Trap camera videos from SGaan Kinghlas - Bowie Seamount: Overview of data obtained during Sablefish bottom longline trap fishing in 2016

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2017

Canadian Data Report of Fisheries and Aquatic Sciences 1279

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TRAP CAMERA VIDEOS FROM SGAAN KINGHLAS – BOWIE SEAMOUNT: OVERVIEW OF DATA OBTAINED DURING SABLEFISH BOTTOM LONGLINE TRAP FISHING IN 2016

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Cat. No. Fs97-13/1279E-PDF ISBN 978-0-660-09488-5 ISSN 1488-5395

Correct citation for this publication:

Gauthier, M. 2017. Trap camera videos from SGaan Kinghlas – Bowie Seamount: Overview of data obtained during sablefish bottom longline trap fishing in 2016. Can. Dat. Rep. Fish. Aquat. Sci. 1279: v + 18 p.

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ABSTRACT

Gauthier, M. 2017. Trap camera videos from SGaan Kinghlas – Bowie Seamount: Overview of data obtained during sablefish bottom longline trap fishing in 2016. Can. Dat. Rep. Fish. Aquat. Sci. 1279: v + 18 p.

SGaan Kinghlas-Bowie (SK-B) was designated as a Marine Protected Area (MPA) in 2008 and is co-managed by the Government of Canada and the Council of the Haida Nation. A Sablefish (*Anoplopoma fimbria*) fishery has occurred in some areas of the Bowie Seamount since 1985. A joint research project between DFO, Simon Fraser University, and Wild Canadian Sablefish Ltd. has occurred since 2012 to capture deep-sea videos from the Sablefish longline trap fishery. This data report gives an overview of the video annotation of the habitat (substrate), impacts detected, and soft corals (Alcyonacea, Antipatharia and Pennatulacea Orders; Stylasteridae Family) and sponges (Demospongiae and Hexactinellida Classes) observed from the SK-B fishing trip in May and June 2016. Overall, 32 sets allowed for video observations of the substrate and benthic communities. 16 locations showed a presence of deep-sea corals (Alcyonacea, Pennatulacea, Antiphatharia, Stylasteridae) or sponges (Demospongiae, Hexactinellida), while absent from the 16 other set locations. Soft bottom substrates (mud or sand) were prevalent (75%) followed by hard substrates (35%) consisting of gravel, cobbles, boulders or bedrock. Loose rock was present in most of the sets (69%) where the primary substrate was muddy or sandy. Finally, a majority of sets (26) indicated observations of the traps dragging, rolling, or bouncing on the seafloor, but only a minority (7) allowed for observable impacts on the seafloor, on invertebrates, or on habitat-forming ecosystems. This report will help support future analyses on the biology of Bowie Seamount and SK-B MPA.

RÉSUMÉ

Gauthier, M. 2017. Vidéos obtenues au mont sous-marin Bowie (SGaan Kinghlas) à l'aide de caméras-pièges : Vue s'ensemble des données obtenues pendant la pêche à la palangre de fond et au casier à la morue charbonnière en 2016. Rapp. stat. can. sci. halieut. aquat. 1279 : v + 18 p.

Le mont sous-marin Bowie (SGaan Kinghlas) (SK-B) a été désigné comme zone de protection marine (ZPM) en 2008 et est géré conjointement par le gouvernement du Canada et le Conseil de la Nation Haïda. Une pêche à la morue charbonnière (*Anoplopoma fimbria*)se déroule dans certaines zones du mont sous-marin Bowie depuis 1985. Le MPO, l'Université Simon Fraser, et Wild Canadian Sablefish Ltd. ont entamé un projet de recherche conjoint en 2012 pour saisir des vidéos des grands fonds de la pêche à la palangre et au casier à la morue charbonnière. Ce rapport de données offre une vue d'ensemble de l'annotation des vidéos concernant l'habitat (substrat), les impacts détectés, ainsi que les coraux mous (ordres Alcyonacea, Antipatharia et Pennatulacea; famille Stylasteridae) et les éponges (classes Demospongiae et Hexactinellida) observés pendant le voyage de pêche dans la ZPM SK-B en mai et en juin 2016. Dans l'ensemble, 32 calées ont permis l'observation vidéo du substrat et des communautés benthiques. 16 emplacements ont montré une présence de coraux d'eau profonde (Alcyonacea, Pennatulida, Antiphatharia, Stylasteridae) ou d'éponges (Demospongiae et Hexactinellida) qui étaient cependant absents des 16 autres endroits. Les substrats de fond meuble (de vase ou de sable) étaient très répandus (75 %), suivis par des substrats durs (35 %) composés de gravier, de galets, de rochers ou de substrats rocheux. Des roches détachées étaient présentes dans la plupart des endroits (69 %) où le substrat primaire était vaseux ou sablonneux. Enfin, une majorité des calées (26) ont permis d'observer des casiers qui trainaient, qui roulaient ou qui rebondissaient sur le fond marin, mais seule une minorité (7) a relevé des impacts observables sur le fond marin, sur les invertébrés, ou sur les écosystèmes qui font office d'habitat. Ce rapport contribuera aux analyses futures de la biologie du mont sous-marin Bowie et de la ZPM SK-B.

BACKGROUND

Since 1985, Sablefish (*Anoplopoma fimbria*) fishery in British Columbia has occurred at SGaan Kinghlas - Bowie (SK-B) Seamount (Murie et al. 1996). Conical traps are used with a bottom diameter of 54-58" (Murie et al. 1996) and are attached to bottom longlines that are anchored, typically a set will comprise 40-80 traps. The SK-B Seamount Marine Protected Area (MPA) was established in 2008 around three seamounts: Hodgkins, Davidson and Bowie (SGaan Kinghlas). To manage commercial fishing activities, the SK-B MPA was separated into three zones. Zone 1 (SK-B seamount down to 457 m) and Zone 3 (Hodgkins and Davidson seamounts) are closed to fishing, while zone 2 is open for Sablefish longline trap fishery deeper than 457 m on SK-B Seamount (DFO 2015; see Figure 1).

A joint research project between DFO, Simon Fraser University, and Wild Canadian Sablefish Ltd. has been carried out since 2012 to capture deep-sea videos from the Sablefish longline trap fishery. Figure 2 illustrates the fishing gear and camera system to monitor the potential effect of fishing gear on benthic ecosystems in Zone 2 (Doherty and Cox, 2017).

This data report gives an overview of the video annotation of the habitat (substrate), impacts detected, soft corals (Alcyonacea, Antipatharia and Pennatulacea Orders; Stylasteridae Family) and sponges (Demospongiae and Hexactinellida Classes) observed from the SK-B fishing trip in May and June 2016. Trap camera observations at SK-B from 2014-2015 fishing trips and video review methods are previously described in Doherty and Cox (2017).

CAMERA DEPLOYMENTS

Camera systems were mounted in Sablefish traps. To allow for a clearer field of view, the net was removed from one side of the trap (Figure 2; from Doherty and Cox, 2017). For a general view of the deployment, see Doherty and Cox (2017). Although the linear distance between set endpoints ranged from 2.2 to 3.8 km, with a median set length of 3.0 km, the gear position on bottom may differ because of prevailing currents, depth, and/or substrate type.

Cameras were deployed on 4 of the 10 fishing events for the May 2016 trip (May 9 - May 12) and on 28 of the 66 fishing events for the June 2016 trip (June 1 - June 26). Traps with cameras remained on the seafloor for between 20-48 hours, with a median bottom time of 46 hours.
Video observations of bottom substrate were successfully obtained from 32 of the trap camera sets. Some videos within those sets did not allow for video observations of the bottom substrate because:

(1) The image turned black;

(2) The trap rested on its side or was dragging in a position where the bottom substrate was not visible;

(3) The trap was suspended in the water column while being set or retrieved;

(4) The visibility was extremely poor due to sediments in the water column.

VIDEO PROCESSING

VideoMiner Software version 3.0.8.0 developed by DFO (Available at: downloads.crmltd.ca/f/Crm1335/) was used to annotate the videos. Attributes related to the physical substrate, current speed and direction, and trap position and movements were stored in a Microsoft Access database.

Video clips recorded were of 60 seconds duration and varied between 10 and 35 clips per set. Cameras were programmed to record video at 2-hour intervals while the trap was stationary on the seabed. Accelerometers within the camera housings were used to trigger supplementary video clips of gear movement during retrieval. All videos were processed to capture movement, bottom type, and species while the trap was stationary. All videos were processed for trap movement during gear retrieval.

Video annotation of all benthic species was influenced by the distance to the camera, the visibility, the field of view (obstructed or not) and a lack of species samples to allow for precise identification (Cairns 2007, Reiswig 2015). Species were identified to the lowest taxonomic rank possible (e.g. species, genus, family, order, etc.) with higher confidence, meaning that if the confidence was low for a species, the higher taxonomic rank would be chosen to increase the confidence level. Identification confidence scores of “low”, “medium”, or “high” were used nonetheless (Appendix 2), but this reduces the prevalence for low confidence level observations. Recent Quality Assurance Quality Control on SK-B video annotation data has shown that it was preferred to use a higher taxonomy level to increase the level of confidence for data analysis (Gauthier and Gale, in prep.).

Video recordings of the seabed varied with movement of the traps. Some sets allowed for more field of view of the seabed than others because of that reason. Recordings happened while the trap was not moving, in addition to a variable amount of video while the gear was retrieved. These new bottom observations while the trap was retrieved varied with how many videos were collected during that time, how long the trap was moving along the seafloor, the position of the trap (dragging, rolling, suspended), the camera angle, and the water clarity.

Most observations of coral and sponges did not require access to resources because the taxonomy level was at the Order or Class level. Nonetheless, primary resources included Lamb and Hanby 2005, Wing and Bernard 2004, Clark 2006, Cairns 2007, Jamieson et al. 2007, Etnoyer 2008, Stone et al. 2011,

Williams 2013 and Du Preez et al. 2015. The World Register of Marine Species (WoRMS; www.marinespecies.org; accessed November 2016) was used to verify nomenclature. Video stills of the taxa observed can be found in Appendix 1. Because the quality of video footage is always superior to video stills, they are a bit blurry.

SUMMARY OF VIDEO OBSERVATIONS

CORALS AND SPONGES

Out of 32 set locations, 50% (16) included observations of corals or sponges (Table1). Gorgonian corals (Order Alcyonacea) were found in 10 locations, Sea whip (Order Pennatulacea) was found in 1 location, sponges (Classes Demospongiae or Hexactinellida) was found in 6 locations, black corals (Order Antipatharia) were found in 2 and hydrocorals (Family Stylasteridae) in 3.

Table 1. Quantity of sets with presence of corals and/or sponges based on video observations during the May and June 2016 sablefish fishing trips to SK-B Seamount.

Observations	May	June	Total	%
Alcyonacea Order (Gorgonian corals)	0	10	10	32
Pennatulacea Order (Sea whips)	0	1	1	3
Antipatharia Order (Black corals)	0	2	2	6
Soft Corals/Octocorals (ID'd at higher level)	2	5	7	22
Porifera Phylum (Sponges)	0	6	6	19
Hydrocorals (Stylasteridae family)	0	3	3	9
Presence of Corals and Sponges	2	14	16	50
Absence of Corals and Sponges	5	11	16	50
Total Observations	**7**	**25**	**32**	**100**

Overall, 32 sets and 254 videos showed a presence of coral and sponges, for a total of 72 unique observations of corals or sponges. Sets of videos while traps were stationary (32 sets; 231 videos) and videos in motion (all types of motions) (12 sets; 22 videos) accounted for 38 and 34 observations of coral and sponge structures, respectively (see Appendix 2).

BOTTOM SUBSTRATE

The prevalent bottom substrate was mud or sand as primary substrate (75%), followed by bedrock or loose rock as the primary substrate (Table 2).

Table 2. Quantity of sets with presence of corals and/or sponges arranged by substrate type based on video observations during May 2016 and June 2016 sablefish fishing trips to SK-B Seamount.

Substrate	Number of Camera Sets	Percent of Sets	Sets with Presence of Coral or Sponge
Soft bottom as primary substrate:			
Soft bottom (mud)	12	38	0
Soft bottom (sand)	1	0	1
Mud with bedrock	1	0	0
Mud with gravel	9	28	0
Mud with cobbles	9	28	5
Mud with boulders	7	22	2
Total sets on soft bottom (sand or mud)	24	75	8
Hard bottom as primary substrate:			
Boulders	5	16	3
Gravel with sand	0	0	0
Gravel with boulders	1	0	0
Cobbles with sand or mud	1	0	0
Cobbles with boulders	1	0	0
Bedrock with boulders	2	0	1
Bedrock with mud or sand	5	0	3
Total sets on hard bottom (any types)	11	34	**7**

Notes: Hard bottom substrate was classified based on substrate descriptors in 'VideoMiner' software:

Gravel, between 1/8 inch and 3 inch (combined observations classified as "pea gravel" or "gravel" in database)

Cobble, between 3 inches and basketball size

Boulders, bigger than a basketball

TRAP MOTION AND IMPACTS OBSERVED

Out of 32 sets, 26 indicated the traps dragging, rolling or bouncing on the seafloor. The trap was dragging on the seabed in 23 sets (51 videos) but only 6 sets (10 videos) allowed a camera angle to observe impacts. 9 sets (17 videos) showed the trap rolling or bouncing on the seafloor, while 3 sets out of those (6 videos) allowed for the observation of impacts. Overall, 9 sets allowed to measure impacts: 2 sets (4 videos) showed drag marks on the bottom, 5 sets (11 videos) showed damage to invertebrates, and 2 sets (9 videos) showed damage to habitat-forming ecosystems (corals or sponges).

CONCLUSION

In May and June 2016, 10 and 66 longline trap fishing sets, respectively, were deployed on fishing trips to SK-B Seamount. Overall, 32 sets allowed for video observations of the substrate and benthic communities. 16 locations showed a presence of deep-sea corals (Alcyonacea, Pennatulacea, Antiphatharia, Stylasteridae) or sponges (Demospongiae, Hexactinellida), while absent from the 16 other set locations.

Soft bottom substrates (mud or sand) were prevalent (75%) followed by hard substrates (35%) consisting of gravel, cobbles, boulders or bedrock. Loose rock was present in most of the sets (69%) where the primary substrate was muddy or sandy.

Alcyonacea corals were present in 5 locations where the main substrate was mud or sand only, in 5 locations where the main substrate was soft bottom in addition to loose rock (gravel, cobbles, or boulders) and in 13 locations where the main substrate was hard bottom (gravel, cobbles, bedrock and boulders) (see Appendix 2). Pennatulacea and sponges were mostly present where the main substrate was hard bottom (6 locations) and rarely where it was soft substrate with cobbles (2 locations).

Finally, a majority of sets (26) indicated observations of the traps dragging, rolling, or bouncing on the seafloor, but only a minority (7) allowed for observable impacts on the seafloor, on invertebrates, or on habitat-forming ecosystems.

ACKNOWLEDGEMENTS

The authors would like to thank Wild Canadian Sablefish Ltd. for funding the development of the trap camera systems, allowing permission to use the data and specimen photos, and supporting this project through their sustainable fisheries research program. We also owe enormous thanks to the captains, crew, and observers who made this project possible, DFO staff K. Anderson, and L. Lacko, who assisted with data collection, equipment preparation, and training of at-sea observers for deploying trap cameras on commercial fishing trips, as well as provided feedback on improvements to the camera system software. Funding for the video analysis portion of this project was provided by DFO.

REFERENCES

Cairns, S.D. 2007. Calcaxonian octocorals (Cnidaria: Anthozoa) from eastern Pacific seamounts. Proc. Calif. Acad. Sci. 58: 511–541.

Chu, J.W.F, and Leys, S.P. 2010. High resolution mapping of community structure in three glass sponge reefs (Porifera, Hexactinellida). Mar. Ecol. Prog. Ser. 417: 97-113.

Clark, R. 2006. Field guide to the benthic marine invertebrates of Alaska's shelf and upper slope. NOAA/NMFS/AFSC/RACE DIVISION. 305 p.

Etnoyer, P.J. 2008. A new species of *Isidella* bamboo coral (Octocorallia: Alcyonacea: Isididae) from northeast Pacific seamounts. Proc. Biol. Soc Washi. 121: 541–553.

DFO. 2011. SGaan Kinghlas Bowie Seamount Marine Protected Area Monitoring Indicators, Protocols and Strategies. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2010/036: 13 p.

DFO. 2015. Appendix 7: Sablefish Commercial Harvest Plan. *In* Pacific Region Groundfish Integrated Fisheries Management Plan. Version 1.3. pp. 1-25.

Doherty, B. and Cox, S. 2017. Data summary of trap camera video obtained during Sablefish bottom longline trap fishing at SGaan Kinghlas - Bowie Seamount, 2014-2015. Can. Dat. Rep. Fish. Aquat. Sci. 1276: iii + 20 p.

Du Preez, C., Curtis, J., Davies, S., Clarke, M., and Fruh, E. 2015. Cobb seamount species inventory. Can. Tech. Rep. Fish. Aquat. Sci. 3122: 108 p.

Gauthier, M. and Gale, K. Manuscript in preparation. Bowie Seamount Species Inventory: biogenic species (Algae, Cnidaria, Porifera, Bryozoa).

Jamieson, G.S., Pellegrin, N., and Jesson, S. 2007. Taxonomy and zoogeography of cold-water corals in coastal British Columbia. Bull. Mar. Sci. 81: 215–229.

Lamb, A. & B. P. Hanby. 2005. Marine life of the Pacific Northwest. Harbour Publishing, Madeira Park, British Columbia, Canada.

Lambert, P. 2000. Sea stars of British Columbia, Southeast Alaska and Puget Sound. UBC Press, Vancouver, British Columbia, Canada.

Leys, S.P., Mackie, G.O., and Reiswig, H.M. 2007. The biology of glass sponges. Adv. Mar. Biol. 52: 1-145.

Love, M. S., M. Yoklavich, & L. Thorsteinson. 2002. The rockfishes of the Northeast Pacific. University of California Press, Berkley, California, USA.

Murie, D.J., Saunders, M., and McFarlane, G. 1996. Canadian trap-fishery for Sablefish on seamounts in the Northeastern Pacific Ocean, 1983-1993. Can. Manuscr. Rep. Fish. Aquat. Sci. 2348: 107 p.

Molodtsova, T.N. 2013. Deep-sea mushroom soft corals (Octocorallia: Alcyonacea: Alcyoniidae) of the Northern Mid-Atlantic Ridge. Mar. Biol. Res. 9: 488-515.

Reiswig, H. M. 2013. 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.

Reiswig, H.M. 2015. First Lanuginellinae (Porifera, Hexactinellida, Rossellidae) from the NE Pacific and first species of *Doconesthes* from the Pacific Ocean. Zootaxa 3920: 572-578.

Stone, R.P., Lehnert, H., Reiswig, H. 2011. A guide to the deep-water sponges of the Aleutian Island Archipelago. NOAA Professional Paper NMFS 12: 187 p.

Williams, G.C. 2013. New taxa and revisionary systematics of alcyonacean octocorals from the Pacific coast of North America (Cnidaria, Anthozoa). Zookeys 283: 15-42.

Wing, B.L. and Barnard, D.R. 2004. A field guide to Alaskan corals. US Dep. Commer. NOAA Tech Memo: NMFS-AFSC-146: 67 p.

FIGURES

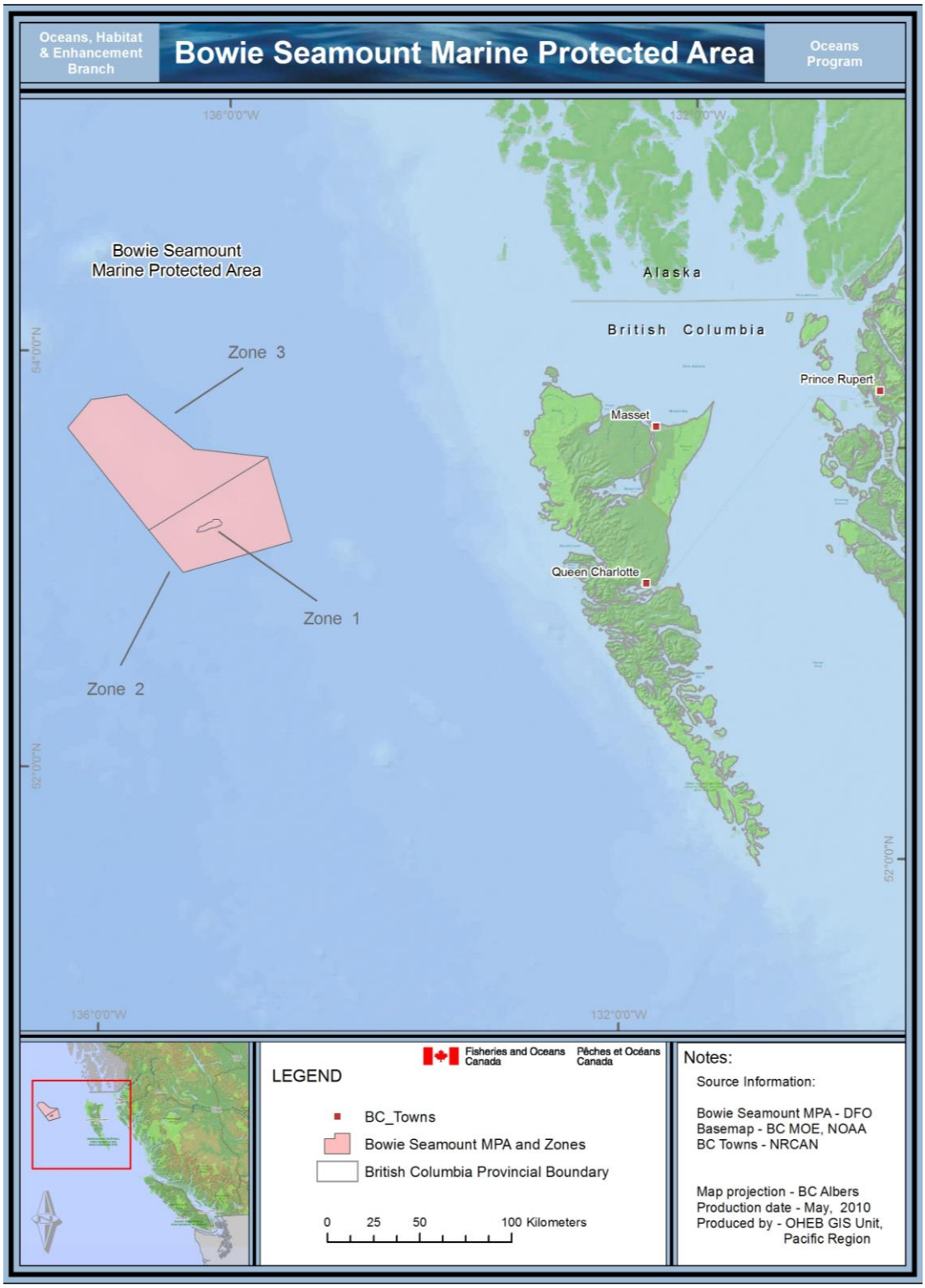
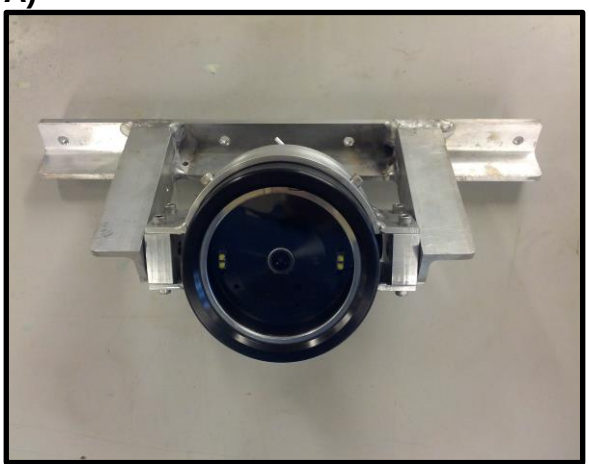


Figure 1. Map of SGaan Kinghlas-Bowie Seamount Marine Protected Area and fishery management zones (Source: DFO 2011).

A)



B)

Figure 2. A) Camera in bracket. B) Front view (left) and top view (right) of camera (grey bracket) and accelerometer (orange bracket) mounted in Sablefish trap.

APPENDIX 1 - CORAL AND SPONGE VIDEO STILLS

PHYLUM CNIDARIA

CLASS ANTHOZOA

Order Alcyonacea - Gorgonian corals

Family Alcyoniidae - Mushroom Corals

Heteropolypus ritteri [1]

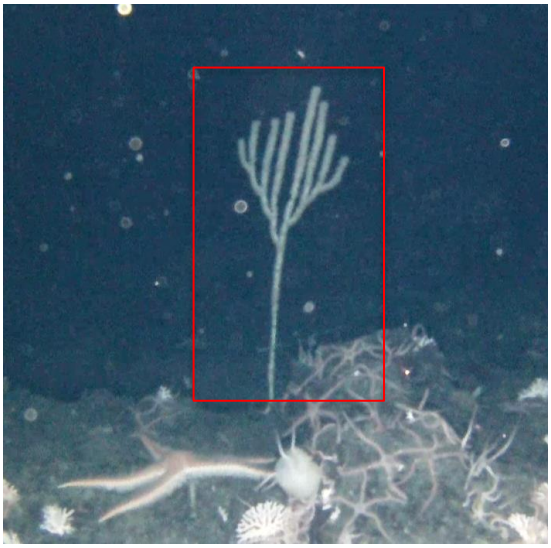
Image Credit:
Wild Canadian Sablefish Ltd.
Observer Depths: 846 m

[1] Until recently binomial nomenclature was *Anthomastus ritteri* (Molodtsova 2013)

Family Isididae - Bamboo Corals

Unidentified Isididae sp.

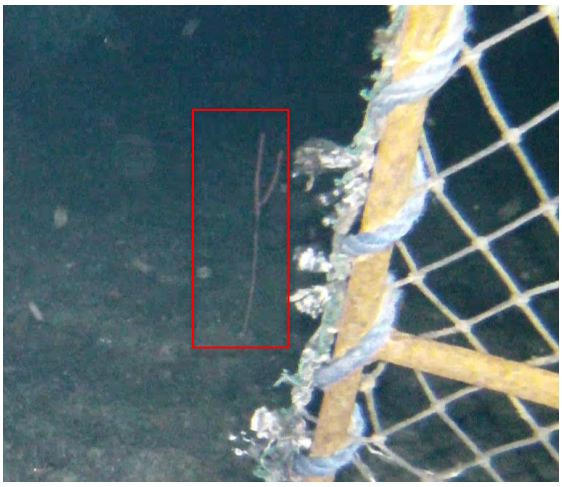
Image Credit:
Wild Canadian Sablefish Ltd.
Observed Depths: 559 - 809 m



Family Plexauridae

Swiftia simplex

Image Credit:
Wild Canadian Sablefish Ltd.
Observed Depths: 646 - 913 m



Unknown Gorgonian

Image Credit:
Wild Canadian Sablefish Ltd.
Observed Depths: 752 - 863 m

Order Antipatharia – Black Corals

Lillipathes

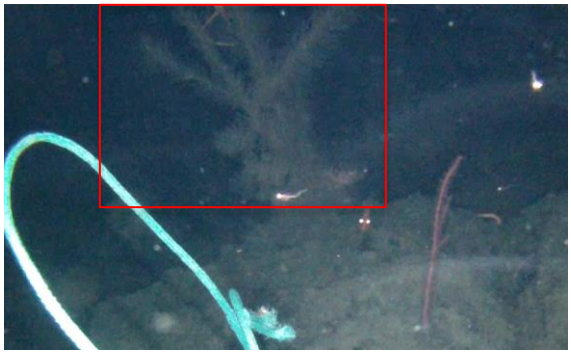


Image Credit:
Wild Canadian Sablefish Ltd.
Observed Depths: 846 m

Order Pennatulacea - Sea whips and sea pens

Umbellula lindahli

Image Credit:
Wild Canadian Sablefish Ltd.
Observed Depths: 751 m

Note: All video observations of sea whips were of poor quality and thus taxonomic identification was only possible to the order level with the exception of *Umbellula lindahli.*

CLASS HYDROZOA

Order Anthoathecata

Family Stylasteridae - Hydrocorals

Unidentified Stylasteridae spp.

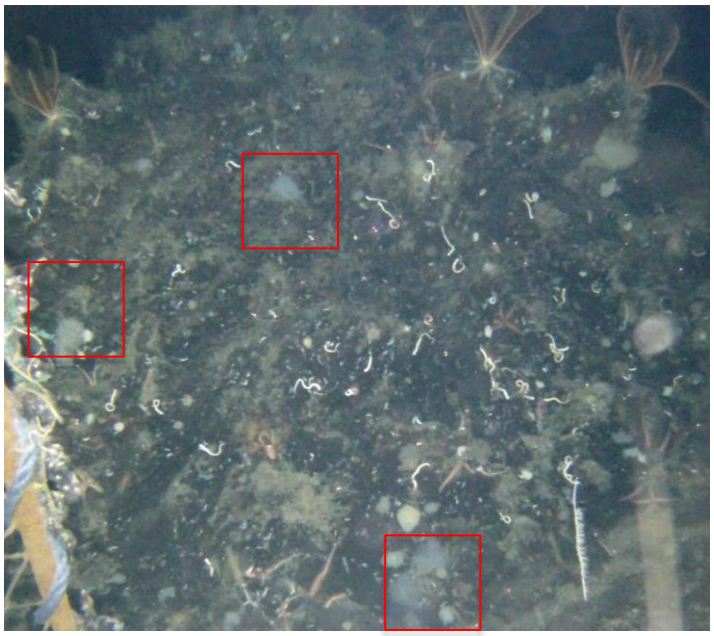
Image Credit:
Wild Canadian Sablefish Ltd.
Observed Depth: 680 m

PHYLUM PORIFERA

CLASS DEMOSPONGIAE - DEMO SPONGES

Unidentified Demospongiae sp.

Image Credit:
Wild Canadian Sablefish Ltd.
Observed Depth: 713 m



CLASS HEXACTINELLIDA - GLASS SPONGES

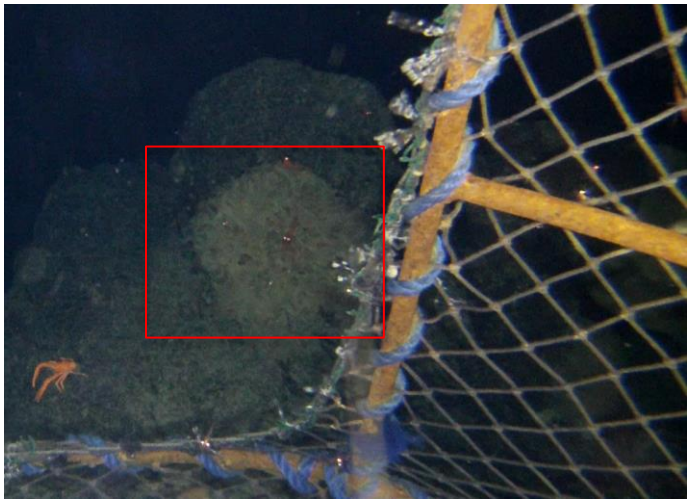
Unidentified Hexactinollida sp.

Image Credit:
Wild Canadian Sablefish, Ltd.
Observed Depth: 731 m

Note: Likely Rosselidae family but too far to tell.

Farrea sp.

Image Credit:
Wild Canadian Sablefish, Ltd.
Observed Depth: NA



APPENDIX 2 - SUMMARY OF CORAL/SPONGE BOTTOM OBSERVATIONS

Order/Phylum	Taxa	Count	Depth (m)	Trap Status	Comment	IDConfidence	Substrate
Alcyonacea	Alcyonacea	1	860	Stationary		High	Bedrock with mud
Alcyonacea	Alcyonacea	1	680	Stationary		High	Not visible
Alcyonacea	Alcyonacea	1	NA	Stationary		High	Bedrock with mud
Alcyonacea	Alcyonacea	1	NA	Dragging		High	Soft bottom
Alcyonacea	Alcyonacea	1	902	Stationary		High	Soft bottom with cobbles
Alcyonacea	Alcyonacea	1	902	Stationary		High	Soft bottom with cobbles
Alcyonacea	Alcyonacea	2	559	Stationary		High	Bedrock with boulders
Alcyonacea	Alcyonacea	2	559	Dragging		High	Bedrock with boulders
Alcyonacea	Alcyonacea	3	559	Rolling		High	Bedrock with sand
Alcyonacea	Alcyonacea	1	726	Stationary		High	Boulders
Alcyonacea	*Heteropolypus ritteri*	2	846	Rolling		High	Boulders
Alcyonacea	Isididae	1	809	Dragging		High	Soft bottom with boulders

Alcyonacea	Isididae	1	559	Stationary		High	Bedrock with boulders
Alcyonacea	Isididae	4	559	Dragging		High	Bedrock with boulders
Alcyonacea	Isididae	1	731	Bouncing		High	Soft bottom with cobbles
Alcyonacea	Isididae	1	731	Stationary		High	Soft bottom
Alcyonacea	Isididae	1	731	Dragging		High	Soft bottom
Alcyonacea	Isididae	1	731	Dragging		High	Soft bottom
Alcyonacea	Isididae	1	726	Stationary		High	Boulders with cobbles
Alcyonacea	Isididae	1	726	Suspended		High	Boulders
Alcyonacea	Isididae	1	713	Dragging		High	Not visible
Alcyonacea	*Swiftia simplex*	1	913	Stationary		High	Soft bottom with gravel
Alcyonacea	*Swiftia simplex*	1	NA	Stationary		High	Bedrock with mud
Alcyonacea	*Swiftia simplex*	2	846	Rolling		High	Boulders

Alcyonacea	*Swiftia simplex*	1	646	Dragging		High	Soft bottom
Anthoathecata	Stylasteridae	2	680	Stationary		High	Bedrock with mud
Anthoathecata	Stylasteridae	10	559	Stationary		High	Bedrock with boulders
Anthoathecata	Stylasteridae	1	731	Bouncing		High	Soft bottom with cobbles
Antipatharia	Antipatharia	2	913	Dragging		High	Bedrock with mud
Antipatharia	Antipatharia	1	913	Dragging		High	Bedrock with mud
Antipatharia	*Lillipathes*	2	846	Rolling		High	Boulders
Antipatharia	*Lillipathes*	1	846	Dragging		High	Boulders
Octocorallia	Octocorallia	1	491	Bouncing		Medium	Gravel with boulders
Octocorallia	Octocorallia	1	568	Stationary		Medium	Soft bottom with boulders
Octocorallia	Octocorallia	2	913	Stationary		High	Soft bottom with cobbles
Octocorallia	Octocorallia	2	725	Stationary		High	Soft bottom with cobbles
Octocorallia	Octocorallia	1	680	Stationary		High	Not visible
Pennatulacea	Pennatulacea	1	559	Rolling		High	Bedrock with sand
Pennatulacea	*Umbellula lindahli*	1	751	Unidentifiable motion		High	Soft bottom with cobbles
Porifera	Demospongiae	5	713	Stationary		Medium	Boulders
Porifera	*Farrea*	1	NA	Stationary	Probably dead	High	Boulders

Porifera	Hexactinellida	1	559	Stationary		High	Bedrock with boulders
Porifera	Hexactinellida	1	731	Bouncing		High	Soft bottom with cobbles
Porifera	Hexactinellida	1	846	Rolling		High	Boulders
Porifera	Hexactinellida	1	726	Suspended		High	Boulders

Notes:

- When available, depth is the mean bottom depth measured from Seabird SBE39 depth sensors deployed in traps. When SBE39 data were not available depths were taken from trap camera depth sensors. When depth data was not available from either SBE39 or trap camera depth sensors, depths are estimated as the midpoint of the set.
- Hard bottom substrate was classified based on substrate descriptors in 'VideoMiner' software:
  - Gravel, between 1/8 inch and 3 inch (combined observations classified as "pea gravel" or "gravel" in database)
  - Cobble, between 3 inches and basketball size
  - Boulders, bigger than a basketball