South Coast Fjords 2023

Bay d'Espoir – White Bear Bay, 18th to the 26th of November 2023

RV Connor Murphy

Cruise ID: CM231118

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Personnel On-board

Shipboard Participants

1. **Emmeline Broad,** Marine Institute of Memorial University of Newfoundland
2. **Kirk Regular,** Marine Institute of Memorial University of Newfoundland
3. **Adam Templeton,** Marine Institute of Memorial University of Newfoundland
4. **Robyn Whelan**, Marine Institute of Memorial University of Newfoundland
5. **Vonda Hayes**, Department of Fisheries and Oceans
6. **Kathryn Murray**, Department of Fisheries and Oceans

Shore-based Participates

1. **Katleen Robert,** Marine Institute of Memorial University of Newfoundland
2. **Evan Edinger,** Memorial University of Newfoundland
3. **John Fisher**, Marine Institute of Memorial University of Newfoundland
4. **Bárbara Neves,** Department of Fisheries and Oceans

RV Connor Murphy Crew

1. **Dudley Fowler**, Captain
2. **Phil Wilcodd,** First Mate
3. **Oleksii Chervinskyi,** Chief Engineer
4. **Steve Parsons,** Deck Hand
5. **Josh Dalton,** Deck Hand
6. **Geoffrey Parsons,** Chef

Expedition Rational

Fjords are complex geological features consisting of coastal incisions in which offshore deep-water species can establish (1). Benthic habitat complexity in fjords is often linked to the complex and highly sloped rocky topography interacting with currents and gradients in water column properties (e.g., temperature, salinity, and oxygenation) (2). Due to this complexity, fjord walls are known to support communities of suspension and filter feeders, including cold-water corals and other vulnerable, slow-growing taxa (3, 4). However, fjord habitats are often situated close to human activity and risk exposure to anthropogenic influence. For example, the Miawpukek First Nation traditional territory of Bay d'Espoir is the deepest fjord on the south coast of Newfoundland (5). Due to numerous sheltered bays and inlets, Bay d'Espoir offers optimal conditions for finfish cages and suspended shellfish gear culture, and planning continues for the expansion of aquaculture activities (6), Bay d'Espoir is also the location of complex and highly sloped rocky habitats, where sea anemones, sponges, stalked barnacles and the giant file clam *Acesta cryptadelphe* were observed (7). Though these observations were made over 30 years ago, very little research has taken place to understand the benthic community structure in this location. Habitat-forming cold-water coral species, *Paragorgia arborea,* has also been reported in the area (6), along with the sea pen *Pennatula aculeata* in the bottom of the Bay (8). Observations such as these indicate vulnerable benthic taxa could be more widespread than previously known. To support marine spatial management, particularly the coastal and fjord systems in around Newfoundland and Labrador where there is little to no baseline data, it is important to understand the distribution of ecologically important habitats. Efforts to address this knowledge gap aligns with the objectives set in the Fortune Bay coastal Baseline Program and Marine Conservation Targets (MCT) program. The MCT program aims to characterise the macrofaunal density and assess the effect of environmental and anthropogenic variables on macrofauna community patterns in White Bear Bay and Bay d'Espoir. White Bear Bay, located approximately 92 kilometres west of Bay d'Espoir, has yet to house infrastructure supporting aquaculture, meaning the habitats within experience different levels of anthropogenic disturbance. Compared to Bay d'Espoir, even less is known regarding the complexity of the benthic habitats of White Bear Bay. The pooling of resources to meet joint research objectives and the multidisciplinary approach facilitated within the scope of this expedition is a crucial step towards documenting the spatial distribution of fjord habitats in Newfoundland and Labrador, and understanding how vulnerable these habitats could be to disturbance. The primary objectives of this research are:

1. Collect baseline data towards developing new Fortune Bay Coastal Environmental Baseline Program and Marine Conservation Targets (MCT) within the South Coast Fjords of Newfoundland.
2. Strengthen existing collaborations between the Department of Fishery and Oceans (DFO) and MI (Marine Institute) by pooling resources to support monitoring activities aboard a new

research vessel within the Newfoundland and Labrador region. During this expedition, the team utilized a new charter vessel, RV Connor Murphy, and valuable feedback is obtained regarding the vessel and crew's performance and potential capability to operate with an observation class ROV for missions in 2024 and beyond.

The collaborative approach to this research also provides a platform to strengthen relationships and facilitate mutual knowledge exchange between MI/DFO and the community of the Miawpukek First Nation. During this expedition, community visits and outreach activity in Conne River were prioritized.

Operational Objectives

During this expedition, the primary operational objectives were as follows:

1. The acquisition of multibeam sonar data in Bay d'Espoir and White Bear Bay.
2. To characterize benthic habitats by collecting seabed video at target sites that may host cold-water corals and their associates.
3. Conduct CTD profiles and collect water samples to investigate cold-water carbonate production.
4. Characterize benthic fauna diversity (including functional diversity) through the collection of samples and sediment physio-chemical characteristics at specific predetermined sites in Bay d'Espoir and White Bear Bay.

Pre-expedition planning identified targets for preliminary surveying (Appendix 6) based on existing 20-meter resolution bathymetry compiled by DFO. Though multi-resolution bathymetry maps exist for part of the study area of Bay d'Espoir, full multibeam coverage, including backscatter, would better aid the identification of complex rocky habitats with the potential to support cold-water coral communities. After new sonar data acquisition and assessment of backscatter, this data was used to prioritize between the proposed sites for video surveys and target new sites of interest. Assessment of shallow (< 250 m depth), rocky cold-water coral habitats will be made using either the drop camera or ROV. Soft-sediment benthic habitat can be imaged using either the Drop Camera, ROV, or at the deepest part of the fjord (800 m) with the Bounce camera system. The completion of these activities meets operational objectives one and two.

CTD casts and water samples at fixed depths will be conducted close to the targeted video survey sites to measure the background hydrography and collect water samples for carbonate chemistry to meet objective three.

Targeted sites for sediment sampling to assess benthic fauna and physio-chemical characteristics are fixed and will be conducted with Van Veen grabs, meeting objective four.

Expedition Narrative

Mobilization occurred in St. John's, and equipment was stored but not unpacked in a metal shipping container (referred to as the sea-can). The sea-can was the only available sheltered workspace, and it was attached to the vessel's back deck before departure. The expedition lasted over nine days, during which we collected data from Bay d' Espoir, White Bear Bay, and Bay De Vieux. Four days were lost to downtime in dock due to two severe weather days, and two days to embark and disembark the science team that travelled by road to meet the vessel in Conne River.

Saturday 18th November

Due to a delay in paperwork, a departure on the 16th of November was impossible, meaning that the science team travelled by road and embarked in Conne River at 16:30 NST on the 18th of November. The team built a working lab space inside the sea-can secured on the back deck and prepared the boat for scientific operation. A severe weather system was scheduled for the following day, with the capacity to limit scientific activities. A network problem in the bridge prevented the multibeam system from working, and a separate issue was identified with the sound velocity profiler; a solution was pending. Science operations were discussed with the crew and deckhands. The science team attended a safety briefing by the captain and chief scientist. The captain informed us that deployment of equipment overboard could only occur in daylight hours due to safety.

Sunday 19th November

Inclement weather prevented science operations from commencing. The team continued to prepare the boat for scientific operations. The ship's winch cable was switched out to a smaller gasoline engine winch and cable provided by Marine Institute (MI). The winch wire on the Connor Murphy is very thick; therefore, this change was made to hasten equipment deployment time. The MI winch cable was fixed to the main roller wheel on the vessel's A-frame; however, we discovered that the ship's winch cable counter did not function. A backup cable counter brought by MI was fixed to the deck to monitor cable deployment speed and count the distance of cable paid out crucial for deployment of specialized equipment (e.g., CTD, Van Veen grab). A problem was identified with the portable fume hood that prevented it from being used without a new filter code to make it operational. Finally, the network issue for the multibeam was identified and resolved; this was due to a faulty/unplugged cable in the network on the bridge. Additionally, a problem with the sound velocity profiler was resolved. No scientific operation was conducted during the day, and we prepared to leave early in the morning during improved sea and wind conditions.

Monday 20th November

Science operations commenced at 5:00 NST with a transit from Conne River to Goblin Head (Lower Bay d' Espoir, see Appendix 6) running the shipboard multibeam (EM712). We were slow transiting due to conducting Sound Velocity Profiles to calibrate the EM712, one of which had to be repeated and entered manually into the vessel's multibeam software (Kongsberg SIS V5). The backscatter highlighted several rocky features at Goblin Head, including a small rift that extended into the cliff face above the ocean surface. This point was already proposed as a station (initially "ROV 14"; see Appendix 6 for proposed station locations). The ROV was deployed close to this rift to observe the wall below (station 3, event 8). However, the vessel could not maintain its position in gear due to a thruster issue. The captain relied on "clutching out" the gear and relying on the bow thrusters to prevent the vessel from spinning. This resulted in the ship drifting with the surface tidal flow (at the time approaching slack tide) towards the land edge. The ROV dive was aborted at the captain's request. Upon recovery, the ROV was found to have an electrical fault, meaning we could not record the live video feed.

We opted to conduct a CTD cast (station 4, event 9, originally named "CTD3", 680 m) in the deeper part of the Lower Bay channel, west of Goblin Head. All six niskin bottles were fired, and we had no issues with the water sampling. When initially plotting the profile in Seabird's software (SeaTerm), it was clear that the oxygen and pH sensors were not displaying the correct values. We contacted DFO Bedford for advice and were supplied with calibration files for each sensor. Deck operation ceased at sundown, and during the night, the vessel mapped the proposed Van Veen grab sites opposite Butter Cove in Lower Bay, then down from the North Bay through the Lower Bay across the fjord sill into Hermitage Bay. We transited back to Conne River south of Bois Island, mapping with the EM712. We were required to be docked in Conne River the following day for an outreach event organized with Se't A'newey Kina'matino'kuom School, Miawpukek Mi'kmaw Mawi'omi of Conne River.

Tuesday 21st November

The vessel docked at Conne River at 7:00 am NST and met members of the shore team (E. Edinger and K. Robert). High school students from Se't A'newey Kina'matino'kuom School and indigenous guardians of the Miawpukek Mi'kamawey Mawi'omi First Nation reserve boarded the vessel for a tour at 10:00 am NST. The science team provided outreach activities, including hands-on education on scientific equipment operations and an introduction to deep-sea corals with physical samples on hand. The students were encouraged to fly the ROV dockside to observe their community's seabed habitats. An introduction to cold-water corals and a "touch" table were presented to the students, showcasing local coral species (e.g., *Paragorgia arborea*, *Pennatula aculeata*). After lunch, we transited back to Goblin Head to deploy the Drop Camera (station 6, event 14) in the same position as the failed ROV.

The vessel struggled to remain on station and drifted out of the bottom range of the camera (> 250 m) meaning deployment of the drop cam had to be aborted. Moving East of Goblin Bay, two drop camera transects were conducted before sundown (stations 7 and 8 and events 15 and 16). We observed several sponge taxa and a soft white coral morphotype in a complex rocky substrate. Overnight, we transited to White Bear Bay, collecting multibeam data along the way.

Wednesday 22nd November

The vessel reached White Bear Bay in the early hours of the 22nd of November. Mapping was conducted throughout the fjord depending on where the boat could safely operate at night. We had fair weather conditions for our time in White Bear Bay. We completed three of the five proposed stations (stations 12, 13, and 14) for drop camera transects (n = 3 with one aborted deployment) and Van Veen grabs (three replicate grabs at each station; n = 9 grabs with numerous miss-fired deployments). The three stations were conducted on the proposed stations named 5, 3, and 1 (see Appendix 6 for proposed station locations), traveling south towards the mouth of the fjord. Video transects were conducted before the Van Veen grabs. The drop camera transects were planned to be straight lines running west to east across the position of the proposed Van Veen station. However, the vessel struggled to maintain position on a fixed heading and slightly deviated. Seabed imagery showed similar conditions at each station: muddy sand, white polychaete worm tubes, fish, and several northern shrimp spp., many observed with eggs. The three replicate grabs per station were randomly positioned around each proposed station. The vessel drifted with the surface tide despite the captain's efforts. This meant that after every grab, whether successful or misfired, the vessel had to return to the initial station position to redeploy the Van Veen.

After completing three of the five stations proposed, we transited into Bay De Vieux east of White Bear Bay to a site south of Gnat Island, mapping as we went. This site was designated a DFO priority site due to the known presence of sea pen fields (see Appendix 6 for proposed station locations). It was prioritized over the remaining two Van Veen Grab sites in White Bear Bay following instruction by B. Neves. Bathymetry derived from GEBCO, and the navigation chart on-board indicated the station at Gnat Island should be at approx. 220 m, but the shipboard multibeam showed approx. 300 m depth, meaning it was too deep to deploy the drop camera system. The bounce camera system, depth rated to 2000m, could not be deployed because it was not ready, and we were losing daylight and our chance to deploy the camera. The decision was to pick a site in shallower bathymetry, west of the proposed point, to collect drop camera video (station 16, event 40). At this station, we did not see any sea pens. The substrate was muddy sand intersected by exposed rock with a muddy veneer. We observed a community like that of White Bear Bay with many shrimp spp. and polychaete tubes. Van Veen samples were sieved for infauna from White Bear Bay and was preserved with formalin on the back deck because the fume hood remained inoperative; appropriate PPE and procedures were

followed. It was noted that the successful benthic samples were named and numbered using a scheme different from the event log; this is cross-referenced in the sample log, Appendix 6. Transit back to Bay d'Espoir occurred after sundown, mapping along the way. During the transit, an unidentified shipwreck was discovered at 47.531294, -56.714472, sitting at a depth of 178m (see attached archaeological site record form, map, and multibeam sonar imagery in Appendix 8).

Thursday 23rd November

We arrived in Bay d'Espoir in the early hours on the 23rd of November into the North Bay. At first light, we conducted two CTD casts at a depth of 316 meters (station 17, events 41 and 42). The first cast misfired (all niskin bottles failed to close and sample water) and was disregarded. The second cast was used to collect water samples; however, we did not have a water sample at 50 m, as the niskin bottle programmed for that depth did not fire. We conducted a bounce camera transect within the deepest depth contour (station 18, event 43, from 308 m) of North Bay, traveling in a southerly direction for 30 minutes with a drop to the seabed conducted every 30 seconds. Provisional examination of the imagery showed a muddy sand substrate with white polychaete tubes and potentially sea pens (P. *aculeata*). However, no clear images of them in the foreground were captured. The drop camera was deployed at North Bay Head (station 19, event 44, close to the proposed station "ROV site 2", see Appendix 6) to ground truth an area of complex bathymetry. An underwater cliff face was imaged housing a mixed benthic community of sponges, soft corals, and anemones. The camera was recovered after 15 minutes due to the vessel drifting away from the area of interest and the increasing risk of damage to the Drop camera. We moved to the deepest part of the Lower Bay and conducted a bounce camera survey for 30 minutes, with a drop every 30 seconds (station 20, event 45, 780m). Inspection of the imagery shows a muddy sand substrate is present, similar to North Bay; however, larger individual sea pens (likely P. *aculeata*) were visible (but still unclear) through the drop and uptake of the frame in both the forward and downward facing cameras. Smaller individuals were visible in the down-facing camera lying across the sediment (not standing upright) just before the frame made contact with the sediment. We continued into Lower Bay to deploy the drop camera (station 21, event 46). The aim was to ground truth the bathymetry type across the priority line 1 proposed for Van Veen grabs at Butter Cove (see Appendix 6, Figure 16). The substrate observed was exposed bedrock running east to west along the bay colonized by anemones, intersected with patches of muddy sand substrates. The camera video appeared rotated, giving the impression that the rocky substrate was a vertical wall, but this was not likely based on the bathymetry. The transect ended early because the vessel struggled to maintain position along the transit line. Science activities were halted at this point due to incoming inclement weather. The vessel transited inland to St Albans for shelter, docking just after sunset.

Friday 24th November

We remained docked at St Albans due to inclement weather; however, we conducted outreach activity for the Fisheries and Marine Institute Research Week 2023 by collaborating with CFER led by R. Whelan. The team was video-linked by mobile in real time to students attending the event in Hampton Hall within the Marine Institute. The team and project were introduced, and the audience was given a vessel tour. The ROV was set up off the vessel in the dock, and the audience saw the ROV submerged and seabed imagery in real-time.

Saturday 25th November

We arrived in the Lower Bay opposite Butter Cove at first light; the Van Veen line (priority line 3, see Appendix 6) was selected due to the reduced complexity of the seabed evident from multibeam and backscatter collected during transit over the area and the ground-truthing of the substrate with the drop camera in station 21 / event 46. Station 23 is the most southerly of the five points within priority line three. Five Van Veen deployments were conducted around this position, resulting in two miss-fired grabs and three successful grabs. Samples containing multiple sea pens (*P. aculeata*) were collected between ~398-422 m depth. In a deviation from the sampling protocol, all three successful grabs were kept and sieved for infauna. Van Veen grabs were conducted at the next adjacent point on priority line three (station 24). Nine deployments resulted in six miss-fired grabs (likely due to swell causing slack in the winch cable) and three successful grabs. Again, the sediment sampled contained numerous sea pens (*P. aculeata*), including one observed with gametes. All mud samples were retained to sieve for infauna. Science operation finished at 15:30 NST, and the vessel transited back to Conne River, docking just after sunset.

Sunday 26th November

The science team disembarked the Vessel at 7:30 NST and travelled back to St. John’s by road.

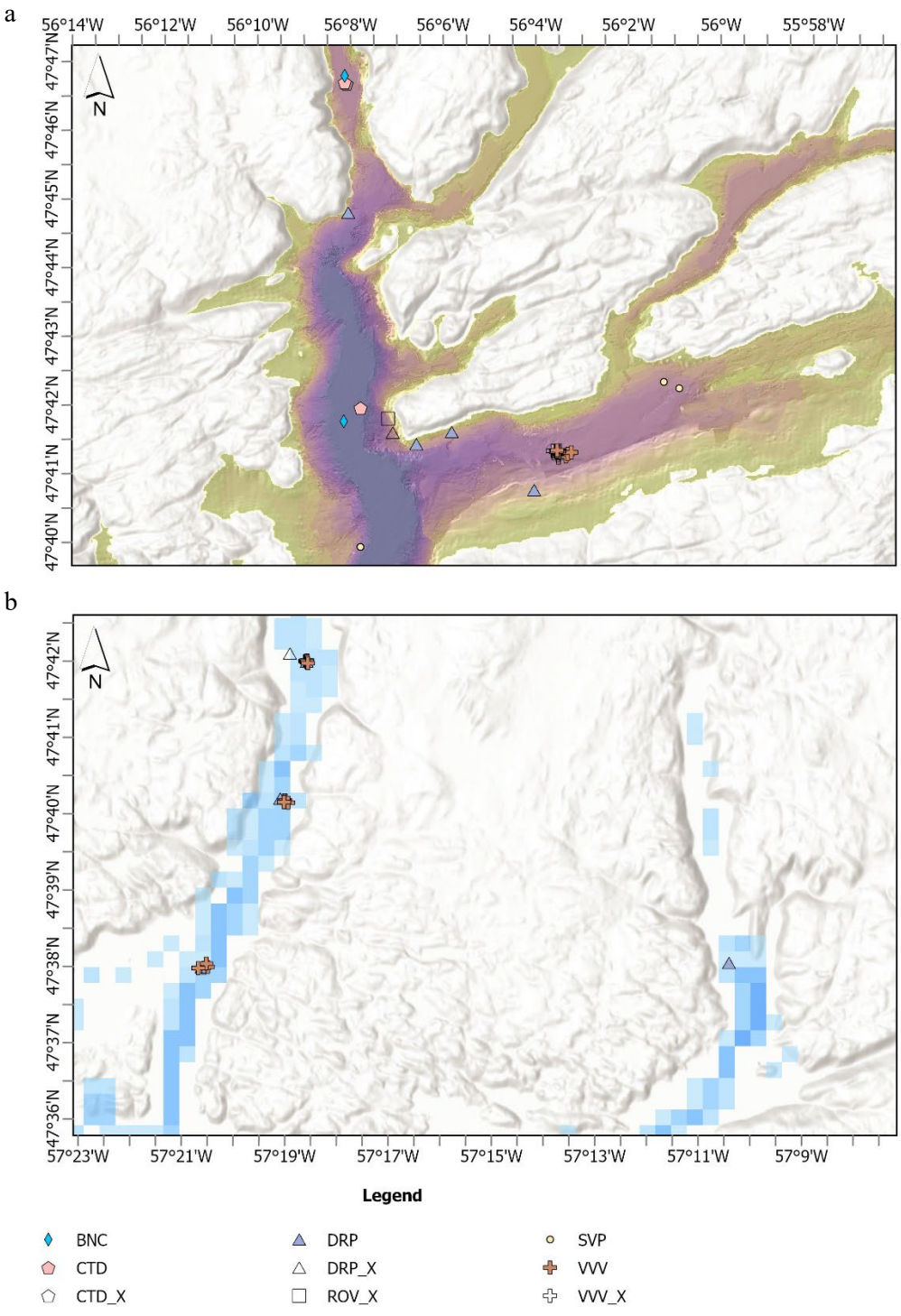

Figure 1: Overview of scientific activities in (a) Bay d'Espoir and (b) White Bear Bay. Symbols represent gear type, BNC: Bounce Camera, CTD: Conductivity Temperature Depth Sensor, DRP: Drop Camera, ROV: Remotely Operated Vehicle. SVP: Sound Velocity Profile, VVV: Van Veen Grab. Colourless symbols marked with an "X" represent unsuccessful deployments. Multibeam data and several SVPs are not shown.

1. Summary of Activity

During this expedition, we collected data in 24 stations across 63 events using an array of sampling equipment. We collected almost full coverage multibeam with backscatter data for the sites of interest within Bay d' Espoir and White Bear Bay, along with 78 benthic and 54 water samples. Additionally, the team facilitated two outreach events and imaged a new shipwreck off the south coast of Newfoundland.

2. Multibeam

Shipboard multibeam was acquired using a Kongsberg EM712, 1°x1° with an SBG Navsight/Apogee Inertial Navigation System and an AML Micro SV at the transducer head. Both AML Minos and AML 6 Sound Velocity Profilers were used during the survey.

The SBG Apogee system on the R/V Connor Murphy (101-0431800) was not immediately operational. The vessel did not have a DGNSS subscription, and MI antennas are incompatible with the onboard SBG Nav System. K. Regular secured a one-week test subscription (Marinestar Coastal) through Fugro (Houston) at zero charge, providing 10 cm positional accuracy, which was more accurate than regular GPS.

Six Sound Velocity Profiles and ninety-nine survey lines resulted in almost full multibeam and backscatter coverage in Bay d'Espoir, White Bear Bay, and part of Bay De Vieux (Figures 1 & 2). Survey lines were planned to overlap existing bathymetry in Bay d' Espoir to collect full coverage backscatter. Multiple surveys of the study region were conducted at night, including areas that had not been surveyed before (e.g., White Bear Bay). In areas of high slope, specifically in the deepest parts of the fjord, the beam angle was adjusted to obtain higher resolution over the more complex rocky features and walls. Detailed information on survey lines is present in Appendix 2. Raw sonar data was not post-processed during the expedition.

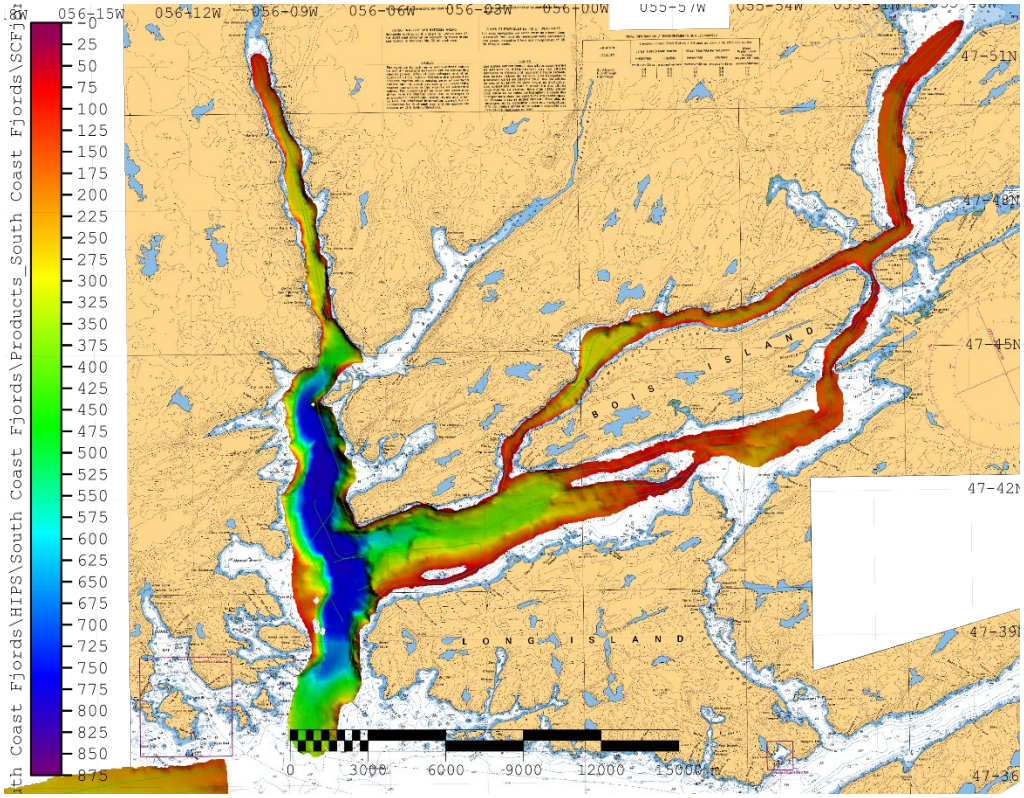

Figure 2: Coverage of multibeam echo sounder activity in Bay'd Espoir.

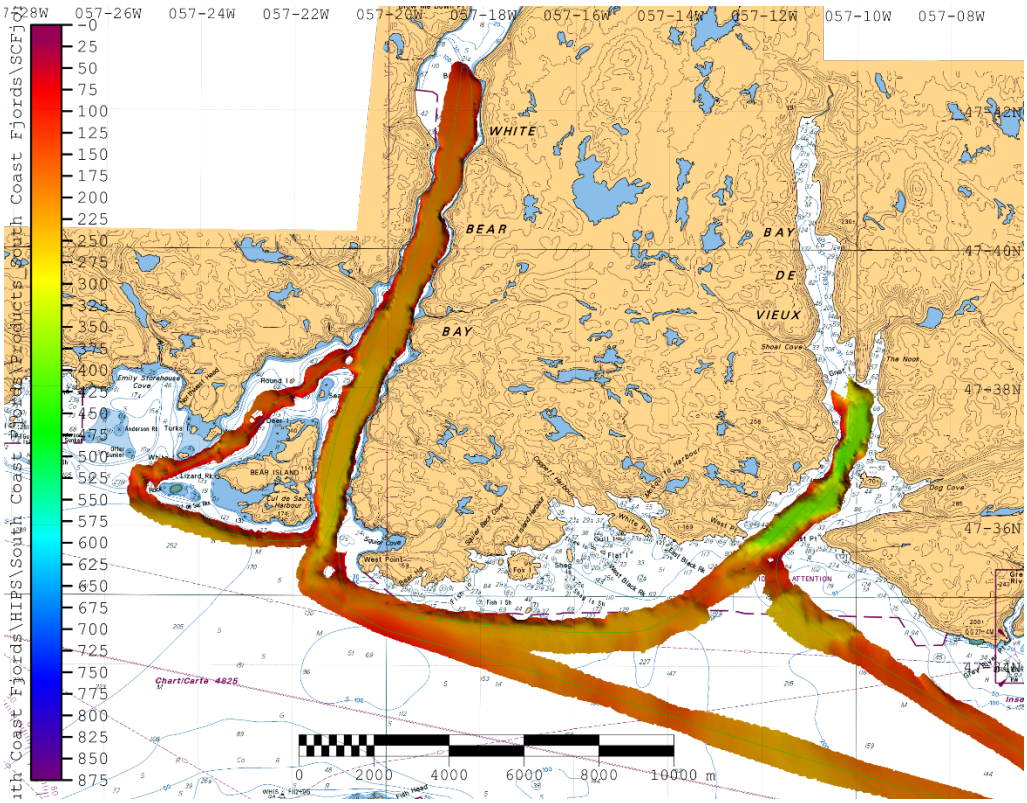

Figure 3: Coverage of multibeam echo sounder activity in White Bear Bay and Bay De Vieux.

2. ROV

We utilized the SeaMor Chinook ROV, with a depth rated to 300 m; however, the deployment depth was restricted to 250 m. The ROV was configured without the manipulator arm. The integrated camera system captures HD video and is illuminated with two lamps at 1500 lumens. The ROV houses green scaling lasers setting a visible scale of 150 mm. The control system and camera feed monitor are operated from within a pelican case, which was positioned next to the starboard door of the vessel (Figure 4). The live feed is recorded to an SD card via a separate recorder (Blackmagic Video Assist). ROV positioning (USBL) was tracked and recorded within the water column, with the receiver deployed on a long pole over the starboard side. ROV position was recorded to TimeZero software, which also logs the vessel's position in real-time.

Two of the science party observed the live stream of the ROV via a link to a TV located in the mess for real-time video observational logging. Three science party members (One ROV pilot, one with cable management, and one recording metadata/communicating with the bridge) were on the deck. It was agreed with the bridge, once the ROV was deployed, to keep the vessel on station until we requested the vessel to move, depending on the amount of ROV cable paid out. The vessel would follow a predetermined heading to a finishing marker, which was set in the vessel's own GPS tracking system (TimeZero) at a speed of 1 knot.

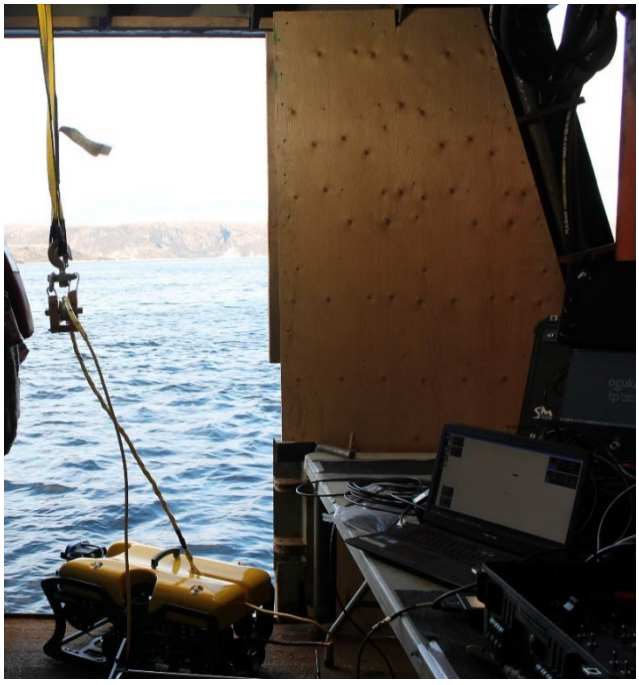

Figure 4: On-deck configuration for ROV deployment. Photo: K Murray.

Table 1: Summary of ROV deployments.

Dive # & Date	Station	Event	Start Latitude (DD)	Start Longitude (DD)	Start Depth (m)	End Latitude (DD)	End Longitude (DD)	End Depth (m)
#1/ Nov 20th	3	8	47.69583	-56.12137	250	NA	NA	NA

2.1 ROV Challenges

The ROV was deployed once (Table 1), but the dive was aborted before reaching the seabed due to vessel positioning issues. The ROV could only be deployed from the starboard side door. The captain positioned the bow into the wind, but the surface tide pulled the boat towards the rock face, away from the starting station coordinates. Due to problems with the thrusters, this movement could not be countered, and the captain instructed us to abort.

During deployment, the USBL failed to register the correct position for the ROV, which may have been driven by interference from the deep fresh layer in the water column. After recovery, a fault was discovered between the live video stream and the video recorder, meaning that the ROV could not be deployed for data collection for the remainder of the expedition. We continued by using the drop camera. SeaMor was contacted once the issue was detected, but a solution was not reached during the expedition. The ROV was utilized during the two outreach events, as recording the seabed video during the live stream was not required.

3. Drop Camera

The Drop Camera was a SubC Imaging Coastal Rayfin Camera. The camera was set within a custom metal frame between two lamps (Aquorea Mk3 LED) of 15,000 lumens each and scaling lasers (MantaRay Parallel Lasers), which set a laser scale of 100 mm. The camera is depth rated to 300m; however, it was deployed to a maximum depth of 250 m. The camera has no positioning system, so the coordinates noted (Appendix 3) are the vessel position. Camera controls were operated from a dedicated field laptop running the Sub-C software, which manages the lamp illumination, camera exposure, laser operation, and start and stop recording functions. The video recording preferences were set to HD capabilities = 1920 x 1080 at 30 frames per second; the lamp strobing was off. Video files are stored on the camera, which has a limit of 512 GB. All stored data is extracted to an external hard drive via the computer after the Drop Camera is on deck with no more deployments pending. It is noted that the overlay time/date does not retain the correct time/date, and the information is shown at the start of the transect on a whiteboard (time in UTC, date, location, and station).

Two of the science party observed the live stream of the Drop Camera via a link to a TV located in the mess for real-time video observational logging; three members of the science party (Drop Camera management, cable management, and one recording metadata /communicating with the bridge) were located on the deck.

Figure 5: On-deck configuration for Drop Camera deployment (a) configuration for deployment/recovery (b) dry set up of the BCP unit, ethernet, and Sub-C software on dedicated field laptop. Photos: E Broad.

Once the Drop Camera was deployed, it was agreed with the bridge to drift with the surface tide following a predetermined heading to a finishing marker set in the vessel's own GPS tracking system (TimeZero), trying to maintain a speed of 1 knot or less.

The camera was deployed by hand out the starboard door with the data transfer cable running through a pulley block (Figure 5). Video recording starts when the system is on the deck. The station metadata is shown to the camera using a whiteboard, and then the camera is dropped to the seabed to drift approximately 1-1.5 meters from the bottom. An effort was made to maintain the laser dots within the scale box overlayed on the video feed seen in the subsea camera software to minimize the change in the field of view, and the cable was pulled in and paid out manually to facilitate the camera lens distance from the seabed. At the end of the transect, the recording is stopped before recovery starts.

The distance and duration of each transect are not standardized. In Bay d'Espoir, we aimed to collect 30 minutes of bottom imagery for standard transects. In White Bear Bay, we aimed to conduct a straight line transect west to east across the proposed Van Veen grab site with approx. 200-500 m of video before and after the predetermined station point. The transect line following a fixed heading of the maximum transect distance was prepared on the bridge and entered on the vessel's own GPS

software (TimeZero). A summary of observations and information on the individual video files per station is detailed in Appendix 3.

Table 2: Summary of Drop Camera deployments.

Dive # & Date	Station	Event	Start Latitude (DD)	Start Longitude (DD)	Start Depth (m)	End Latitude (DD)	End Longitude (DD)	End Depth (m)
#1/ Nov 21st	6	14	47.69265	-56.11977	250	NA - Aborted	NA - Aborted	NA
#2/ Nov 21st	7	15	47.68977	-56.11133	160	47.6898	-56.1120	130
#3/ Nov 21st	8	16	47.69263	-56.09860	169	47.6924	-56.0972	170
#4/ Nov 22nd	11	20	47.70202	-57.31560	145	NA - Aborted	NA - Aborted	NA
#5/ Nov 22nd	12	21	47.70028	-57.31015	148	47.7003	-57.3095	150
#6/ Nov 22nd	13	29	47.67033	-57.31857	201	47.6697	-57.3137	108
#7/ Nov 22nd	14	34	47.63347	-57.34368	237	47.6329	-57.3384	237
#8/ Nov 22nd	16	40	47.63477	-57.17350	235	47.6326	-57.1730	241
#9/ Nov 23rd	19	44	47.74613	-56.13488	150	47.7481	-56.1336	217
#10/ Nov 23rd	21	46	47.67832	-56.06925	224	47.6783	-56.0732	201

3.1 Drop Camera Challenges

There were no operational issues with the drop camera, but we did find it challenging to collect data due to the vessel struggling to hold position. We found that the vessel could not maintain a speed counter to current/wind movement as well as maintain a heading. This resulted in the camera drifting across the same area in a “figure of 8” pattern in station 7 and away from the straight-line heading during deployment in White Bear Bay (Stations 11-15).

4. Bounce Camera

The bounce camera system consists of a metal frame supporting two cameras recording video, one down-facing with lasers (SubC Imaging Camera 6000 m depth rated) and one forward-facing (GoPro 10 in a specialized housing by Anglerfish Creative, 2000 m depth rated). The down-facing camera is housed in a metal box in the middle of the frame, along with a battery and a set of scaling lasers (MantaRay Parallel Lasers) at a scale of 100 mm. The down-facing camera is paired with a set of external white SubC LED lights that provide an 80˚ beam angle (circular) and 180 lumens per watt. The forward-facing camera is attached at an oblique angle to the front of the metal housing (roughly -10 °), and the height from the ground to approximately the centre of the GoPro lens is 31.5 inches. One lamp (Aquorea Mk3 LED) of 15,000 lumens was incorporated from the Drop Camera (left strobe lamp) along with another strobe lamp on the right. The video is recorded directly to the camera systems. Note that the GoPro was running in 5.3K video. The camera system does not have a dedicated positioning system, so the coordinates noted are the vessel position.

The system was deployed per Marine Institute's standard operating procedure using the vessel's winch and cable. Video is started on the deck, and station metadata is shown to both cameras using a whiteboard (time in UTC, date, location, and station). The system is lowered by winch at 80 m/min, which slows to 20 m/min within 50 m of the seabed. When the winch wire slacks, the system is assumed to be on the seabed. After 15 seconds, the winch operator retracts 1-2 m of the wire for 30 seconds before lowering the camera again. This yo-yo method is conducted for 30 minutes while the vessel moves at < 2 knots on a fixed heading. We averaged a vessel speed between 0.3-0.7 knots while conducting transects.

The estimated drop camera positions based on the vessel position when the line goes slack are detailed in Appendix 5.

Before deployment, the whiteboard containing the metadata was not always visible, and care was taken to order video files appropriately after the video was downloaded from the camera. The videos were consecutively renamed from the original file names using the file names generated in the station list. The forward-facing camera has an 'f' added to the filename (see Appendix 5).

Table 3: Summary of Bounce Camera transects.

Dive # & Date	Station	Event	Start Latitude (DD)	Start Longitude (DD)	Start Depth (m)	End Latitude (DD)	End Longitude (DD)	End Depth (m)
#1/ Nov 23rd	18	43	47.77917	-56.13560	308	47.77072	-56.13385	307
#2/ Nov 23rd	20	45	47.69533	-56.13732	780	47.68963	-56.14350	700

Figure 6: Bounce Camera configuration (a) for the down-facing camera and (b) with the forward-facing camera with additional Subsea lamp (left of the forward-facing camera) removed from the Drop Camera. Photos: E Broad.

5. Van Veen Grab

The expedition used a standard Van Veen Grab set-up deployed using the Marine Institute winch wire and line counter. Infauna was isolated from sediment in a Wilson AutoSiever machine with a mesh of 500 µm. The AutoSiever was set on the port side of the back deck, and the internal water sprinklers supplied seawater via the fire hose. The bridge controlled the operation of the hose. The excess water and mud were expelled port overboard via tubing attached to the AutoSiever. A specialized lid was used to cover the sieve, and the machine can work unsupervised.

Table 4: Container and preservation type for each benthic sample collected with the Van Veen grab.

Analysis type	**Preservation**	**Container**
Chlorophyll	Freeze (-80°C)	Black falcon tube (10 mL)
Drugs & Pesticides	Freeze (-20°C)	Amber glass jar (120 mL)
Grain size	Fridge	Sputum cup (100 mL)
Organic Matter	Freeze (-20°C)	Sputum cup (100 mL)
Microplastics*	Room temperature	Glass jar (1.9 L)
Metals	Freeze (-20°C)	Plastic jar (30 mL)
Infauna	10% buffered formalin	Plastic jar (500 mL)
Infauna**	100% ethanol	Available option
Infauna**	Freeze (-80°C)	Ziploc bag

*Only collected from Bay d'Espoir. **Preservation methods that were species-specific.

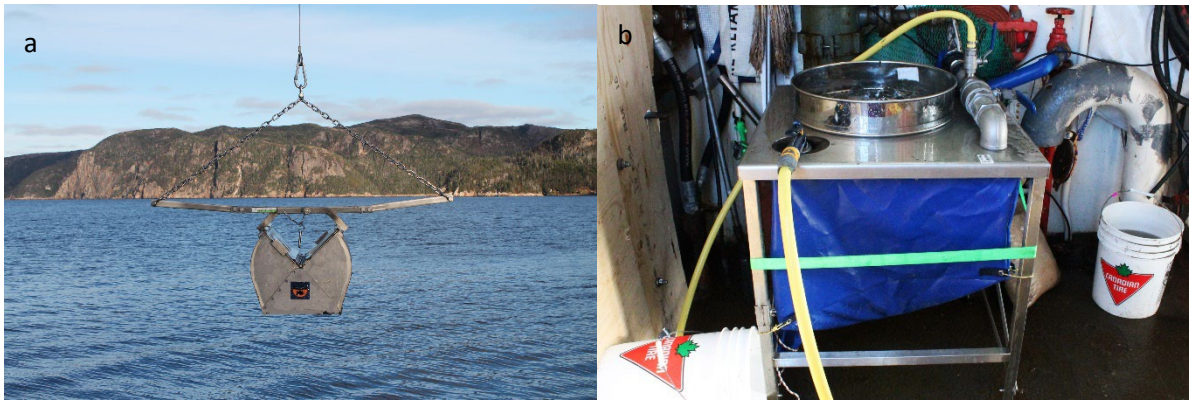

Figure 7: (a) Van Veen grab being deployed at White Bear Bay. (b) The AutoSiever machine set-up; sieve lid and waste tubing not shown. Photos: K Murray.

5.1 White Bear Bay Sample Collection

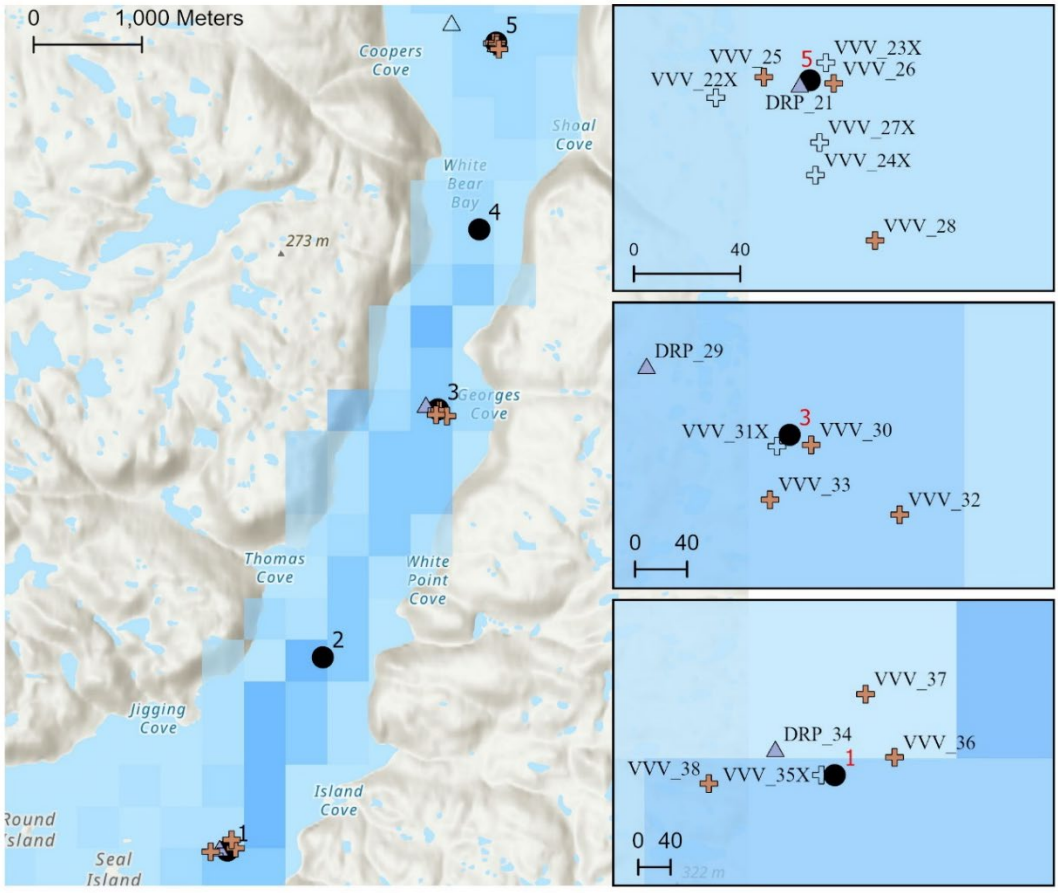

Figure 8: Distribution of successful Van Veen sediment grabs and the start location of Drop Camera Video in White Bear Bay. Three of the five stations were completed. Labels indicate sampling gear and event number. Colourless crosses with an " X " label indicate that deployment resulted in a misfire. The scale bar in insert maps is in meters.

Nine Van Veen sediment grabs were successfully obtained at three stations within White Bear Bay. Station 12 was in the innermost/northern section of the bay at 149-150 m depth with four misfires and three successful Van Veen grabs. Station 13 was in the bay's middle section, ranging in depth from 197-201 m, where four deployments were conducted, with one misfire and three successful Van Veen grabs. The third and final station at White Bear Bay, station 14, was near the bay's outer/southern portion, ranging in depth from 237-239 m, where four deployments were conducted, with one misfire and three successful Van Veen grabs.

Sediment grabs appeared similar between stations. The sediment type was medium brown mud, darker and thicker with depth within the Van Veen grab. Sediment samples were collected from the first successful Van Veen grab at each station for chlorophyll (n = 3 per station), organic matter (n = 3 per station), grain size (n = 3 per station), metals (n = 1 per station), and drug and pesticide (n =1 per station) analyses. Two additional Van Veen grabs were collected at each station for infauna; each grab sample was sieved using an auto Siever machine with a mesh of 500 µm. Once the mud was removed, the remaining infauna were preserved in formalin. Sieved samples were mostly organic matter, small gravel, shell hash, and polychaete tubes. Infauna from all stations also appeared similar, with visible polychaetes and worms within samples. A few juvenile brittle stars (<1 cm) were also noted. At station 14, a suspected acorn worm and translucent sea cucumber (~12.5 mm in length) were observed. All infauna samples were preserved in 10% buffered formalin except the sea cucumber, which was preserved in 100% ethanol. The complete sample list is detailed in Appendix 4.

Pictures of successful Van Veen grabs before subsampling will show a whiteboard with the incorrect station number (STN:1-3). To clarify, these stations were 12, 13, and 14, which are B. Neves' proposed station numbers 5, 3 & 1, respectively.

Figure 9: Three successful Van Veen grab replicates from White Bear Bay. Photos: V Hayes

5.2 Bay d'Espoir Sample Collection

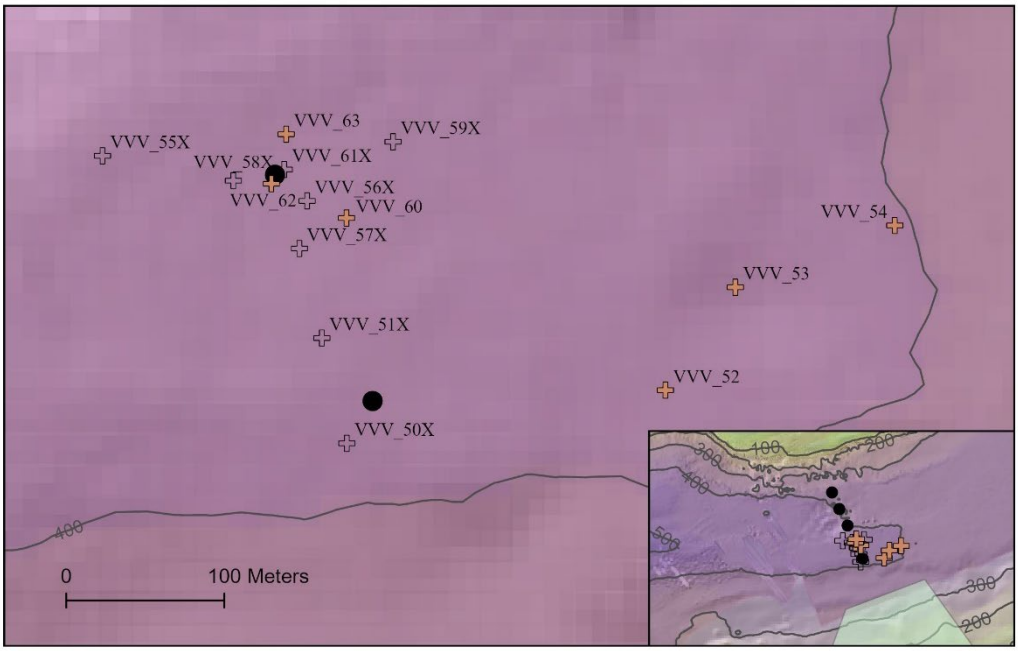

Figure 10: Distribution of successful (brown crosses) and unsuccessful (colourless crosses with "X" label) around the predetermined sampling points. Only two of the five stations were sampled (all five stations are detailed in the insert map). Labels are sampling gear plus event number.

Five stations following a straight line, with three sediment replicates taken at each station, were predetermined for sediment sampling opposite Butter Cove in Bay d'Espoir. Only two of the five target stations were sampled, meaning six Van Veen grabs were obtained over two stations. In a deviation from the sampling protocol, the sediment from every grab was kept and sieved for infauna.

Sediment from all grabs was consistent in colour and texture: dark grey with a thin veneer of brown sediment on the surface, muddy with sea pens (*P. aculeata*) visible within the sediment. On two occasions, sea pens were hanging from the jaw of the Van Veen. Heart urchins (*Briaster fragilis*) and small krill were also present in the grabs. Sediment samples were collected from the first successful Van Veen grab at each station for chlorophyll (n = 3 per station), organic matter (n = 3 per station), grain content (n = 3 per station), metals (n = 1 per station), drug and pesticide (n = 1 per station), and microplastic (n = 1 per station) analyses. All Van Veen grabs at each station were sieved at a mesh of 500 µm to obtain infauna samples. Infauna was preserved in 10% buffered formalin, with one brittle star and one sea urchin in 100% ethanol. Sea pens (24 total) were photographed and frozen at -80 °C for future analysis. The complete sample list is detailed in Appendix 4.

5.3 Van Veen Grab Challenges

In total, there were six misfires of the Van Veen at White Bear Bay and eight in Bay d'Espoir. The issue was due to pre-mature firing, returning the Van Veen full of water rather than sediment. The

cause was a combination of currents, depth, and operational constraints. Generally, Van Veen grabs are not used at depths > 200 m and are overly sensitive during deployment. To aid in the success of firing, standardized DFO deployment protocol was adjusted to a lower rate of ~55 m min^{-1}, then slowed to ~10 m min^{-1} when within 20 m of the seabed. Of note, the pay-out of the line exceeded known depths (based on multibeam data) up to 30 m at some Bay d'Espoir stations, possibly due to stronger subsurface currents.

Figure 11: Three successful Van Veen grab replicates from Bay d'Espoir. Photo: V. Hayes.

6. CTD

The CTD rosette sampler houses six 4 L niskin bottles, a CTD system (SBE 19plusV2), and a fluorometer. The CTD system continuously collects data for conductivity, temperature, and pressure as it moves through the water column. The fluorometer continuously measures chlorophyll-a, FDOM, rhodamine, phycocyanin, and phycoerythrin. DFO-Bedford supplied an additional O_2 sensor (SEB43) and pH sensor (SEB18), which also monitors the water column continuously. The borrowed sensors were installed into the SBE 19plusV2 and secured to the central rosette (see Figure 12). We did not have calibration data for any of the sensors.

CTD depths for firing niskin bottles were pre-set before deployment using a dedicated PC running Seaterm AF V2 software. The depth position of the deepest niskin to fire was set to fire approximately 15 meters above the bottom depth established in the multibeam. The CTD was deployed from the aft A-frame using the Marine Institute winch and cable following standard Marine Institute operating procedure. The sensor information was extracted with the rosette resting on the back deck through a dedicated cable fixed to a laptop located within the sea-can. Niskin bottles and sensors were rinsed with deionized water after deployment.

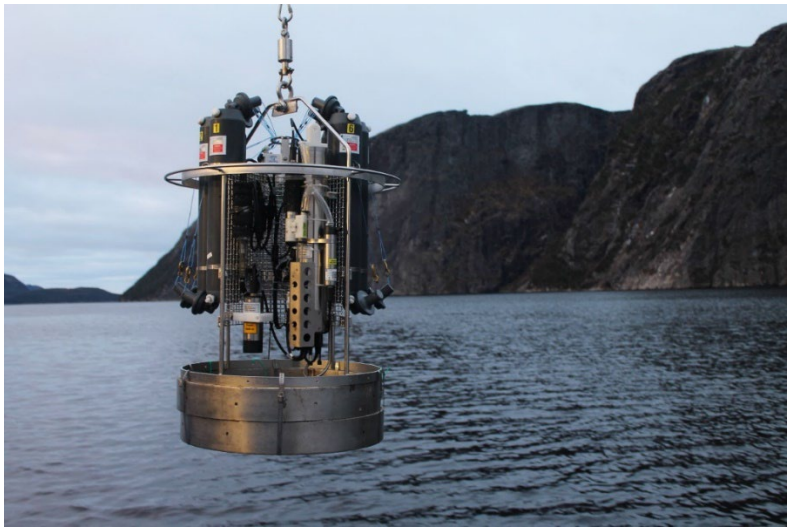

Figure 12: SBE 19plusV2 CTD rosette with additional pH and O_2 sensors installed. Photo: K Murray.

6.1 Summary of CTD sampling

Two successful CTD profiles with water samples were conducted at different stations during the expedition, close to sites where seabed imagery was collected. The first was in Lower Bay (Table 6, Figure 13), and the second was in the North Bay (Table 7, Figure 14). Depth intervals targeted for water samples aligned with DFO CTD survey methodology. At each sample depth on the CTD upcast, seawater samples were collected in a dedicated niskin bottle. At different stations, the same niskin bottle was used for the same depth, e.g., niskin 1 is at the bottom, niskin 2 at 400 m, and niskin 6 is at the surface.

Water samples were taken to analyse the Total Inorganic Carbon (TIC) (n = 1 per niskin), pCO_2 (n = 1 per niskin), oxygen isotopes (n = 1 per niskin), and water nutrients (n = 2 per niskin). Samples to calibrate salinity were collected from surface and bottom bottles only. The sampling procedure for niskin bottles followed the DFO standard procedure. However, it is noted that for oxygen isotopes and nutrients, caps and collection bottles were rinsed three times and over-filled by two volumes without using tubing. Nutrients were handled and filled with bare hands using no tubing. Handling of water samples requiring poisoning with Mercuric Chloride was isolated in the lab space and handled by a different science team member to the member taking and storing the oxygen, nutrient, and salinity samples. Care was taken to avoid cross-contamination. Details of water sample type and preservation method are detailed in Table 5. A complete sample list is detailed in Appendix 4. CTD processing was conducted in SBE Data Processing Software, and the raw data from each cast are supplied as binary .hex files following the CFER CTD data conversion protocol.

Table 5: Container and preservation type for each water sample.

Analysis type	**Preservation**	**Container**
Carbonates (TIC)	Mercuric Chloride 100 µL & Store at room temp	500 ml glass & stopper
pCO_2	Mercuric Chloride 50 µL & Store in fridge	160 ml glass & crimp
Oxygen-18	Store at room temp	60 ml amber glass
Nutrients	Freeze (-20°C)	2 X 50ml falcon tube
Salinity	Store at room temp	Square glass bottle

Table 6: Sample list for Nov 20th, 2023, 18:40 UTC: station 4 (East of Goblin Head, Lower Bay). Bottom depth: 783 m. DFO generates sample IDs.

Sample ID	Niskin	Approx. depth (m)*	Carbonates (n=1)	pCO2 (n=1)	Oxygen isotope (n=1)	Nutrients (n=2)	Salinity (n=1)
436750	1	Set at 759, 783 was recorded	X	X	X	X	X
436751	2	400	X	X	X	X	
436752	3	200	X	X	X	X	
436753	4	100	X	X	X	X	
436754	5	50	X	X	X	X	
436755	6	5 m (surface)	X	X	X	X	X

X = sample taken.

Table 7: Sample list for Nov 23rd, 2023, 11:26 UTC: station 17 (North Bay). Bottom depth: 316 m. DFO generates sample IDs.

Sample ID	Niskin	Approx. depth (m)*	Carbonates (n=1)	pCO2 (n=1)	Oxygen isotope (n=1)	Nutrients (n=2)	Salinity (n=1)
436756	1	290	X	X	X	X	X
436757	3	200	X	X	X	X	
436758	4	100	X	X	X	X	
~~436759~~	~~5~~	~~50~~	misfire	misfire	misfire	misfire	misfire
436760	6	5 m (surface)	X	X	X	X	X

X = sample taken
*Depth is the programmed depth to trigger the first Niskin on the up cast.

6.2 CTD Challenges

The cast at station 4 was previously identified with existing bathymetry at a bottom depth of 680 m. However, the boat depth over the station showed 759 m, and the cast (Figure 13) registered a bottom depth of 783 m. It is thought that a tidal current likely pulled the rosette into a deeper part of the central channel in Lower Bay.

Some pCO_2 water samples were compromised when the fridge became too cold. Some of the bottles were fully or partially frozen, lifting the crimped lid. After thawing, we re-crimped the tops, but these were noted to contain air bubbles after this. Affected samples are detailed in the sample list in Appendix 4.

Even with the calibration files, we struggled to correct the pH sensor readings and Chl*a* values were not checked. We lacked the expertise on board to resolve this issue.

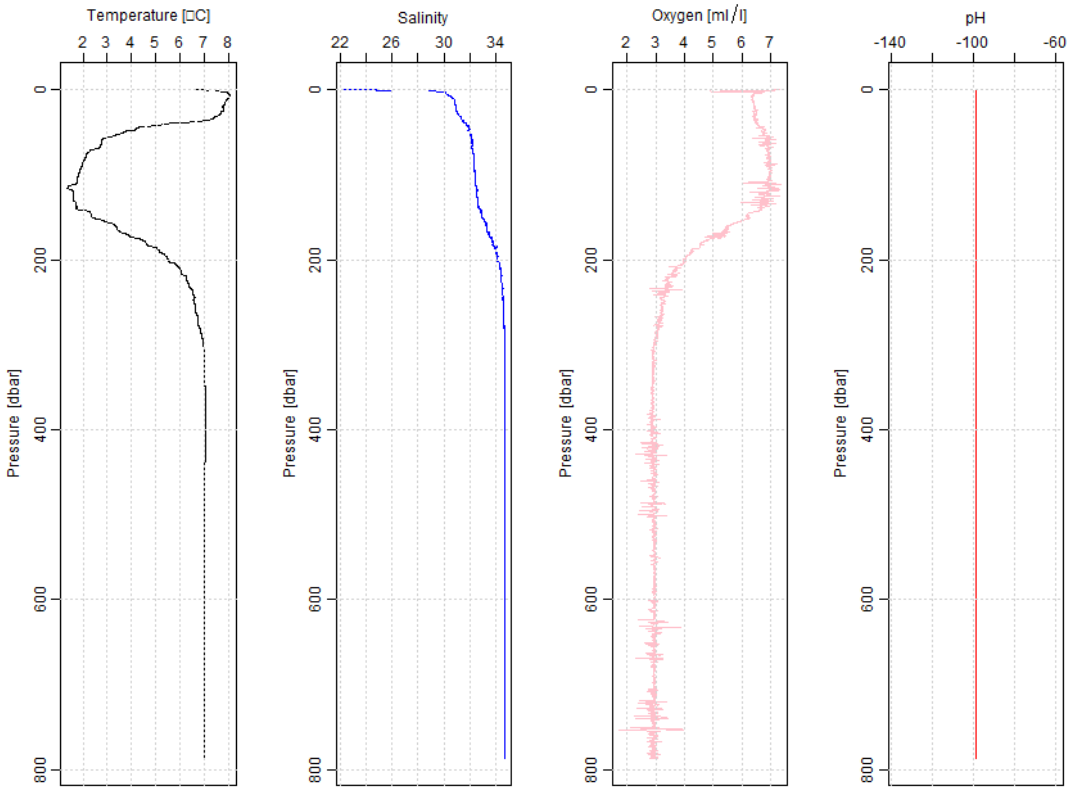

Figure 13: Initial temperature, salinity, and oxygen plot of CTD downcast of water column profile at station 4 (Lower Bay off Goblin Head); pH reading is inaccurate.

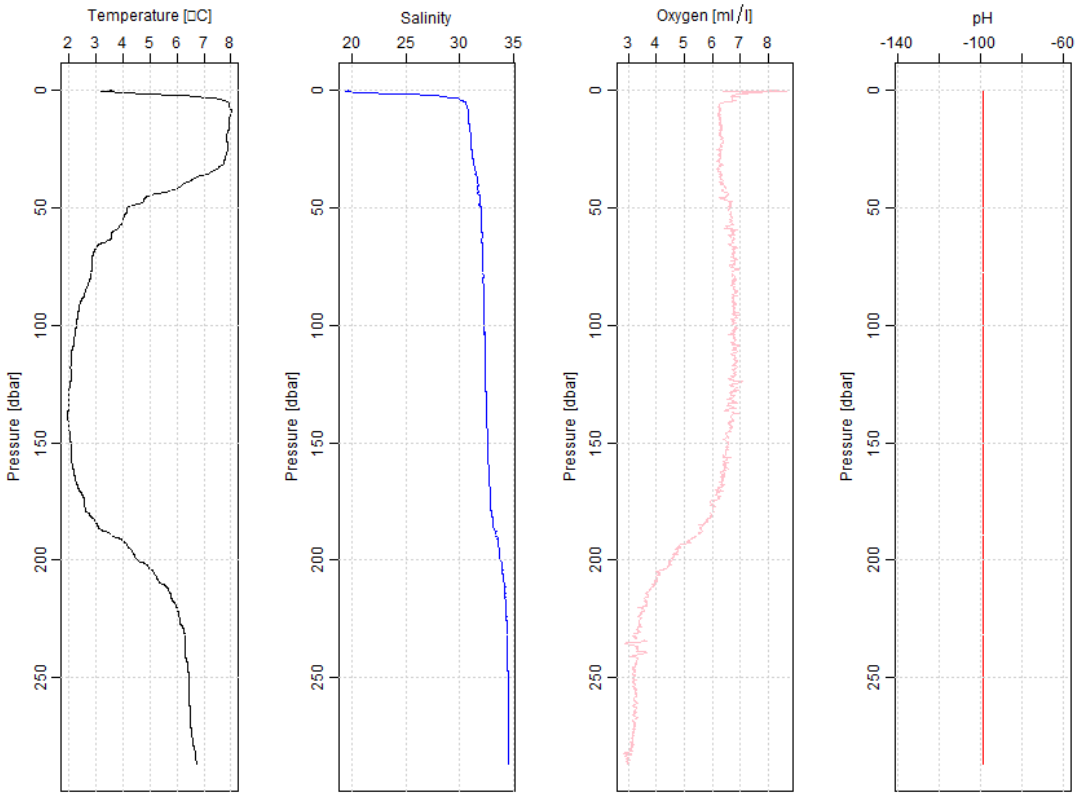

Figure 14: Initial temperature, salinity, and oxygen plot of CTD downcast of water column profile at station 17 (Upper Bay). The pH reading is inaccurate.

7. Vessel Positioning

Real-time GPS vessel tracking with Software TimeZero was managed using a dedicated laptop with surge protection (provided by the Centre for Fisheries Ecosystems Research). The GPS signal was wired through to the sea-can from the bridge, and we did not note any outages with this system.

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Appendix One: Station and Event Log

Table 8: Station and event log.

Hydrographic Zone	Station No	Event	Gear Code	Start Date	Start Time UTC	Start Lat (DD)	Start Long (DD)	Start Water Depth (m)	End Date	End Time UTC	End Lat (DD)	End Long (DD)	End water Depth (m)	Comments
BDE-UB	1	1	SVP	20 November 2023	08:35:00	47.85855	-55.80733	100	20 November 2023	NA	NA	NA	NA	Deployed with rope, limited depth captured
BDE-UB	Transit	2	MBES	20 November 2023	09:24:00	47.84098	-55.83212	100	20 November 2023	NA	NA	NA	NA	Line zero traveling at 8.5 knots
BDE-BIS	Transit	3	MBES	20 November 2023	09:46:00	47.78992	-55.83883	156	20 November 2023	NA	NA	NA	NA	Line 1 at 5 knots
BDE-LB	2	4	SVP	20 November 2023	12:03:00	47.70397	-56.02213	332	20 November 2023	NA	NA	NA	NA	drift on boat 0.2-0.3 knots, used the winch but its too fast gave bad data
BDE-LB	2	5	SVP	20 November 2023	12:32:00	47.70238	-56.01667	347	20 November 2023	NA	NA	NA	NA	Repeated SVP at a slower speed on winch , profile only showed 100m but the data was there for the full profile. This was entered manually into SIS
BDE-LB	MB1	6	MBES	20 November 2023	13:20:00	47.70728	-56.00758	210	20 November 2023	NA	NA	NA	NA	MB of Goblin head 5.7 knots started on line 6
BDE-LB	MB2	7	MBES	20 November 2023	14:34:00	47.70783	-56.12755	648	20 November 2023	NA	NA	NA	NA	more MB of Goblin Head 5 Knots
BDE-LB	3	8	ROV	20 November 2023	16:29:00	47.69583	-56.12137	250	20 November 2023	NA	NA	NA	NA	First ROV dive at "ROV 14 on Goblin Head- aborted before reaching bottom
BDE-LB	4	9	CTD	20 November 2023	18:40:00	47.69857	-56.13122	5	20 November 2023	19:13:00	NA	NA	NA	First CTD at site "CTD3" water samples collected at 5m(surface N6:436755), 50m (N5:436754), 100m (N4:436753), 200m (N3:436752), 400m (N2: 436751), bottom (N1: 436750).

														Though the multibeam states the site was at 680 m, the bottom depth of the deepest sample N1 was recorded at 759 m.
BDE-LB	MB3	10	MBES	20 November 2023	19:30:00	47.69033	-56.12650	778	20 November 2023	NA	NA	NA	NA	MBES butter cove
BDE-LB	5	11	SVP	20 November 2023	21:06:00	47.66475	-56.13183	761	20 November 2023	NA	NA	NA	NA	SVP deep water (around 700m)
BDE-LB	MB4	12	MBES	20 November 2023	22:00:00	47.66028	-56.11908	700	20 November 2023	NA	NA	NA	NA	MBES Lower Bay to North Bay, transect to Connor River line 15
BDE-LB	MB5	13	MBES	21 November 2023	17:19:00	47.70585	-55.94938	39	21 November 2023	NA	NA	NA	NA	MBES Lower bay over Butter Cove
BDE-LB	6	14	DRP	21 November 2023	18:47:00	47.69265	-56.11977	250	21 November 2023	18:50:00	NA	NA	NA	Aborted due to current pulling drp cam under boat and boat unable to maintain position. Took 17 minutes to pull the 150m of cable back onboard.
BDE-LB	7	15	DRP	21 November 2023	19:28:00	47.68977	-56.11133	160	21 November 2023	20:11:00	47.68983	-56.11202	130	First drop video captured some VME indicators (sponge, soft coral)
BDE-LB	8	16	DRP	21 November 2023	20:30:00	47.69263	-56.09860	169	21 November 2023	20:50:00	47.69240	-56.09720	170	this site was 0.5 km East along lower bay from the first drop site
BDE-OHB	9	17	SVP	21 November 2023	21:50:00	47.10062	-56.02888	83	21 November 2023	NA	NA	NA	NA	Outside of Bay
BDE-WBB	MB6	18	MBES	21 November 2023	22:00:00	NA	NA	NA	21 November 2023	NA	NA	NA	NA	MB transit to WBB
WBB	10	19	SVP	21 November 2023	01:00:00	47.09767	-57.05997	NA	21 November 2023	NA	NA	NA	NA	Head of WBB
WBB	11	20	DRP	22 November 2023	10:52:00	47.70202	-57.31560	145	22 November 2023	10:55:00	NA	NA	NA	Aborted - drifted too far from VVV position
WBB	12	21	DRP	22 November 2023	11:15:00	47.70028	-57.31015	148	22 November 2023	11:52:00	47.70027	-57.30952	150	AKA site "5" (Appendix 6).

WBB	12	22	VVV	22 November 2023	12:09:00	47.70023	-57.31057	149	22 November 2023	12:19:00	NA	NA	NA	Misfired
WBB	12	23	VVV	22 November 2023	12:35:00	47.70035	-57.31002	149	22 November 2023	12:25:00	NA	NA	NA	Misfired
WBB	12	24	VVV	22 November 2023	12:28:00	47.69997	-57.31007	149	22 November 2023	12:36:00	NA	NA	NA	Misfired
WBB	12	25	VVV	22 November 2023	12:40:00	47.70030	-57.31033	149	22 November 2023	12:49:00	NA	NA	NA	AKA site "5" (Appendix 6). Images may note sediment samples site "1" Replicate 1 (top). DFO ID in Appendix 4 "wb_station_1"
WBB	12	26	VVV	22 November 2023	12:55:00	47.70028	-57.30998	149	22 November 2023	13:02:00	NA	NA	NA	AKA site "5" (Appendix 6). Images may note sediment samples site "1" Replicate 2 (top). DFO ID in Appendix 4 "wb_station_1"
WBB	12	27	VVV	22 November 2023	13:04:00	47.70008	-57.31005	149	22 November 2023	13:14:00	NA	NA	NA	Misfired
WBB	12	28	VVV	22 November 2023	13:16:00	47.69975	-57.30977	150	22 November 2023	13:29:00	NA	NA	NA	AKA site "5" (Appendix 6). Images may note sediment samples site "1" Replicate 3 (top). DFO ID in Appendix 4 "wb_station_1"
WBB	13	29	DRP	22 November 2023	14:04:00	47.67033	-57.31857	201	22 November 2023	14:36:00	47.66968	-57.31368	108	AKA site "3" (Appendix 6).
WBB	13	30	VVV	22 November 2023	14:52:00	47.66978	-57.31688	200	22 November 2023	15:08:00	NA	NA	NA	AKA site "3" (Appendix 6). Images may note sediment samples site "2" Replicate 1 (middle). DFO ID in Appendix 4 "wb_station_3"
WBB	13	31	VVV	22 November 2023	15:05:00	47.66977	-57.31723	198	22 November 2023	02:09:36	NA	NA	NA	Misfired
WBB	13	32	VVV	22 November 2023	15:29:00	47.66930	-57.31597	193	22 November 2023	15:33:00	NA	NA	NA	AKA site "3" (Appendix 6). Images may note sediment samples site "2" Replicate 2 (middle). DFO ID in Appendix 4 "wb_station_3"

WBB	13	33	VVV	22 November 2023	15:42:00	47.66940	-57.31730	197	22 November 2023	15:52:00	NA	NA	NA	AKA site "3" (Appendix 6). Images may note sediment samples site "2" Replicate 3 (middle). DFO ID in Appendix 4 "wb_station_3"
WBB	14	34	DRP	22 November 2023	16:42:00	47.63347	-57.34368	237	22 November 2023	17:18:00	47.63285	-57.33838	237	AKA site "1" (Appendix 6).
WBB	14	35	VVV	22 November 2023	17:28:00	47.63317	-57.34292	238	22 November 2023	09:50:24	NA	NA	NA	Misfired
WBB	14	36	VVV	22 November 2023	17:42:00	47.63337	-57.34172	239	22 November 2023	17:53:00	NA	NA	NA	AKA site "1" (Appendix 6). Images may note sediment samples site "3" Replicate 1 (fjord mouth). DFO ID in Appendix 4 "wb_station_5"
WBB	14	37	VVV	22 November 2023	17:59:00	47.63407	-57.34220	239	22 November 2023	18:10:00	NA	NA	NA	AKA site "1" (Appendix 6). Images may note sediment samples site "3" Replicate 2 (fjord mouth). DFO ID in Appendix 4 "wb_station_5"
WBB	14	38	VVV	22 November 2023	18:31:00	47.63307	-57.34477	237	22 November 2023	18:31:00	NA	NA	NA	AKA site "1" (Appendix 6). Images may note sediment samples site "3" Replicate 3 (fjord mouth). DFO ID in Appendix 4 "wb_station_5"
WBB-GNT	15 (MB7)	39	MBES	22 November 2023	19:00:00	NA	NA	NA	22 November 2023	NA	NA	NA	NA	MBES from white bear bay to Gnat island time and start pos not recorded
GNT	16	40	DRP	22 November 2023	20:26:00	47.63477	-57.17350	235	22 November 2023	21:15:00	47.63258	-57.17298	241	AKA site "6" (Appendix 6). This point was the closest position we could drop in under 250m water depth
GNT-BDE	MB8	Not Logged	MBES	23 November 2023	21:15:00	NA	NA	NA	23 November 2023	NA	NA	NA	NA	Transit - night shift meta not logged
BDE-NB	17	41	CTD	23 November 2023	11:09:00	47.77722	-56.13492	316	23 November 2023	11:25:00	NA	NA	NA	"CTD4"All Niskin bottles did not fire, cast discarded
BDE-NB	17	42	CTD	23 November 2023	11:26:00	47.77758	-56.13562	316	23 November 2023	11:39:00	NA	NA	NA	"CTD4" All fired apart from niskin bottle 5 (50m), opted to keep the cast & remaining niskin/water samples due to

														limited time. Water samples collected at 5m(surface N6:436760), 100m (N4:436758), 200m (N3:436757), bottom (316 m N1: 436756).
BDE-NB	18	43	BNC	23 November 2023	13:13:00	47.77917	-56.13560	308	23 November 2023	13;43	47.77072	-56.13385	307	30 MIN = 29 DROPS
BDE-LB	19	44	DRP	23 November 2023	14:55:00	47.74613	-56.13488	150	23 November 2023	15:01:00	47.74808	-56.13355	217	Site previously named "ROV2" (Appendix 6). Dipped drp cam to check, wall structure was 400m deep
BDE-LB	20	45	BNC	23 November 2023	18:28:00	47.69533	-56.13732	780	23 November 2023	15:15:00	47.68963	-56.14350	700	30 MIN = 30 DROPS
BDE-LB	21	46	DRP	23 November 2023	18:28:00	47.67832	-56.06925	224	23 November 2023	15:15:00	47.67830	-56.07315	201	Drift over proposed VVV line 2 (Appendix 6) to ground truth the presence of ridges seen in the sonar backscatter in the area. There were rocky ridges present.
BDE-LB	22	47	SVP	23 November 2023	NA	NA	NA	NA	23 November 2023	NA	NA	NA	NA	Night shift- no details recorded
BDE-BIS	MB9	48	MBES	23 November 2023	19:20:00	NA	NA	NA	23 November 2023	NA	NA	NA	NA	Mapping Lower Bay/BIS
BDE-LaP	MB10	49	MBES	23 November 2023	NA	NA	NA	NA	23 November 2023	NA	NA	NA	NA	unknown start time
BDE-LB	23	50	VVV	25 November 2023	11:54:00	47.68592	-56.06032	398	25 November 2023	12:09:00	NA	NA	NA	Start of VVV Opp Butter Cove on line 3 moving from the mid bay towards cliff face (Appendix 6). Misfired
BDE-LB	23	51	VVV	25 November 2023	12:18:00	47.68652	-56.06052	422	25 November 2023	12:31:00	NA	NA	NA	Line 3 (Appendix 6). Misfired
BDE-LB	23	52	VVV	25 November 2023	12:33:00	47.68620	-56.05763	409	25 November 2023	12:48:00	NA	NA	NA	Line 3 (Appendix 6) Replicate 1 - bottom was reached with 450 m line, 40 m of additional line paid out, site depth (column V/U)was read from the

														multibeam. DFO ID: be_station_1
BDE-LB	23	53	VVV	25 November 2023	13:28:00	47.68678	-56.05703	412	25 November 2023	13:43:00	NA	NA	NA	Line 3 (Appendix 6) Replicate 2. DFO ID: be_station_1
BDE-LB	23	54	VVV	25 November 2023	13:59:00	47.68712	-56.05568	402	25 November 2023	14:14:00	NA	NA	NA	Line 3 (Appendix 6). Replicate 3. DFO ID: be_station_1
BDE-LB	24	55	VVV	25 November 2023	14:27:00	47.68757	-56.06235	428	25 November 2023	14:35:00	NA	NA	NA	Line 3 on the second position (Appendix 6). misfired
BDE-LB	24	56	VVV	25 November 2023	14:48:00	47.68730	-56.06063	433	25 November 2023	14:50:00	NA	NA	NA	Line 3 on the second position (Appendix 6). Misfire, cable didn't reach bottom, jumped mid water and was recovered to deck
BDE-LB	24	57	VVV	25 November 2023	14:52:00	47.68703	-56.06070	421	25 November 2023	15:07:00	NA	NA	NA	Line 3 on the second position (Appendix 6). Misfired-switched to a different Van Veen Grab
BDE-LB	24	58	VVV	25 November 2023	NA	47.68742	-56.06125	422	25 November 2023	NA	NA	NA	NA	Line 3 on the second position (Appendix 6). Pull cord on generator for winch broke, grab was on water surface but not deployed fully
BDE-LB	24	59	VVV	25 November 2023	16:04:00	47.68763	-56.05990	415	25 November 2023	16:21:00	NA	NA	NA	Line 3 on the second position (Appendix 6). Misfired
BDE-LB	24	60	VVV	25 November 2023	16:29:00	47.68720	-56.06030	419	25 November 2023	16:41:00	NA	NA	NA	Line 3 on the second position (Appendix 6). Replicate 1. DFO ID: be_station_2
BDE-LB	24	61	VVV	25 November 2023	17:04:00	47.68748	-56.06082	419	25 November 2023	17:19:00	NA	NA	NA	Line 3 on the second position (Appendix 6). Misfired
BDE-LB	24	62	VVV	25 November 2023	17:22:00	47.68740	-56.06093	431	25 November 2023	17:38:00	NA	NA	NA	Line 3 on the second position (Appendix 6). Replicate 2.DFO ID: be_station_2
BDE-LB	24	63	VVV	25 November 2023	17:50:00	47.68768	-56.06080	422	25 November 2023	18:04:00	NA	NA	NA	Line 3 on the second position (Appendix 6). Replicate 3. DFO ID: be_station_2

Appendix Two: Multibeam Events

Table 9: Summary of Multibeam events.

line	HIPS File Name	Day	Line	Start (UTC)	Finish (UTC)	Total Time	Speed (kn)	Swath	Note
1	Bay D'Espoir	2023-324	0000_20231120_092434_ConnerMurphy	20/11/2023 09:25	20/11/2023 09:47	21:41.0	5		
2	Bay D'Espoir	2023-324	0001_20231120_094617_ConnerMurphy	20/11/2023 09:47	20/11/2023 10:17	29:59.0	5		
3	Bay D'Espoir	2023-324	0002_20231120_101617_ConnerMurphy	20/11/2023 10:17	20/11/2023 10:47	29:59.0	5		
4	Bay D'Espoir	2023-324	0003_20231120_104617_ConnerMurphy	20/11/2023 10:47	20/11/2023 11:17	29:59.0	5		
5	Bay D'Espoir	2023-324	0004_20231120_111617_ConnerMurphy	20/11/2023 11:17	20/11/2023 11:47	29:59.0	5		
6	Bay D'Espoir	2023-324	0005_20231120_114617_ConnerMurphy	20/11/2023 11:47	20/11/2023 11:51	04:48.0	5		
7	Bay D'Espoir	2023-324	0006_20231120_133224_ConnerMurphy	20/11/2023 13:33	20/11/2023 14:03	29:59.0	5		Copper Head, surveying upslope, heading 25
8	Bay D'Espoir	2023-324	0007_20231120_140224_ConnerMurphy	20/11/2023 14:03	20/11/2023 14:31	28:28.0	5		End at Goblin Head
9	Bay D'Espoir	2023-324	0008_20231120_143412_ConnerMurphy	20/11/2023 14:35	20/11/2023 15:05	29:59.0	5		Outer Depths
10	Bay D'Espoir	2023-324	0009_20231120_150412_ConnerMurphy	20/11/2023 15:05	20/11/2023 15:16	11:42.0	5		
11	Bay D'Espoir	2023-324	0010_20231120_151554_ConnerMurphy	20/11/2023 15:16	20/11/2023 15:22	05:24.0	5		Turn
12	Bay D'Espoir	2023-324	0011_20231120_152119_ConnerMurphy	20/11/2023 15:22	20/11/2023 15:43	21:06.0	5		Toward Goblin, headed 250 degrees
13	Bay D'Espoir	2023-324	0012_20231120_192957_ConnerMurphy	20/11/2023 19:30	20/11/2023 20:00	29:59.0	5		

14	Bay D'Espoir	2023-324	0013_20231120_195957_ConnerMurphy	20/11/2023 20:00	20/11/2023 20:30	29:59.0	5		
15	Bay D'Espoir	2023-324	0014_20231120_202957_ConnerMurphy	20/11/2023 20:30	20/11/2023 20:56	25:24.0	5		
16	Bay D'Espoir	2023-324	0015_20231120_215419_ConnerMurphy	20/11/2023 21:55	20/11/2023 22:25	29:59.0	5		North Heading, West side from Jarvis
17	Bay D'Espoir	2023-324	0016_20231120_222419_ConnerMurphy	20/11/2023 22:25	20/11/2023 22:55	29:59.0	5		
18	North Bay	2023-324	0017_20231120_225419_ConnerMurphy	20/11/2023 22:55	20/11/2023 23:25	29:59.0	5		
19	North Bay	2023-324	0018_20231120_232419_ConnerMurphy	20/11/2023 23:25	20/11/2023 23:55	29:59.0	5		
20	North Bay	2023-324	0019_20231120_235419_ConnerMurphy	20/11/2023 23:55	21/11/2023 00:25	29:59.0	5		
21	North Bay	2023-325	0020_20231121_002419_ConnerMurphy	21/11/2023 00:25	21/11/2023 00:35	10:07.0	5		Stopped Line (10min)
22	North Bay	2023-325	0021_20231121_003427_ConnerMurphy	21/11/2023 00:35	21/11/2023 00:38	03:12.0	5		Turn
23	North Bay	2023-325	0022_20231121_003740_ConnerMurphy	21/11/2023 00:38	21/11/2023 01:08	29:59.0	5		South in North Bay
24	North Bay	2023-325	0023_20231121_010740_ConnerMurphy	21/11/2023 01:08	21/11/2023 01:38	29:59.0	5		Through Sil @ North Bay
25	North Bay	2023-325	0024_20231121_013740_ConnerMurphy	21/11/2023 01:38	21/11/2023 02:08	29:59.0	5		
26	Bay D'Espoir	2023-325	0025_20231121_020740_ConnerMurphy	21/11/2023 02:08	21/11/2023 02:38	29:59.0	5		end of Goblin
27	Bay D'Espoir	2023-325	0026_20231121_023740_ConnerMurphy	21/11/2023 02:38	21/11/2023 03:08	29:59.0	5		
28	Bay D'Espoir	2023-325	0027_20231121_030740_ConnerMurphy	21/11/2023 03:08	21/11/2023 03:24	15:46.0	5		15min
29	Bay D'Espoir	2023-325	0028_20231121_032327_ConnerMurphy	21/11/2023 03:24	21/11/2023 03:30	06:08.0	5		Turn, mouth of Bay D'Espoir

30	Bay D'Espoir	2023-325	0029_20231121_032936_ConnerMurphy	21/11/2023 03:30	21/11/2023 04:00	29:59.0	5		Into Bay D'Espoir
31	Bay D'Espoir	2023-325	0030_20231121_035936_ConnerMurphy	21/11/2023 04:00	21/11/2023 04:30	29:59.0	5		
32	Bay D'Espoir	2023-325	0031_20231121_042936_ConnerMurphy	21/11/2023 04:30	21/11/2023 05:00	29:59.0	5		
33	Bay D'Espoir	2023-325	0032_20231121_045936_ConnerMurphy	21/11/2023 05:00	21/11/2023 05:30	29:59.0	5		
34	Bay D'Espoir	2023-325	0033_20231121_052936_ConnerMurphy	21/11/2023 05:30	21/11/2023 06:00	29:59.0	5		
35	Bay D'Espoir	2023-325	0034_20231121_055936_ConnerMurphy	21/11/2023 06:00	21/11/2023 06:30	29:59.0	5		
36	Bay D'Espoir	2023-325	0035_20231121_062936_ConnerMurphy	21/11/2023 06:30	21/11/2023 07:00	29:59.0	5		
37	Bay D'Espoir	2023-325	0036_20231121_065936_ConnerMurphy	21/11/2023 07:00	21/11/2023 07:30	29:59.0	5		
38	Bay D'Espoir	2023-325	0037_20231121_072936_ConnerMurphy	21/11/2023 07:30	21/11/2023 08:00	29:59.0	5		
39	Bay D'Espoir	2023-325	0038_20231121_075936_ConnerMurphy	21/11/2023 08:00	21/11/2023 08:30	29:59.0	5		
40	Bay D'Espoir	2023-325	0039_20231121_082936_ConnerMurphy	21/11/2023 08:30	21/11/2023 09:00	29:59.0	5		
41	Bay D'Espoir	2023-325	0040_20231121_085936_ConnerMurphy	21/11/2023 09:00	21/11/2023 09:04	03:42.0	5		
42	Bay D'Espoir	2023-325	0041_20231121_171839_ConnerMurphy	21/11/2023 17:19	21/11/2023 17:49	29:59.0	5		Headed out from Conne River
43	Bay D'Espoir	2023-325	0042_20231121_174839_ConnerMurphy	21/11/2023 17:49	21/11/2023 18:19	29:59.0	5		
44	Bay D'Espoir	2023-325	0043_20231121_181839_ConnerMurphy	21/11/2023 18:19	21/11/2023 18:23	03:30.0	5		Headed to Goblin
45	Transit	2023-325	0044_20231121_215554_ConnerMurphy	21/11/2023 21:56	21/11/2023 22:26	29:59.0	9	65/65	reduced swath for speed

46	Transit	2023-325	0045_20231121_222554_ConnerMurphy	21/11/2023 22:26	21/11/2023 22:56	29:59.0	9	65/65	
47	Transit	2023-325	0046_20231121_225554_ConnerMurphy	21/11/2023 22:56	21/11/2023 23:26	29:59.0	9	65/65	
48	Transit	2023-325	0047_20231121_232554_ConnerMurphy	21/11/2023 23:26	21/11/2023 23:56	29:59.0	9	65/65	
49	Transit	2023-325	0048_20231121_235554_ConnerMurphy	21/11/2023 23:56	22/11/2023 00:26	29:59.0	9	65/65	
50	Transit	2023-326	0049_20231122_002554_ConnerMurphy	22/11/2023 00:26	22/11/2023 00:56	29:59.0	9	65/65	
51	Transit	2023-326	0050_20231122_005554_ConnerMurphy	22/11/2023 00:56	22/11/2023 01:26	29:59.0	9	65/65	
52	Transit	2023-326	0051_20231122_012554_ConnerMurphy	22/11/2023 01:26	22/11/2023 01:56	29:59.0	9	65/65	
53	Transit	2023-326	0052_20231122_015554_ConnerMurphy	22/11/2023 01:56	22/11/2023 02:26	30:00.0	9	65/65	
54	Transit	2023-326	0053_20231122_022554_ConnerMurphy	22/11/2023 02:26	22/11/2023 02:56	29:59.0	9	65/65	
55	White Bear Bay	2023-326	0054_20231122_025554_ConnerMurphy	22/11/2023 02:56	22/11/2023 03:26	29:59.0	5	65/65	
56	White Bear Bay	2023-326	0055_20231122_032554_ConnerMurphy	22/11/2023 03:26	22/11/2023 03:49	22:33.0	5	65/65	Forgot to stop logging during cast
57	White Bear Bay	2023-326	0056_20231122_035408_ConnerMurphy	22/11/2023 03:55	22/11/2023 04:25	29:59.0	5	50/70	Start on eastern side
58	White Bear Bay	2023-326	0057_20231122_042408_ConnerMurphy	22/11/2023 04:25	22/11/2023 04:55	29:59.0	5		Overhanging wall
59	White Bear Bay	2023-326	0058_20231122_045408_ConnerMurphy	22/11/2023 04:55	22/11/2023 05:25	29:59.0	5		
60	White Bear Bay	2023-326	0059_20231122_052408_ConnerMurphy	22/11/2023 05:25	22/11/2023 05:29	04:20.0	5		Top of Bay
61	White Bear Bay	2023-326	0060_20231122_052829_ConnerMurphy	22/11/2023 05:29	22/11/2023 05:31	01:49.0	5		Turn

62	White Bear Bay	2023-326	0061_20231122_053019_ConnerMurphy	22/11/2023 05:31	22/11/2023 06:01	29:59.0	5		South
63	White Bear Bay	2023-326	0062_20231122_060019_ConnerMurphy	22/11/2023 06:01	22/11/2023 06:31	29:59.0	5		
64	White Bear Bay	2023-326	0063_20231122_063019_ConnerMurphy	22/11/2023 06:31	22/11/2023 07:01	29:59.0	5		
65	White Bear Bay	2023-326	0064_20231122_070019_ConnerMurphy	22/11/2023 07:01	22/11/2023 07:31	29:59.0	5		
66	White Bear Bay	2023-326	0065_20231122_073019_ConnerMurphy	22/11/2023 07:31	22/11/2023 08:01	29:59.0	5		
67	Transit	2023-326	0066_20231122_080019_ConnerMurphy	22/11/2023 08:01	22/11/2023 08:25	24:39.0	5		
68	Bay De Vieux	2023-326	0067_20231122_082459_ConnerMurphy	22/11/2023 08:25	22/11/2023 08:36	10:39.0	5		
69	Bay De Vieux	2023-326	0068_20231122_185115_ConnerMurphy	22/11/2023 18:52	22/11/2023 19:22	29:59.0	5		Transit Bay De Vieux
70	Bay De Vieux	2023-326	0069_20231122_192115_ConnerMurphy	22/11/2023 19:22	22/11/2023 19:52	29:59.0	5		Transit Bay De Vieux
71	Transit	2023-326	0070_20231122_195115_ConnerMurphy	22/11/2023 19:52	22/11/2023 20:11	19:37.0	9	70/70	Transit Bay De Vieux
72	Transit	2023-326	0071_20231122_211639_ConnerMurphy	22/11/2023 21:17	22/11/2023 21:47	29:59.0	9	70/70	
73	Transit	2023-326	0072_20231122_214639_ConnerMurphy	22/11/2023 21:47	22/11/2023 22:17	29:59.0	9	70/70	
74	Transit	2023-326	0073_20231122_221639_ConnerMurphy	22/11/2023 22:17	22/11/2023 22:47	29:59.0	9	70/70	
75	Transit	2023-326	0074_20231122_224639_ConnerMurphy	22/11/2023 22:47	22/11/2023 23:17	29:59.0	9	70/70	
76	Shipwreck	2023-326	0075_20231122_231639_ConnerMurphy	22/11/2023 23:17	22/11/2023 23:47	29:59.0	9		
77	Shipwreck	2023-326	0076_20231122_234639_ConnerMurphy	22/11/2023 23:47	23/11/2023 00:17	29:59.0	4		

78	Shipwreck	2023-327	0077_20231123_001639_ConnerMurphy	23/11/2023 00:17	23/11/2023 00:22	04:29.0	4	15/15	
79	Shipwreck	2023-327	0078_20231123_002806_ConnerMurphy	23/11/2023 00:29	23/11/2023 00:30	01:47.0	4		
80	Transit	2023-327	0079_20231123_002954_ConnerMurphy	23/11/2023 00:30	23/11/2023 00:31	01:02.0	9	70/70	
81	Transit	2023-327	0080_20231123_003855_ConnerMurphy	23/11/2023 00:39	23/11/2023 00:41	01:29.0	9	70/70	
82	Transit	2023-327	0081_20231123_005604_ConnerMurphy	23/11/2023 00:57	23/11/2023 01:27	29:59.0	9	70/70	
83	Transit	2023-327	0082_20231123_012604_ConnerMurphy	23/11/2023 01:27	23/11/2023 01:57	29:59.0	9	70/70	
84	Transit	2023-327	0083_20231123_015604_ConnerMurphy	23/11/2023 01:57	23/11/2023 02:27	29:59.0	9	70/70	
85	Transit	2023-327	0084_20231123_022604_ConnerMurphy	23/11/2023 02:27	23/11/2023 02:57	29:59.0	9	70/70	
86	Transit	2023-327	0085_20231123_025604_ConnerMurphy	23/11/2023 02:57	23/11/2023 03:27	29:59.0	9	70/70	
87	Transit	2023-327	0086_20231123_032604_ConnerMurphy	23/11/2023 03:27	23/11/2023 03:57	29:59.0	9	70/70	
88	Transit	2023-327	0087_20231123_035604_ConnerMurphy	23/11/2023 03:57	23/11/2023 04:27	29:59.0	9	70/70	
89	Lampidoes Passage	2023-327	0088_20231123_042604_ConnerMurphy	23/11/2023 04:27	23/11/2023 04:57	29:59.0	5		
90	Lampidoes Passage	2023-327	0089_20231123_045604_ConnerMurphy	23/11/2023 04:57	23/11/2023 04:58	01:24.0	5		
91	Lampidoes Passage	2023-327	0090_20231123_192440_ConnerMurphy	23/11/2023 19:25	23/11/2023 19:55	29:59.0	5	70/70	Headed to Conne River
92	Lampidoes Passage	2023-327	0091_20231123_195440_ConnerMurphy	23/11/2023 19:55	23/11/2023 20:25	29:59.0	5		
93	Lampidoes Passage	2023-327	0092_20231123_202440_ConnerMurphy	23/11/2023 20:25	23/11/2023 20:37	11:55.0	5		

94	Lampidoes Passage	2023-327	0093_20231123_204053_ConnerMurphy	23/11/2023 20:41	23/11/2023 21:00	18:27.0	5		
95	Lampidoes Passage	2023-327	0094_20231123_210243_ConnerMurphy	23/11/2023 21:03	23/11/2023 21:19	15:40.0	5		
96	Lampidoes Passage	2023-329	0095_20231125_182115_ConnerMurphy	25/11/2023 18:22	25/11/2023 18:52	29:59.0	5		
97	Lampidoes Passage	2023-329	0096_20231125_185115_ConnerMurphy	25/11/2023 18:52	25/11/2023 19:22	29:59.0	5		
98	Lampidoes Passage	2023-329	0097_20231125_192115_ConnerMurphy	25/11/2023 19:22	25/11/2023 19:52	29:59.0	5		
99	Lampidoes Passage	2023-329	0098_20231125_195115_ConnerMurphy	25/11/2023 19:52	25/11/2023 20:16	24:05.0	5		

Appendix Three: Drop Camera Dive Summaries

Table 10: Summary of Drop Camera video files.

Date DD/MM/YY	Site-bay-station number*	In water time UTC	Start Latitude (DD)	Start Longitude (DD)	Start Depth (m)	Comment	File names**
21/11/2023	BDE-LB-006	18:47	47.69265	-56.11977	NA	Aborted	~~1969-12-31 – 233409,~~ ~~1969-12-31 - 234411~~
21/11/2023	BDE-LB-007	19:28	47.68977	-56.11133	160.0	Lower bay: Shell hash & rocks – drifted back over starting position	1970-01-01 – 001150, 1970-01-01 – 002151, 1970-01-01 – 003158, 1970-01-01 – 004159, 1970-01-01 - 005200
21/11/2023	BDE-LB-008	20:30	47.69263	-56.09860	169.0	0.5 km east from station 7	1970-01-01-011039, 1970-01-01 – 012041, 1970-01-01 – 013045, ~~1970-01-01 – 162418,~~ 1970-01-01 – 163241,
22/11/2023	BDE-WBB-011	10:52	47.70202	-57.31560	NA	Aborted	~~1970-01-01 – 153645,~~ ~~1970-01-01 – 154647~~
22/11/2023	BDE-WBB-012	11:15	47.70028	-57.31015	148.0	Barbara's site "5" sediment samples site "1"	1970-01-01 – 160133, 1970-01-01 – 161135, 1970-01-01 – 162151, ~~1970-01-01 – 162418,~~ 1970-01-01 - 163152
22/11/2023	BDE-WBB-013	14:04	47.67033	-57.31857	201.0	Barbara's site "3" sediment samples site "2"	1970-01-01 – 184653, 1970-01-01 – 185654, 1970-01-01 – 190656
22/11/2023	BDE-WBB-014	16:42	47.63347	-57.34368	237.0	Barbara's site "1" sediment samples site "3"	1970-01-01 – 212519, 1970-01-01 – 213521, 1970-01-01 – 214540
22/11/2023	GNT-016	20:26	47.63477	-57.17350	235.0	Barbara's site "6", this point was the closest position we could drop in under 250m water depth	1970-01-02 – 010910, 1970-01-02 – 011912, 1970-01-02 – 012913, 1970-01-02 – 013916, ~~1970-01-02 – 014917~~

23/11/2023	BDE-LB-019	14:55	47.74613	-56.13488	150.0	The site previously named "ROV2" wall structure was 400m deep	1970-01-02 – 194113, 1970-01-02 – 195115, ~~1970-01-02 – 200116,~~ ~~1970-01-02 - 230914~~
23/11/2023	BDE-LB-021	18:28	47.67832	-56.06925	224.0	Drift over Barbara's line 2/backup line to ground truth the presence of ridges in the area	1970-01-02 – 231211, 1970-01-02 - 232213

*BDE = Bay d' Espoir, LB = Lower Bay, WBB= White Bear Bay, GNT = Gnat Island. ** Individual files are ten minutes long, those with a strike through are files that contain no data but were created during the transect. Drop camera videos will not show ascent and recovery.

Summary observations per Drop Camera dive

The following observations and summaries were notes made during the live feed from the dives. The general format of observations is logged as the time in NST, followed by how far into the recording the observations were logged (e.g., 5 mins = 5 mins after the start of the dive recording).

November 21, 2023

Goblin head (Bay d' Espoir) drop camera summary

The first drop camera deployment at Goblin Head began at 169 m and ended at ~172 m. Substratum consisted of sediment-covered cobble and plentiful scallop and mussel shells. Occasional sea anemones, crab and Polymastia sponges were observed during this portion of the dive. The transect alternated between this habitat type and large slabs of angular bedrock dominated by sea anemones, various sponge species (*Polymastia* sp., *Stylocordyla* sp., *Tentorium semisuberites*, encrusting sponge sp., unidentified white sponges), sea stars, and bryozoans. Many redfish were observed tucked within the crevasses of the bedrock. Few soft corals, crinoids, spiny crabs, and shrimp were also recorded.
The second drop camera deployment at Goblin Head began at a depth of 135m and ended at ~172 m. The substratum mainly consisted of boulders and gravel. Redfish were again observed within spaces between large rock. Boulders had sea stars, sponges (encrusting white sponge, encrusting yellow sponge, *Tentorium* sp., unidentified sp.), bryozoans, tube polychaetes. This site appeared to have a high rate of sedimentation based on sediment accumulation on rocks.

Drop camera deployment Station 6 & 7 (~15:58 -1642)

- Back at Goblin head. Lasers are 10 cm apart.
- Station 6 down at about 15:20. Site ~250m. Putting line down by hand so it will take a while. Nevermind, brought up to surface at 15:37- there was too much drift by the boat. Redeploying at shallower site (~50-60 m)
- Second attempt station 7: in water at 15:58. Hit bottom at: 16:01 - 135m.
- 16:02 lots of shells (scallops). Dense cobbles and sand. sea anemones.
- 16:03, large bedrock. *Polymastia*s sponge, encrusting sponges.
- Angular rocks with sponges (fan sponge). Yellow encrusting sponge. Sea star.
- 16:04 krill, sea anemones, small white sponges tentorium sp.
- 16:05: redfish. Big sponges. Cushion sponges. Fan sponges, spiny crab.
- 16:06 *Polymastia*. Rocks are very angular (fallen bedrock). Ball sponge. Sea star. Redfish. Bryozoans. Redfish in rock cracks. Lollipop sponges.
- 16:07 (10 mins in) sponges! (mycal sponge), bryozoans, ascidians, *Polymastia*, redfish tucked inside rocks. Encrusting sponge, sea anemones. Bryozoans, *Polymastia*, tremaster seastar (?). Krill are attracted to the drop cam light.
- 16:09 (11:30mins). Lollipop sponges, encrusting sponges,
- 16:10 BIG soft coral. Soft coral again, bryozoan,
- 16:11 ascidian, BIG sea anemones (2). Tentorium sponges.
- 16:12 *Polymastia*, sea anemones, large, exposed bedrock. Little crab. More lollipop sponges, sea anemones, larger sponges,
- 16:13 (15mins in). wall of sea anemone sand bryozoans. Back to ground: rock with sediment.
- 16:14 (17 mins in) scallop. 147 m depth. Mostly just sediment rocks.
- 16:15 (18 mins in) BIG spiny crab and lollipop sponge
- 16:17 (19 mins) lots of scallop shells (empty)
- 16:18 (21 mins: possible pelagic jelly. Tons of scallop shells. Red algae? Potential ceranthid
- 16:20 (22 mins) shrimp. Krills.
- 16:22 (24 mins) sculpin. Hermit crab.
- 16:23 (25 mins) *Polymastia*, redfish, crab. Rock/cobble with high sedimentation.
- 16:24 (26 mins) less scallops. Not seeing sea anemones really. *Polymastia*, chiton,
- 16:27 (29-30 mins) bryozoans, sponge, *Polymastia*, sea anemone/potential cerianthid. Kelp. 150m. sea star.
- 16:29 (31 mins) still small rock with sediment. *Polymastia* (3),
- 16:30 (32 mins) ball sponge, back to scallop shells, most look empty. Sea anemone
- 16:31 (33 mins) redfish (2). back into rock wall. *Polymastia*, sea anemones, small white sponges, yellow encrusting sponge, sea stars, most nestled redfish, tube anemone, encrusting sponges,
- 16:33 (35 mins) large ball sponges, red fish, sea star (6 arms), sea anemones, ball sponge, redfish. , large sponge

- 16:34 (36 mins) angular rock outcrop, LOTS of redfish all tucked in rock crack.
- 16:35 (37 mins) gravel bottom, mussel shells, sea anemones, shrimp, scallop shells are back, 136 m. small rock bottom.
- 16:38 (40 mins) dragging bottom, some CRINOIDS. Soft coral,
- Coming up 1639. Hit surface ~1641.

Drop camera deployment Station 8 (16:57-17:27)

- In water 1657, dive will be about 170m.
- Hit bottom 1659 – 135m
- Boulders with redfish in crevasses. Large boulders. Tube sponge
- 17:01 (5 mins) sea star. Encrusting white sponge. Tentorium sponges, worm tube.
- 17:03 (6mins) sea star, boulder pile. Chiton. Sea star.
- 17:03 (7 mins) not much, a lot of sediment on rocks
- 17:04 (8mins) cobble/gravel, small scallop.
- 17:06 (9 mins) sea star on rock, getting boulders again. Redfish
- 17:07 (10 mins) big boulders again, red fish within spaces. Encrusting yellow sponges, kelp (?),
- 17:08 (11mins) encrusting white sponge, big boulders with sand between. Few redfish. High sedimentation. Nice sponge.
- 17:08 (12 mins) rocks, redfish tucked in. tube polychaete, bug redfish, sponge, bryozoan (2). Another tube polychaete.
- 17:10 (13-14 mins). Smaller rocks and gravel. Tube polychaete, bryozoans, spiny crab., tentorium sponge x2, back to gravel and rock.
- 17:12 (15mins) mostly gravel and cobble. 167 m.
- (16 mins) unidentified finfish.
- 17:13 (17 mins) exposed bedrock with gravel. Sea star. Sea anemone.
- 17:15 (18 mins) sea star, 173 m. encrusting white sponge, chiton,
- 17:16 (19 mins) large cobble and lots of sediment covering bedrock. Kelp.
- 17:17 (20 mins) 172 m. small boulders.
- 17:19 coming up & 1723 surface.

November 22, 2023

White Bear Bay drop camera summary

Four drop camera deployments (~30 minutes each) were conducted at White Bear Bay between a depth of 140 and 240 m. This habitat-type was similar between sites with fine sediment throughout the transect, occasional burrows, and leaf matter. Many shrimps were observed sedentary on the sediment, some with eggs. Schools of krill swarmed the light of the drop camera, particularly on the first two dives. Occasional sea anemones, flatfish, snow crab. A few redfish, grenadier fish, a sea cucumber, juvenile skate, and spiny crab were also observed. The third and fourth dive recorded a notable amount of white polychaete tubes, with few long unidentified worms.

Drop camera deployment Station 11 (WB-2023-ST1) Dive 1 - 145 m

- In water at 07:23
- Hit bottom at 07:25 147 m
- 07:25 (3 mins) fine sediment. Shrimp. Sea urchin(?). more shrimp. Leaf. Sea anemone. Flat fish
- 07:27 (4 mins). More shrimp. Different species of shrimp/ sea anemone. Stick.
- 07:28(5 mi8ns) sea anemone, shrimp, still fine sediment. Pretty bare.
- 07:29 (6mins) redfish on sediment. Shrimp just sit on sediment. Note: some shrimp looks like they have eggs.
- 07:31 (8 mins) looks like white sea urchins? Lots of shrimp.
- 07:32 (9mins) snow crab! Potentially male. Shrimp. Cluster of burrows.
- 07:33 (10 mins) shrimp. Burrows. Still fine sediment. Flatfish juvenile.
- 07:34 (11mins) shrimp (lots).
- 07:35 (12 mins) coming
- 07:39 hit surface. Repositioning then redeploying.

Drop camera deployment Station 12 (WB-2023-ST1) Dive 2 – 145m

- In water at 07:48. We will be going over the Van Veen site.
- Hit bottom at 07:50 - 147 m
- 07:51 (3 mins) Fine sediment, shrimp, krill loving light. Leaf. Burrow.
- 07:52 (4 mins) being chased by krill. Stirring up all the sediment.
- 07:54 (6mins) so many krill. Looks like sandy mud.
- 07:55 (7 mins) shrimp, sediment is bare.
- 07:56 (9 mins) shrimp. Still lots of krill.
- 07:58 (10 mins) more shrimp sitting on sediment
- 07:59 (11 mins) BABY SKATE. Something that looked like sea pen.
- 08:00 (12 mins) more shrimp. Weird orange thing.
- 08:01 (13 mins) leaves.
- 08:02 (15 mins)
- 08:03 (16 mins) still fine sediment. Shrimp, sea cucumber.
- 08:05 (17 mins) shrimp. Flatfish ~15cm.
- 08:06 (18m ins) another flatfish. ~10 cm. juvenile.
- 08:08 (20 mins) more shrimp. Redfish.
- 08:09 (21 mins) bare fine sediment. Shrimp. Leaf.
- 08:10 (22 mins) flatfish. Snow crab.
- 08:11 (23 mins) leaves
- 08:12 (24 mins) shrimp. Red thing. 148 m.
- 08:13 (25 mins) going a little too fast to ID. Sea anemone close to camera, large.
- 08:14 (26 mins) bare fine sediment, big flatfish
- 08:25 (27 mins) big burrow. Shrimp. Leaf. Snow crab (male)
- 08:16 (28 mins) shrimp with eggs, another shrimp.
- 08:17 (29 mins) shrimp. Fine sediment.
- 08:18 (30 mins) coming up
- Hit surface at --unrecorded—

Drop camera deployment #3 Station 13 (WB-2023-ST3) 201 m

- We skipped the WB-2023-ST2
- In water at 10:34
- Hit bottom at 10:38 200m
- Slammed into the seafloor and had mud on camera.
- 10:39 (6mins) more muddy-looking bottom. Krill swarming again. White-stick-like things on sediment (~5cm length).
- 10:40 (7mins) leaf debris, a lot of particles in water column, shrimp
- 10:41 (8 mins) leaves, snow crab (<10cm), stick white stick-like things.
- 10:42 (9 mins) brittle star, camera hit sediment again
- 10:44 (11 mins), small crab, leaf debris
- 10:45 (12 mins) shrimp, still krill around. Still unidentified stick-like things.
- 10:46 (13mins) still very fine sediment bed.
- 10:47 (14 mins) kelp matter?
- 10:48 (15mins) seaweed strife.
- 10:49 (16 mins) big Ceramaster sea star on mud
- 10:50 (17mins) not as many shrimps compared to Station 11/12.
- 10:51 (18 mins) pretty empty seabed. Stick debris still.
- 10:54-10:55 (20-21mins) shrimp. Crab. Another small crab (<5cm). shrimp.
- 10:55(22mins) shrimp.
- 10:56 (23 mins)
- 10:57 (24 mins) isopod swimming. Still many white stick-like things. Wide burrows (2) >10cm. crab(?)
- 10:58 (25 mins) snow crab, sea anemone. Plant matter. 189m depth.
- 10:59 (26 mins) cluster of small burrows. Large burrow with occupant.
- 11:00 coming up

- 11:06 on surface
- FYI white sticks are tubes.

Drop camera deployment #4 Station 14 (WB-2023-ST5)

- In water 13:12, hit bottom on 13:16 (230m)
- 13:16 (5 mins) fine sediment, polychaete tubes (many), krill, plant matter, brittle star,
- 1317 (6mins) looks the same as the other two stations really except no shrimp so far.
- 13:19 (8 mins) same fine sediment with tubes and occasional leaves.
- 13:20 (9 mins) 236 m.
- 13:22 (11mins) same. Brittle star.
- 13:23 (12 mins) plant matter, still just many polychaete tubes, krill. Fine sediment. 237m.
- 13:24 (13mins) rock with big spiny crab.
- 13:26 (15mins) flatfish (big).
- 13:27 (16mins) burrows.
- 13:29 (18 mins) still same. Lots of particulates in water.
- 13:31 (19 mins) 20 cm grenadier fish.
- 13:32 (20 mins) big kelp piece.
- 13:33 (21 mins) plant matter offscreen.
- 13:34 (22 mins) same tubes and sediment and leaves, something long and white worm?
- 13:35 (23 mins) beer bottle.
- 13:36 (24 mins) spiny crab (two)
- 13:37 (25 mins) long polychaete tube or long worm. Kelp?
- 13:38 (26 mins) 236 m.
- 13:39 (27 mins) coming off bottom.
- 13:40 (28 mins) more grenadier fish. Long worm again (the third). Kelp.
- 13:41 off bottom (again).
- 13:48 (?) surface.

November 22, 2023

Gnat Island drop camera summary

A drop camera was deployed at Gnat Island at a starting depth of 235 m. This site was fine sediment substratum with large angular exposed bedrock towards the end of the transect. Shrimp were observed on the mud, many with visible eggs. Redfish were observed close to the outcrop. Large sea anemones and bryozoans were often present on as well. Large pieces of kelp and sea stars were occasionally observed on the seabed throughout the transect. Multiple fish species were observed at this site including redfish, flat fish, eel pout, fish doctor, and unidentified sp. Spiny crab and snow crab were also present. A cerianthid, cnenophores, and unidentified sponge sp. were also recorded.

Drop Camera Deployment #5 Station 16 (Gnat Island)

- 235m m. Had to come off point because it was too deep
- In water at 16:56
- Hit bottom at 17:00 234.5m
- 17:00 (5mins) shrimp, fine sediment, big fish, crab
- 17:01 (6mins) shrimp (few),
- 17:02 (7mins) maybe ctenophore, big sea anemone, seaweed, snow crab. Shrimp,
- 17:03 (8mins) snow crab. Leaves, 238m. big shrimp.
- 17:04 (9mins) big shrimp, lots of sediment in this area à everything is covered. Redfish.
- 17:05 (10mins) sponge, long worm, fish, snow crab,
- 17:06 (11mins) shrimp, many little orange things but too far to see what they are.
- 17:07 (12 mins) shrimp, exposed bedrock, shrimp,
- 17:08 (13 mins) redfish, sea star, Many redfish. Going into large angular rocks. Sea anemone. Shrimp. Big kelp piece.
- 17:09 (14 mins) ctenophore, shrimp, 236m depth,

- 17:10 (15 mins) big shrimp with eggs, leaf, shrimp,
- 17:11 (16 mins) sea anemone (2 species), flatfish, shrimp, shrimp, BIG kelp piece.
- 17:12 (17 mins) nothing but sediment and some shrimp
- 17:14 (19 mins) stalked benthic species
- 17:15 (20 mins) shrimp
- 17:16 (21 mins) shrimp (few)
- 17:17 (22 mins) Rock with spiny crab, big sea anemone. Shrimp with eggs
- 17:18 (23 mins) shrimp, unidentified crab-like things, shrimp,
- 17:19 (24 mins) shrimp with eggs (3 of them), big burrow, shrimp, cerianthid!
- 17:20 (25 mins) brittle star, skulpin, red fish, flatfish, unidentified circular animal,
- 17:21 (26 mins) scallop shell, eel pout,
- 17:22 (27 mins) eel pout or fish doctor,
- 17:23 (28 mins) shrimp, kelp piece, small possible sponge, seabed ridge, fish
- 17:24 (29 mins) rock with bryozoans, burrow, one krill,
- 17:25 (30 mins) rock outcrop with bryozoans. 236 m, nice bryozoan, kelp piece, flatfish, sea star,
- 17:26 (31 mins) redfish (10cm), seabed ridge, BIG sea anemone, Ctenophore, bryozoans, big redfish, four big sea anemones and crab, bryozoans
- 17:27 (32 mins) bryozoans, hiding redfish, big sea anemone, big kelp, 235m, redfish within kelp, sea anemone.
- 17:28 (33 mins) unidentified pink animal (?), sponge, small fish
- 17:29 (34 mins) fine sediment habitat, shrimp, big fish – long,
- 17:31 (36 mins) sea star on rock.
- 17:32 (37 mins) shrimp, small unidentified circular thing, polychaete tubes,
- 17:33 (38 mins) 241 m,
- 17:34 (39 mins) sea anemone on rock, bryozoans on rock, sea star on rock, shell hash (?), sea star, redfish, redfish hiding in rock crevasse
- 17:35 (40 mins) redfish, seabed ridges
- 17:36 (40 mins) off bottom, 232 m.
- Hit surface at: 17:41

November 23, 2023

Drop camera Bay d'Espoir summary

Two drop cameras were conducted in Bay d'Espoir. The first was deployed in the upper bay at a depth of 100-200 m near a vertical wall. The short dive (~20 mins) showed a wall of bedrock slanting downwards. Many large sea anemones were present on the wall, along with sea stars, soft corals (likely *Drifa* spp.), crabs and sponge sp (encrusting sponges, *Polymastia* spp., unidentified sponge sp.). White sea urchins, shrimp and redfish were also recorded at this site. Many small organisms present on the wall were unidentified during the dive due to quality.

The drop camera was deployed for a short (15 minutes), second time in Butter Cove, over the proposed 'Line 2' Van Veen transect. The depth was approximately 200-235 m. At the beginning of the dive, the habitat type was exposed bedrock with sediment accumulation. Many large sea anemones, sponges, and shrimp (one observed with eggs) were recorded. Sea stars, a spiny crab, a grenadier fish, and small white unidentified organisms on the rock were also present. The substrate changed shortly into the dive to soft mud habitat with visible polychaete tubes. Shrimp were present on the sediment (one observed with eggs). Various fish were also observed (redfish, flatfish, unidentified sp.).

Drop camera deployment #1 Station 19 (upper Bay d'Espoir) logs

- Dropping it quickly near a vertical wall in Bay d'Espoir to check it out
- In water at 11:27
- 11:31 (4mins) See rock wall with sea star

- 11:32 (5mins) being pulled up.
- 11:35 (8mins) wall with sea anemones/ sea stars. Many sea anemones. Crab. Sea stars. White sea urchins, *Polymastia*.
- 11:36 (9mins) soft corals (*Drifa* sp.) seen as hauling it up. Bryozoans, many soft corals, sea stars. Sponges,
- 11:37 (10 mins) small redfish, sea star, small white balls, *Polymastia*, crab, soft coral,
- 11:38 (11mins) sea anemone, sponge, 106 m.
- 11:39 (12 mins) drifting in water
- 11:40 (13 mins) wall again on a downward slant (\), sea anemones, encrusting sponges, cannot see it clearly. 187 m.
- 11:42 (14-15mins) sea urchin, sea anemones (many), shrimp on wall, spiny crab, white sea urchins, sponges, encrusting white sponge,
- 11:43 (16 mins) sea star, sea anemone, potential sea pig (or stalked animal) hard to see but different from other fauna, whelk,
- 11:45 (18 mins) drifting
- 11:46 (19 mins) drifting
- 11:47 (20 mins) pulling up
- Video cut out at 11:51.

Drop camera deployment #2 Station 21 (Bay d'Espoir - Butter Cove) logs

- Depth 200-235m – depth meter does not appear to be working. Camera is sideways
- Going over new 'Line 2' Van Veen line coordinates because others are too deep.
- Entered water at 14:58, 15:02 on decent there was a cnenophore.
- Hit wall at 15:03. Bottom type: exposed bedrock with sediment accumulated on it
- 15:03 sponges, spiny crab, sea anemones, grenadier fish, shrimp with eggs
- 15:04 small unidentified white organisms, Big Sea anemone, sea star, sea anemone BIG, shrimp, large sea anemone,
- 15:05 Large Sea anemone, shrimp, sea anemone, shrimp, big sea anemone, sea star (small yellow), shrimp
- 15:06 more sea anemones. They are big. Many of them (>5).
- 15:07: soft mud habitat. Polychaete tubes, shrimp,
- 15:08 shrimp, red fish, crab, burrow (~2cm),
- 15:09: long white worm (?), shrimp, leaves, redfish, unidentified fish,
- 15:10 BIG sea anemone on a rock. Shrimp with eggs,
- 15:11 flatfish, still muddy substratum. Shrimp (4), fish (2)
- 15:12 coming out.
- 15:15 video cut out. It was still on its way up.

Appendix Four: Details of Benthic and Water Samples

Table 11: Details of samples taken within the expedition

sample_ID	method	gear	dfo_station_id	mi_station_id	analysis_type	preservation	date	location	container	approx_depth (m)	notes
436750	CTD	Niskin 1		station_4_event_9	carbonates	room_temp	20-Nov	bay_d'espoir_goblin_head	500mL_glass	759	
436750	CTD	Niskin 1		station_4_event_9	pCO2	fridge	20-Nov	bay_d'espoir_goblin_head	160mL_glass	759	Partially froze in the fridge (~half frozen). Was thawed and put back in fridge after temperature of fridge was adjusted. Upon demobilization, there was air bubbles in it.
436750	CTD	Niskin 1		station_4_event_9	oxygen_isotopes	room_temp	20-Nov	bay_d'espoir_goblin_head	60mL_amber_glass	759	
436750	CTD	Niskin 1		station_4_event_9	nutrients	freezer (-20°C)	20-Nov	bay_d'espoir_goblin_head	falcon_50 mL	759	
436750	CTD	Niskin 1		station_4_event_9	nutrients	freezer (-20°C)	20-Nov	bay_d'espoir_goblin_head	falcon_50 mL	759	
436750	CTD	Niskin 1		station_4_event_9	salinity	room_temp	20-Nov	bay_d'espoir_goblin_head	square_glass	759	
436751	CTD	Niskin 2		station_4_event_9	carbonates	room_temp	20-Nov	bay_d'espoir_goblin_head	500mL_glass	400	
436751	CTD	Niskin 2		station_4_event_9	pCO2	fridge	20-Nov	bay_d'espoir_goblin_head	160mL_glass	400	
436751	CTD	Niskin 2		station_4_event_9	oxygen_isotopes	room_temp	20-Nov	bay_d'espoir_goblin_head	60mL_amber_glass	400	
436751	CTD	Niskin 2		station_4_event_9	nutrients	freezer (-20°C)	20-Nov	bay_d'espoir_goblin_head	falcon_50 mL	400	
436751	CTD	Niskin 2		station_4_event_9	nutrients	freezer (-20°C)	20-Nov	bay_d'espoir_goblin_head	falcon_50 mL	400	
436752	CTD	Niskin 3		station_4_event_9	carbonates	room_temp	20-Nov	bay_d'espoir_goblin_head	500mL_glass	200	
436752	CTD	Niskin 3		station_4_event_9	pCO2	fridge	20-Nov	bay_d'espoir_goblin_head	160mL_glass	200	
436752	CTD	Niskin 3		station_4_event_9	oxygen_isotopes	room_temp	20-Nov	bay_d'espoir_goblin_head	60mL_amber_glass	200	
436752	CTD	Niskin 3		station_4_event_9	nutrients	freezer (-20°C)	20-Nov	bay_d'espoir_goblin_head	falcon_50 mL	200	
436752	CTD	Niskin 3		station_4_event_9	nutrients	freezer (-20°C)	20-Nov	bay_d'espoir_goblin_head	falcon_50 mL	200	

436753	CTD	Niskin 4		station_4_event_9	carbonates	room_temp	20-Nov	bay_d'espoir_goblin_head	500mL_glass	100	
436753	CTD	Niskin 4		station_4_event_9	pCO2	fridge	20-Nov	bay_d'espoir_goblin_head	160mL_glass	100	Completely froze in the fridge. The cap had popped ot of place. Sample was recapped while frozen to limit gas exchange, then thawed and put back in fridge after temperature of fridge was adjusted. Upon demobilization, there was air bubbles in it.
436753	CTD	Niskin 4		station_4_event_9	oxygen_isotopes	room_temp	20-Nov	bay_d'espoir_goblin_head	60mL_amber_glass	100	
436753	CTD	Niskin 4		station_4_event_9	nutrients	freezer (-20°C)	20-Nov	bay_d'espoir_goblin_head	falcon_50mL	100	
436753	CTD	Niskin 4		station_4_event_9	nutrients	freezer (-20°C)	20-Nov	bay_d'espoir_goblin_head	falcon_50mL	100	
436754	CTD	Niskin 5		station_4_event_9	carbonates	room_temp	20-Nov	bay_d'espoir_goblin_head	500mL_glass	50	
436754	CTD	Niskin 5		station_4_event_9	pCO2	fridge	20-Nov	bay_d'espoir_goblin_head	160mL_glass	50	
436754	CTD	Niskin 5		station_4_event_9	oxygen_isotopes	room_temp	20-Nov	bay_d'espoir_goblin_head	60mL_amber_glass	50	
436754	CTD	Niskin 5		station_4_event_9	nutrients	freezer (-20°C)	20-Nov	bay_d'espoir_goblin_head	falcon_50mL	50	
436754	CTD	Niskin 5		station_4_event_9	nutrients	freezer (-20°C)	20-Nov	bay_d'espoir_goblin_head	falcon_50mL	50	
436755	CTD	Niskin 6		station_4_event_9	carbonates	room_temp	20-Nov	bay_d'espoir_goblin_head	500mL_glass	5	
436755	CTD	Niskin 6		station_4_event_9	pCO2	fridge	20-Nov	bay_d'espoir_goblin_head	160mL_glass	5	Partially froze in the fridge (~3/4 frozen). Was thawed and put back in fridge after temperature of fridge was adjusted. The cap subsequently bulged around where the seal is while in fridge (not frozen). It was recrimped but not recapped. Upon demobilization, there was air bubbles in it.
436755	CTD	Niskin 6		station_4_event_9	oxygen_isotopes	room_temp	20-Nov	bay_d'espoir_goblin_head	60mL_amber_glass	5	

436755	CTD	Niskin 6		station_4_event_9	nutrients	freezer (-20°C)	20-Nov	bay_d'espoir_goblin_head	falcon_50mL	5	
436755	CTD	Niskin 6		station_4_event_9	nutrients	freezer (-20°C)	20-Nov	bay_d'espoir_goblin_head	falcon_50mL	5	
436755	CTD	Niskin 6		station_4_event_9	salinity	room_temp	20-Nov	bay_d'espoir_goblin_head	square_glass	5	
WB-2023-ST1-VV1-R1-CHLO	van_veen	van_veen_rep1	wb_station_1	station_12_event_25	chlorophyll	freezer (-80°C)	22-Nov-23	white_bear_bay	black_falcon_10mL	200	
WB-2023-ST1-VV1-R2-CHLO	van_veen	van_veen_rep1	wb_station_1	station_12_event_25	chlorophyll	freezer (-80°C)	22-Nov-23	white_bear_bay	black_falcon_10mL	200	
WB-2023-ST1-VV1-R3-CHLO	van_veen	van_veen_rep1	wb_station_1	station_12_event_25	chlorophyll	freezer (-80°C)	22-Nov-23	white_bear_bay	black_falcon_10mL	200	
WB-2023-ST1-VV1-R1-OM	van_veen	van_veen_rep1	wb_station_1	station_12_event_25	organic_matter	freezer (-20°C)	22-Nov-23	white_bear_bay	100mL_sputum	200	
WB-2023-ST1-VV1-R2-OM	van_veen	van_veen_rep1	wb_station_1	station_12_event_25	organic_matter	freezer (-20°C)	22-Nov-23	white_bear_bay	100mL_sputum	200	
WB-2023-ST1-VV1-R3-OM	van_veen	van_veen_rep1	wb_station_1	station_12_event_25	organic_matter	freezer (-20°C)	22-Nov-23	white_bear_bay	100mL_sputum	200	
WB-2023-ST1-VV1-R1-GS	van_veen	van_veen_rep1	wb_station_1	station_12_event_25	grain_size	fridge	22-Nov-23	white_bear_bay	100mL_sputum	200	
WB-2023-ST1-VV1-R2-GS	van_veen	van_veen_rep1	wb_station_1	station_12_event_25	grain_size	fridge	22-Nov-23	white_bear_bay	100mL_sputum	200	
WB-2023-ST1-VV1-R3-GS	van_veen	van_veen_rep1	wb_station_1	station_12_event_25	grain_size	fridge	22-Nov-23	white_bear_bay	100mL_sputum	200	
WB-2023-ST1-VV1-DP	van_veen	van_veen_rep1	wb_station_1	station_12_event_25	drugs_pesticides	freezer (-20°C)	22-Nov-23	white_bear_bay	120mL_amber_glass	200	
WB-2023-ST1-VV1-M	van_veen	van_veen_rep1	wb_station_1	station_12_event_25	metals	freezer (-20°C)	22-Nov-23	white_bear_bay	30mL_plastic	200	
WB-2023-ST1-VV2-INFAUNA	van_veen	van_veen_rep2	wb_station_1	station_12_event_26	infauna	10%_buffered_formalin	22-Nov-23	white_bear_bay	500mL_plastic	200	

WB-2023-ST1-VV3-INFAUNA	van_veen	van_veen_rep3	wb_station_1	station_12_event_28	infauna	10%_buffered_formalin	22-Nov-23	white_bear_bay	500mL_plastic	200	
WB-2023-ST3-VV1-R1-CHLO	van_veen	van_veen_rep1	wb_station_3	station_13_event_30	chlorophyll	freezer (-80°C)	22-Nov-23	white_bear_bay	black_falcon_10mL	200	
WB-2023-ST3-VV1-R2-CHLO	van_veen	van_veen_rep1	wb_station_3	station_13_event_30	chlorophyll	freezer (-80°C)	22-Nov-23	white_bear_bay	black_falcon_10mL	200	
WB-2023-ST3-VV1-R3-CHLO	van_veen	van_veen_rep1	wb_station_3	station_13_event_30	chlorophyll	freezer (-80°C)	22-Nov-23	white_bear_bay	black_falcon_10mL	200	
WB-2023-ST3-VV1-R1-OM	van_veen	van_veen_rep1	wb_station_3	station_13_event_30	organic_matter	freezer (-20°C)	22-Nov-23	white_bear_bay	100mL_sputum	200	
WB-2023-ST3-VV1-R2-OM	van_veen	van_veen_rep1	wb_station_3	station_13_event_30	organic_matter	freezer (-20°C)	22-Nov-23	white_bear_bay	100mL_sputum	200	
WB-2023-ST3-VV1-R3-OM	van_veen	van_veen_rep1	wb_station_3	station_13_event_30	organic_matter	freezer (-20°C)	22-Nov-23	white_bear_bay	100mL_sputum	200	
WB-2023-ST3-VV1-R1-GS	van_veen	van_veen_rep1	wb_station_3	station_13_event_30	grain_size	fridge	22-Nov-23	white_bear_bay	100mL_sputum	200	
WB-2023-ST3-VV1-R2-GS	van_veen	van_veen_rep1	wb_station_3	station_13_event_30	grain_size	fridge	22-Nov-23	white_bear_bay	100mL_sputum	200	
WB-2023-ST3-VV1-R3-GS	van_veen	van_veen_rep1	wb_station_3	station_13_event_30	grain_size	fridge	22-Nov-23	white_bear_bay	100mL_sputum	200	
WB-2023-ST3-VV1-DP	van_veen	van_veen_rep1	wb_station_3	station_13_event_30	drugs_pesticides	freezer (-20°C)	22-Nov-23	white_bear_bay	120mL_amber_glass	200	
WB-2023-ST3-VV1-M	van_veen	van_veen_rep1	wb_station_3	station_13_event_30	metals	freezer (-20°C)	22-Nov-23	white_bear_bay	30mL_plastic	200	
WB-2023-ST3-VV2-INFAUNA	van_veen	van_veen_rep2	wb_station_3	station_13_event_32	infauna	10%_buffered_formalin	22-Nov-23	white_bear_bay	500mL_plastic	193	
WB-2023-ST3-VV3-INFAUNA	van_veen	van_veen_rep3	wb_station_3	station_13_event_33	infauna	10%_buffered_formalin	22-Nov-23	white_bear_bay	500mL_plastic	197	

WB-2023-ST5-VV1-R1-CHLO	van_veen	van_veen_rep1	wb_station_5	station_14_event_36	chlorophyll	freezer (-80°C)	22-Nov-23	white_bear_bay	black_falcon_10mL	239	
WB-2023-ST5-VV1-R2-CHLO	van_veen	van_veen_rep1	wb_station_5	station_14_event_36	chlorophyll	freezer (-80°C)	22-Nov-23	white_bear_bay	black_falcon_10mL	239	
WB-2023-ST5-VV1-R3-CHLO	van_veen	van_veen_rep1	wb_station_5	station_14_event_36	chlorophyll	freezer (-80°C)	22-Nov-23	white_bear_bay	black_falcon_10mL	239	
WB-2023-ST5-VV1-R1-OM	van_veen	van_veen_rep1	wb_station_5	station_14_event_36	organic_matter	freezer (-20°C)	22-Nov-23	white_bear_bay	100mL_sputum	239	
WB-2023-ST5-VV1-R2-OM	van_veen	van_veen_rep1	wb_station_5	station_14_event_36	organic_matter	freezer (-20°C)	22-Nov-23	white_bear_bay	100mL_sputum	239	
WB-2023-ST5-VV1-R3-OM	van_veen	van_veen_rep1	wb_station_5	station_14_event_36	organic_matter	freezer (-20°C)	22-Nov-23	white_bear_bay	100mL_sputum	239	
WB-2023-ST5-VV1-R1-GS	van_veen	van_veen_rep1	wb_station_5	station_14_event_36	grain_size	fridge	22-Nov-23	white_bear_bay	100mL_sputum	239	
WB-2023-ST5-VV1-R2-GS	van_veen	van_veen_rep1	wb_station_5	station_14_event_36	grain_size	fridge	22-Nov-23	white_bear_bay	100mL_sputum	239	
WB-2023-ST5-VV1-R3-GS	van_veen	van_veen_rep1	wb_station_5	station_14_event_36	grain_size	fridge	22-Nov-23	white_bear_bay	100mL_sputum	239	
WB-2023-ST5-VV1-DP	van_veen	van_veen_rep1	wb_station_5	station_14_event_36	drugs_pesticides	freezer (-20°C)	22-Nov-23	white_bear_bay	120mL_amber_glass	239	
WB-2023-ST5-VV1-M	van_veen	van_veen_rep1	wb_station_5	station_14_event_36	metals	freezer (-20°C)	22-Nov-23	white_bear_bay	30mL_plastic	239	
WB-2023-ST5-VV1-INFAUNA	van_veen	van_veen_rep1	wb_station_5	station_14_event_36	polychaete tube samples	100%_ethanol	22-Nov-23	white_bear_bay	100mL_sputum	239	Samples of polychaete tubes
WB-2023-ST5-VV2-INFAUNA	van_veen	van_veen_rep2	wb_station_5	station_14_event_37	infauna	10%_buffered_formalin	22-Nov-23	white_bear_bay	500mL_plastic	239	
WB-2023-ST5-VV3-INFAUNA	van_veen	van_veen_rep3	wb_station_5	station_14_event_38	infauna	10%_buffered_formalin	22-Nov-23	white_bear_bay	500mL_plastic	237	

WB-2023-ST5-VV3-INFAUNA	van_veen	van_veen_rep3	wb_station_5	station_14_event_38	infauna	100%_ethanol	22-Nov-23	white_bear_bay	cryovial	237	small cryovial of delicate sea cucumber from grab.
436756	CTD	Niskin 1		station_17_event_42	carbonates	room_temp	23-Nov	bay_d'espoir_north_bay_head	500mL_glass	290-310	
436756	CTD	Niskin 1		station_17_event_42	pCO2	fridge	23-Nov	bay_d'espoir_north_bay_head	160mL_glass	290-310	
436756	CTD	Niskin 1		station_17_event_42	oxygen_isotopes	room_temp	23-Nov	bay_d'espoir_north_bay_head	60mL_amber_glass	290-310	
436756	CTD	Niskin 1		station_17_event_42	nutrients	freezer (-20°C)	23-Nov	bay_d'espoir_north_bay_head	falcon_50 mL	290-310	
436756	CTD	Niskin 1		station_17_event_42	nutrients	freezer (-20°C)	23-Nov	bay_d'espoir_north_bay_head	falcon_50 mL	290-310	
436756	CTD	Niskin 1		station_17_event_42	salinity	room_temp	23-Nov	bay_d'espoir_north_bay_head	square_glass	290-310	
436757	CTD	Niskin 3		station_17_event_42	carbonates	room_temp	23-Nov	bay_d'espoir_north_bay_head	500mL_glass	200	
436757	CTD	Niskin 3		station_17_event_42	pCO2	fridge	23-Nov	bay_d'espoir_north_bay_head	160mL_glass	200	
436757	CTD	Niskin 3		station_17_event_42	oxygen_isotopes	room_temp	23-Nov	bay_d'espoir_north_bay_head	60mL_amber_glass	200	
436757	CTD	Niskin 3		station_17_event_42	nutrients	freezer (-20°C)	23-Nov	bay_d'espoir_north_bay_head	falcon_50 mL	200	
436757	CTD	Niskin 3		station_17_event_42	nutrients	freezer (-20°C)	23-Nov	bay_d'espoir_north_bay_head	falcon_50 mL	200	
436758	CTD	Niskin 4		station_17_event_42	carbonates	room_temp	23-Nov	bay_d'espoir_north_bay_head	500mL_glass	100	
436758	CTD	Niskin 4		station_17_event_42	pCO2	fridge	23-Nov	bay_d'espoir_north_bay_head	160mL_glass	100	
436758	CTD	Niskin 4		station_17_event_42	oxygen_isotopes	room_temp	23-Nov	bay_d'espoir_north_bay_head	60mL_amber_glass	100	
436758	CTD	Niskin 4		station_17_event_42	nutrients	freezer (-20°C)	23-Nov	bay_d'espoir_north_bay_head	falcon_50 mL	100	
436758	CTD	Niskin 4		station_17_event_42	nutrients	freezer (-20°C)	23-Nov	bay_d'espoir_north_bay_head	falcon_50 mL	100	
436760	CTD	Niskin 6		station_17_event_42	carbonates	room_temp	23-Nov	bay_d'espoir_north_bay_head	500mL_glass	surface	
436760	CTD	Niskin 6		station_17_event_42	pCO2	fridge	23-Nov	bay_d'espoir_north_bay_head	160mL_glass	surface	
436760	CTD	Niskin 6		station_17_event_42	oxygen_isotopes	room_temp	23-Nov	bay_d'espoir_north_bay_head	60mL_amber_glass	surface	
436760	CTD	Niskin 6		station_17_event_42	nutrients	freezer (-20°C)	23-Nov	bay_d'espoir_north_bay_head	falcon_50 mL	surface	

436760	CTD	Niskin 6		station_17_event_42	nutrients	freezer (-20°C)	23-Nov	bay_d'espoir_north_bay_head	falcon_50mL	surface	
436760	CTD	Niskin 6		station_17_event_42	salinity	room_temp	23-Nov	bay_d'espoir_north_bay_head	square_glass	surface	
BE-2023-ST1-VV1-R1-CHLO	van_veen	van_veen_rep1	be_station_1	station_23_event_52	chlorophyll	freezer (-80°C)	25-Nov-23	bay_d'espoir_butter_cove	black_falcon_10mL	409	
BE-2023-ST1-VV1-R2-CHLO	van_veen	van_veen_rep1	be_station_1	station_23_event_52	chlorophyll	freezer (-80°C)	25-Nov-23	bay_d'espoir_butter_cove	black_falcon_10mL	409	
BE-2023-ST1-VV1-R3-CHLO	van_veen	van_veen_rep1	be_station_1	station_23_event_52	chlorophyll	freezer (-80°C)	25-Nov-23	bay_d'espoir_butter_cove	black_falcon_10mL	409	
BE-2023-ST1-VV1-R1-OM	van_veen	van_veen_rep1	be_station_1	station_23_event_52	organic_matter	freezer (-20°C)	25-Nov-23	bay_d'espoir_butter_cove	100mL_sputum	409	
BE-2023-ST1-VV1-R2-OM	van_veen	van_veen_rep1	be_station_1	station_23_event_52	organic_matter	freezer (-20°C)	25-Nov-23	bay_d'espoir_butter_cove	100mL_sputum	409	
BE-2023-ST1-VV1-R3-OM	van_veen	van_veen_rep1	be_station_1	station_23_event_52	organic_matter	freezer (-20°C)	25-Nov-23	bay_d'espoir_butter_cove	100mL_sputum	409	
BE-2023-ST1-VV1-R1-GS	van_veen	van_veen_rep1	be_station_1	station_23_event_52	grain_size	fridge	25-Nov-23	bay_d'espoir_butter_cove	100mL_sputum	409	
BE-2023-ST1-VV1-R2-GS	van_veen	van_veen_rep1	be_station_1	station_23_event_52	grain_size	fridge	25-Nov-23	bay_d'espoir_butter_cove	100mL_sputum	409	
BE-2023-ST1-VV1-R3-GS	van_veen	van_veen_rep1	be_station_1	station_23_event_52	grain_size	fridge	25-Nov-23	bay_d'espoir_butter_cove	100mL_sputum	409	
BE-2023-ST1-VV1-DP	van_veen	van_veen_rep1	be_station_1	station_23_event_52	drugs_pesticides	freezer (-20°C)	25-Nov-23	bay_d'espoir_butter_cove	120mL_amber_glass	409	
BE-2023-ST1-VV1-M	van_veen	van_veen_rep1	be_station_1	station_23_event_52	metals	freezer (-20°C)	25-Nov-23	bay_d'espoir_butter_cove	30mL_plastic	409	
BE-2023-ST1-VV1-MP	van_veen	van_veen_rep1	be_station_1	station_23_event_52	microplastics	room_temp	25-Nov-23	bay_d'espoir_butter_cove	1.9L_jar	409	going to Ina Benner/Uta Passow at OSC
BE-2023-ST1-VV1-SEAPENS	van_veen	van_veen_rep1	be_station_1	station_23_event_52	infauna	freezer (-80°C)	25-Nov-23	bay_d'espoir_butter_cove	ziploc	409	P. aculeata: 3 whole (1 whole, 2 are either juveniles or partial), 1 partial

BE-2023-ST1-VV1-URCHIN	van_veen	van_veen_rep1	be_station_1	station_23_event_52	infauna	100% ethanol	25-Nov-23	bay_d'espoir_butter_cove	100mL_sputum	409	1 heart urchin
BE-2023-ST1-VV1-INFAUNA	van_veen	van_veen_rep1	be_station_1	station_23_event_52	infauna	10%_buffered_formalin	25-Nov-23	bay_d'espoir_butter_cove	500mL_plastic	409	
BE-2023-ST1-VV2-INFAUNA	van_veen	van_veen_rep2	be_station_1	station_23_event_53	infauna	10%_buffered_formalin	25-Nov-23	bay_d'espoir_butter_cove	500mL_plastic	412	
BE-2023-ST1-VV2-SEAPENS	van_veen	van_veen_rep2	be_station_1	station_23_event_53	infauna	freezer (-80°C)	25-Nov-23	bay_d'espoir_butter_cove	ziploc	412	P. aculeata: 3 whole (2 are juveniles), 1 skeleton
BE-2023-ST1-VV3-INFAUNA	van_veen	van_veen_rep3	be_station_1	station_23_event_54	infauna	10%_buffered_formalin	25-Nov-23	bay_d'espoir_butter_cove	500mL_plastic	402	
BE-2023-ST1-VV3-SEAPENS	van_veen	van_veen_rep3	be_station_1	station_23_event_54	infauna	freezer (-80°C)	25-Nov-23	bay_d'espoir_butter_cove	ziploc	402	P. aculeata: 2 samples (1 juvenile, 1 partial)
BE-2023-ST1-VV1-BS	van_veen	van_veen_rep3	be_station_1	station_23_event_54	infauna	freezer (-80°C)	25-Nov-23	bay_d'espoir_butter_cove	ziploc	402	1 brittle star
BE-2023-ST2-VV1-R1-CHLO	van_veen	van_veen_rep1	be_station_2	station_24_event_60	chlorophyll	freezer (-80°C)	25-Nov-23	bay_d'espoir_butter_cove	black_falcon_10mL	419	
BE-2023-ST2-VV1-R2-CHLO	van_veen	van_veen_rep1	be_station_2	station_24_event_60	chlorophyll	freezer (-80°C)	25-Nov-23	bay_d'espoir_butter_cove	black_falcon_10mL	419	
BE-2023-ST2-VV1-R3-CHLO	van_veen	van_veen_rep1	be_station_2	station_24_event_60	chlorophyll	freezer (-80°C)	25-Nov-23	bay_d'espoir_butter_cove	black_falcon_10mL	419	
BE-2023-ST2-VV1-R1-OM	van_veen	van_veen_rep1	be_station_2	station_24_event_60	organic_matter	freezer (-20°C)	25-Nov-23	bay_d'espoir_butter_cove	100mL_sputum	419	
BE-2023-ST2-VV1-R2-OM	van_veen	van_veen_rep1	be_station_2	station_24_event_60	organic_matter	freezer (-20°C)	25-Nov-23	bay_d'espoir_butter_cove	100mL_sputum	419	
BE-2023-ST2-VV1-R3-OM	van_veen	van_veen_rep1	be_station_2	station_24_event_60	organic_matter	freezer (-20°C)	25-Nov-23	bay_d'espoir_butter_cove	100mL_sputum	419	
BE-2023-ST2-VV1-R1-GS	van_veen	van_veen_rep1	be_station_2	station_24_event_60	grain_size	fridge	25-Nov-23	bay_d'espoir_butter_cove	100mL_sputum	419	

BE-2023-ST2-VV1-R2-GS	van_veen	van_veen_rep1	be_station_2	station_24_event_60	grain_size	fridge	25-Nov-23	bay_d'espoir_butter_cove	100mL_sputum	419	
BE-2023-ST2-VV1-R3-GS	van_veen	van_veen_rep1	be_station_2	station_24_event_60	grain_size	fridge	25-Nov-23	bay_d'espoir_butter_cove	100mL_sputum	419	
BE-2023-ST2-VV1-DP	van_veen	van_veen_rep1	be_station_2	station_24_event_60	drugs_pesticides	freezer (-20°C)	25-Nov-23	bay_d'espoir_butter_cove	120mL_amber_glass	419	
BE-2023-ST2-VV1-M	van_veen	van_veen_rep1	be_station_2	station_24_event_60	metals	freezer (-20°C)	25-Nov-23	bay_d'espoir_butter_cove	30mL_plastic	419	
BE-2023-ST2-VV1-MP	van_veen	van_veen_rep1	be_station_2	station_24_event_60	microplastics	room_temp	25-Nov-23	bay_d'espoir_butter_cove	1.9L_jar	419	going to Ina Benner/Uta Passow at OSC
BE-2023-ST2-VV1-SEAPENS	van_veen	van_veen_rep1	be_station_2	station_24_event_60	infauna	freezer (-80°C)	25-Nov-23	bay_d'espoir_butter_cove	ziploc	419	P. aculeata: 4 whole (2 are juveniles), 1 partial skeleton. Had a small (2 cm) juvenile but sample was lost.
BE-2023-ST2-VV1-INFAUNA	van_veen	van_veen_rep1	be_station_2	station_24_event_60	infauna	10%_buffered_formalin	25-Nov-23	bay_d'espoir_butter_cove	500mL_plastic	419	
BE-2023-ST2-VV2-INFAUNA	van_veen	van_veen_rep2	be_station_2	station_24_event_62	infauna	10%_buffered_formalin	25-Nov-23	bay_d'espoir_butter_cove	500mL_plastic	431	
BE-2023-ST2-VV2-SEAPENS	van_veen	van_veen_rep2	be_station_2	station_24_event_62	infauna	freezer (-80°C)	25-Nov-23	bay_d'espoir_butter_cove	ziploc	431	P. aculeata: 5 whole (3 are juveniles). Two largest showing eggs within tissue.
BE-2023-ST2-VV3-INFAUNA	van_veen	van_veen_rep3	be_station_2	station_24_event_63	infauna	10%_buffered_formalin	25-Nov-23	bay_d'espoir_butter_cove	500mL_plastic	422	
BE-2023-ST2-VV3-SEAPENS	van_veen	van_veen_rep3	be_station_2	station_24_event_63	infauna	freezer (-80°C)	25-Nov-23	bay_d'espoir_butter_cove	ziploc	422	P. aculeata: 5 whole (3 are juveniles).

Appendix Five: Bounce Camera Image Details

Table 12: Summary of Bounce Camera video files.

Date DD/MM/YY	**Site-bay-station number***	**In water time UTC (HH:MM)**	**Start Latitude (DD)**	**Start Longitude (DD)**	**Start Depth (m)**	**End Latitude (DD)**	**End Longitude (DD)**	**End Depth (m)**
23/11/2025	BDE-UB-018	13:13	47.77917	-56.13560	308.0	47.77072	-56.13385	307
Transect duration 30 minutes = 29 drops								
Station 18 video file names:								
Down-facing: CM231118_BDE-UB-018_BNC-001a, CM231118_BDE-UB-018_BNC-001b, CM231118_BDE-UB-018_BNC-001c, CM231118_BDE-UB-018_BNC-001d, CM231118_BDE-UB-018_BNC-001e Missing file showing recovery Forward-facing: CM231118_BDE-UB-018_BNC-001aF, CM231118_BDE-UB-018_BNC-001bF, CM231118_BDE-UB-018_BNC-001cF, CM231118_BDE-UB-018_BNC-001eF, CM231118_BDE-UB-018_BNC-001fF, CM231118_BDE-UB-018_BNC-001gF								
23/11/2023	BDE-LB-020	18:28	47.69533	-56.13732	780.0	47.68963	-56.14350	700
Transect duration 30 minutes = 30 drops								
Station 20 video file names:								
Down-facing: CM231118_BDE-LB-020_BNC-002a, CM231118_BDE-LB-020_BNC-002b, CM231118_BDE-LB-020_BNC-002c, CM231118_BDE-LB-020_BNC-002e, CM231118_BDE-LB-020_BNC-003d Missing file showing recovery Forward-facing: CM231118_BDE-LB-020_BNC-002aF, CM231118_BDE-LB-020_BNC-002bF, CM231118_BDE-LB-020_BNC-002cF, CM231118_BDE-LB-020_BNC-002dF								

* BDE = Bay d' Espoir, UB = Upper Bay, LB = Lower Bay.

Table 13: Approximate locations (vessel position) of individual drops conducted within Bounce Camera transects.

Drop number	Latitude (DD)	Longitude (DD)	Estimated Depth (m)	Time (UTC)
Station 18: North Bay				
drp1	47.77853	-56.13517	314	13:19
drp2	47.77828	-56.13525	309	13:22
drp3	47.61145	-56.13520	310	13:23
drp4	47.77793	-56.13512	310	13:24
drp5	47.77772	-56.13503	310	13:25
drp6	47.77763	-56.13503	310	13:26
drp7	47.77752	-56.13500	310	13:27
drp8	47.77737	-56.13485	311	13:28
drp9	47.77717	-56.13470	310	13:29
drp10	47.77700	-56.13458	310	13:30
drp11	47.77685	-56.13448	310	13:31
drp12	47.77650	-56.13437	312	13:33
drp13	47.77617	-56.13427	311	13:33
drp14	47.77595	-56.13422	311	13:35
drp15	47.77563	-56.13417	311	13:36
drp16	47.77538	-56.13412	311	13:37
drp17	47.77510	-56.13407	311	13:38
drp18	47.75792	-56.13403	312	13:40
drp19	47.77430	-56.13402	311	13:42
drp20	47.77403	-56.13397	311	13:43
drp21	47.77375	-56.13392	312	13:44
drp22	47.77348	-56.13378	311	13:45
drp23	Missing	Missing	311	13:46

drp24	47.77297	-56.13387	311	13:47
drp25	47.77272	-56.13395	311	13:48
drp26	47.77257	-56.13400	311	13:49
drp27	47.77242	-56.13400	310	13:50
drp28	47.77232	-56.13402	310	13:51
drp29	47.77218	-56.13402	310	13:52
Station 20: Lower Bay				
drp1	47.69313	-56.13715	782	17:03
drp2	47.69302	-56.13725	780	17:04
drp3	47.69288	-56.13737	780	17:05
drp4	47.69272	-56.13708	872	17:06
drp5	47.69245	-56.13752	781	17:07
drp6	47.69228	-56.13758	782	17:08
drp7	47.69254	-56.13780	779	17:10
drp8	47.69190	-56.13793	779	17:11
drp9	47.69168	-56.13813	780	17:12
drp10	47.69150	-56.13835	778	17:13
drp11	47.69137	-56.13852	776	17:14
drp12	47.69125	-56.13873	775	17:15
drp13	47.69112	-56.13898	776	17:16
drp14	47.69103	-56.13922	777	17:17
drp15	47.69092	-56.13952	774	17:18
drp16	47.69080	-56.13975	773	17:19
drp17	47.69072	-56.13990	772	17:20
drp18	47.69067	-56.14000	773	17:21
drp19	47.69062	-56.14003	775	17:21
drp20	47.69048	-56.14015	773	17:22
drp21	47.69028	-56.14027	770	17:23

drp22	47.69000	-56.14045	768	17:25
drp23	47.68977	-56.14065	764	17:26
drp24	47.68965	-56.14083	762	17:27
drp25	47.68957	-56.14102	751	17:28
drp26	47.68952	-56.14117	751	17:29
drp27	47.68952	-56.14123	748	17:30
drp28	47.68923	-56.14132	744	17:31
drp29	47.68898	-56.14147	730	17:32
drp30	47.68870	-56.14163	714	17:33

Appendix Six: Proposed Sampling Plan (pre-expedition planning)

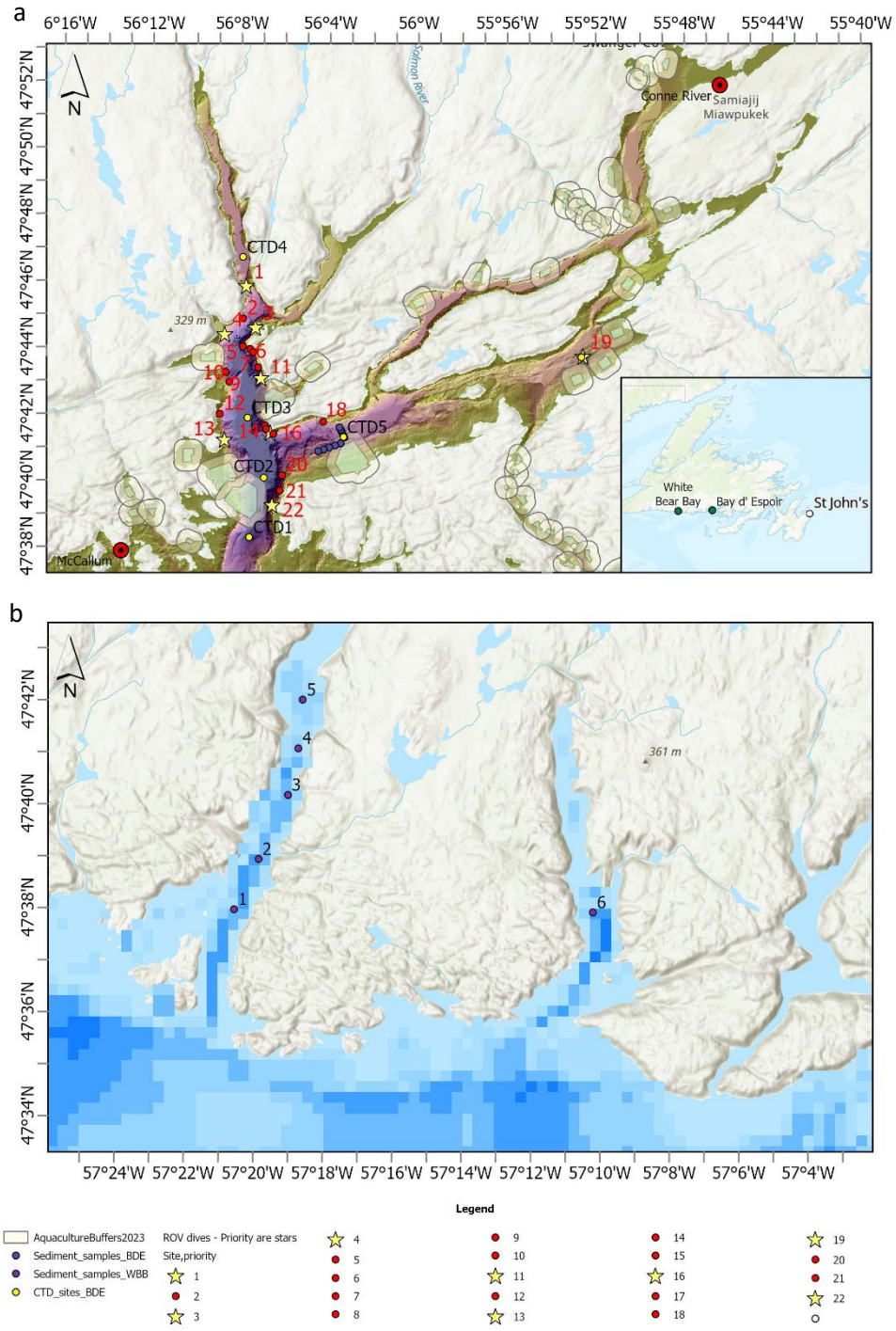

Figure 15: Location of Bay d'Espoir (a) and White Bear Bay (b) in Newfoundland and Labrador. Proposed stations of ROV, CTD, and sediment sampling interest are marked, along with 500m buffers around licensed aquaculture sites.

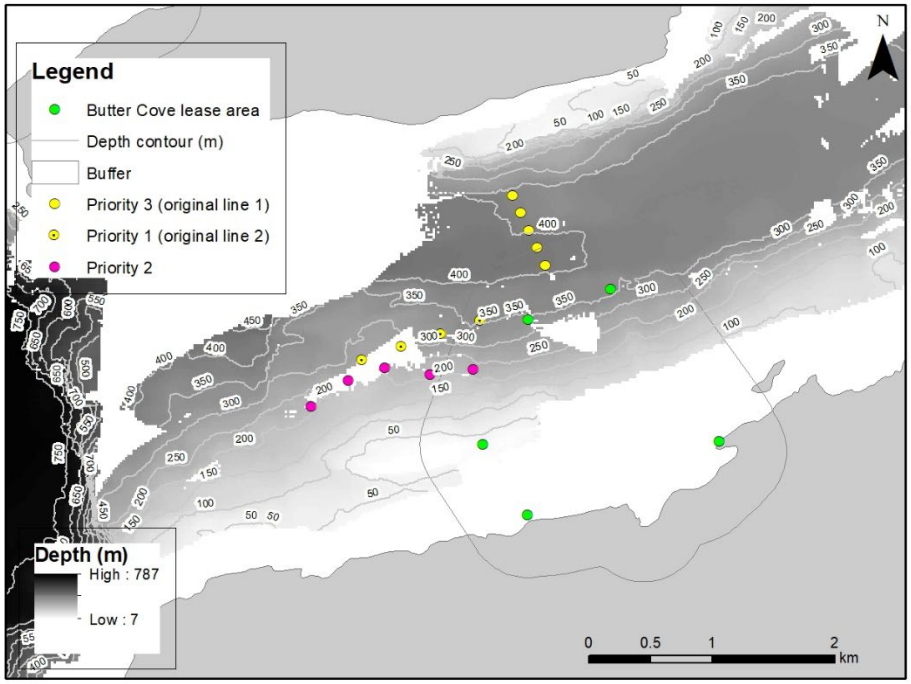

Figure 16: priority lines proposed for Van Veen grabs of sediment in Lower Bay opposite Butter Cove aquaculture lease area.

Table 14: key to station location abbreviations, see Figure 18.

Bay	**Hydrographic Zone**	**Site code**
Bay D'Espoir	Bois Island South	BDE-BIS
Bay D'Espoir	North Bay	BDE-NB
Bay D'Espoir	Upper Bay	BDE-UB
Bay D'Espoir	Lampidoes Passage	BDE-LaP
Bay D'Espoir	Outer Hemitage Bay	BDE-OHB
Bay D'Espoir	Lower Bay	BDE-LB
Bay De Vieux	Gnat Island	GNT
White Bear Bay	NA	WBB

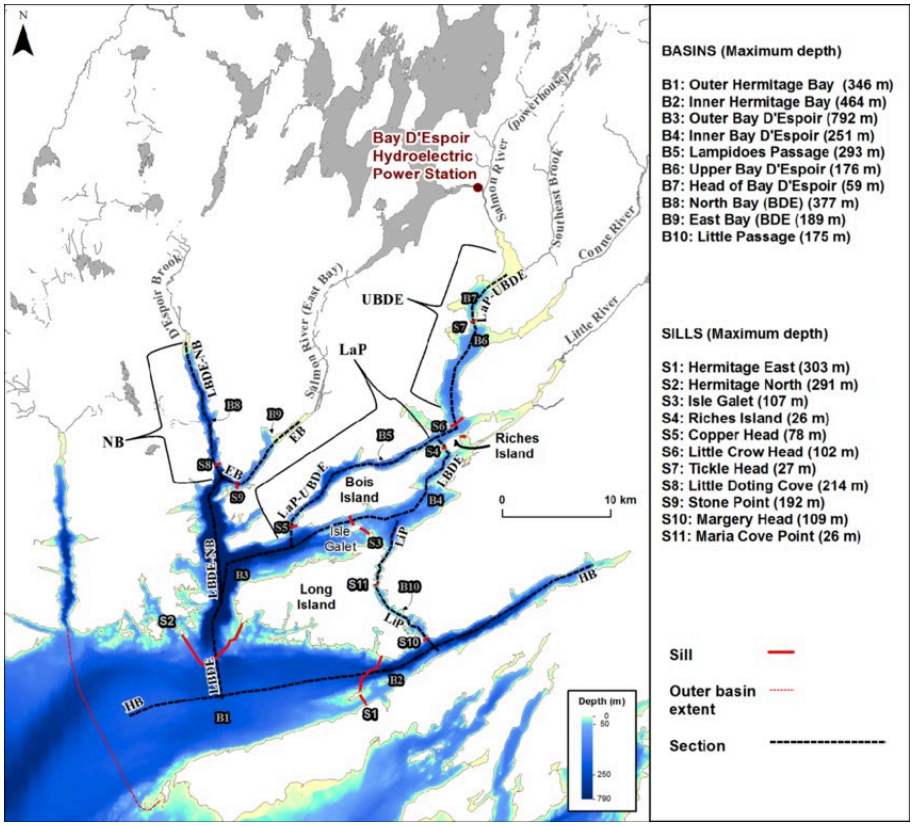

Figure 17: Figure detailing basin naming scheme, figure extracted from Donnet et al., 2018 (9).

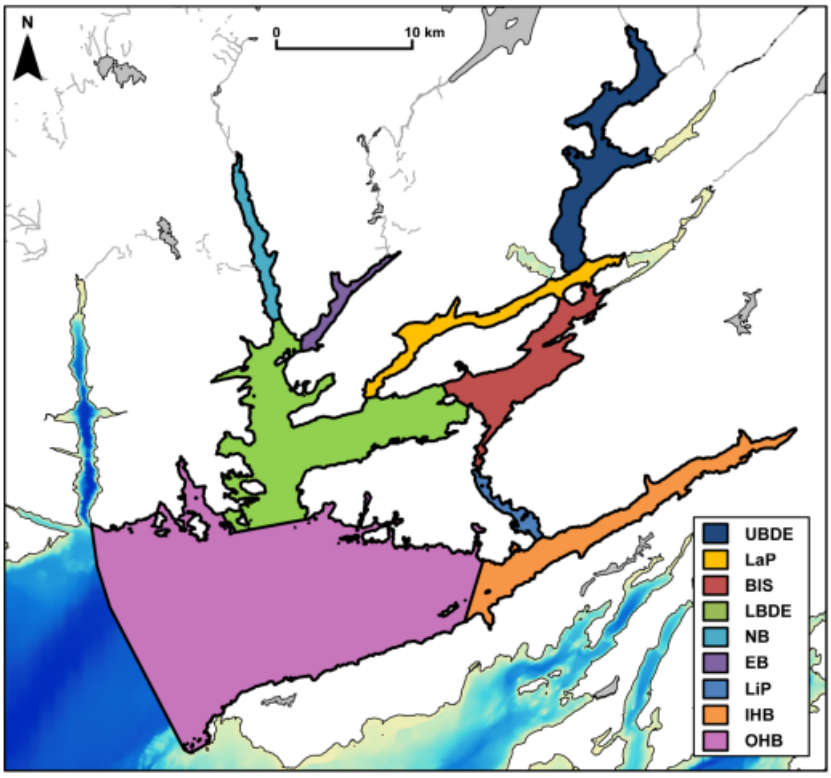

Figure 18: Hydrographic zoning presented in Donnet et al., 2018 (9), we adopted the terminology (e.g., "lower Bay d'Espoir," LBDE, section in green, see Table 10) to name samples taken within sub-regions of the bay.

Appendix Seven: Expedition Sea State and Tides

Table 15: Daily Sea state and tidal information.

Date	Sunrise (HH:MM)	Sunset (HH:MM)	Vessel location	Weather reading location	Tide Cycle	Beaufort Wind Scale	Other
19 Nov	07:26	16:33	BDE	Ship Cove, NL	Spring - NA	6 +, In Dock – Conne River	Southerly wind blowing up the fjord system
20 Nov	07:26	16:31	BDE	Ship Cove, NL	Spring High 1.65 m – 02:01 Low 0.69 m – 07:16 High 1.92 m – 14:35 Low 0.71 m – 20:28	1-2	Bright with light cloud cover
21 Nov	07:27	16:30	BDE	Ship Cove, NL	Spring, High 1.68 m – 03:06 Low 0.77 m - 08:35 High 1.88 m - 15:40 Low 0.86 m – 21:56	1-2	Bright, light cloud cover but mostly clear
22 Nov	07:29	16:29	WBB	Grey River, NL	Neep High 1.20 m – 04:14 Low 0.50 m- 10:30 High 1.20 m – 16:30	1	Sunny, clear skies in the morning

					Low 0.4 m – 23:27		
23 Nov	07:32	16:30	BDE	Ship Cove, NL	Neep High 1.80 m – 05:08 Low 0.60 m- 11:26 High 1.80 m – 17:40 Low 0.6 m – 23:40	1 – 2 in UB in the morning 3 - 4 in OB in the afternoon	Sunny, clear skies in the morning Snowing and fog in the afternoon in OB
24 Nov	07:33	16:29	BDE	Ship Cove, NL	Neep High 1.90 m – 06:05 Low 0.50 m- 12:22 High 1.80 m – 18:31	6 +, In Dock – St. Albans	Easterly wind, 3-5 m sea out of the inlet
25 Nov	07:35	16:28	BDE	Ship Cove, NL	Neep Low 0.50 m – 00:32 High 2.0 m- 06:56 Low 0.5 m – 13.11 High 1.8 m – 19:21	3 - 4	White peaks in shallower regions (Lower Bay)

Appendix Eight: Unidentified Wreck information

Details submitted to the shipwreck society by K Regular

NEWFOUNDLAND AND LABRADOR

ARCHAEOLOGICAL SITE RECORD FORM

*According to Newfoundland Regulation 143/91 "Archaeological Investigation Permit Regulations under The Historic Resources Act (O.C. 574-91) Section 11. (2)(a) an archaeologist is to submit within **30 days after expiration of Research Permit** completed Newfoundland and Labrador Archaeological Site Record Forms for all newly discovered sites and for all revisits to known sites*

USE YOUR MOUSE TO MOVE BETWEEN FIELDS

Permit Number _____ Permit Holder Regular, Kirk
Last name, First name

Site Name Unidentified Wreck

Borden Number _____ Ethnographic Number _____

Previous Recording Errors _____

Location Located on seafloor three nautical miles south of Francois.

Access Francois would be the closest port to access the wreck by boat. The wreck is three nautical miles south at 47° 31' 52.66" N, 56° 42' 52.10" W at a depth of 178m to the seabed and standing as much as six metres off the bottom.

Jurisdiction **Provincial** Federal Nunatsiavut Private Land Nearest Large Community Francois
Underline one

Major Drainage Atlantic Ocean Minor Drainage N/A

Map Reference NTS _____ UTM Military Grid _____

Latitude 47° 31' 52.66" N Longitude 56° 42' 52.10" W

Easting _____ Northing _____

GPS? **Yes** No | GPS Margin of Error 0.10m | Elevation 178 m bsl | Datum NAD1927 NAD1983 **WGS 84**

Underline one — Underline one

Air Photo Reference _____ | Other Map References _____ | CHS nautical chart 4826

Site Description: Site consists of what looks to be a sunken fishing trawler with the fish holds exposed.

Not a description of the physical geography of the area. Discuss what evidence indicates an archaeological site is present.

Culture(s): Euro-Newfoundland

Phase/Complex: Newfoundland

Site Type: Shipwreck | Features: shipwreck and artifacts

Specific site type should be listed for each Culture if the site is multi-cultural. — Specific features should be listed for each Culture if the site is multi-cultural.

Period Dates _____

Lab Dates: N/A | Site Size: 70 m x 18 m = 1260 m^2

Condition Assessment

Destroyed = no physical evidence of site remains
Fair = significant disturbance, some remains in-situ
Good = majority of site intact
Excellent = site is pristine, no disturbance
Undetermined = site condition not confirmed

Applies to areas of site not excavated- underline one

Additional Details
A size similar to a trawler with fish holds exposed on shipwreck.

Disturbance Assessment

Looting
Gardening
Construction
Trails (e.g. hiking, ATVs paths)
Tree Falls
Rising Sea Level
Flooded
Windblown
Coastal Erosion
Other (Please specify)
Site is too deep for divers, but could be identified with deep water ocean technology.

Underline all that apply

Risk Assessment: Yes **No** | Details (If Yes) _____

Underline one

Vegetation

Informant Name and Address: Regular, Kirk, Marine Institute, MUN
Last name, First name

Principal Researcher (s): Regular, Kirk
Last name, First name

Research Date(s): 11222023
MMDDYYYY numerics only

Archaeological Activity Conducted Under Current Permit:
Excavation: ___m X ___m = ____m2
Testing: number of test pits ____; size of test pits ___ cm X ___ cm
Trenching: size of area trenched ___m X ___m = ____m2
Surface Collection: size of area surface collected ___m X ___m = ____m2
Non-excavation Recording Activities (site mapping, **photography**, etc)
Other (Please specify): **multibeam sonar survey**
Complete or underline all that apply

Collection: none
Be as specific as possible, quantity & type

Collection Repository: N/A

Photo Records: N/A

Published References

Unpublished References

Remarks: While transiting between research sites on the south coast the vessel Conner Murphy was conducting a multibeam survey of the seabed and found a target on the seafloor. The vessel turned back to survey two more lines over the unidentified wreck to acquire more soundings of the site to create a better image of the wreck.

Site Record Form Completed By: Regular, Kirk
Last name, First name

Date: 11222023
MMDDYYYY numerics only

Figure 19: Approximate location of shipwreck.

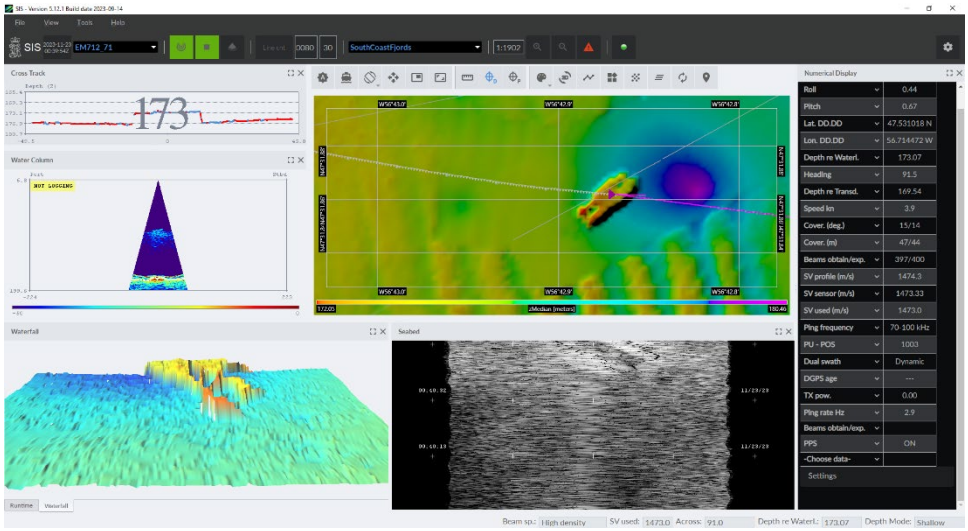

Figure 20: Screenshot of multibeam sonar passing over the shipwreck (from Conner Murphy).