

# **SGaan Kinghlas-Bowie Seamount Marine Protected Area Species Inventory: Algae, Cnidaria, Bryozoa and Porifera**

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SGAAN KINGHLAS-BOWIE SEAMOUNT MARINE PROTECTED AREA SPECIES  
INVENTORY: ALGAE, CNIDARIA, BRYOZOA AND PORIFERA

By

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## ABSTRACT

Gauthier, M., Curtis, J.M.R., Gale, K.S.P., Archer, S.K., and Haggarty, D.R. 2018.  
SGaan Kinghlas-Bowie Seamount Marine Protected Area Species Inventory: Algae,  
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Bowie Seamount or SGaan Kinghlas (the traditional Haida First Nation name) is an isolated biodiversity hotspot located within the Exclusive Economic Zone (EEZ) waters of Canada in the Northeast Pacific Ocean. In 2008, Bowie seamount was protected in the SGaan Kinghlas-Bowie Seamount Marine Protected Area (SK-B MPA) under Canada's Oceans Act. In order to characterize the biodiversity of Bowie Seamount, Fisheries and Oceans Canada (DFO) led three expeditions (DFO Science Cruise Number PAC 2000-031, PAC 2011-062, PAC 2015-048) to survey the benthic communities using submersible in 2000; a Remotely Operated Vehicle (ROV) and an Autonomous Underwater Vehicle (AUV) in 2011; and a tow-camera system in 2015. The 2000 survey was focused on benthic rockfishes, but collected information on habitat and invertebrates as well. A submersible was used to survey between 53-306 m. Longline surveys also occurred to look at fish health and biological traits. The 2011 survey aimed to document the habitats and species on SK-B Seamount and collected benthic imagery using a ROV (28-272 m) and an AUV (180-933 m). The main objective of the 2015 survey was to document benthic biodiversity in the deeper (> 200 m) areas of Bowie and Hodgkins Seamounts. In total, 17 transects were completed between 249 m and 1246 m depth. In total, 66 taxa from the Algae, Bryozoa, Cnidaria, and Porifera phyla were observed in the SK-B MPA using the visual surveys. Here we provide a complete list of species observed on the three surveys, and documented in previous reports. We document each record with photographs, whether the species has been previously observed at SK-B MPA, the surveys and depth range the observations were made from, and additional notes. Two companion reports document other invertebrate and chordate species observed in the SK-B MPA.

## RÉSUMÉ

Gauthier, M., Curtis, J.M.R., Gale, K. et Haggarty, D. 2018. Inventaire des espèces dans la zone de protection SGaan Kinghlas- Mont Sous Marin Bowie: Algues, Bryozoa, Cnidaria et Porifera. Rapp. tech. can. sci. halieut. aquat. 3196: vi + 56 p.

Le mont sous-marin Bowie ou SGaan Kinghlas (nom traditionnel de la Première Nation Haïda) constitue une zone prioritaire (pour la biodiversité) isolée, située dans les eaux de la zone économique exclusive (ZEE) du Canada, dans le nord-est de l'océan Pacifique. En 2008, la protection du mont sous-marin Bowie a été officialisée par la désignation de la zone de protection marine du mont sous-marin Bowie (SGaan Kinghlas) [ZPM SK-B] en vertu de la Loi sur les océans du Canada. Afin de caractériser la biodiversité du mont sous-marin Bowie, Pêches et Océans Canada (MPO) a dirigé trois expéditions (campagnes scientifiques du MPO nos PAC 2000-031, PAC 2011-062, PAC 2015-048) ayant pour objectif l'étude des communautés benthiques, au moyen d'un engin sous-marin, en 2000; d'un véhicule sous-marin téléguidé (VTG) et d'un un véhicule sous-marin autonome (VSA), en 2011; et d'une caméra sous-marine, en 2015. La campagne scientifique de 2000 était axée sur les sébastes (benthiques), mais elle a aussi permis de recueillir des renseignements quant à l'habitat et aux invertébrés. Un engin sous-marin a été utilisé pour effectuer des levés à une profondeur de 53 à 306 m. Des relevés à la palangre ont également été réalisés afin d'observer l'état de santé des poissons ainsi que leurs caractéristiques biologiques. L'étude de 2011 visait la documentation des habitats et des espèces présentes au mont sous-marin SK-B et a permis de recueillir de l'imagerie benthique au moyen d'un VTG (28 à 272 m) et d'un VSA (180 à 933 m). Le principal objectif de la campagne réalisée en 2015 était de documenter la biodiversité benthique des zones plus profondes (> 200 m) des monts sous-marins Bowie et Hodgkins. Au total, des relevés ont été effectués dans 17 transects à une profondeur allant de 249 à 1246 m. Au total, les relevés visuels ont permis d'observer 66 taxons de phylums d'algues, de bryozoaires, de cnidaires et de spongiaires dans la ZPM SK-B. Dans ce document, nous fournissons une liste complète des espèces observées lors des trois relevés et documentées dans les rapports précédents. Nous documentons chaque fiche à l'aide de photographies et indiquons si les espèces ont été observées précédemment dans la ZPM SK-B; nous mentionnons les relevés et les tranches d'eau pour lesquelles des observations ont été effectuées, et offrons des remarques supplémentaires. Deux rapports complémentaires documentent les autres espèces invertébrées et cordées observées dans la ZPM SK-B.

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## INTRODUCTION

Bowie Seamount or SGaan Kinghlas (SK-B Seamount) is located within Canada's national waters. SGaan Kinghlas is the traditional Haida First Nation name. It is situated 180 km west of Haida Gwaii in Canada's Exclusive Economic Zone (200 nautical miles from the coast). Bowie Seamount is at the southern end of a seamount chain extending from the Aleutian trench in Alaska. It is shallower and younger than other seamounts within the chain. Although the seamount reaches depths of 3,000 metres, its peak is estimated to be 24 metres below the water's surface. Also, it is estimated to be less than a million years old (Canessa et al. 2003). In 2008, SK-B Seamount, along with two deeper, adjacent seamounts, Hodgkins and Davidson Seamounts, were protected under Canada's Oceans Act in the SGaan Kinghlas-Bowie Seamount Marine Protected Area (SK-B MPA) (Figure 1, Figure 2). These seamounts were targeted for protection in an MPA because seamounts are areas of higher biodiversity compared to surrounding ocean. This increased biodiversity is a consequence of nutrient rich waters being brought to the surface through upwelling as well as providing physical habitat (Canessa et al. 2003).

Sporadic surveys have taken place on SGaan Kinghlas-Bowie Seamount since the 1940s, for geological, biological, and naval purposes (see Gale et al. 2017 for summary). Information on target and non-target fish and non-target invertebrate species is available from commercial fishery records, as well as SCUBA dive, submersible, and remotely operated vehicle (ROV) surveys (Canessa et al. 2003).

Fisheries and Oceans Canada (DFO) carried out benthic video surveys in 2000 (Yamanaka 2005), 2011 (unpublished) and 2015 (Gale et al. 2017). All three surveys took place on board the *CCGS John P. Tully* (Figure 2). The 2000 survey was from July 31<sup>st</sup> to August 14<sup>th</sup> (PAC 2000-031). Although the survey was focused on benthic rockfishes, they collected information on all fishes, habitat and invertebrates using video from a human occupied submersible (*Delta* submersible). They also did a longline survey to collect data on fish health and biological traits, collected oceanographic information (CTD and bongo nets), and recorded seabird and mammal observations (Yamanaka 2005). The depths surveyed by submersible ranged from 53-306 m in depth. The 2011 survey, July 19<sup>th</sup> to August 5<sup>th</sup> (PAC 2011-062), was led by James Boutillier (Pacific Biological Station, DFO), and was a joint venture between DFO and the United States (US) National Oceanic and Atmospheric Administration (NOAA) and aimed to document the habitats and species on SGaan Kinghlas-Bowie Seamount. The 2011 survey collected benthic imagery using DFO's Phantom ROV (video and photos; survey range 28-272 m) and NOAA's SeaBED AUV (photos; 180-933 m) (unpublished data).

With the exception of the photos taken during the deep AUV dives in 2011, all of the previous visual surveys of benthic communities at SK-B Seamount were restricted to shallow areas around the plateau at depths less than about 300 m (Figure 2c). No visual surveys have previously been done anywhere on Hodgkins or Davidson Seamounts and little was known of the species composition and diversity in the deeper areas of SK-B MPA. Therefore a survey was completed July 4<sup>th</sup> to July 21<sup>st</sup>, 2015 (PAC 2015-048), using a tow-camera system to survey deeper regions in the SK-B MPA. Goals of this survey were to characterize the deeper biodiversity at SK-B Seamount. The depth range surveyed was from 249 m to 1246 m, although the majority of the area surveyed was below 500 m (Gale et al. 2017).

## OBJECTIVE

We present a complete inventory of taxa that have to date been found at SK-B MPA as determined by the three visual surveys described above. We provide a summary of all taxa detected in the SK-B MPA, their scientific and common names, survey photographs, transect information, depth ranges observed at, and our degree of confidence with the observation. The 2011 and 2015 surveys went through a thorough quality assurance/quality control (QAQC) process in 2016 to evaluate the taxa identifications. Although the 2000 survey was not included in the QAQC exercise, the manned submersible allowed for expert ID during the survey itself. In order to reduce the size of the reports, the SK-B MPA species inventory has been divided into three separate reports dealing with the following taxa: species forming biogenic habitat (Algae, Cnidaria, Porifera, Bryozoa; this report), Chordata (Gauthier et al. 2018b), and other invertebrates (Gauthier et al. 2018c).

## METHODS

The three surveys used different methods but all had the objective to document benthic communities of SK-B Seamount using imagery.

In 2000, the Delta submersible was used and could hold two people (a pilot and a scientist) (Yamanaka 2005). Cameras and lasers are mounted externally, with a forward-view as well as a starboard side-view standard definition (SD) camera. Each camera was mounted with parallel lasers. Each submersible dive consisted of two 30 minute transects with a 10 minute break between transects for photography and repositioning. Post-processing of the videotape was conducted by Rick Stanley and Jonathan Martin to assess habitat and enumerate fish by voice recordings from the on-board scientist and visual review of both the forward and the side view videotape (Yamanaka 2005). Videotapes were subsequently re-reviewed by Jonathan Martin to record details including all species occurrences, habitat type, and image quality using the Video Miner (version 1.2) qualitative protocol. A summary of the depths and durations of the 20 dives completed is found in Table 1.

In 2011 a combination of ROV (DFO's Phantom ROV) and AUV (NOAA's SeaBED AUV) was used. The ROV conducted 16 dives at various locations on the seamount. For each ROV dive SD and high definition (HD) video was collected as well as still photos. The AUV conducted 4 successful dives at various locations on the seamount during which it collected still images. Sarah Cook systematically annotated the video and the digital still photographs from the AUV to record details including all species occurrences, habitat type, and image quality using the Video Miner (version 1.2) qualitative protocol. Only 5 AUV dives had photos (Dives 1,4,5,6,7). A summary of the depths, lengths and durations of the 20 dives completed on this survey is found in Table 2.

In 2015, a tow-camera system "BOOTS" (Bathyal Ocean Observation and Televideo System) was used (Gale et al. 2017). An HD MiniZeus video camera was set in the forward-facing position, with capabilities for pan and tilt (horizontal and vertical axes, respectively). Two parallel scaling lasers, positioned 10 cm apart, were attached to the camera's pan-tilt chassis, such that the laser dots always remained in the centre of view. An HD 1CamAlpha+ video camera with 24-megapixel still image capabilities was set in the downward-facing position on the tow-camera frame. There were no scaling lasers associated with the downward-facing camera during the survey. High resolution photographs (6544 x 3680 pixels) were collected using the 1CamAlpha during 16 of the 17 BOOTS dives. The camera was configured to automatically take a photo every 10 seconds, but the actual interval between captured pictures was about 15 seconds (average 4 pictures per minute). Overall, 3546 photos were collected during the BOOTS dives.

In 2015, Maeva Gauthier systematically annotated 42 hours of video to record details including all species occurrences and relative abundance, habitat type, and image quality using Video Miner (version 2.1.4) quantitative protocol. Photographs were not used for this analysis because videos were considered more useful for video annotation (Gale et al. 2017). A summary of the depths, lengths and durations of the 17 dives completed on this survey is found in Table 3.

In addition to video annotation, all videos and still photographs from the surveys were viewed by the experts aboard the cruises (see Expedition Participants, below) in real time and following retrieval of vehicles to compile preliminary list of observed species.

In 2016, a thorough QAQC process was completed on the 2011 and 2015 survey datasets. Five to 10 records of each taxa were randomly selected and reviewed by independent taxonomic experts. In some cases, experts recommended that some taxa be grouped to a higher level of taxonomy to ensure a higher level of confidence for data analysis. There was also a difference in the level of taxonomy between surveys. The image quality during the 2011 survey was better and allowed for lower-level taxonomic identification compared to the 2015 survey.

### **Species Inventory Format**

This species inventory, modelled after the species inventory for Cobb Seamount by Du Preez et al. (2015), documents observations from the SK-B MPA surveys using images, taxonomy, scientific and common names, the taxonomic authority, a level of confidence in the identification, the year of the survey and depth range at which the organism was observed, as well as additional notes including pertinent information and relevant references. An example of the inventory format is provided in Table 4. World Register of Marine Species (WoRMS 2014) was used as authoritative reference.

### ***Taxonomy***

The organisms in this species inventory report are presented in taxonomic order, starting with Class (1.1) Phaeophyceae and ending with Class (5.3) Homoscleromorpha. Each organism is identified to the lowest taxonomic level possible with confidence. Page headers indicate the Phylum, Class, and Order, and individual inventory records indicate Family, Genus, and Species. If an organism could not be identified to species, the lowest taxonomic level is provided followed by “sp.”. If more than one taxon was observed and differentiated a number follows (e.g. “sp. 1”). If more than one taxon was observed but could not be differentiated, the lowest taxonomic level is followed by “spp.”. Common names (if well established) or a brief description of the organism is also included. If the image does not allow identifying to species level but there are reasons to believe it looks like a known species, “cf.” is used in the species name. See Figure 3 for example of pictures.

### ***Confidence in Identification***

Confidence in identification categories refer to previous records of the organism occurring on SK-B Seamount:

- **Previously observed:** This organism has been observed by divers or in imagery collected from submersibles at SK-B MPA. Our confidence is high but there are no voucher specimens from this location to confirm the identification.
- **Previously collected:** This organism has been collected at SK-B MPA and identified by taxonomic experts.
- **New record:** This is the first record of this organism occurring in SK-B MPA. There are no previous observations and no voucher specimens from this location. It is likely that this organism has been observed and/or collected in neighbouring regions including other seamounts or from the continental shelf at similar depths.

If the organism was previously observed or collected at SK-B MPA a numerical reference of the record's source follows the confidence category. Where,

- [1] = Austin (1999)
- [2] = Canessa et al. (2003)
- [3] = Herlinveaux (1971)
- [4] = Boutillier (2011)
- [5] = Martin (2010)
- [6] = McDaniel (2003)
- [7] = Cooke (2011)
- [8] = Scagel (1970)
- [9] = Scrimger and Bird (1969)
- [10] = Yamanaka and Brown (1999)
- [11] = Yamanaka (2005), if collected with longline
- [12] = Yamanaka (pers. comm.)

### ***Survey year and depth***

The survey year(s) and the depth range (in meters) where the organism was observed are provided. If the observed depth range exceeds the species' published known range a footnote indicating the discrepancy with relevant references is included. If a species was only observed once, a single observed depth is mentioned rather than a depth range.

### ***Image(s)***

For each taxon record a photograph or video still from the 2000, 2011 or 2015 cruise is provided (with the image credit). Multiple photos are provided when an organism has different morphotypes or distinctly different juvenile and adult life-stages, or to demonstrate the appearance of the organism in a group/colony and the appearance of the organism close up. In images where the organism may be difficult to see, a white arrow or a red box is used to indicate its location. For images that are very low quality, an alternative image has been added from other available online resources. Note that imagery from video is often clearer than it may appear to be from the still screen shots.

### ***Species Inventory table***

Finally, this information was tabulated into a comprehensive table that details the complete species list recorded from SK-B MPA across all transects undertaken in 2000, 2011, 2015. The table includes images, taxonomy, scientific and common names, the taxonomic authority, the level of identification confidence, and the survey(s) and depth range at which the organism was observed, as well as additional notes and relevant references. An example of the inventory format is provided in Table 4.

A checklist of the taxa presented in this report is found in Appendix 1. Appendix 2 presents all taxa in this report as well as the literature. Advice from taxonomic experts consulted for this report is summarized in Appendix 3.

Table 1. Depths, length and duration of dives from the 2000 survey of Bowie Seamount.

Date	Number of Transects	Transect names	Min. depth (m)	Max. depth (m)	Av. transect length (m)	Av. dive duration (min)
3 Aug 2000	2	5182 [1,2]	73	169	-	103
5 Aug 2000	2	5183 [1,2]	224	306	-	132
5 Aug 2000	2	5184 [1,2]	146	233	-	101
5 Aug 2000	2	5185 [1,2]	195	300	-	110
6 Aug 2000	2	5186 [1,2]	100	260	-	102
6 Aug 2000	2	5187 [1,2]	105	290	-	104
6 Aug 2000	2	5188 [1,2]	67	218	-	86
7 Aug 2000	2	5189 [1,2]	76	183	-	74
7 Aug 2000	2	5191 [1,2]	72	177	-	96
7 Aug 2000	2	5192 [1,2]	53	210	-	93
8 Aug 2000	2	5193 [1,2]	133	200	-	88
9 Aug 2000	2	5195 [1,2]	78	153	-	83
9 Aug 2000	1	5196 [1]	114	147	-	50
10 Aug 2000	2	5198 [1,2]	95	158	-	80
10 Aug 2000	2	5199 [1,2]	62	178	-	75
10 Aug 2000	2	5200 [1,2]	0	196	-	80
10 Aug 2000	2	5201 [1,2]	120	220	-	87
11 Aug 2000	2	5202 [1,2]	147	175	-	62
11 Aug 2000	2	5203 [1,2]	0	231	-	89
11 Aug 2000	2	5206 [1,2]	0	220	-	69

Table 2. Vehicle type, depths, length and duration of dives from the 2011 survey of Bowie Seamount.

Date	Type	Transect Name	Min Depth	Max Depth	Transect Length (m)	Duration (min)
24 Jul 2011	ROV	1	165	246	1252	58
24 Jul 2011	ROV	2	232	239	1281	43
25 Jul 2011	ROV	3	170	269	1386	67
25 Jul 2011	ROV	4	156	251	2240	109
25 Jul 2011	ROV	5	141	178	630	63
26 Jul 2011	ROV	6	50	225	1069	91
26 Jul 2011	ROV	7	64	103	434	44
26 Jul 2011	ROV	8	214	234	2055	86
31 Jul 2011	ROV	9	29	90	594	79
31 Jul 2011	ROV	10	43	190	977	97
01 Aug 2011	ROV	11	64	231	974	93
01 Aug 2011	ROV	12	98	196	986	89
02 Aug 2011	ROV	13	48	227	1012	85
02 Aug 2011	ROV	14	78	111	385	28
02 Aug 2011	ROV	15	67	82	na	100
02 Aug 2011	ROV	16	101	103	202	64
23-24 Jul 2011	AUV	d20110723_1	186	259	1093	1440 (24 hr)
25-26 Jul 2011	AUV	d20110725_4	428	483	1444	1440 (24 hr)
27 Jul 2011	AUV	d20110726_5	449	451	47	163
01 Aug 2011	AUV	d20110801_6	176	498	760	51
02 Aug 2011	AUV	d20110801_7	420	930	1305	87

Table 3. Depths, length and duration of dives from the 2015 survey of SGAan Kinghlas-Bowie Marine Protected Area. Transect length for each dive is reported based on camera positioning (USBL, if available for the entirety of the dive) and the ship's positioning (A-frame).

Date	Number of Transects	Transect names	Min. depth (m)	Max. depth (m)	Transect length (m) / USBL/A-frame	Transect duration (min)
10 Jul 2015	1	5	272	327	— / 247	30
10 Jul 2015	1	6	556	613	— / 256	31
11 Jul 2015	1	7	716	733	261 / 257	43
11 Jul 2015	1	8	854	968	265 / 261	45
12 Jul 2015	1	9	1016	1176	606 / 526	56
12 Jul 2015	1	10	401	463	263 / 264	32
12 Jul 2015	1	11	871	928	— / 258	29
12 Jul 2015	1	12	727	845	— / 266	43
13 Jul 2015	1	13	316	350	— / 266	42
13 Jul 2015	1	14	682	747	241 / 257	32
13 Jul 2015	1	15	749	830	313 / 271	43
13 Jul 2015	1	16	1011	1246	835 / 710	84
16 Jul 2015	1	17	591	677	262 / 263	38
16 Jul 2015	1	18	632	840	559 / 515	70
16 Jul 2015	2	19a	674	956	534 / 511	68
		b	704	882	375 / 251	29
17 Jul 2015	1	20	1028	1125	270 / 251	31

Table 4. An example of the inventory record format and brief explanation of notation.

#. Phylum  
 ##. Class  
 ###. Order

	Family name Scientific name Common name Taxonomic authority Confidence of identification Survey(s) where the organism was observed Depth range of the observations (meters)
Image credit Photograph or video filename	Footnotes (if applicable)



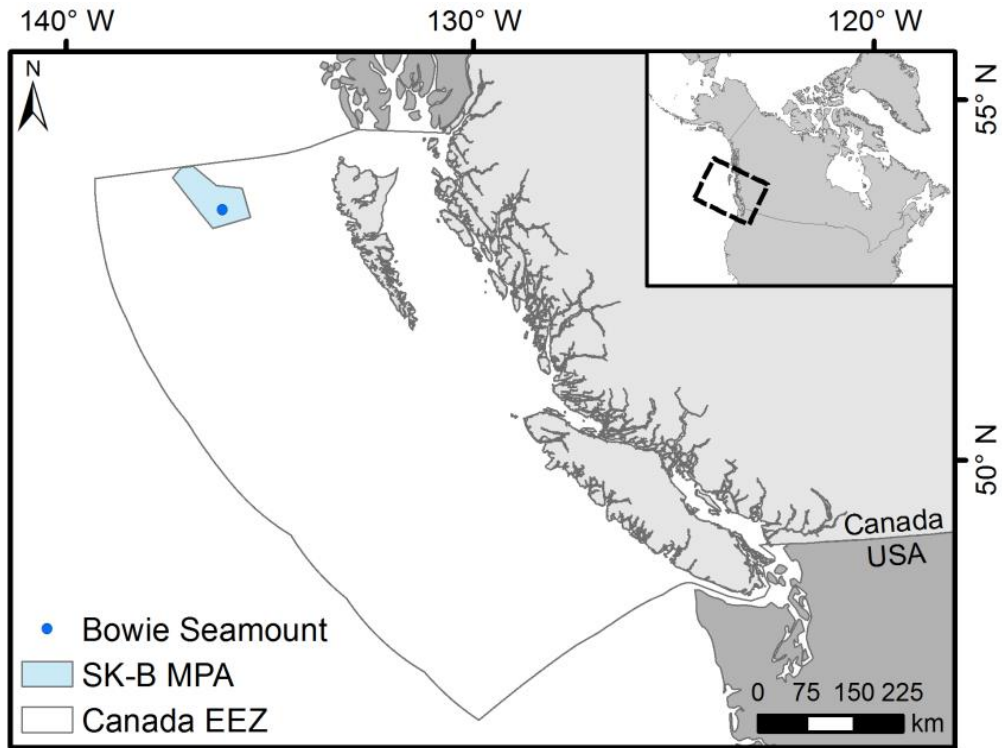


Figure 1. Location of Bowie Seamount and SGaan Kinghlas-Bowie Marine Protected Area (SK-B MPA) within Canada's EEZ (Exclusive Economic Zone).

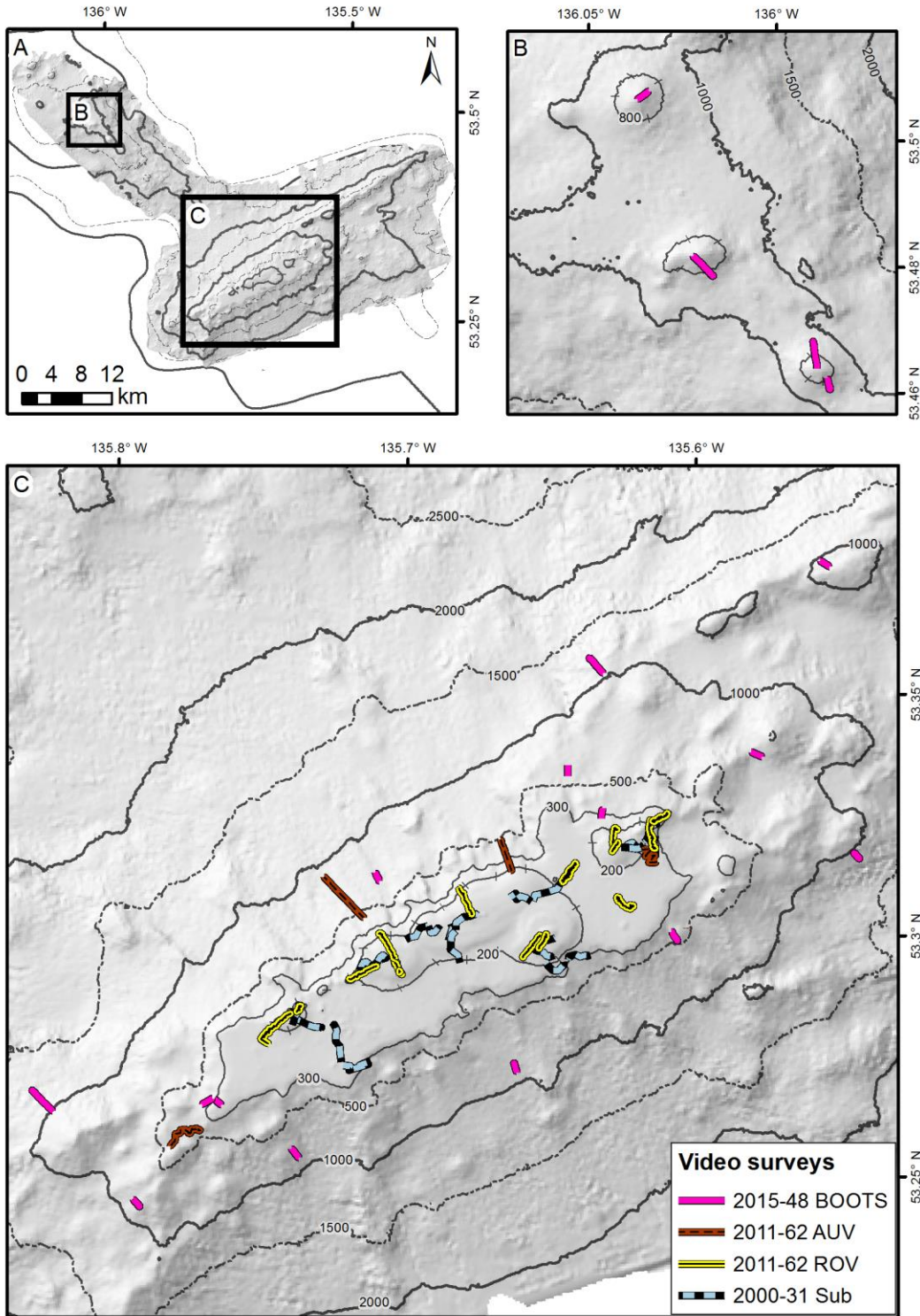
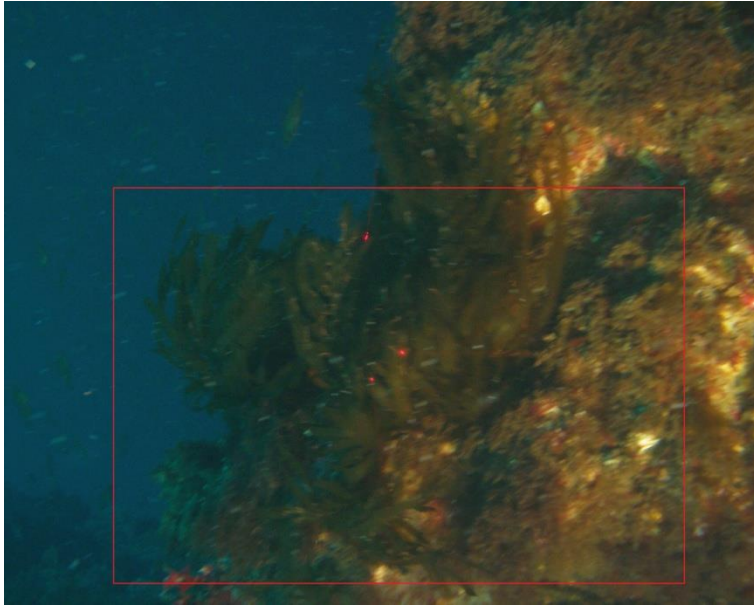


Figure 2. Locations of video surveys carried out by DFO at Bowie and Hodgkins Seamounts from 2000 (Delta submersible; Yamanaka 2005), 2011 (Phantom ROV and SeaBED AUV; unpublished), and 2015 (BOOTS tow-camera system; Gale et al. 2017); A) Bowie and Hodgkins Seamounts, B) the three summits of Hodgkins Seamount, and C) part of Bowie Seamount including the shallow summit.



Figure 3. Examples of organisms observed during the SK-B MPA 2000, 2011, and 2015 surveys. Top left: *Farrea* spp. sponge with deep-sea sunflower star (*Rathbunaster californicus*). Lower left: Benthopectinidae sea stars and boot sponges (Rosselidae). Right: Poacher (Agonidae) and squat lobsters (*Munida quadrispina*) surrounding an orange sea pen (*Ptilosarcus gurneyi*). Image credits: © Fisheries and Oceans Canada, 2011 (top left and right) and DFO Science (BOOTS tow-camera, 2015-048; bottom left).

**1. Phylum: Ochrophyta – brown algae**  
**1.1. Class: Phaeophyceae**



**Phaeophyceae**  
**Brown algae**

Authority: Lamouroux 1813

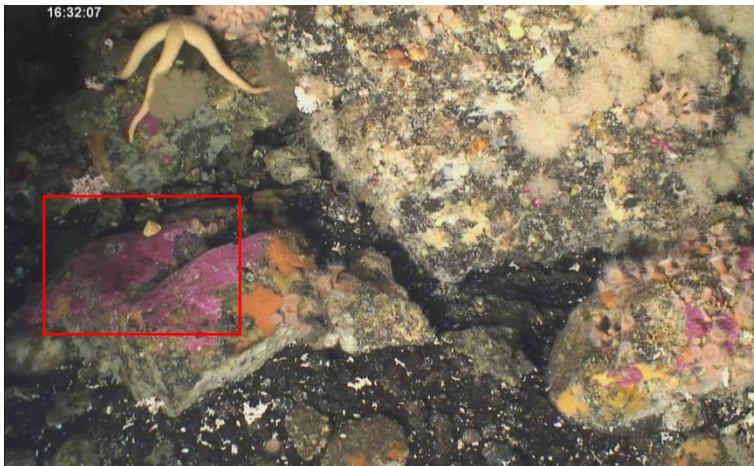
Confidence: Previously observed [6]

Survey(s): 2011

Depths (m): 50

Credit: © Fisheries and Oceans Canada, 2011  
Video still: 073111\_204947\_243.jpg

**2. Phylum: Rhodophyta – red algae**  
**2.1. Class: Florideophyceae**  
**2.1.2. Order: Corallinales**



**Family Corallinaceae**

Authority: Heydrich 1897 & Philippi  
1837

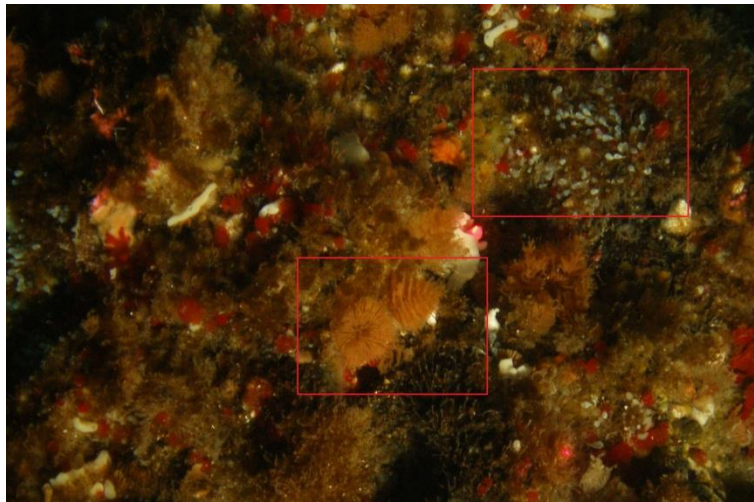
Confidence: Previously observed [6]

Survey(s): 2011

Depths (m): 29-92

Credit: © Fisheries and Oceans Canada, 2011  
Video still: Pac2011-062\_Dive6\_163200

3. Phylum: Bryozoa – moss animals  
3.1. Class: Gymnolaemata  
3.1.1. Order: Cheilostomatida



Family Bugulidae

***Bugulina californica***  
**Spiral bryozoan**

Authority: Robertson, 1905

Confidence: Previously observed [6]

Survey(s): 2011  
Depths (m): 38-222

Credit: © Fisheries and Oceans Canada, 2011  
Video still: 073111\_232532\_247.jpg



Family Cellariidae

***Cellaria diffusa***  
**Spindly rabbit-ear bryozoan**

Authority: Robertson, 1905

Confidence: New record

Survey(s): 2011  
Depths (m): NA

Credit: © Fisheries and Oceans Canada, 2011  
Video still: 072511\_165304\_265 - Copy.jpg



Credit: © Fisheries and Oceans Canada, 2011  
Photo: P8010181.JPG

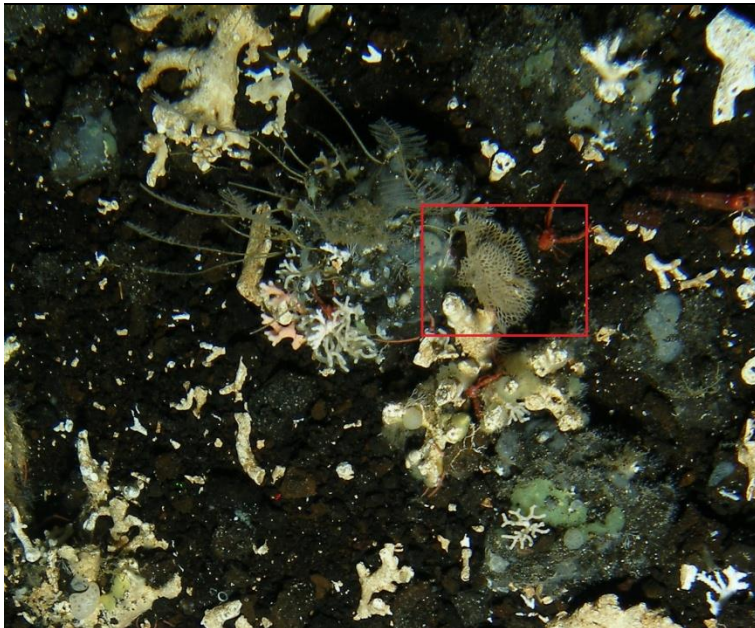
Family Myriaporidae

***Leieschara* sp.**

Authority: Kluge, 1929 /  
M.Sars, 1863

Confidence: New record

Survey(s): 2011 and 2015  
Depths (m): NA



Credit: © Fisheries and Oceans Canada, 2011  
Photo: P8010408.JPG

Family Phidoloporidae

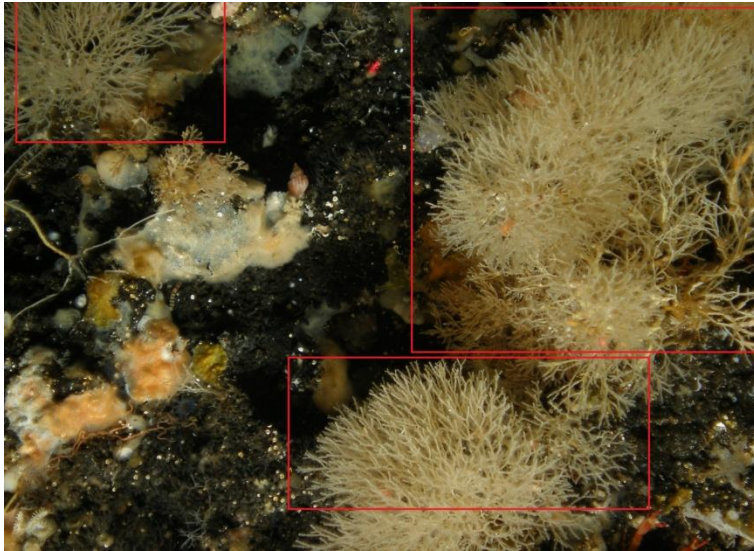
***Phidolopora* sp.**  
**Lattice-work bryozoan**

Authority: Gabb & Horn, 1862

Confidence: New record

Survey(s): 2011  
Depths (m): NA

3. Phylum: Bryozoa – moss animals  
3.2. Class: Stenolaemata  
3.2.1. Order: Cyclostomatida



Family Crisiidae

***Crisia* sp.**  
**White tuft bryozoan**

Authority: Lamouroux, 1812

Confidence: New record

Survey(s): 2011 and 2015  
Depths (m): NA

Credit: © Fisheries and Oceans Canada, 2011  
Photo: 072611\_163529\_187 - Copy.jpg



Family Heteroporidae

***Heteropora* sp.**  
**Delicate staghorn bryozoan**

Authority: de Blainville, 1830

Confidence: New record

Survey(s): 2011  
Depths (m): NA

Credit: © Fisheries and Oceans Canada, 2011  
Photo: 072611\_160441\_110 - Copy.jpg

Notes: All bryozoans were not annotated from the videos and are not in the observation database from 2011.

**4. Phylum: Cnidaria – anemones, corals, hydroids, & others**

**4.1. Class: Anthozoa**

**4.1.1. Order: Actiniaria – sea anemones**



**Actiniaria sp. 1**  
**Unknown orange anemone**

Confidence: new record

Survey(s): 2015  
Depths (m): NA

Credit: DFO Science (BOOTS tow-camera, 2015-048)  
Video still: PAC2015-048\_Dive007 (188).jpg



**Actiniaria sp. 2**  
**Unknown dark/purple deep-sea anemone**

Confidence: new record

Survey(s): 2015  
Depths (m): NA

Credit: DFO Science (BOOTS tow-camera, 2015-048)  
Video still: Pac2015\_Dive019\_Darkpurple\_Anemone.png





Credit: © Fisheries and Oceans Canada, 2011  
Photo: 072411\_174000\_71.jpg

Family Actiniidae

***Cribrinopsis fernaldi***  
**Crimson anemone**

Authority: Siebert & Spaulding 1976

Confidence: Previously observed [5, 6]

Survey(s): 2011  
Depths (m): 48-237



Credit: © Fisheries and Oceans Canada, 2011  
Photo: P8010133.jpg

Family Actinostolidae

***Stomphia didemon***  
**Swimming/cowardly anemone**

Authority: Siebert 1973

Confidence: New record

Survey(s): 2011  
Depths (m): 69-219



Credit: DFO Science (BOOTS tow-camera, 2015-048)  
Video still: PAC2015-048\_Dive010 (104).jpg

Family Hormathiidae

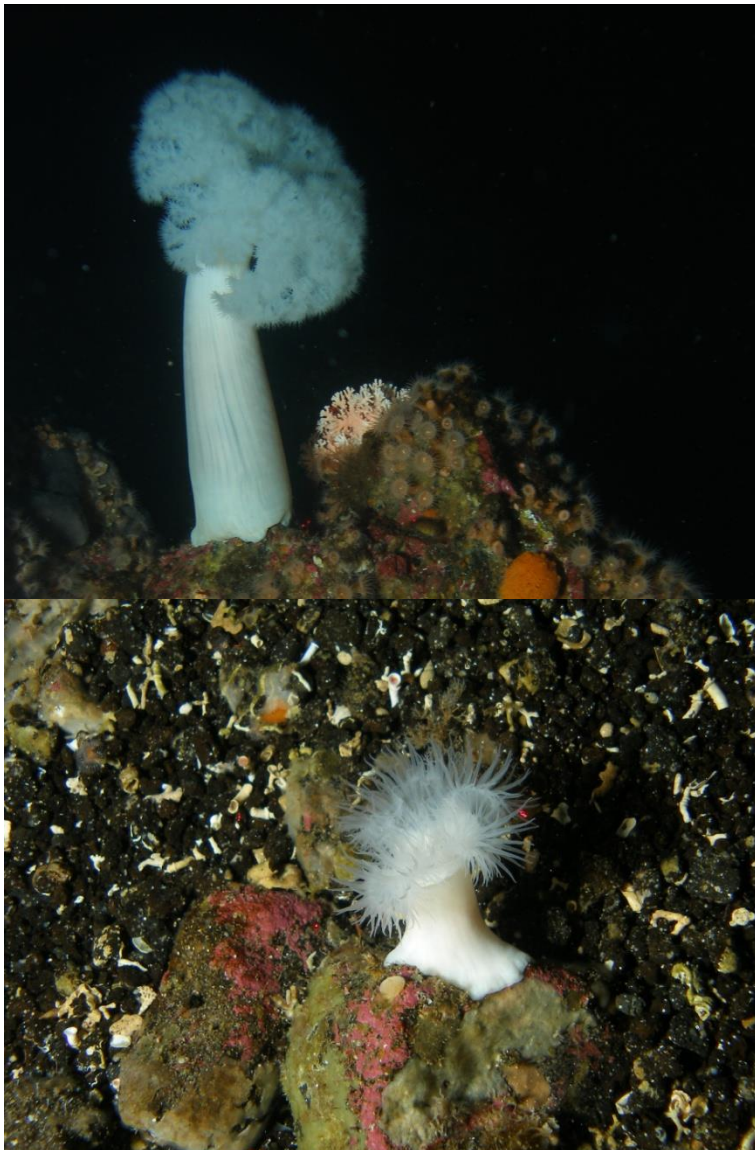
**cf. Hormathiidae sp.**  
**Fly trap anemone**

Authority: Carlgren 1932

Confidence: New record

Survey(s): 2015

Depths (m): 335-435



Credit: © Fisheries and Oceans Canada, 2011  
Photo: P8010277 - Copy.jpg (top) and P8010164.jpg (bottom)

Family Metridiidae

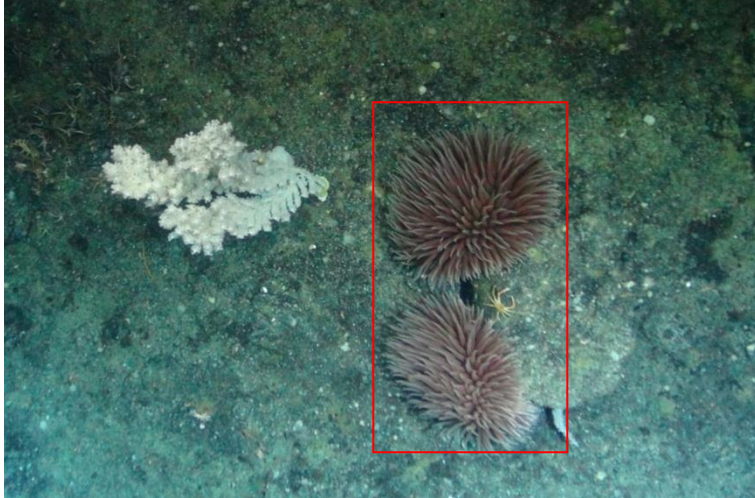
***Metridium* sp.**  
**Plumose anemone**

Authority: de Blainville, 1824

Confidence: Previously observed [6]

Survey(s): 2011

Depths (m): 34-217



Family Liponematidae

***Liponema brevicorne***  
**Pompom anemone**

Authority: McMurrich, 1893

Confidence: Previously observed [5]

Survey(s): 2015  
Depths (m): 330-413

Credit: DFO Science (BOOTS tow-camera, 2015-048)  
Video still: PAC2015-048\_Dive013 (98).jpg

#### 4. Phylum: Cnidaria – anemones, corals, hydroids, & others

##### 4.1. Class: Anthozoa

##### 4.1.2. Order: Alcyonacea – soft corals



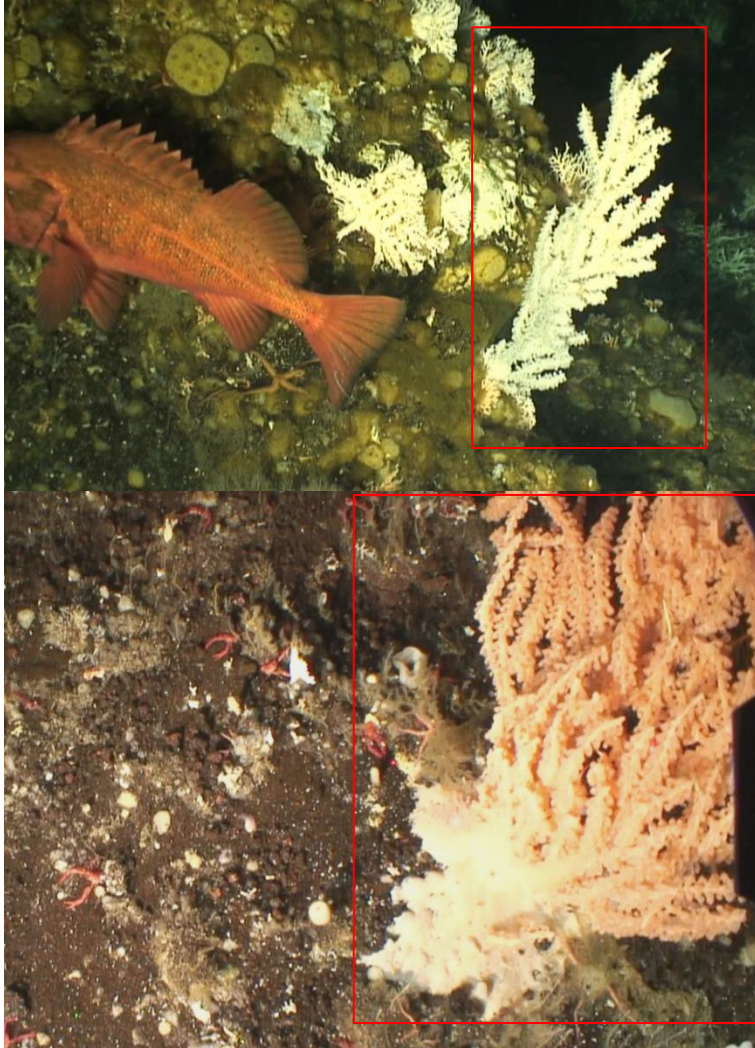
**Unknown Alcyonacea**

Authority: Gray 1870

Confidence: New record

Survey(s): 2015  
Depths (m): 1211-1237

Credit: DFO Science (BOOTS tow-camera, 2015-048)  
Video still: Pac2015\_Dive016\_Screengrabs-Narella\_001.png



Family Acanthogorgiidae

***Calcigorgia spiculifera***

Authority: Broch, 1935

Confidence: New record

Survey(s): 2011

Depths (m): 201-251

Notes: *Primnoa pacifica* look very similar to *Calcigorgia spiculifera*, so using a higher level of taxonomy (Alcyonacea) may be needed when distance doesn't allow to ID to a lower taxonomy level. Few visual clues to help: *Primnoa* spp.: are dichotomously branched and polyps are large and face downward, polyps are crowded irregularly around stem and branches, skeleton calcifies polyps embedded in covering matrix. *Calcigorgia* spp.: polyps extend over branch surface as a cylindrical cap when tentacles are retracted, colonies irregularly branched, polyps non-retractile, skeleton is non-porous, horny material.

Credit: © Fisheries and Oceans Canada, 2011  
Video still: Pac2011-062\_2016-07-28\_161234\_Calcigorgia.png,  
Pac2011-062\_2016-07-28\_162303\_Calcigorgia.png



Family Alcyoniidae

***Anthomastus* sp.**

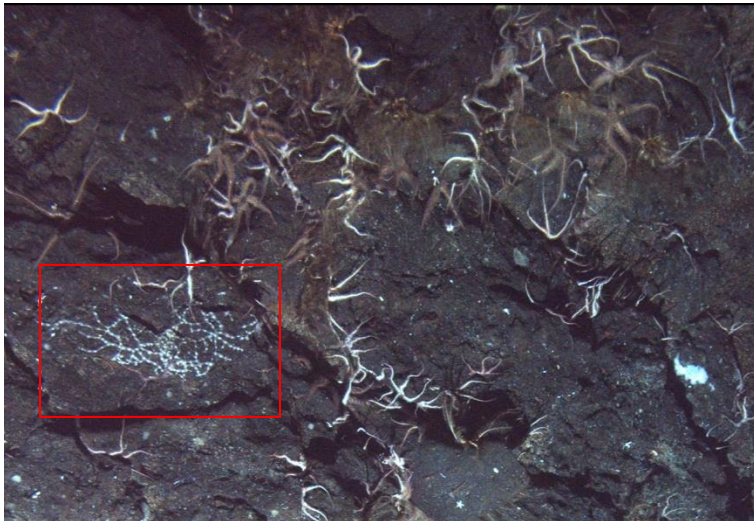
Authority: Verrill, 1878

Confidence: New record

Survey(s): 2015

Depths (m): 738-1200

Credit: DFO Science (BOOTS tow-camera, 2015-048)  
Video still: PAC2015-048\_Dive007 (128).jpg



Family Clavulariidae

***Clavularia* sp.**

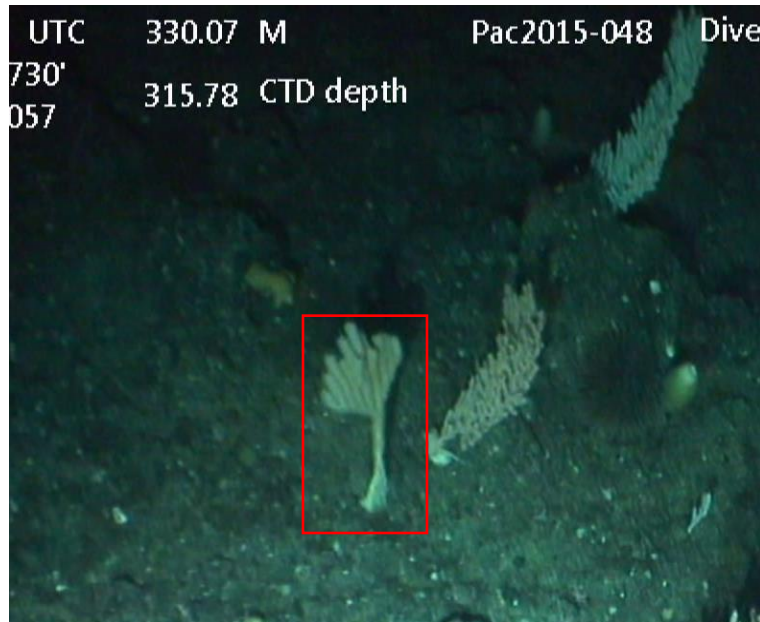
Authority: Blainville, 1830

Confidence: New record

Survey(s): 2011 (AUV)

Depths (m): 428-483

Credit: © Fisheries and Oceans Canada, 2011  
Video still: 20110726.015523.02278 copy



Credit: DFO Science (BOOTS tow-camera, 2015-048)  
Video still: Pac2015\_Dive013\_Screengrabs-Isididae\_001.png

Family Isididae

Authority: Gray 1857

Confidence: New record

Survey(s): 2015  
Depths (m): 330-1239



Credit: DFO Science (BOOTS tow-camera, 2015-048)  
Video still: Pac2015-048\_Dive009 (102).jpg

Family Isididae

***Lepidisis sp.***

Authority: Verrill 1883

Confidence: New record

Survey(s): 2015  
Depths (m): 816-1169



Family Paragorgiidae

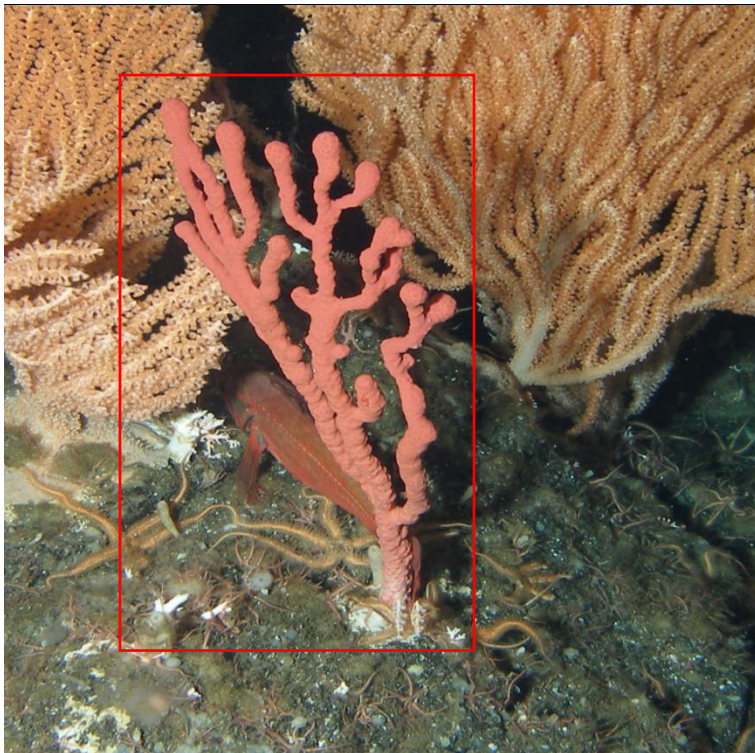
***Paragorgia* sp.**  
**Bubble gum coral**

Authority: Milne-Edwards 1857

Confidence: Previously observed [5]

Survey(s): 2000, 2015  
Depths (m): 653-960

Credit: DFO Science (BOOTS tow-camera, 2015-048)  
Video still: Pac2015\_Dive019\_Screengrabs-  
ParagorgiaArborea\_001.png



Family Paragorgiidae

***Paragorgia arborea***  
**Bubble gum coral**

Authority: Milne-Edwards 1857

Confidence: New record

Survey(s): 2000, 2011, 2015  
Depths (m): 241-863

Credit: © Fisheries and Oceans Canada, 2011  
Photo: 072511\_051320\_69.jpg



Family Plexauridae

***Swiftia simplex***

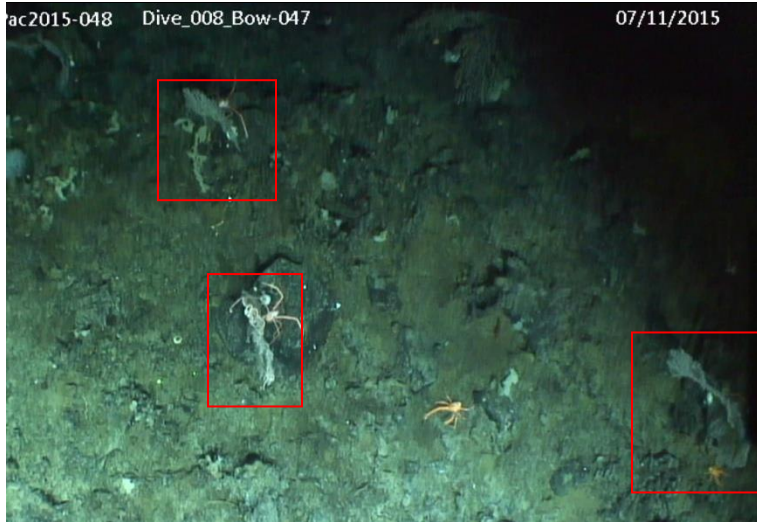
Authority: Nutting 1909

Confidence: Previously observed [5]

Survey(s): 2015

Depths (m): 781-809 (*Swiftia* sp.  
264-1195)

Credit: DFO Science (BOOTS tow-camera, 2015-048)  
Video still: PAC2015-048\_Dive012 (107).jpg



Family Primnoidae

Authority: Nutting, 1912

Confidence: Previously observed [5]

Survey(s): 2011, 2015

Depths (m): 328-1173

Notes: *Parastenella* and *Chrysogorgia*  
look similar from distance.  
Recommended to leave it at the family  
level after QAQC.

Credit: DFO Science (BOOTS tow-camera, 2015-048)  
Video still: Pac2015\_Dive008\_Screengrabs-Parastenella\_001.png





Family Primnoidae

***Primnoa cf. pacifica***  
**Red tree coral**

Authority: Kinoshita, 1907

Confidence: Previously observed [5]

Survey(s): 2011, 2015

Depths (m): 242-731

Notes: *Primnoa pacifica* look very similar to *Calcigorgia spiculifera*, so using a higher level of taxonomy (Alcyonacea) may be needed when distance doesn't allow to ID to a lower taxonomy level.



Credit: © Fisheries and Oceans Canada, 2011  
Video still: Pac2011-062\_2016-07-28\_161438\_Primnoa.png  
Pac2011-062\_2016-07-28\_161939\_Primnoa.png



Family Primnoidae

**Unknown "Yellow Primnoid"**

Authority: Nutting, 1912

Confidence: New record

Survey(s): 2015

Depths (m): 752-960

Credit: DFO Science (BOOTS tow-camera, 2015-048)  
Video still: Pac2015\_Dive019\_Screengrabs-YellowPrimnoid\_001.png

**4. Phylum: Cnidaria – anemones, corals, hydroids, & others**  
**4.1. Class: Anthozoa**  
**4.1.3. Order: Antipatharia – black corals**



**Unknown Antipatharia**

Confidence: New record

Survey(s): 2015  
Depths (m): 738-966

Notes: Antipatharia taxonomy level was used when the camera angle or proximity did not allow for a lower taxonomy level ID.

Credit: DFO Science (BOOTS tow-camera, 2015-048)  
Video still: Pac2015-048\_Dive019\_223550\_PM018.png (top)  
Pac2015-048\_SZ\_HD\_7\_16\_2015\_Dive018\_182930\_PM010.png (bottom)



Family Schizopathidae

***Lillipathes* sp.**

Authority: Totton 1923

Confidence: New record

Survey(s): 2015

Depths (m): 775-942

Credit: DFO Science (BOOTS tow-camera, 2015-048)  
Video still: PAC2015-048\_Dive008 (67).jpg

#### 4. Phylum: Cnidaria – anemones, corals, hydroids, & others

##### 4.1. Class: Anthozoa

##### 4.1.4. Order: Pennatulacea – sea pens



Family Anthoptilidae

***Anthoptilum grandiflorum***  
**Feather boa sea pen**

Authority: Kölliker 1880

Confidence: New record

Survey(s): 2015

Depths (m): 591-1096

Credit: DFO Science (BOOTS tow-camera, 2015-048)  
Video still: Pac2015\_Dive014\_160624\_PM010.png

Notes: It is difficult to distinguish *A. grandiflorum* and *A. murrayi* owing to their similar morphologies, small size, and the limited resolution of the imagery; both species may occur in this region



Family Halipteridae

***Halipteris willemoesi***  
**Sea whip**

Authority: Kölliker 1870

Confidence: New record

Survey(s): 2000, 2011, 2015  
Depths (m): 176-1047

Notes: Likely the same sea whip listed as *Stylatula elongata* by Parker & Tunnicliffe (1994)

Credit: © Fisheries and Oceans Canada, 2011  
Photo: 080211\_153315\_16.jpg



Family Pennatulidae

***Ptilosarcus gurneyi***  
**Orange sea pen**

Authority: Gray, 1860

Confidence: Previously observed [5]

Survey(s): 2011  
Depth (m): 76-170

Credit: © Fisheries and Oceans Canada, 2011  
Photo: P8010118.jpg



Family Umbellulidae

***Umbellula cf. lindahli***

Authority: K lliker 1875

Confidence: New record

Survey(s): 2015

Depth (m): 704-1035

Credit: DFO Science (BOOTS tow-camera, 2015-048)  
Video still: PAC2015-048\_Dive014 (93).jpg



Family Virgulariidae

***Virgularia sp.***

Authority: Lamarck, 1816

Confidence: New record

Survey(s): 2011 (AUV)

Depth (m): 420-930

Credit:   Fisheries and Oceans Canada, 2011  
Video still: 20110726.003102.00760 copy

4. Phylum: Cnidaria – anemones, corals, hydroids, & others

4.1. Class: Anthozoa

4.1.5. Order: Scleractinia – stony corals



Family Caryophylliidae

***Desmophyllum dianthus***  
**Cockscomb cup coral**

Authority: Esper, 1794

Confidence: New record

Survey(s): 2011  
Depths (m): 238-249

Credit: © Fisheries and Oceans Canada, 2011  
Photo: 072511\_155849\_45 - Copy.jpg



Family Dendrophylliidae

***Balanophyllia elegans***  
**Orange cup coral**

Authority: Verrill, 1864

Confidence: Previously observed [5]

Survey(s): 2011  
Depths (m): 248

Credit: © Fisheries and Oceans Canada, 2011  
Video still: Pac2011-062\_Dive004\_040050.png

**4. Phylum: Cnidaria – anemones, corals, hydroids, & others**  
**4.1. Class: Anthozoa**  
**4.1.6. Order: Zoantharia**



Credit: © Fisheries and Oceans Canada, 2011  
Photo: 072611\_163048\_173.jpg

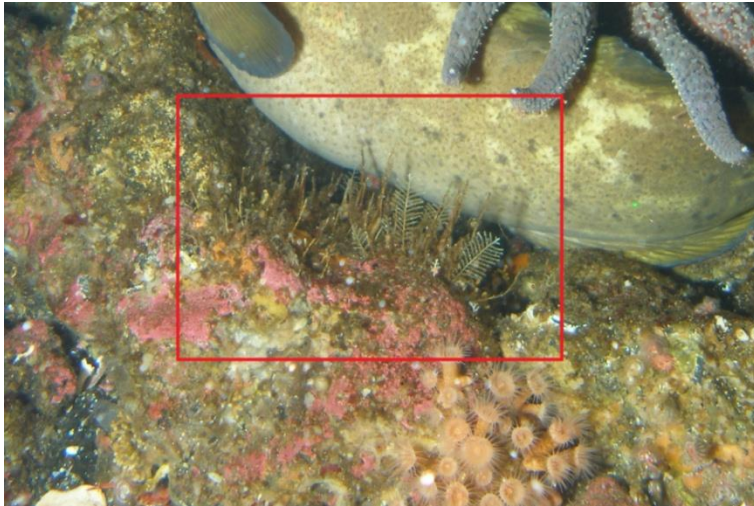
**Zoantharia**

Authority: Gray, 1832

Confidence: Previously observed [1, 2, 6]

Survey(s): 2011  
Depths (m): 29-183

**4. Phylum: Cnidaria – anemones, corals, hydroids, & others**  
**4.2. Class: Hydrozoa**  
**4.2.1. Order: Leptothecata**



Credit: © Fisheries and Oceans Canada, 2011  
Photo: P8010256.JPG

Family Sertulariidae

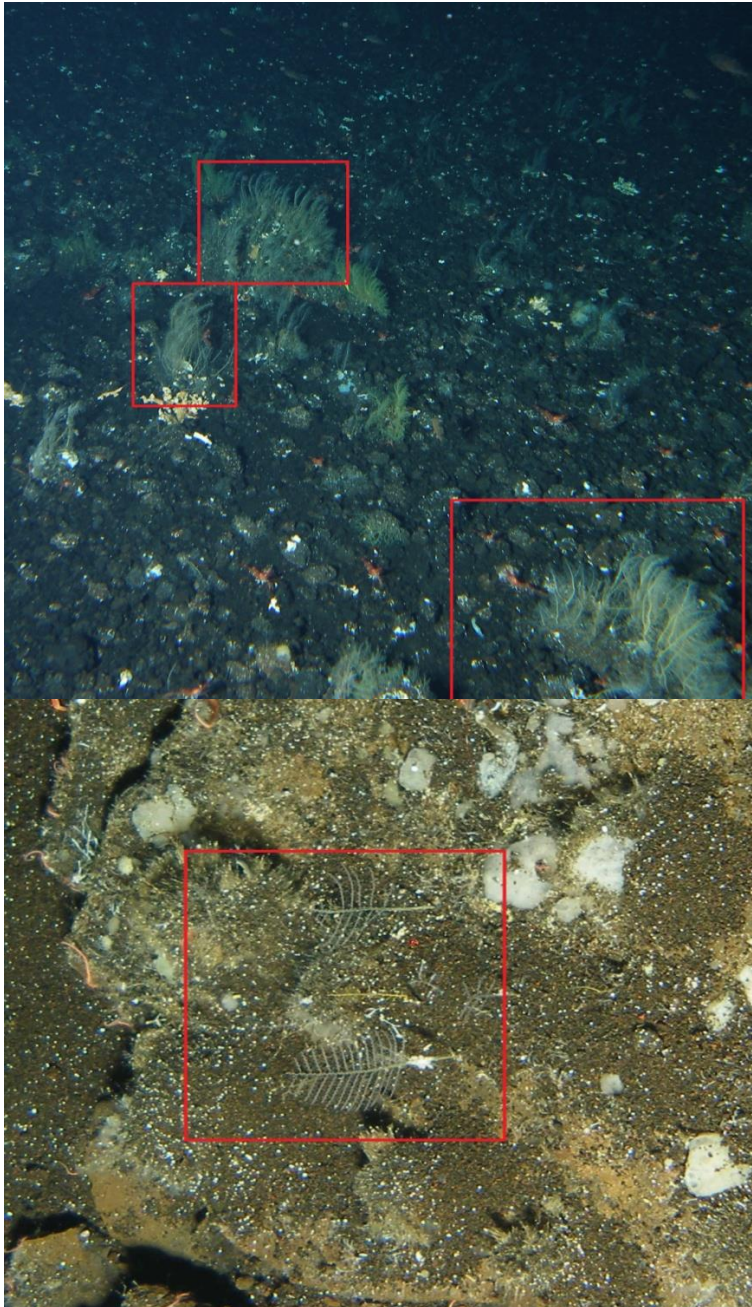
***Abietinaria* sp.**

Authority: Kirchenpauer, 1884

Confidence: New record

Survey(s): 2011  
Depths (m): 67-248

4. Phylum: Cnidaria – anemones, corals, hydroids, & others  
4.2. Class: Hydrozoa  
4.2.2. Order: Anthoathecata



Family Plumulariidae

***Plumularia* spp.**

Authority: Lamarck, 1816

Confidence: Previously observed [6]

Survey(s): 2011

Depths (m): 29-33

Credit: © Fisheries and Oceans Canada, 2011  
Photos: P8010462.JPG and 072411\_180659\_154 - Copy.jpg (bottom)





Credit: © Fisheries and Oceans Canada, 2011  
Photo: 072411\_175838\_127.jpg

Family Stylasteridae

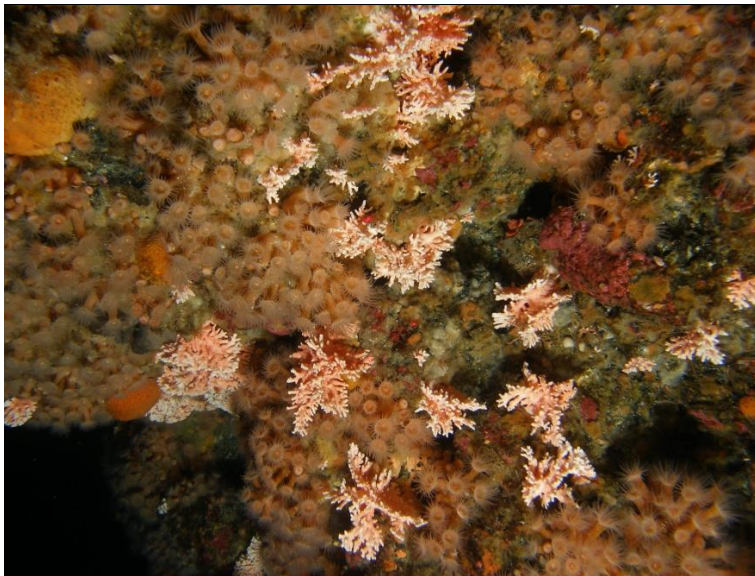
***Stylaster* spp.**

Authority: Gray, 1847

Confidence: Previously observed [5]

Survey(s): 2011

Depths (m): 45-251



Credit: © Fisheries and Oceans Canada, 2011  
Photo: P8010298.JPG

Family Stylasteridae

***Stylaster* sp. 1**  
**Pink Stylaster**

Authority: Gray, 1847

Confidence: New record

Survey(s): 2011

Depths (m): 45-251



**Unknown Hydrocoral sp. 1**

Authority: Gray, 1847

Confidence: New record

Survey(s): 2011

Depths (m): NA

Credit: © Fisheries and Oceans Canada, 2011  
Photo: P8010358 (2).JPG



Family Tubulariidae

***Tubularia***

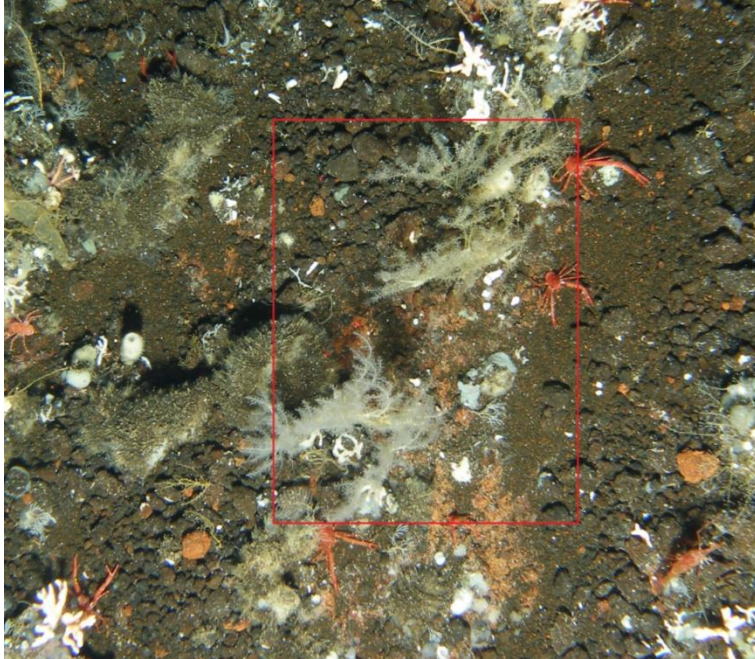
Authority: Linnaeus, 1758

Confidence: New record

Survey(s): 2011

Depths (m): 78-173

Credit: © Fisheries and Oceans Canada, 2011  
Video still: Pac2011\_Dive4\_Screengrabs-Tubularia001.png



**Unknown Hydrozoa sp. 1**

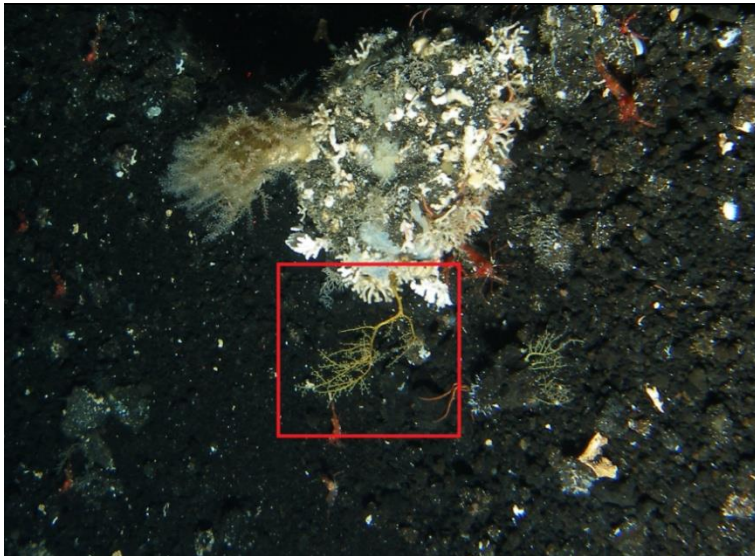
Authority: Owen, 1843

Confidence: New record

Survey(s): 2011

Depths (m): NA

Credit: © Fisheries and Oceans Canada, 2011  
Photo: 072511\_170250\_304 - Copy.jpg



**Unknown Hydrozoa sp. 2**

Authority: Owen, 1843

Confidence: New record

Survey(s): 2011

Depths (m): NA

Credit: © Fisheries and Oceans Canada, 2011  
Photo: P8010476.JPG



**Bryozoan/Hydroid Morphotype**

Authority: NA

Confidence: Previously observed

Survey(s): 2015  
Depths (m): 316-1196

Notes: Bryozoans and Hydroids are hard to distinguish with distance, so these categories were grouped as morphotype after QAQC for 2015.

Credit: DFO Science (BOOTS tow-camera, 2015-048)  
Video still: Pac2015-048\_Dive007\_160744

**4. Phylum: Cnidaria**  
**4.3. Class: Schyphozoa**



Family Periphyllidae

***Periphylla sp.***

Authority: F. Muller, 1861

Confidence: New record

Survey(s): 2015  
Depths (m): 449

Credit: DFO Science (BOOTS tow-camera, 2015-048)  
Video still: Pac2015-048\_SZ\_HD\_7\_12\_2015\_153548\_PM006-periphylla.png

**5. Phylum: Porifera – sponges**  
**5.1. Class: Demospongiae**



**Demospongiae sp. 1**  
**“Brown chimney sponge”**

Authority: Sollas, 1885

Confidence: New record

Survey(s): 2015  
Depths (m): 635-1094

Credit: DFO Science (BOOTS tow-camera, 2015-048)  
Video still: Pac2015-048\_Dive019\_PM\_224412.png



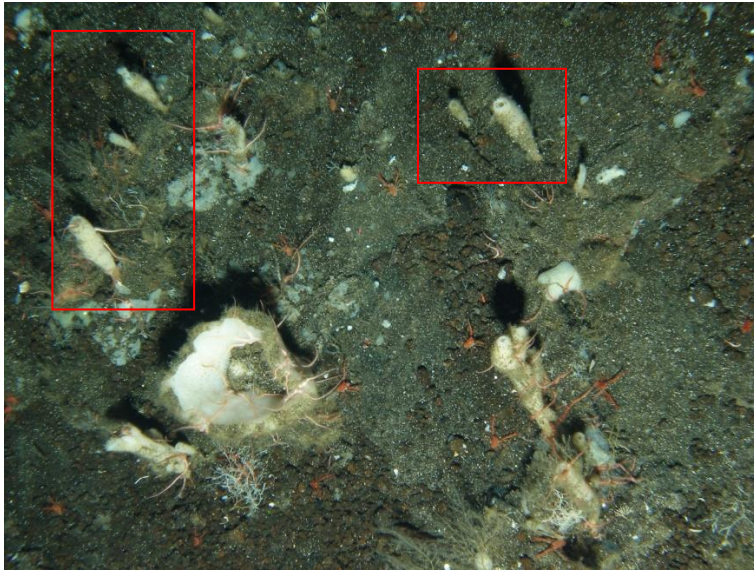
**Demospongiae sp. 2**  
**“Finger Sponge”**

Confidence: New record

Survey(s): 2015  
Depths (m): 1058-1156

Credit: DFO Science (BOOTS tow-camera, 2015-048)  
Video still: Pac2015\_Dive009\_Porifera Sp1 Finger Sponge.jpg

**5. Phylum: Porifera – sponges**  
**5.1. Class: Demospongiae**  
**5.1.1. Order: Axinellida**



Family Axinellidae

Authority: Schmidt, 1870

Confidence: New record

Survey(s) 2011

Depths (m): 237

Credit: © Fisheries and Oceans Canada, 2011  
Photo: 072411\_033229\_73 (2).jpg

**5. Phylum: Porifera – sponges**  
**5.1. Class: Demospongiae**  
**5.1.2. Order: Desmacellida**



Family Desmacellidae

***Desmacella* spp.**

Authority: Schmidt, 1870

Confidence: New record

Survey(s): 2011

Depths (m): 95-249

Credit: © Fisheries and Oceans Canada, 2011  
Video still: Pac2011\_Dive003\_Screengrabs-Desmacella\_001.png

5. Phylum: Porifera – sponges  
5.1. Class: Demospongiae  
5.1.3. Order: Poecilosclerida



Credit: © Fisheries and Oceans Canada, 2011  
Video still: Pac2011\_Dive004\_Asbestopluma.png

Family Cladorhizidae

***Asbestopluma* spp.**

Authority: Topsent, 1901

Confidence: New record

Survey(s): 2011

Depths (m): 197-247



Credit: DFO Science (BOOTS tow-camera, 2015-048)  
Video still: Pac2015\_Dive007\_Screengrabs-Esperiopsis\_001.png

Family Esperiopsidae

***Esperiopsis* spp.**

Authority: Carter, 1882

Confidence: New record

Survey(s): 2015

Depths (m): 331-938



Credit: NOAA NWFSC/PIFSC AUV Team  
Photo: Pac2011\_Dive009\_Screengrabs-Hamigera.png

Family Hymedesmiidae

***Hamigera* spp.**

Authority: Gray, 1867

Confidence: New record

Survey(s): 2011 (AUV)

Depths (m): 67-76



Credit: © Fisheries and Oceans Canada, 2011  
Video still: Pac2011\_Dive001\_Screengrabs-Isodictyidae\_001.png

Family Isodictyidae

***Isodictya* sp.**

Authority: Bowerbank, 1864

Confidence: New record

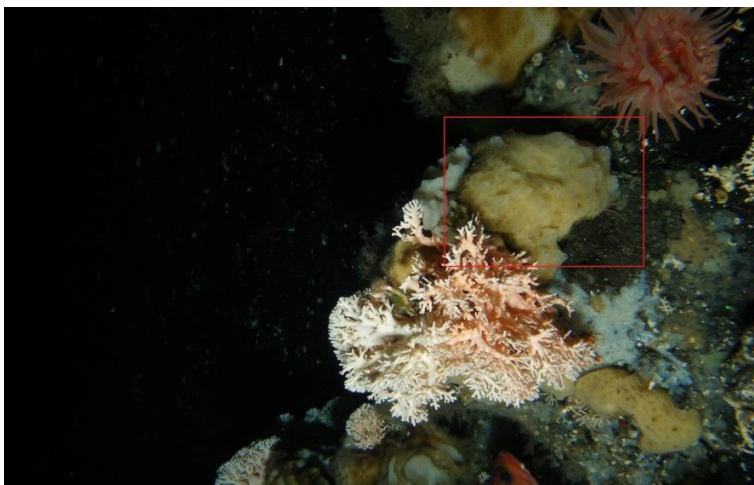
Survey(s): 2011

Depths (m): 76-251

## 5. Phylum: Porifera – sponges

### 5.1. Class: Demospongiae

#### 5.1.4. Order: Polymastiida



Credit: © Fisheries and Oceans Canada, 2011  
Photo: P8010487.mpg

Family Polymastiidae

***Polymastia* sp.**  
**Nipple sponge**

Authority: Bowerbank 1862

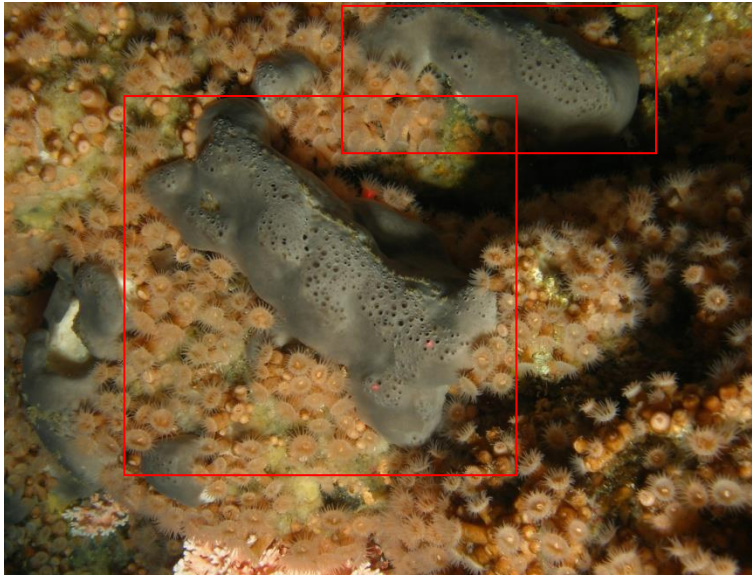
Confidence: New record

Survey(s): 2011

Depths (m): 84-164



5. Phylum: Porifera – sponges  
5.2. Class: Demospongiae  
5.1.5. Order: Tetractinellida



Credit: © Fisheries and Oceans Canada, 2011  
Photo: 072611\_175007\_278 (top).jpg

Family Geodiidae

***Penares cortius***

Authority: de Laubenfels, 1930

Confidence: Previously observed [6]

Survey(s): 2011, 2015

Depths (m): 29-951



Credit: © Fisheries and Oceans Canada, 2011  
Photo: 072411\_175540\_118.jpg

Family Vulcanellidae

***Poecillastra* sp.**  
**Plate sponge**

Authority: Sollas, 1888

Confidence: New record

Survey(s): 2015

Depths (m): 591-918

5 Phylum: Porifera – sponges  
5.2. Class: Hexactinellida – glass sponges  
5.2.1. Order: Hexactinosida



Family Aphrocallistidae

***Heterochone calyx* or  
*Aphrocallistes vastus***

Authority: Schulze, 1886

Confidence: Previously observed [5]

Survey(s): 2000, 2015

Depths (m): 329-858



Notes: *Aphrocallistes vastus* and *Heterochone calyx* are difficult to differentiate in ROV videos based only on whole-sponge morphology. With only ROV video and in the absence of voucher specimens, some qualitative attributes that might be useful are, (1) large 'mitten-like' appendages sometimes occur in some morphotypes of very large individuals of *A. vastus* (although this trait has also been observed for *H. calyx*), (2) Only *H. calyx* has a hydroid symbiont – this trait might potentially be useful for in situ species ID but has yet to be evaluated for this purpose. As with all sponges, microscopy is the only method for ascribing a definitive species-level ID; different spicules occurring on the atrial body wall surface (inside sponge cavity) taxonomically distinguishes the two species (J. Chu, pers. comm., 2018).

Credit: © Fisheries and Oceans Canada, 2011  
Photo: 080211\_161849\_126.jpg (top), P8010499.jpg (bottom)



Credit: DFO Science (BOOTS tow-camera, 2015-048)  
Video still: Dive\_018\_PM012\_184331.jpg

Family: Euretidae

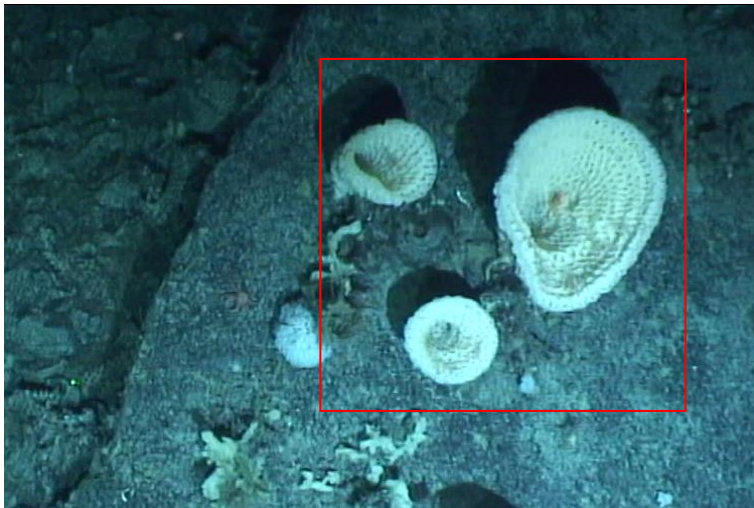
***Chonelasma* spp.**  
***Chonelasma oreia***

Authority: Schulze, 1886

Confidence: New record

Survey(s): 2015  
Depths (m): 602-773

Notes: May be confused for *Pinulasma* sp. due to visibility or distance. The distinguishing visual characteristic between the two is the basket like appearance if *Pinulasma*. *Chonelasma* may be identified to species level (*Chonelasma oreia*) when visibility or distance sufficient. See Reiswig (2014).



Credit: DFO Science (BOOTS tow-camera, 2015-048)  
Video still: Dive018\_PM012\_184331.jpg

Family Euretidae

***Pinulasma* spp.**

Authority: Reiswig & Stone 2013

Confidence: New record

Survey(s): 2015  
Depths (m): 634-957

Notes: May be confused for *Chonelasma* due to visibility or distance.



Credit: DFO Science (BOOTS tow-camera, 2015-048)  
Video still: PAC2015-048\_Dive008 (19).jpg

Family Farreidae

***Farrea* spp.**

Authority: Bowerbank, 1862

Confidence: Previously observed [5]

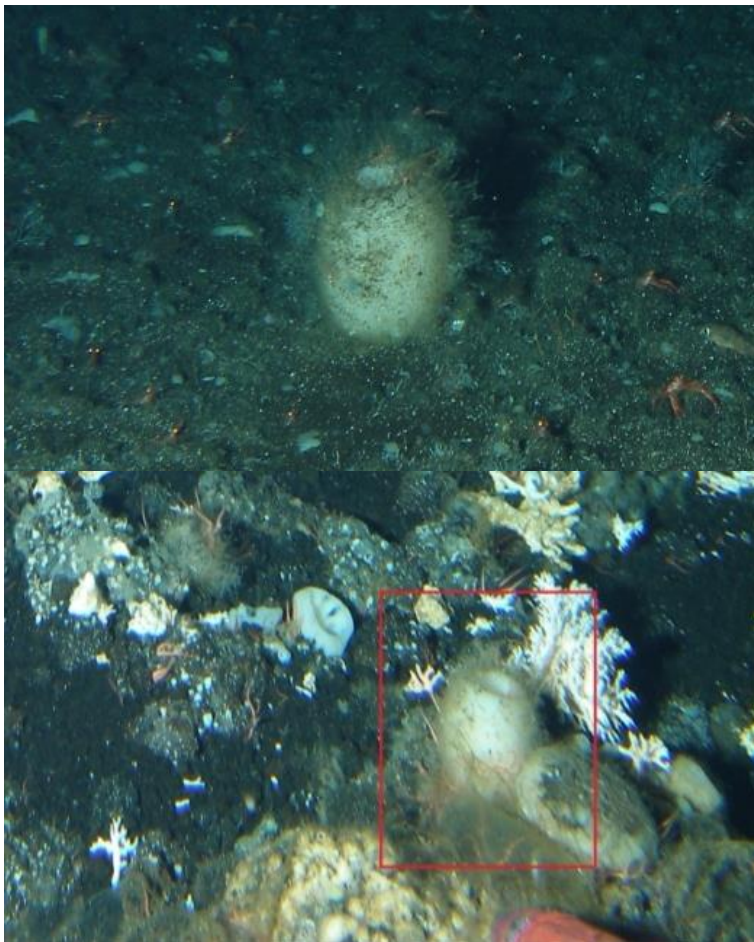
Survey(s): 2000, 2015

Depths (m): 634-966

## 5 Phylum: Porifera – sponges

### 5.2. Class: Hexactinellida – glass sponges

#### 5.2.2. Order: Lyssacinosa



Family Rossellidae

***Acanthascus* spp.,  
*Rhabdocalyptus* spp., or  
*Staurocalyptus* spp.  
Boot Sponges**

Authority: Schulze, 1885, Schulze  
1886, and Ijima 1897

Confidence: Previously observed [5]

Survey(s): 2011, 2015

Depths (m): 97-1233

Notes: Very hard to distinguish between those species with videos only. It is recommended to keep a higher level of taxonomy (H. Reiswig, pers. comm., 2016)

Credit: © Fisheries and Oceans Canada, 2011  
Video still (top): 072411\_175220\_108.jpg  
Video still (bottom): P8010365.jpg

**5 Phylum: Porifera – sponges**  
**5.3. Class: Homoscleromorpha**



**Unknown Homoscleromorpha**  
**'Beige encrusting sponge'**

Authority: Bergquist, 1978

Confidence: New record

Survey(s): 2015  
Depths (m):591-956

Notes: The depth range for the observations was not available, so the depth range of the transects where it was observed was used.

Credit: DFO Science (BOOTS tow-camera, 2015-048)  
Video still: PAC2015-048\_Dive019\_224321.jpg

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This survey was possible through direct funding from the International Governance Strategy (IGS) Program.

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## IMAGE CREDITS

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NOAA NWFSC/PIFSC AUV Team – Personnel from NOAA (NWFS and Pac Islands).

© Fisheries and Oceans Canada, 2011 – Fisheries and Oceans Canada Pacific Biological Station remotely operated vehicle team

DFO Science (BOOTS tow-camera, 2015-048) – Fisheries and Oceans Canada Pacific Biological Station tow-camera team

## REFERENCES

- Canessa R.R., Conley, K.W., Smiley, B.D. 2003. Bowie Seamount Pilot Marine Protected Areas: An Ecosystem Overview Report. Can. Tech. Rep. Fish. Aquat. Sci. 2461: xi + 85 p.
- Du Preez, C., Curtis, J.M.R., Davies, S.C., Clarke, M.E., and Fruh, E.L. 2015. Cobb Seamount Species Inventory. Can. Tech. Rep. Fish. Aquat. Sci. 3122: viii + 108 p.
- Gale, K.S.P., Curtis, J.M.R., Morgan, K.H., Stanley, C., Szaniszlo, W., Burke, L.A., Davidson, L.N.K., Doherty, B., Gatien, G., Gauthier, M., Gauthier, S., Haggarty, D.R., Ianson, D., Neill, A., Pegg, J., Wallace, K., and Zand, J.D.M. 2017. Survey Methods, Data Collections, and Species Observations from the 2015 Survey to SGaan Kinghlas-Bowie Marine Protected Area. Can. Tech. Rep. Fish. Aquat. Sci. 3206: vii + 94 p.
- Gauthier, M., Curtis, J.M.R., Gale, K.S.P., and Haggarty, D.R. 2018b. SGaan Kinghlas-Bowie Seamount Marine Protected Area Species Inventory: Chordata. Can. Tech. Rep. Fish. Aquat. Sci. 3197: vi + 48 p.
- Gauthier, M., Curtis, J.M.R., Gale, K.S.P., and Haggarty, D.R. 2018c. SGaan Kinghlas-Bowie Seamount Marine Protected Area Species Inventory: Invertebrates (Annelida, Arthropoda, Brachiopoda, Ctenophora, Echinodermata and Mollusca). Can. Tech. Rep. Fish. Aquat. Sci. 3198: vi + 67 p.
- Herlinveaux, R.H. 1971. Oceanographic features of and biological observations at Bowie Seamount, 14-15 Aug., 1969. Fish. Res. Board Can. Tech. Rep. No. 273: 35 p.
- Parker, T. and Tunnicliffe, V. 1994. Dispersal strategies of the biota on an oceanic seamount: implications for ecology and biogeography. Biological Bulletin 187: 336-345.
- Reiswig, H.M. 2014. Six new species of glass sponges (Porifera: Hexactinellida) from the north-eastern Pacific Ocean. Journal of the Marine Biological Association of the United Kingdom 94(2): 267-284.
- Scagel, R.F. 1970. Benthic algae of Bowie Seamount. Syesis 3: 15-16.
- Scrimger, J.A., and Bird, J. 1969. Bowie Seamount – preliminary survey for instrument package placement. Defense Research Establishment Pacific. Tech. Memorandum 69-7. 8 p.
- WoRMS Editorial Board. 2014. World Register of Marine Species. (Accessed at <http://www.marinespecies.org> at VLIZ)
- Yamanaka, K.L. 2005. Data report for the research cruise onboard the CCGS John P. Tully and the F/V Double Decker to Bowie Seamount and Queen Charlotte Islands July 31st to August 14th 2000. Can. Data. Rep. Fish. Aquat. Sci. 1163: vii + 46 p.

### Additional Resources

- Barnes C.A. and Paquette R.G. 1957. Circulation near the Washington coast. Proceedings of the 8<sup>th</sup> Pacific Science Congress 3: 585-608.
- Bowlby, E., Brancato, M.S., Bright, J., Brenkman, K. and Boutillier, J. 2011. A characterization of deep-sea coral and sponge communities on the continental shelf of northern Washington, Olympic Coast National Marine Sanctuary, using a remotely operated vehicle in 2008. A preliminary report to the Pacific Fishery Management Council essential fish habitat review committee. 56 p.



- Butler, J.L., Love M.S. and Laidig, T.E. 2012. A guide to the rockfishes, thornyheads, and scorpionfishes of the Northeast Pacific. University of California Press, Berkley, California, USA. 200 p.
- Clarke, M.E., Whitmire, C., Fruh, E., Anderson, J., Taylor, J., Rooney, J., Ferguson, S., and Singh, H. 2010. Developing the SeaBED AUV as a tool for conducting routine surveys of fish and their habitat in the Pacific. Proceeding of the Autonomous Underwater Vehicle 2010. Institute of Electrical and Electronic Engineers and Oceanic Engineering Society. Monterey, California, USA. 5 p.
- Davis, E.E. and Karsten, J.L. 1986. On the cause of the asymmetric distribution of seamounts about the Juan de Fuca Ridge: ridge-crest migration over a heterogenous asthenosphere. *Earth and Planetary Science Letters* 79: 385-396.
- Encyclopedia of Life. (Accessed at <http://www.eol.org>)
- Froese, R. and Pauly, D. (ed). 2011. FishBase. World-wide electronic publication. (Accessed at <http://www.fishbase.org>)
- Furness, R., Knapman, P., Nichols, J., and Scott, I. 2010. The Canadian Pacific sablefish (*Anoplopoma fimbria*) fishery. Moody Marine Ltd, Derby, United Kingdom. 187 p.
- Grant, D., Gjernes, M. and Venables, N. 2000. A practical guide to the identification of commercial groundfish species of British Columbia. Fleming Printing Ltd., Victoria, British Columbia, Canada. 34 p.
- Guiry, M.D. and Guiry, G.M. 2014. AlgaeBase. World-wide electronic publication, National University of Ireland, Galway. (Accessed at <http://www.algaebase.org>)
- Kozloff, E.N. and Price, L.H. 1996. Marine invertebrates of the Pacific Northwest. University of Washington Press, Seattle, Washington, USA. 539 p.
- Lamb, A. and Hanby, B.P. 2005. Marine life of the Pacific Northwest. Harbour Publishing, Madeira Park, British Columbia, Canada. 398 p.
- Lambert, P. 2000. Sea stars of British Columbia, Southeast Alaska and Puget Sound. UBC Press, Vancouver, British Columbia, Canada. 186 p.
- Lambert, P. and Austin, W.C. 2007. Brittle stars, sea urchins and feather stars of British Columbia, Southeast Alaska and Puget Sound. Royal British Columbia Museum, Victoria, British Columbia, Canada. 150 p.
- Lambert, P. and Boutillier, J. 2011. Deep-sea Echinodermata of British Columbia, Canada. *Can. Tech. Rep. Fish. Aquat. Sci.* 2929: viii + 143p.
- Love, M.S., Yoklavich, M., and Thorsteinson, L. 2002. The rockfishes of the Northeast Pacific. University of California Press, Berkley, California, USA. 404 p.
- Love, M.S. 2011. Certainly more than you want to know about the fishes of the Pacific Coast. Really Big Press, Santa Barbara, California, USA. 649 p.
- Morato, T. and Pauly, D. (ed). 2004. Seamounts: biodiversity and fisheries. Fisheries Centre Research Reports 12(5). Fisheries Centre, University of British Columbia, Vancouver, British Columbia, Canada. 84 p.
- NOAA Fisheries. 2016. National Marine Fisheries Service, Alaska Fisheries Science Center, Seattle, Washington. Posters "Seastars of Alaska", World-wide electronic publication, (Accessed at [http://access.afsc.noaa.gov/pubs/posters/pdfs/Seastars\\_of\\_AK\\_3-posters-combined.pdf](http://access.afsc.noaa.gov/pubs/posters/pdfs/Seastars_of_AK_3-posters-combined.pdf))

- Orr, J.W., and Hawkins, S. 2008. Species of the rougheye rockfish complex: resurrection of *Sebastes melanostictus* (Matsubara, 1934) and a redescription of *Sebastes aleutianus* (Jordan and Evermann, 1898) (Teleostei: Scorpaeniformes). Fishery Bulletin 106(2): 111-134.
- Paquette R.G., Collias, E.E., and Love, C.M. 1954. Eastern North Pacific offshore physical and chemical data observed during 1952. University of Washington, Department of Oceanography Technical Report No. 22, 25 p.
- Personal communication with Dr. Henry Reiswig (Porifera expert)
- Personal communication with Dr. Daphne Fautin (Actiniaria expert)
- Personal communication with Dr. Philip Lambert (Holothuroidea expert)
- Rowden A.A., Dower, J.F., Schlacher, T.A., Consalvey, M. and Clark, M.R. 2010. Paradigms in seamount ecology: fact, fiction and future. Marine Ecology 31 (Suppl. 1): 226-241.
- Sanctuary Integrated Monitoring Network. (Accessed at <http://www.sanctuariesimon.org/index.php>)
- Stone, R.P., Lehnert, H. and Reiswig, H. 2011. A guide to the deepwater sponges of the Aleutian Island Archipelago. NOAA Professional Paper NMFS 12, 187 p.
- Wing, B.L. and Barnard, D.R. 2004. A field guide to Alaskan corals. NOAA technical memorandum NMFS-AFSC-146. 67 p.

### **Unpublished Data Sources**

- Austin, B. 1999. Identification of Bowie Seamount Biota from 1995 National Geographic Magazine sub-sea video: final report. Prepared for Fisheries and Oceans Canada.
- Boutillier, J. 2011. DFO Cruise PAC 2011-062 recounts/re-IDs of Sarah Cooke's counts of certain rockfish by Jim Boutillier.
- Cooke, S. 2011. DFO Cruise PAC 2011-062 video analysis by Sarah Cooke.
- Martin, J. 2010. DFO Cruise PAC 2000-031 video analysis by Jonathan Martin in 2010, to annotate sponges and corals.
- McDaniel N., Swanston, D., Haight, R., Reid, D., Grant, G. 2003. Biological Observations at Bowie Seamount, August 3-5, 2003. Preliminary Report Prepared for Fisheries and Oceans Canada. October 22, 2003. 25 p. (Accessed at: <http://www.dfo-mpo.gc.ca/Library/328294.pdf>)
- Yamanaka, K.L. and Brown, T.J. 1999. Species Identified from Bowie Seamount Fisheries Reports and Logs. Compiled by Lynne Yamanaka and Tom J Brown. 1999.
- Yamanaka, K.L. 2000. DFO Cruise PAC 2000-031 video database. For Lynne Yamanaka in 2000, focus on fish and habitat only.

## APPENDIX 1 – CRUISE TAXONOMIC CHECKLIST

Classification of the 65 organisms observed as occurring on SK-B Seamount during the 2000, 2011, and 2015 surveys from the Algae, Bryozoa, Cnidaria, and Porifera phyla.

**Phylum: Ochrophyta**

**Class: Phaeophyceae**

Phaeophyceae sp.

**Phylum: Rhodophyta**

**Class: Florideophyceae**

**Order: Corallinales**

Corallinaceae sp.

**Phylum: Bryozoa**

**Class: Gymnolaemata**

**Order: Cheilostomatida**

*Bugulina californica*

*Cellaria diffusa*

*Leieschara* sp.

*Phidolopora* sp.

Bryozoan/Hydroid spp.

**Class: Stenolaemata**

**Order: Cyclostomatida**

*Crisia* sp.

*Heteropora* sp.

**Phylum: Cnidaria**

**Class: Anthozoa**

**Order: Actiniaria**

Actiniaria sp.1

Actiniaria sp.2

Actiniaria sp.3

*Cribrinopsis fernaldi*

cf. *Hormathiidae* sp.

*Liponema brevicorne*

*Metridium* sp.

*Stomphia didemon*

**Order: Alcyonacea**

*Alcyonacea* spp.

*Anthomastus* sp.

*Calcigorgia spiculifera*

*Clavularia* sp.

*Isidella* sp.

*Lepidisis* sp.

*Paragorgia* sp.

*Paragorgia arborea*

*Primnoa* cf. *pacifica*

Primnoidea

*Swiftia simplex*

**Order: Antipatharia**

Antipatharia spp.

*Lillipathes* sp.

**Order: Pennatulaceae**

*Anthoptilum grandiflorum*

*Halipterus willemoesi*

Pennatulaceae spp.

*Ptilosarcus gurneyi*

*Umbellula* cf. *lindahli*

*Virgularia* sp.

**Order: Scleractinia**

*Balanophyllia elegans*

*Desmophyllum dianthus*

**Order: Zoantharia**

Zoantharia

**Class: Hydrozoa**

Hydrozoa sp.1

Hydrozoa sp. 2

**Order: Anthoathecata**

Hydrocoral sp.1

*Plumularia* spp.

*Stylaster* spp.

*Stylaster* sp. 1

*Tubularia*

**Order: Leptothecata**

*Abietinaria* sp.

**Class: Schyphozoa**

*Periphylla* sp.

**Phylum: Porifera**

**Class: Demospongiae**

Demospongiae spp.

**Order: Axinellida**

Axinellidae

**Order: Desmacellida**

*Desmacella* spp.

**Order: Poecilosclerida**

*Asbestopluma* spp.

*Esperiopsis* spp.

*Hamigera* spp.

*Isodictya* sp.

**Order: Polymastiida**

*Polymastia* sp.

**Order: Tetractinellida**

*Penares cortius*

*Poecillastra* sp.

**Class: Hexactinellida**

**Order: Hexactinosida**

*Aphrocallistes vastus*

*Chonelasma* spp.

*Farrea* spp.

*Hexactinosida* spp.

*Heterochone calyx*

*Pinulasma* spp.

**Order: Lyssacinosa**

Rossellidae (*Acanthascus* spp.,

*Rhabdocalyptus* spp. & *Staurocalyptus* spp.)

## APPENDIX 1 – SUMMARY TAXONOMIC CHECKLIST

Classification of all 105 benthic and mid-water organisms observed as occurring on SK-B Seamount including the 2000, 2011, 2015 survey taxa the Algae, Bryozoa, Cnidaria, and Porifera phyla as well as species present from the literature. Species with an asterisk indicate absence from the 2000, 2011, and 2015 surveys.

**Phylum: Ochrophyta**

**Class: Phaeophyceae**

Phaeophyceae sp.

**Order: Desmarestiales**

*Desmarestia dudresnayi* subsp. *foliaceae*\*

*Desmarestia herbacea*\*

*Desmarestia viridis*\*

**Order: Laminariales**

*Laminaria yezoensis*\*

**Order: Sphacelariales**

*Battersia norrisi*\*

**Phylum: Rhodophyta**

**Class: Florideophyceae**

**Order: Ceramiales**

*Antithamnion defectum*\*

*Cryptopleura*\*

*Cumathamnion decipiens*\*

*Haraldiophyllum nottii*\*

*Membranoptera* sp.\*

*Phycodrys isabellae*\*

*Polyneura latissima*\*

*Polysiphonia pacifica*\*

*Ptilota* sp.\*

*Ptilota filicina*\*

**Order: Corallinales**

Corallinaceae sp.

**Order: Gigartinales**

*Callophyllis* sp.\*

*Callophyllis rhynochocarpa*\*

*Hommersandia maximicarpa*\*

*Opuntiella californica*\*

**Order: Rhodymeniales**

*Gloiocladia laciniata*\*

*Fryeella gardneri*\*

**Phylum: Bryozoa**

**Class: Gymnolaemata**

**Order: Cheilostomatida**

*Bugulina californica*

*Cellaria diffusa*

*Leieschara* sp.

*Phidolopora* sp.

Bryozoan/Hydroid spp.

**Class: Stenolaemata**

**Order: Cyclostomatida**

*Crisia* sp.

*Heteropora* sp.

**Phylum: Cnidaria**

**Class: Anthozoa**

**Order: Actiniaria**

Actiniaria sp.1

Actiniaria sp.2

Actiniaria sp.3

*Anthopleura xanthogrammica*\*

*Cribrinopsis fernaldi*

cf. *Hormathiidae* sp.

*Liponema brevicorne*

*Metridium* sp.

*Metridium farcimen*\*

*Stomphia didemon*

*Urticina lofotensis*\*

**Order: Alcyonacea**

Alcyonacea spp.

*Calcigorgia spiculifera*

*Anthomastus* sp.

*Clavularia* sp.

*Isidella* sp.

*Lepidisis* sp.

*Paragorgia* sp.

*Paragorgia arborea*

*Swiftia simplex*

*Primnoa* cf. *pacifica*

Primnoidea

**Order: Antipatharia**

Antipatharia spp.

*Lillipathes* sp.

**Order: Pennatulacea**

Pennatulacea spp.

*Anthoptilum grandiflorum*

*Halipteris willemoesi*

*Ptilosarcus gurneyi*

*Umbellula* cf. *lindahli*

*Virgularia* sp

**Order: Scleractinia – stony corals**

*Balanophyllia elegans*  
*Desmophyllum dianthus*  
*Madrepora* sp. \*

**Order: Zoantharia**

*Epizoanthus scotinus*\*  
Zoantharia

**Class: Hydrozoa**

Hydrozoa sp. 1  
Hydrozoa sp. 2

**Order: Anthoathecata**

Hydrocoral sp. 1  
*Plumularia* spp  
*Stylaster* spp  
*Stylaster* sp. 1  
*Tubularia*

**Order: Leptothecata**

*Abietinaria* sp.  
*Obelia longissima*\*

**Order: Narcomedusae**

*Solmissus* sp. \*

**Order: Siphonophorae**

*Nanomia bijuga*\*

**Class: Schyphozoa**

*Periphylla* sp.

**Phylum: Porifera**

**Class: Calcarea**

Calcarea sp.\*  
*Leucilla nuttingi*\*  
*Leucosolenia* sp. \*

**Class: Demospongiae**

Demospongiae spp.

**Order: Axinellida**

Axinellidae  
*Axinella* sp. \*

**Order: Desmacellida**

*Desmacella* spp.

**Order: Haplosclerida**

*Haliclona (Haliclona)*\*

**Order: Poecilosclerida**

*Acarnus erithacus*\*  
*Asbestopluma* spp.  
*Esperiopsis* spp.  
*Hamigera* spp.  
*Isodictya* sp.  
*Mycale (Mycale) loveni*\*

**Order: Polymastiida**

*Polymastia* sp.

**Order: Tetractinellida**

*Penares cortius*  
*Poecillastra* sp.

**Class: Hexactinellida**

**Order: Hexactinosida**

*Aphrocallistes vastus*  
*Chonelasma* spp.  
*Farrea* spp.  
*Farrea occa*\*  
*Heterochone calyx*  
*Hexactinosida* spp.  
*Pinulasma* spp.

**Order: Lyssacinosa**

*Acanthascus* sp.\*  
*Rhabdocalyptus dawsoni*\*  
Rossellidae  
*Staurocalyptus* sp. \*

## APPENDIX 3 – EXPERT ID ADVICE

Experts consulted by Maeva Gauthier in 2016 for advice on species identification. These notes are extracted from a longer communication.

### Dr. Henry Reiswig - Sponges expert

Conversation notes

- Hard to see differences between *Farrea* species on photos. Changed *Farrea occa* for *Farrea* sp.
- *Acanthascus* are mainly found hanging down on cliffs. *Rhabdocalyptus* tends to be looking dirty and *Staurocalyptus* is more clean. But they are still very hard to distinguish using only imagery.
- Most boot sponges should be grouped under the Family Rosellidae (Class: hexactinellida)
- General comment: Yellow sponge sometimes found on *Farrea* is a demospongia predator sponge, likely *Desmacella* genus, family Biennidae

### Dr. Daphne G. Fautin, Anemone Expert

Professor Emerita, University of Kansas

- Color is a really poor feature for identifying anemones, in part because many species are the same color, and because many species can assume a variety of colors.
- Venus fly-trap anemones: Many deep-sea anemones appear to assume that form. One is, indeed, *Actinoscyphia*, but these found here are not members of that genus. Rather, they probably belong to the genus *Hormathia* – and are certainly members of family Hormathiidae. Many people, alas, have assumed that the common name Venus fly-trap anemone is a synonym of the scientific name *Actinoscyphia* – and so the misidentification is magnified.
- Family Actinostolidae and Hormathiidae seem to be the most abundant and diverse families in the deep sea. A major problem is that there is no way of knowing how many species are in these photos – all may show the same species or each photo may be of a different species. And ditto the genera to which they belong.

### Dr. Philip Lambert- Echinoderm expert

Holothuroids

- The class “holothuroidea” is the safest statement in many instances. Most images are too low resolution to even make out tube feet vs papillae so are not identifiable beyond class.

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