Polymastiidae.

Remarks: Resembles *Trachyteleia hispida* (Bowerbank, 1864) identified from the Gulf of St. Lawrence and the Newfoundland and Labrador shelf. Also resembles *Sphaerotylus* sp., which has been identified from a physical sample collected northwest of the Laurentian Channel in the Gulf of St. Lawrence. A physical specimen is required to confirm. Wide papillae collapse after collection – see Dinn 2020.

Polymastid sponges are generally round-spherical with papillae that range in length, width, and number. Genera and species within this family look similar to one another and cannot be reliably distinguished from imagery alone.



Round with projections

Polymastiidae sp.3

WoRMS AphiaID: 131673

identificationQualifier: gen. indet.

Description: Pale yellow-white, round body, though shape is flattened. Has short finger-like projections (papillae). Number of projections varies.

Key characteristics: Flattened with short papillae.



ID Note: Requires visual examination of collar and/or spicule microscopy. When in doubt, ID to family Polymastiidae.

Remarks: This might be *Polymastia uberrima* (Schmidt, 1870) (see page 21) based on spicules examined on a similar-looking specimen, but this cannot be confirmed from imagery alone. This species has been identified from a physical sample collected Northwest of the Laurentian Channel in the Gulf of St. Lawrence. See Dinn 2020.

Polymastid sponges are generally round-spherical with papillae that range in length, width, and number. Genera and species within this family look similar to one another and cannot be reliably distinguished from imagery alone.



Round with projections

Phylum Porifera

Class Demospongiae

Subclass Heteroscleromorpha

Order Polymastiida

Family Polymastiidae

Polymastiidae sp.4

WoRMS AphiaID: 131673

identificationQualifier: gen. indet.

Description: Round body with wide papillae that are all the same size. Number of papillae varies.

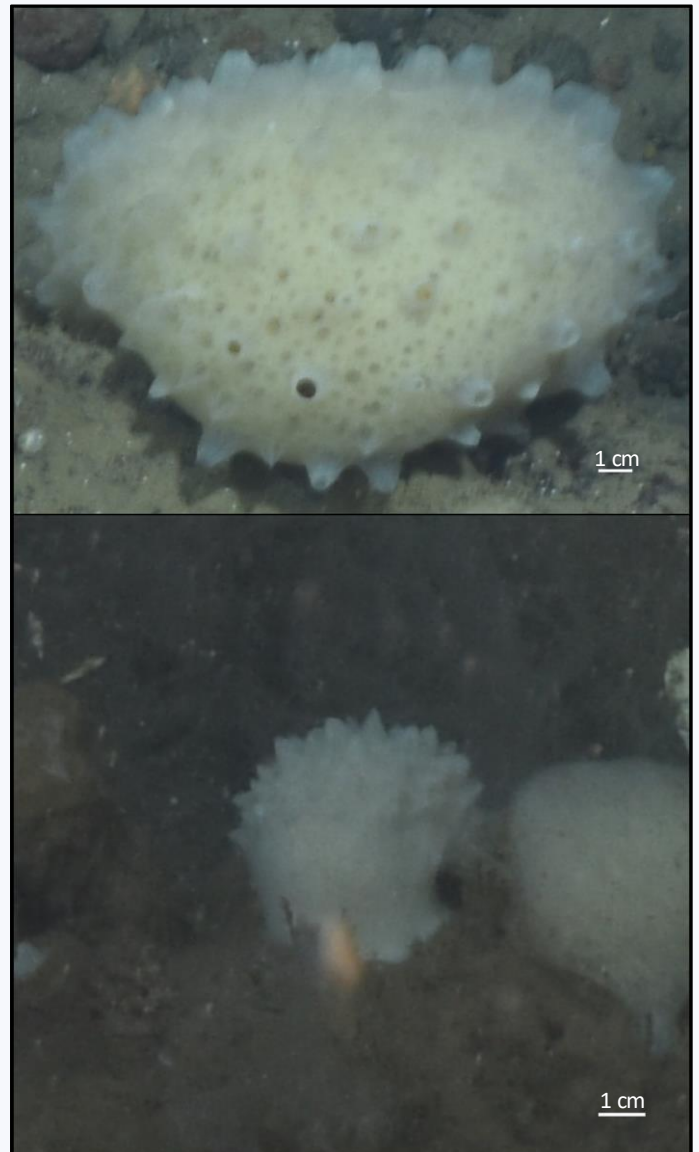
Key characteristics: Wide and abundant papillae.



ID Note: Requires visual examination of collar and/or spicule microscopy. ID to family Polymastiidae.

Remarks: Resembles *Weberella bursa* (Vosmaer, 1885) but this cannot be confirmed from imagery alone. This species has been identified from a physical sample collected Northwest of the Laurentian Channel in the Gulf of St. Lawrence. See Dinn 2020.

Polymastid sponges are generally round-spherical with papillae that range in length, width, and number. Genera and species within this family look similar to one another and cannot be reliably distinguished from imagery alone.



Round with projections

Polymastiidae

WoRMS AphiaID: 131673

identificationQualifier: gen. indet.

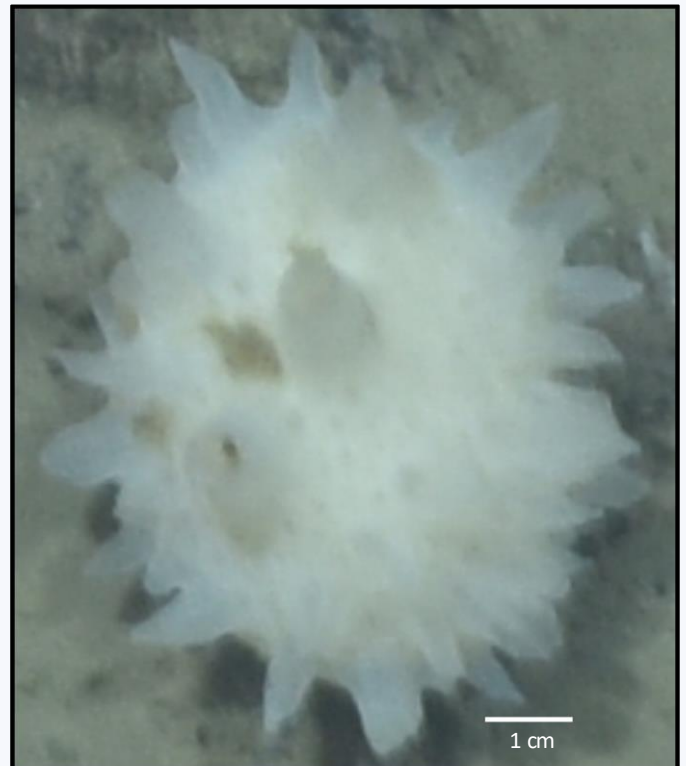
Description: Round body with finger-like projections (papillae). Papillae may vary in length, width, and number within and among species in this family. The body may look like an inflated glove or papillae may be retracted. A collar may be present around the base of the sponge, although this may not always be visible in an image (see *Polymastia uberrima* on p. 21).

Key characteristics: Round cushion-like body, with papillae.



ID Note: Requires visual examination of collar and/or spicule microscopy. When in doubt, ID to morphotype “Round with projections”.

Remarks: Polymastid sponges are generally round-spherical with papillae that range in length, width, and number. Genera and species within this family look similar to one another and cannot be reliably distinguished from imagery alone.



Round with projections

Phylum Porifera

Class Demospongiae

Subclass Heteroscleromorpha

Order Suberitida

Family Stylocordylidae

Stylocordyla borealis (Lovén, 1868)

WoRMS AphiaID: 134240

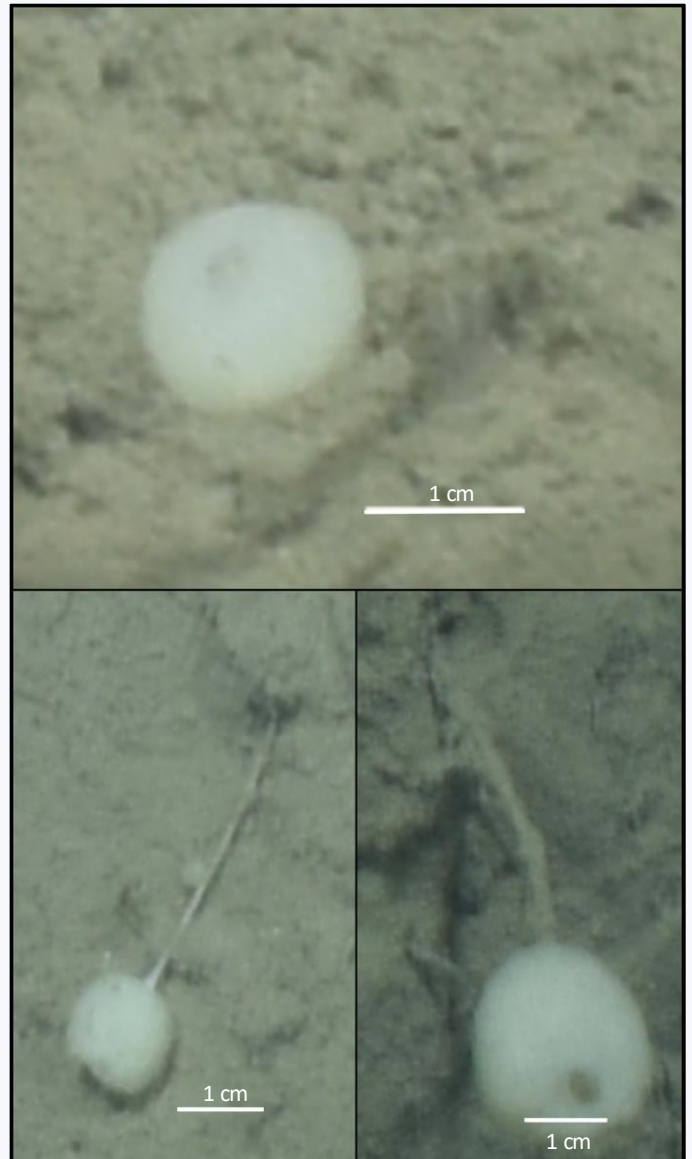
Description: Long thin stalk protruding out of soft sediment. White terminal bulb with small pores.

Key characteristics: White bulb with small opening, long thin stalk.



ID Note: Regionally very common, easy to distinguish.

Remarks: Common in the Laurentian Channel, *S. borealis* is presumed to be the only species in the region.



Stalked

Phylum Porifera

Class Undetermined

Subclass Undetermined

Order Undetermined

Family Undetermined

White encrusting

WoRMS AphiaID: 558

verbatimIdentification: Porifera sp.1

Description: White encrusting sponge found on rocky substrate. Number, arrangement, and appearance of projections varies.

Key characteristics: White encrusting sponge, projections present.



ID Note: Requires microscope examination of spicules. Code to morphotype “White encrusting”.

Remarks: Looks similar to “Suberitida unknown 1” in Dinn 2020, although a physical specimen is required to confirm.



Encrusting

Phylum Porifera

Class Undetermined

Subclass Undetermined

Order Undetermined

Family Undetermined

Yellow encrusting

WoRMS AphiaID: 558

verbatimIdentification: Porifera sp.2

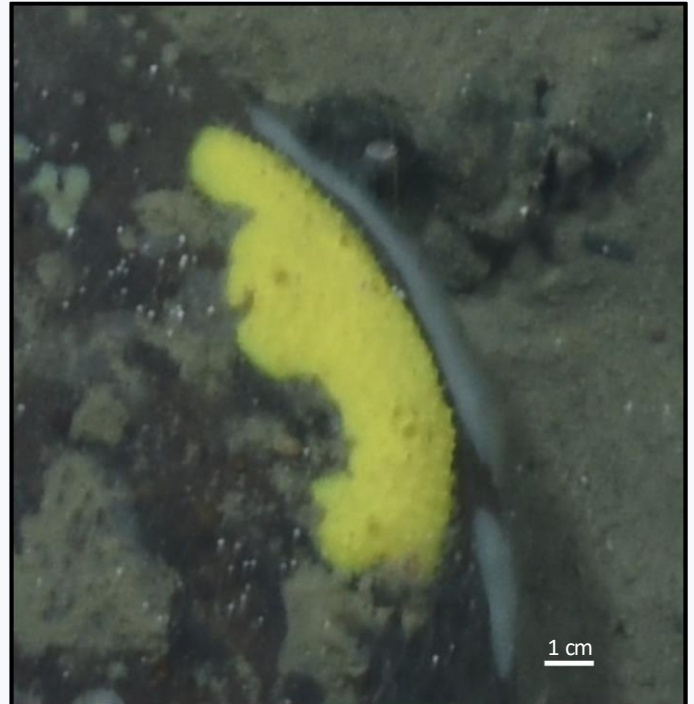
Description: Yellow encrusting sponge found on rocky substrate.

Key characteristics: Bright yellow encrustation, many small projections.



ID Note: Requires microscope examination of spicules. Code to morphotype "Encrusting yellow".

Remarks: Yellow encrusting sponge with visible projections is similar to *Aplysilla* cf. *sulfurea* (Schulze, 1878) in Dinn 2020, although a physical specimen is required to confirm.



Encrusting

Phylum Porifera

Class Undetermined

Subclass Undetermined

Order Undetermined

Family Undetermined

White massive

WoRMS AphiaID: 558

verbatimIdentification: Porifera sp.3

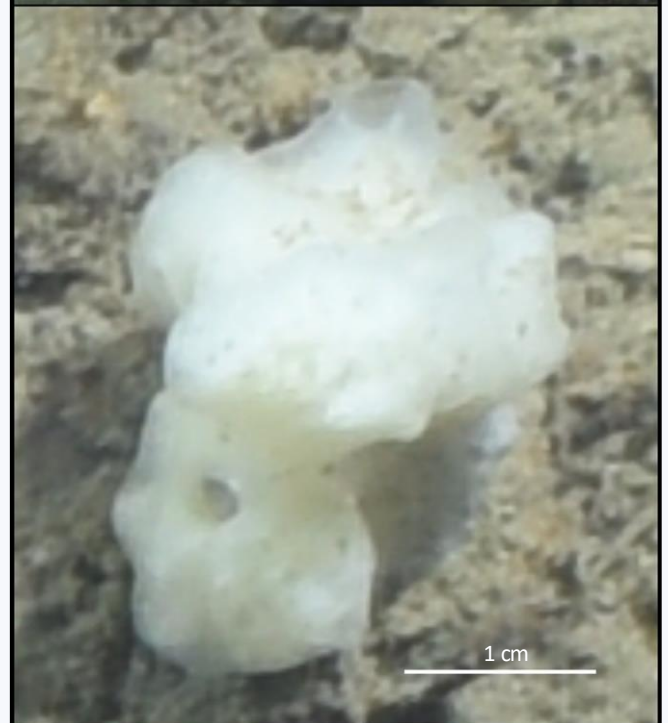
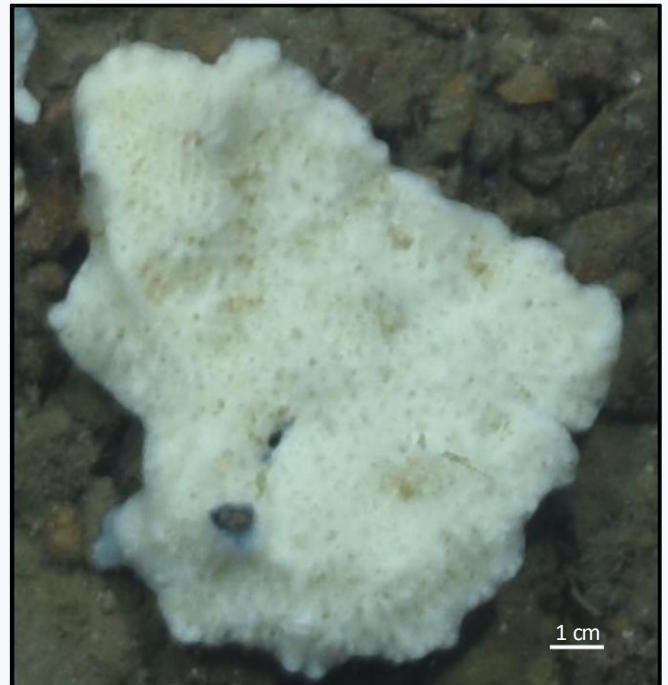
Description: Large, white, and amorphous with many pores visible. Found on soft and hard substrates.

Key characteristics: White, many pores.



ID Note: Requires visual examination of collar and/or spicule microscopy. Code to morphotype "White massive".

Remarks: Examination of the spicules of a physical specimen is required to identify.



Massive

Phylum Porifera

Class Undetermined

Subclass Undetermined

Order Undetermined

Family Undetermined

Round

WoRMS AphiaID: 558

verbatimIdentification: Porifera sp.4

Description: Round with one large opening. Pale-yellow-white, lattice visible.

Key characteristics: Round with large opening, lattice visible, attached to hard substrate.



ID Note: Requires visual examination of collar and/or spicule microscopy. Code to morphotype "Round".

Remarks: Examination of the spicules of a physical specimen is required to identify.



Large osculum

Phylum Porifera

Class Undetermined

Subclass Undetermined

Order Undetermined

Family Undetermined

White finger-like

WoRMS AphiaID: 558

verbatimIdentification: Porifera sp.5

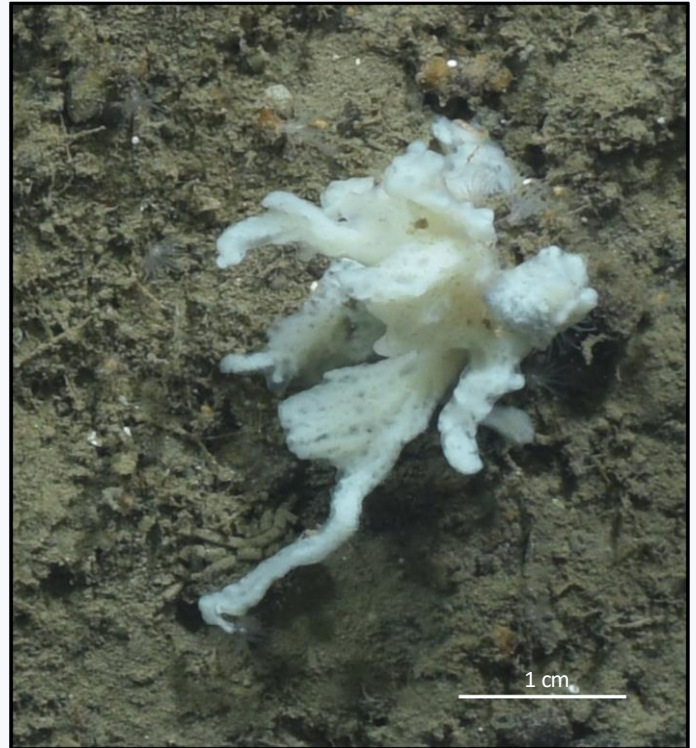
Description: Porous white structure with long, finger-like projections.

Key characteristics: Porous white structure with long, finger-like projections.



ID Note: Requires visual examination of collar and/or spicule microscopy. Code to morphotype "White finger-like".

Remarks: Resembles "Suberitida unknown sp.1" in Dinn 2020. However, examination of the spicules of a physical specimen is required to identify.



Finger-like

Phylum Porifera

Class Undetermined

Subclass Undetermined

Order Undetermined

Family Undetermined

Small barrel

WoRMS AphiaID: 558

verbatimIdentification: Porifera sp.6

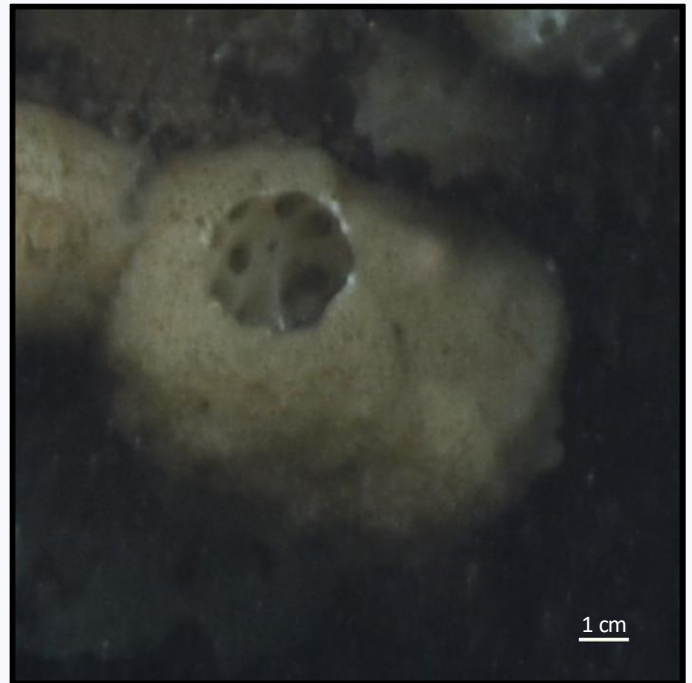
Description: Yellow-brown, structure that is ball-like and porous. A single large opening is visible.

Key characteristics: Yellow-brown, with fine pores and a large osculum, attached to hard substrate.



ID Note: Requires visual examination of collar and/or spicule microscopy. Code to morphotype "Small barrel".

Remarks: Resembles the genus *Mycale* Gray, 1867.



Thin-walled

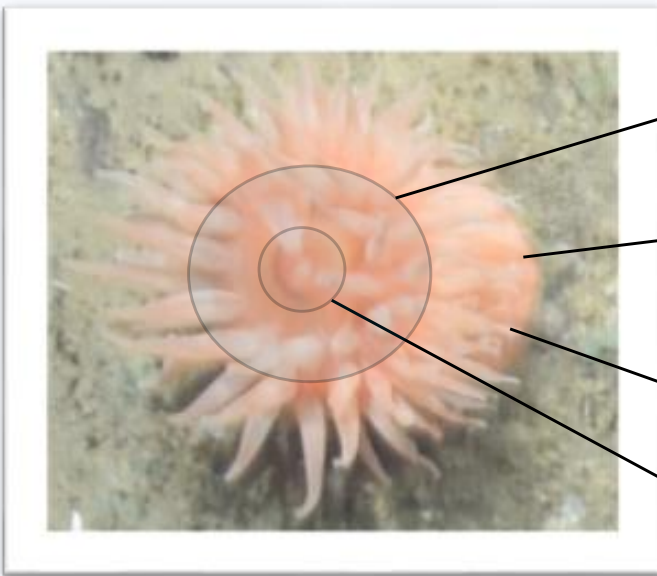


Phylum Cnidaria

Class Hexacorallia

Sea anemones

(Order Actiniaria)



Oral disc

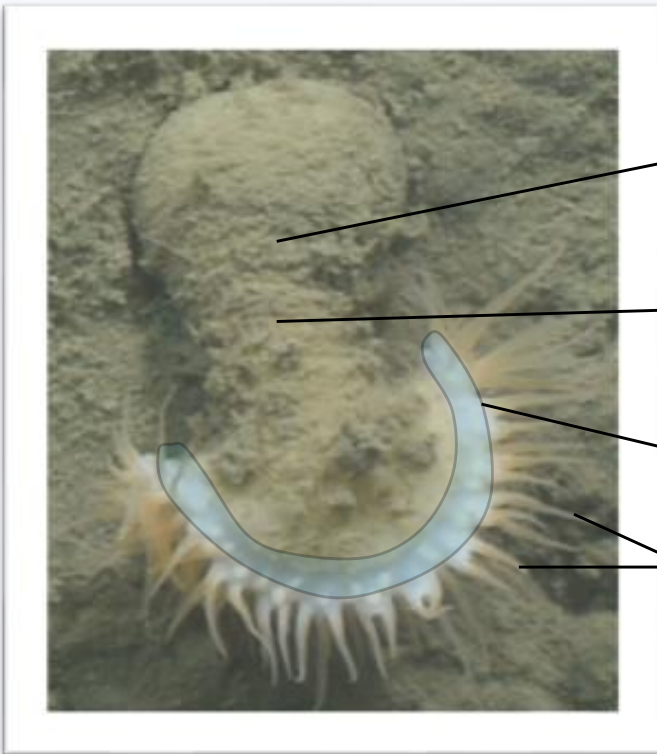
Column

(anchored on rock)

Tentacles

(many cycles)

Mouth



Column

(Anchored in mud)

Tubercles

Scapulus

Tentacles

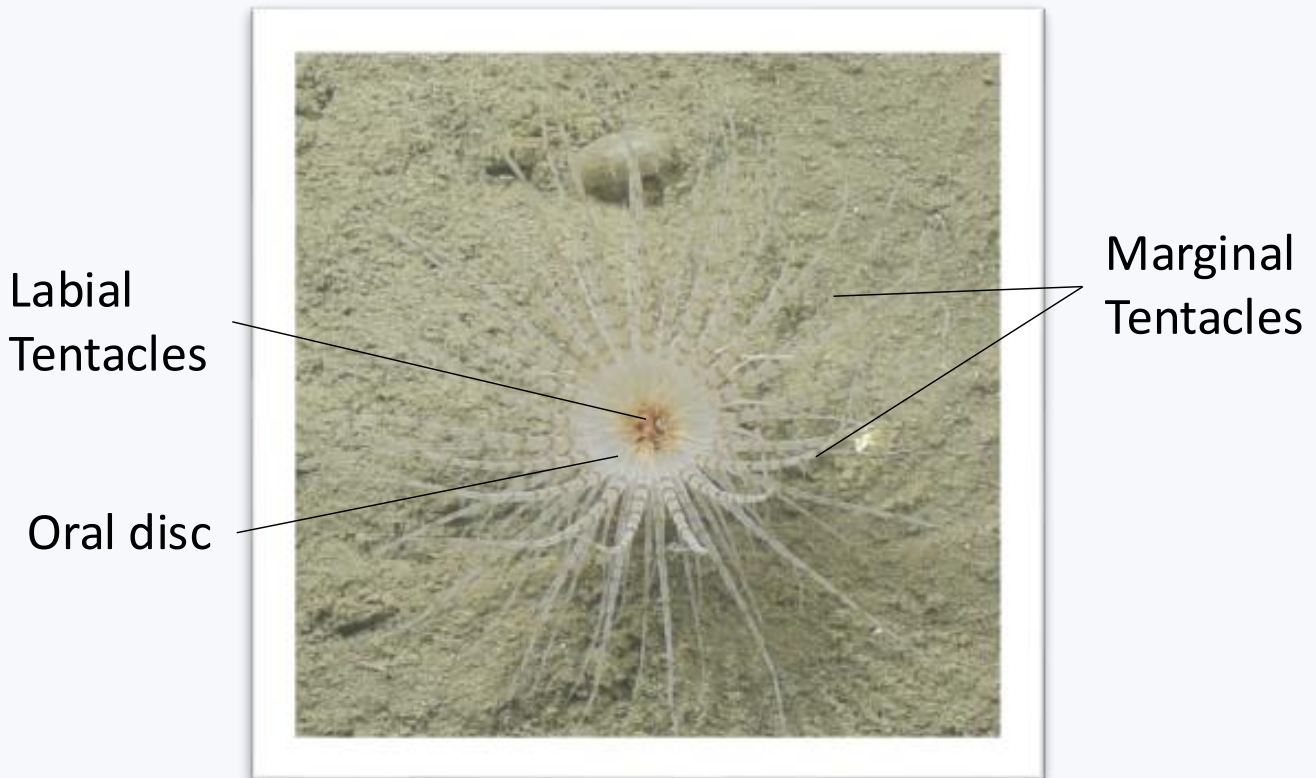
Tentacles of actiniarians vary in their number of cycles, but are usually multiples of 6. They may be arranged around the margin of the **oral disc** and/or on the oral disc itself (Stampar et al. 2016).

The **column** of an actiniarian may be smooth, or rough with cuticle or folds (**tubercles** or other specializations) that may or may not be visible in an image; it may also be differentiated into regions (**scapulus** = distal column, **scapus** = proximal column). Actiniarians may be anchored on rocks (top) or in soft substrates (bottom).

Some actiniarians resemble cup corals; when identifying from imagery, the obvious lack of a calyx and/or the presence of more than one cycle of tentacles usually differentiates Actiniaria from Scleractinia (usually one cycle) and Zoantharia (colonial polyps with two cycles on margin of oral disc). When in doubt, ID to subclass Hexacorallia.

Class Hexacorallia

Family Cerianthidae

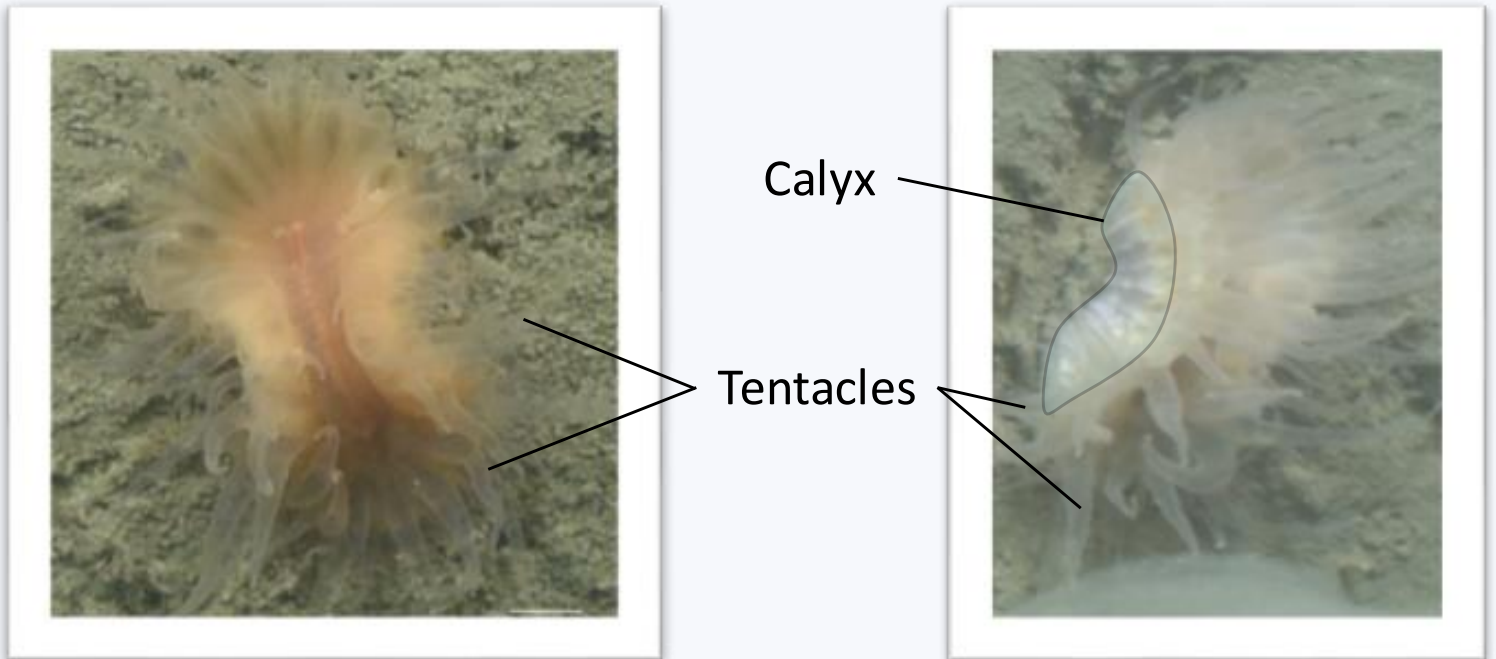


Cerianthid tentacles are arranged in two distinct cycles: internal (labial) and external (marginal) (Carlgren, 1912), each of which may be further arranged into two or more pseudo-cycles. Marginal tentacles occur around the margin of, and delineate the extent of, the oral disc. Labial tentacles occur within the oral disc and are non-retractile. Tentacle length may vary between cycles. See Stampar et al. (2016) for review of cerianthid systematics.

Class Hexacorallia

Solitary stony corals

(Order Scleractinia)



Tentacles of scleractinians have batteries of tiny wart-like nematocysts and are often arranged in a single cycle on the margin of the oral disc (Stampar et al. 2016), although the tentacle arrangement is unknown for most corals and may be variable (Daly et al. 2007). The calcified external skeleton (**calyx**) of the corallum can be circular to elliptical and is layered as radial partitions (**cycles**) of **septa**; the arrangement and number of septa may be used to differentiate taxa within this group (Daly et al. 2007), although septa are not usually visible in living specimens *in situ*.

Solitary stony corals, known as “cup corals”, are common throughout the Laurentian Channel and are the only Scleractinian corals present in the MPA. Some cup corals appear anemone-like; when identifying from imagery, the presence of a calyx differentiates O. Scleractinia cup corals from other hexacorals. When in doubt, code to subclass Hexacorallia.

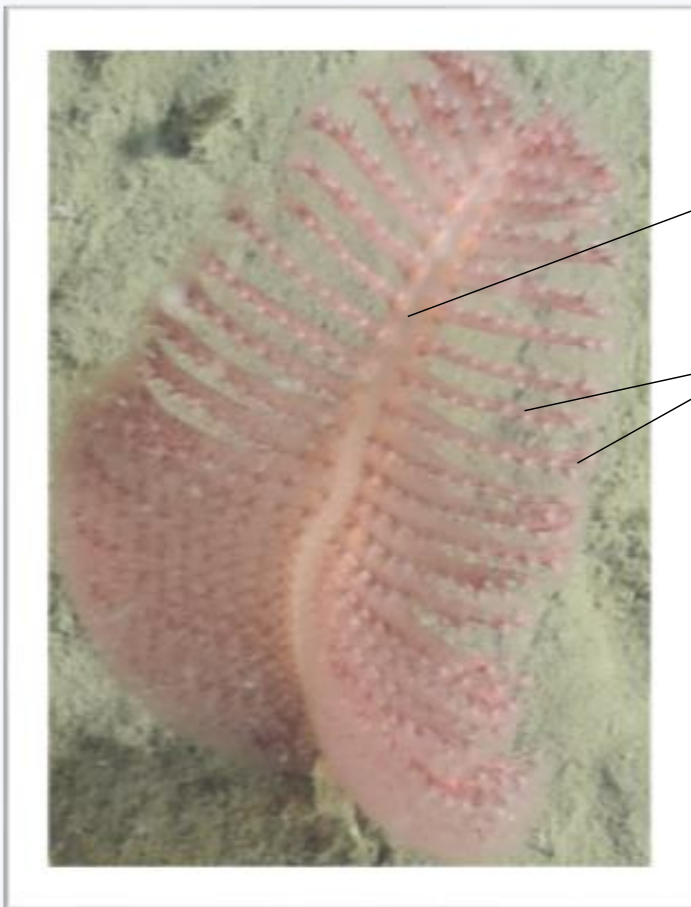
Class Octocorallia



Octocoral polyps always have eight tentacles (pictured above). Sea pen (**superfamily Pennatuloidea**) colonies have a characteristic morphology but vary in size and shape by species; they are generally divided into an upper **rachis** with polyps and a **bulbous base** or **peduncle** without polyps that anchors the colony in the sediment.

Sea pens

(Superfamily Pennatuloidea)



Rachis

Polyp
leaves



Peduncle
(buried)

Soft corals

(Family Coralliidae)



Soft corals

(Order Malacalcyonacea)



Class Hydrozoa

Solitary hydroid

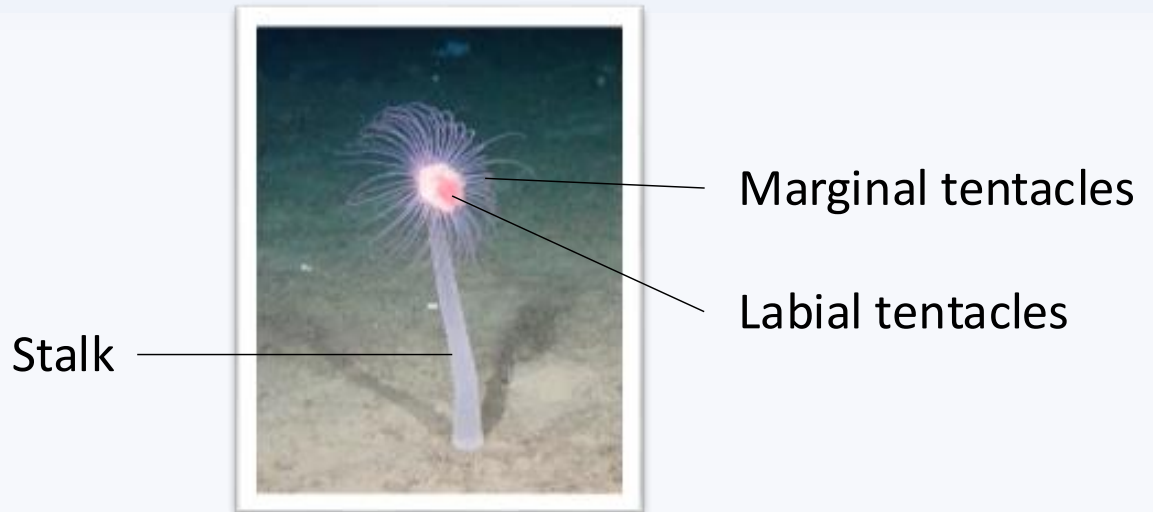


Photo credit: ArcticNet-CSSF-DFO

Class Scyphozoa

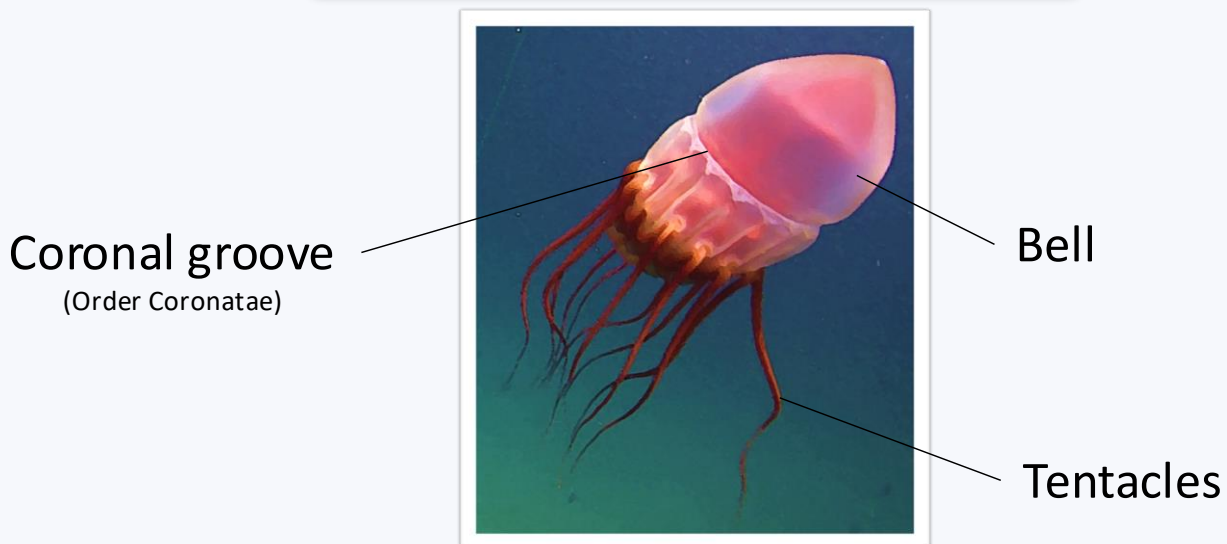


Photo credit: CSSF-CHONe-DFO

Jellyfish usually have a sessile, colonial **polyp** stage and a free-swimming **medusa** stage. In most species in class **Hydrozoa**, the medusa stage has a muscular ring of tissue (**velum**) which aids in swimming. Further, some species consist of a solitary polyp that lacks a medusa stage. In class **Scyphozoa**, the polyp phase is greatly reduced in favour of a large medusa phase (Cairns et al., 2009). Scyphozomedusae generally lack a **velum**.

Phylum Cnidaria

Subphylum Anthozoa

Class Hexacorallia

Order Actiniaria

Suborder Enthemonae

Family Actinoscyphiidae

Actinoscyphia Stephenson, 1920

WoRMS AphialID: 100707

identificationQualifier: sp. indet.

Description: Pale orange column is smooth (lacks tubercles). Oral disc is darker in colour, large and undulated with numerous (>100) short tentacles around the margin. Observed on top of soft substrate.

Key characteristics: Smooth column, large overall size; oral disc enlarged and undulated, but not bilobed (Carlgren, 1949; Rodriguez et al., 2008).



ID Note: A physical specimen is required to narrow down to species level. When in doubt, ID to superfamily Metridioidea.

Remarks: Likely one of two species: *A. aurelia* (Stephenson, 1918) or *A. saginata* (Verrill, 1882), but possibly also *A. verrilli* (Gravier, 1918) from further south. This genus and family are often identified as “venus flytrap anemones”; however, such morphology is a strategy adopted by several families (Hormathiidae, Actinoscyphiidae, Amphianthidae) and genera (*Paraphelliactis*, *Phelliactis*, *Amphianthus*, *Actinoscyphia*) in the deep sea.



Photo credits: CSSF-CHONe-DFO

A n e m o n e s

Actinostola callosa (Verrill, 1882)

WoRMS AphiaID: 100839

Description: Pale orange oral disc; many long, thick, tapering translucent tentacles arranged in several cycles; column pale orange; found on top of soft-sediments or anchored on hard substrates. Upper column with large square tubercles though not prominent when anemone is expanded (Sebens, 1998).

Key characteristics: Large pale-orange anemone, large oral disc with long, tapering tentacles arranged only along the margin, smooth column.



ID Note: In these images the upper column is not visible to corroborate the presence of large square tubercles, however the other parts of these specimens resemble *Actinostola callosa*. When in doubt, ID to order Actiniaria.

Remarks: There are only a few large deep-water anemones in the Laurentian Channel region. Somewhat similar to *Actinauge cristata* (column with brown cuticle and obvious tubercles; p.43), which is also very common in the region.



Actinauge cristata Riemann-Zürneck, 1986

WoRMS AphiaID: 158210

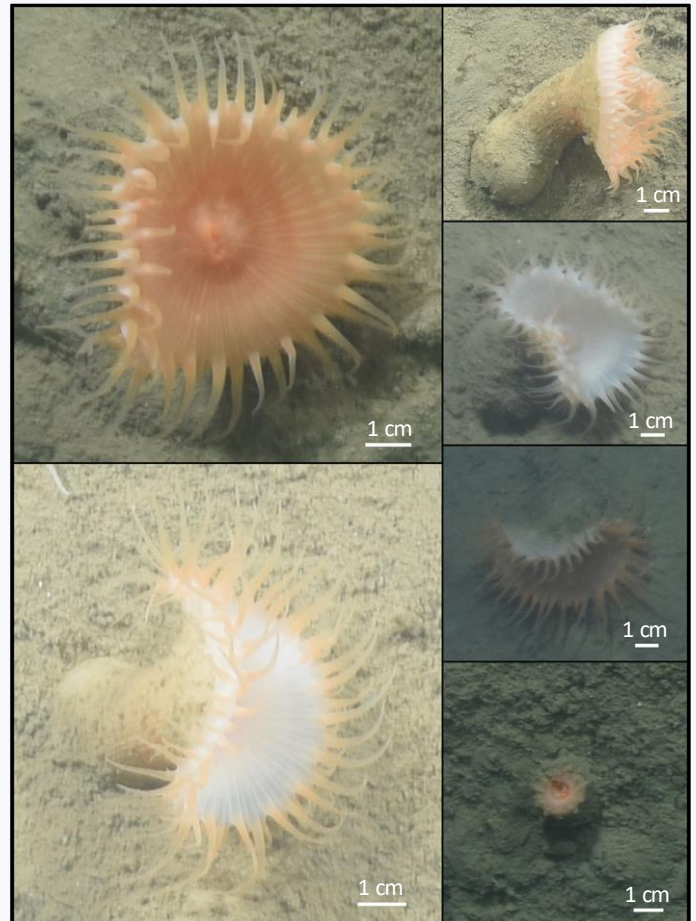
Description: Orange to translucent-white oral disc; up to 96 orange tentacles arranged in two cycles at the margin of the oral disc; column is pale orange with cuticle and small tubercles; found partially burrowed/anchored in soft-sediments. Occasionally observed with oral disc folded like a Venus flytrap.

Key characteristics: Column with brown cuticle and small tubercles; tentacles arranged in two cycles at the margin of the oral disc; base of column englobes substrate to anchor in soft bottoms.



ID Note: Common in the Laurentian Channel. When in doubt, ID to family Hormathiidae.

Remarks: Hormathiid anemones are commonly misidentified as family Actinoscyphiidae (e.g., *Actinoscyphia*), which also resemble Venus flytraps but have smooth columns. Similar to *Phelliactis americana* Widersten, 1976 (large tubercles in regular vertical rows; Sebens, 1998), which has been collected between 238 – 366 m nearby on the Scotian Shelf.



Phylum Cnidaria

Subphylum Anthozoa

Class Hexacorallia

Order Actiniaria

Suborder Enthemonae

Family Liponematidae

Liponema multicornes (Verrill, 1880)

WoRMS AphiaID: 593072

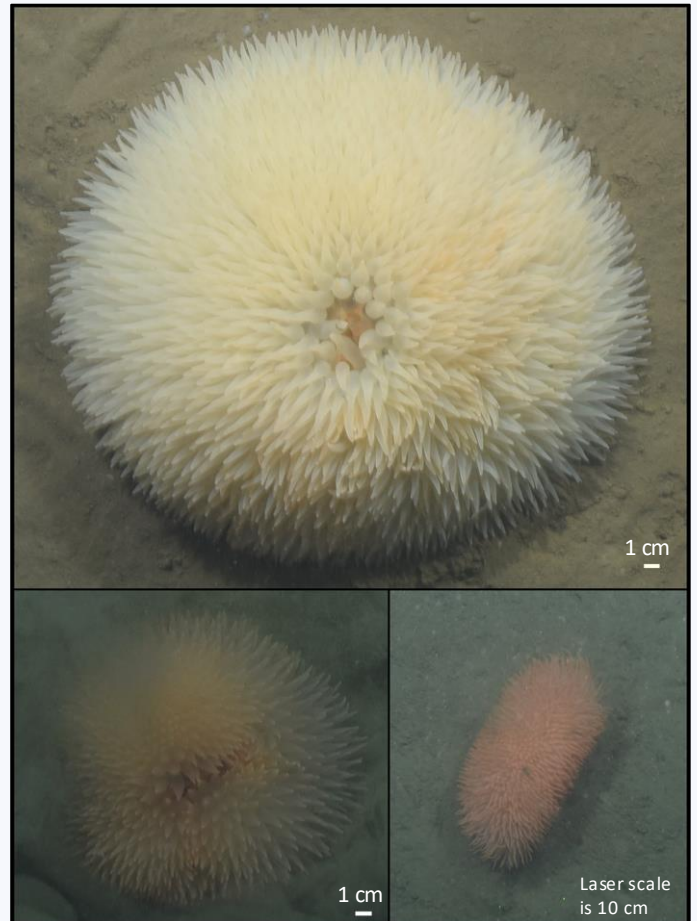
Description: Column flattened, oral disc completely covered with hundreds of short tentacles. The base is hidden by the oral disc. Colour ranges from pale-white or tan to pink-orange.

Key characteristics: Looks like a pom-pom; tentacles are shed when disturbed; might lie unattached and rolling on the seabed.



ID Note: Distinct morphology easy to distinguish. When in doubt, ID to genus *Liponema*.

Remarks: In the Laurentian Channel, most likely to be *Liponema multicornes* (Verrill, 1880) as this is currently the only known species of this genus in the region. See Sebens (1998), Nozères (2018).



A n e m o n e s

Phylum Cnidaria

Subphylum Anthozoa

Class Hexacorallia

Order Actiniaria

Suborder Enthemonae

Family Actiniidae

Actiniidae sp.1

WoRMS AphiaID: 100653

identificationQualifier: fam. stet.

Description: Pale inner oral disc with pinkish-red blotches around the base of the tentacles that run radially toward the center of the disc and demarcate the first two cycles. Four cycles of thick and short pale tentacles with lighter tips.

Key characteristics: Dark pinkish-red blotches on oral disc, four cycles of short but thick tentacles. Found attached to hard substrates.



ID Note: When in doubt, ID to order Actiniaria.

Remarks: If column is visible and verrucae can be seen, then the species is believed to be *Cribrinopsis similis*. No verrucae = *Urticina crassicornis*. Previously, these were identified as *Urticina felina*, which is NE Atlantic-only. However, both *C. similis* and *U. crassicornis* are controversial species in Pacific vs Atlantic and future revisions may be expected. This is likely *Cribrinopsis similis* (pink radial bands). Other characteristics that distinguish these species, including the mesentery fertility and organization, and nematocyst type and size (cnidome), require a physical specimen; see Sanamyan et al. (2020).



A n e m o n e s

Phylum Cnidaria

Subphylum Anthozoa

Class Hexacorallia

Order Actiniaria

Suborder Enthemonae

Family Actiniidae

Actiniidae sp.2

WoRMS AphiaID: 100653

identificationQualifier: fam. stet.

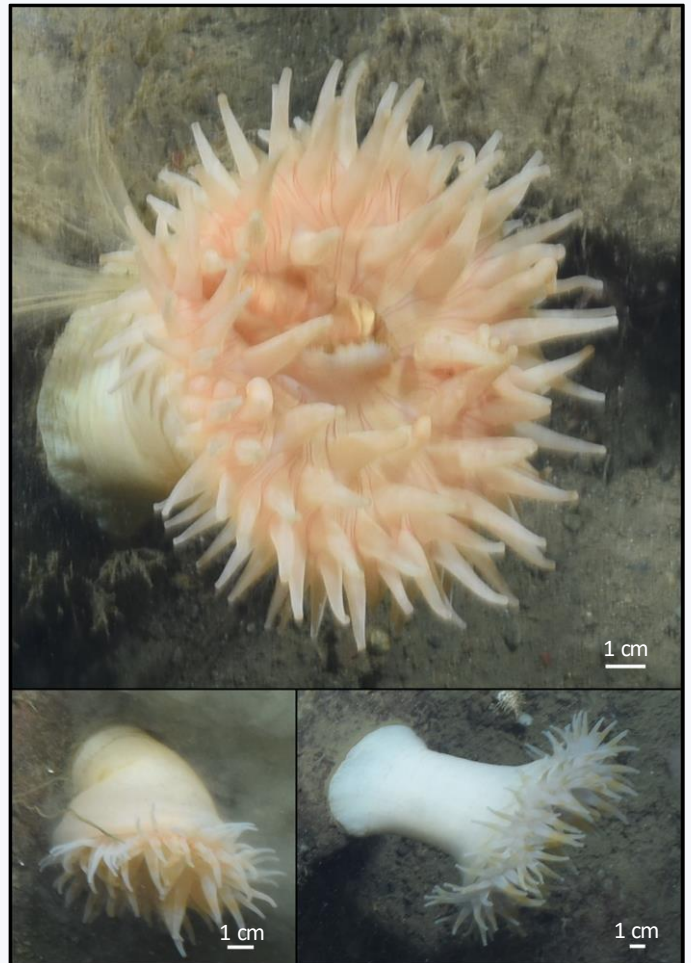
Description: Pale orange oral disc with evident stripes; many short, thick tentacles arranged in several “layers”; body stalk tan-white; found anchored on hard substrates.

Key characteristics: Many rows of short, thick tentacles, pink-pale oral disc with darker stripes, smooth stalk.



ID Note: When in doubt, ID to order Actiniaria.

Remarks: Where the column can be seen and no verrucae are present, as in the images on the right, species is believed to be *Urticina crassicornis* (Müller, 1776), but a specimen is required to confirm.



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Actiniaria sp.1

WoRMS AphiaID: 1360

identificationQualifier: ord. stet.

Description: Pinkish oral disc with many long pale-lavender tentacles.

Key characteristics: Circular oral surface, purple or pale-pink to shiny grey with pale tentacles that are long and thick. Tentacles are deciduous (detach easily).



ID Note: If deciduous tentacles are observed, can identify to superfamily Actinioidea. Otherwise, when in doubt, ID to order Actiniaria.

Remarks: This morphotype resembles members of the genus *Bolocera* Gosse, 1860. Although there are several members of the genus in the region, the most often cited species being *B. tuediae* (Johnston, 1832), morphological and molecular studies are necessary for further identification.



Phylum Cnidaria

Subphylum Anthozoa

Class Hexacorallia

Order Actiniaria

Family Undetermined

Actiniaria sp.2

WoRMS AphiaID: 1360

identificationQualifier: ord. stet.

Description: Orange oral disc; many short, thick orange tentacles arranged in four cycles; body stalk orange; found anchored on hard substrates.

Key characteristics: Pale-orange, large oral disc with no tentacles, smooth stalk, short tentacles.



ID Note: When in doubt, ID to order Actiniaria.

Remarks: Resembles *Stomphia coccinea* (Müller, 1776) as well as *Urticina crassicornis*.



A n e m o n e s

Actiniaria sp.3

WoRMS AphiaID: 1292

identificationQualifier: ord. stet.

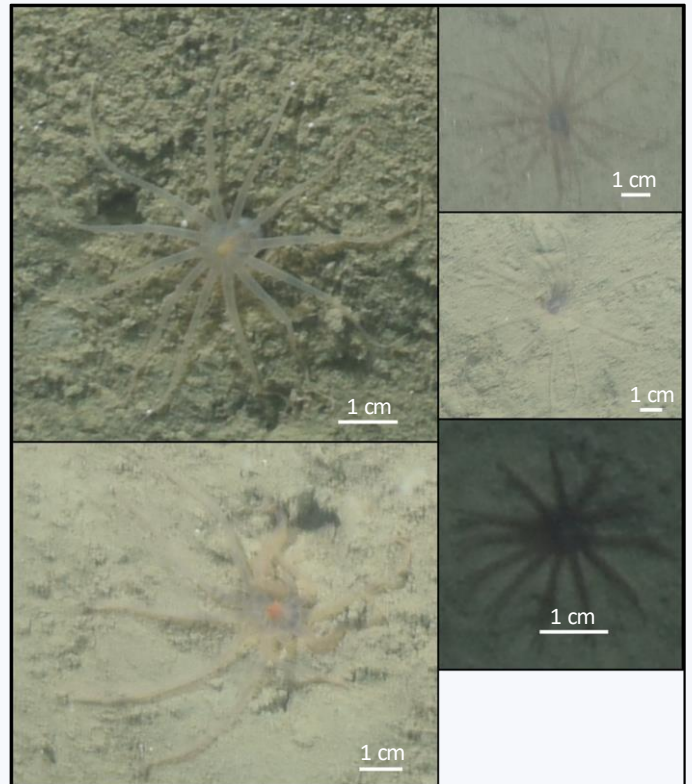
Description: A single cycle of tentacles surrounding a small oral disc. Colour varies from pale lavender and translucent to dark purple.

Key characteristics: Small diameter (<1/5 total diameter) oral surface, dark purple or pale pink-grey with 12 tentacles. Found burrowed in soft substrates.



ID Note: ID to order Actiniaria.

Remarks: Pale and red morphs could be two distinct taxa, although colour is not always a reliable characteristic (varies with turbidity, camera, lighting equipment, etc.). Burrowing anemones are represented in each anemone lineage, making identification difficult. Based on the number of tentacles, individuals in these images resemble *Halcampoides* sp., *Halcampa* sp., and members of Edwardsiidae.



Burrowing anemones

Actiniaria sp.4

WoRMS AphiaID: 100653

identificationQualifier: ord. stet.

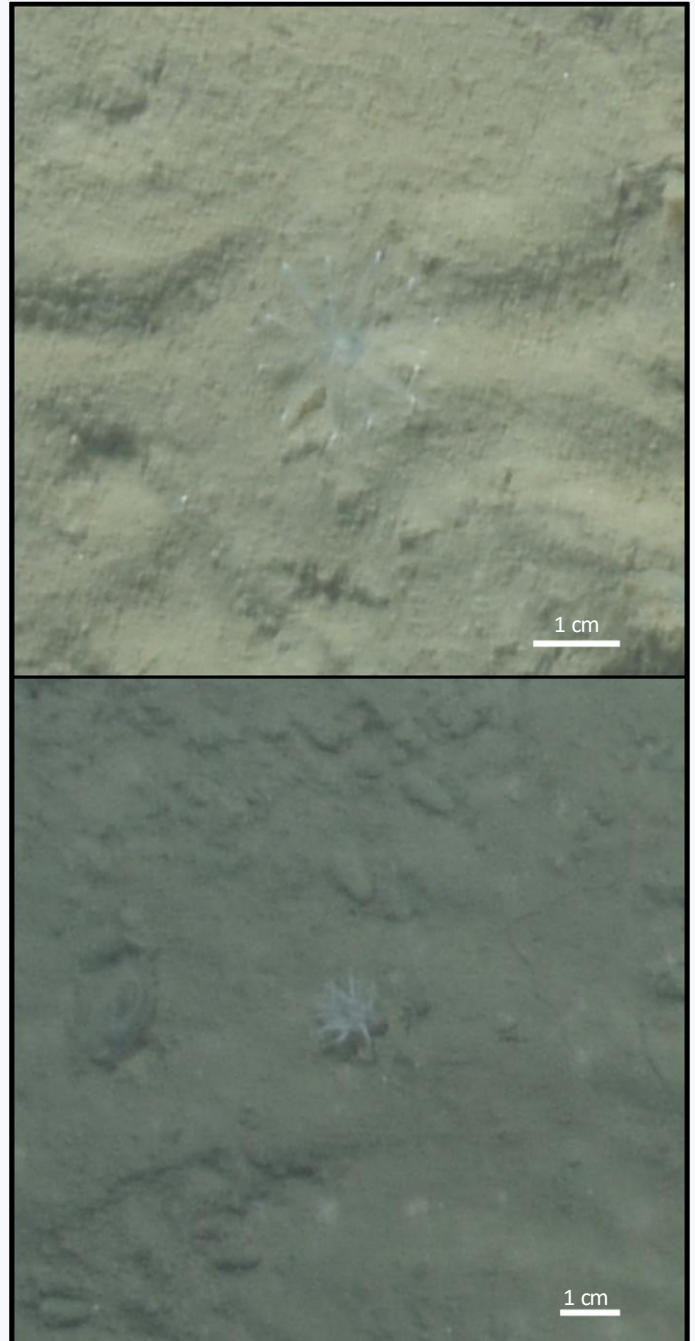
Description: A single cycle of 12 tentacles with white tips surrounding a small, light blue oral disc.

Key characteristics: Small diameter (<1/5 total diameter) oral surface, pale-translucent, 12 tentacles.



ID Note: ID to order Actiniaria.

Remarks: May be a juvenile of *Actiniaria* sp.3 or another actinarian. Burrowing anemones are represented in each anemone lineage, making identification difficult. Based on the number of tentacles, these images resemble *Halcampoides* sp., *Halcapa* sp., some Edwardsiidae, and others.



Actiniaria sp.5

WoRMS AphiaID: 100653

identificationQualifier: ord. stet.

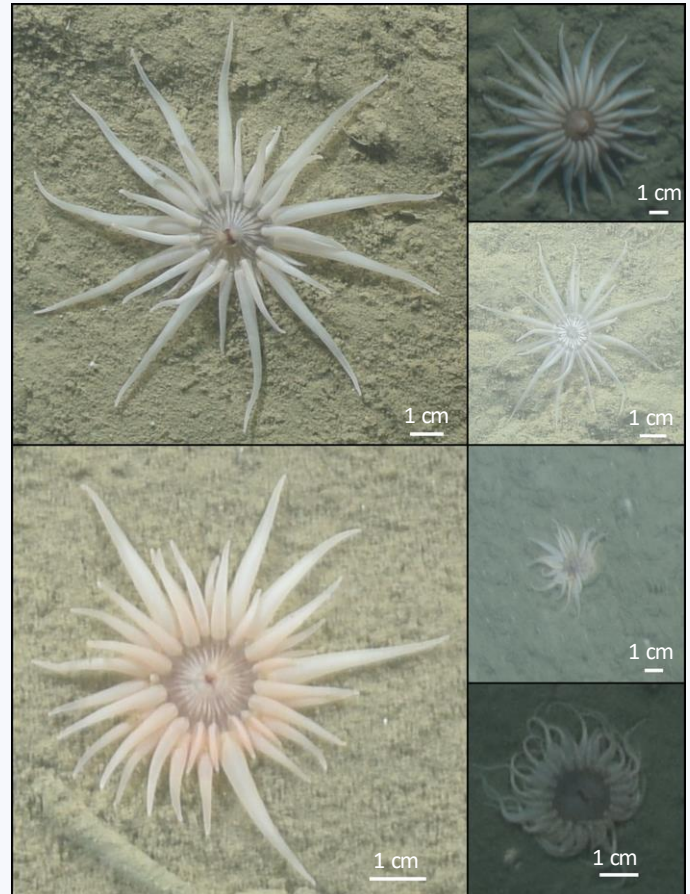
Description: Burrowing anemone, pale blue-pinkish. 2-3 tentacle cycles. Oral disc is small, <1/3 total diameter.

Key characteristics: Up to 40 thick tentacles (12-20 longer tentacles in outer cycle with alternating shorter tentacles, and 12-20 shorter tentacles in innermost cycle).



ID Note: When in doubt, ID to order Actiniaria.

Remarks: This taxa is common in the Laurentian Channel MPA. Burrowing anemones are an understudied group; they are taxonomically complex and difficult to distinguish morphologically.



Burrowing anemones

Ceriantharia sp.1

WoRMS AphiaID: 1361

identificationQualifier: ord. stet.

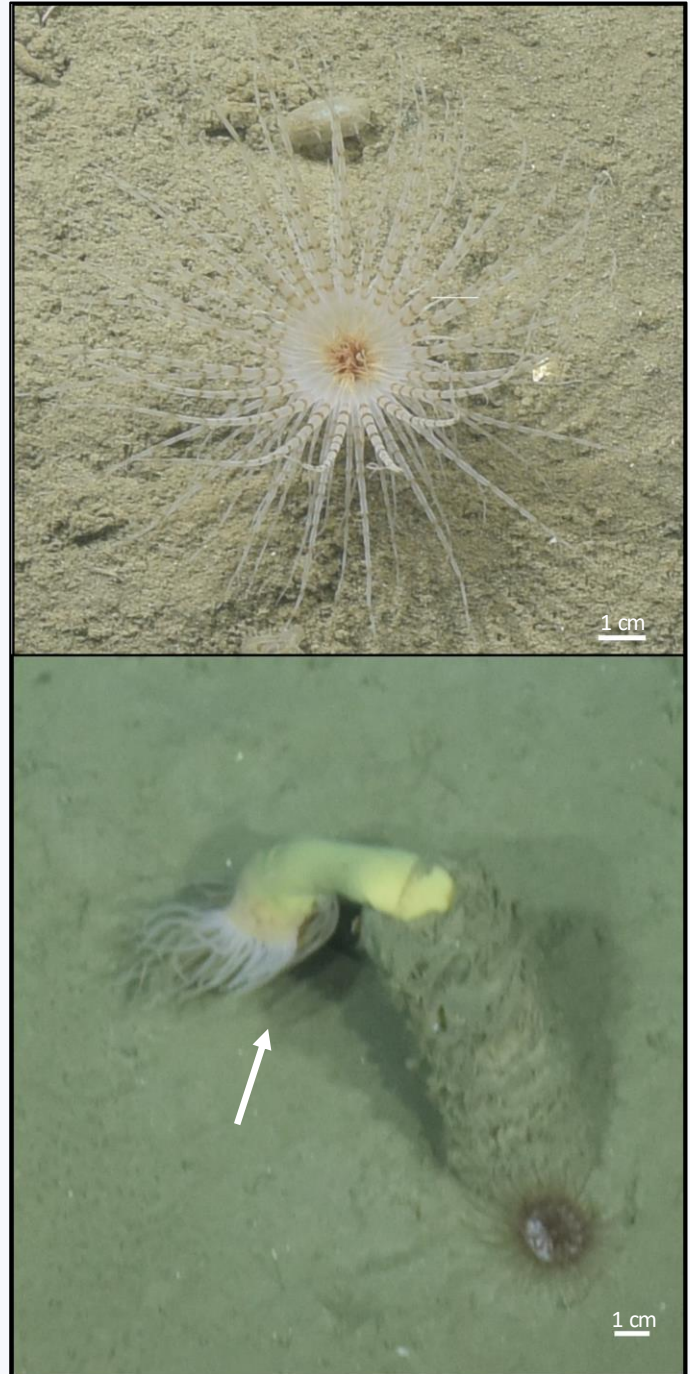
Description: Tube-dwelling anemone, pale-translucent white oral disc; many long, thin tentacles with brown stripes. Long pale yellow-green stalk extending above the sediment surface from a mud-covered tube.

Key characteristics: >60 tentacles with brown bands on long thin tentacles.



ID Note: ID beyond this level is difficult and time-consuming; ID to family Cerianthidae.

Remarks: In the region, banded tentacles may be an indicator of *Pachycerianthus borealis* (Verrill, 1873) ([iNaturalist](#)). However, recent genetic analysis suggested previous samples collected from Newfoundland have been mis-identified and may belong to the genus *Synarachnactis* Carlgren 1924 (Molodtsova et al. 2023). Cerianthid anemones are an understudied group; they are taxonomically complex and difficult to distinguish morphologically.



Tube-dwelling anemones

Phylum Cnidaria

Subphylum Anthozoa

Class Hexacorallia

Order Ceriantharia

Family Undetermined

Ceriantharia sp.2

WoRMS AphiaID: 1361

identificationQualifier: ord. stet.

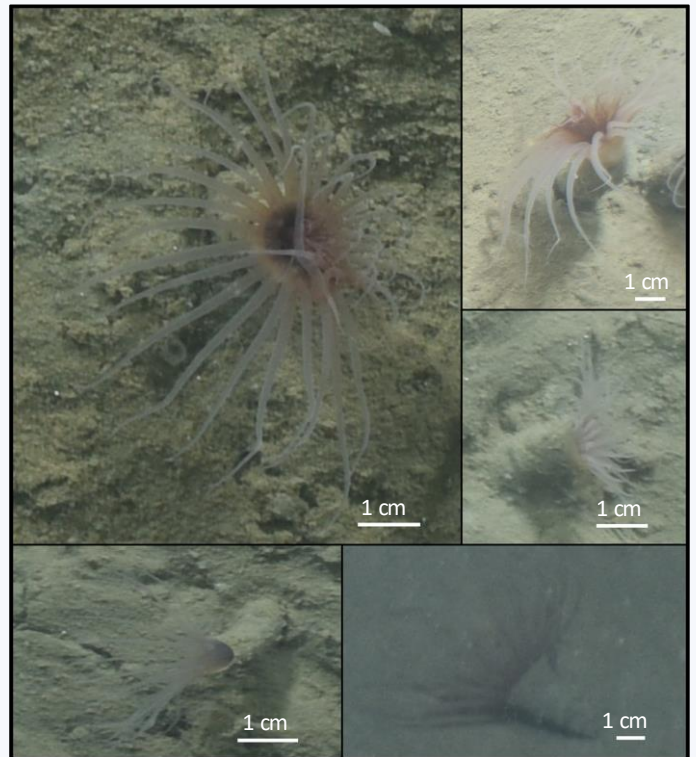
Description: Tube-dwelling anemone, dark red-purple oral disc; many long, thin and pale marginal tentacles with dark red labile tentacles.

Key characteristics: 32 pale marginal tentacles arranged in two cycles; tube always visible.



ID Note: ID beyond this level is difficult and time-consuming; ID to family Cerianthidae.

Remarks: White morph also exists (not pictured), which may be a distinct taxon *sensu* de Mendonça (2022).



Tube-dwelling anemones

Flabellum (Ulocyathus) alabastrum Mosely, 1876

WoRMS AphiaID: 135194

identificationQualifier: sp. inc.

Description: Solitary cup coral, free-living on soft-sediments. Tentacles may be retracted or inflated up to 10 times the size of the corallum. Flesh and tentacle colour varies from pink or brownish-red to translucent white.

Key characteristics: Highly compressed calyx.



ID Note: If extreme calyx compression is not visible, ID to sub-genus *Flabellum (Ulocyathus)*. Unless confirmed by a physical specimen, include the 'inc.' open nomenclature sign to indicate uncertainty at the species level.

Remarks: *Flabellum (Ulocyathus) alabastrum* is identifiable by the highly compressed calyx. When that feature is not clearly visible, it may be easily confused with other cup coral species. Additionally, hybridization can occur within the subgenus, limiting identification from imagery.

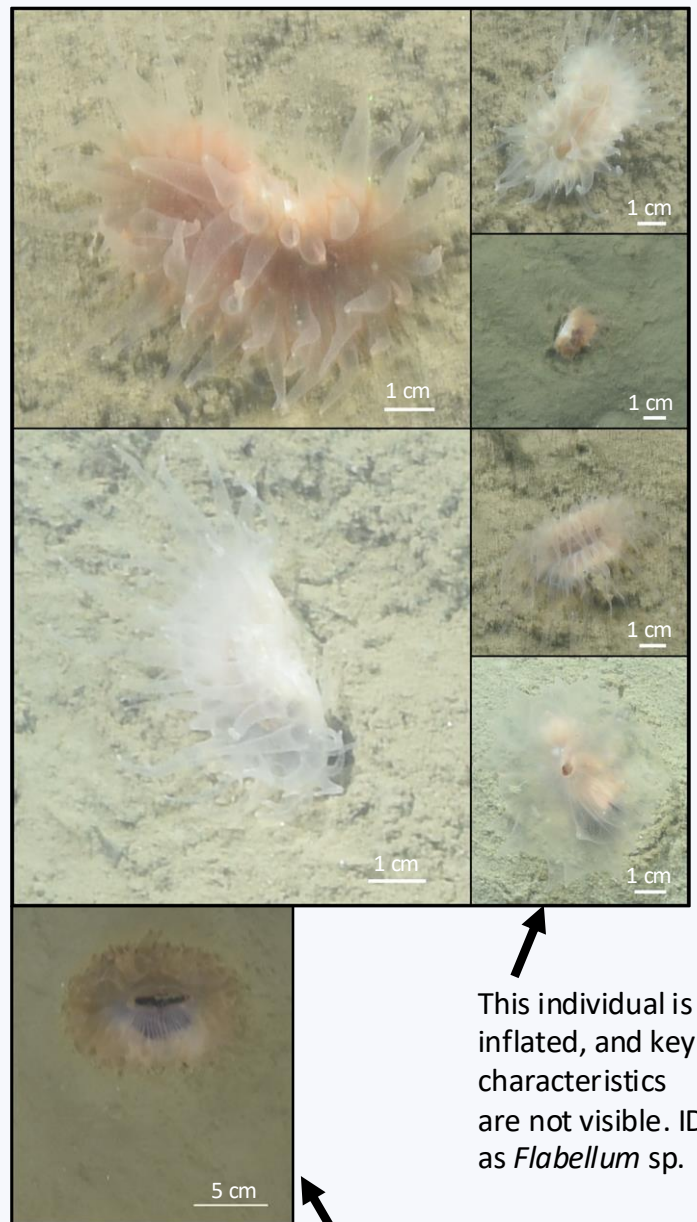


Photo credit: CSSF-CHONe-DFO

This individual is inflated, and key characteristics are not visible. ID as *Flabellum* sp.

Large and unusual looking specimen with inflated tentacles. ID as *Flabellum* sp.

Flabellum (Ulocyathus) macandrewi Gray, 1849

WoRMS AphiaID: 135197

identificationQualifier: sp. inc.

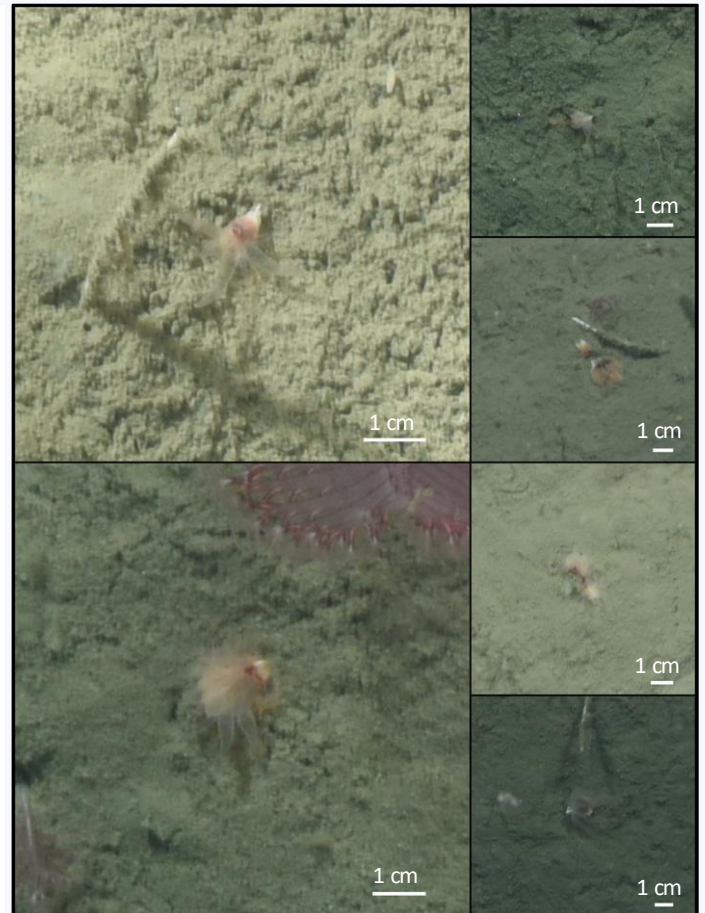
Description: Solitary cup coral, free-living on soft-sediments. Tentacles may be retracted or extended up to 10 times the size of the corallum. Individuals of this species are almost always fragmented, as a result of asexual reproduction by longitudinal division; fractures extend from the top to the base of the skeleton, and whole individuals are extremely rare (Cairns, 1988).

Key characteristics: Fragmented.



ID Note: If not fragmented, cannot be sure it is *F. macandrewi*. When in doubt, ID to sub-genus *Flabellum (Ulocyathus)*. Unless confirmed by a physical specimen, include the 'inc.' open nomenclature sign to indicate uncertainty at the species level.

Remarks: *Flabellum (Ulocyathus) macandrewi* is identifiable by a fractured or fragmented calyx. May be easily confused with broken individuals of other cup coral species. Additionally, hybridization occurs within the subgenus, limiting identification from imagery.



Flabellum (Ulocyathus) sp. Sars, 1851

WoRMS AphiaID: 509582

identificationQualifier: sp. indet.

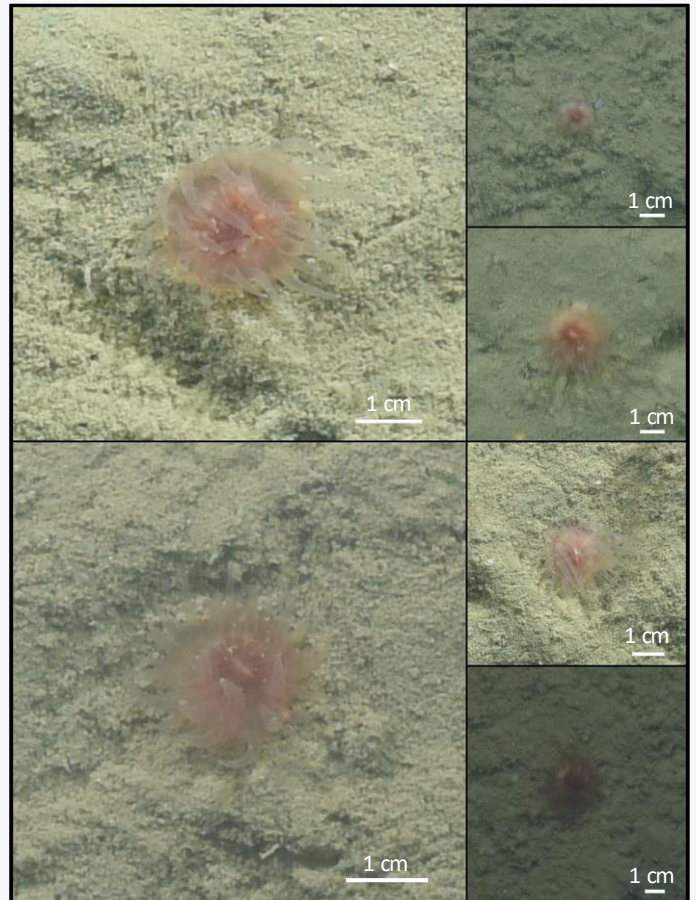
Description: Solitary cup coral, free-living on soft-sediments. Oral surface always pointing up perpendicular to sediment surface.

Key characteristics: Round calyx, red center.



ID Note: When in doubt, ID to order Scleractinia. Confirming species identification requires specimen collection.

Remarks: Resembles *Flabellum (Ulocyathus) angulare* (round calyx and dark centre) but cannot confirm unless the base of the calyx can be seen, or the cycles of septa counted. This species can be confused with sea anemones and the cup corals *Vaughanella margaritata* or *Caryophyllia (Caryophyllia) ambrosia* due to their similar calyx shape. These two species have not been reported in the Laurentian Channel, so identification as *Flabellum (Ulocyathus) sp.* should be seen as tentative. Additionally, hybridization occurs within the subgenus, limiting identification from imagery.



Solitary stony corals

Zoantharia

WoRMS AphiaID: 607338

identificationQualifier: ord. stet.

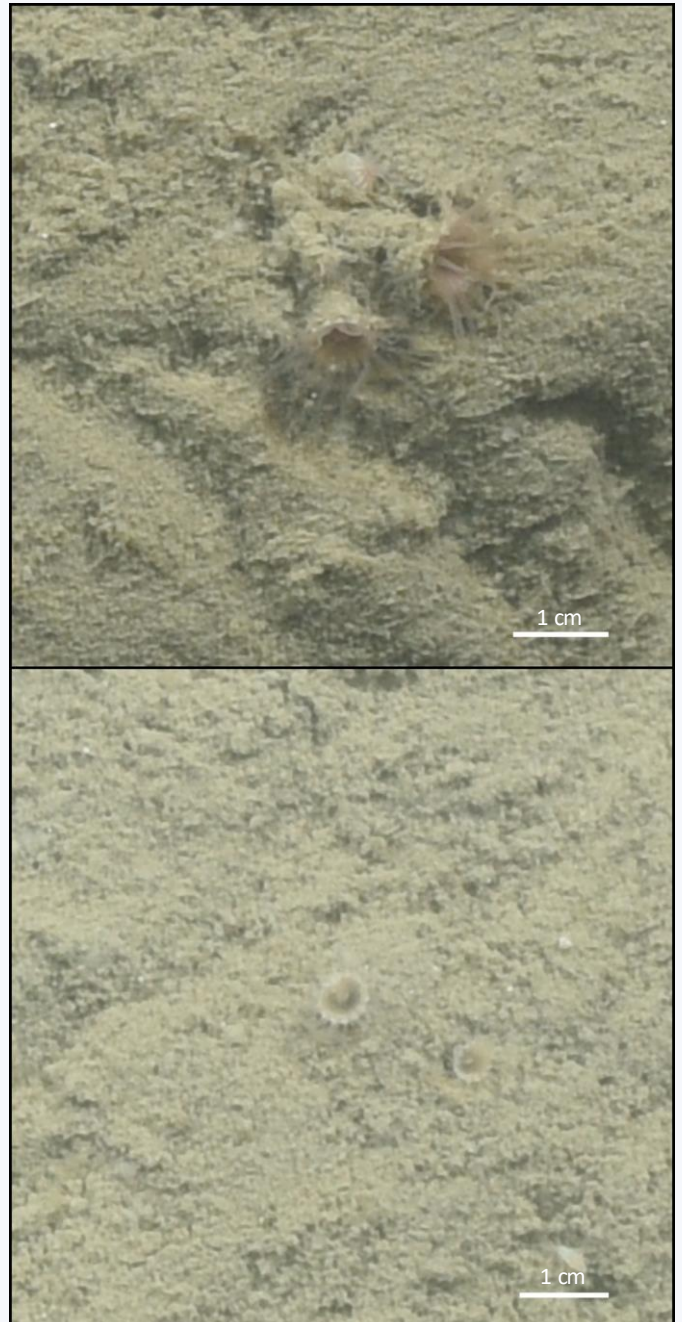
Description: Very small zoantharians buried in soft-substrates in clusters of multiple individuals, but sometimes can be found in a parasitic association with corals (e.g., large gorgonians), although these are not well known in the Laurentian Channel. Has a single cycle of short, pale-orange tentacles with a white oral surface, but also found in other colours.

Key characteristics: Pale orange-white crown, usually more than one are present, tube usually visible.



ID Note: ID beyond this level is difficult and time-consuming; ID to order Zoantharia. When in doubt, ID to class Hexacorallia.

Remarks: Zoantharians are an understudied group; they are taxonomically complex and difficult to distinguish from imagery. Zoanthid species identification requires specimen collection. When found in a parasitic association with corals, collecting both the zoanthid and coral substrate can be beneficial to assist with species ID, and can likely be used as an indicator of coral health.



Hexacorallia sp.1

WoRMS AphiaID: 1340

identificationQualifier: subcla. stet.

Description: Small, dark to pale pink-translucent oral disc. Short and thin pale tentacles. Found attached to hard substrates or in soft-sediment (possibly attached to sub-surface pebbles).

Key characteristics: Circular oral surface, purple or pale-pink to shiny grey with pale tentacles.



ID Note: We cannot confidently confirm what kind of hexacoral these individuals are, although they most likely belong to either order Actiniaria, order Corallimorpharia, or order Scleractinia. In these cases, specimens should be identified as subclass Hexacorallia.

Remarks: These specimens are very small, and images likely contain multiple species.



Duva florida (Rathke, 1806)

WoRMS AphiaID: 146943

Description: Soft body colonies with a main trunk (=stem) from which branches are derived. Polyps are restricted to the terminal ends of the branches, giving the colony its characteristic broccoli or cauliflower shape (umbellate). Has non-retractile polyps and is found attached to hard substrate.

Key characteristics: Surface of trunk and branches is smooth (sclerites are absent or rare); cauliflower shape (polyps only at terminal end of branches).



ID Note: When in doubt, ID to order Malacalcyonacea.

Remarks: *Duva florida* is the only confirmed species of the genus *Duva* in the Laurentian Channel and surrounding area. It can be distinguished from species in the other soft coral genera known in the region (*Drifa*, *Gersemia*, and *Pseudodrifa*) by the lack of polyps along its trunk and branches, giving it a distinctive “broccoli” appearance *in situ*. *Duva* also mostly lacks sclerites in the trunk, which can be seen in good photos of other genera (e.g., *Drifa*). See Klubb (2020) for discussion about identification of cold-water soft corals *in situ*. Images are edited to improve contrast.



Gersemia von Marenzeller, 1878

WoRMS AphiaID: 146953

identificationQualifier: sp. indet.

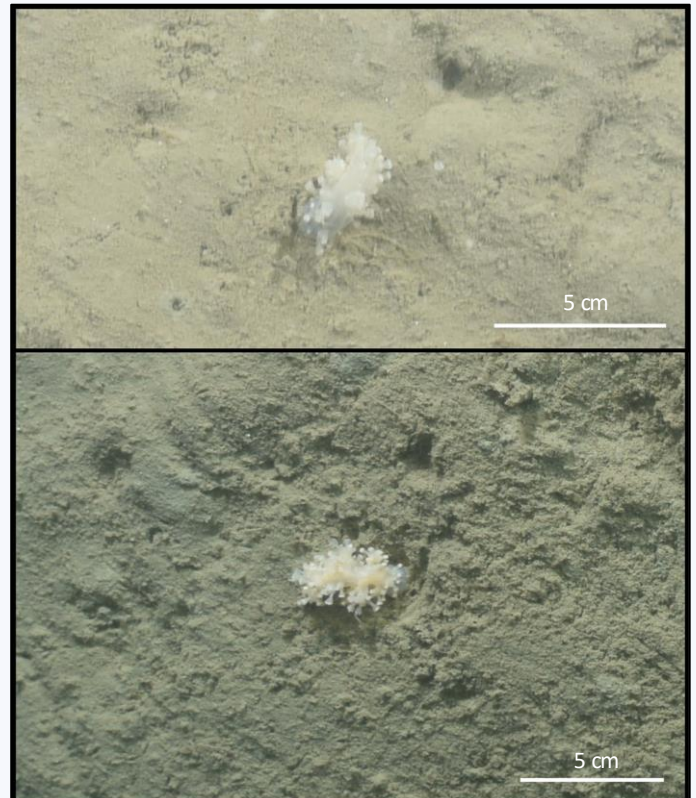
Description: Soft body colonies with a main trunk (=stem) from which branches are derived. Translucent white or pale orange body which, when contracted resembles the surface of a strawberry. Polyps may be visible or retracted.

Key characteristics: Fully retractile polyps, which even when not fully retracted give the colony a rigid appearance.



ID Note: When in doubt, ID to order Malacalcyonacea.

Remarks: Two species of *Gersemia* have been documented in the region: *G. fruticosa* Sars, 1860 (polyps not clustered at branch tips, can anchor in soft-sediment) and *G. rubiformis* (Ehrenberg, 1834) (polyps clustered at branch tips, terminal polyp bulbs usually red). Pictured top and middle are likely *G. fruticosa* on account of the soft-substrate and body colour, but a physical specimen is required to confirm. When inflated they resemble Malacalcyonacea sp.1 (p. 61), however there is some uncertainty when the polyps are not retracted. Furthermore, there are uncertainties regarding the status of currently accepted species of *Gersemia*. In addition, when polyps are expanded, colonies might resemble other soft coral genera such as *Drifa* or *Pseudodrifa*.



Malacalcyonacea sp.1 McFadden, van Ofwegen & Quattrini, 2022

WoRMS AphiaID: 1609357

identificationQualifier: fam. indet.

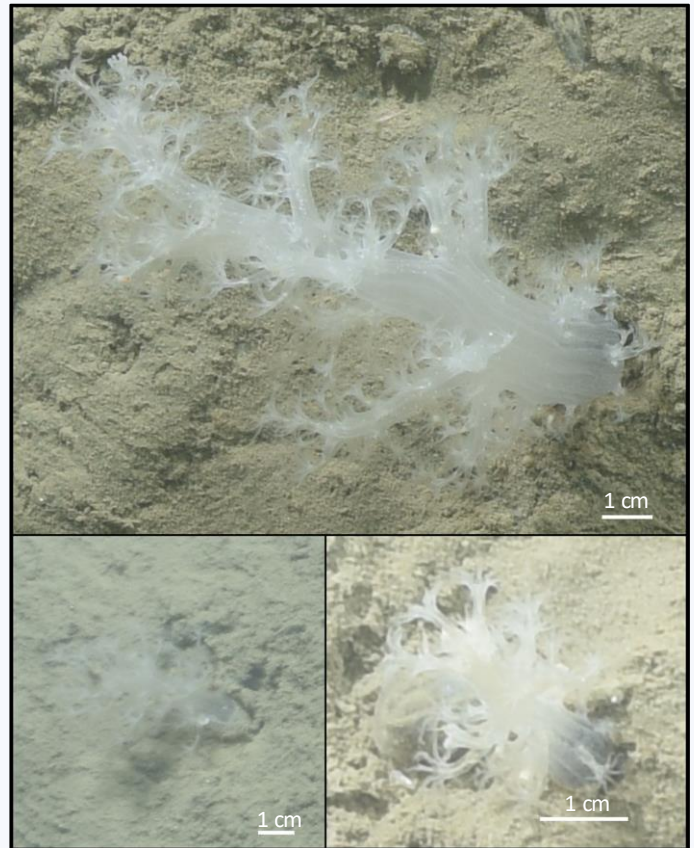
Description: Soft body colonies with a main trunk from which branches are derived. Some species may resemble broccoli or cauliflower in shape, while others when contracted resemble the surface of a strawberry. Degree of branching varies by species. Polyps may be visible or retracted.

Key characteristics: Colonies are small (<30 cm) and flexible due to a hydrostatic skeleton and the presence of microscopic calcareous sclerites (usually not seen from imagery). They have a tree-like shape, with a main trunk and branches.



ID Note: Four morphologically similar soft coral genera are difficult to distinguish without a physical specimen (see Remarks). ID to Order Malacalcyonacea. Note that fragments or juveniles of other octocorals (e.g., *Paragorgia*, *Acathogorgia*) may be misidentified as soft corals.

Remarks: *Drifa*, *Duva*, *Gersemia*, and *Pseudodrifa* have all been identified from physical samples in the region. Until 2022, these genera were all part of family Nephtheidae. Now, the genera *Drifa*, *Duva*, and *Pseudodrifa* are part of the family Capnellidae, and *Gersemia* is part of family Alcyoniidae (McFadden et al 2022). Here, we use *Malacalcyonacea* sp.1 to refer to these morphologically similar soft corals. It may be possible to identify an individual beyond the order level if the image quality is good and certain features are visible (see p. 59 and p. 60).



Phylum Cnidaria

Subphylum Anthozoa

Class Octocorallia

Order Scleralcyonacea

Family Coralliidae

Subfamily Anthomastinae

Heteropolypus Tixier-Durivault, 1964

WoRMS AphiaID: 345446

identificationQualifier: sp. indet.

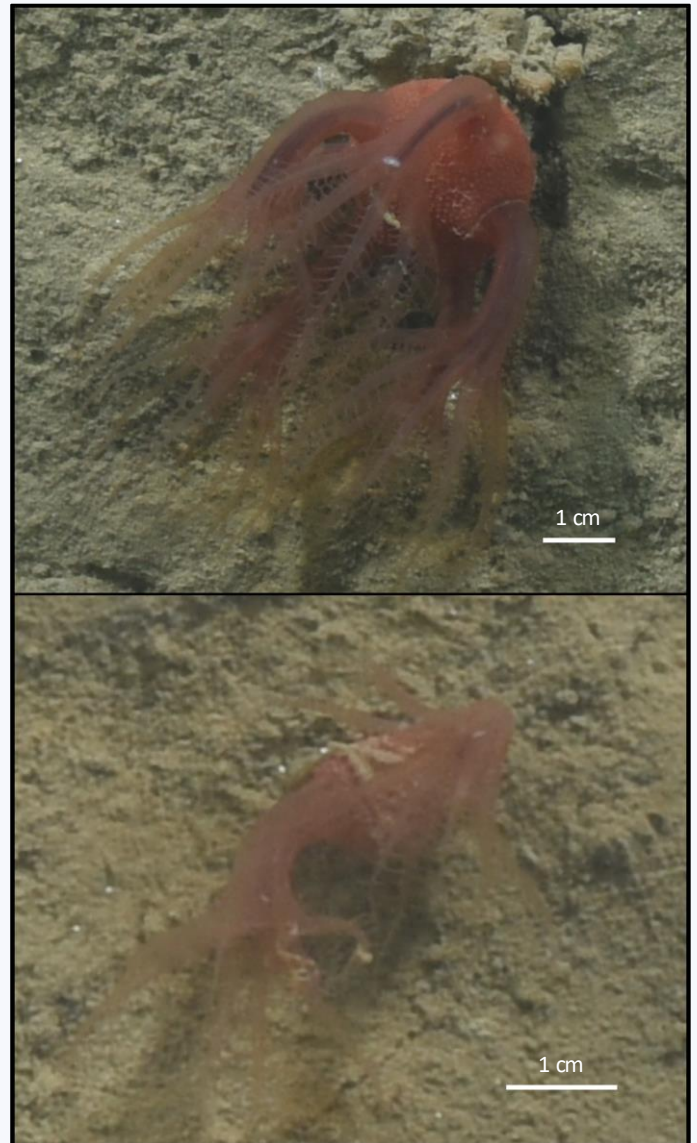
Description: Mushroom morphology with distinct cap and stem region. Polyps extend from cap (also known as capitulum or polyparium) and vary in number. Cap and polyps are red and fleshy, small siphonozooids may be visible on cap.

Key characteristics: Mushroom morphology, large red zooids extending only from the margin of fleshy polyparium (Molodtsova, 2013). Found anchored in soft sediment.



ID Note: Within the group of mushroom corals, it is possible to identify to genus if polyps are only present along the margin of the cap (*Heteropolypus* spp.) or if the cap-stem transition zone can be seen. Physical specimen required to identify to species. When in doubt, ID to subfamily Anthomastinae.

Remarks: Not common in the Laurentian Channel, usually found in deeper water. Colonies of *Heteropolypus* spp. are found anchored in soft sediments, but other mushroom corals in the family Coralliidae are usually found attached to hard substrate. Although colonies of *Heteropolypus* can be distinguished from other Coralliidae genera from an image, physical specimens are required for identification at species level. See Molodtsova (2013) for detailed diagnoses of North Atlantic mushroom corals.



Mushroom corals

Phylum Cnidaria

Subphylum Anthozoa

Class Octocorallia

Order Scleralcyonacea

Superfamily Pennatuloidea

Family Anthoptilidae

Anthoptilum Kölliker, 1880

WoRMS AphiaID: 128489

identificationQualifier: sp. indet.

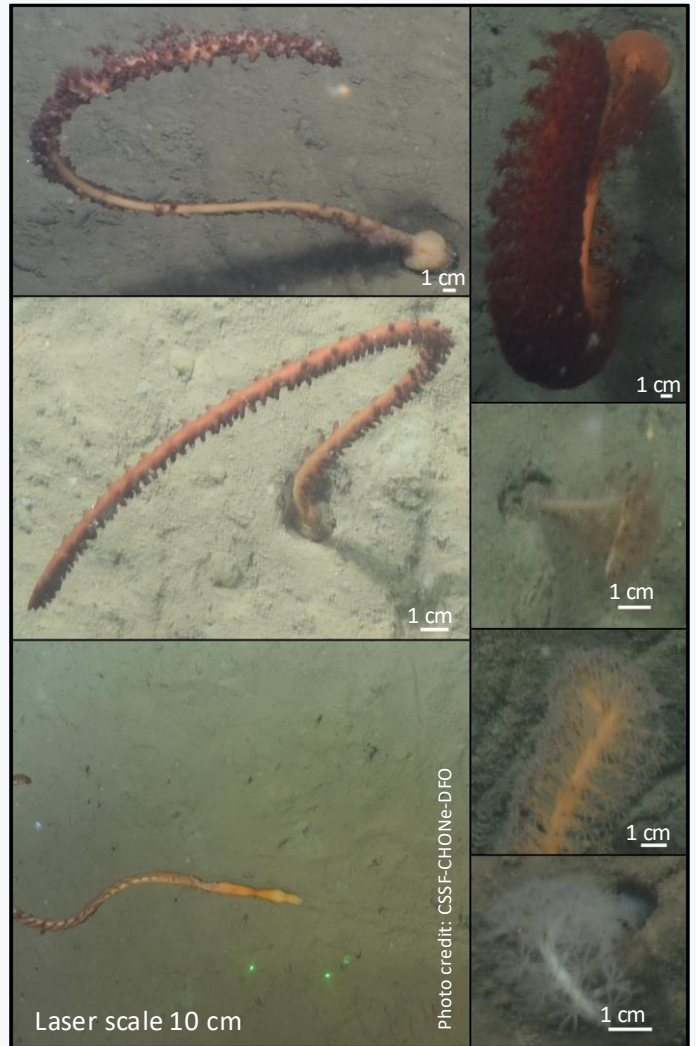
Description: Sea pen with “question mark” morphology; bulbous top part of peduncle exposed; albinism rare, and often seen laying on the seafloor.

Key characteristics: Distinct question-mark shape, tan-orange rachis with polyps directly attached to rachis (do not form polyp leaves), dominating one side of the colony. Top part of peduncle is thick, conspicuous, and usually exposed.



ID Note: Species in the genus *Anthoptilum* are difficult to identify from imagery alone. ID to genus.

Remarks: In the Laurentian Channel, two species of *Anthoptilum* have been commonly identified as part of DFO-NL trawl surveys: *Anthoptilum murrayi* K lliker (1880) and *A. grandiflorum* (Verrill, 1879). Therefore, the collection of physical specimens is required to confirm identification to species level.



Sea pens

Phylum Cnidaria

Subphylum Anthozoa

Class Octocorallia

Order Scleralcyonacea

Superfamily Pennatuloidea

Family Balticinidae

Balticina finmarchica (Sars, 1851)

WoRMS AphiaID: 584787

Sea pens

Description: Whip-like colonies, with polyps arranged on raised pads on one side of the rachis. Dorsal side is bare, making the axis look conspicuous, white in colour. Polyps have brown tips and are arranged on raised pads on one side of the rachis, dorsal side is bare.

Key characteristics: Raised pads with polyps coming off them.



ID Note: Could be confused with *Funiculina quadrangularis*, another whip-like sea pen found in the Laurentian Channel. When in doubt, ID to superfamily Pennatuloidea.

Remarks: Sea anemones (e.g., *Stephanauge nexilis*) are commonly seen attached to the upper portion of the rachis.

Colonies of *Balticina finmarchica* (= *Halipteris finmarchica*) can be found in high densities in some areas, but these fields are not common in the Laurentian Channel.

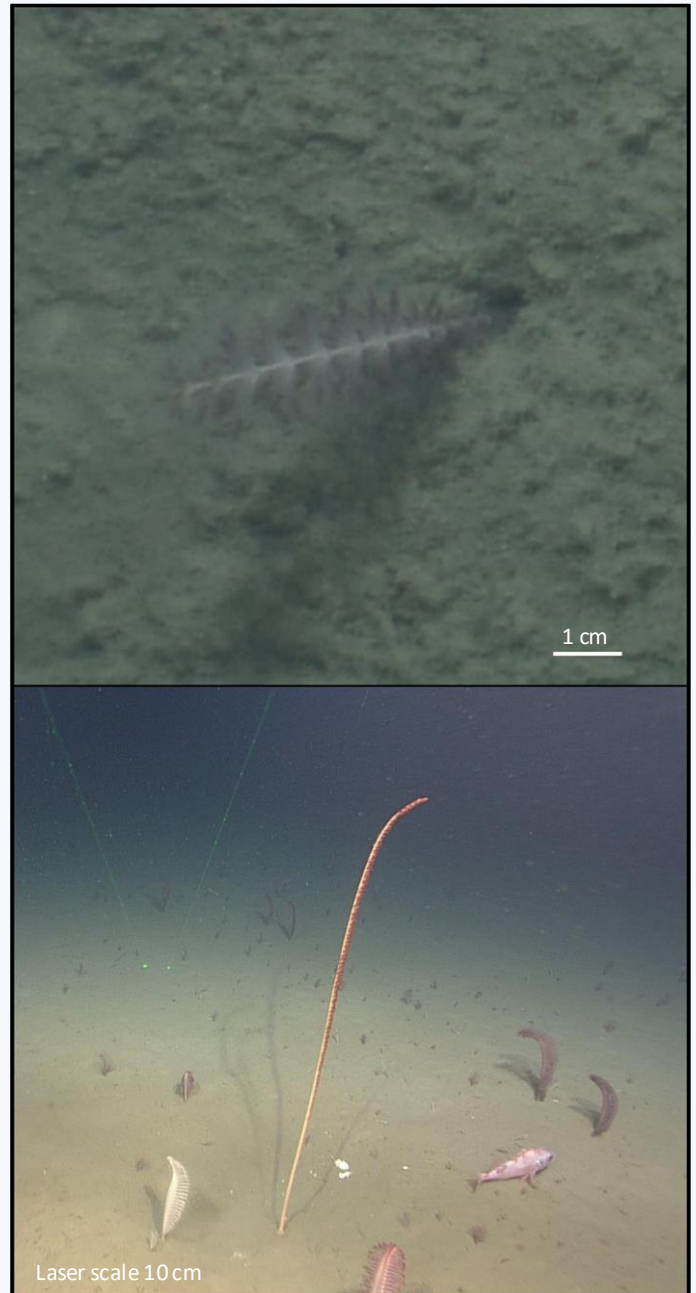


Photo credit: CSSF-CHONe-DFO

Funiculina quadrangularis (Pallas, 1766)

WoRMS AphiaID: 128506

Description: Whip-like morphology, bare stem usually visible. Tubular polyps red-reddish brown and arranged bilaterally on rachis, either irregular or in distinct rows.

Key characteristics: Straight body, bare stem visible at proximal part of axis with no peduncle bulb, bilateral polyps.



ID Note: Can be confused with *Balticina finmarchica*, which is also whip-shaped but with a smaller polyp-free zone above the peduncle. In addition, polyps in *B. finmarchica* are shorter. When in doubt, ID to superfamily Pennatuloidea.

Remarks: *Funiculina quadrangularis* is the only *Funiculina* species documented in the region. Therefore, identification at the species level from imagery is suitable, but caution should be exercised.



Sea pens

Kophobelemnion Asbjørnsen, 1856

WoRMS AphiaID: 128492

identificationQualifier: sp. indet.

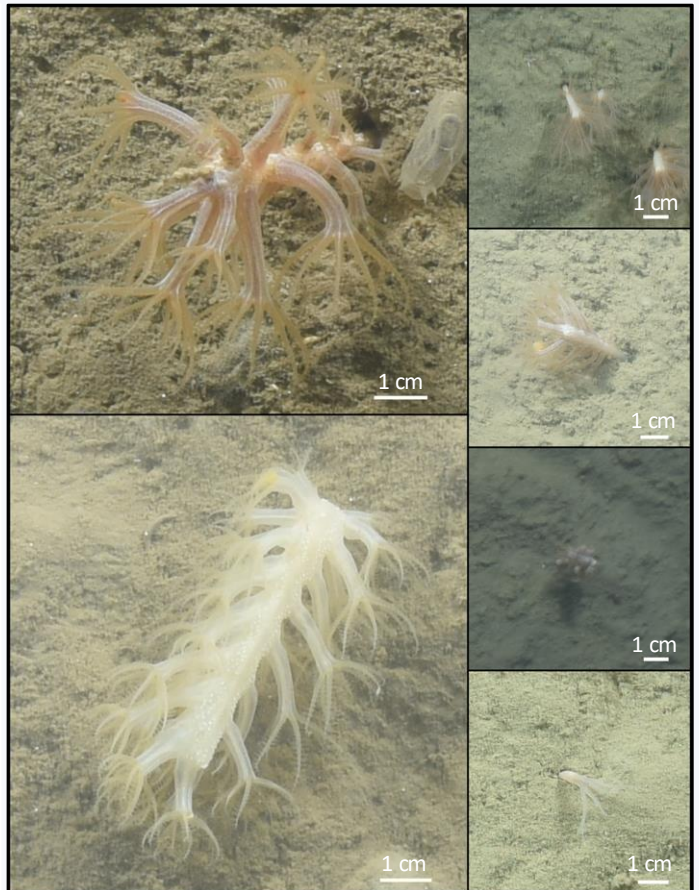
Description: Large polyps arranged along two sides of rachis (biserially) and vary in colour from brownish to pale and white. Number of polyps varies; peduncle completely buried and not seen *in situ*. Colonies can partially or completely withdraw into the sediment and appear to have less polyps than what they have.

Key characteristics: Colonies are short, with very large polyps (in comparison to most other sea pens). Polyps often in close proximity to the substrate.



ID Note: ID to genus; when in doubt, ID to superfamily Pennatuloidea.

Remarks: Possibly the species *K. stelliferum*, which has been reported in the region based on physical specimens. However, the possibility of having other species cannot be excluded. Recent seafloor imagery has indicated that the genus seems to be more common than previously thought. Squat lobsters are commonly seen near these sea pens.



Sea pens

Pennatula aculeata Danielssen, 1860

WoRMS AphiaID: 128515

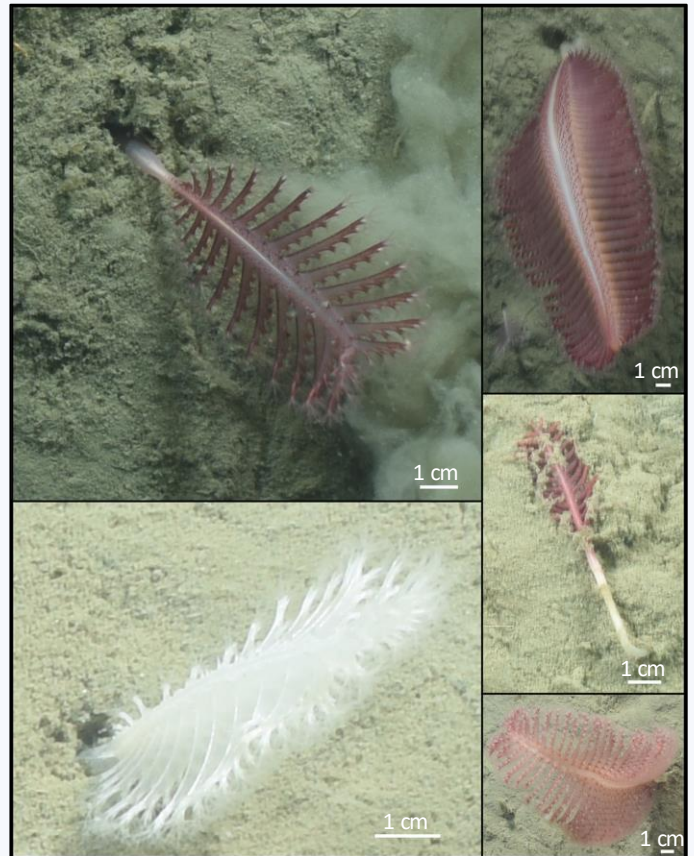
Description: Feather-like morphology. Rachis red-violet with bilateral polyp leaves. Spike-shaped mesozooids located on the dorsal side of the rachis, between small siphonozooids. Peduncle white-translucent and partially visible (most of it buried). Albino-pale morphs exist but are not common.

Key characteristics: Red feather morphology with thin leaves, peduncle bulb not prominent.



ID Note: In the Laurentian Channel this sea pen is easily identifiable. It can be distinguished by the lack of a bulbous base, less fleshy leaves, and appears red-violet in imagery in comparison to *Ptilella grandis* (Ehrenberg, 1834) (see page 68). When in doubt, ID to superfamily Pennatuloidea.

Remarks: In the Laurentian Channel, this species is always found in multiples, and can form extensive fields.



Phylum Cnidaria

Subphylum Anthozoa

Class Octocorallia

Order Scleralcyonacea

Superfamily Pennatuloidea

Family Pennatulidae

Ptilella grandis (Ehrenberg, 1834)

WoRMS AphiaID: 1379630

Description: Feather-like morphology. Rachis red-brown with bilateral polyp leaves, wide naked dorsal track, prominent bulbous base at sediment-water intersection.

Key characteristics: Wide dorsal track bare of zooids.



ID Note: This species can easily be distinguished from *P. aculeata* mostly due to its bulbous base, its red-brown coloration, and adults are generally larger. Regionally distinct, wide and bare dorsal track must be visible. When in doubt, ID to superfamily Pennatuloidea.

Remarks: In the Laurentian Channel this sea pen is easily identifiable. This species is not very common in the Laurentian Channel MPA, but it is common in other regions (e.g., Gulf of St. Lawrence). Image taken in the Gulf of St. Lawrence (outside the MPA) and is reproduced here with permission from Marilyn Thorne ([iNaturalist](#)).



Photo credit: MPO/IMG Équipe MCT

Sea pens

Phylum Cnidaria

Subphylum Anthozoa

Class Octocorallia

Order Scleralcyonacea

Superfamily Pennatuloidea

Family Protoptilidae

Protoptilum carpenterii Kölliker, 1880

WoRMS AphiaID: 128525

Description: Colonies slender, rigid-looking. White polyps extending bilaterally from a contrasting red rachis. Polyps come directly from rachis, polyp leaves absent. Can retract fully into the substrate.

Key characteristics: White polyps extending bilaterally from a contrasting red rachis, no polyp leaves.



ID Note: Regionally distinct, easily distinguishable if observed from up-close, but can be overlooked due to their small size and ability to withdraw in the sediment. When in doubt, ID to superfamily Pennatuloidea.

Remarks: *P. carpenterii* can withdraw rapidly and completely into the sediment (Ambroso et al. 2021), making physical samples collected from trawling a rare occurrence.



Sea pens

Pennatuloidea sp.1

WoRMS AphiaID: 1367

identificationQualifier: supfam. indet.

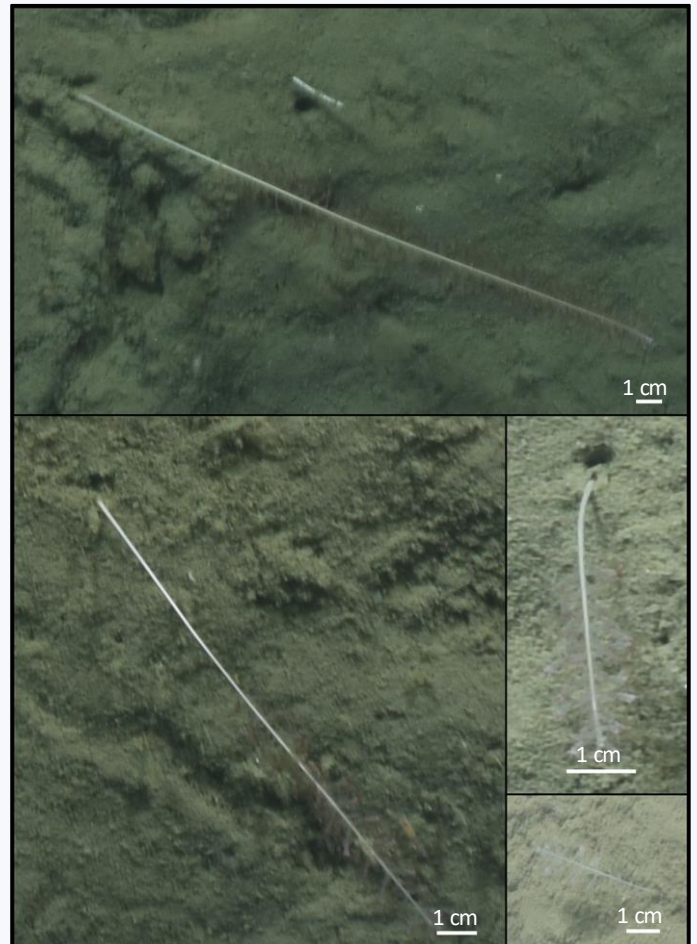
Description: Very thin rachis with small polyps arranged in whorls. The stem is usually exposed and always polyp-free.

Key characteristics: Thin white rachis, lower stem polyp-free and visible. Polyps translucent or tinged brown at the tips.



ID Note: Regionally distinct and easy to identify. However, it may be difficult to see in ROV imagery that is oblique or taken further from the seabed. ID to superfamily Pennatuloidea.

Remarks: This sea pen is delicate and key features are difficult to observe from *in situ* imagery. Species ID cannot be confidently confirmed; collections are encouraged. This sea pen may be a juvenile *Funiculina quadrangularis* (p. 65). This sea pen also resembles *Virgularia mirabilis*, which has been recorded in the Northwest Atlantic, but samples are rare. Because of its rapid withdrawal behaviour (Ambroso et al. 2013) and small size *V. mirabilis* is not often captured in trawl surveys.



Sea pens

Rhodaliidae Haeckel, 1888

WoRMS AphiaID: 135350

Description: Red-orange, shaggy, hemispherical body with a lighter dorsal side and pale center. Has long fine tentacles drifting or anchored to substrate.

Key characteristics: Orange, hemispherical body with long, fine tentacles.



ID Note: When in doubt, ID to order Siphonophorae.

Remarks: Benthic siphonophores are rare but fascinating. Siphonophores have both polyps and medusae combined into a single planktonic colony (Gravili, 2016); benthic siphonophores are closely associated with the seafloor, using fine tentacles to anchor and move close to the seafloor. Diversity of Siphonophorae reviewed in Mapstone (2014). Pictured is likely *Stephalia corona* Haeckel, 1888, which has been collected in the Laurentian Channel. These are often seen drifting >1 m above the seafloor, and are not commonly observed in downward-facing imagery (Sarah de Mendonça *pers obs.*).



Siphonophores

Photo credit: CSSF-CHONe-DFO

Anthoathecata sp.1

WoRMS AphiaID: 13551

identificationQualifier: fam. indet.

Description: Translucent stalk lacking a theca (chitinous outer layer) terminating in a small bulb with many fine tentacles. Buried in soft substrate.

Key characteristics: Stalk without theca; small terminal bulb with many fine tentacles.



ID Note: When in doubt, ID to class Hydrozoa.

Remarks: Delicate and very small. Resembles members of the suborder Aplanulata (e.g., Tubulariidae, Corymorphidae). These images were captured using Campod, which is designed to collect close-up seafloor imagery in high-definition and allows coverage of very small specimens that may otherwise be missed.



Solmissus Haeckel, 1856

WoRMS AphiaID: 117074

identificationQualifier: sp. indet.

Description: Small, translucent bell with white opaque vellum and short, translucent tentacles. Solitary and free-living in the water column.

Key characteristics: Small, translucent medusa.



ID Note: When in doubt, ID to class Hydrozoa.

Remarks: Small hydromedusae occur near-bottom but may be missed in *in situ* imagery, which is not optimized to record these specimens. These images were captured using Campod, which is designed to collect close-up seafloor imagery in high-definition, and allows coverage of very small specimens that may otherwise be missed.



Phylum Cnidaria

Class Scyphozoa

Subclass Coronamedusae

Order Coronatae

Family Periphyllidae

Periphylla periphylla (Péron & Lesueur, 1810)

WoRMS AphiaID: 135294

Description: Large translucent outer bell with dark red-purple inner layer and tentacles. O. Coronatae can be distinguished from other Scyphozooan orders by a single deep groove around the circumference of the bell and the presence of a pedalium (Daly et al. 2007). Upper half of bell (crown) is smooth, lower half of bell margin is folded (pedalium) with a single, long dark red-purple tentacle extending from each section.

Key characteristics: Large translucent bell with dark red-purple tentacles, deep coronal groove.



ID Note: Regionally easy to distinguish. When in doubt, ID to family Periphyllidae.

Remarks: Large Coronatae jellies are found almost exclusively in the deep-sea. This individual appears to be getting eaten by a sea anemone.



Photo credit: CSSF-CHONe-DFO

True jellyfish

Phylum Cnidaria

Class Scyphozoa

Subclass Discomedusae

Order Semaestomeae

Family Ulmaridae

Aurelia (Linnaeus, 1758)

WoRMS AphiaID: 135306

identificationQualifier: sp. indet.

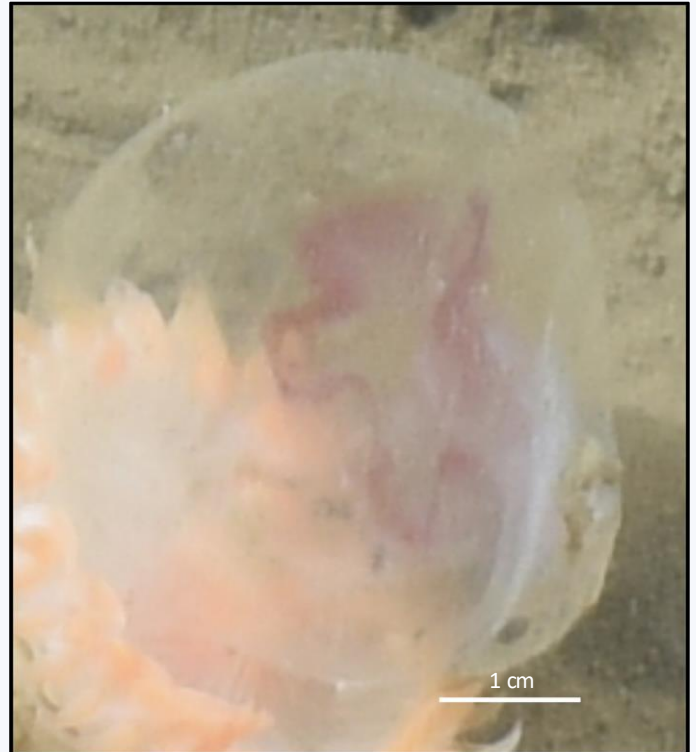
Description: Large translucent bell with pink-purple markings.

Key characteristics: Translucent bell with pink-purple markings.



ID Note: When in doubt, ID to class Scyphozoa.

Remarks: Small scyphomedusae occur near-bottom but may be missed in *in situ* imagery, which is not optimized to record these specimens. These images were captured using Campod, which is designed to collect close-up seafloor imagery in high-definition, and allows coverage of very small specimens that may otherwise be missed. This individual appears to be getting eaten by a sea anemone.

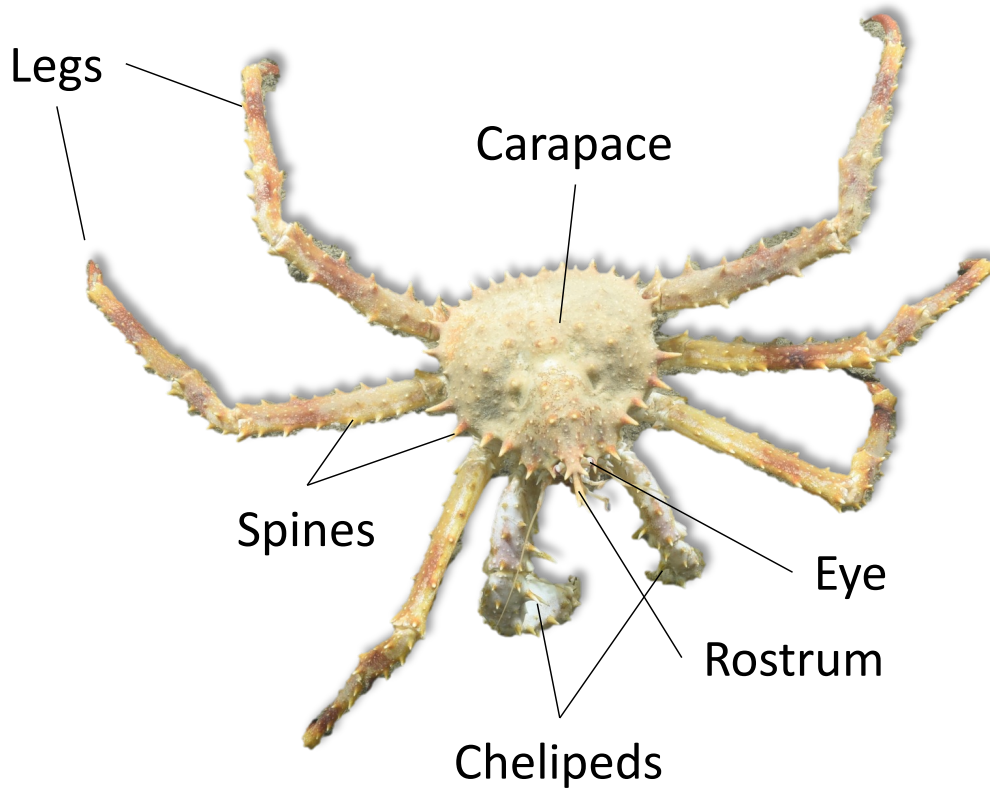


True jellyfish

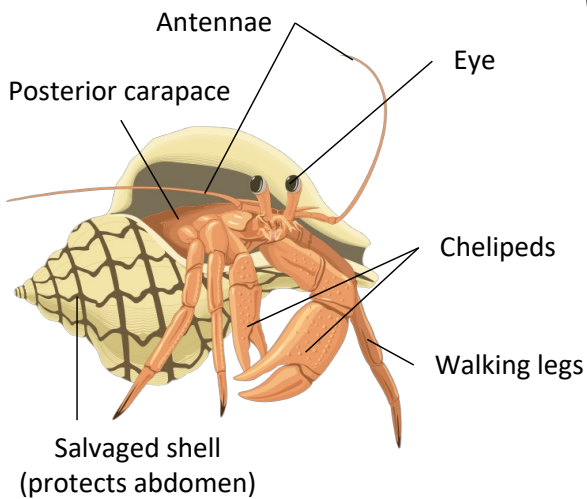


Phylum Arthropoda

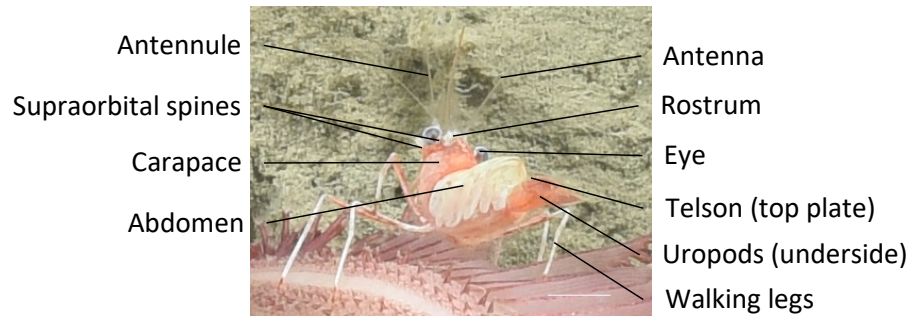
Arthropod Morphology



Anomuran crab
(*Lithodes maja*)



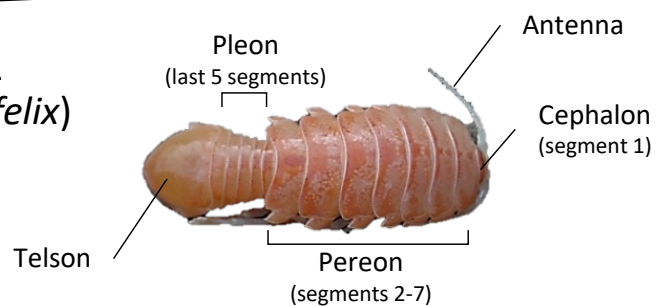
Hermit crab
(*Pagurus* spp.)



Shrimp
(*Caridea* spp.)

Isopod
(*Syscenus infelix*)

76



Phylum Arthropoda

Class Malacostraca

Subclass Eumalacostraca

Order Decapoda

Infraorder Anomura

Family Munnidopsidae

Munidopsis curvirostra Whiteaves, 1874

WoRMS AphiaID: 107175

Description: Has six pairs of walking legs visible (other legs smaller and tucked under abdomen) and two long chelipeds (longer than walking legs; long rostrum pointed and curved up (Squires, 1990). Body and eyes are orange.

Key characteristics: Small-bodied with a long, upturned rostrum, orange eyes, long chelipeds, six legs visible.



ID Note: When in doubt, ID to superfamily Galatheoidea.

Remarks: May be confused with the larger *Stereomastis sculpta* (Smith, 1880), which also has long chelipeds and inhabits similar habitats in the region. *M. curvirostra* is often seen with the sea pen *Kophobelemnion* (see page 66).



Crabs & shrimp

May be confused with...



Image retrieved from: <https://www.marinespecies.org/aphia.php?p=image&tid=107700&pic=110538>
Description: Collected by Éric Parent (MPO-IML).
Author: Nozères, Claude

Phylum Arthropoda

Class Malacostraca

Subclass Eumalacostraca

Order Decapoda

Infraorder Anomura

Family Lithodidae

Lithodes maja (Linnaeus, 1758)

WoRMS AphiaID: 107205

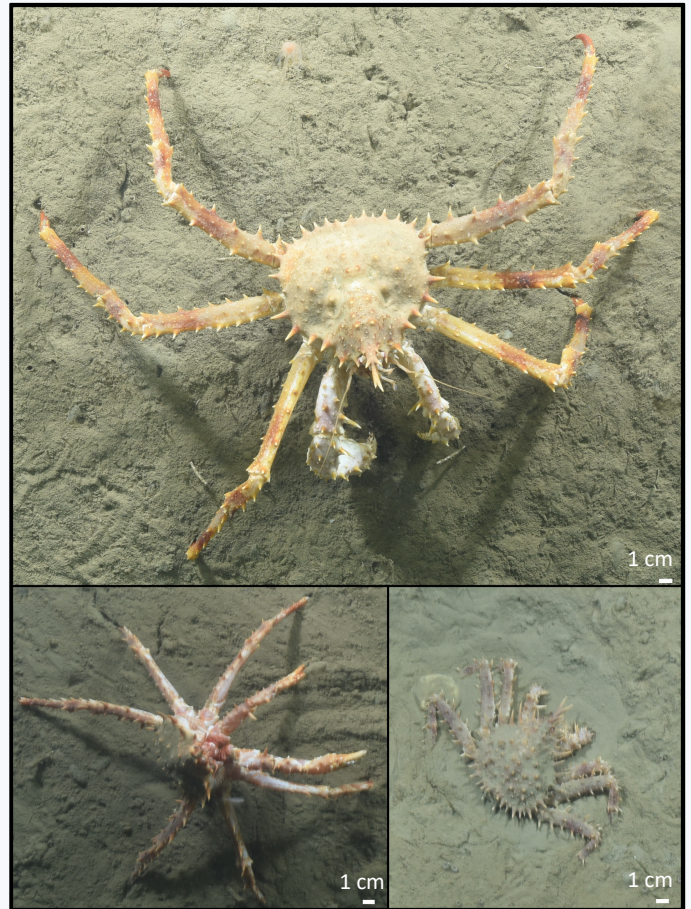
Description: Three pairs of walking legs and two chelipeds. Stout, bifurcated rostrum where the points are separated for less than half the rostrum length (Pollock, 1998). Large spines around carapace margin, legs, and chelipeds. Carapace is pear-shaped and pale orange to red in colour.

Key characteristics: Six legs visible, spikey carapace and legs; often pale/dark bands on legs; bifurcated rostrum (Squires, 1990).



ID Note: Regionally distinct, ID to species. When in doubt, ID to family Lithodidae.

Remarks: Could be mistaken for the larger *Neolithodes grimaldii* (scarlet red, even spikier).



Crabs & shrimp

May be confused with...



Neolithodes grimaldii

Image retrieved from: <https://www.marinespecies.org/aphia.php?p=image&tid=107206&pic=40597>
Description: Porcupine crab (cruise: Alfred Needler N156 August 1991)
Author Fisheries and Oceans Canada, Daphne Themelis (CaRMS@dfo-mpo.gc.ca)

Phylum Arthropoda

Class Malacostraca

Subclass Eumalacostraca

Order Decapoda

Infraorder Brachyura

Family Oregoniidae

Hyas araneus (Linnaeus, 1758)

WoRMS AphiaID: 1071322

Description: Elongated carapace with bifurcated but fused (triangular shaped) rostrum with a narrow slit between horns, smooth lateral margin. Four pairs of walking legs + two chelipeds.

Key characteristics: Elongated carapace with triangular rostrum with a slit, smooth lateral margin (Squires, 1990). Pear-shaped body (longer than wide) with slender rounded legs.



ID Note: When in doubt, ID to genus *Hyas*.

Remarks: Often confused with the lyre crab, *Hyas alutaceus* (formerly *Hyas coarctatus alutaceus*), that has a violin-shaped body due to the suborbital crest near the eyes (see Pohle, 1990). *Hyas coarctatus coarctatus* (as *H. coarctatus*) is further south, e.g., Bay of Fundy. See Pohle 1990 for illustrations.



Photo credit: CSSF-CHONe-DFO

May be confused with...



Hyas alutaceus

CC BY-NC-SA

Description: Lesser Toad Crab -dorsal view. Appears to be of the form *Hyas coarctatus alutaceus*, now accepted as *Hyas alutaceus*. See: Pohle, G. W. 1990. A guide to decapod Crustacea from the Canadian Atlantic: Anomura and Brachyura. Can. Tech. Rep. Fish. Aquat. Sci. 1771 : iv + 30 p.

Author: Fisheries and Oceans Canada, Catriona Day

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Phylum Arthropoda

Class Malacostraca

Subclass Eumalacostraca

Order Decapoda

Infraorder Caridea

Family Crangonidae

Pontophilus norvegicus (M. Sars, 1861)

WoRMS AphiaID: 107563

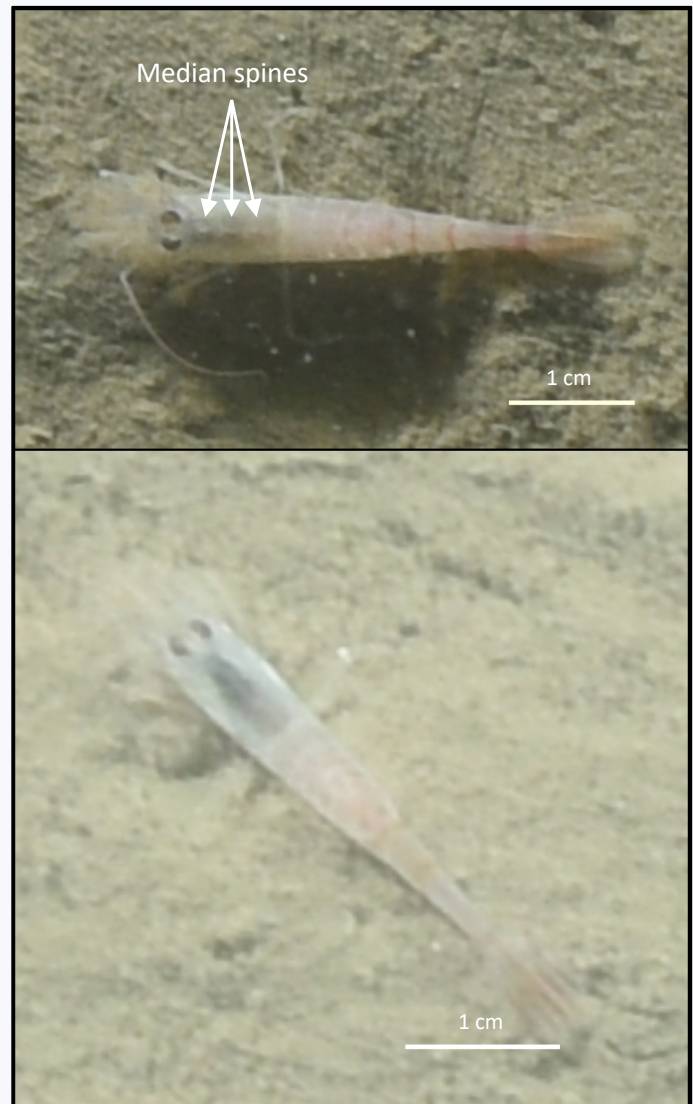
Description: Ten-legged crustacean. Pale-translucent carapace with pale-red abdomen, eyes dark, small, and close together.

Key characteristics: Three median spines (Squires, 1990). Slender, pale-translucent carapace with pale-reddish-brown abdomen, eyes dark, small, and close together.



ID Note: Distinctively slender and deep-water crangonid shrimp; no others in this family deeper than 300 m. May be confused with *Sabinea* sp. when near 200 m depth. If in doubt, ID to family Crangonidae.

Remarks: Several shrimps have been identified in the Laurentian Channel, mostly belonging to the families Pandalidae, Crangonidae, Pasiphaeidae, and Thoridae. See Squires (1990) and Savard and Nozères (2012).



Crabs & shrimp

Phylum Arthropoda

Class Malacostraca

Subclass Eumalacostraca

Order Decapoda

Infraorder Caridea

Family Pasiphaeidae

Pasiphaea multidentata Esmark, 1866

WoRMS AphiaID: 107676

Description: Ten-legged crustacean.

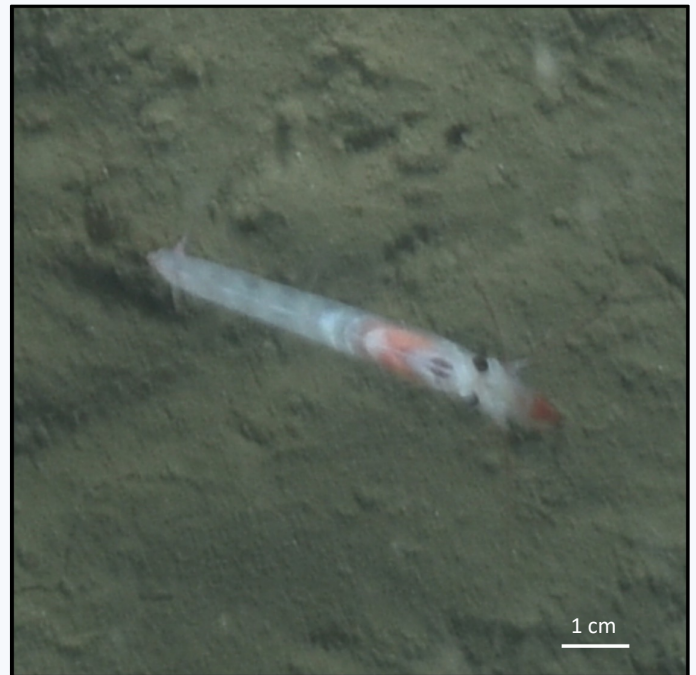
Translucent carapace with pale red visible, with translucent white abdomen, eyes dark, small, and spaced apart.

Key characteristics: Short, pointed rostrum, carina (spine) on either side of head. Glass shrimp are translucent to red, with a flattened (laterally-compressed) body, oval eyes, and red pincers (chelae).



ID Note: May be mistaken for *Pasiphaea tarda* (uncommon, larger, and usually redder), or *Eusergestes arcticus* (a shrimp of Penaeoidea, not Caridea). When in doubt, ID to genus *Pasiphaea*.

Remarks: Several shrimps have been identified in the Laurentian Channel and in the Gulf of St. Lawrence region, mostly belonging to the families Pandalidae, Crangonidae, Pasiphaeidae, and Thoridae. See Squires (1990) and Savard and Nozères (2012).



Crabs & shrimp

Phylum Arthropoda

Class Malacostraca

Subclass Eumalacostraca

Order Decapoda

Infraorder Caridea

Family Undetermined

Caridea sp.1

WoRMS AphiaID: 106674

identificationQualifier: fam. indet.

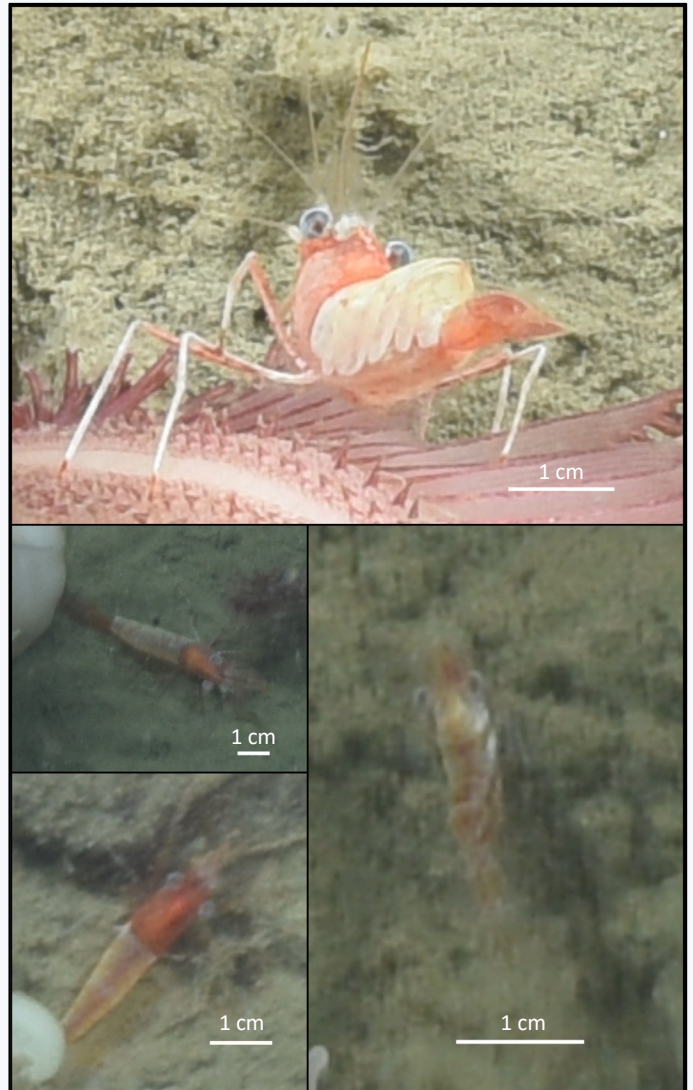
Description: Ten-legged crustacean, often associated with anemones and sea pens. Has large eyes (Squires, 1990) and blade-like rostrum. Carapace red, often with pale abdomen.

Key characteristics: Red carapace with pale abdomen, large eyes. Small and stout-bodied, benthic (non-swimming) multi-coloured shrimp with blade-like rostrum that is not always easy to see from top-down view.



ID Note: ID to infraorder Caridea.

Remarks: Several shrimp taxa have been identified in the Laurentian Channel, mostly belonging to the families Pandalidae, Crangonidae, Pasiphaeidae, and Thoridae. See Squires (1990) and Savard and Nozères (2012).



Crabs & shrimp

Phylum Arthropoda

Class Malacostraca

Subclass Eumalacostraca

Order Decapoda

Infraorder Anomura

Family Paguridae

Pagurus JC Fabricius, 1775

WoRMS AphiaID: 106854

identificationQualifier: sp. indet.

Description: A crab carrying a shell. Two chelipeds and two pairs of walking legs visible. Shell morphology varies.

Key characteristics: Carries a shell (hermit crab), presence of stripes, texture, or hairs on chelipeds and legs distinguish some species, such as the hairy hermit (*P. pubescens*), and the Western Atlantic hairy Arctic hermit (*P. arcuatus*). Shallow-water species include *P. acadianus* and *P. longicarpus*.



ID Note: Difficult to distinguish species-specific characters in imagery. ID to genus *Pagurus*.

Remarks: In the Laurentian Channel, the genus *Pagurus* sp. has been confirmed by physical samples.



Hermit crabs

Phylum Arthropoda

Class Malacostraca

Subclass Eumalacostraca

Order Isopoda

Family Aegidae

Syscenus infelix Harger, 1880

WoRMS AphiaID: 156446

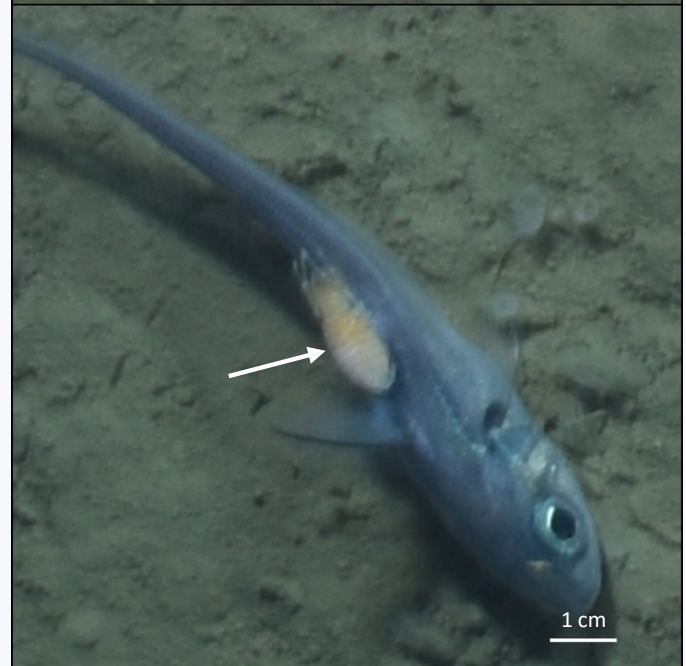
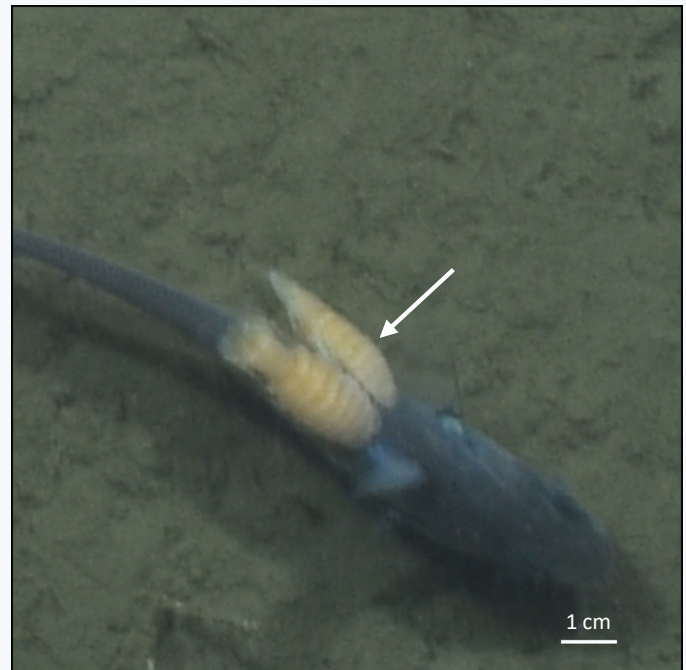
Description: A blind, ectoparasitic isopod found attached to the grenadier *Nezumia bairdii* (see page 130) on the dorsal midline behind the dorsal fin. Body is pink-orange in colour with a long, broad tail.

Key characteristics: Long and narrow abdomen with broad tail (Richardson, 1901), ectoparasite.



ID Note: May be mistaken for *Aega psora* (has eyes and oval body without long tail, pp. 86), which is also ectoparasitic, though not on *N. bairdii*. When in doubt, ID to family Aegidae.

Remarks: In the Laurentian Channel and Gulf of St. Lawrence region, *Syscenus infelix* has been documented as a common external parasite on the grenadier *Nezumia baridii* (Goode & Bean, 1877)(pp.129). This association appears to be species-specific (Ross et al., 2001).



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Phylum Arthropoda

Class Malacostraca

Subclass Eumalacostraca

Order Isopoda

Family Aegidae

Aega psora (Linnaeus, 1758)

WoRMS AphiaID: 118827

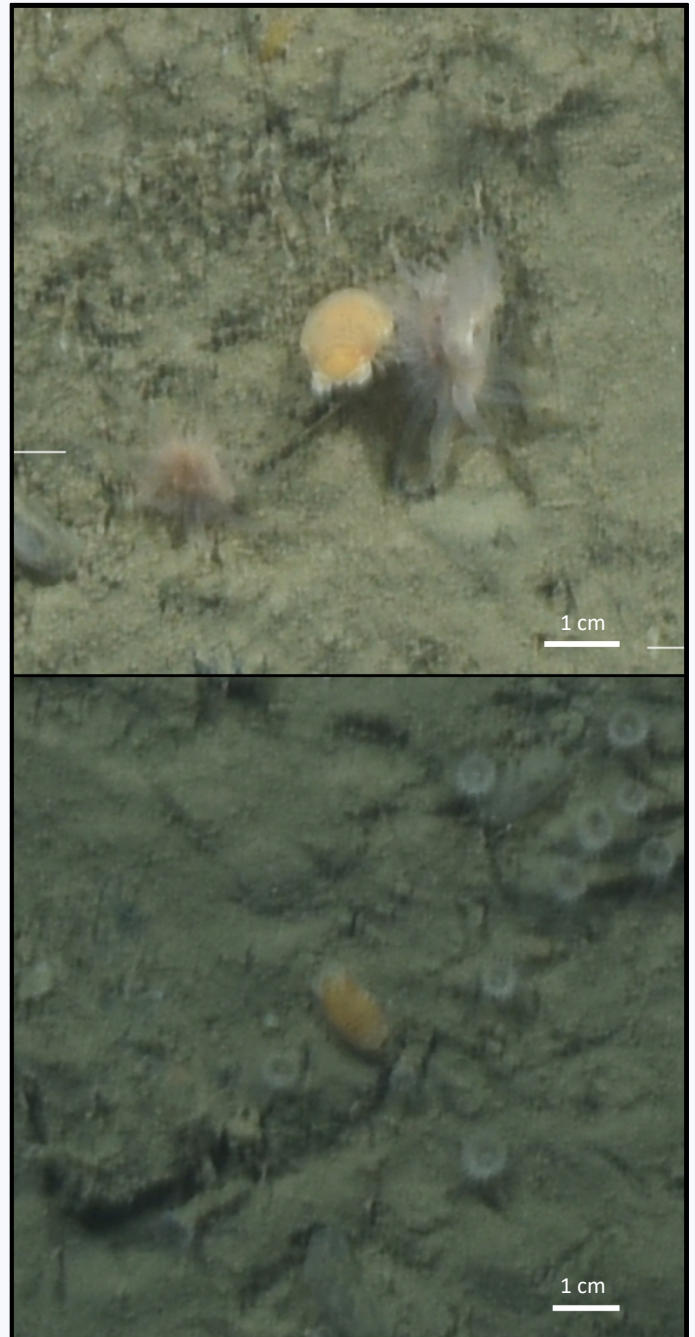
Description: Large ectoparasitic isopod, usually of cods and halibuts. Orange body with pointed telson and large uropods.

Key characteristics: Large, dark oval eyes. Orange body with short tail, pointed telson (Richardson, 1901), and large uropods.



ID Note: Resembles the blind, long-tailed *Syscenus infelix* (pp. 85). When in doubt, ID to family Aegidae.

Remarks: In the Laurentian Channel and Gulf of St. Lawrence region, *Aega psora* has been documented as a common external parasite on cods and halibuts, and occasionally on the grenadier *Nezumia baridii* (Goode & Bean, 1877)(pp. 129). In some cases, may be observed free-swimming.



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Phylum Arthropoda

Class Pycnogonida

Order Pantopoda

Family Undetermined

Pantopoda

WoRMS AphiaID: 1302

identificationQualifier: fam. indet.

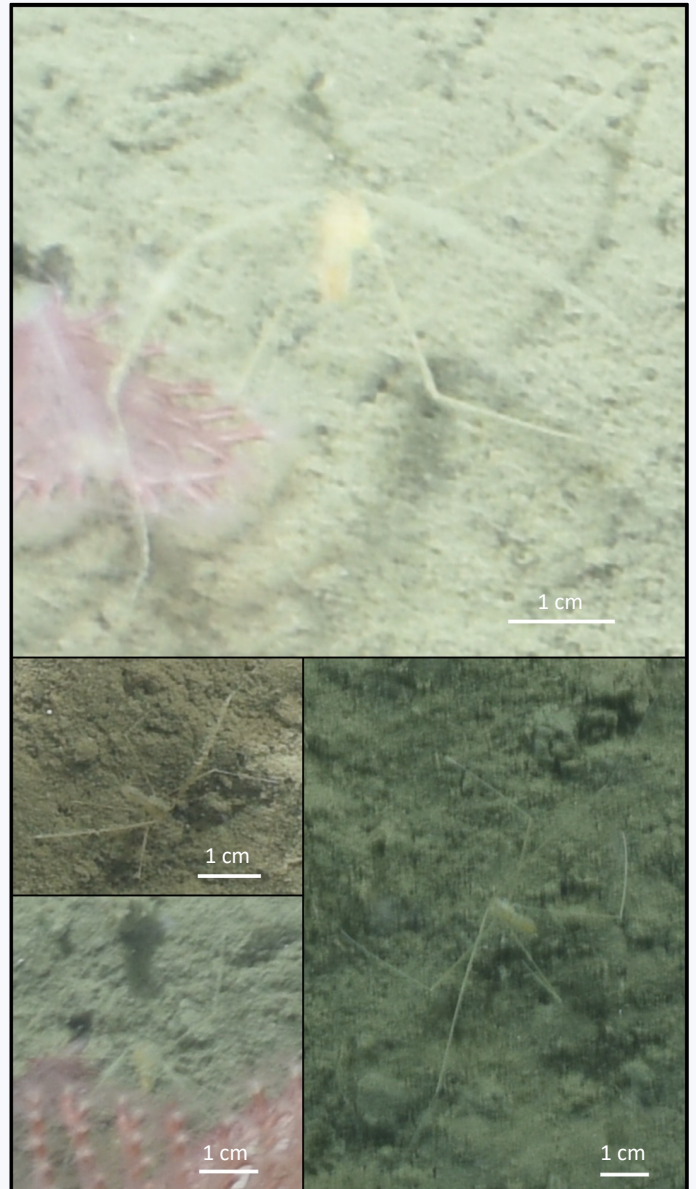
Description: Pale orange body with 3 pairs of very fine walking legs. Long proboscis extends from head. Often found associated with sea pens.

Key characteristics: Small, fine features, spider-like.



ID Note: Difficult to distinguish characters in imagery. ID to order Pantopoda.

Remarks: Small Pycnogonida seen here are likely of the genus *Nymphon* sp. based on previously collected samples but require a physical sample to confirm.



Sea spiders

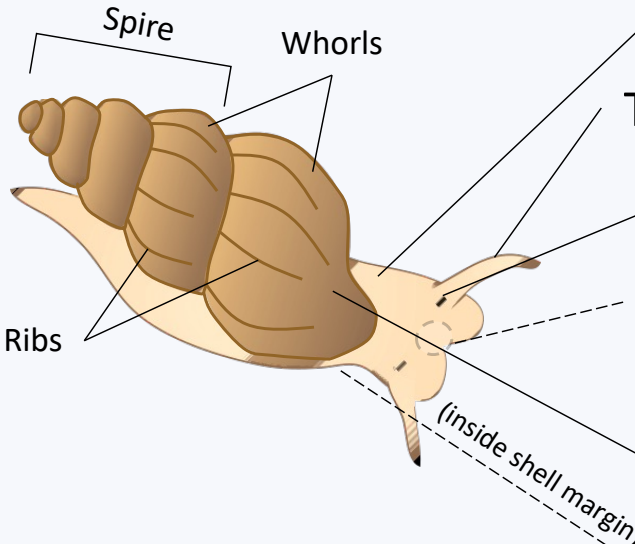


Phylum Mollusca

Molluscan morphology

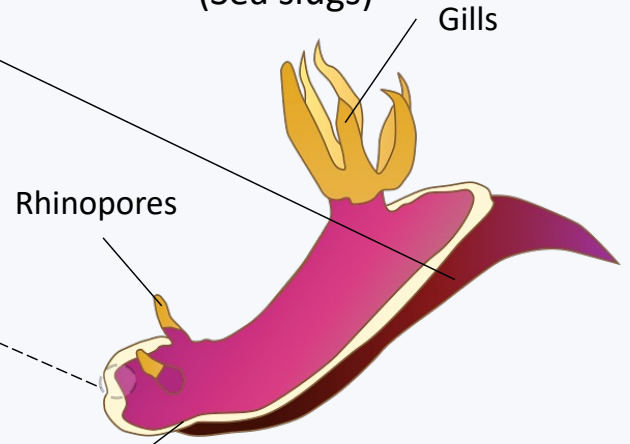
Class Gastropoda

(Snails, sea slugs)



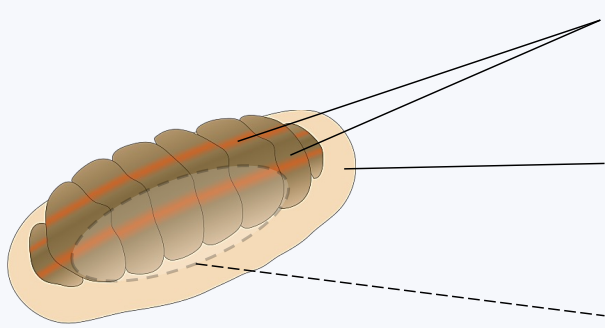
Order Nudibranchia

(Sea slugs)



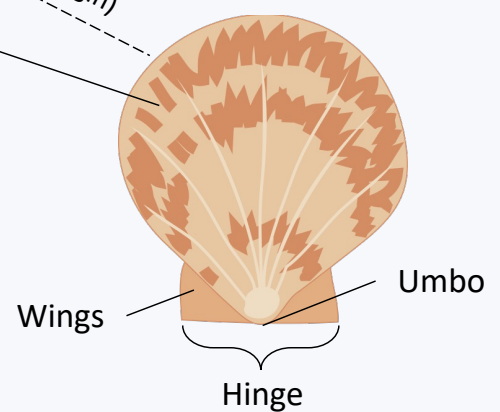
Class Polyplacophora

(Chitons)



Class Bivalvia

(Clams, scallops)



Foot
Tentacles
Eye
Mouth (Ventral)
Shell
Mantle

Valves (Shell)
Girdle (Mantle)
Foot (Ventral)

Molluscs vary widely in their morphology but have several distinct features. They have a ventral muscular **foot** for locomotion (internal in bivalves) and a soft **mantle** that surrounds the internal organs and lines the inside of the defensive **shell** (except nudibranchs). Shell structure varies and may consist of several interlocking **plates** (C. Polyplacophora), two **valves** connected by a hinge (C. Bivalvia) or be absent all together (O. Nudibranchia). Respiratory **gills** may be internal or external.

Image credits:
Sea snail, chiton & scallop: Dieter Tracey, Water and Rivers Commission (ian.umces.edu/media-library)
Nudibranch: Tracey Saxby, Integration and Application Network (ian.umces.edu/media-library)

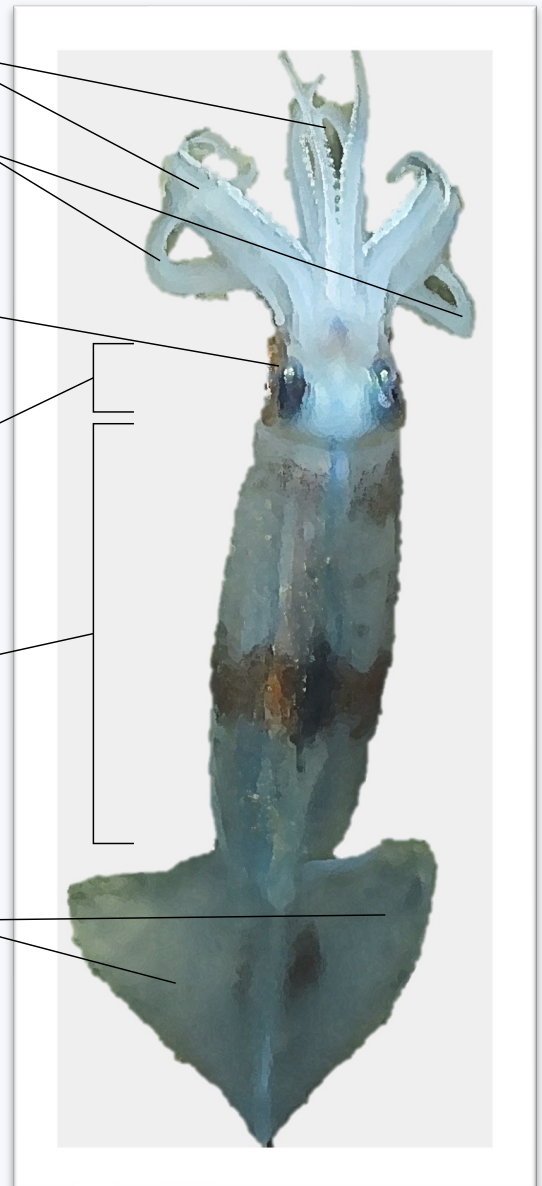
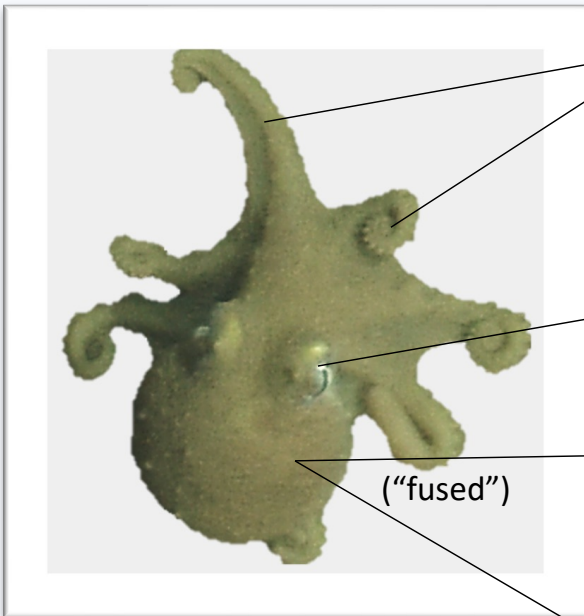
Class Cephalopoda

Order Octopoda

(Octopus)

Superorder Decapodiformes

(Squid)



Cephalopods exhibit many modifications of the general molluscan body plan. Their shell is greatly reduced to an internal "pen" structure (except nautiloids), leaving the soft **mantle** exposed. In **order Octopoda**, the margin of the mantle is fused to the head; in **superorder Decapodiformes** (squid) the mantle margin may be partially fused or completely free. The **foot** has been modified into a **siphon** that enables fast swimming via jet propulsion. Stabilizing **fins** at the posterior end also aid in swimming (absent in many octopods).

Squid and octopus both have eight **arms** surrounding a **beak** (mouth). Squid have two additional **tentacles** that aid in feeding.

Image credits:
Octopus and squid: DFO

Phylum Mollusca

Class Cephalopoda

Subclass Coleoidea

Order Oegopsida

Family Ommastrephidae

Illex illecebrosus (Lesueur, 1821)

WoRMS AphiaID: 153087

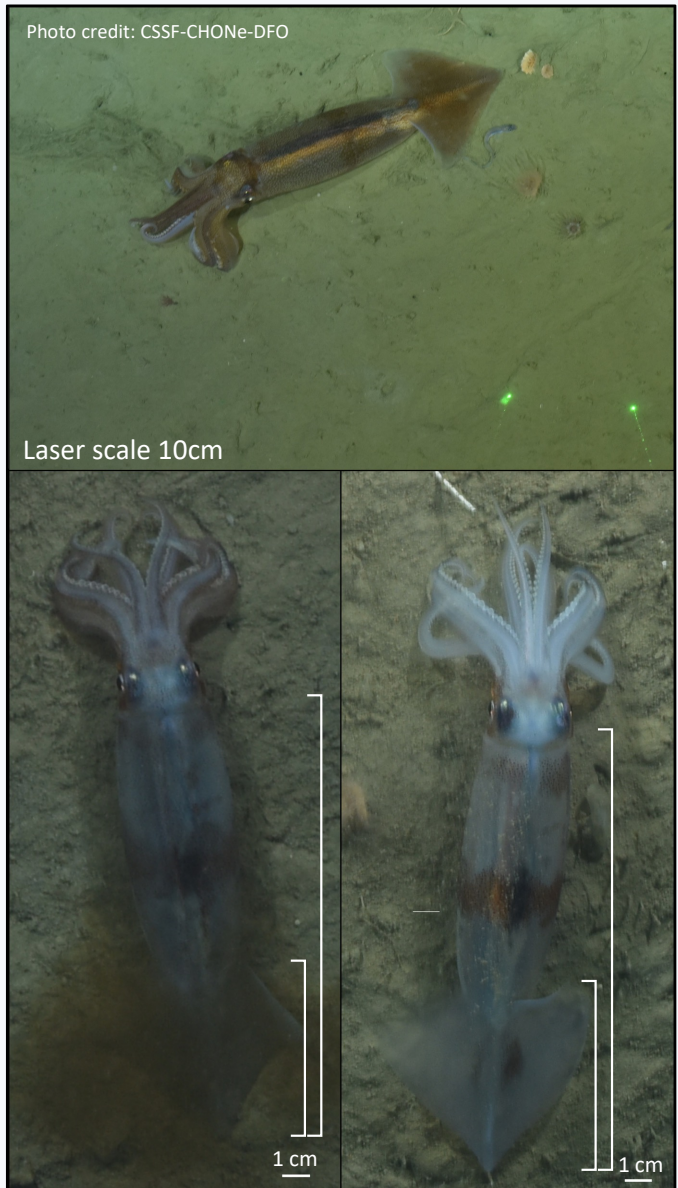
Description: Squid have 10 arms, two tentacles, and anterior fins. Head and mantle are clearly delineated.

Key characteristics: Triangular fins $< \frac{1}{2}$ to $\frac{1}{3}$ total mantle length.



ID Note: Colour cannot be used as a diagnostic character since they change colour. When in doubt, ID to superorder Decapodiformes.

Remarks: The most common species of squid known in the Laurentian Channel area is the short-finned squid *Illex illecebrosus* (Lesueur, 1821). Could be confused with the arctic *Gonatus fabricii* or southern inshore *Doryteuthis pealeii*; both are not likely to be present in the Laurentian Channel, but occurrences are possible. *G. fabricii* has been confirmed in the winter and North of Laurentian Channel ([iNaturalist](#)), and *D. pealeii* egg masses were documented in the region in autumn 2022 ([iNaturalist](#), [iNaturalist](#)).



Short-finned squid

Phylum Mollusca

Class Cephalopoda

Subclass Coleoidea

Order Sepiidae

Suborder Sepiolina

Family Sepiolidae

Stoloteuthis leucoptera (Verrill, 1878)

WoRMS AphiaID: 157037

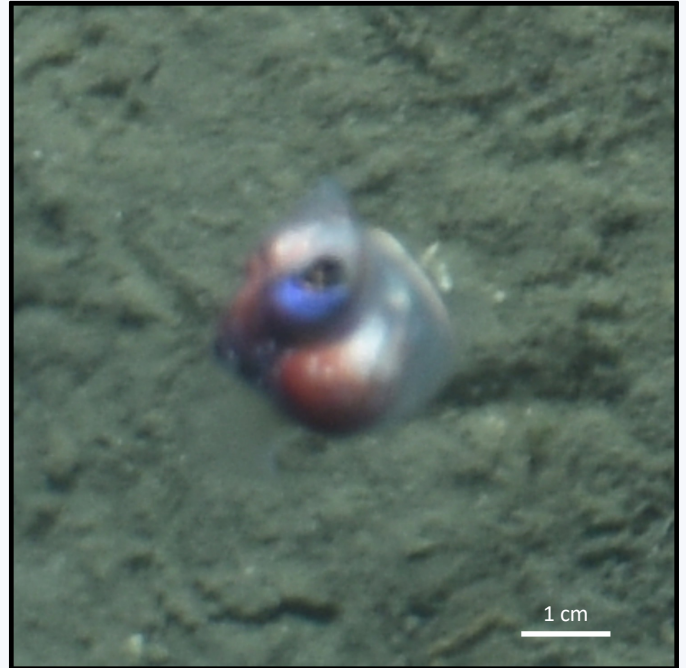
Description: Very small bobtail squid with large eyes and short fins. Mantle fused to head between the eyes.

Key characteristics: Pelagic bobtail, with small body, short arms, large blue eyes, and ventral blue patch.



ID Note: Difficult to identify from imagery. When in doubt, ID to order Sepiidae.

Remarks: In the Laurentian Channel, the suprabenthic *Rossia megaptera* (Verrill, 1881) and *R. palpebrossa* (Owen 1835) (see page 93) have also been documented.



Bobtail squids

Phylum Mollusca

Class Cephalopoda

Subclass Coleoidea

Order Sepiidae

Suborder Sepiolina

Family Sepiolidae

Rossia palpebrosa (Owen, 1835)

WoRMS AphiaID: 153083

identificationQualifier: cf. *palpebrosa*

Description: Short body, arms, and mantle (as wide as it is long), each about 1/3 of total length. Fins are semi-circular and almost the full height of the mantle. Eight arms and two tentacles.

Key characteristics: Mottled red-brown colour, perimeter of mantle separated from head (unlike octopus).



ID Note: When in doubt, ID to suborder Coleoidea.

Remarks: In the Laurentian Channel, this may be confused with *Bathypolypus bairdii* (Verrill, 1873) (see page 94), and other cephalopods, especially when resting on the seafloor and fins are hidden. This is likely *Rossia palpebrosa*, but *Rossia megaptera* is also present and is difficult to distinguish.

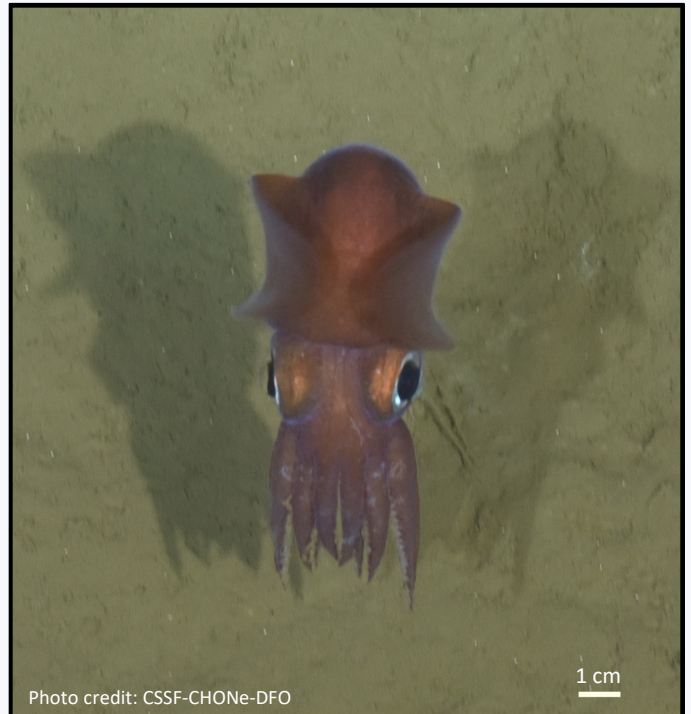


Photo credit: CSSF-CHONe-DFO

1 cm

Bobtail squids

Phylum Mollusca

Class Cephalopoda

Subclass Coleoidea

Order Octopoda

Suborder Incirrata

Family Bathypolypodidae

Bathypolypus bairdii (Verrill, 1873)

WoRMS AphiaID: 157011

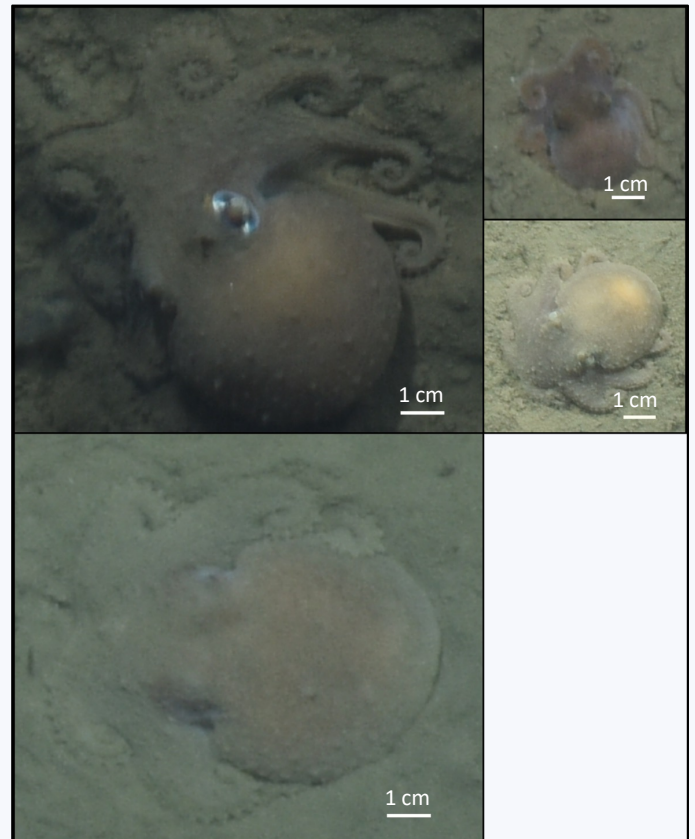
Description: Octopus have 8 arms. Body is rounded, and the head and mantle are not clearly delineated (i.e., are fused).

Key characteristics: Small body with wart-like bumps covering surface.



ID Note: When in doubt, ID to superfamily Octopodoidea.

Remarks: *Bathypolypus bairdii* (Verrill, 1873) is the only species known to occur in the Laurentian Channel region (long misidentified as *B. arcticus*, Prosch, 1849, but corrected by Muus 2002). They vary in colour from pale grey to red-brown. Likely to be mistaken for bobtail squids (O. Sepiidae, especially *Rossia* sp.). Another species, *Graneledone verrucosa* (Verrill, 1881), is deep-purple and occurs in deeper water (<1000 m) in the open Atlantic.



OCTOPUS

Phylum Mollusca

Class Gastropoda

Subclass Caenogastropoda

Order Littorinimorpha

Family Aporrhaidae

Arrhoges occidentalis (Beck, 1836)

WoRMS AphiaID: 531617

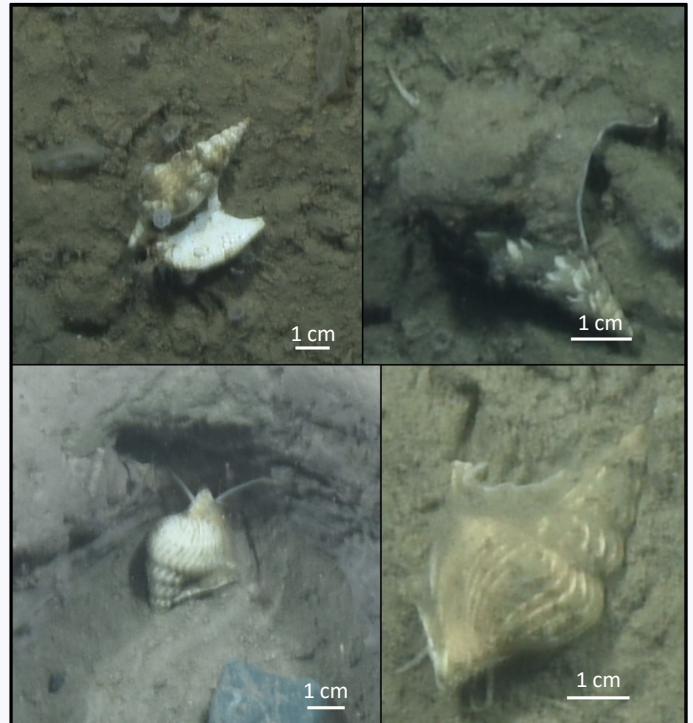
Description: Large, thick shell with a flared outer margin of shell aperture. This wing or lip is more pronounced in adults. Shell also has longitudinal ribs.

Key characteristics: Thick shell with greatly flared lip.



ID Note: Easily distinguishable, though may be mistaken for *Colus* sp. (family Buccinidae) if the flare is hidden or not developed (i.e., juveniles).

Remarks: This is the only species of pelican-foot snail (family Aporrhaidae) that has been identified in the Laurentian Channel.



pelican-foot snails

Phylum Mollusca

Class Gastropoda

Subclass Caenogastropoda

Order Littorinimorpha

Family Naticidae

Naticidae spp. Guilding, 1834

WoRMS AphiaID: 145

identificationQualifier: gen. indet.

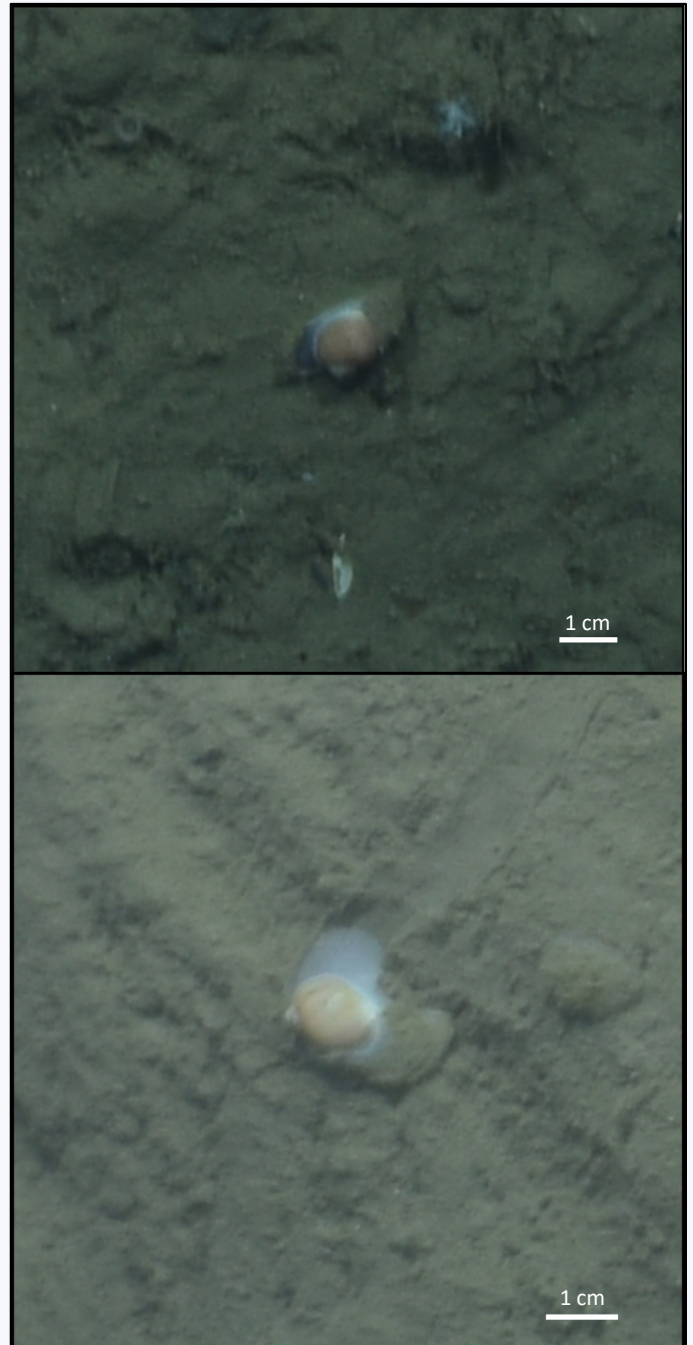
Description: Moon snails have a globular shell shape, and a wide foot that overflows from the shell. Can be seen pushing or burrowing through soft substrates.

Key characteristics: Brown-orange shell, wide pale-translucent foot.



ID Note: Easy to distinguish to family. Requires examination of shell opening and operculum to identify to species. ID to family Naticidae.

Remarks: Several species of moon snail have been documented in the Laurentian Channel and surrounding region to date, including *Cryptonatica affinis* (Gmelin, 1791) and members of the genus *Euspira* sp. (Agassiz, 1837).



M O O N S N A I L S

Phylum Mollusca

Class Gastropoda

Subclass Caenogastropoda

Order Neogastropoda

Family Buccinidae

Buccinum spp. Linnaeus, 1758

WoRMS AphiaID: 137701

identificationQualifier: sp. indet.

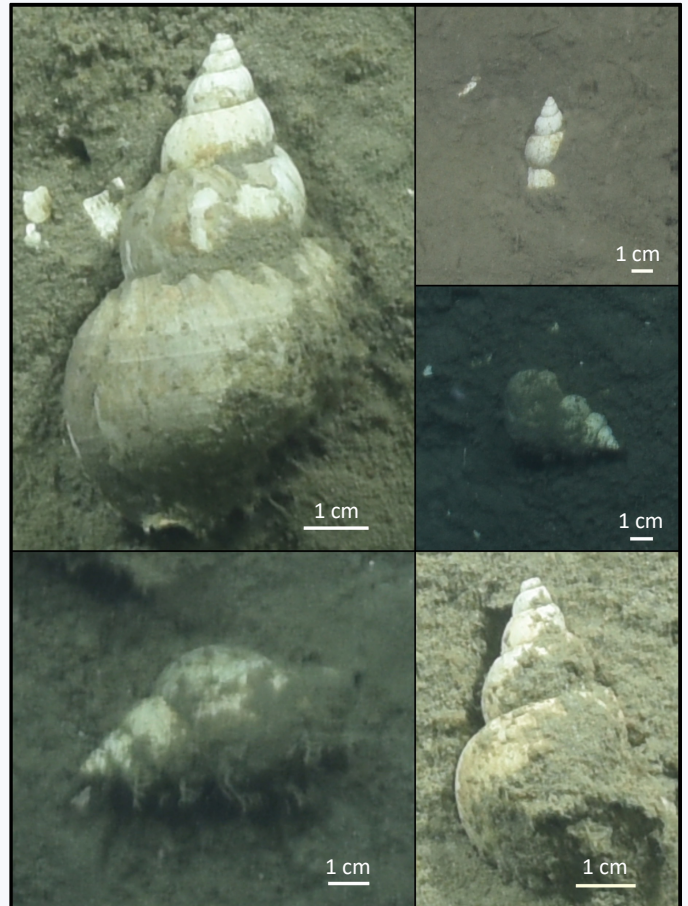
Description: Tall spire, though shell is stout (length < 2-times width). Shell looks smooth with fine raised cords that follow the spiral contour. Longitudinal ribs absent.

Key characteristics: Tall spire, shell looks smooth (less prominent ribs) – family usually has striations and ribs – shell morphology varies.



ID Note: Requires physical specimen to identify to genus, and genetics to identify to species. When in doubt, ID to family Buccinidae.

Remarks: Buccinid snails are common in the Laurentian Channel, and their shell morphologies are highly variable. Pictured are likely the deep-water species *Buccinum cyaneum* Bruguière, 1789. The species of *Buccinum* sp., *Colus* sp., and others in the family can be very difficult taxonomically.



True whelks

Phylum Mollusca

Class Gastropoda

Subclass Caenogastropoda

Order Neogastropoda

Family Buccinidae

Buccinidae spp. Rafinesque, 1815

WoRMS AphiaID: 149

identificationQualifier: gen. indet.

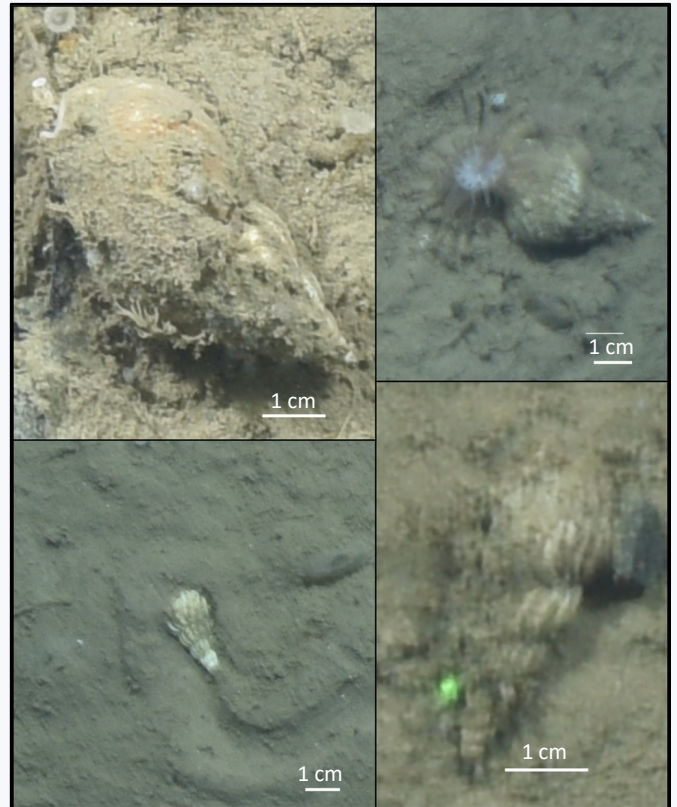
Description: Large shells with distinct longitudinal ridges. Shells are long and mostly white or have some brown.

Key characteristics: Tall spires with longitudinal ridges.



ID Note: Difficult to distinguish in imagery. ID to family Buccinidae.

Remarks: Marine gastropods are difficult to identify from *in situ* imagery since ventral structures (i.e., operculum shape, etc.) often need to be examined to identify species. Further, they are often covered in mud, algal detritus, and epibionts that obscure otherwise visible shell features that could aid in identification.



True whelks

Phylum Mollusca

Class Gastropoda

Subclass Vestigastropoda

Order Trochida

Family Margaritidae

Margarites costalis (A. Gould, 1841)

WoRMS AphiaID: 141819

Description: Iridescent, spiral shell that is distinctly wider than long, with a pointed spire.

Key characteristics: Iridescent blue-pink shells with strong lateral ridges on whorls.



ID Note: When in doubt, ID to order Trochida.

Remarks: Could be confused with other margarite or solarielle snails; similar species include *Margarites groenlandicus* (Gmelin, 1791) (less iridescent, flatter spire), and *Solariella varicosa* (Mighels & C.B. Adams, 1842) and *S. obscura* (Couthouy, 1838) (different ridges and shell opening below).



Marine snails

Phylum Mollusca

Class Gastropoda

Subclass Tectipleura

Order Cephalaspidea

Family Scaphandridae

Scaphander punctostriatus (Mighels & C.B. Adams 1842)

WoRMS AphiaID: 139490

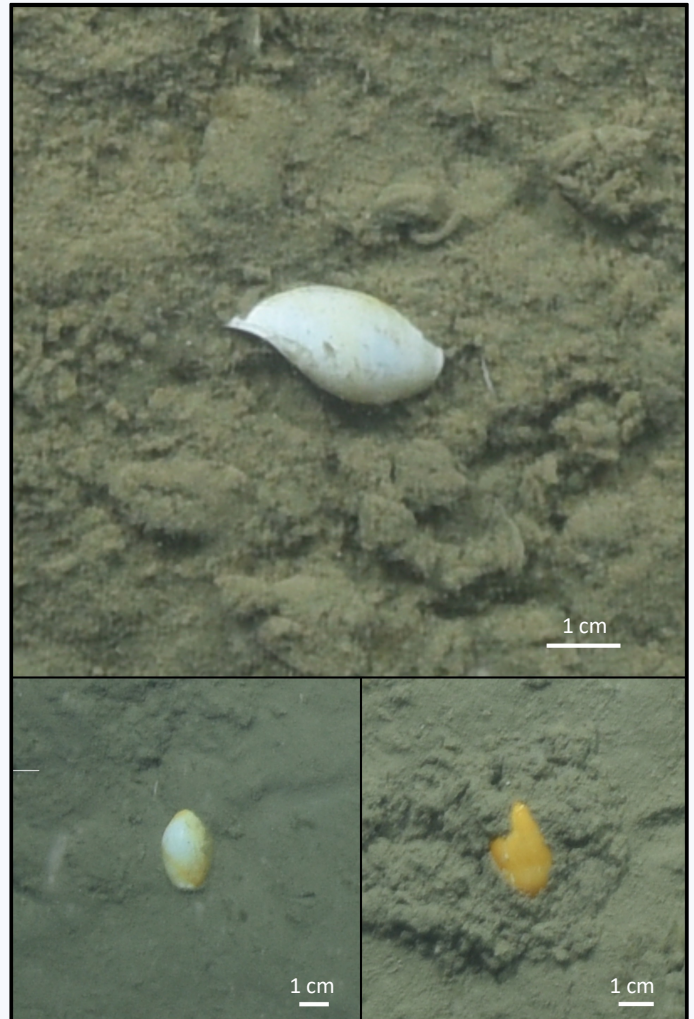
Description: Shell is a single, smooth whorl with no ribs or scratches. Spire not visible, length is greater than two-times the width. Colour white to yellowish-brown.

Key characteristics: Shell smooth with very fine striations (not visible here). No spire and only one whorl, length > 2 times the width.



ID Note: Easily distinguishable by large size (inshore species are smaller). When in doubt, ID to order Cephalaspidea.

Remarks: Bubbles (order Cephalaspidea) are easy to spot as their shell consists of a single whorl.



Bubble snails

Phylum Mollusca

Class Gastropoda

Subclass Undetermined

Order Undetermined

Family Undetermined

Gastropoda sp.1

WoRMS AphiaID: 101

identificationQualifier: fam. indet.

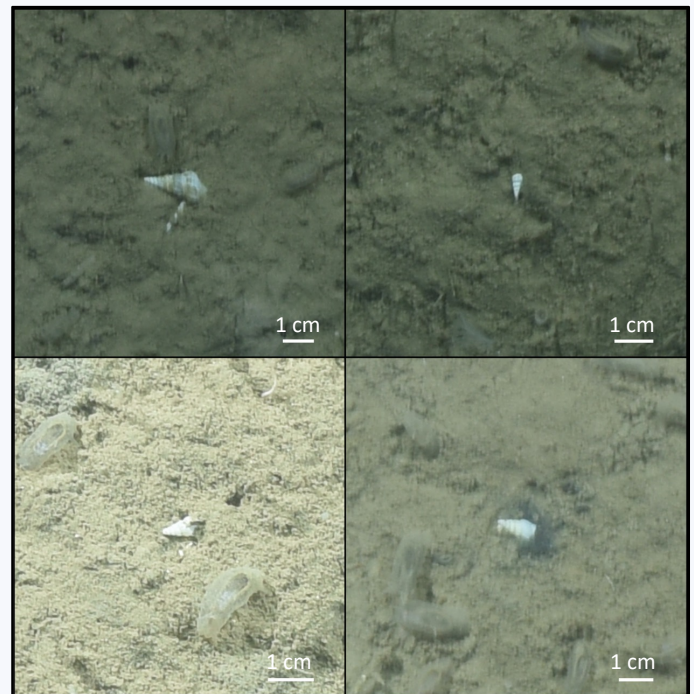
Description: Small white shell that is long; tall spire, with whorls.

Key characteristics: Tall spire with whorls, very small.



ID Note: Difficult to distinguish. ID to class Gastropoda.

Remarks: Marine gastropods are difficult to identify from *in situ* imagery since ventral structures (i.e., operculum shape, etc.) often need to be examined to identify species. Additionally, it may be difficult to discern whether snails are alive or dead. In cases where the shell is clearly empty, we suggest labeling the observation as "debris" to distinguish it from live individuals.



Marine snails

Phylum Mollusca

Class Bivalvia

Subclass Autobranchia

Order Cartida

Family Astartidae

Astarte spp. J. Sowerby, 1816

WoRMS AphiaID: 137683

identificationQualifier: spp. indet.

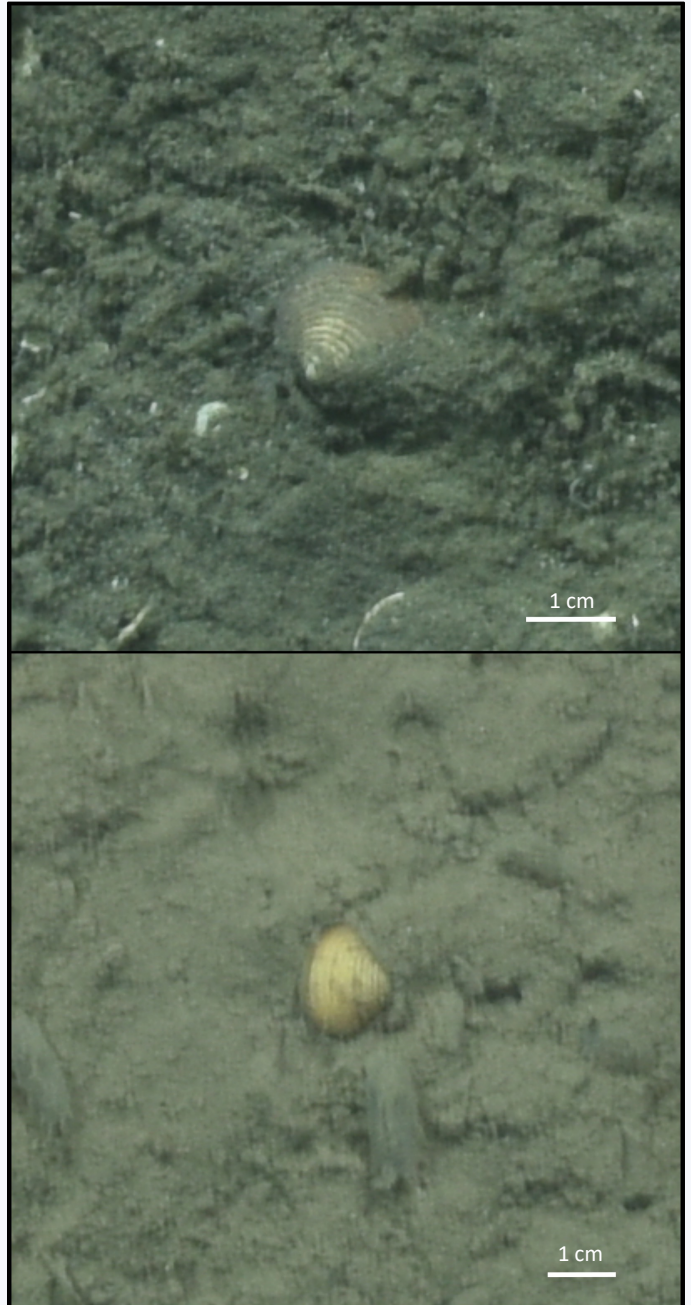
Description: Small triangular shell with off-center apex. Has obvious concentric ridges, with a brown-yellow, or chestnut colour.

Key characteristics: 10-20 obvious and deep concentric ridges, shell brown-yellow. Free-living in soft-sediments.



ID Note: Easily distinguishable to genus but requires a physical specimen to identify further. ID to genus *Astarte*.

Remarks: Most bivalves are burrowers, but *Astarte* are on or near the sediment surface so are visible in imagery. Physical characteristics required to distinguish many bivalves to species include internal morphological characteristics, such as sinus of pallial line, hinge type, foot colour, and shell thickness and internal colour.



C | a | m | s

Phylum Mollusca

Class Bivalvia

Subclass Autobranchia

Order Pectinida

Family Propeamussiidae

Similipecten greenlandicus (G.B. Sowerby II, 1842)

WoRMS AphiaID: 181299

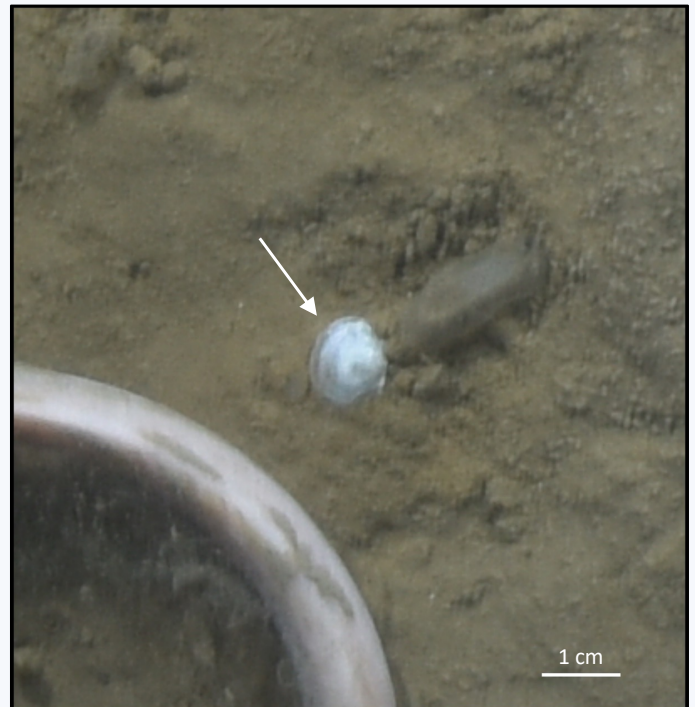
Description: Wings on either side of umbo a key character for scallops (order Pectinida). Shell is white and partially translucent.

Key characteristics: Small, semi-translucent-white clam with apex centered and obvious wings on either side of umbo visible.



ID Note: Easily distinguishable.

Remarks: *Similipecten greenlandicus* is common in the Laurentian Channel and has been collected and identified from physical samples. In general, physical characteristics required to distinguish many bivalves to species include internal morphological characteristics, such as sinus of pallial line, hinge type, foot colour, and shell thickness and internal colour. However, *S. greenlandicus* is regionally distinct.



Scallops

Phylum Mollusca

Class Gastropoda

Subclass Heterobranchia

Order Nudibranchia

Suborder Cladobranchia

Family Dendronotoidea

Dendronotus Alder & Hancock, 1845

WoRMS AphiaID: 137885

identificationQualifier: sp. indet.

Description: Uniform pale pink-orange semi-translucent body, with few translucent, finger-like cerrata in a row on either side along body margin. Two pairs of anterior tentacles are the same colour as the body.

Key characteristics: Pale pink-orange body with few translucent cerrata.



ID Note: Requires physical specimen, ID to genus. When in doubt, ID to order Nudibranchia.

Remarks: In the Laurentian Channel and surrounding region, the species *Dendronotus frondosus* (Ascanius, 1744) (reddish, near shore) and *D. elegans* A.E. Verrill 1880 (pale), have been identified from physical samples collected by trawling. *D. velifer* G.O. Sars, 1878 (reddish and spotted, deep water, historically misreported as *D. robustus* A.E. Verrill, 1870) has also been and confirmed by genetic barcoding ([iNaturalist](#)). Dorid nudibranchs, such as *Colga villosa* (Odhner, 1907) (yellow-white, short cerrata) and *Doridoxa walteri* (A. Krause, 1892) (white, many short papillae with posterior gills and lacking long anterior tentacles) also inhabit the region, albeit in relatively shallow waters (100-200 m) and are unlikely in the deeper waters of the Laurentian Channel. The other deep-water species is *Heterodoris robusta* A.E. Verrill & Emerton, 1882 (large 103 and red).



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Phylum Mollusca

Class Gastropoda

Subclass Heterobranchia

Order Nudibranchia

Suborder Cladobranchia

Superfamily Fionoidea

Fionoidea sp.1

WoRMS AphiaID: 412646

identificationQualifier: fam. indet.

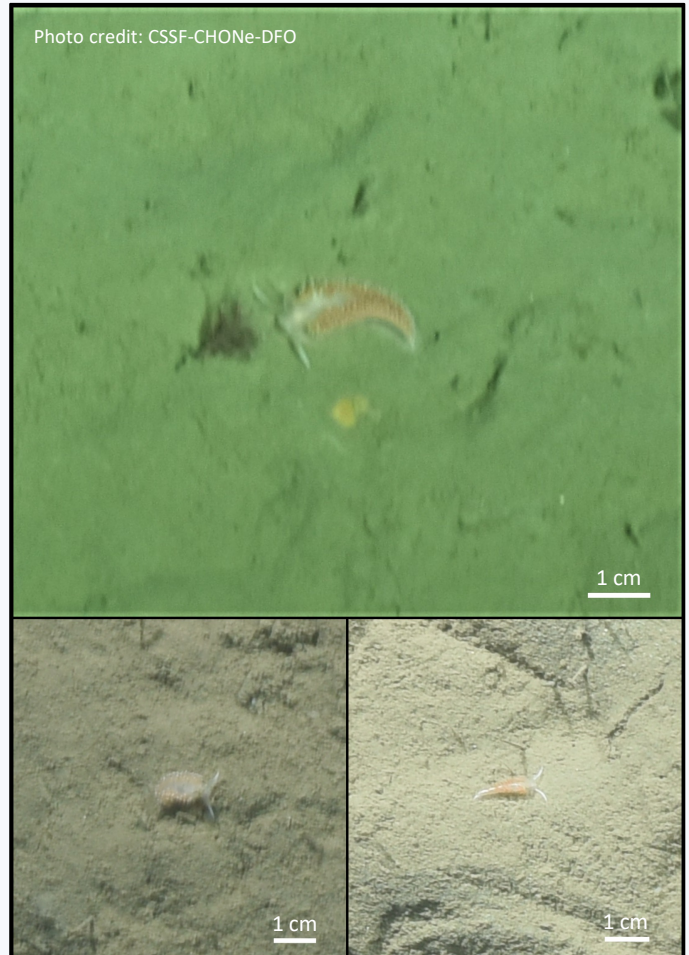
Description: White body with orange cerrata that have white tips. Mid-dorsal region bare. Two pairs of white anterior tentacles, one pair longer.

Key characteristics: Orange cerrata with white tips, white-translucent body



ID Note: Requires physical specimen to identify further; ID to superfamily. When in doubt, ID to order Nudibranchia.

Remarks: Recent polyphyly identified in the family Flabellinidae complicates identification from morphology alone (Korshunova et al. 2017; Furfaro et al. 2018). Physical specimen is required for close-up identification of morphological features, as well as genetic analysis.



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Phylum Mollusca

Class Polyplacophora

Subclass Neoloricata

Order Undetermined

Family Undetermined

Neoloricata

WoRMS AphiaID: 57

identificationQualifier: ord. indet.

Description: Chiton shells consist of eight overlapping plates (valves) embedded in a muscular girdle. They have a small mouth with a radula for scraping algae off rocks, and a large foot for locomotion. Colour of valves and girdle, as well as extent of girdle varies (girdle covers entire shell in some species).

Key characteristics: Pale valves, found in deep-water; free-living on hard substrates.



ID Note: Difficult to ID as colour varies. When in doubt, ID to class Polyplacophora.

Remarks: Chitons occur primarily on rocks in the intertidal zone, with few species in deeper water. Two species have been documented in the region, *Hanleya hanleyi* (Leach, 1844) and *Stenosemus albus* (Linnaeus, 1767). The substrate of the Laurentian Channel is primarily comprised of soft-sediments. Occasional boulder fields yield a plethora of otherwise uncommon species in the region; chitons among them.



Chitons

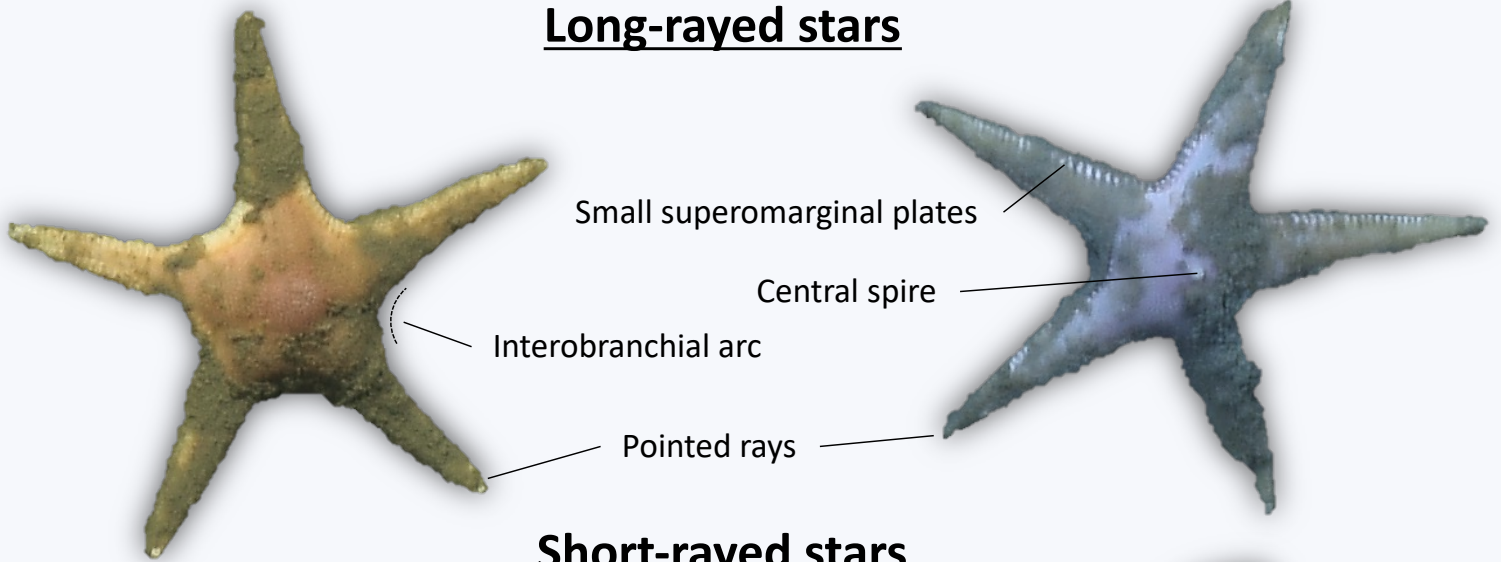


Phylum Echinodermata

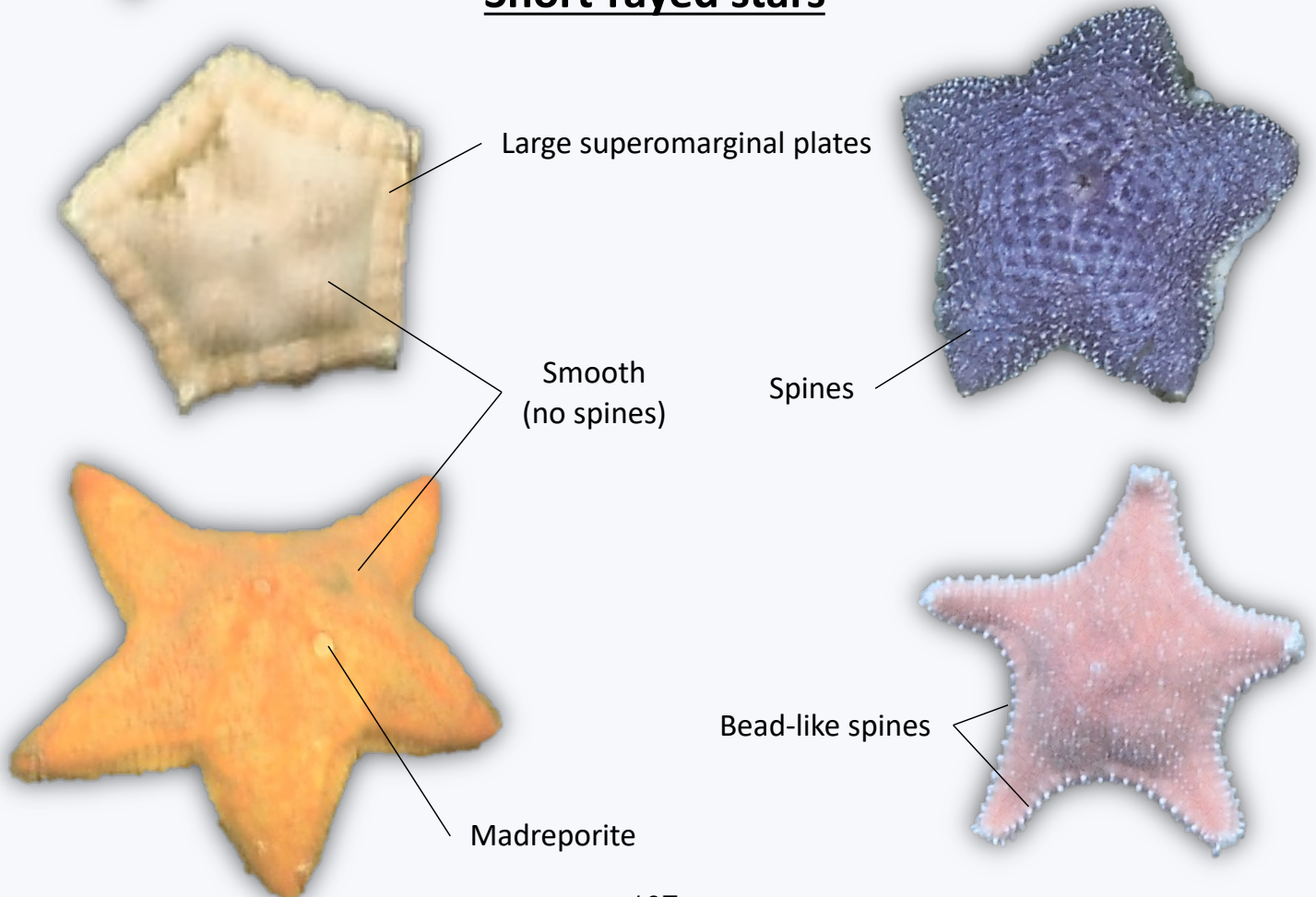
Echinoderm external morphology

Class Asteroidea

Long-rayed stars



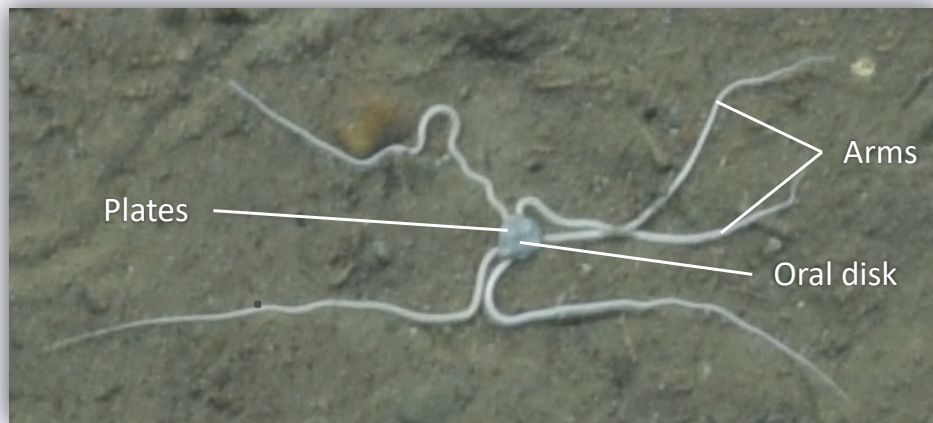
Short-rayed stars



Echinoderm external morphology

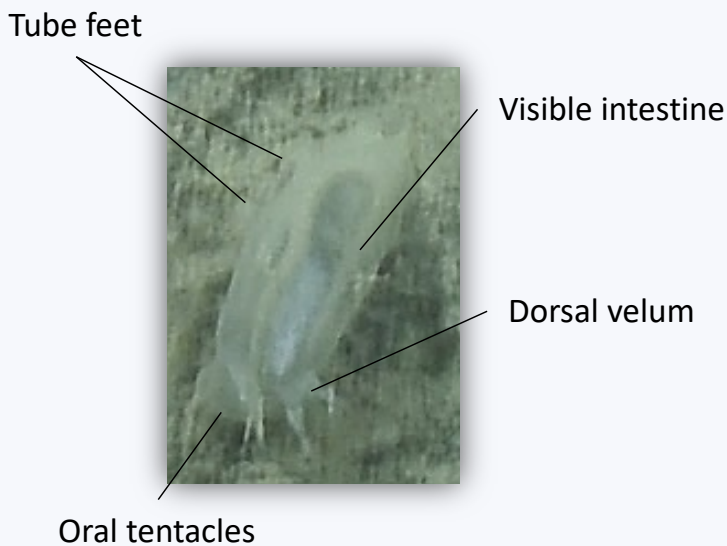
Class Ophiuroidea

(Brittle stars)



Class Holothuroidea

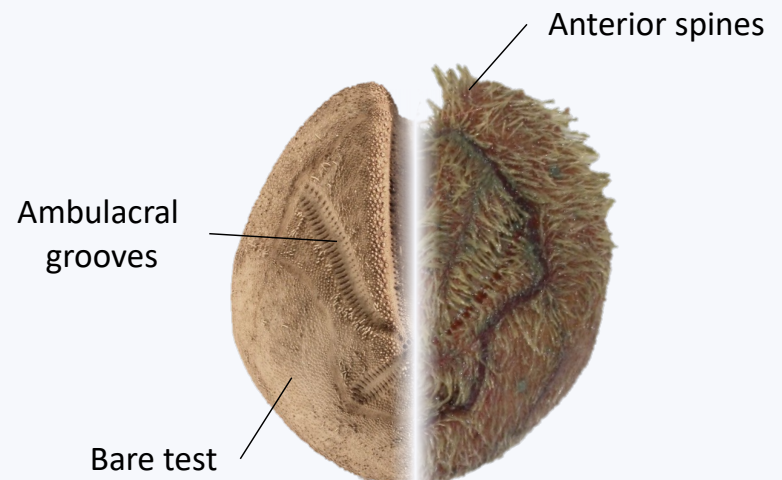
(Sea cucumbers)



Elpidiidae
(Sea pigs)

Class Echinoidea

(Sea urchins)



Spatangoida
(Heart urchins)

Phylum Echinodermata

Class Asteroidea

Subclass Ambuloasteroidea

Order Paxillosida

Family Pseudarchasteridae

Pseudarchaster parelii (Düben & Koren, 1846)

WoRMS AphiaID: 124085

Description: Long-rayed star with a pale red-tan body. Arms taper into a dull point. Often seen partially buried in soft sediments. Small but prominent superomarginal plates.

Key characteristics: Large disk that looks almost muscular; colour fades toward distal end of arms, arms wide and look flat. Interbranchial arc is rounded.



ID Note: Easily distinguishable when whole body is visible. When in doubt, ID to order Paxillosida.

Remarks: May be mistaken for *Psilaster andromeda* (Müller & Troschel, 1842; sharp interbranchial arc; pp. 111, this guide).



Sea stars

Phylum Echinodermata

Class Asteroidea

Subclass Ambuloasteroidea

Order Paxillosida

Family Astropectinidae

Psilaster andromeda (Müller & Troschel, 1842)

WoRMS AphiaID: 123908

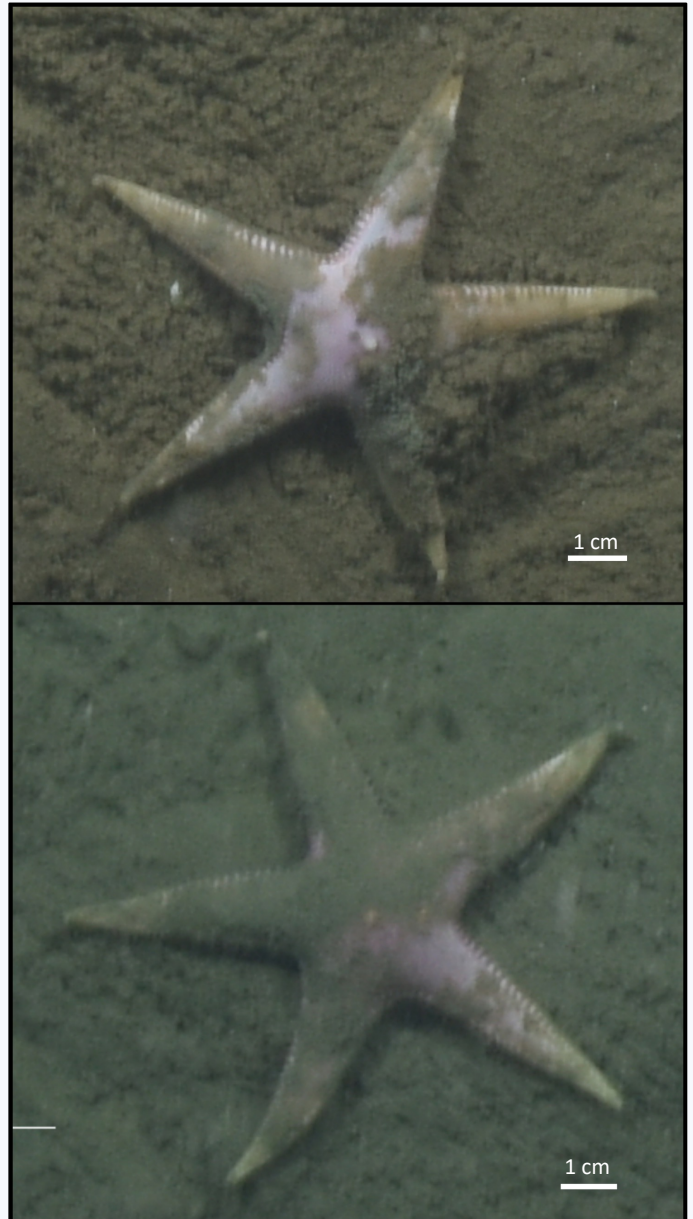
Description: Classic star shape with smooth pick oral surface and a raised point at the center of the disk. Long arms taper to a sharp point. Has small but prominent superomarginal plates. Often seen covered in mud.

Key characteristics: Smooth, pale pink body, long arms with small superomarginal plates. Raised point in center of aboral surface. Sharp-angled interbranchial arc.



ID Note: Easily distinguishable. When in doubt, ID to order Paxillosida.

Remarks: May be mistaken for *Pseudarchaster parellii* (Düben & Koren, 1846; rounded interbranchial arc; pp.110, this guide).



Sea stars

Phylum Echinodermata

Class Asteroidea

Subclass Ambuloasteroidea

Order Paxillosida

Family Ctenodiscidae

Ctenodiscus crispatus (Bruzelius, 1805)

WoRMS AphiaID: 123915

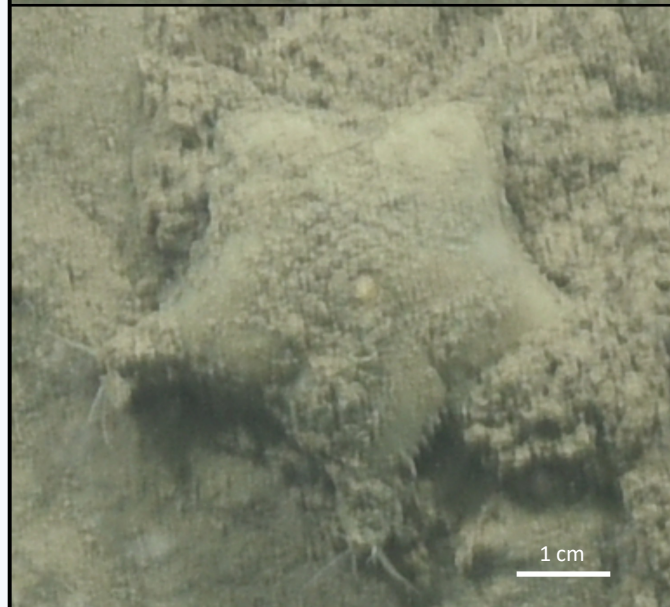
Description: Grey (yellow when not covered in mud) body with short arms, and central spire. Mud-covered with long tube feet extended from each point. Marginal plates reduced, aboral surface is smooth without spines.

Key characteristics: Short arms, mud-covered, long tube feet extended from each point.



ID Note: Easily distinguished.

Remarks: Common in the Laurentian Channel. May be seen mostly buried in soft substrates.



Sea stars

Phylum Echinodermata

Class Asteroidea

Subclass Ambuloasteroidea

Order Spinulosida

Family Echinasteridae

Henricia Gray, 1840

WoRMS AphiaID: 123276

identificationQualifier: sp. indet.

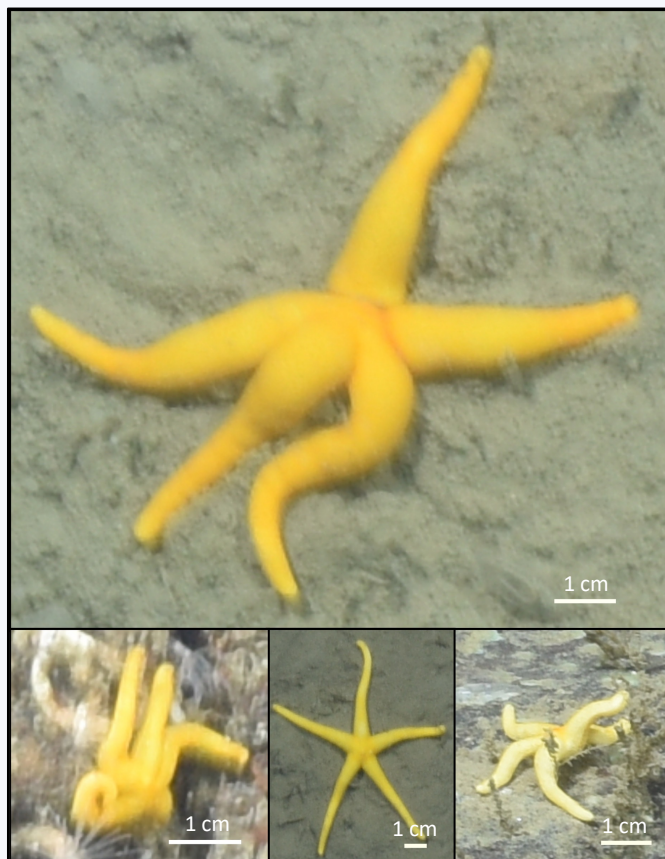
Description: Very small central disk with long tapering arms that are slightly pinched at the disk (basically meeting in the center). Aboral surface appears smooth and uniformly coloured, though shading may vary slightly. Found on soft or hard substrates.

Key characteristics: Uniform colour, small disk with long and thick cylindrical arms.



ID Note: Easy to distinguish to genus level but requires a physical specimen to identify to species; ID to genus *Henricia*.

Remarks: Colour varies widely within the genus, from yellows or oranges, to reds and purples. Only yellow ones have been seen in the Campod imagery at the Laurentian Channel.



Sea stars

Phylum Echinodermata

Class Asteroidea

Subclass Ambuloasteroidea

Order Valvatida

Family Goniasteridae

Ceramaster granularis (Retzius, 1783)

WoRMS AphiaID: 124020

Description: Pale-reddish pink, has obvious superomarginal plates that line up with similarly large inferomarginal plates. Short rays have white tips, often resembles a pentagon in shape.

Key characteristics: Pale-reddish pink, has large marginal plates, short rays.



ID Note: Easily distinguishable.

Remarks: Colour varies from white-ish to reddish-pink. Looks more pentagonal when small. May be swollen (middle-right image).



Sea stars

Phylum Echinodermata

Class Asteroidea

Subclass Ambuloasteroidea

Order Valvatida

Family Goniasteridae

Hippasteria phrygiana (Parelius, 1768)

WoRMS AphiaID: 124043

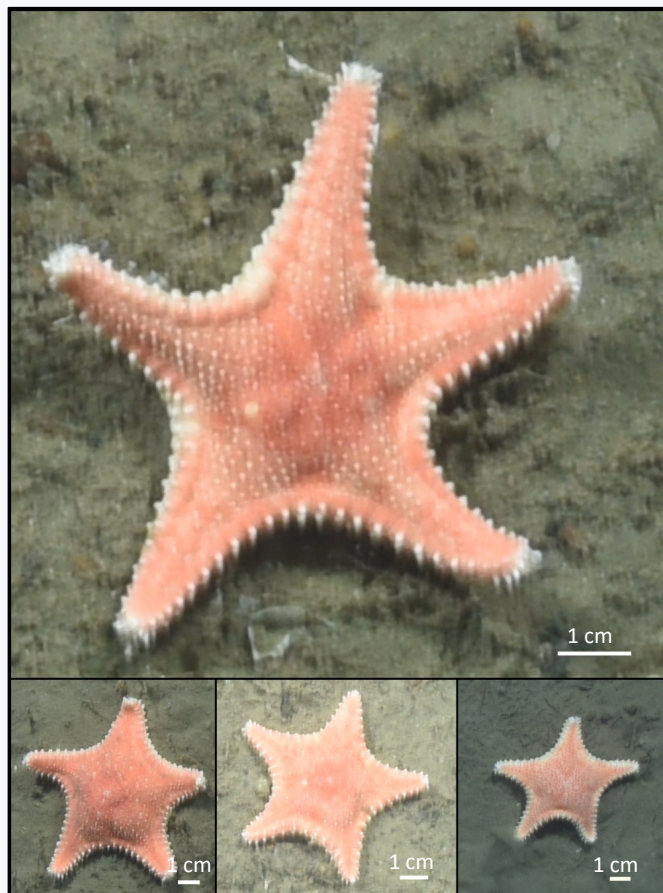
Description: Aboral surface is pink and covered in small, bead-like spikes. Has short rays with larger white bead-like spines around the margin. Prominent superomarginal plates.

Key characteristics: Pale pink, short rays with white spines on margin and aboral surface.



ID Note: Easily distinguishable.

Remarks: May be swollen (Phylum Echinodermata cover photo).



Sea stars

Phylum Echinodermata

Class Asteroidea

Subclass Ambuloasteroidea

Order Valvatida

Family Poraniidae

Poraniomorpha (Poraniomorpha) hispida (M. Sars, 1872)

WoRMS AphiaID: 125170

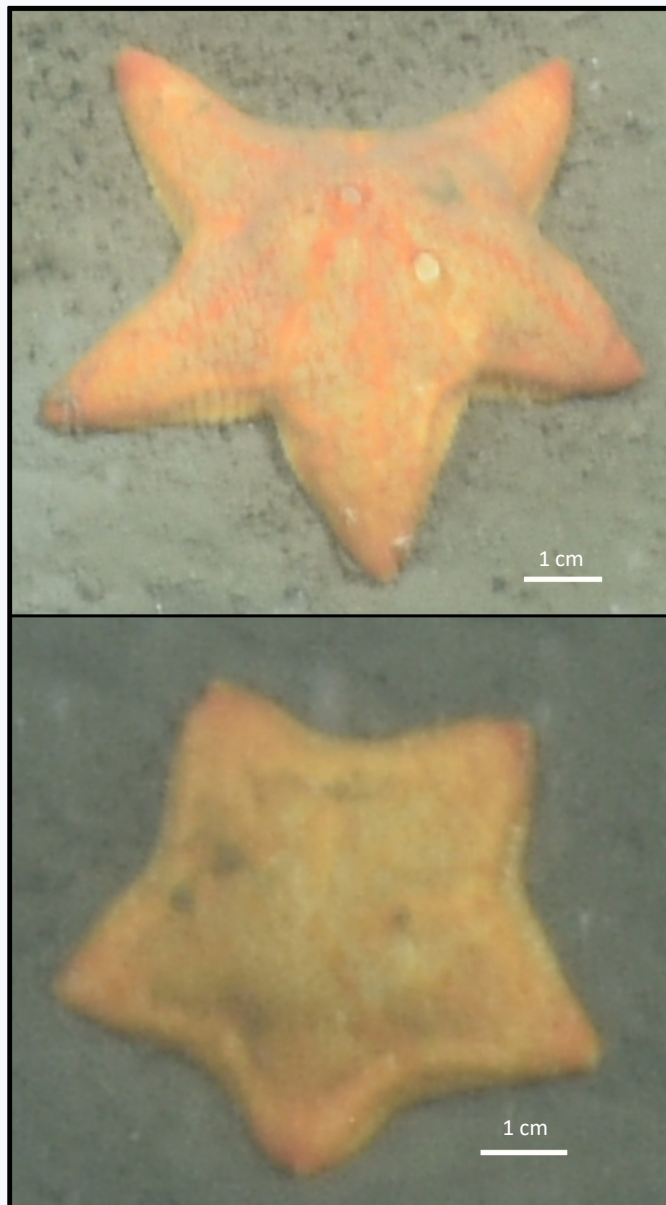
Description: Arms short and wide, tapering to a point. Body orange with darker colour at the tips of the arms.

Key characteristics: Orange aboral surface with thick tapering arms with darker tips.



ID Note: Easily distinguishable to genus but difficult to distinguish between species; when in doubt, ID to genus *Poraniomorpha*.

Remarks: *P. (P.) hispida* is the only species likely in the Laurentian Channel. The arctic *P. (P.) tumida* (Stuxberg, 1878; longer arms) has been recorded in the St. Lawrence Estuary and eastern Canadian Arctic ([iNaturalist](#)) but not in the Laurentian Channel. See Nozères 2022 for comparison.



Sea stars

Phylum Echinodermata

Class Asteroidea

Subclass Ambuloasteroidea

Order Velatida

Family Pterasteridae

Diplopteraster multiples (M. Sars, 1866)

WoRMS AphiaID: 124128

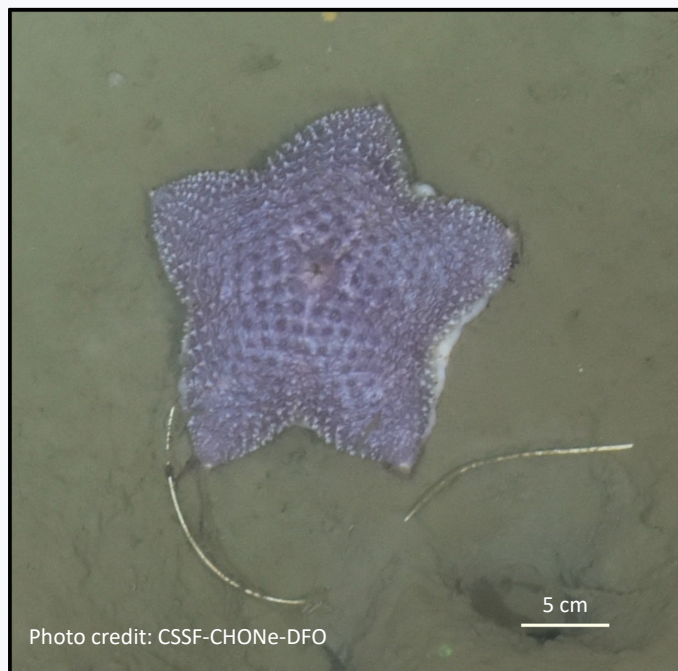
Description: Arms short and wide, tapering to a point that is white. Body purple with large madreporite in center. Five short white lines visible extending from center towards the space between each arm. Aboral surface covered in small spikes that are white near the body margins and purple near the body center.

Key characteristics: Purple, short and stout arms, covered in spikes.



ID Note: Easily distinguishable.

Remarks: *D. multiples* is the only species of the genus found in the Laurentian Channel MPA and surrounding area. It is commonly collected in DFO bottom trawl surveys in the Gulf of St. Lawrence (Bernier et al 2023), Scotian Shelf (Regnier-McKellar 2021), NL shelf (Brodie et al 2013), and the eastern Canadian Arctic (DFO 2016).



Sea stars

Phylum Echinodermata

Class Ophiuroidea

Subclass Undetermined

Order Undetermined

Family Undetermined

Ophiura sarsii Lütken, 1855

WoRMS AphiaID: 123084

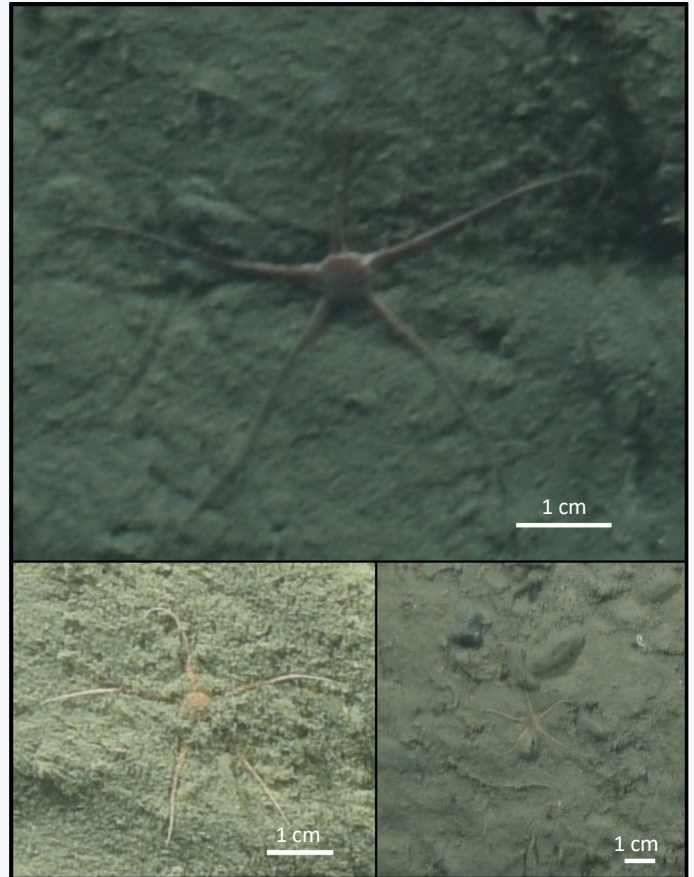
Description: Small, round central disk that is reddish-orange. Arms thin and orange, colour may transition to pale-white at distal ends.

Key characteristics: Round, pale orange disk and arms that are long and thin.



ID Note: Can be difficult to distinguish due to mud and fine features. When in doubt, ID to class Ophiuroidea.

Remarks: Brittle stars (Ophiuroidea) are a diverse group and are often small with very fine features that are difficult to distinguish in imagery. To date, several genera have been identified from physical samples collected in trawls in the Laurentian Channel and surrounding region, including *Amphiura* sp., *Ophiacantha* sp., *Ophiopholis* sp., and *Ophiura* sp. Ophiuroidea are often hard to see in imagery and may be partly covered by sediment.



Brittle stars

Phylum Echinodermata

Class Ophiuroidea

Subclass Myophiuroidea

Order Amphilepidida

Family Amphiuridae

Amphiura Forbes, 1843

WoRMS AphiaID: 123613

identificationQualifier: sp. indet.

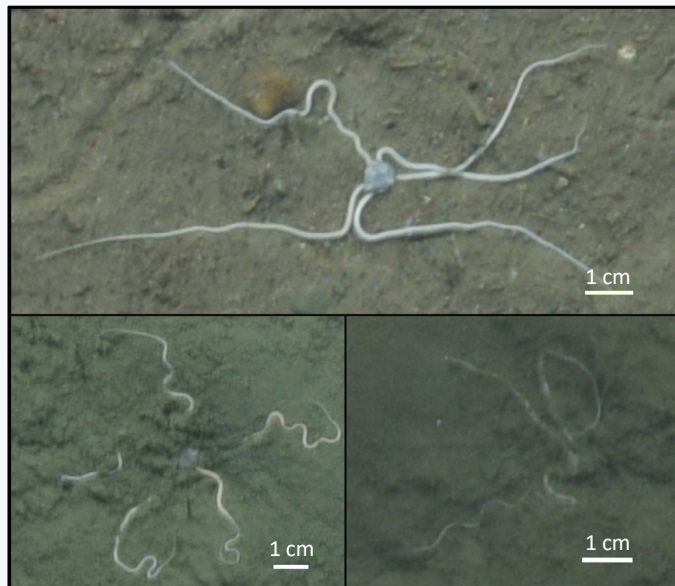
Description: Long and thin white arms extending from a small, blue-grey disk. Five distinct bumps on aboral surface. Disk is often buried and only the arms are visible.

Key characteristics: Small, pale blue-grey central disk; long, white, squiggly arms.



ID Note: Easily distinguished to genus but requires a physical specimen to identify to species. ID to genus.

Remarks: Brittle stars (Ophiuroidea) are a diverse group and are often small with very fine features that are difficult to distinguish in imagery. To date, several genera have been identified from physical samples collected in trawls in the Laurentian Channel and surrounding region, including *Amphiura* sp., *Ophiacantha* sp., *Ophiopholis* sp., and *Ophiura* sp. Ophiuroidea are often hard to see in imagery and may be partly covered by sediment.



Brittle stars

Phylum Echinodermata

Class Ophiuroidea

Subclass Undetermined

Order Undetermined

Family Undetermined

Ophiuroidea sp.1

WoRMS AphiaID: 123084

identificationQualifier: ord. indet.

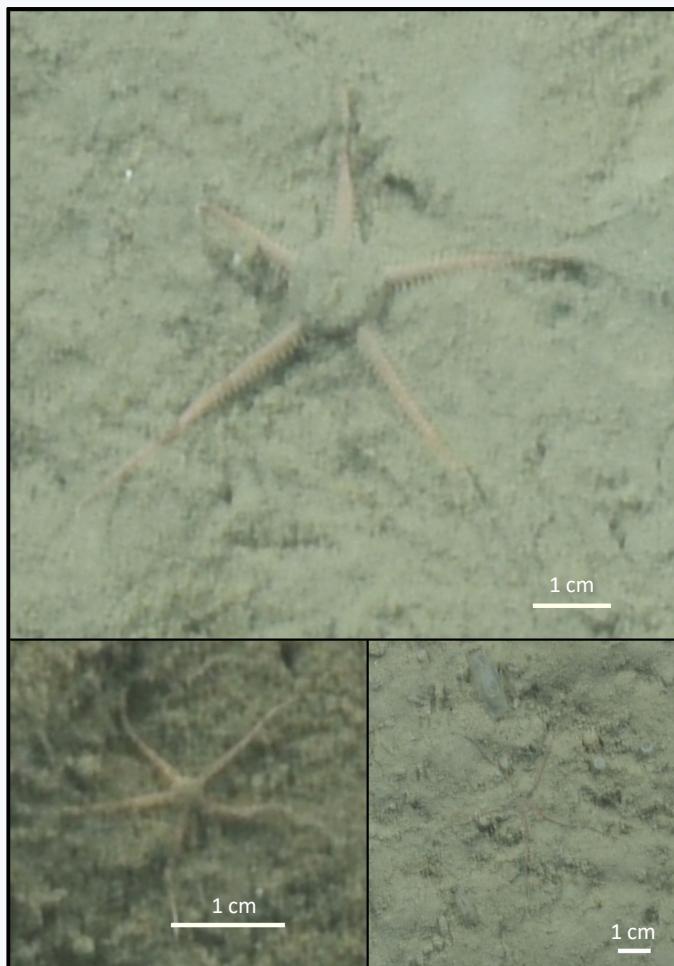
Description: Small central disk that is mud-covered-grey, with straight edges between arms giving a pentagonal shape. Arms orange with short spines along their margins.

Key characteristics: Grey pentagonal disk, orange arms.



ID Note: Requires a physical specimen to identify further. ID to class Ophiuroidea.

Remarks: Brittle stars (Ophiuroidea) are a diverse group and are often small with very fine features that are difficult to distinguish in imagery. To date, several genera have been identified from physical samples collected in trawls in the Laurentian Channel and surrounding region, including *Amphiura* sp., *Ophiacantha* sp., *Ophiopholis* sp., and *Ophiura* sp. Ophiuroidea are often hard to see in imagery and may be partly covered by sediment.



Brittle stars

Phylum Echinodermata

Class Ophiuroidea

Subclass Undetermined

Order Undetermined

Family Undetermined

Ophiuroidea sp.2

WoRMS AphiaID: 123084

identificationQualifier: ord. indet.

Description: Pale pink disk that is slightly bulbous with five lobes. Arms short and slightly darker than disk.

Key characteristics: Pale pink and swollen or bulbous disk, orange arms pale near disk



ID Note: Requires a physical specimen to identify further. When in doubt, ID to class Ophiuroidea.

Remarks: Resembles *Ophioscolex glacialis* Müller & Troschel, 1842, which has been collected in the Gulf of St. Lawrence. Brittle stars (Ophiuroidea) are a diverse group and are often small with very fine features that are difficult to distinguish in imagery. To date, several genera have been identified from physical samples collected in trawls in the Laurentian Channel and surrounding region, including *Amphiura* sp., *Ophiacantha* sp., *Ophiopholis* sp., and *Ophiura* sp. Ophiuroidea are often hard to see in imagery and may be partly covered by sediment.



Brittle stars

Phylum Echinodermata

Class Echinoidea

Subclass Euechinoidea

Order Spatangoida

Family Schizasteridae

Brisaster fragilis (Düben & Koren, 1844)

WoRMS AphiaID: 124404

Description: Hemispheric, or elongated, body shape. They are burrowing urchins that live under the sediment surface. In imagery, they are found bare tests (i.e., dead) that have a grey surface with 5 distinct grooves and lack spines.

Key characteristics: Grey surface with 5 distinct grooves.



ID Note: Easily distinguishable, however the specimens pictured are dead debris. Live *B. fragilis* are very unlikely to be seen in imagery as they are buried. Make sure to label as debris.

Remarks: This is the only species of heart urchin abundant at depth in the Laurentian Channel. Another heart urchin, *Moira atropos* (Lamarck, 1816) is regionally present, but mostly found shallower than 50 m.



Sea urchins

Phylum Echinodermata

Class Holothuroidea

Subclass Actinopoda

Order Elasipodida

Family Elpidiidae

Elpidiidae Théel, 1882

WoRMS AphiaID: 123191

identificationQualifier: fam. stet.

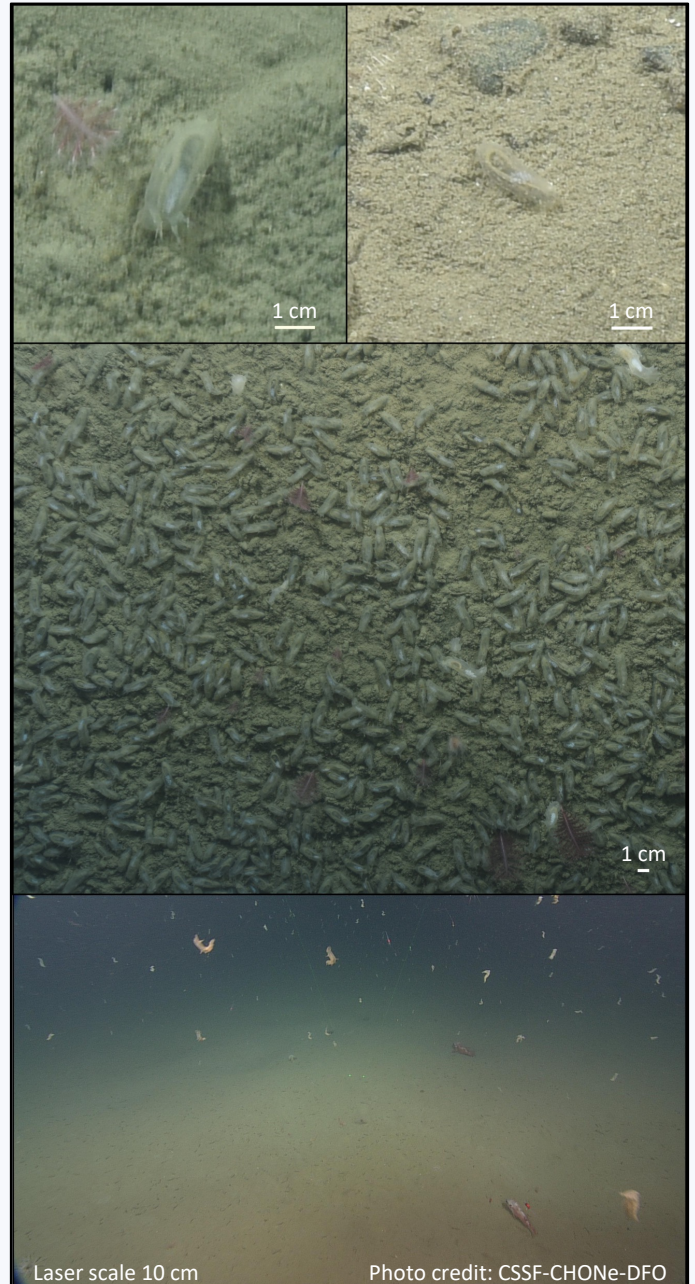
Description: Oblong translucent body with anterior appendages to aid in movement and surface deposit feeding. A dorsal flap (velum) may be visible at the anterior end, which aids in swimming (Miller & Pawson 1990).

Key characteristics: Translucent body, sediment-filled intestine visible.

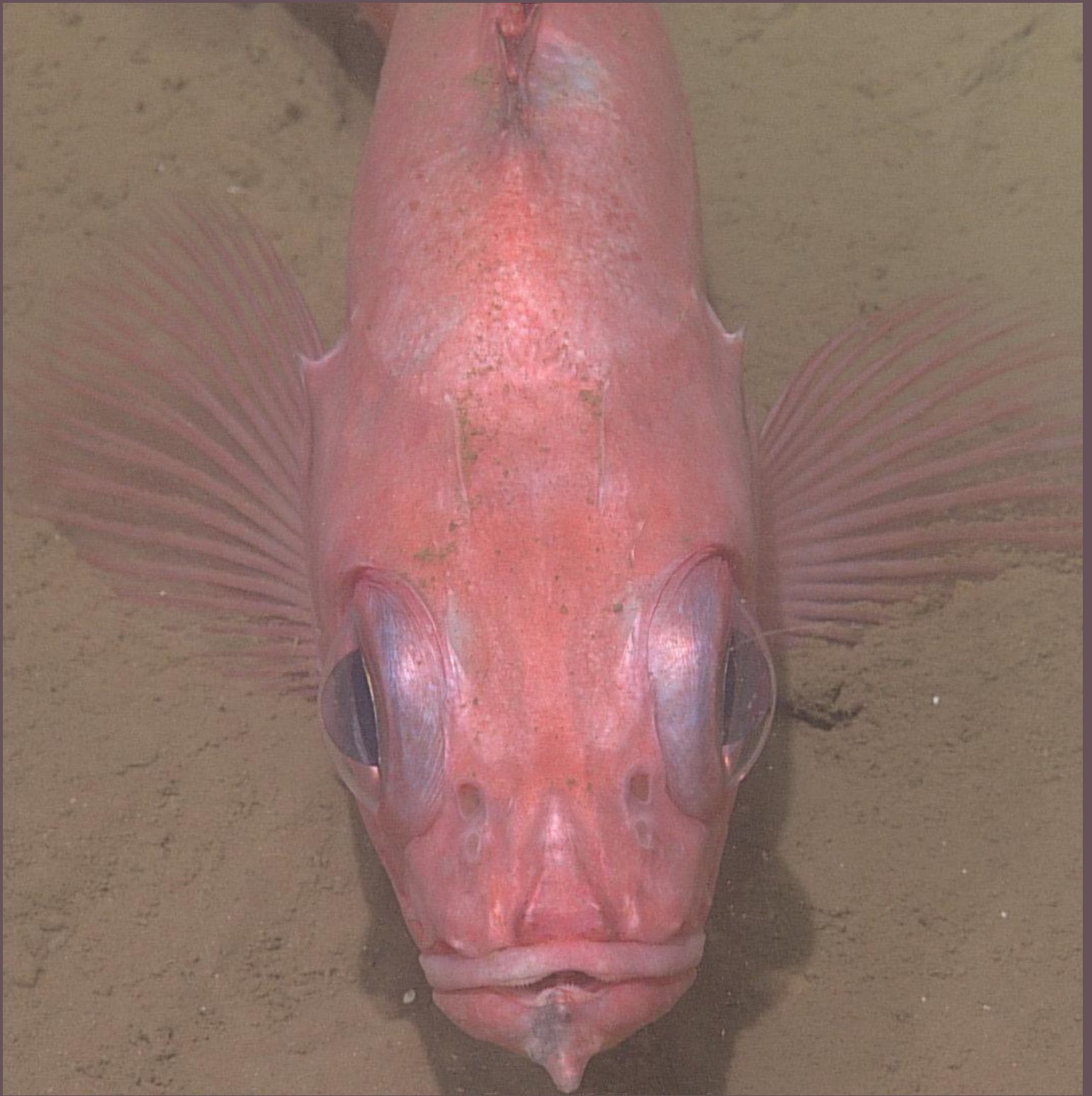


ID Note: Easily distinguished to Family but requires a physical specimen to identify further. ID to family Elpidiidae.

Remarks: Resembles the genus *Kolga*. Sea cucumbers of the family Elpidiidae are often referred to as “Sea pigs”. They can form large aggregations on the seabed (middle photo) and can often be seen swimming in the water column near the seafloor (bottom image).



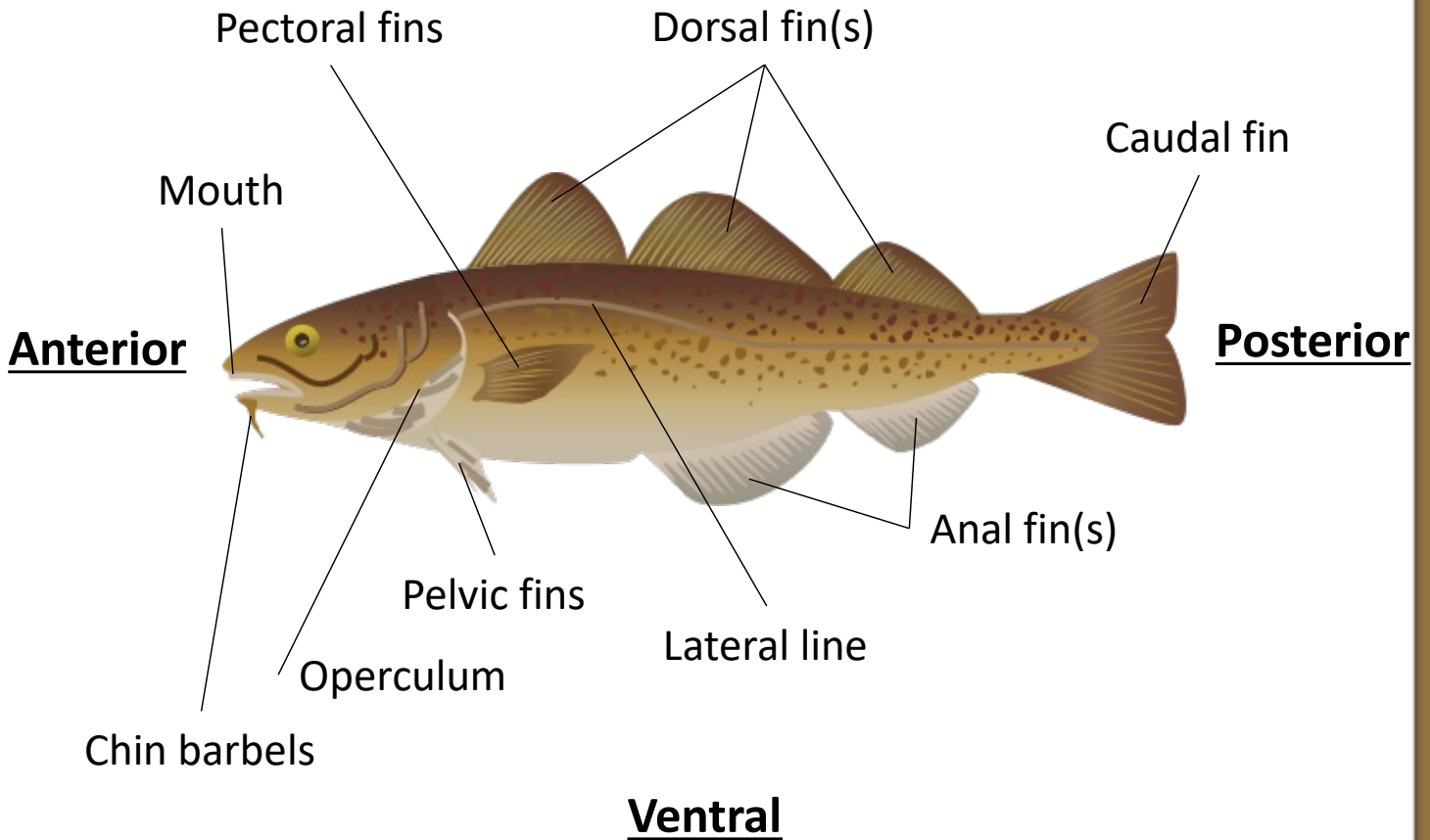
Sea pigs



Phylum Chordata

Morphology

Dorsal



Cod: Kim Kraeer, Lucy Van Essen-Fishman, Integration and Application Network (ian.umces.edu/media-library)

Fusiform



Atlantic cod
(*Gadus morhua*)

Elongate



Atlantic Wolffish
(*Anarhichas lupus*)

Anguilliform



Atlantic hagfish
(*Myxine limosa*)

Depressiform



Witch flounder
(*Glyptocephalus cynoglossus*)

Phylum Chordata

Class Actinopteri

Subclass Teleostei

Order Gadiformes

Family Gadidae

Pollachius virens (Linnaeus, 1758)

WoRMS AphiaID: 126441

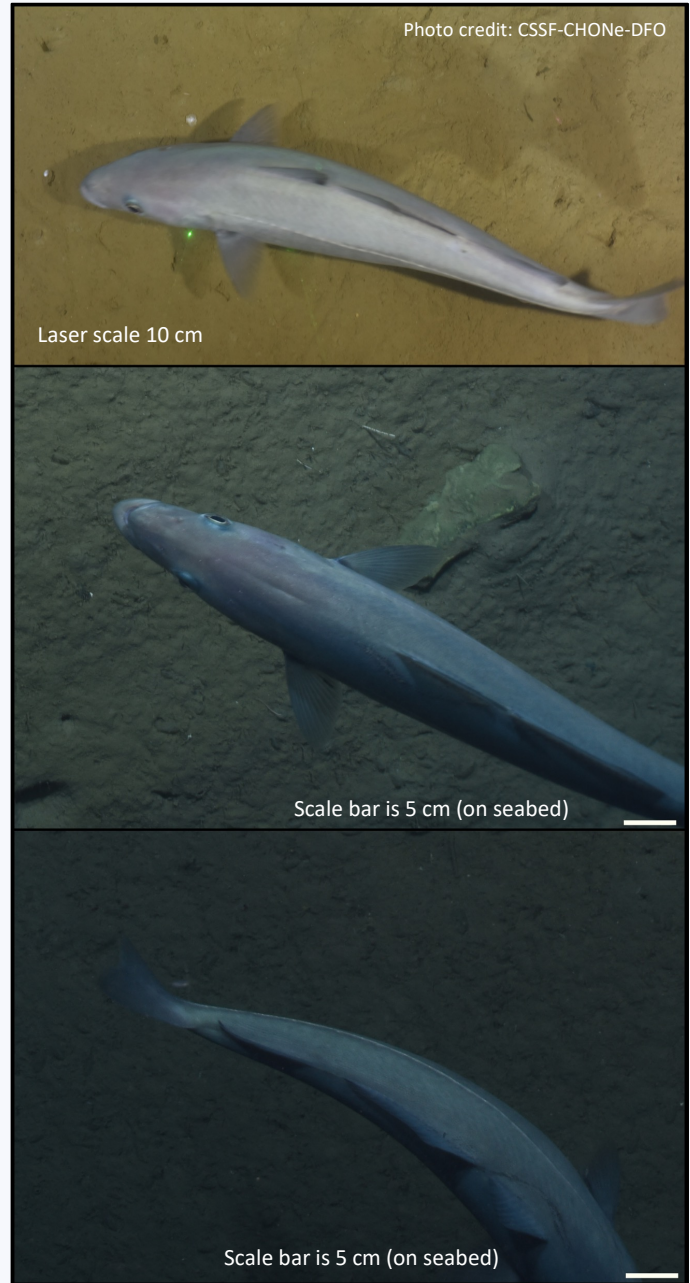
Description: Saithe (pollock) are uniform grey in colour with a slightly darker head where the lower jaw is longer than the upper jaw, and its mouth is slightly upturned. They have three dorsal fins, and a distinct, pale lateral line. Tail is slightly forked (visible in the shadow in the top photo).

Key characteristics: Uniform grey colour, three dorsal fins spaced close together, pale lateral line, lower jaw longer (Mecklenburg et al. 2018).



ID Note: When in doubt, ID to family Gadidae.

Remarks: In the Northwest Atlantic, mostly collected in the Gulf of Maine, along the Scotian Shelf, along the margins of the Laurentian channel, and in the Gulf of St. Lawrence, though have been found further south to Florida and off the east coast of Newfoundland and Labrador to the Labrador Sea.



Codfishes

Phylum Chordata

Class Actinopteri

Subclass Teleostei

Order Gadiformes

Family Gadidae

Gadus morhua Linnaeus, 1758

WoRMS AphiaID: 126436

Description: Atlantic cod have three dorsal fins, two anal fins and a squared caudal fin. Pelvic fins are anterior to the pectoral fins. Dark tan-olive body shaded dorsal-ventral with small dark spots. Has a distinct, pale lateral line.

Key characteristics: Three dorsal fins, spotty pattern, squared caudal fin, pronounced pale lateral line from gills to tail.



ID Note: Colour changes through life history stages; easy to distinguish as adults (>20 cm) but very difficult for juveniles.

Remarks: Historically, Atlantic cod have been one of the most commercially important fisheries in the region.



Photo credit: CSSF-CHONe-DFO

Codfishes

Phylum Chordata

Class Actinopteri

Subclass Teleostei

Order Gadiformes

Family Lotidae

Enchelyopus cimbrius (Linnaeus, 1766)

WoRMS AphiaID: 126450

Description: The Fourbeard rockling has an anguilliform body shape with large pectoral fins. Dorsal fin long (>2/3 body length) and usually dark with white tips. Anal fin also long (~1/2 body length); both are somewhat rounded near the caudal fin, which is rounded. Four barbels on mouth, although these are not usually visible in *in situ* images; long first ray on dorsal fin (Cohen et al. 1990).

Key characteristics: Coffee brown-grey body with white fin borders and dark spots (Mecklenburg et al. 2018).



Rocklings



ID Note: Easy to distinguish.

Phylum Chordata

Class Actinopteri

Subclass Teleostei

Order Gadiformes

Family Macrouridae

Nezumia bairdii (Goode & Bean, 1877)

WoRMS AphiaID: 183289

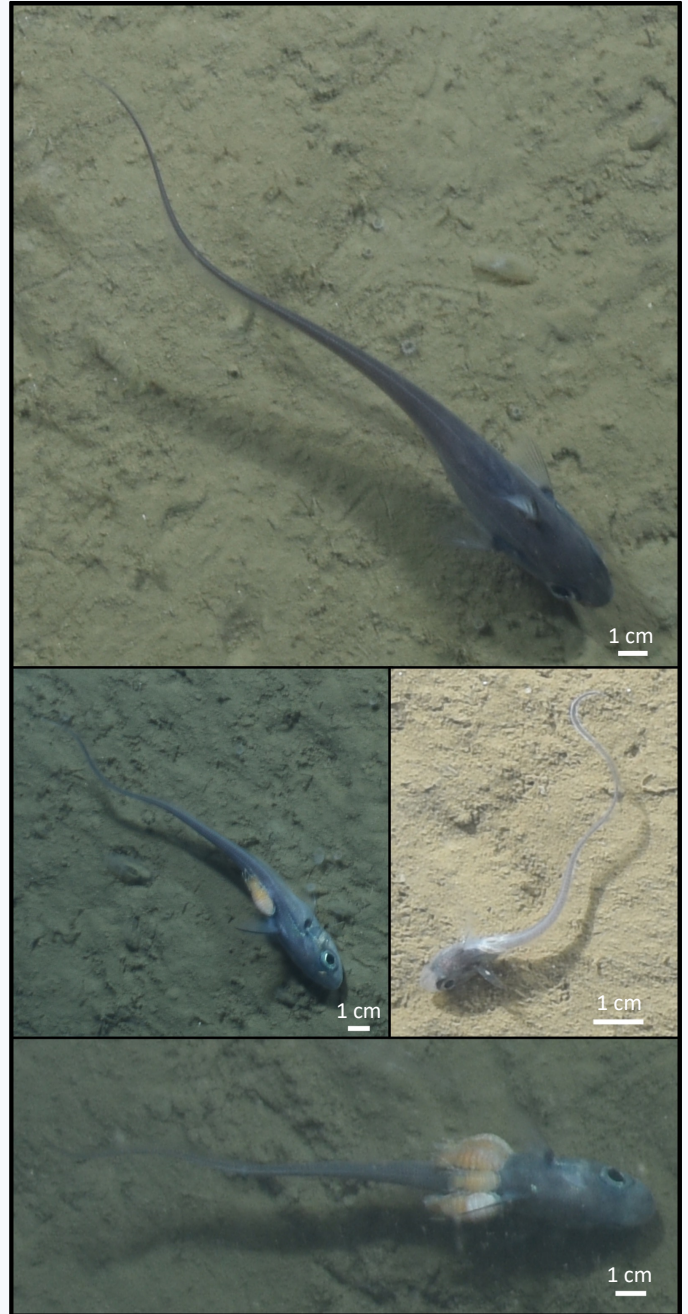
Description: Grenadiers have an elongated body that tapers strongly toward posterior end. One long spine on a short dorsal fin. Large eyes. The Marlin-spike grenadier has a distinctly darker and uniform colour compared to other grenadiers.

Key characteristics: Large eyes, pointed nose, rat-like long tail (Cohen et al. 1990).



ID Note: Easily distinguished.

Remarks: Other grenadiers in the region are silvery in colour (e.g. *Malacocephalus occidentalis* Goode & Bean, 1885); *N. bairdii* is easily distinguished by its darker colour. Often parasitized by *Systemus infelix* (Harger, 1880) (pp. 85).



Grenadiers

Phylum Chordata

Class Actinopteri

Subclass Teleostei

Order Gadiformes

Family Merlucciidae

Merluccius bilinearis (Mitchill, 1814)

WoRMS AphiaID: 158962

Description: Silver hakes are a brown-tan colour with dark bands on dorsal side and dark blotches on lateral sides. Two dorsal fins, first starts posterior to pectoral fins. Lower jaw slightly longer.

Key characteristics: Two dorsal fins, second one is long with a V near the tail but does not split into a third fin; 3 dark blotches on dorsal side.



ID Note: Difficult to distinguish if the dorsal fins are not visible. When in doubt, ID to order Gadiformes.

Remarks: Similar colouration to juvenile Atlantic cod (*Gadus morhua*).



HAKES

Phylum Chordata

Class Actinopteri

Subclass Teleostei

Order Gadiformes

Family Phycidae

Phycis chesteri Goode & Bean, 1878

WoRMS AphiaID: 158988

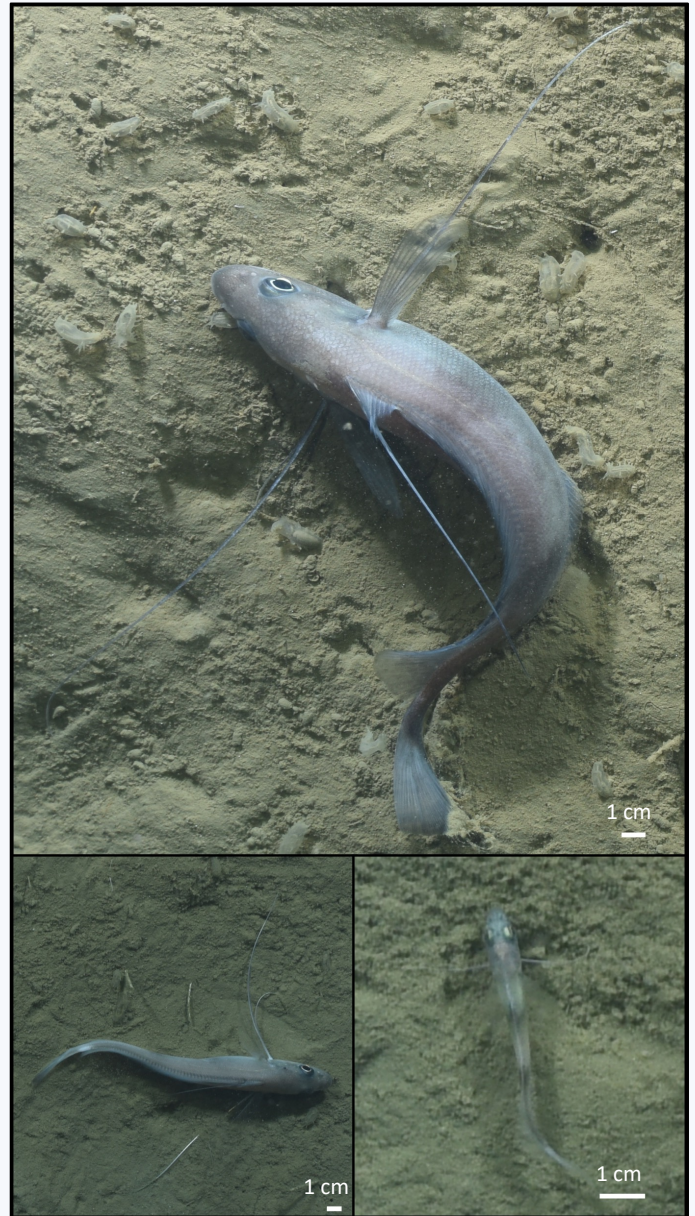
Description: Longfin hakes have a slender fusiform body shape with straight caudal fin. Long dorsal fin rounded at posterior end. Colour is pale tan on dorsal side with silvery-grey ventral side and fins. Long rays extend from pelvic fins and anterior dorsal fin.

Key characteristics: Very long rays on pelvic fins (> TL) and a single long dorsal ray (Cohen et al. 1990).



ID Note: Easily distinguishable if long rays are visible. When in doubt, ID to family Phycidae.

Remarks: When long rays cannot be seen, could be mistaken for other hakes, such as *Urophycis tenuis* (Mitchill, 1814; pp.132, this guide).



Hakes

Phylum Chordata

Class Actinopteri

Subclass Teleostei

Order Gadiformes

Family Phycidae

Urophycis tenuis (Mitchill, 1814)

WoRMS AphiaID: 126504

Description: White hakes have a fusiform body shape with straight caudal fin. Two dorsal fins, first is short (<width of pectoral fins) with a long first ray, second is long and slightly rounded at posterior end. Anal fin long (~1/2 body length). Pelvic fins anterior to pectorals and are modified to be long, but thicker and shorter than *Phycis chesteri*. Uniform brown-tan body colour with blotches, though colour is variable (Cohen et al. 1990).

Key characteristics: Somewhat similar to *Phycis chesteri* (pp. 131), but body is larger and pelvic rays < TL.



ID Note: Easily distinguishable.

Remarks: White hake in the Atlantic and Northern Gulf of St. Lawrence are listed as "Threatened" by COSEWIC (COSEWIC, 2013).



HAKES

Phylum Chordata

Class Actinopteri

Subclass Teleostei

Order Lophiformes

Family Lophiidae

Lophius americanus Valenciennes, 1837

WoRMS AphiaID: 159184

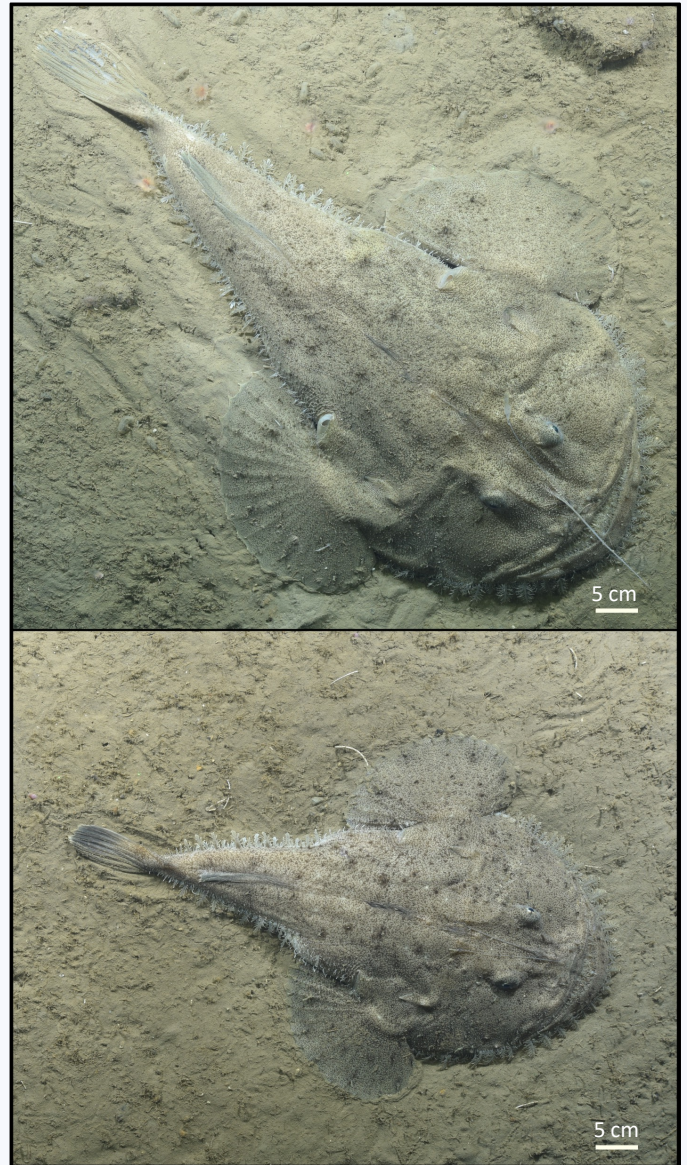
Description: Monkfish have a depressiform body shape tapering to a rounded caudal fin. Large pectoral fins, mouth oriented to point up. Head is about half of total length. Body margin is frilled. Two long modified spines on the head used for luring prey. Tan coloured with small dark spots.

Key characteristics: Flattened body shape, presence of lure (Robbins et al. 1986; Nozères, 2018).



ID Note: Easily distinguishable.

Remarks: Can grow very large (60-100 cm), however recent evidence from fisheries-independent survey data suggests decrease in average body size from 71 cm to 37.19 cm between 1963 and 2018 (0.61 cm/year) in the Northwest Atlantic (Charbonneau et al. 2020).



Monkfish

Phylum Chordata

Class Actinopteri

Subclass Teleostei

Order Lophiformes

Family Ogcocephalidae

Dibranchus atlanticus Peters, 1876

WoRMS AphiaID: 126558

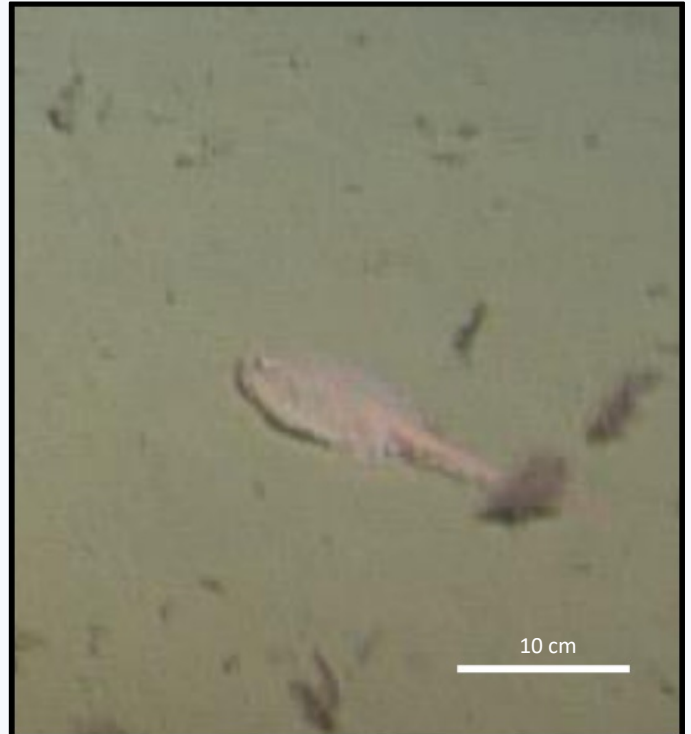
Description: Batfish have a depressiform body shape tapering to a rounded caudal fin. Mouth oriented to point up. Head is about half of total length. Body covered in tubercles.

Key characteristics: Flattened body shape, covered in tubercles



ID Note: Easily distinguishable.

Remarks: *D. atlanticus* occurs above 800-1000 m, while the closely related *D. tremendus* is found in deeper water (Bradbury, 1999). Considerably smaller than *Lophius americanus*, reaching a max total length of 39.4 cm (Scott & Scott, 1988).



Batfish

Phylum Chordata

Class Actinopteri

Subclass Teleostei

Order Pleuronectiformes

Family Pleuronectidae

Glyptocephalus cynoglossus (Linnaeus, 1758)

WoRMS AphiaID: 127136

Description: Witch flounders have a depressiform body shape with rounded caudal fin. Both eyes on right side of head (key characteristic of Pleuronectidae), head and mouth are small. Lateral line makes a gradual arch around pectoral fin.

Key characteristics: Tan-greyish-brown colour, occasionally with faded blotches. Top-side pectoral fin is dark with a white border near the tip, other fins are also dark (Whitehead et al. 1984; Mecklenburg et al. 2018).



ID Note: Easily distinguishable, though sometimes buried. When in doubt, ID to family Pleuronectidae.

Remarks: Very common in the region. Several species of flatfish inhabit the Laurentian Channel and surrounding region, but the dark pectoral fin of the witch flounder is distinctive.



Right-eyed flatfish

Phylum Chordata

Class Actinopteri

Subclass Teleostei

Order Pleuronectiformes

Family Pleuronectidae

Hippoglossus hippoglossus (Linnaeus, 1758)

WoRMS AphiaID: 127138

Description: Atlantic halibut have a depressiform body shape with large head, mouth, and dorsal and anal fins. Body colour is olive-grey-brown and blotchy. Dark blotches also on dorsal and anal fins. Arched lateral line. Concave tail.

Key characteristics: Massive size, with large head, mouth, and fins; Arched lateral line and concave tail (Mecklenburg et al. 2018).



ID Note: Easily distinguishable.

Remarks: In the Laurentian Channel, this species could be confused with the Greenland halibut (*Reinhardtius hippoglossoides*, Walbaum, 1792). *Hippoglossus hippoglossus* is distinguishable by its arched lateral line, triangular-diamond-shaped body, and mottled brown colour, compared to the straight lateral line, less-triangular, and uniformly dark grey colour of *R. hippoglossoides*.



Right-eyed flatfish

Phylum Chordata

Class Actinopteri

Subclass Teleostei

Order Perciformes

Family Sebastidae

Sebastes spp. Cuvier, 1829

WoRMS AphiaID: 126175

identificationQualifier: spp. indet.

Description: Redfish have a fusiform body shape and a large head and wide mouth. Has a row of short dorsal spines followed by a dorsal fin. Caudal fin slightly concave, pelvic fins slightly posterior to pectorals. A combination of light and dark orange and white blotches; colour varies.

Key characteristics: Reddish-orange and white with dorsal spines (Nozères, 2018).



ID Note: Genus is easily distinguished, but a physical specimen is required to identify to species. ID to genus *Sebastes*.

Remarks: Three species of *Sebastes* have been documented in the Laurentian Channel and the region: *S. mentella*, *S. fasciatus*, and *S. norvegicus* (COSEWIC, 2010). Ecologically, there is some separation by depth (*S. norvegicus* and *S. fasciatus* are shallower, *S. mentella* is deeper). Morphologically, the golden redfish (*S. norvegicus*) is larger, more orange (not blotchy-red) and lacks a chin beak. The beaked redfishes (*S. fasciatus*, *S. mentella*) are distinguished by genetics (Senay et al. 2022). May also be mistaken for the Blackbelly rosefish, *Helicolenus dactylopterus* (Delaroche, 1809), although they are uncommon in the area and can be distinguished by a dark cheek, marbled red- 136 white blotches, and more golden like eye.



Redfish

Phylum Chordata

Class Actinopteri

Subclass Teleostei

Order Perciformes

Family Anarhichadidae

Anarhichas lupus Linnaeus, 1758

WoRMS AphiaID: 126758

Description: Atlantic Wolffish have an anguilliform body shape with large head and pectoral fins. Long dorsal and anal fins, separate rounded caudal fin. Body colour greyish-green to reddish-brown or black with dark bands.

Key characteristics: Body usually with several vertical dark bands, short snout (Nozères, 2018).



ID Note: Easily confused with eelpouts (Zoarcidae) that have longer snout and dorsal and anal fins that are continuous to the tail.

Remarks: The Atlantic Wolffish is listed as a “Species of Special Concern” under Canada’s Species At Risk Act (SARA). Two related species, the Northern Wolffish (*Anarhichas denticulatus*) and the Spotted Wolffish (*Anarhichas minor*) also occur in the Laurentian Channel and are both listed as “Threatened” under SARA (Fisheries and Oceans Canada, 2018). The presence of SARA-listed species in the Laurentian Channel contributed to the designation of the Marine Protected Area in 2019, and *A. denticulatus* is listed as one of the conservation objectives for the MPA.



Wolffishes

Phylum Chordata

Class Actinopteri

Subclass Teleostei

Order Perciformes

Family Cryptacanthoididae

Cryptacanthodes maculatus Storer, 1839

WoRMS AphiaID: 159675

Description: Wrymouths have an anguilliform body shape with small head and pectoral fins. Long dorsal and anal fins, separate rounded caudal fin. Large up-turned mouth. Body colour tan dorsal side with many spots, lighter ventral side.

Key characteristics: Distinct lateral body spotting and upturned head.



ID Note: Easily distinguished from wolffish and eelpouts by the head.

Remarks: Wrymouths are burrow-dwellers; large holes nearby may be visible.

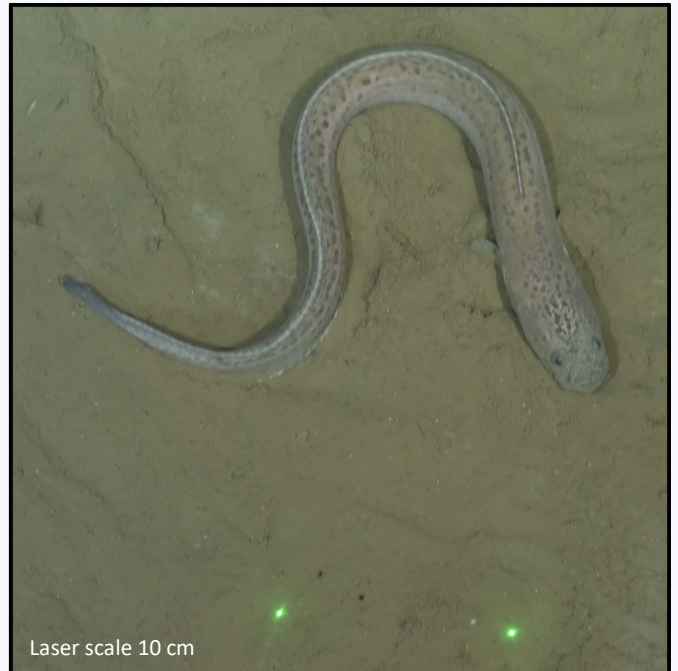


Photo credit: CSSF-CHONe-DFO

Wrymouths

Phylum Chordata

Class Actinopteri

Subclass Teleostei

Order Perciformes

Family Liparidae

Paraliparis Goode & Bean, 1896

WoRMS AphiaID: 234519

identificationQualifier: sp. indet.

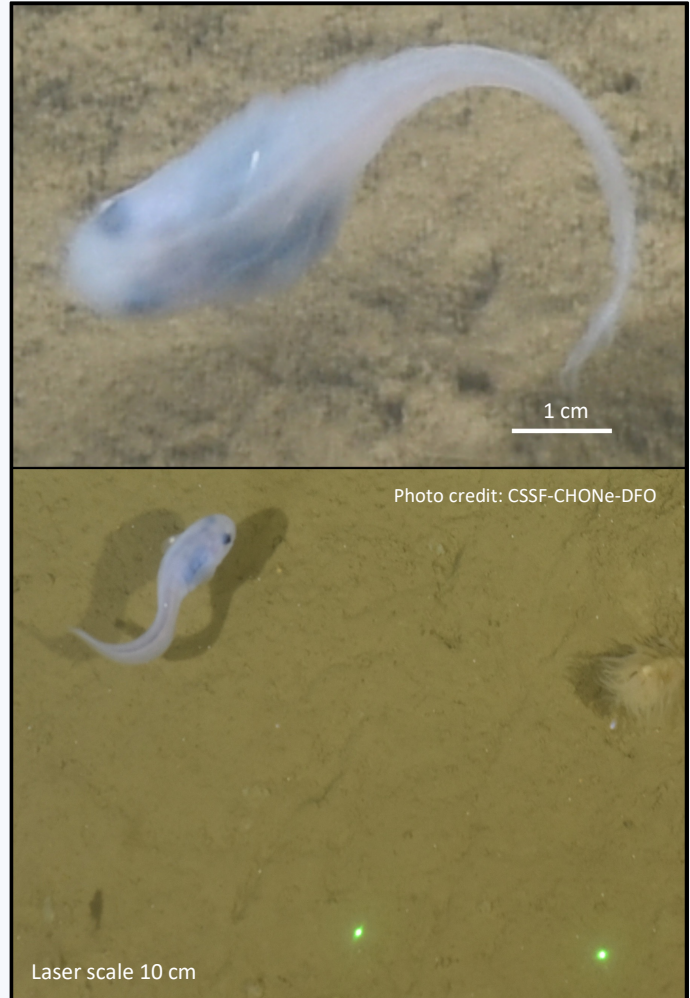
Description: Snailfish generally have an elongate, tadpole-shaped body (Whitehead et al. 1984). A single, continuous dorsal and anal fin confluent with caudal fin, but caudal fin still extends beyond where these fins meet (Whitehead et al. 1984). Translucent and unpigmented body, with dark eyes and dark internal features near the anterior end.

Key characteristics: Translucent tadpole-shaped body with dark eyes and internal structures visible.



ID Note: Easy to distinguish to genus. Although unlikely, ID to species is possible if a clear view of the snout and back are obtained (see Remarks). When in doubt, ID to genus.

Remarks: Snailfish genera can be distinguished by the presence/absence of a ventral sucker, number of nostril pairs, and location of the anus relative to the anal fins and suction disk (Mecklenburg et al. 2018). These characters are generally not visible in *in situ* imagery. Both the Blacksnout snailfish, *Paraliparis copei* Goode & Bean 1896 (black lips) and Lowfin snailfish *P. calidus* Cohen 1968 (black band on dorsal side) have been identified from physical specimens in the Laurentian Channel and surrounding area (Clark & Emberley 2021).



Snailfishes

Phylum Chordata

Class Actinopteri

Subclass Teleostei

Order Perciformes

Family Zoarcidae

Lycenchelys verrillii (Goode & Bean, 1877)

WoRMS AphiaID: 159258

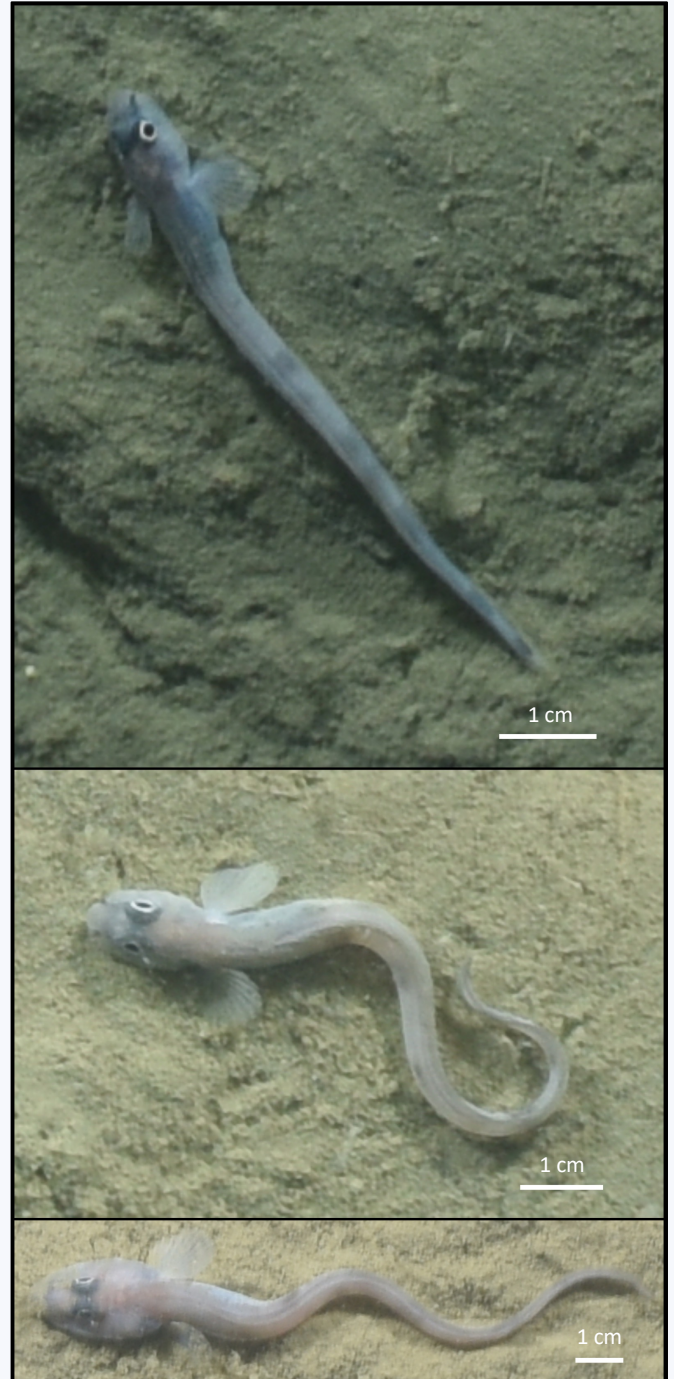
Description: Wolf eelpouts have an anguilliform body shape with small head. Long anal and dorsal fin tapering to a tail at the posterior end. Dark circles around eyes and between them. Also has dark bands on body.

Key characteristics: Small-bodied, long and broad head (for males), with very long tail and dark checker pattern (bands) on pale tan sides.



ID Note: When in doubt, ID to family Zoarcidae.

Remarks: Common in the Laurentian Channel. Easily mistaken for small specimens of *Lycodes vahlii* (short-tailed), which is also common in the region.



Eelpouts

Phylum Chordata

Class Actinopteri

Subclass Teleostei

Order Perciformes

Family Zoarcidae

Lycodes esmarkii Collett, 1875

WoRMS AphiaID: 127103

Description: The Greater eelpout has an anguilliform body shape with large head and eyes. Long anal and dorsal fin taper into a tail at the posterior end. Dark body with light-white bands or marks on the lateral sides of the body.

Key characteristics: Large size, dark body with several white ring-like marks/bands.



ID Note: Easily distinguished if pale bands are visible. When in doubt, ID to family Zoarcidae.

Remarks: In the Laurentian Channel, could be mistaken for *Lycodes terraenovae* Collett, 1896, a similar species that is dark but with no white markings.



Eel
pouts

Phylum Chordata

Class Actinopteri

Subclass Teleostei

Order Perciformes

Family Zoarcidae

Lycodes Reinhardt, 1831

WoRMS AphiaID: 126104

identificationQualifier: sp. indet.

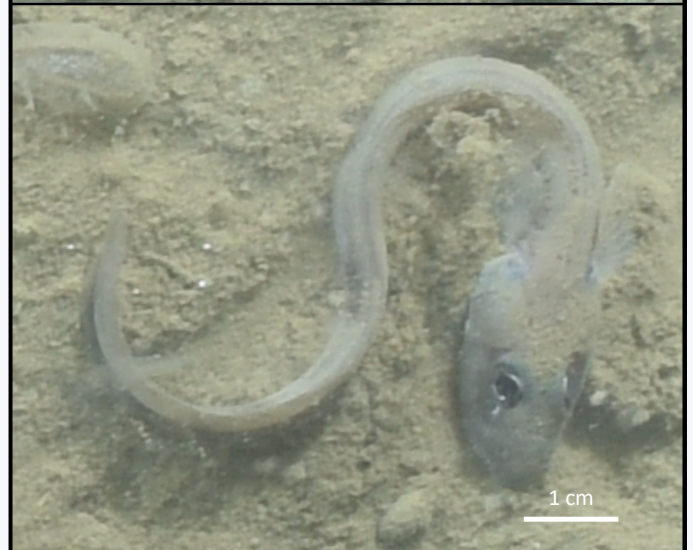
Description: Eelpouts have an anguilliform body shape with dorsal and anal fins tapering to meet at the tail. Tan coloured dorsal side and white ventral side. Resting on seafloor in soft-sediments.

Key characteristics: Medium-sized, with long head, eel-like body with continuous fins to tail.



ID Note: Species of this genus are difficult to distinguish from imagery. When in doubt, code to genus *Lycodes* if large, ID to family Zoarcidae if small.

Remarks: Several similar species have been documented in the Laurentian Channel, including *Lycodes esmarkii* (dark with pale rings, pp. 142), *Lycodes vahlii* (pale with dark bands), and *Lycenchelys verrillii* (smaller, longer tail, pp. 141).



Eelpouts

Phylum Chordata

Class Actinopteri

Subclass Teleostei

Order Perciformes

Family Zoarcidae

Melanostigma atlanticum Koefoed, 1952

WoRMS AphiaID: 127120

Description: Atlantic soft pouts have large eyes, and a white-translucent, gelatinous body that is slender throughout, tapering toward the posterior end (Nozères, 2018). They have long dorsal and anal fins that meet at the tail; lack pelvic fins.

Key characteristics: Slender white-translucent body, dark lips/snout.



ID Note: When in doubt, ID to family Zoarcidae.

Remarks: Common in the Laurentian Channel. May be mistaken for translucent snail fish in the genus *Paraliparis* (deeper body, black belly; Nozères, 2018).



Eel pouts

Phylum Chordata

Class Elasmobranchii

Subclass Neoselachii

Order Squaliformes

Family Etmopteridae

Centroscyllium fabricii (Reinhardt, 1825)

WoRMS AphiaID: 105906

Description: Black Dogfish have an elongate body shape with anguilliform (undulating) swimming pattern. Two dorsal fins, each with a short spine at the anterior end. Anal fin lacking. Heterocercal tail (asymmetrical tail, top longer than bottom).

Key characteristics: Adults are uniformly black; fins of juveniles have white margins.



ID Note: Regionally distinct, easy to identify.

Remarks: Only two species of small sharks are abundant in the Laurentian Channel: *Squalus acanthias* and *Centroscyllium fabricii*. *S. acanthias* also has two dorsal spines and no anal fin, but it can be distinguished from *C. fabricii* by its light pinkish-grey body. *C. fabricii* is listed as a conservation objective for the Laurentian Channel MPA; the shallow portion of the MPA protects potential nursery areas.



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Phylum Chordata

Class Elasmobranchii

Subclass Neoselachii

Order Squaliformes

Family Squalidae

Squalus acanthias Linnaeus, 1758

WoRMS AphiaID: 105923

Description: Spiny Dogfish have an elongate body shape with anguilliform (undulating) swimming pattern. Two dorsal fins, each with a short spine at the anterior end. Anal fin lacking. Heterocercal tail (asymmetrical tail, top longer than bottom).

Key characteristics: White dots along lateral side of body.



ID Note: Regionally distinct, easy to identify.

Remarks: Only two species of small sharks are abundant in the Laurentian Channel: *Squalus acanthias* and *Centroscyllium fabricii* (pp. 145). *S. acanthias* also has two dorsal spines and no anal fin, but it can be distinguished from *C. fabricii* by its light pinkish-grey body.



Photo credit: CSSF-CHONe-DFO

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Phylum Chordata

Class Elasmobranchii

Subclass Neoselachii

Order Rajiformes

Family Rajidae

Amblyraja radiata (Donovan, 1808)

WoRMS AphiaID: 105865

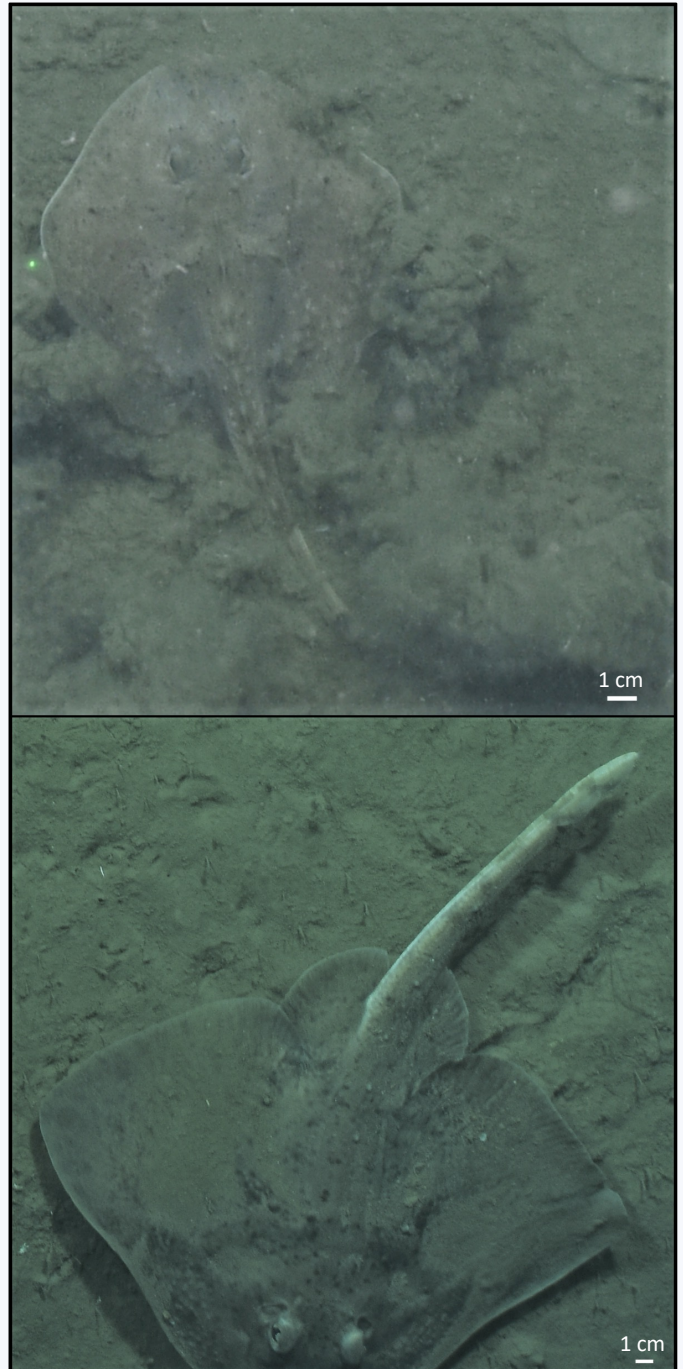
Description: Thorny skates have multiple rows of dorsal spines from eyes to start of pelvic fins; a single row of spines along the middorsal section of the tail. Thick tail with short fins. Colour varies, usually brownish-grey dorsal surface with small black blotches scattered across body. Juvenile (bottom) lighter with more blotches.

Key characteristics: In large specimens, a single median row of large spines along back to the tail.



ID Note: Spines can be difficult to see in imagery. When in doubt, ID to family Rajidae.

Remarks: May be confused with *Leucoraja ocellata* (several tail spine rows), *Rajella fyllae* (white patch on snout), *Malacoraja senta* (tail spines only when small, pp. 148), or *Bathyraja spinicauda* (triangular nose, diamond-shaped body).



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Phylum Chordata

Class Elasmobranchii

Subclass Neoselachii

Order Rajiformes

Family Rajidae

Malacoraja senta (Garman, 1885)

WoRMS AphiaID: 158554

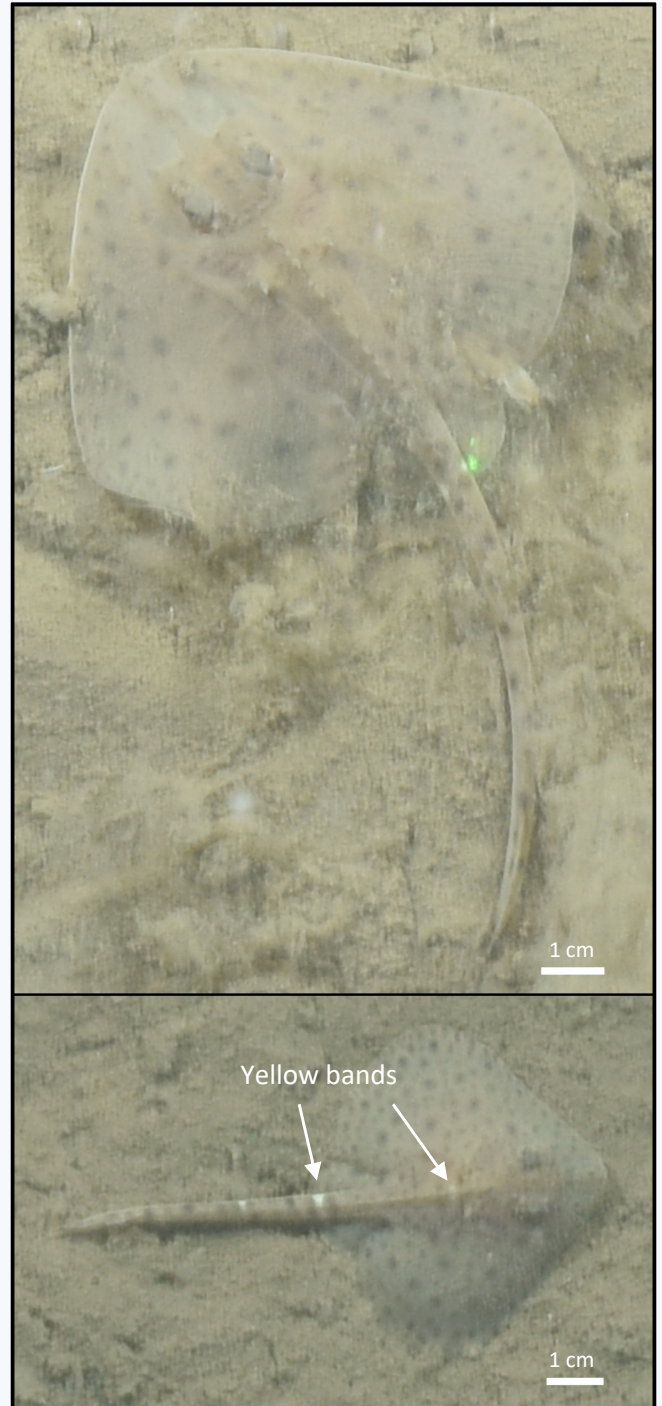
Description: Smooth skates have large spines on middorsal body behind eyes, and a single row of large spines from eyes to pelvic fins. Spines on the tail are lost with age. Nose is pointed, body margin is slightly rounded from nose to fin. Juveniles (bottom) have two light bands on their tail. Tan body colour with many black spots.

Key characteristics: No spines on large ones, tail spines on small ones but with yellow banding on tail.



ID Note: Spines can be difficult to see in imagery. When in doubt, ID to family Rajidae.

Remarks: May be confused with *Amblyraja radiata* (single row of spines from back to tail; pp. 147). Protecting *M. senta* is listed as a conservation objective for the Laurentian Channel MPA.



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Phylum Chordata

Class Myxini

Order Myxiniformes

Family Myxinidae

Myxine limosa Girard, 1859

WoRMS AphiaID: 271309

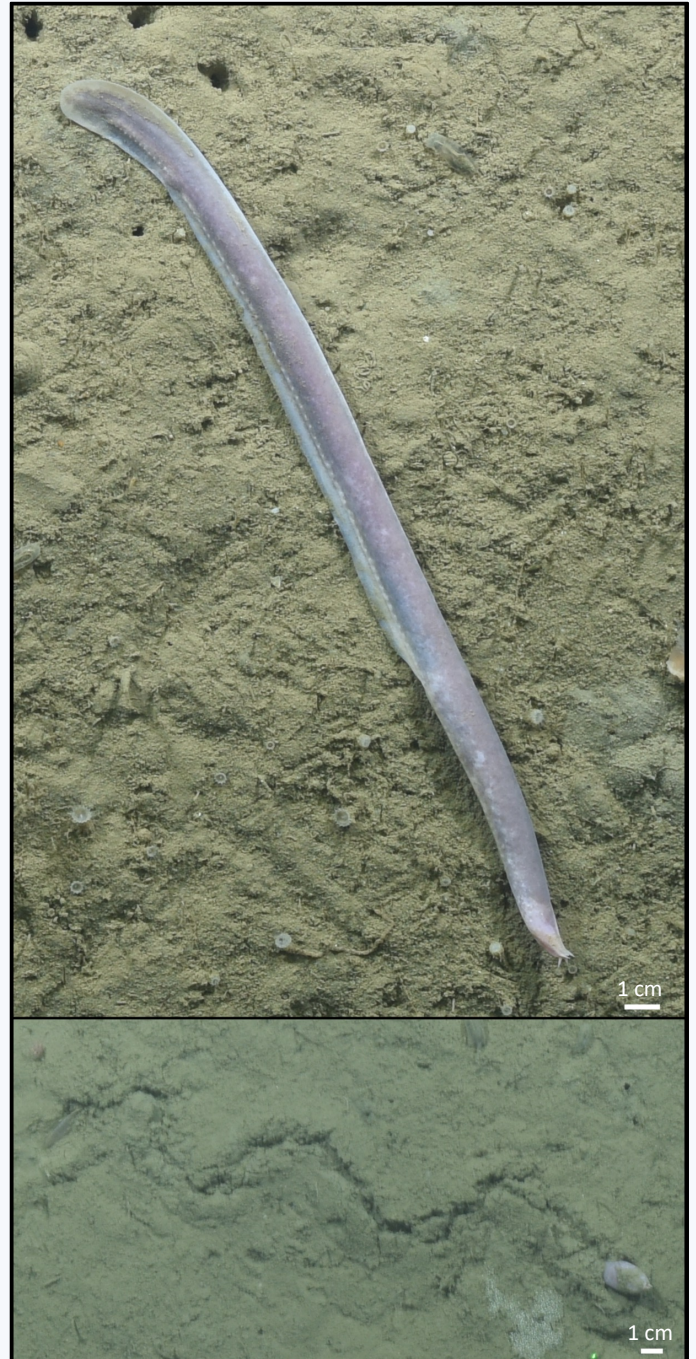
Description: Hagfish have long slender body that lacks pelvic, pectoral, anal, and dorsal fins. Head lacks eyes and a jaw, though have four pairs of barbels around the mouth. Body is pinkish-purple on dorsal side with white underside.

Key characteristics: No jaws, eyes, or fins; long pinkish-purple body.



ID Note: Easily distinguishable.

Remarks: *Myxine limosa* is the only species of hagfish in the Northwest Atlantic, but it has long been misreported as the Northeast Atlantic species, *M. glutinosa*. It may be observed fully exposed, but usually seen partially buried or only the head is visible (pictured bottom).



H a g f i s h

Phylum Chordata

Superclass Actinopteri

Subclass Teleostei

Order Undetermined

Family Undetermined

Teleostei sp.1 Linnaeus, 1758

WoRMS AphiaID: 293496

identificationQualifier: ord. indet.

Description: Long, narrow silver bodies with a small head where the lower jaw is longer than the upper jaw. Often observed with their head buried in soft substrates, drifting near the seabed, or darting erratically. Fin structure rarely visible *in situ*.

Key characteristics: Body elongate, slender and silver.



ID Note: A physical specimen is required to distinguish taxa; ID to subclass Teleostei.

Remarks: May represent several taxa (Boulard et al. 2023). Closely resembles a barracudina, such as *Arctozenus risso* (Bonaparte, 1840; slender, silver, drifts near the seafloor, has adipose fin and short dorsal fin). Also resembles one of three species of sand lance (*Ammodytes*) known in the region (*A. americanus*, *A. dubius*, or *A. hexapterus*). Sand lance are commonly found nearshore in shallow waters, and offshore to 274 m depth; previously reported occurrence in deeper water are related to specimens found in stomach contents and were dismissed as inaccurate depth records.

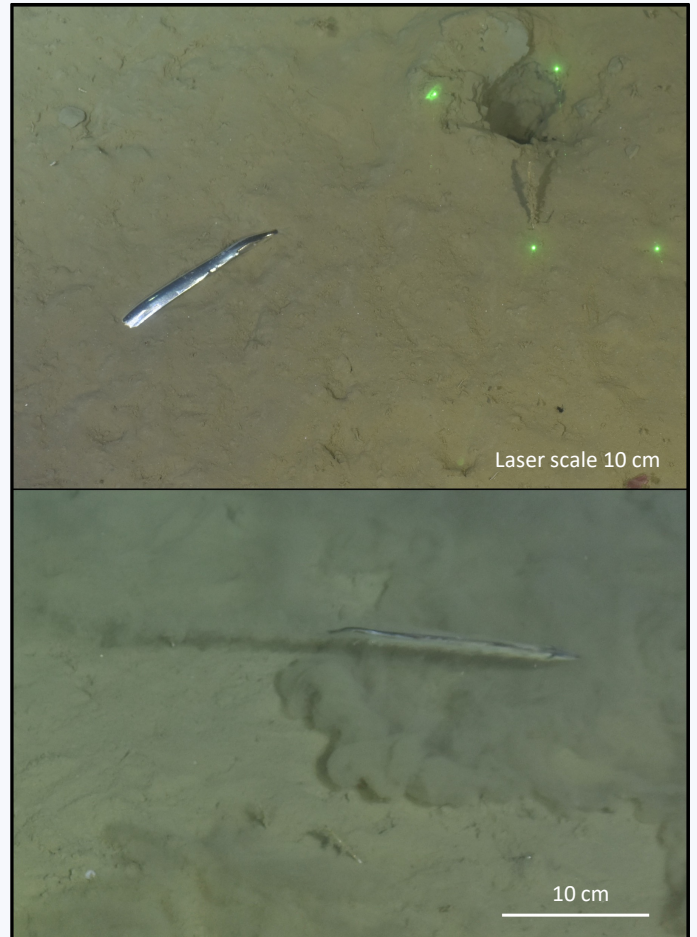


Photo credit: CSSF-CHONe-DFO

Sand lance-like

Phylum Chordata

Superclass Actinopteri

Order Undetermined

Family Undetermined

Actinopteri

WoRMS AphiaID: 843664

identificationQualifier: cla. indet.

Description: Small and slender silver fish, elongate and laterally compressed body. Fast moving, often blurry when recorded.



ID Note: No distinctive features are visible to identify to a lower rank, ID to superclass Actinopteri.

Remarks: Resembles the Atlantic argentine (*Argentina silus* (Ascanius, 1775)) or Atlantic herring (*Clupea harengus* Linnaeus, 1758), both of which occur in the Laurentian Channel.



Photo credit: CSSF-CHONe-DFO

F I S H

Phylum Chordata

Class Ascidiacea

Subclass Undetermined

Order Undetermined

Family Undetermined

Ascidiacea sp.1

WoRMS AphiaID: 1839

verbatimIdentification: Ascidiacea (solitary)

Description: Small, round and inflated body with two openings (siphons). Colour is translucent gray. Found singly attached to hard surfaces.

Key characteristics: Spherical with two openings on hard substrate.



ID Note: Ascidians are taxonomically difficult and lower ranks cannot be reliably distinguished from imagery. ID to class Ascidiacea.

Remarks: Resembles *Ascidia* sp., a genus of solitary ascidians commonly found in the region. There are at least three species in this genus documented in the Gulf of St. Lawrence (*A. callosa*, *A. obliqua*, and *A. prunum*) and a fourth (*A. dijmphniana*) present in Labrador and the eastern Canadian Arctic (Mah et al. 2016).



Tunicates

1 cm

Phylum Chordata

Class Ascidiacea

Subclass Undetermined

Order Undetermined

Family Undetermined

Ascidiacea sp.2

WoRMS AphiaID: 1839

verbatimIdentification: Ascidiacea (colonial)

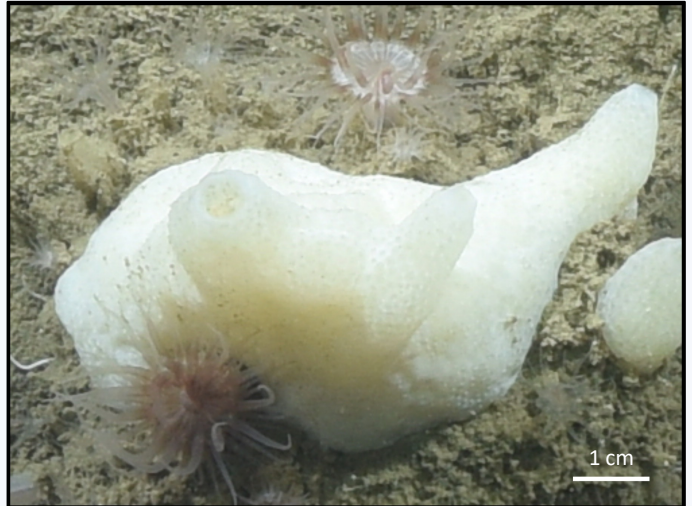
Description: White to translucent body with several small openings. Size and number of openings vary; many individual or small colonies usually observed together. Found attached to hard substrate.

Key characteristics: White-translucent, many siphons/openings.



ID Note: ID to class Ascidiacea.

Remarks: Colonial tunicates tend to spread over hard substrates and smother other taxa. Ascidians are taxonomically difficult and lower ranks cannot be reliably distinguished from imagery. These images likely represent different ascidian species.



Tunicates

Phylum Chordata

Class Ascidiacea

Subclass Undetermined

Order Undetermined

Family Undetermined

Ascidiacea sp.3

WoRMS AphiaID: 1839

identificationRemarks: ord. stet.

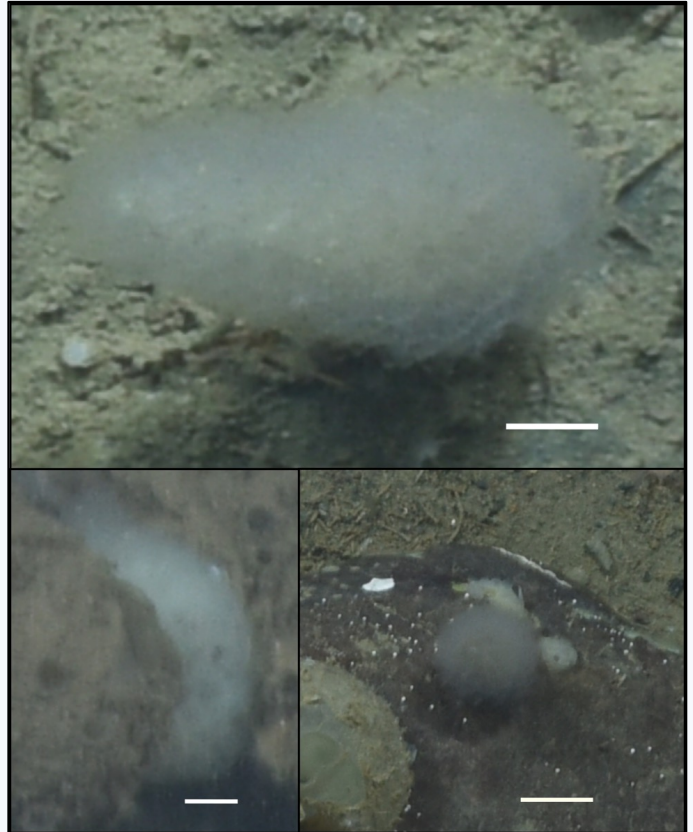
Description: Semi-transparent, grey and hazy clump. Somewhat spherical or oblong, with grainy or gelatinous-looking texture. Found on hard substrates.

Key characteristics: Grey, grainy clump.



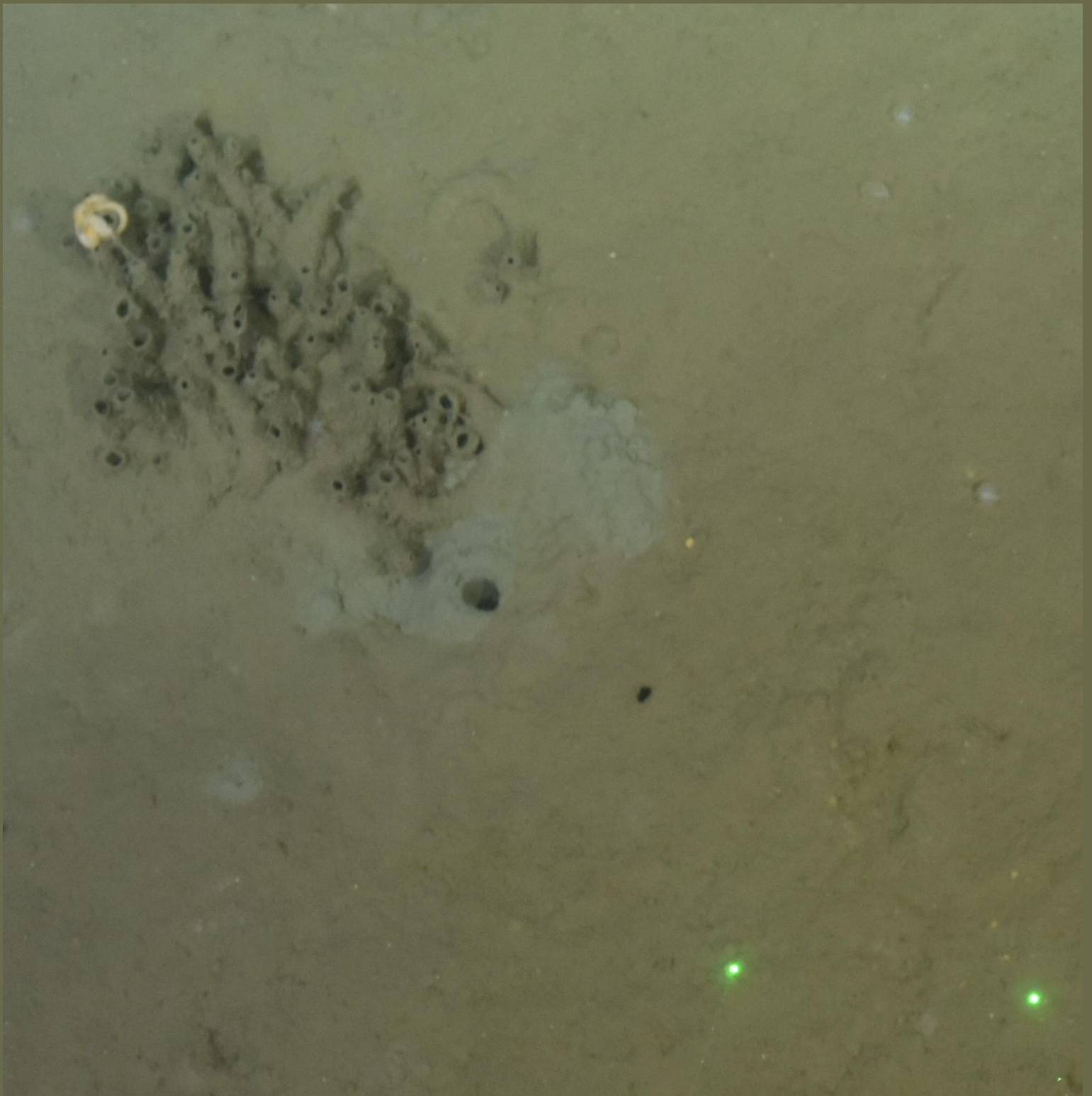
ID Note: ID to class Ascidiacea.

Remarks: These colonial ascidians likely belong to the genus *Alpidium* ([iNaturalist](#)). Grey clumps such as those pictured are uncommon in images taken from the Laurentian Channel MPA. A physical specimen is likely required to identify further.



Tunicates

1 cm



Other

Phylum Annelida

Class Polychaeta

Subclass Errantia

Order Phyllodocida

Family Aphroditidae

Aphrodita hastata Moore, 1905

WoRMS AphiaID: 157181

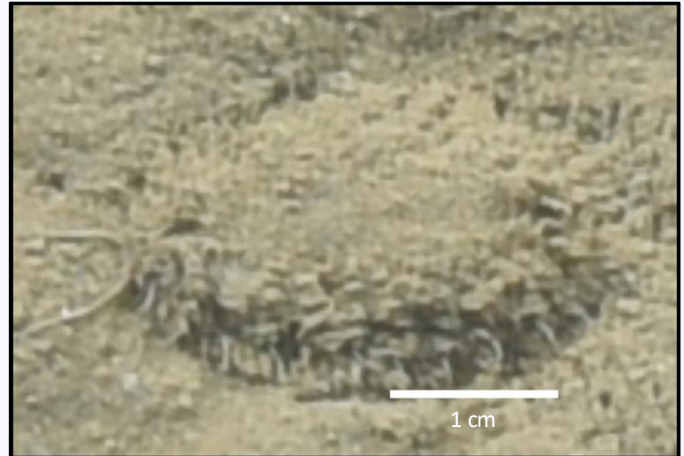
Description: Small (< 3 cm), short and broad body covered in setae (looks hairy). Two long palps may be visible at the anterior end.

Key characteristics: Small, hairy body that is dorsoventrally flattened.



ID Note: Easily distinguished.

Remarks: Currently the only member of the genus *Aphrodita* reported in the Laurentian Channel. However, it is believed to be in need of taxonomic review and may in fact be several species. A smaller and less 'furry' (no hairs on back) scaled worm species *Laetmonice filicornis* Kinberg, 1856 also occurs in the region.



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Phylum Annelida

Class Polychaeta

Subclass Sedentaria

Order Sabellida

Family Serpulidae

Serpulidae Rafinesque, 1815

WoRMS AphiaID: 988

identificationQualifier: gen. indet.

Description: Translucent branchial plumes extending from a smooth white calcified tube that is attached to rock. Tube coils irregularly, individual tubes may touch but are easily distinguished from one another (Pollock, 1998).

Key characteristics: White tubes with translucent branchial crown; irregular coils.



ID Note: ID to family Serpulidae.

Remarks: Feather duster worms (O. Sabellida) have a crown of branchial plumes for filter feeding. Serpulid feather dusters secrete a calcareous tube that coils irregularly, compared to F. Spirorbidae, which coil regularly (Pollock, 1998). They live attached to hard substrates. However, they require physical specimens to see key characters under a microscope, precluding further identification from *in situ* imagery.



Feather-duster worms

Phylum Bryozoa

Class Undetermined

Subclass Undetermined

Order Undetermined

Family Undetermined

Bryozoa

WoRMS AphiaID: 146142

identificationQualifier: cla. stet.

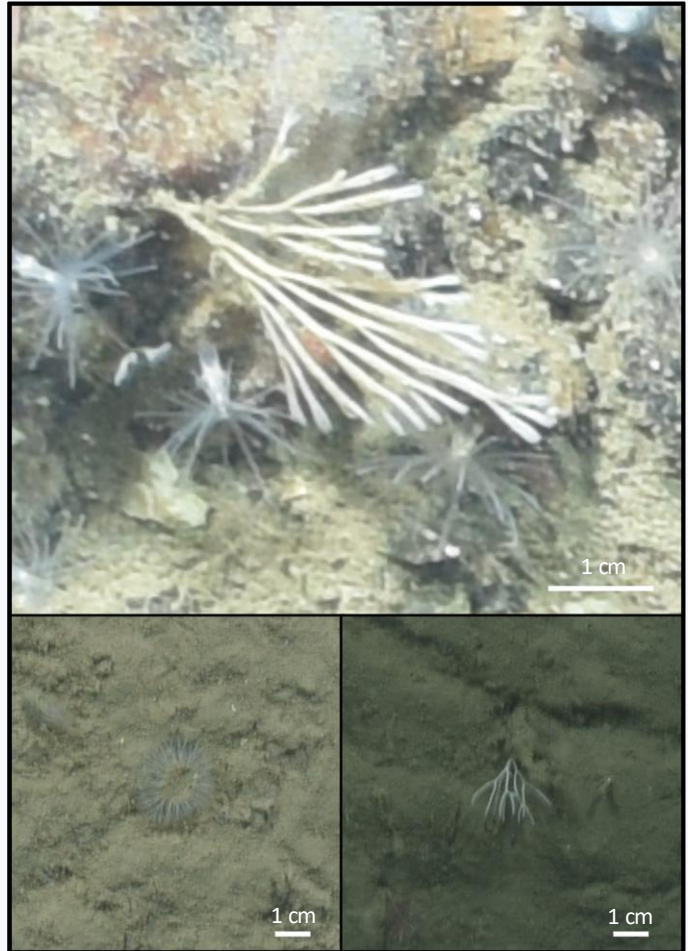
Description: White mineralized exoskeleton that is upright and branching. A single point of attachment at the base anchors the colony to hard substrates.

Key characteristics: Fine, white-grey exoskeleton, flattened branches.



ID Note: ID to phylum Bryozoa.

Remarks: Bryozoans consist of many microscopic zooids that serve different functions; colony shape varies widely depending on the types of zooids, their growth pattern (budding), and the mineral composition of their excreted exoskeleton (Ruppert et al. 2004). They are taxonomically difficult and lower ranks cannot be reliably distinguished from imagery. These images likely represent several species of Bryozoa.



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Phylum Nemertea

Class Undetermined

Subclass Undetermined

Order Undetermined

Family Undetermined

Nemertea sp.1

WoRMS AphiaID: 1839

identificationQualifier: cla. indet.

Description: Reddish-brown worm with darker head, body tapering toward posterior end.

Key characteristics: Reddish-brown and worm-like.



ID Note: Code to phylum Nemertea.

Remarks: Perhaps *Amphiporous* sp. or *Cerebratulus* sp. Phylum Nemertea was only observed once in the Campod imagery. A physical specimen is required to identify further.



R i b b o n
w o r m s

Phylum Undetermined

Class Undetermined

Subclass Undetermined

Order Undetermined

Family Undetermined

Undetermined sp.1

WoRMS AphiaID: Undetermined

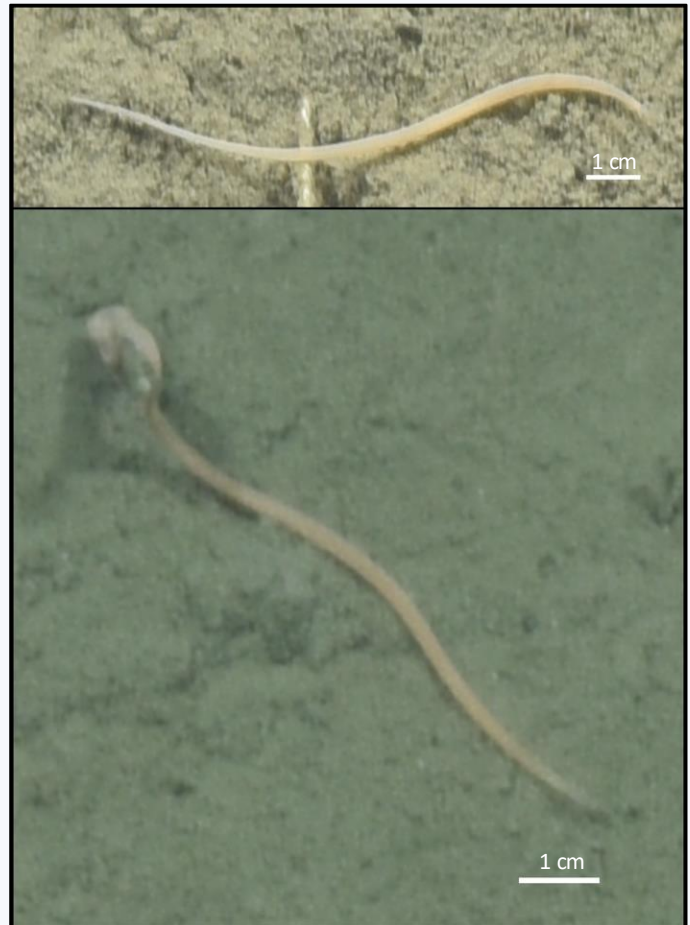
Description: Pale orange, elongate worm that appears to be smooth (no segments visible).

Key characteristics: Long, slender worm with pale orange-white colouration. Observed on soft-sediment.



ID Note: Further identification pending.

Remarks: This worm is very rare in images collected from the Laurentian Channel MPA. A physical specimen may be required to identify further.



Undetermined

Phylum Undetermined

Class Undetermined

Subclass Undetermined

Order Undetermined

Family Undetermined

Undetermined sp.2

WoRMS AphiaID: Undetermined

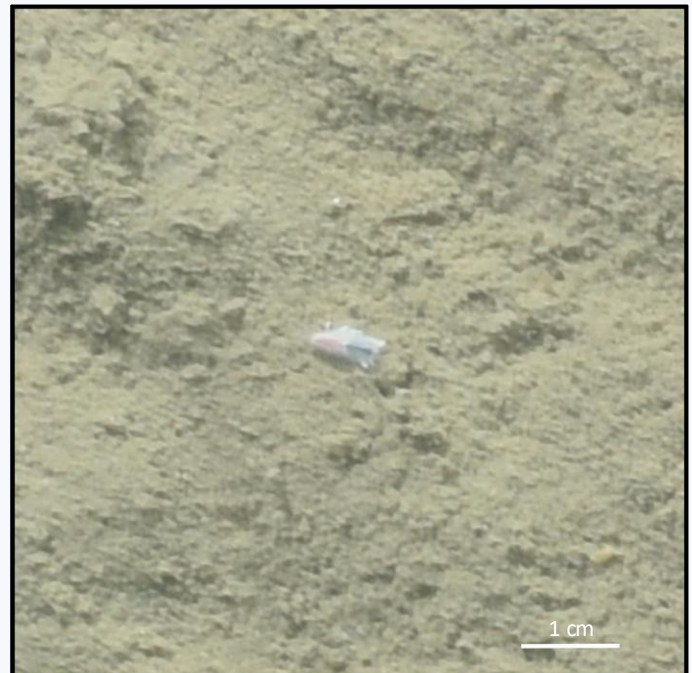
Description: Very small (<1 cm), red and blue dorsal surface with white or translucent podia visible along lateral margin.

Key characteristics: Very small, red and blue colour with translucent to white lateral fringe.



ID Note: Further identification pending.

Remarks: This taxon is uncommon in the images collected from the Laurentian Channel MPA. May be of the order Amphipoda, or class Polychaeta. A physical specimen may be required to identify further.



Undetermined

Phylum Undetermined

Class Undetermined

Subclass Undetermined

Order Undetermined

Family Undetermined

Undetermined sp.3

WoRMS AphiaID: Undetermined

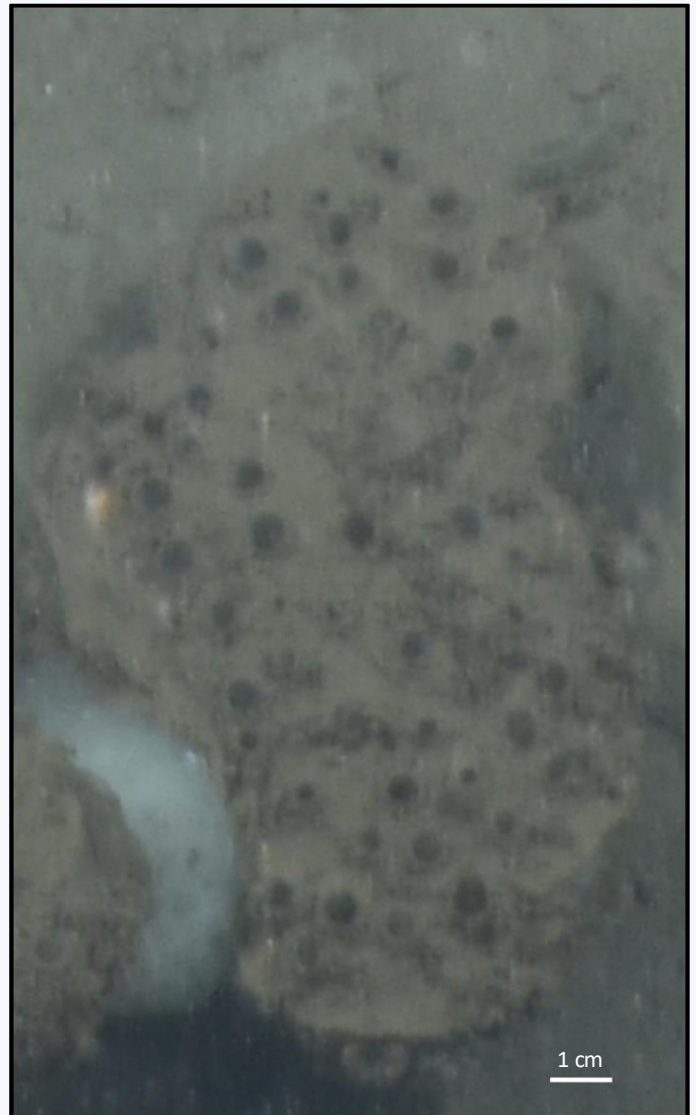
Description: Mud-covered shelf with many similar-sized pores (oscula?).

Key characteristics: Mud-covered shelf with many openings, found attached to hard substrates.



ID Note: Further identification pending.

Remarks: These are likely sponges, possibly a type of *Hymedesmia* or *Phorbas*. Only two of these specimens were observed in images examined for this guide collected from the Laurentian Channel MPA. A physical specimen is likely required to identify further.



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Phylum Undetermined

Class Undetermined

Subclass Undetermined

Order Undetermined

Family Undetermined

Undetermined sp.4

WoRMS AphiaID: Undetermined

Description: Small reddish-brown blob, may have polyps.



ID Note: Might be an octocoral, but image too blurry to see any distinguishing characteristics. Do not identify.

Remarks: Although imagery and video technology has come a long way, image quality may still be suboptimal in some *in situ* images. In the case where an image is too blurry to visually confirm any diagnostic characteristics, it is better not to assign a taxonomic identification than to guess at an incorrect one. Here, we call this specimen "Undetermined sp.4"



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Phylum Undetermined

Class Undetermined

Subclass Undetermined

Order Undetermined

Family Undetermined

Algal detritus

WoRMS AphiaID: Undetermined

Description: Brown algae with bifurcate branching pattern. Holdfast may be fused to a pebble or entire alga may be drifting.

Key characteristics: Brown algal detritus.

ID Note: Further identification pending. Make sure to code as "debris" not as a normal organism in its habitat.

Remarks: Macroalgae detritus provides an important food source for deep-sea benthic detritivores and grazers, such as sea urchins and crustaceans (Moore et al., 2004).



Macroalgae

Phylum Undetermined

Class Undetermined

Subclass Undetermined

Order Undetermined

Family Undetermined

Anthropogenic debris

WoRMS AphiaID: Undetermined

Description: Crumpled trash.

Key characteristics: White, shredded with writing on the side.

Remarks: Human impacts on the ocean are far-reaching; anthropogenic pollution is only one of many examples of our footprint.



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5 ACKNOWLEDGEMENTS

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7 Appendix A Other resources

Table 3. Non-exhaustive list of image catalogues and taxonomic identification guides that may aid in the identification of physical specimens.

Guide	Citation
A Pictorial Guide to the Epibenthic Megafauna of Orphan Knoll (northwest Atlantic) Identified from In Situ Benthic Video Footage	Wudrick et al. 2020
A practical guide to the Marine Animals of Northeastern North America	Pollock 1998
Benthic Deepwater Animal Guide V3	NOAA
Coral, Sponge, and Other Vulnerable Marine Ecosystem Indicator Identification Guide, NAFO Area	Kenchington et al. 2015
Decapod Crustaceans of Newfoundland and Labrador and the Canadian Eastern Arctic	Squires 1996
Deep Sea ID v.1.2 A Field Guide to the Marine Life of the Deep Sea	Glover et al. 2015
Deep-sea species image catalogue	Howell et al. 2017
FathomNet	Katija et al. 2022
Invertebrate biodiversity and photo catalogue from the 2018 Northern and Striped shrimp stock assessment survey in Davis Strait, Hudson Strait and Northern Labrador coast	Lacasse et al. 2020
Marine Fishes of the Arctic Region Volume I	Mecklenburg et al. 2018
Marine Fishes of the Arctic Region Volume II	Mecklenburg et al. 2018
Marine Flora and Fauna of the Eastern United States Anthozoa: Actiniaria, Corallimorpharia, Ceriantharia, and Zoanthidea	Sebens 1998

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Guide	Citation
Marine Flora and Fauna of the Eastern United States Anthozoa: Mollusca	Vecchione et al. 1989

Table 4. Comparison of taxa and morphotaxa names used in recent publications from the Laurentian Channel Marine Protected Area in relation to this study. In some cases, multiple names were given to morphologically similar taxa, which were grouped into a single morphotaxon in this guide; these have been grouped together. Taxon names from other publications were included where the same taxon or morphotaxon was identified in this guide. de Mendonça and Metaxas 2024 is an updated list of morphotaxa names, which reflects recent changes in Octocorallia systematics *sensu* McFadden et al. 2023, and further consultation with taxonomic experts.

Command et al. 2024 (this study)	Boulard et al. 2023	de Mendonça and Metaxas 2021	de Mendonça and Metaxas 2024
Polymastiidae		Polymastiidae (F.) sp. 1	Polymastiidae (F.) sp. 1
Encrusting white		Porifera (P.) sp. 23	Porifera (P.) sp. 23
Round		Porifera (P.) sp. 3	Porifera (P.) sp. 3
White finger-like		Porifera (P.) sp. 21 Porifera (P.) sp. 24	Porifera (P.) sp. 21
<i>Stylocordyla borealis</i>		<i>Stylocordyla</i> sp. 1	<i>Stylocordyla</i> sp. 1
<i>Actinauge cristata</i>	<i>Actinoscyphia</i> sp.	<i>Actinoscyphia</i> sp. 1 <i>Actinoscyphia</i> sp. 2	<i>Actinaugae cristata</i>
<i>Actinostola callosa</i>		Actiniaria (O.) sp. 19	Actiniaria (O.) sp. 19
<i>Liponema multicornis</i>		<i>Liponema</i> sp. 1	<i>Liponema</i> sp. 1
Actiniaria sp.5	Cerianthid sp1	Actiniaria (O.) sp. 23	<i>Edwardsia</i> sp. 1
Actiniidae sp.1		Anthozoa (C.) sp. 5	Anthozoa (C.) sp. 5
Actiniaria sp.1		Actiniaria (O.) sp. 1 Actiniaria (O.) sp. 4 Actiniaria (O.) sp. 11 Actiniaria (O.) sp. 28	Actiniaria (O.) sp. 1
Actiniaria sp.3		Anthozoa (O.) sp. 25	Anthozoa (O.) sp. 25
		Anthozoa (O.) sp. 27	Anthozoa (O.) sp. 27
Ceriantharia sp.1	Actiniaria sp6	Cerianthidae (F.) sp.3 Cerianthidae (F.) sp. 1 Cerianthidae (F.) sp. 2	Cerianthidae (F.) sp.3 Cerianthidae (F.) sp. 1

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Command et al. 2024 (this study)	Boulard et al. 2023	de Mendonça and Metaxas 2021	de Mendonça and Metaxas 2024
Ceriantharia sp.2		Actiniaria (O.) sp. 32	Anthozoa (C.) sp. 6
<i>Flabellum (Ulocyathus) alabastrum</i>	<i>Flabellum</i> spp. Scleractinia sp1	<i>Flabellum alabastrum</i>	<i>Flabellum alabastrum</i>
		Anthozoa (C.) sp. 4	Anthozoa (C.) sp. 4
<i>Flabellum (Ulocyathus) macandrewi</i>		Hexacorallia (SC.) spp. Scleractinia (O.) spp.	Hexacorallia (SC.) spp.
<i>Flabellum (Ulocyathus) sp.</i>	Scleractinia sp4	Hexacorallia (SC.) spp. Scleractinia (O.) spp.	Hexacorallia (SC.) spp.
Zoantharia		Cnidaria (P.) sp. 3 Ascidiacea (C.) sp. 3	Cnidaria (P.) sp. 3
<i>Heteropolypus</i>		Alcyoniidae (F.) sp. 1	Anthomastinae (SF.) sp. 1
Malacalcyonacea sp.1	Nephtheidae sp.	Alcyoniidae (F.) sp. 2 <i>Gersemia</i> sp. 1	Malacalcyonacea (O.) spp.
<i>Anthoptilum</i>	<i>Anthoptilum</i> spp.	<i>Anthoptilum</i> spp. <i>Anthoptilum</i> sp. 1	<i>Anthoptilum</i> spp.
<i>Funiculina quadrangularis</i>		Pennatulacea (O.) sp. 5	Pennatuloidea (SF.) sp. 5
<i>Kophobelemnon</i>	<i>Kophobelemnon</i> sp.	<i>Kophobelemnon</i> spp. <i>Kophobelemnon</i> sp. 2	<i>Kophobelemnon</i> spp.
<i>Protoptilum carpenterii</i>		<i>Protoptilum</i> sp. 1	<i>Protoptilum</i> sp. 1
<i>Pennatula aculeata</i>	<i>Pennatula</i> spp.	<i>Pennatula</i> sp. 2 <i>Pennatula</i> sp. 3	<i>Pennatula</i> sp. 2
<i>Ptilella grandis</i>		<i>Ptilella grandis</i>	<i>Ptilella grandis</i>
Pennatuloidea sp.1		Pennatulacea (O.) sp. 8 Unidentified sp. 216	Pennatuloidea (SF.) sp. 8 Pennatuloidea (SF.) sp. 9

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Command et al. 2024 (this study)	Boulard et al. 2023	de Mendonça and Metaxas 2021	de Mendonça and Metaxas 2024
Hexacorallia sp.1		Anthozoa (O.) sp. 24 Anthozoa (O.) sp. 25	Anthozoa (O.) sp. 24 Anthozoa (O.) sp. 25
<i>Munidopsis curvirostra</i>		Anomura (InfraO.) sp. 3	Anomura (InfraO.) sp. 3
<i>Lithodes maja</i>		<i>Lithodes maja</i>	<i>Lithodes maja</i>
<i>Pagurus</i>		Paguroidea (SF.) sp. 1	Paguroidea (SF.) sp. 1
<i>Scaphander punctostriatus</i>		Mollusca (P.) sp. 1	Mollusca (P.) sp. 1
<i>Pseudarchaster parellii</i>		Goniasteridae (F.) sp.1 Asteroidea (C.) sp 1	Asteroidea (C.) sp 1
<i>Psilaster andromeda</i>		Asteroidea (C.) sp. 4	Asteroidea (C.) sp. 4
<i>Ctenodiscus crispatus</i>		<i>Pteraster</i> sp. 1	Asteroidea (C.) sp. 20
<i>Henricia</i>		Asteroidea (C.) sp. 15	Asteroidea (C.) sp. 15
<i>Ceramaster granularis</i>		Asteroidea (C.) sp. 13	Asteroidea (C.) sp. 13
<i>Poraniomorpha (Poraniomorpha) hispida</i>		Asteroidea (C.) sp. 17	Asteroidea (C.) sp. 17
<i>Diplopteraster multiples</i>		Asteroidea (C.) sp.10	Asteroidea (C.) sp.10
<i>Ophiura sarsii</i>		Ophiuroidea (C.) sp. 4	Ophiuroidea (C.) sp. 4
<i>Amphiura</i>		Ophiuroidea (C.) sp. 7	Ophiuroidea (C.) sp. 7
Ophiuroidea sp.1		Ophiuroidea (C.) sp. 6	Ophiuroidea (C.) sp. 6
Elpidiidae		Holothuroidea (C.) sp. 1	Elpidiidae (F.) spp.
<i>Pollachius virens</i>	<i>Pollachius virens</i>		
<i>Gadus morhua</i>	<i>Gadus morhua</i>		
<i>Enchelyopus cimbrius</i>	<i>Enchelyopus cimbrius</i>		
<i>Nezumia bairdii</i>	<i>Nezumia bairdii</i>		

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Command et al. 2024 (this study)	Boulard et al. 2023	de Mendonça and Metaxas 2021	de Mendonça and Metaxas 2024
<i>Merluccius bilinearis</i>	<i>Merluccius bilinearis</i>		
<i>Phycis chesteri</i>	<i>Phycis chesteri</i>		
<i>Urophycis tenuis</i>	<i>Urophycis tenuis</i>		
<i>Lophius americanus</i>	<i>Lophius americanus</i>		
<i>Dibranchus atlanticus</i>	<i>Dibranchus indet. sp.</i>		
<i>Glyptocephalus cynoglossus</i>	<i>Glyptocephalus cynoglossus</i>		
<i>Hippoglossus hippoglossus</i>	<i>Hippoglossus hippoglossus</i>		
<i>Sebastes</i>	<i>Sebastes spp.</i>		
<i>Cryptacanthus maculata</i>	<i>Cryptacanthus maculata</i>		
<i>Paraliparis</i>	<i>Liparidae sp.</i>		
<i>Lycenchelys verrillii</i>	<i>Lycenchelys vyerrillii</i>		
<i>Centroscyllium fabricii</i>	<i>Centroscyllium fabricii</i>		
<i>Amblyraja radiata</i>	Rajidae spp.		
<i>Malacoraja senta</i>	Rajidae spp.		
<i>Myxine limosa</i>	<i>Myxine glutinosa</i>		
Teleostei sp1	Teleostei sp1		
Actinopteri	Actinopterygii sp. indet. Unidentified fish <i>Argentina silus</i>		
Ascidiacea sp.1		Ascidiacea (C.) sp. 3	Ascidiacea (C.) sp. 3
Ascidiacea sp.2		Porifera (P.) sp. 6	Ascidiacea (C.) sp. 5

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Command et al. 2024 (this study)	Boulard et al. 2023	de Mendonça and Metaxas 2021	de Mendonça and Metaxas 2024
Serpulidae		Nemertea (P.) sp. 2	Serpulidae (F.) sp.1
Bryozoa		Bryozoa (P.) sp. 1	
Nemertea		Nemertea (P.) sp. 1	
Undetermined sp.1		Unidentified sp. 107	Unidentified sp. 107
