Cruise Report in Support of Maritimes Region Research Project 'Use of Passive Acoustics to Quantify Fish Biodiversity and Habitat Use': Ocean Observation Systems in the Gully MPA and Scotian Shelf 2022

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Canadian Manuscript Report of
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2023

CRUISE REPORT IN SUPPORT OF MARITIMES REGION RESEARCH PROJECT 'USE OF PASSIVE ACOUSTICS TO QUANTIFY FISH BIODIVERSITY AND HABITAT USE': OCEAN OBSERVATION SYSTEMS IN THE GULLY MPA AND SCOTIAN SHELF 2022

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ABSTRACT

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The Department of Fisheries and Oceans in collaboration with the University of Edinburgh and the Ocean Tracking Network successfully recovered three benthic landers in the Sambro Bank Sponge Conservation Area in the spring of 2022 and redeployed one in the Sambro Bank Sponge Conservation Area and two in the Gully Marine Protected Area in the autumn of 2022. These landers are equipped with camera systems and passive acoustic receivers to record the soundscapes on *Vazella pourtalesii* sponge and sea pen grounds. Two moorings were also recovered, and one deployed on behalf of Dr. Ryan Stanley. This document provides the necessary background information for the recovery (SWA2022-374) and redeployment (AHA2022-469) missions.

RÉSUMÉ

De Clippele, L.H., Xu, J., Mohn, C., Wolff, G., Blackbird, S., Whoriskey, F., Barthelotte, J., Phelan, K., MacDonald, B., Lirette, C., Kenchington, E. 2023. Cruise Report in Support of Maritimes Region Research Project 'Use of Passive Acoustics to Quantify Fish Biodiversity and Habitat Use': Ocean Observation Systems in the Gully MPA and Scotian Shelf 2022. Can. Manuscr. Rep. Fish. Aquat. Sci. 3260: iv + 42 p.

En collaboration avec l'Université d'Édimbourg et Ocean Tracking Network, Pêches et Océans Canada est parvenu à récupérer trois modules de descente benthiques déployés dans la zone de conservation des éponges du banc Sambro au printemps 2022, puis à redéployer un module dans la même zone, et deux dans la zone de protection marine du Gully à l'automne 2022. Ces modules de descente sont munis de caméras et de récepteurs acoustiques passifs permettant d'enregistrer le paysage sonore de lits d'éponges *Vazella pourtalesii* et de pennatules. On a aussi récupéré deux ancrages et déployé un instrument ancré pour Ryan Stanley (Ph.D.). Le présent document fournit les renseignements de base pertinents sur les missions de récupération (SWA2022-374) et de redéploiement (AHA2022-469).

INTRODUCTION

The Canadian Coast Guard (CCG)-facilitated two at-sea missions to recover and deploy scientific equipment, departing and returning from the Bedford Institute of Oceanography (BIO) in Dartmouth, Nova Scotia. Those missions successfully completed six operations: 3 lander recoveries (May 2022) and 3 lander deployments (October 2022) and completed the core activities planned for each mission. Details on the research objectives and the technical operations of the landers that were recovered in May 2022 are provided by Kenchington et al. (2021a). Data associated with that report are deposited in an online open access data repository which provides the necessary background information for the mission (HUDSON2021-048) and data collected in 2021 for the three CTD casts and photos acquired along transects using a drop camera system (4K Camera) to characterize the benthic habitats (Kenchington et al., 2021b).

Upon recovery of the landers in May 2022, the data were extracted from the instruments and the lander and data collection devices were refurbished for redeployment. Details of the data collection from the 2021-2022 deployment and of the research objectives of the 2022 lander redeployments in October, are provided in this report.

This research project is registered in the DFO DMApps under Project 835 (Use of Passive Acoustics to Quantify Fish Biodiversity and Habitat Use) and was approved by DFO management. The end date of the project is 29 March 2024. The project is a collaboration between DFO, the University of Edinburgh, the University of Liverpool, the Ocean Tracking Network (OTN) and the iAtlantic project (https://www.iatlantic.eu/). The iAtlantic project is funded by the European Union's Horizon 2020 research and innovation programme under Grant Agreement no. 818123 and formally ends in 2023.

The principal investigators associated with the project are provided in Table 1. All maps shown in this report were created in ArcGIS using a NAD83 UTM 20N projection.

Table 1. List of Principle Investigators Responsible for Research Deliverables**.**

Name	**Institution**	**Role**
Dr. Laurence De Clippele	University of Edinburgh	PI, Fish Acoustics
Dr. Jinshan Xu	DFO-BIO	PI, Marine Mammal Acoustics
Prof. Murray Roberts	University of Edinburgh	iAtlantic Co-ordinator
Dr. Fred Whoriskey	Ocean Tracking Network	OTN Acoustic Receivers
Prof. George Wolff	University of Liverpool	PI, Sediments
Dr. Sabena Blackbird	University of Liverpool	PI, Sediments
Dr. Christian Mohn	Aarhus University	PI, Physical Oceanography
Dr. Ellen Kenchington	DFO-BIO	DFO Project Lead

LANDER RECOVERY MISSION DETAILS (MAY 2022)

CCGS Sir William Alexander (SWA2022374)

The CCGS *Sir William Alexander* is a Martha L. Black-class light icebreaker. The Commanding Officer for the mission (SWA2022374) was Captain Doug Roe of the Canadian Coast Guard. Captain Roe and his crew, together with Rena Sicord (Planing Officer), Gillian Williams (ROC Officer) and Jay Barthelotte (DFO Vessel Co-ordinator) were instrumental to the success of this mission. At-sea science personnel are listed in Table 2. Barry MacDonald (DFO) was the Chief Scientist for the mission.

Table 2. CCGS *Sir William Alexander* Cruise Participants, Affiliation and Responsibilities.

Name	Affiliation	Duty
1. MacDonald, Barry	DFO	Chief Scientist
2. Camille Lirette	DFO	Data Management
3. Meggie Chamandy	DFO	Training

The overall aim of the SWA2022374 recovery mission (12-13 May 2022) was to recover three benthic landers from the Sambro Bank Sponge Conservation Area (Figure 1), which were deployed in September 2021 (Kenchington et al., 2021a,b). Each lander was equipped with passive acoustic monitoring (PAM) recorders (SoundTrap and Ocean Tracking Network Acoustic Receivers), temperature, salinity and current sensors, a camera system and sediment traps (Kenchington et al., 2021a). Standard operating procedures (SOPs) for recovery of the landers are provided in Appendix 1. Figure 2 shows the lander recovery operation at sea.

The mission successfully completed three operations which are summarized in Table 3. The date/time, latitude/longitude and depth were recorded along with other metadata.

Table 3. Time and Location of the Lander Recovery Operations.

Station	Mooring No.	Date	Time (GMT)	Latitude (DM)	Longitude (DM)	Sounder Depth (m)
HDV	M2201	12-May	18:10	43º 53.2634' N	63º 05.7266' W	151
DV	M2202	12-May	18:43	43º 53.7716' N	63º 04.7649' W	169
LDV	M2179	12-May	19:14	43º 54.8680' N	63º 03.4418' W	228

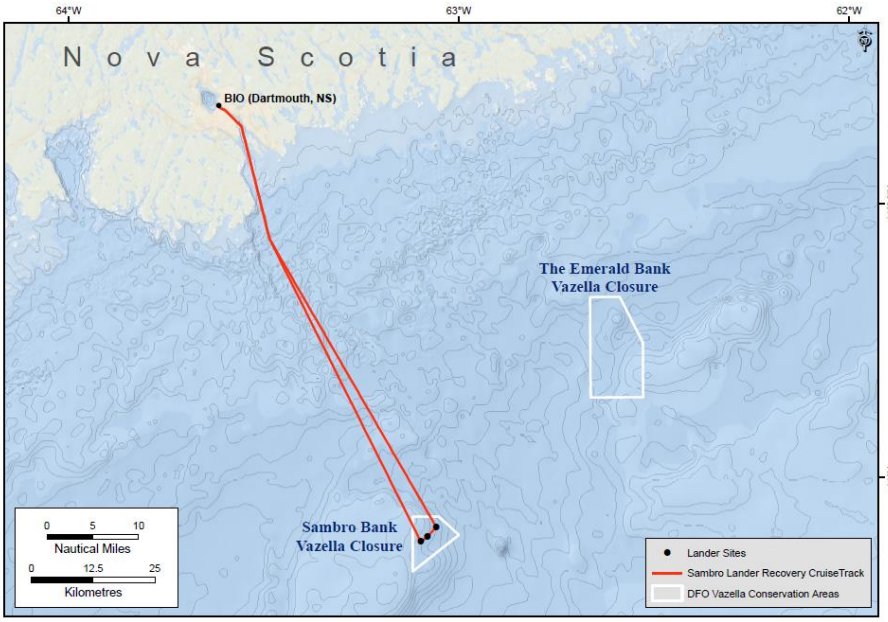


Figure 1. Stylized cruise track (red line) showing the location of the landers (black circles) relative to the port of departure (BIO). The Sambro Bank Sponge Conservation Area and the near by Emerald Bank Sponge Conservation Area are shown in white outline.

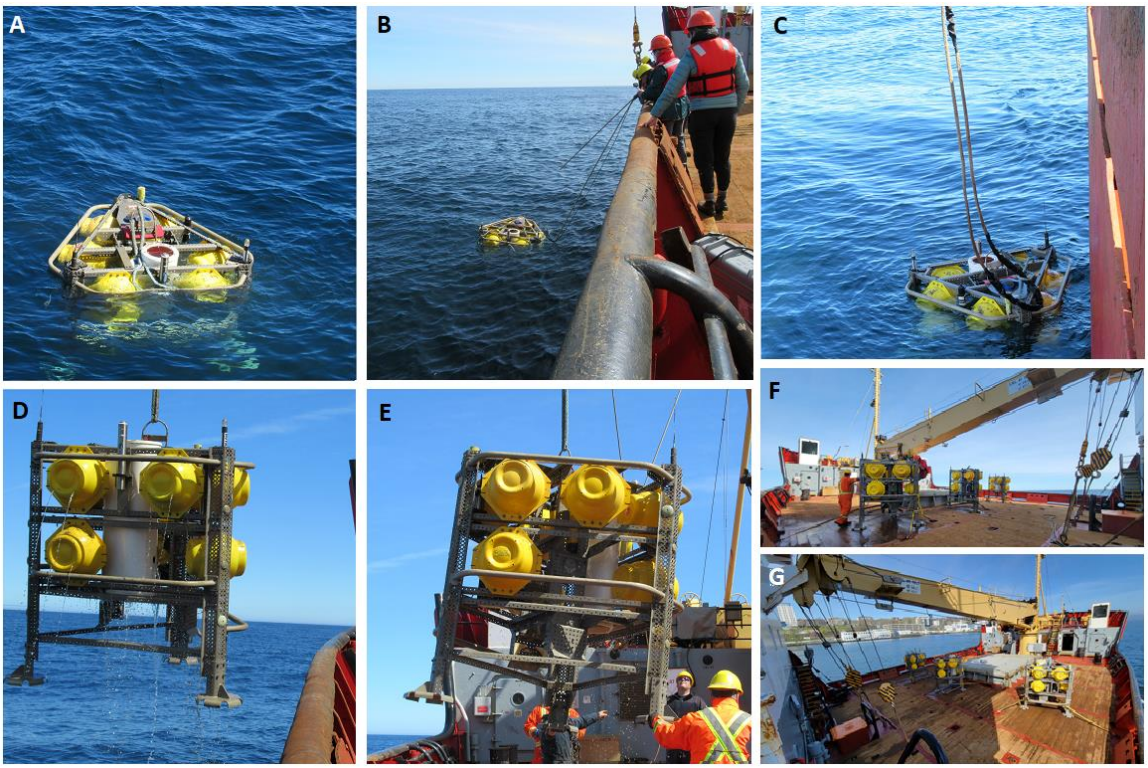


Figure 2. Photos of the lander recovery operations at sea. An acoustic release triggers the lander's surfacing (A). The ship repositioned and the lander was then hooked (B, C), and raised onto the deck of the vessel (D, E), where it is secured (F, G). See Appendix 1.

PRELIMINARY RESULTS FROM RECOVERY MISSION

An annotated list of data collected from the landers are provided in Table 4.

Table 4. Overview of Lander Data Collections (2021-2022). Important information for interpreting biological and acoustic observations was collected from the associated instrumentation. Quality assurance and control was assessed and the lead investigators (PIs) indicated (see Table 1).

Instrumentation	Data Associated with Instrumentation	QA/QC Status	PI(S)	Comments
Sentinel V ADCP (2)	Speed and direction of currents	Completed.	Christian Mohn	Successful data collection.
Infinity AEM-USB	2-D current and T	Completed.	Jinshan Xu Christian Mohn	Successful data collection.
Seabird CTD (3)	Conductivity, temperature, and depth	Completed.	All	Successful data collection.
Technicap PPS 4/3 Sediment Trap	Particle flux data (POM) and lipid biomarkers	Drift was noted: L1 lost 4min 9sec, L2 lost 1min 1sec.	George Wolff, Sabena Blackbird	Successful data collection.
ST500	Acoustic. Bandwidth 20 Hz – 48 kHz. 96 kHz, 312 s (5.2 min) sleep for 900 s (15 min) period	Completed.	Jinshan Xu, Laurence De Clippele	Successful data collection in general. Data collection stopped on April 25th 2022 due to storage being full. It has interference from ADCP.
ST600	Acoustic. Bandwidth 20 Hz – 48 kHz. 96 kHz, 312 s (5.2 min) sleep for 900 s (15 min) period	Completed.	Jinshan Xu, Laurence De Clippele	Successful data collection. It has interference from ADCP.
AMAR	Acoustic. Bandwidth 10 Hz – 32 kHz Acoustic. 560 s @ 64kHz, 340 s sleep for 900 s (15 mins) period	Completed.	Jinshan Xu, Laurence De Clippele	Successful data collection.
Sony DSC-RX0 Lander Cameras	HDV Site 1 = 2793 photos (57 full days, 1 partial day) DV Site 2 = 11799 photos (245.8 days) LDV Site 3 = 11794 photos (245.7 days)	Completed. Drift time checked.	Laurence DeClippele	Camera 1 issues at HDV site.
OTN acoustic receivers	Presence of OTN tagged fish	Completed.	Fred Whoriskey	Successful data collection.

Time-Lapse Camera

Data collection was hugely successful with 26,386 photos taken. Photos were taken every 30 minutes. At lander site 1, the 'high-density sponge' site (HDV), 2,793 photos were taken, spanning a period of ~58 days (~ 2 months). At lander 2, the 'dead sponge' site (DV), 11,799 photos were collected over 245.8 days (~8.1 months). At lander site 3, the 'low-density sponge' (LDV) site, 11,794 images were collected, spanning a period of 245.7 days (8.1 months). Unfortunately, one of the stainless bulkhead connectors failed and leaked due to significant corrosion and cathodic delamination of the rubber from the connector body, causing the camera at lander site 1 (HDV) to stop working after two months (Figure 3). See also Appendix 2.

The images will be annotated in BIIGLE (https://biigle.de/), a web service for image annotation, which has a machine learning function built in. Fish such as redfish, pollock, silver hake, and sculpins have been observed.

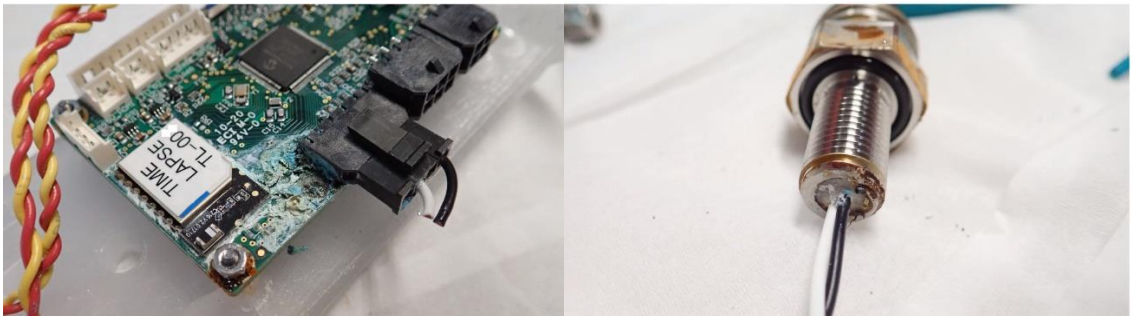


Figure 3. Image of the circuit board of the camera from lander site 1 that suffered corrosion.

Passive Acoustic Data

Around 1 TB of compressed acoustic data (.sud format) per site was collected. Preliminary results show there are many species of baleen whales present in this area: fin whale, blue whale, sei whale, minke whale, North Atlantic right whale, and humpback whale (Figure 4), and signals in the lower frequency bands (< 1kHz) emitted by crustaceans and fish were also picked up (Figure 5). Sounds will be annotated in the Raven Pro Software (https://ravensoundsoftware.com/software/raven-pro/).

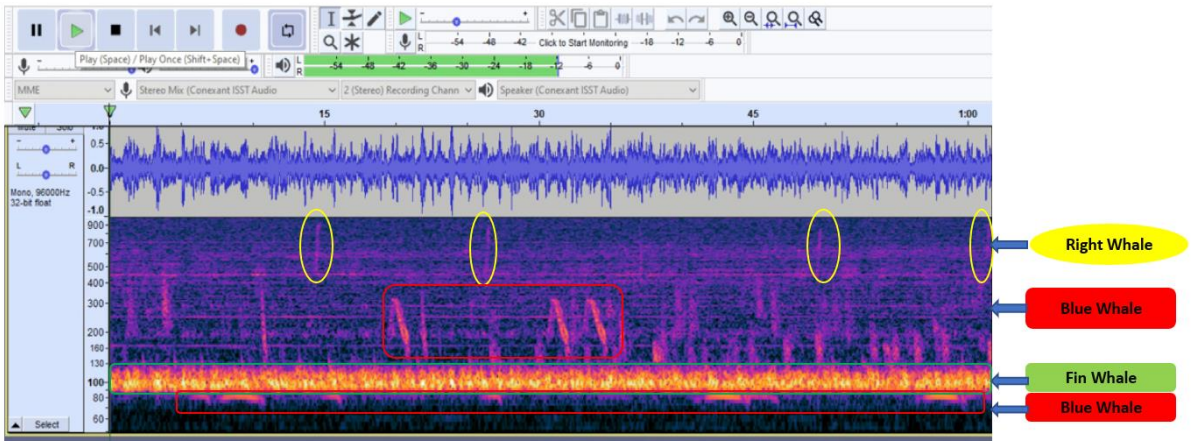


Figure 4. Example showing a spectrogram and waveform indicating the presence of the right whale, blue whale, and fin whale at the same time.

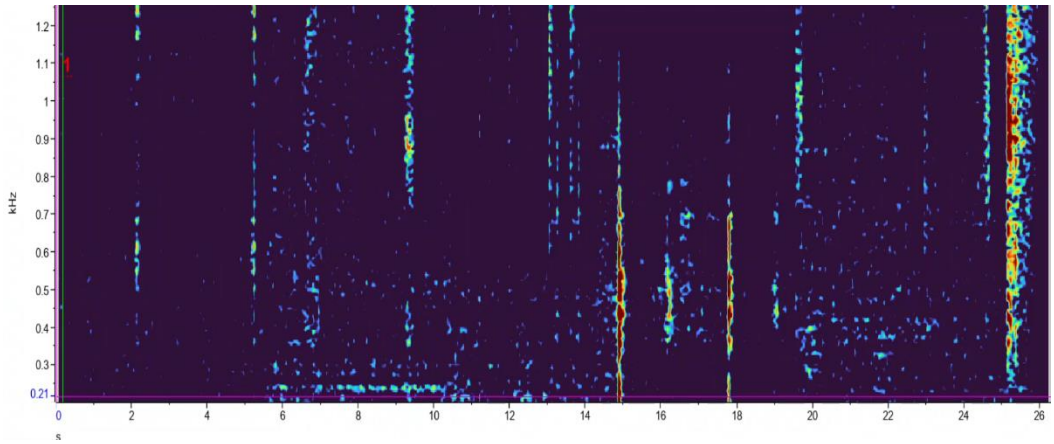


Figure 5. A spectrogram showing a compilation of sounds likely produced by fish and crustaceans.

Ocean Tracking Network (OTN) Receivers

The receivers picked up the presence of the Atlantic bluefin tuna, blue shark and Atlantic swordfish, within ~500 m of the landers. More information can be found on the OTN website: https://members.oceantrack.org/project?ccode=SPONGE

CTD Processing Data

Figures 6, 7 and 8 show graphs of the variation in temperature, salinity and conductivity at the three lander sites. Raw data were scanned for outliers (mainly during deployment and recovery phase). Salinity was calculated from conductivity and pressure records using the Gibbs SeaWater (GSW) Oceanographic Toolbox of TEOS-10 (https://www.teos-10.org/software.htm). The sampling interval is 300 seconds (the original sampling interval, remains unchanged).

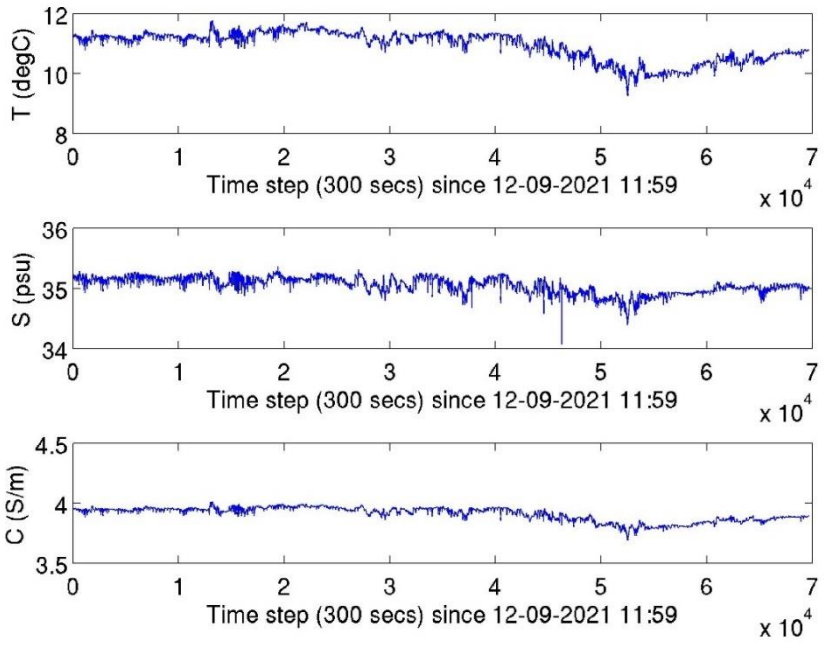


Figure 6. Time series of temperature (degC), salinity and conductivity (S/m) from measurements with a Seabird SBE37 mounted on lander 1 M2201 (high-density sponge site; HDV). The start date and time were 12/09/2021 11:59 – 12/05/2022 11:59.

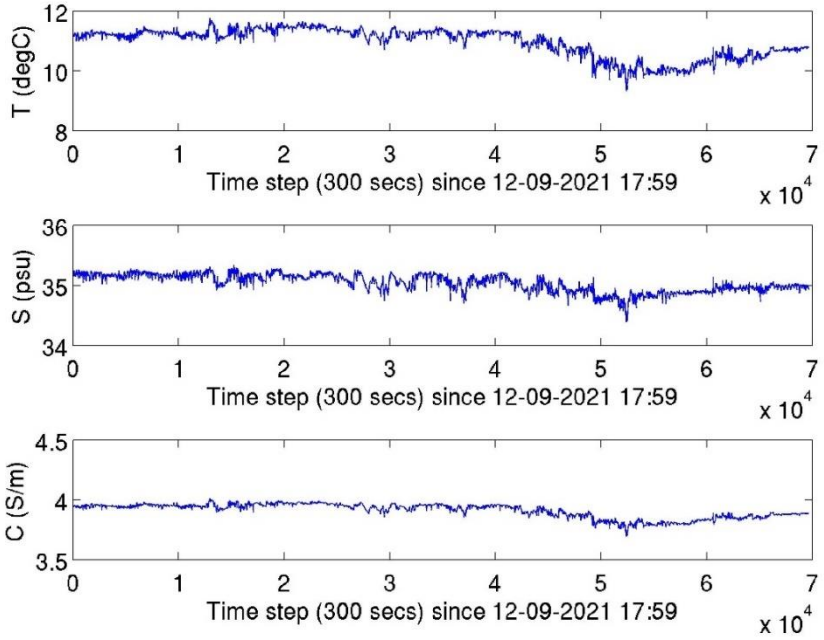


Figure 7. Time series of temperature (degC), salinity and condictivity (S/m) from measurements with a Seabird SBE37 mounted on lander 2 M2202 (dead sponge site; DV). Start date and time was 12/09/2021 17:59 – 12/05/2022 13:59.

Over winter, all sites are relatively warm, around 12 °C, cooling down to around 10°C in spring. This pattern is also visible in the salinity and conductivity, with both being higher in winter and decreasing towards spring (Figures 6-8).

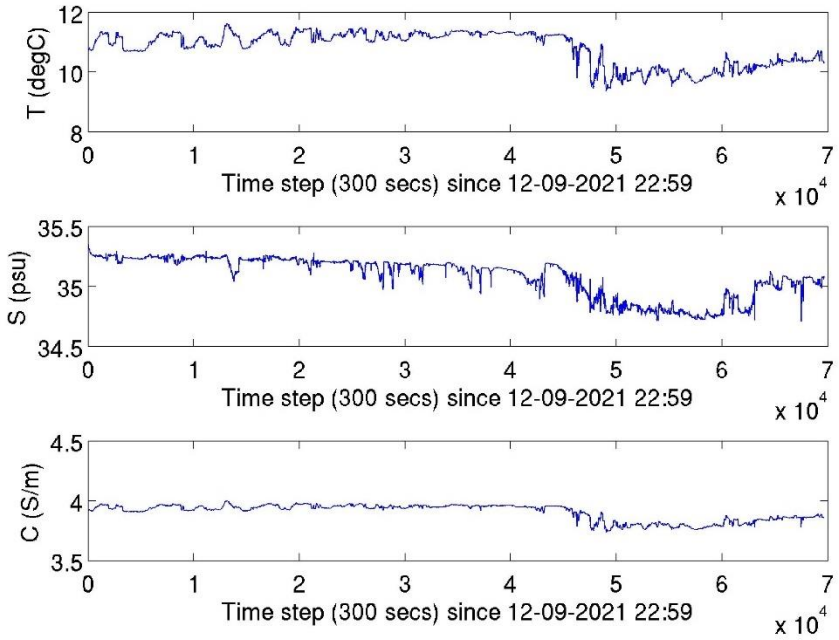


Figure 8. Time series of temperature (degC), salinity and condictivity (S/m) from measurements with a Seabird SBE37 mounted on lander 3 M2179 (low-density sponge site; LDV). Start date and time was 12/09/2021 17:59 – 12/05/2022 13:59.

Current Velocity

Below are the results from the 2-D velocity current meters. Data points with high acoustic energy/noise (high error velocity) were removed. Data were ensemble-averaged to create 1 hour ensemble profiles (Figures 9-10).

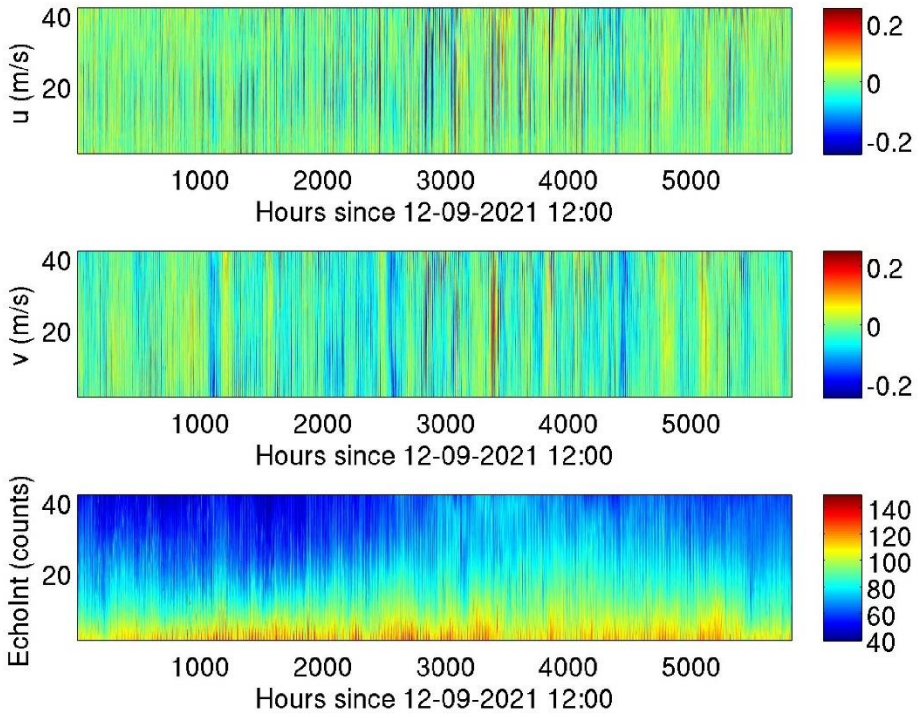


Figure 9. Time series of hourly averages of u (m/s), v (m/s), echo intensity (counts) versus depth range (m), from ADCP lander 1 M2201 (high sponge density site; HDV).

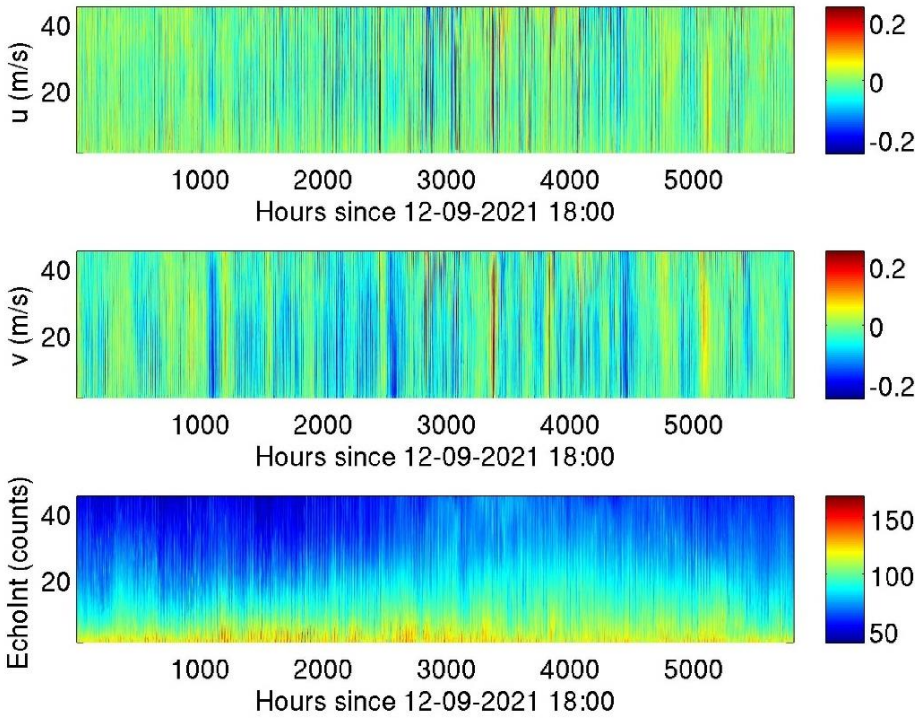


Figure 10. Time series of hourly averages of u (m/s), v (m/s), echo intensity (counts) versus depth range (m) from ADCP lander 2 M2202 (dead sponge site; DV).

Sediment Traps

The median POC flux at lander 1 (high sponge density site; HDV) was 7.05 (range: 2.18-31.80) and 9.16 (range: 1.71-30.1) at lander 2 (dead sponge site; DV) (Figure 11).

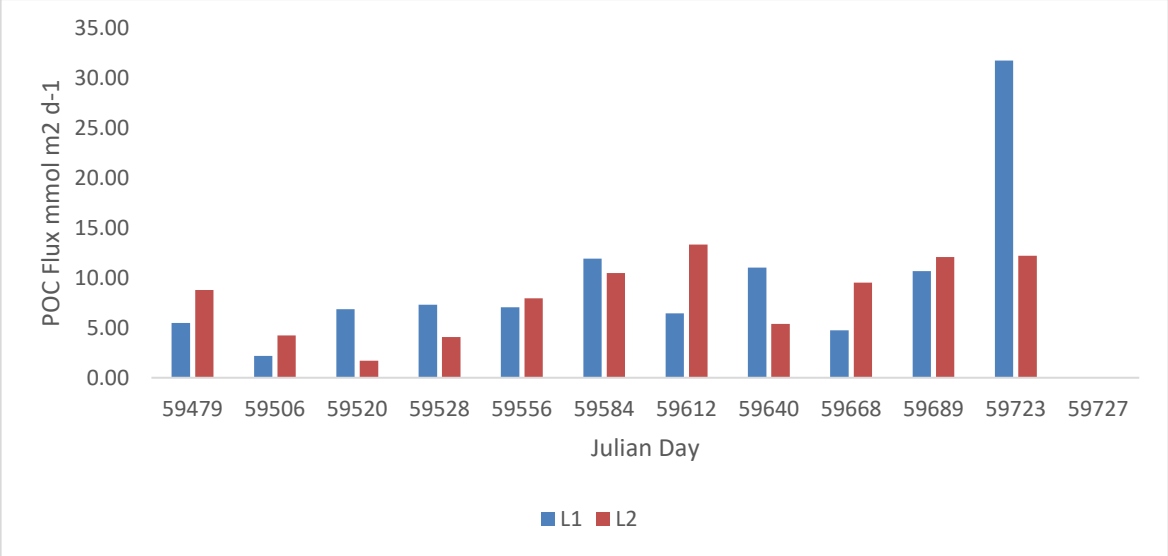


Figure 11. Time series of the POC flux for lander 1 (high sponge site; HDV) and 2 (dead sponge site; DV).

LANDER REDEPLOYMENT MISSION DETAILS (OCTOBER 2022)

CCGS *Ann Harvey* 2022 (AHA2022469)

The CCGS *Ann Harvey* is a Canadian Coast Guard buoy tender. The main aim of the AHA2022469 mission (5-7 October 2022) was to redeploy the three benthic landers; one in the Sambro Bank Sponge Conservation Area on the HDV station where the camera system failed in the previous deployment, and two in the Gully MPA in a sea pen habitat. Details of the research objectives and site selection are extracted from the unpublished cruise report (Kenchington et al., 2022 unpublished) and provided in Appendix 2 under their original section numbers [Note that it is the planning document and NOT the final operational results which are reported herein]. The relevant permits needed to work in the conservation areas are found in the Annexes 1-3 to that cruise plan, and are duplicated in Appendix 2.

The Commanding Officer for the mission (AHA2022469) was Captain Elotus Sturge of the Canadian Coast Guard. Captain Sturge and his crew. in particular Irving Powell (First Officer) and Keenan Welch (Third Officer), and Jay Barthelotte (DFO Vessel Co-ordinator and Chief Scientist) were instrumental to the success of this mission. At-sea science personnel are listed in Table 5.

Table 5. CCGS *Ann Harvey* Cruise Participants, Affiliation and Responsibilities.

Name	Affiliation	Duty
1. Jay Bartholette	DFO	Chief Scientist, Mooring Specialist
2. Jinshan Xu	DFO	PI, Acoustic Specialist
3. Barry MacDonald	DFO	Operational Lead, Lander Cameras and Fittings
4. Calisa Staniforth	DFO	Science Support, Marine Mammals/Turtles
5. Jennifer Field	DFO	Marine Rigger

As previously (Kenchington et al., 2021a), the landers are equipped with passive acoustic monitoring (PAM) recorders (SoundTrap and Ocean Tracking Network Acoustic Receivers), temperature, salinity and current sensors, a camera system and sediment traps. Landers will be recovered in spring 2023. The mission was also used to recover three moorings and deploy one, all in the Gully MPA, on behalf of Dr. Ryan Stanley (Habitat Ecology Section, BIO) (see Appendix 2).

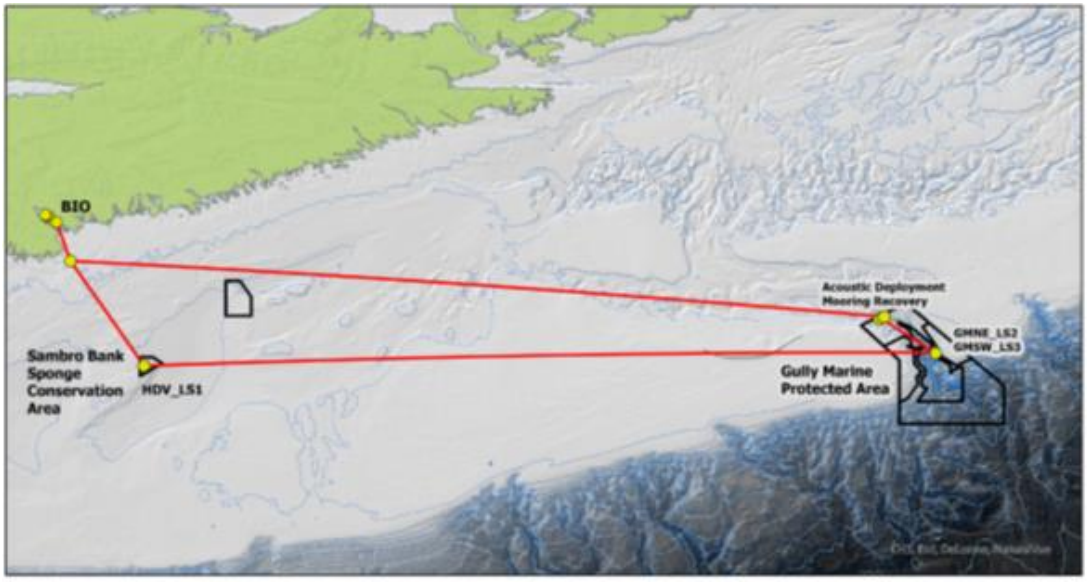


Figure 12. Stylized cruise track (red) for AHA2022469, 5-7 Oct, 2022. The location of the Sambro and Emerald Bank Sponge Conservation Areas and The Gully MPA are indicated with a black outline. The route progressed from Halifax to the Gully to Sambro Bank and back to Halifax.

The mission completed seven operations which are summarized in Table 6, showing the date/time, latitude/longitude and depth along with other metadata. The position of the benthic landers was determined by an acoustic survey done after the landers were deployed (Table 6). That survey confirmed that the landers were sitting on the bottom in an upright position. The cruise track (stylized; Figure 12) shows the relative positions of the sites. Deployment operations and close-ups of the camera system are shown in Figure 13. Details of the deployment locations are shown in Figures 14 (Gully MPA) and 15

(Sambro Bank Sponge Conservation Area). Fishing with bottom-contact gears is prohibited in those areas.

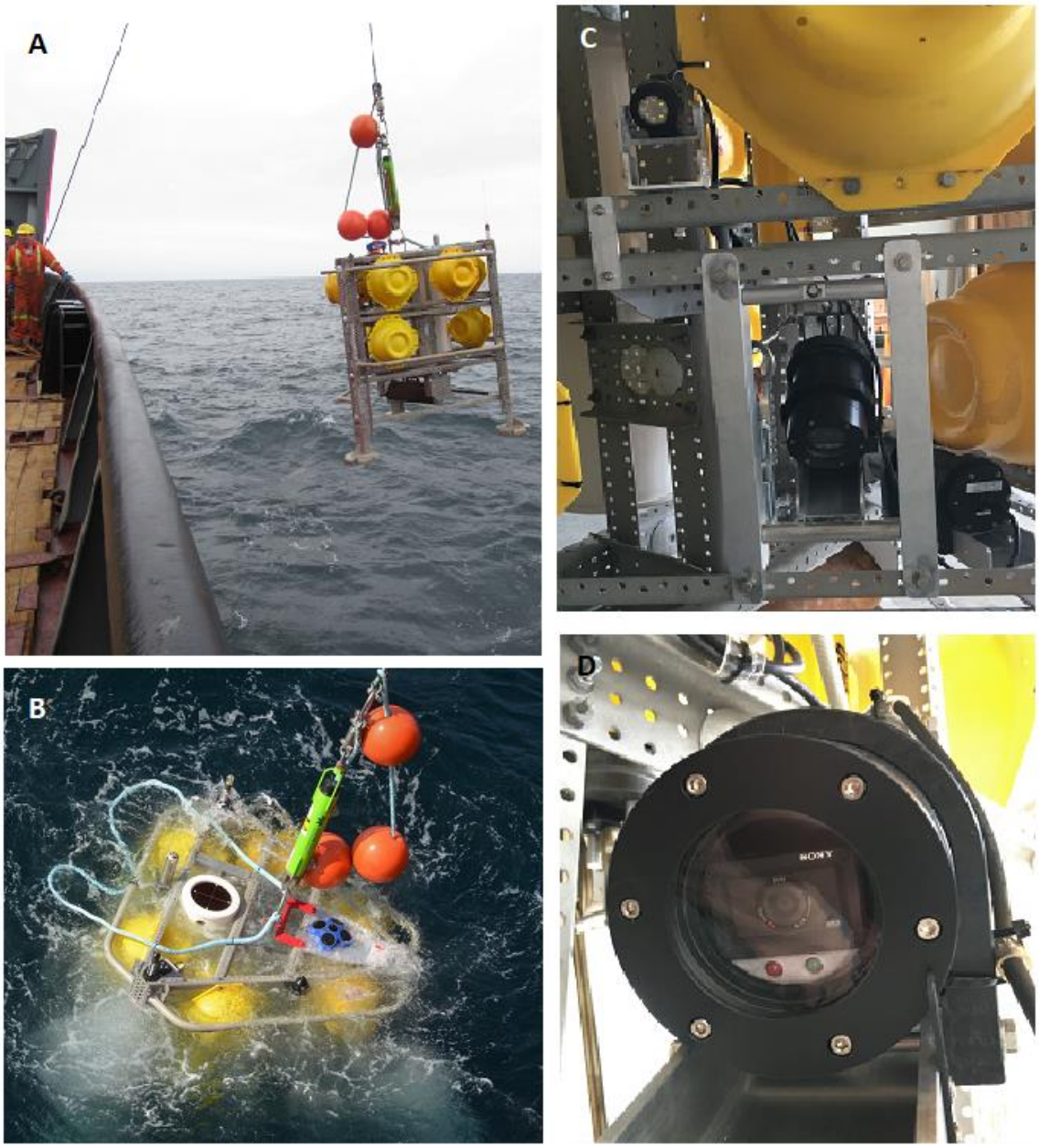


Figure 13. Images from the lander deployment operation showing upright positioning in the water (A, B) and close-ups of the camera system (C, D).

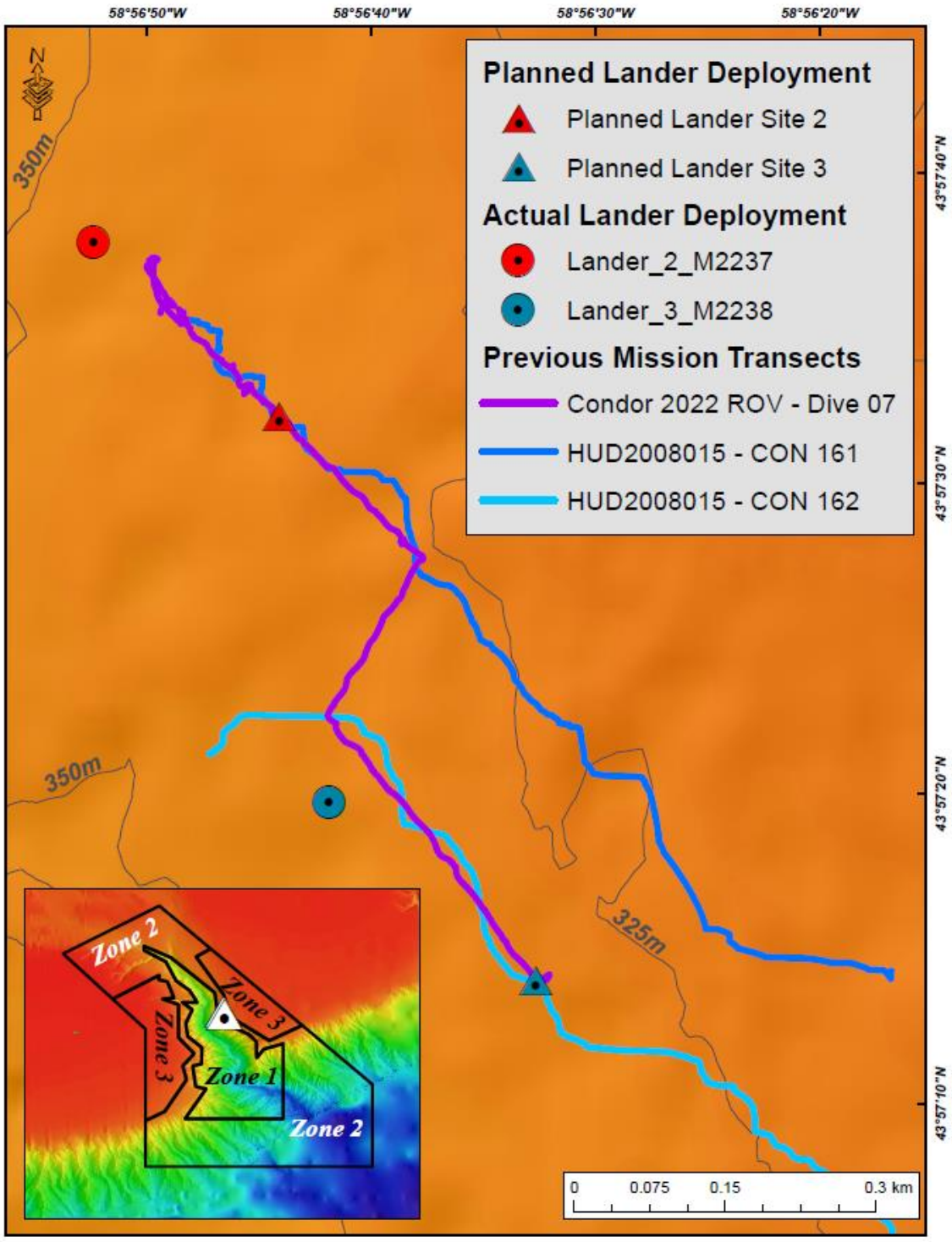


Figure 14. Location of the lander deployment site in the Gully MPA (red: GNNE-LS2; Mooring Number M2237 and blue: GMSW-LS3; Mooring Number M2238) showing the relative positions of the planned deployment sites (triangles) and the actual deployment sites (circles) in October 2022 on the AHA2022469 mission. The location of photo transects taken on previous missions is shown on the map and detailed in the legend.

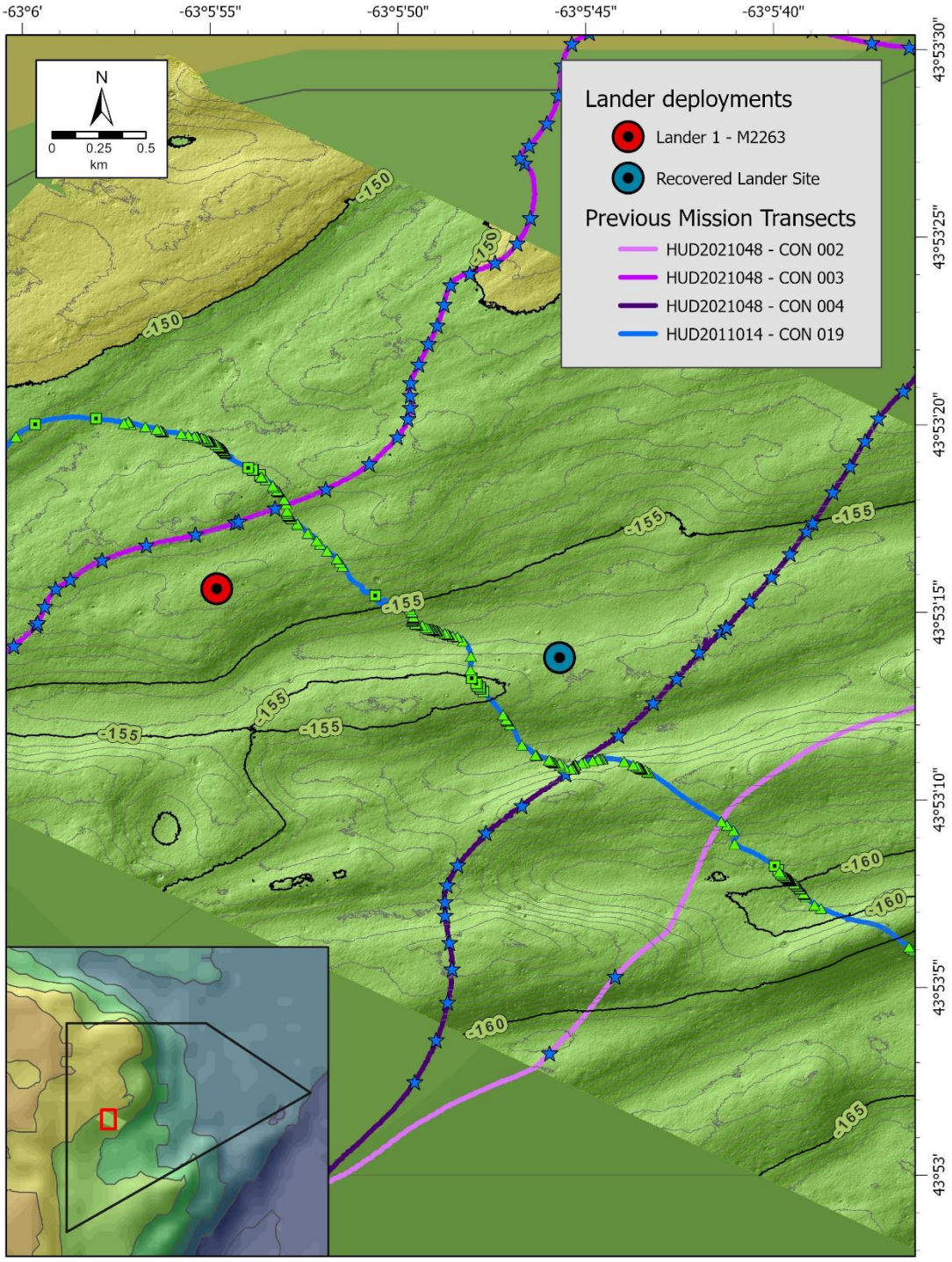


Figure 15. Location of the lander deployment site in the Sambro Bank Sponge Conservation Area (HDV-LS1; Mooring Number M2263) showing the relative positions of the lander deployed in 2021 and recovered in May 2022 (blue circle) and the lander redeployed in October 2022 on the AHA2022469 mission. The location of photo transects taken on previous missions is shown on the map and detailed in the legend. Stars, triangles and squares reperesent photo locations along the image transects.

Table 6. Time and Location of the Lander Recovery and Other Operations.

Station (Mooring No.)	**Date**	**Time (GMT)**	**Latitude (DM)**	**Longitude (DM)**	**Depth (m)**	**Comments**
HDV-LS1 (M2263)	7-Oct-22	08:29	43°53.2605'N	63°05.9137'W	156	Deployed successfully. On bottom, upright. Position from acoustic survey.
GNNE-LS2 (M2237)	5-Oct-22	16:24	43°57.6190'N	58°56.8660'W	336	As above.
GMSW-LS3 (M2238)	5-Oct-22	14:08	43°57.3210'N	58°56.6810'W	327	As above.
Range_200	6-Oct-22	08:15				Stanley station. Did not surface. Area was left after 20 min. to recover/deploy another mooring. Travelled back to the station to take another look at 10:00.
GUL_3	6-Oct-22	09:02	44° 08.120'N	59° 13.694'W	305	Stanley station. Deployment Successful. 24ft away from the station.
Range_400	6-Oct-22	09:13	44° 08.322'N	59° 13.448'W	306	Stanley station. Recovery successful. Release time.
Range_600	6-Oct-22	09:43	44° 08.710'N	59° 12.686'W	150	As above.

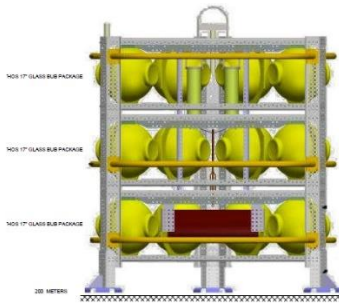
REFERENCES

Kenchington, E., C. Lirette & L.H. De Clippele. 2021a. Cruise Report in Support of Maritimes Region Research Project: Use of Passive Acoustics to Quantify Fish Biodiversity and Habitat Use. *Canadian Manuscript Report of Fisheries and Aquatic Sciences* 3231: iv + 52 p. https://publications.gc.ca/collections/collection_2021/mpo-dfo/Fs97-4-3231-eng.pdf

Kenchington, E., C. Lirette & L.H. De Clippele. 2021b. Cruise Report in Support of Maritimes Region Research Project: Use of Passive Acoustics to Quantify Fish Biodiversity and Habitat Use, Mendeley Data, V https://data.mendeley.com/datasets/wcs8mjt27d/1

Kenchington, E., De Clippele, L.H., Xu, J., Lirette, C., MacDonald, B. & Phelan, K. (2022 Unpublished). Use of Passive Acoustics to Quantify Fish Biodiversity and Habitat Use. Cruise Planning Document. Mission No: AHA2022469. September 2022. Rev. 2. (available from C. Lirette upon request).

APPENDIX 1: STANDARD OPERATING PROCEDURES FOR LANDER RECOVERY OPERATIONS



Voyage Number: SWA2022374

Recovery of Benthic Landers

Overall Objective:

The overall aim of this mission is to recover three benthic landers from the Sambro Bank Sponge Conservation Area in support of the DFO-funded project: "Use of Passive Acoustics to Quantify Fish Biodiversity and Habitat Use". Each lander is equipped with passive acoustic monitoring (PAM) recorders (SoundTrap and Ocean Tracking Network Acoustic Receivers), temperature, salinity and current sensors, a camera system and sediment traps. Landers were deployed in September 2021.

SOP – Lander Recovery:

Note: The Landers are not expected to sit very high in the water once they break the surface. Due to this, recovery must be attempted in very calm sea conditions, during daylight hours. Ideally wave heights / swell should be no more that 1.0 – 1.5m, and winds light. The Landers are equipped with a satellite beacon, Xenon flashers and Landers 1 and 2 have a radio beacon. These aids should assist in the recovery of the Landers in the event that visual location fails.

Note: Be sure to notify Jay Barthelotte prior to departure that the mission is a go and that he has the ship's contact information. The satellite beacons will contact him and he will be able to contact us via an iridium satellite phone.

- When arriving on site the quartermaster should determine how the ship will drift and set up 2-3 cables downwind of the station. Discuss the operation to determine how the ship would prefer to set up for recovery.
- Ensure that the bridge turns off any sounders and refrain from the use of thrusters and propulsion when attempting to communicate with the receivers. Let the vessel drift. Be sure there is clear communication with the bridge when the transducer is in / out of the water.

- Connect transducer to the transceiver (deck box) and place transducer in the water. Be sure to clear the hull (full length of cable = ~25 / 50m). (manual for releases, and deck box attached)
- Interrogate the receiver (send interrogate code) and be sure to establish good communication. Return signal will confirm if the lander is upright or tilted.
- Send release code, check release rotation status (deck box display) and inform the Bridge. The Lander should travel at 1 – 2 m / sec (150m = <2 min 30 sec to surface / 220m = <3 min 45 sec to surface).
- If indication is good that the release shaft turned 7 revolutions (deck box display) remove transducer from the water.
- Let the bridge know that they are safe to maneuver and keep watch for the Lander to surface.
- Note time when the Lander is spotted at surface.
- Recover Lander and record the time / location when it is alongside and lifted out of the water. The crew will know the best way to recover and place the Lander on board.
- Secure the Lander on deck.
- Cover the top of the sediment trap with a plastic bag and secure (to prevent wash water ingress).
- Turn off the satellite beacon. Magnet swipes until the unit indicates a solid "red". Check status with a quick swipe of magnet to ensure it is in off (red) mode.
- Turn off Flasher (3) and radio beacon (2). Switch on base of units.
- Rinse Lander with fresh water.
- Place and secure covers on the ADCPs
- Before offloading wrap and secure a plastic bag around the sediment trap sample bottles / tray.
- Repeat for remaining landers
- Offload Landers to BIO wharf and use forklift to move them to a secure location. All instruments can remain "on" until the responsible party turns them off / downloads data.
- Wash again with fresh water (sediment trap top covered to prevent water ingress).
- Allow to drip dry and move to internal location (cruise prep).
- Remove sediment trap bottles. Cap and label bottles (Lander number and position number – Lander 1 or 2, position 1-12). Store samples in formaldehyde stores room (update inventory – Brighid).
- Contact the owners of the instruments and have the units removed and data downloaded. Assist as required. Jinshan – Sound Traps, AMAR and current sensor.
  Adam – CTD (3), ADCP (2) and Satellite beacons (3). OTN acoustic receiver (3).

SOP – Equipment:

(manuals are included which contain detailed information on the equipment)

Transceiver / Transducer:

- Charge deck boxes prior to Mission / recovery.
- Connect the transducer to the transceiver (deck box).
- Note the location and identify which Lander (receivers) you will be communicating with. The codes are laminated and in the deck box case.
- Ensure the ship has any sonar systems turned off and the ship is not maneuvering (prop(s) / thrusters are not active).

- Lower the transducer into the water and position it below the hull of the ship.
- Turn on the transceiver and adjust power to make sure it is not at max power (5 should be fine).
- Interrogate the release - Send Enable command and wait for response. If the release is able to acquire the signal it will respond. Fifteen ping response will indicate that the release is upright (<45°from upright) and 7 that it is tilted (> 45 ° from upright).
- If communication is good, send the release command. Note the time and response (7 pings = successful release cycle).
- Let the Bridge and sea watch know that the Lander has been released and to keep watch for it surfacing.
- Remove hydrophone / transceiver from the water and let bridge know so they can maneuver.
- If successful the Lander should release the drop weight and begin to float to the surface. It should travel at apx. 1-2 m/sec. (150m depth = 1.25 - 2.5 minutes and 220m = 1.8 – 3.7 min). Due to the size of the Landers and amount of floatation we suspect surfacing will be at the longer of these estimates.
- The crew of the ship will know best how to bring the Lander aboard. Be sure to note location once the Lander is alongside. It is important to note the time that the Lander is removed from the water. Sensors will indicate the change and this may allow for better calculations of clock drift.
- Secure Lander on deck.
- Turn off the Flasher and Rf beacon (if equipped)
- Turn off the satellite beacon. Wave a magnet along the side near the top of the beacon until the flashing light turns solid red, then remove magnet. Test that the unit is off by fast swiping the magnet and the unit should light a solid red.
- Dry the top of the sediment tarp (if equipped) and cover and secure with plastic and tape.
- Rinse the Lander with fresh water (if available)
- Place covers on the ADCPs.

Novatech Direction Finder:

- Charge direction finder prior to Mission / recovery.
- Install antenna set with the black caps. The Rf beacons are set to transmit on Channel #69 – Freq: 156.475.
- Find a location that has a clear view point.
- Turn on unit, adjust channel (156.475) and volume.
- Hold upright and slowly turn (scan) for signal.
- Have the ship proceed in the strongest direction indicated.

No Communication:

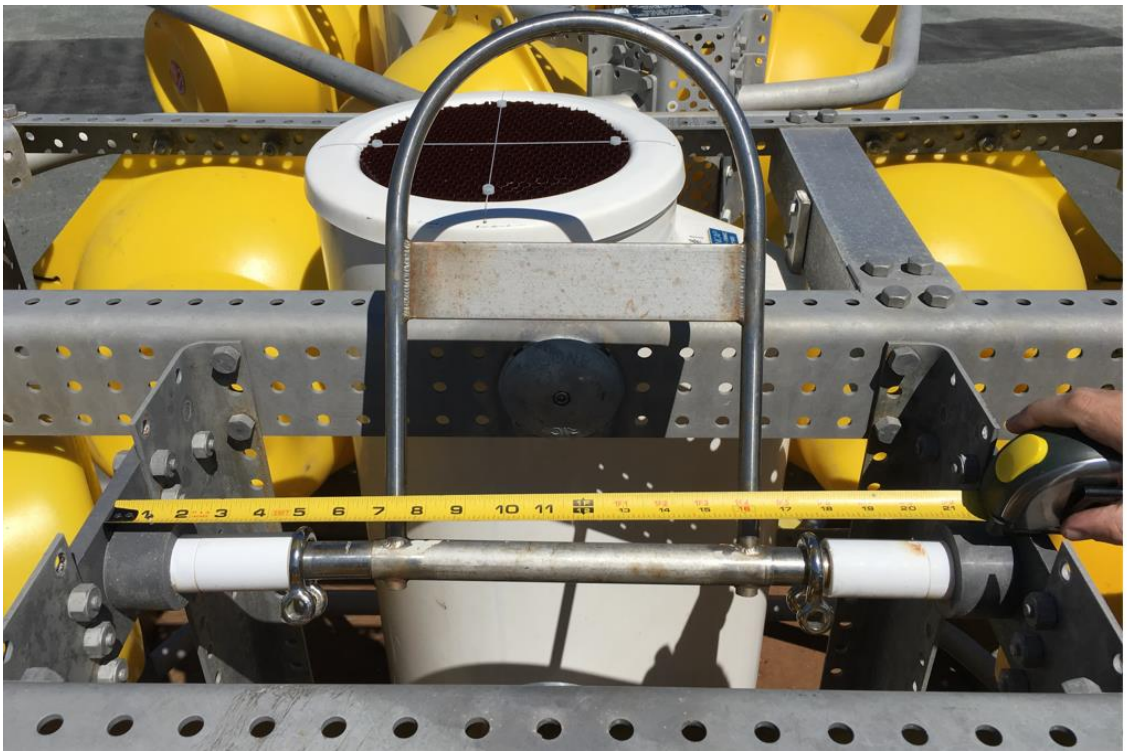
- If unsuccessful interrogate the release again to try and determine issue.
- Continue to maintain look out for the Lander in case it surfaces.
- If you believe that the release was successful but are unable to see the Lander keep an eye out for the flashers (nighttime especially).

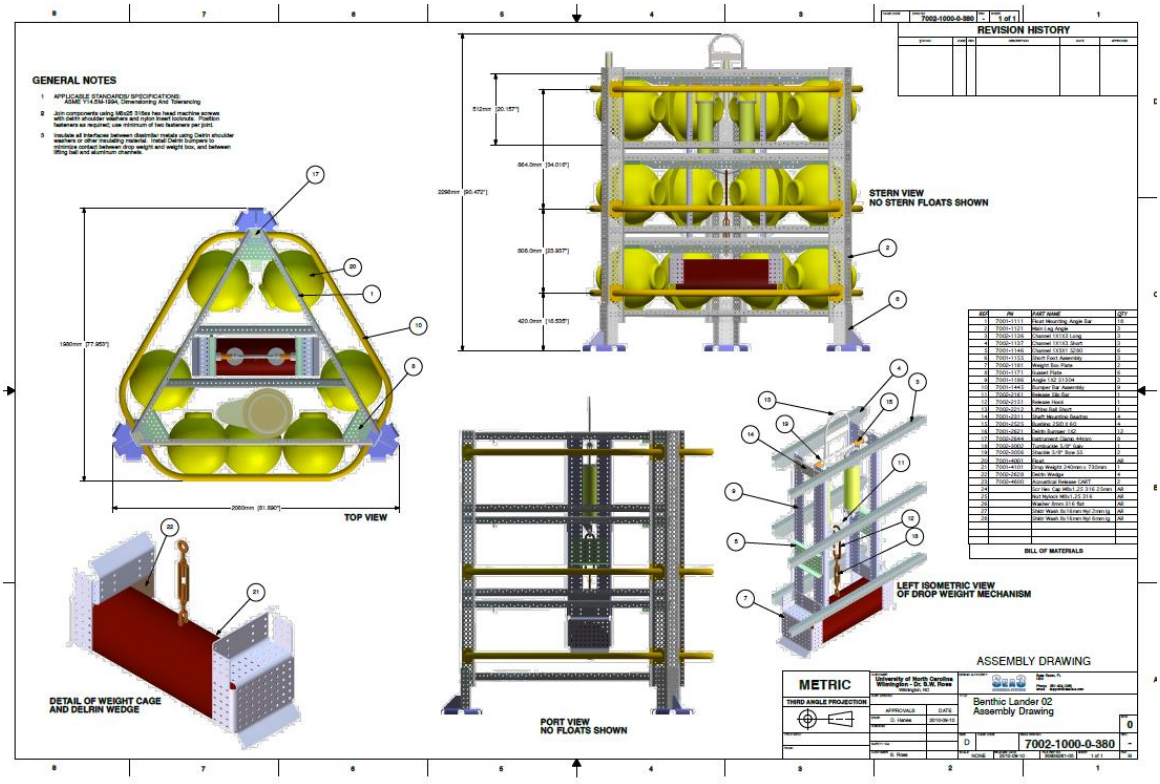
-The satellite beacon will take some time to dry (10 min) but if it does a phone call will be sent to Jay who will contact the ship with co-ordinates. Be sure to notify Jay before departure to remind him of the trip and make sure he has the ship's contact information.

-A Radio Frequency beacon is attached to Lander 1 and 2. A hand held detection unit can be used to locate the direction of the lander.

- Try repositioning the ship. Be sure to remove the hydrophone / transceiver from the water before the ship begins to move. Keep bow in same direction but move ship to 90°from current position. Lower transducer from the side of ship that is facing the Lander site. Keep trying to interrogate the release / try the other release / reposition ship to get closer to the Lander (1 cable).
- Try adjusting the power of the deck box (+/-), and ensure the ship is quiet in the water (sounder and props).
- Try using the backup transceiver and transducer and repeat above.
- If this all fails move to another lander site and attempt communication / release. If successful then the equipment works. Go back and revisit the failed site. Try positioning the ship at 5 cables from Lander site at 12 o'clock, then 3 o'clock and then 9 o'clock. Then try the same at 10 cables and repeat.

Images of Lander:




REVISION HISTORY
GENERAL NOTES
STERN VIEW
NO STERN FLOATS SHOWN
TOP VIEW
DETAIL OF WEIGHT CAGE
AND DELRIN WEDGE
PORT VIEW
NO FLOATS SHOWN
LEFT ISOMETRIC VIEW
OF DROP WEIGHT MECHANISM
BILL OF MATERIALS
ASSEMBLY DRAWING
METRIC
THIRD ANGLE PROJECTION
Benthic Lander 02
Assembly Drawing
7002-1000-0-380

APPENDIX 2: EXTRACTS FROM THE UNPUBLISHED CRUISE PLANNING DOCUMENT (AHA2022469)

Use of Passive Acoustics to Quantify Fish Biodiversity and Habitat Use

Cruise Planning Document

Mission No: AHA2022469

September 2022

Rev 2

3. OVERALL PROJECT OBJECTIVES

The overall objective of this project is to document fish use of benthic habitats with a focus on habitats that are considered Significant Benthic Areas (Canadian policy terminology) or Vulnerable Marine Ecosystems (International policy terminology). Acoustic landscapes, or soundscapes, are composed of biological, geophysical and anthropogenic sounds, and in some environments, such as tropical coral reefs, biological components dominate the soundscape. We aim to deploy passive acoustic recorders in such habitats to document the soundscape as a measure of both fish diversity and of fish habitat use. Acoustic receivers additionally provide information on tagged species that are within 500 m to 1 km of the landers.

In the first year of our study three landers were successfully deployed on a globally unique glass sponge ground off the coast of Nova Scotia that is both a VME and SBA (Kenchington et al., 2021a, b). *Vazella pourtalesii* is a relatively large sponge (up to 50 cm) that can form dense biogenic habitats and locally enhances invertebrate biodiversity. Fourteen fish species in trawl catches have been found to be significantly associated with these sponge grounds, including commercially important silver hake, redfish, haddock and northern shortfin squid. Since fish may use these sponge grounds for feeding, spawning, and nursery areas there is a need to collect more information on fish use of this key benthic habitat in order to support decision-making following an ecosystem approach. In year two (the last year of the study) we will redeploy one lander at the high-density sponge site on Sambro Bank and deploy the remaining two landers in a sea pen habitat in the Gully Marine Protected Area. This second study will extend our observations to a different habitat type and allow for greater generalizations to be drawn on fish use of VMEs.

The project has five overall objectives (expanded from the previous objectives to include sea pen habitats):

Objective 1: Characterize fish use of sponge grounds and sea pen fields on the Scotian Shelf through analysis of sound emissions associated with spawning and other behaviours in order to identify important areas for enhanced protection and inform ecosystem management decision-making (PI Laurence De Clippele)

Objective 2: Characterization of ambient noise levels on the sponge grounds and sea pen fields (PI Laurence De Clippele);

Objective 3: Evaluate the use of sound as an indicator of fish biodiversity (PI Laurence De Clippele);

Objective 4: Screen the acoustic signals for the presence of North Atlantic Right Whale (PI Jinshan Xu);

Objective 5: Collect environmental data to explain patterns of high and low sponge density and to compare between the two habitats (sea pen and sponge) (PI Laurence De Clippele, Christian Mohn, George Wolff)

References

Kenchington, E., C. Lirette & L.H. De Clippele. 2021a. Cruise Report in Support of Maritimes Region Research Project: Use of Passive Acoustics to Quantify Fish Biodiversity and Habitat Use. *Canadian Manuscript Report of Fisheries and Aquatic Sciences* 3231: iv + 52 p. https://publications.gc.ca/collections/collection_2021/mpo-dfo/Fs97-4-3231-eng.pdf

Kenchington, E., C. Lirette & L.H. De Clippele. 2021b. Cruise Report in Support of Maritimes Region Research Project: Use of Passive Acoustics to Quantify Fish Biodiversity and Habitat Use, Mendeley Data, V https://data.mendeley.com/datasets/wcs8mjt27d/1

4. STUDY LOCATIONS

4.1 Resampling the Sambro Bank HDV site

The camera on the high-density sponge site deployed at Sambro Bank in 2021 failed after two months. All other data systems worked well and so to complete the data set we propose to redeploy at the HDV site in 2022. If the camera is successful then we will have the complementary imagery for the sounds and the sound data will have a temporal replicate.

4.2 Sea Pen Fields in the Gully Marine Protected Area

Site selection in the Gully MPA considered available data on coral and sponge distribution collected by DFO using underwater imagery. The location had to be on a gentle slope to avoid tumbling down the canyon wall, in an area with lower bottom current velocities to reduce deployment and subsequent lander drift, shallower than 500 m to respect the depth limits of the equipment, and in an area with significant concentrations of a VME indicator taxon. The final location is in sea pen habitat on a moraine field on the eastern slope of the canyon (Figure 4.2.1). This area met the requirements, including the physical requirements (Figure 4.2.2) and is habitat for four families of corals (Figure 4.2.3). Prior to our mission new survey data was collected from an ROV operating in the region under the Atlantic Condor 2022 Expedition cruise “Deep-water coral, sponge, and seep habitats along the Northwest Atlantic shelf and slope: geology, ecology, and conservation” led by Dr. Owen Sherwood (Dalhousie). The videos were collected on the 12th of August and confirmed a high-density of fish and sea pens, especially redfish, Pennatulidae and Halipteridae (Figures 4.2.4, 4.2.5). The habitat is mixed, with patches of bare soft sediment interchanged with patches of soft sediment with boulders.

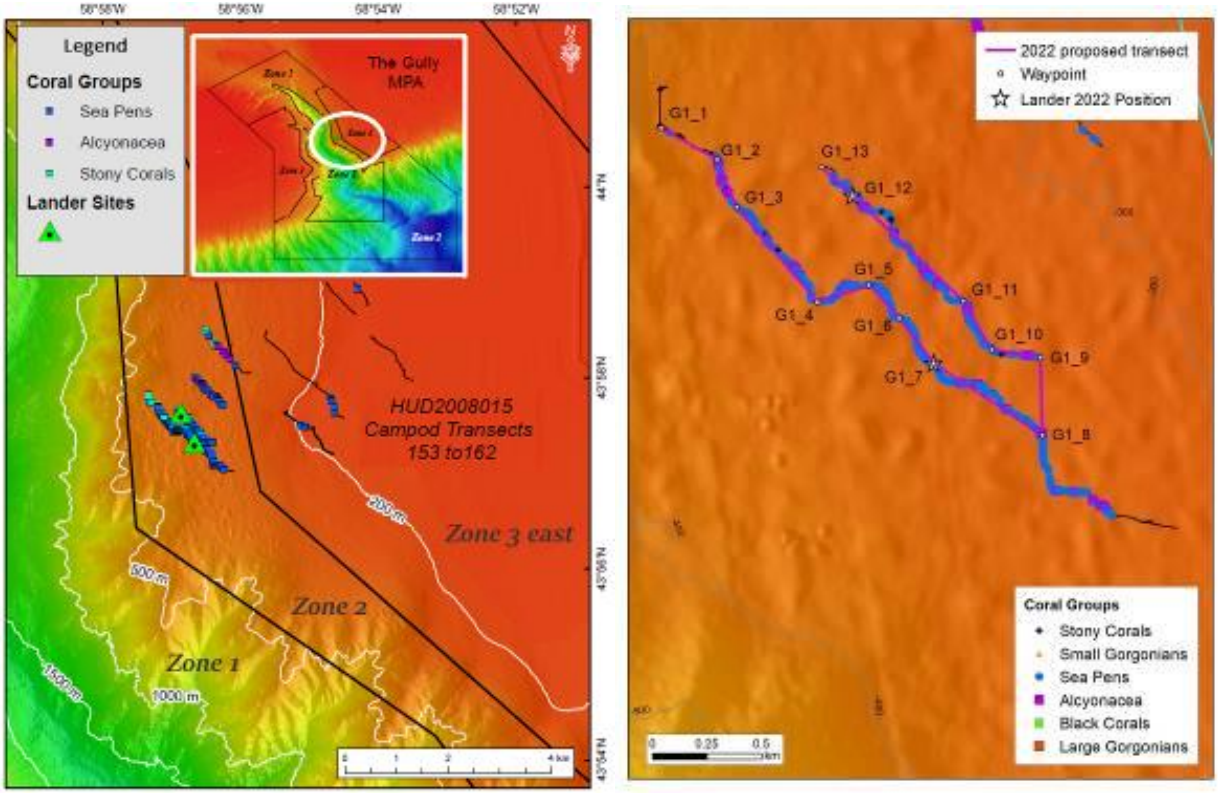


Figure 4.2.1. (Left) Locations of the two lander sites GMNE_LS1 (upper) and GMSW_LS2 (lower) in Zone 2 of the Gully MPA showing the position of the photo transects in the area and the bathymetry. Sea pens were frequently observed on these transects. (Right) Proposed ROV transect to be completed by the Atlantic Condor in August prior to this mission.

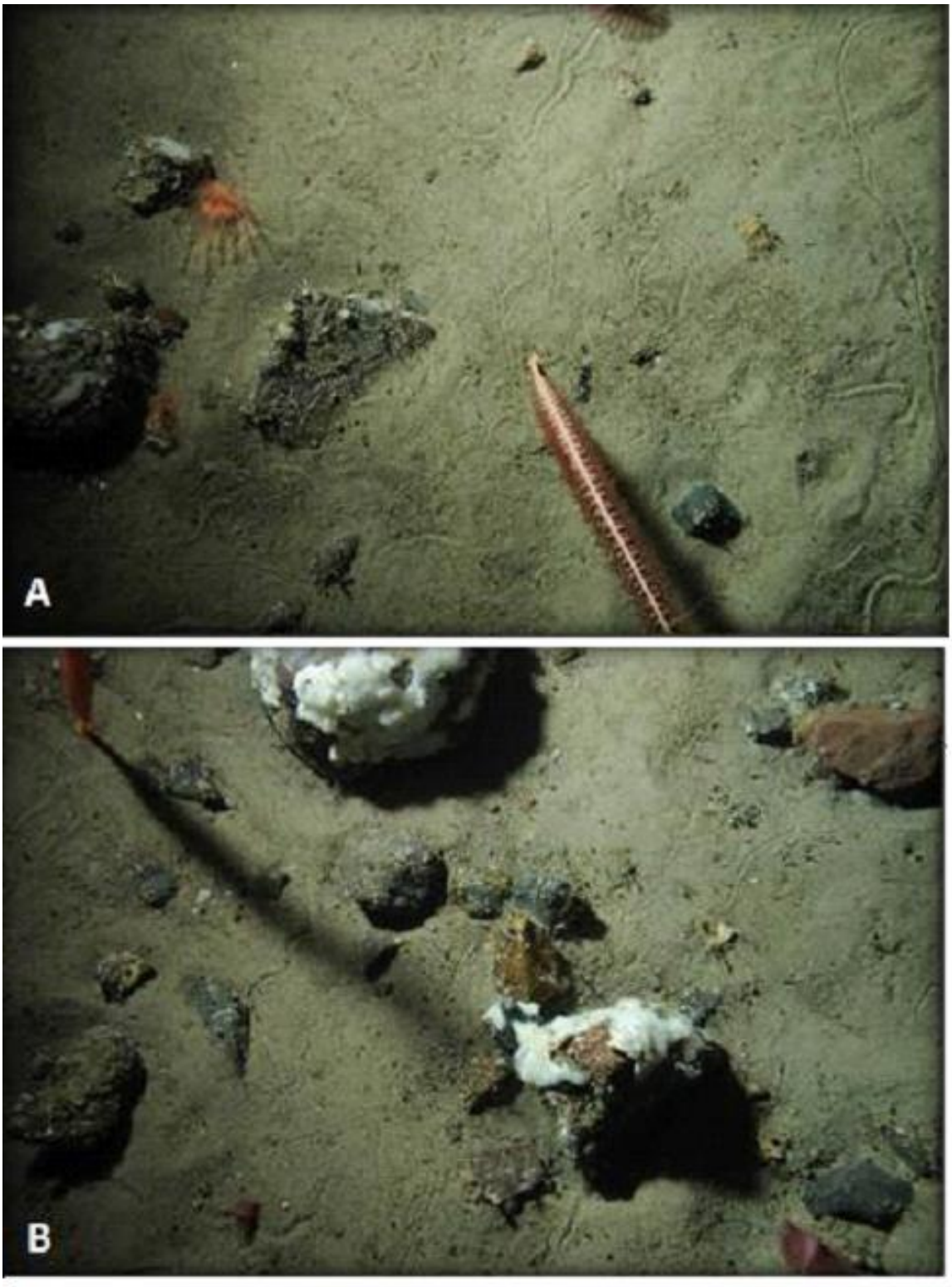


Figure 4.2.2. Images taken of the bottom showing the matrix of rocks and sand populated by sea pens at GMNE_LS1 (top) and GMSW_LS2 (bottom) from the 2008 Hudson mission using Campod.

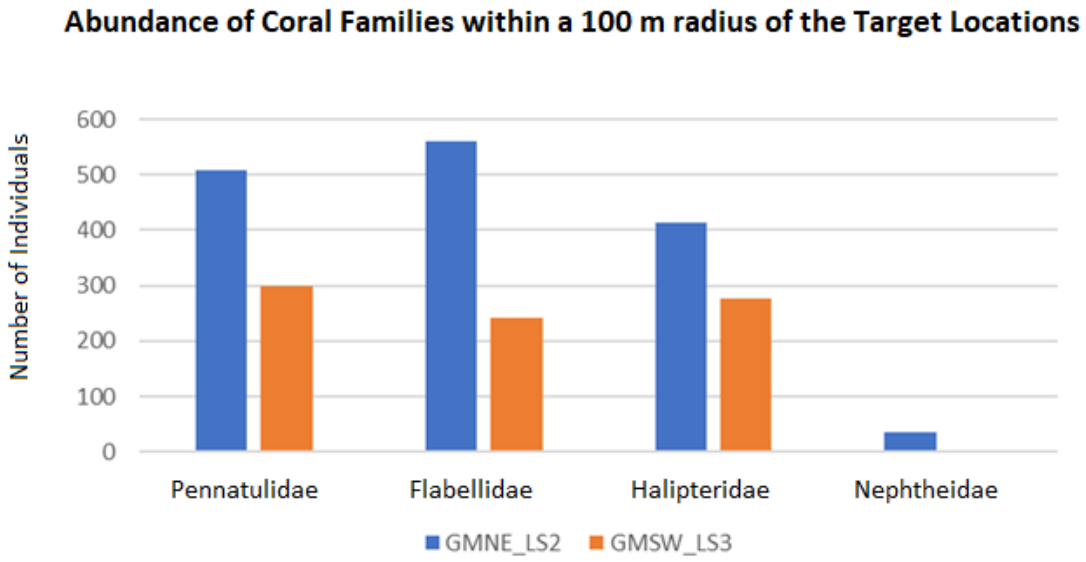


Figure 4.2.3. Histogram of abundance of individuals in each of four coral families found in the area within 100 m radius of the target lander locations determined from the 2008 Hudson mission benthic photographic transects conducted with Campod, the DFO drop camera system. [Note that familial nomenclature is associated with the 2008 data collection and has not been updated to more recent taxonomic revision, e.g., McFadden et al. 2022 https://doi.org/10.18061/bssb.v1i3.8735)]

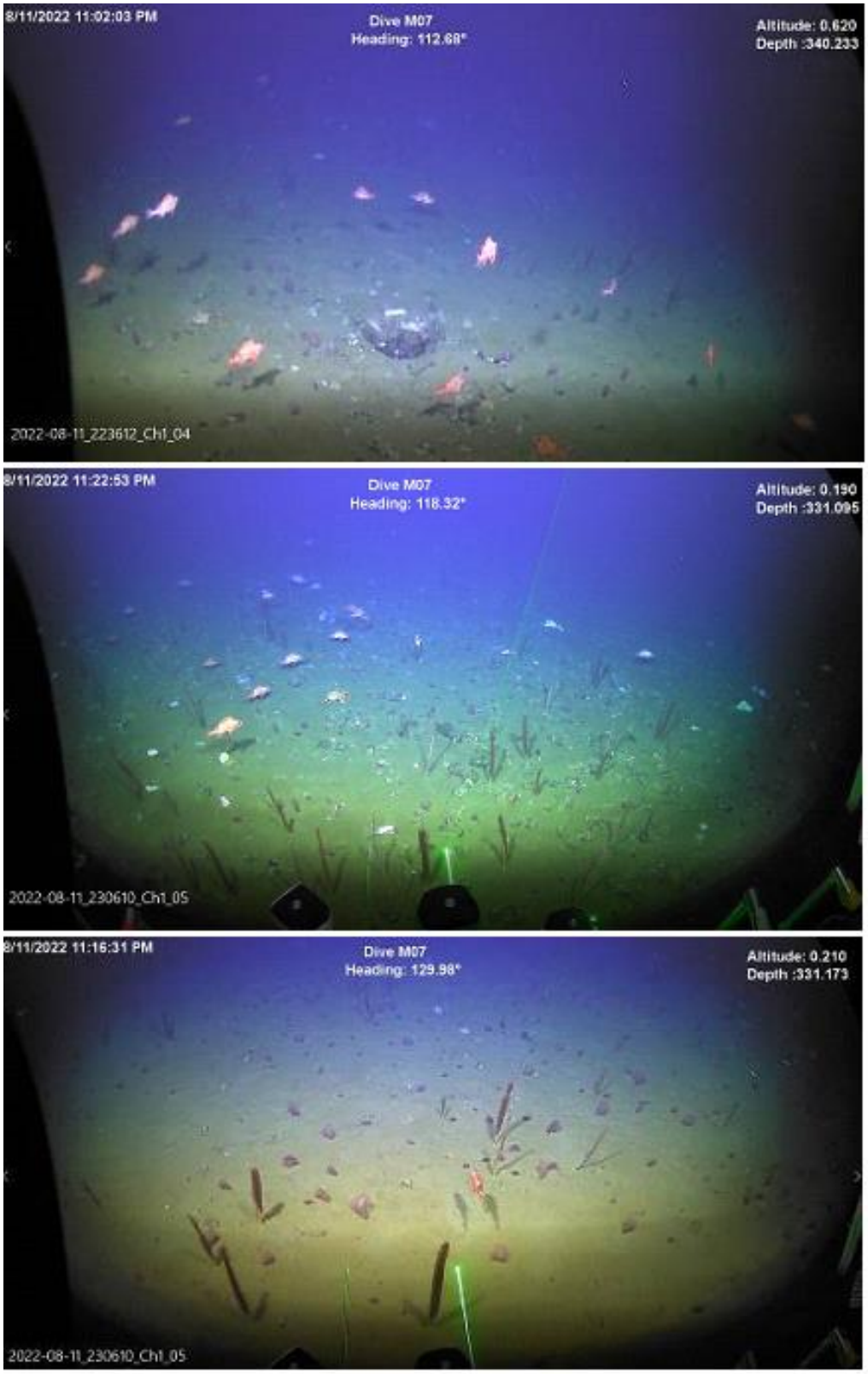


Figure 4.2.4. Snapshots of site around LS2 from the *Atlantic Condor* expedition led by Dr. Owen Sherwood (Dalhousie University).

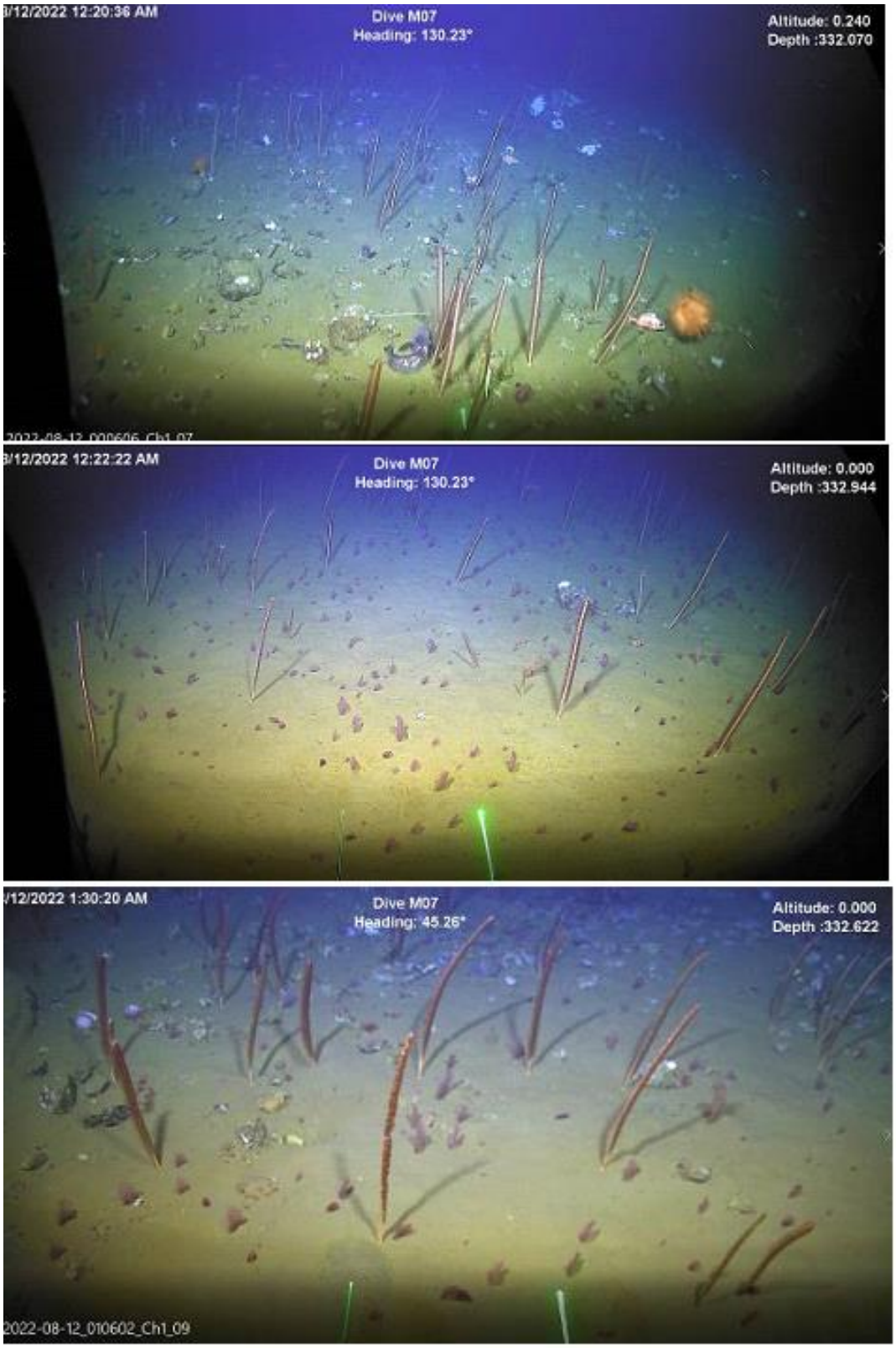


Figure 4.2.5. Snapshots of site around LS3 from the *Atlantic Condor* expedition led by Dr. Owen Sherwood (Dalhousie University).

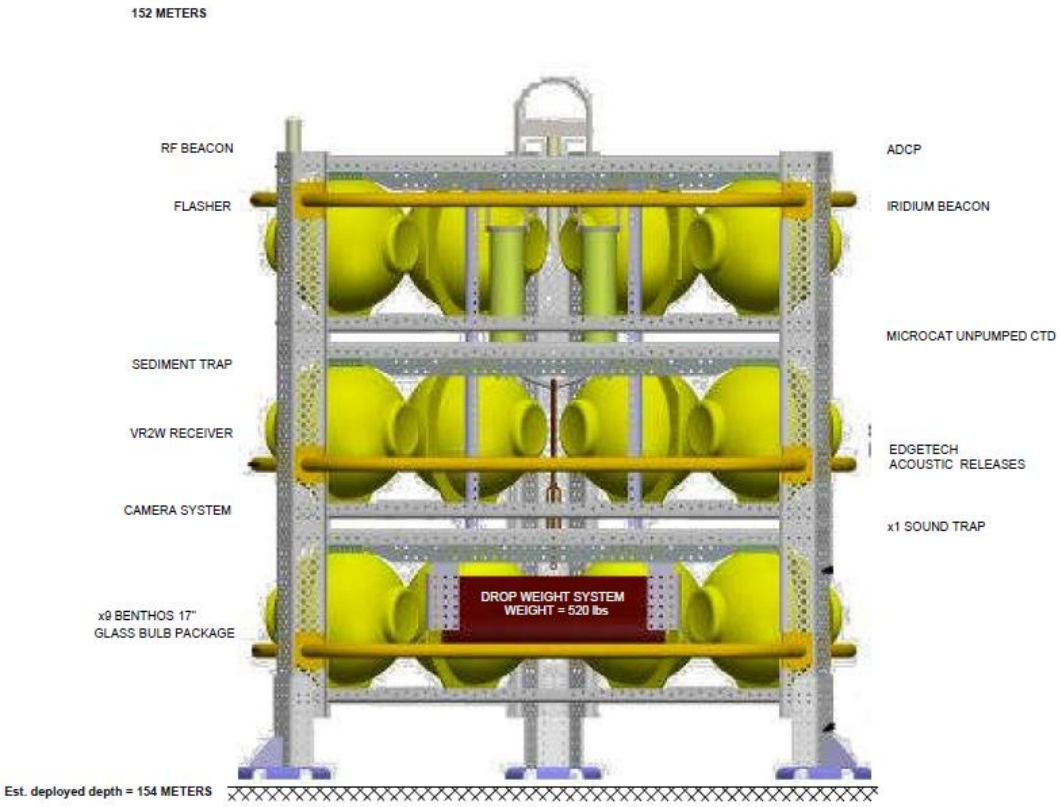
5. LANDER EQUIPMENT FITTINGS AND SETTING CHANGES

Based on results from the 2021/2 deployments, we decided to increase our sampling rate to accommodate the detection of beaked whales (northern bottlenose whale, and endangered species) which are known to live year round in the Gully. This can be achieved with a small sacrifice of the sampling period, with less impact on the Soundtraps than on AMAR. We have also upgraded the memory, by using 512GB SD cards instead of 256GB, which we used in the 2021/2 deployments. The soundtraps will record every 15 min starting at 00:58. The AMAR will record every 30 min starting at 00:58. The ADCPs are set to begin recording on 15 September 2022, 11 min after the hour (00:11) sampling every 30 min. The CTD will start collecting data on 26 August 2022, one time every 3 minutes. The camera will take an image every 30 min, starting at the top of the hour and has been set up to start doing this ahead of the deployment. The sediment trap (net vol = 24 x 250ml or 6L) will start collecting data on 1 September 2022 and the schedule is as follows: (Bottles 1 - 3 for a time period of 2 weeks, Bottles 4 - 9 for a time period of 4 weeks, Bottles 10 - 12 for a time period of 2 weeks). Due to a delay in deployment one bottle will have to be excluded as it will open prior to deployment. Sediment trap data will be collected until 13 April 2023. All SOPs, release codes and manuals were emailed to PIs and cruise participants on Friday 2 Sept 2022 (Barry MacDonald email).

A) HDV_LS1: HIGH-DENSITY VAZELLA SITE (SAMBRO BANK)

Seafloor depth of this deployment is around 154 m depth. At this site we will fit a single channel ST500, ADCP, OTN receiver, sediment trap, CTD (no O_2) and camera system. Settings for the ST500 (serial no: 5512) [1] (Figure 5.1):

Sound recorder	Record period (min)	Once every (min)	Sample rate (Hz)	Battery endurance (days)	Memory endurance (days)	Starting time	Gain setting
ST500	5.4	15	196 kHz	313	318	2 mins before round clock	High Gain



EQUIPMENT	MODEL NO.	SERIAL NO.	
ST500 Sound Trap	NA	5512	
Sediment Trap	PPS-413	0062	
ADCP	S100	134	
Camera System	TL-BT-001	T2-001	
Sable Beacon	NA	S202	
Flasher	ST-400A	A11-051	
Rf Beacon	RF-700A1	Y08-019	Freq = 156.475 (channel #69)
Microcat Unpumped CTD	37SM	27SM35080-3062	
VR2W Receiver	NA	138346	
Acoustic Releases	PORT	36507 & 45039	

ACOUSTIC RELEASE CODES:

36507:
Release code: 433072
Enable code: 416551
Disable code: 416572

45039 (triggered May 2022):
Release code: 451313
Enable code: 471672
Disable code: 471703

Figure 5.1. Diagram providing an overview of the instruments and their serial numbers, attached to LS1.

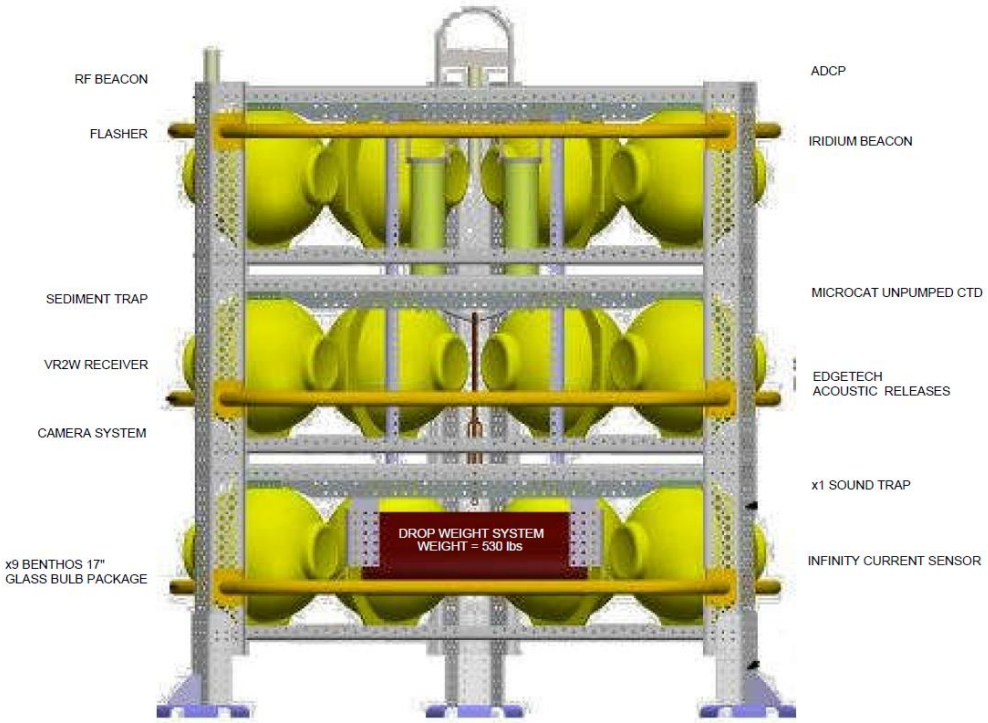
B) GMNE_LS2: THE GULLY NORTHEASTERN SITE

Lander 2 will be deployed at the GMNE_LS2 site. Seafloor depth is around 332 m. This lander will have a Soundtrap ST500, ADCP, CTD (no O_2), camera system, an infinity current meter, OTN receiver and sediment trap. For the Soundtrap ST500[1] (serial no: 5470) (Figure 5.2):

[1] In 2021/2 both Soundtraps were configured as:

Sountrap	Record Period (min)	Once Every (min)	Sample rate (Hz)	Max time (days)	Constraint
ST500	5.2	15	96000	298	Battery
ST600	5.2	15	96000	279	Battery

Sound recorder	Record period (min)	Once every (min)	Sample rate (Hz)	Battery endurance (days)	Memory endurance (days)	Starting time	Gain setting
ST500	4.8	15	288	291	278	2 mins before round clock	Low Gain



EQUIPMENT:	MODEL NO.	SERIAL NO.	
ST500 Sound Trap	NA	5470	
Sediment trap	PPS-413	0051	
ADCP	WHS300	0499	
Camera System	TL-BT-002	TL-002	
Iridium Beacon	NA	S203	
Flasher	ST-400A	Z05-132	
Rf Beacon	RF-700A1	Z05-133	Freq = 156.475 (channel #69)
Microcat Unpumped CTD	37SM	37SM32078-2775	
VR2W Receiver	NA	138354	
Acoustic Releases	PORT	34603 & 34604	
Infinity Current Sensor	AEM-USB	1948	

ACOUSTIC RELEASE CODES:

34603 (triggered May 2022):
Release code: 134505
Enable code: 122566
Disable code: 136013

34604:
Release code: 134526
Enable code: 136030
Disable code: 136055

Figure 5.2. Diagram providing an overview of the instruments' serial numbers, attached to LS2.

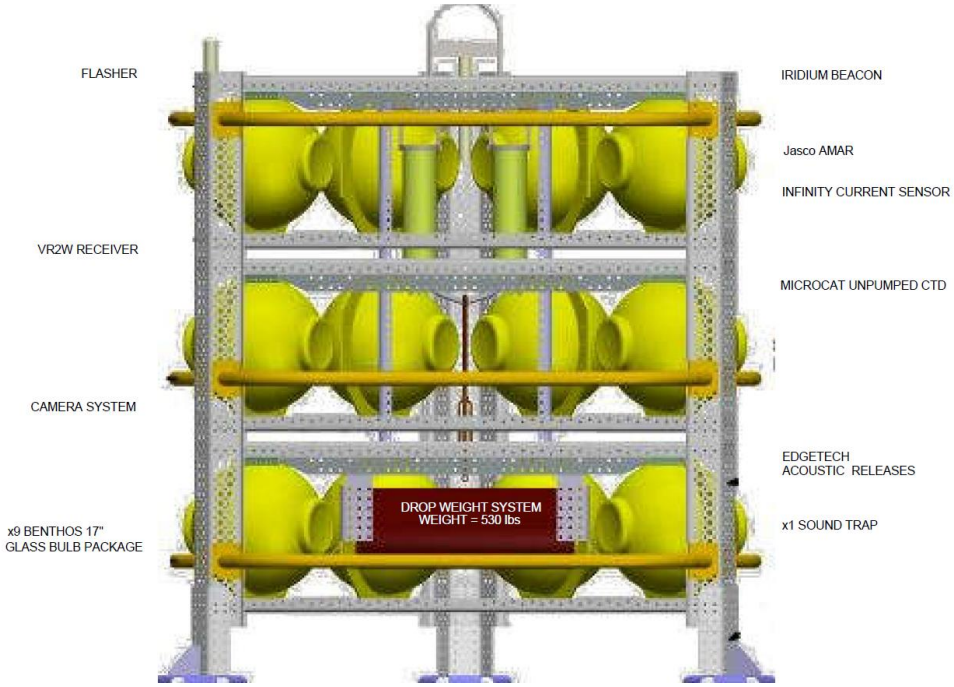
C) GMSW_LS3: THE GULLY SOUTHWESTERN SITE

Seafloor depth for this lander deployment is around 332 m. Lander 3 will be fitted with the Soundtrap ST600, AMAR[2], an infinity current meter, OTN receiver, CTD (no O_2) and a camera system (Figure 5.3). Settings of the ST600 and AMAR are:

Sound recorder	Record period	Once every (min)	Sample rate (Hz)	Battery endurance (days)	Memory endurance (days)	Starting time	Gain setting
ST600	4.8 min	15	192	267	289	2 mins before round clock	High gain
AMAR cycle 1	650 sec	30	64	288	390	5 mins before round clock	Zero gain
AMAR cycle 2	180 sec		256				
AMAR sleep	970 sec		NA				

[2] AMAR settings in 2021/2 were:

560 second @ 64kHz, 340 second sleep for 900 second (15 mins) period. The battery endurance was 288 days, and memory endurance was 324 days.



EQUIPMENT:	MODEL NO.	SERIAL NO.	ACOUSTIC RELEASE CODES:
ST600 Sound Trap	NA	6436	**36506:**
Jasco AMAR	NA	772	Release code: 433051
Infinity Current Sensor	AEM-USB	1857	Enable code: 416517
Camera System	TL-BT-003	TL-003	Disable code: 416534
Iridium Beacon	NA	S204	
Flasher	ST-400A	V08-012	**45040 (triggered May 2022):**
Microcat Unpumped CTD	37-SM	37SM32078-2797	Release code: 451330
VR2W Receiver	NA	138359	Enable code: 471720
Acoustic Releases	PORT	36506 & 45040	Disable code: 471745

Figure 5.3. Diagram providing an overview of the instruments and their serial numbers, attached to LS3.

Figure 5.4. Lander deployment using acoustic release on winch rope and block on crane. The Lander is lowered to the ocean floor, then released acoustically with a transducer.

MOORING DROP AND RECOVERY FOR STANLEY ET AL.

Drs. Ryan Stanley and Nick Jeffrey have asked if we could redeploy a mooring at the site GUL_03 and also recover 3 ‘range testing receivers’ interspliced within that array (between GUL 1 and GUL 4) these receivers (named: range_200, range_400, range_600) are at a distance of 1 km, 400m, and 1.8 km from GUL_03, respectively. They were hoping to identify a vessel that might be able to retrieve them this year (trigger the acoustic release and capture the receivers floating at the surface – 3 floats each). Locations are given in Table 6.1 and mapped in Figures 6.1 and 6.2.

Table 6.1. Location of moorings belonging to the research project of Dr. Ryan Stanley (DFO). GUL_3 is the redeployment site and range_200, range_400 and range_600 are the recovery sites.

Longitude	Latitude	Depth (m)	Type	Name
-59.2531	44.12361	-289.2	acoustic array	GUL_1
-59.2407	44.12974	-303.9	acoustic array	GUL_2
-59.22827	44.13534	-311.0	acoustic array	GUL_3
-59.2160	44.14200	-307.0	acoustic array	GUL_4
-59.2037	44.14813	-280.6	acoustic array	GUL_5
-59.1913	44.15425	-262.8	acoustic array	GUL_6
-59.1790	44.16038	-231.7	acoustic array	GUL_7
-59.1666	44.16651	-197.3	acoustic array	GUL_8
-59.1543	44.17264	-197.3	acoustic array	GUL_9
-59.1419	44.17877	-181.0	acoustic array	GUL_10
-59.1296	44.18489	-180.1	acoustic array	GUL_11
-59.1172	44.19102	-212.1	acoustic array	GUL_12
-59.1049	44.19715	-227.4	acoustic array	GUL_13
-59.0925	44.20328	-228.4	acoustic array	GUL_14
-59.0801	44.20941	-256.6	acoustic array	GUL_15
-59.2391	44.13044	-300.0	range testing	range_200
-59.2243	44.13753	-305.0	range testing	range_400
-59.2111	44.14465	-310.0	range testing	range_600

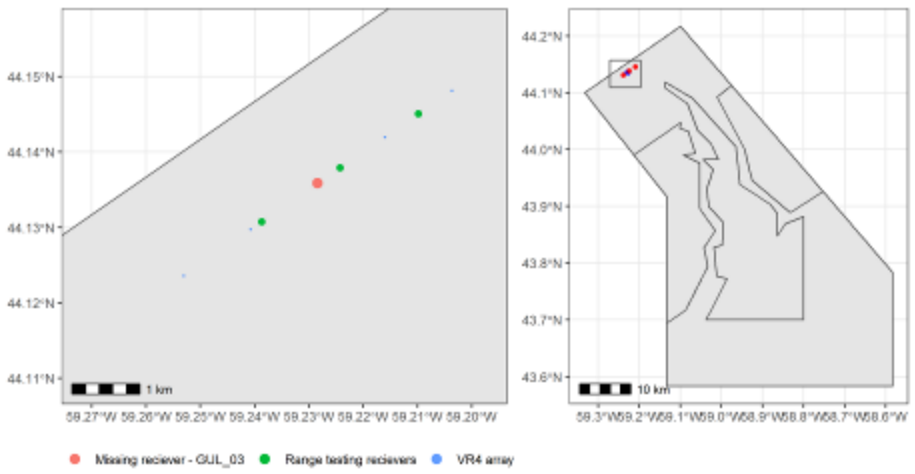


Figure 6.1. Location of moorings belonging to the research project of Dr. Ryan Stanley (DFO). The red circle denotes the mooring drop site and the three green circles indicate the mooring recovery sites for the range testing.

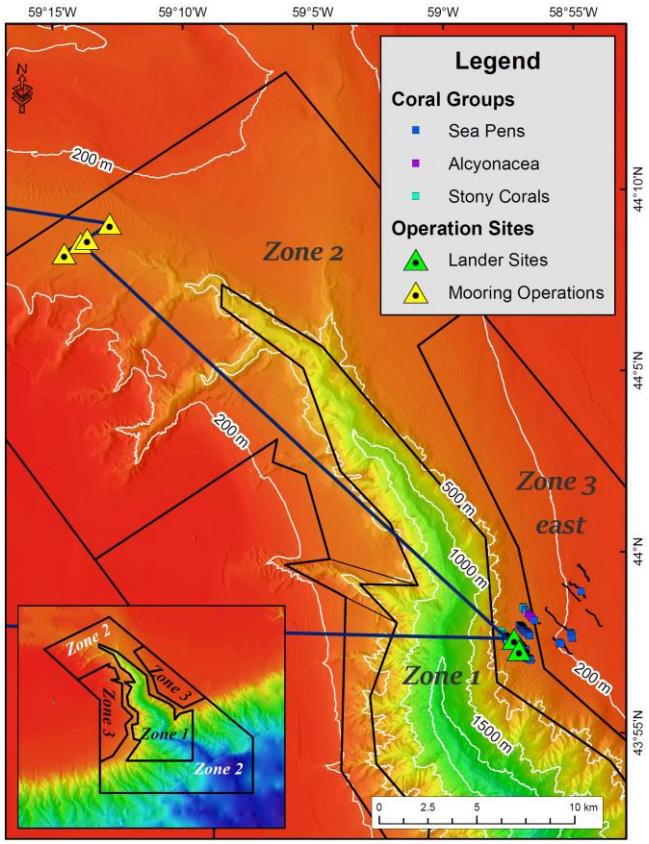


Figure 6.2. Location of moorings belonging to the research project of Dr. Ryan Stanley (DFO) (yellow triangles) in relation to the lander sites (green triangles). The dark blue line shows the cruise track and the management zones of the MPA are outlined in black.

ANNEX 1: Gully MPA permit (Kenchington)

Fisheries and Oceans Canada | Pêches et Océans Canada

PO Box 1006
Dartmouth, NS
B2Y 4A2

File / Référence
GMPA-2022-04

July 13, 2022

Dear Dr. Ellen Kenchington:

RE: Gully Marine Protected Area (MPA) Activity Approval

I am pleased to inform you that your request to deploy two benthic landers to conduct biodiversity and habitat use research in the Gully MPA for one day between August 19 and August 29, 2022 has been approved under Section 6(1) of the *Gully MPA Regulations*. Information provided in the application submitted on June 16, 2022 (attached) demonstrates compliance with the regulatory conditions that must be met for issuance of Ministerial Approval. Any changes to the approved activities that have not been described in the submitted and approved plan must be discussed with Marine Planning and Conservation (MPC) prior to commencement.

While in the MPA, you will be expected to comply with all applicable federal legislation. In particular, we would like to emphasize that holding a Ministerial Approval issued pursuant to the *Gully MPA Regulations* and the *Oceans Act* does not satisfy the requirements of the *Species at Risk Act* or the *Fisheries Act*. Neither does the MPA Approval given here substitute for any permits or licences required under those statutes. It is your responsibility to ensure any necessary authorizations are acquired prior to undertaking the approved MPA activities.

To support conservation and protection of the MPA ecosystem, you are asked to adhere to the following requests while undertaking the approved research:

1. Advise Fishery Officer Brad Pye by phone (902-499-0923) and by follow-up email (brad.pye@dfo-mpo.gc.ca and regulations.xmar@dfo-mpo.gc.ca) at least 72 hours before the activity begins so that they are aware an activity will be occurring in the MPA. Please ensure you have the vessel and captain information ready to be shared when contacting DFO C&P.

2. Decrease vessel speed to 10 knots or less when operating in the MPA as per the General Guidelines for MPAs published by the Canadian Coast Guard in Section 5A of the Annual Edition Notices to Mariners (https://www.notmar.gc.ca).

3. Maintain a watch during daylight hours for turtles, marine mammals and marine debris (e.g., abandoned fishing gear, plastics, other garbage or pollutants). Report any marine mammal collisions, entanglements, distressed or dead animals to the marine animal emergency hotline (1-866-567-6277), or via VHF channel 16. Sightings of Northern Bottlenose, Sowerby's beaked, Blue or North Atlantic Right whales including location, date, and photos should be reported to XMARwhalesightings@dfo-mpo.gc.ca. Also, provide any sightings information to Marine Planning and Conservation (MPC).

4. Report environmental emergencies or other incidents, including unintentional discharges and mammal collisions, to the Canadian Coast Guard within two hours of the occurrence. Notify MPC as soon as possible and file an incident report.
5. Report any sea turtle sightings to the turtle hotline (1-888-729-4667). Sightings of sea turtles including date, location, species, condition, and photos should be submitted at http://seaturtle.ca/turtle-sighting/
6. Provide a post-activity report to MPC that details MPA arrival and departure dates & times, and outlines operations undertaken within the MPA.

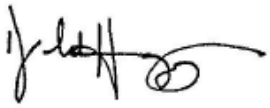
We have enclosed a set of templates and instructions to assist with the documentation being sought in the requests attached to this Approval. The activity report, sightings data, and incident notifications should be submitted to Tanya Pelrine in MPC at:

Tanya Pelrine
Fisheries and Oceans Canada
Bedford Institute of Oceanography
1 Challenger Dr., B500
Dartmouth, NS
B2Y 2V9

Phone: (902) 402-2578
E-mail: Tanya.Pelrine@dfo-mpo.gc.ca

Please confirm with Tanya Pelrine that you have received this letter, and feel free to follow-up anytime should you have any questions or need further clarification.

Yours sincerely,



Donald Humphrey
A/Director, Oceans & Aquaculture Management
Aquatic Ecosystem Branch
Maritimes Region

Attachments:
Approved Activity Plan
Activity and Incident Report Template

ANNEX 2: Gully MPA permit (Stanley)

Fisheries and Oceans Canada | Pêches et Océans Canada

PO Box 1006
Dartmouth, NS
B2Y 4A2

File / Référence
GMPA-2021-05

Dear Ryan Stanley:

RE: Gully Marine Protected Area (MPA) Activity Approval

I am pleased to inform you that your request to conduct Acoustic monitoring of fish in the Gully Marine Protected Area in the Gully MPA between August 15th and September 17th 2021 with annual receiver rollover/maintenance occurring late summer/fall 2022 and 2023 with a final retrieval in 2024 has been approved under Section 6(1) of the *Gully MPA Regulations*. Information provided in the application submitted on June 18th, 2021 (attached) demonstrates compliance with the regulatory conditions that must be met for issuance of Ministerial Approval. Any changes to the approved activities that have not been described in the submitted and approved plan must be discussed with Marine Planning and Conservation (MPC) prior to commencement.

While in the MPA, you will be expected to comply with all applicable federal legislation. In particular, we would like to emphasize that holding a Ministerial Approval issued pursuant to the *Gully MPA Regulations* and the *Oceans Act* does not satisfy the requirements of the *Species at Risk Act* or the *Fisheries Act*. Neither does the MPA Approval given here substitute for any permits or licences required under those statutes. It is your responsibility to ensure any necessary authorizations are acquired prior to undertaking the approved MPA activities.

To support conservation and protection of the MPA ecosystem, you are asked to adhere to the following requests while undertaking the approved research [*Revise as needed*]:

1. Advise Fishery Officer Brad Pye by phone (902-499-0923) and by follow-up email (brad.pye@dfo-mpo.gc.ca and regulations.xmar@dfo-mpo.gc.ca) at least 72 hours before the activity begins so that they are aware an activity will be occurring in the MPA.
2. Decrease vessel speed to 10 knots or less when operating in the MPA as per the General Guidelines for MPAs published by the Canadian Coast Guard in Section 5A of the Annual Edition Notices to Mariners (https://www.notmar.gc.ca).
3. Maintain a watch during daylight hours for turtles, marine mammals and marine debris (e.g., abandoned fishing gear, plastics, other garbage or pollutants). Provide any sightings information to Marine Planning and Conservation (MPC).
4. Report environmental emergencies or other incidents, including unintentional discharges and mammal collisions, to the Canadian Coast Guard within two hours of the occurrence. Notify MPC as soon as possible and file an incident report.
5. Provide a post-activity report to MPC that details MPA arrival and departure dates & times, and outlines operations undertaken within the MPA.

We have enclosed a set of templates and instructions to assist with the documentation being sought in the requests attached to this Approval. The activity report, sightings data, and incident notifications should be submitted to Leah McConney in MPC at:

Leah McConney
Fisheries and Oceans Canada
Bedford Institute of Oceanography
1 Challenger Dr., B500
Dartmouth, NS
B2Y 2V9

Phone: (902) 499-0526
E-mail: Leah.McConney@dfo-mpo.gc.ca

Please confirm with Leah McConney that you have received this letter, and feel free to follow-up anytime should you have any questions or need further clarification.

Yours sincerely,

Dobson, Suzanne Digitally signed by Dobson, Suzanne
Date: 2021.07.15 12:02:42 -03'00'

Suzanne Dobson
A/Director, Oceans & Aquaculture Management
Aquatic Ecosystem Branch
Maritimes Region

Attachments:
Approved Activity Plan
Activity and Incident Report Template

ANNEX 3: Sambro Sponge Conservation Area permit

Fisheries and Oceans Canada | Pêches et Océans Canada

P.O. Box 1006
Dartmouth, NS B2Y 4A2

August 16, 2022

Dr. Ellen Kenchington
Research Scientist
Science Branch
Bedford Institute of Oceanography
Fisheries and Oceans Canada, Maritimes Region

Dear Dr. Kenchington:

RE: 2022 Activities in Sambro Bank Sponge Conservation Area

The Marine Planning and Conservation (MPC) section of Fisheries and Oceans Canada (DFO), Maritimes Region, have reviewed your activities being conducted in August 2022 in the Sambro Sponge Conservation Area. Your proposal to conduct sampling has been reviewed to be consistent with the goals and objectives of the conservation area and broader conservation planning in the region. I am pleased to inform you that we support this activity.

MPC requests any substantial changes to the program, such as alterations in sampling station locations, be provided prior to sailing. It remains your responsibility to meet legal requirements associated with the planned and approved activities. Ensure that all necessary permits, authorizations and consents required under other applicable federal legislation and regulations are acquired prior to undertaking the approved activity.

Thank you for continuing sponge research activity and advancing our understanding of these valuable ecosystems in our region. If you have any questions, please do not hesitate to contact me at 902-403-2548 or Derek.Fenton@dfo-mpo.gc.ca.

Yours sincerely,

Derek Fenton

Section Head
Marine Planning and Conservation
Maritimes Region, Fisheries and Oceans Canada
Bedford Institute of Oceanography