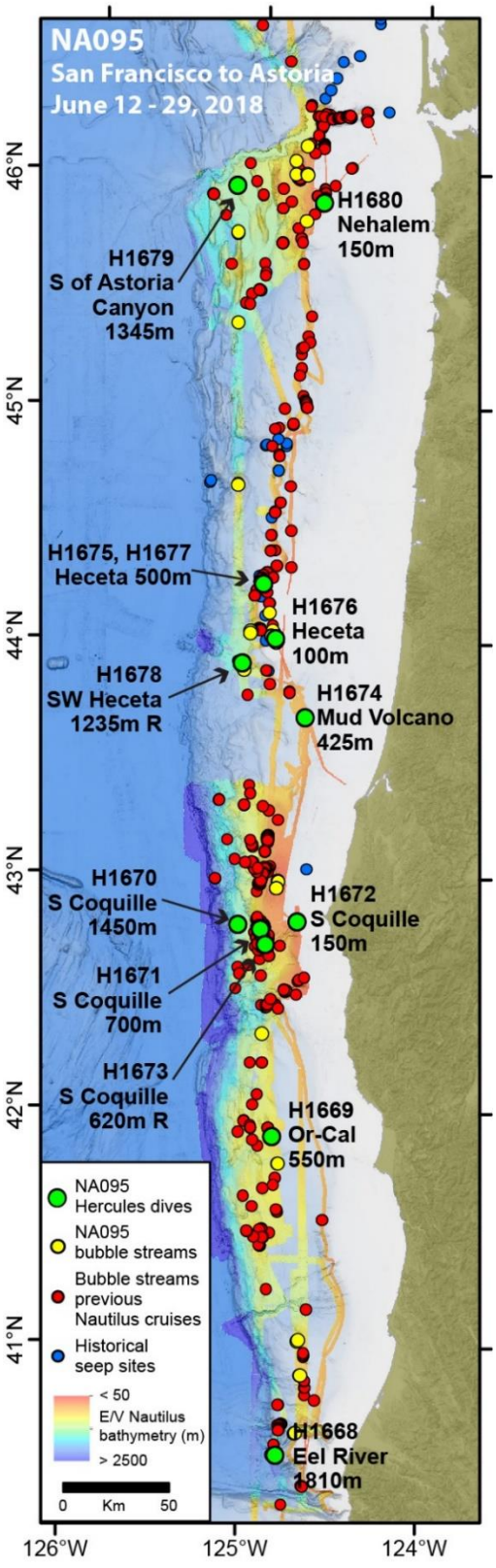
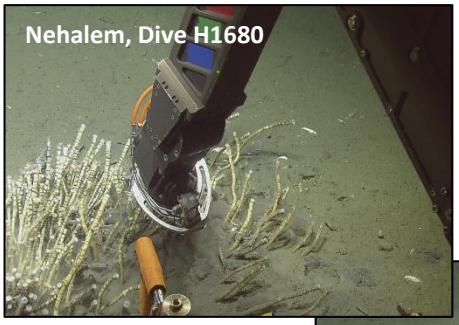
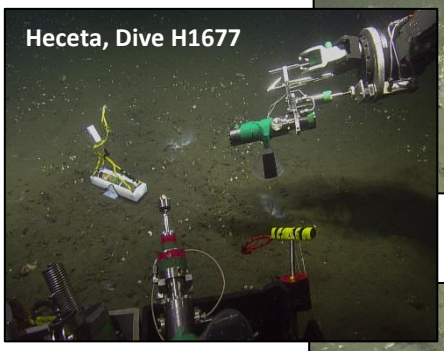
NA095 – Cascadia Margin

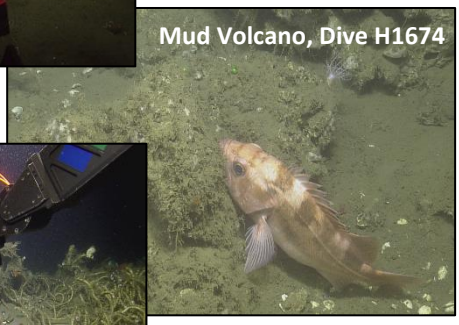
June 12-29, 2018 San Francisco, CA to Astoria, OR, USA

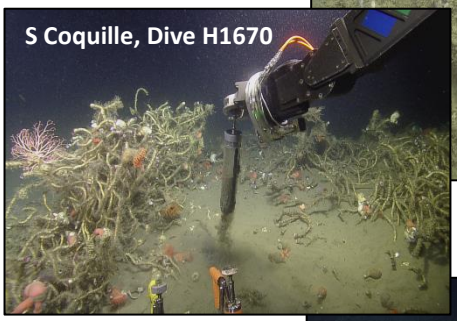
E/V *Nautilus* Captain Neil Myles; ROV *Hercules* Lead Pilot Bob Waters; Nicole Raineault Expedition Leader, Camilla Wilkinson (Cruise Report) and Tamara Baumberger Lead Scientist

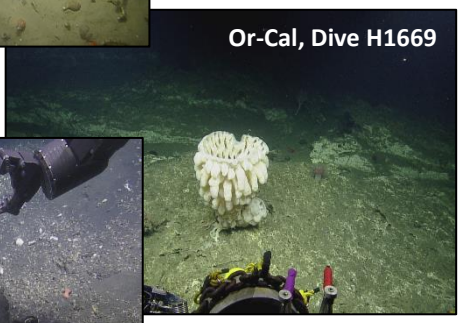


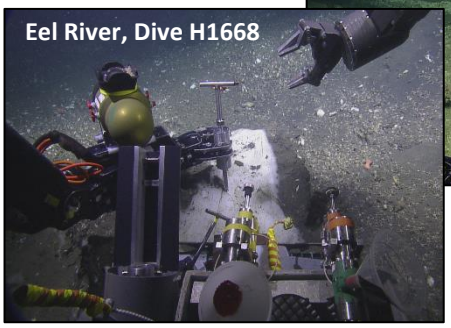












NA095 – The Cascadia Margin

E/V *Nautilus* and ROV *Hercules* are owned and operated by the Ocean Trust Inc. (OET). The expedition was collaborative between OET and the NOAA Ocean Exploration and Research Program.

Front Cover: Location map created by Susan G. Merle.

Table of Contents

Figure List:

Table List:

Part 1: An overview of E/V Nautilus Cruise NA095 "The Cascadia Margin'

Tamara Baumberger OSU CIMRS / NOAA PMEL

The NA095 (E/V *Nautilus*) cruise began in Mare Island, CA on June 12 and ended in Astoria on June 29 (Figure 1). The main focus of the cruise was extensive ROV surveys and sampling of methane seeps along the Oregon and Northern Californian Cascadia continental margin. Due to a ship engine failure, loading of the equipment on Mare Island was delayed by 3 days. Another delay of 1.5 days was caused by bad weather. During the waiting time, the E/V *Nautilus* was mostly at anchor in San Francisco Bay. Transit to the first site (Eel River) began on Saturday June 16 in the evening (about 5.30 pm PT) instead of Tuesday June 13 in the morning. Dive objectives for NA095 were: **1)** test the prototype of a gas-tight in-situ hydrate sampler (Dives H1668 and H1678); **2)** collect gas-tight bubble samples (all dives but H1677); **3)** collect samples for seep fluids, seep fauna and sediments (all dives but H1677); **4)** eDNA water column and fauna (all dives); **5)** evaluate the process for vertical flux for nutrients, trace metals and dissolved gases (all dives); **6)** collection of passive acoustic data (Dives H1675 and H1677); **7)** collect MAPR data (all dives), and **8)** explore large carbonate ridges (Dives H1669 and H1679).

NA095 involved collaborations at sea and on shore with NOAA Pacific Marine Environmental Laboratory (PMEL), University of Washington (UW) and Oregon State University (OSU). Nicole Raineault served as expedition leader, and Tamara Baumberger (at sea) and Bob Embley (ashore) were lead scientists. The expedition was funded by the NOAA Office of Ocean Exploration and Research (OER) and the Ocean Exploration Trust (OET). An undergraduate (Rebecca Crawford, OSU) and a graduate student (Sarah Seabrook, OSU) were part of the science team.

The exploration carried out during NA095 resulted in the characterization of twelve seep sites spread over a depth range from 100 m to 1810 m, located between 40° and 46° N. Nine of the seep sites had never been visited with an ROV before: Or-Cal 550 m, S. Coquille 150 m, S. Coquille 700 m, S. Coquille 1450 m, Mud Volcano 425 m, Heceta 500 m, Heceta 100 m, Astoria Canyon 1345 m and Nehalem 150 m. Two were repeat dives conducted during the E/V *Nautilus* expedition in 2016: Heceta 1235 m, S. Coquille 620 m. One site (Eel River 1810 m) is a known and well-studied seep site with exposed hydrate. The dive sites were chosen based on their location on the accretionary wedge focused on visiting sites at the same latitude over a large range of depths. This sampling strategy allowed for observation of the evolution of two seep sites over a 2-year time window and allowed identification of similarities and differences between seep sites with water depth/location on the accretionary wedge and latitude. Major working areas for depth comparisons were S. Coquille (Dives H1670 - H1673), Heceta (Dives H1675 – H1678) and Astoria/Nehalem (Dives H1679 and H1680).

A highlight of NA095 was the first use of a new hydrate sampler (designed and machined by Conrad Young, Ramona CA with input from John Lupton (NOAA PMEL) and Tamara Baumberger. During NA072 in 2016, samples of the Cascadia Margin bubble streams were

successfully obtained. However, the question remained as to whether the bubble streams at the upper limit of the hydrate stability zone are produced by the dissociation of hydrate, or instead represent free gas ascending through the sediment. Based on previous studies, the expectation is that comparison of the noble gas composition of the free gas versus the gas contained in hydrate will help to determine the origin of the gas bubble streams. Previous attempts to collect uncontaminated samples of hydrate have been unsuccessful due to air contamination and gas loss after sample collection. This motivated the development of a sampler, in which a small piece of hydrate gets hermetically sealed into a small gas-tight volume at the seafloor. As the ROV ascends to the sea surface, the decrease in pressure and increase in temperature will cause the hydrate to dissociate. The gas-tight design of the hydrate sampler allows us to retain sample integrity during the increase in gas pressure within the sampler as the hydrate dissociates. Once the hydrate sampler is back on deck, a high vacuum line is used for subsampling the gas phase without air contamination or gas loss. Two hydrate samples were successfully obtained and subsampled during NA095 (Eel River 1810 m – Dive H1668 and Heceta 1235 m – Dive H1678).

In addition, NA095 visited a feature with a distinct circular cone and a flat top previously identified as mud volcano based on its shape from bathymetry (Dive H1674). The revisited sites Heceta 1235 m (Dive H1678) and S. Coquille 620 m (Dive H1673) both showed changes in bubble activity and the associated ecosystem compared to 2016. A large pit with hydrate-coated walls and bubble streams was located at S. Coquille 700 m (Dive H1671). Vertical water column profiles above the seep sites gave indication for methane transport upwards into the shallow mixed layer. During NA095 an area of 3550 km^2 was mapped in 1515 line kilometers. Most of the mapping was conducted during transit between dive sites and for pre-dive surveys. There was time for one distinct survey close to Astoria before having to end operations and head to port. Several new bubbles streams were located during these mid-water surveys. Passive acoustic hydrophone data were collected at the site Heceta 500 m (Dives H1675 and 1677) for 29 hours (two tidal circles).

NA095 got attention in the news media. Journalists from the Daily Astorian (newspaper) and a photographer from the Oregon Stater (OSU Alumni Association) came aboard the *Nautilus* in Astoria on June 30 to collect information for an article. Tamara Baumberger and Susan Merle were also contacted by free-lance journalists publishing in EOS, National Geographic and Discover.

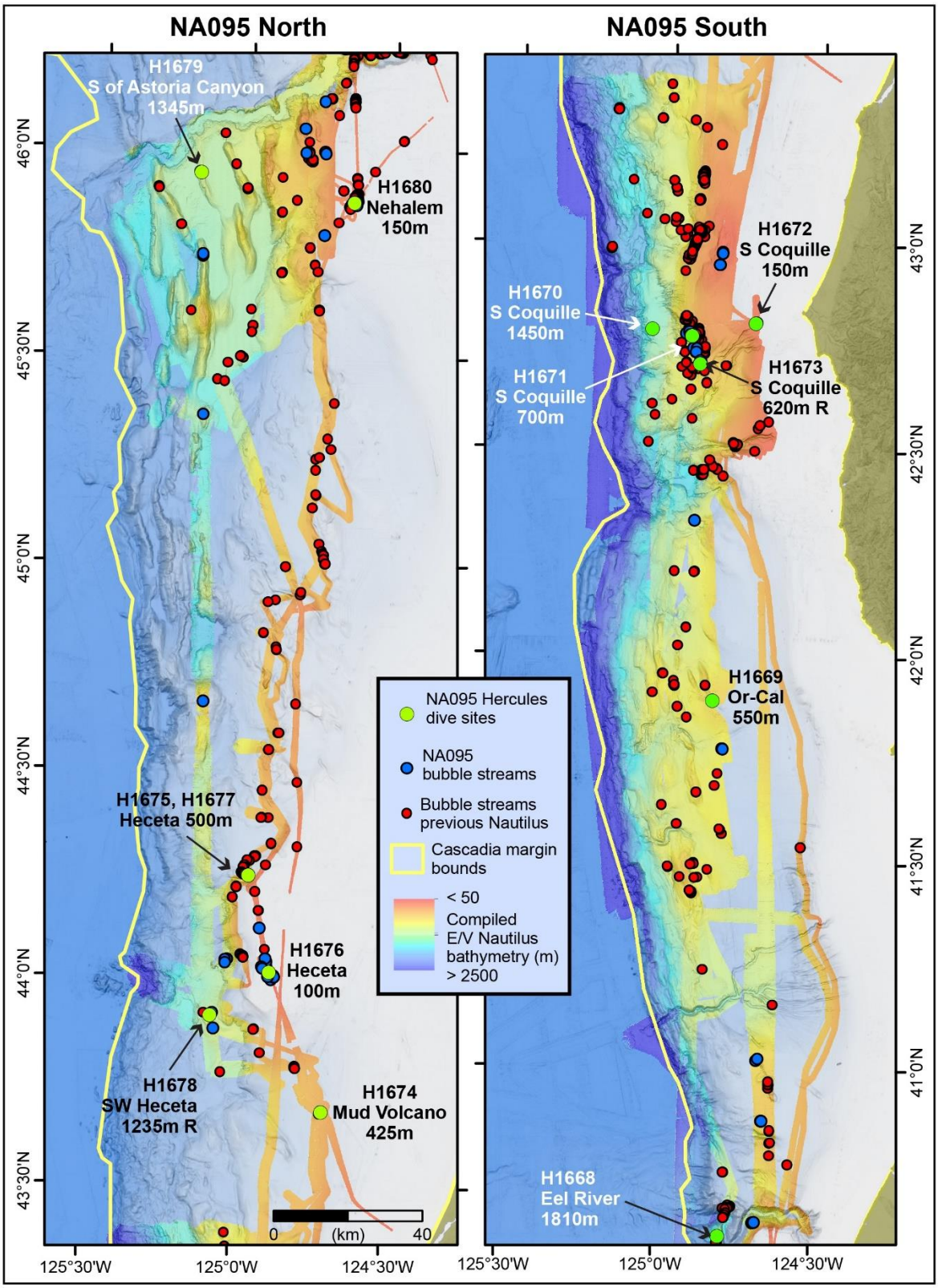


Figure 1. Locations of Hercules ROV dives and methane bubble streams found along the Cascadia Margin on NA095 with the E/V *Nautilus*' EM302 multibeam sonar system.

Preliminary Results and Observations:

Hydrate sampling: Two hydrate samples were successfully obtained and subsampled during NA095 (Eel River 1810 m – Dive H1668 and Heceta 1235 m – Dive H1678). Eel River was the very first site where the sampler was deployed and sampling was successful right away. A solid core of hydrate got collected from a large hydrate mound. The positions of the exposed hydrate were provided by Ed Peltzer (MBARI). The second opportunity to use the hydrate sampler was at a hydrate outcrop discovered during NA072 at Heceta in 2016. The hydrate was more difficult to access and only a few flakes where sampled. Gas composition analyses of both samples are ongoing in the shore-based laboratories of NOAA PMEL and UW.

Seep sites comparison with depth and latitude: Characterization of the bubble streams and the chemosynthetic seep ecosystem with depth and latitude was another important cruise goal. In particular, if the ecosystem changes over latitude or depth or a combination thereof. Seeps occur at all depths and at various geological settings. Bubble activity did not have a clear pattern regarding bubble flow rate and intensity with depth nor with latitude. The vent fauna showed some indication for variations with depth, such as tubeworms at deep seep sites and the absence of clams in the very shallow areas. The interaction between seep and non-seep communities varied. There was often a dominant non-seep community present at each seep, but these non-seep species varied. It has to be determined if there is a distinct pattern visible with location.

Seep evolution between 2016 and 2018: Two sites, which were located and visited in 2016, were revisited during NA095. Both sites showed an evolution of seepage and the associated ecosystem over the two years. At Heceta SW 1235 m, the bubble stream sampled in 2016 was not active anymore. The area still had traces from previous active seepage, but was now deserted. Active seepage in 2018 was located 40 m east of the 2016 bubble stream site, but right in the area where we sampled tubeworms, bacterial mats and clams in 2016. At Coquille SW 620 m, one site had a more extensive bacterial mat compared to 2016, but no bubble streams where they were sampled in 2016. The second site still had bubble streams with a constant high flow rate and the associated ecosystem. These observations show that the evolution of the seeps over time is variable, fast changing and that bubble streams are local. However, seepage was present in both years at all visited sites, even though not observed at the exact same location.

Tracking mantle helium input: During NA072 in 2016, mantle helium input in the cold seep gases was detected in samples collected at Coquille at a depth of 620 m. To investigate the chemical evolution of the Coquille site, a repeat dive was conducted at the same seep. In addition, 3 additional dives were conducted at the same latitude, but different depths (150 m, 700 m, and 1450 m). Noble gas analysis in the obtained bubble samples are ongoing.

Mud Volcano: A purely exploratory dive was conducted at a structure looking like a mud volcano. The morphology suggests that it was formed by a constructional process of over pressured fluidized sediment erupting from the seafloor. Climbing up the slope of the flat cone, carbonates and a bubble stream were observed. Sediment got sparser the closer to the top. The top of the cone was flat with gnarly carbonate structures. The carbonate structure was the habitat of many fish (rockfish, thornyhead, sablefish) and other fauna (sponge, coral, sunstar) – and home to abandoned fishing gear. A big field of bubble streams with small bubbles was located in the SE portion of the cone. No indication for mud eruptions were identified on the cone. All rock structures were carbonate. If this structure is a mud volcano, then it is really old. Alternatively, it could be a carbonate reef.

Carbonate Ridge: The base of the ridge had a thin cover of sediment and many flatfish and rockfish. Abandoned fishing gear was found on several places on the carbonate ridge showing that these carbonate grounds are important habitats for fish. All observed bubble streams were located along a crack, alongside the carbonate cap. The cracks were often over half a meter deep and about as wide. Diffuse methane flow in the crack was abundant as indicated by the presence of bacterial mats and clams. No bubble streams were observed on very top of the cap, but black crusted carbonates were dominant.

Passive acoustic survey: During NA072 in 2016, a deployed hydrophone recorded methane bubble streams rising from the seafloor at Heceta at 1228 m. The record quality was lowered by ship propeller and ROV noise. In 2018, the experiment was repeated at Heceta 500 m lasting for nearly two tidal circles. Background noise was avoided by working at a different site about 25 km away for the time of the hydrophone deployment.

Mid-water survey vs. seafloor seeps: Comparison of the bubble stream response on the multibeam sonar during mid-water surveys and the actual bubble stream at the survey show that even bubble streams with a low bubble flow rate can cause a strong signal on the multibeam. This is especially true for deep bubble streams within the hydrate stability field with hydrate skin formation around the bubble. Bubble stream locations identified based on the multibeam surveys were very accurate. However, a strong response on the sonar does not correspond with a high bubble flow rate at the seafloor. Future efforts in quantifications of bubble streams from multibeam sonar data are required.

Water column chemistry: Dissolved methane was observed in the shallow mixed layer at least at one location. Water column methane concentrations are highest right above the seep and decrease with height. The methane concentration at the Cascadia Margin at all locations was overall elevated compared to background concentrations measured in the Pacific Ocean.

Table 1. NA095 dive plan listing Hercules ROV dive locations, sites and times. All times are in UTC.

Dive	Latitude	Longitude	Depth (m)	NA095 Dive Site	On Bottom (Date; Time)	Off Bottom (Date; Time)
H1668	40.53543197	-124.783521	1828.8	Eel Canyon Hydrate	2018-06-18; 02:27:04	2018-06-18; 09:12:13
H1669	41.89992598	-124.8413903	684.7	Oregon-California (Or-Cal)	2018-06-19; 00:16:02	2018-06-19; 10:20:36
H1670	42.79305279	-125.0619564	1450.6	South Coquille	2018-06-19; 21:29:34	2018-06-20; 04:38:37
H1671	42.78059841	-124.9318802	724.8	South Coquille (Slope)	2018-06-20; 17:05:06	2018-06-21; 01:22:57
H1672	42.81039024	-124.721047	149.6	South Coquille (Shelf)	2018-06-21; 15:58:56	2018-06-22; 00:50:56
H1673	42.7129155	-124.901044	613.4	South Coquille 620R	2018-06-22; 16:03:15	2018-06-22; 22:39:51
H1674	43.678996	-124.7063385	477.9	Mud Volcano	2018-06-23; 16:49:24	2018-06-24; 00:54:16
H1675	44.2495603	-124.9577698	487.8	Heceta 500m	2018-06-24; 16:10:02	2018-06-24; 21:25:24
H1676	44.0169565	-124.879681	96.1	Heceta 100m	2018-06-25; 07:12:15	2018-06-25; 15:14:10
H1677	44.249314	-124.957053	486.4	Heceta 500mR	2018-06-25; 22:52:00	2018-06-25; 23:26:18
H1678	43.9114255	-125.0757085	1224.4	South west Heceta 1235mR	2018-06-26; 08:01:52	2018-06-26; 16:37:11
H1679	45.941517	-125.177801	1366.5	South Astoria Canyon	2018-06-27; 16:35:15	2018-06-28; 02:10:11
H1680	45.8736155	-124.645033	190.1	Nehalem Bank	2018-06-28; 11:19:48	2018-06-28; 22:25:31

R = Repeat dive

Dive Summaries:

Tamara Baumberger

H1668 Eel River 1810

The main objective for this dive was to test out the prototype of the hydrate sampler. Ed Peltzer from MBARI provided positions for exposed hydrates. The dive took place in a slide scar south of the Eel River Canyon at 1810 m water depth. Hydrate outcrops were located after a search of about 3 hours by locating the MBARI marker 1. The exposed hydrate was successfully sampled with the hydrate sampler. This was what looked like a hydrate mound with exposure of clear hydrate patches. Bubble streams were located later and sampled in a mini gas-tight. Two push cores were collected and clams were scooped. Three Niskin bottles were taken. One right about the sampling site, one 10 m above in the water column and one 50 m below the upper limit of the bubble stream plume (550 m).

H1669 OrCal – Oregon Californian border

The main objective of this dive was to traverse a carbonate ridge on a transform fault at 550 to 700 m water depth and sample a seep site on the carbonate cap. The base of the ridge had a thin cover of sediment and many flatfish and rockfish. Fishing gear was found in several places on the carbonate ridge. All bubble streams observed were located along a crack, alongside the carbonate cap. The cracks were often over half a meter deep and about as wide. Diffuse methane flow in the crack was abundant as indicated by the presence of bacterial mats and clams. Several bubble streams were observed on the NE of the cap and some in the S. No bubble streams observed on the very top of the cap. Black crusted carbonates were dominant on top of the cap. Two Niskin bottles were fired close to the seafloor and the remaining four in the water column for a chemical profile.

H1670 S. Coquille 1460

The main objective of this dive was to locate and sample a deep bubble stream and associated ecosystem at 1460 m water depth. Tubeworm bushes were detected right at the landing position. Clam beds and microbial mats were abundant too. The seep was patchy and spread over about 200 meters with no obvious seep center location. No bubble stream was located and thus no bubble samples obtained. Recovered the ROV early because a hydraulic fitting on the winch broke and led to an oil spill on deck. The winch was repaired within an hour and the ROV recovered immediately after the winch was working again. Two Niskin bottles were fired over seep sites. The rest came up empty because sampling on the way up after the winch incident was not allowed.

H1671 S. Coquille 700

The main objective of this dive was to located bubble streams, bacterial mats, and clams in an area of high backscatter. The first site was located with abundant bacterial mats and clam beds in a high backscatter area. Carbonate exposure was sparse. Mostly covered with at least 20 cm of sediment. No bubble streams were found in this area. After crossing a possible fault line towards the end of the dive, an about 4 meters long pit was discovered with vigorous bubble streams. The pit was about 2 meters deep and had a hydrate coated walls. The coating was possibly formed after the pit collapsed and released a high amount of methane. Three Niskins were taken close to the seafloor and 3 on the way up for chemistry.

H1672 S. Coquille 150

The main objective of this dive was to locate bubble streams and associated seep ecosystems on the Coquille shelf about 14 km off Cape Blanco. The visibility was very low. Lots of marine snow, likely due to input from land and/or upwelling. The dive covered 6 bubble streams located during the pre-dive multibeam survey. Four locations with bubble streams were found at the seafloor during the dive. They were all intermittent when first located. All completely shut off when trying to sample for gas. Bacterial mats were sparse. A few shell beds were present, but no live clams. The ROV was several times surrounded by krill that decreased visibility to zero. The krill would also stir up sediments and decrease the visibility even after the krill passed through. The ROV sonar was used to try locating bubble streams at about 8 m height in the water column. This method was not successful at this depth. The dive covered an area of high backscatter. Large areas of a hard substrate covered by only a few centimeters of sediments were observed. Likely carbonate. Basalt would be possible in this area too as it was very close to land. Niskin bottles on the ascent for chemical water column profile.

H1673 S. Coquille 620R

This is a repeat dive of dive H1521 from 2016. The ROV landed right next to seafloor marker 233 (sampling site in 2016). The bacterial mat was more abundant than 2 years ago. There were also extensive clam beds. No active bubble stream was detected at this site. The ROV then moved on to seafloor marker 288 (sampling site 2016). Four bubble streams were seeping from carbonate ground at this site. The bubble streams were constant with a high flow rate. There were extensive bacterial mats and clam beds. It was difficult to sample for push cores because of the hard substrate (basalt). When getting more into background sediment, sea stars were present. Many sablefish. A third seep area was detected west of the marker 288 site. There was one active bubble stream with intermittent burps. Interval was between a few seconds up to about 2 minutes. Niskin bottles for chemical profile in water column. Had to recover at 4 pm because wind and currents were picking up.

H1674 Mud Volcano 480

This was a purely exploratory dive to test if this is a mud volcano. The morphology suggests it was formed by a constructional process of over pressured fluidized sediment erupting from the seafloor. The dive started north of the high backscatter SW trending ridge. The ROV then moved to the NE along the ridge and down to the depression between ridge and mud volcano structure. The ridge was carbonated and three bubble streams were located on it. More sediments were present in the depression and circular bacterial mats and clam beds were sampled. More carbonates and a bubble stream was observed while climbing up the slope of the cone. The sediment became sparser and sparser the higher up the ROV climbed. The top of the cone was flat with gnarly carbonate structures. There were plenty of fish (rockfish, thornyhead, sablefish) and other fauna (sponge, coral, sunstar) – and fishing gear on top of the cone. A big field of bubble streams with small bubbles was located in the ESE area of the cone. This field likely showed up as a diffuse signal on the multibeam. The frequency of the bubble flows varied with occasional complete shut offs. No indication of mud eruptions on the cone. All rock structures were carbonate. If it is a mud volcano, then it is really old. Bob Embley thinks it might be a carbonate reef. Early recovery because of wind and currents picking up. Niskins on the way up for water column profile. Dive ended at about 6 pm.

H1675 Heceta Canyon Head 500

This dive was planned for 4 am, but was on hold until about 9 am because of high wind and currents. Main objectives were to deploy the hydrophone and to get samples for gas and fluid chemistry as well as biology. Numerous bubble streams were detected in this area, several of which may reach the sea surface as suggested from the mid-water sonar data. The dive started at a position where a tall and bright bubble stream was located during the pre-dive multibeam survey. Several smaller bubble streams were located at the seafloor in the area of the dive starting point, but all were not as intense as the sonar survey may have suggested. They were weak and many shut off as soon as the ROV landed/got close. On the lookout for a more vigorous bubble stream for the deployment of the hydrophone, the search continued and a site with 6 to 7 strong and intermittent bubble streams venting from sediment was located. The site was called Bubble Bonanza. This site was chosen for the deployment of the hydrophone and for gas sampling. The bubble stream sampled for gas was intermittent with burps of big bubbles every 1 to 2 minutes. Bacterial mats and clam beds were sampled to the east of the intense bubble site. At the end of the dive the ROV returned to Bubble Bonanza to get a duplicate gas sample. A carbonate was sampled right before the ascent started. Niskin bottles were triggered at 400, 300, 200 and 100 m depth for a chemical profile. Early recovery (about 15:00) because of wind and currents picking up again. Marker 214 was deployed.

H1676 Heceta Bank 100

The main objective for this dive was to investigate a shallow seep site at Heceta Bank. The pre-dive multibeam survey was very noisy. It was difficult to identify good targets for bubble

streams because so many fish obscured the midwater data. Several lines were run over the same area (200 % coverage) and pin-pointed three possible targets. The dive started at the three waypoints selected from the old data set. The seafloor was covered by rock debris, with some sediment beneath it. Possibly originating from the rocky slope seen on the bathymetry. Some carbonate deposits. No clams were observed; bacterial mats were sparse. Bubble streams often went along with the bacterial mats. Several bubble streams were located throughout the dive. All were intermittent, but quite strong for the short time slots when emitting bubbles. Two of these bubbles streams were sampled for gas. The first one took 1.5 hours to the funnel about half way. The second one took 40 minutes until there was enough gas to trigger the bottle. Many Canary rockfish were observed, possibly hundreds in the Argus camera, while sampling for gas. One rock was collected. A water column profile for chemistry was collected on the way up (100, 80, 60, 40, 20 m). During recovery, the HD camera cables got into the thruster and were fried. The ROV was repaired the same day. The hydrophone recovery dive was delayed for a few hours.

H1677 Heceta Canyon Head 500

The main objective of this dive was to pick up the hydrophone. The hydrophone was retrieved, some videos of the rising bubbles were taken and a water column profile for chemistry was obtained during ascent.

H1678 Heceta SW 1235R

This dive was a repeat dive from 2016 (H1520). Objectives were to resample for tubeworms, bacterial mats, clam beds, bubbles, and carbonates as well as collecting a second hydrate sample with the hydrate sampler prototype. A high rising bubble stream was detected during the pre-dive multibeam survey. This bubble stream was 40 m east of where bubbles were sampled in 2016, but right in the area where tubeworms, bacterial mats and clams were collected in 2016. The target from the multibeam survey was the starting point of the dive. The ROV landed close to tubeworms bushes surrounded by clam beds, and some bacterial mats. Several brittle stars were collected. Soon after, a line of many bubble streams was located. All had a strong and continuous bubble flow. The area was named Bubble Curtain. Two gas-tights were sampled from this area. Bubbles exited from flat black sediment. In addition, the following samples were taken: Two push cores with white and orange intermixed bacterial mat, one core close to tubeworms and one core close to clams; tubeworms; one major fluid sample from a bacterial mat utilizing the cap for 2 hours and 24 minutes. After collecting these samples, the ROV went a bit to the north, closer to where the carbonate outcrops were observed earlier, to look for exposed hydrate to sample. Exposed hydrate was located after some search, but it was not accessible for sampling. Just a few meters further along the wall, another hydrate outcrop was located. It was tricky to access for the ROV, but doable. The view on the sampler teeth was obscured during sampling, but some hydrate flakes rising from the sample area were observed during sampling. After, the marker from the 2016 bubble sampling site was collected and

relocated to the bubble curtain site. The 2016 bubble sampling site still had traces from previous active seeping, but had mostly died over the past two years. The currently active field is about 100 m in diameter. The ROV Kraft manipulator became tangled up in a rope at the end of the dive. Managed to get the rope off the manipulator before ascending. Niskin profile on the way up for chemistry.

H1679 Accretionary Ridge South of Astoria Canyon

The main objective of this dive was to explore the accretionary ridge, collect bubbles, bacterial mats, fauna, carbonate, and potentially hydrate. The dive started west of the northern summit where a faint bubble stream was detected in the 2016 multibeam dataset. No bubble stream was located on the seafloor at this location. The dive track then moved on to WP 3, the first location where a bubble stream was detected during the pre-dive multibeam survey. About three faint bubble streams were located at the seafloor surrounded by tubeworms, carbonates, bacterial mats and clams. Marker 282 was dropped at this location and the dive track moved on towards the northern summit. The overall area was characterized by carbonate deposits (some looked like conglomerates or filled with fossils - sampled), bacterial mats and tubeworms wherever it was slightly active. The tubeworms were often small bushes with no dead tubes. The dive track then moved downhill from the northern summit towards a depression. It was more sedimented in this depression, but was mostly inactive. WP 8 and WP 9 were two more areas with bubbles streams located in the pre-dive survey. The ROV followed a narrow carbonate ridge line (detected in the Argus camera) between the two waypoints. Many areas with bacterial mats and clam beds were present and some bubble streams were located and sampled and Marker 221 deployed. After sampling around WP 8 and exploring WP9, the dive returned to WP3 to sample bubbles, and for biology. The bubble streams at Marker 282 were much more intense and higher in numbers during this second visit. There were at least 7 bubble streams present during gas sampling. Seep fluid was sampled by using the cap over a bacterial mat for 12 minutes. Push coring was hampered by a very thin sediment layer (a few centimeters) over hard ground (likely carbonate). Site Marker 282 was sampled for tubeworms, clams, snails, anemones, seep fluid, gas and a seawater blank hydrate sample. Niskin bottles taken during ascent for chemical profile.

H1680 Nehalem 175 m

This was the last dive of the expedition. The objectives were to collect more shallow shelf gas samples, seep fluids, carbonates, sediments and fauna. The dive started on background sediments and a background Niskin sample was collected shortly after the dive started. The ROV then climbed up the western side of the fracture and bubble streams were soon located. A gas-tight sample was collected and NAV targets put in the system at sites of interests (bubbles, mats, carbonates, clams). Substrate was hard, with only a very thin sediment layer. Bacterial mats were very small and sparse. Two pushcores were collected in one of them. After 6 hours on the western side of the fracture, a water column transect was conducted to transit into the

fractured area at the bottom of the eastern slope. From there the ROV was climbing the eastern slope. Two more bubble streams were detected on this side as well as an area with orange and white mat. A bubble stream with bubbles emitted every 20 seconds was sampled and some clam shells and snails were collected too. The orange and white mat was sampled with a pushcore and a Niskin bottle as well as for seep fluids. A chemical profile on the ascent was collected at 170, 127, 80 and 50 m.

Figure 2. NA095 scientific personnel at Sea.

Table 2. Scientific participants at Sea.

Name	Role	Affiliation
Nicole Raineault	Expedition Leader	OET
Tamara Baumberger	Lead Scientist	NOAA PMEL / OSU
Susan Merle	Scientist/Mapping Specialist	NOAA PMEL / OSU
Camilla Wilkinson	Scientist	NOAA PMEL / OSU
Nathan Buck	Scientist	NOAA PMEL / UW
Kevin Roe	Scientist	NOAA PMEL / UW
Rebecca Crawford	Scientist	OSU
Jamie Wagner	Science Manager	Duke University
Sarah Seabrook	Science Manager in Training	Oregon State University
Ally Aplin	Science Intern	UCSB
Renato Kane	Lead Navigator/Mapper	OET
Miles Saunders	Lead Navigator/Mapper	OET
Kate Von Krusenstiern	Navigator/Mapper	UNH-CCOM
Lindsay Gee	Mapping Coordinator	OET
Kyle Neumann	Lead Video Engineer	OET
Amber Giacone	Video Engineer	OET
Oscar Estrada Torrejon	Video Intern	Rochester Institute of Technology
Josh Chernov	Lead ROV Engineer (Hercules)	OET
Bob Waters	ROV Engineer (Hercules)	OET
Michael Hannaford	ROV Engineer (Hercules)	OET

Table 2. cont. Scientific participants at Sea.

Name	Role	Affiliation
Gabrielle Inglis	ROV Engineer (Argus)	OET
Patrick Madaus	ROV Intern (Argus)	University of Connecticut
Leonardo Castro Sitiriche	ROV Intern (Argus)	University of Puerto Rico
Mark DeRoche	Deck Chief	OET
Ethan Gold	Data Engineer	OET
Samantha Wishnak	Digital Media Coordinator	OET
Marty Momsen	Lead Science Communication Fellow	Houston Public School
Cassi Weathersbee	Science Communication Fellow	Prince William County Public Schools
Savanna Nilsen	Science Communication Fellow	Sterne School

Table 3. Operations Log.

Date (UTC)	Time (UTC*)	Operation
7/16/2018	23:30:00	Departed San Francisco Bay, CA USA. Transit to first dive site
7/18/2018	0:56:16	Commencing **dive H1668** at a slump block near Eel River, previously visited by EMBARI, to sample methane hydrate with the new hydrate sampler; pushcore, fauna, GT, and water samples were also taken near seep area with bubble streams
7/18/2018	11:57:17	Argus and Hercules ROV back on deck
7/18/2018	23:44:03	Commencing **dive H1669** at the Oregon-California border on a NW-SE trending ridge with high backscatter, expected to be a carbonate feature. Rock samples (carbonates), fauna, and Niskin samples were taken. Gas tight and major samples were attempted
7/19/2018	11:26:57	Argus and Hercules ROV back on deck
7/19/2018	20:33:16	Commencing **dive H1670** at a deep site (1455 m) at Coquille South on a large seep. Pushcores, Niskins, majors, clams, tubeworms, and other fauna samples were taken around seep microbial mats
7/20/2018	7:27:53	Argus and Hercules ROV back on deck
7/20/2018	16:25:27	Commencing **dive H1671** at SW of Coquille bank in ~700 m water, where there is a fault scarp and a high concentration of bubble plumes; exploration of the bubble streams, and collection of (for microbiology, chemistry, and fauna analyses) gas-tights, pushcores, majors, Niskins
7/20/2018	2:33:27	Argus and Hercules ROV back on deck
7/21/2018	15:34:43	Commencing **dive H1672** SW of Coquille bank at 150+ m depth to locate bubble plumes seen on multibeam surveys; look for microbial mat, clam beds, and bubble streams to sample with gas-tights, cores, majors, Niskins, and representative fauna
7/22/2018	1:29:17	Argus and Hercules ROV back on deck
7/22/2018	15:33:57	Commencing **dive H1673** at SW Coquille ~620 m, revisiting a seep site from 2016 dive H1521; look for seafloor marker 233, marker 288, and bubble plumes; sample bubbles, fluids, sediments, and fauna using gas-tights, Niskins, and pushcores
7/22/2018	23:16:37	Argus and Hercules ROV back on deck
7/23/2018	16:25:40	Commencing **dive H1674** on a mud volcano between Coquille and Heceta Banks, from base (480 m) to summit (420 m); look for evidence of seeps and bubble streams, sampling bubbles, fluids, microbial mats, sediment, and representative fauna and rocks.
7/24/2018	1:59:00	Argus and Hercules ROV back on deck
7/24/2018	15:42:23	Commencing **dive H1675** on Heceta Bank canyon head 500 m area of numerous bubble plumes, some of which may reach the surface; deploy hydrophone near vigorous bubble stream; collect gas, fluid, sediment, and representative biological and geological samples when possible.
7/24/2018	18:21:00	**Deployment of the hydrophone**
7/24/2018	22:13:09	Argus and Hercules ROV back on deck

Table 3. cont. Operations Log

Date (UTC)	Time (UTC*)	Operation
7/25/2018	7:02:17	Commencing **dive H1676** on Heceta Bank 100 m site to investigate a small field of bubble streams that stretched 60 m north to south in multibeam return. Found a rocky bottom with many erratic boulders and carbonate mounds. A multitude of rockfish were present at this site and several bubble streams were discovered. Two gas-tights, a rock sample, and Niskins were collected.
7/25/2018	16:02:59	Argus and Hercules ROV back on deck
7/25/2018	22:24:20	Commencing **dive H1677** to revisit Heceta Bank canyon head 500 m area to recover hydrophone deployed on H1675 next to seafloor maker-214; Niskin samples were acquired on the ascent.
7/25/2018	23:23:00	**Recovery of hydrophone**
7/26/2018	0:23:03	Argus and Hercules ROV back on deck
7/26/2018	7:11:47	commencing **dive H1678** to revisit Heceta SW 1235mR, from the *Nautilus* 2016 cruise, to look for methane seeps and collect gas samples, push cores, fluids, hydrates, clams, and other representative biology.
7/26/2018	18:48:35	Argus and Hercules ROV back on deck
7/27/2018	15:39:59	Commencing **dive H1679** on accretionary ridge south of Astoria Canyon, looking for bubble streams seen in NA095 multibeam data; when seeps located, collect gas, fluids, sediments, possibly hydrate, and representative fauna and rocks.
7/28/2018	4:13:43	Argus and Hercules ROV back on deck
7/28/2018	11:05:00	Commencing **dive H1680** at Nehalem Bank at approximately 150 m; looking for bubble streams and surrounding biota, to collect gas-tight samples, push cores for fauna and microbiology, majors and Niskins for chemistry, and other representative biology and geology.
7/28/2018	22:57:01	Argus and Hercules ROV back on deck
7/29/2018	8:52:43	Offshore Astoria Canyon. Multibeam mapping, sub-bottom profiling, XBT and packing up science equipment
7/29/2018	20:30:00	Cruise ends. E/V *Nautilus* arrives at Port of Astoria, OR USA

***** *Coordinated Universal Time (UTC) is 7 hours ahead of Pacific Time (PT)*

Note: Multibeam seafloor and water column surveys were conducted on transits between dive sites and pre-dive to determine the level of bubble stream activity on the seafloor.

Part 2: Data archiving and dissemination, sample information, scientists ashore, multibeam bathymetric collection and data processing

Nicole Raineault, OET

Data Archiving and Dissemination:

The Ocean Exploration Trust partnered with the Pacific Marine Environmental Lab on a NOAA OER-funded expedition. As an Applied Exploration cruise OET meets the Public Access to Research Results (PARR) requirements by making cruise data publically accessible through inclusion in national databases. We strive to collect data in a way that will be useful to scientists decades after a cruise. Digital, video, and sample data (including oceanographic sensor data, HD video and images, observational notes, mapping and navigation data) collected aboard *Nautilus* are essential to a successful expedition and are collected to fit widely accepted standards for archival purposes.

Data are logged, aggregated, processed, and quadruplicated by automated scripts. These data types are categorized as primary (raw) and secondary (processed), or video. Video is archived separately due to the high volume and specialized equipment required. A subset of the raw primary data types is streamed home live for monitoring and processing. A mirror copy of the software that produces secondary products on the ship is simultaneously running on shore to reproduce some secondary products for off-ship consumption with low bandwidth requirements.

A critical component of our exploration is sharing the data with others for use in research and education and to aid in scientific grant writing. The dataset-of-record is carried home from the ship at the end of each cruise, and ingested into the shore-side fileserver and video Quality Control queue. Data subsets are shared offsite on request via webserver or physical hard drives for large packages. Video is delivered to clients on custom-assembled RAID units. Cruise and data request information is available via the NOAA Digital Ocean Atlas. Currently scientists can request data and video via an electronic request form. Video delivery typically takes up to two months and has a nominal cost associated with it. The data is currently being ingested in the Rolling Deck to Repository (R2R). R2R routinely catalogs and deposits data in long-term public archives, including the NOAA National Centers for Environmental Information (NCEI).

Sample Information:

The science team collected representative samples of biology and geology for the benefit of the scientific community at large, as well as specimens and samples for their own research. OET makes physical samples, available to all researchers through archival institutions that provide access to samples. We currently send all biological samples to Harvard University's Museum of Comparative Zoology and all geological samples to the Marine Geological Samples Lab at the University of Rhode Island. For more information about our repositories, to view the collections, or make a request please visit the web pages of the repositories:

Geological Samples: http://www.ngdc.noaa.gov/mgg/curator/curator.html

Biological Samples: http://mczbase.mcz.harvard.edu/SpecimenSearch.cfm

71 individual samples were taken on this cruise. Many were subsampled for a total of 333 samples. 35 are biological specimens, 25 are rocks, 6 are gas tights, 6 major, 2 hydrate, 48 Niskin samples, 171 sediment core, and 4 scoops.

Scientists Ashore:

The Scientist Ashore Program is a network of scientists around the world who are interested in participating in our exploration live from home. Since 2013, *Nautilus* has formally recruited shoreside scientists in cruises via a sign-up on the Ocean Exploration Trust Scientists Ashore webpage. Dr. Robert Embley was the lead scientist ashore for this cruise. 94 scientists signed up as shoreside participants for this expedition.19 scientists actively participated from shore during this cruise through our web-based ChatLog system, which allows shoreside scientists to communicate with the watchstanding scientists. The ChatLog is archived as cruise data so that shoreside expertise can be used in post-cruise data analysis. To improve the ability of scientists to follow along on shore the Inner Space Center posted archives of each dive on YouTube to allow post-dive viewing.

Table 4. Scientists Ashore Participants.

David Butterfield	University of Washington & NOAA PMEL
Elizabeth Clarke	NOAA Northwest Fisheries Science Center
Ray Colby	Makah Tribe
Robert Embley	CIMRS, Oregon State University
Meredith Everett	NOAA Northwest Fisheries Science Center
Erica Fruh	NOAA Fisheries
Thomas Hansknecht	Independent Researcher
Christopher Kelley	University of Hawaii
Tom Laidig	NMFS, Santa Cruz
Lisa Levin	Scripps Institution of Oceanography
Crispin Little	University of Leeds
John Lupton	NOAA Pacific Marine Environmental Laboratory
Dean Pentcheff	Natural History Museum of Los Angeles County
Abigail Powell	NOAA Northwest Fisheries Science Center
Kenneth Sulak	U.S. Geological Survey, Gainesville, FL
Andrew Thurber	Oregon State University
Janet Watt	U.S. Geological Survey
Curt Whitmire	NOAA Northwest Fisheries Science Center
Mary Wicksten	Texas A&M University

Part 3: Mapping Data Collection, Processing and Analysis

Lindsay Gee, OET

E/V Nautilus collected seafloor mapping data during the cruise with the Kongsberg EM302 30kHz multibeam sonar and Knudsen 320M 3.5 and 15kHz sub-bottom profiler for the shallow sub-surface geology. The EM302 was used to collect bathymetry, backscatter and water column data throughout the cruise and 3,525 km^2 of the seafloor was mapped in depths ranging from 70 m to 2,500 m. A Seapath 330 with an MRU 5 motion reference unit was used to measure instantaneous heave, attitude and position. The Seapath was directly interfaced to the EM302 to compensate for pitch, roll, heave and yaw in real-time and these data were recorded by the SIS software controlling the EM302.

Nautilus has a number of options for observing sound speed profiles (SSP) to support EM302 multibeam mapping and uses the HydrOffice Sound Speed Manager (SSM) to manage the profiles, process the various observation, transmit to SIS and archive the data. During NA095 observations were recorded using the Sippican XBT, Oceanscience UCTD and the Seabird CTD on ascent from *ROV Hercules* dives. All observations were extended to full depth using the World Ocean Atlas in the SSM.

Raw data files collected during the cruise included:

- EM302.all (bathymetry, seafloor backscatter, position, attitude and runtime setting),
- EM302.wcd (full beam time series water column data),
- EM302.asvp and .abs files (sound speed and absorption data),
- XBT.edf and .rdf files (temperature/depth profile),
- UCTD.asc files (temperature, salinity and depth profile),
- ROV CTD.tsv files (temperature, salinity and depth profile sampled for SSM),
- 320M SBP.keb, .kea and .sgy files (sub-bottom files).

The multibeam data were processed onboard to remove outliers and generate products for dive planning and final cruise products using the QPS Qimera and Fledermaus software. The survey was acquired to the instantaneous water surface and no vertical or tidal corrections were applied. Processing was undertaken in different modules of software:

- Bathymetry (Qimera for cleaning and products, Fledermaus for integration of data and products),
- Backscatter (FMGT processing mosaic generation from GSF files exported from Qimera),
- Water-column (FM Midwater for location of seeps, Qimera for seep localization, Fledermaus for data integration).

The processed data files and products generated during the cruise included:

- GSF files (cleaned bathymetry and seafloor backscatter data),
- Images geotiff files (sun-illuminated bathymetry and gray-scale backscatter mosaic),
- KML files (bathymetry and backscatter data),
- Reports.pdf (overview map of each survey),
- SD files (Fledermaus bathymetry and backscatter data),
- ArcGIS.shp (areal coverage of each survey),
- Surfaces FP geotiff files (bathymetry and backscatter data),
- Water-column .ods, .xlsx, .sd and .tif files (WC contact locations and images),
- Profile files .csv, .kml, .asvp, .caris and .unb (SSM export of processed SVP data),
- No onboard processing or products from sub-bottom data.

Nautilus has carried out a number of surveys on the Cascadia Margin over the past few years, and the ROV dives planned on NA095 were mostly based around seeps located during those cruises. NA095 had two main modes of mapping:

- Re-mapping of ROV sites to confirm that seeps were active and establishing the best estimated seep positions to support the dives, and
- Mapping areas that had not been mapped by multibeam to acquire bathymetry, backscatter and water column data.

Seeps were present in all locations identified on previous cruises and their initial detection was identified in the FM Midwater tool. However, this tool does not fully refract the geo-picked locations, and depending on their location in the swath this can induce errors of tens of meters in position. Once the seeps had been detected, an improved and refracted position was obtained from the swath editor in Qimera, where a sounding was selected from the water column view where the seep was estimated to exit the seabed. The backscatter data was processed in parallel and variations in intensity from areas of bacterial mats and carbonate assisted in localizing the seeps.

To further improve the estimated position *Nautilus* ran two orthogonal lines over the seep locations. The average position from selected sounding position from the two lines was used as the ROV dive target. This approach reduced ROV search time and it is estimated that seeps were located by the ROV to within 5 m to 10 m of the mapped position, in depths over 1,000 m.

All other mapping, to fill in gaps in coverage, was conducted with the EM302, and lines planned at 75-100 % overlap and the multibeam swatch coverage set to 65 degrees. As noted above, the bathymetry was cleaned onboard, and final grids and clean data products were generated. The exported cleaned GSF files were used in the generation of the final backscatter mosaic for each area mapped. All multibeam water column data was reviewed onboard in FM Midwater and a spreadsheet generated of all seeps detected. There were 91 seep locations detected and these ranged from a single flare to multiple flares in the same location. This number also includes some previous flares that were re-mapped in preparation for ROV dives.

Table 5: NA095 water column data multibeam flares observed on NA095

Longitude	Latitude	Depth	Rise	Pos type	Description
-124.784794	40.540514	-1848.7	408.59	beam fan	
-124.784573	40.536222	-1803.95	1430.15	beam fan	
-124.800701	40.537145	-2064.16	1215.52	beam fan	
-124.676484	40.628154	-870.69	-441.94	beam fan	paired flare with 000B/C
-124.673671	40.629878	-822.54	-408.94	beam fan	paired flare with 000A/C
-124.671258	40.629297	-779.85	-361	beam fan	paired flare with 000A/B
-124.654382	40.875484	-647.3	-298.25	beam fan	adjacent to 001B
-124.651846	40.876169	-631.5	-331.07	beam fan	adjacent to 001A
-124.672837	41.021052	-712.42	-288.83	beam fan	adjacent to 002B
-124.667596	41.025985	-700.26	-401.48	beam fan	adjacent to 002A
-124.802822	41.777704	-835.53	-371.21	beam fan	paired flare with 009B
-124.799625	41.776900	-854.25	-441.12	beam fan	paired flare with 009A
-124.837748	41.893620	-539.11	-223.29	beam fan	hard to different bottom position
-124.907943	42.329867	-1071.04	-498.73	beam fan	
-124.947207	42.783502	-792.73	-389.86	beam fan	
-124.938223	42.788084	-765.82	-399.97	beam fan	
-124.934913	42.779808	-732.89	-345.65	beam fan	
-124.927084	42.776163	-704.45	359.98	beam fan	
-124.924449	42.774566	-698.81	261.42	beam fan	
-124.922770	42.748228	-711.75	312.95	beam fan	
-124.911961	42.747088	-607.71	249.85	beam fan	
-124.913892	42.738318	-587.13	248.35	beam fan	
-124.899326	42.718254	-593.61	186.39	beam fan	
-124.899755	42.710817	-606.66	206.47	beam fan	large double seeps
-124.901057	42.710984	-610.89	459.28	beam fan	large double seeps
-124.714721	42.811724	-144.89	-45.77	beam fan	faint seep
-124.832220	42.982321	-128.49	-30.04	beam fan	faint flare
-124.832749	42.978792	-128.69	-28.4	beam fan	faint flare, paired with 022B
-124.831898	42.978930	-127.37	-28.78	beam fan	paired with 022C

Table 5 cont. NA095 water column data multibeam flares observed on NA095

Longitude	Latitude	Depth	Rise	Pos type	Description
-124.841738	42.951099	-130.08	-44.75	beam fan	four flares
-124.841346	42.951073	-129.5	-67.73	beam fan	four flares
-124.841018	42.950775	-128.5	-60.05	beam fan	four flares
-124.840742	42.950818	-128.58	-59.67	beam fan	four flares
-124.899191	42.717650	-598.57	-546.76	beam fan	paired with 051B
-124.899437	42.718016	-603.84	-232.84	beam fan	paired with 051A
-124.902821	42.709987	-623.32	-210.68	beam fan	paired with 053B
-124.898779	42.710141	-607.35	-265.22	beam fan	paired with 053A
-124.897220	42.712528	-596.31	-168.36	beam fan	faint seep, see .jpg
-124.697343	43.682183	-422.18	-330.11	beam fan	mud volcano?
-124.697810	43.682404	-422.68	-252.31	beam fan	mud volcano?
-124.957142	44.249491	-495.57	-287.83	beam fan	brightest flare of the six
-124.956153	44.249067	-490.61	-112.24	beam fan	group of six flares
-124.955768	44.249103	-490.61	-129.58	beam fan	group of six flares
-124.958024	44.249731	-495.43	-183.96	beam fan	group of six flares
-124.958045	44.248767	-499.91	-102.2	beam fan	group of six flares
-124.959964	44.248913	-497.38	-132.32	beam fan	faintest fair of the 078 group, away from main group
-124.915832	44.122946	-168.65	-14.11	beam fan	could be fish
-124.891370	44.041693	-131.23	-35.2	beam fan	fish or flare
-124.871481	44.003462	-83.74	-39.92	beam fan	
-124.872855	43.998131	-85.99	-57.7	beam fan	
-124.883137	44.016191	-105.48	-52.85	beam fan	
-124.894430	44.048647	-138.87	-44.21	beam fan	faint flare
-124.866226	44.008216	-82.58	-33.36	beam fan	faint flare
-124.864416	44.005858	-79.55	-44.19	beam fan	
-124.864561	44.005040	-81.74	-27.74	beam fan	scant, thin flare rising hide in the WC
-124.864199	44.005137	-82.88	-28.87	beam fan	shorter flare associated with 094C
-124.884093	44.005899	-98.55	-46.68	beam fan	paired flare with 0096B
-124.884022	44.005920	-98.8	-48.95	beam fan	paired flare with 0096A
-124.905273	44.028797	-132.49	-60.5	beam fan	faint flare
-124.902458	44.024983	-130.57	-58.68	beam fan	paired with 098C
-124.901899	44.025158	-129.79	-76.84	beam fan	paired with 098B
-125.021939	44.046878	-1086.83	-581.4	beam fan	Nadir Flare
-125.027747	44.045747	-1067.8	-619.99	beam fan	faint flare
-125.027198	44.037824	-1136.08	-626.68	beam fan	Nadir Flare
-125.061939	43.879003	-1040.09	-348.09	beam fan	faint flare – sidelobe
-125.076381	43.910849	-1250	-618	beam fan	Nadir Flare
-125.066707	43.917146	-1232	-613	beam fan	faint flare

Table 5 cont. NA095 water column data multibeam flares observed on NA095

Longitude	Latitude	Depth	Rise	Pos type	Description
-125.123336	44.666506	-662.18	-296.19	beam fan	
-125.147256	45.358105	-1230.33	-606.9	beam fan	R side lobe; possibly 2 flares in map view
-125.161588	45.741353	-1239.44	-547.21	beam fan	relation to 14B?
-125.162469	45.745188	-1199.94	-486.17	beam fan	relation to 14A?
-125.175656	45.941400	-1365.33	-743.24	beam fan	separate flare from 0017B
-125.177876	45.942176	-1362.06	-484.98	beam fan	separate flare from 0017A
-125.178783	45.943078	-1366.51	-663.62	beam fan	relation to 19B?
-125.176152	45.941700	-1356.43	-711.87	beam fan	relation to 19A?
-125.175239	45.941834	-1364.78	-708.3	beam fan	same as 19a?
-125.177272	45.943298	-1361.96	-567.54	beam fan	
-124.644427	45.875233	-192.9	73.73	beam fan	
-124.644918	45.875538	-193.87	88.06	beam fan	
-124.637278	45.869692	-178.27	87.76	beam fan	
-124.635469	45.873066	-186.39	101.01	beam fan	
-124.640083	45.877534	-185.68	97.54	beam fan	multiple inside lobe
-124.643422	45.877438	-183.74	50.73	beam fan	
-124.647892	45.876689	-196.14	89.99	beam fan	
-124.644977	45.875446	-192.35	92.24	beam fan	
-124.644500	45.874545	-194.74	69.75	beam fan	
-124.638750	45.870103	-184.5	60.52	beam fan	
-124.638191	45.870895	-185.55	91.91	beam fan	multiple faint flares
-124.637388	45.869682	-178.2	58.4	beam fan	
-124.637448	45.869049	-176.42	83.99	beam fan	
-124.814189	45.993451	-496.64	316.56	beam fan	multiple flares picked center
-124.818430	46.051494	-302.15	121.06	beam fan	Weak flare
-124.745485	45.795074	-393.96	145.46	beam fan	diffuse seeps
-124.748574	45.996634	-356.33	142.72	beam fan	Flare in sidelobe
-124.751091	46.117706	-503.22	163.24	beam fan	
-124.745937	45.991980	-334.94	150.63	beam fan	Large diffuse flares in sidelobe
-124.784491	40.53575	-1796			H1668 Quimera diveplan pick
-125.062272	42.792518	-1438			H1670 Quimera diveplan pick
-124.721586	42.81059	-150			H1672 Quimera diveplan pick
-124.721569	42.810591	-151			H1672 Quimera diveplan pick
-124.721466	42.810854	-150			H1672 Quimera diveplan pick
-124.721088	42.810644	-149			H1672 Quimera diveplan pick
-124.720401	42.810527	-150			H1672 Quimera diveplan pick
-124.718713	42.810841	-142			H1672 Quimera diveplan pick
-124.900528	42.712508	-614			H1673 Quimera diveplan pick

Table 5 cont. NA095 water column data multibeam flares observed on NA095

Longitude	Latitude	Depth	Rise	Pos type	Description
-124.900959	42.710703	-615			H1673 Quimera diveplan pick
-124.89956	42.710439	-608			H1673 Quimera diveplan pick
-124.7033872	43.67660662	-450			H1674 Quimera diveplan pick
-124.7011617	43.6789955	-465			H1674 Quimera diveplan pick
-124.957059	44.249867	-494			H1675 Quimera diveplan pick
-124.95789	44.249741	-496			H1675 Quimera diveplan pick
-124.956172	44.249432	-489			H1675 Quimera diveplan pick
-124.955687	44.249175	-488			H1675 Quimera diveplan pick
-124.957901	44.248702	-497			H1675 Quimera diveplan pick
-124.956837	44.248273	-493			H1675 Quimera diveplan pick
-124.955587	44.247653	-491			H1675 Quimera diveplan pick
-124.959832	44.248971	-497			H1675 Quimera diveplan pick
-124.883244	44.016296	-105.3			H1676 Quimera diveplan pick
-124.882991	44.016916	-104.31			H1676 Quimera diveplan pick
-124.877987	44.016364	-100.04			H1676 Quimera diveplan pick
-124.95747	44.249652				H1677 Hypack seafloor bubbles - 6 streams - hydrophone
-124.957444	44.249815				H1677 Hypack seafloor bubbles
-124.958038	44.249865				H1677 Hypack seafloor bubbles
-124.95719	44.249851				H1677 Hypack seafloor bubbles
-125.0756955	43.9108284	-1216			H1678 Quimera diveplan pick
-125.0757309	43.9108331	-1216			H1678 Quimera diveplan pick
-125.178085	45.94319	-1332			H1679 Quimera diveplan pick
-125.175767	45.941908	-1340			H1679 Quimera diveplan pick
-125.175077	45.941886	-1339			H1679 Quimera diveplan pick
-124.644482	45.8745				H1680 Quimera diveplan pick
-124.644462	45.875192				H1680 Quimera diveplan pick
-124.644988	45.875419				H1680 Quimera diveplan pick
-124.643433	45.877521				H1680 Quimera diveplan pick
-124.640219	45.877546				H1680 Quimera diveplan pick
-124.638119	45.870896				H1680 Quimera diveplan pick
-124.63869	45.870079				H1680 Quimera diveplan pick
-124.637287	45.869707				H1680 Quimera diveplan pick
-124.637316	45.868973				H1680 Quimera diveplan pick

Part 4: Gas-tight and Hydrate Sampling

Camilla M. Wilkinson, CIMRS Oregon State University/NOAA EOI

Gas-tight bubble sampling:

In order to determine the noble gas composition of bubbles escaping along the Cascadia Margin, we have collected samples from multiple bubble streams. Gas samples were collected using titanium alloy gas-tight bottles. Samples taken at a depth greater than 1000 m were collected in 'mini' 10 ml volume bottles. All other samples were collected in the standard ca. 150 ml volume bottles. The gas-tight bottles were fitted with a funnel, attached to the bottle inlet using PEEK tubing. This allowed the pilots operating ROV *Hercules* to concentrate the released bubbles in the funnel before hydraulically triggering the bottle. This method ensured that only high quality gas samples were collected with little to no entrained seawater.

The gas-tight samplers were evacuated and leak tested in the NOAA/PMEL Helium Isotope Lab (Newport, OR), prior to the NA095 cruise. A total of 11 evacuated samplers ready to use where brought onboard *E/V Nautilus* for sample collection during NA095. In addition, the high-vacuum seagoing extraction line was also installed in the ships wet lab. This enabled sample extraction into glass ampules, and re-evacuation of the gas-tight samplers following each ROV dive. In total, 16 bubble stream samples were collected from 9 ROV dives, and processed on board *E/V Nautilus*.

Hydrate sampling:

In addition to the bubble streams, there are a small number of sites along the Cascadia Margin where methane hydrate deposits are exposed and visible on the seafloor. In order to address critical questions, such as, are the bubble streams produced by the dissociation of hydrate, or do they represent free gas ascending through the sediment, uncontaminated samples of the solid hydrate were collected. This was achieved through use of a newly developed hydrate sampler, which is capable of removing small samples of hydrate from an outcrop and hermetically sealing it into a small gas-tight volume in-situ.

The hydrate was allowed to dissociate in the gas-tight volume without exposure to air or other contaminants (e.g., seawater), before being processed on board *E/V Nautilus* in a similar way to the normal gas-tight samples. The gas contained in the solid hydrate will be compared to the noble gas composition of the free gas collected from the bubbles so that the origin of the free gas bubble streams may be determined. In total, 2 solid methane hydrate samples were collected and processed.

The following is a brief description summary of each sample site and samples collected. A complete list is presented in Table 6.

Eel River (H1668): This site provided the first opportunity to test out the newly developed hydrate sampler. The dive took place in a slide scar, south of the Eel River Canyon, and at 1810 m water depth. The MBARI marker 1 hydrate outcrop (hydrate mound with exposure of clear hydrate patches) was successfully sampled (NA095-01-Hydrate). A bubble stream was also sampled using a 10 ml 'mini' gas-tight bottle, however this sample was not viable (bottle leaked and sample contaminated).

Oregon-California border (H1669): This dive traversed a carbonate ridge on a transform fault at 550 m to 700 m water depth. All bubble streams observed were located along a crack, adjacent to a carbonate cap. Diffuse methane flow was abundant in the crack and several bubble streams were observed on the northeast of the cap and some in the south. However, no bubble streams were observed on the very top of the cap. Two gas-tight bottles triggered at one location in order to ensure a sample was acquired after the first gas-tight appeared not to trigger. Both samples were in fact viable and both bottles were processed (NA095-11-GT11 and NA095-GT9).

South Coquille (H1670; H1671; H1672 and H1673): Several dives were conducted in this area. Dives at 1460 m and 150 m water depth yielded no, or intermittent bubble streams, which shut off as sampling was about to commence. Dives at 700 m (vigorous bubble streams), and 620 m (a repeat of dive H1521 from 2016; constant bubble streams with a high flow rate) yielded viable streams and two gas-tight samples were collected from each locality (NA095-042-GT10; NA095-043-GT2; and NA095-058-GT7; NA095-061-GT5, respectively).

'Mud Volcano' (H1674): This site at 480 m water depth, according to backscatter data, appeared to have the morphology of a mud volcano. A carbonate ridge yielded three bubble streams, as well as from carbonates located along the slope of the cone. A large field of bubble streams emitting small bubbles was located to the southeast of the cone. Only one gas-tight sample (NA095-079-GT10) was possible at this locality as bad weather forced the dive to finish early.

Heceta Canyon Head (H1675): Numerous bubble streams were detected in this area (at 500 m water depth), several of which may reach the sea surface. The dive started at a tall and bright bubble stream located in the pre-dive multibeam survey. In addition, several smaller bubble streams were also seen in this area but they were weak and/or shut off before sampling could take place. Another site with 6 to 7 vigorous bubble streams provided a better sampling locality. Both gas-tight bottles (NA095-086-GT2).

Heceta Bank (H1676): This site was the shallowest seep site visited (at 100 m water depth) and proved to be challenging to identify good targets for bubble streams due to biological interference affecting the multibeam data. Several bubble streams were identified during the

dive and although intermittent, all seemed to exhibit a strong flow. Two gas-tight samples were collected, the first took 1.5 hours to achieve a half full funnel, whereas the second took 40 minutes before triggering the bottle. Unfortunately, an issue with the seagoing extraction line during sample processing, meant that only one gas-tight sample was extracted successfully (NA095-105-GT9).

Heceta SW (H1678): This was a repeat of dive H1520 from 2016 at 1235 m water depth. A high rising bubble stream was detected during the pre-dive multibeam survey. This bubble stream was located 40 m east of where bubbles were sampled in 2016, and led to an area consisting of a line of several tens of bubble streams exiting from flat black sediment. Two gas-tight samples were taken from this area (NA095-117-GT2 and NA095-124-GT1). In addition, exposed hydrate with poor access, was also successfully sampled (NA095-128-Hydrate). During the use of the hydrate sampler, some hydrate flakes were seen rising from the sampler. Further inspection on board revealed the solid sample has been small, but it gave enough gas for extraction.

Accretionary Ridge, South of Astoria Canyon (H1679): Bubble streams sampled during this dive (at 1354 m water depth), were detected during the pre-dive multibeam survey. The first sample location was pre-set as waypoint 3 and one gas-tight bottle was triggered here (NA095-137-GT1). Bubble streams at Marker 282 (dropped during the first half of the dive) were more intense and higher in numbers when we returned there towards the end of the dive. There were at least 7 bubble streams present during gas sampling and one was selected for sampling (NA095-144-GT2).

Nehalem (H1680): This was the final dive (175 m water depth) of the expedition and allowed us to collect further shallow shelf gas samples. The first gas-tight sample (NA095-155-GT7), was collected to the western side of a fracture. The second gas-tight sample (NA095-159-GT10) was collected from a bubble stream emitting bubbles approximately every 20 seconds.

All bubble and hydrate samples will be measured for their chemical and isotopic composition in the second half of year 2018.

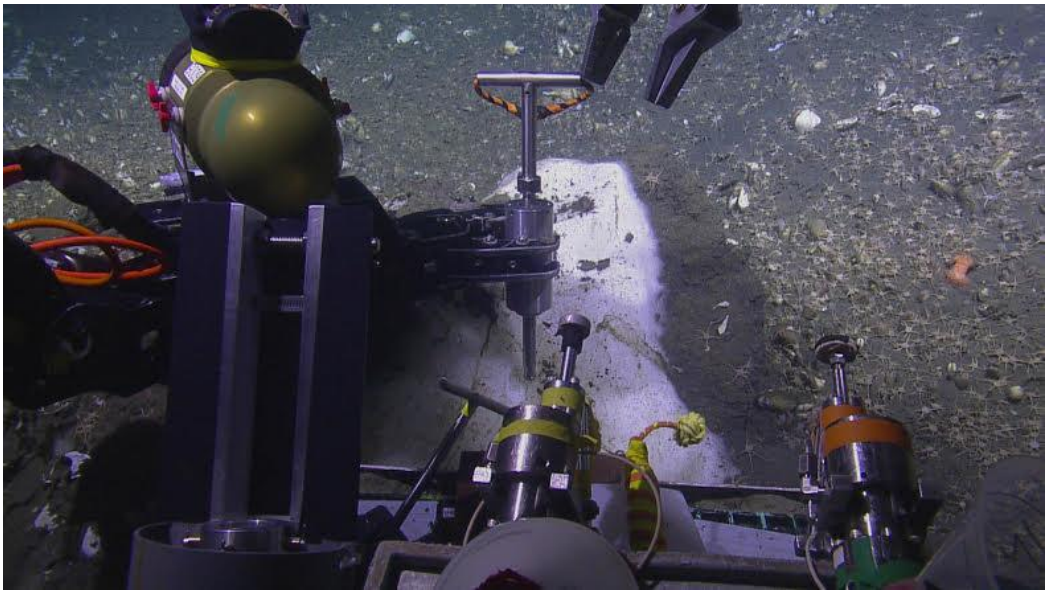


Figure 3. Hydrate sampling at Eel River during dive H1668.

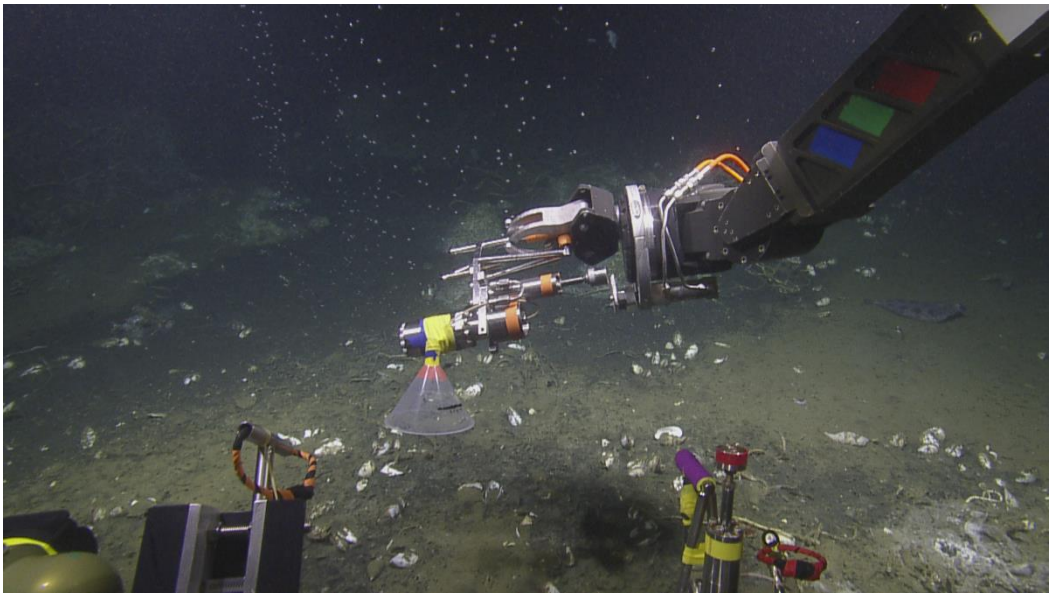


Figure 4. Gas-Tight sampling south of Astoria Canyon during dive H1679.

Table 6. Summary of gas and hydrate samples collected during NA095.

GTB #	*Nautilus* Sample ID	Dive #	Site	Depth (m)	Lat.	Long.	Seep T (deg C)	fluid wt. (g)
	NA095-01-Hydrate	H1668	Eel River	1810	40.5355	-124.7848	2.34	2
11	NA095-11-GT11	H1669	Or-Cal	1813	40.5356	-124.7848	4.97	n/a
9	NA095-GT9	H1669	Or-Cal	1813	42.7761	-124.9269	4.97	106.02
10	NA095-042-GT10	H1671	South Coquille	700	42.7761	-124.9269	4.51	98.7
2	NA095-043-GT2	H1671	South Coquille	700	42.7761	-124.9270	4.49	117.6
7	NA095-058-GT7	H1673	South Coquille	613	42.7107	-124.9011	4.90	n/a
5	NA095-061-GT5	H1673	South Coquille	613	42.7107	-124.9012	4.81	n/a
10	NA095-079-GT10	H1674	Mud Volcano	420	43.6821	-124.6974	5.70	90.2
2	NA095-086-GT2	H1675	Heceta Canyon Head	490	44.2497	-124.9574	5.07	n/a
7	NA095-096-GT7	H1675	Heceta Canyon Head	490	44.2497	-124.9575	5.16	n/a
9	NA095-105-GT9	H1676	Heceta Bank	99	44.0163	-124.8833	8.33	n/a
2	NA095-117-GT2	H1678	Heceta SW	1223	43.9107	-125.0758	3.15	n/a
1	NA095-124-GT1	H1678	Heceta SW	1224	43.9108	-125.0758	3.11	n/a
	NA095-128-Hydrate	H1678	Heceta SW	1226	43.9106	-125.0759	3.07	n/a
1	NA095-137-GT1	H1679	South of Astoria Canyon	1354	45.9420	-125.1755	2.92	16.7
2	NA095-144-GT2	H1679	South of Astoria Canyon	1354	45.9433	-125.1778	2.88	n/a
7	NA095-155-GT7	H1680	Nehalem	188	45.8753	-124.6447	6.63	n/a
10	NA095-159-GT10	H1680	Nehalem	177	45.8697	-124.6372	6.67	n/a

Part 5: Benthic Observations and Sampling

Sarah Seabrook, Oregon State University, OET

The benthic sampling plan was designed to expand upon findings from the 2016 Cascadia Seeps expedition on the E/V *Nautilus* (NA072). The NA072 cruise revealed latitudinal variabilities in the species richness and diversity of microbial communities at the seeps studied, surprising heterogeneity within and among seep sites, and expanded the known limits of vestimentiferan siboglinid tube worms (see Seabrook *et al.,* 2017). To test hypothesis concerning the distribution of the seep species observed and sampled in 2016, the main objectives of the benthic team for the NA095 cruise were: (1) conduct visual survey of habitats, documenting the makeup of the seep sites (i.e. clam bed, tube worm bush, microbial mat, carbonate formations, hydrate) and the extent of the different features present; (2) collect sediment cores within microbial mats, clam beds, and tube worm bush assemblages at all sites possible; (3) collect faunal samples of seep endemics and associates within the regions cored, and opportunistically. The sediment cores were processed for both porewater (extracted with rhizons at 2 cm increments down the core, CH_4 and H_2S concentrations measured on board), and microorganisms (sliced at centimeter increments down the core and preserved at -80 °C for subsequent analysis). Faunal samples were subsampled for symbionts (preserved at -80 °C), isotopes and fatty acids (preserved at -80 °C), and species identification and population genomic work (preserved in EtOH).

The sampling design of the cruise allowed for us to sample in a manner that will allow us to better parse out how variations in the microbial and faunal communities may be related to depth and latitude. We had three different regions that we were able to sample seeps at three depth intervals (within the 100-200 m, 500-800 m, and 1,200-1,500 m depth ranges). These were in the Coquille region (S. Coquille, 1,460 m, 700 m and 620 m, and 150 m), the Heceta region (1,235 m, 500 m, and 100 m), and the Astoria region (1,346 m and 175 m, with 800 m and 500 m visited in 2016). In addition to these dives, we also explored other sites outside of these sampling ranges to expand our understanding of faunal variations on the margin. Table 7, highlights the sampling at all sites visited, with processing methods as described above, and the benthic observations at the sites were as follows:

Dive H1668, Eel Canyon Hydrate: A highly studied site with exposed methane hydrates. We observed many clam beds, both of live clams and some dominated by shell hash. Many of the clam beds had brittle star associates. Other associate organisms included holothurians, gastropods, *echinoderms*, and fish species including grenadiers and hagfish. There were no notable microbial mats with the region we explored.

Dive H1669, Or-Cal: Carbonate platforms with microbial mats and small clam beds occurring between the cracks of the carbonate formations. There were orange and white microbial mats present at this site. Many associate organisms were on the carbonate platforms including mushroom corals, Heteropolypus, encrusting sponges, and bryozoans. On top of ridge, many

sunstars, barrel sponges, and skate egg casing were seen. White and blue microbial mats were seen on top of the ridge, and extensive clam beds were encountered during the traverse of the ridge. Throughout the dive there were many flatfish, sea stars, thornyheads, and holothurians seen on or near the sediment.

Dive H1670, S. Coquille: On a muddy bottom there were many sea pigs, rock fish, anemones, and seep associated clam shells. Dense aggregations of tube worms were found here with many associates including anemones, snail egg casing, and an octopus. Orange and white microbial mats were seen, and there were extensive dispersed clam beds. The clam beds were often covered in brittle stars. Background sediment was very sparse compared to the sediments experiencing active seepage. Associated fish included goosefish, flatfish, rockfish, rattail fish, and thornyheads.

Dive H1671, S. Coquille Slope: This site had dense microbial mats and clam beds, some acharax shells and live gastropods were found in the clam beds. A carbonate outcrop area was found that looked like it could have been the remnants of an ancient seep. Glass sponges and crabs were common on carbonate outcrops. Many fish were seen including snailfish, thornyheads, and hagfish. The benthos also had many sea stars and snails.

Dive H1672, S. Coquille Shelf: Many invertebrates on rocky outcrops around the site, including anemones, brachiopods, basket stars, sea stars, snails, and coral types. Multiple rockfish types in water including green spotted rockfish and rosy rockfish. Small microbial mats were common around the site.

Dive H1673, S. Coquille 620R: Patches of microbial mats and clam beds with associate organisms including chitons, and snails. Mushrooms corals and sea stars also common around the microbial mat and clam bed features. Microbial mat with dense grouping of polychaetes were amongst the carbonate and clam bed features, and there were small white gastropods that have been found near regions with hydrates that were seen at this site as well.

Dive H1674, Mud Volcano: A hard bottom area that was later found to be more of a carbonate structure than a mud volcano. Had many associates on the hard benthos, including brachiopods, crabs, sponges, corals, flytrap anemones, holothoriuns, and sunstars. Several small clam beds and microbial mats were found around the site. Fish included sablefish, rockfish, halibut, sole, and thornyheads.

Dive H1675, Heceta 500m: Soft sediment with clam beds and microbial mats. Associate organisms including sunstars, thornyheads, mushroom corals, snail egg casing, urchins, flytrap anemones, gastropods, and flatfish.

Dive H1676, Heceta 100m: Microbial mats amongst rubble and boulders. Dense schools of rockfish at this site, many of them were canary rockfish, additionally there were also lingcod and skates. Invertebrates included sponges, sea stars, feather stars, and basket stars.

Dive H1677, Heceta 500m: Short return dive to retrieve hydrophone, no significant observations.

Dive H1678, Heceta 1235mR: Many microbial mats were found at this site, both orange and white. Additionally, there were extensive seep associated clam beds and dense tubeworm assemblages. The clam beds had many brittle stars associated with them. The tubeworms had many associate organisms including fly trap anemones, sponges, bryozoans, basket stars, crabs, and snails. Some acharax shells were seen near the clam beds, and brittle stars were living on the clam beds. Hagfish, thornyheads, and flatfish were the dominant fish seen.

Dive H1679, S. Astoria Canyon: Microbial mats, clam beds, and tubeworms were commonly found around the whole region explored in this dive. Brittle stars were found in association with the clam beds. Many large snails and anemones were on large ridge/carbonate features that had intermittent bubbling. Tubeworm assemblages had many associated organisms including flytrap anemones, snails, sponges, and shrimp. Parastanella coral and carnivorous sponges were common on the hard structures among the seep features.

Dive H1680, Nehalem Bank: Orange and white microbial mats were distributed amongst the benthos. Mostly muddy seafloor with flatfish, urchins, and sea stars. Carbonate rocks were distributed around with sea stars, hermit crabs, hagfish, glass sponges, branching sponges, and coral including Swiftia pacifica and Plumeralla longspina corals. Fish included lingcod, rockfish, rat fish, and thornyheads.

Table 7. Benthic sampling conducted on the NA095 by dive number. See Table 12 for full dive details.

Dive #	Depth (m)	Samples
H1668	1800	Push cores: one in clam bed Fauna: Clams, brittle stars and associated meiofauna
H1669	545	Fauna: clams
H1670	1454	Push cores: one near vestimentiferan tube worm assemblage, one in microbial mat, and one near clam bed. Fauna: clams, brittle stars, vestimentiferan tube worms, and some associated meiofauna
H1671	731	Push cores: duplicate in microbial mat, duplicate in clam bed, one background. Fauna: clams and gastropod associates
H1672	149	Push cores: one in patchy reduced sediment Fauna: associate organisms from rock sample
H1673	612	Push cores: one in microbial mat, one near clam bed Fauna: polychaete associates from microbial mat
H1674	421	Push cores: one in clam bed, one in microbial mat Fauna: clams, associate organisms from rock samples,
H1675	491	Push cores: duplicate in microbial mat, duplicate in clam bed, Fauna: clams and associate gastropods, associate organisms from rock samples
H1678	1124	Push cores: one in microbial mat, one near vestimentiferan tube worm assemblage, one near clam bed, one background Fauna: brittle stars, vestimentiferan tube worms, clams
H1679	1300	Push cores: duplicate in clam bed, one in microbial mat Fauna: associate organisms from rock samples, snails, anemones, vestimentiferan tube worms,
H1680	190	Push cores: duplicate in white microbial mats, one in orange microbial mat

Part 6: Majors and Fluid Chemistry

Kevin Roe, NOAA/PMEL

We took 12 major samples from the methane seeps. This was usually accomplished by first setting a PVC cap on the sediment to sequester fluids seeping from the sediment. The time in which the cap was deployed was generally 15 minutes to greater than one hour before the sampler was inserted into the cap hole and triggered (Fig. 5). Sulfide, pH, alkalinity and methane were determined at sea. We returned cuts to NOAA/PMEL for analysis of nutrients, major elements, trace elements and where warranted, sulfur isotopes. Sample information is presented in Table 8, including sulfide data determined at sea.

In addition, we carried out measurements of sulfide and methane at sea from extracted pore fluids from push cores. Generally, pore fluids were extracted every 2 cm using 5 ml syringes pulling pore fluids through rhizon filters. There were 26 push cores in all, and 181 pore water samples (Table 9). Remaining water from the methane analysis was saved for major element and possibly trace element analysis at NOAA/PMEL.

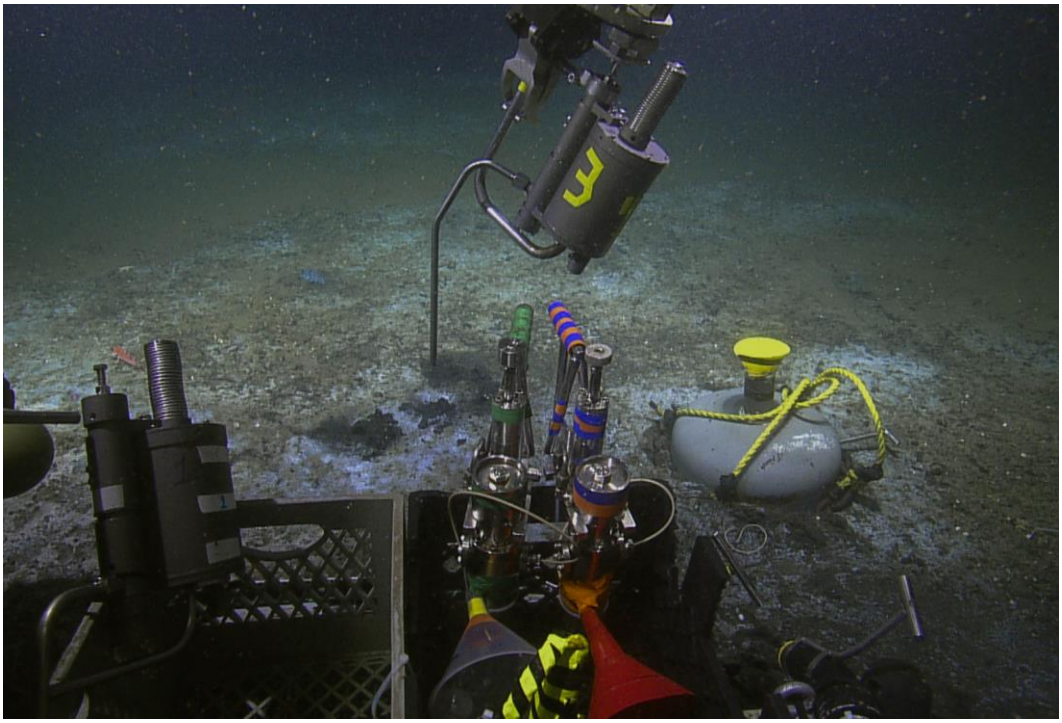


Figure 5. Photograph showing the PVC cap positioned on the seafloor and the major sampler being deployed.

Table 8. Summary of samples collected during cruise NA095

PMEL #	*Nautilus* ID #	Dive #	Site	Lat.	Long.	*Depth (m)*	Sulfide (µM)	Description
H1670M4	NA095-23-M4	H1670	South Coquille	42.79259252	-125.0620371	1455	<0.15	On site of large tubeworm bush with many associates; in pair with -022 Niskin; tubeworm bush is isolated from some of the other seep features; valve in the tubeworm bush
H1670M2	NA095-27-M2	H1670	South Coquille	42.792498	-125.0612606	1452	4.7	Water from in PVC cone, which is over sediment with some faint microbial mat and clam shells; next to dense white mat; used PVC cone to accumulate fluids from 03:16 to 03:57, then major fired from 03:57 to 03:59
H1671M3	NA095-39-M3	H1671	South Coquille	42.779491	-124.9319591	731	41.2	Funnel was left for 50 minutes on top of a clam bed patch; cored about 1 m away and took slurp of clams; likely very diffuse flow
H1671M1	NA095-34-M1	H1671	South Coquille	42.78000153	-124.9317536	732	42.0	In funnel that has been set on “mat 05” while we did push core sampling -032 and -033 (about 20 minutes)
H1672M2	NA095-49-M2	H1672	South Coquille	42.8107785	-124.7210575	149	<0.2	Area that we tried to take a GT before but the bubbling stopped; some shell hash and reduced sediment patches, not very active
H1674M1	NA095-73-M1	H1674	Mud Volcano	43.6796045	-124.700822	473	<0.3	Same location as -072, dispersed clam beds, major taken over a small microbial mat surrounded by clams
H1675M2	NA095-90-M2	H1675	Heceta Canyon Head	44.2500863	-124.9579315	492	3.7	Major of PVC cone that was deployed for about 15 minutes over a microbial mat at “mat 003”; next to push cores -088 and -089
H1675M4	NA095-95-M4	H1675	Heceta Canyon Head	44.24984154	-124.9579835	492	<0.3	In clam bed adjacent to clams where we cored and slurped -092, -093, and -094; funnel was down for about 20 minutes

Table 8. cont. Summary of samples collected during cruise NA095

PMEL #	*Nautilus* ID #	Dive #	Site	Lat.	Long.	*Depth (m)*	Sulfide (µM)	Description
H1678M4	NA095-127-M4	H1678	Heceta SW	43.910792	-125.075419	1224	14.5	Taking major sample in PVC funnel, placed in area of white and orange mat,; in same area that sample -119 was taken
H1679M4	NA095-147-M4	H1679	Accretionary Ridge S. of Astoria Canyon	45.943251	-125.1779485	1355	4.6	Taking major sample same place as the hydrate seawater sample, using PVC cone, on white mat
H1680M3	NA095-163-M3	H1680	Nehalem	45.87013892	-124.6386263	183	<0.4	Over orange and white microbial mat at mat 004; relatively small but dense where occurring
H1680M1	NA095-166-M1	H1680	Nehalem	45.8701101	-124.6386328	183	<0.4	Major over funnel that was left for 15 minutes over the orange microbial mat that we cored (same area as -163, -165, -166)

Table 9. Summary of Push core and pore water samples taken during cruise NA095

EventLog ID	Dive #	Lat.	Long.	*Depth (m)*	Eventlog Description	*Temp (degC)*	*Salinity (psu)*	*Oxygen (µmoles/L)*	Corrected O_2 data	Porewaters extracted	WetLab Description (Overall sample)
NA095-004	H1668	40.53563271	-124.7848036	1813	in clam bed that we took -002 and -003 above; will be duplicate with -005	2.18	34.57826326	55.30951625	44.96663671	7	11 cm deep; reduced sediment appeared 3 cm down; some worms and other invertebrates within core; core sliced and porewater extracted
NA095-025	H1670	42.79256161	-125.0620432	1455	in the same tubeworm habitat as samples -023 and -024, in the middle of the two tubeworm bushes	2.74	34.52392381	31.62181334	25.70853425	7	core survived transit well; non-reduced sediment visible, all brown; core sliced and porewater extracted
NA095-028	H1670	42.79253564	-125.061302	1452	in thin filamentous mat, near sample -027; with small clams and brittle stars on top	2.68	34.5277923	31.58026161	25.67475269	4	short core; some of the water drained out, but integrity remained; brittle stars, small tubeworms on the surface of the core, as well as thioploca mat; core sliced and porewater extracted
NA095-032	H1671	42.7800105	-124.931765	732	on “mat 05”, next to where major sampler is; doing the core in duplicate; likely beggiatoa; a few thorny heads	4.48	34.30609761	6.157012121	5.005650854	8	actively releasing bubbles; some indication of layering though still not all blown out; fully reduced sediment; core sliced and porewater extracted
NA095-033	H1671	42.78001342	-124.931738	732	duplicate with -032, first attempt failed so we had to put in again after the others are removed - two fails - very gelatnous	4.48	34.30630155	6.253427299	5.084036394	9	bubbly and somewhat shaken, but more clear and more defined than -032; core sliced and porewater extracted
NA095-036	H1671	42.77951114	-124.931929	731	in a clam bed, many of the clams are buried; going right next to many clams; first attempt failed, moved over towards a new patch; one core located more in the clam bed than the next core (036 more in clam bed); small groups of clams with gastropods intermixed with lots of detritus	4.49	34.30962958	6.255115135	5.085408605	9	3.5 cm down, reduced sediment starts; top 3.5 cm spotted with reduced sediment; urchins, gastropods, and clams on surface; core sliced and porewater extracted

Table 9. cont. Summary of Push core and pore water samples taken during cruise NA095

EventLog ID	Dive #	Lat.	Long.	*Depth (m)*	Eventlog Description	*Temp (degC)*	*Salinity (psu)*	*Oxygen (µmoles/L)*	Corrected O_2 data	Porewaters extracted	WetLab Description (Overall sample)
NA095-037	H1671	42.77953077	-124.931931	731	duplicate with -036, but less in clam bed (more on outer edge); first core put in the sediment, last core taken out of sediment	4.49	34.30378781	6.213722968	5.051756773	8	no fauna on top; change top reduced sediment lower down in core and less defined (see photos); horizontal striations of reduced sediment; core sliced and porewater extracted
NA095-041	H1671	42.779051	-124.9306995	723	background push core, muddy bottom with sea stars, thornyheads, polychaetes; paired with -040	4.54	34.30222678	6.371332545	5.179893359	8	brown all the way down, no sign of reduced sediment; core in good shape; core sliced and porewater extracted
NA095-050	H1672	42.8107789	-124.7210542	149	area where we took major sample; patches of reduced sediment and some shell hash but not much else; no more active bubbles coming up	7.05	33.98402098	78.28822379	63.64832594	8	microbial mat 8 cm and 10 cm down; some patches of reduced sediment; looks more “seepy” than -051; core sliced and porewater extracted
NA095-051	H1672	42.810778	-124.7210535	149	duplicate with -050	7.05	33.97960247	78.36159733	63.70797863	8	some reduced spots throughout but predominantly brown; krill on top and a polychaete sticking out; microbial mat at 13-15 cm; core sliced and porewater extracted down to 13 cm
NA095-063	H1673	42.710645	-124.9012095	613	microbial mat, duplicate with -062	4.82	34.22906438	10.07837355	8.193717697	8	reduced, sulfur-smelling sediment throughout; microbial mat on top and randomly throughout; core sliced and porewater extracted
NA095-064	H1673	42.710763	-124.9011105	612	right up from the clam bed we were poking around at before	4.84	34.22958302	10.07290935	8.189275303	5	reduced sediment throughout; clam on top; core sliced and porewater extracted

Table 9. cont. Summary of Push core and pore water samples taken during cruise NA095

EventLog ID	Dive #	Lat.	Long.	*Depth (m)*	Eventlog Description	*Temp (degC)*	*Salinity (psu)*	*Oxygen (µmoles/L)*	Corrected O_2 data	Porewaters extracted	WetLab Description (Overall sample)
NA095-074	H1674	43.67960899	-124.7008233	473	in same area as -072 and -073, disperse clam beds cores taken in the microbial mat in the middle of a circular clam beds - this sample of the exterior clam bed	5.51	34.11307889	31.28822453	25.43732654	6	lighter brown color on top, black sediment and then grey sediment below; live clams in the top 5 cm; core sliced and porewater extracted
NA095-075	H1674	43.67961538	-124.7008223	473	duplicate with -074, this one in microbial mat	5.50	34.11467196	31.58883773	25.68172507	5	bubbles actively coming up; microbial mat that was on top got disturbed by bubbles 0-8 cm; core sliced and porewater extracted
NA095-089	H1675	44.25008652	-124.9579155	492	duplicate with -088, microbial mat about 20-30 cm in length	5.16	34.16225954	19.09616581	15.52518281	7	0-13 cm core size; black, reduced sediment; core intact; core sliced and porewater extracted
NA095-092	H1675	44.24982	-124.9579803	492	clam bed at “clam 001”	5.16	34.16225954	19.09616581	15.52518281	8	0-13 cm core size; black, reduced sediment; core intact; core sliced and porewater extracted
NA095-093	H1675	44.24982	-124.9579803	492	duplicate with -092; clam bed at “clam 001”	5.16	34.16200469	19.3569873	15.73723068	8	0-12 cm core size; live clam on top; reduced sediment a few cm down, transitioning to greyish mud; core sliced and porewater extracted
NA095-120	H1678	43.91081289	-125.0754281	1225	at “mat 001” target; dense microbial mat, orange and white; very expansive bubbles came up when we put the core in, so moved farther in and re-put the core there	3.15	34.48347778	16.78754265	13.64827217	8	0-10 cm core size; bubbled up some, but polychaetes and mat still on top, and overall looked good; few bubble holes when slicing; core sliced and porewater extracted
NA095-122	H1678	43.91098773	-125.0756175	1224	on periphery of tubeworm bush	3.15	34.47909528	16.96239754	13.7904292	6	0-7 cm core size; slightly uneven like it shifted some but integrity looked ok; a little reduced at bottom; live Acharax within core; core sliced and porewater extracted

Table 9. cont. Summary of Push core and pore water samples taken during cruise NA095

EventLog ID	Dive #	Lat.	Long.	*Depth (m)*	Eventlog Description	*Temp (degC)*	*Salinity (psu)*	*Oxygen (µmoles/L)*	Corrected O_2 data	Porewaters extracted	WetLab Description (Overall sample)
NA095-125	H1678	43.91058368	-125.0756147	1224	at periphery of clam bed site, near "clam 001" target; in sediment with live clams, next to clams but not right over them	3.11	34.48163044	17.1318933	13.92822925	6	hole in bottom, filled with water 0-6 cm; some clams throughout; reduced sediment striations horizontally across noticed when slicing core; core sliced and porewater extracted
NA095-130	H1678	43.9109012	-125.0763915	1222	north of waypoint 3, muddy sediment, core for background sediment	3.07	34.48523496	18.35691376	14.92417089	6	0-8 cm core size; hole in bottom, filled with water; brown sediment throughout; core sliced and porewater extracted
NA095-140	H1679	45.9432635	-125.177992	1356	outside of mat area we previously were trying to core at, with some live clams nearby	2.92	34.49416164	19.53798625	15.88438282	5	0-8 cm core size; reduced sediment about 1 cm down, first in horizontal striations, and then throughout; a little water/air hole in bottom; worm in core; core sliced and porewater extracted
NA095-148	H1679	45.94328954	-125.1779378	1355	to the left of the microbial mat that we took the major sample on	2.85	34.50107848	21.23885078	17.26718568	4	0-6 cm core size; very few reduced patches in core; core sliced and porewater extracted
NA095-156	H1680	45.87758137	-124.6402494	181	at mat 002, right in the middle of white mat	6.63	25.70282391	66.27126124	53.87853539	8	0-15 cm core size; top 4-5 cm reduced, bottom is glacial mud; core sliced and porewater extracted
NA095-157	H1680	45.87758282	-124.6402623	181	near mat 002, about 2 m away, in thin small white mat	6.63	25.6356713	65.88356358	53.56333719	8	0-15 cm core size; top 3-4 cm reduced, bottom is glacial mud; hardly any porewater; core sliced and porewater extracted
NA095-164	H1680	45.87012369	-124.6386275	183	orange microbial mat we did major -163 at	6.70	34.00497834	67.2481635	54.67275692	7	orange mat visible on top; 0-1 cm is a little mixed up, animal within core; top 7 cm reduced, bottom portion is glacial mud; core sliced and porewater extracted

Part 7: Water Column Sampling and Methane Analysis

Nathaniel Buck, NOAA/PMEL

Discrete water column sampling was conducted during the Cascadia 2018 research cruise aboard the E/V *Nautilus* (NA095), to broaden the understanding of how methane seeps found on the continental margin play on the biogeochemistry of seawater. Samples were collected using six 5 L Ocean Test Equipment (OTE) water sampling bottles that were attached to the ROV *Hercules* and rigged with Silastic® tubing springs. OTE bottles were subsampled for H_2, CH_4, dissolved inorganic carbon (DIC), pH, nutrients and total dissolvable Mn and Fe (TDMn and TDFe, respectively). CH_4 and H_2 concentrations were sampled and characterized moments after the recovery of the ROV where 100 ml of bubble-free sample was drawn directly into 140 ml syringes followed by the addition of 40 ml headspace of ultrapure helium. The sample was vigorously shaken then allowed to warm to room temperature as to reach equilibrium for H_2 and CH_4 between the water and gas phase. After equilibration, the headspace gas was injected into a SRI 8610C gas chromatograph. The separation of CH_4 and H_2 was accomplished with a 15 m long molecular sieve 5 A column. CH_4 concentrations were measured with a flame ionization detector and H_2 concentrations were determined with a highly sensitive helium-pulsed discharged detector [*Kelley et al.,* 1998]. Likewise, pH was analyzed shipboard around an hour after ROV recovery using the method of Resing *et al*., [2004] a technique that has a precision of ± 0.001 pH units within a single cast and an overall daily precision between ± 0.005 and 0.010 units. The remaining sample types were stored accordingly for future laboratory analysis. A total of thirteen dives were conducted resulting in 70 bottle samples. Dive locations, sample depths and sample inventories are summarized in Table 10.

CH_4 and H_2 analysis was also conducted on porewater samples that were extracted with rhizons at 2cm intervals of sediment cores as well as major samplers. Sample volumes and headspace were adjusted to accommodate for the high concentrations of gases found in sediments and ranged anywhere between 1 to 4 ml seawater and 40 to 100 ml He. From the thirteen dives 26 sediment core samples were taken resulting in 183 subsamples. Twelve samples were also analyzed from the Majors samplers. Summary sample locations, sediment depths and sample inventories for porewater and Majors samples can be found in Tables 11 and 12, respectively. Full details are presented in Table 13.

Kelley, D. S., M. D. Lilley, J. E. Lupton, and E. J. Olson (1998), Enriched H_2, CH_4, and ^3He concentrations in hydrpthermal plumes associated with the 1996 Gorda Ridge eruptive event, *Deep-Sea Research Part II*, *45*, 2665-2682.
Resing, J. A., J. E. Lupton, R. A. Feely, and M. D. Lilley (2004), CO_2 and ^3He in hydrothermal plumes: implications for mid-ocean ridge CO_2 flux, *Earth and Planetary Science Letters*, *226*(3-4), 449-464.

Table 10. Summary of dive locations, depths and sample inventories for Niskin bottle samples collected during cruise NA095

DIVE ID	Site Name	btm_depth (m)	Niskin #	Lat.	Long.	*Depth (m)*	CH4/H2 syringe #	DIC #	pH	Nuts #	TDM #	Eventlog Description	Sampling / Analysis notes
H1668	Eel River	1810	N7	40.53568909	-124.7847558	1813	3172	1	1,2		1	Niskin over the clam bed that we did the gas tight (-002); large bed with many dead and some live clams; many brittle stars and some anemones and snails	
H1668	Eel River	1810	N12	40.5356865	-124.7847993	1803	3122	2	3,4		2	Niskin 10m above clam bed and bubble stream that were sampled for 002-006	
H1668	Eel River		N11	40.53581375	-124.78439	548	4110					Niskin sample 550 m depth, which is 50 m below the top of the multibeam seep plume	Major leak out of bottom - Only sampled CH4
H1669	Or-Cal	550	N7	41.8940555	-124.8377975	299	4145	3	1,2,3	1	3	at 300m depth	
H1669	Or-Cal	550	N8	41.89383167	-124.8378796	399	3173	4	4,5	2	4	at 400 m depth	
H1669	Or-Cal	550	N9	41.8937655	-124.837897	449	2402	5	6,7	3	5	at 450m depth	
H1669	Or-Cal	550	N10	41.89365	-124.838235	517	3122	6	8,9	4	6	Niskin at 50 m above seafloor	
H1669	Or-Cal	550	N11	41.89419068	-124.8382093	546	4110	7	10,11	5	7	at bubbles004 over a microbial mat in a carbonate crack	
H1669	Or-Cal	550	N12	41.894131	-124.8381175	545	3172	8	12,13	6	8	Niskin at bubbles001, same location as samples -011, -012, -013	
H1670	S. Coquille	1450	N7	42.79257588	-125.0620207	1454	3172	9	1,2,3	7	9	near “tube worm 001” site	Winch broke during dive - only 2 Niskins
H1670	S. Coquille	1450	N8	42.79255574	-125.0612551	1452	4110	10	4,5,	8	10	Niskin about 1 to 1.5 m above the "mat 002" site, with microbial mats, dead clams, a few bubbles nearby	
H1671	S. Coquille	700	N7	42.78000692	-124.9317725	731	3122	11	1,2,3	9	11	taken 1 m above “mat 05” target; a very dense white microbial mat, likely beggiatoa; going to core and major sample here as well	Unable to run pH samples - due to time constraints with CH4 measurements

Table 10. cont. Summary of dive locations, depths and sample inventories for Niskin bottle samples collected during cruise NA095

DIVE ID	Site Name	btm_depth (m)	Niskin #	Lat.	Long.	*Depth (m)*	CH4/H2 syringe #	DIC #	pH	Nuts #	TDM #	Eventlog Description	Sampling / Analysis notes
H1671	S. Coquille	700	N8	42.77953927	-124.9319224	731	3173	12	4,5	10	12	1 m above a clam bed with some gastropods in it and thornyheads and acharax shells	
H1671	S. Coquille	700	N9	42.77905054	-124.930698	722	4110	13	6,7	11	13	background Niskin, muddy bottom with sea stars, snails, thornyheads, soles, some worms in sediment; likely upstream of seep	leaker
H1671	S. Coquille	700	N10	42.7760431	-124.9269338	700	4145	14	8,9	12	14	taking Niskin sample above seep site, same site as gas-tight (-042, -043) and scoop (-044) samples; over the pit	
H1671	S. Coquille	700	N11	42.7760678	-124.9269832	650	2402	15	10,11	13	15	taking Niskin water sample during ascent at ~650 m	
H1671	S. Coquille	700	N12	42.7760635	-124.9269415	550	3172	16	12,13	14	16	during ascent at ~550 m	
H1672	S. Coquille	150	N7	42.81072322	-124.7211598	149	3172	17	1,2,3	15	17	taken 1 m off bottom	leaker -
H1672	S. Coquille	150	N8	42.81072368	-124.7211465	139	2402	18	4,5	16	18	taken at 140 m depth	
H1672	S. Coquille	150	N9	42.8107275	-124.721145	130	4145	19	6,7	17	19	taken at 130 m depth	leaker
H1672	S. Coquille	150	N10	42.8107295	-124.7211505	100	4110	20	8,9	18	20	taken at 100 m depth	
H1672	S. Coquille	150	N11	42.81121199	-124.7210214	46	3122	21	10,11	19	21	taken at 50 m depth	
H1672	S. Coquille	150	N12	42.811149	-124.7210415	20	3137	22	12,13	20	22	taken at 20 m depth	Twist tie fell into DIC sample
H1673	S. Coquille	620	N7	42.71074607	-124.901173	611	3122	23	1,2,3	21	23	about 2 m above bubbles, with some small white branched sponges and small mushroom corals on shelf by bubbles	
H1673	S. Coquille	620	N8	42.71004689	-124.9012308	496	4110	24	4,5	22	24	taken at 500 m depth	
H1673	S. Coquille	620	N9	42.71013607	-124.9015183	389	4145	25	6,7	23	25	taken at 400 m depth	
H1673	S. Coquille	620	N10	42.71017406	-124.9012383	299	3172	26	8,9	24	26	taken at 300 m depth	
H1673	S. Coquille	620	N11	42.7101815	-124.9013306	196	2402	27	10,11	25	27	taken at 200 m depth	
H1673	S. Coquille	620	N12	42.71018933	-124.9011057	98	3173	28	12,13	26	28	taken at 100 m depth	

Table 10. cont. Summary of dive locations, depths and sample inventories for Niskin bottle samples collected during cruise NA095

DIVE ID	Site Name	btm_depth (m)	Niskin #	Lat.	Long.	*Depth (m)*	CH4/H2 syringe #	DIC #	pH	Nuts #	TDM #	Eventlog Description	Sampling / Analysis notes
H1674	Mud Volcano	425	N7	43.679616	-124.7008307	473	3122	29	1,2,3	27	29	area with several clam beds, over a region with a small microbial mat surrounded by clams - interesting feature	
H1674	Mud Volcano	425	N8	43.68055236	-124.698327	417	4110	30	4,5	28	30	taken at 415 m depth	
H1674	Mud Volcano	425	N9	43.68050607	-124.69821	399	4145	31	6,7	29	31	taken at 400 m depth	
H1674	Mud Volcano	425	N10	43.68027446	-124.6981601	301	3172	32	8,9	30	32	taken at 300 m depth	
H1674	Mud Volcano	425	N11	43.68038	-124.6980704	196	2402	33	10,11	31	33	taken at 200 m depth	
H1674	Mud Volcano	425	N12	43.680265	-124.6979914	100	3173	34	12,13	21	34	taken at 100 m depth	
H1675	Heceta	500	N7	44.2497255	-124.95753	490	3402	35	1,2,3	33	35	At area where hydrophone deployed and gas-tight -086 were taken, before push cores and slurps were attempted; over a clam bed with sparse microbial mats and bubbles	
H1675	Heceta	500	N8	44.25009159	-124.95792	492	3172	36	4,5	34	36	over “mat 003” where -088, -089, and -090 were taken	
H1675	Heceta	500	N9	44.2493135	-124.9575825	400	4110	37	6,7	35	37	taken at 400 m depth	
H1675	Heceta	500	N10	44.24945992	-124.9571029	299	3122	38	8,9	36	38	taken at 300 m depth	
H1675	Heceta	500	N11	44.249606	-124.9570095	199	4138	39	10,11	37	39	taken at 200 m depth	
H1675	Heceta	500	N12	44.24938725	-124.9574594	99	4145	40	12,13	38	40	taken at 100 m depth	
H1676	Heceta	100	N7	44.0175155	-124.8793715	98	4145	41	1,2,3	39	41	above white and orange mat	
H1676	Heceta	100	N8	44.01694189	-124.8828795	100	4110	42	4,5	40	42	right above -106, "bubbles 009", 100 m depth	
H1676	Heceta	100	N9	44.01666998	-124.8831105	80	2402	43	6,7	41	43	taken at 80 m depth	
H1676	Heceta	100	N10	44.016953	-124.8834525	60	3122	44	8,9	42	44	taken at 60 m depth	
H1676	Heceta	100	N11	44.01665669	-124.8832185	40	4138	45	10,11	43	45	taken at 40 m depth	
H1676	Heceta	100	N12	44.01701334	-124.8829223	20	3122	46	12,13	44	46	taken at 20 m depth	

Table 10. cont. Summary of dive locations, depths and sample inventories for Niskin bottle samples collected during cruise NA095

DIVE ID	Site Name	btm_depth (m)	Niskin #	Lat.	Long.	*Depth (m)*	CH4/H2 syringe #	DIC #	pH	Nuts #	TDM #	Eventlog Description	Sampling / Analysis notes
H1677	Heceta	500	N7	44.24969044	-124.9574652	450	3172					taken at 450 m depth	
H1677	Heceta	500	N8	44.249696	-124.957398	401	4138					taken at 400 m depth	
H1677	Heceta	500	N9	44.24966485	-124.9575645	300	3122					taken at 300 m depth	
H1677	Heceta	500	N10	44.249679	-124.9575135	200	4110					taken at 200 m depth	
H1677	Heceta	500	N12	44.24970215	-124.9575061	100	4145					taken at 100 m depth	
H1678	SW Heceta	1235	N7	43.91078423	-125.0754355	1225		47	1,2,3	45	47	above microbial mat (very extensive) and clams	Air valve open
H1678	SW Heceta	1235	N8	43.91064802	-125.0759543	1224		48	4,5	46	48	above bubble plume at site where we sampled the hydrate (-128), above “hydrate 002” site	Air valve open
H1678	SW Heceta	1235	N9	43.9108765	-125.0758372	1177		49	6,7	47	49	taken 50 m off bottom (~1175 m depth)	Air valve open
H1678	SW Heceta	1235	N10	43.911147	-125.075912	999		50	8,9	48	50	taken at 1000 m depth	Air valve open
H1678	SW Heceta	1235	N11	43.91194967	-125.0753854	600		51	10,11	49	51	taken at 600 m depth (about 50 m below the top of the bubble stream seen in multibeam data)	Air valve open
H1678	SW Heceta	1235	N12	43.91094568	-125.0755052	500		52	12,13	50	52	taken at 500 m depth	Air valve open
H1679	S of Astoria Canyon	1345	N7	45.94329682	-125.1778261	1353	3172	53	1,2,3	51	57	above bubble site where marker is, where we took gas-tight sample -144	
H1679	S of Astoria Canyon	1345	N8	45.94290319	-125.1776962	1346	2402	54	4,5	52	58	taken at 10 m altitude from recovery position	
H1679	S of Astoria Canyon	1345	N9	45.94275637	-125.1773295	1307	3122	55	6,7	53	59	taken at 50 m off bottom	
H1679	S of Astoria Canyon	1345	N10	45.94265898	-125.1776456	630	4138	56	8,9	54	60	taken at 630 m depth	
H1679	S of Astoria Canyon	1345	N11	45.9428875	-125.1773265	500	4110	57	10,11	55	61	taken at 500 m depth	
H1679	S of Astoria Canyon	1345	N12	45.942636	-125.1776139	199	4145	58	12,13	56	62	taken at 200 m depth	
H11680	Nehalem	150	N7	45.8742065	-124.6446382	191	4145	59	1,2,3	57	59	background Niskin near WP2	
H11680	Nehalem	150	N8	45.87009895	-124.6386308	182	4110	60	4,5	58	60	1m above microbial mat for -163, -164, and -166	

Table 10. cont. Summary of dive locations, depths and sample inventories for Niskin bottle samples collected during cruise NA095

DIVE ID	Site Name	btm_depth (m)	Niskin #	Lat.	Long.	*Depth (m)*	CH4/H2 syringe #	DIC #	pH	Nuts #	TDM #	Eventlog Description	Sampling / Analysis notes
H11680	Nehalem	150	N9	45.86992303	-124.6384574	168	3122		6,7	59	61	taken at 170 m depth	
H11680	Nehalem	150	N10	45.86985202	-124.6384865	124	3172		8,9	60		taken at 130 m depth	
H11680	Nehalem	150	N11	45.8697405	-124.6382885	81	2402		10,11	61		taken at 80 m depth	
H11680	Nehalem	150	N12	45.86974138	-124.6383212	51	4138		12,13	62		taken at 50 m depth	

Table 11. Summary of dive locations, depths and sample inventories for Push Core samples collected during cruise NA095

DIVE ID	Site Name	Sample ID	Sediment Depth (cm)	Latitude	Longitude	*Depth (m)*
H1668	Eel River	NA095-4	0	40.53563271	-124.7848036	1813
H1668	Eel River	NA095-4	1	40.53563271	-124.7848036	1813
H1668	Eel River	NA095-4	3	40.53563271	-124.7848036	1813
H1668	Eel River	NA095-4	5	40.53563271	-124.7848036	1813
H1668	Eel River	NA095-4	7	40.53563271	-124.7848036	1813
H1668	Eel River	NA095-4	9	40.53563271	-124.7848036	1813
H1668	Eel River	NA095-4	11	40.53563271	-124.7848036	1813
H1670	S Coquille	NA095-25	1	42.79256161	-125.0620432	1455
H1670	S Coquille	NA095-25	3	42.79256161	-125.0620432	1455
H1670	S Coquille	NA095-25	5	42.79256161	-125.0620432	1455
H1670	S Coquille	NA095-25	7	42.79256161	-125.0620432	1455
H1670	S Coquille	NA095-25	9	42.79256161	-125.0620432	1455
H1670	S Coquille	NA095-25	11	42.79256161	-125.0620432	1455
H1670	S Coquille	NA095-25	13	42.79256161	-125.0620432	1455
H1670	S Coquille	NA095-28	1	42.79253564	-125.061302	1452
H1670	S Coquille	NA095-28	3	42.79253564	-125.061302	1452
H1670	S Coquille	NA095-28	5	42.79253564	-125.061302	1452
H1670	S Coquille	NA095-28	9	42.79253564	-125.061302	1452
H1671	S Coquille	NA095-32	0	42.7800105	-124.931765	732
H1671	S Coquille	NA095-32	1	42.7800105	-124.931765	732
H1671	S Coquille	NA095-32	3	42.7800105	-124.931765	732
H1671	S Coquille	NA095-32	5	42.7800105	-124.931765	732
H1671	S Coquille	NA095-32	7	42.7800105	-124.931765	732
H1671	S Coquille	NA095-32	9	42.7800105	-124.931765	732
H1671	S Coquille	NA095-32	11	42.7800105	-124.931765	732
H1671	S Coquille	NA095-32	13	42.7800105	-124.931765	732

Table 11. cont. Summary of dive locations, depths and sample inventories for Push Core samples collected during cruise NA095

DIVE ID	Site Name	Sample ID	Sediment Depth (cm)	Latitude	Longitude	*Depth (m)*
H1671	S Coquille	NA095-33	2	42.78001342	-124.931738	732
H1671	S Coquille	NA095-33	4	42.78001342	-124.931738	732
H1671	S Coquille	NA095-33	6	42.78001342	-124.931738	732
H1671	S Coquille	NA095-33	8	42.78001342	-124.931738	732
H1671	S Coquille	NA095-33	10	42.78001342	-124.931738	732
H1671	S Coquille	NA095-33	12	42.78001342	-124.931738	732
H1671	S Coquille	NA095-33	14	42.78001342	-124.931738	732
H1671	S Coquille	NA095-33	16	42.78001342	-124.931738	732
H1671	S Coquille	NA095-36	0	42.77951114	-124.931929	731
H1671	S Coquille	NA095-36	2	42.77951114	-124.931929	731
H1671	S Coquille	NA095-36	4	42.77951114	-124.931929	731
H1671	S Coquille	NA095-36	6	42.77951114	-124.931929	731
H1671	S Coquille	NA095-36	8	42.77951114	-124.931929	731
H1671	S Coquille	NA095-36	10	42.77951114	-124.931929	731
H1671	S Coquille	NA095-36	12	42.77951114	-124.931929	731
H1671	S Coquille	NA095-36	14	42.77951114	-124.931929	731
H1671	S Coquille	NA095-36	16	42.77951114	-124.931929	731
H1671	S Coquille	NA095-37	0	42.77953077	-124.931931	731
H1671	S Coquille	NA095-37	2	42.77953077	-124.931931	731
H1671	S Coquille	NA095-37	4	42.77953077	-124.931931	731
H1671	S Coquille	NA095-37	6	42.77953077	-124.931931	731
H1671	S Coquille	NA095-37	8	42.77953077	-124.931931	731
H1671	S Coquille	NA095-37	10	42.77953077	-124.931931	731
H1671	S Coquille	NA095-37	12	42.77953077	-124.931931	731
H1671	S Coquille	NA095-37	14	42.77953077	-124.931931	731
H1671	S Coquille	NA095-41	0	42.779051	-124.9306995	723
H1671	S Coquille	NA095-41	1	42.779051	-124.9306995	723

Table 11. cont. Summary of dive locations, depths and sample inventories for Push Core samples collected during cruise NA095

DIVE ID	Site Name	Sample ID	Sediment Depth (cm)	Latitude	Longitude	*Depth (m)*
H1671	S Coquille	NA095-41	3	42.779051	-124.9306995	723
H1671	S Coquille	NA095-41	5	42.779051	-124.9306995	723
H1671	S Coquille	NA095-41	7	42.779051	-124.9306995	723
H1671	S Coquille	NA095-41	9	42.779051	-124.9306995	723
H1671	S Coquille	NA095-41	11	42.779051	-124.9306995	723
H1672	S Coquille	NA095-50	0	42.8107789	-124.7210542	149
H1672	S Coquille	NA095-50	1.5	42.8107789	-124.7210542	149
H1672	S Coquille	NA095-50	3.5	42.8107789	-124.7210542	149
H1672	S Coquille	NA095-50	5.5	42.8107789	-124.7210542	149
H1672	S Coquille	NA095-50	7.5	42.8107789	-124.7210542	149
H1672	S Coquille	NA095-50	9.5	42.8107789	-124.7210542	149
H1672	S Coquille	NA095-50	11.5	42.8107789	-124.7210542	149
H1672	S Coquille	NA095-50	13.5	42.8107789	-124.7210542	149
H1672	S Coquille	NA095-51	0	42.810778	-124.7210535	149
H1672	S Coquille	NA095-51	1.5	42.810778	-124.7210535	149
H1672	S Coquille	NA095-51	3.5	42.810778	-124.7210535	149
H1672	S Coquille	NA095-51	5.5	42.810778	-124.7210535	149
H1672	S Coquille	NA095-51	7.5	42.810778	-124.7210535	149
H1672	S Coquille	NA095-51	9.5	42.810778	-124.7210535	149
H1672	S Coquille	NA095-51	11.5	42.810778	-124.7210535	149
H1672	S Coquille	NA095-51	13.5	42.810778	-124.7210535	149
H1673	S Coquille	NA095-63	0	42.710645	-124.9012095	613
H1673	S Coquille	NA095-63	1	42.710645	-124.9012095	613
H1673	S Coquille	NA095-63	3	42.710645	-124.9012095	613
H1673	S Coquille	NA095-63	7	42.710645	-124.9012095	613
H1673	S Coquille	NA095-63	5	42.710645	-124.9012095	613
H1673	S Coquille	NA095-63	9	42.710645	-124.9012095	613

Table 11. cont. Summary of dive locations, depths and sample inventories for Push Core samples collected during cruise NA095

DIVE ID	Site Name	Sample ID	Sediment Depth (cm)	Latitude	Longitude	*Depth (m)*
H1673	S Coquille	NA095-63	11	42.710645	-124.9012095	613
H1673	S Coquille	NA095-63	13	42.710645	-124.9012095	613
H1673	S Coquille	NA095-64	0	42.710763	-124.9011105	612
H1673	S Coquille	NA095-64	0.25	42.710763	-124.9011105	612
H1673	S Coquille	NA095-64	2.25	42.710763	-124.9011105	612
H1673	S Coquille	NA095-64	4.25	42.710763	-124.9011105	612
H1673	S Coquille	NA095-64	6.25	42.710763	-124.9011105	612
H1674	Mud Volcano	NA095-75	0	43.67961538	-124.7008223	473
H1674	Mud Volcano	NA095-75	1	43.67961538	-124.7008223	473
H1674	Mud Volcano	NA095-75	2.5	43.67961538	-124.7008223	473
H1674	Mud Volcano	NA095-75	4.5	43.67961538	-124.7008223	473
H1674	Mud Volcano	NA095-75	6.5	43.67961538	-124.7008223	473
H1674	Mud Volcano	NA095-75	8.5	43.67961538	-124.7008223	473
H1675	Heceta	NA095-89	0	44.25008652	-124.9579155	492
H1675	Heceta	NA095-89	2	44.25008652	-124.9579155	492
H1675	Heceta	NA095-89	4	44.25008652	-124.9579155	492
H1675	Heceta	NA095-89	6	44.25008652	-124.9579155	492
H1675	Heceta	NA095-89	8	44.25008652	-124.9579155	492
H1675	Heceta	NA095-89	10	44.25008652	-124.9579155	492
H1675	Heceta	NA095-89	12	44.25008652	-124.9579155	492
H1675	Heceta	NA095-93	0	44.24982	-124.9579803	492
H1675	Heceta	NA095-93	1	44.24982	-124.9579803	492
H1675	Heceta	NA095-93	3	44.24982	-124.9579803	492
H1675	Heceta	NA095-93	5	44.24982	-124.9579803	492
H1675	Heceta	NA095-93	7	44.24982	-124.9579803	492
H1675	Heceta	NA095-93	9	44.24982	-124.9579803	492
H1675	Heceta	NA095-93	11	44.24982	-124.9579803	492

Table 11. cont. Summary of dive locations, depths and sample inventories for Push Core samples collected during cruise NA095

DIVE ID	Site Name	Sample ID	Sediment Depth (cm)	Latitude	Longitude	*Depth (m)*
H1675	Heceta	NA095-93	13	44.24982	-124.9579803	492
H1678	SW Heceta	NA095-130	0	43.9109012	-125.0763915	1222
H1678	SW Heceta	NA095-130	0.5	43.9109012	-125.0763915	1222
H1678	SW Heceta	NA095-130	2.5	43.9109012	-125.0763915	1222
H1678	SW Heceta	NA095-130	4.5	43.9109012	-125.0763915	1222
H1678	SW Heceta	NA095-130	6.5	43.9109012	-125.0763915	1222
H1678	SW Heceta	NA095-130	8.5	43.9109012	-125.0763915	1222
H1678	SW Heceta	NA095-125	0	43.91058368	-125.0756147	1224
H1678	SW Heceta	NA095-125	1	43.91058368	-125.0756147	1224
H1678	SW Heceta	NA095-125	3	43.91058368	-125.0756147	1224
H1678	SW Heceta	NA095-125	5	43.91058368	-125.0756147	1224
H1678	SW Heceta	NA095-125	7	43.91058368	-125.0756147	1224
H1678	SW Heceta	NA095-125	9	43.91058368	-125.0756147	1224
H1678	SW Heceta	NA095-120	0	43.91081289	-125.0754281	1225
H1678	SW Heceta	NA095-120	0.25	43.91081289	-125.0754281	1225
H1678	SW Heceta	NA095-120	2.25	43.91081289	-125.0754281	1225
H1678	SW Heceta	NA095-120	4.25	43.91081289	-125.0754281	1225
H1678	SW Heceta	NA095-120	6.25	43.91081289	-125.0754281	1225
H1678	SW Heceta	NA095-120	8.25	43.91081289	-125.0754281	1225
H1678	SW Heceta	NA095-120	10.25	43.91081289	-125.0754281	1225
H1678	SW Heceta	NA095-120	12.25	43.91081289	-125.0754281	1225
H1678	SW Heceta	NA095-122	0	43.91098773	-125.0756175	1224
H1678	SW Heceta	NA095-122	1	43.91098773	-125.0756175	1224
H1678	SW Heceta	NA095-122	3	43.91098773	-125.0756175	1224
H1678	SW Heceta	NA095-122	5	43.91098773	-125.0756175	1224
H1678	SW Heceta	NA095-122	7	43.91098773	-125.0756175	1224
H1678	SW Heceta	NA095-122	9	43.91098773	-125.0756175	1224

Table 11. cont. Summary of dive locations, depths and sample inventories for Push Core samples collected during cruise NA095

DIVE ID	Site Name	Sample ID	Sediment Depth (cm)	Latitude	Longitude	*Depth (m)*
H1679	S of Astoria Canyon	NA095-140	0	45.9432635	-125.177992	1356
H1679	S of Astoria Canyon	NA095-140	0.25	45.9432635	-125.177992	1356
H1679	S of Astoria Canyon	NA095-140	2.25	45.9432635	-125.177992	1356
H1679	S of Astoria Canyon	NA095-140	4.25	45.9432635	-125.177992	1356
H1679	S of Astoria Canyon	NA095-140	6.25	45.9432635	-125.177992	1356
H1679	S of Astoria Canyon	NA095-140	8.25	45.9432635	-125.177992	1356
H1679	S of Astoria Canyon	NA095-148	0	45.94328954	-125.1779378	1355
H1679	S of Astoria Canyon	NA095-148	0.5	45.94328954	-125.1779378	1355
H1679	S of Astoria Canyon	NA095-148	2.5	45.94328954	-125.1779378	1355
H1679	S of Astoria Canyon	NA095-148	4.5	45.94328954	-125.1779378	1355
H1680	Nehalem	NA095-156	0	45.87758137	-124.6402494	181
H1680	Nehalem	NA095-156	1	45.87758137	-124.6402494	181
H1680	Nehalem	NA095-156	3	45.87758137	-124.6402494	181
H1680	Nehalem	NA095-156	5	45.87758137	-124.6402494	181
H1680	Nehalem	NA095-156	7	45.87758137	-124.6402494	181
H1680	Nehalem	NA095-156	9	45.87758137	-124.6402494	181
H1680	Nehalem	NA095-156	11	45.87758137	-124.6402494	181
H1680	Nehalem	NA095-156	13	45.87758137	-124.6402494	181
H1680	Nehalem	NA095-157	0	45.87758282	-124.6402623	181
H1680	Nehalem	NA095-157	0.25	45.87758282	-124.6402623	181
H1680	Nehalem	NA095-157	2025	45.87758282	-124.6402623	181
H1680	Nehalem	NA095-157	4.25	45.87758282	-124.6402623	181
H1680	Nehalem	NA095-157	6.25	45.87758282	-124.6402623	181
H1680	Nehalem	NA095-157	5.28	45.87758282	-124.6402623	181
H1680	Nehalem	NA095-157	10.25	45.87758282	-124.6402623	181
H1680	Nehalem	NA095-157	12.25	45.87758282	-124.6402623	181
H1680	Nehalem	NA095-164	0	45.87012369	-124.6386275	183

Table 11. cont. Summary of dive locations, depths and sample inventories for Push Core samples collected during cruise NA095

DIVE ID	Site Name	Sample ID	Sediment Depth (cm)	Latitude	Longitude	*Depth (m)*
H1680	Nehalem	NA095-164	0.5	45.87012369	-124.6386275	183
H1680	Nehalem	NA095-164	2.5	45.87012369	-124.6386275	183
H1680	Nehalem	NA095-164	4.5	45.87012369	-124.6386275	183
H1680	Nehalem	NA095-164	6.5	45.87012369	-124.6386275	183
H1680	Nehalem	NA095-164	8.5	45.87012369	-124.6386275	183
H1680	Nehalem	NA095-164	10.5	45.87012369	-124.6386275	183

Table 12. Summary of dive locations, depths and sample inventories for Major samples collected during cruise NA095

DIVE ID	Site Name	Sample ID	Lat.	Long.	*Depth (m)*
H1670	S Coquille	NA095-023-MA04-PMEL	42.79259	-125.0620371	1455
H1670	S Coquille	NA095-027-MA02-PMEL	42.7925	-125.0612606	1452
H1671	S Coquille	NA095-034-MA03-PMEL	42.78	-124.9317536	732
H1671	S Coquille	NA095-039-MA01-PMEL	42.77949	-124.9319591	731
H1672	S Coquille	NA095-049-MA02-PMEL	42.81078	-124.7210575	149
H1674	Mud Volcano	NA095-073-MA01-PMEL	43.6796	-124.700822	473
H1675	Heceta	NA095-090-MA02-PMEL	44.25009	-124.9579315	492
H1675	Heceta	NA095-095-MA04-PMEL	44.24984	-124.9579835	492
H1678	SW Heceta	NA095-127-MA04-PMEL	43.91079	-125.075419	1224
H1679	S of Astoria Canyon	NA095-147-MA04-PMEL	45.94325	-125.1779485	1355
H1680	Nehalem	NA095-166-MA01-PMEL	45.87011	-124.6386328	183
H1680	Nehalem	NA095-163-MA03-PMEL	45.87014	-124.6386263	183

Part 8: In-situ Hydrophone Deployment

Robert Dziak, NOAA/PMEL

A total of 29 hours of passive acoustic data were collected using an in situ hydrophone deployed at the Heceta 500 m site (Dives H1675 and 1677; Figure 6). The goal of the deployment was to record long enough to obtain two tidal cycles, which we will use to assess variability in frequency and gas volume rates through time. The hydrophone was deployed near Marker 214 from 2018-06-24 UTC 18:21 to 06-25 23:25. The hydrophone was deployed within the middle of at least six streams of bubbles (bubbles 005). A gas-tight sample (NA095-086) and temperature reading were also collected near the bubble 005 site. Some hydrate formed in the cone of the gas-tight sampler, however no temperature differential was observed near the bubbles.

The hydrophone used for this experiment was a Greenridge Sciences Acousonde 3B™. The Acousonde omnidirectional, record at a 232 kHz sample rate with a 6-pole linear phase anti-aliasing filter at 42 kHz, has an element sensitivity of -204 dB re 1 V/µPa for the high frequency channel with 49 dB flat gain above 25 Hz, and an estimated gain error of ±1 dB. The hydrophone was strapped to a concrete block which in turn anchored the hydrophone to the seafloor (Figure 6). A positively buoyant float marked the location of the hydrophone, which recorded for ~29 hrs on the seafloor before being recovered and brought back to the surface vessel. Figure 7 shows the spectrogram of the 29 hours of the hydrophone deployment. There are continuous, broadband (~1-25 kHz) signals with little background noise from hours 2 to 20 that we interpret as oscillation sounds from the streams of bubbles emanating from the seafloor. There is also obvious noise from the ROV propellers and/or ship background noise once the hydrophone was on deck of the E/V *Nautilus*, but this noise can be distinguished from the bubble sounds by their frequency content.

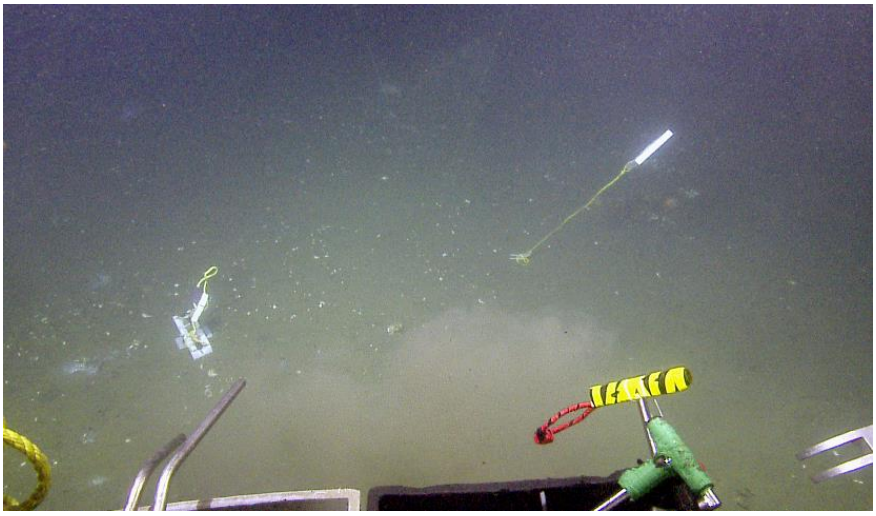


Figure 6: ROV camera image of hydrophone (lower left) deployed in bubble stream field at the Heceta 500 m site.

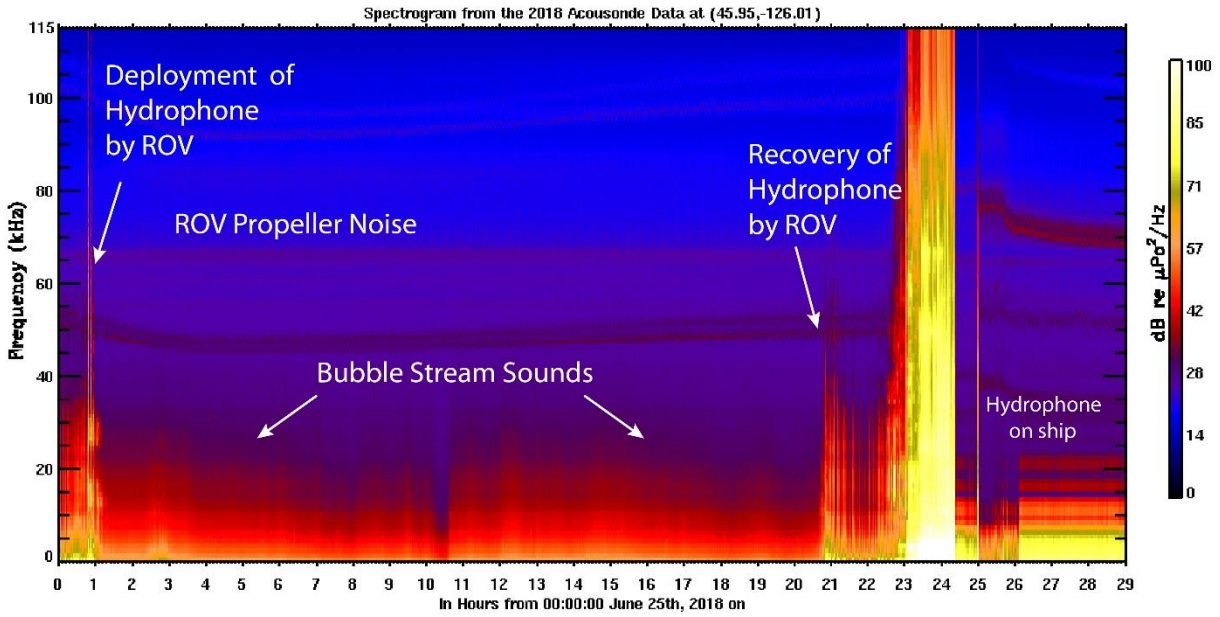


Figure 7: Spectrogram of hydrophone deployed at Heceta site (500 m), Marker 214. Vertical axis is frequency; horizontal axis is time in hours. Hours 2 through 20 show bubble oscillation sounds from ~1 – 25 kHz (Dziak *et al*., 2018). ROV propeller and/or ship and physical noise due to recovery of hydrophone also can be seen on the record.

Dziak, Bob & Matsumoto, Haru & Embley, R.W. & Merle, S & Lau, T-K & Baumberger, Tamara & Hammond, S.R. & Raineault, N. (2018). *Passive acoustic records of seafloor methane bubble streams on the Oregon continental margin*. Deep Sea Research Part II: Topical Studies in Oceanography. 10.1016/j.dsr2.2018.04.001.

Part 9: Cascadia Margin Expedition Outreach

Kelly Moran & the OET Education Team, OET

Various methods of outreach were employed to engage with the general public during the Cascadia Margin (NA095) expedition aboard E/V *Nautilus*. These methods included the 24/7 live stream from the ROVs and ship via **NautilusLive.org**; live ship-to-shore interactions with school and public groups ashore; photo albums of ROV dive highlights and topside activities; produced highlight videos for online distribution; and blogs posted to Nautiluslive.org. Additionally, the team collaborated with NOAA OER and NOAA PMEL partners for press and interviews.

Ship-To-Shore Interactions:

During the Cascadia cruise, the team on board conducted 16 ship-to-shore interactions with audiences in 10 states with a total reach of more than 440 people across many age groups. Venues that participated in these interactions included:

Girlstart Summer Camp - Houston, TX. ~30 students
Hatfield Marine Science Center (x2) - Newport, OR. ~40 people each interaction
Bosque Cafe - Newport, OR. ~30 people
Alaska Sealife Center - Seward, AK. ~10 people
Marineland Dolphin Adventure Center (x2) - Marineland, FL. ~30 campers
Leschi Elementary School - Seattle, WA. 21 students
College for Kids - Southwestern College (x2) - Chula Vista, CA. 40 students in each interaction
Smithsonian Natural History Museum (x2) - Washington, D.C. ~30 people
Academy of Our Lady of Peace - San Diego, CA. ~15 students
La Grange High School - Lake Charles, LA. ~15 people
Great Lakes Aquarium - Duluth, MI. ~25 people
The Franklin Institute - Philadelphia, PA. 20 people

Online Content:

2 photo albums created by our Science Communication Fellows:
http://*Nautilus*live.org/album/2018/06/26/life-cascadia-margin-methane-seeps
http://*Nautilus*live.org/album/2018/06/27/cascadia-margin-sampling-technology

2 highlight videos were produced for social media and Nautiluslive.org:
http://*Nautilus*live.org/video/2018/06/13/expedition-overview-cascadia-margin-seeps
http://*Nautilus*live.org/video/2018/06/21/cephalopod-week-cascadia-margin

1 blog written for the Latest News section on Nautiluslive.org:
http://*Nautilus*live.org/blog/2018/06/16/back-seeps-exploring-cascadia-margin

Online Metrics:

Nautiluslive.org pageviews: 491,416

Nautiluslive.org comments: 2,440

Press & Media:

Selection of media coverage:

https://toukou.nhk.or.jp/doga/movies/detail/8343
https://phys.org/news/2018-06-scientists-hydrophone-methane-seeps-ocean.html
http://www.nwnewsnetwork.org/post/bubble-hunters-ocean-scientists-count-1000-methane-seeps-pacific-northwest-coast
http://terra.oregonstate.edu/2018/06/oregons-methane-coast/
https://pugetsoundblogs.com/waterways/2018/06/20/*Nautilus*-submarine-can-send-your-soul-to-the-bottom-bob-ballard/

At-Sea Programs:

The expedition also involved participants in OET's education programs, the Science Communication Fellowship and Science & Engineering Internship Program. These opportunities, funded by OET and partners, provide real-world exposure for students and educators to cutting-edge science and provide valuable STEM workforce development experiences. Three educators and four undergraduate student participated in the cruise this way including contributing to general outreach.

Science Communication Fellows:

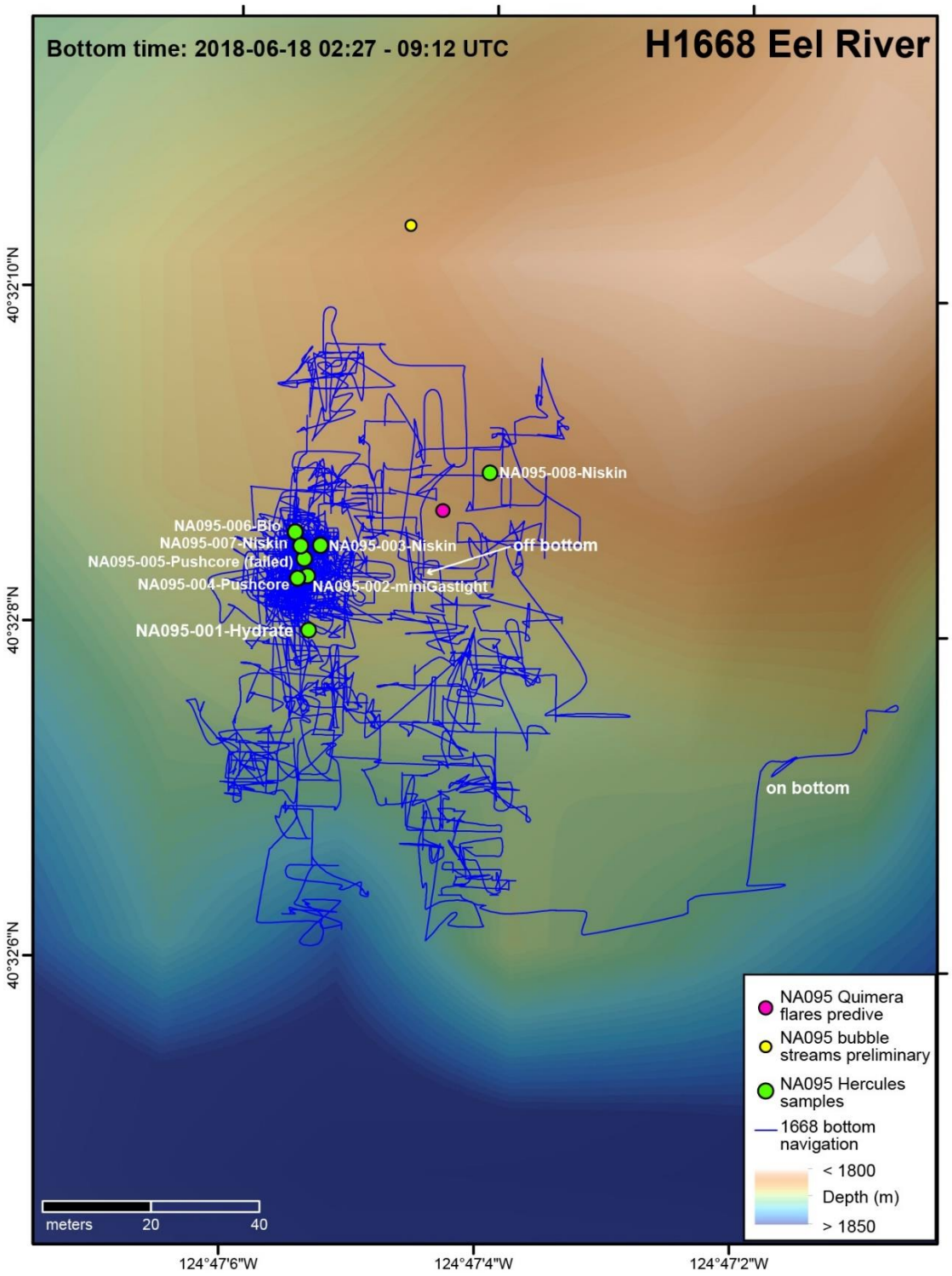
Martin Momsen - Houston Public School, Winona, Minnesota
Cassandra Weathersbee - Prince William County Public Schools, Manassas, Virginia
Savanna Nilsen - The Sterne School, San Francisco, California

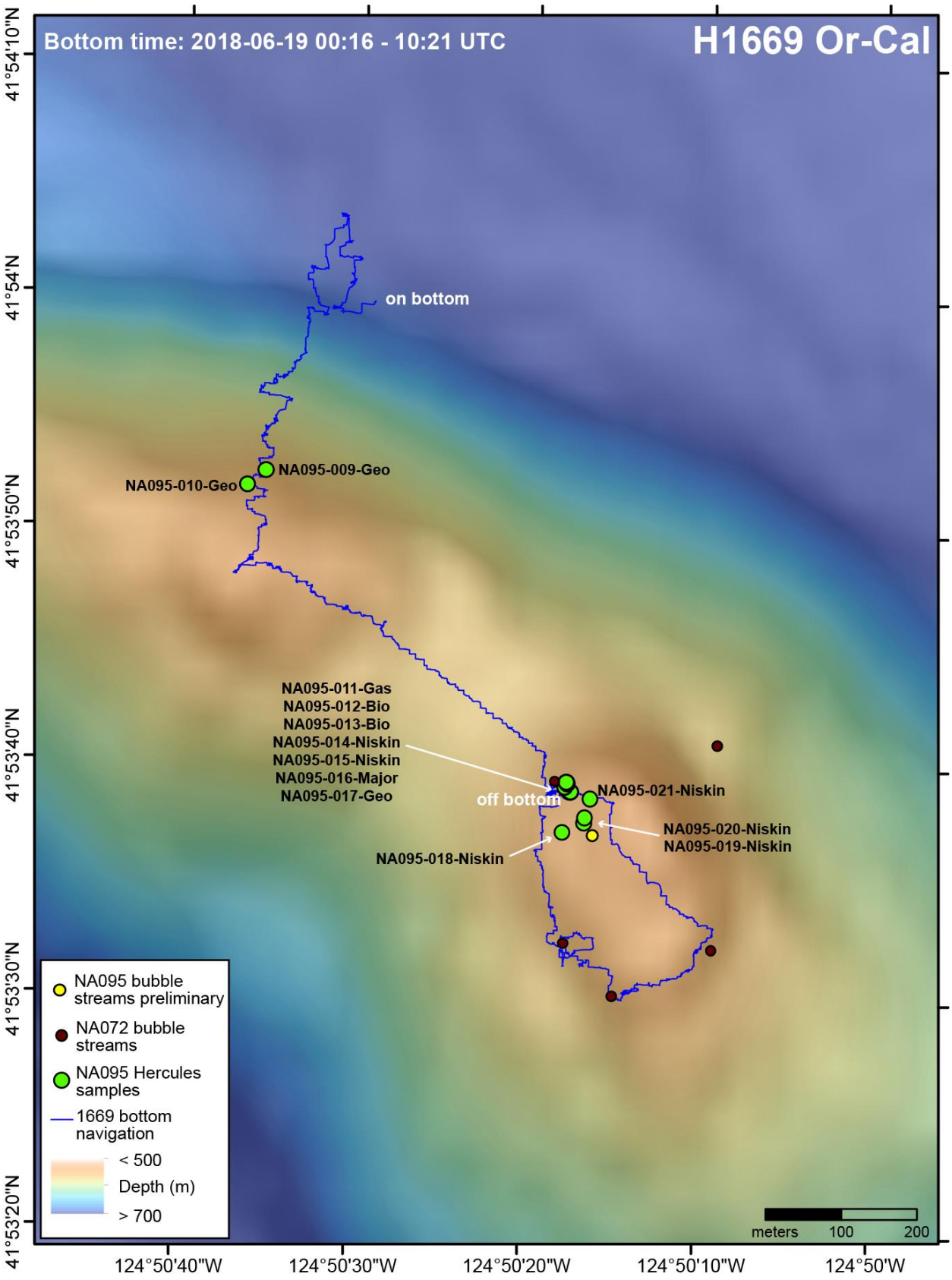
Science & Engineering Interns

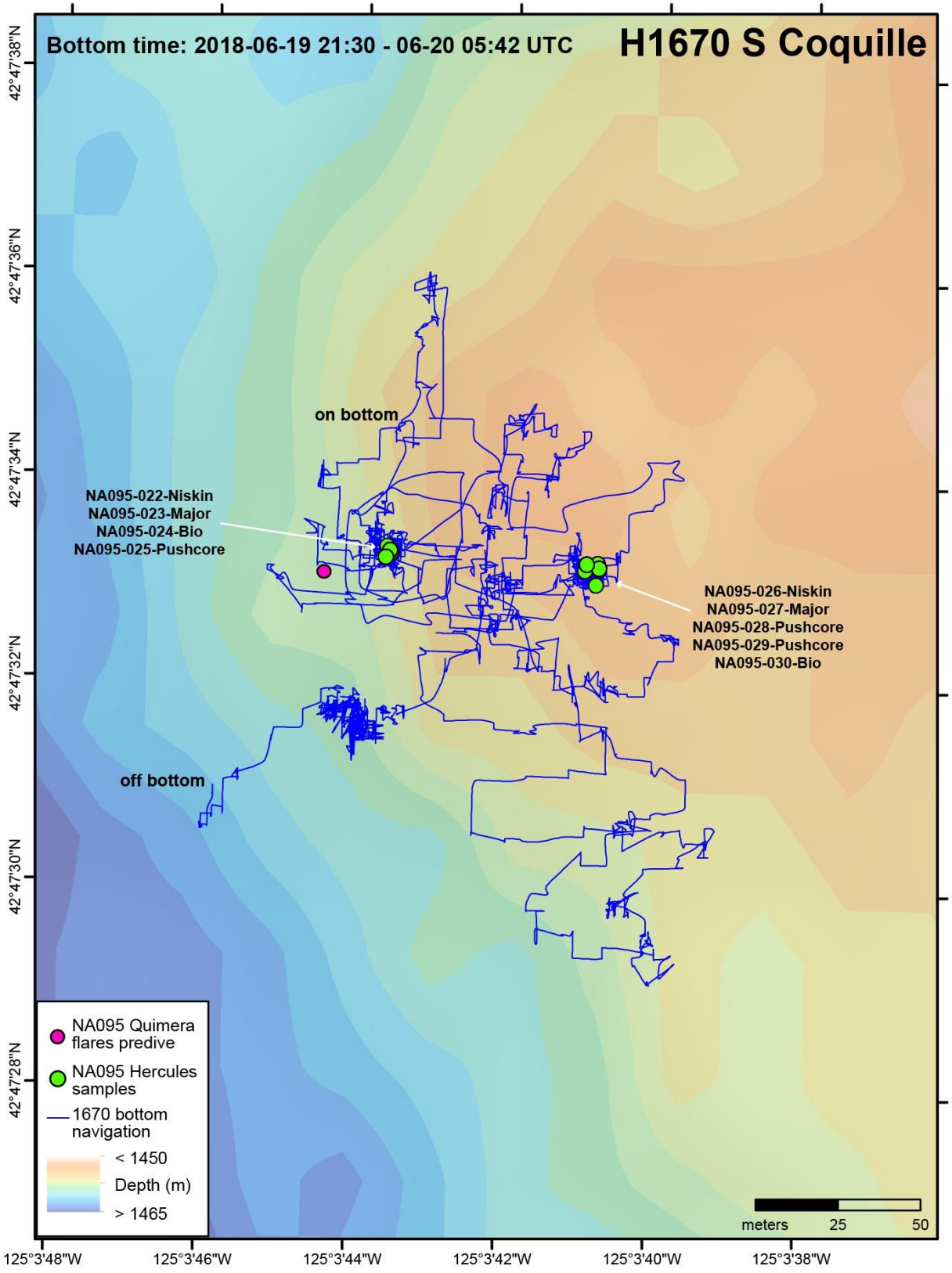
Ally Alpin - University of California, Santa Barbara
Leonardo Castro Sitiriche - University of Puerto Rico
Patrick Madaus - University of Connecticut
Oscar Eduardo Estrada Torrejon - Rochester Institute of Technology

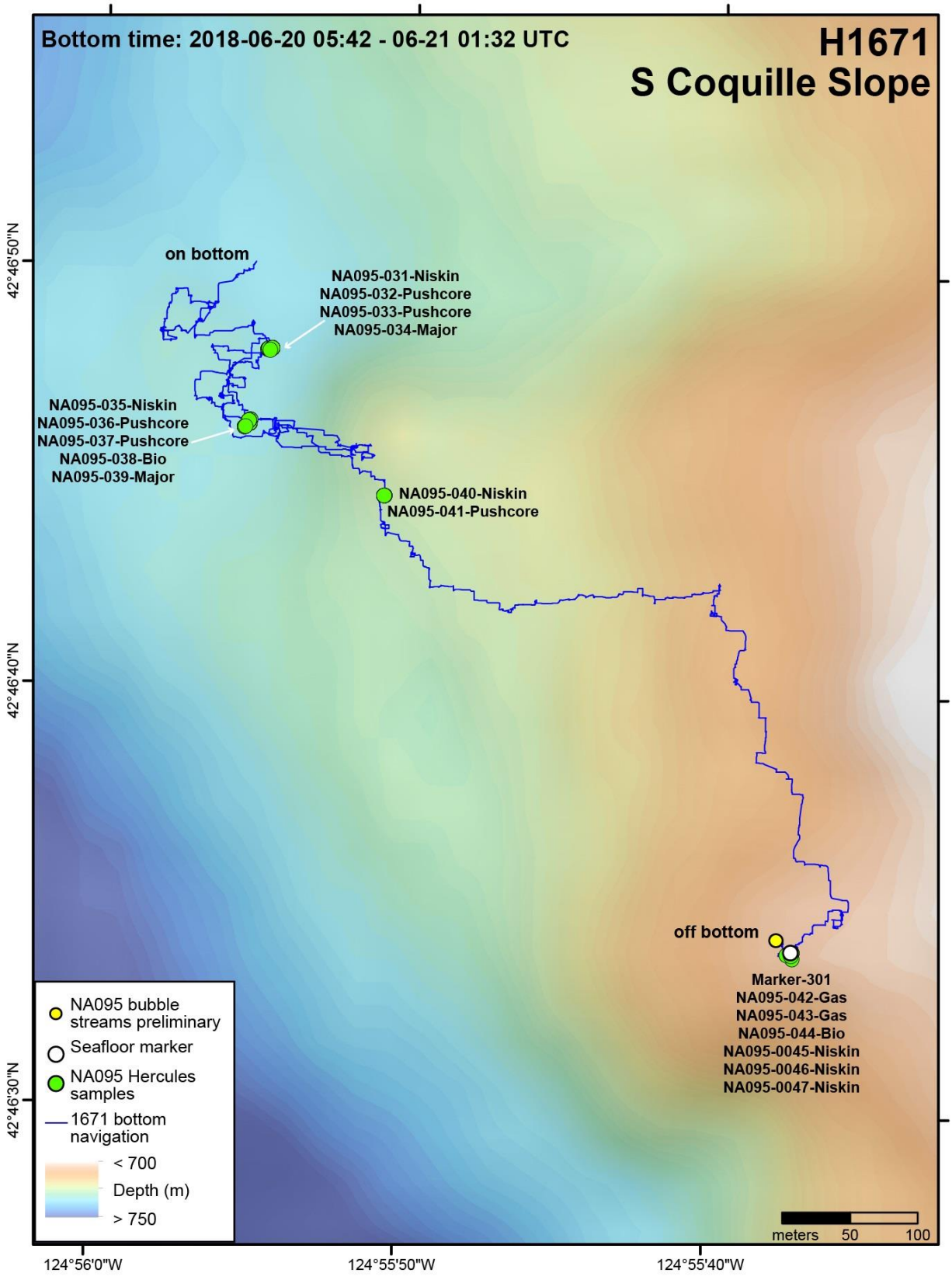
Part 10: Hercules ROV Dive Maps

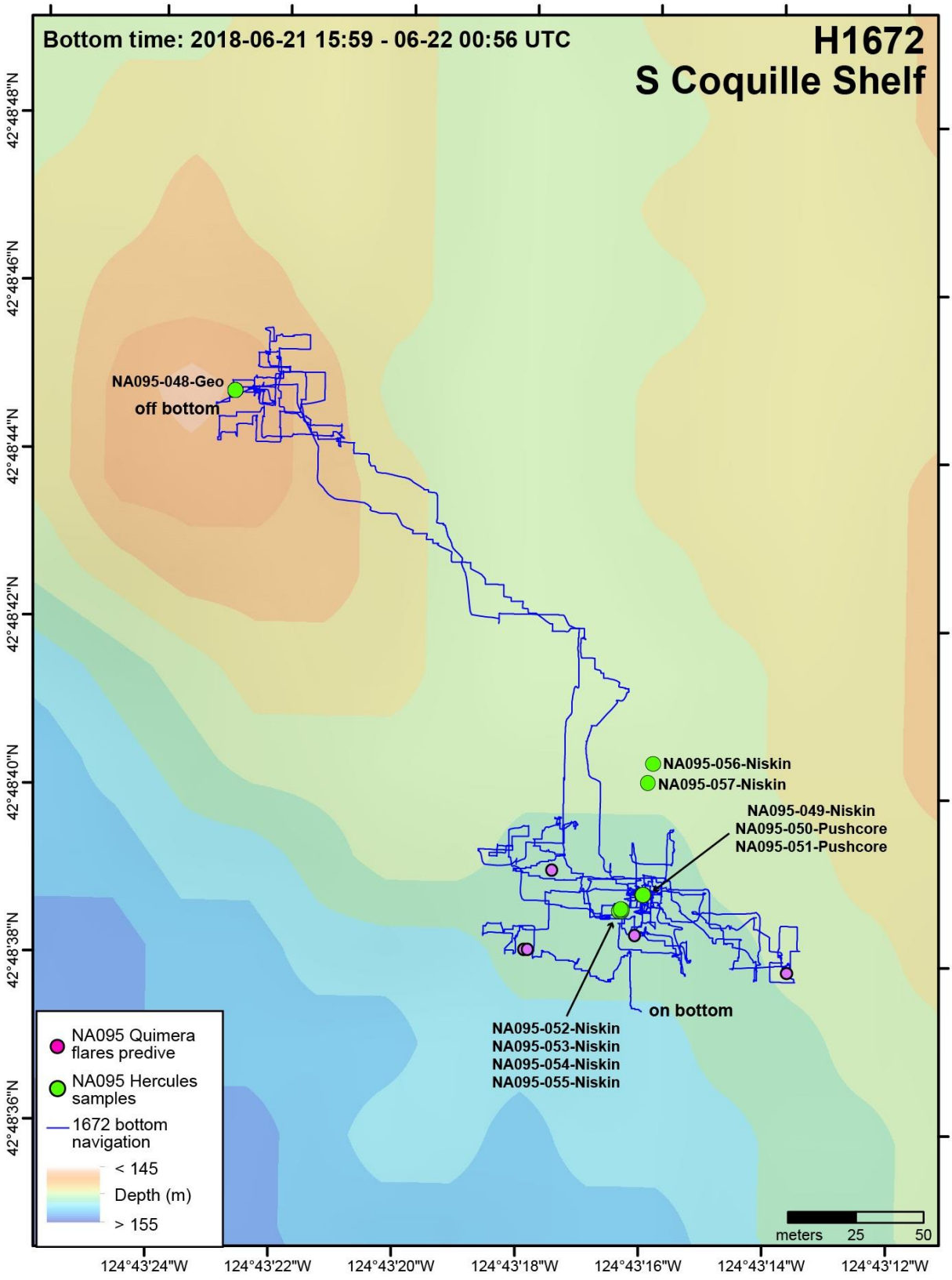
All times are UTC. Created by Susan G. Merle

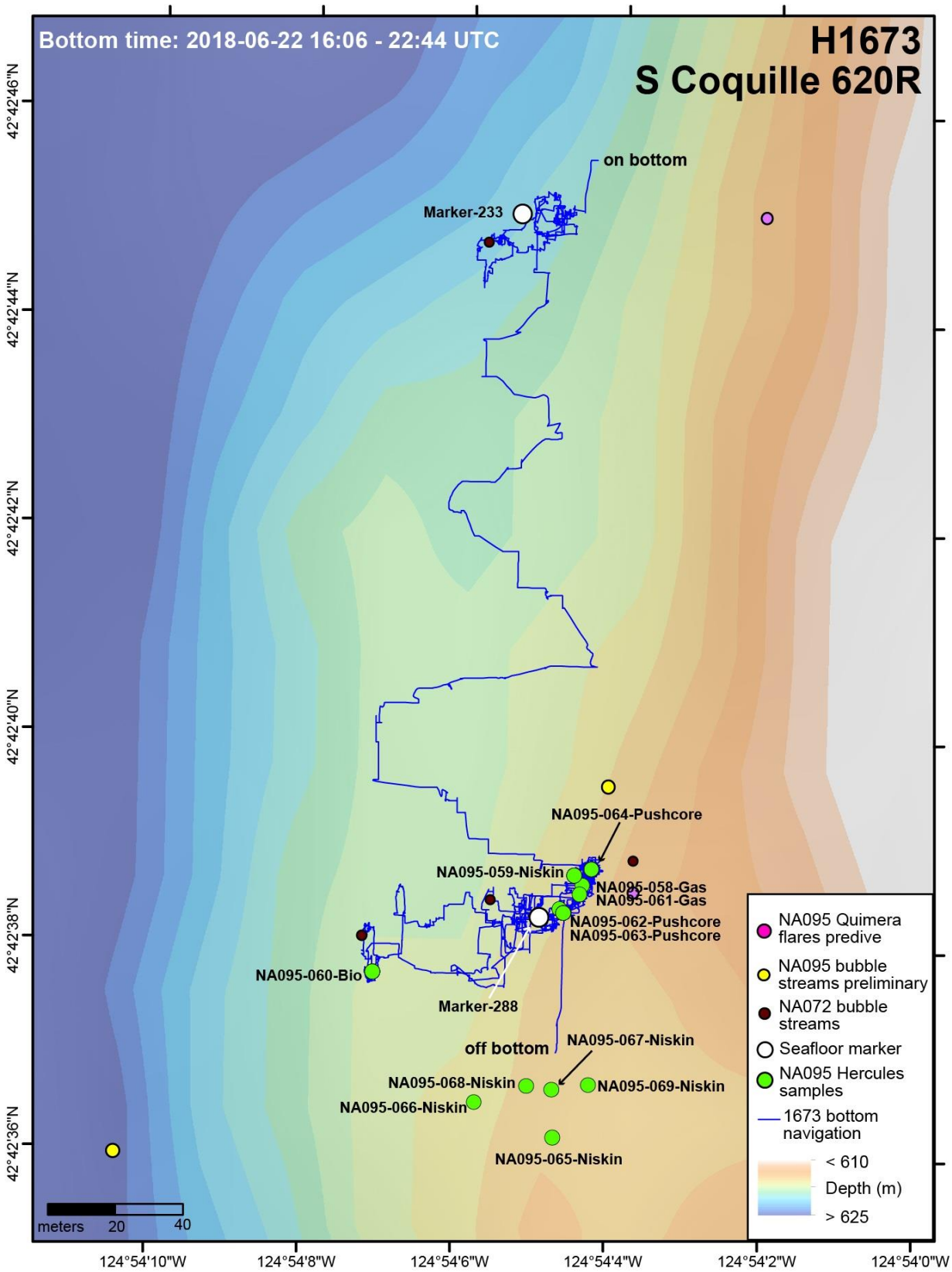


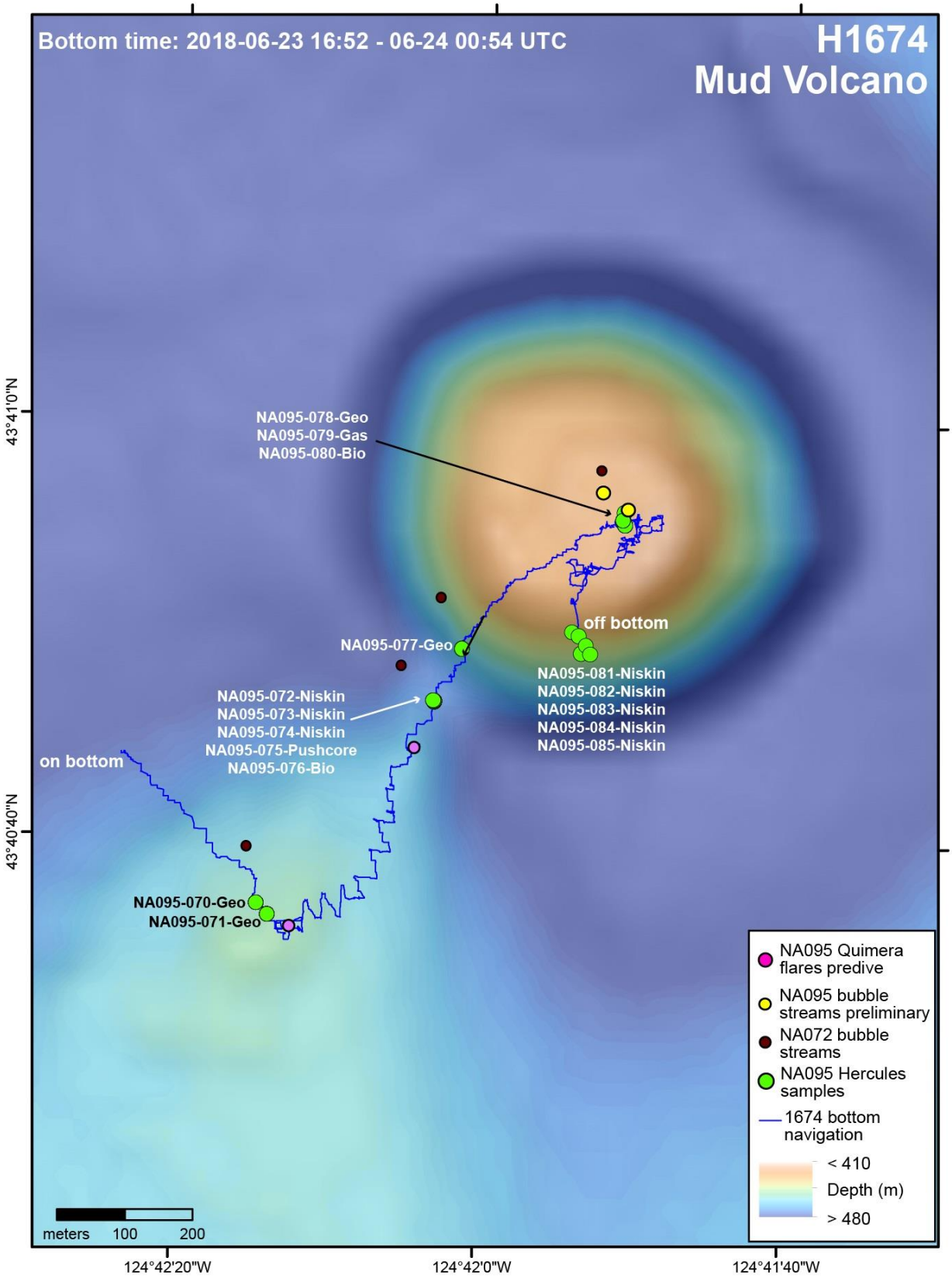

Bottom time: 2018-06-19 00:16 - 10:21 UTC
H1669 Or-Cal
on bottom
NA095-009-Geo
NA095-010-Geo
NA095-011-Gas
NA095-012-Bio
NA095-013-Bio
NA095-014-Niskin
NA095-015-Niskin
NA095-016-Major
NA095-017-Geo
off bottom
NA095-021-Niskin
NA095-020-Niskin
NA095-019-Niskin
NA095-018-Niskin
NA095 bubble streams preliminary
NA072 bubble streams
NA095 Hercules samples
1669 bottom navigation
< 500
Depth (m)
> 700
meters 100 200
41°54'10"N
41°54'N
41°53'50"N
41°53'40"N
41°53'30"N
41°53'20"N
124°50'40"W
124°50'30"W
124°50'20"W
124°50'10"W
124°50'W

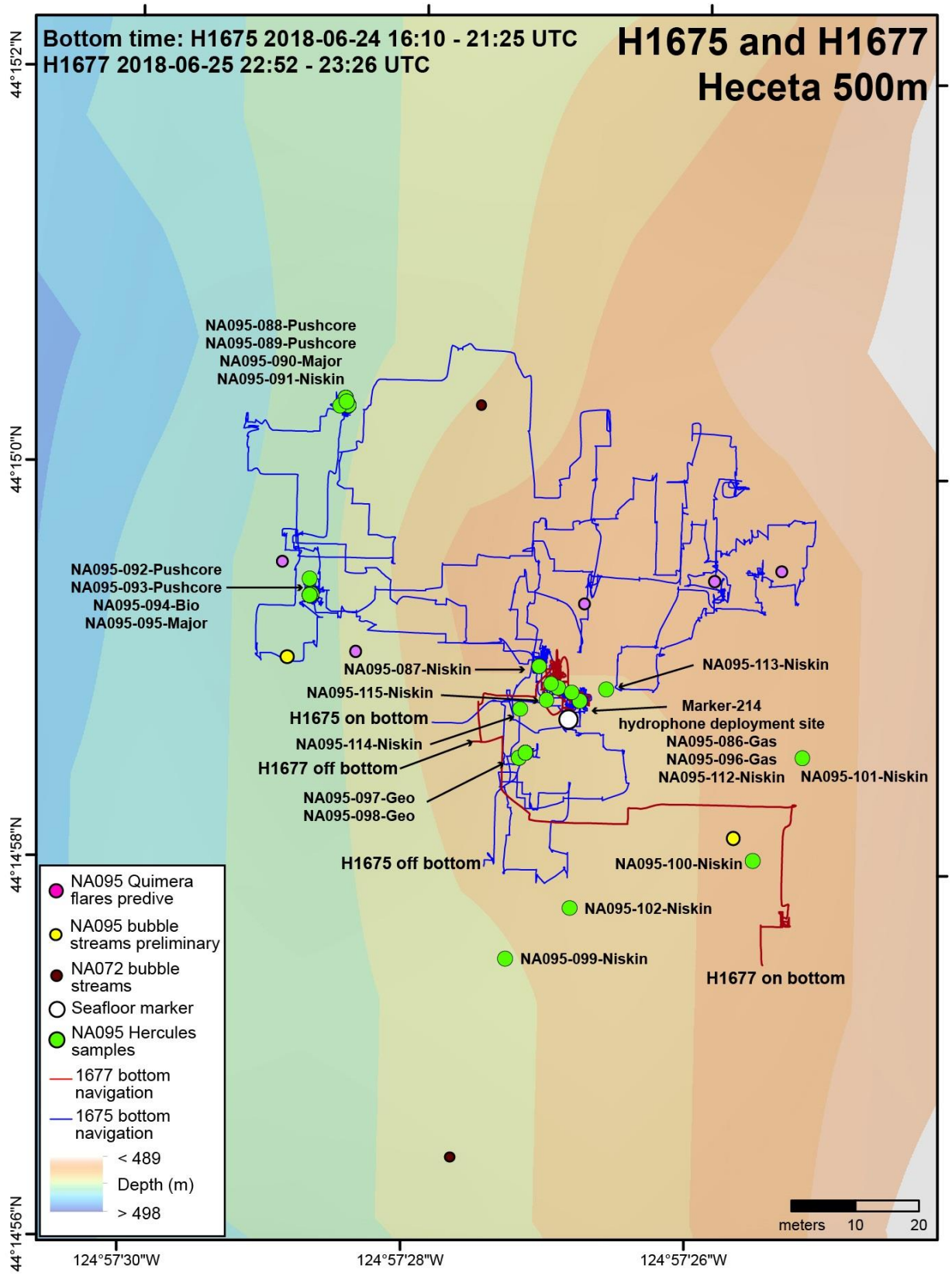

Bottom time: 2018-06-19 21:30 - 06-20 05:42 UTC
H1670 S Coquille
on bottom
off bottom
NA095-022-Niskin
NA095-023-Major
NA095-024-Bio
NA095-025-Pushcore
NA095-026-Niskin
NA095-027-Major
NA095-028-Pushcore
NA095-029-Pushcore
NA095-030-Bio
NA095 Quimera flares predive
NA095 Hercules samples
1670 bottom navigation
< 1450
Depth (m)
> 1465
meters 25 50
42°47'38"N
42°47'36"N
42°47'34"N
42°47'32"N
42°47'30"N
42°47'28"N
125°3'48"W
125°3'46"W
125°3'44"W
125°3'42"W
125°3'40"W
125°3'38"W

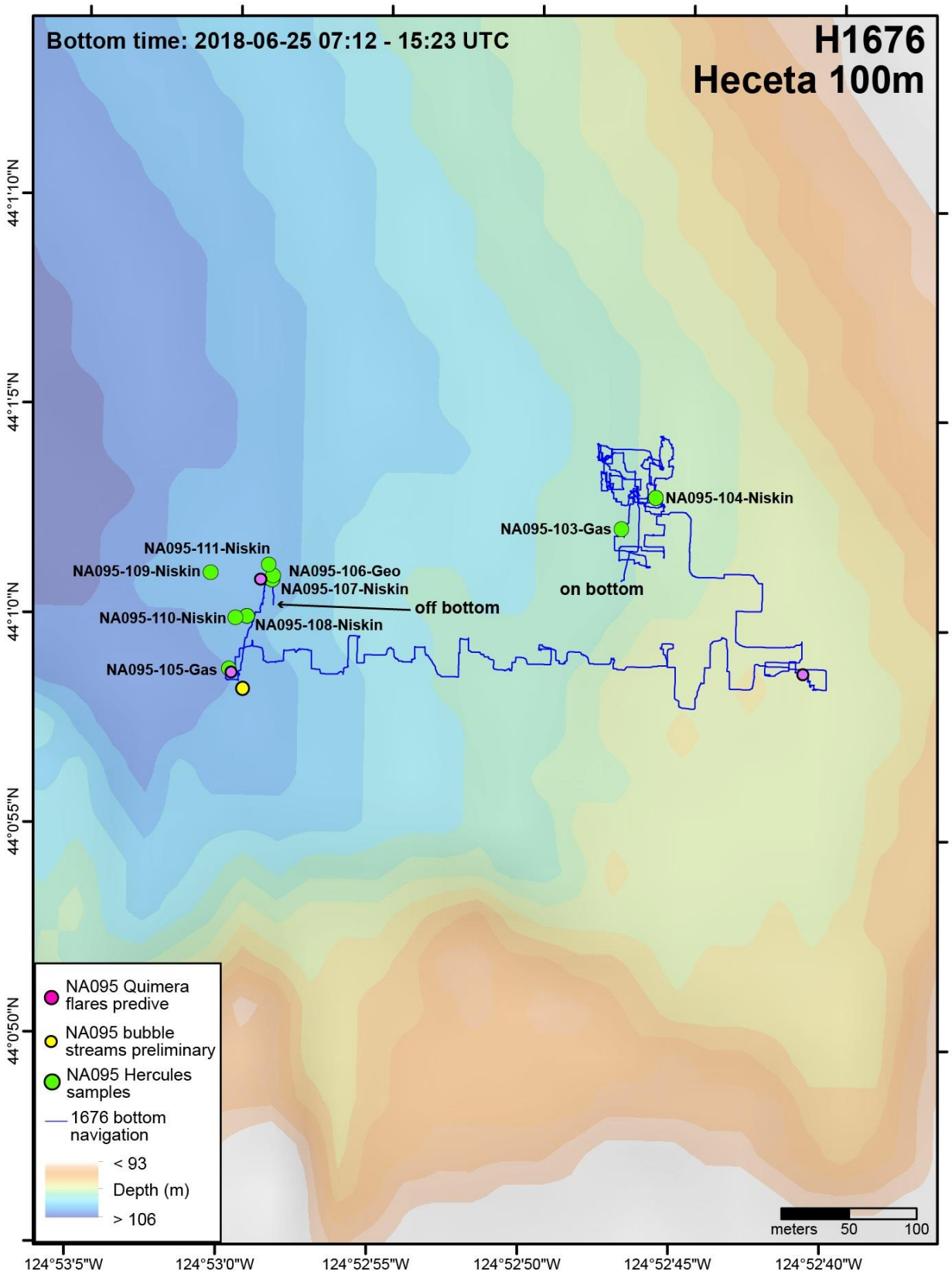

Bottom time: 2018-06-20 05:42 - 06-21 01:32 UTC
H1671
S Coquille Slope
on bottom
NA095-031-Niskin
NA095-032-Pushcore
NA095-033-Pushcore
NA095-034-Major
NA095-035-Niskin
NA095-036-Pushcore
NA095-037-Pushcore
NA095-038-Bio
NA095-039-Major
NA095-040-Niskin
NA095-041-Pushcore
off bottom
Marker-301
NA095-042-Gas
NA095-043-Gas
NA095-044-Bio
NA095-0045-Niskin
NA095-0046-Niskin
NA095-0047-Niskin
NA095 bubble streams preliminary
Seafloor marker
NA095 Hercules samples
1671 bottom navigation
< 700
Depth (m)
> 750
meters 50 100
42°46'50"N
42°46'40"N
42°46'30"N
124°56'0"W
124°55'50"W
124°55'40"W

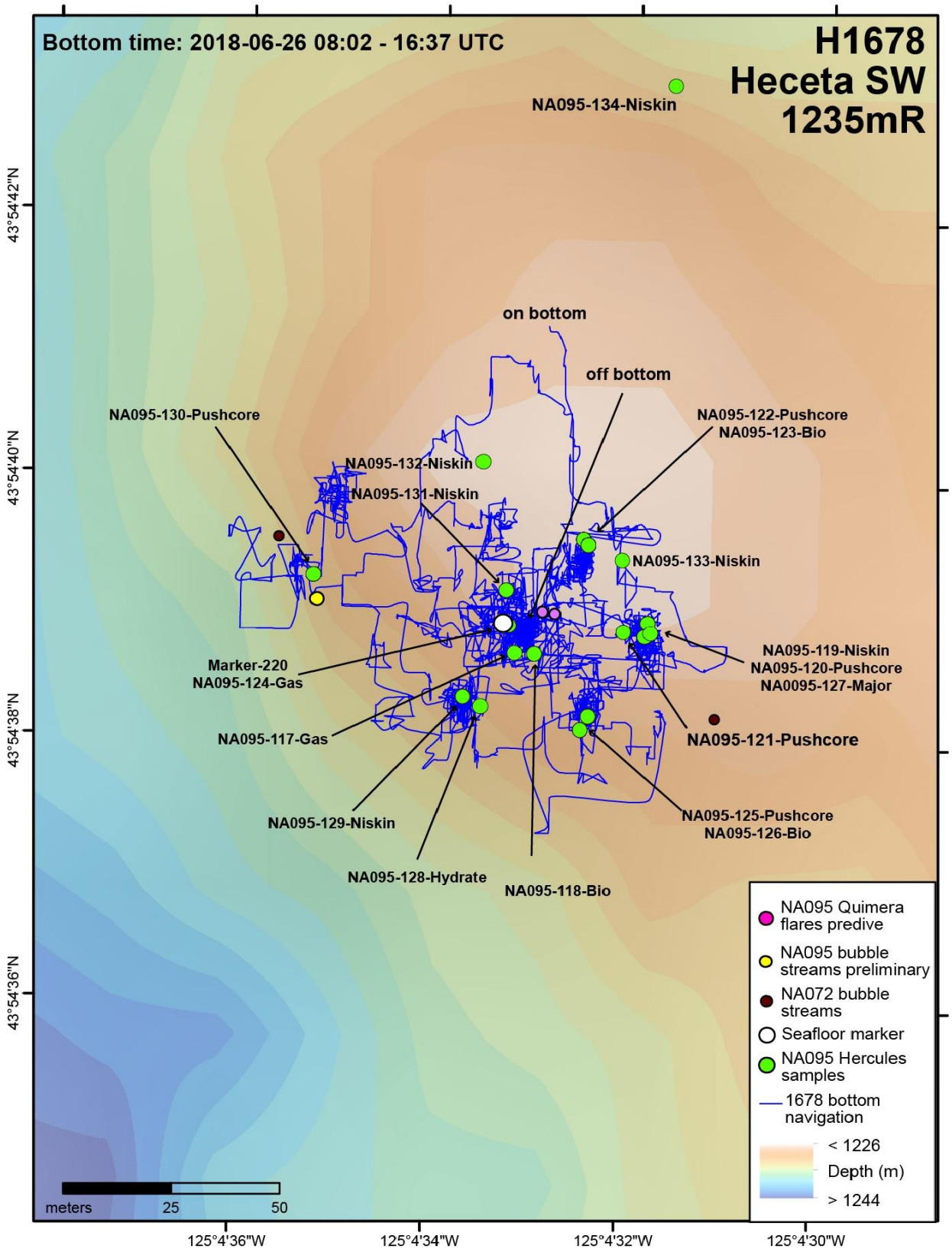

Bottom time: 2018-06-21 15:59 - 06-22 00:56 UTC
H1672
S Coquille Shelf
NA095-048-Geo
off bottom
NA095-056-Niskin
NA095-057-Niskin
NA095-049-Niskin
NA095-050-Pushcore
NA095-051-Pushcore
on bottom
NA095-052-Niskin
NA095-053-Niskin
NA095-054-Niskin
NA095-055-Niskin
NA095 Quimera flares predive
NA095 Hercules samples
1672 bottom navigation
< 145
Depth (m)
> 155
meters 25 50
42°48'48"N
42°48'46"N
42°48'44"N
42°48'42"N
42°48'40"N
42°48'38"N
42°48'36"N
124°43'24"W
124°43'22"W
124°43'20"W
124°43'18"W
124°43'16"W
124°43'14"W
124°43'12"W

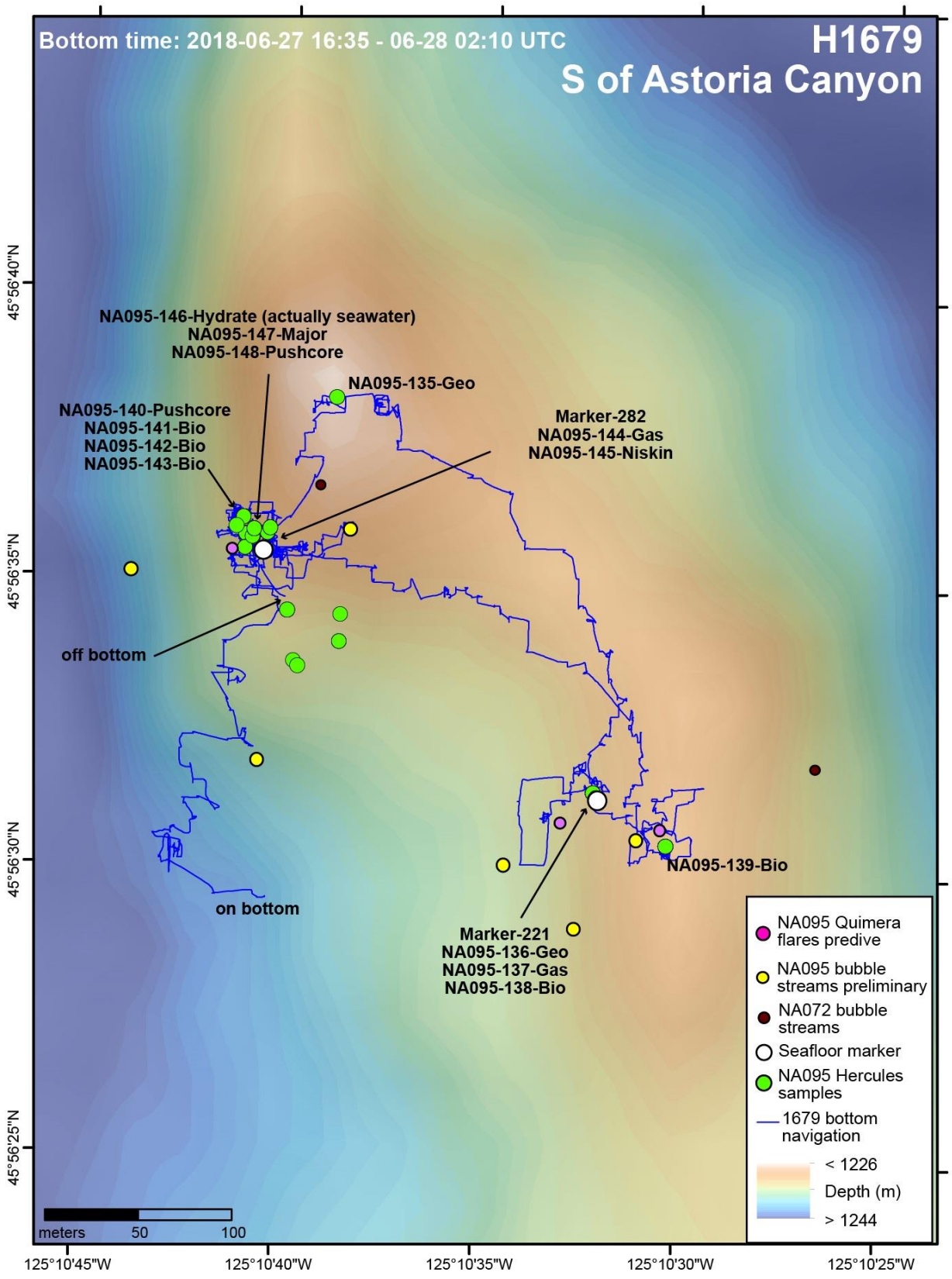

Bottom time: 2018-06-22 16:06 - 22:44 UTC
H1673
S Coquille 620R
on bottom
Marker-233
NA095-064-Pushcore
NA095-059-Niskin
NA095-058-Gas
NA095-061-Gas
NA095-062-Pushcore
NA095-063-Pushcore
NA095-060-Bio
Marker-288
off bottom
NA095-067-Niskin
NA095-068-Niskin
NA095-069-Niskin
NA095-066-Niskin
NA095-065-Niskin
NA095 Quimera flares predive
NA095 bubble streams preliminary
NA072 bubble streams
Seafloor marker
NA095 Hercules samples
1673 bottom navigation
< 610
Depth (m)
> 625
meters 20 40
42°42'46"N
42°42'44"N
42°42'42"N
42°42'40"N
42°42'38"N
42°42'36"N
124°54'10"W
124°54'8"W
124°54'6"W
124°54'4"W
124°54'2"W
124°54'0"W

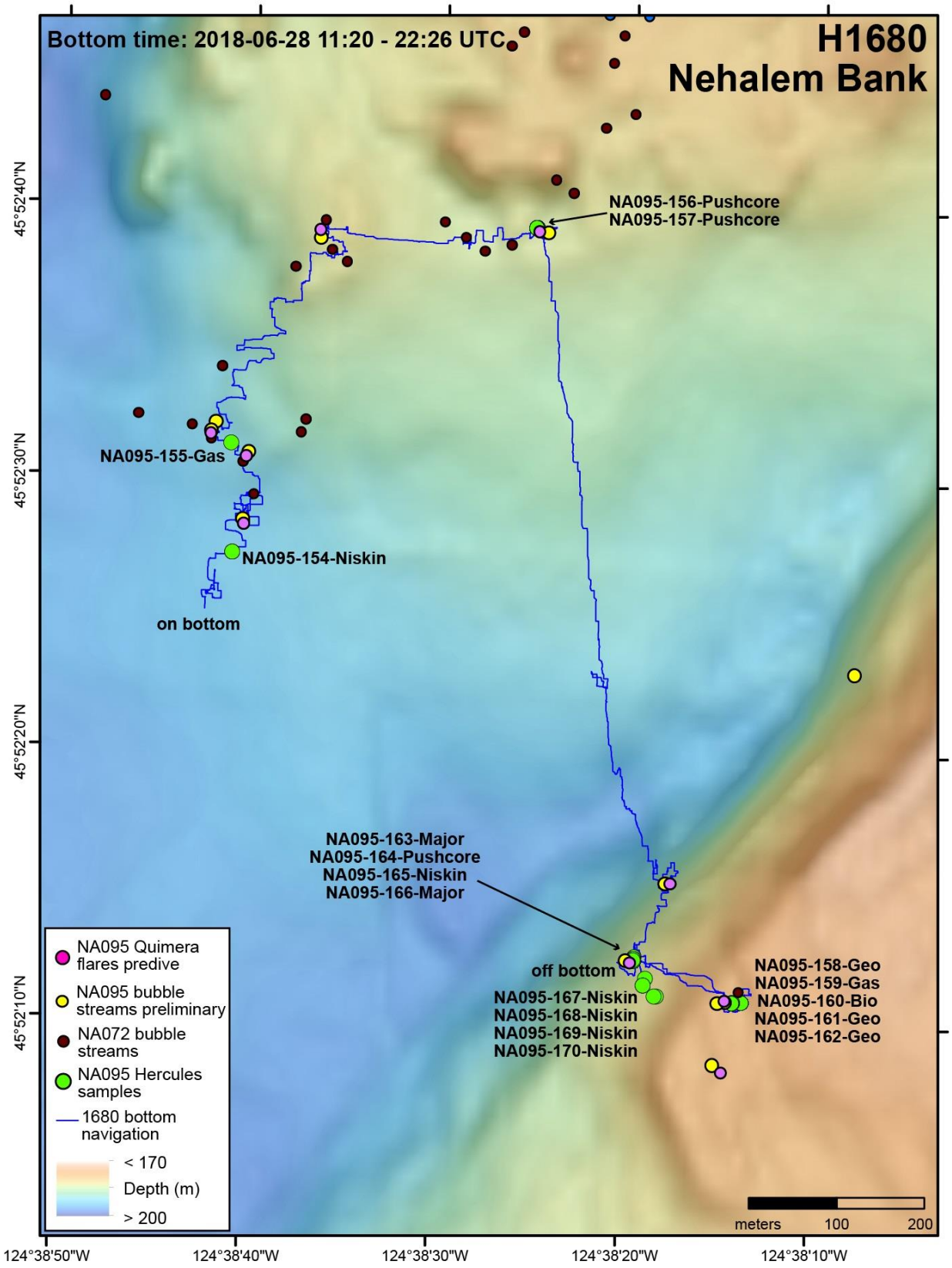

Bottom time: 2018-06-23 16:52 - 06-24 00:54 UTC
H1674
Mud Volcano
NA095-078-Geo
NA095-079-Gas
NA095-080-Bio
off bottom
NA095-077-Geo
NA095-081-Niskin
NA095-082-Niskin
NA095-083-Niskin
NA095-084-Niskin
NA095-085-Niskin
NA095-072-Niskin
NA095-073-Niskin
NA095-074-Niskin
NA095-075-Pushcore
NA095-076-Bio
on bottom
NA095-070-Geo
NA095-071-Geo
NA095 Quimera flares predive
NA095 bubble streams preliminary
NA072 bubble streams
NA095 Hercules samples
1674 bottom navigation
< 410
Depth (m)
> 480
meters 100 200
43°41'0"N
43°40'40"N
124°42'20"W
124°42'0"W
124°41'40"W


Bottom time: H1675 2018-06-24 16:10 - 21:25 UTC
H1677 2018-06-25 22:52 - 23:26 UTC
H1675 and H1677
Heceta 500m
44°15'2"N
44°15'0"N
44°14'58"N
44°14'56"N
124°57'30"W
124°57'28"W
124°57'26"W
NA095-088-Pushcore
NA095-089-Pushcore
NA095-090-Major
NA095-091-Niskin
NA095-092-Pushcore
NA095-093-Pushcore
NA095-094-Bio
NA095-095-Major
NA095-087-Niskin
NA095-115-Niskin
H1675 on bottom
NA095-114-Niskin
H1677 off bottom
NA095-097-Geo
NA095-098-Geo
H1675 off bottom
NA095-113-Niskin
Marker-214
hydrophone deployment site
NA095-086-Gas
NA095-096-Gas
NA095-112-Niskin
NA095-101-Niskin
NA095-100-Niskin
NA095-102-Niskin
NA095-099-Niskin
H1677 on bottom
NA095 Quimera flares predive
NA095 bubble streams preliminary
NA072 bubble streams
Seafloor marker
NA095 Hercules samples
1677 bottom navigation
1675 bottom navigation
< 489
Depth (m)
> 498
meters 10 20


Bottom time: 2018-06-25 07:12 - 15:23 UTC
H1676
Heceta 100m
NA095-104-Niskin
NA095-103-Gas
on bottom
NA095-111-Niskin
NA095-109-Niskin
NA095-106-Geo
NA095-107-Niskin
off bottom
NA095-110-Niskin
NA095-108-Niskin
NA095-105-Gas
NA095 Quimera flares predive
NA095 bubble streams preliminary
NA095 Hercules samples
1676 bottom navigation
< 93
Depth (m)
> 106
meters 50 100
44°1'10"N
44°1'5"N
44°1'0"N
44°0'55"N
44°0'50"N
124°53'5"W
124°53'0"W
124°52'55"W
124°52'50"W
124°52'45"W
124°52'40"W


Bottom time: 2018-06-26 08:02 - 16:37 UTC
H1678
Heceta SW
1235mR
NA095-134-Niskin
on bottom
off bottom
NA095-130-Pushcore
NA095-122-Pushcore
NA095-123-Bio
NA095-132-Niskin
NA095-131-Niskin
NA095-133-Niskin
Marker-220
NA095-124-Gas
NA095-119-Niskin
NA095-120-Pushcore
NA0095-127-Major
NA095-117-Gas
NA095-121-Pushcore
NA095-129-Niskin
NA095-125-Pushcore
NA095-126-Bio
NA095-128-Hydrate
NA095-118-Bio
43°54'42"N
43°54'40"N
43°54'38"N
43°54'36"N
125°4'36"W
125°4'34"W
125°4'32"W
125°4'30"W
meters
25
50
NA095 Quimera flares predive
NA095 bubble streams preliminary
NA072 bubble streams
Seafloor marker
NA095 Hercules samples
1678 bottom navigation
< 1226
Depth (m)
> 1244


Bottom time: 2018-06-27 16:35 - 06-28 02:10 UTC
H1679
S of Astoria Canyon
NA095-146-Hydrate (actually seawater)
NA095-147-Major
NA095-148-Pushcore
NA095-135-Geo
NA095-140-Pushcore
NA095-141-Bio
NA095-142-Bio
NA095-143-Bio
Marker-282
NA095-144-Gas
NA095-145-Niskin
off bottom
on bottom
NA095-139-Bio
Marker-221
NA095-136-Geo
NA095-137-Gas
NA095-138-Bio
NA095 Quimera flares predive
NA095 bubble streams preliminary
NA072 bubble streams
Seafloor marker
NA095 Hercules samples
1679 bottom navigation
< 1226
Depth (m)
> 1244
meters
50
100
45°56'40"N
45°56'35"N
45°56'30"N
45°56'25"N
125°10'45"W
125°10'40"W
125°10'35"W
125°10'30"W
125°10'25"W


Bottom time: 2018-06-28 11:20 - 22:26 UTC
H1680
Nehalem Bank
NA095-156-Pushcore
NA095-157-Pushcore
NA095-155-Gas
NA095-154-Niskin
on bottom
NA095-163-Major
NA095-164-Pushcore
NA095-165-Niskin
NA095-166-Major
off bottom
NA095-167-Niskin
NA095-168-Niskin
NA095-169-Niskin
NA095-170-Niskin
NA095-158-Geo
NA095-159-Gas
NA095-160-Bio
NA095-161-Geo
NA095-162-Geo
NA095 Quimera flares predive
NA095 bubble streams preliminary
NA072 bubble streams
NA095 Hercules samples
1680 bottom navigation
< 170
Depth (m)
> 200
meters
100
200
45°52'40"N
45°52'30"N
45°52'20"N
45°52'10"N
124°38'50"W
124°38'40"W
124°38'30"W
124°38'20"W
124°38'10"W

Part 11: NA095 Sample Information

Table 13 (pages 73 – 175) contains detailed information pertaining to all samples collected by ROV Hercules during each dive of cruise NA095. The following is a list of abbreviations that are found in Table 13:

Zm = Depth (m) Paroscientific Digiquartz
Tc = Temperature (degC) Seabird FastCat 49Plus
Spsu = Salinity (psu) Seabird FastCat 49Plus
O_2 = Corrected O_2 data (x0.813)
Wetlab = Wet lab description for each subsample

Table 14 (page 176) contains a list of all seafloor markers set down and/or visited during cruise NA095.

Note: Sample information extracted from information provided by E/V *Nautilus* scientific personnel.

Table 13. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-001	NA095-001-HY-PMEL	H1668	2018-06-18T06:25:50.687Z	40.53555	-124.78478	1809.3	Hydrate	2.3	34.6	38.4	Hydrate sample by Embari marker 1, from exposed mound surrounded by brittle stars and clams (mostly dead); targeting an area with minimal sediment on top; sampler dropped, but hydrate still appears to be inside tube	Separate water from gas using seagoing extraction line	Glass Ampules	NOAA PMEL
NA095-002	NA095-002-GT01mini-PMEL	H1668	2018-06-18T08:01:27.458Z	40.53564	-124.78478	1812.6	Gas	2.2	34.6	43.8	Gas-tight sample (gt mini #01, yellow) from single bubble stream coming up through a clam bed; the clam bed is a mixture of dead and live clams with many brittle stars amongst the bed and some anemones and snails around as well; the bubbles are coming up from a portion of the clam bed that has more reduced sediment then the surrounding areas.		Glass Ampules	NOAA PMEL
NA095-003	NA095-003-Chem-PMEL	H1668	2018-06-18T08:05:13.537Z	40.53569	-124.78476	1812.6	Niskin	2.2	34.6	44.4	Niskin over the clam bed that we did the gas tight (-002); large bed with many dead and some live clams; many brittle stars and some anemones and snails	Water used for geochemistry tests and 3 l used for eDNA filtration	NA	NOAA PMEL
NA095-003	NA095-003-01-A-PMEL	H1668	2018-06-18T08:05:13.537Z	40.53569	-124.78476	1812.6	Niskin	2.2	34.6	44.4	Niskin over the clam bed that we did the gas tight (-002); large bed with many dead and some live clams; many brittle stars and some anemones and snails		95% Ethanol	NOAA PMEL (Stepien)
NA095-003	NA095-003-02-E-OSU	H1668	2018-06-18T08:05:13.537Z	40.53569	-124.78476	1812.6	Niskin	2.2	34.6	44.4	Niskin over the clam bed that we did the gas tight (-002); large bed with many dead and some live clams; many brittle stars and some anemones and snails		Frozen	OSU (Thurber)
NA095-004	NA095-004-Chem-PMEL	H1668	2018-06-18T08:16:33.219Z	40.53563	-124.78480	1812.6	Push core	2.2	34.6	45.0	In clam bed that we took -002 and -003 above; will be duplicate with -005	11 cm deep; reduced sediment appeared 3 cm down; some worms and other invertebrates within core; core sliced and porewater extracted	NA	NOAA PMEL (Butterfield)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-004	NA095-004-01-E-OSU	H1668	2018-06-18T08:16:33.219Z	40.53563	-124.78480	1812.6	Push core	2.2	34.6	45.0	In clam bed that we took -002 and -003 above; will be duplicate with -004		Frozen	OSU (Thurber)
NA095-004	NA095-004-02-E-OSU	H1668	2018-06-18T08:16:33.219Z	40.53563	-124.78480	1812.6	Push core	2.2	34.6	45.0	In clam bed that we took -002 and -003 above; will be duplicate with -003		Frozen	OSU (Thurber)
NA095-004	NA095-004-03-E-OSU	H1668	2018-06-18T08:16:33.219Z	40.53563	-124.78480	1812.6	Push core	2.2	34.6	45.0	In clam bed that we took -002 and -003 above; will be duplicate with -002		Frozen	OSU (Thurber)
NA095-004	NA095-004-04-E-OSU	H1668	2018-06-18T08:16:33.219Z	40.53563	-124.78480	1812.6	Push core	2.2	34.6	45.0	In clam bed that we took -002 and -003 above; will be duplicate with -001		Frozen	OSU (Thurber)
NA095-004	NA095-004-05-E-OSU	H1668	2018-06-18T08:16:33.219Z	40.53563	-124.78480	1812.6	Push core	2.2	34.6	45.0	In clam bed that we took -002 and -003 above; will be duplicate with 000		Frozen	OSU (Thurber)
NA095-004	NA095-004-06-E-OSU	H1668	2018-06-18T08:16:33.219Z	40.53563	-124.78480	1812.6	Push core	2.2	34.6	45.0	In clam bed that we took -002 and -003 above; will be duplicate with 001		Frozen	OSU (Thurber)
NA095-004	NA095-004-07-E-OSU	H1668	2018-06-18T08:16:33.219Z	40.53563	-124.78480	1812.6	Push core	2.2	34.6	45.0	In clam bed that we took -002 and -003 above; will be duplicate with 002		Frozen	OSU (Thurber)
NA095-004	NA095-004-08-E-OSU	H1668	2018-06-18T08:16:33.219Z	40.53563	-124.78480	1812.6	Push core	2.2	34.6	45.0	In clam bed that we took -002 and -003 above; will be duplicate with 003		Frozen	OSU (Thurber)
NA095-004	NA095-004-09-E-OSU	H1668	2018-06-18T08:16:33.219Z	40.53563	-124.78480	1812.6	Push core	2.2	34.6	45.0	In clam bed that we took -002 and -003 above; will be duplicate with 004		Frozen	OSU (Thurber)
NA095-004	NA095-004-10-F-OSU	H1668	2018-06-18T08:16:33.219Z	40.53563	-124.78480	1812.6	Push core	2.2	34.6	45.0	In clam bed that we took -002 and -003 above; will be duplicate with 005		Seawater	OSU (Thurber)
NA095-004	NA095-004-11-F-OSU	H1668	2018-06-18T08:16:33.219Z	40.53563	-124.78480	1812.6	Push core	2.2	34.6	45.0	In clam bed that we took -002 and -003 above; will be duplicate with 006		Seawater	OSU (Thurber)
NA095-005	SAMPLE FAILED	H1668	2018-06-18T08:21:37.689Z	40.53567	-124.78479	1812.7	Push core	2.2	34.6	44.4	In clam bed of 002 and 003; duplicate with 004; in patch of sediment between the clams, had to move locations a little bit for the last cores	Sample failed		

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-006	NA095-006-01-E-OSU	H1668	2018-06-18T08:41:34.432Z	40.53571	-124.78481	1812.7	Bio	2.2	34.6	44.1	Collecting clams from the same clam bed as -002, -003, -004, -005; taking from a clump of clams that are all alive and very dense; some brittle stars amongst it; the sediment is very reduced under these clams	Many large and small clams (~50), brittle stars (~30), and some other small fauna in mud	Frozen	OSU (Thurber)
NA095-006	NA095-006-02-A-MCZ	H1668	2018-06-18T08:41:34.432Z	40.53571	-124.78481	1812.7	Bio	2.2	34.6	44.1	Collecting clams from the same clam bed as -002, -003, -004, -005; taking from a clump of clams that are all alive and very dense; some brittle stars amongst it; the sediment is very reduced under these clams		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-006	NA095-006-03-E-OSU	H1668	2018-06-18T08:41:34.432Z	40.53571	-124.78481	1812.7	Bio	2.2	34.6	44.1	Collecting clams from the same clam bed as -002, -003, -004, -005; taking from a clump of clams that are all alive and very dense; some brittle stars amongst it; the sediment is very reduced under these clams		Frozen	OSU (Thurber)
NA095-006	NA095-006-04-A-MCZ	H1668	2018-06-18T08:41:34.432Z	40.53571	-124.78481	1812.7	Bio	2.2	34.6	44.1	Collecting clams from the same clam bed as -002, -003, -004, -005; taking from a clump of clams that are all alive and very dense; some brittle stars amongst it; the sediment is very reduced under these clams		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-006	NA095-006-05-A-PMEL	H1668	2018-06-18T08:41:34.432Z	40.53571	-124.78481	1812.7	Bio	2.2	34.6	44.1	Collecting clams from the same clam bed as -002, -003, -004, -005; taking from a clump of clams that are all alive and very dense; some brittle stars amongst it; the sediment is very reduced under these clams		95% Ethanol	NOAA PMEL (Stepien)
NA095-006	NA095-006-06-A-MCZ	H1668	2018-06-18T08:41:34.432Z	40.53571	-124.78481	1812.7	Bio	2.2	34.6	44.1	Collecting clams from the same clam bed as -002, -003, -004, -005; taking from a clump of clams that are all alive and very dense; some brittle stars amongst it; the sediment is very reduced under these clams		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-006	NA095-006-07-A-MCZ	H1668	2018-06-18T08:41:34.432Z	40.53571	-124.78481	1812.7	Bio	2.2	34.6	44.1	Collecting clams from the same clam bed as -002, -003, -004, -005; taking from a clump of clams that are all alive and very dense; some brittle stars amongst it; the sediment is very reduced under these clams		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-006	NA095-006-08-D-OSU	H1668	2018-06-18T08:41:34.432Z	40.53571	-124.78481	1812.7	Bio	2.2	34.6	44.1	Collecting clams from the same clam bed as -002, -003, -004, -005; taking from a clump of clams that are all alive and very dense; some brittle stars amongst it; the sediment is very reduced under these clams		Formalin	OSU (Thurber)
NA095-007	NA095-007-Chem-PMEL	H1668	2018-06-18T08:47:46.429Z	40.53569	-124.78480	1803.4	Push core	2.2	34.6	44.1	Niskin 10m above clam bed and bubble stream that were sampled for 002-006	Water used for geochemistry tests and 3 l used for eDNA filtration	NA	NOAA PMEL
NA095-007	NA095-007-01-A-PMEL	H1668	2018-06-18T08:47:46.429Z	40.53569	-124.78480	1803.4	Push core	2.2	34.6	44.1	Niskin 10m above clam bed and bubble stream that were sampled for 002-006		95% Ethanol	NOAA PMEL (Stepien)
NA095-007	NA095-007-02-E-OSU	H1668	2018-06-18T08:47:46.429Z	40.53569	-124.78480	1803.4	Push core	2.2	34.6	44.1	Niskin 10m above clam bed and bubble stream that were sampled for 002-006		Frozen	OSU (Thurber)
NA095-008	NA095-008-Chem-PMEL	H1668	2018-06-18T10:54:09.875Z	40.53581	-124.78439	547.9	Niskin	5.4	34.2	12.9	Niskin sample 550 m depth, which is 50 m below the top of the multibeam seep plume		NA	NOAA PMEL
NA095-009	NA095-009-C-PMEL	H1669	2018-06-19T02:11:54.675Z	41.89789	-124.84308	563.4	Rock	5.2	34.2	13.2	Black rock that seems to be carbonate with magnesium coating, since it does not look like other tan carbonates; about 10 cm in length	Dark brown rock with black spots; evidence of chemical reactions on surface of rock; very smooth; overall rock: 15 x 12 cm; rock broken into subsamples with hammer	Dry	NOAA PMEL (Embley)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-009	NA095-009-C-GSO	H1669	2018-06-19T02:11:54.675Z	41.89789	-124.84308	563.4	Rock	5.2	34.2	13.2	Black rock that seems to be carbonate with magnesium coating, since it does not look like other tan carbonates; about 10 cm in length		Dry	GSO (Graduate School of Oceanography at URI)
NA095-010	NA095-010-C-PMEL	H1669	2018-06-19T02:30:49.530Z	41.89771	-124.84337	557.8	Carbonate	5.1	34.2	12.8	Hard substrate taken, about 12cm across, in starboard biobox b	Angular carbonate rock, tabular in shape, light brown; overall rock: 15 x 15 cm; rock broken into subsamples with hammer	Dry	NOAA PMEL (Embley)
NA095-010	NA095-010-C-GSO	H1669	2018-06-19T02:30:49.530Z	41.89771	-124.84337	557.8	Carbonate	5.1	34.2	12.8	Hard substrate taken, about 12cm across, in starboard biobox b		Dry	GSO (Graduate School of Oceanography at URI)
NA095-011	NA095-011-GT11-PMEL	H1669	2018-06-19T06:01:42.292Z	41.89413	-124.83814	544.3	Gas	5.0	34.2	9.9	Gt (gas-tight) purple #11; at nav target "bubbles 001", over bubble stream near clams; bubbles from crack in carbonate, crack filled with white microbial mat; had to try to trigger 3x before success	Separate water from gas using seagoing extraction line	Glass Ampules	NOAA PMEL
NA095-012	NA095-012-E-OSU	H1669	2018-06-19T09:16:36.252Z	41.89412	-124.83812	545.0	Bio	4.8	34.2	8.5	Clams by bubbles001 and gas-tight sample -011; several live clams in a very small crack near the bubble flow	4 clams, calyptogena sp.	Frozen	OSU (Thurber)
NA095-012	NA095-012-01-A-PMEL	H1669	2018-06-19T09:16:36.252Z	41.89412	-124.83812	545.0	Bio	4.8	34.2	8.5	Clams by bubbles001 and gas-tight sample -011; several live clams in a very small crack near the bubble flow		95% Ethanol	NOAA PMEL (Stepien)
NA095-013	NA095-013-E-OSU	H1669	2018-06-19T09:18:41.027Z	41.89413	-124.83813	545.0	Bio	4.8	34.2	8.2	Slurp of the same clams collected in -012, to try to increase number retrieved	7 clams, calyptogena sp.	Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-013	NA095-013-01-A-MCZ	H1669	2018-06-19T09:18:41.027Z	41.89413	-124.83813	545.0	Bio	4.8	34.2	8.2	Slurp of the same clams collected in -012, to try to increase number retrieved		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-013	NA095-013-02-A-PMEL	H1669	2018-06-19T09:18:41.027Z	41.89413	-124.83813	545.0	Bio	4.8	34.2	8.2	Slurp of the same clams collected in -012, to try to increase number retrieved		95% Ethanol	NOAA PMEL (Stepien)
NA095-014	NA095-014-Chem-PMEL	H1669	2018-06-19T09:21:22.338Z	41.89413	-124.83812	545.1	Niskin	4.9	34.2	8.9	Niskin at bubbles001, same location as samples -011, -012, -013	Water used for geochemistry tests and 1 l used for eDNA filtration	NA	NOAA PMEL
NA095-014	NA095-014-01-A-PMEL	H1669	2018-06-19T09:21:22.338Z	41.89413	-124.83812	545.1	Niskin	4.9	34.2	8.9	Niskin at bubbles001, same location as samples -011, -012, -013		95% Ethanol	NOAA PMEL (Stepien)
NA095-014	NA095-014-02-E-OSU	H1669	2018-06-19T09:21:22.338Z	41.89413	-124.83812	545.1	Niskin	4.9	34.2	8.9	Niskin at bubbles001, same location as samples -011, -012, -013	Water used for geochemistry tests and 3 l used for eDNA filtration	Frozen	OSU (Thurber)
NA095-015	NA095-015-Chem-PMEL	H1669	2018-06-19T09:41:11.361Z	41.89419	-124.83821	545.8	Niskin	4.9	34.2	9.2	At bubbles004 over a microbial mat in a carbonate crack	Water used for geochemistry tests and 1 l used for eDNA filtration	NA	NOAA PMEL
NA095-015	NA095-015-01-A-PMEL	H1669	2018-06-19T09:41:11.361Z	41.89419	-124.83821	545.8	Niskin	4.9	34.2	9.2	At bubbles004 over a microbial mat in a carbonate crack		95% Ethanol	NOAA PMEL (Stepien)
NA095-015	NA095-015-02-E-OSU	H1669	2018-06-19T09:41:11.361Z	41.89419	-124.83821	545.8	Niskin	4.9	34.2	9.2	At bubbles004 over a microbial mat in a carbonate crack	Water used for geochemistry tests and 3 l used for eDNA filtration	Frozen	OSU (Thurber)
NA095-016	SAMPLE FAILED	H1669	2018-06-19T10:00:05.540Z	41.89423	-124.83817	545.6	Major	4.9	34.2	9.6	At bubbles004 and sample -015 (Niskin); at an area with a bubble stream over a microbial mat (orange and white), down in a channel between carbonate platforms	Sample failed		

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-017	NA095-017-C-PMEL	H1669	2018-06-19T10:17:56.217Z	41.89424	-124.83818	545.8	Carbonate	4.9	34.2	9.6	Grab of microbial mat and a large carbonate rock; taken just forward of -016, in the channel with microbial mats at bubbles004; some mushroom corals and other associates on the rock	Rock, grey-brown in color; associates include mushroom corals, limpets, chiton, shrimp, and polychaetes; overall rock: 29 x 27 cm; rock broken into subsamples with hammer	Dry	NOAA PMEL (Embley)
NA095-017	NA095-017-C-GSO	H1669	2018-06-19T10:17:56.217Z	41.89424	-124.83818	545.8	Carbonate	4.9	34.2	9.6	Grab of microbial mat and a large carbonate rock; taken just forward of -016, in the channel with microbial mats at bubbles004; some mushroom corals and other associates on the rock		Dry	GSO (Graduate School of Oceanography at URI)
NA095-017	NA095-017-01-A-MCZ	H1669	2018-06-19T10:17:56.217Z	41.89424	-124.83818	545.8	Carbonate	4.9	34.2	9.6	Grab of microbial mat and a large carbonate rock; taken just forward of -016, in the channel with microbial mats at bubbles004; some mushroom corals and other associates on the rock		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-017	NA095-017-02-A-MCZ	H1669	2018-06-19T10:17:56.217Z	41.89424	-124.83818	545.8	Carbonate	4.9	34.2	9.6	Grab of microbial mat and a large carbonate rock; taken just forward of -016, in the channel with microbial mats at bubbles004; some mushroom corals and other associates on the rock		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-017	NA095-017-03-A-MCZ	H1669	2018-06-19T10:17:56.217Z	41.89424	-124.83818	545.8	Carbonate	4.9	34.2	9.6	Grab of microbial mat and a large carbonate rock; taken just forward of -016, in the channel with microbial mats at bubbles004; some mushroom corals and other associates on the rock		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-017	NA095-017-04-A-MCZ	H1669	2018-06-19T10:17:56.217Z	41.89424	-124.83818	545.8	Carbonate	4.9	34.2	9.6	Grab of microbial mat and a large carbonate rock; taken just forward of -016, in the channel with microbial mats at bubbles004; some mushroom corals and other associates on the rock		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-017	NA095-017-05-A-MCZ	H1669	2018-06-19T10:17:56.217Z	41.89424	-124.83818	545.8	Carbonate	4.9	34.2	9.6	Grab of microbial mat and a large carbonate rock; taken just forward of -016, in the channel with microbial mats at bubbles004; some mushroom corals and other associates on the rock		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-017	NA095-017-06-A-MCZ	H1669	2018-06-19T10:17:56.217Z	41.89424	-124.83818	545.8	Carbonate	4.9	34.2	9.6	Grab of microbial mat and a large carbonate rock; taken just forward of -016, in the channel with microbial mats at bubbles004; some mushroom corals and other associates on the rock		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-018	NA095-018-Chem-PMEL	H1669	2018-06-19T10:31:48.914Z	41.89365	-124.83824	517.2	Niskin	5.2	34.2	13.0	Niskin at 50 m above seafloor	Water used for geochemistry tests	NA	NOAA PMEL
NA095-019	NA095-019-Chem-PMEL	H1669	2018-06-19T10:38:03.487Z	41.89377	-124.83790	449.5	Niskin	5.5	34.1	21.9	At 450m depth	Water used for geochemistry tests	NA	NOAA PMEL
NA095-020	NA095-020-Chem-PMEL	H1669	2018-06-19T10:42:18.205Z	41.89383	-124.83788	399.1	Niskin	5.7	34.1	26.3	At 400 m depth	Water used for geochemistry tests	NA	NOAA PMEL
NA095-021	NA095-021-Chem-PMEL	H1669	2018-06-19T10:50:34.650Z	41.89406	-124.83780	298.9	Niskin	6.2	34.0	52.9	At 300m depth	Water used for geochemistry tests	NA	NOAA PMEL
NA095-022	NA095-022-01-A-PMEL	H1670	2018-06-20T01:28:48.373Z	42.79258	-125.06202	1454.0	Niskin	2.7	34.5	25.9	Near “tube worm 001” site	Water used for geochemistry tests and 2 l used for eDNA filtration	95% Ethanol	NOAA PMEL (Stepien)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-022	NA095-022-02-E-OSU	H1670	2018-06-20T01:28:48.373Z	42.79258	-125.06202	1454.0	Niskin	2.7	34.5	25.9	Near “tube worm 001” site		Frozen	OSU (Thurber)
NA095-022	NA095-022-Chem-PMEL	H1670	2018-06-20T01:28:48.373Z	42.79258	-125.06202	1454.0	Niskin	2.7	34.5	25.9	Near “tube worm 001” site		NA	NOAA PMEL
NA095-023	NA095-023-MA04-PMEL	H1670	2018-06-20T01:42:06.799Z	42.79259	-125.06204	1454.8	Major	2.7	34.5	25.3	On site of large tubeworm bush with many associates; in pair with -022 Niskin; tubeworm bush is isolated from some of the other seep features; valve in the tubeworm bush	Fluid used for geochemistry tests	NA	NOAA PMEL
NA095-024	NA095-024-01-E-OSU	H1670	2018-06-20T01:50:52.619Z	42.79258	-125.06203	1454.8	ROV grab	2.7	34.5	25.7	Same tubeworm colony as sample -023; tapping tubeworms then grabbing a bunch of them; submitted in eventlog a few minutes early	Tubeworms likely lamellibrachia sp., 3 full length and several partial worms	Frozen	OSU (Thurber)
NA095-024	NA095-024-02-E-OSU	H1670	2018-06-20T01:50:52.619Z	42.79258	-125.06203	1454.8	ROV grab	2.7	34.5	25.7	Same tubeworm colony as sample -023; tapping tubeworms then grabbing a bunch of them; submitted in eventlog a few minutes early		Frozen	OSU (Thurber)
NA095-024	NA095-024-03-E-OSU	H1670	2018-06-20T01:50:52.619Z	42.79258	-125.06203	1454.8	ROV grab	2.7	34.5	25.7	Same tubeworm colony as sample -023; tapping tubeworms then grabbing a bunch of them; submitted in eventlog a few minutes early		Frozen	OSU (Thurber)
NA095-024	NA095-024-04-E-OSU	H1670	2018-06-20T01:50:52.619Z	42.79258	-125.06203	1454.8	ROV grab	2.7	34.5	25.7	Same tubeworm colony as sample -023; tapping tubeworms then grabbing a bunch of them; submitted in eventlog a few minutes early		Frozen	OSU (Thurber)
NA095-024	NA095-024-05-E-OSU	H1670	2018-06-20T01:50:52.619Z	42.79258	-125.06203	1454.8	ROV grab	2.7	34.5	25.7	Same tubeworm colony as sample -023; tapping tubeworms then grabbing a bunch of them; submitted in eventlog a few minutes early		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-024	NA095-024-06-E-OSU	H1670	2018-06-20T01:50:52.619Z	42.79258	-125.06203	1454.8	ROV grab	2.7	34.5	25.7	Same tubeworm colony as sample -023; tapping tubeworms then grabbing a bunch of them; submitted in eventlog a few minutes early		Frozen	OSU (Thurber)
NA095-024	NA095-024-07-E-OSU	H1670	2018-06-20T01:50:52.619Z	42.79258	-125.06203	1454.8	ROV grab	2.7	34.5	25.7	Same tubeworm colony as sample -023; tapping tubeworms then grabbing a bunch of them; submitted in eventlog a few minutes early		Frozen	OSU (Thurber)
NA095-024	NA095-024-08-E-OSU	H1670	2018-06-20T01:50:52.619Z	42.79258	-125.06203	1454.8	ROV grab	2.7	34.5	25.7	Same tubeworm colony as sample -023; tapping tubeworms then grabbing a bunch of them; submitted in eventlog a few minutes early		Frozen	OSU (Thurber)
NA095-024	NA095-024-09-E-OSU	H1670	2018-06-20T01:50:52.619Z	42.79258	-125.06203	1454.8	ROV grab	2.7	34.5	25.7	Same tubeworm colony as sample -023; tapping tubeworms then grabbing a bunch of them; submitted in eventlog a few minutes early		Frozen	OSU (Thurber)
NA095-024	NA095-024-10-E-OSU	H1670	2018-06-20T01:50:52.619Z	42.79258	-125.06203	1454.8	ROV grab	2.7	34.5	25.7	Same tubeworm colony as sample -023; tapping tubeworms then grabbing a bunch of them; submitted in eventlog a few minutes early		Frozen	OSU (Thurber)
NA095-024	NA095-024-11-A-MCZ	H1670	2018-06-20T01:50:52.619Z	42.79258	-125.06203	1454.8	ROV grab	2.7	34.5	25.7	Same tubeworm colony as sample -023; tapping tubeworms then grabbing a bunch of them; submitted in eventlog a few minutes early		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-024	NA095-024-12-A-MCZ	H1670	2018-06-20T01:50:52.619Z	42.79258	-125.06203	1454.8	ROV grab	2.7	34.5	25.7	Same tubeworm colony as sample -023; tapping tubeworms then grabbing a bunch of them; submitted in eventlog a few minutes early		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-024	NA095-024-13-A-MCZ	H1670	2018-06-20T01:50:52.619Z	42.79258	-125.06203	1454.8	ROV grab	2.7	34.5	25.7	Same tubeworm colony as sample -023; tapping tubeworms then grabbing a bunch of them; submitted in eventlog a few minutes early		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-024	NA095-024-14-A-MCZ	H1670	2018-06-20T01:50:52.619Z	42.79258	-125.06203	1454.8	ROV grab	2.7	34.5	25.7	Same tubeworm colony as sample -023; tapping tubeworms then grabbing a bunch of them; submitted in eventlog a few minutes early		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-024	NA095-024-15-A-MCZ	H1670	2018-06-20T01:50:52.619Z	42.79258	-125.06203	1454.8	ROV grab	2.7	34.5	25.7	Same tubeworm colony as sample -023; tapping tubeworms then grabbing a bunch of them; submitted in eventlog a few minutes early		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-025	NA095-025-Chem-PMEL	H1670	2018-06-20T02:27:51.386Z	42.79256	-125.06204	1454.8	Push core	2.7	34.5	25.7	In the same tubeworm habitat as samples -023 and -024, in the middle of the two tubeworm bushes	Core survived transit well; non-reduced sediment visible, all brown; core sliced and porewater extracted	NA	NOAA PMEL (Butterfield)
NA095-025	NA095-025-01-E-OSU	H1670	2018-06-20T02:27:51.386Z	42.79256	-125.06204	1454.8	Push core	2.7	34.5	25.7	In the same tubeworm habitat as samples -023 and -024, in the middle of the two tubeworm bushes		Frozen	OSU (Thurber)
NA095-025	NA095-025-02-E-OSU	H1670	2018-06-20T02:27:51.386Z	42.79256	-125.06204	1454.8	Push core	2.7	34.5	25.7	In the same tubeworm habitat as samples -023 and -024, in the middle of the two tubeworm bushes		Frozen	OSU (Thurber)
NA095-025	NA095-025-03-E-OSU	H1670	2018-06-20T02:27:51.386Z	42.79256	-125.06204	1454.8	Push core	2.7	34.5	25.7	In the same tubeworm habitat as samples -023 and -024, in the middle of the two tubeworm bushes		Frozen	OSU (Thurber)
NA095-025	NA095-025-04-E-OSU	H1670	2018-06-20T02:27:51.386Z	42.79256	-125.06204	1454.8	Push core	2.7	34.5	25.7	In the same tubeworm habitat as samples -023 and -024, in the middle of the two tubeworm bushes		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-025	NA095-025-05-E-OSU	H1670	2018-06-20T02:27:51.386Z	42.79256	-125.06204	1454.8	Push core	2.7	34.5	25.7	In the same tubeworm habitat as samples -023 and -024, in the middle of the two tubeworm bushes		Frozen	OSU (Thurber)
NA095-025	NA095-025-06-E-OSU	H1670	2018-06-20T02:27:51.386Z	42.79256	-125.06204	1454.8	Push core	2.7	34.5	25.7	In the same tubeworm habitat as samples -023 and -024, in the middle of the two tubeworm bushes		Frozen	OSU (Thurber)
NA095-025	NA095-025-07-E-OSU	H1670	2018-06-20T02:27:51.386Z	42.79256	-125.06204	1454.8	Push core	2.7	34.5	25.7	In the same tubeworm habitat as samples -023 and -024, in the middle of the two tubeworm bushes		Frozen	OSU (Thurber)
NA095-025	NA095-025-08-E-OSU	H1670	2018-06-20T02:27:51.386Z	42.79256	-125.06204	1454.8	Push core	2.7	34.5	25.7	In the same tubeworm habitat as samples -023 and -024, in the middle of the two tubeworm bushes		Frozen	OSU (Thurber)
NA095-025	NA095-025-09-E-OSU	H1670	2018-06-20T02:27:51.386Z	42.79256	-125.06204	1454.8	Push core	2.7	34.5	25.7	In the same tubeworm habitat as samples -023 and -024, in the middle of the two tubeworm bushes		Frozen	OSU (Thurber)
NA095-025	NA095-025-10-E-OSU	H1670	2018-06-20T02:27:51.386Z	42.79256	-125.06204	1454.8	Push core	2.7	34.5	25.7	In the same tubeworm habitat as samples -023 and -024, in the middle of the two tubeworm bushes		Frozen	OSU (Thurber)
NA095-025	NA095-025-11-F-OSU	H1670	2018-06-20T02:27:51.386Z	42.79256	-125.06204	1454.8	Push core	2.7	34.5	25.7	In the same tubeworm habitat as samples -023 and -024, in the middle of the two tubeworm bushes		Seawater	OSU (Thurber)
NA095-026	NA095-026-01-A-PMEL	H1670	2018-06-20T03:07:13.369Z	42.79256	-125.06126	1451.8	Niskin	2.7	34.5	25.6	Niskin about 1 to 1.5 m above the "mat 002" site, with microbial mats, dead clams, a few bubbles nearby	Water used for geochemistry tests and 2 l used for eDNA filtration	95% Ethanol	NOAA PMEL (Stepien)
NA095-026	NA095-026-02-E-OSU	H1670	2018-06-20T03:07:13.369Z	42.79256	-125.06126	1451.8	Niskin	2.7	34.5	25.6	Niskin about 1 to 1.5 m above the "mat 002" site, with microbial mats, dead clams, a few bubbles nearby		Frozen	OSU (Thurber)
NA095-026	NA095-026-Chem-PMEL	H1670	2018-06-20T03:07:13.369Z	42.79256	-125.06126	1451.8	Niskin	2.7	34.5	25.6	Niskin about 1 to 1.5 m above the "mat 002" site, with microbial mats, dead clams, a few bubbles nearby		NA	NOAA PMEL

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-027	NA095-027-MA02-PMEL	H1670	2018-06-20T04:01:03.153Z	42.79250	-125.06126	1452.1	Major	2.7	34.5	25.4	Water from in pvc cone, which is over sediment with some faint microbial mat and clam shells; next to dense white mat; used pvc cone to accumulate fluids from 03:16 to 03:57, then major fired from 03:57 to 03:59	Fluid used for geochemistry tests	NA	NOAA PMEL
NA095-028	NA095-028-Chem-PMEL	H1670	2018-06-20T04:13:36.219Z	42.79254	-125.06130	1451.9	Push core	2.7	34.5	25.7	In thin filamentous mat, near sample -027; with small clams and brittle stars on top	Short core; some of the water drained out, but integrity remained; brittle stars, small tubeworms on the surface of the core, as well as thioploca mat; core sliced and porewater extracted	NA	NOAA PMEL (Butterfield)
NA095-028	NA095-028-01-E-OSU	H1670	2018-06-20T04:13:36.219Z	42.79254	-125.06130	1451.9	Push core	2.7	34.5	25.7	In thin filamentous mat, near sample -027; with small clams and brittle stars on top		Frozen	OSU (Thurber)
NA095-028	NA095-028-02-E-OSU	H1670	2018-06-20T04:13:36.219Z	42.79254	-125.06130	1451.9	Push core	2.7	34.5	25.7	In thin filamentous mat, near sample -027; with small clams and brittle stars on top		Frozen	OSU (Thurber)
NA095-028	NA095-028-03-E-OSU	H1670	2018-06-20T04:13:36.219Z	42.79254	-125.06130	1451.9	Push core	2.7	34.5	25.7	In thin filamentous mat, near sample -027; with small clams and brittle stars on top		Frozen	OSU (Thurber)
NA095-028	NA095-028-04-E-OSU	H1670	2018-06-20T04:13:36.219Z	42.79254	-125.06130	1451.9	Push core	2.7	34.5	25.7	In thin filamentous mat, near sample -027; with small clams and brittle stars on top		Frozen	OSU (Thurber)
NA095-028	NA095-028-05-E-OSU	H1670	2018-06-20T04:13:36.219Z	42.79254	-125.06130	1451.9	Push core	2.7	34.5	25.7	In thin filamentous mat, near sample -027; with small clams and brittle stars on top		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-028	NA095-028-06-E-OSU	H1670	2018-06-20T04:13:36.219Z	42.79254	-125.06130	1451.9	Push core	2.7	34.5	25.7	In thin filamentous mat, near sample -027; with small clams and brittle stars on top		Frozen	OSU (Thurber)
NA095-028	NA095-028-07-F-OSU	H1670	2018-06-20T04:13:36.219Z	42.79254	-125.06130	1451.9	Push core	2.7	34.5	25.7	In thin filamentous mat, near sample -027; with small clams and brittle stars on top		Seawater	OSU (Thurber)
NA095-029	NA095-029-01-E-OSU	H1670	2018-06-20T04:21:58.371Z	42.79254	-125.06125	1451.9	Push core	2.7	34.5	25.9	In sediment with small polychaete tubes and brittle stars, near samples -027 and -028	Water drained out of core, some left on top but not much; brown sediment with 8 cm down becoming reduced; small tubeworms and brittle stars on top; (no geochem, potentially mixed up)	Frozen	OSU (Thurber)
NA095-029	NA095-029-02-E-OSU	H1670	2018-06-20T04:21:58.371Z	42.79254	-125.06125	1451.9	Push core	2.7	34.5	25.9	In sediment with small polychaete tubes and brittle stars, near samples -027 and -028		Frozen	OSU (Thurber)
NA095-029	NA095-029-03-E-OSU	H1670	2018-06-20T04:21:58.371Z	42.79254	-125.06125	1451.9	Push core	2.7	34.5	25.9	In sediment with small polychaete tubes and brittle stars, near samples -027 and -028		Frozen	OSU (Thurber)
NA095-029	NA095-029-04-E-OSU	H1670	2018-06-20T04:21:58.371Z	42.79254	-125.06125	1451.9	Push core	2.7	34.5	25.9	In sediment with small polychaete tubes and brittle stars, near samples -027 and -028		Frozen	OSU (Thurber)
NA095-029	NA095-029-05-E-OSU	H1670	2018-06-20T04:21:58.371Z	42.79254	-125.06125	1451.9	Push core	2.7	34.5	25.9	In sediment with small polychaete tubes and brittle stars, near samples -027 and -028		Frozen	OSU (Thurber)
NA095-029	NA095-029-06-E-OSU	H1670	2018-06-20T04:21:58.371Z	42.79254	-125.06125	1451.9	Push core	2.7	34.5	25.9	In sediment with small polychaete tubes and brittle stars, near samples -027 and -028		Frozen	OSU (Thurber)
NA095-029	NA095-029-07-E-OSU	H1670	2018-06-20T04:21:58.371Z	42.79254	-125.06125	1451.9	Push core	2.7	34.5	25.9	In sediment with small polychaete tubes and brittle stars, near samples -027 and -028		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-029	NA095-029-08-E-OSU	H1670	2018-06-20T04:21:58.371Z	42.79254	-125.06125	1451.9	Push core	2.7	34.5	25.9	In sediment with small polychaete tubes and brittle stars, near samples -027 and -028		Frozen	OSU (Thurber)
NA095-030	NA095-030-01-E-OSU	H1670	2018-06-20T04:28:40.388Z	42.79255	-125.06130	1451.9	Bio	2.7	34.5	26.4	Slurp for clams in sediment by samples -027, -028, -029; also got scale worm, brittle stars, polychaetes	2 large clams and many small clams; lots of sea spiders, brittle stars, and assorted worms (some in mud tubes); 1 isopod, small snail, and limpet	Frozen	OSU (Thurber)
NA095-030	NA095-030-02-A-PMEL	H1670	2018-06-20T04:28:40.388Z	42.79255	-125.06130	1451.9	Bio	2.7	34.5	26.4	Slurp for clams in sediment by samples -027, -028, -029; also got scale worm, brittle stars, polychaetes		95% Ethanol	NOAA PMEL (Stepien)
NA095-030	NA095-030-03-A-MCZ	H1670	2018-06-20T04:28:40.388Z	42.79255	-125.06130	1451.9	Bio	2.7	34.5	26.4	Slurp for clams in sediment by samples -027, -028, -029; also got scale worm, brittle stars, polychaetes		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-030	NA095-030-04-E-OSU	H1670	2018-06-20T04:28:40.388Z	42.79255	-125.06130	1451.9	Bio	2.7	34.5	26.4	Slurp for clams in sediment by samples -027, -028, -029; also got scale worm, brittle stars, polychaetes		Frozen	OSU (Thurber)
NA095-030	NA095-030-05-A-MCZ	H1670	2018-06-20T04:28:40.388Z	42.79255	-125.06130	1451.9	Bio	2.7	34.5	26.4	Slurp for clams in sediment by samples -027, -028, -029; also got scale worm, brittle stars, polychaetes		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-030	NA095-030-06-A-MCZ	H1670	2018-06-20T04:28:40.388Z	42.79255	-125.06130	1451.9	Bio	2.7	34.5	26.4	Slurp for clams in sediment by samples -027, -028, -029; also got scale worm, brittle stars, polychaetes		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-030	NA095-030-07-A-MCZ	H1670	2018-06-20T04:28:40.388Z	42.79255	-125.06130	1451.9	Bio	2.7	34.5	26.4	Slurp for clams in sediment by samples -027, -028, -029; also got scale worm, brittle stars, polychaetes		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-030	NA095-030-08-A-MCZ	H1670	2018-06-20T04:28:40.388Z	42.79255	-125.06130	1451.9	Bio	2.7	34.5	26.4	Slurp for clams in sediment by samples -027, -028, -029; also got scale worm, brittle stars, polychaetes		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-030	NA095-030-09-A-MCZ	H1670	2018-06-20T04:28:40.388Z	42.79255	-125.06130	1451.9	Bio	2.7	34.5	26.4	Slurp for clams in sediment by samples -027, -028, -029; also got scale worm, brittle stars, polychaetes		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-030	NA095-030-10-A-MCZ	H1670	2018-06-20T04:28:40.388Z	42.79255	-125.06130	1451.9	Bio	2.7	34.5	26.4	Slurp for clams in sediment by samples -027, -028, -029; also got scale worm, brittle stars, polychaetes		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-031	NA095-031-01-A-PMEL	H1671	2018-06-20T19:42:43.936Z	42.78001	-124.93177	731.5	Niskin	4.5	34.3	5.1	Taken 1 m above “mat 05” target; a very dense white microbial mat, likely beggiatoa; going to core and major sample here as well	Water used for geochemistry tests and 1.93 l used for eDNA filtration	95% Ethanol	NOAA PMEL (Stepien)
NA095-031	NA095-031-02-E-OSU	H1671	2018-06-20T19:42:43.936Z	42.78001	-124.93177	731.5	Niskin	4.5	34.3	5.1	Taken 1 m above “mat 05” target; a very dense white microbial mat, likely beggiatoa; going to core and major sample here as well		Frozen	OSU (Thurber)
NA095-031	NA095-031-Chem-PMEL	H1671	2018-06-20T19:42:43.936Z	42.78001	-124.93177	731.5	Niskin	4.5	34.3	5.1	Taken 1 m above “mat 05” target; a very dense white microbial mat, likely beggiatoa; going to core and major sample here as well		NA	NOAA PMEL
NA095-032	NA095-032-Chem-PMEL	H1671	2018-06-20T20:01:44.039Z	42.78001	-124.93177	731.8	Push core	4.5	34.3	5.0	On “mat 05”, next to where major sampler is; doing the core in duplicate; likely beggiatoa; a few thorny heads	Actively releasing bubbles; some indication of layering though still not all blown out; fully reduced sediment; core sliced and porewater extracted	NA	NOAA PMEL (Butterfield)
NA095-032	NA095-032-01-E-OSU	H1671	2018-06-20T20:01:44.039Z	42.78001	-124.93177	731.8	Push core	4.5	34.3	5.0	On “mat 05”, next to where major sampler is; doing the core in duplicate; likely beggiatoa; a few thorny heads		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-032	NA095-032-02-E-OSU	H1671	2018-06-20T20:01:44.039Z	42.78001	-124.93177	731.8	Push core	4.5	34.3	5.0	On “mat 05”, next to where major sampler is; doing the core in duplicate; likely beggiatoa; a few thorny heads		Frozen	OSU (Thurber)
NA095-032	NA095-032-03-E-OSU	H1671	2018-06-20T20:01:44.039Z	42.78001	-124.93177	731.8	Push core	4.5	34.3	5.0	On “mat 05”, next to where major sampler is; doing the core in duplicate; likely beggiatoa; a few thorny heads		Frozen	OSU (Thurber)
NA095-032	NA095-032-04-E-OSU	H1671	2018-06-20T20:01:44.039Z	42.78001	-124.93177	731.8	Push core	4.5	34.3	5.0	On “mat 05”, next to where major sampler is; doing the core in duplicate; likely beggiatoa; a few thorny heads		Frozen	OSU (Thurber)
NA095-032	NA095-032-05-E-OSU	H1671	2018-06-20T20:01:44.039Z	42.78001	-124.93177	731.8	Push core	4.5	34.3	5.0	On “mat 05”, next to where major sampler is; doing the core in duplicate; likely beggiatoa; a few thorny heads		Frozen	OSU (Thurber)
NA095-032	NA095-032-06-E-OSU	H1671	2018-06-20T20:01:44.039Z	42.78001	-124.93177	731.8	Push core	4.5	34.3	5.0	On “mat 05”, next to where major sampler is; doing the core in duplicate; likely beggiatoa; a few thorny heads		Frozen	OSU (Thurber)
NA095-032	NA095-032-07-E-OSU	H1671	2018-06-20T20:01:44.039Z	42.78001	-124.93177	731.8	Push core	4.5	34.3	5.0	On “mat 05”, next to where major sampler is; doing the core in duplicate; likely beggiatoa; a few thorny heads		Frozen	OSU (Thurber)
NA095-032	NA095-032-08-E-OSU	H1671	2018-06-20T20:01:44.039Z	42.78001	-124.93177	731.8	Push core	4.5	34.3	5.0	On “mat 05”, next to where major sampler is; doing the core in duplicate; likely beggiatoa; a few thorny heads		Frozen	OSU (Thurber)
NA095-032	NA095-032-09-E-OSU	H1671	2018-06-20T20:01:44.039Z	42.78001	-124.93177	731.8	Push core	4.5	34.3	5.0	On “mat 05”, next to where major sampler is; doing the core in duplicate; likely beggiatoa; a few thorny heads		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-032	NA095-032-10-E-OSU	H1671	2018-06-20T20:01:44.039Z	42.78001	-124.93177	731.8	Push core	4.5	34.3	5.0	On “mat 05”, next to where major sampler is; doing the core in duplicate; likely beggiatoa; a few thorny heads		Frozen	OSU (Thurber)
NA095-032	NA095-032-11-E-OSU	H1671	2018-06-20T20:01:44.039Z	42.78001	-124.93177	731.8	Push core	4.5	34.3	5.0	On “mat 05”, next to where major sampler is; doing the core in duplicate; likely beggiatoa; a few thornyheads		Frozen	OSU (Thurber)
NA095-032	NA095-032-12-E-OSU	H1671	2018-06-20T20:01:44.039Z	42.78001	-124.93177	731.8	Push core	4.5	34.3	5.0	On “mat 05”, next to where major sampler is; doing the core in duplicate; likely beggiatoa; a few thorny heads		Frozen	OSU (Thurber)
NA095-032	NA095-032-13-E-OSU	H1671	2018-06-20T20:01:44.039Z	42.78001	-124.93177	731.8	Push core	4.5	34.3	5.0	On “mat 05”, next to where major sampler is; doing the core in duplicate; likely beggiatoa; a few thorny heads		Frozen	OSU (Thurber)
NA095-032	NA095-032-14-E-OSU	H1671	2018-06-20T20:01:44.039Z	42.78001	-124.93177	731.8	Push core	4.5	34.3	5.0	On “mat 05”, next to where major sampler is; doing the core in duplicate; likely beggiatoa; a few thorny heads		Frozen	OSU (Thurber)
NA095-032	NA095-032-15-E-OSU	H1671	2018-06-20T20:01:44.039Z	42.78001	-124.93177	731.8	Push core	4.5	34.3	5.0	On “mat 05”, next to where major sampler is; doing the core in duplicate; likely beggiatoa; a few thorny heads		Frozen	OSU (Thurber)
NA095-032	NA095-032-16-F-OSU	H1671	2018-06-20T20:01:44.039Z	42.78001	-124.93177	731.8	Push core	4.5	34.3	5.0	On “mat 05”, next to where major sampler is; doing the core in duplicate; likely beggiatoa; a few thorny heads		Seawater	OSU (Thurber)
NA095-033	NA095-033-Chem-PMEL	H1671	2018-06-20T20:08:55.644Z	42.78001	-124.93174	731.8	Push core	4.5	34.3	5.1	Duplicate with -032, first attempt failed so we had to put in again after the others are removed - two fails - very gelatnous	Bubbly and somewhat shaken, but more clear and more defined than -032; core sliced and porewater extracted	NA	NOAA PMEL (Butterfield)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-033	NA095-033-01-E-OSU	H1671	2018-06-20T20:08:55.644Z	42.78001	-124.93174	731.8	Push core	4.5	34.3	5.1	Duplicate with -032, first attempt failed so we had to put in again after the others are removed - two fails - very gelatnous		Frozen	OSU (Thurber)
NA095-033	NA095-033-02-E-OSU	H1671	2018-06-20T20:08:55.644Z	42.78001	-124.93174	731.8	Push core	4.5	34.3	5.1	Duplicate with -032, first attempt failed so we had to put in again after the others are removed - two fails - very gelatnous		Frozen	OSU (Thurber)
NA095-033	NA095-033-03-E-OSU	H1671	2018-06-20T20:08:55.644Z	42.78001	-124.93174	731.8	Push core	4.5	34.3	5.1	Duplicate with -032, first attempt failed so we had to put in again after the others are removed - two fails - very gelatnous		Frozen	OSU (Thurber)
NA095-033	NA095-033-04-E-OSU	H1671	2018-06-20T20:08:55.644Z	42.78001	-124.93174	731.8	Push core	4.5	34.3	5.1	Duplicate with -032, first attempt failed so we had to put in again after the others are removed - two fails - very gelatnous		Frozen	OSU (Thurber)
NA095-033	NA095-033-05-E-OSU	H1671	2018-06-20T20:08:55.644Z	42.78001	-124.93174	731.8	Push core	4.5	34.3	5.1	Duplicate with -032, first attempt failed so we had to put in again after the others are removed - two fails - very gelatnous		Frozen	OSU (Thurber)
NA095-033	NA095-033-06-E-OSU	H1671	2018-06-20T20:08:55.644Z	42.78001	-124.93174	731.8	Push core	4.5	34.3	5.1	Duplicate with -032, first attempt failed so we had to put in again after the others are removed - two fails - very gelatnous		Frozen	OSU (Thurber)
NA095-033	NA095-033-07-E-OSU	H1671	2018-06-20T20:08:55.644Z	42.78001	-124.93174	731.8	Push core	4.5	34.3	5.1	Duplicate with -032, first attempt failed so we had to put in again after the others are removed - two fails - very gelatnous		Frozen	OSU (Thurber)
NA095-033	NA095-033-08-E-OSU	H1671	2018-06-20T20:08:55.644Z	42.78001	-124.93174	731.8	Push core	4.5	34.3	5.1	Duplicate with -032, first attempt failed so we had to put in again after the others are removed - two fails - very gelatnous		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-033	NA095-033-09-E-OSU	H1671	2018-06-20T20:08:55.644Z	42.78001	-124.93174	731.8	Push core	4.5	34.3	5.1	Duplicate with -032, first attempt failed so we had to put in again after the others are removed - two fails - very gelatnous		Frozen	OSU (Thurber)
NA095-033	NA095-033-10-E-OSU	H1671	2018-06-20T20:08:55.644Z	42.78001	-124.93174	731.8	Push core	4.5	34.3	5.1	Duplicate with -032, first attempt failed so we had to put in again after the others are removed - two fails - very gelatnous		Frozen	OSU (Thurber)
NA095-033	NA095-033-11-E-OSU	H1671	2018-06-20T20:08:55.644Z	42.78001	-124.93174	731.8	Push core	4.5	34.3	5.1	Duplicate with -032, first attempt failed so we had to put in again after the others are removed - two fails - very gelatnous		Frozen	OSU (Thurber)
NA095-033	NA095-033-12-E-OSU	H1671	2018-06-20T20:08:55.644Z	42.78001	-124.93174	731.8	Push core	4.5	34.3	5.1	Duplicate with -032, first attempt failed so we had to put in again after the others are removed - two fails - very gelatnous		Frozen	OSU (Thurber)
NA095-033	NA095-033-13-F-OSU	H1671	2018-06-20T20:08:55.644Z	42.78001	-124.93174	731.8	Push core	4.5	34.3	5.1	Duplicate with -032, first attempt failed so we had to put in again after the others are removed - two fails - very gelatnous		Seawater	OSU (Thurber)
NA095-034	NA095-034-MA03-PMEL	H1671	2018-06-20T20:18:21.016Z	42.78000	-124.93175	731.9	Major	4.5	34.3	5.1	In funnel that has been set on “mat 05” while we did push core sampling -032 and -033 (about 20 minutes)	Fluid used for geochemistry tests	NA	NOAA PMEL
NA095-035	NA095-035-01-A-PMEL	H1671	2018-06-20T20:48:20.867Z	42.77954	-124.93192	730.5	Niskin	4.5	34.3	5.2	1 m above a clam bed with some gastropods in it and thornyheads and acharax shells	Water used for geochemistry tests and 1.9 l used for eDNA filtration	95% Ethanol	NOAA PMEL (Stepien)
NA095-035	NA095-035-02-E-OSU	H1671	2018-06-20T20:48:20.867Z	42.77954	-124.93192	730.5	Niskin	4.5	34.3	5.2	1 m above a clam bed with some gastropods in it and thornyheads and acharax shells		Frozen	OSU (Thurber)
NA095-035	NA095-035-Chem-PMEL	H1671	2018-06-20T20:48:20.867Z	42.77954	-124.93192	730.5	Niskin	4.5	34.3	5.2	1 m above a clam bed with some gastropods in it and thornyheads and acharax shells		NA	NOAA PMEL

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-036	NA095-036-Chem-PMEL	H1671	2018-06-20T21:14:18.966Z	42.77951	-124.93193	731.1	Push core	4.5	34.3	5.1	In a clam bed, many of the clams are buried; going right next to many clams; first attempt failed, moved over towards a new patch; one core located more in the clam bed than the next core (036 more in clam bed); small groups of clams with gastropods intermixed with lots of detritus	3.5 cm down, reduced sediment starts; top 3.5 cm spotted with reduced sediment; urchins, gastropods, and clams on surface; core sliced and porewater extracted	NA	NOAA PMEL (Butterfield)
NA095-036	NA095-036-01-E-OSU	H1671	2018-06-20T21:14:18.966Z	42.77951	-124.93193	731.1	Push core	4.5	34.3	5.1	In a clam bed, many of the clams are buried; going right next to many clams; first attempt failed, moved over towards a new patch; one core located more in the clam bed than the next core (036 more in clam bed); small groups of clams with gastropods intermixed with lots of detritus		Frozen	OSU (Thurber)
NA095-036	NA095-036-02-E-OSU	H1671	2018-06-20T21:14:18.966Z	42.77951	-124.93193	731.1	Push core	4.5	34.3	5.1	In a clam bed, many of the clams are buried; going right next to many clams; first attempt failed, moved over towards a new patch; one core located more in the clam bed than the next core (036 more in clam bed); small groups of clams with gastropods intermixed with lots of detritus		Frozen	OSU (Thurber)
NA095-036	NA095-036-03-E-OSU	H1671	2018-06-20T21:14:18.966Z	42.77951	-124.93193	731.1	Push core	4.5	34.3	5.1	In a clam bed, many of the clams are buried; going right next to many clams; first attempt failed, moved over towards a new patch; one core located more in the clam bed than the next core (036 more in clam bed); small groups of clams with gastropods intermixed with lots of detritus		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-036	NA095-036-04-E-OSU	H1671	2018-06-20T21:14:18.966Z	42.77951	-124.93193	731.1	Push core	4.5	34.3	5.1	In a clam bed, many of the clams are buried; going right next to many clams; first attempt failed, moved over towards a new patch; one core located more in the clam bed than the next core (036 more in clam bed); small groups of clams with gastropods intermixed with lots of detritus		Frozen	OSU (Thurber)
NA095-036	NA095-036-05-E-OSU	H1671	2018-06-20T21:14:18.966Z	42.77951	-124.93193	731.1	Push core	4.5	34.3	5.1	In a clam bed, many of the clams are buried; going right next to many clams; first attempt failed, moved over towards a new patch; one core located more in the clam bed than the next core (036 more in clam bed); small groups of clams with gastropods intermixed with lots of detritus		Frozen	OSU (Thurber)
NA095-036	NA095-036-06-E-OSU	H1671	2018-06-20T21:14:18.966Z	42.77951	-124.93193	731.1	Push core	4.5	34.3	5.1	In a clam bed, many of the clams are buried; going right next to many clams; first attempt failed, moved over towards a new patch; one core located more in the clam bed than the next core (036 more in clam bed); small groups of clams with gastropods intermixed with lots of detritus		Frozen	OSU (Thurber)
NA095-036	NA095-036-07-E-OSU	H1671	2018-06-20T21:14:18.966Z	42.77951	-124.93193	731.1	Push core	4.5	34.3	5.1	In a clam bed, many of the clams are buried; going right next to many clams; first attempt failed, moved over towards a new patch; one core located more in the clam bed than the next core (036 more in clam bed); small groups of clams with gastropods intermixed with lots of detritus		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-036	NA095-036-08-E-OSU	H1671	2018-06-20T21:14:18.966Z	42.77951	-124.93193	731.1	Push core	4.5	34.3	5.1	In a clam bed, many of the clams are buried; going right next to many clams; first attempt failed, moved over towards a new patch; one core located more in the clam bed than the next core (036 more in clam bed); small groups of clams with gastropods intermixed with lots of detritus		Frozen	OSU (Thurber)
NA095-036	NA095-036-09-E-OSU	H1671	2018-06-20T21:14:18.966Z	42.77951	-124.93193	731.1	Push core	4.5	34.3	5.1	In a clam bed, many of the clams are buried; going right next to many clams; first attempt failed, moved over towards a new patch; one core located more in the clam bed than the next core (036 more in clam bed); small groups of clams with gastropods intermixed with lots of detritus		Frozen	OSU (Thurber)
NA095-036	NA095-036-10-E-OSU	H1671	2018-06-20T21:14:18.966Z	42.77951	-124.93193	731.1	Push core	4.5	34.3	5.1	In a clam bed, many of the clams are buried; going right next to many clams; first attempt failed, moved over towards a new patch; one core located more in the clam bed than the next core (036 more in clam bed); small groups of clams with gastropods intermixed with lots of detritus		Frozen	OSU (Thurber)
NA095-036	NA095-036-11-E-OSU	H1671	2018-06-20T21:14:18.966Z	42.77951	-124.93193	731.1	Push core	4.5	34.3	5.1	In a clam bed, many of the clams are buried; going right next to many clams; first attempt failed, moved over towards a new patch; one core located more in the clam bed than the next core (036 more in clam bed); small groups of clams with gastropods intermixed with lots of detritus		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-036	NA095-036-12-E-OSU	H1671	2018-06-20T21:14:18.966Z	42.77951	-124.93193	731.1	Push core	4.5	34.3	5.1	In a clam bed, many of the clams are buried; going right next to many clams; first attempt failed, moved over towards a new patch; one core located more in the clam bed than the next core (036 more in clam bed); small groups of clams with gastropods intermixed with lots of detritus		Frozen	OSU (Thurber)
NA095-036	NA095-036-13-E-OSU	H1671	2018-06-20T21:14:18.966Z	42.77951	-124.93193	731.1	Push core	4.5	34.3	5.1	In a clam bed, many of the clams are buried; going right next to many clams; first attempt failed, moved over towards a new patch; one core located more in the clam bed than the next core (036 more in clam bed); small groups of clams with gastropods intermixed with lots of detritus		Frozen	OSU (Thurber)
NA095-036	NA095-036-14-E-OSU	H1671	2018-06-20T21:14:18.966Z	42.77951	-124.93193	731.1	Push core	4.5	34.3	5.1	In a clam bed, many of the clams are buried; going right next to many clams; first attempt failed, moved over towards a new patch; one core located more in the clam bed than the next core (036 more in clam bed); small groups of clams with gastropods intermixed with lots of detritus		Frozen	OSU (Thurber)
NA095-036	NA095-036-15-E-OSU	H1671	2018-06-20T21:14:18.966Z	42.77951	-124.93193	731.1	Push core	4.5	34.3	5.1	In a clam bed, many of the clams are buried; going right next to many clams; first attempt failed, moved over towards a new patch; one core located more in the clam bed than the next core (036 more in clam bed); small groups of clams with gastropods intermixed with lots of detritus		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-036	NA095-036-16-E-OSU	H1671	2018-06-20T21:14:18.966Z	42.77951	-124.93193	731.1	Push core	4.5	34.3	5.1	In a clam bed, many of the clams are buried; going right next to many clams; first attempt failed, moved over towards a new patch; one core located more in the clam bed than the next core (036 more in clam bed); small groups of clams with gastropods intermixed with lots of detritus		Frozen	OSU (Thurber)
NA095-036	NA095-036-17-F-OSU	H1671	2018-06-20T21:14:18.966Z	42.77951	-124.93193	731.1	Push core	4.5	34.3	5.1	In a clam bed, many of the clams are buried; going right next to many clams; first attempt failed, moved over towards a new patch; one core located more in the clam bed than the next core (036 more in clam bed); small groups of clams with gastropods intermixed with lots of detritus		Seawater	OSU (Thurber)
NA095-037	NA095-037-Chem-PMEL	H1671	2018-06-20T21:16:29.870Z	42.77953	-124.93193	731.1	Push core	4.5	34.3	5.1	Duplicate with -036, but less in clam bed (more on outer edge); first core put in the sediment, last core taken out of sediment	No fauna on top; change top reduced sediment lower down in core and less defined (see photos); horizontal striations of reduced sediment; core sliced and porewater extracted	NA	NOAA PMEL (Butterfield)
NA095-037	NA095-037-01-E-OSU	H1671	2018-06-20T21:16:29.870Z	42.77953	-124.93193	731.1	Push core	4.5	34.3	5.1	Duplicate with -036, but less in clam bed (more on outer edge); first core put in the sediment, last core taken out of sediment		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-037	NA095-037-02-E-OSU	H1671	2018-06-20T21:16:29.870Z	42.77953	-124.93193	731.1	Push core	4.5	34.3	5.1	Duplicate with -036, but less in clam bed (more on outer edge); first core put in the sediment, last core taken out of sediment		Frozen	OSU (Thurber)
NA095-037	NA095-037-03-E-OSU	H1671	2018-06-20T21:16:29.870Z	42.77953	-124.93193	731.1	Push core	4.5	34.3	5.1	Duplicate with -036, but less in clam bed (more on outer edge); first core put in the sediment, last core taken out of sediment		Frozen	OSU (Thurber)
NA095-037	NA095-037-04-E-OSU	H1671	2018-06-20T21:16:29.870Z	42.77953	-124.93193	731.1	Push core	4.5	34.3	5.1	Duplicate with -036, but less in clam bed (more on outer edge); first core put in the sediment, last core taken out of sediment		Frozen	OSU (Thurber)
NA095-037	NA095-037-05-E-OSU	H1671	2018-06-20T21:16:29.870Z	42.77953	-124.93193	731.1	Push core	4.5	34.3	5.1	Duplicate with -036, but less in clam bed (more on outer edge); first core put in the sediment, last core taken out of sediment		Frozen	OSU (Thurber)
NA095-037	NA095-037-06-E-OSU	H1671	2018-06-20T21:16:29.870Z	42.77953	-124.93193	731.1	Push core	4.5	34.3	5.1	Duplicate with -036, but less in clam bed (more on outer edge); first core put in the sediment, last core taken out of sediment		Frozen	OSU (Thurber)
NA095-037	NA095-037-07-E-OSU	H1671	2018-06-20T21:16:29.870Z	42.77953	-124.93193	731.1	Push core	4.5	34.3	5.1	Duplicate with -036, but less in clam bed (more on outer edge); first core put in the sediment, last core taken out of sediment		Frozen	OSU (Thurber)
NA095-037	NA095-037-08-E-OSU	H1671	2018-06-20T21:16:29.870Z	42.77953	-124.93193	731.1	Push core	4.5	34.3	5.1	Duplicate with -036, but less in clam bed (more on outer edge); first core put in the sediment, last core taken out of sediment		Frozen	OSU (Thurber)
NA095-037	NA095-037-09-E-OSU	H1671	2018-06-20T21:16:29.870Z	42.77953	-124.93193	731.1	Push core	4.5	34.3	5.1	Duplicate with -036, but less in clam bed (more on outer edge); first core put in the sediment, last core taken out of sediment		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-037	NA095-037-10-E-OSU	H1671	2018-06-20T21:16:29.870Z	42.77953	-124.93193	731.1	Push core	4.5	34.3	5.1	Duplicate with -036, but less in clam bed (more on outer edge); first core put in the sediment, last core taken out of sediment		Frozen	OSU (Thurber)
NA095-037	NA095-037-11-E-OSU	H1671	2018-06-20T21:16:29.870Z	42.77953	-124.93193	731.1	Push core	4.5	34.3	5.1	Duplicate with -036, but less in clam bed (more on outer edge); first core put in the sediment, last core taken out of sediment		Frozen	OSU (Thurber)
NA095-037	NA095-037-12-E-OSU	H1671	2018-06-20T21:16:29.870Z	42.77953	-124.93193	731.1	Push core	4.5	34.3	5.1	Duplicate with -036, but less in clam bed (more on outer edge); first core put in the sediment, last core taken out of sediment		Frozen	OSU (Thurber)
NA095-037	NA095-037-13-E-OSU	H1671	2018-06-20T21:16:29.870Z	42.77953	-124.93193	731.1	Push core	4.5	34.3	5.1	Duplicate with -036, but less in clam bed (more on outer edge); first core put in the sediment, last core taken out of sediment		Frozen	OSU (Thurber)
NA095-037	NA095-037-14-F-OSU	H1671	2018-06-20T21:16:29.870Z	42.77953	-124.93193	731.1	Push core	4.5	34.3	5.1	Duplicate with -036, but less in clam bed (more on outer edge); first core put in the sediment, last core taken out of sediment		Seawater	OSU (Thurber)
NA095-038	NA095-038-01-E-OSU	H1671	2018-06-20T21:31:00.375Z	42.77949	-124.93197	731.2	Bio	4.5	34.3	5.2	Slurp of clam beds that we took cores -036 and -037 in; associated gastropods collected along with clams	Many clams (~56) and small, tan-shelled, pink-bodied snails (~30); also a shrimp, tiny scale worm, long thin worms, and tiny white clam; clams about 2.5-4.5 cm long	Frozen	OSU (Thurber)
NA095-038	NA095-038-02-A-PMEL	H1671	2018-06-20T21:31:00.375Z	42.77949	-124.93197	731.2	Bio	4.5	34.3	5.2	Slurp of clam beds that we took cores -036 and -037 in; associated gastropods collected along with clams		95% Ethanol	NOAA PMEL (Stepien)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-038	NA095-038-03-A-MCZ	H1671	2018-06-20T21:31:00.375Z	42.77949	-124.93197	731.2	Bio	4.5	34.3	5.2	Slurp of clam beds that we took cores -036 and -037 in; associated gastropods collected along with clams		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-038	NA095-038-04-A-MCZ	H1671	2018-06-20T21:31:00.375Z	42.77949	-124.93197	731.2	Bio	4.5	34.3	5.2	Slurp of clam beds that we took cores -036 and -037 in; associated gastropods collected along with clams		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-038	NA095-038-05-A-MCZ	H1671	2018-06-20T21:31:00.375Z	42.77949	-124.93197	731.2	Bio	4.5	34.3	5.2	Slurp of clam beds that we took cores -036 and -037 in; associated gastropods collected along with clams		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-038	NA095-038-06-A-MCZ	H1671	2018-06-20T21:31:00.375Z	42.77949	-124.93197	731.2	Bio	4.5	34.3	5.2	Slurp of clam beds that we took cores -036 and -037 in; associated gastropods collected along with clams		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-038	NA095-038-07-A-MCZ	H1671	2018-06-20T21:31:00.375Z	42.77949	-124.93197	731.2	Bio	4.5	34.3	5.2	Slurp of clam beds that we took cores -036 and -037 in; associated gastropods collected along with clams		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-038	NA095-038-08-A-MCZ	H1671	2018-06-20T21:31:00.375Z	42.77949	-124.93197	731.2	Bio	4.5	34.3	5.2	Slurp of clam beds that we took cores -036 and -037 in; associated gastropods collected along with clams		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-039	NA095-039-MA01-PMEL	H1671	2018-06-20T21:38:48.811Z	42.77949	-124.93196	731.4	Major	4.5	34.3	5.2	Funnel was left for 50 minutes on top of a clam bed patch; cored about 1 m away and took slurp of clams; likely very diffuse flow	Fluid used for geochemistry tests	NA	NOAA PMEL
NA095-040	NA095-040-01-A-PMEL	H1671	2018-06-20T22:06:36.511Z	42.77905	-124.93070	722.2	Niskin	4.5	34.3	5.2	Background Niskin, muddy bottom with sea stars, snails, thornyheads, soles, some worms in sediment; likely upstream of seep	Water used for geochemistry tests and 2 l used for eDNA filtration; some water backlogged out of pump for a few seconds during eDNA filtration	95% Ethanol	NOAA PMEL (Stepien)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-040	NA095-040-02-E-OSU	H1671	2018-06-20T22:06:36.511Z	42.77905	-124.93070	722.2	Niskin	4.5	34.3	5.2	Background Niskin, muddy bottom with sea stars, snails, thornyheads, soles, some worms in sediment; likely upstream of seep		Frozen	OSU (Thurber)
NA095-040	NA095-040-Chem-PMEL	H1671	2018-06-20T22:06:36.511Z	42.77905	-124.93070	722.2	Niskin	4.5	34.3	5.2	Background Niskin, muddy bottom with sea stars, snails, thornyheads, soles, some worms in sediment; likely upstream of seep		NA	NOAA PMEL
NA095-041	NA095-041-Chem-PMEL	H1671	2018-06-20T22:11:48.053Z	42.77905	-124.93070	722.7	Push core	4.5	34.3	5.2	Background push core, muddy bottom with sea stars, thornyheads, polychaetes; paired with -040	Brown all the way down, no sign of reduced sediment; core in good shape; core sliced and porewater extracted	NA	NOAA PMEL (Butterfield)
NA095-041	NA095-041-01-E-OSU	H1671	2018-06-20T22:11:48.053Z	42.77905	-124.93070	722.7	Push core	4.5	34.3	5.2	Background push core, muddy bottom with sea stars, thornyheads, polychaetes; paired with -040		Frozen	OSU (Thurber)
NA095-041	NA095-041-02-E-OSU	H1671	2018-06-20T22:11:48.053Z	42.77905	-124.93070	722.7	Push core	4.5	34.3	5.2	Background push core, muddy bottom with sea stars, thornyheads, polychaetes; paired with -040		Frozen	OSU (Thurber)
NA095-041	NA095-041-03-E-OSU	H1671	2018-06-20T22:11:48.053Z	42.77905	-124.93070	722.7	Push core	4.5	34.3	5.2	Background push core, muddy bottom with sea stars, thornyheads, polychaetes; paired with -040		Frozen	OSU (Thurber)
NA095-041	NA095-041-04-E-OSU	H1671	2018-06-20T22:11:48.053Z	42.77905	-124.93070	722.7	Push core	4.5	34.3	5.2	Background push core, muddy bottom with sea stars, thornyheads, polychaetes; paired with -040		Frozen	OSU (Thurber)
NA095-041	NA095-041-05-E-OSU	H1671	2018-06-20T22:11:48.053Z	42.77905	-124.93070	722.7	Push core	4.5	34.3	5.2	Background push core, muddy bottom with sea stars, thornyheads, polychaetes; paired with -040		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-041	NA095-041-06-E-OSU	H1671	2018-06-20T22:11:48.053Z	42.77905	-124.93070	722.7	Push core	4.5	34.3	5.2	Background push core, muddy bottom with sea stars, thornyheads, polychaetes; paired with -040		Frozen	OSU (Thurber)
NA095-041	NA095-041-07-E-OSU	H1671	2018-06-20T22:11:48.053Z	42.77905	-124.93070	722.7	Push core	4.5	34.3	5.2	Background push core, muddy bottom with sea stars, thornyheads, polychaetes; paired with -040		Frozen	OSU (Thurber)
NA095-041	NA095-041-08-E-OSU	H1671	2018-06-20T22:11:48.053Z	42.77905	-124.93070	722.7	Push core	4.5	34.3	5.2	Background push core, muddy bottom with sea stars, thornyheads, polychaetes; paired with -040		Frozen	OSU (Thurber)
NA095-041	NA095-041-09-E-OSU	H1671	2018-06-20T22:11:48.053Z	42.77905	-124.93070	722.7	Push core	4.5	34.3	5.2	Background push core, muddy bottom with sea stars, thornyheads, polychaetes; paired with -040		Frozen	OSU (Thurber)
NA095-041	NA095-041-10-E-OSU	H1671	2018-06-20T22:11:48.053Z	42.77905	-124.93070	722.7	Push core	4.5	34.3	5.2	Background push core, muddy bottom with sea stars, thornyheads, polychaetes; paired with -040		Frozen	OSU (Thurber)
NA095-041	NA095-041-11-E-OSU	H1671	2018-06-20T22:11:48.053Z	42.77905	-124.93070	722.7	Push core	4.5	34.3	5.2	Background push core, muddy bottom with sea stars, thornyheads, polychaetes; paired with -040		Frozen	OSU (Thurber)
NA095-041	NA095-041-12-E-OSU	H1671	2018-06-20T22:11:48.053Z	42.77905	-124.93070	722.7	Push core	4.5	34.3	5.2	Background push core, muddy bottom with sea stars, thornyheads, polychaetes; paired with -040		Frozen	OSU (Thurber)
NA095-041	NA095-041-13-E-OSU	H1671	2018-06-20T22:11:48.053Z	42.77905	-124.93070	722.7	Push core	4.5	34.3	5.2	Background push core, muddy bottom with sea stars, thornyheads, polychaetes; paired with -040		Frozen	OSU (Thurber)
NA095-041	NA095-041-14-E-OSU	H1671	2018-06-20T22:11:48.053Z	42.77905	-124.93070	722.7	Push core	4.5	34.3	5.2	Background push core, muddy bottom with sea stars, thornyheads, polychaetes; paired with -040		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-041	NA095-041-15-E-OSU	H1671	2018-06-20T22:11:48.053Z	42.77905	-124.93070	722.7	Push core	4.5	34.3	5.2	Background push core, muddy bottom with sea stars, thornyheads, polychaetes; paired with -040		Frozen	OSU (Thurber)
NA095-041	NA095-041-16-E-OSU	H1671	2018-06-20T22:11:48.053Z	42.77905	-124.93070	722.7	Push core	4.5	34.3	5.2	Background push core, muddy bottom with sea stars, thornyheads, polychaetes; paired with -040		Frozen	OSU (Thurber)
NA095-042	NA095-042-GT10-PMEL	H1671	2018-06-21T00:10:40.113Z	42.77608	-124.92695	700.6	Gas	4.5	34.3	5.1	Large amount of bubbles coming out of crevice within a large collapsed site with hydrate icicles; using funnel to collect	Separate water from gas using seagoing extraction line	Glass Ampules	NOAA PMEL
NA095-043	NA095-043-GT02-PMEL	H1671	2018-06-21T00:26:32.682Z	42.77608	-124.92696	700.8	Gas	4.5	34.3	5.1	Sample at same site as sample -042; taking more bubble samples to get higher abundance; many hydrate covered bubbles were in the funnel		Glass Ampules	NOAA PMEL
NA095-044	NA095-044-01-E-OSU	H1671	2018-06-21T00:54:02.686Z	42.77608	-124.92693	701.0	Scoop	4.5	34.3	5.1	Same site as gas-tight samples -042 an -043; live clams sticking out of sediment	Black, thick, sulfur-smelling mud with 23 clams; clams ~0.5-7 cm long; may be two different species of clams – when dissected, some bloody inside and some not	Frozen	OSU (Thurber)
NA095-044	NA095-044-02-A-PMEL	H1671	2018-06-21T00:54:02.686Z	42.77608	-124.92693	701.0	Scoop	4.5	34.3	5.1	Same site as gas-tight samples -042 an -043; live clams sticking out of sediment		95% Ethanol	NOAA PMEL (Stepien)
NA095-044	NA095-044-03-A-MCZ	H1671	2018-06-21T00:54:02.686Z	42.77608	-124.92693	701.0	Scoop	4.5	34.3	5.1	Same site as gas-tight samples -042 an -043; live clams sticking out of sediment		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-044	NA095-044-04-A-MCZ	H1671	2018-06-21T00:54:02.686Z	42.77608	-124.92693	701.0	Scoop	4.5	34.3	5.1	Same site as gas-tight samples -042 an -043; live clams sticking out of sediment		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-045	NA095-045-Chem-PMEL	H1671	2018-06-21T01:15:10.029Z	42.77604	-124.92693	699.9	Niskin	4.5	34.3	5.2	Taking Niskin sample above seep site, same site as gas-tight (-042, -043) and scoop (-044) samples; over the pit	Water used for geochemistry tests	NA	NOAA PMEL
NA095-046	NA095-046-Chem-PMEL	H1671	2018-06-21T01:28:14.615Z	42.77607	-124.92698	650.1	Niskin	4.8	34.2	6.5	Taking Niskin water sample during ascent at ~650 m		NA	NOAA PMEL
NA095-047	NA095-047-Chem-PMEL	H1671	2018-06-21T01:36:43.563Z	42.77606	-124.92694	550.1	Niskin	5.0	34.2	11.1	During ascent at ~550 m		NA	NOAA PMEL
NA095-048	NA095-048-C-PMEL	H1672	2018-06-21T22:44:52.352Z	42.81242	-124.72294	146.8	Rock	7.1	34.0	62.4	Collection of a rock from waypoint 8; grabbed it up from some rubble on the seafloor, really attached, had to break some off; dropped the first one and tried again; had to move to a new location found a good ledge to sample from; found one loose on the seafloor near the bottom of the ledge covered in lots of inverts including brachiopods, chiton, polychaetes	Grey rock with many encrusting colored patches (sponges and possibly other organisms) and numerous other small invertebrate associates; overall rock: 28 cm x 10.5 cm x 8 cm; rock broken into subsamples with hammer	Dry	NOAA PMEL (Embley)
NA095-048	NA095-048-C-GSO	H1672	2018-06-21T22:44:52.352Z	42.81242	-124.72294	146.8	Rock	7.1	34.0	62.4	Collection of a rock from waypoint 8; grabbed it up from some rubble on the seafloor, really attached, had to break some off; dropped the first one and tried again; had to move to a new location found a good ledge to sample from; found one loose on the seafloor near the bottom of the ledge covered in lots of inverts including brachiopods, chiton, polychaetes		Dry	GSO (Graduate School of Oceanography at URI)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-048	NA095-048-01-A-MCZ	H1672	2018-06-21T22:44:52.352Z	42.81242	-124.72294	146.8	Rock	7.1	34.0	62.4	Collection of a rock from waypoint 8; grabbed it up from some rubble on the seafloor, really attached, had to break some off; dropped the first one and tried again; had to move to a new location found a good ledge to sample from; found one loose on the seafloor near the bottom of the ledge covered in lots of inverts including brachiopods, chiton, polychaetes		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-048	NA095-048-02-A-MCZ	H1672	2018-06-21T22:44:52.352Z	42.81242	-124.72294	146.8	Rock	7.1	34.0	62.4	Collection of a rock from waypoint 8; grabbed it up from some rubble on the seafloor, really attached, had to break some off; dropped the first one and tried again; had to move to a new location found a good ledge to sample from; found one loose on the seafloor near the bottom of the ledge covered in lots of inverts including brachiopods, chiton, polychaetes		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-048	NA095-048-03-A-MCZ	H1672	2018-06-21T22:44:52.352Z	42.81242	-124.72294	146.8	Rock	7.1	34.0	62.4	Collection of a rock from waypoint 8; grabbed it up from some rubble on the seafloor, really attached, had to break some off; dropped the first one and tried again; had to move to a new location found a good ledge to sample from; found one loose on the seafloor near the bottom of the ledge covered in lots of inverts including brachiopods, chiton, polychaetes		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-048	NA095-048-04-A-MCZ	H1672	2018-06-21T22:44:52.352Z	42.81242	-124.72294	146.8	Rock	7.1	34.0	62.4	Collection of a rock from waypoint 8; grabbed it up from some rubble on the seafloor, really attached, had to break some off; dropped the first one and tried again; had to move to a new location found a good ledge to sample from; found one loose on the seafloor near the bottom of the ledge covered in lots of inverts including brachiopods, chiton, polychaetes		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-048	NA095-048-05-A-MCZ	H1672	2018-06-21T22:44:52.352Z	42.81242	-124.72294	146.8	Rock	7.1	34.0	62.4	Collection of a rock from waypoint 8; grabbed it up from some rubble on the seafloor, really attached, had to break some off; dropped the first one and tried again; had to move to a new location found a good ledge to sample from; found one loose on the seafloor near the bottom of the ledge covered in lots of inverts including brachiopods, chiton, polychaetes		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-048	NA095-048-06-A-MCZ	H1672	2018-06-21T22:44:52.352Z	42.81242	-124.72294	146.8	Rock	7.1	34.0	62.4	Collection of a rock from waypoint 8; grabbed it up from some rubble on the seafloor, really attached, had to break some off; dropped the first one and tried again; had to move to a new location found a good ledge to sample from; found one loose on the seafloor near the bottom of the ledge covered in lots of inverts including brachiopods, chiton, polychaetes		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-048	NA095-048-07-A-MCZ	H1672	2018-06-21T22:44:52.352Z	42.81242	-124.72294	146.8	Rock	7.1	34.0	62.4	Collection of a rock from waypoint 8; grabbed it up from some rubble on the seafloor, really attached, had to break some off; dropped the first one and tried again; had to move to a new location found a good ledge to sample from; found one loose on the seafloor near the bottom of the ledge covered in lots of inverts including brachiopods, chiton, polychaetes		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-048	NA095-048-08-A-MCZ	H1672	2018-06-21T22:44:52.352Z	42.81242	-124.72294	146.8	Rock	7.1	34.0	62.4	Collection of a rock from waypoint 8; grabbed it up from some rubble on the seafloor, really attached, had to break some off; dropped the first one and tried again; had to move to a new location found a good ledge to sample from; found one loose on the seafloor near the bottom of the ledge covered in lots of inverts including brachiopods, chiton, polychaetes		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-048	NA095-048-09-A-MCZ	H1672	2018-06-21T22:44:52.352Z	42.81242	-124.72294	146.8	Rock	7.1	34.0	62.4	Collection of a rock from waypoint 8; grabbed it up from some rubble on the seafloor, really attached, had to break some off; dropped the first one and tried again; had to move to a new location found a good ledge to sample from; found one loose on the seafloor near the bottom of the ledge covered in lots of inverts including brachiopods, chiton, polychaetes		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-048	NA095-048-10-A-MCZ	H1672	2018-06-21T22:44:52.352Z	42.81242	-124.72294	146.8	Rock	7.1	34.0	62.4	Collection of a rock from waypoint 8; grabbed it up from some rubble on the seafloor, really attached, had to break some off; dropped the first one and tried again; had to move to a new location found a good ledge to sample from; found one loose on the seafloor near the bottom of the ledge covered in lots of inverts including brachiopods, chiton, polychaetes		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-048	NA095-048-11-A-MCZ	H1672	2018-06-21T22:44:52.352Z	42.81242	-124.72294	146.8	Rock	7.1	34.0	62.4	Collection of a rock from waypoint 8; grabbed it up from some rubble on the seafloor, really attached, had to break some off; dropped the first one and tried again; had to move to a new location found a good ledge to sample from; found one loose on the seafloor near the bottom of the ledge covered in lots of inverts including brachiopods, chiton, polychaetes		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-048	NA095-048-12-A-MCZ	H1672	2018-06-21T22:44:52.352Z	42.81242	-124.72294	146.8	Rock	7.1	34.0	62.4	Collection of a rock from waypoint 8; grabbed it up from some rubble on the seafloor, really attached, had to break some off; dropped the first one and tried again; had to move to a new location found a good ledge to sample from; found one loose on the seafloor near the bottom of the ledge covered in lots of inverts including brachiopods, chiton, polychaetes		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-048	NA095-048-13-A-MCZ	H1672	2018-06-21T22:44:52.352Z	42.81242	-124.72294	146.8	Rock	7.1	34.0	62.4	Collection of a rock from waypoint 8; grabbed it up from some rubble on the seafloor, really attached, had to break some off; dropped the first one and tried again; had to move to a new location found a good ledge to sample from; found one loose on the seafloor near the bottom of the ledge covered in lots of inverts including brachiopods, chiton, polychaetes		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-048	NA095-048-14-A-MCZ	H1672	2018-06-21T22:44:52.352Z	42.81242	-124.72294	146.8	Rock	7.1	34.0	62.4	Collection of a rock from waypoint 8; grabbed it up from some rubble on the seafloor, really attached, had to break some off; dropped the first one and tried again; had to move to a new location found a good ledge to sample from; found one loose on the seafloor near the bottom of the ledge covered in lots of inverts including brachiopods, chiton, polychaetes		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-048	NA095-048-15-A-MCZ	H1672	2018-06-21T22:44:52.352Z	42.81242	-124.72294	146.8	Rock	7.1	34.0	62.4	Collection of a rock from waypoint 8; grabbed it up from some rubble on the seafloor, really attached, had to break some off; dropped the first one and tried again; had to move to a new location found a good ledge to sample from; found one loose on the seafloor near the bottom of the ledge covered in lots of inverts including brachiopods, chiton, polychaetes		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-048	NA095-048-16-A-MCZ	H1672	2018-06-21T22:44:52.352Z	42.81242	-124.72294	146.8	Rock	7.1	34.0	62.4	Collection of a rock from waypoint 8; grabbed it up from some rubble on the seafloor, really attached, had to break some off; dropped the first one and tried again; had to move to a new location found a good ledge to sample from; found one loose on the seafloor near the bottom of the ledge covered in lots of inverts including brachiopods, chiton, polychaetes		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-049	NA095-049-MA02-PMEL	H1672	2018-06-22T00:24:03.229Z	42.81078	-124.72106	149.3	Major	7.1	34.0	63.7	Area that we tried to take a gt before but the bubbling stopped; some shell hash and reduced sediment patches, not very active	Fluid used for geochemistry tests	NA	NOAA PMEL

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-050	NA095-050-Chem-PMEL	H1672	2018-06-22T00:33:06.113Z	42.81078	-124.72105	149.4	Push core	7.1	34.0	63.6	Area where we took major sample; patches of reduced sediment and some shell hash but not much else; no more active bubbles coming up	Microbial mat 8 cm and 10 cm down; some patches of reduced sediment; looks more “seepy” than -051; core sliced and porewater extracted	NA	NOAA PMEL (Butterfield)
NA095-050	NA095-050-01-E-OSU	H1672	2018-06-22T00:33:06.113Z	42.81078	-124.72105	149.4	Push core	7.1	34.0	63.6	Area where we took major sample; patches of reduced sediment and some shell hash but not much else; no more active bubbles coming up		Frozen	OSU (Thurber)
NA095-050	NA095-050-02-E-OSU	H1672	2018-06-22T00:33:06.113Z	42.81078	-124.72105	149.4	Push core	7.1	34.0	63.6	Area where we took major sample; patches of reduced sediment and some shell hash but not much else; no more active bubbles coming up		Frozen	OSU (Thurber)
NA095-050	NA095-050-03-E-OSU	H1672	2018-06-22T00:33:06.113Z	42.81078	-124.72105	149.4	Push core	7.1	34.0	63.6	Area where we took major sample; patches of reduced sediment and some shell hash but not much else; no more active bubbles coming up		Frozen	OSU (Thurber)
NA095-050	NA095-050-04-E-OSU	H1672	2018-06-22T00:33:06.113Z	42.81078	-124.72105	149.4	Push core	7.1	34.0	63.6	Area where we took major sample; patches of reduced sediment and some shell hash but not much else; no more active bubbles coming up		Frozen	OSU (Thurber)
NA095-050	NA095-050-05-E-OSU	H1672	2018-06-22T00:33:06.113Z	42.81078	-124.72105	149.4	Push core	7.1	34.0	63.6	Area where we took major sample; patches of reduced sediment and some shell hash but not much else; no more active bubbles coming up		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-050	NA095-050-06-E-OSU	H1672	2018-06-22T00:33:06.113Z	42.81078	-124.72105	149.4	Push core	7.1	34.0	63.6	Area where we took major sample; patches of reduced sediment and some shell hash but not much else; no more active bubbles coming up		Frozen	OSU (Thurber)
NA095-050	NA095-050-07-E-OSU	H1672	2018-06-22T00:33:06.113Z	42.81078	-124.72105	149.4	Push core	7.1	34.0	63.6	Area where we took major sample; patches of reduced sediment and some shell hash but not much else; no more active bubbles coming up		Frozen	OSU (Thurber)
NA095-050	NA095-050-08-E-OSU	H1672	2018-06-22T00:33:06.113Z	42.81078	-124.72105	149.4	Push core	7.1	34.0	63.6	Area where we took major sample; patches of reduced sediment and some shell hash but not much else; no more active bubbles coming up		Frozen	OSU (Thurber)
NA095-050	NA095-050-09-E-OSU	H1672	2018-06-22T00:33:06.113Z	42.81078	-124.72105	149.4	Push core	7.1	34.0	63.6	Area where we took major sample; patches of reduced sediment and some shell hash but not much else; no more active bubbles coming up		Frozen	OSU (Thurber)
NA095-050	NA095-050-10-F-OSU	H1672	2018-06-22T00:33:06.113Z	42.81078	-124.72105	149.4	Push core	7.1	34.0	63.6	Area where we took major sample; patches of reduced sediment and some shell hash but not much else; no more active bubbles coming up		Seawater	OSU (Thurber)
NA095-051	NA095-051-Chem-PMEL	H1672	2018-06-22T00:34:02.065Z	42.81078	-124.72105	149.4	Push core	7.1	34.0	63.7	Duplicate with -050	Some reduced spots throughout but predominantly brown; krill on top and a polychaete sticking out; microbial mat at 13-15 cm; core sliced and porewater extracted down to 13 cm	NA	NOAA PMEL (Butterfield)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-051	NA095-051-01-E-OSU	H1672	2018-06-22T00:34:02.065Z	42.81078	-124.72105	149.4	Push core	7.1	34.0	63.7	Duplicate with -050		Frozen	OSU (Thurber)
NA095-051	NA095-051-02-E-OSU	H1672	2018-06-22T00:34:02.065Z	42.81078	-124.72105	149.4	Push core	7.1	34.0	63.7	Duplicate with -050		Frozen	OSU (Thurber)
NA095-051	NA095-051-03-E-OSU	H1672	2018-06-22T00:34:02.065Z	42.81078	-124.72105	149.4	Push core	7.1	34.0	63.7	Duplicate with -050		Frozen	OSU (Thurber)
NA095-051	NA095-051-04-E-OSU	H1672	2018-06-22T00:34:02.065Z	42.81078	-124.72105	149.4	Push core	7.1	34.0	63.7	Duplicate with -050		Frozen	OSU (Thurber)
NA095-051	NA095-051-05-E-OSU	H1672	2018-06-22T00:34:02.065Z	42.81078	-124.72105	149.4	Push core	7.1	34.0	63.7	Duplicate with -050		Frozen	OSU (Thurber)
NA095-051	NA095-051-06-E-OSU	H1672	2018-06-22T00:34:02.065Z	42.81078	-124.72105	149.4	Push core	7.1	34.0	63.7	Duplicate with -050		Frozen	OSU (Thurber)
NA095-051	NA095-051-07-E-OSU	H1672	2018-06-22T00:34:02.065Z	42.81078	-124.72105	149.4	Push core	7.1	34.0	63.7	Duplicate with -050		Frozen	OSU (Thurber)
NA095-051	NA095-051-08-E-OSU	H1672	2018-06-22T00:34:02.065Z	42.81078	-124.72105	149.4	Push core	7.1	34.0	63.7	Duplicate with -050		Frozen	OSU (Thurber)
NA095-051	NA095-051-09-E-OSU	H1672	2018-06-22T00:34:02.065Z	42.81078	-124.72105	149.4	Push core	7.1	34.0	63.7	Duplicate with -050		Frozen	OSU (Thurber)
NA095-051	NA095-051-10-E-OSU	H1672	2018-06-22T00:34:02.065Z	42.81078	-124.72105	149.4	Push core	7.1	34.0	63.7	Duplicate with -050		Frozen	OSU (Thurber)
NA095-051	NA095-051-11-E-OSU	H1672	2018-06-22T00:34:02.065Z	42.81078	-124.72105	149.4	Push core	7.1	34.0	63.7	Duplicate with -050		Frozen	OSU (Thurber)
NA095-051	NA095-051-12-E-OSU	H1672	2018-06-22T00:34:02.065Z	42.81078	-124.72105	149.4	Push core	7.1	34.0	63.7	Duplicate with -050		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-051	NA095-051-13-E-OSU	H1672	2018-06-22T00:34:02.065Z	42.81078	-124.72105	149.4	Push core	7.1	34.0	63.7	Duplicate with -050		Frozen	OSU (Thurber)
NA095-051	NA095-051-14-F-OSU	H1672	2018-06-22T00:34:02.065Z	42.81078	-124.72105	149.4	Push core	7.1	34.0	63.7	Duplicate with -050		Seawater	OSU (Thurber)
NA095-052	NA095-052-01-A-PMEL	H1672	2018-06-22T00:46:52.891Z	42.81072	-124.72116	149.4	Niskin	7.1	34.0	63.9	Taken 1 m off bottom	Water used for geochemistry tests and 2 l used for eDNA filtration; spigot not closed, some leaking during eDNA filtration	95% Ethanol	NOAA PMEL (Stepien)
NA095-052	NA095-052-02-E-OSU	H1672	2018-06-22T00:46:52.891Z	42.81072	-124.72116	149.4	Niskin	7.1	34.0	63.9	Taken 1 m off bottom		Frozen	OSU (Thurber)
NA095-052	NA095-052-Chem-PMEL	H1672	2018-06-22T00:46:52.891Z	42.81072	-124.72116	149.4	Niskin	7.1	34.0	63.9	Taken 1 m off bottom		NA	NOAA PMEL
NA095-053	NA095-053-Chem-PMEL	H1672	2018-06-22T00:52:59.240Z	42.81072	-124.72115	139.4	Niskin	7.1	34.0	64.2	Taken at 140 m depth	Water used for geochemistry tests	NA	NOAA PMEL
NA095-054	NA095-054-Chem-PMEL	H1672	2018-06-22T00:54:28.912Z	42.81073	-124.72115	130.0	Niskin	7.1	34.0	66.7	Taken at 130 m depth	Water used for geochemistry tests	NA	NOAA PMEL
NA095-055	NA095-055-Chem-PMEL	H1672	2018-06-22T00:58:16.238Z	42.81073	-124.72115	100.0	Niskin	7.2	34.0	71.7	Taken at 100 m depth	Water used for geochemistry tests	NA	NOAA PMEL
NA095-056	NA095-056-Chem-PMEL	H1672	2018-06-22T01:07:59.322Z	42.81121	-124.72102	46.5	Niskin	8.0	33.9	88.5	Taken at 50 m depth	Water used for geochemistry tests	NA	NOAA PMEL

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-057	NA095-057-Chem-PMEL	H1672	2018-06-22T01:12:27.672Z	42.81115	-124.72104	20.1	Niskin	DATA MISSING			Taken at 20 m depth	Water used for geochemistry tests	NA	NOAA PMEL
NA095-058	NA095-058-GT07-PMEL	H1673	2018-06-22T18:12:58.408Z	42.71072	-124.90114	613.4	Gas	4.9	34.2	10.0	By "bubbles 001" site, sampling from steady stream of bubbles coming from under a carbonate ledge with white filamentous mat; hydrate forming in collection funnel; at base of "carbonate staircase"	Separate water from gas using seagoing extraction line	Glass Ampules	NOAA PMEL
NA095-059	NA095-059-01-A-PMEL	H1673	2018-06-22T18:25:34.267Z	42.71075	-124.90117	611.1	Niskin	4.9	34.2	10.0	About 2 m above bubbles, with some small white branched sponges and small mushroom corals on shelf by bubbles	Water used for geochemistry tests and 2 l used for eDNA filtration	95% Ethanol	NOAA PMEL (Stepien)
NA095-059	NA095-059-02-E-OSU	H1673	2018-06-22T18:25:34.267Z	42.71075	-124.90117	611.1	Niskin	4.9	34.2	10.0	About 2 m above bubbles, with some small white branched sponges and small mushroom corals on shelf by bubbles		Frozen	OSU (Thurber)
NA095-059	NA095-059-Chem-PMEL	H1673	2018-06-22T18:25:34.267Z	42.71075	-124.90117	611.1	Niskin	4.9	34.2	10.0	About 2 m above bubbles, with some small white branched sponges and small mushroom corals on shelf by bubbles		NA	NOAA PMEL
NA095-060	NA095-060-01-E-OSU	H1673	2018-06-22T20:30:46.972Z	42.71048	-124.90190	615.3	Bio	4.8	34.2	8.8	Slurp of small amphipod-looking animals that are on a really dense microbial mat; at “mat 009” next to a bubble stream and some clams (actually worms, not amphipods)	Dark grey/black fine sediment with while filamentous mat and numerous very small (~0.5-1 cm long), thin, tan worms, though a few are more pink colored	Frozen	OSU (Thurber)
NA095-060	NA095-060-02-A-MCZ	H1673	2018-06-22T20:30:46.972Z	42.71048	-124.90190	615.3	Bio	4.8	34.2	8.8	Slurp of small amphipod-looking animals that are on a really dense microbial mat; at “mat 009” next to a bubble stream and some clams (actually worms, not amphipods)		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-060	NA095-060-03-E-OSU	H1673	2018-06-22T20:30:46.972Z	42.71048	-124.90190	615.3	Bio	4.8	34.2	8.8	Slurp of small amphipod-looking animals that are on a really dense microbial mat; at “mat 009” next to a bubble stream and some clams (actually worms, not amphipods)		Frozen	OSU (Thurber)
NA095-060	NA095-060-04-A-MCZ	H1673	2018-06-22T20:30:46.972Z	42.71048	-124.90190	615.3	Bio	4.8	34.2	8.8	Slurp of small amphipod-looking animals that are on a really dense microbial mat; at “mat 009” next to a bubble stream and some clams (actually worms, not amphipods)		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-061	NA095-061-GT05-PMEL	H1673	2018-06-22T21:15:56.497Z	42.71070	-124.90115	612.6	Gas	4.8	34.2	8.4	At “bubbles 002” waypoint; two streams of bubbles coming out of a carbonate ledge; some microbial mats and clams and gastropods around; a lot of bubbles accumulating right now	Separate water from gas using seagoing extraction line	Glass Ampules	NOAA PMEL
NA095-062	SAMPLE FAILED	H1673	2018-06-22T22:10:51.505Z	42.71066	-124.90122	611.4	Push core	4.8	34.2	8.3	First attempt failed; tried a microbial mat that was quite thick and potentially a hole in the carbonate platform	Sample failed		
NA095-063	NA095-063-Chem-PMEL	H1673	2018-06-22T22:24:47.827Z	42.71065	-124.90121	613.1	Push core	4.8	34.2	8.2	Microbial mat, duplicate with -062	Reduced, sulfur-smelling sediment throughout; micorbial mat on top and randomly throughout; core sliced and porewater extracted	NA	NOAA PMEL (Butterfield)
NA095-063	NA095-063-01-E-OSU	H1673	2018-06-22T22:24:47.827Z	42.71065	-124.90121	613.1	Push core	4.8	34.2	8.2	Microbial mat, duplicate with -062		Frozen	OSU (Thurber)
NA095-063	NA095-063-02-E-OSU	H1673	2018-06-22T22:24:47.827Z	42.71065	-124.90121	613.1	Push core	4.8	34.2	8.2	Microbial mat, duplicate with -062		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-063	NA095-063-03-E-OSU	H1673	2018-06-22T22:24:47.827Z	42.71065	-124.90121	613.1	Push core	4.8	34.2	8.2	Microbial mat, duplicate with -062		Frozen	OSU (Thurber)
NA095-063	NA095-063-04-E-OSU	H1673	2018-06-22T22:24:47.827Z	42.71065	-124.90121	613.1	Push core	4.8	34.2	8.2	Microbial mat, duplicate with -062		Frozen	OSU (Thurber)
NA095-063	NA095-063-05-E-OSU	H1673	2018-06-22T22:24:47.827Z	42.71065	-124.90121	613.1	Push core	4.8	34.2	8.2	Microbial mat, duplicate with -062		Frozen	OSU (Thurber)
NA095-063	NA095-063-06-E-OSU	H1673	2018-06-22T22:24:47.827Z	42.71065	-124.90121	613.1	Push core	4.8	34.2	8.2	Microbial mat, duplicate with -062		Frozen	OSU (Thurber)
NA095-063	NA095-063-07-E-OSU	H1673	2018-06-22T22:24:47.827Z	42.71065	-124.90121	613.1	Push core	4.8	34.2	8.2	Microbial mat, duplicate with -062		Frozen	OSU (Thurber)
NA095-063	NA095-063-08-E-OSU	H1673	2018-06-22T22:24:47.827Z	42.71065	-124.90121	613.1	Push core	4.8	34.2	8.2	Microbial mat, duplicate with -062		Frozen	OSU (Thurber)
NA095-063	NA095-063-09-E-OSU	H1673	2018-06-22T22:24:47.827Z	42.71065	-124.90121	613.1	Push core	4.8	34.2	8.2	Microbial mat, duplicate with -062		Frozen	OSU (Thurber)
NA095-063	NA095-063-10-E-OSU	H1673	2018-06-22T22:24:47.827Z	42.71065	-124.90121	613.1	Push core	4.8	34.2	8.2	Microbial mat, duplicate with -062		Frozen	OSU (Thurber)
NA095-063	NA095-063-11-F-OSU	H1673	2018-06-22T22:24:47.827Z	42.71065	-124.90121	613.1	Push core	4.8	34.2	8.2	Microbial mat, duplicate with -062		Seawater	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-064	NA095-064-Chem-PMEL	H1673	2018-06-22T22:36:43.206Z	42.71076	-124.90111	612.3	Push core	4.8	34.2	8.2	Right up from the clam bed we were poking around at before	Reduced sediment throughout; clam on top; core sliced and porewater extracted	NA	NOAA PMEL (Butterfield)
NA095-064	NA095-064-01-E-OSU	H1673	2018-06-22T22:36:43.206Z	42.71076	-124.90111	612.3	Push core	4.8	34.2	8.2	Right up from the clam bed we were poking around at before		Frozen	OSU (Thurber)
NA095-064	NA095-064-02-E-OSU	H1673	2018-06-22T22:36:43.206Z	42.71076	-124.90111	612.3	Push core	4.8	34.2	8.2	Right up from the clam bed we were poking around at before		Frozen	OSU (Thurber)
NA095-064	NA095-064-03-E-OSU	H1673	2018-06-22T22:36:43.206Z	42.71076	-124.90111	612.3	Push core	4.8	34.2	8.2	Right up from the clam bed we were poking around at before		Frozen	OSU (Thurber)
NA095-064	NA095-064-04-E-OSU	H1673	2018-06-22T22:36:43.206Z	42.71076	-124.90111	612.3	Push core	4.8	34.2	8.2	Right up from the clam bed we were poking around at before		Frozen	OSU (Thurber)
NA095-064	NA095-064-05-E-OSU	H1673	2018-06-22T22:36:43.206Z	42.71076	-124.90111	612.3	Push core	4.8	34.2	8.2	Right up from the clam bed we were poking around at before		Frozen	OSU (Thurber)
NA095-064	NA095-064-06-F-OSU	H1673	2018-06-22T22:36:43.206Z	42.71076	-124.90111	612.3	Push core	4.8	34.2	8.2	Right up from the clam bed we were poking around at before		Seawater	OSU (Thurber)
NA095-065	NA095-065-Chem-PMEL	H1673	2018-06-22T22:52:51.103Z	42.71005	-124.90123	496.2	Niskin	5.3	34.2	16.3	Taken at 500 m depth	Water used for geochemistry tests	NA	NOAA PMEL
NA095-066	NA095-066-Chem-PMEL	H1673	2018-06-22T22:57:07.957Z	42.71014	-124.90152	388.7	Niskin	5.7	34.1	26.7	Taken at 400 m depth	Water used for geochemistry tests	NA	NOAA PMEL
NA095-067	NA095-067-Chem-PMEL	H1673	2018-06-22T23:02:14.042Z	42.71017	-124.90124	298.6	Niskin	6.5	34.0	49.7	Taken at 300 m depth	Water used for geochemistry tests	NA	NOAA PMEL

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-068	NA095-068-Chem-PMEL	H1673	2018-06-22T23:07:30.280Z	42.71018	-124.90133	196.5	Niskin	7.0	34.0	66.1	Taken at 200 m depth	Water used for geochemistry tests	NA	NOAA PMEL
NA095-069	NA095-069-Chem-PMEL	H1673	2018-06-22T23:13:05.950Z	42.71019	-124.90111	98.5	Niskin	8.3	33.9	101.0	Taken at 100 m depth	Water used for geochemistry tests	NA	NOAA PMEL
NA095-070	NA095-070-C-PMEL	H1674	2018-06-23T17:22:11.201Z	43.67690	-124.70399	454.1	Rock	5.4	34.1	22.4	Grab off a rocky plate, covered in brachiopods, seastar, other fauna (including hydroids); near target 2a ridge	Long grey rock, with dark grey inside; lot of encrusting sponges and hydroids, and very abundant other associate fauna; overall rock 24.5 x 9 x 5.5 cm; grey rock with many encrusting colored patches (sponges and possibly other organisms) and numerous other small invertebrate associates; overall rock: 28 cm x 10.5 cm x 8 cm; rock broken into subsamples with hammer	Dry	NOAA PMEL (Embley)
NA095-070	NA095-070-C-GSO	H1674	2018-06-23T17:22:11.201Z	43.67690	-124.70399	454.1	Rock	5.4	34.1	22.4	Grab off a rocky plate, covered in brachiopods, seastar, other fauna (including hydroids); near target 2a ridge		Dry	GSO (Graduate School of Oceanography at URI)
NA095-070	NA095-070-01-A-MCZ	H1674	2018-06-23T17:22:11.201Z	43.67690	-124.70399	454.1	Rock	5.4	34.1	22.4	Grab off a rocky plate, covered in brachiopods, seastar, other fauna (including hydroids); near target 2a ridge		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-070	NA095-070-02-A-MCZ	H1674	2018-06-23T17:22:11.201Z	43.67690	-124.70399	454.1	Rock	5.4	34.1	22.4	Grab off a rocky plate, covered in brachiopods, seastar, other fauna (including hydroids); near target 2a ridge		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-070	NA095-070-03-A-MCZ	H1674	2018-06-23T17:22:11.201Z	43.67690	-124.70399	454.1	Rock	5.4	34.1	22.4	Grab off a rocky plate, covered in brachiopods, seastar, other fauna (including hydroids); near target 2a ridge		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-070	NA095-070-04-A-MCZ	H1674	2018-06-23T17:22:11.201Z	43.67690	-124.70399	454.1	Rock	5.4	34.1	22.4	Grab off a rocky plate, covered in brachiopods, seastar, other fauna (including hydroids); near target 2a ridge		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-070	NA095-070-05-A-MCZ	H1674	2018-06-23T17:22:11.201Z	43.67690	-124.70399	454.1	Rock	5.4	34.1	22.4	Grab off a rocky plate, covered in brachiopods, seastar, other fauna (including hydroids); near target 2a ridge		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-070	NA095-070-06-A-MCZ	H1674	2018-06-23T17:22:11.201Z	43.67690	-124.70399	454.1	Rock	5.4	34.1	22.4	Grab off a rocky plate, covered in brachiopods, seastar, other fauna (including hydroids); near target 2a ridge		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-070	NA095-070-07-A-MCZ	H1674	2018-06-23T17:22:11.201Z	43.67690	-124.70399	454.1	Rock	5.4	34.1	22.4	Grab off a rocky plate, covered in brachiopods, seastar, other fauna (including hydroids); near target 2a ridge		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-070	NA095-070-08-A-MCZ	H1674	2018-06-23T17:22:11.201Z	43.67690	-124.70399	454.1	Rock	5.4	34.1	22.4	Grab off a rocky plate, covered in brachiopods, seastar, other fauna (including hydroids); near target 2a ridge		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-071	NA095-071-C-PMEL	H1674	2018-06-23T17:30:23.885Z	43.67675	-124.70379	451.8	Rock	5.4	34.1	22.3	Loose rock, breaking into smaller piece, lots of fauna; near target 2a ridge	Large grey rock with numerous holes; several broken off smaller pieces of rock; many types of small associates, and two long (dead/empty) seep tubeworm tubes	Dry	NOAA PMEL (Embley)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-071	NA095-071-C-GSO	H1674	2018-06-23T17:30:23.885Z	43.67675	-124.70379	451.8	Rock	5.4	34.1	22.3	Loose rock, breaking into smaller piece, lots of fauna; near target 2a ridge		Dry	GSO (Graduate School of Oceanography at URI)
NA095-071	NA095-071-01-A-MCZ	H1674	2018-06-23T17:30:23.885Z	43.67675	-124.70379	451.8	Rock	5.4	34.1	22.3	Loose rock, breaking into smaller piece, lots of fauna; near target 2a ridge		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-071	NA095-071-02-A-MCZ	H1674	2018-06-23T17:30:23.885Z	43.67675	-124.70379	451.8	Rock	5.4	34.1	22.3	Loose rock, breaking into smaller piece, lots of fauna; near target 2a ridge		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-071	NA095-071-03-A-MCZ	H1674	2018-06-23T17:30:23.885Z	43.67675	-124.70379	451.8	Rock	5.4	34.1	22.3	Loose rock, breaking into smaller piece, lots of fauna; near target 2a ridge		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-071	NA095-071-04-A-MCZ	H1674	2018-06-23T17:30:23.885Z	43.67675	-124.70379	451.8	Rock	5.4	34.1	22.3	Loose rock, breaking into smaller piece, lots of fauna; near target 2a ridge		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-071	NA095-071-05-A-MCZ	H1674	2018-06-23T17:30:23.885Z	43.67675	-124.70379	451.8	Rock	5.4	34.1	22.3	Loose rock, breaking into smaller piece, lots of fauna; near target 2a ridge		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-071	NA095-071-06-A-MCZ	H1674	2018-06-23T17:30:23.885Z	43.67675	-124.70379	451.8	Rock	5.4	34.1	22.3	Loose rock, breaking into smaller piece, lots of fauna; near target 2a ridge		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-071	NA095-071-07-A-MCZ	H1674	2018-06-23T17:30:23.885Z	43.67675	-124.70379	451.8	Rock	5.4	34.1	22.3	Loose rock, breaking into smaller piece, lots of fauna; near target 2a ridge		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-071	NA095-071-08-A-MCZ	H1674	2018-06-23T17:30:23.885Z	43.67675	-124.70379	451.8	Rock	5.4	34.1	22.3	Loose rock, breaking into smaller piece, lots of fauna; near target 2a ridge		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-071	NA095-071-09-A-MCZ	H1674	2018-06-23T17:30:23.885Z	43.67675	-124.70379	451.8	Rock	5.4	34.1	22.3	Loose rock, breaking into smaller piece, lots of fauna; near target 2a ridge		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-071	NA095-071-10-A-MCZ	H1674	2018-06-23T17:30:23.885Z	43.67675	-124.70379	451.8	Rock	5.4	34.1	22.3	Loose rock, breaking into smaller piece, lots of fauna; near target 2a ridge		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-072	NA095-072-01-A-PMEL	H1674	2018-06-23T19:54:50.175Z	43.67962	-124.70083	473.2	Niskin	5.5	34.1	24.8	Area with several clam beds, over a region with a small microbial mat surrounded by clams - interesting feature	Water used for geochemistry tests and 2 l used for eDNA filtration	95% Ethanol	NOAA PMEL (Stepien)
NA095-072	NA095-072-02-E-OSU	H1674	2018-06-23T19:54:50.175Z	43.67962	-124.70083	473.2	Niskin	5.5	34.1	24.8	Area with several clam beds, over a region with a small microbial mat surrounded by clams - interesting feature		Frozen	OSU (Thurber)
NA095-072	NA095-072-Chem-PMEL	H1674	2018-06-23T19:54:50.175Z	43.67962	-124.70083	473.2	Niskin	5.5	34.1	24.8	Area with several clam beds, over a region with a small microbial mat surrounded by clams - interesting feature		NA	NOAA PMEL
NA095-073	NA095-073-MA01-PMEL	H1674	2018-06-23T20:02:58.283Z	43.67960	-124.70082	473.2	Major	5.5	34.1	25.0	Same location as -072, dispersed clam beds, major taken over a small microbial mat surrounded by clams	Fluid used for geochemistry tests	NA	NOAA PMEL
NA095-074	NA095-074-Chem-PMEL	H1674	2018-06-23T20:11:52.527Z	43.67961	-124.70082	473.1	Niskin	5.5	34.1	25.4	In same area as -072 and -073, disperse clam beds cores taken in the microbial mat in the middle of a circular clam beds - this sample of the exterior clam bed	Lighter brown color on top, black sediment and then grey sediment below; live clams in the top 5 cm; core sliced and porewater extracted	NA	NOAA PMEL (Butterfield)
NA095-074	NA095-074-01-E-OSU	H1674	2018-06-23T20:11:52.527Z	43.67961	-124.70082	473.1	Niskin	5.5	34.1	25.4	In same area as -072 and -073, disperse clam beds cores taken in the microbial mat in the middle of a circular clam beds - this sample of the exterior clam bed		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-074	NA095-074-02-E-OSU	H1674	2018-06-23T20:11:52.527Z	43.67961	-124.70082	473.1	Niskin	5.5	34.1	25.4	In same area as -072 and -073, disperse clam beds cores taken in the microbial mat in the middle of a circular clam beds - this sample of the exterior clam bed		Frozen	OSU (Thurber)
NA095-074	NA095-074-03-E-OSU	H1674	2018-06-23T20:11:52.527Z	43.67961	-124.70082	473.1	Niskin	5.5	34.1	25.4	In same area as -072 and -073, disperse clam beds cores taken in the microbial mat in the middle of a circular clam beds - this sample of the exterior clam bed		Frozen	OSU (Thurber)
NA095-074	NA095-074-04-E-OSU	H1674	2018-06-23T20:11:52.527Z	43.67961	-124.70082	473.1	Niskin	5.5	34.1	25.4	In same area as -072 and -073, disperse clam beds cores taken in the microbial mat in the middle of a circular clam beds - this sample of the exterior clam bed		Frozen	OSU (Thurber)
NA095-074	NA095-074-05-E-OSU	H1674	2018-06-23T20:11:52.527Z	43.67961	-124.70082	473.1	Niskin	5.5	34.1	25.4	In same area as -072 and -073, disperse clam beds cores taken in the microbial mat in the middle of a circular clam beds - this sample of the exterior clam bed		Frozen	OSU (Thurber)
NA095-074	NA095-074-06-E-OSU	H1674	2018-06-23T20:11:52.527Z	43.67961	-124.70082	473.1	Niskin	5.5	34.1	25.4	In same area as -072 and -073, disperse clam beds cores taken in the microbial mat in the middle of a circular clam beds - this sample of the exterior clam bed		Frozen	OSU (Thurber)
NA095-074	NA095-074-07-E-OSU	H1674	2018-06-23T20:11:52.527Z	43.67961	-124.70082	473.1	Niskin	5.5	34.1	25.4	In same area as -072 and -073, disperse clam beds cores taken in the microbial mat in the middle of a circular clam beds - this sample of the exterior clam bed		Frozen	OSU (Thurber)
NA095-074	NA095-074-08-E-OSU	H1674	2018-06-23T20:11:52.527Z	43.67961	-124.70082	473.1	Niskin	5.5	34.1	25.4	In same area as -072 and -073, disperse clam beds cores taken in the microbial mat in the middle of a circular clam beds - this sample of the exterior clam bed		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-075	NA095-075-Chem-PMEL	H1674	2018-06-23T20:13:18.631Z	43.67962	-124.70082	473.2	Push core	5.5	34.1	25.7	Duplicate with -074, this one in microbial mat	Bubbles actively coming up; microbial mat that was on top got disturbed by bubbles 0-8 cm; core sliced and porewater extracted	NA	NOAA PMEL (Butterfield)
NA095-075	NA095-075-01-E-OSU	H1674	2018-06-23T20:13:18.631Z	43.67962	-124.70082	473.2	Push core	5.5	34.1	25.7	Duplicate with -074, this one in microbial mat		Frozen	OSU (Thurber)
NA095-075	NA095-075-02-E-OSU	H1674	2018-06-23T20:13:18.631Z	43.67962	-124.70082	473.2	Push core	5.5	34.1	25.7	Duplicate with -074, this one in microbial mat		Frozen	OSU (Thurber)
NA095-075	NA095-075-03-E-OSU	H1674	2018-06-23T20:13:18.631Z	43.67962	-124.70082	473.2	Push core	5.5	34.1	25.7	Duplicate with -074, this one in microbial mat		Frozen	OSU (Thurber)
NA095-075	NA095-075-04-E-OSU	H1674	2018-06-23T20:13:18.631Z	43.67962	-124.70082	473.2	Push core	5.5	34.1	25.7	Duplicate with -074, this one in microbial mat		Frozen	OSU (Thurber)
NA095-075	NA095-075-05-E-OSU	H1674	2018-06-23T20:13:18.631Z	43.67962	-124.70082	473.2	Push core	5.5	34.1	25.7	Duplicate with -074, this one in microbial mat		Frozen	OSU (Thurber)
NA095-075	NA095-075-06-E-OSU	H1674	2018-06-23T20:13:18.631Z	43.67962	-124.70082	473.2	Push core	5.5	34.1	25.7	Duplicate with -074, this one in microbial mat		Frozen	OSU (Thurber)
NA095-075	NA095-075-07-E-OSU	H1674	2018-06-23T20:13:18.631Z	43.67962	-124.70082	473.2	Push core	5.5	34.1	25.7	Duplicate with -074, this one in microbial mat		Frozen	OSU (Thurber)
NA095-075	NA095-075-08-E-OSU	H1674	2018-06-23T20:13:18.631Z	43.67962	-124.70082	473.2	Push core	5.5	34.1	25.7	Duplicate with -074, this one in microbial mat		Frozen	OSU (Thurber)
NA095-075	NA095-075-09-E-OSU	H1674	2018-06-23T20:13:18.631Z	43.67962	-124.70082	473.2	Push core	5.5	34.1	25.7	Duplicate with -074, this one in microbial mat		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-075	NA095-075-10-E-OSU	H1674	2018-06-23T20:13:18.631Z	43.67962	-124.70082	473.2	Push core	5.5	34.1	25.7	Duplicate with -074, this one in microbial mat		Frozen	OSU (Thurber)
NA095-075	NA095-075-11-E-OSU	H1674	2018-06-23T20:13:18.631Z	43.67962	-124.70082	473.2	Push core	5.5	34.1	25.7	Duplicate with -074, this one in microbial mat		Frozen	OSU (Thurber)
NA095-076	NA095-076-01-E-OSU	H1674	2018-06-23T20:21:38.955Z	43.67962	-124.70083	473.2	Bio	5.5	34.1	24.6	Slurp of clams that we cored for -074 and -075	Calyptogena sp. clams (~50), with a few dead shells; clams about 2-4 cm long	Frozen	OSU (Thurber)
NA095-076	NA095-076-02-A-PMEL	H1674	2018-06-23T20:21:38.955Z	43.67962	-124.70083	473.2	Bio	5.5	34.1	24.6	Slurp of clams that we cored for -074 and -075		95% Ethanol	NOAA PMEL (Stepien)
NA095-076	NA095-076-03-A-MCZ	H1674	2018-06-23T20:21:38.955Z	43.67962	-124.70083	473.2	Bio	5.5	34.1	24.6	Slurp of clams that we cored for -074 and -075		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-077	NA095-077-C-PMEL	H1674	2018-06-23T20:39:35.219Z	43.68031	-124.70032	451.7	Carbonate	5.6	34.1	27.2	Near waypoint 4, on slope of 'mud volcano;' many carbonate boulders in this region; found a small loose rock to take	Blocky tan rock, lumpy, with fewer associates than samples -070 or -071; overall rock: 18.5 x 13 x 10.5 cm; rock broken into subsamples with hammer	Dry	NOAA PMEL (Embley)
NA095-077	NA095-077-C-GSO	H1674	2018-06-23T20:39:35.219Z	43.68031	-124.70032	451.7	Carbonate	5.6	34.1	27.2	Near waypoint 4, on slope of 'mud volcano;' many carbonate boulders in this region; found a small loose rock to take		Dry	GSO (Graduate School of Oceanography at URI)
NA095-077	NA095-077-01-A-MCZ	H1674	2018-06-23T20:39:35.219Z	43.68031	-124.70032	451.7	Carbonate	5.6	34.1	27.2	Near waypoint 4, on slope of 'mud volcano;' many carbonate boulders in this region; found a small loose rock to take		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-077	NA095-077-02-A-MCZ	H1674	2018-06-23T20:39:35.219Z	43.68031	-124.70032	451.7	Carbonate	5.6	34.1	27.2	Near waypoint 4, on slope of 'mud volcano;' many carbonate boulders in this region; found a small loose rock to take		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-077	NA095-077-03-A-MCZ	H1674	2018-06-23T20:39:35.219Z	43.68031	-124.70032	451.7	Carbonate	5.6	34.1	27.2	Near waypoint 4, on slope of 'mud volcano;' many carbonate boulders in this region; found a small loose rock to take		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-077	NA095-077-04-A-MCZ	H1674	2018-06-23T20:39:35.219Z	43.68031	-124.70032	451.7	Carbonate	5.6	34.1	27.2	Near waypoint 4, on slope of 'mud volcano;' many carbonate boulders in this region; found a small loose rock to take		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-077	NA095-077-05-A-MCZ	H1674	2018-06-23T20:39:35.219Z	43.68031	-124.70032	451.7	Carbonate	5.6	34.1	27.2	Near waypoint 4, on slope of 'mud volcano;' many carbonate boulders in this region; found a small loose rock to take		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-077	NA095-077-06-A-MCZ	H1674	2018-06-23T20:39:35.219Z	43.68031	-124.70032	451.7	Carbonate	5.6	34.1	27.2	Near waypoint 4, on slope of 'mud volcano;' many carbonate boulders in this region; found a small loose rock to take		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-078	NA095-078-C-PMEL	H1674	2018-06-23T22:21:42.727Z	43.68198	-124.69740	420.6	Carbonate	5.7	34.1	31.1	Rock sample near waypoint 3 where we were going to try to take a gt sample, near three bubble streams; lots of detritus, clam shells and a sunflower star in the area	Mud-covered, tan and grey rock, with fewer associates than samples -070, -071, or -077; overall rock: 16 x 14 x 10 cm; rock broken into subsamples with hammer	Dry	NOAA PMEL (Embley)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-078	NA095-078-C-GSO	H1674	2018-06-23T22:21:42.727Z	43.68198	-124.69740	420.6	Carbonate	5.7	34.1	31.1	Rock sample near waypoint 3 where we were going to try to take a gt sample, near three bubble streams; lots of detritus, clam shells and a sunflower star in the area		Dry	GSO (Graduate School of Oceanography at URI)
NA095-078	NA095-078-01-A-MCZ	H1674	2018-06-23T22:21:42.727Z	43.68198	-124.69740	420.6	Carbonate	5.7	34.1	31.1	Rock sample near waypoint 3 where we were going to try to take a gt sample, near three bubble streams; lots of detritus, clam shells and a sunflower star in the area		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-078	NA095-078-02-A-MCZ	H1674	2018-06-23T22:21:42.727Z	43.68198	-124.69740	420.6	Carbonate	5.7	34.1	31.1	Rock sample near waypoint 3 where we were going to try to take a gt sample, near three bubble streams; lots of detritus, clam shells and a sunflower star in the area		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-078	NA095-078-03-A-MCZ	H1674	2018-06-23T22:21:42.727Z	43.68198	-124.69740	420.6	Carbonate	5.7	34.1	31.1	Rock sample near waypoint 3 where we were going to try to take a gt sample, near three bubble streams; lots of detritus, clam shells and a sunflower star in the area		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-078	NA095-078-04-A-MCZ	H1674	2018-06-23T22:21:42.727Z	43.68198	-124.69740	420.6	Carbonate	5.7	34.1	31.1	Rock sample near waypoint 3 where we were going to try to take a gt sample, near three bubble streams; lots of detritus, clam shells and a sunflower star in the area		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-078	NA095-078-05-A-MCZ	H1674	2018-06-23T22:21:42.727Z	43.68198	-124.69740	420.6	Carbonate	5.7	34.1	31.1	Rock sample near waypoint 3 where we were going to try to take a gt sample, near three bubble streams; lots of detritus, clam shells and a sunflower star in the area		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-078	NA095-078-06-A-MCZ	H1674	2018-06-23T22:21:42.727Z	43.68198	-124.69740	420.6	Carbonate	5.7	34.1	31.1	Rock sample near waypoint 3 where we were going to try to take a gt sample, near three bubble streams; lots of detritus, clam shells and a sunflower star in the area		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-079	NA095-079-GT10-PMEL	H1674	2018-06-23T23:13:42.505Z	43.68215	-124.69741	420.4	Gas	5.7	34.1	30.5	About 10 m away from waypoint 6, multiple bubble streams coming out from benthos; lots of clams both live and dead, and large carbonate boulders surround this site	Separate water from gas using seagoing extraction line	Glass Ampules	NOAA PMEL
NA095-080	NA095-080-E-OSU	H1674	2018-06-23T23:38:41.694Z	43.68204	-124.69743	421.3	Slurp	5.6	34.1	29.4	Slurping live clam sample near clams 004 target but southward; too tough of terrain for push core	Clams (~20); clams about 2-4.5 cm long; lots of dark, igneous pebbles and some minerals	Frozen	OSU (Thurber)
NA095-080	NA095-080-01-A-PMEL	H1674	2018-06-23T23:38:41.694Z	43.68204	-124.69743	421.3	Slurp	5.6	34.1	29.4	Slurping live clam sample near clams 004 target but southward; too tough of terrain for push core		95% Ethanol	NOAA PMEL (Stepien)
NA095-080	NA095-080-02-A-MCZ	H1674	2018-06-23T23:38:41.694Z	43.68204	-124.69743	421.3	Slurp	5.6	34.1	29.4	Slurping live clam sample near clams 004 target but southward; too tough of terrain for push core		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-080	NA095-080-03-C-PMEL	H1674	2018-06-23T23:38:41.694Z	43.68204	-124.69743	421.3	Slurp	5.6	34.1	29.4	Slurping live clam sample near clams 004 target but southward; too tough of terrain for push core		Dry	NOAA PMEL (Embley)
NA095-080	NA095-080-04-C-GSO	H1674	2018-06-23T23:38:41.694Z	43.68204	-124.69743	421.3	Slurp	5.6	34.1	29.4	Slurping live clam sample near clams 004 target but southward; too tough of terrain for push core		Dry	GSO (Graduate School of Oceanography at URI)
NA095-081	NA095-081-Chem-PMEL	H1674	2018-06-24T00:55:32.589Z	43.68055	-124.69833	417.0	Niskin	5.7	34.1	30.9	Taken at 415 m depth	Water used for geochemistry tests	NA	NOAA PMEL

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-082	NA095-082-Chem-PMEL	H1674	2018-06-24T00:58:40.283Z	43.68051	-124.69821	399.3	Niskin	5.8	34.1	34.2	Taken at 400 m depth	Water used for geochemistry tests	NA	NOAA PMEL
NA095-083	NA095-083-Chem-PMEL	H1674	2018-06-24T01:11:54.422Z	43.68027	-124.69816	300.9	Niskin	6.3	34.0	53.8	Taken at 300 m depth	Water used for geochemistry tests	NA	NOAA PMEL
NA095-084	NA095-084-Chem-PMEL	H1674	2018-06-24T01:25:49.727Z	43.68038	-124.69807	195.8	Niskin	7.2	34.0	85.0	Taken at 200 m depth	Water used for geochemistry tests	NA	NOAA PMEL
NA095-085	NA095-085-Chem-PMEL	H1674	2018-06-24T01:36:52.923Z	43.68027	-124.69799	99.6	Niskin	8.4	33.8	117.3	Taken at 100 m depth	Water used for geochemistry tests	NA	NOAA PMEL
NA095-086	NA095-086-GT02-PMEL	H1675	2018-06-24T18:39:07.821Z	44.24968	-124.95745	490.1	Gas	5.1	34.2	14.8	At site "bubbles 005", where hydrophone is deployed and seafloor marker will be deployed; in area with 8+ streams, some more intermittent than others, taking sample from one of the more regular flows; white mat holes are where bubbles are coming out, no carbonate, some live and dead clams nearby; some hydrate forming in cone	Separate water from gas using seagoing extraction line	Glass Ampules	NOAA PMEL
NA095-087	NA095-087-01-A-PMEL	H1675	2018-06-24T19:15:25.254Z	44.24973	-124.95753	490.1	Niskin	5.1	34.2	15.4	At area where hydrophone deployed and gas-tight -086 were taken, before push cores and slurps were attempted; over a clam bed with sparse microbial mats and bubbles	Water used for geochemistry tests and 2 l used for eDNA filtration	95% Ethanol	NOAA PMEL (Stepien)
NA095-087	NA095-087-02-E-OSU	H1675	2018-06-24T19:15:25.254Z	44.24973	-124.95753	490.1	Niskin	5.1	34.2	15.4	At area where hydrophone deployed and gas-tight -086 were taken, before push cores and slurps were attempted; over a clam bed with sparse microbial mats and bubbles		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-087	NA095-087-Chem-PMEL	H1675	2018-06-24T19:15:25.254Z	44.24973	-124.95753	490.1	Niskin	5.1	34.2	15.4	At area where hydrophone deployed and gas-tight -086 were taken, before push cores and slurps were attempted; over a clam bed with sparse microbial mats and bubbles		NA	NOAA PMEL
NA095-088	NA095-088-01-E-OSU	H1675	2018-06-24T19:57:45.795Z	44.25010	-124.95792	492.2	Push core	5.1	34.2	15.5	In beggiatoa microbial mat at “mat 003”; some clam hash nearby but no live clams; mat about 20-30 cm	0-6 cm usable core; bottom fell out, top stayed intact; clam on top; core sliced	Frozen	OSU (Thurber)
NA095-088	NA095-088-02-E-OSU	H1675	2018-06-24T19:57:45.795Z	44.25010	-124.95792	492.2	Push core	5.1	34.2	15.5	In beggiatoa microbial mat at “mat 003”; some clam hash nearby but no live clams; mat about 20-30 cm		Frozen	OSU (Thurber)
NA095-088	NA095-088-03-E-OSU	H1675	2018-06-24T19:57:45.795Z	44.25010	-124.95792	492.2	Push core	5.1	34.2	15.5	In beggiatoa microbial mat at “mat 003”; some clam hash nearby but no live clams; mat about 20-30 cm		Frozen	OSU (Thurber)
NA095-088	NA095-088-04-E-OSU	H1675	2018-06-24T19:57:45.795Z	44.25010	-124.95792	492.2	Push core	5.1	34.2	15.5	In beggiatoa microbial mat at “mat 003”; some clam hash nearby but no live clams; mat about 20-30 cm		Frozen	OSU (Thurber)
NA095-088	NA095-088-05-E-OSU	H1675	2018-06-24T19:57:45.795Z	44.25010	-124.95792	492.2	Push core	5.1	34.2	15.5	In beggiatoa microbial mat at “mat 003”; some clam hash nearby but no live clams; mat about 20-30 cm		Frozen	OSU (Thurber)
NA095-088	NA095-088-06-E-OSU	H1675	2018-06-24T19:57:45.795Z	44.25010	-124.95792	492.2	Push core	5.1	34.2	15.5	In beggiatoa microbial mat at “mat 003”; some clam hash nearby but no live clams; mat about 20-30 cm		Frozen	OSU (Thurber)
NA095-089	NA095-089-Chem-PMEL	H1675	2018-06-24T19:59:55.946Z	44.25009	-124.95792	492.3	Push core	5.2	34.2	15.5	Duplicate with -088, microbial mat about 20-30 cm in length	0-13 cm core size; black, reduced sediment; core intact; core sliced and porewater extracted	NA	NOAA PMEL (Butterfield)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-089	NA095-089-01-E-OSU	H1675	2018-06-24T19:59:55.946Z	44.25009	-124.95792	492.3	Push core	5.2	34.2	15.5	Duplicate with -088, microbial mat about 20-30 cm in length		Frozen	OSU (Thurber)
NA095-089	NA095-089-02-E-OSU	H1675	2018-06-24T19:59:55.946Z	44.25009	-124.95792	492.3	Push core	5.2	34.2	15.5	Duplicate with -088, microbial mat about 20-30 cm in length		Frozen	OSU (Thurber)
NA095-089	NA095-089-03-E-OSU	H1675	2018-06-24T19:59:55.946Z	44.25009	-124.95792	492.3	Push core	5.2	34.2	15.5	Duplicate with -088, microbial mat about 20-30 cm in length		Frozen	OSU (Thurber)
NA095-089	NA095-089-04-E-OSU	H1675	2018-06-24T19:59:55.946Z	44.25009	-124.95792	492.3	Push core	5.2	34.2	15.5	Duplicate with -088, microbial mat about 20-30 cm in length		Frozen	OSU (Thurber)
NA095-089	NA095-089-05-E-OSU	H1675	2018-06-24T19:59:55.946Z	44.25009	-124.95792	492.3	Push core	5.2	34.2	15.5	Duplicate with -088, microbial mat about 20-30 cm in length		Frozen	OSU (Thurber)
NA095-089	NA095-089-06-E-OSU	H1675	2018-06-24T19:59:55.946Z	44.25009	-124.95792	492.3	Push core	5.2	34.2	15.5	Duplicate with -088, microbial mat about 20-30 cm in length		Frozen	OSU (Thurber)
NA095-089	NA095-089-07-E-OSU	H1675	2018-06-24T19:59:55.946Z	44.25009	-124.95792	492.3	Push core	5.2	34.2	15.5	Duplicate with -088, microbial mat about 20-30 cm in length		Frozen	OSU (Thurber)
NA095-089	NA095-089-08-E-OSU	H1675	2018-06-24T19:59:55.946Z	44.25009	-124.95792	492.3	Push core	5.2	34.2	15.5	Duplicate with -088, microbial mat about 20-30 cm in length		Frozen	OSU (Thurber)
NA095-089	NA095-089-09-E-OSU	H1675	2018-06-24T19:59:55.946Z	44.25009	-124.95792	492.3	Push core	5.2	34.2	15.5	Duplicate with -088, microbial mat about 20-30 cm in length		Frozen	OSU (Thurber)
NA095-089	NA095-089-10-E-OSU	H1675	2018-06-24T19:59:55.946Z	44.25009	-124.95792	492.3	Push core	5.2	34.2	15.5	Duplicate with -088, microbial mat about 20-30 cm in length		Frozen	OSU (Thurber)
NA095-089	NA095-089-11-E-OSU	H1675	2018-06-24T19:59:55.946Z	44.25009	-124.95792	492.3	Push core	5.2	34.2	15.5	Duplicate with -088, microbial mat about 20-30 cm in length		Frozen	OSU (Thurber)
NA095-089	NA095-089-12-E-OSU	H1675	2018-06-24T19:59:55.946Z	44.25009	-124.95792	492.3	Push core	5.2	34.2	15.5	Duplicate with -088, microbial mat about 20-30 cm in length		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-089	NA095-089-13-E-OSU	H1675	2018-06-24T19:59:55.946Z	44.25009	-124.95792	492.3	Push core	5.2	34.2	15.5	Duplicate with -088, microbial mat about 20-30 cm in length		Frozen	OSU (Thurber)
NA095-089	NA095-089-14-F-OSU	H1675	2018-06-24T19:59:55.946Z	44.25009	-124.95792	492.3	Push core	5.2	34.2	15.5	Duplicate with -088, microbial mat about 20-30 cm in length		Seawater	OSU (Thurber)
NA095-090	NA095-090-MA02-PMEL	H1675	2018-06-24T20:03:51.208Z	44.25009	-124.95793	492.2	Major	5.1	34.2	15.6	Major of pvc cone that was deployed for about 15 minutes over a microbial mat at “mat 003”; next to push cores -088 and -089	Fluid used for geochemistry tests	NA	NOAA PMEL
NA095-091	NA095-091-01-A-PMEL	H1675	2018-06-24T20:06:57.023Z	44.25009	-124.95792	492.2	Niskin	5.1	34.2	15.7	Over “mat 003” where -088, -089, and -090 were taken	Water used for geochemistry tests and 2 l used for eDNA filtration	95% Ethanol	NOAA PMEL (Stepien)
NA095-091	NA095-091-02-E-OSU	H1675	2018-06-24T20:06:57.023Z	44.25009	-124.95792	492.2	Niskin	5.1	34.2	15.7	Over “mat 003” where -088, -089, and -090 were taken		Frozen	OSU (Thurber)
NA095-091	NA095-091-Chem-PMEL	H1675	2018-06-24T20:06:57.023Z	44.25009	-124.95792	492.2	Niskin	5.1	34.2	15.7	Over “mat 003” where -088, -089, and -090 were taken		NA	NOAA PMEL
NA095-092	NA095-092-01-E-OSU	H1675	2018-06-24T20:34:10.211Z	44.24982	-124.95798	491.6	Push core	5.2	34.2	15.8	At “clams 001”; small clump of live clams amongst an extensive clam hash/mix of live clam beds	0-10 cm core size; live clams on top; reduced sediment a few cm down; core sliced	Frozen	OSU (Thurber)
NA095-092	NA095-092-02-E-OSU	H1675	2018-06-24T20:34:10.211Z	44.24982	-124.95798	491.6	Push core	5.2	34.2	15.8	At “clams 001”; small clump of live clams amongst an extensive clam hash/mix of live clam beds		Frozen	OSU (Thurber)
NA095-092	NA095-092-03-E-OSU	H1675	2018-06-24T20:34:10.211Z	44.24982	-124.95798	491.6	Push core	5.2	34.2	15.8	At “clams 001”; small clump of live clams amongst an extensive clam hash/mix of live clam beds		Frozen	OSU (Thurber)
NA095-092	NA095-092-04-E-OSU	H1675	2018-06-24T20:34:10.211Z	44.24982	-124.95798	491.6	Push core	5.2	34.2	15.8	At “clams 001”; small clump of live clams amongst an extensive clam hash/mix of live clam beds		Frozen	OSU (Thurber)
NA095-092	NA095-092-05-E-OSU	H1675	2018-06-24T20:34:10.211Z	44.24982	-124.95798	491.6	Push core	5.2	34.2	15.8	At “clams 001”; small clump of live clams amongst an extensive clam hash/mix of live clam beds		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-092	NA095-092-06-E-OSU	H1675	2018-06-24T20:34:10.211Z	44.24982	-124.95798	491.6	Push core	5.2	34.2	15.8	At “clams 001”; small clump of live clams amongst an extensive clam hash/mix of live clam beds		Frozen	OSU (Thurber)
NA095-092	NA095-092-07-E-OSU	H1675	2018-06-24T20:34:10.211Z	44.24982	-124.95798	491.6	Push core	5.2	34.2	15.8	At “clams 001”; small clump of live clams amongst an extensive clam hash/mix of live clam beds		Frozen	OSU (Thurber)
NA095-092	NA095-092-08-E-OSU	H1675	2018-06-24T20:34:10.211Z	44.24982	-124.95798	491.6	Push core	5.2	34.2	15.8	At “clams 001”; small clump of live clams amongst an extensive clam hash/mix of live clam beds		Frozen	OSU (Thurber)
NA095-092	NA095-092-09-E-OSU	H1675	2018-06-24T20:34:10.211Z	44.24982	-124.95798	491.6	Push core	5.2	34.2	15.8	At “clams 001”; small clump of live clams amongst an extensive clam hash/mix of live clam beds		Frozen	OSU (Thurber)
NA095-092	NA095-092-10-E-OSU	H1675	2018-06-24T20:34:10.211Z	44.24982	-124.95798	491.6	Push core	5.2	34.2	15.8	At “clams 001”; small clump of live clams amongst an extensive clam hash/mix of live clam beds		Frozen	OSU (Thurber)
NA095-093	NA095-093-Chem-PMEL	H1675	2018-06-24T20:34:45.843Z	44.24982	-124.95798	491.6	Push core	5.2	34.2	15.7	Duplicate with -092; clam bed at “clam 001”	0-12 cm core size; live clam on top; reduced sediment a few cm down, transitioning to greyish mud; core sliced and porewater extracted	NA	NOAA PMEL (Butterfield)
NA095-093	NA095-093-01-E-OSU	H1675	2018-06-24T20:34:45.843Z	44.24982	-124.95798	491.6	Push core	5.2	34.2	15.7	Duplicate with -092; clam bed at “clam 001”		Frozen	OSU (Thurber)
NA095-093	NA095-093-02-E-OSU	H1675	2018-06-24T20:34:45.843Z	44.24982	-124.95798	491.6	Push core	5.2	34.2	15.7	Duplicate with -092; clam bed at “clam 001”		Frozen	OSU (Thurber)
NA095-093	NA095-093-03-E-OSU	H1675	2018-06-24T20:34:45.843Z	44.24982	-124.95798	491.6	Push core	5.2	34.2	15.7	Duplicate with -092; clam bed at “clam 001”		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-093	NA095-093-04-E-OSU	H1675	2018-06-24T20:34:45.843Z	44.24982	-124.95798	491.6	Push core	5.2	34.2	15.7	Duplicate with -092; clam bed at “clam 001”		Frozen	OSU (Thurber)
NA095-093	NA095-093-05-E-OSU	H1675	2018-06-24T20:34:45.843Z	44.24982	-124.95798	491.6	Push core	5.2	34.2	15.7	Duplicate with -092; clam bed at “clam 001”		Frozen	OSU (Thurber)
NA095-093	NA095-093-06-E-OSU	H1675	2018-06-24T20:34:45.843Z	44.24982	-124.95798	491.6	Push core	5.2	34.2	15.7	Duplicate with -092; clam bed at “clam 001”		Frozen	OSU (Thurber)
NA095-093	NA095-093-07-E-OSU	H1675	2018-06-24T20:34:45.843Z	44.24982	-124.95798	491.6	Push core	5.2	34.2	15.7	Duplicate with -092; clam bed at “clam 001”		Frozen	OSU (Thurber)
NA095-093	NA095-093-08-E-OSU	H1675	2018-06-24T20:34:45.843Z	44.24982	-124.95798	491.6	Push core	5.2	34.2	15.7	Duplicate with -092; clam bed at “clam 001”		Frozen	OSU (Thurber)
NA095-093	NA095-093-09-E-OSU	H1675	2018-06-24T20:34:45.843Z	44.24982	-124.95798	491.6	Push core	5.2	34.2	15.7	Duplicate with -092; clam bed at “clam 001”		Frozen	OSU (Thurber)
NA095-093	NA095-093-10-E-OSU	H1675	2018-06-24T20:34:45.843Z	44.24982	-124.95798	491.6	Push core	5.2	34.2	15.7	Duplicate with -092; clam bed at “clam 001”		Frozen	OSU (Thurber)
NA095-093	NA095-093-11-E-OSU	H1675	2018-06-24T20:34:45.843Z	44.24982	-124.95798	491.6	Push core	5.2	34.2	15.7	Duplicate with -092; clam bed at “clam 001”		Frozen	OSU (Thurber)
NA095-093	NA095-093-12-E-OSU	H1675	2018-06-24T20:34:45.843Z	44.24982	-124.95798	491.6	Push core	5.2	34.2	15.7	Duplicate with -092; clam bed at “clam 001”		Frozen	OSU (Thurber)
NA095-093	NA095-093-13-F-OSU	H1675	2018-06-24T20:34:45.843Z	44.24982	-124.95798	491.6	Push core	5.2	34.2	15.7	Duplicate with -092; clam bed at “clam 001”		Seawater	OSU (Thurber)
NA095-094	NA095-094-E-OSU	H1675	2018-06-24T20:44:48.839Z	44.24982	-124.95798	491.6	Bio	5.2	34.2	15.8	Slurp in clam bed where push cores -092 and -093 were taken	Mix of live clams (n=36) and dead shells, calyptogena sp.; also included small snails, some worms (including some in cone tubes), and a few other associates	Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-094	NA095-094-01-A-PMEL	H1675	2018-06-24T20:44:48.839Z	44.24982	-124.95798	491.6	Bio	5.2	34.2	15.8	Slurp in clam bed where push cores -092 and -093 were taken		95% Ethanol	NOAA PMEL (Stepien)
NA095-094	NA095-094-02-A-MCZ	H1675	2018-06-24T20:44:48.839Z	44.24982	-124.95798	491.6	Bio	5.2	34.2	15.8	Slurp in clam bed where push cores -092 and -093 were taken		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-094	NA095-094-03-A-MCZ	H1675	2018-06-24T20:44:48.839Z	44.24982	-124.95798	491.6	Bio	5.2	34.2	15.8	Slurp in clam bed where push cores -092 and -093 were taken		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-094	NA095-094-04-A-MCZ	H1675	2018-06-24T20:44:48.839Z	44.24982	-124.95798	491.6	Bio	5.2	34.2	15.8	Slurp in clam bed where push cores -092 and -093 were taken		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-094	NA095-094-05-A-MCZ	H1675	2018-06-24T20:44:48.839Z	44.24982	-124.95798	491.6	Bio	5.2	34.2	15.8	Slurp in clam bed where push cores -092 and -093 were taken		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-094	NA095-094-06-A-MCZ	H1675	2018-06-24T20:44:48.839Z	44.24982	-124.95798	491.6	Bio	5.2	34.2	15.8	Slurp in clam bed where push cores -092 and -093 were taken		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-094	NA095-094-07-A-MCZ	H1675	2018-06-24T20:44:48.839Z	44.24982	-124.95798	491.6	Bio	5.2	34.2	15.8	Slurp in clam bed where push cores -092 and -093 were taken		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-095	NA095-095-MA04-PMEL	H1675	2018-06-24T20:49:51.484Z	44.24984	-124.95798	491.5	Major	5.2	34.2	15.9	In clam bed adjacent to clams where we cored and slurped -092, -093, and -094; funnel was down for about 20 minutes	Fluid used for geochemistry tests	NA	NOAA PMEL
NA095-096	NA095-096-GT07-PMEL	H1675	2018-06-24T21:15:06.713Z	44.24970	-124.95749	489.6	Gas	5.2	34.2	16.4	Back at “bubbles 005” where the hydrophone and marker are deployed and where the first gas-tight (-086) was collected; still steadily streaming	Separate water from gas using seagoing extraction line	Glass Ampules	NOAA PMEL

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-097	NA095-097-C-PMEL	H1675	2018-06-24T21:22:33.918Z	44.24960	-124.95757	489.7	Carbonate	5.2	34.2	17.0	Crumbly carbonate rock near “bubbles 005” where the gas-tights (-086, -096) were taken and hydrophone deployed	Broken pieces of rock, 2 larger and some rubble; a few small worm associates; 1 brachiopod associate (not kept because several were saved from -098, at the same site)	Dry	NOAA PMEL (Embley)
NA095-097	NA095-097-C-GSO	H1675	2018-06-24T21:22:33.918Z	44.24960	-124.95757	489.7	Carbonate	5.2	34.2	17.0	Crumbly carbonate rock near “bubbles 005” where the gas-tights (-086, -096) were taken and hydrophone deployed		Dry	GSO (Graduate School of Oceanography at URI)
NA095-097	NA095-097-01-A-MCZ	H1675	2018-06-24T21:22:33.918Z	44.24960	-124.95757	489.7	Carbonate	5.2	34.2	17.0	Crumbly carbonate rock near “bubbles 005” where the gas-tights (-086, -096) were taken and hydrophone deployed		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-098	NA095-098-C-PMEL	H1675	2018-06-24T21:24:21.445Z	44.24960	-124.95755	489.7	Carbonate	5.2	34.2	17.0	Larger rock at same location at -097	Large rock with many cavities, holes, pockmarks; covered in faunal associates, especially hydroids and worms in sediment tubes; ~10-15 round, clear, empty egg cases, though 1 had a worm still inside; overall rock: 20 x 15 x 17 cm; rock broken into subsamples with hammer	Dry	NOAA PMEL (Embley)
NA095-098	NA095-098-C-GSO	H1675	2018-06-24T21:24:21.445Z	44.24960	-124.95755	489.7	Carbonate	5.2	34.2	17.0	Larger rock at same location at -097		Dry	GSO (Graduate School of Oceanography at URI)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-098	NA095-098-01-A-MCZ	H1675	2018-06-24T21:24:21.445Z	44.24960	-124.95755	489.7	Carbonate	5.2	34.2	17.0	Larger rock at same location at -097		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-098	NA095-098-02-A-MCZ	H1675	2018-06-24T21:24:21.445Z	44.24960	-124.95755	489.7	Carbonate	5.2	34.2	17.0	Larger rock at same location at -097		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-098	NA095-098-03-A-MCZ	H1675	2018-06-24T21:24:21.445Z	44.24960	-124.95755	489.7	Carbonate	5.2	34.2	17.0	Larger rock at same location at -097		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-098	NA095-098-04-A-MCZ	H1675	2018-06-24T21:24:21.445Z	44.24960	-124.95755	489.7	Carbonate	5.2	34.2	17.0	Larger rock at same location at -097		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-098	NA095-098-05-A-MCZ	H1675	2018-06-24T21:24:21.445Z	44.24960	-124.95755	489.7	Carbonate	5.2	34.2	17.0	Larger rock at same location at -097		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-098	NA095-098-06-A-MCZ	H1675	2018-06-24T21:24:21.445Z	44.24960	-124.95755	489.7	Carbonate	5.2	34.2	17.0	Larger rock at same location at -097		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-098	NA095-098-07-A-MCZ	H1675	2018-06-24T21:24:21.445Z	44.24960	-124.95755	489.7	Carbonate	5.2	34.2	17.0	Larger rock at same location at -097		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-098	NA095-098-08-A-MCZ	H1675	2018-06-24T21:24:21.445Z	44.24960	-124.95755	489.7	Carbonate	5.2	34.2	17.0	Larger rock at same location at -097		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-098	NA095-098-09-A-MCZ	H1675	2018-06-24T21:24:21.445Z	44.24960	-124.95755	489.7	Carbonate	5.2	34.2	17.0	Larger rock at same location at -097		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-098	NA095-098-10-A-MCZ	H1675	2018-06-24T21:24:21.445Z	44.24960	-124.95755	489.7	Carbonate	5.2	34.2	17.0	Larger rock at same location at -097		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-098	NA095-098-11-A-MCZ	H1675	2018-06-24T21:24:21.445Z	44.24960	-124.95755	489.7	Carbonate	5.2	34.2	17.0	Larger rock at same location at -097		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-099	NA095-099-Chem-PMEL	H1675	2018-06-24T21:33:08.545Z	44.24931	-124.95758	400.1	Niskin	5.9	34.1	35.0	Taken at 400 m depth	Water used for geochemistry tests	NA	NOAA PMEL
NA095-100	NA095-100-Chem-PMEL	H1675	2018-06-24T21:42:06.821Z	44.24946	-124.95710	298.8	Niskin	6.3	34.0	50.4	Taken at 300 m depth	Water used for geochemistry tests	NA	NOAA PMEL
NA095-101	NA095-101-Chem-PMEL	H1675	2018-06-24T21:49:29.178Z	44.24961	-124.95701	199.4	Niskin	6.8	34.0	65.3	Taken at 200 m depth	Water used for geochemistry tests	NA	NOAA PMEL
NA095-102	NA095-102-Chem-PMEL	H1675	2018-06-24T21:56:59.727Z	44.24939	-124.95746	98.8	Niskin	8.0	33.8	84.0	Taken at 100 m depth	Water used for geochemistry tests	NA	NOAA PMEL
NA095-103	NA095-103-GT10-PMEL	H1676	2018-06-25T10:54:16.505Z	44.01730	-124.87968	98.5	Gas	8.2	33.8	86.3	Another intermittent bubble stream that we think are bubbles we saw in argus cam. appears to have a three - five minute frequency, coming out of a microbial mat	Separate water from gas using seagoing extraction line	Glass Ampules	NOAA PMEL
NA095-104	NA095-104-01-A-PMEL	H1676	2018-06-25T11:14:34.408Z	44.01752	-124.87937	97.9	Niskin	8.2	33.8	86.3	Above white and orange mat	Water used for geochemistry tests and 2 l used for eDNA filtration	95% Ethanol	NOAA PMEL (Stepien)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-104	NA095-104-02-E-OSU	H1676	2018-06-25T11:14:34.408Z	44.01752	-124.87937	97.9	Niskin	8.2	33.8	86.3	Above white and orange mat		Frozen	OSU (Thurber)
NA095-104	NA095-104-Chem-PMEL	H1676	2018-06-25T11:14:34.408Z	44.01752	-124.87937	97.9	Niskin	8.2	33.8	86.3	Above white and orange mat		NA	NOAA PMEL
NA095-105	NA095-105-GT09-PMEL	H1676	2018-06-25T14:44:19.718Z	44.01632	-124.88326	102.6	Gas	8.3	33.8	92.0	At waypoint 4, around mat area, lots of carbonate rubble, two streams of bubbles in same place	Separate water from gas using seagoing extraction line	Glass Ampules	NOAA PMEL
NA095-106	NA095-106-C-PMEL	H1676	2018-06-25T15:07:03.268Z	44.01692	-124.88289	101.9	Carbonate	8.4	33.8	92.7	Very crumbly carbonate rock, by "bubbles 009", in area with some white mat patches and by active bubble streams	Grey and tan/yellow rock, with some black and white layers; some white filamentous mat also attached; overall rock: 10 x 3.5 x 7.5 cm; rock broken into subsamples with hammer	Dry	NOAA PMEL (Embley)
NA095-106	NA095-106-C-GSO	H1676	2018-06-25T15:07:03.268Z	44.01692	-124.88289	101.9	Carbonate	8.4	33.8	92.7	Very crumbly carbonate rock, by "bubbles 009", in area with some white mat patches and by active bubble streams		Dry	GSO (Graduate School of Oceanography at URI)
NA095-106	NA095-106-01-A-MCZ	H1676	2018-06-25T15:07:03.268Z	44.01692	-124.88289	101.9	Carbonate	8.4	33.8	92.7	Very crumbly carbonate rock, by "bubbles 009", in area with some white mat patches and by active bubble streams		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-107	NA095-107-Chem-PMEL	H1676	2018-06-25T15:12:28.698Z	44.01694	-124.88288	100.2	Niskin	8.4	33.8	93.6	Right above -106, "bubbles 009", 100 m depth	Water used for geochemistry tests	NA	NOAA PMEL

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-108	NA095-108-01-A-PMEL	H1676	2018-06-25T15:25:06.028Z	44.01667	-124.88311	80.0	Niskin	8.9	33.5	129.0	Taken at 80 m depth	Water used for geochemistry tests and 2 l used for eDNA filtration	95% Ethanol	NOAA PMEL (Stepien)
NA095-108	NA095-108-02-E-OSU	H1676	2018-06-25T15:25:06.028Z	44.01667	-124.88311	80.0	Niskin	8.9	33.5	129.0	Taken at 80 m depth		Frozen	OSU (Thurber)
NA095-108	NA095-108-Chem-PMEL	H1676	2018-06-25T15:25:06.028Z	44.01667	-124.88311	80.0	Niskin	8.9	33.5	129.0	Taken at 80 m depth		NA	NOAA PMEL
NA095-109	NA095-109-Chem-PMEL	H1676	2018-06-25T15:32:23.545Z	44.01695	-124.88345	60.2	Niskin	9.2	33.1	167.6	Taken at 60 m depth	Water used for geochemistry tests	NA	NOAA PMEL
NA095-110	NA095-110-Chem-PMEL	H1676	2018-06-25T15:38:21.302Z	44.01666	-124.88322	40.1	Niskin	9.2	32.7	191.6	Taken at 40 m depth	Water used for geochemistry tests	NA	NOAA PMEL
NA095-111	NA095-111-Chem-PMEL	H1676	2018-06-25T15:41:59.629Z	44.01701	-124.88292	20.2	Niskin	12.4	31.9	268.4	Taken at 20 m depth	Water used for geochemistry tests	NA	NOAA PMEL
NA095-112	NA095-112-Chem-PMEL	H1677	2018-06-25T23:30:09.094Z	44.24969	-124.95747	449.6	Niskin	5.3	34.1	19.0	Taken at 450 m depth	Water used for geochemistry tests	NA	NOAA PMEL
NA095-113	NA095-113-Chem-PMEL	H1677	2018-06-25T23:36:43.315Z	44.24970	-124.95740	400.5	Niskin	5.6	34.1	31.2	Taken at 400 m depth	Water used for geochemistry tests	NA	NOAA PMEL
NA095-114	NA095-114-Chem-PMEL	H1677	2018-06-25T23:45:01.912Z	44.24966	-124.95756	299.9	Niskin	6.3	34.0	47.2	Taken at 300 m depth	Water used for geochemistry tests	NA	NOAA PMEL
NA095-115	NA095-115-Chem-PMEL	H1677	2018-06-25T23:52:37.140Z	44.24968	-124.95751	200.0	Niskin	7.0	34.0	67.8	Taken at 200 m depth	Water used for geochemistry tests	NA	NOAA PMEL

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-116	NA095-116-Chem-PMEL	H1677	2018-06-26T00:01:36.016Z	44.24970	-124.95751	100.0	Niskin	8.4	33.8	90.5	Taken at 100 m depth	Water used for geochemistry tests	NA	NOAA PMEL
NA095-117	NA095-117-GT02mini-PMEL	H1678	2018-06-26T08:47:03.790Z	43.91074	-125.07581	1223.0	Gas	3.1	34.5	13.5	Curtain of bubbles by carbonate formations, tubeworms, reduced sediment, and clams; bubbles formed a hydrate shell	Separate water from gas using seagoing extraction line	Glass Ampules	NOAA PMEL
NA095-118	NA095-118-E-OSU	H1678	2018-06-26T09:03:20.783Z	43.91074	-125.07575	1224.8	Bio	3.1	34.5	13.6	Brittle stars at the bubble curtain site (by sample -117)	30 brittle stars, plus a few other associates	Frozen	OSU (Thurber)
NA095-118	NA095-118-01-A-PMEL	H1678	2018-06-26T09:03:20.783Z	43.91074	-125.07575	1224.8	Bio	3.1	34.5	13.6	Brittle stars at the bubble curtain site (by sample -117)		95% Ethanol	NOAA PMEL (Stepien)
NA095-118	NA095-118-02-A-MCZ	H1678	2018-06-26T09:03:20.783Z	43.91074	-125.07575	1224.8	Bio	3.1	34.5	13.6	Brittle stars at the bubble curtain site (by sample -117)		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-118	NA095-118-03-A-MCZ	H1678	2018-06-26T09:03:20.783Z	43.91074	-125.07575	1224.8	Bio	3.1	34.5	13.6	Brittle stars at the bubble curtain site (by sample -117)		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-118	NA095-118-04-A-MCZ	H1678	2018-06-26T09:03:20.783Z	43.91074	-125.07575	1224.8	Bio	3.1	34.5	13.6	Brittle stars at the bubble curtain site (by sample -117)		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-119	NA095-119-01-A-PMEL	H1678	2018-06-26T09:10:30.012Z	43.91078	-125.07544	1224.8	Niskin	3.1	34.5	13.8	Above microbial mat (very extensive) and clams	Water used for geochemistry tests and 2 l used for eDNA filtration	95% Ethanol	NOAA PMEL (Stepien)
NA095-119	NA095-119-02-E-OSU	H1678	2018-06-26T09:10:30.012Z	43.91078	-125.07544	1224.8	Niskin	3.1	34.5	13.8	Above microbial mat (very extensive) and clams		Frozen	OSU (Thurber)
NA095-119	NA095-119-Chem-PMEL	H1678	2018-06-26T09:10:30.012Z	43.91078	-125.07544	1224.8	Niskin	3.1	34.5	13.8	Above microbial mat (very extensive) and clams		NA	NOAA PMEL

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-120	NA095-120-Chem-PMEL	H1678	2018-06-26T09:34:45.665Z	43.91081	-125.07543	1225.3	Push core	3.1	34.5	13.6	At “mat 001” target; dense microbial mat, orange and white; very expansive bubbles came up when we put the core in, so moved farther in and re-put the core there	0-10 cm core size; bubbled up some, but polychaetes and mat still on top, and overall looked good; few bubble holes when slicing; core sliced and porewater extracted	NA	NOAA PMEL (Butterfield)
NA095-120	NA095-120-01-E-OSU	H1678	2018-06-26T09:34:45.665Z	43.91081	-125.07543	1225.3	Push core	3.1	34.5	13.6	At “mat 001” target; dense microbial mat, orange and white; very expansive bubbles came up when we put the core in, so moved farther in and re-put the core there		Frozen	OSU (Thurber)
NA095-120	NA095-120-02-E-OSU	H1678	2018-06-26T09:34:45.665Z	43.91081	-125.07543	1225.3	Push core	3.1	34.5	13.6	At “mat 001” target; dense microbial mat, orange and white; very expansive bubbles came up when we put the core in, so moved farther in and re-put the core there		Frozen	OSU (Thurber)
NA095-120	NA095-120-03-E-OSU	H1678	2018-06-26T09:34:45.665Z	43.91081	-125.07543	1225.3	Push core	3.1	34.5	13.6	At “mat 001” target; dense microbial mat, orange and white; very expansive bubbles came up when we put the core in, so moved farther in and re-put the core there		Frozen	OSU (Thurber)
NA095-120	NA095-120-04-E-OSU	H1678	2018-06-26T09:34:45.665Z	43.91081	-125.07543	1225.3	Push core	3.1	34.5	13.6	At “mat 001” target; dense microbial mat, orange and white; very expansive bubbles came up when we put the core in, so moved farther in and re-put the core there		Frozen	OSU (Thurber)
NA095-120	NA095-120-05-E-OSU	H1678	2018-06-26T09:34:45.665Z	43.91081	-125.07543	1225.3	Push core	3.1	34.5	13.6	At “mat 001” target; dense microbial mat, orange and white; very expansive bubbles came up when we put the core in, so moved farther in and re-put the core there		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-120	NA095-120-06-E-OSU	H1678	2018-06-26T09:34:45.665Z	43.91081	-125.07543	1225.3	Push core	3.1	34.5	13.6	At “mat 001” target; dense microbial mat, orange and white; very expansive bubbles came up when we put the core in, so moved farther in and re-put the core there		Frozen	OSU (Thurber)
NA095-120	NA095-120-07-E-OSU	H1678	2018-06-26T09:34:45.665Z	43.91081	-125.07543	1225.3	Push core	3.1	34.5	13.6	At “mat 001” target; dense microbial mat, orange and white; very expansive bubbles came up when we put the core in, so moved farther in and re-put the core there		Frozen	OSU (Thurber)
NA095-120	NA095-120-08-E-OSU	H1678	2018-06-26T09:34:45.665Z	43.91081	-125.07543	1225.3	Push core	3.1	34.5	13.6	At “mat 001” target; dense microbial mat, orange and white; very expansive bubbles came up when we put the core in, so moved farther in and re-put the core there		Frozen	OSU (Thurber)
NA095-120	NA095-120-09-E-OSU	H1678	2018-06-26T09:34:45.665Z	43.91081	-125.07543	1225.3	Push core	3.1	34.5	13.6	At “mat 001” target; dense microbial mat, orange and white; very expansive bubbles came up when we put the core in, so moved farther in and re-put the core there		Frozen	OSU (Thurber)
NA095-120	NA095-120-10-E-OSU	H1678	2018-06-26T09:34:45.665Z	43.91081	-125.07543	1225.3	Push core	3.1	34.5	13.6	At “mat 001” target; dense microbial mat, orange and white; very expansive bubbles came up when we put the core in, so moved farther in and re-put the core there		Frozen	OSU (Thurber)
NA095-120	NA095-120-11-F-OSU	H1678	2018-06-26T09:34:45.665Z	43.91081	-125.07543	1225.3	Push core	3.1	34.5	13.6	At “mat 001” target; dense microbial mat, orange and white; very expansive bubbles came up when we put the core in, so moved farther in and re-put the core there		Seawater	OSU (Thurber)
NA095-121	NA095-121-01-D-OSU	H1678	2018-06-26T09:39:07.599Z	43.91079	-125.07550	1224.8	Push core	3.1	34.5	13.8	Perimeter of very extensive microbial mat, duplicate with -120; more orange mat area than previous push core	Very bubbled up core, just sieved sediment	Formalin	OSU (Thurber)
NA095-121	NA095-121-02-D-OSU	H1678	2018-06-26T09:39:07.599Z	43.91079	-125.07550	1224.8	Push core	3.1	34.5	13.8	Perimeter of very extensive microbial mat, duplicate with -120; more orange mat area than previous push core		Formalin	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-122	NA095-122-Chem-PMEL	H1678	2018-06-26T09:57:09.223Z	43.91099	-125.07562	1223.8	Push core	3.2	34.5	13.8	On periphery of tubeworm bush	0-7 cm core size; slightly uneven like it shifted some but integrity looked ok; a little reduced at bottom; live acharax within core; core sliced and porewater extracted	NA	NOAA PMEL (Butterfield)
NA095-122	NA095-122-01-E-OSU	H1678	2018-06-26T09:57:09.223Z	43.91099	-125.07562	1223.8	Push core	3.2	34.5	13.8	On periphery of tubeworm bush		Frozen	OSU (Thurber)
NA095-122	NA095-122-02-E-OSU	H1678	2018-06-26T09:57:09.223Z	43.91099	-125.07562	1223.8	Push core	3.2	34.5	13.8	On periphery of tubeworm bush		Frozen	OSU (Thurber)
NA095-122	NA095-122-03-E-OSU	H1678	2018-06-26T09:57:09.223Z	43.91099	-125.07562	1223.8	Push core	3.2	34.5	13.8	On periphery of tubeworm bush		Frozen	OSU (Thurber)
NA095-122	NA095-122-04-E-OSU	H1678	2018-06-26T09:57:09.223Z	43.91099	-125.07562	1223.8	Push core	3.2	34.5	13.8	On periphery of tubeworm bush		Frozen	OSU (Thurber)
NA095-122	NA095-122-05-E-OSU	H1678	2018-06-26T09:57:09.223Z	43.91099	-125.07562	1223.8	Push core	3.2	34.5	13.8	On periphery of tubeworm bush		Frozen	OSU (Thurber)
NA095-122	NA095-122-06-E-OSU	H1678	2018-06-26T09:57:09.223Z	43.91099	-125.07562	1223.8	Push core	3.2	34.5	13.8	On periphery of tubeworm bush		Frozen	OSU (Thurber)
NA095-122	NA095-122-07-E-OSU	H1678	2018-06-26T09:57:09.223Z	43.91099	-125.07562	1223.8	Push core	3.2	34.5	13.8	On periphery of tubeworm bush		Frozen	OSU (Thurber)
NA095-122	NA095-122-08-F-OSU	H1678	2018-06-26T09:57:09.223Z	43.91099	-125.07562	1223.8	Push core	3.2	34.5	13.8	On periphery of tubeworm bush		Seawater	OSU (Thurber)
NA095-122	NA095-122-09-D-OSU	H1678	2018-06-26T09:57:09.223Z	43.91099	-125.07562	1223.8	Push core	3.2	34.5	13.8	On periphery of tubeworm bush		Formalin	OSU (Thurber)
NA095-122	NA095-122-10-A-MCZ	H1678	2018-06-26T09:57:09.223Z	43.91099	-125.07562	1223.8	Push core	3.2	34.5	13.8	On periphery of tubeworm bush		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-123	NA095-123-01-D-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab	Large clump of tubeworms, with some sponge and anemone associates on tubeworm tubes	Formalin	OSU (Thurber)
NA095-123	NA095-123-02-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-03-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-04-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-05-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-06-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-07-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-08-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-09-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-10-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-11-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-123	NA095-123-12-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-13-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-14-A-PMEL	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		95% Ethanol	NOAA PMEL (Stepien)
NA095-123	NA095-123-15-A-MCZ	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-123	NA095-123-16-A-MCZ	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-123	NA095-123-17-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-18-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-19-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-20-A-PMEL	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		95% Ethanol	NOAA PMEL (Stepien)
NA095-123	NA095-123-21-A-MCZ	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-123	NA095-123-22-A-MCZ	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-123	NA095-123-23-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-24-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-25-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-26-A-PMEL	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		95% Ethanol	NOAA PMEL (Stepien)
NA095-123	NA095-123-27-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-28-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-29-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-30-A-PMEL	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		95% Ethanol	NOAA PMEL (Stepien)
NA095-123	NA095-123-31-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-32-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-33-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-34-A-PMEL	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		95% Ethanol	NOAA PMEL (Stepien)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-123	NA095-123-35-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-36-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-37-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-38-A-PMEL	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		95% Ethanol	NOAA PMEL (Stepien)
NA095-123	NA095-123-39-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-40-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-41-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-42-A-PMEL	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		95% Ethanol	NOAA PMEL (Stepien)
NA095-123	NA095-123-43-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-44-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-45-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-46-A-PMEL	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		95% Ethanol	NOAA PMEL (Stepien)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-123	NA095-123-47-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-48-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-49-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-50-A-PMEL	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		95% Ethanol	NOAA PMEL (Stepien)
NA095-123	NA095-123-51-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-52-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-53-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-54-A-PMEL	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		95% Ethanol	NOAA PMEL (Stepien)
NA095-123	NA095-123-55-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-56-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-57-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-58-A-PMEL	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		95% Ethanol	NOAA PMEL (Stepien)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-123	NA095-123-59-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-60-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-61-E-OSU	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		Frozen	OSU (Thurber)
NA095-123	NA095-123-62-A-PMEL	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		95% Ethanol	NOAA PMEL (Stepien)
NA095-123	NA095-123-63-A-PMEL	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		95% Ethanol	NOAA PMEL (Stepien)
NA095-123	NA095-123-64-A-PMEL	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		95% Ethanol	NOAA PMEL (Stepien)
NA095-123	NA095-123-65-A-PMEL	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		95% Ethanol	NOAA PMEL (Stepien)
NA095-123	NA095-123-66-A-MCZ	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-123	NA095-123-67-A-MCZ	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-123	NA095-123-68-A-MCZ	H1678	2018-06-26T10:23:50.444Z	43.91098	-125.07560	1223.5	Bio	3.1	34.5	13.8	Tubeworm bush grab		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-124	NA095-124-GT01mini-PMEL	H1678	2018-06-26T10:40:27.212Z	43.91080	-125.07583	1224.0	Gas	3.1	34.5	14.0	Back at “bubbles 001”, duplicate gas-tight to ensure good samples; bubble curtain still streaming	Separate water from gas using seagoing extraction line	Glass Ampules	NOAA PMEL
NA095-125	NA095-125-Chem-PMEL	H1678	2018-06-26T11:04:20.674Z	43.91058	-125.07561	1224.5	Push core	3.1	34.5	13.9	At periphery of clam bed site, near “clam 001” target; in sediment with live clams, next to clams but not right over them	Hole in bottom, filled with water 0-6 cm; some clams throughout; reduced sediment striations horizontally across noticed when slicing core; core sliced and porewater extracted	NA	NOAA PMEL (Butterfield)
NA095-125	NA095-125-01-E-OSU	H1678	2018-06-26T11:04:20.674Z	43.91058	-125.07561	1224.5	Push core	3.1	34.5	13.9	At periphery of clam bed site, near “clam 001” target; in sediment with live clams, next to clams but not right over them	0-6 cm core size; hole in bottom, filled with water; some clams throughout; reduced sediment striations horizontally across noticed when slicing core; core sliced and porewater extracted	Frozen	OSU (Thurber)
NA095-125	NA095-125-02-E-OSU	H1678	2018-06-26T11:04:20.674Z	43.91058	-125.07561	1224.5	Push core	3.1	34.5	13.9	At periphery of clam bed site, near “clam 001” target; in sediment with live clams, next to clams but not right over them		Frozen	OSU (Thurber)
NA095-125	NA095-125-03-E-OSU	H1678	2018-06-26T11:04:20.674Z	43.91058	-125.07561	1224.5	Push core	3.1	34.5	13.9	At periphery of clam bed site, near “clam 001” target; in sediment with live clams, next to clams but not right over them		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-125	NA095-125-04-E-OSU	H1678	2018-06-26T11:04:20.674Z	43.91058	-125.07561	1224.5	Push core	3.1	34.5	13.9	At periphery of clam bed site, near “clam 001” target; in sediment with live clams, next to clams but not right over them		Frozen	OSU (Thurber)
NA095-125	NA095-125-05-E-OSU	H1678	2018-06-26T11:04:20.674Z	43.91058	-125.07561	1224.5	Push core	3.1	34.5	13.9	At periphery of clam bed site, near “clam 001” target; in sediment with live clams, next to clams but not right over them		Frozen	OSU (Thurber)
NA095-125	NA095-125-06-E-OSU	H1678	2018-06-26T11:04:20.674Z	43.91058	-125.07561	1224.5	Push core	3.1	34.5	13.9	At periphery of clam bed site, near “clam 001” target; in sediment with live clams, next to clams but not right over them		Frozen	OSU (Thurber)
NA095-125	NA095-125-07-F-OSU	H1678	2018-06-26T11:04:20.674Z	43.91058	-125.07561	1224.5	Push core	3.1	34.5	13.9	At periphery of clam bed site, near “clam 001” target; in sediment with live clams, next to clams but not right over them		Seawater	OSU (Thurber)
NA095-126	NA095-126-E-OSU	H1678	2018-06-26T11:22:16.818Z	43.91061	-125.07559	1224.4	Scoop	3.1	34.5	14.1	In same clam bed as push core -125; in periphery of site, live clams in sediment; took multiple scoops in same clam bed (3 scoops total)	24 clams, plus a few other associates	Frozen	OSU (Thurber)
NA095-126	NA095-126-01-A-PMEL	H1678	2018-06-26T11:22:16.818Z	43.91061	-125.07559	1224.4	Scoop	3.1	34.5	14.1	In same clam bed as push core -125; in periphery of site, live clams in sediment; took multiple scoops in same clam bed (3 scoops total)		95% Ethanol	NOAA PMEL (Stepien)
NA095-126	NA095-126-02-A-MCZ	H1678	2018-06-26T11:22:16.818Z	43.91061	-125.07559	1224.4	Scoop	3.1	34.5	14.1	In same clam bed as push core -125; in periphery of site, live clams in sediment; took multiple scoops in same clam bed (3 scoops total)		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-126	NA095-126-03-A-MCZ	H1678	2018-06-26T11:22:16.818Z	43.91061	-125.07559	1224.4	Scoop	3.1	34.5	14.1	In same clam bed as push core -125; in periphery of site, live clams in sediment; took multiple scoops in same clam bed (3 scoops total)		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-126	NA095-126-04-A-MCZ	H1678	2018-06-26T11:22:16.818Z	43.91061	-125.07559	1224.4	Scoop	3.1	34.5	14.1	In same clam bed as push core -125; in periphery of site, live clams in sediment; took multiple scoops in same clam bed (3 scoops total)		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-126	NA095-126-05-A-MCZ	H1678	2018-06-26T11:22:16.818Z	43.91061	-125.07559	1224.4	Scoop	3.1	34.5	14.1	In same clam bed as push core -125; in periphery of site, live clams in sediment; took multiple scoops in same clam bed (3 scoops total)		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-127	NA095-127-MA04-PMEL	H1678	2018-06-26T11:43:31.633Z	43.91079	-125.07542	1224.0	Major	3.1	34.5	14.3	Taking major sample in pvc funnel, placed in area of white and orange mat,; in same area that sample -119 was taken	Fluid used for geochemistry tests	NA	NOAA PMEL
NA095-128	NA095-128-HY-PMEL	H1678	2018-06-26T13:06:38.260Z	43.91063	-125.07590	1225.7	Hydrate	3.1	34.5	14.8	Using a grab technique and hydrate tool in crevices of carbonate mound near bubble plume, marked as “hydrate 002”	Separate water from gas using seagoing extraction line	Glass Ampules	NOAA PMEL
NA095-129	NA095-129-01-A-PMEL	H1678	2018-06-26T13:21:04.061Z	43.91065	-125.07595	1223.8	Niskin	3.1	34.5	14.8	Above bubble plume at site where we sampled the hydrate (-128), above “hydrate 002” site	Water used for geochemistry tests and 2 l used for eDNA filtration	95% Ethanol	NOAA PMEL (Stepien)
NA095-129	NA095-129-02-E-OSU	H1678	2018-06-26T13:21:04.061Z	43.91065	-125.07595	1223.8	Niskin	3.1	34.5	14.8	Above bubble plume at site where we sampled the hydrate (-128), above “hydrate 002” site		Frozen	OSU (Thurber)
NA095-129	NA095-129-Chem-PMEL	H1678	2018-06-26T13:21:04.061Z	43.91065	-125.07595	1223.8	Niskin	3.1	34.5	14.8	Above bubble plume at site where we sampled the hydrate (-128), above “hydrate 002” site		NA	NOAA PMEL

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-130	NA095-130-Chem-PMEL	H1678	2018-06-26T13:33:37.408Z	43.91090	-125.07639	1222.4	Push core	3.1	34.5	14.9	North of waypoint 3, muddy sediment, core for background sediment	0-8 cm core size; hole in bottom, filled with water; brown sediment throughout; core sliced and porewater extracted	NA	NOAA PMEL (Butterfield)
NA095-130	NA095-130-01-E-OSU	H1678	2018-06-26T13:33:37.408Z	43.91090	-125.07639	1222.4	Push core	3.1	34.5	14.9	North of waypoint 3, muddy sediment, core for background sediment		Frozen	OSU (Thurber)
NA095-130	NA095-130-02-E-OSU	H1678	2018-06-26T13:33:37.408Z	43.91090	-125.07639	1222.4	Push core	3.1	34.5	14.9	North of waypoint 3, muddy sediment, core for background sediment		Frozen	OSU (Thurber)
NA095-130	NA095-130-03-E-OSU	H1678	2018-06-26T13:33:37.408Z	43.91090	-125.07639	1222.4	Push core	3.1	34.5	14.9	North of waypoint 3, muddy sediment, core for background sediment		Frozen	OSU (Thurber)
NA095-130	NA095-130-04-E-OSU	H1678	2018-06-26T13:33:37.408Z	43.91090	-125.07639	1222.4	Push core	3.1	34.5	14.9	North of waypoint 3, muddy sediment, core for background sediment		Frozen	OSU (Thurber)
NA095-130	NA095-130-05-E-OSU	H1678	2018-06-26T13:33:37.408Z	43.91090	-125.07639	1222.4	Push core	3.1	34.5	14.9	North of waypoint 3, muddy sediment, core for background sediment		Frozen	OSU (Thurber)
NA095-130	NA095-130-06-E-OSU	H1678	2018-06-26T13:33:37.408Z	43.91090	-125.07639	1222.4	Push core	3.1	34.5	14.9	North of waypoint 3, muddy sediment, core for background sediment		Frozen	OSU (Thurber)
NA095-130	NA095-130-07-E-OSU	H1678	2018-06-26T13:33:37.408Z	43.91090	-125.07639	1222.4	Push core	3.1	34.5	14.9	North of waypoint 3, muddy sediment, core for background sediment		Frozen	OSU (Thurber)
NA095-130	NA095-130-08-E-OSU	H1678	2018-06-26T13:33:37.408Z	43.91090	-125.07639	1222.4	Push core	3.1	34.5	14.9	North of waypoint 3, muddy sediment, core for background sediment		Frozen	OSU (Thurber)
NA095-130	NA095-130-09-E-OSU	H1678	2018-06-26T13:33:37.408Z	43.91090	-125.07639	1222.4	Push core	3.1	34.5	14.9	North of waypoint 3, muddy sediment, core for background sediment		Frozen	OSU (Thurber)
NA095-130	NA095-130-10-E-OSU	H1678	2018-06-26T13:33:37.408Z	43.91090	-125.07639	1222.4	Push core	3.1	34.5	14.9	North of waypoint 3, muddy sediment, core for background sediment		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-131	NA095-131-01-A-PMEL	H1678	2018-06-26T16:48:36.098Z	43.91088	-125.07584	1176.6	Niskin	3.2	34.5	12.5	Taken 50 m off bottom (~1175 m depth)	Water used for geochemistry tests and 2 l used for eDNA filtration	95% Ethanol	NOAA PMEL (Stepien)
NA095-131	NA095-131-02-E-OSU	H1678	2018-06-26T16:48:36.098Z	43.91088	-125.07584	1176.6	Niskin	3.2	34.5	12.5	Taken 50 m off bottom (~1175 m depth)		Frozen	OSU (Thurber)
NA095-131	NA095-131-Chem-PMEL	H1678	2018-06-26T16:48:36.098Z	43.91088	-125.07584	1176.6	Niskin	3.2	34.5	12.5	Taken 50 m off bottom (~1175 m depth)	Water used for geochemistry tests	NA	NOAA PMEL
NA095-132	NA095-132-Chem-PMEL	H1678	2018-06-26T17:08:49.953Z	43.91115	-125.07591	999.4	Niskin	3.8	34.4	6.6	Taken at 1000 m depth	Water used for geochemistry tests	NA	NOAA PMEL
NA095-133	NA095-133-Chem-PMEL	H1678	2018-06-26T17:38:43.404Z	43.91195	-125.07539	599.9	Niskin	4.7	34.2	7.4	Taken at 600 m depth (about 50 m below the top of the bubble stream seen in multibeam data)	Water used for geochemistry tests	NA	NOAA PMEL
NA095-134	NA095-134-Chem-PMEL	H1678	2018-06-26T17:54:50.525Z	43.91095	-125.07551	500.0	Niskin	5.0	34.2	14.4	Taken at 500 m depth	Water used for geochemistry tests	NA	NOAA PMEL
NA095-135	NA095-135-C-PMEL	H1679	2018-06-27T18:50:33.405Z	45.94393	-125.17739	1343.4	Carbonate	2.9	34.5	16.3	Broke a piece of carbonate off ledge at top of ridge, near waypoint 3	Brown rock, no associates; overall rock: 15.5 x 9.5 x 13 cm; rock broken into subsamples with hammer	Dry	NOAA PMEL (Embley)
NA095-135	NA095-135-C-GSO	H1679	2018-06-27T18:50:33.405Z	45.94393	-125.17739	1343.4	Carbonate	2.9	34.5	16.3	Broke a piece of carbonate off ledge at top of ridge, near waypoint 3		Dry	GSO (Graduate School of Oceanography at URI)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-136	NA095-136-C-PMEL	H1679	2018-06-27T20:22:55.740Z	45.94206	-125.17555	1354.2	ROV grab	2.9	34.5	15.9	Conglomerate rock sample from the conglomerate (carbonate based) ledge we were exploring around	Conglomerate carbonate, light grey with white swirls; associates include lots of short branching sponges (both white ones and cream ones), worms, 2 white squat lobsters (1 with eggs), and some other small fauna; overall rock: 22 x 13 x 30.5 cm; rock broken into subsamples with hammer	Dry	NOAA PMEL (Embley)
NA095-136	NA095-136-C-GSO	H1679	2018-06-27T20:22:55.740Z	45.94206	-125.17555	1354.2	ROV grab	2.9	34.5	15.9	Conglomerate rock sample from the conglomerate (carbonate based) ledge we were exploring around		Dry	GSO (Graduate School of Oceanography at URI)
NA095-136	NA095-136-01-E-OSU	H1679	2018-06-27T20:22:55.740Z	45.94206	-125.17555	1354.2	ROV grab	2.9	34.5	15.9	Conglomerate rock sample from the conglomerate (carbonate based) ledge we were exploring around		Frozen	OSU (Thurber)
NA095-136	NA095-136-02-A-MCZ	H1679	2018-06-27T20:22:55.740Z	45.94206	-125.17555	1354.2	ROV grab	2.9	34.5	15.9	Conglomerate rock sample from the conglomerate (carbonate based) ledge we were exploring around		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-136	NA095-136-03-E-OSU	H1679	2018-06-27T20:22:55.740Z	45.94206	-125.17555	1354.2	ROV grab	2.9	34.5	15.9	Conglomerate rock sample from the conglomerate (carbonate based) ledge we were exploring around		Frozen	OSU (Thurber)
NA095-136	NA095-136-04-A-MCZ	H1679	2018-06-27T20:22:55.740Z	45.94206	-125.17555	1354.2	ROV grab	2.9	34.5	15.9	Conglomerate rock sample from the conglomerate (carbonate based) ledge we were exploring around		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-136	NA095-136-05-E-OSU	H1679	2018-06-27T20:22:55.740Z	45.94206	-125.17555	1354.2	ROV grab	2.9	34.5	15.9	Conglomerate rock sample from the conglomerate (carbonate based) ledge we were exploring around		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-136	NA095-136-06-A-MCZ	H1679	2018-06-27T20:22:55.740Z	45.94206	-125.17555	1354.2	ROV grab	2.9	34.5	15.9	Conglomerate rock sample from the conglomerate (carbonate based) ledge we were exploring around		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-136	NA095-136-07-E-OSU	H1679	2018-06-27T20:22:55.740Z	45.94206	-125.17555	1354.2	ROV grab	2.9	34.5	15.9	Conglomerate rock sample from the conglomerate (carbonate based) ledge we were exploring around		Frozen	OSU (Thurber)
NA095-136	NA095-136-08-A-MCZ	H1679	2018-06-27T20:22:55.740Z	45.94206	-125.17555	1354.2	ROV grab	2.9	34.5	15.9	Conglomerate rock sample from the conglomerate (carbonate based) ledge we were exploring around		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-136	NA095-136-09-A-MCZ	H1679	2018-06-27T20:22:55.740Z	45.94206	-125.17555	1354.2	ROV grab	2.9	34.5	15.9	Conglomerate rock sample from the conglomerate (carbonate based) ledge we were exploring around		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-136	NA095-136-10-A-MCZ	H1679	2018-06-27T20:22:55.740Z	45.94206	-125.17555	1354.2	ROV grab	2.9	34.5	15.9	Conglomerate rock sample from the conglomerate (carbonate based) ledge we were exploring around		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-136	NA095-136-11-A-MCZ	H1679	2018-06-27T20:22:55.740Z	45.94206	-125.17555	1354.2	ROV grab	2.9	34.5	15.9	Conglomerate rock sample from the conglomerate (carbonate based) ledge we were exploring around		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-137	NA095-137-GT02mini-PMEL	H1679	2018-06-27T20:47:01.890Z	45.94204	-125.17552	1354.0	Gas	2.9	34.5	15.7	Slight bubble stream coming out of seafloor next to one of the carbonate conglomerates, flowing steady since we landed to collet rock sample but not many bubbles	Separate water from gas using seagoing extraction line	Glass Ampules	NOAA PMEL

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-138	NA095-138-E-OSU	H1679	2018-06-27T21:12:27.606Z	45.94203	-125.17553	1354.0	Bio	3.0	34.5	15.5	Snail near bubble sample collected on top of carbonate formation by mats, tubeworms; one may be in slurp flush	2 large white snails	Frozen	OSU (Thurber)
NA095-138	NA095-138-01-A-MCZ	H1679	2018-06-27T21:12:27.606Z	45.94203	-125.17553	1354.0	Bio	3.0	34.5	15.5	Snail near bubble sample collected on top of carbonate formation by mats, tubeworms; one may be in slurp flush		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-139	NA095-139-C-PMEL	H1679	2018-06-27T21:49:37.262Z	45.94181	-125.17503	1352.8	Bio	2.9	34.5	15.3	Anemones that are on microbial mat/carbonate in a very seepy area	Grey rock with some white filamentous mat, numerous limpets, an anemone, and some snails and worms; overall rock: 15 x 9.5 x 11 cm; rock broken into subsamples with hammer	Dry	NOAA PMEL (Embley)
NA095-139	NA095-139-C-GSO	H1679	2018-06-27T21:49:37.262Z	45.94181	-125.17503	1352.8	Bio	2.9	34.5	15.3	Anemones that are on microbial mat/carbonate in a very seepy area		Dry	GSO (Graduate School of Oceanography at URI)
NA095-139	NA095-139-01-E-OSU	H1679	2018-06-27T21:49:37.262Z	45.94181	-125.17503	1352.8	Bio	2.9	34.5	15.3	Anemones that are on microbial mat/carbonate in a very seepy area		Frozen	OSU (Thurber)
NA095-139	NA095-139-02-A-MCZ	H1679	2018-06-27T21:49:37.262Z	45.94181	-125.17503	1352.8	Bio	2.9	34.5	15.3	Anemones that are on microbial mat/carbonate in a very seepy area		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-139	NA095-139-03-E-OSU	H1679	2018-06-27T21:49:37.262Z	45.94181	-125.17503	1352.8	Bio	2.9	34.5	15.3	Anemones that are on microbial mat/carbonate in a very seepy area		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-139	NA095-139-04-A-MCZ	H1679	2018-06-27T21:49:37.262Z	45.94181	-125.17503	1352.8	Bio	2.9	34.5	15.3	Anemones that are on microbial mat/carbonate in a very seepy area		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-139	NA095-139-05-E-OSU	H1679	2018-06-27T21:49:37.262Z	45.94181	-125.17503	1352.8	Bio	2.9	34.5	15.3	Anemones that are on microbial mat/carbonate in a very seepy area		Frozen	OSU (Thurber)
NA095-139	NA095-139-06-E-OSU	H1679	2018-06-27T21:49:37.262Z	45.94181	-125.17503	1352.8	Bio	2.9	34.5	15.3	Anemones that are on microbial mat/carbonate in a very seepy area		Frozen	OSU (Thurber)
NA095-139	NA095-139-07-E-OSU	H1679	2018-06-27T21:49:37.262Z	45.94181	-125.17503	1352.8	Bio	2.9	34.5	15.3	Anemones that are on microbial mat/carbonate in a very seepy area		Frozen	OSU (Thurber)
NA095-140	NA095-140-Chem-PMEL	H1679	2018-06-27T23:09:49.482Z	45.94326	-125.17799	1356.2	Push core	2.9	34.5	15.9	Outside of mat area we previously were trying to core at, with some live clams nearby	0-8 cm core size; reduced sediment about 1 cm down, first in horizontal striations, and then throughout; a little water/air hole in bottom; worm in core; core sliced and porewater extracted	NA	NOAA PMEL (Butterfield)
NA095-140	NA095-140-01-E-OSU	H1679	2018-06-27T23:09:49.482Z	45.94326	-125.17799	1356.2	Push core	2.9	34.5	15.9	Outside of mat area we previously were trying to core at, with some live clams nearby		Frozen	OSU (Thurber)
NA095-140	NA095-140-02-E-OSU	H1679	2018-06-27T23:09:49.482Z	45.94326	-125.17799	1356.2	Push core	2.9	34.5	15.9	Outside of mat area we previously were trying to core at, with some live clams nearby		Frozen	OSU (Thurber)
NA095-140	NA095-140-03-E-OSU	H1679	2018-06-27T23:09:49.482Z	45.94326	-125.17799	1356.2	Push core	2.9	34.5	15.9	Outside of mat area we previously were trying to core at, with some live clams nearby		Frozen	OSU (Thurber)
NA095-140	NA095-140-04-E-OSU	H1679	2018-06-27T23:09:49.482Z	45.94326	-125.17799	1356.2	Push core	2.9	34.5	15.9	Outside of mat area we previously were trying to core at, with some live clams nearby		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-140	NA095-140-05-E-OSU	H1679	2018-06-27T23:09:49.482Z	45.94326	-125.17799	1356.2	Push core	2.9	34.5	15.9	Outside of mat area we previously were trying to core at, with some live clams nearby		Frozen	OSU (Thurber)
NA095-140	NA095-140-06-E-OSU	H1679	2018-06-27T23:09:49.482Z	45.94326	-125.17799	1356.2	Push core	2.9	34.5	15.9	Outside of mat area we previously were trying to core at, with some live clams nearby		Frozen	OSU (Thurber)
NA095-140	NA095-140-07-E-OSU	H1679	2018-06-27T23:09:49.482Z	45.94326	-125.17799	1356.2	Push core	2.9	34.5	15.9	Outside of mat area we previously were trying to core at, with some live clams nearby		Frozen	OSU (Thurber)
NA095-140	NA095-140-08-E-OSU	H1679	2018-06-27T23:09:49.482Z	45.94326	-125.17799	1356.2	Push core	2.9	34.5	15.9	Outside of mat area we previously were trying to core at, with some live clams nearby		Frozen	OSU (Thurber)
NA095-140	NA095-140-09-F-OSU	H1679	2018-06-27T23:09:49.482Z	45.94326	-125.17799	1356.2	Push core	2.9	34.5	15.9	Outside of mat area we previously were trying to core at, with some live clams nearby		Seawater	OSU (Thurber)
NA095-141	NA095-141-01-E-OSU	H1679	2018-06-27T23:22:39.117Z	45.94320	-125.17800	1356.2	Slurp	2.9	34.5	15.8	In same area as previous core sample, live clams	11 live clams, 8 polychaetes, 11 brittle stars, and rock and pebbles; clams like calyptogena sp.	Frozen	OSU (Thurber)
NA095-141	NA095-141-02-A-PMEL	H1679	2018-06-27T23:22:39.117Z	45.94320	-125.17800	1356.2	Slurp	2.9	34.5	15.8	In same area as previous core sample, live clams		95% Ethanol	NOAA PMEL (Stepien)
NA095-141	NA095-141-03-A-MCZ	H1679	2018-06-27T23:22:39.117Z	45.94320	-125.17800	1356.2	Slurp	2.9	34.5	15.8	In same area as previous core sample, live clams		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-141	NA095-141-04-E-OSU	H1679	2018-06-27T23:22:39.117Z	45.94320	-125.17800	1356.2	Slurp	2.9	34.5	15.8	In same area as previous core sample, live clams		Frozen	OSU (Thurber)
NA095-141	NA095-141-05-A-PMEL	H1679	2018-06-27T23:22:39.117Z	45.94320	-125.17800	1356.2	Slurp	2.9	34.5	15.8	In same area as previous core sample, live clams		95% Ethanol	NOAA PMEL (Stepien)
NA095-141	NA095-141-06-A-MCZ	H1679	2018-06-27T23:22:39.117Z	45.94320	-125.17800	1356.2	Slurp	2.9	34.5	15.8	In same area as previous core sample, live clams		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-141	NA095-141-07-E-OSU	H1679	2018-06-27T23:22:39.117Z	45.94320	-125.17800	1356.2	Slurp	2.9	34.5	15.8	In same area as previous core sample, live clams		Frozen	OSU (Thurber)
NA095-141	NA095-141-08-A-MCZ	H1679	2018-06-27T23:22:39.117Z	45.94320	-125.17800	1356.2	Slurp	2.9	34.5	15.8	In same area as previous core sample, live clams		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-142	NA095-142-01-E-OSU	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143	Several tubeworms, probably lamellabrachia sp., with one flytrap anemone associate and a pyrosome; overlaps with sample -143	Frozen	OSU (Thurber)
NA095-142	NA095-142-02-E-OSU	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		Frozen	OSU (Thurber)
NA095-142	NA095-142-03-E-OSU	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		Frozen	OSU (Thurber)
NA095-142	NA095-142-04-A-PMEL	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		95% Ethanol	NOAA PMEL (Stepien)
NA095-142	NA095-142-05-A-MCZ	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-142	NA095-142-06-A-MCZ	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-142	NA095-142-07-E-OSU	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		Frozen	OSU (Thurber)
NA095-142	NA095-142-08-E-OSU	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		Frozen	OSU (Thurber)
NA095-142	NA095-142-09-E-OSU	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		Frozen	OSU (Thurber)
NA095-142	NA095-142-10-A-PMEL	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		95% Ethanol	NOAA PMEL (Stepien)
NA095-142	NA095-142-11-E-OSU	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		Frozen	OSU (Thurber)
NA095-142	NA095-142-12-E-OSU	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		Frozen	OSU (Thurber)
NA095-142	NA095-142-13-E-OSU	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		Frozen	OSU (Thurber)
NA095-142	NA095-142-14-A-PMEL	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		95% Ethanol	NOAA PMEL (Stepien)
NA095-142	NA095-142-15-E-OSU	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		Frozen	OSU (Thurber)
NA095-142	NA095-142-16-E-OSU	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		Frozen	OSU (Thurber)
NA095-142	NA095-142-17-E-OSU	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-142	NA095-142-18-A-PMEL	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		95% Ethanol	NOAA PMEL (Stepien)
NA095-142	NA095-142-19-E-OSU	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		Frozen	OSU (Thurber)
NA095-142	NA095-142-20-E-OSU	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		Frozen	OSU (Thurber)
NA095-142	NA095-142-21-E-OSU	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		Frozen	OSU (Thurber)
NA095-142	NA095-142-22-A-PMEL	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		95% Ethanol	NOAA PMEL (Stepien)
NA095-142	NA095-142-23-E-OSU	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		Frozen	OSU (Thurber)
NA095-142	NA095-142-24-E-OSU	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		Frozen	OSU (Thurber)
NA095-142	NA095-142-25-E-OSU	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		Frozen	OSU (Thurber)
NA095-142	NA095-142-26-A-PMEL	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		95% Ethanol	NOAA PMEL (Stepien)
NA095-142	NA095-142-27-E-OSU	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		Frozen	OSU (Thurber)
NA095-142	NA095-142-28-E-OSU	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		Frozen	OSU (Thurber)
NA095-142	NA095-142-29-E-OSU	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-142	NA095-142-30-A-PMEL	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		95% Ethanol	NOAA PMEL (Stepien)
NA095-142	NA095-142-31-E-OSU	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		Frozen	OSU (Thurber)
NA095-142	NA095-142-32-E-OSU	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		Frozen	OSU (Thurber)
NA095-142	NA095-142-33-E-OSU	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		Frozen	OSU (Thurber)
NA095-142	NA095-142-34-A-PMEL	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		95% Ethanol	NOAA PMEL (Stepien)
NA095-142	NA095-142-35-E-OSU	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		Frozen	OSU (Thurber)
NA095-142	NA095-142-36-E-OSU	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		Frozen	OSU (Thurber)
NA095-142	NA095-142-37-E-OSU	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		Frozen	OSU (Thurber)
NA095-142	NA095-142-38-A-PMEL	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		95% Ethanol	NOAA PMEL (Stepien)
NA095-142	NA095-142-39-E-OSU	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		Frozen	OSU (Thurber)
NA095-142	NA095-142-40-E-OSU	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		Frozen	OSU (Thurber)
NA095-142	NA095-142-41-A-MCZ	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-142	NA095-142-42-E-OSU	H1679	2018-06-27T23:54:20.375Z	45.94335	-125.17801	1356.8	ROV grab	2.9	34.5	16.8	Tubeworms with flytrap anemone; overlaps with sample -143		Frozen	OSU (Thurber)
NA095-143	SAME AS NA095-142	H1679	2018-06-28T00:28:07.055Z	45.94330	-125.17806	1356.6	ROV grab	2.8	34.5	17.1	Duplicates of previous tubeworm sample, approx. 10 tubeworms; overlaps with sample -142		NA	NA
NA095-144	NA095-144-GT01mini-PMEL	H1679	2018-06-28T01:01:37.238Z	45.94327	-125.17784	1353.4	Gas	2.9	34.5	17.3	In area of marker, a couple bubble streams, fairly steady	Separate water from gas using seagoing extraction line	Glass Ampules	NOAA PMEL
NA095-145	NA095-145-01-A-PMEL	H1679	2018-06-28T01:07:48.502Z	45.94330	-125.17783	1353.1	Niskin	2.9	34.5	17.4	Above bubble site where marker is, where we took gas-tight sample -144	Water used for geochemistry tests and 1.9 l used for eDNA filtration	95% Ethanol	NOAA PMEL (Stepien)
NA095-145	NA095-145-02-E-OSU	H1679	2018-06-28T01:07:48.502Z	45.94330	-125.17783	1353.1	Niskin	2.9	34.5	17.4	Above bubble site where marker is, where we took gas-tight sample -144		Frozen	OSU (Thurber)
NA095-145	NA095-145-Chem-PMEL	H1679	2018-06-28T01:07:48.502Z	45.94330	-125.17783	1353.1	Niskin	2.9	34.5	17.4	Above bubble site where marker is, where we took gas-tight sample -144		NA	NOAA PMEL
NA095-146	NA095-146-HY-PMEL	H1679	2018-06-28T01:41:37.519Z	45.94325	-125.17795	1355.3	Hydrate	2.9	34.5	17.4	Just a seawater sample, not true hydrate; over bacterial mat where samples were taken earlier in the dive	Separate water from gas using seagoing extraction line	Glass Ampules	NOAA PMEL
NA095-147	NA095-147-MA04-PMEL	H1679	2018-06-28T01:48:02.644Z	45.94325	-125.17795	1355.3	Major	2.9	34.5	17.3	Taking major sample same place as the hydrate seawater sample, using pvc cone, on white mat	Fluid used for geochemistry tests	NA	NOAA PMEL
NA095-148	NA095-148-Chem-PMEL	H1679	2018-06-28T02:00:10.622Z	45.94329	-125.17794	1355.3	Push core	2.8	34.5	17.3	To the left of the microbial mat that we took the major sample on	0-6 cm core size; very few reduced patches in core; core sliced and porewater extracted	NA	NOAA PMEL (Butterfield)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-148	NA095-148-01-E-OSU	H1679	2018-06-28T02:00:10.622Z	45.94329	-125.17794	1355.3	Push core	2.8	34.5	17.3	To the left of the microbial mat that we took the major sample on		Frozen	OSU (Thurber)
NA095-148	NA095-148-02-E-OSU	H1679	2018-06-28T02:00:10.622Z	45.94329	-125.17794	1355.3	Push core	2.8	34.5	17.3	To the left of the microbial mat that we took the major sample on		Frozen	OSU (Thurber)
NA095-148	NA095-148-03-E-OSU	H1679	2018-06-28T02:00:10.622Z	45.94329	-125.17794	1355.3	Push core	2.8	34.5	17.3	To the left of the microbial mat that we took the major sample on		Frozen	OSU (Thurber)
NA095-148	NA095-148-04-E-OSU	H1679	2018-06-28T02:00:10.622Z	45.94329	-125.17794	1355.3	Push core	2.8	34.5	17.3	To the left of the microbial mat that we took the major sample on		Frozen	OSU (Thurber)
NA095-148	NA095-148-05-E-OSU	H1679	2018-06-28T02:00:10.622Z	45.94329	-125.17794	1355.3	Push core	2.8	34.5	17.3	To the left of the microbial mat that we took the major sample on		Frozen	OSU (Thurber)
NA095-148	NA095-148-06-E-OSU	H1679	2018-06-28T02:00:10.622Z	45.94329	-125.17794	1355.3	Push core	2.8	34.5	17.3	To the left of the microbial mat that we took the major sample on		Frozen	OSU (Thurber)
NA095-148	NA095-148-07-E-OSU	H1679	2018-06-28T02:00:10.622Z	45.94329	-125.17794	1355.3	Push core	2.8	34.5	17.3	To the left of the microbial mat that we took the major sample on		Frozen	OSU (Thurber)
NA095-148	NA095-148-08-E-OSU	H1679	2018-06-28T02:00:10.622Z	45.94329	-125.17794	1355.3	Push core	2.8	34.5	17.3	To the left of the microbial mat that we took the major sample on		Frozen	OSU (Thurber)
NA095-148	NA095-148-09-F-OSU	H1679	2018-06-28T02:00:10.622Z	45.94329	-125.17794	1355.3	Push core	2.8	34.5	17.3	To the left of the microbial mat that we took the major sample on		Seawater	OSU (Thurber)
NA095-149	NA095-149-01-A-PMEL	H1679	2018-06-28T02:12:37.689Z	45.94290	-125.17770	1345.7	Niskin	3.0	34.5	15.5	Taken at 10 m altitude from recovery position	Water used for geochemistry tests and 2 l used for eDNA filtration	95% Ethanol	NOAA PMEL (Stepien)
NA095-149	NA095-149-02-E-OSU	H1679	2018-06-28T02:12:37.689Z	45.94290	-125.17770	1345.7	Niskin	3.0	34.5	15.5	Taken at 10 m altitude from recovery position		Frozen	OSU (Thurber)
NA095-149	NA095-149-Chem-PMEL	H1679	2018-06-28T02:12:37.689Z	45.94290	-125.17770	1345.7	Niskin	3.0	34.5	15.5	Taken at 10 m altitude from recovery position		NA	NOAA PMEL

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-150	NA095-150-01-A-PMEL	H1679	2018-06-28T02:16:38.287Z	45.94276	-125.17733	1306.6	Niskin	3.0	34.5	14.0	Taken at 50 m off bottom		95% Ethanol	NOAA PMEL (Stepien)
NA095-150	NA095-150-02-E-OSU	H1679	2018-06-28T02:16:38.287Z	45.94276	-125.17733	1306.6	Niskin	3.0	34.5	14.0	Taken at 50 m off bottom		Frozen	OSU (Thurber)
NA095-150	NA095-150-Chem-PMEL	H1679	2018-06-28T02:16:38.287Z	45.94276	-125.17733	1306.6	Niskin	3.0	34.5	14.0	Taken at 50 m off bottom		NA	NOAA PMEL
NA095-151	NA095-151-Chem-PMEL	H1679	2018-06-28T03:07:30.688Z	45.94266	-125.17765	630.0	Niskin	4.6	34.2	6.7	Taken at 630 m depth	Water used for geochemistry tests	NA	NOAA PMEL
NA095-152	NA095-152-Chem-PMEL	H1679	2018-06-28T03:18:20.427Z	45.94289	-125.17733	499.9	Niskin	5.1	34.1	16.9	Taken at 500 m depth	Water used for geochemistry tests	NA	NOAA PMEL
NA095-153	NA095-153-Chem-PMEL	H1679	2018-06-28T03:43:50.760Z	45.94264	-125.17761	199.2	Niskin	7.3	34.0	85.2	Taken at 200 m depth	Water used for geochemistry tests	NA	NOAA PMEL
NA095-154	NA095-154-01-A-PMEL	H1680	2018-06-28T11:44:14.856Z	45.87421	-124.64464	190.6	Niskin	6.6	34.0	54.4	Background Niskin near wp2	Water used for geochemistry tests and 2 l used for eDNA filtration	95% Ethanol	NOAA PMEL (Stepien)
NA095-154	NA095-154-02-E-OSU	H1680	2018-06-28T11:44:14.856Z	45.87421	-124.64464	190.6	Niskin	6.6	34.0	54.4	Background Niskin near wp2		Frozen	OSU (Thurber)
NA095-154	NA095-154-Chem-PMEL	H1680	2018-06-28T11:44:14.856Z	45.87421	-124.64464	190.6	Niskin	6.6	34.0	54.4	Background Niskin near wp2		NA	NOAA PMEL
NA095-155	NA095-155-GT07-PMEL	H1680	2018-06-28T13:26:16.594Z	45.87532	-124.64469	188.2	Gas	6.6	34.0	53.5	Bubbles in small carbonate rubble area, surrounded by a few urchins and a pyrosome; slow and slightly intermittent	Separate water from gas using seagoing extraction line	Glass Ampules	NOAA PMEL

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-156	NA095-156-Chem-PMEL	H1680	2018-06-28T16:05:23.339Z	45.87758	-124.64025	181.2	Push core	6.6	25.7	53.9	At mat 002, right in the middle of white mat	0-15 cm core size; top 4-5 cm reduced, bottom is glacial mud; core sliced and porewater extracted	NA	NOAA PMEL (Butterfield)
NA095-156	NA095-156-01-E-OSU	H1680	2018-06-28T16:05:23.339Z	45.87758	-124.64025	181.2	Push core	6.6	25.7	53.9	At mat 002, right in the middle of white mat		Frozen	OSU (Thurber)
NA095-156	NA095-156-02-E-OSU	H1680	2018-06-28T16:05:23.339Z	45.87758	-124.64025	181.2	Push core	6.6	25.7	53.9	At mat 002, right in the middle of white mat		Frozen	OSU (Thurber)
NA095-156	NA095-156-03-E-OSU	H1680	2018-06-28T16:05:23.339Z	45.87758	-124.64025	181.2	Push core	6.6	25.7	53.9	At mat 002, right in the middle of white mat		Frozen	OSU (Thurber)
NA095-156	NA095-156-04-E-OSU	H1680	2018-06-28T16:05:23.339Z	45.87758	-124.64025	181.2	Push core	6.6	25.7	53.9	At mat 002, right in the middle of white mat		Frozen	OSU (Thurber)
NA095-156	NA095-156-05-E-OSU	H1680	2018-06-28T16:05:23.339Z	45.87758	-124.64025	181.2	Push core	6.6	25.7	53.9	At mat 002, right in the middle of white mat		Frozen	OSU (Thurber)
NA095-156	NA095-156-06-E-OSU	H1680	2018-06-28T16:05:23.339Z	45.87758	-124.64025	181.2	Push core	6.6	25.7	53.9	At mat 002, right in the middle of white mat		Frozen	OSU (Thurber)
NA095-156	NA095-156-07-E-OSU	H1680	2018-06-28T16:05:23.339Z	45.87758	-124.64025	181.2	Push core	6.6	25.7	53.9	At mat 002, right in the middle of white mat		Frozen	OSU (Thurber)
NA095-156	NA095-156-08-E-OSU	H1680	2018-06-28T16:05:23.339Z	45.87758	-124.64025	181.2	Push core	6.6	25.7	53.9	At mat 002, right in the middle of white mat		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-156	NA095-156-09-E-OSU	H1680	2018-06-28T16:05:23.339Z	45.87758	-124.64025	181.2	Push core	6.6	25.7	53.9	At mat 002, right in the middle of white mat		Frozen	OSU (Thurber)
NA095-156	NA095-156-10-E-OSU	H1680	2018-06-28T16:05:23.339Z	45.87758	-124.64025	181.2	Push core	6.6	25.7	53.9	At mat 002, right in the middle of white mat		Frozen	OSU (Thurber)
NA095-156	NA095-156-11-E-OSU	H1680	2018-06-28T16:05:23.339Z	45.87758	-124.64025	181.2	Push core	6.6	25.7	53.9	At mat 002, right in the middle of white mat		Frozen	OSU (Thurber)
NA095-156	NA095-156-12-E-OSU	H1680	2018-06-28T16:05:23.339Z	45.87758	-124.64025	181.2	Push core	6.6	25.7	53.9	At mat 002, right in the middle of white mat		Frozen	OSU (Thurber)
NA095-156	NA095-156-13-E-OSU	H1680	2018-06-28T16:05:23.339Z	45.87758	-124.64025	181.2	Push core	6.6	25.7	53.9	At mat 002, right in the middle of white mat		Frozen	OSU (Thurber)
NA095-156	NA095-156-14-E-OSU	H1680	2018-06-28T16:05:23.339Z	45.87758	-124.64025	181.2	Push core	6.6	25.7	53.9	At mat 002, right in the middle of white mat		Frozen	OSU (Thurber)
NA095-156	NA095-156-15-E-OSU	H1680	2018-06-28T16:05:23.339Z	45.87758	-124.64025	181.2	Push core	6.6	25.7	53.9	At mat 002, right in the middle of white mat		Frozen	OSU (Thurber)
NA095-157	NA095-157-Chem-PMEL	H1680	2018-06-28T16:14:17.503Z	45.87758	-124.64026	181.3	Push core	6.6	25.6	53.6	Near mat 002, about 2 m away, in thin small white mat		NA	NOAA PMEL (Butterfield)
NA095-157	NA095-157-01-E-OSU	H1680	2018-06-28T16:14:17.503Z	45.87758	-124.64026	181.3	Push core	6.6	25.6	53.6	Near mat 002, about 2 m away, in thin small white mat		Frozen	OSU (Thurber)
NA095-157	NA095-157-02-E-OSU	H1680	2018-06-28T16:14:17.503Z	45.87758	-124.64026	181.3	Push core	6.6	25.6	53.6	Near mat 002, about 2 m away, in thin small white mat		Frozen	OSU (Thurber)
NA095-157	NA095-157-03-E-OSU	H1680	2018-06-28T16:14:17.503Z	45.87758	-124.64026	181.3	Push core	6.6	25.6	53.6	Near mat 002, about 2 m away, in thin small white mat		Frozen	OSU (Thurber)
NA095-157	NA095-157-04-E-OSU	H1680	2018-06-28T16:14:17.503Z	45.87758	-124.64026	181.3	Push core	6.6	25.6	53.6	Near mat 002, about 2 m away, in thin small white mat		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-157	NA095-157-05-E-OSU	H1680	2018-06-28T16:14:17.503Z	45.87758	-124.64026	181.3	Push core	6.6	25.6	53.6	Near mat 002, about 2 m away, in thin small white mat		Frozen	OSU (Thurber)
NA095-157	NA095-157-06-E-OSU	H1680	2018-06-28T16:14:17.503Z	45.87758	-124.64026	181.3	Push core	6.6	25.6	53.6	Near mat 002, about 2 m away, in thin small white mat		Frozen	OSU (Thurber)
NA095-157	NA095-157-07-E-OSU	H1680	2018-06-28T16:14:17.503Z	45.87758	-124.64026	181.3	Push core	6.6	25.6	53.6	Near mat 002, about 2 m away, in thin small white mat		Frozen	OSU (Thurber)
NA095-157	NA095-157-08-E-OSU	H1680	2018-06-28T16:14:17.503Z	45.87758	-124.64026	181.3	Push core	6.6	25.6	53.6	Near mat 002, about 2 m away, in thin small white mat		Frozen	OSU (Thurber)
NA095-157	NA095-157-09-E-OSU	H1680	2018-06-28T16:14:17.503Z	45.87758	-124.64026	181.3	Push core	6.6	25.6	53.6	Near mat 002, about 2 m away, in thin small white mat		Frozen	OSU (Thurber)
NA095-157	NA095-157-10-E-OSU	H1680	2018-06-28T16:14:17.503Z	45.87758	-124.64026	181.3	Push core	6.6	25.6	53.6	Near mat 002, about 2 m away, in thin small white mat		Frozen	OSU (Thurber)
NA095-157	NA095-157-11-E-OSU	H1680	2018-06-28T16:14:17.503Z	45.87758	-124.64026	181.3	Push core	6.6	25.6	53.6	Near mat 002, about 2 m away, in thin small white mat		Frozen	OSU (Thurber)
NA095-157	NA095-157-12-E-OSU	H1680	2018-06-28T16:14:17.503Z	45.87758	-124.64026	181.3	Push core	6.6	25.6	53.6	Near mat 002, about 2 m away, in thin small white mat		Frozen	OSU (Thurber)
NA095-157	NA095-157-13-E-OSU	H1680	2018-06-28T16:14:17.503Z	45.87758	-124.64026	181.3	Push core	6.6	25.6	53.6	Near mat 002, about 2 m away, in thin small white mat		Frozen	OSU (Thurber)
NA095-157	NA095-157-14-E-OSU	H1680	2018-06-28T16:14:17.503Z	45.87758	-124.64026	181.3	Push core	6.6	25.6	53.6	Near mat 002, about 2 m away, in thin small white mat		Frozen	OSU (Thurber)
NA095-157	NA095-157-15-E-OSU	H1680	2018-06-28T16:14:17.503Z	45.87758	-124.64026	181.3	Push core	6.6	25.6	53.6	Near mat 002, about 2 m away, in thin small white mat		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-157	NA095-157-16-F-OSU	H1680	2018-06-28T16:14:17.503Z	45.87758	-124.64026	181.3	Push core	6.6	25.6	53.6	Near mat 002, about 2 m away, in thin small white mat		Seawater	OSU (Thurber)
NA095-158	NA095-158-C-PMEL	H1680	2018-06-28T19:12:24.288Z	45.86969	-124.63704	176.2	Carbonate	6.7	34.0	55.0	Rock picked up from carbonate ledges on ground with fauna (brachiopods, brittle stars, and more)	Brown rock with abundant faunal associates; overall rock: 13 x 15 x 2.5 cm; rock broken into subsamples with hammer	Dry	NOAA PMEL (Embley)
NA095-158	NA095-158-C-GSO	H1680	2018-06-28T19:12:24.288Z	45.86969	-124.63704	176.2	Carbonate	6.7	34.0	55.0	Rock picked up from carbonate ledges on ground with fauna (brachiopods, brittle stars, and more)		Dry	GSO (Graduate School of Oceanography at URI)
NA095-158	NA095-158-01-A-MCZ	H1680	2018-06-28T19:12:24.288Z	45.86969	-124.63704	176.2	Carbonate	6.7	34.0	55.0	Rock picked up from carbonate ledges on ground with fauna (brachiopods, brittle stars, and more)		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-158	NA095-158-02-A-MCZ	H1680	2018-06-28T19:12:24.288Z	45.86969	-124.63704	176.2	Carbonate	6.7	34.0	55.0	Rock picked up from carbonate ledges on ground with fauna (brachiopods, brittle stars, and more)		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-158	NA095-158-03-A-MCZ	H1680	2018-06-28T19:12:24.288Z	45.86969	-124.63704	176.2	Carbonate	6.7	34.0	55.0	Rock picked up from carbonate ledges on ground with fauna (brachiopods, brittle stars, and more)		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-158	NA095-158-04-A-MCZ	H1680	2018-06-28T19:12:24.288Z	45.86969	-124.63704	176.2	Carbonate	6.7	34.0	55.0	Rock picked up from carbonate ledges on ground with fauna (brachiopods, brittle stars, and more)		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-158	NA095-158-05-A-MCZ	H1680	2018-06-28T19:12:24.288Z	45.86969	-124.63704	176.2	Carbonate	6.7	34.0	55.0	Rock picked up from carbonate ledges on ground with fauna (brachiopods, brittle stars, and more)		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-158	NA095-158-06-A-MCZ	H1680	2018-06-28T19:12:24.288Z	45.86969	-124.63704	176.2	Carbonate	6.7	34.0	55.0	Rock picked up from carbonate ledges on ground with fauna (brachiopods, brittle stars, and more)		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-158	NA095-158-07-A-MCZ	H1680	2018-06-28T19:12:24.288Z	45.86969	-124.63704	176.2	Carbonate	6.7	34.0	55.0	Rock picked up from carbonate ledges on ground with fauna (brachiopods, brittle stars, and more)		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-158	NA095-158-08-A-MCZ	H1680	2018-06-28T19:12:24.288Z	45.86969	-124.63704	176.2	Carbonate	6.7	34.0	55.0	Rock picked up from carbonate ledges on ground with fauna (brachiopods, brittle stars, and more)		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-158	NA095-158-09-A-MCZ	H1680	2018-06-28T19:12:24.288Z	45.86969	-124.63704	176.2	Carbonate	6.7	34.0	55.0	Rock picked up from carbonate ledges on ground with fauna (brachiopods, brittle stars, and more)		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-158	NA095-158-10-A-MCZ	H1680	2018-06-28T19:12:24.288Z	45.86969	-124.63704	176.2	Carbonate	6.7	34.0	55.0	Rock picked up from carbonate ledges on ground with fauna (brachiopods, brittle stars, and more)		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-158	NA095-158-11-A-MCZ	H1680	2018-06-28T19:12:24.288Z	45.86969	-124.63704	176.2	Carbonate	6.7	34.0	55.0	Rock picked up from carbonate ledges on ground with fauna (brachiopods, brittle stars, and more)		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-158	NA095-158-12-A-MCZ	H1680	2018-06-28T19:12:24.288Z	45.86969	-124.63704	176.2	Carbonate	6.7	34.0	55.0	Rock picked up from carbonate ledges on ground with fauna (brachiopods, brittle stars, and more)		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-159	NA095-159-GT10-PMEL	H1680	2018-06-28T20:38:44.490Z	45.86969	-124.63717	176.9	Gas	6.7	34.0	55.6	Bubble 007 stream that was marked with poking stick before; intermittent with around 20 second intervals; some carbonate rubble around	Separate water from gas using seagoing extraction line	Glass Ampules	NOAA PMEL

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-160	NA095-160-01-A-MCZ	H1680	2018-06-28T20:56:01.258Z	45.86969	-124.63716	176.9	Bio	6.7	34.0	55.5	Clam shells and some snails	Clams shells (not vesicomyid clam shells) and some pebbles, mixed with small snails, cream globular sponges, small worms, several krill, and some other small fauna	95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-160	NA095-160-02-A-MCZ	H1680	2018-06-28T20:56:01.258Z	45.86969	-124.63716	176.9	Bio	6.7	34.0	55.5	Clam shells and some snails		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-160	NA095-160-03-A-MCZ	H1680	2018-06-28T20:56:01.258Z	45.86969	-124.63716	176.9	Bio	6.7	34.0	55.5	Clam shells and some snails		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-160	NA095-160-04-A-MCZ	H1680	2018-06-28T20:56:01.258Z	45.86969	-124.63716	176.9	Bio	6.7	34.0	55.5	Clam shells and some snails		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-160	NA095-160-05-A-MCZ	H1680	2018-06-28T20:56:01.258Z	45.86969	-124.63716	176.9	Bio	6.7	34.0	55.5	Clam shells and some snails		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-160	NA095-160-06-A-MCZ	H1680	2018-06-28T20:56:01.258Z	45.86969	-124.63716	176.9	Bio	6.7	34.0	55.5	Clam shells and some snails		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-160	NA095-160-07-A-MCZ	H1680	2018-06-28T20:56:01.258Z	45.86969	-124.63716	176.9	Bio	6.7	34.0	55.5	Clam shells and some snails		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)
NA095-160	NA095-160-08-A-MCZ	H1680	2018-06-28T20:56:01.258Z	45.86969	-124.63716	176.9	Bio	6.7	34.0	55.5	Clam shells and some snails		95% Ethanol	MCZ (Harvard Museum of Comparative Zoology)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-161	NA095-162-C-PMEL	H1680	2018-06-28T21:06:25.341Z	45.86968	-124.63717	176.8	Carbonate	6.7	34.0	55.4	Some carbonate outcrop peeking out through the mud; looks gray; same site as -162	Grey, flat-ish rock; no associates	Dry	NOAA PMEL (Embley)
NA095-162	NA095-162-C-GSO	H1680	2018-06-28T21:17:58.800Z	45.86968	-124.63717	176.9	Rock	6.7	34.0	55.2	Interesting rock near the bubble sample - continuation of -161	Light grey, flat, angular rock; no associates	Dry	GSO (Graduate School of Oceanography at URI)
NA095-163	NA095-163-MA03-PMEL	H1680	2018-06-28T21:51:44.609Z	45.87014	-124.63863	183.0	Major	6.7	34.0	54.7	Over orange and white microbial mat at mat 004; relatively small but dense where occurring	Fluid used for geochemistry tests	NA	NOAA PMEL
NA095-164	NA095-164-Chem-PMEL	H1680	2018-06-28T21:58:21.462Z	45.87012	-124.63863	182.9	Push core	6.7	34.0	54.7	Orange microbial mat we did major -163 at	Orange mat visible on top; 0-1 cm is a little mixed up, animal within core; top 7 cm reduced, bottom portion is glacial mud; core sliced and porewater extracted	NA	NOAA PMEL (Butterfield)
NA095-164	NA095-164-01-E-OSU	H1680	2018-06-28T21:58:21.462Z	45.87012	-124.63863	182.9	Push core	6.7	34.0	54.7	Orange microbial mat we did major -163 at		Frozen	OSU (Thurber)
NA095-164	NA095-164-02-E-OSU	H1680	2018-06-28T21:58:21.462Z	45.87012	-124.63863	182.9	Push core	6.7	34.0	54.7	Orange microbial mat we did major -163 at		Frozen	OSU (Thurber)
NA095-164	NA095-164-03-E-OSU	H1680	2018-06-28T21:58:21.462Z	45.87012	-124.63863	182.9	Push core	6.7	34.0	54.7	Orange microbial mat we did major -163 at		Frozen	OSU (Thurber)
NA095-164	NA095-164-04-E-OSU	H1680	2018-06-28T21:58:21.462Z	45.87012	-124.63863	182.9	Push core	6.7	34.0	54.7	Orange microbial mat we did major -163 at		Frozen	OSU (Thurber)
NA095-164	NA095-164-05-E-OSU	H1680	2018-06-28T21:58:21.462Z	45.87012	-124.63863	182.9	Push core	6.7	34.0	54.7	Orange microbial mat we did major -163 at		Frozen	OSU (Thurber)
NA095-164	NA095-164-06-E-OSU	H1680	2018-06-28T21:58:21.462Z	45.87012	-124.63863	182.9	Push core	6.7	34.0	54.7	Orange microbial mat we did major -163 at		Frozen	OSU (Thurber)

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-164	NA095-164-07-E-OSU	H1680	2018-06-28T21:58:21.462Z	45.87012	-124.63863	182.9	Push core	6.7	34.0	54.7	Orange microbial mat we did major -163 at		Frozen	OSU (Thurber)
NA095-164	NA095-164-08-E-OSU	H1680	2018-06-28T21:58:21.462Z	45.87012	-124.63863	182.9	Push core	6.7	34.0	54.7	Orange microbial mat we did major -163 at		Frozen	OSU (Thurber)
NA095-164	NA095-164-16-F-OSU	H1680	2018-06-28T21:58:21.462Z	45.87012	-124.63863	182.9	Push core	6.7	34.0	54.7	Orange microbial mat we did major -163 at		Seawater	OSU (Thurber)
NA095-165	NA095-165-01-A-PMEL	H1680	2018-06-28T22:14:02.352Z	45.87010	-124.63863	182.1	Niskin	6.6	34.0	55.0	1m above microbial mat for -163, -164, and -166	Water used for geochemistry tests and 2 l used for eDNA filtration, as well as an additional 1 l on another eDNA filter	95% Ethanol	NOAA PMEL (Stepien)
NA095-165	NA095-165-02-E-OSU	H1680	2018-06-28T22:14:02.352Z	45.87010	-124.63863	182.1	Niskin	6.6	34.0	55.0	1m above microbial mat for -163, -164, and -166		Frozen	OSU (Thurber)
NA095-165	NA095-165-03-A-PMEL	H1680	2018-06-28T22:14:02.352Z	45.87010	-124.63863	182.1	Niskin	6.6	34.0	55.0	1m above microbial mat for -163, -164, and -166		95% Ethanol	NOAA PMEL (Everett)
NA095-165	NA095-165-Chem-PMEL	H1680	2018-06-28T22:14:02.352Z	45.87010	-124.63863	182.1	Niskin	6.6	34.0	55.0	1m above microbial mat for -163, -164, and -166		NA	NOAA PMEL
NA095-166	NA095-166-MA01-PMEL	H1680	2018-06-28T22:18:12.350Z	45.87011	-124.63863	182.8	Major	6.7	34.0	54.8	Major over funnel that was left for 15 minutes over the orange microbial mat that we cored (same area as -163, -165, -166)	Fluid used for geochemistry tests	NA	NOAA PMEL
NA095-167	NA095-167-Chem-PMEL	H1680	2018-06-28T22:26:44.114Z	45.86992	-124.63846	167.6	Niskin	6.8	34.0	56.7	Taken at 170 m depth	Water used for geochemistry tests	NA	NOAA PMEL

Table 13. cont. NA095 Hercules ROV Samples

Event Log ID	Sample ID	Dive	Date/Time Logged (UTC)	Lat.	Long.	*Zm*	Sample Type	*Tc*	*Spsu*	O_2	Event log Description	Wetlab	Preservation	Recipient
NA095-168	NA095-168-01-A-PMEL	H1680	2018-06-28T22:29:44.024Z	45.86985	-124.63849	124.3	Niskin	7.7	33.9	62.4	Taken at 130 m depth	Water used for geochemistry tests and 2 l used for eDNA filtration	95% Ethanol	NOAA PMEL (Stepien)
NA095-168	NA095-168-02-E-OSU	H1680	2018-06-28T22:29:44.024Z	45.86985	-124.63849	124.3	Niskin	7.7	33.9	62.4	Taken at 130 m depth		Frozen	OSU (Thurber)
NA095-168	NA095-168-Chem-PMEL	H1680	2018-06-28T22:29:44.024Z	45.86985	-124.63849	124.3	Niskin	7.7	33.9	62.4	Taken at 130 m depth		NA	NOAA PMEL
NA095-169	NA095-169-Chem-PMEL	H1680	2018-06-28T22:35:31.542Z	45.86974	-124.63829	80.6	Niskin	8.6	33.5	112.9	Taken at 80 m depth	Water used for geochemistry tests	NA	NOAA PMEL
NA095-170	NA095-170-Chem-PMEL	H1680	2018-06-28T22:39:00.484Z	45.86974	-124.63832	50.7	Niskin	9.0	33.0	170.8	Taken at 50 m depth	Water used for geochemistry tests	NA	NOAA PMEL

# dried:	**34**
# in ethanol	**214**
# in formalin:	**5**
# frozen:	**427**
# eDNA:	**51**
# other:	**101**
# lost:	**0**
Subsample Sum:	**832**

Table 14. NA095 Seafloor Markers

Marker	Dive	Site	Comments	Depth (m)	Latitude	Longitude
301	H1671	South Coquille (Slope)	S Coquille 700m site - on ledge next to depression (pit) with hydrate coating on sediments, where collected gas-tight samples	701.0	42.77607465	-124.9269445
288	H1673	South-Coquille (620mR)	Deployed at 19:04. 28 m from gas sampling site.	491	42.710633	-124.901297
214	H1675	Heceta 500m	Deployed ~ 2 m from hydrophone on seafloor. Area (~3m across) of 6 -8 bubble streams coming out of sedimented seafloor with small bac mat patches	490.0	44.249688	-124.957451
220	H1678	South west Heceta 1235mR	Marker originally deployed in 2016 and moved in 2018 to a more active site of bubble stream curtain.	1223.0	43.91079142	-125.075833
282	H1679	South Astoria Canyon	S of Astoria Canyon site - (N summit?) hdg 77° time? 0050 6-7 bubble streams when sampled later	1354.1	45.94325017	-125.1778381
221	H1679	South Astoria Canyon	S of Astoria Canyon site - (S summit?) hdg 77° time 2030?	1354.1	45.94207452	-125.1755432

Part 12: NA095 Dive Summaries

The following dive summaries have been extracted from material provided by E/V *Nautilus* scientific personnel.

H1668 NAUTLIUS DIVE REPORT

Site: NA095 Eel Canyon Hydrate

Launch Time UTC: 18 June 2018, 00:56:16
On Bottom UTC: 18 June 2018, 02:27:04
Latitude: On Bottom: 40.5354319721 N
Longitude: On Bottom: 124.783521 W
Vehicle Depth: On Bottom: 1828.80 m

Recovery Time UTC: 18 June 2018, 11:57:17.35
Off Bottom Time UTC: 18 June 2018, 09:12:13.17
Off Bottom: 40.535656 N
Off Bottom: 124.7844865 W
Off Bottom: 1808.54 m

Objective: The goal of this dive was to investigate a slump block near Eel River and to sample solid methane hydrate and bubble streams as well as acquire push-core samples for fauna, microbiology, chemistry and eDNA.

Samples:

NA095-001 (Hydrate sample using hydrate sampler)
NA095-002 (Gas Sample)
NA095-003 (Niskin bottle)
NA095-004 (Push core)
NA095-005 (Push Core)
NA095-006 (Biological – clams)
NA095-007 (Push core)
NA095-008 (Niskin bottle)

Dive Summary:

00:56 – 02:27 Hercules in water. Saw ctenophores, silver fish, jellies, siphonophores, shrimp and some red worms in water column. The vehicles then were on bottom and began transit to site.

02:28 – 02:35 Habitat is muddy seafloor with shells, snails, fish and clam beds. Seeing an abundance of marine snow, small ophiuroids and sea stars. Began to head to the 1A waypoint.

02:36 – 02:51 We continued along the bottom looking for hydrates, finding sea stars, skates, as well as eels, holothurians and gastropods as we were approximately at the 1A waypoint.

02:51 – 03:11 Continuing to follow clam beds looking for hydrates, had a shift change and then found some bubbles but these bubbles only appeared to have individual bubbles coming up.

03:12 – 03:21 In process of finding an old marker on the seafloor and preparing to move to the next waypoint if it is not found soon, but there was no evidence of the marker by M1B so moved 20m North to the next marker. Sea pigs, hydroids, gastropods, and dense patches of clams with brittle stars in them.

03:22 – 03:39 We then arrived at a point where bubbles were observed at the multi beam and alternated between soft sediment and large patches of dark grey sediments where live clam beds were abundant. Then moved east to continue search for hydrates, visibility varied based on sediment in water column but improved quickly.

03:40 – 03:59 Began moving south and saw areas of lots of sediments, holothurians and both dead and live clam beds. Headed south to move back toward the waypoint M1A/5A to search for hydrates and bubbles. Repositioned vehicles due to a target in sonar, then found more bubbles again.

04:00 – 04:21 Changed direction several times, then made it back to landing site where sea pigs, gastropods, orange sea anemones and shrimp were seen. Found extensive live and dead clam beds.

04:22 – 04:27 Continued looking for clam beds, bubbles, and hydrates using sonar.

04:28 – 04:40 In this transiting period, we are 32km off shore between Humbolt and Eureka. Headed toward bright reflections in sonar.

04:41 – 05:02 Not seeing any bubbles around the area with the sonar target. Began heading toward waypoint 4A, using a zigzag approach. Passed several clam beds while transiting.

05:03 – 05:20 Many dense live clam beds found as well as brittle stars, orange snails, sea pigs and a grenadier fish. Reduced sediment is seen between clam beds. Plan to continue slowly moving upslope, looking for bubbles.

05:21 – 05:30 Moved over area with dead clams and dark grey patches. Moving north, looking for bubbles. Found a large mound of hydrate and dropped a navigation target (Hydrate01).

05:31 – 05:47 Located EMBARI marker 1, covered in hydroids. Continued circling around the hydrate mound. Looking for largest exposed hydrate for MISO camera stills and sampling.

05:48 – 06:26 Difficulty taking hydrate sample as there seemed to be a leak in the valve and the sampler was not in its holster. Many clams and hydrates in this area, and a hydrate sample (NA095-001) was taken after some difficulty securing it.

06:27 – 06:40 Headed 25m West of EMBARI marker 1 to target 4A to look for bubbles. Headed back down to seafloor and figuring out best path to look for bubbles.

06:41 – 06:49 Repositioning vehicles. Still looking for bubbles. Found another hydrate mound and navigation dropped a target (Hydrate02) and then proceeded to look for bubbles.

06:50 – 07:16 Moving in zigzag pattern to continue looking for bubbles in sonar. More spots of reduced sediment amongst dead clam beds.

07:17 – 07:26 Bubble streams were found above clam beds, with bubbles coming out adjacent to a clam sticking out of sediment.

07:27 – 08:02 A gas tight sample was taken using a funnel (NA095-002) amongst a mixture of dead and live clams.

08:03 – 08:11 Then, a Niskin sample was taken (NA095-003) as well as a push core sample (NA095-004), in the same area as previous sample.

08:11 – 08:21 First push core sample (NA095-004) slipped out, so another was taken and secured (NA095-005).

08:22 – 08:41 Then a scoop sample of live clams, brittle stars and sediment was taken (NA095-006). Sediment in water column from scooping.

08:42 – 08:52 Taking another push core sample (NA095-007). Then left sample site in search of more bubbles.

08:53 – 09:04 Octopus, live clams, brittle stars, mussel shells, sea pigs and anemones seen. Heading north toward site that we saw the bubble plume at in the mapping data. Found bubbles but trying to find the source of them

09:05 – 09:10 Bubbles found in an area of coarser material where mud has been removed. We then prepared to ascend and take a last Niskin sample at 550m depth.

09:11 – 09:38 Preparing for and starting ascent. There is some marine snow in the water and some jellies. Dealt with some troubleshooting with Hercules scoop and speed.

09:40 – 10:54 Continuing ascent. The Niskin sample was taken 50m below the top of the multibeam seep plume (NA095-008).

10:55 – 11:57 Continued to surface finding small, clear jellies and worms and fish. Argus and Hercules on deck.

H1669 NAUTLIUS DIVE REPORT

Site: NA095 Oregon-California boarder

Launch Time UTC: 18 June 2018, 23:44:03
On Bottom UTC: 19 June 2018, 00:16:02
Latitude: On Bottom: 41.8999259815 N
Longitude: On Bottom: 124.841390306 W
Vehicle Depth: On Bottom: 684.66 m

Recovery Time UTC: 19 June 2018, 11:26:57
Off Bottom Time UTC: 19 June 2018, 10:20:36
Off Bottom: 41.8942272159 N
Off Bottom: 124.83817779 W
Off Bottom: 542.56 m

Objective: To observe carbonates on the Oregon-California border on a NW-SE trending ridge with high backscatter. We will start at the base and explore upslope and across the ridge to a seep sight where we will sample carbonate and seep gas and fauna.

Samples:

NA095-009 (Rock sample)
NA095-010 (Carbonate sample)
NA095-011 (Gas sample)
NA095-012 (Biological – clams)
NA095-013 (Biological – clams)
NA095-014 (Niskin bottle)
NA095-015 (Niskin bottle)
NA095-016 (Major sample)
NA095-017 (Carbonate sample)
NA095-018 (Niskin bottle)
NA095-019 (Niskin bottle)
NA095-020 (Niskin bottle)
NA095-021 (Niskin bottle)

Dive Summary:

00:00 – 00:19 Both vehicles in water. Marine snow, planktonic life, and small fish in water column. On bottom there are flatfish and sea stars in thick mud sediment. Began transit to site.

00:20 – 00:31 Heading toward waypoint 1 for a visual survey and then moving toward waypoint 2 along the ridge afterwards. More flatfish, echinoderms, sea stars, thornyheads, holothurians and marine snow in water.

00:32 – 00:37 Seeing rocks that are approximately 30cm in size and dark in exterior color. These are potentially carbonate rocks with manganese coating. We approached a rockier area closer to waypoint 1 with sea stars and ground fish.

00:38 – 00:47 Passing over some sparse microbial mats. Seeing clams, anemones, and old sponges. Mat 001 is a target for an interesting pockmark feature with thioploca. Poking sediment to test for carbonate just below the surface. Poked sediment for carbonate 2-15cm down.

00:48 – 00:56 Heading upslope for a visual survey of the terrain. Seeing corals and encrusting sponge on rock. The bottom is likely underlain by carbonate slabs. Vehicles are turning around and heading up the slope, and we are seeing ground fish and thornyheads as we head up.

00:57 – 01:02 Continuing search for carbonates, seeing many flatfish and sea stars along thick muddy floor. Finding colonized sponges with corals and shrimp on it. The white structure is populated by branching bryozoans. Still seeing a mostly sedimented seafloor but larger carbonate outcrops coated in sediment are appearing.

01:03 – 01:13 In a less sediment coated area of seafloor, more rubble and carbonate are visible. Seeing clam shells. Seeing old fishing line, marked as a hazard zone for the vehicles at this vertical wall of carbonate rocks and sediment.

01:14 – 01:40 In assessing the vertical wall, it seems like it'll be steep for the rest of the way up the slope. Finding less fish in this rockier environment, but still finding corals in rocky carbonate area. Likely on a small strike slip fault that moves periodically during earthquakes, could see methane seeps soon. A lot of fauna is living on the carbonate structures, especially within the old sponges.

01:41 – 01:51 Found skate egg casing within an old sponge and found pink gorgonians (Paragorgia). Continued up steep carbonate rocks, around 40m from the top. Finding sponges covered in brittle stars, old anemones, shrimps, Sibagogoria, Heteropolyopus.

01:52 – 02:03 Terrain is beginning to flatten out, but we're still on the side of the ridge. Finding carbonates and some blockier dark colored rocks with heavy encrustation. Many more sub angular rocks grouped together on carbonate. Larger blocky dark rocks with fractures amongst carbonate.

02:04 – 02:13 Preparing to and taking a grab sample of dark rock that seems to have manganese coating (NA095-009). Sample is approximately 10cm long, 5cm wide.

02:14 – 02:20 Continuing up slope, seeing broken carbonate with some dark rocks, brittle stars, sponges, and corals. There is a lack of fish on harder substrate in comparison to the softer sediment. Also found plastic bag on hard substrate.

02:21 – 02:33 Setting up to take and taking carbonate rock sample. Difficult to sample due to hardness and thickness of substrate, but was able to take a grab sample (NA095-010).

02:34 – 02:42 Moving south on top of ridge. Finding many sunstars, sponges, and skate egg casings. As continuing along hard substrate, finding more manganese-coated rocks and saw an octopus. We saw a rubble surface of small rocks and light sediment coating as we continued southward.

02:43 – 02:59 Found blue bacterial mat and live clams, indicating possible methane in this area. When continuing to and arriving at waypoint 2 at the top of the ridge, saw jellies and siphonophores as well as carbonate slabs with fauna living on it.

03:00 – 03:15 Headed southeast to next ridge as well as waypoint 3. Found scattered thornyheads, crinoids, many-armed sea stars, anemones, mushroom corals, and soft coral stalks.

03:16 – 03:51 Found small white microbial mat patch (Batmat03). Carbonate slab is broken up with wide crevice, finding similar fauna as previous carbonate areas. Black rocks on top of carbonate are very angular and blocky. Maneuvering around fishing lines and saw cockatoo squid and sea spider. Began moving downslope and are seeing smaller black rubble still manganese coated, with small patches of shell among rubble.

0352 - 0411 Heading toward waypoint 3, finding that rubble is more sediment-covered and less exposed in this area. Also seeing a few patches of white microbial mats. Looking for bubbles with sonar.

0412 – 0426 Seeing purple microbial mat and white bacterial mat here. Abundance of small snails around the white mat. Seeing stream of bubbles from crack in seafloor, higher flow every few seconds. This crack has white mat, dark reduced sediment, and a small patch of clams. Decided that there are at least two bubble streams here.

04:28 – 04:41 Scanned area for more bubble streams using sonar. Found several streams from this crack, laid down nav targets (bubbles 001 and bubbles 002) and going to check out another spot in area. White mat in bubbles 002 area. Heading of fracture is about 160 degrees.

04:42 – 05:07 Adjusting sonar settings and began looking at bubbles again. Found new bubbles site (bubbles 003) with one yellow and one white mat in the area. Also found bubbles 004.

05:08 – 05:09 Back at bubbles 001. Had multiple errors in sampling using gas-tight sampling method including not triggering. Skate passed by during sampling. Hoped that at least one of the samples worked (NA095-011).

05:10 – 06:27 Moving toward the top of the ridge toward waypoint 4. Finding octopus, mushroom corals, thornyheads, sea stars, and marine snow as making way along carbonate plates on slope. Saw microbial mats in carbonate cracks while transiting.

06:28 – 06:44 Continuing transit to waypoint 4 and waypoint 5, checking sonar for bubbles. Some sonar returns seem like they may be from the fishing gear. Transiting to waypoint 6 instead due to fishing gear.

06:45 – 07:14 Approaching carbonate with high vertical relief, crevice between the two edges with microbial mats within the cracks. Some interspersed clam shells in the channels. Also some more aggregated carbonate with some manganese crust on rocks on the scattered carbonates. Continuing towards waypoint 6, coming up into water to look for bubbles with sonar.

07:15 – 07:40 Looking for bubbles we saw in the water column, lost them in descent, but then found them again as well as microbial mats in the crevices. There are three bubble streams in this site as well as orange and white bacterial mats. Continuing towards waypoint 7 to see if it is a better place for core sampling.

07:41 – 08:22 Large fish, soft coral, and extensive clam shells in waypoint 7 area. Large outcrops of carbonate, large manganese encrusted boulders with anemones, mushroom corals, and sea stars.

08:23 – 08:49 Transiting towards 3, finding another microbial mat in crack as well as thornyheads and some clams. Seeing bubbles (bubbles07) coming out of sea floor as microbial mats are lining the edges of carbonate. Also seeing some exposed carbonate on edges and dead microbial mats.

08:50 – 09:21 Poking the crack with clams to test for ability to core sample here. Sampling clams with scoop (NA095-012) by bubbles 01, and slurp of the same clams collected in sample 012 to increase number retrieved (NA095-013), as well as a Niskin sample in same area (NA095-014).

09:22 – 10:03 Moving toward bubbles 003 to look for microbial mats, and took a Niskin sample (NA095-015) at bubbles 004 as well as a major sample (NA095-016).

10:04 – 10:24 Moving along the carbonate channel to find a good rock to sample, and found one (NA095-017). There is some microbial mat on the rock.

10:25 – 10:50 Taking a Niskin at 50m above the seafloor (Na095-018). Continuing ascent up. Taking Niskins at 50 to 100m intervals (NA095-019), (NA095-020), and (NA095-021).

10:51 – 11:27 Continuing ascent up. Lots of marine snow and some small black fish as well as ctenophores. Both vehicles on deck.

H1670 NAUTLIUS DIVE REPORT

Site: NA095 South Coquille

Launch Time UTC: 19 June 2018, 20:33:16
On Bottom UTC: 19June 2018, 21:29:34
Latitude: On Bottom: 42.793052786 N
Longitude: On Bottom: 125.061956372 W
Vehicle Depth: On Bottom: 1450.61 m

Recovery Time UTC: 20 June 2018, 07:27:53
Off Bottom Time UTC: 20 June 2018, 04:38:37
Off Bottom: 42.792359 N
Off Bottom: 125.061839391 W
Off Bottom: 1442.29 m

Objective: We are diving at a large seep on the deep site at Coquille South. The seep is at 1455 m water depth.

Samples:

NA095-022 (Niskin bottle)
NA095-023 (Major sample)
NA095-024 (Biological grab sample)
NA095-025 (Push core)
NA095-026 (Niskin bottle)
NA095-027 (Major sample)
NA095-028 (Push core)
NA095-029 (Push core)
NA095-030 (Biological slurp sample)

Dive Summary:

20:33 – 21:30 Vehicles in water. Very green water and seeing pyrosomes as well as lots of little silver fish. On muddy bottom with sea pigs and lots of marine snow.

21:31 – 21:49 Seeing rock fish, some clam shells, tubeworms and anemones. Lots of clumps of tubeworms. There are snails, anemones, and other associates on tubeworm bush.

21:50 – 21:57 Found tubeworm clusters that could potentially be the furthest south that they have been found on CA-OR-WA margin. Saw hydroids covering tubeworm bushes, basket sea star. Looked on sonar for bubbles, did not find anything, going to search site and orient selves.

21:58 – 22:20 Over flat muddy bottom seeing some detritivores and fish. Also seeing dead patch of clams, and (live) sea pigs, snails, other fauna. Going to look at east side of tubeworm bush site. Found clam bed with associates amongst clams, rattail fish, other fauna on muddy seafloor.

22:21 – 22:30 Clam bed found, many dead. Group of clams, mat and tubeworms. Snail egg casings found amongst the tubeworm bushes.

22:31 – 22:50 Found perimeter of site, turning around to continue exploring. Found new clam bed, a plastic bag, tubeworms, snail egg casings, anemones and an octopus. Some sparse shell hash around but in the perimeter mostly at this point. Beginning to find northern edge of this site.

22:51 – 23:17 Moving southeast between targets 3 and 5. Outside of seep site, looking to mark perimeters. Finding tanner crabs, clam beds, snail egg towers, sunstars, sea pigs. Heading to outer edge of targets and toward perimeter 5. Found more extensive clam beds, microbial mats and carbonate.

23:18 – 23:42 Found methane bubbles. Found gastropods, possible buried hydrates, orange microbial mats. Continuing surveying site, finding short tubeworm colonies, goosefish, anemones. Seeing live clams with siphons in sediment. Many clams at waypoint 5.

23:43 – 00:18 Continuing survey of muddy seafloor, heading 20m south. Seeing tanner crab, rattail fish, sea pens. Surveying the southern-most point of the dive. Hundreds of brittle stars in the sediment.

00:19 – 00:41 Reset DVL, heading downslope to head southeast to waypoint 6. Seeing anemones, sea pigs, sea pens, Acharax. Heading northwesterly toward where we launched to re-evaluate tubeworms. Continuing on muddy seafloor, seeing fauna and some sparse clams.

00:42 – 00:47 Entering a larger, dispersed clam field. They appear to be mostly dead. (Clam012). Much smoother sediments than other clam beds, likely has been dead for a while. Heading toward site 1 again, sea pigs are dominant life in this area with some stars, anemones and gastropods as well.

00:48 – 01:12 Approaching another clam bed, this one has some live tubeworms within the clam beds. Microbial mat seen. Back over muddy seafloor, overall sparse life. Finishing survey of this site and going to look for bubbles and start sampling soon. Heading east to a mound to check for a seep. Seeing more clam beds, tubeworms, snail egg casings, octopus, red crabs. Dropping marker for tube 004.

01:13 – 01:42 Seeing live clams next to tubeworm 004 colony. Coming off the seabed to check for bubbles with sonar. Heading to tube site 001 now to start sampling, finished surveying. Took a Niskin sample (NA095-022) at the tubes 001 site.

01:43 – 02:14 Taking major sample in site of large tubeworms with many associates (NA095-023). Also grab sampling tubeworms (NA095-024) at the same site as sample -023.

02:15 – 02:33 Finished grab sample after some difficulty putting the worms into the box, and looking to take push cores now. Took push core at the same tubeworm habitat as samples -023 and -024 in the middle of the bushes (NA095-025). Now picking up the funnel and heading to mat 02.

02:34 – 03:04 Transiting to mat site. Seeing some tanner crabs, continuing through clam bed area. Crossing shell hash, small bacterial mat, and some tubeworms. Lots of dead clam shells and some large holes, a very slow release of individual bubbles from one of the holes. PVC funnel set up on sea floor, preparing to take a Niskin sample.

03:05 – 03:39 Took Niskin (NA095-026) about 1 to 1.5m above the mat 002 site with microbial mats, dead clams, and a few bubbles. Moving PVC funnel and moving off bottom to check sonar for bubbles. Wasn't able to find bubbles with sonar, heading back to mat 002 site for sampling.

03:40 – 04:10 Poking area with the intermittent bubbles at mat 002 to see if a strong stream can be started for sampling. Not enough bubbles for a gas tight sample, taking a major sample (NA095-027) instead next to dense white mat. Going to try to take push core sample next.

04:11 – 04:22 Push core sample (NA095-028) taken in thin filamentous mat near sample -027 with small clams and brittle stars on top. Took another push core (NA095-029) in sediment with small polychaete tubes and brittle stars near samples -027 and -028.

04:23 – 04:37 Next will slurp where the small clams were near the previous few samples. Took slurp for clams in sediment (NA095-030), also got scale worm, brittle stars, polychaetes. Picking up PVC cone and heading to another clam site (clams 005) to sample more.

04:38 – 05:44 Issue with the winch. Troubleshooting and then heading to surface. Beginning ascent.

05:45 – 07:27 Continuing ascent. Seeing black fish, siphonophores, red jelly, clear shrimp, long skinny grey and white fish, ctenophores. Both vehicles on deck.

H1671 NAUTLIUS DIVE REPORT

Site: NA095 South Coquille slope

Launch Time UTC: 20 June 2018, 16:25:27
On Bottom UTC: 20 June 2018-06, 17:05:06
Latitude: On Bottom: 42.7805984053 N
Longitude: On Bottom: 124.931880224 W
Vehicle Depth: On Bottom: 724.76 m

Recovery Time UTC: 21 June 2018, 02:33:27
Off Bottom Time UTC: 21 June 2018, 01:22:57
Off Bottom: 42.7760737593 N
Off Bottom: 124.92694597 W
Off Bottom: 699.15 m

Objective: Dive SW of Coquille bank in ~700 m water, where there is a fault scarp and a high concentration of bubble plumes; explore the bubble streams, and collect (for microbiology, chemistry, and fauna analyses) gas tights, push cores, majors, Niskins, and possibly other representative bio or geo samples.

Samples:

NA095-031 (Niskin bottle)
NA095-032 (Push core)
NA095-033 (Push core)
NA095-034 (Major sample)
NA095-035 (Niskin bottle)
NA095-036 (Push core)
NA095-037 (Push core)
NA095-038 (Biological slurp sample)
NA095-039 (Major sample)
NA095-040 (Niskin bottle)
NA095-041 (Push core)
NA095-042 (Gas sample)
NA095-043 (Gas sample)
NA095-044 (Scoop sample)
NA095-045 (Niskin bottle)
NA095-046 (Niskin bottle)
NA095-047(Niskin bottle)

Dive Summary:

16:32 – 17:05 Vehicles in water. Numerous pyrosomes in water, jellies, ctenophores, small thin silver fish, and siphonophores. Orange squid and pinkish-grey flatworm animal floated by. Lots of marine snow. Vehicles on bottom.

17:06 – 17:33 Heading toward waypoint 2 and 9 where bubble streams were found in 2016. Looked with sonar, but didn't see anything. Seeing flatfish, thornyheads, and numerous small clams on bottom. Seafloor is fine brown sediment with some black patches. Fairly sparse clams here, going to head to an area with denser clams.

17:34 – 17:49 Small microbial mat found, set target (mat 001). Clam density increasing. Seeing eelpout, deep sea sole. Searching for bubbles with sonar. Moving toward waypoint 2 to continue search for bubbles. Scattered small clams, occasional thornyheads, some patches of sediment with nearly no clams. Found large grey microbial mat (mat 002) and thin grey mat (mat 003). Sediment here does not have clams.

17:50 – 18:11 Seeing hagfish, scattered clams, rockfish, sea stars, thornyheads, flatfish. Marked a large long mat line (mat 004) of grey and white perpendicular lines. Another extensive white mat (mat 005) found. Small clams and polychaetes. Poking sediment and mat, very soft. Some bubbles escaped.

18:12 – 18:25 Moving toward waypoint 2. Extensive mat area, increasing density of clams. Seeing small catshark, a few thornyheads, and a small eelpout near mat. Targeted mat 006a, going to look for opposite side. Large pyrosome and a dover sole. Marked mat 006b, not the end of mat but need to look for bubbles again.

18:26 – 18:54 Scanning for bubbles with sonar. Red jelly, ctenophores, orange squid floating by. Heading toward waypoint 3 since did not find bubbles with sonar. Dungeness crab, snailfish, thornyheads, tanner crab seen in transit.

18:55 – 19:20 Muddy sediment turning into rocky rubble area covered in several large white vase sponges. Crab in sponge, squat lobster seen. Looking at a carbonate structure that is likely a carbonate structure or lump. Some clams and large carbonate mounds seen. When looking for bubbles with sonar the large carbonate ridge caused an interesting return in sonar, but no bubbles. Thornyheads, pyrosomes, sea stars on seafloor. Carbonate outcrop area is likely remnants of an ancient seep, more glass sponges and crabs.

19:21 – 19:46 Fishing cage spotted with crabs and pyrosomes within. Hyroids growing on cage. Crabs, thornyheads, hagfish seen. More clam beds found and an indentation in sea floor with a few acharax. Heading back to mat 006b for push core samples. In transit seeing expansive clam beds and microbial mats.

19:47 – 20:22 Setting down on sea floor to do sampling on mat 005. Took a push core (NA095-032) on mat 005, and another push core (NA095-033) as a duplicate of the previous one. Finished with push cores, took a major sample (NA095-034) in funnel set on mat 005.

20:23 – 20:53 Moving toward mat 006a and 006b for sampling and to look for clam beds. Some sparse clams and sparse mats found. In transit finding hagfish, frilled clams, gastropods. Looking for denser clams, in meantime taking a Niskin sample (NA095-035) 1m above a clam bed with gastropods, thornyheads, and acharax shells in it.

20:54 – 21:17 Taking push core sample (NA095-036) in a clam bed, and another core (NA095-037) was taken less in the clam bed than the first.

21:18 – 21:43 Taking a slurp of clam beds (NA095-038) where we took the previous push core samples as well as a major sample (NA095-039) over the clam bed. Moving toward waypoint 4 and 5 along fault line toward area of higher return for sampling.

21:44 – 22:17 On muddy bottom with disperse sea stars, thornyheads, pyrosomes and hagfish. Finding carbonate rubble with detritus and some shell hash. Took Niskin sample (NA095-040) and a push core (NA095-041) on the muddy bottom with sea stars, thornyheads, and polychaetes around.

22:18 – 22:45 Plan to transit waypoint 4 to 5 along fault line, then down to 7. Exploring for bubbles along the way and then will move up slope soon. Similar muddy bottom and fauna. Trying to find the fault line and seeing various fish, pyrosomes, snails, and evidence of burrowing animals in sediment.

22:46 – 23:21 Continuing transit toward 7 with similar bottom sediment and fauna. Some mud with bioturbation of trails and burrows. Clams show that we are getting closer to a possible seep site.

23:22 – 23:38 Surveying for seeps. Heading toward seep target 12 after searching and finding a good target with sonar. Muddy seafloor with bioturbation and sea stars as well as some rock fish. Dropping mat 007 target. Expansive areas of reduced sediment and mat with clams. Tiny gastropods on white mat and some larger gastropods and clams.

23:39 – 00:20 Seep spotted and bubbles found. Placing mark 01 for bubbles. Icicle-like hydrates inside large hole near bubble area. Took gas-tight sample (NA095-042) and hydrates formed within funnel. Squid came in front of camera while sampling.

00:21 – 00:40 Going to make sure we got enough bubbles and take another gas-tight sample (NA095-043) at same site. Taking pictures with miso camera and deploying marker here.

00:41 – 01:03 Taking a scoop sample (NA095-044) of live clams at same site on top of pit near bubbles. Setting marker #301 here at rim of pit where seep was sampled.

01:04 – 01:21 Collected funnel. Preparing to and took a Niskin sample (NA095-045) over the seep site.

01:22 – 01:37 Ready to start ascent, going to take Niskins during ascent. Marked heading of target at 360 degrees. Took Niskin at 650m depth (NA095-046) and another at 550m (NA095-047).

01:38 – 02:22 Finished samples and are continuing ascent to surface. Lots of marine snow and ctenophores.

02:23 – 02:33 Very green water at surface. Both vehicles on deck.

H1672 NAUTLIUS DIVE REPORT

Site: NA095 South Coquille Shelf

Launch Time UTC: 21 June 2018, 15:34:43
On Bottom UTC: 21 June 2018, 15:58:56
Latitude: On Bottom: 42.810390241 N
Longitude: On Bottom: 124.721047 W
Vehicle Depth: On Bottom: 149.57 m

Recovery Time UTC: 22 June 2018, 01:29:17
Off Bottom Time UTC: 22 June 2018, 00:50:56
Off Bottom: 42.8107239282 N
Off Bottom: 124.721144179 W
Off Bottom: 146.05 m

Objective: Diving southwest of Coquille bank at approximately 150m depth to try to locate bubble plumes seen on multi beam surveys. Looking for microbial mats, clam beds, and bubbles to sample with gas tights, push cores, majors, Niskins and representative fauna.

Samples:

NA095-048 (Rock sample)
NA095-049 (Major sample)
NA095-050 (Push core)
NA095-051 (Push core)
NA095-052 (Niskin bottle)
NA095-053 (Niskin bottle)
NA095-054 (Niskin bottle)
NA095-055 (Niskin bottle)
NA095-056 (Niskin bottle)
NA095-057 (Niskin bottle)

Dive Summary:

15:38 – 15:58 Vehicles in water. Seeing clear jellies, ctenophores, moderate amount of marine snow, but not as much as on previous dives on this cruise. In descent.

15:59 – 16:33 On bottom. Lots of krill, not great visibility. Headed to waypoints 1 and 2 to look for bubbles. Looking for bubbles with sonar, possible bubbles so going to investigate. Still lots of krill, some jellies, and some white plumose anemones. Target no longer looks like bubbles, so continuing to waypoints 1 and 2.

16:34 – 16:52 Found small patch of shell hash or white mat. At waypoints 1 and 2, looking for evidence of seeps. Seeing anemones, pyrosomes, and occasionally a sea cucumber or fish. Not seeing bubbles with sonar, heading toward waypoint 3. Very dense krill. Strong current.

16:53 – 17:07 Exploring waypoint 3, looking for seep evidence. A few spots of tiny white bacterial mats. Found a small bubble stream, intermittent. Flatfish, plumose anemones near bubble stream. Targeted bubbles 001, sporadic and couldn't find more bubbles, not enough for a sample.

17:08 – 17:29 Headed closer to waypoint 3. Seeing large orange sea cucumber, several flatfish, a pyrosome and a tiny patch of bacterial mat at target 3. Very long skinny grey fish. Slightly rocky patch with a few shells, pyrosome, plumose anemones. Found a few small spots of white microbial mat, largest so far so set target (mat 001). Not a continuous mat, but individual spots. Searching from waypoint 3 to 4.

17:30 – 18:00 Looking around waypoint 5 for seeps. Scanning sonar for bubbles. Headed closer to waypoint 4 to search possible targets from sonar. Found bubbles (bubbles 002), investigating them is challenging due to strong current and many krill. Trying to relocate these bubbles, seeing a crab trap along bottom as well as plumose anemones.

18:01 – 18:20 Still bubble hunting around bubble 002 target. Some hard substrate around crab trap, large sea slug. Found a small patch of bacterial mat, white sea star. Heading from waypoint 4 and 5 and passing through bubbles 002 and mat 002 targets along the way.

18:21 – 18:50 Just saw bubbles, they are intermittent. Targeted as bubbles 003. The bottom here is hard, no mud. Seeing more bubbles but no clear marker of where they are coming from. Seeing even more bubbles on bubbles 002 target, going to sit here to see if they are frequent enough to sample. Poking sediment to try to stir up bubbles. Still no bubbles.

18:51 – 19:38 Planning to head back to waypoint 4. Bubble stream back on, going to try to take a gas tight sample. Dense krill. Still trying to take sample of bubbles, trying to come off the sea floor then come back down to trigger bubbles. Bubbles are very sparse and haven't turned back on for a while.

19:39 – 20:11 Picking up to look for bubbles elsewhere. Sparse microbial mats. Large sea stars, some sponges amongst muddy bottom, large white plumose anemones, basket stars. Back at waypoint 4, scanning sonar for bubbles. Dense krill, poor visibility. Planning to head toward waypoint 6.

20:12 – 20:36 Moving toward waypoint 6. Transiting along muddy bottom, seeing lingcod and plumose anemones as well as sea stars, hagfish, pyrosomes. Many krill still in water, poor visibility. Seeing some carbonate outcrops with corals coming up off the carbonate. Green spotted rockfish, rosy rockfish, sea cucumbers, corals, sharpchin rockfish. Going to use sonar again.

2037 – 2059 Not seeing much on sonar. Dense krill still. Some more small rocks that seem to be carbonate, muddy bottom, and sparse microbial mats. Flatfish, plumose anemones. Back in the area we saw bubbles 01 and 03, heading toward waypoint 8. The multibeam located two tall bubble streams at this location. Rockier outcrop and shell hash.

21:00 – 21:27 Snails, gastropods, corals, brachiopods on rocky outcrop. More krill, some flatfish. In transit to waypoint 8, seeing sparse microbial mats and some carbonate rubble. A few bubbles found over a sparse microbial mat. Seeing anemones and basket stars. Mats are becoming denser. Some crabs over flat muddy bottom.

21:28 – 21:53 Microbial mats are becoming sparse. Seeing rockier features. Scanning for sonar but not seeing bubbles nearby. A lot of detritus and dense krill, visibility is low. Bottom is pretty flat and sparse. Some carbonate rubble and sea stars.

21:54 – 22:14 Poor visibility due to krill. Some more texture so seafloor now, vertical profile to seafloor. Anemones, basket stars, sparse microbial mats, sea stars, flatfish and lingcod. Looking for more microbial mats but they are sparse.

22:15 – 22:41 Sitting down in front of microbial mat now, there are small patches of orange and white. Poking sediment. Going to head back toward waypoint 3 and 4. Dense krill. Planning to take a rock sample, having trouble due to poor visibility.

22:42 – 22:46 Took a rock sample near waypoint 8 (NA095-048), it is covered with lots of invertebrates including brachiopods, chitons, brittle stars. Now that we took sample we are heading toward waypoint 3 and 4.

22:47 – 23:24 Really bad visibility. Heading back toward bubbles 002 and 003 to hopefully find some to sample. Plumose anemone, crab trap seen. Strong current with some ebb tide. Checking sonar. On muddy bottom with some dark patches with sparse fauna.

23:25 – 23:43 Seeing some clams and reduced sediments, a more promising area. Moving back toward bubble targets. Finding some interesting terrain but doesn't appear to contain any seeps.

23:44 – 00:35 Haven't found bubbles so are planning to poke around and take a push core sample. One poke went into sediment well but the second poke did not go in deep. Took a major sample (NA095-049), push core sample (**NA095-050**) at same area where we were looking for bubbles around our targeted bubbles 002. Took another push core sample duplicate with the last one (**NA0950-051**). Going to look around waypoint 4 in more detail.

00:36 – 00:46 Very bad visibility. Seeing some anemones and brittle stars. Going to begin taking Niskins and transit up. Took Niskin 1m off of the bottom (**NA095-052**).

00:47 – 00:56 Off bottom. Taking a Niskin at 140m (**NA095-053**) and another at 130m (**NA095-054**).

00:57 – 01:17 Continuing ascent. Took another Niskin sample at 100m (**NA095-055**) and another at 50m (**NA095-056**). Took last Niskin at 20m (**NA095-057**). Now heading up.

01:18 – 01:29 Continuing ascent, seeing some ctenophores and marine snow. Both vehicles on deck.

H1673 NAUTLIUS DIVE REPORT

Site: NA095 South Coquille 620 Repeat dive

Launch Time UTC: 22 June 2018, 15:33:57
On Bottom UTC: 22 June 2018, 16:03:15
Latitude: On Bottom: 42.7129155 N
Longitude: On Bottom: 124.901044036 W
Vehicle Depth: On Bottom: 613.43 m

Recovery Time UTC: 22 June 2018, 23:16:37
Off Bottom Time UTC: 22 June 2018, 22:39:51
Off Bottom: 42.7106763963 N
Off Bottom: 124.901169925 W
Off Bottom: 609.31 m

Objective: Dive at SW Coquille at approximately 620m, revisiting a seep site from 2016 dive H1521. Looking for seafloor marker 233, marker 288 and bubble plumes; plan to sample bubbles, fluids, sediments, and fauna using gas tights, majors, Niskins and push cores.

Samples:

NA095-058 (Gas sample)	NA095-062 (Push core)	NA095-066 (Niskin bottle)
NA095-059 (Niskin bottle)	NA095-063 (Push core)	NA095-067 (Niskin bottle)
NA095-060 (Biological slurp sample)	NA095-064 (Push core)	NA095-068 (Niskin Bottle)
NA095-061 (Gas sample)	NA095-065 (Niskin bottle)	NA095-069 (Niskin Bottle)

Dive Summary:

15:33 – 16:03 Vehicles in water. Seeing a few pyrosomes, long siphonophores, ctenophores, a larvation house, small silver fish, some shrimp, jellies, squid and lots of marine snow.

16:04 – 16:06 On bottom. Tan sediment with lots of small white sea stars, some small rubble along bottom, a few thornyheads and anemones, scattered patches of small white shells, flat fish.

16:07 – 16:26 Found marker 233 in area of sediment covered in rubble. Rubble is plate-shaped with some white mat around the edges. Dropped nav target (mat 001). Small snails and clams in the white filamentous mat. More clams and mat than what was seen in 2016. Circling around the marker, looking for bubbles. Pulling off the seafloor to use the sonar to search for bubbles.

16:27 – 16:54 Heading to waypoint 2 to look for bubbles. Seeing a sablefish, hatchetfish and some dense clam beds, a mix of live and dead (clams 001). Patch of rocky plates and a white mat at the edge of them (mat 002).

16:55 – 17:21 At waypoint 2. Clams and very light patches of bacterial mat here. Several mushroom corals, lots of orange sea stars, extensive clams both live and dead, and some flatfish. Looking for bubbles with sonar, then heading back to marker 233 to continue searching. Seeing sablefish and a few chitons and snails around mat, as well as some live clams. Continuing to look for bubble streams around 233 before moving on.

17:22 – 17:37 Heading to marker 288 by waypoint 4. Moving across sediment with scattered small rocks, numerous sea stars, clams, thornyheads, flatfish, hagfish, gastropods, mushroom corals. Less rubble as we move along, denser sea stars. Two large crabs.

17:38 – 17:50 Rocky plates and a patch of clams. Some small patches of mat. Shortspine thornyheads, mushroom corals, sunstars, shell debris, flatfish. Large patch of clams, few patches of grey mat (mat 003). Frequency of mat patches is increasing.

17:51 – 18:13 Moved away from mat area. High density of mushroom corals, field of shell hash, clams but appear to be dead. Rocky mounds and large plates. Light bacterial mat on the plates. Found bubbles (bubbles 001) took a gas tight sample (NA095-058) where hydrate formed in the funnel at base of "carbonate stair case."

18:14 – 18:31 Looking at the site to observe bubble behavior. This site may be the same as the waypoint 6 seen in the multibeam or could be related to waypoint 7, too. Seeing some corals and sponges on shelf above bubbles. Took a Niskin sample (NA095-059) above the bubbles. Moving back further to look at a carbonate platform.

18:32 – 18:50 Putting down the major funnel to take a major sample later in the dive just below the bubble shelf on a grey mat. Heading back to marker 288 at waypoint 4. At rocky area with gooey mat (mat 004). Extensive clam bed with shells seen. Also saw another white mat patch (mat 005).

18:51 – 19:03 Seeing carbonate plates and a field of shells. Fishing net at edge of carbonate platform.

19:04 – 19:29 Found marker 288 at waypoint 4. Microbial mats, clam beds, carbonate formation at this site. Found some more bubbles in the sonar, continuing to look for them. Seeing sablefish, small eel, thornyhead, sea stars and mushroom coral. Constraining the limits of the clam bed.

19:30 – 19:54 Patch of reduced sediment found. Back at marker 288 and looking around at targets. Extensive clam beds and microbial mats (mat 006). Live clam bed. Passing over some carbonate ridges. Very dense areas and mats, some white gastropods in the reduced sediment that are generally associated with hydrates.

19:55 – 20:20 Saw a bubble stream, intermittent. Seeing lots of mats and clam beds intermixed. Polychaetes coming up through the mat and many small worms (originally thought to be amphipods). Looking at sonar, and going to go back to slurp the small worms.

20:21 – 20:47 Took a slurp sample (NA095-060) of the small worms that are on a really dense microbial mat at mat 009 next to a bubble stream and some clams. Moving back toward marker 288. Saw a sort of filamentous biology floating in the water. Doing a sonar survey.

20:48 – 21:22 Navigating around marker 288, looking for bubbles and mats that we sampled previously. Took a gas-tight sample (NA095-061) at bubbles 002 coming out of a carbonate ledge and around some mats and clams.

21:23 – 21:56 Using the temperature probe. Looking for a place to take major and push core samples. Core sample did not hold, so going to try again.

21:57 – 22:39 Got a push core sample (NA095-062) in a microbial mat that was thick and potentially a hole in the carbonate platform. Then took duplicate core sample (NA095-063), then took a third push core sample (NA095-064) at the clam bed we had poked around at earlier.

22:40 – 22:47 Stowing everything away and going to end the dive early due to weather issues. Off bottom.

22:48 – 23:13 In ascent. Took several Niskin samples. Took one at 500m (NA095-065), another at 400m (NA095-066), another at 300m (NA095-067), another at 200m (NA095-068), and a last sample at 100m (NA095-069).

23:14 – 23:29 Continued ascent. Green water at surface. Strong current and windy, some difficulty recovering vehicles. Both vehicles on deck.

H1674 NAUTLIUS DIVE REPORT

Site: NA095 Mud Volcano

Launch Time UTC: 23 June 2018, 16:25:40
On Bottom UTC: 23 June 2018, 16:49:24
Latitude: On Bottom: 43.678996 N
Longitude: On Bottom: 124.7063385 W
Vehicle Depth: On Bottom: 477.91 m

Recovery Time UTC: 24 June 2018, 01:59:00
Off Bottom Time UTC: 24 June 2018, 00:54:16
Off Bottom: 43.6805615 N
Off Bottom: 124.69828 W
Off Bottom: 420.03 m

Objective: Dive on a mud volcano between Coquille and Heceta Banks, looking for evidence of seeps and bubble streams. Sample bubbles, fluids, microbial mats, sediment, and representative fauna and rocks.

Samples:

NA095-070 (Rock sample)
NA095-071 (Rock sample)
NA095-072 (Niskin bottle)
NA095-073 (Major sample)
NA095-074 (Niskin bottle)
NA095-075 (Push core)
NA095-076 (Biological slurp sample)
NA095-077 (Carbonate sample)
NA095-078 (Carbonate sample)
NA095-079 (Gas sample)
NA095-080 (Biological slurp sample)
NA095-081 (Niskin bottle)
NA095-082 (Niskin bottle)
NA095-083 (Niskin bottle)
NA095-084 (Niskin bottle)
NA095-085 (Niskin bottle)

Dive Summary:

16:31 – 16:49 Vehicles in water. Scattered pyrosomes, ctenophores, larvation houses, some krill, long skinny silver fish, some shrimp seen. On bottom.

16:50 – 17:19 Soft sediment with flatfish, a few thornyheads, some clear and yellow jellies, cockatoo squid. Moving toward waypoint 2a, where a bubble stream was seen on multibeam. Seeing a flatfish, white sea stars, sunstars, thornyheads, purple urchins and a

catshark. There are a few pieces of scattered rubble, a large rocky mound, carbonate plates, and scattered shells. Looking for a rock to sample.

17:20 – 17:31 Grabbed a rock sample (NA095-070) off a rocky plate, covered in brachiopods, sea stars, and other fauna. Heading to waypoint 2a again, seeing rocky ground covered with lots of fauna. Sponges, shells, fish, sea fans, and a skate. Took another rock sample (NA095-071) of loose rock with lots of fauna on it, most likely carbonate.

17:32 – 18:05 Continuing to waypoint 2a. Thick fishing line found, occasional carbonates on sedimented seafloor. Patch of mixed live and dead clams and a tiny grey mat. Seeing sea fans, hagfish. Looking on top of ridge for evidence of seeps. Seeing patch of live brachiopods. Looking for bubbles with sonar, none found. Heading toward waypoint 3 instead to look for bubbles.

18:06 – 18:24 Moving across rocky mounds with shell hash in between. Seeing rockfish, cockatoo squids, flatfish, and sponges. Continuing toward waypoint 3, downslope. Crabs, sponges, corals and sunstars in rocky area. Some small patches of microbial mat, not enough to sample.

18:25 – 19:05 At waypoint 3, heading to waypoint 3a. Flat sedimented area with occasional rocky patches. Lots of sessile sea cucumbers, crabs, pyrosomes, flytrap anemones, and clams. Traveling along the ridge crest to waypoint 3a. Seeing rocky outcrop that is likely exposed carbonate. Seeing same fauna as before. Saw two tiger shrimp on a soft coral and brittle stars.

19:06 – 19:30 Continuing toward waypoint 3a, moving over mud-covered carbonate with small sponges, basket stars, bubble gum coral, as well as some groundfish species. Found two streams of bubbles, seem intermittent. Looking for and found more bubbles after checking sonar and surveying area. Seeing multiple bubble streams, looking for other signs of seepage.

19:31 – 19:53 Moving on toward waypoint 4 now, over fauna-covered seafloor with sessile sea cucumbers, sponges, rockfish and brachiopods. Continuing toward the mud volcano, the fauna on the bottom are becoming sparser and starting to see more clam beds. Set marker for clams 01 and mats 01. Took temperature probe over microbial mat to see temperature difference in the fluids coming out of the mat area, but not much differential observed.

19:54 – 20:21 Taking a Niskin sample (NA095-072) in area with several clam beds and small microbial mats. Also took major sample (NA095-073) in same area as previous sample. Then took another Niskin (NA095-074) in the same area as well as a push core sample (NA095-075). Lastly, took a slurp sample (NA095-076) of the clams that we covered in the past few samples.

20:22 – 20:32 Continuing toward waypoint 4 and beginning to climb the mud volcano. At first, muddy bottom with sparse rockfish and sea stars on the sediment, but seeing less sediment as climbing up, with more filter feeders appearing.

20:33 – 20:45 Seeing large carbonate rock outcrops near waypoint 4, sampled a small loose rock (NA095-077). Seeing some clams and bacterial mats near the hard substrate.

20:46 – 21:16 Bubblegum coral, brachiopods, sponges, mushroom coral seen as well as filter feeders along rocky seafloor. Approaching the top and finding lots of fauna and some large fish.

21:17 – 21:45 Cruising toward waypoint 6, very flat with no sediment. Then found some small rocks with fish around us, then shell hash and sparse microbial mats at mat 02. Overall, the benthic area is becoming muddier with more sablefish, rockfish, a buried halibut, deep-sea sole, and some large carbonate outcrops. Approaching clam bed areas, mostly shell hash.

21:46 – 22:16 Bubbles coming up, lots of clam shells, but no live ones have been seen yet. Putting down bubbles 05 marker. Bubbles are quite large but intermittent. Searching for more bubbles with the sonar. Found at least four bubble streams in rocky carbonate area, as well as some shell hash.

22:17 – 22:41 Took a rock sample (NA095-078) near waypoint 3 by three bubble streams, lots of detritus, clam shells, and a sunflower star. Finding some large clams and steady bubbles. Bubbles 007 tagged here.

22:42 – 23:19 Setting up for a gas-tight sample. Took gas-tight sample (NAO95-079) near waypoint 6 in multiple bubble streams. Poking around area to try to take a push core. Lack of sediment depth.

23:20 – 23:41 Going to take a slurp instead of push core sample, looking for live clams. Took sample (NA095-080) slightly southward of clams 004 target.

23:42 – 00:15 Muddy bottom, shell hash, some clams, fish and sea stars. A salp with a shrimp was seen. More fishing line. Going to head toward waypoint 8 to see what we find on top of the mud volcano. Lots of fauna on rocks.

00:16 – 00:46 Large bed of clams, small patch of bacterial mat. Dozens of rockfish and sablefish. Finding more microbial mats (mat 04) and lots of fish.

00:47 – 00:54 Going to call the dive due to weather, heading up soon and taking Niskins on the way up. Lots of carbonate mounds at the southern rim of the volcano.

00:55 – 01:36 Off bottom. Taking Niskin 10m off the bottom (NA095-081), another at 400m depth (NA095-082), another at 300m depth (NA095-083), another at 200m depth (NA095-084) and a last Niskin (NA095-085) at 100m depth.

01:37 – 02:03 Finished Niskins. Continuing ascent. Winds making for difficult recovery. Both vehicles on deck.

H1675 NAUTLIUS DIVE REPORT

Site: NA095 Heceta 500m

Launch Time UTC: 24 June 2018, 15:42:23
On Bottom UTC: 24 June 2018,16:10:02
Latitude: On Bottom: 44.2495602955 N
Longitude: On Bottom: 124.957769843 W
Vehicle Depth: On Bottom: 487.84 m

Recovery Time UTC: 24 June 2018, 22:13:09
Off Bottom Time UTC: 24 June 2018, 21:25:24
Off Bottom: 44.2494491726 N
Off Bottom: 124.957610693 W
Off Bottom: 487.43 m

Objective: Dive on Heceta Bank canyon 500m area of numerous bubble plumes, some of which may reach the surface; deploy hydrophone near vigorous bubble stream, collect bubbles, fluid, sediment and representative biological and geological samples when possible.

Samples:

NA095-086 (Gas sample)
NA095-087 (Niskin bottle)
NA095-088 (Push core)
NA095-089 (Push core)
NA095-090 (Major sample)
NA095-091 (Niskin bottle)
NA095-092 (Push core)
NA095-093 (Push core)
NA095-094 (Biological sample)
NA095-095 (Major sample)
NA095-096 (Gas sample)
NA095-097 (Carbonate sample)
NA095-098 (Carbonate sample)
NA095-099 (Niskin bottle)
NA095-100 (Niskin bottle)
NA095-101 (Niskin bottle)
NA095-102 (Niskin bottle)

Dive Summary:

15:42 – 16:10 In the water. Pyrosomes and green water near the surface. Some fish, squid, krill, ctenophores, siphonophores seen. On bottom.

16:11 – 16:20 Seeing soft sediment with shell hash. Hagfish, flatfish, thornyheads, catshark, and anemones seen. Lots of marine snow. Heading toward waypoint 1A. There is a mix of live and dead clams, ctenophores, sunstars, mushroom corals, and a skate.

16:21 – 16:27 Coming across small patches of microbial mats scattered around, carbonates, and some live and dead clams. Looking for bubbles with sonar. Continuing to waypoint 1A.

16:28 – 16:36 Found a slow flow of bubbles near carbonate mound. Bubbles 01 target found right at the waypoint 1A location, white shelf sponge nearby. Seeing sunstars, thornyheads, pyrosomes, mushroom corals, snail egg towers, urchins, and some live clams.

16:37 – 16:58 Found a new bubble stream below original bubbles next to live clams. Intermittent flow, so looking for another site with steadier flow. Increasing density of mat patches, similar fauna as previously stated. Following a trail of mat patches, marking mat 001 for the bacterial mats and clam shells here. Moving back toward waypoint 1A, still looking for larger bubble streams. Found flytrap anemone, flatfish, octopus, occasional thornyheads, gastropods, sea stars. Moving toward waypoint 1.

16:59 – 17:18 Moving across soft sediment and shell hash. Seeing hagfish swimming, small eelpout, large sunstar, a few patches of white mat, mushroom corals. Targeted mat 002 and bubbles 002, but they are at an irregular rate. Seeing more bubbles and now moving on toward waypoint 1 again. Finding carbonate boulders, shell debris, and similar fauna along the way.

17:19 – 17:25 Near waypoint 1, finding soft sediment with no shells and scattered urchins. Headed toward waypoint 2a target. Scattered microbial mat (mat 003), urchins, an orange squid, scattered flatfish, and some gastropods here.

17:26 – 17:33 Found bubbles (bubbles 003) in a field of clam shells and mat patches. Flow stopped, so heading toward high backscatter between waypoints 1A and 2A again. Found a patch of live clams (clams 001), an acharax shell, groundfish, and urchins.

17:34 – 17:53 Soft sediment, approaching a dense shell area and carbonate rock. Bubbles, in the middle of an extensive clam bed of both live and dead clams (bubbles 004), but flow stopped. Traveling south of target 2B. Patches of rocks and slabs of carbonate.

17:54 – 18:15 Bubbles seen. Continuing to explore rocky area. Seeing bubbles here and there among the carbonates, but inconsistent flow. Thornyheads, sablefish, hagfish, flytrap anemone seen. Some shell hash. Found bubbles in sonar, looking for them on seafloor.

18:16 – 18:20 Found at least six streams of bubbles (bubbles 005).

18:21 – 18:48 Deploying hydrophone in the middle of these bubble streams. Took gas-tight sample (NA095-086) where bubbles 005 site was, some hydrate formed in the cone. Took temperature probe reading, no temperature differential seen near bubbles.

18:49 – 19:11 Marker 214 set down behind the bubble streams. Taking video and frame grabs with the MISO camera. Going to look around for clam beds now.

19:12 – 19:38 Found a live clam patch. Took a Niskin sample (NA095-087) where hydrophone and gas-tight (086) were taken. Moving toward mat 003 because push cores were not successful in this area.

19:39 – 20:10 Getting into some more shell hash. Found octopus on seafloor and some urchins. Took two push cores (NA095-088) and (NA095-089) in Beggiatoa microbial mat, at mat 003. Then, took major sample (NA095-090) next to push cores and a Niskin (NA095-091) above the previous samples.

20:11 – 20:38 Going to move on to clams 001 to attempt clam sampling there. Took two push cores (NA095-092) and (NA095-093) at clams 001 in a mix of live and dead clams.

20:39 – 20:56 Taking a slurp sample (NA095-094) where the previous push cores were taken at a live clam bed. Then took a major sample (NA095-095) in the clam bed adjacent to the clams we cored and slurped. Moving toward bubbles 005.

20:57 – 21:25 At bubbles 005, going to prepare to take a gas tight sample. Took gas sample (NA095-096) where the hydrophone and marker are deployed. Then, took a crumby carbonate rock (NA095-097) and a larger carbonate rock (NA095-098) at the same location.

21:26 – 21:57 Off bottom. Took Niskin (NA095-099) at 400m, another at 300m (NA095-100), another at 200m (NA095-101), another at 100m (NA095-102).

21:58 – 22:13 All sampling complete. Moving to surface. Bubbles still coming up into water column, not sure if from Hercules or below. Both vehicles on deck.

H1676 NAUTLIUS DIVE REPORT

Site: NA095 Heceta 100m

Launch Time UTC: 25 June 2018, 07:02:17
On Bottom UTC: 25 June 2018, 07:12:15
Latitude: On Bottom: 44.0169565 N
Longitude: On Bottom: 124.879681003 W
Vehicle Depth: On Bottom: 96.10 m

Recovery Time UTC: 25 June 2018, 16:02:59
Off Bottom Time UTC: 25 June 2018, 15:14:10
Off Bottom: 44.016941 N
Off Bottom: 124.882884288 W
Off Bottom: 97.94 m

Objective: To explore Heceta at 100m to look for seeps and bubbles, while taking gas-tight samples, core samples, fluid and other representative biological and geological samples as they present themselves.

Samples:

NA095-103 (Gas sample)
NA095-104 (Niskin bottle)
NA095-105 (Gas sample)
NA095-106 (Carbonate sample)
NA095-107 (Niskin bottle)
NA095-108 (Niskin bottle)
NA095-109 (Niskin bottle)
NA095-110 (Niskin bottle)
NA095-111 (Niskin bottle)

Dive Summary:

07:02 – 07:12 Vehicles in water. Descending through the water column, saw a school of fish. On bottom.

07:13 – 07:38 Arrived near waypoint 3. Sparse rocky bottom without much biology. Some boulders on the seafloor. Moving to waypoint 1. Seeing krill, canary rockfish, lingcod, feather stars, basket stars, a skate, and sea stars. Found a mat (mat 001). Very rocky bottom with carbonate outcrops and dispersed microbial mats.

07:39 – 07:58 Moving in direction of waypoint 2. Looking for mats and bubbles. Hard substrate here with no sediments. More mat found along the rubble. Expecting seeps to be between waypoints 1, 2, and 3. Going to search this area. Many echinoderms covering the seafloor here. Sea stars and feather stars covering the rubble and microbial mats.

07:59 – 08:13 Found denser mat and sparse bubbles (bubbles 01) coming out. An intermittent bubble stream. Poking the substrate. Appears to be a soft sediment layer below the rock.

08:14 – 08:29 Doing a sonar survey, no bubbles seen, returning to seafloor. Sparse microbial mats, targeting mat 08.

08:30 – 08:37 Found more bubbles (bubbles 02) when Hercules touched down on seafloor, as well as seeing mats and large boulders.

08:38 – 09:15 Found a strong, intermittent bubble stream, but flow stopped before gas-tight sample could be made. Looking for bubbles to sample, heading toward waypoint 3. Lots of rubble and boulders here, some feather stars perched on the rubble.

09:16 – 10:55 Arrived at waypoint 3, looking for bubbles, found stream to sample. Sampling gas at bubbles 004. Gas sample took a long time, but finished collecting (NA095-103).

10:56 – 11:15 Heading to mat 009 to collect samples. Rocky substrate, sparse fauna. Some rockfish and sea stars, as well as feather stars. As we continue, lots of little spotted brightly colored fish and crinoids on the boulders. Took a Niskin sample (NA095-104) over the mat area.

11:16 – 11:46 Getting ready to put funnel down at a small microbial mat where we plan to core. Seeing lots of canary rockfish in argus camera view. Funnel placed over white microbial mat, but unable to core here due to lack of depth in the sediment and all the rubble. Bubbles came out of mat when trying to sample. Core did not work at other sites either. Picking up funnel and planning to redeploy at mat 003. Cobble seafloor with occasional small boulders with crinoids, some very small white microbial mats in transit.

11:47 – 12:08 Past mat 003 now, not seeing larger mats, just patchy white microbial mat and carbonate rubble. Heading toward mat 004 instead. Found bubbles coming out of the carbonate, marking bubbles 005. There are multiple streams of bubbles. Deploying funnel in white mat area. Searched for mat to sample, but did not find one.

12:09 – 12:44 Heading by mat 007 on way to waypoint 6. Stowed funnel. Found mat 007 and more bubble streams, but was not able to take a core sample. Moving on to waypoint 6. No sign of seeps, just less cobble as we continue our transit. Marking mat (mat 010) and another white and orange mat (mat 011). Cobble seafloor with crinoids.

12:45 – 13:23 Tried to take a core sample at mat 011 but it failed. Finding more mats and bubble areas. Going to head to waypoints 4 and 5. Less rocky terrain here in transit, flat seafloor with some cobble and no signs of seeps. Huge school of canary rockfish swam by. Mostly sparse fauna in transit but some skates and sea stars, as well as crinoids.

13:24 – 13;48 Still in transit. Small fish, pyrosomes and some cobble terrain with low-relief and some crinoids. White sponge and calcareous tube casings seen, occasional hummocks on sea floor. Two longnose skates swam by. When zooming in on rocks, finding brittle stars and lots of other echinoderms. Seeing fractured carbonate ridges, getting close to waypoint 4.

13:49 – 14:06 Finding white and orange filamentous mat. Trying to take a core sample, but did not work. Bubbles released as core attempted. Continuing toward waypoint 4. Found intermittent bubbles (bubbles 006). Found more bubbles, preparing gas-tight for sampling. Deployed the funnel and began collecting bubbles.

14:07 – 14:44 Continued collecting bubbles then finished taking sample (NA095-105). Heading toward waypoint 5.

14:45 – 15:05 Seeing cobble seafloor with crinoids. Saw white mat (012 and 013) as well as more bubbles (bubbles 008). Looking around the area for more bubbles and then will take Niskins and return to the surface. Another bubble stream (bubbles 09). Planning to sample a rock.

15:06 – 15:12 Took rock sample (NA095-106) of crumbly carbonate rock by bubbles 009, in area of white mat patches and active bubble streams.

15:13 – 15:41 Off bottom. Took Niskins at 100m (NA095-107), 80m (NA095-108), 60m (NA095-109), 40m (NA095-110), and 20m (NA095-111).

15:42 – 16:02 Both vehicles on deck.

H1677 NAUTLIUS DIVE REPORT

Site: NA095 Heceta 500m Repeat dive

Launch Time UTC: 25 June 2018, 22:24:20
On Bottom UTC: 25 June 2018, 22:52:00
Latitude: On Bottom: 44.249314 N
Longitude: On Bottom: 124.957053 W
Vehicle Depth: On Bottom: 486.37 m

Recovery Time UTC: 26 June 2018, 00:23:03
Off Bottom Time UTC: 25 June 2018, 23:26:18
Off Bottom: 44.2497046575 N
Off Bottom: 124.957462049 W
Off Bottom: 488.90 m

Objective: To pick up the hydrophone previously placed at this site and take water samples as we return on our ascent.

Samples:

NA095-112 (Niskin bottle)
NA095-113 (Niskin bottle)
NA095-114 (Niskin bottle)
NA095-115 (Niskin bottle)
NA095-116 (Niskin bottle)

Dive Summary:

22:24 – 22:52 In water. Beginning descent to seafloor. Pyrosomes and some particulates in water, as well as shrimp, jellies, and small fish. On bottom.

22:53 – 22:58 Ctenophores are in water column and we are seeing carbonate mounds on muddy bottom with some shell hash and thornyheads.

22:59 – 23:03 Moving toward target 1 to find the hydrophone. Quite murky water. Seeing sunflower sea stars, shell hash, marine snow, thornyheads, sablefish, mushroom corals. Entering region of more extensive clam beds and sparse microbial mats where we found the hydrophone and marker.

23:04 – 23:12 Recording the bubbles. Live clams and snails in front of us, as well as some thornyheads. Bubbles are still constantly streaming.

23:13 – 23:22 Continuing to record. Picking Hercules up from the seafloor to fly around the site to get still images. Seeing great bubble streams. Going to retrieve hydrophone now.

23:23 – 23:29 Retrieved the hydrophone. Off bottom. Going to collect Niskins now.

23:30 – 00:02 Took a Niskin at 450m depth (NA095-112), 400m (NA095-113), 300m (NA095-114), 200m (NA095-115).

00:03 – 00:23 Finished Niskins. Continuing ascent. Marine snow, green water and ctenophores at surface. Both vehicles on deck.

H1678 NAUTLIUS DIVE REPORT

Site: NA095 Heceta SW 1235mR

Launch Time UTC: 26 June 2018, 07:11:47
On Bottom UTC: 26 June 2018, 08:01:52
Latitude: On Bottom: 43.9114255 N
Longitude: On Bottom: 125.0757085 W
Vehicle Depth: On Bottom: 1224.44 m

Recovery Time UTC: 26 June 2018, 18:48:35
Off Bottom Time UTC: 26 June 2018, 16:37:11
Off Bottom: 43.9108861055 N
Off Bottom: 125.075832536 W
Off Bottom: 1219.80 m

Objective: To dive Heceta SW 1235mR, from the *Nautilus* 2016 cruise, to look for methane seeps and collect gas samples, push cores, fluids, hydrates, clams, and other representative biology.

Samples:

NA095-117 (Gas sample)
NA095-118 (Biological sample)
NA095-119 (Niskin bottle)
NA095-120 (Push core)
NA095-121 (Push core)
NA095-122 (Push core)
NA095-123 (Biological grab sample)
NA095-124 (Gas sample)
NA095-125 (Push core)
NA095-126 (Scoop sample)
NA095-127 (Major sample)
NA095-128 (Hydrate sample)
NA095-129 (Niskin bottle)
NA095-130 (Push core)
NA095-131 (Niskin bottle)
NA095-132 (Niskin bottle)
NA095-133 (Niskin bottle)
NA095-134 (Niskin bottle)

Dive Summary:

07:11 – 08:01 In water. Lots of pyrosomes, small fish, and gelatinous organisms in the water. Some particles in water, but not a significant amount. On bottom.

08:02 – 08:24 Many extensive clams, tubeworms, and bacterial mats. The tubeworms have sponges on them, and we are also seeing flytrap anemones and rattail fish. Many carbonates as well. Transiting from the clams toward the tubeworms, and found bubbles. Moved on to explore the area, and found more slow bubble streams.

08:25 – 08:48 Found a curtain of bubbles (bubbles 001). These bubbles are forming a hydrate shell, and we are setting up to take a gas-tight sample here. Took sample (NA095-117) of gas at this curtain of bubbles by carbonate formations, tubeworms, reduced sediment, and clams.

08:49 – 09:08 Used temperature probe at bubble curtain, temperature difference was 0.04 degrees Celsius just below seafloor. We then took a sample (NA095-118) of brittle stars at the bubble curtain site. Finding orange and white bacterial mats.

09:09 – 09:23 Large bacterial mat here. Taking Niskin (NA095-119) above microbial mat and very extensive clams. Deploying accumulation cap funnel. Now setting up for push core sampling in same mat area.

09:24 – 09:40 Push core sampling in intermixed white and orange mat. Did not work the first time, but induced bubble streams in efforts. Moving to the periphery of the mat to try to core again. Took successful push core (NA095-120) on mat target 001 and another push core (NA095-121) in perimeter of very extensive mat, duplicate with previous sample with more orange in this area.

09:41 – 09:57 Seeing scarlet king crabs and rattail fish. Heading toward tubeworms (tube 001). On tubeworms, seeing shrimp, sea spiders, anemones. Took push core (NA095-122) on periphery of the tubeworm bush.

09:58 – 10:27 Now sampling the tubeworms. This took some time to sort through all the samples and pick out the amount needed. Tubeworm bush grab (NA095-123) was successful. Now heading back to bubbles 001 target to take a second gas-tight sample.

10:28 – 10:43 Continuing transit to bubbles 001 to get another gas-tight and then to collect clams. Nearing bubbles 001, clams dispersed out, and seeing a hagfish in sediment. Took gas-tight sample (NA095-124) here at the bubble curtain site. Hydrate formed in cone. Clams around the bubble stream.

10:44 – 10:51 At least six or seven bubble plumes in this curtain area. Lots of scattered clam beds in this area, some mats within clams and darker sediment. Zoomed in to verify that some of these clams are live. Seeing flatfish and thornyheads along bottom. As we continue a little west to find new clams, we see an area of mostly dead clams and large crabs.

10:52 – 11:05 Found a nice batch of live clams on periphery, going to sample here. Some pyrosomes in the clam beds and can see siphons on clams. Preparing to take a core sample and slurp here. Took core sample (NA095-125) at periphery of site near clam 001 target, next to sediment with live clams.

11:06 – 11:24 Preparing to scoop live clams in same area as the core sample, clams appear too large to slurp. Took three scoops total of large live clams, approximately 15 (NA095-126). Now going to head back to where we left the major funnel to do a major sample.

11:25 – 11:44 Heading back to major funnel and passing clams 001 area on way. Returned to major funnel site in area of orange and white mat. Took sample (NA095-127) in the same mat area that sample -119 was taken. Picking up funnel.

11:45 – 12:00 Stowed away funnel. Heading to the west to look for some hydrate between waypoint 3 and 4. Moving through dense clam beds during transit, as well as tubeworm beds. Set danger marker for debris (rope) near tubeworms. Seeing tanner crabs, flatfish, thornyheads in this area as we pass over more tubeworms and clam beds, as well as some patchy faint bacterial mats.

12:01 – 12:14 Continuing transit to look for hydrates. Seeing crabs, flatfish, urchins as we pass along small yet frequent patches of clam beds. Moving northeast. Finding more tubeworms, clam beds, an acharax shell, and some carbonate mounds here. Looking at fractured carbonate structure here, found hydrates in a crevice as well as bubbles. Hydrate is seemingly not accessible for sample, but dropping a target here as hydrate 001.

12:15 – 12:40 Continuing to look around this fractured area to look for other hydrates that may be more accessible to sample. Finding lots of mats rather than hydrates in our search. Heading south to look for other hydrate areas, and found another site targeted as hydrate 002 with bubbles in the same area. Setting up to attempt a sample here.

12:41 – 13:08 Trying to figure out a way to sample hydrate, but there are difficulties since this site is also not as feasible as we would like. Took hydrate sample (NA095-128) using a tricky maneuver as this is only the second time this sampler has ever been deployed. Taking photos of area with MISO camera.

13:09 – 13:24 Now taking a Niskin sample (NA095-129) above bubble plume at site where we sampled the hydrate at target hydrate 002. Heading west towards target 3 where marker was deployed in 2016.

13:25 – 13:35 Moving over ridge with hydrates and bubbles to find sediment with patches of tubeworms, clam beds, and flatfish. Muddy seafloor with many sea pigs, some thornyheads and crabs. Arrived at waypoint 3 and continued north to take push core. Took core sample (NA095-130) in muddy area as a core for background sediment.

13:36 – 13:40 Looking for marker placed in 2016, heading north to find it. Seeing thornyheads and few seapigs and gastropods, but overall not as much fauna. Took some sonar fixes to find marker, and in mean time came across some shell hash and flatfish.

13:41 – 13:53 Found the marker numbered 220 and spent time surveying the site to take screen grabs and see how much it has changed. Found five crabs at site and clams, some reduced sediment, and the marker has been biofouled. Not seeing the bubbles found here in 2016, but found that there are some live clams here.

13:54 – 14:10 Picked up marker and moving it southeast to the bubble curtain at bubbles 001 target. Approaching patchier clams and occasional tubeworms. Found possible gastropod egg tower on tubeworm bush. Large bacterial white and rounded mat area here in transit.

14:11 – 14:30 As approaching bubbles 001, finding denser clam beds. Found bubbles and set down marker in the middle of a tubeworm circle. Imaging the marker. Now planning on exploring other parts of the site, heading southeast.

14:31 – 14:44 Finding patchy clams, a tubeworm clump, tanner crabs and sediment with one carbonate rock. Seeing sea pigs and crabs in this flat, muddy area we are approaching. Going to change search pattern to circles around the seep site to determine extents. Redirecting vehicles to north now. Found more clams (clams 002), some carbonate, and some tubeworms. Transition from clams to mud in this area. Sea pigs, snails, thornyheads and occasional gastropod on mud.

14:45 – 15:02 Still heading north, found more clam beds (clams 003) and took a zoom to find that they are mostly alive. Continuing north and around the seep site and found more patches of clams (clams 004). Hagfish, flatfish, thornyheads, sea pigs all in clam bed area. Put down clams 005 target on outer edges of the seep sites. More tubeworms seen alongside hagfish, a plastic water bottle, and sea stars.

15:03 – 15:21 Heading west along the perimeter. Put down another target (clams 007) and quickly thereafter put down another for clams 008 and mat, as well as clams 009 all in similar area. More clam targets were set, and mat target 004. Still tracking along perimeter, using clams as a basis of the perimeter of the seep site.

15:22 – 15:36 At southern extent of this seep site area now. Approaching southern edge of tracing the perimeter where we started from. Targeted clams 018 and mat 005, some orange mat and grey sediment in clam bed. Occasional thornyhead and flatfish during perimeter search. Moving toward bubbles 001, crossing extensive bacterial mat and reduced sediment. Mat target 006. Tubeworms and bubbles spotted along this area as well.

15:37 – 15:58 Searching for bubble curtain spotted earlier and passing over scattered mat patches. Found large carbonate mound and arrived at the large stream of bubbles and marker. Attempted sampling rock, but did not get it due to tough substrate.

15:59 – 16:21 Having trouble with a line that floated by and working on untangling. Had to set down PVC cone to use other manipulator.

16:22 – 16:36 Untangled from line, heading south to avoid it now. Looking to pick up the PVC cone and passing over patches of mat, tubeworms, and clams in the meantime. PVC cone secured. Heading back by marker 220 to start ascent.

16:37 – 16:49 Off bottom. Will take Niskins on the way up. Took Niskin at 50m off the bottom (NA095-131).

16:50 – 17:38 Took another Niskin at 1000m in depth (NA095-132). Seeing pyrosomes, jellies, shrimp, and siphonophores in argus view.

17:39 – 17:57 Took another Niskin at 600m in depth (NA095-133), another at 500m (NA095-134). Finished sampling, continuing ascent.

17:58 – 18:25 Several small, clear jellies and occasional siphonophores and shrimp seen. Also, two larvacean houses. Occasional bubbles seen, likely from Hercules' frame.

18:25 – 20:17 Pyrosomes in both Hercules and argus view. Both vehicles on deck.

H1679 NAUTLIUS DIVE REPORT

Site: NA095 South Astoria Canyon

Launch Time UTC: 27 June 2018, 15:39:59
On Bottom UTC: 27 June 2018, 16:35:15
Latitude: On Bottom: 45.941517 N
Longitude: On Bottom: 125.177801 W
Vehicle Depth: On Bottom: 1366.49 m

Recovery Time UTC: 28 June 2018, 04:13:43
Off Bottom Time UTC: 28 June 2018, 02:10:11
Off Bottom: 45.9429683314 N
Off Bottom: 125.177723314 W
Off Bottom: 1353.50 m

Objective: Dive on accretionary ridge south of Astoria Canyon, looking for bubble streams seen in NA095 multi beam data; when seeps located, collect gas, fluids, sediments, hydrate, and representative fauna and rocks.

Samples:

NA095-135 (Carbonate sample)	NA095-140 (Push core)	NA095-145 (Niskin bottle)	NA095-150 (Niskin bottle)
NA095-136 (Rock grab sample)	NA095-141 (Biological slurp sample)	NA095-146 (Hydrate blank)	NA095-151 (Niskin bottle)
NA095-137 (Gas sample)	NA095-142 (Biological grab sample)	NA095-147 (Major sample)	NA095-152 (Niskin bottle)
NA095-138 (Biological sample)	NA095-143 (Biological grab sample)	NA095-148 (Push core)	NA095-153 (Niskin bottle)
NA095-139 (Biological sample)	NA095-144 (Gas sample)	NA095-149 (Niskin bottle)	

Dive Summary:

15:45 – 16:35 Vehicles in water. Green water with dense marine snow. Seeing siphonophores, jellies, pyrosomes, larvation houses, shrimp and some fish. On bottom.

16:36 – 16:56 Sedimented bottom with a few fish, a skate, and patchy bacterial mats and discolored sediments. Crabs and grenadiers seen. Near waypoint 1. Scattered seafloor holes (lebenssuren), tanner crabs, exposed carbonate, and a few small primnoid corals. Heading toward waypoint 2.

16:57 – 17:13 Scattered brittle stars around the carbonate, a few pyrosomes, sea pigs, scattered shell hash, and grenadier fish. Extensive carbonate just below the surface, a few spots of which are exposed. More primnoid corals as well as some small white sponges. White anemone with red tentacles. Forward matrix light was lost. Still moving toward waypoint 2, seeing some more branching corals with numerous brittle stars and few red worm associates. Coming up slope.

17:14 – 17:25 Scattered patches of exposed carbonate. Occasional grenadiers, tubeworms, snail egg towers, shell hash, thornyheads, and red crabs. Placed tubes 001 target. Many carbonate mounds and scattered patches of tubeworms. Looking around site for bubbles. Also set a mat 001 target, and heading to the east of waypoint 2.

17:26 – 17:37 Live clams found (clams 001), and 2 bubble streams (bubble 001) found and so we dropped a temporary marker 282 down for later potential sampling. Found another bubble stream near the marker we just set down, about the same strength as the other ones.

17:38 – 17:50 Exploring area, looking for more bubbles. Seeing corals, scattered crabs, tubeworms (tubes 002). Heading to waypoint 2 again, then back to the carbonate platform with bubble streams. Bacterial mats, live clams, red worms (mat 003, clams 002). Using sonar to locate more streams, and found that some of the thinner "corals" are actually carnivorous sponges.

17:51 – 18:27 Back at marker 282. Circling area looking for bubbles. Seeing pacific flatnose, corals. Continuously finding carbonates, tubeworms, and small mats. A few flytrap anemones, basket stars, asbestopluma (branched sponges).

18:28 – 18:38 Heading toward waypoint 3 at the northern summit of the ridge. Moving around over carbonate platforms and mounds. Lots of large anemones, corals, sponges. Traveling up this ridge. Some small patches of mat on carbonate.

18:39 – 18:49 Reached top of ridge, looking around area. Patch of corals, sponges, and basket stars among broken carbonate. Preparing to take a carbonate sample here.

185:0 – 19:58 Took carbonate sample (NA095-135) off ledge at the top of the ridge near waypoint 3. Seeing large white gastropod shells.

18:59 – 19:22 Heading toward waypoints 6, 7, 8. Big snails, tubeworms, brittle stars on our way before continuing transit toward waypoint 7. Carbonates and other seep fauna are becoming sparser here. Sediment showing signs of bioturbation, no bacterial mats. Some small carbonates on bottom and muddy bottoms seen in transit.

19:23 – 19:46 Coming down to the depression and waypoint 7. Carbonates, tubeworms, tanner crabs, and shell hash here. Some microbial mats and carnivorous sponges as well as snail casings in the tubeworms. Some live clams in the clam bed.

19:47 – 19:57 Climbing up a hill as we approach waypoint 8, some carbonate rubble below but mostly muddy here. Scanning for bubbles.

19:58 – 20:40 More tubeworms, carnivorous sponges, microbial mats and shell hash appearing. Finding dense microbial mats with clams on the exterior, continuing to look in this area for bubbles. Took a rock sample (NA095-136) here from the conglomerate ledge we were exploring. Many bubbles now, likely from us disturbing the surface. Going to start gas sampling here.

20:41 – 21:13 Took gas-tight sample (NA095-137) from a slight bubble stream next to one of the carbonate conglomerates, flowing steady since we landed to take a rock sample but not many bubbles. Took a temperature probe reading and deployed marker 221. Took slurp biology sample (NA095-138) of a snail on top of carbonate formation by mats, tubeworms.

21:14 – 21:51 Heading to waypoint 9. Carbonates with snails on them, sparse tubeworms, bacterial mats. Following carbonates in search for bubble streams and mats. Setting up for collecting some anemones with the slurp. Found a blobfish. Anemone slurp did not work, so collected a rock sample (NA095-139) to collect the anemone instead.

21:52 – 22:13 Circling around waypoint 9. Clam beds, bacterial mats of both orange and yellow colors and sparse tubeworms. Seeing a bubble stream in argus camera, trying to find it here.

22:14 – 22:22 Moving back to marker 282 where we found many bubbles and other seep fauna at the beginning of the dive. Lots of tubeworms and carbonate.

22:23 – 22:48 Still transiting along ridge back to the first seep we saw during this dive. Looking at clam beds, bacterial mats, brittle stars, skates, tubeworms and some fish during our transit. Another blobfish spotted.

22:49 – 23:17 Nearing our intended waypoints, seeing more carbonate here. Looking for and located marker 282 along with some parastenella corals. Heading toward mats 003 and clams 002 target now to get some sampling done. Found some live clams. Set up for push cores but the sediment was not deep enough in the mat area. Took push core (**NA095-140**) outside of the mat area we previously tried to sample at with some live clams nearby. Now preparing for slurp.

23:18 – 23:35 Took slurp sample (**NA095-141**) of some live clams in the same area as the previous core sample. Going to look around on our way to tubes 002 target and see what we find. Muddy area with little fauna except some tanner crabs, corals and shell hash here.

23:36 – 23:54 Found tubeworms. Tried to take core sample but did not succeed. Took a tubeworm sample with a flytrap anemone on it instead (**NA095-142**).

23:55 – 00:30 Took duplicate samples of previous tube worms, approximately 10 tubeworms in total (**NA095-143**).

00:31 – 01:02 Heading toward a cluster of clams southeast. Lots of carbonate rubble here. Looping back to the marker and found a couple streams of bubbles. Large polychaete worm in bubble seep area. Gas-tight sample (**NA095-144**) in this bubble site near the marker.

01:03 – 01:32 Took Niskin sample (**NA095-145**) above bubble site where we took the gas sample. Now heading south to mat 001 to take a major and push core sample. Very interesting carbonate structure with corals, tubeworms, sea stars and egg casings here. Heading back to the mat that we couldn't core at for major sample. Back at marker, deploying funnel.

01:33 – 01:51 Took hydrate sample (**NA095-146**) using the PVC funnel of seawater over bacterial mat where samples were taken earlier in the dive. Then took major sample (**NA095-147**) in the same place as the seawater hydrate sample.

01:52 – 02:09 Took push core sample (**NA095-148**) to the left of the microbial mat where we took the major sample. Retrieved and secured funnel. Going to start recovery now.

02:10 – 02:57 Off bottom. Took Niskin sample (**NA095-149**) at 10m altitude from recovery position. Took another Niskin sample (**NA095-150**) at 50m altitude. Continuing ascent, seeing marine snow, ctenophores in water column.

02:58 – 03:43 Continuing ascent. Some more particles, ctenophores, marine snow. Took a Niskin sample (**NA095-151**) at 630m depth, and another Niskin (**NA095-152**) at 500m. Seeing some larvacean houses and pyrosomes.

03:44 – 04:02 Took last Niskin (**NA095-153**) at 200m depth. Continuing ascent. Occasional jellies and ctenophores, debris, marine snow in water column. Seeing greenish debris.

04:03 – 04:13 Water clearer now. Both vehicles on deck.

H1680 NAUTLIUS DIVE REPORT

Site: NA095 Nehalem Bank

Launch Time UTC: 28 June 2018, 11:05:00
On Bottom UTC: 28 June 2018, 11:19:48
Latitude: On Bottom: 45.8736155 N
Longitude: On Bottom: 124.645033 W
Vehicle Depth: On Bottom: 190.08 m

Recovery Time UTC: 28 June 2018, 22:57:01
Off Bottom Time UTC: 28 June 2018, 22:25:31
Off Bottom: 45.8699236785 N
Off Bottom: 124.638458525 W
Off Bottom: 172.92 m

Objective: Diving at Nehalem Bank at approximately 150m. Looking for bubble streams and surrounding biota and collecting gas tight samples, push cores for fauna and microbiology, Niskins for chemistry and other representative biology and geology.

Samples:

NA095-154 (Niskin bottle)
NA095-155 (Gas sample)
NA095-156 (Push core)
NA095-157 (Push core)
NA095-158 (Carbonate sample)
NA095-159 (Gas sample)
NA095-160 (Biological sample)
NA095-161 (Carbonate sample)
NA095-162 (Rock sample)
NA095-163 (Major sample)
NA095-164 (Push core)
NA095-165 (Niskin bottle)
NA095-166 (Major sample)
NA095-167 (Niskin bottle)
NA095-168 (Niskin bottle)
NA095-169 (Niskin bottle)
NA095-170 (Niskin bottle)

Dive Summary:

11:05 – 11:20 Vehicles in water. Lots of ctenophores and some particles. Began to see fish in the argus camera. Very cloudy water. On bottom.

11:21 – 11:43 Bad visibility. Murky water. Can see some long silvery fish, krill, anemones, and a muddy seafloor. Many sea urchins on the seafloor. Heading to waypoint 2, still too murky to see anything other than some urchins and fish along the muddy bottom. Visibility began to clear up a little. Seeing a longnose skate, flatfish, urchins, and fish making speed trails.

11:44 – 12:07 Took a Niskin sample (**NA095-154**) in the background near waypoint 2. Continuing toward waypoint 2, seeing silvery fish, sea stars, and urchins. Still murky but visibility is improving. Checking sonar in water column, did not find anything. Seeing a small spotted grey fish along with other flatfish. Very low visibility, seeing what may be bioturbulation holes.

12:08 – 12:24 Moving toward waypoint 3. Flatfish, urchins, sea stars on the muddy seafloor. Becoming clearer visibility here. Moving between waypoint 2 and 3, slightly rising uphill. Finding more plate-like carbonate rocks here with some rockfish, urchins, sea stars, hermit crabs, hagfish, and some shell hash. Possible bubble release where the fish disturbed the seafloor. Lots of krill in water column now.

12:25 – 12:51 Carbonate (001) marked, saw no other signs of seep so moving on. Heading towards waypoint 4. Urchins, carbonate, shell hash and some debris here. Disturbed sediment with large halibut fish and some carbonate rocks, one rounded rock. Marked another carbonate (002). Flatfish, sea anemones, pyrosomes, urchins and sea stars here. Found bubbles 001. Going to take a gas-tight sample here.

12:52 – 13:28 Started gas tight sample. Krill in front of camera. Finished sample (**NA095-155**) in small carbonate rubble area near some urchins and a pyrosome.

13:29 – 13:57 Found another bubble stream nearby (bubbles 002). Continuing to look around to see what we find. Found a skate, urchins, flatfish, and white sponges on the rocks. Moving generally in the direction of waypoint 5. Muddy seafloor, seeing lingcod. Moving toward waypoints 6 and 7 now. Flat, muddy seafloor with krill in water and low visibility. Possible sea pen spotted.

13:58 – 14:29 White sponges on carbonate rocks. Mud with occasional carbonates as we head toward waypoints 6 and 7. Larger orange fish, likely a rockfish. Numerous urchins and sea stars, as well as flytrap anemones and a large pink anemone. Heading up to a depression of sorts and seeing more carbonate, some sea pens, white sponges and rockfish. Seeing plexaurid corals and red and white stick corals.

14:30 – 14:52 Heading to waypoint 7. Two different types of pink coral, one stick coral and one branching coral. Possibly Swiftia pacifica. At waypoint 7, carbonate outcrop with sediment and sponge. Heading to waypoint 6. In transit, carbonate rocks and sediment, fish and some sponges on the rocks. Found bubbles 003. Very slow and intermediate. White mat next to bubbles.

14:53 – 15:26 Heading to waypoint 9. Some krill in cloudy water. Some carbonate mounds, white branched sponges, and rockfish. Heading to waypoints 9 and 8 to check for more seepage. Passing over some rocky patches with pink urchins on sedimented seafloor. Visibility is poor, nothing was found at waypoint 9.

15;27 – 15:54 Large rocky outcrop. Scattered orange sea stars. A few bubble streams seen, and closer to waypoint 8 a bubble stream (004) was targeted. Very weak and intermittent stream. Exploring waypoint 8 for more seep activity. Sedimented seafloor with a few scattered rock patches. Urchins, rockfish, and some mat (mat 001).

15:55 – 16:24 Found more bubbles (005) and mat (002). Poking sediment to check for core sample possibilities. Took core sample (NA095-156) in middle of mat 002. Took another core sample (**NA095-157**) close by in another white mat. Taking temperature with probe. Ambient was 6.7 C and temperature probe saw 6.87 C. Heading toward waypoint 12.

16:25 – 17:10 Seeing a few jellies, siphonophores, pyrosome and occasional ctenophores. Approaching waypoint 12. Seafloor is in sight but visibility is still cloudy. No fauna in sight. At waypoint 12, heading up scarp to waypoint 13. Occasional rocks, rockfish, box crabs and flatfish.

17:11 – 17:32 Scattered rock density is slightly increasing. Heading up fault scarp. Seeing rockfish, flatfish, ratfish, large peach sea stars, pink Plumarella longispina sea fans, white sponges. Still seeing ongoing carbonate rocks. Looking around waypoint 13. Large longnose skate, cup corals and sponges. Increase in krill density.

17:33 – 17:55 At waypoint 13. Found bubbles (006) and mat (003). Bubbles turned off, so moving on to waypoint 14. Some hagfish, chimeras (spotted ratfish), and sponges (small globular and encrusting types). Almost no krill here. Seeing lingcod, red squat lobster (galatheid).

17:56 – 18:23 Still abundant plumerella corals. Scattered white branched sponges. At target 14, looking for bubbles and other seep activity. Glass sponge ahead. No seep evidence, heading to waypoint 15 and 16 instead. Found orange and white mat (mat 004) and (mat 005). Poking sediment to see if we can core here, but too difficult between rocks. Seeing dover sole, more rockfish and seastars, shell hash and increasing density of carbonate rocks.

18:24 – 18:53 Small white mat and more patches of mat nearby. Arriving at waypoint 15 now. Found bubbles (007) and some clam shells next to it. Bubbles are periodic, but predictable at every 20 seconds or so. Setting poking stick down as temporary marker for these bubbles. Found snails, hagfish, ling cods, and sea stars. At target 16, surveying area.

18:54 – 19:35 Moving across rocks with less fauna than before. Collected carbonate (**NA095-158**) on ground with brachiopods, brittle stars and more. Beginning transit back to bubbles 007 where we left the pokey stick. Going over muddy bottom with carnivorous sponges and plumarella corals. Nearing the bubble target, looking for pokey stick.

19:36 – 20:04 Found the bubble stream and a small bacterial mat. Setting up for and collecting gas tight sample. Bubble stream has a burst every 10 to 20 seconds.

20:05 – 20:41 Continuing to and collect and finished taking gas sample (NA095-159) and now looking for temperature.

20:42 – 21:21 Background temperature 6.7 C, no significant temperature change. Took slurp sample (**NA095-160**) of clam shells and some snails. Then took rock sample (**NA095-161**) of carbonate outcrop and another rock sample (**NA095-162**) near the bubble sample.

21:22 – 22:00 Transiting toward mat 004. Poor visibility, lots of detritus and shrimp in the water. Corals growing on surface and rock outcrops. Located the orange and white mat. Took major sample (**NA095-163**) at orange mat as well as a push core sample (**NA095-164**) at the same mat.

22:01 – 22:21 Set down the PVC cap and taking a Niskin at 1m (**NA095-165**). Went exploring, and now taking the major sample from the cap. Took major sample (**NA095-166**) over the orange mat.

22:22 – 22:45 Going to start ascent and take Niskins along the way. Off bottom. Took Niskin at 170m in depth (**NA095-167**), another at 130m depth (**NA095-168**), another at 80m depth (**NA095-169**), and a last Niskin sample at 50m depth (**NA095-170**).

22:46 – 22:57 Both vehicles on deck