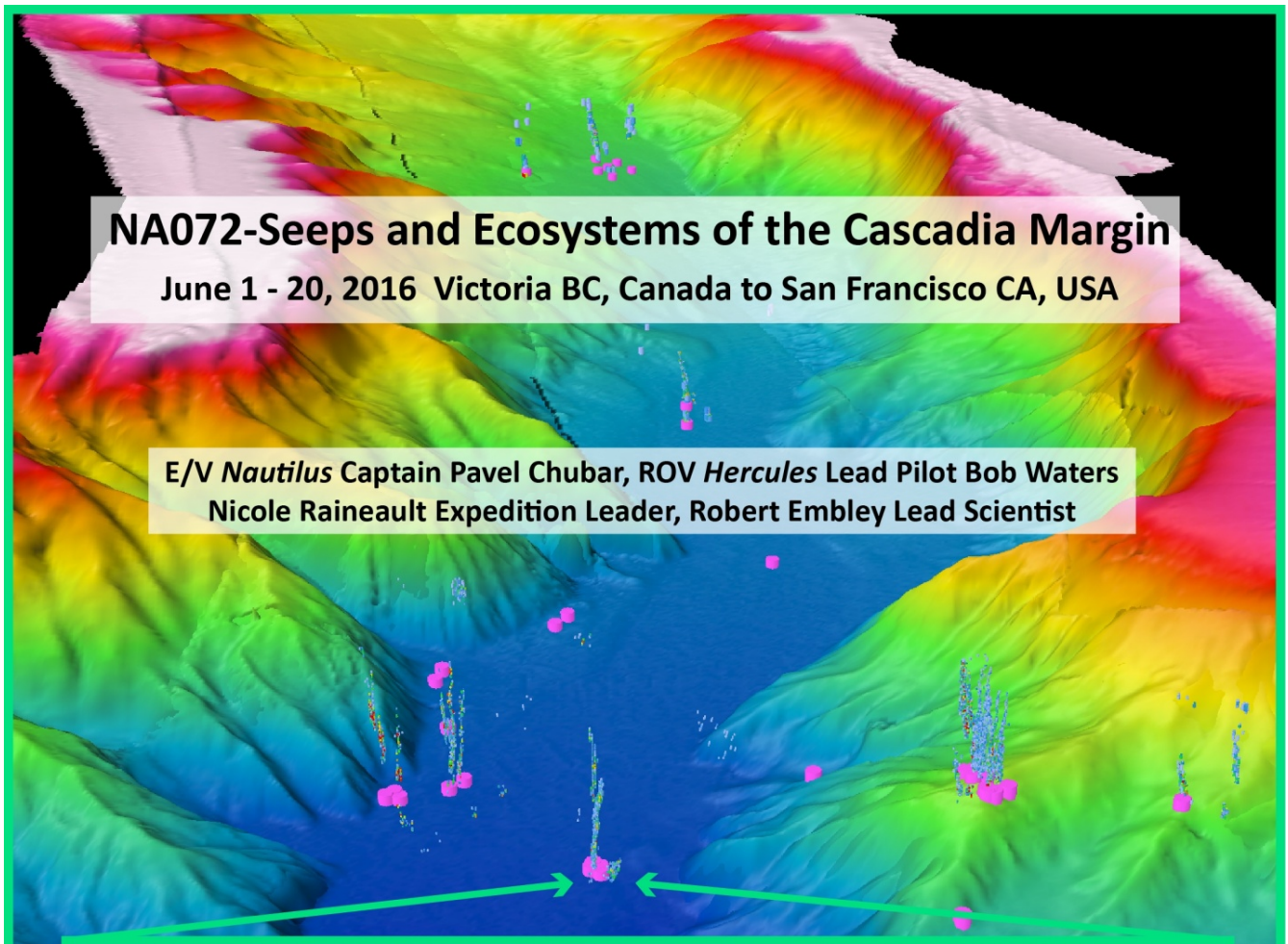
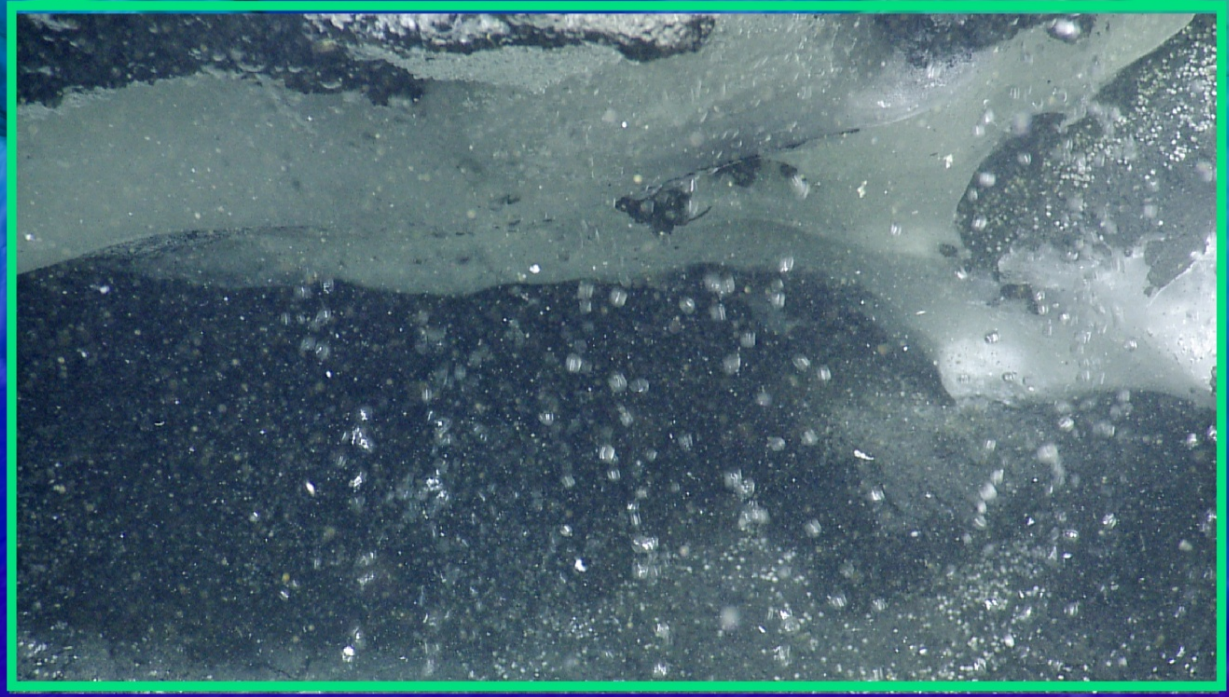
NA072-Seeps and Ecosystems of the Cascadia Margin

June 1 - 20, 2016 Victoria BC, Canada to San Francisco CA, USA



E/V *Nautilus* Captain Pavel Chubar, ROV *Hercules* Lead Pilot Bob Waters
Nicole Raineault Expedition Leader, Robert Embley Lead Scientist



Report compiled by Susan Merle (CIMRS OSU/NOAA) and Robert Embley (NOAA/PMEL)

Cover: Seafloor image (~0.5 m across) of a methane hydrate shelf above bubble streams discovered on dive H1517 at Astoria Canyon on the southern canyon floor, 850 m depth. 3d background image of Astoria canyon bathymetry is overlaid with methane bubble streams discovered on NA072 (magenta cylinders). Bubble streams with high intensity values are also imaged as 3d point clusters. 3d image is ~8 km across mid-image and 3 times vertically exaggerated. (Created by Susan G. Merle)

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

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An Overview of E/V Nautilus Cruise NA072
"Seeps and Ecosystems of the Cascadia Margin"

Bob Embley NOAA/PMEL

The NA072 (E/V *Nautilus*) cruise began in Victoria on June 1 and ended in San Francisco on June 20 (Fig. 1, Table 1). The cruise included: 1) surveys and dives that characterized a WWII shipwreck, *Coast Trader (Dive H1511*), 2) habitat characterization within the outer continental shelf within the Olympic Coast National Marine Sanctuary (Dive H1514), 3) a dive and survey to characterize seafloor habitat at Gray's sponge reef near Grays Canyon, Washington (Dive H1516), 4) characterization of Bamboo coral habitat on the continental slope off southern Oregon/northern California (Dive H1523), and 5) extensive surveys and sampling of methane seeps along the entire U. S. Cascadia continental margin (from Strait of Juan de Fuca to Cape Mendocino – Dives H1510, H1513, H1517-H1521, H1523, H1524).

Cruise NA072 involved collaborations (ashore and at sea) with the (NOAA) Pacific Marine Environmental Laboratory (see Tables 2 and 3), (NOAA) Office of National Marine Sanctuaries (Jim Delgado and Mike Brennan), (NOAA) Olympic Coast National Marine Sanctuary (Liam Antrim), (NOAA) Northwest Fisheries Science Center (Elizabeth Clarke and Curt Whitmire), (NOAA) Southwest Fisheries Science Center (Mary Yoklavich), University of Washington (Paul Johnson and Evan Solomon) and Oregon State University (see lists on Tables 2 and 3). Nicole Raineault (OET) served as expedition leader, and Steve Hammond (ashore) and Bob Embley (at sea) were lead scientists.

The exploration carried out during NA072 resulted in the discovery of 450 methane bubble streams[1] in water depths ranging from 125 to 1625 m depth and characterized ten of these new seeps using the *Hercules* remotely operated vehicle (ROV). Two new sites of methane hydrate exposure were discovered on the seafloor; until now there were only three known sites of hydrate exposure on the Cascadia margin, two of which were discovered more than 20 years ago. Interestingly, we characterized a new type of topography on the southern Cascadia margin, carbonate reefs that were likely formed entirely by methane oxidation. The NA072 cruise greatly exceeded our expectations and the results clearly indicate that there are many more methane sources to be discovered on the Cascadia margin. Prior to NA072 there were very little data about methane flux in the southern area, between Heceta Bank (~43.7° N) and the northern Eel River basin (~41.7° N), but more than 120 bubble plumes were discovered in this region on NA072 within about a week of exploration. These results from NA072 provide insights relevant to NOAA goals, including climate adaptation/mitigation (methane being a

[1]Defined as vertically oriented sonar return originating at the seafloor

powerful greenhouse gas), ocean acidification, and healthy oceans (relationships between chemosynthetic ecosystems and fisheries).

During the first part of the cruise we were able to make ROV dives at previously identified by bubble plumes (but not characterized by ROV) as well as new targets identified by the *Nautilus*' sonar (like the floor of Astoria canyon where we discovered a methane hydrate exposure). As we proceeded south, we discovered many more new methane bubble streams. The ability to take advantage of these new discoveries depended on rapid analyses of the water column sonar data, which we were able to do on board. Subsequent dives with the *Hercules* ROV at selected sites often began within several hours following their discovery. The combination of the ship's multibeam system and the *Hercules* ROV (which was very flexible in its launch and recovery schedule) enabled us to enjoy a great mix of exploration in the pursuit of both discovery and science. Numerous new and interesting sites were also discovered that we didn't have time to characterize. These provide some prime targets for future exploration along the Cascadia margin.

Preliminary Results and Observations

The new seep sites were located within several geologic settings, including: (i) the continental shelf; (ii) canyons, including shallow heads, shoulders, and deep wall sites; (iii) accretionary ridges (where the sediments are being squeezed and faulted during the convergence between the Juan de Fuca and North American tectonic plates); and (iv) upper continental slopes in the ~500-600 m depth range. The *Hercules* ROV is an excellent platform for characterizing these new sites. We took 128 samples, including hard substrata, Niskin-bottle water samples, samples of methane acquired with gas-tight bottles (supplied by John Lupton's lab), suction samples of biology, corals, and push-core samples. At least one graduate student (S. Seabrook) got a substantial portion of her thesis material from this expedition.

The discovery and sampling of two new sites of methane hydrate exposures at 850 m and 1230 m depth provide new opportunities for understanding how hydrate disassociation occurs. The in-progress on-shore characterization of the bubbles sampled with gas-tight bottles will provide information about the source of the methane forming the bubbles. Noble gas analysis may shed light on the climate-relevant question by revealing whether the methane bubbles were released from hydrate or from a gaseous reservoir. Analysis of the samples collected over a large depth range at Astoria Canyon (at 850 m) adjacent to a hydrate outcrop and at 500 m will provide new data regarding this question. Other critical bubble samples were collected at the Heceta South Fault at 1230 m next to a hydrate site and at the SW Coquille Bank at a depth of about 600 m to expand the depth range of the bubble sample collection.

The methane dissociation process, which can be studied directly from the hydrate sites, is particularly important for addressing societally-relevant climate and other issues. A warming ocean could begin to destabilize methane hydrate at its upper limit of stability (~500 m on the Cascadia margin). A 2015 publication hypothesized that this man-made destabilization has already begun. Large-scale destabilization could potentially release methane, a powerful greenhouse gas, into the atmosphere. Such destabilization could also lead to tsunamagenic events from slope destabilization. Additional related potential hazards could result from developing methane hydrate as a fossil fuel resource. Time-series observations could determine if changes are occurring with time at methane seep sites on the Cascadia margin.

Characterization of the chemosynthetic ecosystems feeding on the methane was also an important cruise goal. In particular, how do these "seep" systems interact with the surrounding non-seep communities? The latter is of particular interest along the Cascadia margin, an area of economically valuable fisheries. As noted above, the seeps occur at all depths and various geological settings, but we have only characterized a small percentage of them.

Ultimately it will be important to develop techniques for monitoring ocean methane flux, particularly from dynamic plate boundaries such the Cascadia margin. In what may be an important experiment by the PMEL acoustics program, deployments of a small hydrophone at two vigorous bubble plume sites recorded detectible acoustic signatures during dives H1520 at Heceta SW and H1521 at Coquille SW. It may therefore be possible to use such acoustic data to obtain an estimate of the volume of methane being produced at an instrumented site. The *Hercules* ROV and the E/V *Nautilus* create a lot of acoustic noise and a logical next step would be to deploy a hydrophone at an active seep site and leave it there while the ship works elsewhere during a given expedition.

Time constraints allowed only minimal exploration and characterization of the large number of new methane seep sites found on NA072. Further exploration is critical for expanding the data base on methane seeps along the Cascadia margin and for conducting additional *in situ* characterization of sites encompassing a larger range of variables. We are confident that this will result in abundant value-added new results. We look forward to exploring what opportunities might exist for building on these exciting exploration and research results.

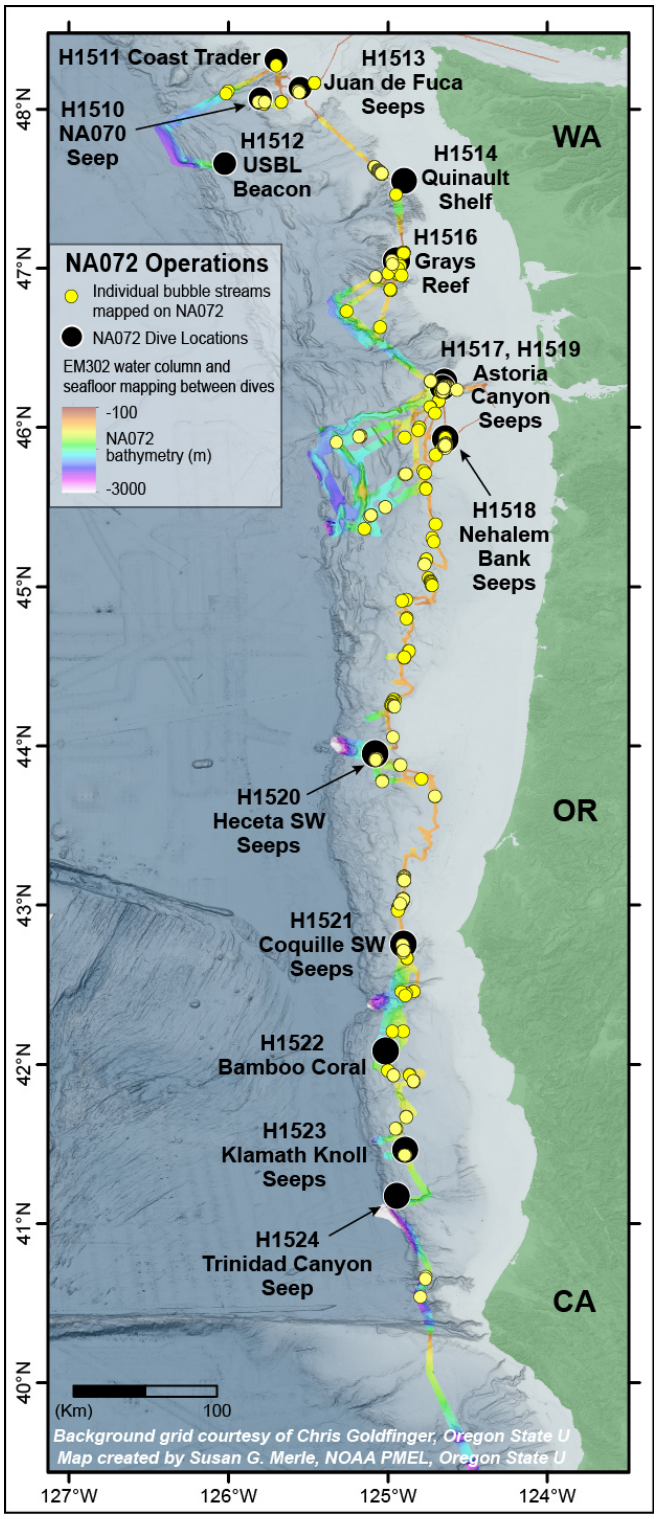


Fig. 1 Locations of *Hercules* ROV dives and methane bubble streams found along Cascadia margin on NA072 with the *E/V Nautilus'* EM302 multibeam sonar system. Gray-scale bathymetry underlay courtesy of C. Goldfinger, CEOAS, Oregon State University. Colorful bands represent swath bathymetry coverage for NA072. Note: The bubble plume streams here include a small number of sites previously identified in publications and re-imaged on NA072.

Table 1: Hercules dive locations, sites, comments and times

All times are UTC

Dive	Longitude	Latitude	Z (m)	Site name	NA072 Dive Comments	On Bottom	Off Bottom
H1510	-125.80402	48.03806	845	H1510 NA070 Seep	Site found mid-slope on shakedown cruise in April, 2016. Did not locate active seep; lots of carbonate at start of dive.	06/02/16 05:55	06/02/16 12:53
H1511	-125.69741	48.27856	159	H1511 Coast Trader	Assessment of Coast Trader, sunk during WWII.	06/02/16 18:19	06/03/16 02:24
H1512	-126.01982	47.63334	1517	H1512 USBL Beacon	Recover USBL beacon.	06/03/16 15:16	06/03/16 15:54
H1513	-125.55439	48.10176	139	H1513 Juan de Fuca Seeps	Seep site discovered on shelf just outside of Straits of Juan de Fuca.	06/03/16 22:08	06/04/16 06:44
H1514	-124.87555	47.49008	166	H1514 Quinault Shelf	Quinault canyon shelf.	06/04/16 15:45	06/05/16 01:04
H1515	-124.94651	46.99593	149	H1515 Grays Sponge Reef	Aborted due to camera pan/tilt jam.	06/05/16 17:59	06/05/16 18:24
H1516	-124.94706	46.99574	151	H1516 Grays Sponge Reef	Assess age and extent of sponge reef.	06/05/16 20:10	06/06/16 02:43
H1517	-124.64875	46.24260	843	H1517 Astoria Canyon Seeps	Sites of bubble plume at 843 and ~500 m. Seeps not completely characterized.	06/07/16 18:00	06/08/16 14:05
H1518	-124.63912	45.88584	174	H1518 Nehalem Bank Seeps	Seeps identified from earlier surveys and fishermen reports, but Nautilus survey pinpointed them.	06/11/16 00:04	06/11/16 13:31
H519	-124.65593	46.22177	500	H1519 Astoria Canyon Seeps	Complete characterization of canyon floor and south rim seeps.	06/11/16 20:54	06/12/16 06:06

Dive	Longitude	Latitude	Z (m)	Site name	NA072 Dive Comments	On Bottom	Off Bottom
H1520	-125.07699	43.91213	1231	H1520 Heceta SW Seeps	Large seep with numerous clams, tubeworm communities SW of Heceta bank, along NW-SE fault; ~1 km separation between sites. Hydrophone deployment site.	06/14/16 00:55	06/14/16 17:29
H1521	-124.90222	42.71220	619	H1521 Coquille SW Seeps	Two new seeps identified on Nautilus sonar ~100 m separation. Hydrophone deployment site	06/16/16 01:32	06/16/16 13:01
H1522	-125.01610	42.04078	1125	H1522 Bamboo Coral	Located bamboo corals on ridge crest in area of high backscatter.	06/16/16 21:12	06/17/16 05:22
H1523	-124.89139	41.42572	730	H1523 Klamath Knoll Seeps	Carbonate reef area; seeps on rim of mound.	06/18/16 00:19	06/18/16 12:53
H1524	-124.94415	41.13582	2182	H1524 Trinidad Canyon Seep	No bubble plume detected; in canyon near where MCS profile showed disruption of hydrate layer; seep located near top of north wall. Dive ended at active seep.	06/18/16 21:53	06/19/16 04:37

Cruise Participants

NA072 scientific personnel at sea

Table 2: Science Participants at Sea

Name	Role	Affiliation
Nicole Raineault	Expedition Leader	OET
Robert Embley	Lead Scientist	NOAA PMEL
Susan Merle	Scientist/Mapping Specialist	NOAA PMEL
Tamara Baumberger	Scientist	NOAA PMEL
Meredith Everett	Scientist	NOAA NWFSC
Sarah Seabrook	Scientist	Oregon State U
Steven Auscavitch	Scientist/Watch Lead	Temple U
Mallory Ringham	Science Manager	Syracuse U
Megan Lubetkin	Science Manager in Training	Bates
Aubrey Foulk	Science Intern	Iowa State
Emil Petruncio	Lead Navigator/Watch Lead	USNA

Name	Role	Affiliation
Renato Kane	Navigator	OET
Alexander Simpson	Navigation intern	USCGA
Onni Irish	Navigator/Mapping specialist	UNH-CCOM
Bob Waters	Hercules pilot	WHOI
Will Sellers	Hercules pilot	WHOI
Michael Hannaford	Hercules pilot	OET
Joshua Reyes	Argus pilot	LBCC
Trevor Shepherd	Argus pilot	Ocean Dynamics
Gabrielle Inglis	Argus pilot	OET
Mark DeRoche	Deck Chief	OET
Dave LePage	Lead Video Engineer	OET
Mary Nichols	Video Engineer	OET
Kyle Sidlik	Video Intern	URI alum
Ethan Gold	Data Engineer	OET
Rachel Rayner	Lead Science Communication Fellow	Discovery Science and Technology Center
Amber Hale	SCF	McNeese State U
Lindsay Holladay	SCF	Seattle Aquarium

Table 3: Science Participants Ashore for NA072

(those who participated in planning and/or chat logs during cruise)

Liam Antrim	Olympic Coast National Marine Sanctuary
Mike Brennan	Ocean Exploration Trust Inc.
Dave Butterfield	U. Washington (JISAO) and NOAA/PMEL
Elizabeth Clarke	Northwest Fisheries Science Center (NOAA, NMFS)
Rick Colwell	Oregon State U., CEOAS
Jim Delgado	Office of Marine Sanctuaries, NOAA
Robert Dziak	NOAA/PMEL
Chris Goldfinger	Oregon State U., CEOAS
Stephen Hammond	NOAA (Affiliate)
Paul Johnson	U. Washington, School of Oceanography
Vern Kulm	Oregon State U. (Retired)
Tom Laidig	Southwest Fisheries Science Center (NOAA, NMFS)
Lisa Levin	Scripps Institute of Oceanography
John Lupton	NOAA/PMEL
Jacques Marc	Marine Archaeologist
Haru Matsumoto	Oregon State U., CIMRS
Robert Schwemmer	Office of Marine Sanctuaries, NOAA
Evan Solomon	U. Washington, School of Oceanography
Andrew Thurber	Oregon State U., CEOAS
Marta Torres	Oregon State U., CEOAS
Anne Trehu	Oregon State U., CEOAS
Waldo Wakefield	Northwest Fisheries Science Center (NOAA, NMFS)
Curt Whitmire	Northwest Fisheries Science Center (NOAA, NMFS)
Mary Yoklavitch	Southwest Fisheries Science Center (NOAA, NMFS)

Discipline Summaries

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's Basic Exploration is guided by the idea that the discoveries we make will eventually prove worthwhile, even if their value is not immediately apparent to those making the observations. 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.

Sample Information

Scientists working with Ocean Exploration Trust on Basic Exploration expeditions agree to collect representative samples of biology and geology for the benefit of the scientific community at large. 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

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 all Basic Exploration cruises via a sign-up on the Ocean Exploration Trust Scientists Ashore webpage. 60 scientists signed up as participants in this cruise. 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.

Multibeam Bathymetric Collection and Data Processing

The *Nautilus* collects seafloor bathymetric and backscatter data and water column data with an EM302 30 kHz multibeam sonar. 7750 km^2 of the seafloor were mapped during the expedition (Fig. 1). *Nautilus* simultaneously collected shallow sub-surface geology with a 3.5 kHz Knudsen sub-bottom profiler. A Seapath 330 with an MRU 5+ motion reference unit was used to measure instantaneous heave, attitude, and position. The Seapath was interfaced to the EM302 in real time to compensate for pitch, roll, and yaw. Attitude and position data from the Seapath were recorded by the EM302. A Sippican XBT system (hand launcher) was used to acquire sound speed profiles to a depth of 760 m using XBT. Raw data files collected during the cruise include EM302 .all files (including bathymetry, seafloor backscatter, position, attitude, and sound speed datagrams), .wcd files (full beam time series), and .asvp files (sound speed profiles), and Sippican XBT .edf and .rdf files. Raw sub-bottom files collected include .keb, .kea, and Seg-Y files.

The multibeam data was cleaned on board *Nautilus* using the QPS software Qimera. The data was imported and swath edited, with outliers removed through point cloud editing. No tidal corrections were applied to the data. The cleaned data was exported as GSFs, geotiffs, XYZ, KML, and SD files. In addition a backscatter mosaic was exported as an SD file and geotiff.

NA072 EM302 mid-water bubble stream data analysis

Susan G. Merle, CIMRS Oregon State U / NOAA EOI

The E/V *Nautilus* is equipped with a Kongsberg EM302 system (30 kHz) that collects seafloor bathymetry and backscatter data and concurrently insonifies the water column, allowing the detection and mapping of gas bubble streams rising from the seafloor. 7750 km^2 of the seafloor were mapped during the expedition (Fig. 1). The seafloor data were edited (cleaned) at sea by the Nautilus scientific team using the QPS Qimera hydrographic processing software.

Preliminary analysis of the water column data detected 450 methane bubble streams, the large majority of which were not previously known (Table 8, end of report). Newly-discovered methane bubble stream emission sites range in depth from 125 to 1630 meters. 77 of the more intense bubble streams were approximately located by the ship's navigators during multibeam surveys. The majority of those targets were never visited by the ROV *Hercules*. ROV navigators pin-pointed the location of 77 bubble streams on the seafloor during the dives. Those Hercules navigation targets have not been rectified with the 450 methane bubble streams identified in the water column data, so the number of actual methane bubble streams will exceed 450 when those analyses are completed.

At sea the bubble streams were located by creating geo-referenced 3D point cluster objects in the FMMidwater stack view (Fig. 2a) that could be loaded into the Fledermaus program and overlain on seafloor bathymetry or backscatter data (Figs. 3 and 4). The point cluster objects were interactively produced by threshold filtering based on acoustic amplitude values of the bubbles in the water column data. This meant that the intensity values had to be high enough to be able to survive the threshold filtering. If the bubbles are not intense enough they get lost in all the background noise in the data. That "noise" was actually visible on our dives as a great amount of marine snow, plankton, and fish in the water column. Actual ship noise spikes also are apparent in the water column data.

Upon return to the office all of the 563 water column data files (~ 1 hour/files) were re-examined using the FMMidwater method that allows for subjectively hand-picking ("geo-picking") bubble stream positions directly from the 2D beamfan display (Fig. 2b). That enables one to observe the less intense plumes that are often not visible in the stack view. The positions derived at sea were re-examined in the 2D beamfan display. There were some places where the data were so noisy that no plumes could be deciphered with either method. Analysis of the midwater data continues.

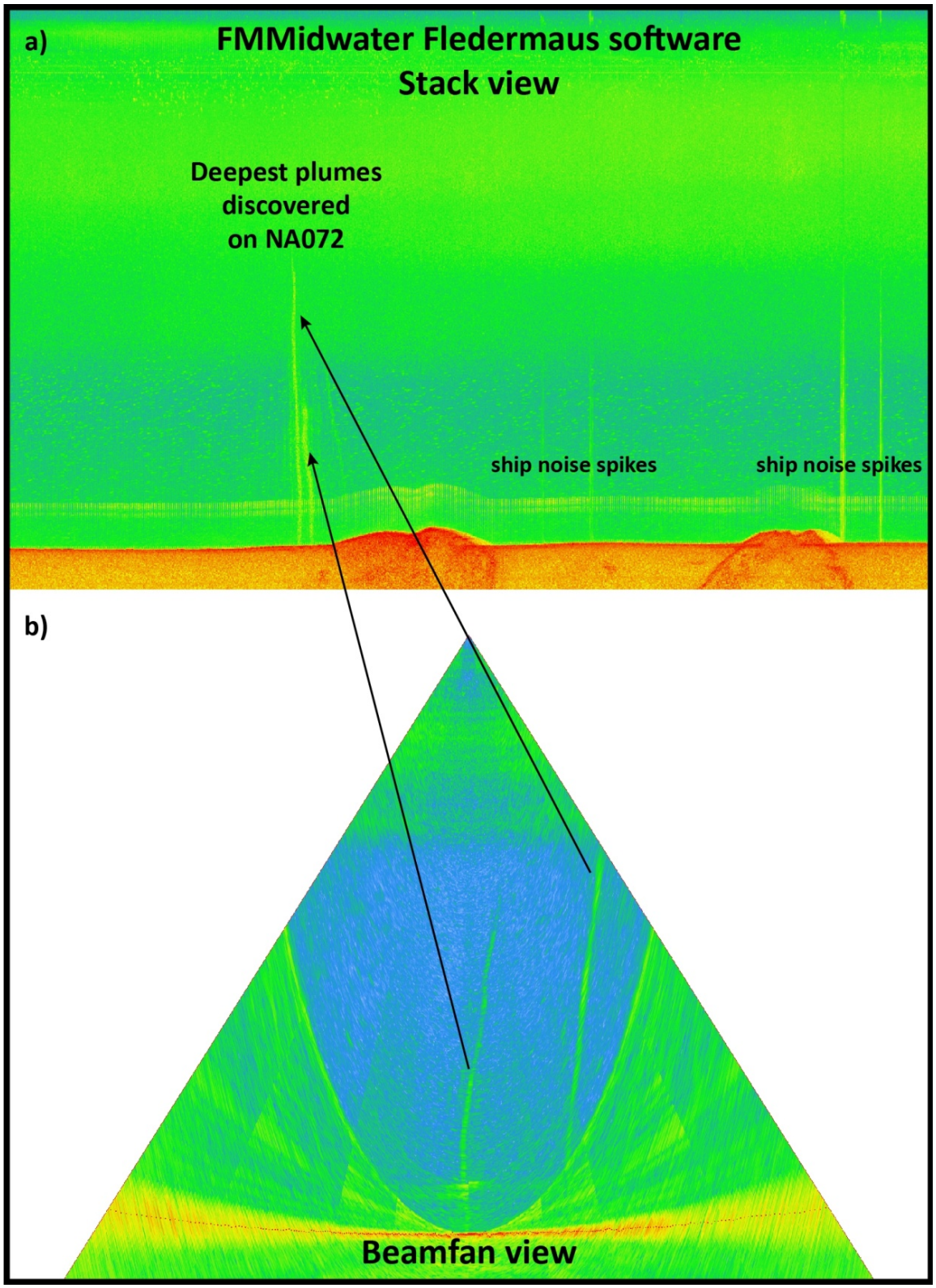


Fig. 2. Fledermaus FMMidwater software options for detecting and isolating gas bubble streams rising from the seafloor.

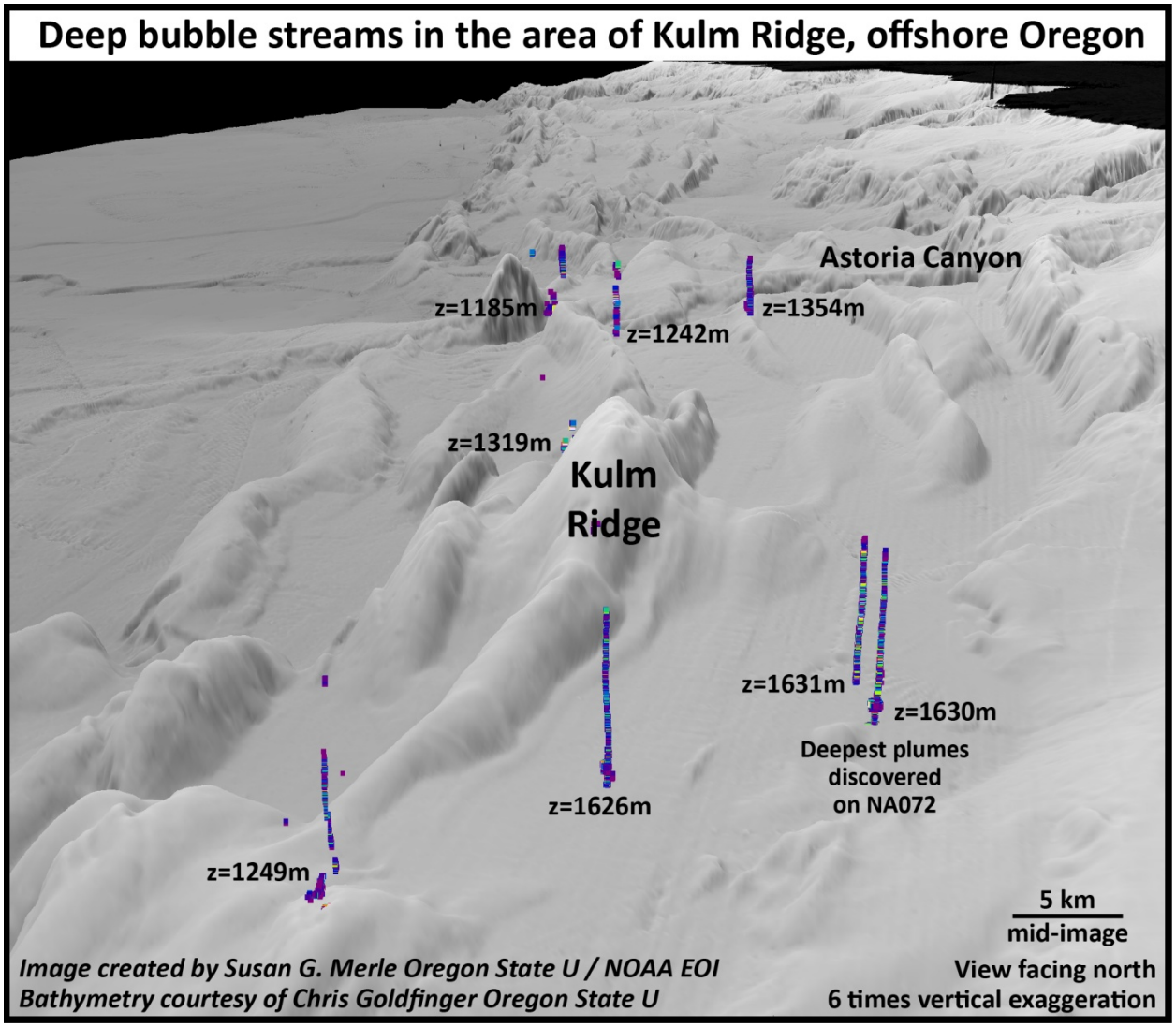


Fig. 3. Deep, intense bubble streams in the area of accretionary ridges and sediments south of Astoria Canyon. The deepest plumes were discovered in the vicinity of Kulm Ridge, offshore Oregon.

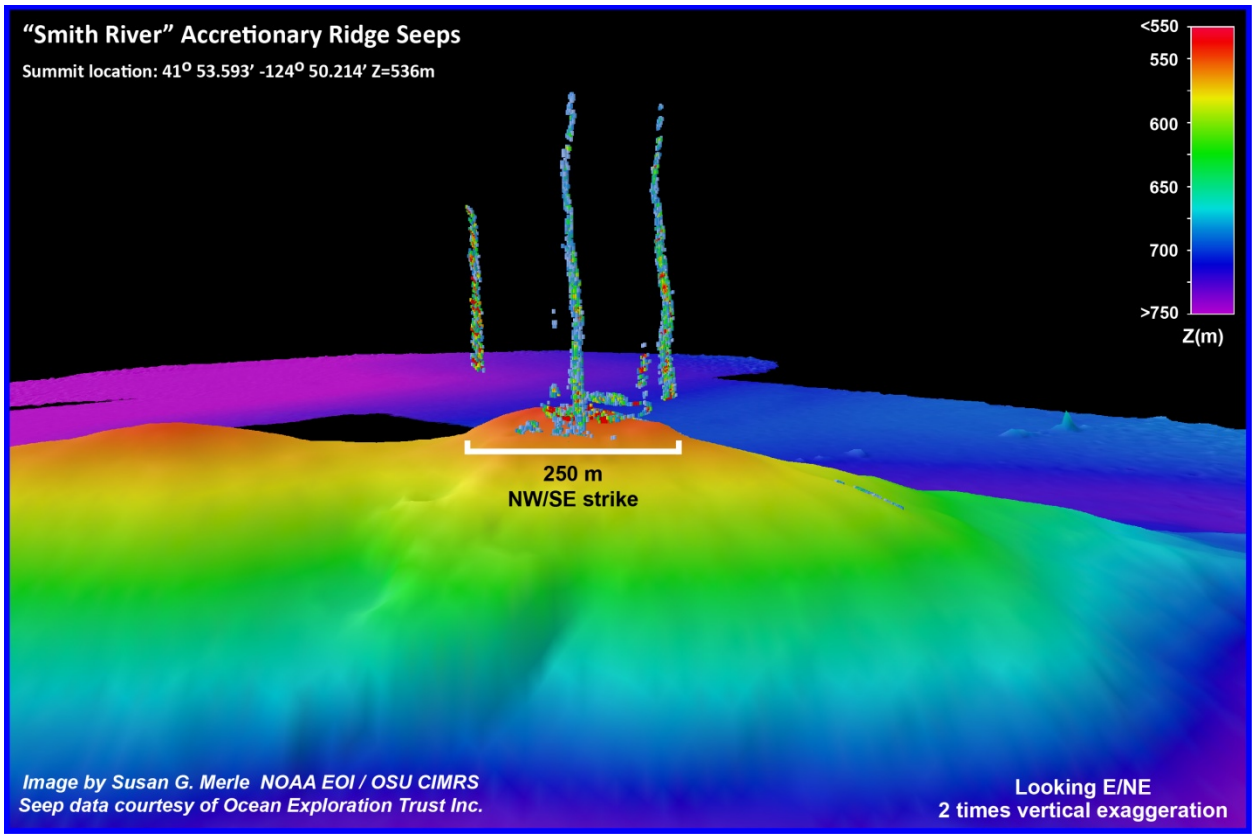


Fig. 4. "Smith River" accretionary ridge methane bubble stream sites. This site, discovered on NA072 was one of many previously undiscovered sites on the northern California margin, and was not visited with the *Hercules* ROV during the expedition.

NA072 Gas-tight bubble sampling

Tamara Baumberger, NRC postdoc, PMEL/NOAA

To determine gas compositions of the bubbles escaping along the Cascadia Margin, gas samples were collected using titanium alloy gas-tight bottles (150 to 160 ml volume). To catch the bubbles, the gas-tight bottles were attached to a funnel with PEEK tubing of about 50 cm length. The gas-tight samplers were evacuated in the NOAA/PMEL Helium Isotope Lab in Newport, OR previously to the NA072 cruise. Due to space restrictions on board the E/V *Nautilus*, the high vacuum extraction line was not installed during this cruise. Thus, sample extraction and re-evacuation of the gas-tight samplers was not possible on board. Consequently, each sampler could only be used once for the collection of one specific bubble sample. Extraction of the samples from the gas-tight bottles and subsampling was conducted subsequent to the cruise on the preinstalled high vacuum extraction line at the NOAA/PMEL Helium Isotope Lab in Newport, OR.

A total of 8 evacuated samplers ready to use where brought on the *Nautilus* for sample collection during NA072. One of the samplers was unfortunately accidently triggered in the basket during installation for sampling a bubble vent during dive H1513 in the Juan de Fuca Straight at 150 m depth.

The remaining 7 gas-tight samplers collected bubble samples as follows:

Astoria Canyon (H1517 and H1519): Bubble samples at the Astoria Canyon were obtained during two dives and at two different depths. During dive H1517 one sample (GT18) was collected at a depth of 850 m where intense bubbling was observed at the same location where exposed hydrate and bacterial mats were present. The exposed hydrate was found in a depression. The bubble sample was obtained at the rim of this depression, where a new bubble stream formed after the first one deceased during the first sampling attempt. However, the bottle got triggered in an unexpected moment and it was very unclear if there was still gas in the funnel at the moment where the bottle was triggered. The shore-based extraction of the sample showed that the sample bottle was full of seawater instead of gas. This sample was repeated in dive H1519 (GT5) at a slightly different, but strong bubble stream from several openings aligned along a small fracture. During the sampling process, hydrate started to form inside the funnel where the bubbles got trapped. Bubble collection time into the funnel was thus a little shortened to prevent a blocked inlet from the funnel to the bottle. This sampling strategy gave way for some seawater entrainment in the bottle. The measured temperature difference between ambient seawater and 20 cm sediment depth was 2.06 °C. For comparison, a measurement was taken in a non-seep-affected area a few meters away. There was not a temperature difference between ambient seawater and 20 cm sediment depth. Another

Astoria Canyon bubble sample was obtained at a depth of 494 m (GT2). It was obtained in an area where intense bubble vents got released continuously from different spots. No hydrate was exposed at this site, but a lot of shell material was present as well as reduced sediment was observed. The measured temperature difference between ambient seawater and 20 cm sediment depth was 0.24 °C.

Nehalem Bank (H1518): During dive H1518 a bubble sample (GT16) was obtained at a water depth of 186 m close to orange and white bacterial mats (enlarged seep area 11/12). Sampling took three attempts because the ROV was unable to release the trigger. Filling time of the funnel was 3 minutes during the final attempt. According to what was visible on the video, the last trigger release seemed to be sufficient. However, during the sample extraction in the shore-based laboratories, it turned out to be a very small sample volume and thus a failed sample. The measured temperature difference between ambient seawater and 20 cm sediment depth was 0.12 °C.

Heceta South Fault (H1520): During dive H1520, a gas bubble sample (GT17) at a water depth of 1227 m was collected. Hydrate was exposed to the seafloor at this sampling depth. The bubble sample was obtained in an area with several diffusely spread bubble streams with a lower flow rate compared to bubble streams seen in earlier dives. A steady, but small bubble stream was sampled (nav target 'bunch of bubbles'). Some of the bubbles had a wobbly appearance while rising. This might be a sign for a hydrate skin forming around the bubble. During sampling, hydrate formed in the funnel where the gas was trapped. This led to a shortened bubble collection time. The measured temperature difference between ambient seawater and 20 cm sediment depth was 0.93 °C. A background temperature measurement in non-seep-affected sediment showed a temperature difference between ambient seawater and 20 cm sediment depth of 0.06 °C.

SW Coquille Bank (H1521): Two samples were obtained during dive H1521 at the SW Coquille Bank. The first sample was taken at a depth of 619 m (GT9) in the area of the northern vents. Bubbles seemed to escape from the seafloor about every 5 seconds. During sampling, some of the gas turned to hydrate in the funnel. But it was visible through the transparent funnel that there was still an adequate amount of the gaseous phase present for sampling. The temperature was taken a few meters away from the sampled bubbles in another bubble vent released from somewhat less consolidated sediment. The measured temperature difference between ambient seawater and about 15 cm sediment depth was 0.1 °C. When sticking the temperature probe into the sediment, the bubble rate increased tremendously. It seemed like the probe had poked right into the very shallow gas reservoir. A second gas bubble sample was obtained in a carbonate-rich area of the southern vent site at 615 m water depth a bit west of point S1. The seep was characterized by a very steady stream of large bubbles exiting the

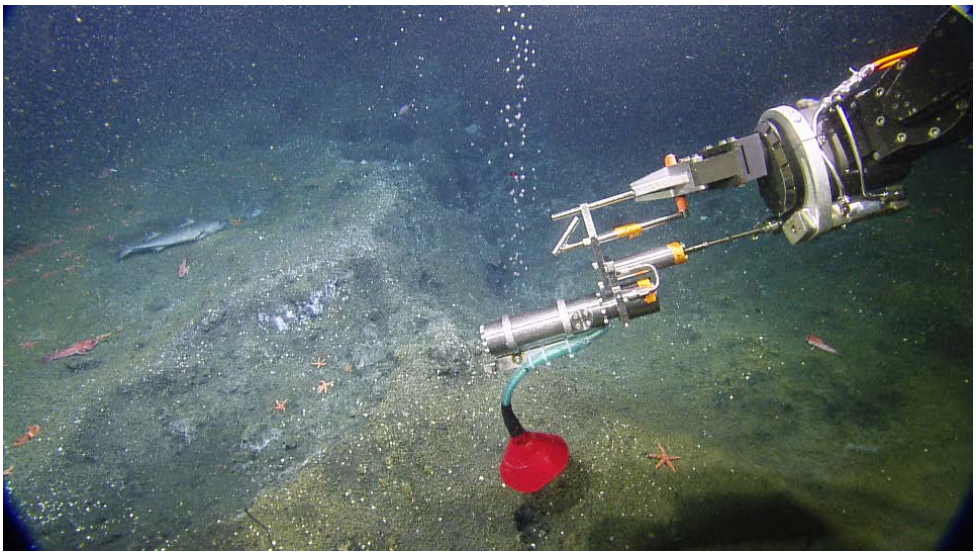
seafloor with a high flow rate. Ambient seawater had a temperature of 3.2 °C. When entering the probe to 10 cm sediment depth, the temperature spiked up to 8.48 °C, but later averaged at 6.4 °C. Thus, the temperature difference between ambient seawater and an average temperature at 10 cm sediment depth was 3.2 °C. After this measurement, the temperature probe never made it back to ambient water temperature and turned out to be broken for later measurements.

Klamath Knoll (H1523): The Klamath Knoll seep was not sampled for bubbles because no more empty samplers were available. This area was defined by the presence of a lot of carbonate sitting on the background substrate like a cap. On one bubble site, bubbles got released from under a carbonate flange in a very high energy manner. Every 3 to 5 seconds, a burst of bubbles got released from under the flange. Being pressurized sometimes during this process, the bubbles broke up into many small bubbles during the release. This was the only site where this feature was observed during NA072.

All bubble samples will be measured for their chemical and isotopic composition in the second half of year 2016.

Table 4: Summary of the gas tight samples collected during NA072

GT	Nautilus Sample ID	Dive	Site	Z (m)	Lat	Long	quality	T at 20 cm (°C)	T ambient SW (°C)	Δ Temp (°C)	Marker
18	NA072-027-GT18	H1517	Astoria Canyon	850	46.2422	-124.6495	low	no temp	-	-	
16	NA072-037-GT16	H1518	Nehalem Bank	186	45.8838	-124.6433	low	5.40	5.28	0.12	216
2	NA072-048-GT2	H1519	Astoria Canyon	494	46.2225	-124.6564	good	3.72	3.48	0.24	244
5	NA072-059-GT5	H1519	Astoria Canyon	849	46.2422	-124.6494	good	4.55	2.49	2.06	273
17	NA072-060-GT17	H1520	Heceta South Fault	1227	43.9109	-125.0760	good	2.58	1.65	0.93	220
9	NA072-080-GT9	H1521	SW Coquille Bank N	619	42.7125	-124.9014	good	3.22 (15 cm)	3.12	0.1	233
11	NA072-088-GT11	H1521	SW Coquille Bank S	615	42.7106	-124.9014	good	6.4 (10 cm)	3.2	3.2	288



Gas-tight sampling at Astoria Canyon during dive H1517

NA072 Seep Biology Summary

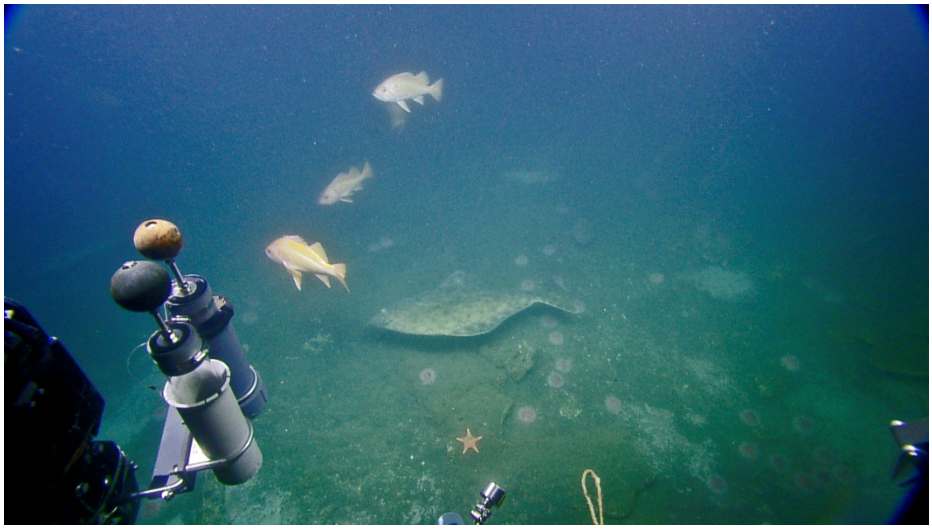
Sarah Seabrook, Oregon State U

To examine the biology of the seep sites discovered and visited with ROV Hercules and Argus a variety of sampling was performed. This included: push cores, slurp sampling, scoops, ROV grabs, and visual surveys. A total of 31 push cores were sampled and were successfully recovered and processed with 16 sectioned at centimeter increments down to 10cm and used for microbial analysis and 15 sectioned at 0-5cm and 5-10cm and used for meio- and macrofaunal analysis. Biological samples were collected the following seep locations: Juan de Fuca at 185 m (48.102, -125.554; 2 push cores), Astoria Canyon at 850 m (46.242, -124.649; 1 slurp, 4 push cores), Astoria Canyon at 495 m (46.222, -124.656; 2 slurps, 1 scoop, 4 push cores), Nehalem Bank at 185 m (45.884, -124.643; 5 push cores), Heceta SW at 1223.9 m (43.911, -125.076; 4 slurps, 2 scoops, 1 grab, 6 push cores), SW Coquille Bank at 620 m (42.712, -124.091; 2 slurps, 2 scoops, 6 push cores), and Klamath Knoll at 734 m (41.428, -124.892; 2 slurps, 2 push cores).

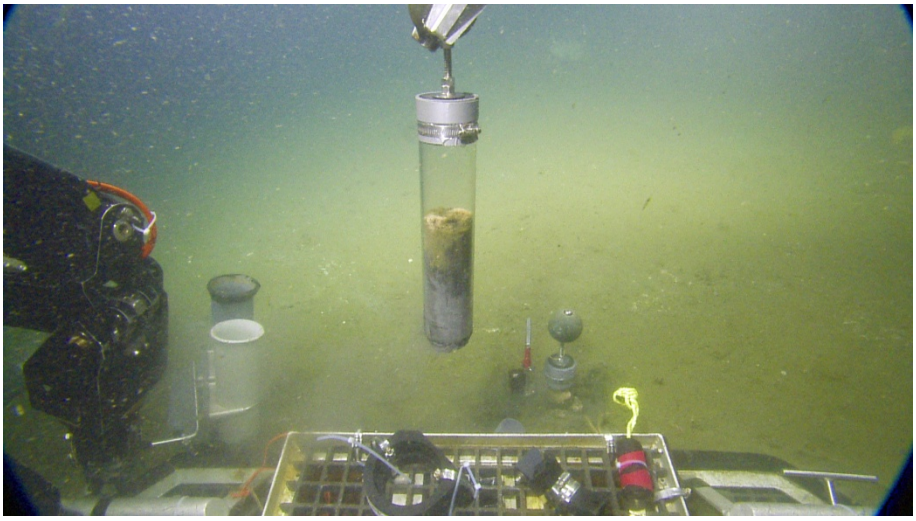
These 7 sites had a variety of geologic environment types (continental shelf, canyons and slopes) and spanned the zone of hydrate stability and the Oxygen Minimum Zone. White microbial mats and reduced sediments were observed at all sites - Astoria Canyon (850 m) and Heceta SW had particularly extensive microbial mats and orange mats were observed at both Nehalem Bank and Klamath Knoll. *Calyptogenia spp.* beds were seen at Astoria Canyon (495 m), Nehalem Bank, Heceta SW, SW Coquille Bank, and Klamath Knoll. Heceta SW had particularly diverse biology with extensive Siboglinidae assemblages observed (with many associates including anemones and encrusting sponges) as well as sparse Ophiuroids and *Acharax spp.* in addition to the extensive microbial mats, *Calyptogena spp.* clam beds, and beds of polychaetes. Both Astoria Canyon (850 m) and SW Coquille Bank had accumulations of small gastropods in the sediment surface around areas of active seepage. Groupings of Asteroideae around seep sites were observed at Astoria Canyon (850 m) and Nehalem Bank. Although not sampled, a dive on Trinidad Canyon (2220 m) revealed sparse assemblages of gooseneck barnacles, Siboglinidae tubeworm assemblages, *Clayptogena spp.* clams and very sparse microbial mats. Overall, an abundance of life was noted at a majority of the seeps visited including but not limited to: Sebastes, Elasmobranchs, Echinoderms, Cephalopods, Gastropods, Annelids, Bivalves and Crustaceans.

Preservation methods varied by sample type and included buffered formalin, ethanol (non-denatured, 95%), RNA-later and freezing at -80°C allowing for a variety of analysis from collected samples. High throughput amplicon sequencing of the V4-V5 region of the 16S rRNA gene and digital drop PCR of the pmoA gene (associated with aerobic methanotrophy) are underway on the push cores specific for microbial analysis. Results are forthcoming and will

help direct both further microbial investigations and analysis of the meio- and macrofaunal samples. Considering the number of seeps discovered, understanding the distribution and diversity of associated organisms is critical if we are to efficiently manage and monitor the impact of global climate change on these communities.



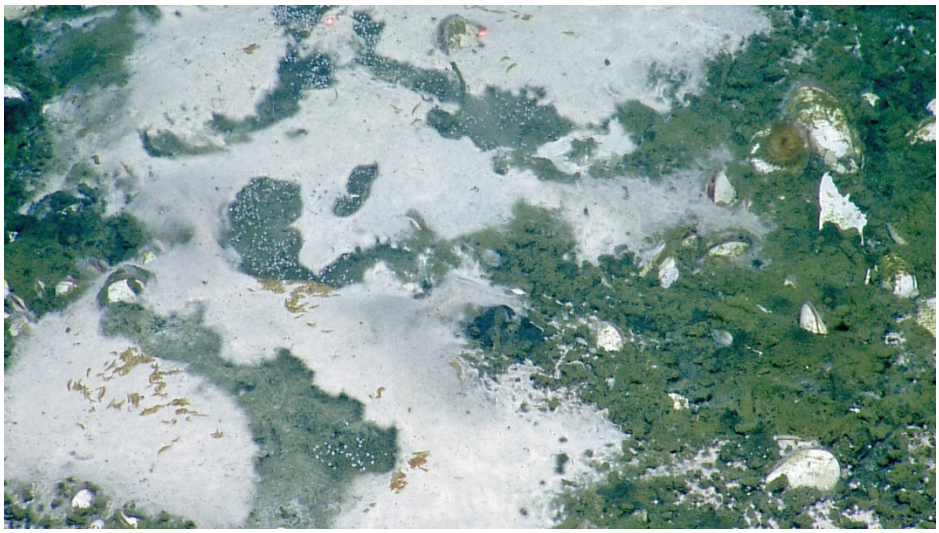
H1518 - Nehalem bank fish, anemones, sea stars and carbonates.



H1518 - Nehalem bank push cores.

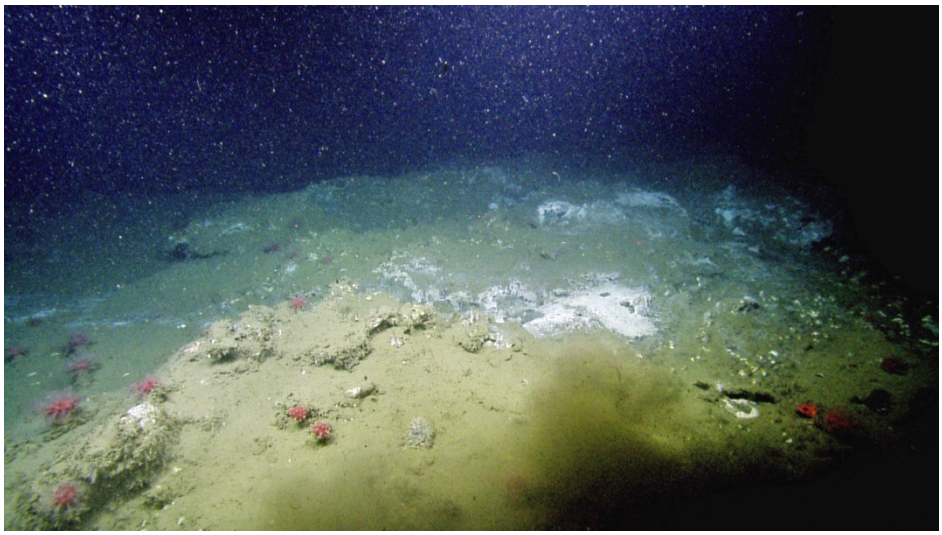
H1518 - Nehalem bank orange and white bacterial mat.

H1520 - Coring clam bed with rockfish and scarlet king crab, Heceta SW.

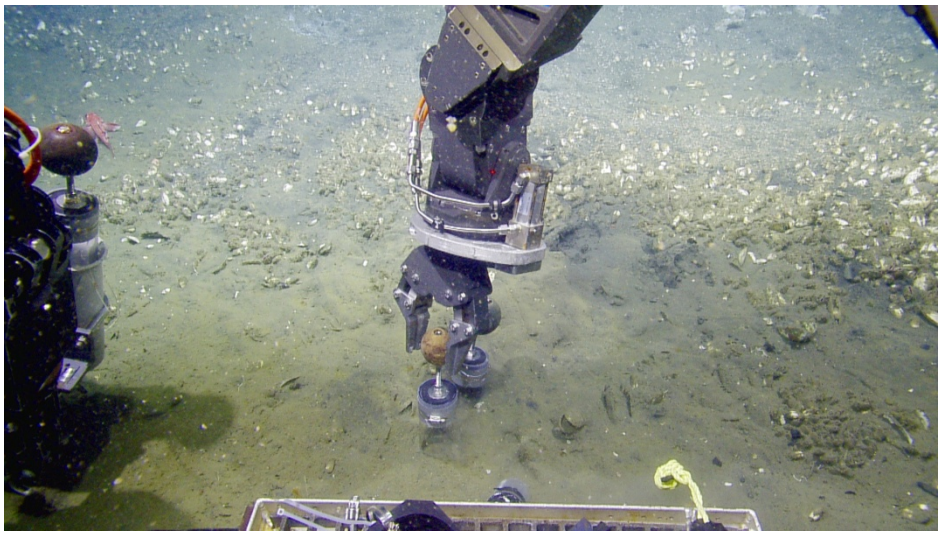


H1520 - Bacterial mat and clams at Heceta SW.

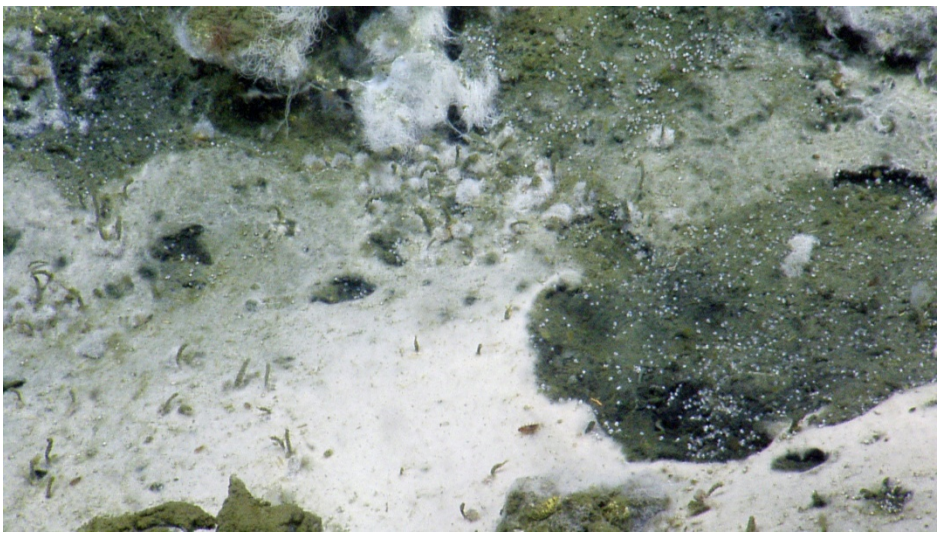
H1520 - Lamellibrachia tube worm bush and clams in background, Heceta SW.



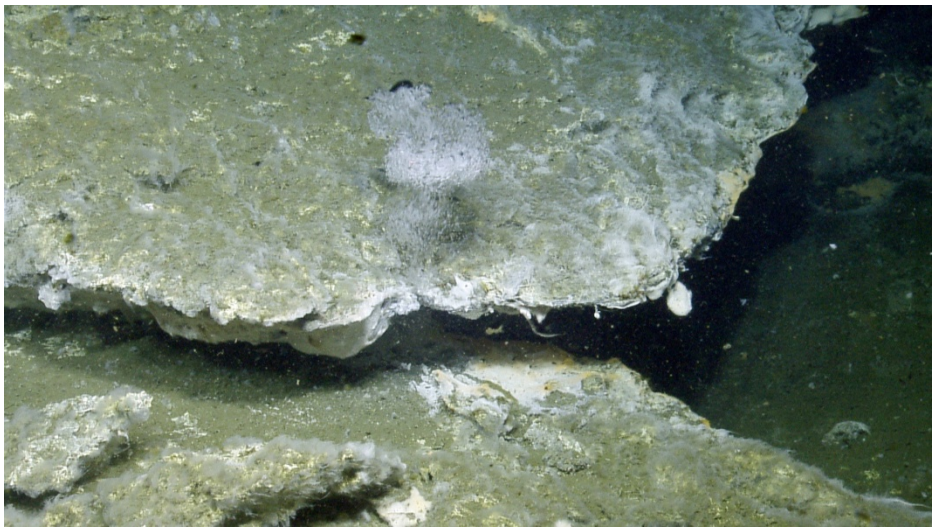
H1521 - Coquille SW bacterial mat and mushroom corals.



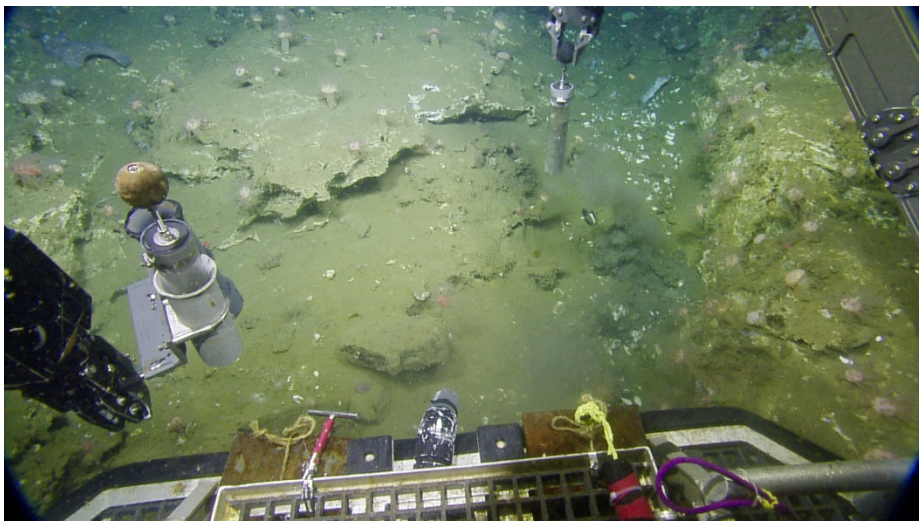
H1521 - Coring clam bed at Coquille SW.



H1521 - Zoom on microbial mat, gastropods and polychaetes at Coquille SW.



H1523 - Klamath knoll carbonates, microbial mat and bubbles.



H1523 - Klamath knoll coring.

H1523 - Klamath knoll microbial mat and fish (with hydrates on its face?).

Environmental DNA Sampling

Meredith Everett, NOAA NWFSC

The goal of the environmental DNA (eDNA) sampling work on this expedition was to further development of an eDNA sampling protocol for deep-sea corals. Deep-sea corals exist in patchy and difficult to access environments. Additionally deep-sea coral species can be delicate and slow growing. As a result of these factors there is interest in developing methods for sampling deep-sea corals that are less invasive and increase opportunity for sampling. Environmental DNA sampling obtains DNA from organisms of interest by sampling, filtering and extracting DNA from water samples taken in the area of the organisms of interest. This method is being successfully used to examine diversity in coastal regions and monitor for invasive species in freshwater environments.

A total of 29 water samples were obtained using Niskin bottles attached to the ROV. The majority of water samples were taken in the vicinity of one or more deep-sea corals, with five samples taken throughout the water column to establish a negative control. At the time of sampling depth, temperature, oxygen and salinity data were taken as well as still images from the ROV video feed. At seven of the sampling locations a physical coral sample was also taken as a positive control.

At the surface, a liter of water was obtained from each Niskin, and filtered through a 0.45µm nitrocellulose filter. These filters were then placed in 5 ml of Longmire's lysis buffer, a salt-buffer that stabilizes DNA samples at room temperature for storage and transport. All 29 samples were shipped back to the NWFSC, where eDNA was successfully extracted from all samples. Pilot sequencing has successfully obtained coral eDNA corresponding to the observed species in two of the samples, and additional sequencing is ongoing.

Table 5: Summary of eDNA and coral samples from cruise NA072

Sample ID	Dive	Sample type	Description
NA072-002	H1513	Niskin	Water sample taken by sea pens, Niskin Bottle 12
NA072-010	H1514	Niskin	Water sample for eDNA
NA072-028	H1517	Niskin	Water sample by bright pink anthomastus mushroom coral
NA072-030	H1517	Niskin	water sample near the pink mushroom coral, anthomastus (one was done earlier (NA072-028), but this region has a higher density of these corals)
NA072-031	H1517	Niskin	water sample for eDNA of paragorgia coral
NA072-035	H1517	Niskin	Niskin next to purplish/reddish colored Swiftia (?) corals, NB 8

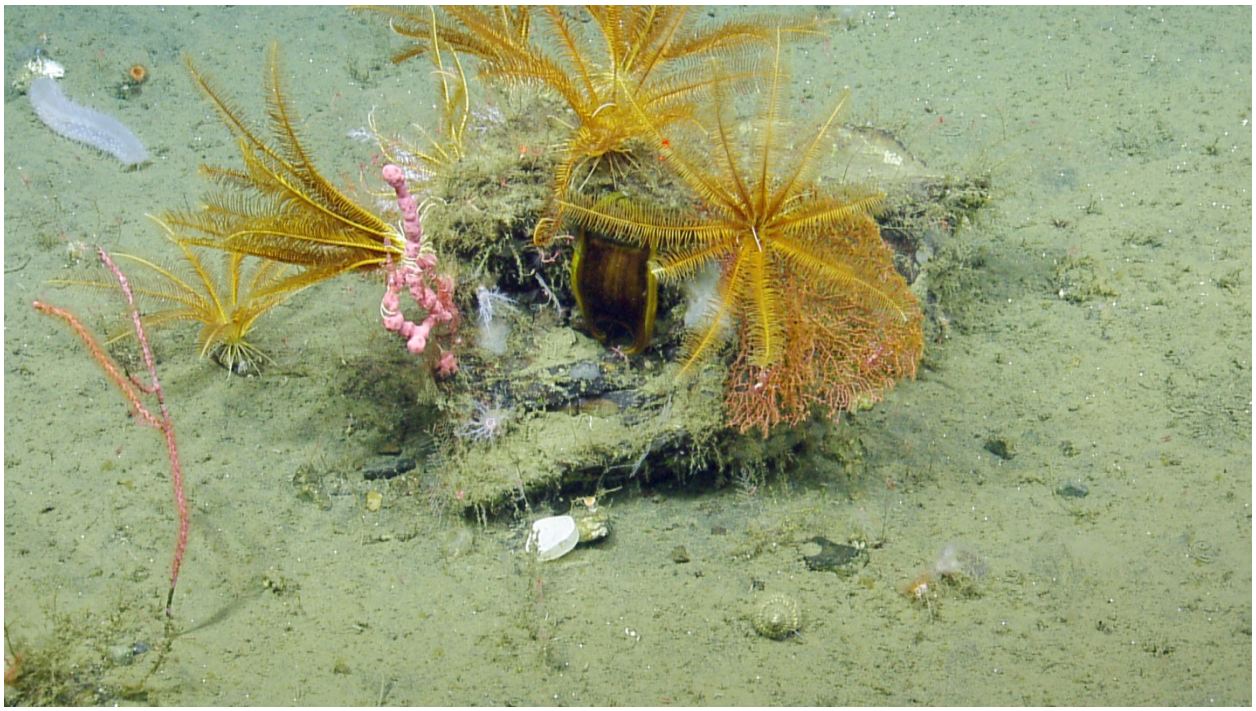
Sample ID	Dive	Sample type	Description
NA072-045-ME	H1518	Niskin	Water sample for eDNA near white Swiftia coral (?), nb12
NA072-047-ME	H1518	Niskin	water sample
NA072-053-ME	H1519	Niskin	Mushroom coral near marker 244.
NA072-055-ME	H1519	Niskin	water sample next to bubblegum coral
NA072-074-ME	H1520	Niskin	Sea Pen Anthoptilum
NA072-076-ME	H1520	Niskin	water sample for eDNA at the seafloor before returning to the surface
NA072-077-ME	H1520	Niskin	water sample for eDNA analysis, intended for collection at 800m
NA072-078-ME	H1520	Niskin	water sample for eDNA collected around 400m
NA072-079-ME	H1520	Niskin	water sample for eDNA collection at about 50m
NA072-081-ME	H1521	Niskin	Water sample for eDNA analysis near Anthomathus mushroom corals, Niskin 12
NA072-096-ME	H1521	Niskin	pink encrusting octocoral
NA072-098-ME	H1521	Niskin	water sample near mushroom corals, NB #8
NA072-099-ME	H1521	Niskin	Water sample in grove of many mushroom corals, NB# 9
NA072-101-ME	H1522	Niskin	Bamboo Coral "forest." also in area
NA072-103-ME	H1522	Niskin	water sample near several Acanthagorgia corals, NB 11
NA072-107-ME	H1522	Niskin	Niskin for eDNA near coral
NA072-108-ME	H1522	Niskin	water sample for eDNA (at least 5-6 corals in the area)
NA072-109-ME	H1522	Niskin	water sample for eDNA, in coral region
NA072-113-ME	H1523	Niskin	water sample next to carbonate covered with Anthomastus mushroom corals, NB#12
NA072-122-ME	H1523	Niskin	Lillipathes?
NA072-124-ME	H1523	Niskin	water sample near paragorgia corals, swiftia, NB#9
NA072-126-ME	H1523	Niskin	water sample next to paragorgia -125 sample, NB#8

Sample ID	Dive	Sample type	Description
NA072-128-ME	H1524	Niskin	water sample next to several Swiftia corals, NB#12
NA072-097-A-ME	H1521	ROV grab	red stoloniferous octocoral
NA072-102-A-ME	H1522	ROV grab	Sample of Acanthagorgia
NA072-104	H1522	ROV grab	white bamboo coral
NA072-105-A-ME	H1522	ROV grab	Isadella, large pale pink; the bottom part or has long flowing streams
NA072-036-A-ME	H1517	Slurp	Slurp #7 of 2 reddish Swiftia corals
NA072-036-01-A-ME	H1517	Slurp	
NA072-046-A-ME	H1518	Slurp	Slurp sample of white coral, SL#1

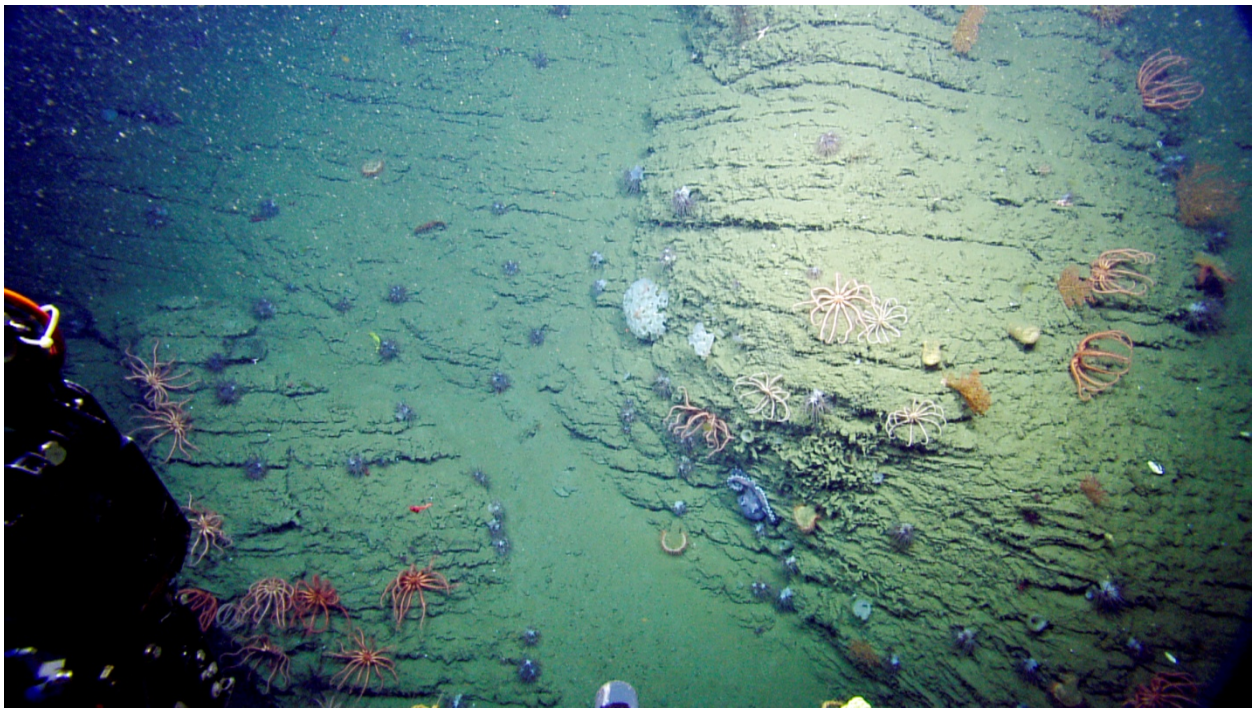
While diving on Klamath Knoll (H1523) to investigate new seeps discovered on the multibeam sonar, a very dense grouping of *Anthomastus sp.* corals were encountered, covering a carbonate outcrop.

Large bamboo corals are an important source of structural habitat in the deep-ocean (dive H1522). Short spine king crabs are feeding and sheltering in this large *Isidella tentaculum*.

During dive H1522 a large stand of old *Isidella tentaculum* emerges from the darkness. This grove was discovered accidentally during a fisheries trawl survey, and the EV *Nautilus* is mapping the extent of the grove. Individuals of this size can be hundreds of years old.



During the dive to explore the grove of bamboo corals, H1522, a high diversity of other gorgonian corals was also observed. These corals all provide important habitat for other deep sea organisms. In this image three distinct deep-sea coral species shelter a skate egg case and provide structure for crinoids.

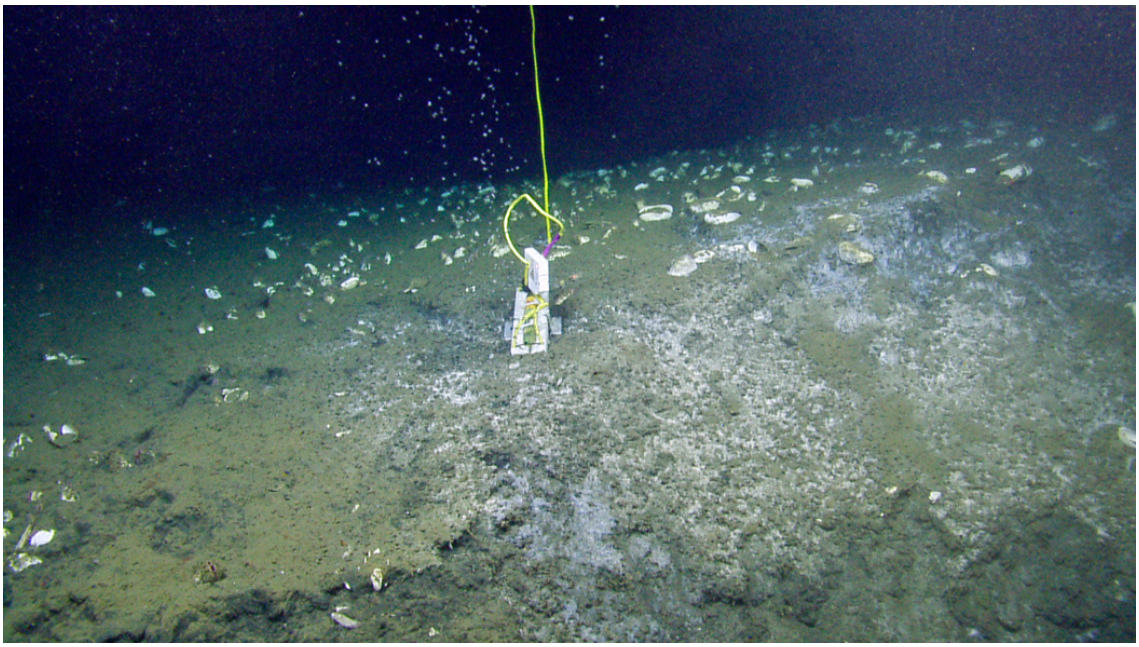


The steep walls of Trinidad canyon (dive H1524) provide critical habitat for many invertebrates. Here gorgonian corals and hexactinellid sponges provide additional habitat for brisingid sea stars, and deep-sea graneledone octopus.

Hydrophone deployments on the Cascadia Margin NA072 expedition

Robert P. Dziak, NOAA PMEL

The goal of the NA072 expedition was to use the Simrad 302 as a survey tool to map bubble plumes at a regional scale along the Oregon and northern California margins, followed by in situ investigation of bubble-plume sites using the ROV *Hercules*. The exploration carried out during NA072 resulted in the discovery of hundreds of new individual methane seep sites in water depths ranging from 125 to 1630 m depth. A Greenridge Acousonde 3B™ hydrophone was deployed via ROV within two vigorous bubble-plume sites. Despite persistent ship and ROV propeller noise, the acoustic signature of the bubble-plume can be seen in the hydrophone record as a broadband (0.5 – 4.5 kHz) series of short duration (~0.2-0.5 msec) pulses that occur in clusters of dozens of pulses lasting 2-3 secs. Previous studies of the passive acoustics of seep bubble-plumes indicate sound is generated during bubble formation, where detachment of the gas bubble from the end of a tube or conduit causes the bubble to oscillate, producing sound. The peak frequency f (the zeroth oscillatory mode) and the bubble equivalent spherical radius r for a given pressure P are: $f = (2\pi r)^{-1} [(3\gamma P/\rho)]^{1/2}$ where γ is the ratio of gas specific heat at constant pressure to constant volume and ρ is the water density (Leifer and Tang, 2006). Thus the frequency of a bubble's oscillation is proportional to the bubble's radius and an assumed spherical volume. Therefore it may be possible to use our acoustic data to roughly estimate the amount of methane being released, over a selected period of time, at these seafloor plume sites.



Hydrophone deployed at Heceta SW (1220 m) on dive H1520

Nautilus Outreach

Rachel Rayner, Discovery Science and Technology Center

The Ocean Exploration Trust is unique in its quantity of educational output from aboard the E/V Nautilus. During the season, the Nautilus Live website live streams 24 hours a day with commentary and viewer interaction whilst the ROVs are diving. In addition, the Science Communication and Education team interact directly with students and museum visitors via video conferencing technology called telepresence.

The Nautilus Live website allows people around the world to tune into the cruise and send questions about the operation. Whilst exact numbers of viewers are hard to obtain, the number of sites (or IP addresses) is counted. This number ranges from 50 to 800 throughout the 24-hour cycle. However, one of these sites could be a large screen on a museum floor, adding significantly to the number of viewers.

Some questions, sent in by audience members, are particular highlights to those working on the E/V Nautilus, and show the variety of people tuning in:

- *You show to us all the operation, the streaming of the cameras is amazing! Is like that we be with you in the operation! Thank you for this experience and congratulations to show how science is made for all the world! -- Renato, an oceanography undergraduate, from Brazil*
- *I have no idea what's going on but I am learning. This is deeply and utterly fascinating.*
- *Watched many dives but these last few days have been the best as far as the crews are concerned. All shifts have brought humor as well as a learning experience. Thanks for making it interesting and fun. Mike, Ca*
- *Thank you again for taking the time to answer our questions while you work, you all have managed to keep me engaged for far longer than I thought you would. I've just made my first donation to the Ocean Exploration Trust and my very next task will be to follow Nautilus on Twitter. Keep up the awesome work!*

In addition to the live stream, the use of telepresence technology to create live interactions allows students and visitors to ask questions to those on the ship. Presenters are supported by illustrative footage of the topics being discussed, which is controlled by a dedicated team at the Inner Space Center, Rhode Island University. Over 14 days (no interactions are held on Sundays and Mondays) there were 55 scheduled interactions with over 1400 participants. Each group heard about the research taking place and saw highlights from the cruise.

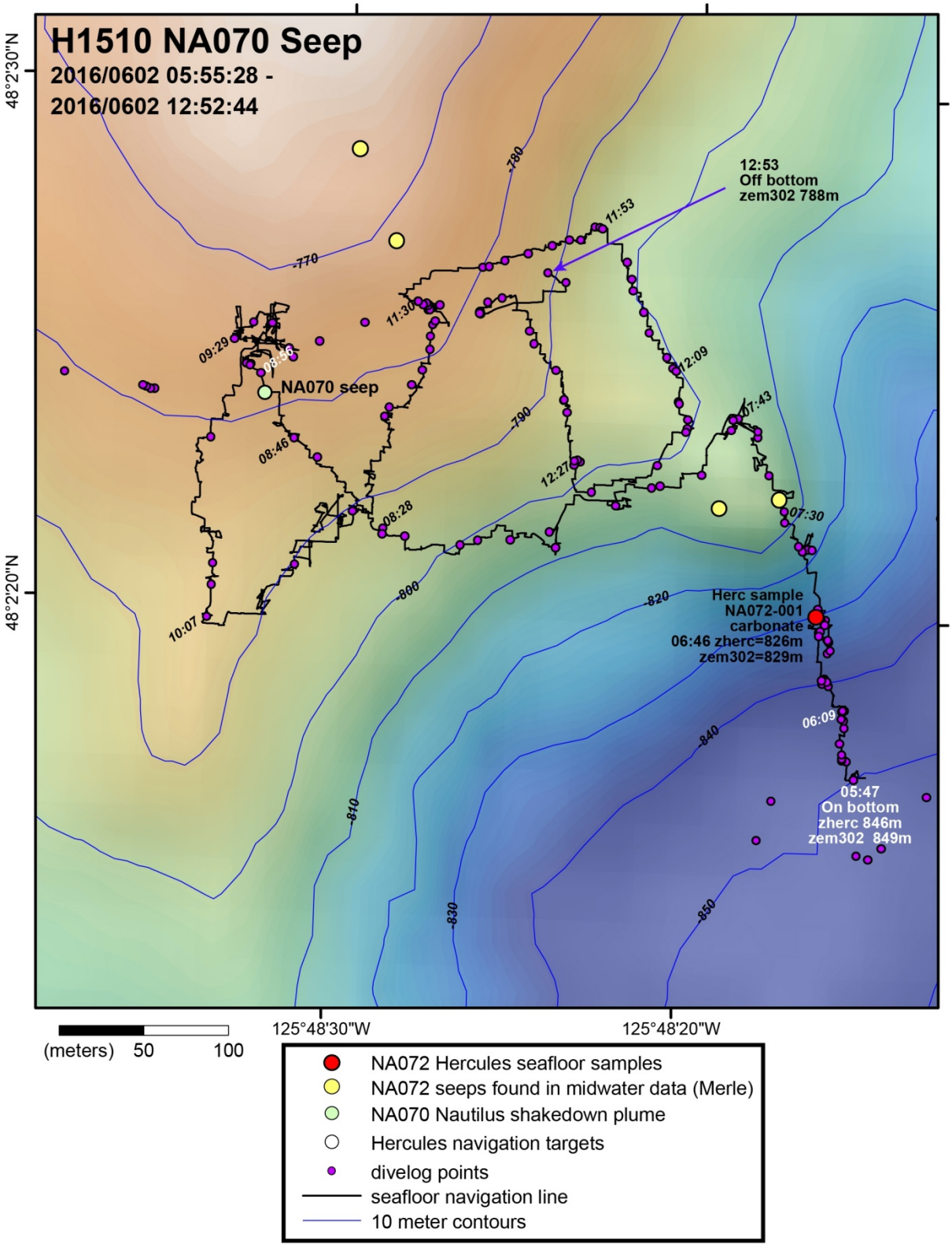
Overall, there were 23 venues from three countries that took part in OET's Live Interactions: Australia, Northern Ireland and the USA who had 12 states participate. The

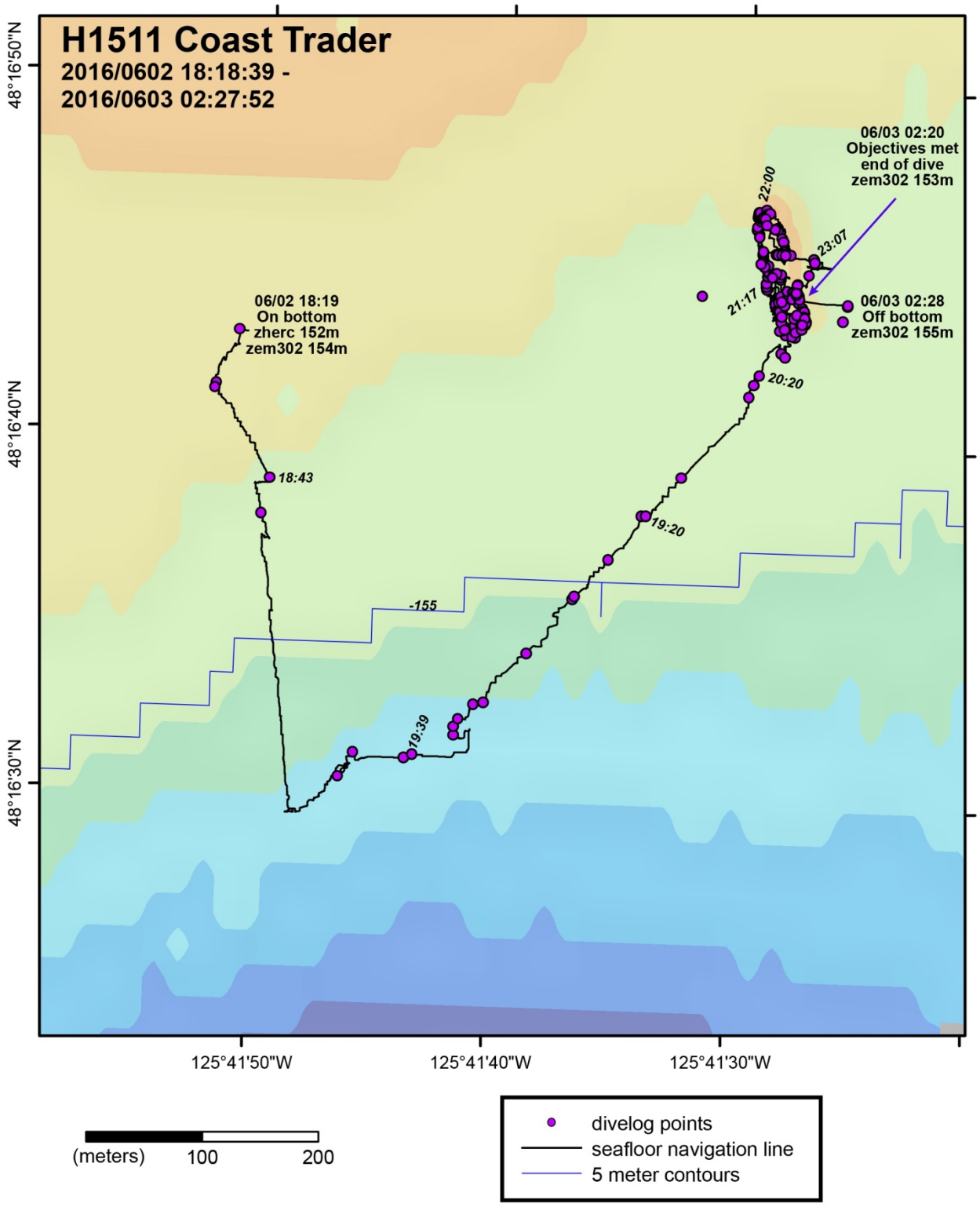
majority of the audiences were students, ranging from first grade to college, making up 63% of the total. As this cruise ran throughout the Northern Hemisphere's summer holidays, many came from summer camps run by aquariums and museums.

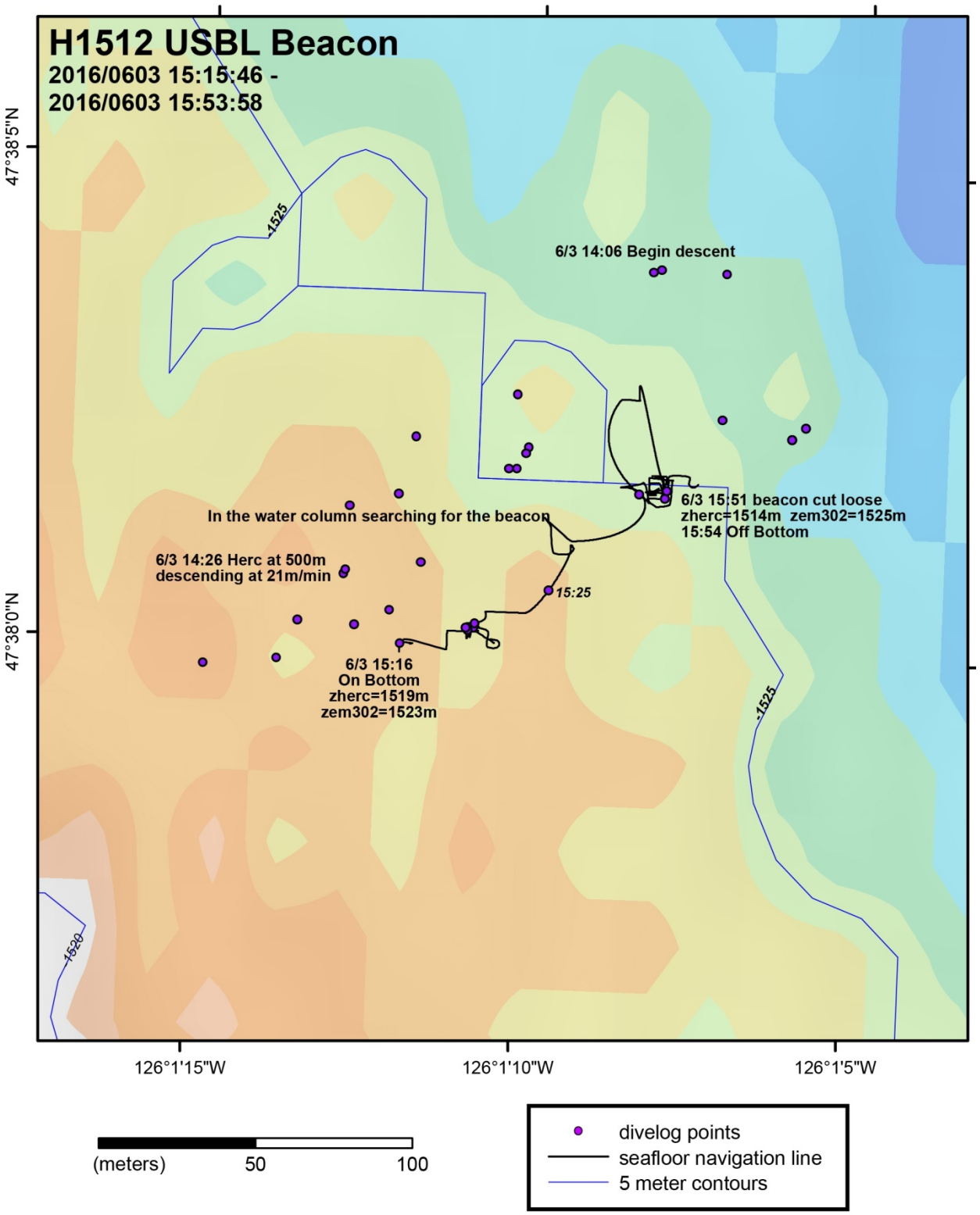
NA072 Hercules Dive Maps

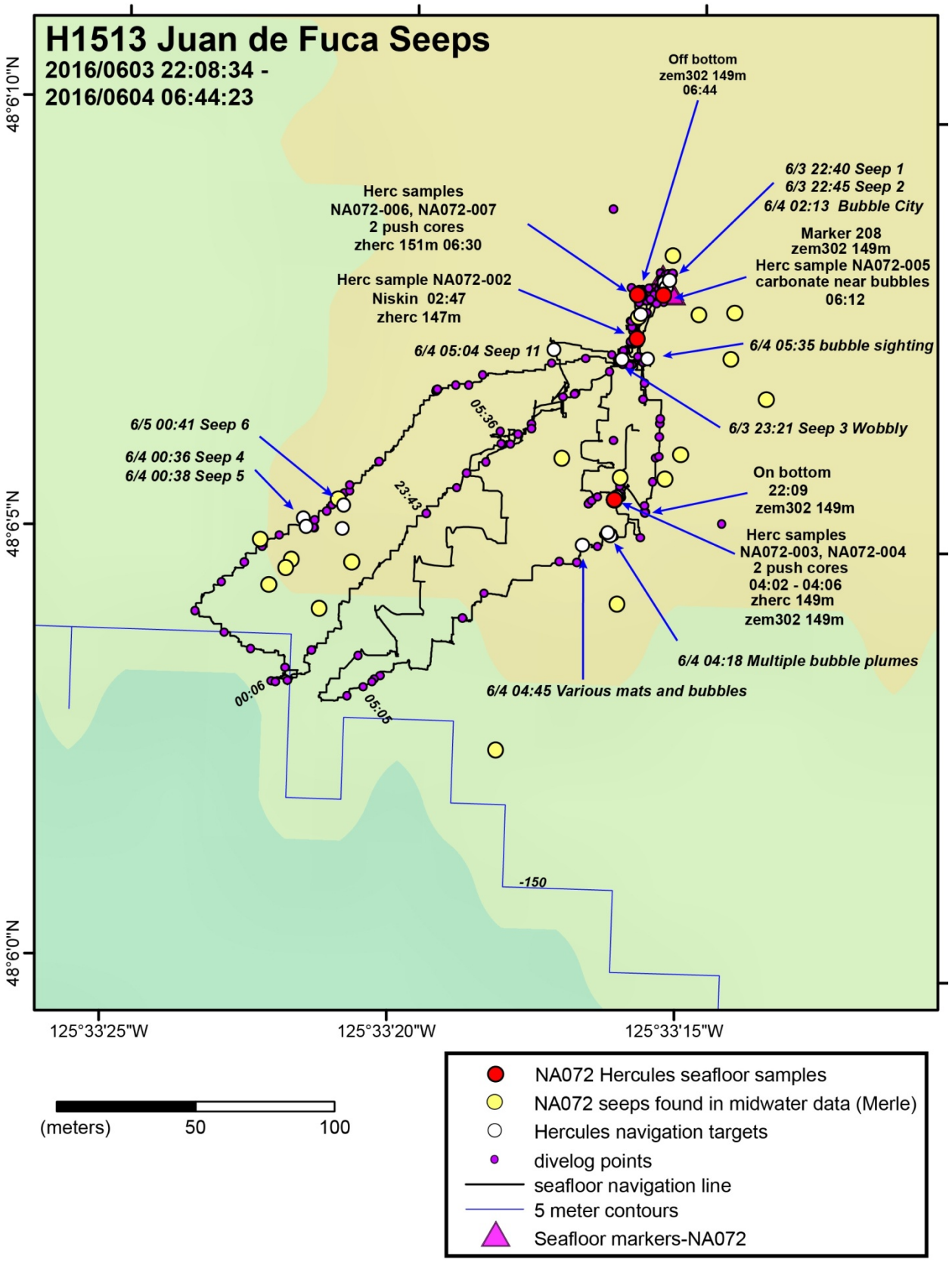
All times are UTC

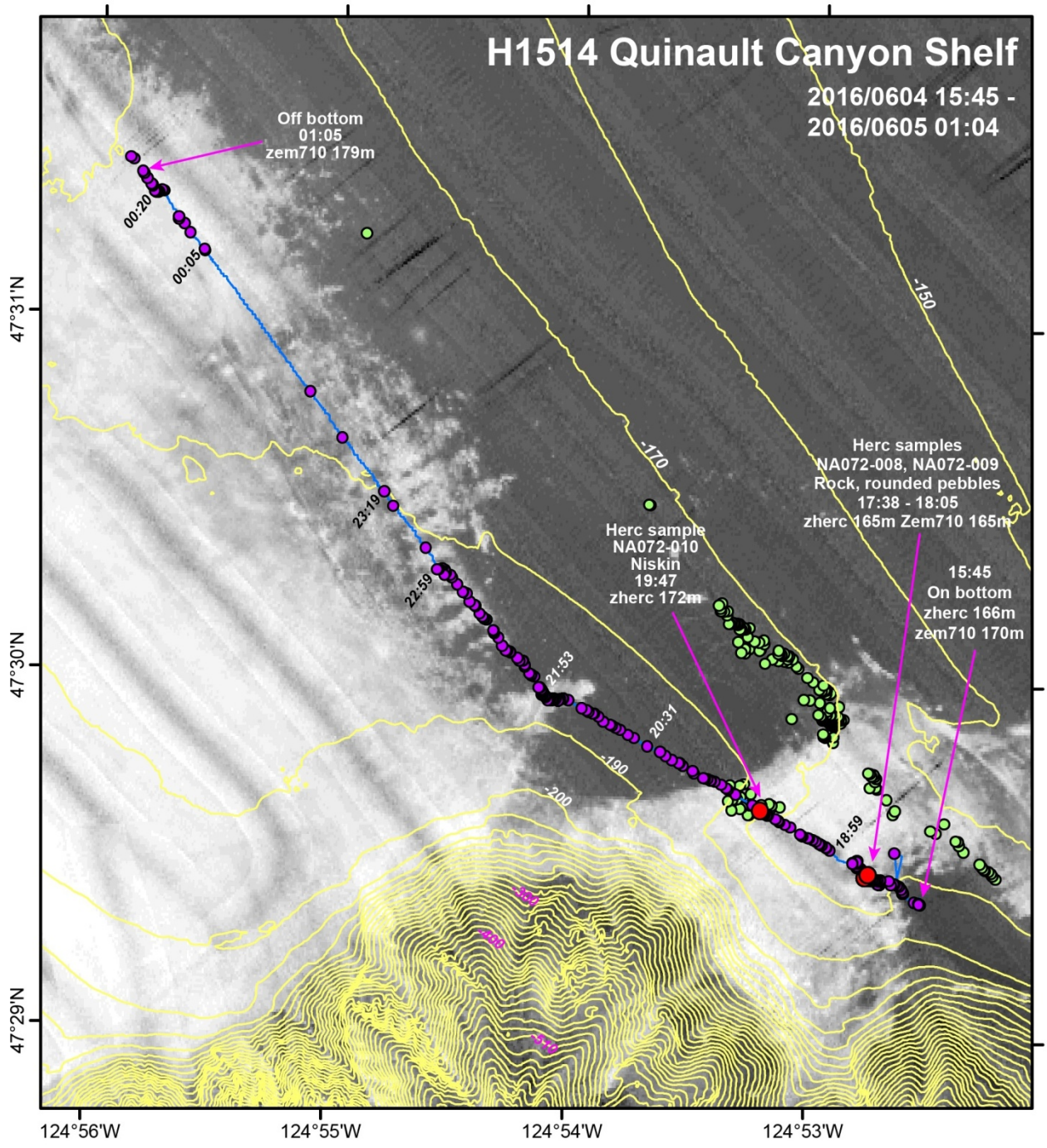
Created by Susan G. Merle

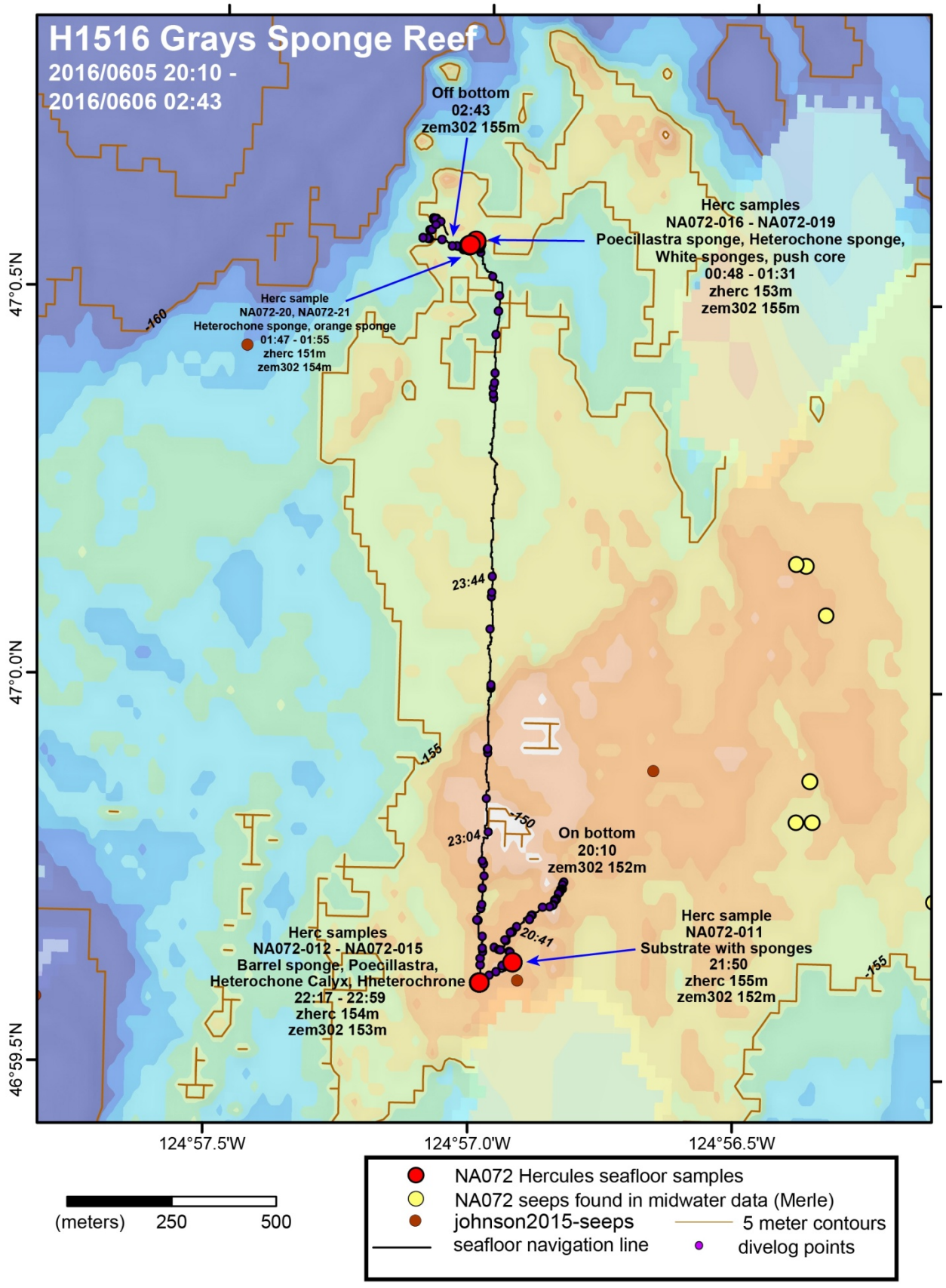


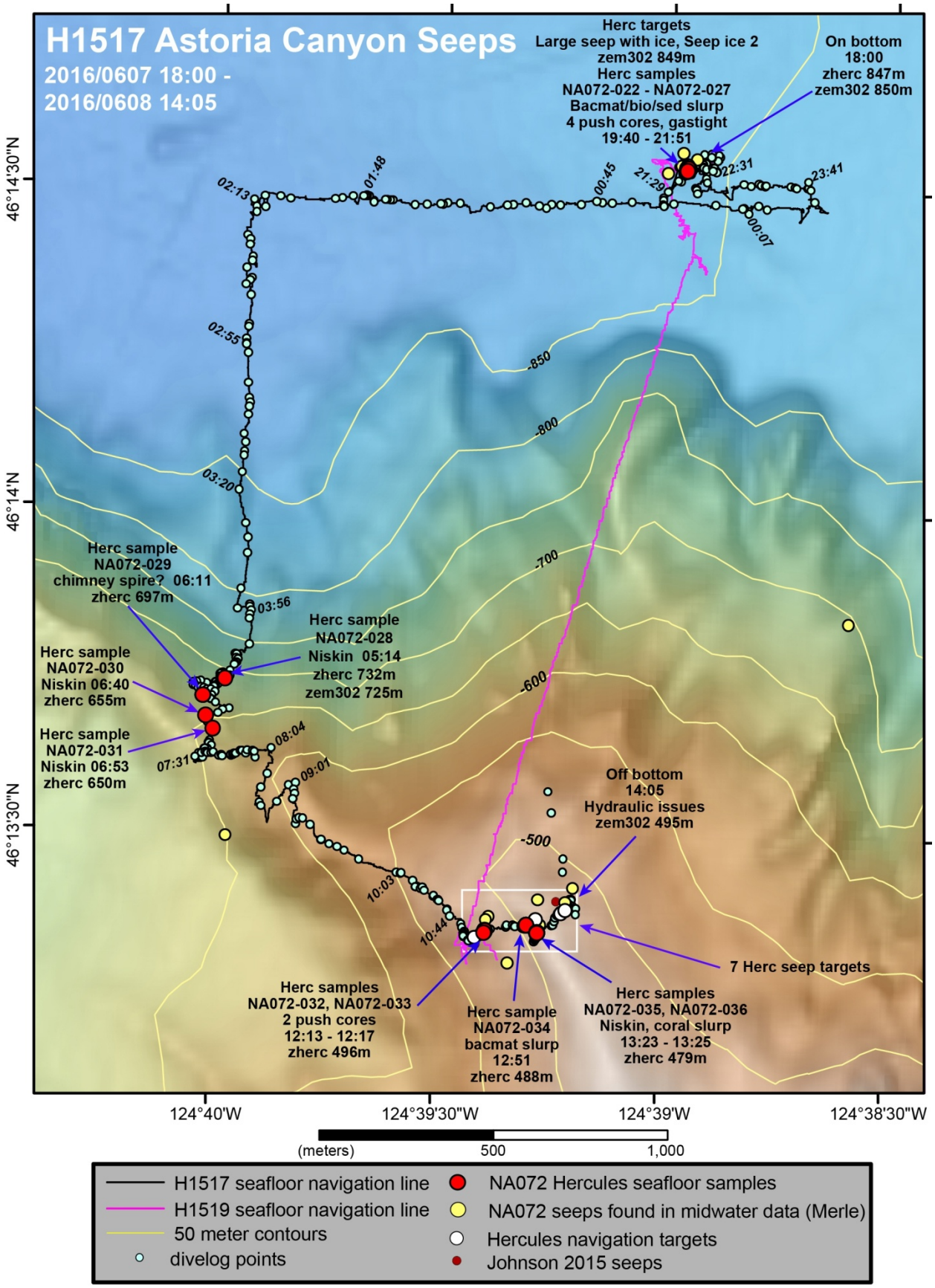

H1511 Coast Trader
2016/0602 18:18:39 -
2016/0603 02:27:52
06/03 02:20
Objectives met
end of dive
zem302 153m
06/03 02:28
Off bottom
zem302 155m
06/02 18:19
On bottom
zherc 152m
zem302 154m
22:00
23:07
21:17
20:20
19:20
18:43
19:39
-155
48°16'50"N
48°16'40"N
48°16'30"N
125°41'50"W
125°41'40"W
125°41'30"W
(meters) 100 200
divelog points
seafloor navigation line
5 meter contours

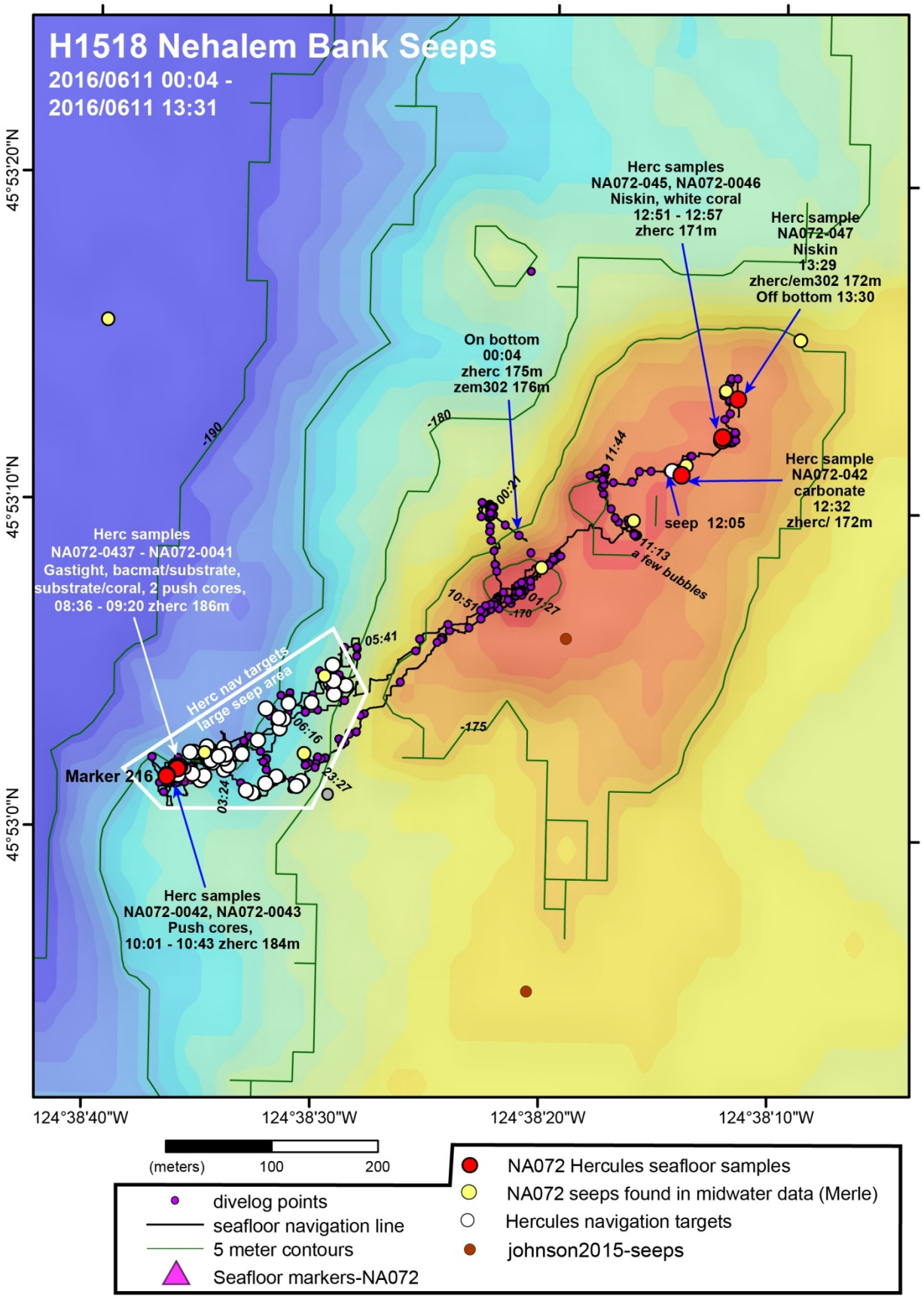

H1512 USBL Beacon
2016/0603 15:15:46 -
2016/0603 15:53:58
47°38'5"N
47°38'0"N
126°1'15"W
126°1'10"W
126°1'5"W
-1525
-1520
6/3 14:06 Begin descent
6/3 15:51 beacon cut loose
zherc=1514m zem302=1525m
15:54 Off Bottom
In the water column searching for the beacon
6/3 14:26 Herc at 500m
descending at 21m/min
15:25
6/3 15:16
On Bottom
zherc=1519m
zem302=1523m
(meters)
50
100
divelog points
seafloor navigation line
5 meter contours

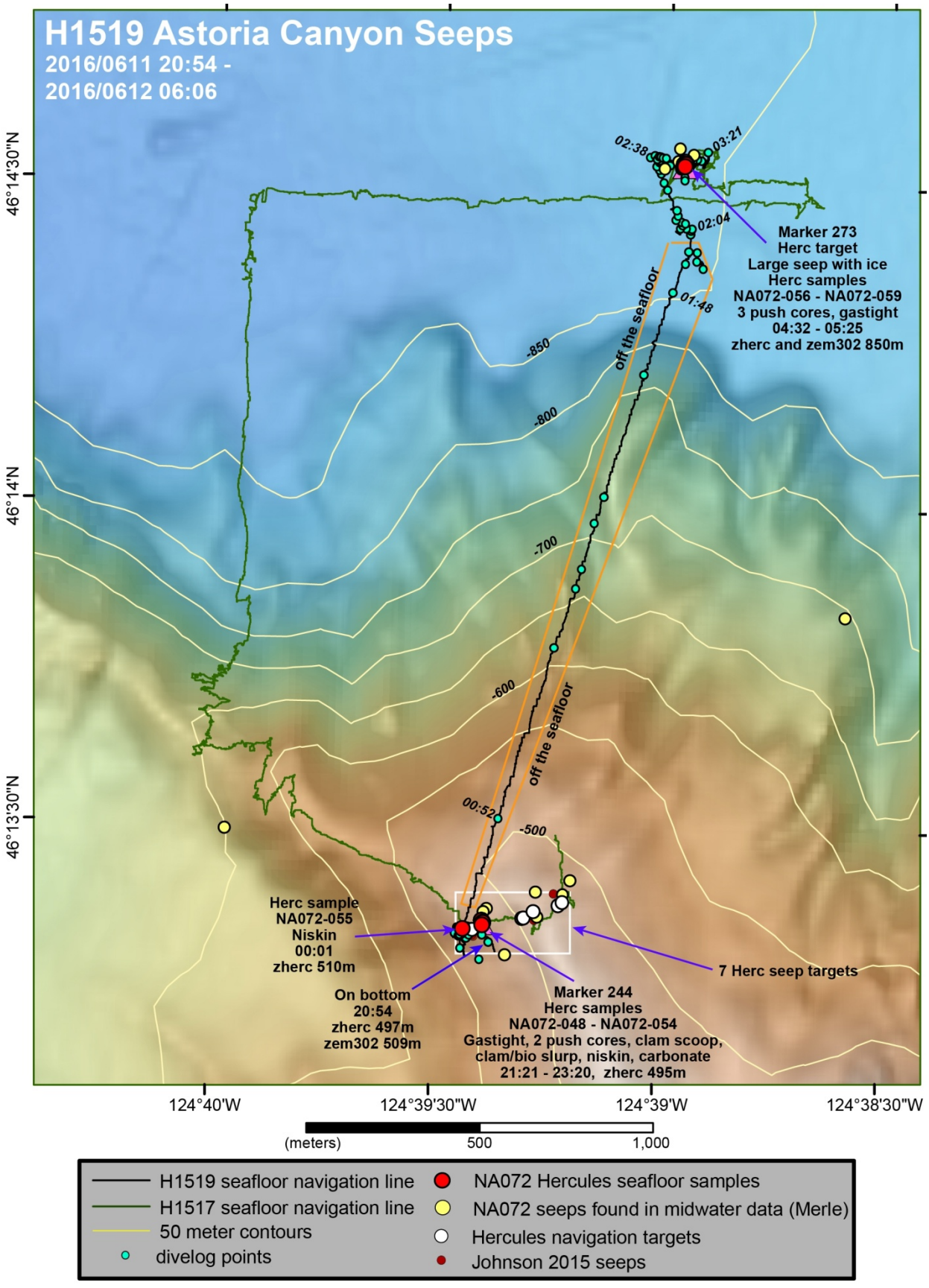

H1513 Juan de Fuca Seeps
2016/0603 22:08:34 -
2016/0604 06:44:23
Off bottom
zem302 149m
06:44
6/3 22:40 Seep 1
6/3 22:45 Seep 2
6/4 02:13 Bubble City
Herc samples
NA072-006, NA072-007
2 push cores
zherc 151m 06:30
Marker 208
zem302 149m
Herc sample NA072-005
carbonate near bubbles
06:12
Herc sample NA072-002
Niskin 02:47
zherc 147m
6/4 05:04 Seep 11
6/4 05:35 bubble sighting
6/3 23:21 Seep 3 Wobbly
6/5 00:41 Seep 6
6/4 00:36 Seep 4
6/4 00:38 Seep 5
05:36
23:43
On bottom
22:09
zem302 149m
Herc samples
NA072-003, NA072-004
2 push cores
04:02 - 04:06
zherc 149m
zem302 149m
6/4 04:18 Multiple bubble plumes
6/4 04:45 Various mats and bubbles
00:06
05:05
-150
48°6'10"N
48°6'5"N
48°6'0"N
125°33'25"W
125°33'20"W
125°33'15"W
(meters)
50
100
NA072 Hercules seafloor samples
NA072 seeps found in midwater data (Merle)
Hercules navigation targets
divelog points
seafloor navigation line
5 meter contours
Seafloor markers-NA072

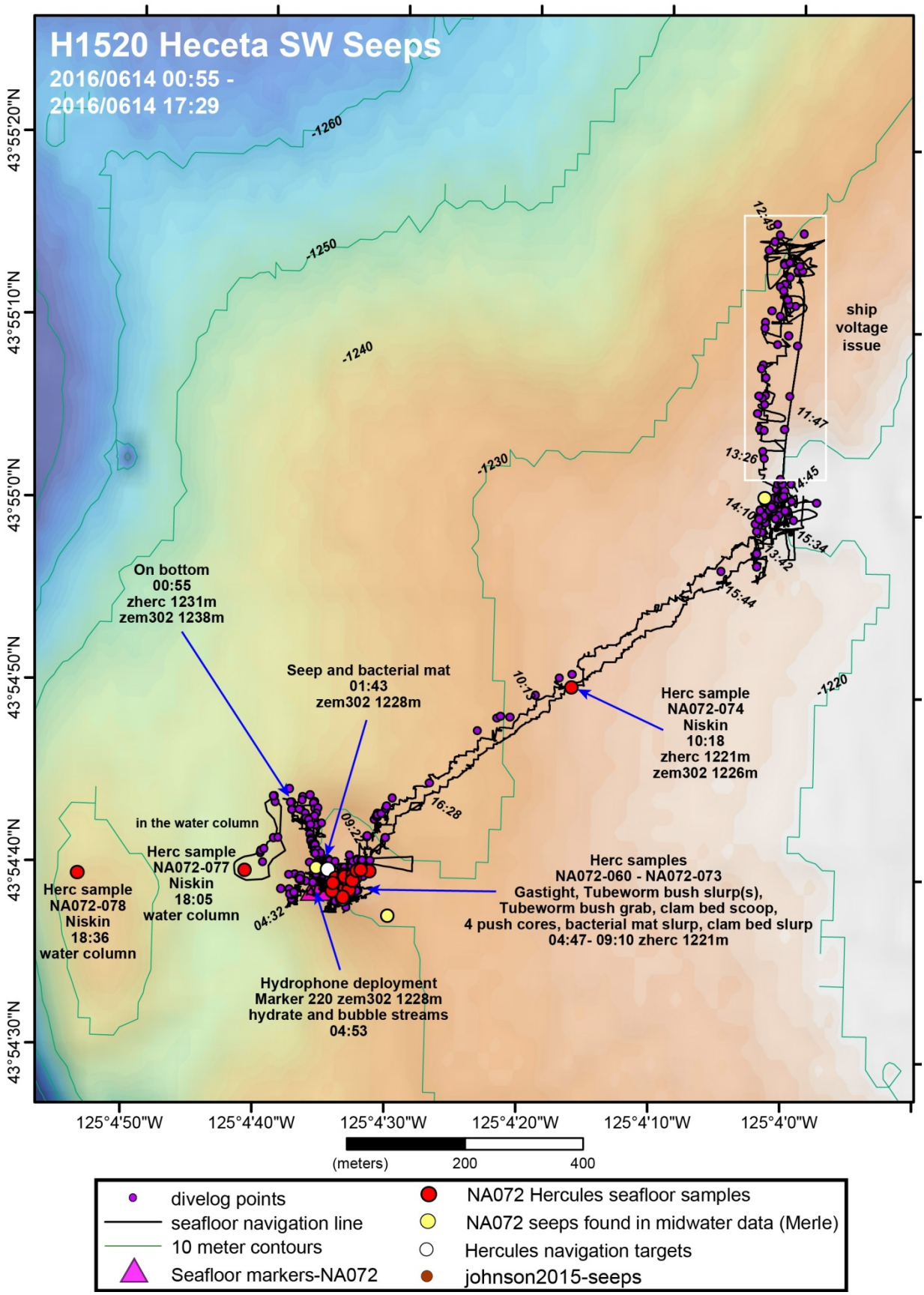

H1514 Quinault Canyon Shelf
2016/0604 15:45 -
2016/0605 01:04
Off bottom
01:05
zem710 179m
00:20
00:05
23:19
22:59
21:53
20:31
18:59
-150
-170
-190
-200
Herc sample
NA072-010
Niskin
19:47
zherc 172m
Herc samples
NA072-008, NA072-009
Rock, rounded pebbles
17:38 - 18:05
zherc 165m Zem710 165m
15:45
On bottom
zherc 166m
zem710 170m
47°31'N
47°30'N
47°29'N
124°56'W
124°55'W
124°54'W
124°53'W
(meters) 500 1,000
1605 RA (710 kHz) grayscale backscatter data - lighter pixels are higher values - overlaid with 10 m bathymetry contours
divelog points
seafloor navigation line
10 meter contours
NA072 Hercules seafloor samples
1605RA seeps found in midwater data (Sampaga)

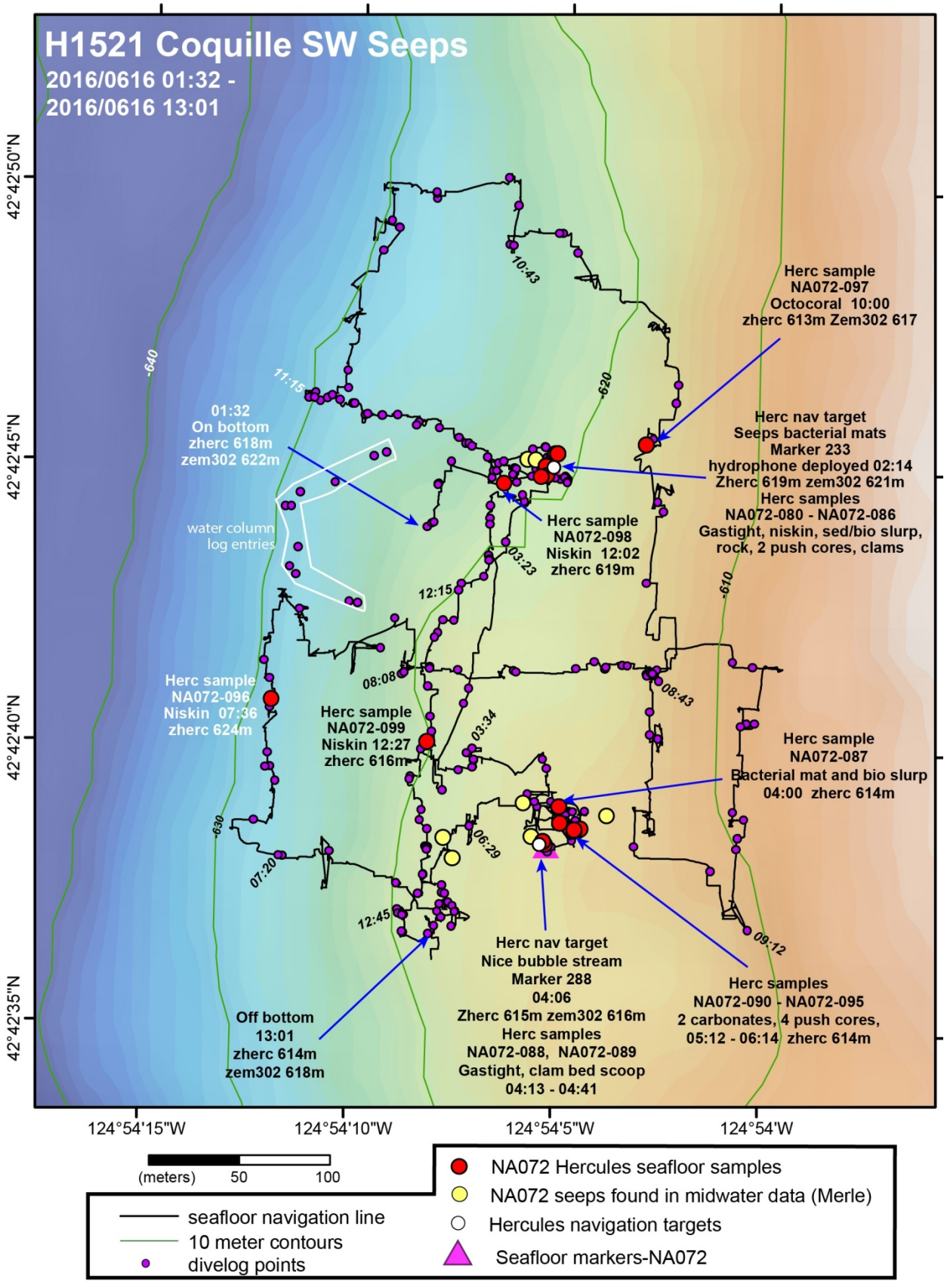

H1516 Grays Sponge Reef
2016/0605 20:10 -
2016/0606 02:43
Off bottom
02:43
zem302 155m
Herc samples
NA072-016 - NA072-019
Poecillastra sponge, Heterochone sponge,
White sponges, push core
00:48 - 01:31
zherc 153m
zem302 155m
Herc sample
NA072-20, NA072-21
Heterochone sponge, orange sponge
01:47 - 01:55
zherc 151m
zem302 154m
-160
23:44
-155
-150
23:04
On bottom
20:10
zem302 152m
20:41
Herc samples
NA072-012 - NA072-015
Barrel sponge, Poecillastra,
Heterochone Calyx, Hheterochrone
22:17 - 22:59
zherc 154m
zem302 153m
Herc sample
NA072-011
Substrate with sponges
21:50
zherc 155m
zem302 152m
-155
47°0.5'N
47°0.0'N
46°59.5'N
124°57.5'W
124°57.0'W
124°56.5'W
(meters) 250 500
NA072 Hercules seafloor samples
NA072 seeps found in midwater data (Merle)
johnson2015-seeps
5 meter contours
seafloor navigation line
divelog points

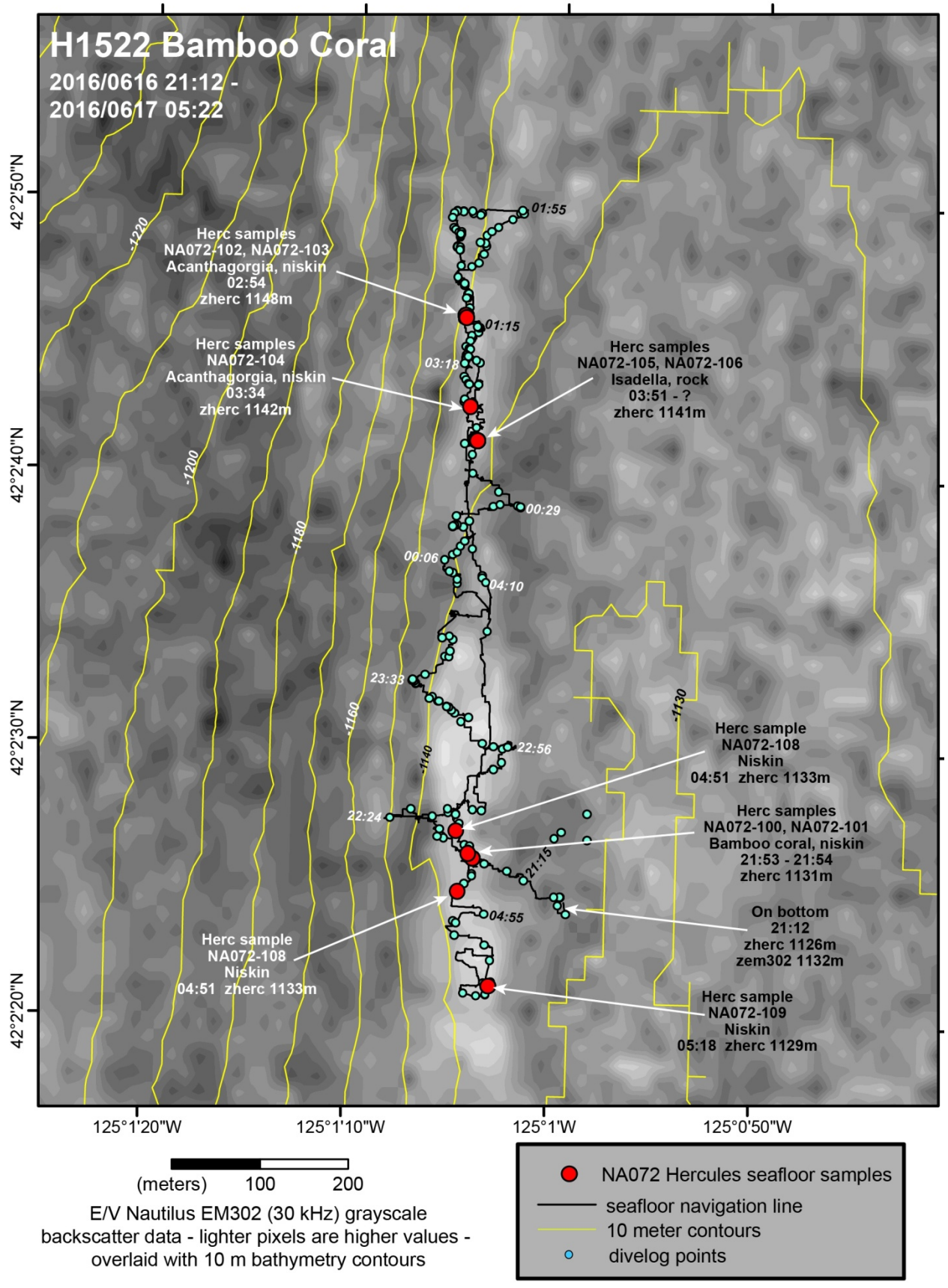

H1517 Astoria Canyon Seeps
2016/0607 18:00 -
2016/0608 14:05
Herc targets
Large seep with ice, Seep ice 2
zem302 849m
Herc samples
NA072-022 - NA072-027
Bacmat/bio/sed slurp
4 push cores, gastight
19:40 - 21:51
On bottom
18:00
zherc 847m
zem302 850m
Herc sample
NA072-029
chimney spire? 06:11
zherc 697m
Herc sample
NA072-028
Niskin 05:14
zherc 732m
zem302 725m
Herc sample
NA072-030
Niskin 06:40
zherc 655m
Herc sample
NA072-031
Niskin 06:53
zherc 650m
Off bottom
14:05
Hydraulic issues
zem302 495m
7 Herc seep targets
Herc samples
NA072-032, NA072-033
2 push cores
12:13 - 12:17
zherc 496m
Herc sample
NA072-034
bacmat slurp
12:51
zherc 488m
Herc samples
NA072-035, NA072-036
Niskin, coral slurp
13:23 - 13:25
zherc 479m
-850
-800
-700
-600
-500
46°14'30"N
46°14'N
46°13'30"N
124°40'W
124°39'30"W
124°39'W
124°38'30"W
(meters)
500
1,000
H1517 seafloor navigation line
H1519 seafloor navigation line
50 meter contours
divelog points
NA072 Hercules seafloor samples
NA072 seeps found in midwater data (Merle)
Hercules navigation targets
Johnson 2015 seeps


H1518 Nehalem Bank Seeps
2016/0611 00:04 -
2016/0611 13:31
Herc samples
NA072-045, NA072-0046
Niskin, white coral
12:51 - 12:57
zherc 171m
Herc sample
NA072-047
Niskin
13:29
zherc/em302 172m
Off bottom 13:30
On bottom
00:04
zherc 175m
zem302 176m
Herc sample
NA072-042
carbonate
12:32
zherc/ 172m
seep 12:05
11:13
a few bubbles
Herc samples
NA072-0437 - NA072-0041
Gastight, bacmat/substrate,
substrate/coral, 2 push cores,
08:36 - 09:20 zherc 186m
Herc nav targets
large seep area
Marker 216
Herc samples
NA072-0042, NA072-0043
Push cores,
10:01 - 10:43 zherc 184m
-190
-180
-170
-175
11:44
00:21
01:27
10:51
05:41
06:16
23:27
03:24
45°53'20"N
45°53'10"N
45°53'0"N
124°38'40"W
124°38'30"W
124°38'20"W
124°38'10"W
(meters)
100
200
divelog points
seafloor navigation line
5 meter contours
Seafloor markers-NA072
NA072 Hercules seafloor samples
NA072 seeps found in midwater data (Merle)
Hercules navigation targets
johnson2015-seeps

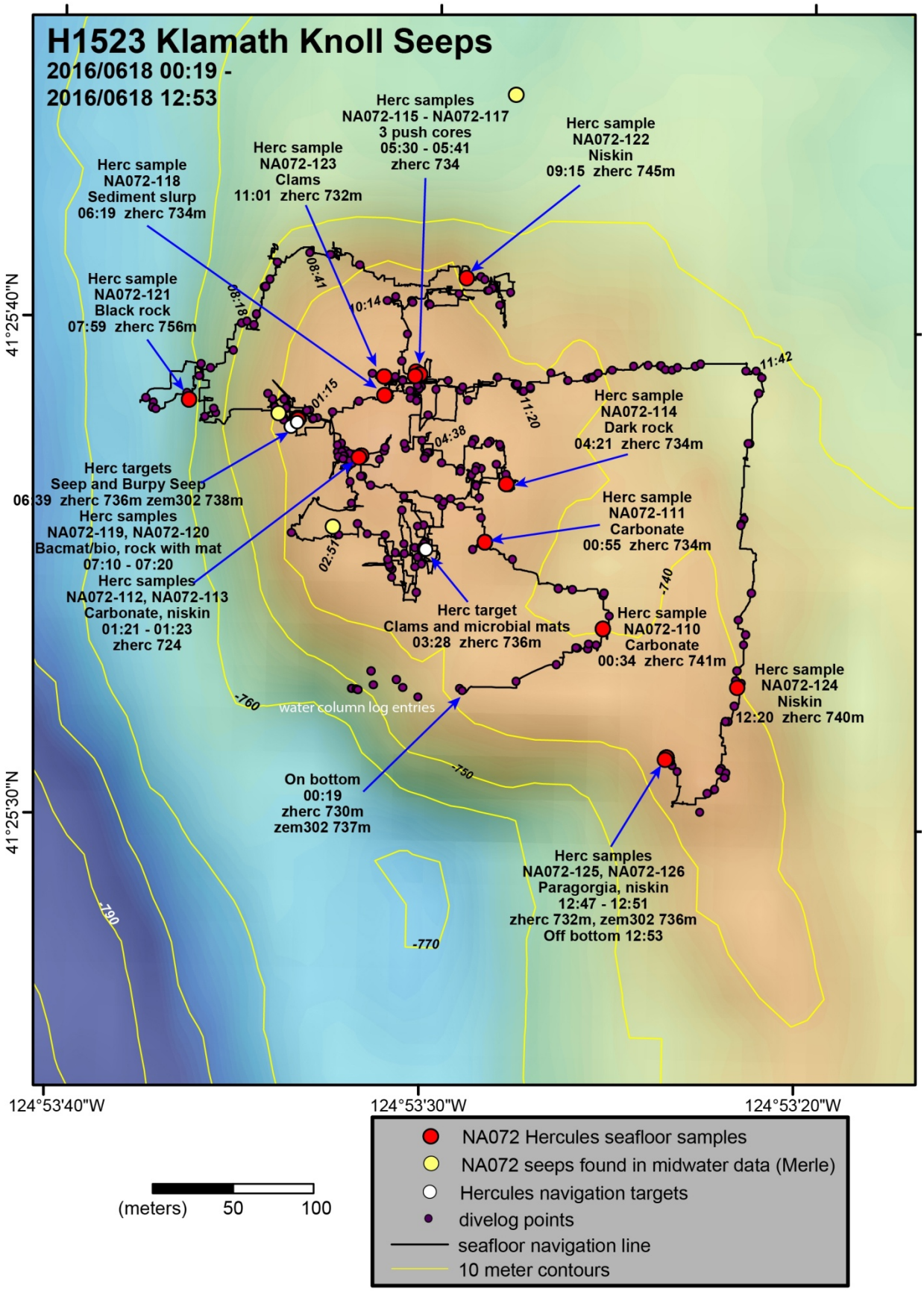

H1519 Astoria Canyon Seeps
2016/0611 20:54 -
2016/0612 06:06
46°14'30"N
46°14'N
46°13'30"N
124°40'W
124°39'30"W
124°39'W
124°38'30"W
02:38
03:21
02:04
01:48
00:52
-850
-800
-700
-600
-500
off the seafloor
off the seafloor
Marker 273
Herc target
Large seep with ice
Herc samples
NA072-056 - NA072-059
3 push cores, gastight
04:32 - 05:25
zherc and zem302 850m
Herc sample
NA072-055
Niskin
00:01
zherc 510m
On bottom
20:54
zherc 497m
zem302 509m
Marker 244
Herc samples
NA072-048 - NA072-054
Gastight, 2 push cores, clam scoop,
clam/bio slurp, niskin, carbonate
21:21 - 23:20, zherc 495m
7 Herc seep targets
(meters)
500
1,000
H1519 seafloor navigation line
H1517 seafloor navigation line
50 meter contours
divelog points
NA072 Hercules seafloor samples
NA072 seeps found in midwater data (Merle)
Hercules navigation targets
Johnson 2015 seeps


H1520 Heceta SW Seeps
2016/0614 00:55 -
2016/0614 17:29
-1260
-1250
-1240
-1230
-1220
12:49
11:47
13:26
14:45
14:10
15:34
13:42
15:44
10:18
16:28
09:22
04:32
ship
voltage
issue
On bottom
00:55
zherc 1231m
zem302 1238m
Seep and bacterial mat
01:43
zem302 1228m
Herc sample
NA072-074
Niskin
10:18
zherc 1221m
zem302 1226m
in the water column
Herc sample
NA072-077
Niskin
18:05
water column
Herc sample
NA072-078
Niskin
18:36
water column
Herc samples
NA072-060 - NA072-073
Gastight, Tubeworm bush slurp(s),
Tubeworm bush grab, clam bed scoop,
4 push cores, bacterial mat slurp, clam bed slurp
04:47- 09:10 zherc 1221m
Hydrophone deployment
Marker 220 zem302 1228m
hydrate and bubble streams
04:53
43°55'20"N
43°55'10"N
43°55'0"N
43°54'50"N
43°54'40"N
43°54'30"N
125°4'50"W
125°4'40"W
125°4'30"W
125°4'20"W
125°4'10"W
125°4'0"W
(meters)
200
400
divelog points
seafloor navigation line
10 meter contours
Seafloor markers-NA072
NA072 Hercules seafloor samples
NA072 seeps found in midwater data (Merle)
Hercules navigation targets
johnson2015-seeps


H1521 Coquille SW Seeps
2016/0616 01:32 -
2016/0616 13:01
42°42'50"N
42°42'45"N
42°42'40"N
42°42'35"N
124°54'15"W
124°54'10"W
124°54'5"W
124°54'W
-640
-620
-610
-630
10:43
11:15
03:23
12:15
08:08
08:43
03:34
06:29
07:20
12:45
09:12
01:32
On bottom
zherc 618m
zem302 622m
water column
log entries
Herc sample
NA072-097
Octocoral 10:00
zherc 613m Zem302 617
Herc nav target
Seeps bacterial mats
Marker 233
hydrophone deployed 02:14
Zherc 619m zem302 621m
Herc samples
NA072-080 - NA072-086
Gastight, niskin, sed/bio slurp,
rock, 2 push cores, clams
Herc sample
NA072-098
Niskin 12:02
zherc 619m
Herc sample
NA072-096
Niskin 07:36
zherc 624m
Herc sample
NA072-099
Niskin 12:27
zherc 616m
Herc sample
NA072-087
Bacterial mat and bio slurp
04:00 zherc 614m
Herc nav target
Nice bubble stream
Marker 288
04:06
Zherc 615m zem302 616m
Herc samples
NA072-088, NA072-089
Gastight, clam bed scoop
04:13 - 04:41
Herc samples
NA072-090 - NA072-095
2 carbonates, 4 push cores,
05:12 - 06:14 zherc 614m
Off bottom
13:01
zherc 614m
zem302 618m
(meters) 50 100
seafloor navigation line
10 meter contours
divelog points
NA072 Hercules seafloor samples
NA072 seeps found in midwater data (Merle)
Hercules navigation targets
Seafloor markers-NA072



E/V Nautilus EM302 (30 kHz) grayscale backscatter data - lighter pixels are higher values - overlaid with 10 m bathymetry contours


H1523 Klamath Knoll Seeps
2016/0618 00:19 -
2016/0618 12:53
Herc samples
NA072-115 - NA072-117
3 push cores
05:30 - 05:41
zherc 734
Herc sample
NA072-122
Niskin
09:15 zherc 745m
Herc sample
NA072-123
Clams
11:01 zherc 732m
Herc sample
NA072-118
Sediment slurp
06:19 zherc 734m
Herc sample
NA072-121
Black rock
07:59 zherc 756m
08:41
08:18
10:14
01:15
11:20
11:42
04:38
Herc sample
NA072-114
Dark rock
04:21 zherc 734m
Herc targets
Seep and Burpy Seep
06:39 zherc 736m zem302 738m
Herc samples
NA072-119, NA072-120
Bacmat/bio, rock with mat
07:10 - 07:20
Herc samples
NA072-112, NA072-113
Carbonate, niskin
01:21 - 01:23
zherc 724
02:51
Herc sample
NA072-111
Carbonate
00:55 zherc 734m
-740
Herc target
Clams and microbial mats
03:28 zherc 736m
Herc sample
NA072-110
Carbonate
00:34 zherc 741m
Herc sample
NA072-124
Niskin
12:20 zherc 740m
-760
water column log entries
-750
On bottom
00:19
zherc 730m
zem302 737m
Herc samples
NA072-125, NA072-126
Paragorgia, niskin
12:47 - 12:51
zherc 732m, zem302 736m
Off bottom 12:53
-790
-770
41°25'40"N
41°25'30"N
124°53'40"W
124°53'30"W
124°53'20"W
(meters) 50 100
NA072 Hercules seafloor samples
NA072 seeps found in midwater data (Merle)
Hercules navigation targets
divelog points
seafloor navigation line
10 meter contours

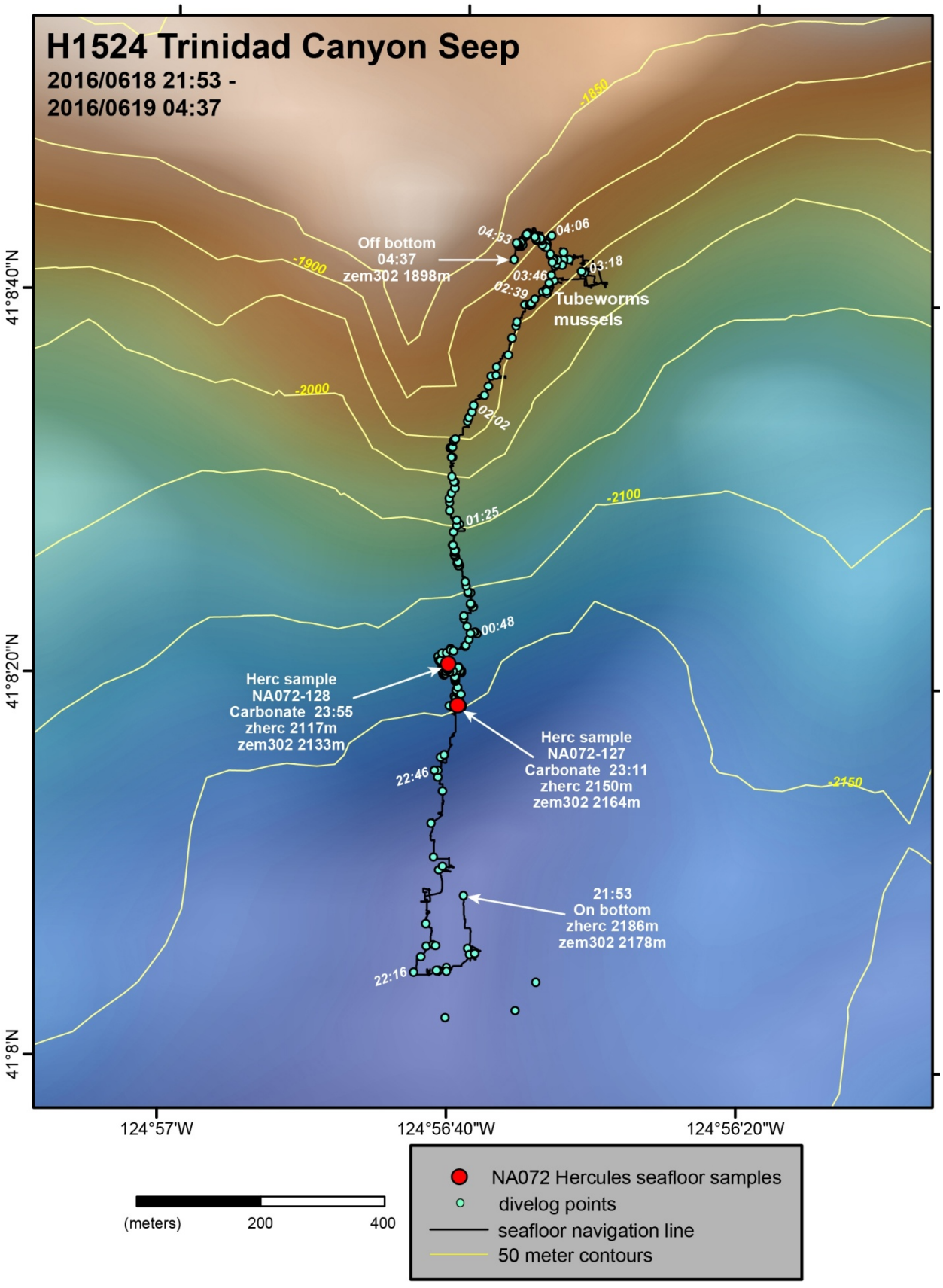

H1524 Trinidad Canyon Seep
2016/0618 21:53 -
2016/0619 04:37
-1850
-1900
-2000
-2100
-2150
Off bottom
04:37
zem302 1898m
04:33
04:06
03:18
03:46
02:39
Tubeworms
mussels
02:02
01:25
00:48
Herc sample
NA072-128
Carbonate 23:55
zherc 2117m
zem302 2133m
Herc sample
NA072-127
Carbonate 23:11
zherc 2150m
zem302 2164m
22:46
21:53
On bottom
zherc 2186m
zem302 2178m
22:16
41°8'40"N
41°8'20"N
41°8'N
124°57'W
124°56'40"W
124°56'20"W
(meters)
200
400
NA072 Hercules seafloor samples
divelog points
seafloor navigation line
50 meter contours

Table 6: NA072 Hercules Samples

Zm *Depth (m) Paroscientific Digiquartz*

Tc *Temp (degC) Seabird FastCat 49Plus*

Spsu *Salinity (psu) Seabird FastCat 49Plus*

O2 Corrected O2 data (x0.813)

*Wetlab*Wet lab description, Overall sample

Note: Sample information provided by E/V *Nautilus* science manager and scientific personnel

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-001	NA072-001-01-D	H1510	2016-06-02T06:46:20.552Z	48.038909	-125.804450	825.9	ROV grab	3.7	34.3		Rock sample of carbonate structure	Brown carbonate with grey coloring at break-off point, ~45x20x15 cm	Air dried	GSO/ URI
NA072-002	NA072-002	H1513	2016-06-04T02:47:21.527Z	48.102051	-125.554407	147.1	Niskin	6.7	33.9	91.3	Water sample taken by sea pens, Niskin Bottle 12	Vial label: 2016 coral, eDNA1	Filter stored in cryo vial	Meredith Everett
NA072-003	NA072-003-01-D (0-5cm)	H1513	2016-06-04T04:02:41.624Z	48.101526	-125.554491	149.5	Push Core	6.7	33.9	90.7	Push core (in pairs, next is 004) near/at bacterial mat with bubbles coming out around it	10 cm core. Dark, fine grained sediment. No distinctive color or texture variations.	Sieved into bottle with filtered seawater/ formalin	Sarah Seabrook / OSU
NA072-003	NA072-003-02-D (5-10cm)	H1513	2016-06-04T04:02:41.624Z	48.101526	-125.554491	149.5	Push Core	6.7	33.9	90.7			Sieved into bottle with filtered seawater/ formalin	Seabrook
NA072-004	NA072-004-01-E (0-1cm)	H1513	2016-06-04T04:06:17.862Z	48.101528	-125.554490	149.5	Push Core	6.7	33.9	90.4	Push core (in pairs, previous pair is 003) near/at bacterial mat with bubbles coming out around it	9 cm core. Dark, fine grained sediment. No distinctive color or texture variations.	1cm slices in whirlpack bags	Seabrook
NA072-004	NA072-004-01-E (1-2cm)	H1513	2016-06-04T04:06:17.862Z	48.101528	-125.554490	149.5	Push Core	6.7	33.9	90.4			1cm slices in whirlpack bags	Seabrook
NA072-004	NA072-004-01-E (2-3cm)	H1513	2016-06-04T04:06:17.862Z	48.101528	-125.554490	149.5	Push Core	6.7	33.9	90.4			1cm slices in whirlpack bags	Seabrook

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-004	NA072-004-01-E (3-4cm)	H1513	2016-06-04T04:06:17.862Z	48.101528	-125.554490	149.5	Push Core	6.7	33.9	90.4			1cm slices in whirlpack bags	Seabrook
NA072-004	NA072-004-01-E (4-5cm)	H1513	2016-06-04T04:06:17.862Z	48.101528	-125.554490	149.5	Push Core	6.7	33.9	90.4			1cm slices in whirlpack bags	Seabrook
NA072-004	NA072-004-01-E (5-6cm)	H1513	2016-06-04T04:06:17.862Z	48.101528	-125.554490	149.5	Push Core	6.7	33.9	90.4			1cm slices in whirlpack bags	Seabrook
NA072-004	NA072-004-01-E (6-7cm)	H1513	2016-06-04T04:06:17.862Z	48.101528	-125.554490	149.5	Push Core	6.7	33.9	90.4			1cm slices in whirlpack bags	Seabrook
NA072-004	NA072-004-01-E (7-8cm)	H1513	2016-06-04T04:06:17.862Z	48.101528	-125.554490	149.5	Push Core	6.7	33.9	90.4			1cm slices in whirlpack bags	Seabrook
NA072-004	NA072-004-01-E (8-9cm)	H1513	2016-06-04T04:06:17.862Z	48.101528	-125.554490	149.5	Push Core	6.7	33.9	90.4			1cm slices in whirlpack bags	Seabrook
NA072-005	NA072-005-01-C	H1513	2016-06-04T06:12:19.893Z	48.102195	-125.554286	150.7	ROV grab	6.6	33.9	90.0	Small carbonate sample covered in sediments near bubbles	Two small ~6x3x3cm brown and grey carbonate samples covered in sediment. Minimal associate fauna.	Air dried	GSO/ URI
NA072-005	NA072-005-03-A	H1513	2016-06-04T06:12:19.893Z	48.102195	-125.554286	150.7	ROV grab	6.6	33.9	90.0			95% EtOH	MCZ
NA072-005	NA072-005-03-B	H1513	2016-06-04T06:12:19.893Z	48.102195	-125.554286	150.7	ROV grab	6.6	33.9	90.0			RNA later	MCZ
NA072-005	NA072-005-04-A	H1513	2016-06-04T06:12:19.893Z	48.102195	-125.554286	150.7	ROV grab	6.6	33.9	90.0			95% EtOH	MCZ
NA072-005	NA072-005-04-B	H1513	2016-06-04T06:12:19.893Z	48.102195	-125.554286	150.7	ROV grab	6.6	33.9	90.0			RNA later	MCZ
NA072-006	NA072-006	H1513	2016-06-04T06:26:51.214Z	48.102196	-125.554407	150.7	Push Core	6.6	33.9	90.2	Push core pair (first of two samples), directly next to bubbles	Core sediment fell apart while attempting to remove it from quiver, sample discarded	–	Seabrook

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-007	NA072-007	H1513	2016-06-04T06:30:20.444Z	48.102194	-125.554411	150.7	Push Core	6.6	33.9	90.2	Push core pair (second of two samples), directly next to bubbles	Core sediment fell apart while attempting to remove it from quiver, sample discarded	–	Seabrook
NA072-008	NA072-008-01-C	H1514	2016-06-04T17:38:22.677Z	47.490933	-124.879355	165.0	ROV grab	6.8	33.9	84.0	Rock sample in the high reflectivity region	Granite rock coated with sediment and dark green biofilm	Air dried	GSO – ONCMS
NA072-008	NA072-008-02-A	H1514	2016-06-04T17:38:22.677Z	47.490933	-124.879355	165.0	ROV grab	6.8	33.9	84.0			95% EtOH	MCZ
NA072-008	NA072-008-02-B	H1514	2016-06-04T17:38:22.677Z	47.490933	-124.879355	165.0	ROV grab	6.8	33.9	84.0			RNA later	MCZ
NA072-008	NA072-008-03-A	H1514	2016-06-04T17:38:22.677Z	47.490933	-124.879355	165.0	ROV grab	6.8	33.9	84.0			95% EtOH	MCZ
NA072-008	NA072-008-03-B	H1514	2016-06-04T17:38:22.677Z	47.490933	-124.879355	165.0	ROV grab	6.8	33.9	84.0			RNA later	MCZ
NA072-009	NA072-009-01	H1514	2016-06-04T18:04:35.479Z	47.491079	-124.879138	165.8	Slurp	6.8	33.9	83.5	Rounded pebbles and gravel region	Sediment sample, mixed gravel and pebbles, generally dark colored	In sample jar in fridge, no preservatives added	GSO – ONCMS
NA072-009	NA072-009-02-A	H1514	2016-06-04T18:04:35.479Z	47.491079	-124.879138	165.8	Slurp	6.8	33.9	83.5			95% EtOH	MCZ
NA072-009	NA072-009-02-B	H1514	2016-06-04T18:04:35.479Z	47.491079	-124.879138	165.8	Slurp	6.8	33.9	83.5			RNA later	MCZ
NA072-010	NA072-010	H1514	2016-06-04T19:46:32.027Z	47.493987	-124.886711	171.8	Niskin	6.8	33.9	80.0	Water sample for eDNA	Vial label: 2016 coral, eDNA2	Filter stored in cryo vial	Everett
NA072-011	NA072-011-C-Clarke	H1516	2016-06-05T21:50:00Z	46.994007	-124.948624	154.7	ROV grab	7.3	33.9	105.5	Sample of substrate with high density of sponges growing on it. Crumbles easily.	Grey clay-esqe conglomerate ~15x8x12cm. May be dead sponge covered with sediment.	air dried	Liz Clarke-NOAA
NA072-011	NA072-011-01-A-MCZ	H1516	2016-06-05T21:50:00Z	46.994007	-124.948624	154.7	ROV grab	7.3	33.9	105.5			95% EtOH	MCZ
NA072-011	NA072-011-01-B-MCZ	H1516	2016-06-05T21:50:00Z	46.994007	-124.948624	154.7	ROV grab	7.3	33.9	105.5			RNA later	MCZ

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-012	NA072-012-01-A-Clarke	H1516	2016-06-05T22:16:53.546Z	46.993557	-124.949657	154.3	ROV grab	7.3	33.9	105.9	Barrel sponge (Acanthascus?), collected off of crumbly substrate similar to first rock sample	3 white barrel sponges attached at base, 15-18 cm long, with several pink 1-5cm brittle stars	95% EtOH	Clarke
NA072-012	NA072-012-01-E-Clarke	H1516	2016-06-05T22:16:53.546Z	46.993557	-124.949657	154.3	ROV grab	7.3	33.9	105.9			-80C freezer	Clarke
NA072-012	NA072-012-01-A-MCZ	H1516	2016-06-05T22:16:53.546Z	46.993557	-124.949657	154.3	ROV grab	7.3	33.9	105.9			95% EtOH	MCZ
NA072-012	NA072-012-01-B-MCZ	H1516	2016-06-05T22:16:53.546Z	46.993557	-124.949657	154.3	ROV grab	7.3	33.9	105.9			RNA later	MCZ
NA072-012	NA072-012-01-01-A-MCZ	H1516	2016-06-05T22:16:53.546Z	46.993557	-124.949657	154.3	ROV grab	7.3	33.9	105.9			95% EtOH	MCZ
NA072-012	NA072-012-01-01-B-MCZ	H1516	2016-06-05T22:16:53.546Z	46.993557	-124.949657	154.3	ROV grab	7.3	33.9	105.9			RNA later	MCZ
NA072-013	NA072-013-01-A-Clarke	H1516	2016-06-05T22:22:12.992Z	46.993553	-124.949649	154.4	ROV grab	7.3	33.9	106.0	Poecillastra (bowl-shaped), collected on similar substrate from rock sample 011	20x20cm white sponge fragmented during collection. Small red worm. Sediment ringing edges of sponge.	95% EtOH	Clarke
NA072-013	NA072-013-01-E-Clarke	H1516	2016-06-05T22:22:12.992Z	46.993553	-124.949649	154.4	ROV grab	7.3	33.9	106.0			-80C freezer	Clarke
NA072-013	NA072-013-01-A-MCZ	H1516	2016-06-05T22:22:12.992Z	46.993553	-124.949649	154.4	ROV grab	7.3	33.9	106.0			95% EtOH	MCZ
NA072-013	NA072-013-01-B-MCZ	H1516	2016-06-05T22:22:12.992Z	46.993553	-124.949649	154.4	ROV grab	7.3	33.9	106.0			RNA later	MCZ
NA072-013	NA072-013-01-01-A-MCZ	H1516	2016-06-05T22:22:12.992Z	46.993553	-124.949649	154.4	ROV grab	7.3	33.9	106.0			95% EtOH	MCZ
NA072-013	NA072-013-01-01-B-MCZ	H1516	2016-06-05T22:22:12.992Z	46.993553	-124.949649	154.4	ROV grab	7.3	33.9	106.0			RNA later	MCZ
NA072-014	NA072-014-01-A-Clarke	H1516	2016-06-05T22:26:00.814Z	46.993553	-124.949648	154.3	ROV grab	7.3	33.9	106.0	Heterochone Calyx - similar location as 012 and 013	15x20 cm white sponge fragmented during collection.	95% EtOH	Clarke

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-014	NA072-014-01-E-Clarke	H1516	2016-06-05T22:26:00.814Z	46.993553	-124.949648	154.3	ROV grab	7.3	33.9	106.0			-80C freezer	Clarke
NA072-014	NA072-014-01-A-MCZ	H1516	2016-06-05T22:26:00.814Z	46.993553	-124.949648	154.3	ROV grab	7.3	33.9	106.0			95% EtOH	MCZ
NA072-014	NA072-014-01-B-MCZ	H1516	2016-06-05T22:26:00.814Z	46.993553	-124.949648	154.3	ROV grab	7.3	33.9	106.0			RNA later	MCZ
NA072-014	NA072-014-01-C-Clarke	H1516	2016-06-05T22:26:00.814Z	46.993553	-124.949648	154.3	ROV grab	7.3	33.9	106.0			air dried	Clarke
NA072-014	NA072-014-01-01-A-MCZ	H1516	2016-06-05T22:26:00.814Z	46.993553	-124.949648	154.3	ROV grab	7.3	33.9	106.0			95% EtOH	MCZ
NA072-014	NA072-014-01-01-B-MCZ	H1516	2016-06-05T22:26:00.814Z	46.993553	-124.949648	154.3	ROV grab	7.3	33.9	106.0			RNA later	MCZ
NA072-015	NA072-015-A-Clarke	H1516	2016-06-05T22:29:08.324Z	46.993557	-124.949640	154.2	ROV grab	7.3	33.9	106.2	Heterochrone species - orange color morph?	12cm orange sponge fragmented during collection. Chunk of root included.	95% EtOH	Clarke
NA072-015	NA072-015-E-Clarke	H1516	2016-06-05T22:29:08.324Z	46.993557	-124.949640	154.2	ROV grab	7.3	33.9	106.2			-80C freezer	Clarke
NA072-015	NA072-015-A-MCZ	H1516	2016-06-05T22:29:08.324Z	46.993557	-124.949640	154.2	ROV grab	7.3	33.9	106.2			95% EtOH	MCZ
NA072-015	NA072-015-B-MCZ	H1516	2016-06-05T22:29:08.324Z	46.993557	-124.949640	154.2	ROV grab	7.3	33.9	106.2			RNA later	MCZ
NA072-015	NA072-015-01-A-MCZ	H1516	2016-06-05T22:29:08.324Z	46.993557	-124.949640	154.2	ROV grab	7.3	33.9	106.2			95% EtOH	MCZ
NA072-015	NA072-015-01-B-MCZ	H1516	2016-06-05T22:29:08.324Z	46.993557	-124.949640	154.2	ROV grab	7.3	33.9	106.2			RNA later	MCZ
NA072-015	NA072-015-02-A-MCZ	H1516	2016-06-05T22:29:08.324Z	46.993557	-124.949640	154.2	ROV grab	7.3	33.9	106.2			95% EtOH	MCZ
NA072-015	NA072-015-02-B-MCZ	H1516	2016-06-05T22:29:08.324Z	46.993557	-124.949640	154.2	ROV grab	7.3	33.9	106.2			RNA later	MCZ

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-016	NA072-016-A-Clarke	H1516	2016-06-06T00:47:42.957Z	47.009459	-124.950332	153.5	ROV grab	7.3	33.9	111.2	Poecillastra sponge	20cm white sponge fragmented during collection. Sediment film around edge. Chunk of root included.	95% EtOH	Clarke
NA072-016	NA072-016-E-Clarke	H1516	2016-06-06T00:47:42.957Z	47.009459	-124.950332	153.5	ROV grab	7.3	33.9	111.2			-80C freezer	Clarke
NA072-016	NA072-016-A-MCZ	H1516	2016-06-06T00:47:42.957Z	47.009459	-124.950332	153.5	ROV grab	7.3	33.9	111.2			95% EtOH	MCZ
NA072-016	NA072-016-B-MCZ	H1516	2016-06-06T00:47:42.957Z	47.009459	-124.950332	153.5	ROV grab	7.3	33.9	111.2			RNA later	MCZ
NA072-016	NA072-016-C-Clarke	H1516	2016-06-06T00:47:42.957Z	47.009459	-124.950332	153.5	ROV grab	7.3	33.9	111.2			air dried	Clarke
NA072-016	NA072-016–01-A-MCZ	H1516	2016-06-06T00:47:42.957Z	47.009459	-124.950332	153.5	ROV grab	7.3	33.9	111.2			95% EtOH	MCZ
NA072-016	NA072-016-01-B-MCZ	H1516	2016-06-06T00:47:42.957Z	47.009459	-124.950332	153.5	ROV grab	7.3	33.9	111.2			RNA later	MCZ
NA072-017	NA072-017-A-Clarke	H1516	2016-06-06T00:53:35.226Z	47.009463	-124.950339	153.5	ROV grab	7.3	33.9	110.8	Yellow heterochone sponge	Nearly whole large yellow sponge with some root.	95% EtOH	Clarke
NA072-017	NA072-017-E-Clarke	H1516	2016-06-06T00:53:35.226Z	47.009463	-124.950339	2016-06-06T01:28:27.320Z	ROV grab	7.3	33.9	110.8			-80C freezer	Clarke
NA072-017	NA072-017-A-MCZ	H1516	2016-06-06T00:53:35.226Z	47.009463	-124.950339	153.5	ROV grab	7.3	33.9	110.8			95% EtOH	MCZ
NA072-017	NA072-017-B-MCZ	H1516	2016-06-06T00:53:35.226Z	47.009463	-124.950339	153.5	ROV grab	7.3	33.9	110.8			RNA later	MCZ
NA072-017	NA072-017-C-Clarke	H1516	2016-06-06T00:53:35.226Z	47.009463	-124.950339	153.5	ROV grab	7.3	33.9	110.8			air dried	Clarke
NA072-018	NA072-018-A-Clarke	H1516	2016-06-06T01:28:27.320Z	47.009498	-124.950328	153.3	Slurp	7.3	33.9	110.2	Pieces of unknown white sponge sample (not heterochone)	Fragmented white sponge, 2-10cm pieces	95% EtOH	Clarke

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-018	NA072-018-E-Clarke	H1516	2016-06-06T01:28:27.320Z	47.009498	-124.950328	153.3	Slurp	7.3	33.9	110.2			-80C freezer	Clarke
NA072-018	NA072-018-A-MCZ	H1516	2016-06-06T01:28:27.320Z	47.009498	-124.950328	153.3	Slurp	7.3	33.9	110.2			95% EtOH	MCZ
NA072-018	NA072-018-B-MCZ	H1516	2016-06-06T01:28:27.320Z	47.009498	-124.950328	153.3	Slurp	7.3	33.9	110.2			RNA later	MCZ
NA072-019	NA072-019-E-Clarke	H1516	2016-06-06T01:31:21.079Z	47.009504	-124.950324	153.4	Push Core	7.3	33.9	110.4	Push core taken next to sample NA072-018-A-Clarke	Dark silty greenish push core with a piece of shell and rock. ~5cm.	-80C freezer	Clarke
NA072-020	NA072-020-A-Clarke	H1516	2016-06-06T01:47:28.351Z	47.009407	-124.950547	151.0	ROV grab	7.3	33.9	110.2	Piece of white heterochone sponge	Pale yellow sponge, very fragmented	95% EtOH	Clarke
NA072-020	NA072-020-E-Clarke	H1516	2016-06-06T01:47:28.351Z	47.009407	-124.950547	151.0	ROV grab	7.3	33.9	110.2			-80C freezer	Clarke
NA072-020	NA072-020-A-MCZ	H1516	2016-06-06T01:47:28.351Z	47.009407	-124.950547	151.0	ROV grab	7.3	33.9	110.2			95% EtOH	MCZ
NA072-020	NA072-020-B-MCZ	H1516	2016-06-06T01:47:28.351Z	47.009407	-124.950547	151.0	ROV grab	7.3	33.9	110.2			RNA later	MCZ
NA072-020	NA072-020-01-A-MCZ	H1516	2016-06-06T01:47:28.351Z	47.009407	-124.950547	151.0	ROV grab	7.3	33.9	110.2			95% EtOH	MCZ
NA072-020	NA072-020-01-B-MCZ	H1516	2016-06-06T01:47:28.351Z	47.009407	-124.950547	151.0	ROV grab	7.3	33.9	110.2			RNA later	MCZ
NA072-021	NA072-021-A-Clarke	H1516	2016-06-06T01:54:53.656Z	47.009417	-124.950519	151.5	ROV grab	7.3	33.9	110.5	Unknown orange sponge	8x4cm fragmented orange sponge with some substrate attached, very different texture from other sponge samples on this dive	95% EtOH	Clarke
NA072-021	NA072-021-E-Clarke	H1516	2016-06-06T01:54:53.656Z	47.009417	-124.950519	151.5	ROV grab	7.3	33.9	110.5			-80C freezer	Clarke
NA072-021	NA072-021-A-MCZ	H1516	2016-06-06T01:54:53.656Z	47.009417	-124.950519	151.5	ROV grab	7.3	33.9	110.5			95% EtOH	MCZ

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-021	NA072-021-B-MCZ	H1516	2016-06-06T01:54:53.656Z	47.009417	-124.950519	151.5	ROV grab	7.3	33.9	110.5			RNA later	MCZ
NA072-022	**NA072-022-D-OSU**	**H1517**	**2016-06-07T19:40:23.689Z**	**46.242236**	**-124.649386**	**850.0**	**Slurp**	**3.7**	**34.3**	**4.9**	**Large streams of consistent bubbles. Possible hydrates in bubbles and along sides of small overhang. White substance along overhang of crevice, possible bacteria? Red solo cup in right hand corner of screen grabs. Lots of associated fauna**	**Many small unidentified gastropods, 1 larger. Black sediment with sulfur smell. Many of the small unidentified gastropods have sulphide-oxidizing bacteria on their backs. Polychaete**	**Formalin**	**Seabrook**
NA072-022	NA072-022-01-A-MCZ	H1517	2016-06-07T19:40:23.689Z	46.242236	-124.649386	850.0	Slurp	3.7	34.3	4.9			95% EtOH	MCZ
NA072-022	NA072-022-01-A-OSU	H1517	2016-06-07T19:40:23.689Z	46.242236	-124.649386	850.0	Slurp	3.7	34.3	4.9			95% EtOH	Seabrook
NA072-022	NA072-022-01-D-OSU	H1517	2016-06-07T19:40:23.689Z	46.242236	-124.649386	850.0	Slurp	3.7	34.3	4.9			Formalin	Seabrook
NA072-022	NA072-022-01-B-MCZ	H1517	2016-06-07T19:40:23.689Z	46.242236	-124.649386	850.0	Slurp	3.7	34.3	4.9			RNA later	MCZ
NA072-022	NA072-022-01-B-OSU	H1517	2016-06-07T19:40:23.689Z	46.242236	-124.649386	850.0	Slurp	3.7	34.3	4.9			RNA later	Seabrook
NA072-022	NA072-022-02-B-OSU	H1517	2016-06-07T19:40:23.689Z	46.242236	-124.649386	850.0	Slurp	3.7	34.3	4.9			RNA later	Seabrook
NA072-022	NA072-022-02-D-OSU	H1517	2016-06-07T19:40:23.689Z	46.242236	-124.649386	850.0	Slurp	3.7	34.3	4.9			Formalin	Seabrook
NA072-022	NA072-022-03-D-OSU	H1517	2016-06-07T19:40:23.689Z	46.242236	-124.649386	850.0	Slurp	3.7	34.3	4.9			Formalin	Seabrook
NA072-022	NA072-022-03-A-MCZ	H1517	2016-06-07T19:40:23.689Z	46.242236	-124.649386	850.0	Slurp	3.7	34.3	4.9			95% EtOH	MCZ
NA072-022	NA072-022-04-D-OSU	H1517	2016-06-07T19:40:23.689Z	46.242236	-124.649386	850.0	Slurp	3.7	34.3	4.9			Formalin	Seabrook

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-022	NA072-022-04-A-MCZ	H1517	2016-06-07T19:40:23.689Z	46.242236	-124.649386	850.0	Slurp	3.7	34.3	4.9			95% EtOH	MCZ
NA072-023	**NA072-023**	**H1517**	**2016-06-07T20:00:55.526Z**	**46.242270**	**-124.649431**	**849.8**	**Push Core**	**3.7**	**34.3**	**5.0**	**At top rim of crevice near two white patches. Sediment black with white specks. Worm tubes and small shells surrounding patches. Second core on bacterial mat. Bubbles occur when pressed into mat**	**Sample was lost from 3-Push Core tray on Mongo arm before recovery**	**–**	**–**
NA072-024	**NA072-024**	**H1517**	**2016-06-07T20:01:55.750Z**	**46.242264**	**-124.649445**	**849.9**	**Push Core**	**3.7**	**34.3**	**5.0**	**1st core inserted, second placed onto Herc**	**Sample was lost from 3-Push Core tray on Mongo arm before recovery**	**–**	**–**
NA072-025	**NA072-025-01-D**	**H1517**	**2016-06-07T20:17:59.601Z**	**46.242265**	**-124.649445**	**850.2**	**Push Core**	**3.7**	**34.3**	**5.0**	**Off to side of bacterial mat. Second core inserted, first core placed on Herc. Sediment black with white specks. Abundance of worms in area. Sediment in core VERY black.**	**Very dark black silt with a strong sulfur smell. Fell apart very quickly.**	**Sieved into bottle with filtered seawater/ formalin**	**Seabrook**
NA072-025	NA072-025-02-D	H1517	2016-06-07T20:17:59.601Z	46.242265	-124.649445	850.2	Push Core	3.7	34.3	5.0			Sieved into bottle with filtered seawater/ formalin	Seabrook
NA072-026	**NA072-026-01-E**	**H1517**	**2016-06-07T20:19:02.693Z**	**46.242260**	**-124.649455**	**850.2**	**Push Core**	**3.7**	**34.3**	**5.0**	**1st placed in-situ, 2nd placed on Herc off mat**	**Top 0-1.5cm is brown, fine sediment that shows signs of oxidation. There is an oily layer at the very top of the core. The rest of the core is dark black, fine silt, anoxic.**	**1cm slices in whirlpack bags**	**Seabrook**
NA072-026	NA072-026-02-E	H1517	2016-06-07T20:19:02.693Z	46.242260	-124.649455	850.2	Push Core	3.7	34.3	5.0			1cm slices in whirlpack bags	Seabrook

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-026	NA072-026-03-E	H1517	2016-06-07T20:19:02.693Z	46.242260	-124.649455	850.2	Push Core	3.7	34.3	5.0			1cm slices in whirlpack bags	Seabrook
NA072-026	NA072-026-04-E	H1517	2016-06-07T20:19:02.693Z	46.242260	-124.649455	850.2	Push Core	3.7	34.3	5.0			1cm slices in whirlpack bags	Seabrook
NA072-026	NA072-026-05-E	H1517	2016-06-07T20:19:02.693Z	46.242260	-124.649455	850.2	Push Core	3.7	34.3	5.0			1cm slices in whirlpack bags	Seabrook
NA072-026	NA072-026-06-E	H1517	2016-06-07T20:19:02.693Z	46.242260	-124.649455	850.2	Push Core	3.7	34.3	5.0			1cm slices in whirlpack bags	Seabrook
NA072-026	NA072-026-07-E	H1517	2016-06-07T20:19:02.693Z	46.242260	-124.649455	850.2	Push Core	3.7	34.3	5.0			1cm slices in whirlpack bags	Seabrook
NA072-026	NA072-026-08-E	H1517	2016-06-07T20:19:02.693Z	46.242260	-124.649455	850.2	Push Core	3.7	34.3	5.0			1cm slices in whirlpack bags	Seabrook
NA072-026	NA072-026-09-E	H1517	2016-06-07T20:19:02.693Z	46.242260	-124.649455	850.2	Push Core	3.7	34.3	5.0			1cm slices in whirlpack bags	Seabrook
NA072-026	NA072-026-10-E	H1517	2016-06-07T20:19:02.693Z	46.242260	-124.649455	850.2	Push Core	3.7	34.3	5.0			1cm slices in whirlpack bags	Seabrook
NA072-027	**NA072-027-GT18**	**H1517**	**2016-06-07T21:51:13.613Z**	**46.242196**	**-124.649451**	**850.3**	**Gas Tight**	**3.7**	**34.3**	**5.0**	**Back at original sample site. GT18. New stream of bubbles started up on top of crevice. Funnel was zip-tied to front porch, luckily was able to pull off without damage. Funnel filling up with bubbles, but difficult to maneuver angle. possible early trigger release**	**This GT was accidentally triggered during bubble collection. So not sure if there were enough bubbles in the funnel at the time of sampling. Second unknown is the CH4 bubbles formed hydrate in the funnel. So there is also a change that the inlet got blocked by methane hydrate.**	**–**	**Baumberger**
NA072-028	**NA072-028**	**H1517**	**2016-06-08T05:14:28.387Z**	**46.228885**	**-124.666244**	**731.7**	**Niskin**	**4.0**	**34.3**	**5.7**	**Water sample by bright pink anthomastus mushroom coral**	**Vial label: 2016 coral, eDNA3**	**Filter stored in cryo vial**	**Everett**

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-029	**NA072-029-01-C-GSO**	**H1517**	**2016-06-08T06:11:47.638Z**	**46.228438**	**-124.667066**	**697.1**	**ROV grab**	**4.2**	**34.2**	**8.3**	**Small chunk of the chimney or spire; carbonate?**	**Several small pieces of multicolored (orange, grey, white, brown) rock, each <4cm in length. One has a small unknown stalked organism attached.**	**air dried**	**GSO/ URI**
NA072-029	NA072-029-02-A-MCZ	H1517	2016-06-08T06:11:47.638Z	46.228438	-124.667066	697.1	ROV grab	4.2	34.2	8.3			95% EtOH	MCZ
NA072-029	NA072-029-02-B-MCZ	H1517	2016-06-08T06:11:47.638Z	46.228438	-124.667066	697.1	ROV grab	4.2	34.2	8.3			RNA later	MCZ
NA072-030	**NA072-030**	**H1517**	**2016-06-08T06:40:29.135Z**	**46.227920**	**-124.666939**	**655.0**	**Niskin**	**4.3**	**34.2**	**8.5**	**water sample near the pink mushroom coral, anthomastus (one was done earlier (NA072-028), but this region has a higher density of these corals)**	**Vial label: 2016 coral, eDNA4**	**Filter stored in cryo vial**	**Everett**
NA072-031	**NA072-031**	**H1517**	**2016-06-08T06:53:05.369Z**	**46.227580**	**-124.666669**	**650.1**	**Niskin**	**4.4**	**34.2**	**8.5**	**water sample for eDNA of paragorgia coral**	**Vial label: 2016 coral, eDNA5**	**Filter stored in cryo vial**	**Everett**
NA072-032	**NA072-032-01-D**	**H1517**	**2016-06-08T12:13:02.853Z**	**46.222499**	**-124.656408**	**495.7**	**Push Core**	**5.1**	**34.1**	**25.3**	**(2nd from aft, black/yellow tape) May have failed, but could not shake it out, so we're keeping it. Right next to bacterial mat, hard substrate, poor sample.**	**Similar to core NA072-033, strong sediment-water interface, dark brown, fine sediment at top transitions to light grey glacial clay**	**Sieved into bottle with filtered seawater/ formalin**	**Seabrook**
NA072-032	NA072-032-02-D	H1517	2016-06-08T12:13:02.853Z	46.222499	-124.656408	495.7	Push Core	5.1	34.1	25.3			Sieved into bottle with filtered seawater/ formalin	Seabrook

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072 -033	**NA072-033-01-E**	**H1517**	**2016-06-08T12:16:50.427Z**	**46.222567**	**-124.656454**	**495.7**	**Push Core**	**5.0**	**34.1**	**24.7**	**(Grey/black tape, furthest aft), push core next to previous sample**	**Astoria Shelf core. Strong sediment-water interface with signs of life (small worm) at top. Dark brown fine silt at top of core transitions to light gray clay/ glacial sediment at 4-5cm. Some bubbles were released from core during slicing.**	**1cm slices in whirlpack bags**	**Seabrook**
NA072-033	NA072-033-02-E	H1517	2016-06-08T12:16:50.427Z	46.222567	-124.656454	495.7	Push Core	5.0	34.1	24.7			1cm slices in whirlpack bags	Seabrook
NA072-033	NA072-033-03-E	H1517	2016-06-08T12:16:50.427Z	46.222567	-124.656454	495.7	Push Core	5.0	34.1	24.7			1cm slices in whirlpack bags	Seabrook
NA072-033	NA072-033-04-E	H1517	2016-06-08T12:16:50.427Z	46.222567	-124.656454	495.7	Push Core	5.0	34.1	24.7			1cm slices in whirlpack bags	Seabrook
NA072-033	NA072-033-05-E	H1517	2016-06-08T12:16:50.427Z	46.222567	-124.656454	495.7	Push Core	5.0	34.1	24.7			1cm slices in whirlpack bags	Seabrook
NA072-033	NA072-033-06-E	H1517	2016-06-08T12:16:50.427Z	46.222567	-124.656454	495.7	Push Core	5.0	34.1	24.7			1cm slices in whirlpack bags	Seabrook
NA072-033	NA072-033-07-E	H1517	2016-06-08T12:16:50.427Z	46.222567	-124.656454	495.7	Push Core	5.0	34.1	24.7			1cm slices in whirlpack bags	Seabrook
NA072-033	NA072-033-08-E	H1517	2016-06-08T12:16:50.427Z	46.222567	-124.656454	495.7	Push Core	5.0	34.1	24.7			1cm slices in whirlpack bags	Seabrook
NA072 -034	**NA072-034-D-OSU**	**H1517**	**2016-06-08T12:51:49.385Z**	**46.222669**	**-124.654860**	**488.3**	**Slurp**	**5.1**	**34.1**	**25.2**	**Filamentous bacterial mat sample**	**Bacterial mat, shells, polychaete**	**Formalin**	**Seabrook**
NA072-034	NA072-034-01-A-OSU	H1517	2016-06-08T12:51:49.385Z	46.222669	-124.654860	488.3	Slurp	5.1	34.1	25.2			95% EtOH	Seabrook
NA072-034	NA072-034-01-B-OSU	H1517	2016-06-08T12:51:49.385Z	46.222669	-124.654860	488.3	Slurp	5.1	34.1	25.2			RNA later	Seabrook
NA072-034	NA072-034-01-A-MCZ	H1517	2016-06-08T12:51:49.385Z	46.222669	-124.654860	488.3	Slurp	5.1	34.1	25.2			95% EtOH	MCZ

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-035	**NA072-035**	**H1517**	**2016-06-08T13:22:40.801Z**	**46.222482**	**-124.654478**	**478.3**	**Niskin**	**5.3**	**34.1**	**28.9**	**Niskin next to purplish/reddish colored Swiftia (?) corals, NB 8**	**Vial label: 2016 coral, eDNA6**	**Filter stored in cryo vial**	**Everett**
NA072-036	**NA072-036-A-ME**	**H1517**	**2016-06-08T13:24:33.688Z**	**46.222461**	**-124.654474**	**480.1**	**Slurp**	**5.2**	**34.1**	**28.9**	**Slurp #7 of 2 reddish Swiftia corals**	**2 red Swiftia corals, brittle star, clams**	**95% EtOH**	**Everett**
NA072-036	NA072-036-01-A-ME	H1517	2016-06-08T13:24:33.688Z	46.222461	-124.654474	480.1	Slurp	5.2	34.1	28.9			95% EtOH	Everett
NA072-036	NA072-036-A-MCZ	H1517	2016-06-08T13:24:33.688Z	46.222461	-124.654474	480.1	Slurp	5.2	34.1	28.9			95% EtOH	MCZ
NA072-036	NA072-036-B-MCZ	H1517	2016-06-08T13:24:33.688Z	46.222461	-124.654474	480.1	Slurp	5.2	34.1	28.9			RNA later	MCZ
NA072-036	NA072-036-02-A-MCZ	H1517	2016-06-08T13:24:33.688Z	46.222461	-124.654474	480.1	Slurp	5.2	34.1	28.9			95% EtOH	MCZ
NA072-036	NA072-036-02-B-MCZ	H1517	2016-06-08T13:24:33.688Z	46.222461	-124.654474	480.1	Slurp	5.2	34.1	28.9			RNA later	MCZ
NA072-036	NA072-036-01-01-A-MCZ	H1517	2016-06-08T13:24:33.688Z	46.222461	-124.654474	480.1	Slurp	5.2	34.1	28.9			95% EtOH	MCZ
NA072-036	NA072-036-01-01-B-MCZ	H1517	2016-06-08T13:24:33.688Z	46.222461	-124.654474	480.1	Slurp	5.2	34.1	28.9			RNA later	MCZ
NA072-037	**NA072-037-GT16**	**H1518**	**2016-06-11T08:35:49.364Z**	**45.883849**	**-124.643297**	**185.6**	**Gas Tight**	**6.7**	**34.0**	**67.4**	**GT16. Sample site near both orange (small) and white (large) bacterial mats. Three separate bubble collections (possible partial trigger on time 1, complete trigger time 3). Approximately 2 minutes per sample 1and 2, 3 minutes for sample 3.**	**Gas tight #16**	**–**	**Baumberger**

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-038	**NA072-038-01-E-OSU**	**H1518**	**2016-06-11T09:02:13.886Z**	**45.883847**	**-124.643263**	**185.7**	**Push Core**	**6.8**	**34.0**	**66.7**	**Near GT sample 037. Orange bacterial mat. Pretty stiff substrate (must tap w/ ROV arm to put in place). no duplicate due to strength of substrate**	**Transition from dark silt to glacial clay at ~4-5cm**	**1cm slices in whirlpack bags**	**Seabrook**
NA072-038	NA072-038-02-E-OSU	H1518	2016-06-11T09:02:13.886Z	45.883847	-124.643263	185.7	Push Core	6.8	34.0	66.7			1cm slices in whirlpack bags	Seabrook
NA072-038	NA072-038-03-E-OSU	H1518	2016-06-11T09:02:13.886Z	45.883847	-124.643263	185.7	Push Core	6.8	34.0	66.7			1cm slices in whirlpack bags	Seabrook
NA072-038	NA072-038-04-E-OSU	H1518	2016-06-11T09:02:13.886Z	45.883847	-124.643263	185.7	Push Core	6.8	34.0	66.7			1cm slices in whirlpack bags	Seabrook
NA072-038	NA072-038-05-E-OSU	H1518	2016-06-11T09:02:13.886Z	45.883847	-124.643263	185.7	Push Core	6.8	34.0	66.7			1cm slices in whirlpack bags	Seabrook
NA072-038	NA072-038-06-E-OSU	H1518	2016-06-11T09:02:13.886Z	45.883847	-124.643263	185.7	Push Core	6.8	34.0	66.7			1cm slices in whirlpack bags	Seabrook
NA072-038	NA072-038-07-E-OSU	H1518	2016-06-11T09:02:13.886Z	45.883847	-124.643263	185.7	Push Core	6.8	34.0	66.7			1cm slices in whirlpack bags	Seabrook
NA072-038	NA072-038-08-E-OSU	H1518	2016-06-11T09:02:13.886Z	45.883847	-124.643263	185.7	Push Core	6.8	34.0	66.7			1cm slices in whirlpack bags	Seabrook
NA072-038	NA072-038-09-E-OSU	H1518	2016-06-11T09:02:13.886Z	45.883847	-124.643263	185.7	Push Core	6.8	34.0	66.7			1cm slices in whirlpack bags	Seabrook
NA072-038	NA072-038-10-E-OSU	H1518	2016-06-11T09:02:13.886Z	45.883847	-124.643263	185.7	Push Core	6.8	34.0	66.7			1cm slices in whirlpack bags	Seabrook
NA072-039	**NA072-039-C-GSO**	**H1518**	**2016-06-11T09:06:11.860Z**	**45.883845**	**124.643257**	**185.5**	**ROV grab**	**6.7**	**34.0**	**67.3**	**Heart-shaped substrate with cup corals**	**3 ~12x5x12cm chunks of carbonate. Brown colored tending to grey where it was freshly broken off. Biofilm at surface, several small horn corals, several chitons**	**air dried**	**GSO**
NA072-039	NA072-039-01-A-MCZ	H1518	2016-06-11T09:06:11.860Z	45.883845	124.643257	185.5	ROV grab	6.7	34.0	67.3			95% EtOH	MCZ

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-039	NA072-039-01-B-MCZ	H1518	2016-06-11T09:06:11.860Z	45.883845	124.643257	185.5	ROV grab	6.7	34.0	67.3			RNA later	MCZ
NA072-039	NA072-039-02-A-MCZ	H1518	2016-06-11T09:06:11.860Z	45.883845	124.643257	185.5	ROV grab	6.7	34.0	67.3			95% EtOH	MCZ
NA072-039	NA072-039-02-B-MCZ	H1518	2016-06-11T09:06:11.860Z	45.883845	124.643257	185.5	ROV grab	6.7	34.0	67.3			RNA later	MCZ
NA072-040	**NA072-040-01-E-OSU**	**H1518**	**2016-06-11T09:18:47.870Z**	**45.883833**	**-124.643279**	**185.5**	**Push Core**	**6.7**	**34.0**	**66.9**	**Orange bacterial mat. Macrofauna. Very hard substrate, difficult to press in core. Possibly glacial mud seen in previous dives?**	**Orange bacterial mat at surface. Dark silty sediment for top 3 cm, transitioning to grey glacial clay at 3-4cm. Small orange/yellow deposits within clay layers.**	**1cm slices in whirlpack bags**	**Seabrook**
NA072-040	NA072-040-02-E-OSU	H1518	2016-06-11T09:18:47.870Z	45.883833	-124.643279	185.5	Push Core	6.7	34.0	66.9			1cm slices in whirlpack bags	Seabrook
NA072-040	NA072-040-03-E-OSU	H1518	2016-06-11T09:18:47.870Z	45.883833	-124.643279	185.5	Push Core	6.7	34.0	66.9			1cm slices in whirlpack bags	Seabrook
NA072-040	NA072-040-04-E-OSU	H1518	2016-06-11T09:18:47.870Z	45.883833	-124.643279	185.5	Push Core	6.7	34.0	66.9			1cm slices in whirlpack bags	Seabrook
NA072-040	NA072-040-05-E-OSU	H1518	2016-06-11T09:18:47.870Z	45.883833	-124.643279	185.5	Push Core	6.7	34.0	66.9			1cm slices in whirlpack bags	Seabrook
NA072-040	NA072-040-06-E-OSU	H1518	2016-06-11T09:18:47.870Z	45.883833	-124.643279	185.5	Push Core	6.7	34.0	66.9			1cm slices in whirlpack bags	Seabrook
NA072-040	NA072-040-07-E-OSU	H1518	2016-06-11T09:18:47.870Z	45.883833	-124.643279	185.5	Push Core	6.7	34.0	66.9			1cm slices in whirlpack bags	Seabrook
NA072-040	NA072-040-08-E-OSU	H1518	2016-06-11T09:18:47.870Z	45.883833	-124.643279	185.5	Push Core	6.7	34.0	66.9			1cm slices in whirlpack bags	Seabrook
NA072-040	NA072-040-09-E-OSU	H1518	2016-06-11T09:18:47.870Z	45.883833	-124.643279	185.5	Push Core	6.7	34.0	66.9			1cm slices in whirlpack bags	Seabrook
NA072-040	NA072-040-10-E-OSU	H1518	2016-06-11T09:18:47.870Z	45.883833	-124.643279	185.5	Push Core	6.7	34.0	66.9			1cm slices in whirlpack bags	Seabrook

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-041	**NA072-041-01-D-OSU**	**H1518**	**2016-06-11T09:20:23.549Z**	**45.883829**	**-124.643288**	**185.6**	**Push Core**	**6.8**	**33.9**	**66.8**	**Duplicate of orange bacterial mat. Change of plan, use this one for macrofauna.**	**Orange bacterial mat at surface. 0-5cm dark silt, 5-10cm glacial clay**	**Sieved into bottle with filtered seawater/ formalin**	**Seabrook**
NA072-041	NA072-041-02-D-OSU	H1518	2016-06-11T09:20:23.549Z	45.883829	-124.643288	185.6	Push Core	6.8	33.9	66.8			Sieved into bottle with filtered seawater/ formalin	Seabrook
NA072-042	NA072-042-01-E-OSU	H1518	2016-06-11T10:01:23.936Z	45.883770	-124.643413	183.8	Push Core	6.7	34.0	66.3	White bacterial mat. Nearest previously marked target "seep11w/mats'. Bubbles appear when core placed. glacial mud at bottom	White bacterial mat at surface, dark brown silt transitioning to light grey glacial clay at 4-5cm depth. Small yellow/orange deposits throughout grey clay. Was on Mongo arm, tilted on deck.	1cm slices in whirlpack bags	Seabrook
NA072-042	NA072-042-02-E-OSU	H1518	2016-06-11T10:01:23.936Z	45.883770	-124.643413	183.8	Push Core	6.7	34.0	66.3			1cm slices in whirlpack bags	Seabrook
NA072-042	NA072-042-03-E-OSU	H1518	2016-06-11T10:01:23.936Z	45.883770	-124.643413	183.8	Push Core	6.7	34.0	66.3			1cm slices in whirlpack bags	Seabrook
NA072-042	NA072-042-04-E-OSU	H1518	2016-06-11T10:01:23.936Z	45.883770	-124.643413	183.8	Push Core	6.7	34.0	66.3			1cm slices in whirlpack bags	Seabrook
NA072-042	NA072-042-05-E-OSU	H1518	2016-06-11T10:01:23.936Z	45.883770	-124.643413	183.8	Push Core	6.7	34.0	66.3			1cm slices in whirlpack bags	Seabrook
NA072-042	NA072-042-06-E-OSU	H1518	2016-06-11T10:01:23.936Z	45.883770	-124.643413	183.8	Push Core	6.7	34.0	66.3			1cm slices in whirlpack bags	Seabrook
NA072-042	NA072-042-07-E-OSU	H1518	2016-06-11T10:01:23.936Z	45.883770	-124.643413	183.8	Push Core	6.7	34.0	66.3			1cm slices in whirlpack bags	Seabrook
NA072-042	NA072-042-08-E-OSU	H1518	2016-06-11T10:01:23.936Z	45.883770	-124.643413	183.8	Push Core	6.7	34.0	66.3			1cm slices in whirlpack bags	Seabrook
NA072-042	NA072-042-09-E-OSU	H1518	2016-06-11T10:01:23.936Z	45.883770	-124.643413	183.8	Push Core	6.7	34.0	66.3			1cm slices in whirlpack bags	Seabrook

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-042	NA072-042-10-E-OSU	H1518	2016-06-11T10:01:23.936Z	45.883770	-124.643413	183.8	Push Core	6.7	34.0	66.3			1cm slices in whirlpack bags	Seabrook
NA072-043	NA072-043-01-D-OSU	H1518	2016-06-11T10:02:52.783Z	45.883765	-124.643416	183.8	Push Core	6.7	34.0	66.1	duplicate w/ 042. microbes	White bacterial mat at surface, dark brown silt transitioning to light grey glacial clay at 4-5cm depth. Small yellow/orange deposits throughout grey clay. Was on Mongo arm, tilted on deck.	Sieved into bottle with filtered seawater/ formalin	Seabrook
NA072-043	NA072-043-02-D-OSU	H1518	2016-06-11T10:02:52.783Z	45.883765	-124.643416	183.8	Push Core	6.7	34.0	66.1			Sieved into bottle with filtered seawater/ formalin	Seabrook
NA072-044	NA072-044-C-GSO	H1518	2016-06-11T12:32:26.114Z	45.886407	-124.637229	171.9	ROV grab	6.7	34.0	69.0	piece of carbonate	Biofouled piece of carbonate. Included cup coral, anemone, squat lobster, snail, shrimp, polychaetes	air dried	GSO
NA072-044	NA072-044-01-A-MCZ	H1518	2016-06-11T12:32:26.114Z	45.886407	-124.637229	171.9	ROV grab	6.7	34.0	69.0			95% EtOH	MCZ
NA072-044	NA072-044-01-B-MCZ	H1518	2016-06-11T12:32:26.114Z	45.886407	-124.637229	171.9	ROV grab	6.7	34.0	69.0			RNA later	MCZ
NA072-044	NA072-044-02-A-MCZ	H1518	2016-06-11T12:32:26.114Z	45.886407	-124.637229	171.9	ROV grab	6.7	34.0	69.0			95% EtOH	MCZ
NA072-044	NA072-044-02-B-MCZ	H1518	2016-06-11T12:32:26.114Z	45.886407	-124.637229	171.9	ROV grab	6.7	34.0	69.0			RNA later	MCZ
NA072-044	NA072-044-03-A-MCZ	H1518	2016-06-11T12:32:26.114Z	45.886407	-124.637229	171.9	ROV grab	6.7	34.0	69.0			95% EtOH	MCZ
NA072-044	NA072-044-03-B-MCZ	H1518	2016-06-11T12:32:26.114Z	45.886407	-124.637229	171.9	ROV grab	6.7	34.0	69.0			RNA later	MCZ

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-044	NA072-044-04-A-MCZ	H1518	2016-06-11T12:32:26.114Z	45.886407	-124.637229	171.9	ROV grab	6.7	34.0	69.0			95% EtOH	MCZ
NA072-044	NA072-044-04-B-MCZ	H1518	2016-06-11T12:32:26.114Z	45.886407	-124.637229	171.9	ROV grab	6.7	34.0	69.0			RNA later	MCZ
NA072-044	NA072-044-05-A-MCZ	H1518	2016-06-11T12:32:26.114Z	45.886407	-124.637229	171.9	ROV grab	6.7	34.0	69.0			95% EtOH	MCZ
NA072-044	NA072-044-05-B-MCZ	H1518	2016-06-11T12:32:26.114Z	45.886407	-124.637229	171.9	ROV grab	6.7	34.0	69.0			RNA later	MCZ
NA072-044	NA072-044-06-A-MCZ	H1518	2016-06-11T12:32:26.114Z	45.886407	-124.637229	171.9	ROV grab	6.7	34.0	69.0			95% EtOH	MCZ
NA072-044	NA072-044-06-B-MCZ	H1518	2016-06-11T12:32:26.114Z	45.886407	-124.637229	171.9	ROV grab	6.7	34.0	69.0			RNA later	MCZ
NA072-044	NA072-044-07-A-MCZ	H1518	2016-06-11T12:32:26.114Z	45.886407	-124.637229	171.9	ROV grab	6.7	34.0	69.0			95% EtOH	MCZ
NA072-044	NA072-044-07-B-MCZ	H1518	2016-06-11T12:32:26.114Z	45.886407	-124.637229	171.9	ROV grab	6.7	34.0	69.0			RNA later	MCZ
NA072-044	NA072-044-08-A-MCZ	H1518	2016-06-11T12:32:26.114Z	45.886407	-124.637229	171.9	ROV grab	6.7	34.0	69.0			95% EtOH	MCZ
NA072-044	NA072-044-08-B-MCZ	H1518	2016-06-11T12:32:26.114Z	45.886407	-124.637229	171.9	ROV grab	6.7	34.0	69.0			RNA later	MCZ
NA072-045	NA072-045-ME	H1518	2016-06-11T12:50:30.529Z	45.886710	-124.636749	170.9	Niskin	6.7	34.0	69.1	Water sample for eDNA near white Swiftia coral (?), nb12	Vial label: 2016 coral, eDNA7	Filter stored in cryo vial	Everett
NA072-046	NA072-046-A-ME	H1518	2016-06-11T12:56:52.221Z	45.886734	-124.636742	171.7	Slurp	6.7	34.0	68.6	Slurp sample of white coral, SL#1	Pink coral sample with squat lobster associate	95% EtOH	Everett
NA072-046	NA072-046-01-A-MCZ	H1518	2016-06-11T12:56:52.221Z	45.886734	-124.636742	171.7	Slurp	6.7	34.0	68.6			95% EtOH	MCZ
NA072-046	NA072-046-01-B-MCZ	H1518	2016-06-11T12:56:52.221Z	45.886734	-124.636742	171.7	Slurp	6.7	34.0	68.6			RNA later	MCZ
NA072-046	NA072-046-02-A-MCZ	H1518	2016-06-11T12:56:52.221Z	45.886734	-124.636742	171.7	Slurp	6.7	34.0	68.6			95% EtOH	MCZ

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-046	NA072-046-02-B-MCZ	H1518	2016-06-11T12:56:52.221Z	45.886734	-124.636742	171.7	Slurp	6.7	34.0	68.6			RNA later	MCZ
NA072-046	NA072-046-03-A-MCZ	H1518	2016-06-11T12:56:52.221Z	45.886734	-124.636742	171.7	Slurp	6.7	34.0	68.6			95% EtOH	MCZ
NA072-046	NA072-046-03-B-MCZ	H1518	2016-06-11T12:56:52.221Z	45.886734	-124.636742	171.7	Slurp	6.7	34.0	68.6			RNA later	MCZ
NA072-047	NA072-047-ME	H1518	2016-06-11T13:29:04.213Z	45.887061	-124.636562	172.3	Niskin	6.7	34.0	67.6	water sample	Vial label: 2016 coral, eDNA8	Filter stored in cryo vial	Everett
NA072-048	**NA072-048-GT2**	**H1519**	**2016-06-11T21:20:51.277Z**	**46.222481**	**-124.656410**	**494.4**	**Gas Tight**	**4.9**	**34.1**	**20.7**	**GT2. Very vigorous stream of bubbles. Many plumes in a small geographic area (near WP1). Substrate is muddy w/ lots of white shell material. Very dark sediment visible, especially around plume, indicating signs of reduction.**	**Gas tight #2**	**–**	**Baumberger**
NA072-049	**NA072-049-01-E-OSU**	**H1519**	**2016-06-11T22:05:03.738Z**	**46.222482**	**-124.656416**	**494.9**	**Push Core**	**5.0**	**34.1**	**23.5**	**Near GT2 sample area w/ many bubble plumes. Clam bed (live). Muddy sediment w/ shell fragments. Possible glacial mud at depth due to difficulty inserting core. Associated macrofauna include sablefish, rathbunaster californicus**	**Very nice core- see pictures**	**1cm slices in whirlpack bags**	**Seabrook**
NA072-049	NA072-049-02-E-OSU	H1519	2016-06-11T22:05:03.738Z	46.222482	-124.656416	494.9	Push Core	5.0	34.1	23.5			1cm slices in whirlpack bags	Seabrook
NA072-049	NA072-049-03-E-OSU	H1519	2016-06-11T22:05:03.738Z	46.222482	-124.656416	494.9	Push Core	5.0	34.1	23.5			1cm slices in whirlpack bags	Seabrook
NA072-049	NA072-049-04-E-OSU	H1519	2016-06-11T22:05:03.738Z	46.222482	-124.656416	494.9	Push Core	5.0	34.1	23.5			1cm slices in whirlpack bags	Seabrook

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-049	NA072-049-05-E-OSU	H1519	2016-06-11T22:05:03.738Z	46.222482	-124.656416	494.9	Push Core	5.0	34.1	23.5			1cm slices in whirlpack bags	Seabrook
NA072-049	NA072-049-06-E-OSU	H1519	2016-06-11T22:05:03.738Z	46.222482	-124.656416	494.9	Push Core	5.0	34.1	23.5			1cm slices in whirlpack bags	Seabrook
NA072-049	NA072-049-07-E-OSU	H1519	2016-06-11T22:05:03.738Z	46.222482	-124.656416	494.9	Push Core	5.0	34.1	23.5			1cm slices in whirlpack bags	Seabrook
NA072-049	NA072-049-08-E-OSU	H1519	2016-06-11T22:05:03.738Z	46.222482	-124.656416	494.9	Push Core	5.0	34.1	23.5			1cm slices in whirlpack bags	Seabrook
NA072-049	NA072-049-09-E-OSU	H1519	2016-06-11T22:05:03.738Z	46.222482	-124.656416	494.9	Push Core	5.0	34.1	23.5			1cm slices in whirlpack bags	Seabrook
NA072-049	NA072-049-10-E-OSU	H1519	2016-06-11T22:05:03.738Z	46.222482	-124.656416	494.9	Push Core	5.0	34.1	23.5			1cm slices in whirlpack bags	Seabrook
NA072-050	**NA072-050-01-D-OSU**	**H1519**	**2016-06-11T22:06:20.073Z**	**46.222487**	**-124.656422**	**495.0**	**Push Core**	**5.0**	**34.1**	**23.5**	**Duplicate w/ 049. macrofauna**	**Good core with many clams**	**Sieved into bottle with filtered seawater/ formalin**	**Seabrook**
NA072-050	NA072-050-02-D-OSU	H1519	2016-06-11T22:06:20.073Z	46.222487	-124.656422	495.0	Push Core	5.0	34.1	23.5			Sieved into bottle with filtered seawater/ formalin	Seabrook
NA072-051	**NA072-051-E-OSU**	**H1519**	**2016-06-11T22:17:41.923Z**	**46.222515**	**-124.656398**	**495.1**	**Scoop**	**5.1**	**34.1**	**24.6**	**Clams near samples 049 and 050.**	**Clams**	**-80C freezer**	**Seabrook**
NA072-052	**NA072-052-E-OSU**	**H1519**	**2016-06-11T22:30:56.646Z**	**46.222504**	**-124.656403**	**495.1**	**Slurp**	**5.1**	**34.1**	**25.0**	**Clams and polychaete. Same as 051, reference to 049 and 050.**	**~15 clams, 3-4cm in length, 1 1cm clam. Some pebble/gravel substrate.**	**No preservative**	**Seabrook**
NA072-052	NA072-052-01-D-OSU	H1519	2016-06-11T22:30:56.646Z	46.222504	-124.656403	495.1	Slurp	5.1	34.1	25.0			Sieved into bottle with filtered seawater/ formalin	Seabrook
NA072-053	**NA072-053-ME**	**H1519**	**2016-06-11T22:48:37.203Z**	**46.222452**	**-124.656437**	**495.1**	**Niskin**	**5.2**	**34.1**	**28.6**	**Mushroom coral near marker 244.**	**Vial label: 2016 coral, eDNA9**	**Filter stored in cryo vial**	**Everett**

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-054	**NA072-054-C-GSO**	**H1519**	**2016-06-11T23:20:26.266Z**	**46.222457**	**-124.656580**	**497.0**	**ROV grab**	**5.1**	**34.1**	**27.5**	**Carbonate rock representative of sample site for 048-053. (Broke off easily, may be consolidated sediment?)**	**~22cm angular sample that looks like consolidated sediment and rock. Porous, color ranges from grey to beige. Occasional tube worms.**	**air dried**	**GSO**
NA072-054	NA072-054-01-A-MCZ	H1519	2016-06-11T23:20:26.266Z	46.222457	-124.656580	497.0	ROV grab	5.1	34.1	27.5			95% EtOH	MCZ
NA072-054	NA072-054-01-B-MCZ	H1519	2016-06-11T23:20:26.266Z	46.222457	-124.656580	497.0	ROV grab	5.1	34.1	27.5			RNA later	MCZ
NA072-054	NA072-054-02-A-MCZ	H1519	2016-06-11T23:20:26.266Z	46.222457	-124.656580	497.0	ROV grab	5.1	34.1	27.5			95% EtOH	MCZ
NA072-054	NA072-054-02-B-MCZ	H1519	2016-06-11T23:20:26.266Z	46.222457	-124.656580	497.0	ROV grab	5.1	34.1	27.5			RNA later	MCZ
NA072-054	NA072-054-03-A-MCZ	H1519	2016-06-11T23:20:26.266Z	46.222457	-124.656580	497.0	ROV grab	5.1	34.1	27.5			95% EtOH	MCZ
NA072-054	NA072-054-03-B-MCZ	H1519	2016-06-11T23:20:26.266Z	46.222457	-124.656580	497.0	ROV grab	5.1	34.1	27.5			RNA later	MCZ
NA072-054	NA072-054-04-A-MCZ	H1519	2016-06-11T23:20:26.266Z	46.222457	-124.656580	497.0	ROV grab	5.1	34.1	27.5			95% EtOH	MCZ
NA072-054	NA072-054-04-B-MCZ	H1519	2016-06-11T23:20:26.266Z	46.222457	-124.656580	497.0	ROV grab	5.1	34.1	27.5			RNA later	MCZ
NA072-054	NA072-054-05-A-MCZ	H1519	2016-06-11T23:20:26.266Z	46.222457	-124.656580	497.0	ROV grab	5.1	34.1	27.5			95% EtOH	MCZ
NA072-054	NA072-054-05-B-MCZ	H1519	2016-06-11T23:20:26.266Z	46.222457	-124.656580	497.0	ROV grab	5.1	34.1	27.5			RNA later	MCZ
NA072-054	NA072-054-06-A-MCZ	H1519	2016-06-11T23:20:26.266Z	46.222457	-124.656580	497.0	ROV grab	5.1	34.1	27.5			95% EtOH	MCZ
NA072-054	NA072-054-06-B-MCZ	H1519	2016-06-11T23:20:26.266Z	46.222457	-124.656580	497.0	ROV grab	5.1	34.1	27.5			RNA later	MCZ

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-055	**NA072-055-ME**	**H1519**	**2016-06-12T00:01:19.813Z**	**46.222338**	**-124.657158**	**510.7**	**Niskin**	**4.9**	**34.1**	**20.6**	**water sample next to bubblegum coral**	**Vial label: 2016 coral, eDNA10**	**Filter stored in cryo vial**	**Everett**
NA072-056	**NA072-056-01-OSU**	**H1519**	**2016-06-12T04:32:11.169Z**	**46.242245**	**-124.649363**	**850.1**	**Push Core**	**3.8**	**34.3**	**4.8**	**One of a pair of two push cores with -057, very spongy surface, core plunged deep into the sediment. Bacterial mat site, rich with bubbles and speckled with white gastropods. At this site, 3 cores were collected because the seal for -057 was expected to fail.**	**Methane hydrates possibly in core, looks mixed up and can't see mat anymore**	**1cm slices in whirlpack bags**	**Seabrook**
NA072-056	NA072-056-02-OSU	H1519	2016-06-12T04:32:11.169Z	46.242245	-124.649363	850.1	Push Core	3.8	34.3	4.8			1cm slices in whirlpack bags	Seabrook
NA072-056	NA072-056-03-OSU	H1519	2016-06-12T04:32:11.169Z	46.242245	-124.649363	850.1	Push Core	3.8	34.3	4.8			1cm slices in whirlpack bags	Seabrook
NA072-056	NA072-056-04-OSU	H1519	2016-06-12T04:32:11.169Z	46.242245	-124.649363	850.1	Push Core	3.8	34.3	4.8			1cm slices in whirlpack bags	Seabrook
NA072-056	NA072-056-05-OSU	H1519	2016-06-12T04:32:11.169Z	46.242245	-124.649363	850.1	Push Core	3.8	34.3	4.8			1cm slices in whirlpack bags	Seabrook
NA072-056	NA072-056-06-OSU	H1519	2016-06-12T04:32:11.169Z	46.242245	-124.649363	850.1	Push Core	3.8	34.3	4.8			1cm slices in whirlpack bags	Seabrook
NA072-056	NA072-056-07-OSU	H1519	2016-06-12T04:32:11.169Z	46.242245	-124.649363	850.1	Push Core	3.8	34.3	4.8			1cm slices in whirlpack bags	Seabrook
NA072-056	NA072-056-08-OSU	H1519	2016-06-12T04:32:11.169Z	46.242245	-124.649363	850.1	Push Core	3.8	34.3	4.8			1cm slices in whirlpack bags	Seabrook
NA072-056	NA072-056-09-OSU	H1519	2016-06-12T04:32:11.169Z	46.242245	-124.649363	850.1	Push Core	3.8	34.3	4.8			1cm slices in whirlpack bags	Seabrook
NA072-056	NA072-056-10-OSU	H1519	2016-06-12T04:32:11.169Z	46.242245	-124.649363	850.1	Push Core	3.8	34.3	4.8			1cm slices in whirlpack bags	Seabrook

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072 -057	**NA072-057-01-E-OSU**	**H1519**	**2016-06-12T04:34:07.584Z**	**46.242258**	**-124.649381**	**850.0**	**Push Core**	**3.8**	**34.3**	**4.8**	**second of a pair of two push cores with -056, very spongy surface, core plunged deep into the sediment (*this one is the one with a bad seal)**	**No good**	**1cm slices in whirlpack bags**	**Seabrook**
NA072-057	NA072-057-02-E-OSU	H1519	2016-06-12T04:34:07.584Z	46.242258	-124.649381	850.0	Push Core	3.8	34.3	4.8			1cm slices in whirlpack bags	Seabrook
NA072-057	NA072-057-03-E-OSU	H1519	2016-06-12T04:34:07.584Z	46.242258	-124.649381	850.0	Push Core	3.8	34.3	4.8			1cm slices in whirlpack bags	Seabrook
NA072-057	NA072-057-04-E-OSU	H1519	2016-06-12T04:34:07.584Z	46.242258	-124.649381	850.0	Push Core	3.8	34.3	4.8			1cm slices in whirlpack bags	Seabrook
NA072-057	NA072-057-05-E-OSU	H1519	2016-06-12T04:34:07.584Z	46.242258	-124.649381	850.0	Push Core	3.8	34.3	4.8			1cm slices in whirlpack bags	Seabrook
NA072-057	NA072-057-06-E-OSU	H1519	2016-06-12T04:34:07.584Z	46.242258	-124.649381	850.0	Push Core	3.8	34.3	4.8			1cm slices in whirlpack bags	Seabrook
NA072-057	NA072-057-07-E-OSU	H1519	2016-06-12T04:34:07.584Z	46.242258	-124.649381	850.0	Push Core	3.8	34.3	4.8			1cm slices in whirlpack bags	Seabrook
NA072-057	NA072-057-08-E-OSU	H1519	2016-06-12T04:34:07.584Z	46.242258	-124.649381	850.0	Push Core	3.8	34.3	4.8			1cm slices in whirlpack bags	Seabrook
NA072-057	NA072-057-09-E-OSU	H1519	2016-06-12T04:34:07.584Z	46.242258	-124.649381	850.0	Push Core	3.8	34.3	4.8			1cm slices in whirlpack bags	Seabrook
NA072-057	NA072-057-10-E-OSU	H1519	2016-06-12T04:34:07.584Z	46.242258	-124.649381	850.0	Push Core	3.8	34.3	4.8			1cm slices in whirlpack bags	Seabrook
NA072 -058	**NA072-058-01-D-OSU**	**H1519**	**2016-06-12T04:35:34.855Z**	**46.242268**	**-124.649394**	**850.1**	**Push Core**	**3.8**	**34.3**	**4.8**	**bonus core from the same site as 056 and 057, this is because it was expected that the tube for core 057 would not hold, but it did**	**Mixed up like -056, expansion/dissolution of hydrates?**	**Sieved into bottle with filtered seawater/ formalin**	**Seabrook**
NA072-058	NA072-058-02-D-OSU	H1519	2016-06-12T04:35:34.855Z	46.242268	-124.649394	850.1	Push Core	3.8	34.3	4.8			Sieved into bottle with filtered seawater/ formalin	Seabrook

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-059	**NA072-059-GT5**	**H1519**	**2016-06-12T05:25:13.366Z**	**46.242199**	**-124.649424**	**848.7**	**Gas Tight**	**3.8**	**34.3**	**4.9**	**steady heavy stream of bubbles from several holes along a fracture at a rich seepage and dark microbial mat site**	**Gas tight #5**	**–**	**Baumberger**
NA072-060	NA072-060-GT17	H1520	2016-06-14T04:46:55.297Z	43.910945	-125.076038	1226.8	Gas Tight	2.9	34.5	17.9	GT17, collected at a steady small bubble flow at the nav site titled 'bunch o bubbles'	Gas Tight #17	–	Baumberger
NA072-061	NA072-061-A-MCZ	H1520	2016-06-14T06:33:08.471Z	43.910798	-125.075832	1224.0	Slurp	2.9	34.5	17.8	Slurp of the many animals living at a rich tube worm bush, anemones and sponge perhaps are among a rich collection of biology	Assorted polychaetes	95% EtOH	MCZ
NA072-061	NA072-061-B-MCZ	H1520	2016-06-14T06:33:08.471Z	43.910798	-125.075832	1224.0	Slurp	2.9	34.5	17.8			RNA later	MCZ
NA072-062	NA072-062-C-OSU	H1520	2016-06-14T06:43:58.141Z	43.910772	-125.075758	1224.0	ROV grab	3.0	34.5	17.8	bunch of tube worms with associate organisms including anemones and sponges and other organisms	Assorted fauna with / from tube worm bush	air dried	Seabrook
NA072-062	NA072-062-A-OSU	H1520	2016-06-14T06:43:58.141Z	43.910772	-125.075758	1224.0	ROV grab	3.0	34.5	17.8			95% EtOH	Seabrook
NA072-062	NA072-062-B-OSU	H1520	2016-06-14T06:43:58.141Z	43.910772	-125.075758	1224.0	ROV grab	3.0	34.5	17.8			RNA later	Seabrook
NA072-062	NA072-062-B-OSU	H1520	2016-06-14T06:43:58.141Z	43.910772	-125.075758	1224.0	ROV grab	3.0	34.5	17.8			RNA later	Seabrook
NA072-062	NA072-062-A-MCZ	H1520	2016-06-14T06:43:58.141Z	43.910772	-125.075758	1224.0	ROV grab	3.0	34.5	17.8			95% EtOH	MCZ
NA072-062	NA072-062-B-MCZ	H1520	2016-06-14T06:43:58.141Z	43.910772	-125.075758	1224.0	ROV grab	3.0	34.5	17.8			RNA later	MCZ
NA072-062	NA072-062-B-MCZ	H1520	2016-06-14T06:43:58.141Z	43.910772	-125.075758	1224.0	ROV grab	3.0	34.5	17.8			RNA later	MCZ
NA072-062	NA072-062-01-A-MCZ	H1520	2016-06-14T06:43:58.141Z	43.910772	-125.075758	1224.0	ROV grab	3.0	34.5	17.8			95% EtOH	MCZ

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-062	NA072-062-01-B-MCZ	H1520	2016-06-14T06:43:58.141Z	43.910772	-125.075758	1224.0	ROV grab	3.0	34.5	17.8			RNA later	MCZ
NA072-062	NA072-062-01-B-OSU	H1520	2016-06-14T06:43:58.141Z	43.910772	-125.075758	1224.0	ROV grab	3.0	34.5	17.8			RNA later	Seabrook
NA072-062	NA072-062-02-A-MCZ	H1520	2016-06-14T06:43:58.141Z	43.910772	-125.075758	1224.0	ROV grab	3.0	34.5	17.8			95% EtOH	MCZ
NA072-062	NA072-062-02-B-MCZ	H1520	2016-06-14T06:43:58.141Z	43.910772	-125.075758	1224.0	ROV grab	3.0	34.5	17.8			RNA later	MCZ
NA072-062	NA072-062-02-B-OSU	H1520	2016-06-14T06:43:58.141Z	43.910772	-125.075758	1224.0	ROV grab	3.0	34.5	17.8			RNA later	Seabrook
NA072-062	NA072-062-03-A-MCZ	H1520	2016-06-14T06:43:58.141Z	43.910772	-125.075758	1224.0	ROV grab	3.0	34.5	17.8			95% EtOH	MCZ
NA072-062	NA072-062-03-B-MCZ	H1520	2016-06-14T06:43:58.141Z	43.910772	-125.075758	1224.0	ROV grab	3.0	34.5	17.8			RNA later	MCZ
NA072-062	NA072-062-04-A-MCZ	H1520	2016-06-14T06:43:58.141Z	43.910772	-125.075758	1224.0	ROV grab	3.0	34.5	17.8			95% EtOH	MCZ
NA072-062	NA072-062-04-B-MCZ	H1520	2016-06-14T06:43:58.141Z	43.910772	-125.075758	1224.0	ROV grab	3.0	34.5	17.8			RNA later	MCZ
NA072-062	NA072-062-05-A-MCZ	H1520	2016-06-14T06:43:58.141Z	43.910772	-125.075758	1224.0	ROV grab	3.0	34.5	17.8			95% EtOH	MCZ
NA072-062	NA072-062-05-B-MCZ	H1520	2016-06-14T06:43:58.141Z	43.910772	-125.075758	1224.0	ROV grab	3.0	34.5	17.8			RNA later	MCZ
NA072-062	NA072-062-06-A-MCZ	H1520	2016-06-14T06:43:58.141Z	43.910772	-125.075758	1224.0	ROV grab	3.0	34.5	17.8			95% EtOH	MCZ
NA072-062	NA072-062-06-B-MCZ	H1520	2016-06-14T06:43:58.141Z	43.910772	-125.075758	1224.0	ROV grab	3.0	34.5	17.8			RNA later	MCZ
NA072-062	NA072-062-07-A-OSU	H1520	2016-06-14T06:43:58.141Z	43.910772	-125.075758	1224.0	ROV grab	3.0	34.5	17.8			95% EtOH	Seabrook

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-063	NA072-063-C-OSU	H1520	2016-06-14T06:58:20.958Z	43.910662	-125.075876	1223.9	Slurp	3.0	34.5	17.6	another thorough slurp of a tube worm bed, many associate organisms including sponges, anemones, snails, and other small critters	Assorted biology including tube worms, gastropods, anemones, and gastropods	air dried	Seabrook
NA072-063	NA072-063-01-A-MCZ	H1520	2016-06-14T06:58:20.958Z	43.910662	-125.075876	1223.9	Slurp	3.0	34.5	17.6			95% EtOH	MCZ
NA072-063	NA072-063-01-B-MCZ	H1520	2016-06-14T06:58:20.958Z	43.910662	-125.075876	1223.9	Slurp	3.0	34.5	17.6			RNA later	MCZ
NA072-063	NA072-063-01-01-A-MCZ	H1520	2016-06-14T06:58:20.958Z	43.910662	-125.075876	1223.9	Slurp	3.0	34.5	17.6			95% EtOH	MCZ
NA072-063	NA072-063-02-A-MCZ	H1520	2016-06-14T06:58:20.958Z	43.910662	-125.075876	1223.9	Slurp	3.0	34.5	17.6			95% EtOH	MCZ
NA072-063	NA072-063-02-B-MCZ	H1520	2016-06-14T06:58:20.958Z	43.910662	-125.075876	1223.9	Slurp	3.0	34.5	17.6			RNA later	MCZ
NA072-063	NA072-063-03-A-MCZ	H1520	2016-06-14T06:58:20.958Z	43.910662	-125.075876	1223.9	Slurp	3.0	34.5	17.6			95% EtOH	MCZ
NA072-063	NA072-063-03-B-MCZ	H1520	2016-06-14T06:58:20.958Z	43.910662	-125.075876	1223.9	Slurp	3.0	34.5	17.6			RNA later	MCZ
NA072-063	NA072-063-04-A-MCZ	H1520	2016-06-14T06:58:20.958Z	43.910662	-125.075876	1223.9	Slurp	3.0	34.5	17.6			95% EtOH	MCZ
NA072-063	NA072-063-05-A-MCZ	H1520	2016-06-14T06:58:20.958Z	43.910662	-125.075876	1223.9	Slurp	3.0	34.5	17.6			95% EtOH	MCZ
NA072-063	NA072-063-05-B-MCZ	H1520	2016-06-14T06:58:20.958Z	43.910662	-125.075876	1223.9	Slurp	3.0	34.5	17.6			RNA later	MCZ
NA072-063	NA072-063-06-A-MCZ	H1520	2016-06-14T06:58:20.958Z	43.910662	-125.075876	1223.9	Slurp	3.0	34.5	17.6			95% EtOH	MCZ
NA072-063	NA072-063-06-B-MCZ	H1520	2016-06-14T06:58:20.958Z	43.910662	-125.075876	1223.9	Slurp	3.0	34.5	17.6			RNA later	MCZ
NA072-063	NA072-063-07-A-MCZ	H1520	2016-06-14T06:58:20.958Z	43.910662	-125.075876	1223.9	Slurp	3.0	34.5	17.6			95% EtOH	MCZ

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-063	NA072-063-08-A-MCZ	H1520	2016-06-14T06:58:20.958Z	43.910662	-125.075876	1223.9	Slurp	3.0	34.5	17.6			95% EtOH	MCZ
NA072-063	NA072-063-08-B-MCZ	H1520	2016-06-14T06:58:20.958Z	43.910662	-125.075876	1223.9	Slurp	3.0	34.5	17.6			RNA later	MCZ
NA072-064	NA072-064-E-OSU	H1520	2016-06-14T07:50:34.227Z	43.910937	-125.075845	1224.5	Scoop	3.0	34.5	16.6	Clam bed (large clams). Associate fauna include crab, sea star, thornyhead, rattail fish, anemone, tube worms, and snail. Large clouds of sediment created upon disturbance with scoop. Also grab of tube worms.	Assorted fauna from clam bed	-80 C freezer	Seabrook
NA072-064	NA072-064-B-OSU	H1520	2016-06-14T07:50:34.227Z	43.910937	-125.075845	1224.5	Scoop	3.0	34.5	16.6			RNA later	Seabrook
NA072-064	NA072-064-B2-OSU	H1520	2016-06-14T07:50:34.227Z	43.910937	-125.075845	1224.5	Scoop	3.0	34.5	16.6			RNA later	Seabrook
NA072-064	NA072-064-A-MCZ	H1520	2016-06-14T07:50:34.227Z	43.910937	-125.075845	1224.5	Scoop	3.0	34.5	16.6			95% EtOH	MCZ
NA072-064	NA072-064-B-MCZ	H1520	2016-06-14T07:50:34.227Z	43.910937	-125.075845	1224.5	Scoop	3.0	34.5	16.6			RNA later	MCZ
NA072-064	NA072-064-01-E-OSU	H1520	2016-06-14T07:50:34.227Z	43.910937	-125.075845	1224.5	Scoop	3.0	34.5	16.6			-80 C freezer	Seabrook
NA072-064	NA072-064-01-B-OSU	H1520	2016-06-14T07:50:34.227Z	43.910937	-125.075845	1224.5	Scoop	3.0	34.5	16.6			RNA later	Seabrook
NA072-064	NA072-064-01-01-A-OSU	H1520	2016-06-14T07:50:34.227Z	43.910937	-125.075845	1224.5	Scoop	3.0	34.5	16.6			95% EtOH	Seabrook
NA072-064	NA072-064-01-01-B-OSU	H1520	2016-06-14T07:50:34.227Z	43.910937	-125.075845	1224.5	Scoop	3.0	34.5	16.6			RNA later	Seabrook
NA072-064	NA072-064-02-A-OSU	H1520	2016-06-14T07:50:34.227Z	43.910937	-125.075845	1224.5	Scoop	3.0	34.5	16.6			95% EtOH	Seabrook
NA072-064	NA072-064-02-B-OSU	H1520	2016-06-14T07:50:34.227Z	43.910937	-125.075845	1224.5	Scoop	3.0	34.5	16.6			RNA later	Seabrook

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-064	NA072-064-02-C-OSU	H1520	2016-06-14T07:50:34.227Z	43.910937	-125.075845	1224.5	Scoop	3.0	34.5	16.6			air dried	Seabrook
NA072-064	NA072-064-02-A-MCZ	H1520	2016-06-14T07:50:34.227Z	43.910937	-125.075845	1224.5	Scoop	3.0	34.5	16.6			95% EtOH	MCZ
NA072-064	NA072-064-02-B-MCZ	H1520	2016-06-14T07:50:34.227Z	43.910937	-125.075845	1224.5	Scoop	3.0	34.5	16.6			RNA later	MCZ
NA072-064	NA072-064-02-C-MCZ	H1520	2016-06-14T07:50:34.227Z	43.910937	-125.075845	1224.5	Scoop	3.0	34.5	16.6			air dried	MCZ
NA072-064	NA072-064-03-D-OSU	H1520	2016-06-14T07:50:34.227Z	43.910937	-125.075845	1224.5	Scoop	3.0	34.5	16.6			formalin	Seabrook
NA072-064	NA072-064-03-A-OSU	H1520	2016-06-14T07:50:34.227Z	43.910937	-125.075845	1224.5	Scoop	3.0	34.5	16.6			95% EtOH	Seabrook
NA072-064	NA072-064-03-C-OSU	H1520	2016-06-14T07:50:34.227Z	43.910937	-125.075845	1224.5	Scoop	3.0	34.5	16.6			air dried	Seabrook
NA072-064	NA072-064-03-01-A-OSU	H1520	2016-06-14T07:50:34.227Z	43.910937	-125.075845	1224.5	Scoop	3.0	34.5	16.6			95% EtOH	Seabrook
NA072-065	NA072-065-01-E-OSU	H1520	2016-06-14T08:05:13.555Z	43.910972	-125.075863	1224.6	Push Core	3.0	34.5	16.3	Gray bacterial mat. Very near clam beds. Associate fauna include clams, thornyhead, rattail, and deep-sea sole. Core taken towards left outer edge of mat. Much resistance encountered when taking core, but not rock. Dark clouds protrude when cores pressed fully into mat.	Mixed up-uncertain about reliable increments – not terrible but be cautious. Shell layer on bottom.	1cm slices in whirlpack bags	Seabrook
NA072-065	NA072-065-02-E-OSU	H1520	2016-06-14T08:05:13.555Z	43.910972	-125.075863	1224.6	Push Core	3.0	34.5	16.3			1cm slices in whirlpack bags	Seabrook
NA072-065	NA072-065-03-E-OSU	H1520	2016-06-14T08:05:13.555Z	43.910972	-125.075863	1224.6	Push Core	3.0	34.5	16.3			1cm slices in whirlpack bags	Seabrook

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-065	NA072-065-04-E-OSU	H1520	2016-06-14T08:05:13.555Z	43.910972	-125.075863	1224.6	Push Core	3.0	34.5	16.3			1cm slices in whirlpack bags	Seabrook
NA072-065	NA072-065-05-E-OSU	H1520	2016-06-14T08:05:13.555Z	43.910972	-125.075863	1224.6	Push Core	3.0	34.5	16.3			1cm slices in whirlpack bags	Seabrook
NA072-065	NA072-065-06-E-OSU	H1520	2016-06-14T08:05:13.555Z	43.910972	-125.075863	1224.6	Push Core	3.0	34.5	16.3			1cm slices in whirlpack bags	Seabrook
NA072-066	NA072-066-01-D-OSU	H1520	2016-06-14T08:06:08.355Z	43.910998	-125.075873	1224.6	Push Core	3.0	34.5	16.3	duplicate w/ 065. right edge of mat. macrofauna.	Separated to use for microbes but changed to macrofauna. Mixed up shell layer on bottom only to 8 cm	Sieved into bottle with filtered seawater/ formalin	Seabrook
NA072-066	NA072-066-02-D-OSU	H1520	2016-06-14T08:06:08.355Z	43.910998	-125.075873	1224.6	Push Core	3.0	34.5	16.3			Sieved into bottle with filtered seawater/ formalin	Seabrook
NA072-067	NA072-067-D-OSU	H1520	2016-06-14T08:10:10.921Z	43.910968	-125.075853	1224.6	Slurp	3.0	34.5	16.1	near PC's 065-066. Bacterial mat and underlying contents.	All sediment, no distinctive organisms to subsample	Sieved into bottle with filtered seawater/ formalin	Seabrook
NA072-068	NA072-068-01-E-OSU	H1520	2016-06-14T08:32:36.173Z	43.910994	-125.075684	1224.9	Push Core	3.1	34.5	15.8	Adjacent to large clam bed. Associated fauna include anemone, hagfish, thornyhead, brittle stars, snail, frilled mussel, possible fuzz on clams (mat or biofuzz?)	–	1cm slices in whirlpack bags	Seabrook
NA072-068	NA072-068-02-E-OSU	H1520	2016-06-14T08:32:36.173Z	43.910994	-125.075684	1224.9	Push Core	3.1	34.5	15.8			1cm slices in whirlpack bags	Seabrook
NA072-068	NA072-068-03-E-OSU	H1520	2016-06-14T08:32:36.173Z	43.910994	-125.075684	1224.9	Push Core	3.1	34.5	15.8			1cm slices in whirlpack bags	Seabrook
NA072-068	NA072-068-04-E-OSU	H1520	2016-06-14T08:32:36.173Z	43.910994	-125.075684	1224.9	Push Core	3.1	34.5	15.8			1cm slices in whirlpack bags	Seabrook
NA072-068	NA072-068-05-E-OSU	H1520	2016-06-14T08:32:36.173Z	43.910994	-125.075684	1224.9	Push Core	3.1	34.5	15.8			1cm slices in whirlpack bags	Seabrook

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-068	NA072-068-016E-OSU	H1520	2016-06-14T08:32:36.173Z	43.910994	-125.075684	1224.9	Push Core	3.1	34.5	15.8			1cm slices in whirlpack bags	Seabrook
NA072-068	NA072-068-07-E-OSU	H1520	2016-06-14T08:32:36.173Z	43.910994	-125.075684	1224.9	Push Core	3.1	34.5	15.8			1cm slices in whirlpack bags	Seabrook
NA072-068	NA072-068-08-E-OSU	H1520	2016-06-14T08:32:36.173Z	43.910994	-125.075684	1224.9	Push Core	3.1	34.5	15.8			1cm slices in whirlpack bags	Seabrook
NA072-068	NA072-068-09-E-OSU	H1520	2016-06-14T08:32:36.173Z	43.910994	-125.075684	1224.9	Push Core	3.1	34.5	15.8			1cm slices in whirlpack bags	Seabrook
NA072-068	NA072-068-10-E-OSU	H1520	2016-06-14T08:32:36.173Z	43.910994	-125.075684	1224.9	Push Core	3.1	34.5	15.8			1cm slices in whirlpack bags	Seabrook
NA072-069	NA072-069-01-D-OSU	H1520	2016-06-14T08:34:27.412Z	43.910946	-125.075643	1224.8	Push Core	3.0	34.5	15.7	duplicate w/ 068.	–	Sieved into bottle with filtered seawater/ formalin	Seabrook
NA072-069	NA072-069-02-D-OSU	H1520	2016-06-14T08:34:27.412Z	43.910946	-125.075643	1224.8	Push Core	3.0	34.5	15.7			Sieved into bottle with filtered seawater/ formalin	Seabrook
NA072-070	NA072-070-01-C-MCZ	H1520	2016-06-14T08:51:01.124Z	43.911060	-125.075344	1224.7	Slurp	3.1	34.5	15.6	In clam bed associated w/ PC's 068-069. Frilled mussel. Polychaete.	Scoop of assorted fauna, including empty frilled mussel shells, tubeworm, polychaetes, gastropods, clams, ophiuroids (sample damaged during processing)	air dried	MCZ
NA072-070	NA072-070-02-A-MCZ	H1520	2016-06-14T08:51:01.124Z	43.911060	-125.075344	1224.7	Slurp	3.1	34.5	15.6			95% EtOH	MCZ
NA072-070	NA072-070-04-A-MCZ	H1520	2016-06-14T08:51:01.124Z	43.911060	-125.075344	1224.7	Slurp	3.1	34.5	15.6			95% EtOH	MCZ
NA072-070	NA072-070-05-A-MCZ	H1520	2016-06-14T08:51:01.124Z	43.911060	-125.075344	1224.7	Slurp	3.1	34.5	15.6			95% EtOH	MCZ
NA072-070	NA072-070-06-A-MCZ	H1520	2016-06-14T08:51:01.124Z	43.911060	-125.075344	1224.7	Slurp	3.1	34.5	15.6			95% EtOH	MCZ

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-071	NA072-071-A-MCZ	H1520	2016-06-14T08:54:31.762Z	43.910908	-125.075686	1224.8	Scoop	3.1	34.5	15.4	In clam bed associated w/ PC's 068-069.	Scoop of assorted fauna, including 4 clams, 1 gastropod, 2 orange anemones, 5 worms, and a tube worm	95% EtOH	MCZ
NA072-071	NA072-071-B-MCZ	H1520	2016-06-14T08:54:31.762Z	43.910908	-125.075686	1224.8	Scoop	3.1	34.5	15.4			RNA later	MCZ
NA072-071	NA072-071-B2-MCZ	H1520	2016-06-14T08:54:31.762Z	43.910908	-125.075686	1224.8	Scoop	3.1	34.5	15.4			RNA later	MCZ
NA072-071	NA072-071-E-OSU	H1520	2016-06-14T08:54:31.762Z	43.910908	-125.075686	1224.8	Scoop	3.1	34.5	15.4			-80C freezer	Seabrook
NA072-071	NA072-071-01-A-OSU	H1520	2016-06-14T08:54:31.762Z	43.910908	-125.075686	1224.8	Scoop	3.1	34.5	15.4			95% EtOH	Seabrook
NA072-071	NA072-071-01-A-MCZ	H1520	2016-06-14T08:54:31.762Z	43.910908	-125.075686	1224.8	Scoop	3.1	34.5	15.4			95% EtOH	MCZ
NA072-071	NA072-071-01-B-MCZ	H1520	2016-06-14T08:54:31.762Z	43.910908	-125.075686	1224.8	Scoop	3.1	34.5	15.4			RNA later	MCZ
NA072-071	NA072-071-02-A-MCZ	H1520	2016-06-14T08:54:31.762Z	43.910908	-125.075686	1224.8	Scoop	3.1	34.5	15.4			95% EtOH	MCZ
NA072-071	NA072-071-02-B-MCZ	H1520	2016-06-14T08:54:31.762Z	43.910908	-125.075686	1224.8	Scoop	3.1	34.5	15.4			RNA later	MCZ
NA072-071	NA072-071-03-A-MCZ	H1520	2016-06-14T08:54:31.762Z	43.910908	-125.075686	1224.8	Scoop	3.1	34.5	15.4			95% EtOH	MCZ
NA072-071	NA072-071-03-B-MCZ	H1520	2016-06-14T08:54:31.762Z	43.910908	-125.075686	1224.8	Scoop	3.1	34.5	15.4			RNA later	MCZ
NA072-071	NA072-071-03-A-OSU	H1520	2016-06-14T08:54:31.762Z	43.910908	-125.075686	1224.8	Scoop	3.1	34.5	15.4			95% EtOH	Seabrook
NA072-071	NA072-071-04-A-MCZ	H1520	2016-06-14T08:54:31.762Z	43.910908	-125.075686	1224.8	Scoop	3.1	34.5	15.4			95% EtOH	MCZ
NA072-071	NA072-071-04-B-MCZ	H1520	2016-06-14T08:54:31.762Z	43.910908	-125.075686	1224.8	Scoop	3.1	34.5	15.4			RNA later	MCZ

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-072	NA072-072-01-E-OSU	H1520	2016-06-14T09:08:26.643Z	43.911063	-125.075594	1224.9	Push Core	3.1	34.5	15.5	Sedimented site. Some white shell material nearby.	–	1cm slices in whirlpack bags	Seabrook
NA072-072	NA072-072-02-E-OSU	H1520	2016-06-14T09:08:26.643Z	43.911063	-125.075594	1224.9	Push Core	3.1	34.5	15.5			1cm slices in whirlpack bags	Seabrook
NA072-072	NA072-072-03-E-OSU	H1520	2016-06-14T09:08:26.643Z	43.911063	-125.075594	1224.9	Push Core	3.1	34.5	15.5			1cm slices in whirlpack bags	Seabrook
NA072-072	NA072-072-04-E-OSU	H1520	2016-06-14T09:08:26.643Z	43.911063	-125.075594	1224.9	Push Core	3.1	34.5	15.5			1cm slices in whirlpack bags	Seabrook
NA072-072	NA072-072-05-E-OSU	H1520	2016-06-14T09:08:26.643Z	43.911063	-125.075594	1224.9	Push Core	3.1	34.5	15.5			1cm slices in whirlpack bags	Seabrook
NA072-072	NA072-072-06-E-OSU	H1520	2016-06-14T09:08:26.643Z	43.911063	-125.075594	1224.9	Push Core	3.1	34.5	15.5			1cm slices in whirlpack bags	Seabrook
NA072-072	NA072-072-07-E-OSU	H1520	2016-06-14T09:08:26.643Z	43.911063	-125.075594	1224.9	Push Core	3.1	34.5	15.5			1cm slices in whirlpack bags	Seabrook
NA072-072	NA072-072-08-E-OSU	H1520	2016-06-14T09:08:26.643Z	43.911063	-125.075594	1224.9	Push Core	3.1	34.5	15.5			1cm slices in whirlpack bags	Seabrook
NA072-072	NA072-072-09-E-OSU	H1520	2016-06-14T09:08:26.643Z	43.911063	-125.075594	1224.9	Push Core	3.1	34.5	15.5			1cm slices in whirlpack bags	Seabrook
NA072-072	NA072-072-10-E-OSU	H1520	2016-06-14T09:08:26.643Z	43.911063	-125.075594	1224.9	Push Core	3.1	34.5	15.5			1cm slices in whirlpack bags	Seabrook
NA072-073	NA072-073-01-D-OSU	H1520	2016-06-14T09:09:51.538Z	43.911075	-125.075510	1224.9	Push Core	3.1	34.5	15.6	duplicate w/ 072. macrofauna.	Core with brittle star, some worms	Sieved into bottle with filtered seawater/ formalin	Seabrook
NA072-073	NA072-073-02-D-OSU	H1520	2016-06-14T09:09:51.538Z	43.911075	-125.075510	1224.9	Push Core	3.1	34.5	15.6			Sieved into bottle with filtered seawater/ formalin	Seabrook
NA072-074	NA072-074-ME	H1520	2016-06-14T10:18:54.927Z	43.913935	-125.071169	1220.7	Niskin	3.1	34.5	15.3	Sea Pen Anthoptilum	Vial label: 2016 coral, eDNA11	Filter stored in cryo vial	Everett

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-075	NA072-075-C-GSO	H1520	2016-06-14T17:17:43.766Z	43.910750	-125.076114	1225.8	ROV grab	3.0	34.5	16.5	Crusty carbonate sample at the SW sites on this dive, near the carbonate nav target	2 small carbonates, 1 clam, 1 long skinny tubeworm	air dried	GSO
NA072-075	NA072-075-01-E-OSU	H1520	2016-06-14T17:17:43.766Z	43.910750	-125.076114	1225.8	ROV grab	3.0	34.5	16.5			-80 C freezer	Seabrook
NA072-075	NA072-075-02-A-MCZ	H1520	2016-06-14T17:17:43.766Z	43.910750	-125.076114	1225.8	ROV grab	3.0	34.5	16.5			95% EtOH	MCZ
NA072-075	NA072-075-02-B-MCZ	H1520	2016-06-14T17:17:43.766Z	43.910750	-125.076114	1225.8	ROV grab	3.0	34.5	16.5			RNA later	MCZ
NA072-075	NA072-075-03-A-MCZ	H1520	2016-06-14T17:17:43.766Z	43.910750	-125.076114	1225.8	ROV grab	3.0	34.5	16.5			95% EtOH	MCZ
NA072-075	NA072-075-03-B-MCZ	H1520	2016-06-14T17:17:43.766Z	43.910750	-125.076114	1225.8	ROV grab	3.0	34.5	16.5			RNA later	MCZ
NA072-076	NA072-076-ME	H1520	2016-06-14T17:26:44.797Z	43.910866	-125.076097	1224.2	Niskin	3.0	34.5	16.6	water sample for eDNA at the seafloor before returning to the surface	Vial label: 2016 coral, eDNA12	Filter stored in cryo vial	Everett
NA072-077	NA072-077-ME	H1520	2016-06-14T18:05:32.621Z	43.911033	-125.077960	817.5	Niskin	4.0	34.3	3.9	water sample for eDNA analysis, intended for collection at 800m	Vial label: 2016 coral, eDNA13	Filter stored in cryo vial	Everett
NA072-078	NA072-078-ME	H1520	2016-06-14T18:35:35.302Z	43.910934	-125.081490	428.0	Niskin	5.6	34.0	36.4	water sample for eDNA collected around 400m	Vial label: 2016 coral, eDNA14	Filter stored in cryo vial	Everett
NA072-079	NA072-079-ME	H1520	2016-06-14T19:04:44.574Z	43.909579	-125.087824	51.4	Niskin	9.5	32.8	204.7	water sample for eDNA collection at about 50m	Vial label: 2016 coral, eDNA15	Filter stored in cryo vial	Everett
NA072-080	NA072-080-GT9	H1521	2016-06-16T02:10:48.101Z	42.712515	-124.901427	618.9	Gas Tight	4.6	34.2	7.2	Gas tight near blurping seep, GT# 9	Gas tight #9	–	Baumberger
NA072-081	NA072-081-ME	H1521	2016-06-16T02:19:31.761Z	42.712573	-124.901378	617.9	Niskin	4.6	34.2	7.2	Water sample for eDNA analysis near Anthomathus mushroom corals, Niskin 12	Vial label: 2016 coral, eDNA16	Filter stored in cryo vial	Everett

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-082	NA072-082-01-A-MCZ	H1521	2016-06-16T02:30:23.235Z	42.712487	-124.901446	618.8	Slurp	4.6	34.2	7.2	Slurp near marker/hydrophone/ blurping seeps, near bacterial mats	Slurp of dark sediment with mat that could not be easily salvaged. Many small bivalves and snails as well as two polychaetes and small rocks	95% EtOH	MCZ
NA072-082	NA072-082-01-B-MCZ	H1521	2016-06-16T02:30:23.235Z	42.712487	-124.901446	618.8	Slurp	4.6	34.2	7.2			RNA later	MCZ
NA072-082	NA072-082-01-E-OSU	H1521	2016-06-16T02:30:23.235Z	42.712487	-124.901446	618.8	Slurp	4.6	34.2	7.2			-80C freezer	Seabrook
NA072-082	NA072-082-02-A-MCZ	H1521	2016-06-16T02:30:23.235Z	42.712487	-124.901446	618.8	Slurp	4.6	34.2	7.2			95% EtOH	MCZ
NA072-082	NA072-082-02-B-MCZ	H1521	2016-06-16T02:30:23.235Z	42.712487	-124.901446	618.8	Slurp	4.6	34.2	7.2			RNA later	MCZ
NA072-082	NA072-082-03-A-MCZ	H1521	2016-06-16T02:30:23.235Z	42.712487	-124.901446	618.8	Slurp	4.6	34.2	7.2			95% EtOH	MCZ
NA072-082	NA072-082-03-B-MCZ	H1521	2016-06-16T02:30:23.235Z	42.712487	-124.901446	618.8	Slurp	4.6	34.2	7.2			RNA later	MCZ
NA072-082	NA072-082-04-A-MCZ	H1521	2016-06-16T02:30:23.235Z	42.712487	-124.901446	618.8	Slurp	4.6	34.2	7.2			95% EtOH	MCZ
NA072-082	NA072-082-04-B-MCZ	H1521	2016-06-16T02:30:23.235Z	42.712487	-124.901446	618.8	Slurp	4.6	34.2	7.2			RNA later	MCZ
NA072-082	NA072-082-05-C-GSO	H1521	2016-06-16T02:30:23.235Z	42.712487	-124.901446	618.8	Slurp	4.6	34.2	7.2			air dried	GSO
NA072-083	NA072-083-C-GSO	H1521	2016-06-16T02:32:33.018Z	42.712509	-124.901439	619.0	ROV grab	4.6	34.2	7.2	Rock sample with some bacterial mat on it	2 ~15x10x5 cm rocks with bacterial mats. 2 small pink worms, some small gastropods.	air dried	GSO
NA072-083	NA072-083-01-A-MCZ	H1521	2016-06-16T02:32:33.018Z	42.712509	-124.901439	619.0	ROV grab	4.6	34.2	7.2			95% EtOH	MCZ
NA072-083	NA072-083-01-B-MCZ	H1521	2016-06-16T02:32:33.018Z	42.712509	-124.901439	619.0	ROV grab	4.6	34.2	7.2			RNA later	MCZ

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-083	NA072-083-02-A-MCZ	H1521	2016-06-16T02:32:33.018Z	42.712509	-124.901439	619.0	ROV grab	4.6	34.2	7.2			95% EtOH	MCZ
NA072-083	NA072-083-02-B-MCZ	H1521	2016-06-16T02:32:33.018Z	42.712509	-124.901439	619.0	ROV grab	4.6	34.2	7.2			RNA later	MCZ
NA072-083	NA072-083-03-A-MCZ	H1521	2016-06-16T02:32:33.018Z	42.712509	-124.901439	619.0	ROV grab	4.6	34.2	7.2			95% EtOH	MCZ
NA072-083	NA072-083-03-B-MCZ	H1521	2016-06-16T02:32:33.018Z	42.712509	-124.901439	619.0	ROV grab	4.6	34.2	7.2			RNA later	MCZ
NA072-083	NA072-083-03-E-MCZ	H1521	2016-06-16T02:32:33.018Z	42.712509	-124.901439	619.0	ROV grab	4.6	34.2	7.2			-80C freezer	Seabrook
NA072-083	NA072-083-03-B-MCZ	H1521	2016-06-16T02:32:33.018Z	42.712509	-124.901439	619.0	ROV grab	4.6	34.2	7.2			RNA later	Seabrook
NA072-084	NA072-084-01-E-OSU	H1521	2016-06-16T02:44:55.115Z	42.712462	-124.901433	619.2	Push Core	4.6	34.2	7.4	Push core near previous slurp site, bacterial mat and dark sediment	Very small amount – used for microbial	1cm slices in whirlpack bags	Seabrook
NA072-084	NA072-084-02-E-OSU	H1521	2016-06-16T02:44:55.115Z	42.712462	-124.901433	619.2	Push Core	4.6	34.2	7.4			1cm slices in whirlpack bags	Seabrook
NA072-084	NA072-084-03-E-OSU	H1521	2016-06-16T02:44:55.115Z	42.712462	-124.901433	619.2	Push Core	4.6	34.2	7.4			1cm slices in whirlpack bags	Seabrook
NA072-084	NA072-084-04-E-OSU	H1521	2016-06-16T02:44:55.115Z	42.712462	-124.901433	619.2	Push Core	4.6	34.2	7.4			1cm slices in whirlpack bags	Seabrook
NA072-084	NA072-084-05-E-OSU	H1521	2016-06-16T02:44:55.115Z	42.712462	-124.901433	619.2	Push Core	4.6	34.2	7.4			1cm slices in whirlpack bags	Seabrook
NA072-085	NA072-085-D-OSU	H1521	2016-06-16T02:46:02.835Z	42.712456	-124.901470	619.2	Push Core	4.6	34.2	7.4	Duplicate to -084	Small amount of 0-5 macrofauna, no water in core tube	Sieved into bottle with filtered seawater/ formalin	Seabrook
NA072-086	NA072-086-A-MCZ	H1521	2016-06-16T03:09:44.263Z	42.712572	-124.901362	619.1	Scoop	4.7	34.2	7.7	Clam bed	Several clams varying in size from 2-8cm in length. Many broken shells, grey muddy sediment, 1 associate snail.	95% EtOH	MCZ

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-086	NA072-086-B-MCZ	H1521	2016-06-16T03:09:44.263Z	42.712572	-124.901362	619.1	Scoop	4.7	34.2	7.7			RNA later	MCZ
NA072-086	NA072-086-E-OSU	H1521	2016-06-16T03:09:44.263Z	42.712572	-124.901362	619.1	Scoop	4.7	34.2	7.7			-80C freezer	Seabrook
NA072-086	NA072-086-B-OSU	H1521	2016-06-16T03:09:44.263Z	42.712572	-124.901362	619.1	Scoop	4.7	34.2	7.7			RNA later	Seabrook
NA072-086	NA072-086-01-A-MCZ	H1521	2016-06-16T03:09:44.263Z	42.712572	-124.901362	619.1	Scoop	4.7	34.2	7.7			95% EtOH	MCZ
NA072-086	NA072-086-01-B-MCZ	H1521	2016-06-16T03:09:44.263Z	42.712572	-124.901362	619.1	Scoop	4.7	34.2	7.7			RNA later	MCZ
NA072-087	NA072-087-D-OSU	H1521	2016-06-16T03:59:58.789Z	42.710823	-124.901302	614.1	Slurp	4.6	34.2	7.6	carbonate base area not good for coring so a slurp of white bacterial mat, small tube worms, tiny snails, and other assorted bio	Small snails with bacterial mat (Tuiopooca), black sediment	Sieved into bottle with filtered seawater/ formalin	Seabrook
NA072-087	NA072-087-01-A-MCZ	H1521	2016-06-16T03:59:58.789Z	42.710823	-124.901302	614.1	Slurp	4.6	34.2	7.6			95% EtOH	MCZ
NA072-087	NA072-087-01-B-MCZ	H1521	2016-06-16T03:59:58.789Z	42.710823	-124.901302	614.1	Slurp	4.6	34.2	7.6			RNA later	MCZ
NA072-087	NA072-087-01-B-OSU	H1521	2016-06-16T03:59:58.789Z	42.710823	-124.901302	614.1	Slurp	4.6	34.2	7.6			RNA later	Seabrook
NA072-087	NA072-087-01-E-OSU	H1521	2016-06-16T03:59:58.789Z	42.710823	-124.901302	614.1	Slurp	4.6	34.2	7.6			-80C freezer	Seabrook
NA072-087	NA072-087-02-A-MCZ	H1521	2016-06-16T03:59:58.789Z	42.710823	-124.901302	614.1	Slurp	4.6	34.2	7.6			95% EtOH	MCZ
NA072-087	NA072-087-02-B-MCZ	H1521	2016-06-16T03:59:58.789Z	42.710823	-124.901302	614.1	Slurp	4.6	34.2	7.6			RNA later	MCZ
NA072-087	NA072-087-03-E-OSU	H1521	2016-06-16T03:59:58.789Z	42.710823	-124.901302	614.1	Slurp	4.6	34.2	7.6			-80C freezer	Seabrook
NA072-087	NA072-087-04-A-MCZ	H1521	2016-06-16T03:59:58.789Z	42.710823	-124.901302	614.1	Slurp	4.6	34.2	7.6			95% EtOH	MCZ

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-087	NA072-087-04-B-MCZ	H1521	2016-06-16T03:59:58.789Z	42.710823	-124.901302	614.1	Slurp	4.6	34.2	7.6			RNA later	MCZ
NA072-087	NA072-087-04-A-OSU	H1521	2016-06-16T03:59:58.789Z	42.710823	-124.901302	614.1	Slurp	4.6	34.2	7.6			95% EtOH	Seabrook
NA072-088	NA072-088-GT11	H1521	2016-06-16T04:12:36.710Z	42.710634	-124.901394	614.7	Gas Tight	4.6	34.2	7.8	Very steady stream of large bubbles, at a carbonate rich area	Gas tight #11	–	Baumberger
NA072-089	NA072-089-A-MCZ	H1521	2016-06-16T04:41:10.624Z	42.710650	-124.901407	614.6	Scoop	4.6	34.2	7.5	clam bed, hard carbonate below (no core possible)	Clams in dark sediment, varying in size. No associate organisms	95% EtOH	MCZ
NA072-089	NA072-089-B-MCZ	H1521	2016-06-16T04:41:10.624Z	42.710650	-124.901407	614.6	Scoop	4.6	34.2	7.5			RNA later	MCZ
NA072-089	NA072-089-E-OSU	H1521	2016-06-16T04:41:10.624Z	42.710650	-124.901407	614.6	Scoop	4.6	34.2	7.5			-80C freezer	Seabrook
NA072-089	NA072-089-B-OSU	H1521	2016-06-16T04:41:10.624Z	42.710650	-124.901407	614.6	Scoop	4.6	34.2	7.5			RNA later	Seabrook
NA072-090	NA072-090-C-GSO	H1521	2016-06-16T05:12:22.479Z	42.710713	-124.901219	614.3	ROV grab	4.6	34.2	7.2	carbonate chunk from lower ledge of several ledge features	2 large rocks (15cm, 10 cm), and several small rock fragments. 2 types of gastropods, 2 small polychaetes, bacterial mat	air dried	GSO
NA072-090	NA072-090-01-A-MCZ	H1521	2016-06-16T05:12:22.479Z	42.710713	-124.901219	614.3	ROV grab	4.6	34.2	7.2			95% EtOH	MCZ
NA072-090	NA072-090-01-B-MCZ	H1521	2016-06-16T05:12:22.479Z	42.710713	-124.901219	614.3	ROV grab	4.6	34.2	7.2			RNA later	MCZ
NA072-090	NA072-090-02-A-MCZ	H1521	2016-06-16T05:12:22.479Z	42.710713	-124.901219	614.3	ROV grab	4.6	34.2	7.2			95% EtOH	MCZ
NA072-090	NA072-090-02-B-MCZ	H1521	2016-06-16T05:12:22.479Z	42.710713	-124.901219	614.3	ROV grab	4.6	34.2	7.2			RNA later	MCZ
NA072-090	NA072-090-03-A-MCZ	H1521	2016-06-16T05:12:22.479Z	42.710713	-124.901219	614.3	ROV grab	4.6	34.2	7.2			95% EtOH	MCZ

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-090	NA072-090-03-B-MCZ	H1521	2016-06-16T05:12:22.479Z	42.710713	-124.901219	614.3	ROV grab	4.6	34.2	7.2			RNA later	MCZ
NA072-090	NA072-090-04-A-MCZ	H1521	2016-06-16T05:12:22.479Z	42.710713	-124.901219	614.3	ROV grab	4.6	34.2	7.2			95% EtOH	MCZ
NA072-090	NA072-090-04-B-MCZ	H1521	2016-06-16T05:12:22.479Z	42.710713	-124.901219	614.3	ROV grab	4.6	34.2	7.2			RNA later	MCZ
NA072-090	NA072-090-04-B-OSU	H1521	2016-06-16T05:12:22.479Z	42.710713	-124.901219	614.3	ROV grab	4.6	34.2	7.2			RNA later	Seabrook
NA072-091	NA072-091-C-GSO	H1521	2016-06-16T05:23:37.786Z	42.710744	-124.901294	612.9	ROV grab	4.6	34.2	7.3	carbonate sample from a higher ledge	Carbonate chunk; possible bacterial mat (maybe sponge) growth on it. Color range: dark grey (likely covered in sediment). Very angular. ~15x10x10cm. Also light grey chunks outlined in white throughout. Fairly fragile.	air dried	GSO
NA072-091	NA072-091-01-A-MCZ	H1521	2016-06-16T05:23:37.786Z	42.710744	-124.901294	612.9	ROV grab	4.6	34.2	7.3			95% EtOH	MCZ
NA072-091	NA072-091-01-B-MCZ	H1521	2016-06-16T05:23:37.786Z	42.710744	-124.901294	612.9	ROV grab	4.6	34.2	7.3			RNA later	MCZ
NA072-091	NA072-091-02-A-MCZ	H1521	2016-06-16T05:23:37.786Z	42.710744	-124.901294	612.9	ROV grab	4.6	34.2	7.3			95% EtOH	MCZ
NA072-091	NA072-091-02-B-MCZ	H1521	2016-06-16T05:23:37.786Z	42.710744	-124.901294	612.9	ROV grab	4.6	34.2	7.3			RNA later	MCZ
NA072-091	NA072-091-03-A-MCZ	H1521	2016-06-16T05:23:37.786Z	42.710744	-124.901294	612.9	ROV grab	4.6	34.2	7.3			95% EtOH	MCZ
NA072-091	NA072-091-03-B-MCZ	H1521	2016-06-16T05:23:37.786Z	42.710744	-124.901294	612.9	ROV grab	4.6	34.2	7.3			RNA later	MCZ
NA072-091	NA072-091-04-A-MCZ	H1521	2016-06-16T05:23:37.786Z	42.710744	-124.901294	612.9	ROV grab	4.6	34.2	7.3			95% EtOH	MCZ

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-091	NA072-091-04-A-MCB	H1521	2016-06-16T05:23:37.786Z	42.710744	-124.901294	612.9	ROV grab	4.6	34.2	7.3			RNA later	MCZ
NA072-092	?	H1521	2016-06-16T05:54:41.914Z	42.710708	-124.901173	614.1	Push Core	4.6	34.2	7.1	softer sediment near clam bed, first of two cores	Microbial transition zone. 4Cm shell in bag – removed	–	Seabrook
NA072-093	NA072-093-D-OSU	H1521	2016-06-16T05:56:06.809Z	42.710716	-124.901155	614.0	Push Core	4.6	34.2	7.1	core in soft sediment near clam bed, number 2 of 2, but top fell off so hard to say about the quality	Macrofauna – got ~5cm out of it	Sieved into bottle with filtered seawater/ formalin	Seabrook
NA072-094	NA072-094-01-E-OSU	H1521	2016-06-16T06:13:53.520Z	42.710708	-124.901196	614.0	Push Core	4.6	34.2	7.2	dark black sediment, quite soft and jello-like, near clam beds (core 1 of 2)	Microbial. Transition possibly ~4cm complete after 6cm.	1cm slices in whirlpack bags	Seabrook
NA072-094	NA072-094-02-E-OSU	H1521	2016-06-16T06:13:53.520Z	42.710708	-124.901196	614.0	Push Core	4.6	34.2	7.2			1cm slices in whirlpack bags	Seabrook
NA072-094	NA072-094-03-E-OSU	H1521	2016-06-16T06:13:53.520Z	42.710708	-124.901196	614.0	Push Core	4.6	34.2	7.2			1cm slices in whirlpack bags	Seabrook
NA072-094	NA072-094-04-E-OSU	H1521	2016-06-16T06:13:53.520Z	42.710708	-124.901196	614.0	Push Core	4.6	34.2	7.2			1cm slices in whirlpack bags	Seabrook
NA072-094	NA072-094-05-E-OSU	H1521	2016-06-16T06:13:53.520Z	42.710708	-124.901196	614.0	Push Core	4.6	34.2	7.2			1cm slices in whirlpack bags	Seabrook
NA072-094	NA072-094-06-E-OSU	H1521	2016-06-16T06:13:53.520Z	42.710708	-124.901196	614.0	Push Core	4.6	34.2	7.2			1cm slices in whirlpack bags	Seabrook
NA072-094	NA072-094-07-E-OSU	H1521	2016-06-16T06:13:53.520Z	42.710708	-124.901196	614.0	Push Core	4.6	34.2	7.2			1cm slices in whirlpack bags	Seabrook
NA072-094	NA072-094-08-E-OSU	H1521	2016-06-16T06:13:53.520Z	42.710708	-124.901196	614.0	Push Core	4.6	34.2	7.2			1cm slices in whirlpack bags	Seabrook
NA072-094	NA072-094-09-E-OSU	H1521	2016-06-16T06:13:53.520Z	42.710708	-124.901196	614.0	Push Core	4.6	34.2	7.2			1cm slices in whirlpack bags	Seabrook
NA072-094	NA072-094-10-E-OSU	H1521	2016-06-16T06:13:53.520Z	42.710708	-124.901196	614.0	Push Core	4.6	34.2	7.2			1cm slices in whirlpack bags	Seabrook
NA072-095	NA072-095-01-D-OSU	H1521	2016-06-16T06:14:16.416Z	42.710712	-124.901196	614.0	Push Core	4.6	34.2	7.2	dark black sediment, quite soft and jello-like, near clam beds (core 2 of 2)	Macrofauna. Clam with stringy stuff.	Sieved into bottle with filtered seawater/ formalin	Seabrook

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-095	NA072-095-02-D-OSU	H1521	2016-06-16T06:14:16.416Z	42.710712	-124.901196	614.0	Push Core	4.6	34.2	7.2			Sieved into bottle with filtered seawater/ formalin	Seabrook
NA072-096	NA072-096-ME	H1521	2016-06-16T07:36:34.037Z	42.711329	-124.903251	624.4	Niskin	4.6	34.2	7.5	pink encrusting octocoral	Vial label: 2016 coral, eDNA17	Filter stored in cryo vial	Everett
NA072-097	NA072-097-A-ME	H1521	2016-06-16T10:00:37.771Z	42.712627	-124.900768	613.6	ROV grab	4.6	34.2	7.6	red stoloniferous octocoral	Not as expected, is actually red Swiftia	95% EtOH	Everett
NA072-097	NA072-097-A-MCZ	H1521	2016-06-16T10:00:37.771Z	42.712627	-124.900768	613.6	ROV grab	4.6	34.2	7.6			95% EtOH	MCZ
NA072-097	NA072-097-B-MCZ	H1521	2016-06-16T10:00:37.771Z	42.712627	-124.900768	613.6	ROV grab	4.6	34.2	7.6			RNA later	MCZ
NA072-098	NA072-098-ME	H1521	2016-06-16T12:02:24.108Z	42.712420	-124.901717	618.7	Niskin	4.5	34.3	6.4	water sample near mushroom corals, NB #8	Vial label: 2016 coral, eDNA18	Filter stored in cryo vial	Everett
NA072-099	NA072-099-ME	H1521	2016-06-16T12:27:33.839Z	42.711134	-124.902199	615.6	Niskin	4.4	34.3	6.3	Water sample in grove of many mushroom corals, NB# 9	Vial label: 2016 coral, eDNA19	Filter stored in cryo vial	Everett
NA072-100	NA072-100-C-MCZ	H1522	2016-06-16T21:31:59.861Z	42.040536	-125.017664	1131.4	ROV grab	3.3	34.5	12.2	Bamboo Coral. Associate fauna include anemone, purple nudibranch, red hydroids, green sponge	–	air dried	MCZ
NA072-100	NA072-100-01-C-GSO	H1522	2016-06-16T21:31:59.861Z	42.040536	-125.017664	1131.4	ROV grab	3.3	34.5	12.2			air dried	GSO
NA072-100	NA072-100-02-A-MCZ	H1522	2016-06-16T21:31:59.861Z	42.040536	-125.017664	1131.4	ROV grab	3.3	34.5	12.2			95% EtOH	MCZ
NA072-100	NA072-100-03-A-MCZ	H1522	2016-06-16T21:31:59.861Z	42.040536	-125.017664	1131.4	ROV grab	3.3	34.5	12.2			95% EtOH	MCZ
NA072-100	NA072-100-04-A-MCZ	H1522	2016-06-16T21:31:59.861Z	42.040536	-125.017664	1131.4	ROV grab	3.3	34.5	12.2			95% EtOH	MCZ
NA072-100	NA072-100-05-A-MCZ	H1522	2016-06-16T21:31:59.861Z	42.040536	-125.017664	1131.4	ROV grab	3.3	34.5	12.2			95% EtOH	MCZ

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-100	NA072-100-06-A-MCZ	H1522	2016-06-16T21:31:59.861Z	42.040536	-125.017664	1131.4	ROV grab	3.3	34.5	12.2			95% EtOH	MCZ
NA072-101	NA072-101-ME	H1522	2016-06-16T21:53:45.329Z	42.040589	-125.017728	1130.7	Niskin	3.3	34.5	12.4	Bamboo Coral "forest." also in area	Vial label: 2016 coral, eDNA20	Filter stored in cryo vial	Everett
NA072-102	NA072-102-A-ME	H1522	2016-06-17T02:53:34.468Z	42.046066	-125.017926	1147.4	ROV grab	3.3	34.5	12.2	Sample of Acanthagorgia	One individual Swiftia >15cm length on a small rock with some associate organisms.	95% EtOH	Everett
NA072-102	NA072-102-A-MCZ	H1522	2016-06-17T02:53:34.468Z	42.046066	-125.017926	1147.4	ROV grab	3.3	34.5	12.2			95% EtOH	MCZ
NA072-102	NA072-102-B-MCZ	H1522	2016-06-17T02:53:34.468Z	42.046066	-125.017926	1147.4	ROV grab	3.3	34.5	12.2			RNA later	MCZ
NA072-102	NA072-102-01-A-MCZ	H1522	2016-06-17T02:53:34.468Z	42.046066	-125.017926	1147.4	ROV grab	3.3	34.5	12.2			95% EtOH	MCZ
NA072-102	NA072-102-01-B-MCZ	H1522	2016-06-17T02:53:34.468Z	42.046066	-125.017926	1147.4	ROV grab	3.3	34.5	12.2			RNA later	MCZ
NA072-102	NA072-102-02-A-MCZ	H1522	2016-06-17T02:53:34.468Z	42.046066	-125.017926	1147.4	ROV grab	3.3	34.5	12.2			95% EtOH	MCZ
NA072-102	NA072-102-02-B-MCZ	H1522	2016-06-17T02:53:34.468Z	42.046066	-125.017926	1147.4	ROV grab	3.3	34.5	12.2			RNA later	MCZ
NA072-103	NA072-103-ME	H1522	2016-06-17T02:58:44.641Z	42.046044	-125.017916	1148.6	Niskin	3.3	34.5	12.8	water sample near several Acanthagorgia corals, NB 11	Vial label: 2016 coral, eDNA21	Filter stored in cryo vial	Everett
NA072-104	NA072-104	H1522	2016-06-17T03:34:09.174Z	42.045137	-125.017832	1141.8	ROV grab	3.3	34.5	12.6	white bamboo coral	Sample lost through crack in forward biobox during dive/ ascent	–	–
NA072-105	NA072-105-A-ME	H1522	2016-06-17T03:50:58.213Z	42.044800	-125.017755	1140.8	ROV grab	3.3	34.5	12.5	Isadella, large pale pink; the bottom part or has long flowing streams	Most of sample lost in transit to surface. Bottom stalk retained.	95% EtOH	Everett
NA072-105	NA072-105-A-MCZ	H1522	2016-06-17T03:50:58.213Z	42.044800	-125.017755	1140.8	ROV grab	3.3	34.5	12.5			95% EtOH	MCZ

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-105	NA072-105-B-MCZ	H1522	2016-06-17T03:50:58.213Z	42.044800	-125.017755	1140.8	ROV grab	3.3	34.5	12.5			RNA later	MCZ
NA072-106	NA072-106-C-GSO	H1522	–	42.044794	-125.017727	1141.3	ROV grab	3.3	34.5	12.5	Large rock with base from the coral in -105 with several associate organisms	~15x15x10cm rock. Greg-dark grey-green in color. Solid, not breakable. Bamboo coral base. Many associate organisms including bryozoans, tunicates, and hydroids.	air dried	GSO
NA072-106	NA072-106-C-MCZ	H1522	–	42.044794	-125.017727	1141.3	ROV grab	3.3	34.5	12.5			air dried	MCZ
NA072-106	NA072-106-01-A-MCZ	H1522	–	42.044794	-125.017727	1141.3	ROV grab	3.3	34.5	12.5			95% EtOH	MCZ
NA072-106	NA072-106-02-A-MCZ	H1522	–	42.044794	-125.017727	1141.3	ROV grab	3.3	34.5	12.5			95% EtOH	MCZ
NA072-106	NA072-106-02-B-MCZ	H1522	–	42.044794	-125.017727	1141.3	ROV grab	3.3	34.5	12.5			RNA later	MCZ
NA072-106	NA072-106-03-A-MCZ	H1522	–	42.044794	-125.017727	1141.3	ROV grab	3.3	34.5	12.5			95% EtOH	MCZ
NA072-106	NA072-106-03-B-MCZ	H1522	–	42.044794	-125.017727	1141.3	ROV grab	3.3	34.5	12.5			RNA later	MCZ
NA072-106	NA072-106-04-A-MCZ	H1522	–	42.044794	-125.017727	1141.3	ROV grab	3.3	34.5	12.5			95% EtOH	MCZ
NA072-106	NA072-106-04-B-MCZ	H1522	–	42.044794	-125.017727	1141.3	ROV grab	3.3	34.5	12.5			RNA later	MCZ
NA072-107	NA072-107-ME	H1522	2016-06-17T04:35:12.526Z	42.040812	-125.017897	1132.5	Niskin	3.5	34.4	9.5	Niskin for eDNA near coral	Vial label: 2016 coral, eDNA22	Filter stored in cryo vial	Everett
NA072-108	NA072-108-ME	H1522	2016-06-17T04:51:05.406Z	42.040197	-125.017858	1133.0	Niskin	3.4	34.4	11.1	water sample for eDNA (at least 5-6 corals in the area)	Vial label: 2016 coral, eDNA23	Filter stored in cryo vial	Everett
NA072-109	NA072-109-ME	H1522	2016-06-17T05:18:56.480Z	42.039239	-125.017415	1129.5	Niskin	3.4	34.4	10.5	water sample for eDNA, in coral region	Vial label: 2016 coral, eDNA24	Filter stored in cryo vial	Everett

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-110	NA072-110-C-GSO	H1523	2016-06-18T00:34:04.362Z	41.426093	-124.890329	740.8	ROV grab	4.0	34.3	6.1	Piece of carbonate ledge from edge of depression	~15x12x8 chunk of carbonate, dark grey with white veins, some rust coloring. 1 small (2cm) polychaete	air dried	GSO
NA072-110	NA072-110-01-A-MCZ	H1523	2016-06-18T00:34:04.362Z	41.426093	-124.890329	740.8	ROV grab	4.0	34.3	6.1			95% EtOH	MCZ
NA072-110	NA072-110-01-B-MCZ	H1523	2016-06-18T00:34:04.362Z	41.426093	-124.890329	740.8	ROV grab	4.0	34.3	6.1			RNA later	MCZ
NA072-111	NA072-111-C-GSO	H1523	2016-06-18T00:55:28.863Z	41.426564	-124.891218	733.8	ROV grab	4.1	34.3	5.4	Piece of carbonate ledge between pit and knoll	White to cream carbonate rock, ~13x10x10cm. Large chunk and small chunk, ~10x3x3cm. Few small pores, overall very solid. Few associate organisms.	air dried	GSO
NA072-111	NA072-111-01-A-MCZ	H1523	2016-06-18T00:55:28.863Z	41.426564	-124.891218	733.8	ROV grab	4.1	34.3	5.4			95% EtOH	MCZ
NA072-111	NA072-111-02-A-MCZ	H1523	2016-06-18T00:55:28.863Z	41.426564	-124.891218	733.8	ROV grab	4.1	34.3	5.4			95% EtOH	MCZ
NA072-111	NA072-111-02-B-MCZ	H1523	2016-06-18T00:55:28.863Z	41.426564	-124.891218	733.8	ROV grab	4.1	34.3	5.4			RNA later	MCZ
NA072-111	NA072-111-03-A-MCZ	H1523	2016-06-18T00:55:28.863Z	41.426564	-124.891218	733.8	ROV grab	4.1	34.3	5.4			95% EtOH	MCZ
NA072-111	NA072-111-03-B-MCZ	H1523	2016-06-18T00:55:28.863Z	41.426564	-124.891218	733.8	ROV grab	4.1	34.3	5.4			RNA later	MCZ
NA072-111	NA072-111-04-A-MCZ	H1523	2016-06-18T00:55:28.863Z	41.426564	-124.891218	733.8	ROV grab	4.1	34.3	5.4			95% EtOH	MCZ
NA072-111	NA072-111-05-A-MCZ	H1523	2016-06-18T00:55:28.863Z	41.426564	-124.891218	733.8	ROV grab	4.1	34.3	5.4			95% EtOH	MCZ
NA072-111	NA072-111-06-A-MCZ	H1523	2016-06-18T00:55:28.863Z	41.426564	-124.891218	733.8	ROV grab	4.1	34.3	5.4			95% EtOH	MCZ

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-112	NA072-112-C-GSO	H1523	2016-06-18T01:21:19.234Z	41.427031	-124.892150	723.9	ROV grab	4.2	34.3	5.1	piece of carbonate	2 carbonate pieces with fluffy white sponge and smooth white sponge. Carbonate ranges from bright white-brown-rust colored. 2 tiny red mushroom corals.	air dried	GSO
NA072-112	NA072-112-01-A-MCZ	H1523	2016-06-18T01:21:19.234Z	41.427031	-124.892150	723.9	ROV grab	4.2	34.3	5.1			95% EtOH	MCZ
NA072-112	NA072-112-01-B-MCZ	H1523	2016-06-18T01:21:19.234Z	41.427031	-124.892150	723.9	ROV grab	4.2	34.3	5.1			RNA later	MCZ
NA072-112	NA072-112-02-A-MCZ	H1523	2016-06-18T01:21:19.234Z	41.427031	-124.892150	723.9	ROV grab	4.2	34.3	5.1			95% EtOH	MCZ
NA072-112	NA072-112-02-B-MCZ	H1523	2016-06-18T01:21:19.234Z	41.427031	-124.892150	723.9	ROV grab	4.2	34.3	5.1			RNA later	MCZ
NA072-112	NA072-112-03-A-MCZ	H1523	2016-06-18T01:21:19.234Z	41.427031	-124.892150	723.9	ROV grab	4.2	34.3	5.1			95% EtOH	MCZ
NA072-112	NA072-112-03-B-MCZ	H1523	2016-06-18T01:21:19.234Z	41.427031	-124.892150	723.9	ROV grab	4.2	34.3	5.1			RNA later	MCZ
NA072-113	NA072-113-ME	H1523	2016-06-18T01:23:26.009Z	41.427020	-124.892170	724.3	Niskin	4.2	34.3	5.1	water sample next to carbonate covered with Anthomastus mushroom corals, NB#12	Vial label: 2016 coral, eDNA25	Filter stored in cryo vial	Everett
NA072-114	NA072-114-C-GSO	H1523	2016-06-18T04:21:01.317Z	41.426888	-124.891071	733.9	ROV grab	4.2	34.3	5.1	dark rock (not carbonate) in lower carbonate area	One ~18x10x10cm chunk of basalt (dark brown- grey-green), fine grained, heavy. 2 small chiton (<1cm each)	air dried	GSO
NA072-114	NA072-114-01-A-MCZ	H1523	2016-06-18T04:21:01.317Z	41.426888	-124.891071	733.9	ROV grab	4.2	34.3	5.1			95% EtOH	MCZ
NA072-114	NA072-114-01-B-MCZ	H1523	2016-06-18T04:21:01.317Z	41.426888	-124.891071	733.9	ROV grab	4.2	34.3	5.1			RNA later	MCZ

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-115	NA072-115	H1523	2016-06-18T05:29:42.170Z	41.427506	-124.891758	734.4	Push Core	4.1	34.3	5.2	failed push core but keeping it since there may be associate organisms that may be useful	Push core failed, no sample collected	–	–
NA072-116	NA072-116-01-E-OSU	H1523	2016-06-18T05:41:03.868Z	41.427492	-124.891729	734.4	Push Core	4.1	34.3	5.3	sediment core from sediment channel, soft sediment and clam bed (core 1of 2)	Microbial. 2 clams on top, no transition. Coarse, dark sediment, slight sulfur smell	1cm slices in whirlpack bags	Seabrook
NA072-116	NA072-116-02-E-OSU	H1523	2016-06-18T05:41:03.868Z	41.427492	-124.891729	734.4	Push Core	4.1	34.3	5.3			1cm slices in whirlpack bags	Seabrook
NA072-116	NA072-116-03-E-OSU	H1523	2016-06-18T05:41:03.868Z	41.427492	-124.891729	734.4	Push Core	4.1	34.3	5.3			1cm slices in whirlpack bags	Seabrook
NA072-116	NA072-116-04-E-OSU	H1523	2016-06-18T05:41:03.868Z	41.427492	-124.891729	734.4	Push Core	4.1	34.3	5.3			1cm slices in whirlpack bags	Seabrook
NA072-116	NA072-116-05-E-OSU	H1523	2016-06-18T05:41:03.868Z	41.427492	-124.891729	734.4	Push Core	4.1	34.3	5.3			1cm slices in whirlpack bags	Seabrook
NA072-116	NA072-116-06-E-OSU	H1523	2016-06-18T05:41:03.868Z	41.427492	-124.891729	734.4	Push Core	4.1	34.3	5.3			1cm slices in whirlpack bags	Seabrook
NA072-116	NA072-116-07-E-OSU	H1523	2016-06-18T05:41:03.868Z	41.427492	-124.891729	734.4	Push Core	4.1	34.3	5.3			1cm slices in whirlpack bags	Seabrook
NA072-116	NA072-116-08-E-OSU	H1523	2016-06-18T05:41:03.868Z	41.427492	-124.891729	734.4	Push Core	4.1	34.3	5.3			1cm slices in whirlpack bags	Seabrook
NA072-116	NA072-116-09-E-OSU	H1523	2016-06-18T05:41:03.868Z	41.427492	-124.891729	734.4	Push Core	4.1	34.3	5.3			1cm slices in whirlpack bags	Seabrook
NA072-116	NA072-116-10-E-OSU	H1523	2016-06-18T05:41:03.868Z	41.427492	-124.891729	734.4	Push Core	4.1	34.3	5.3			1cm slices in whirlpack bags	Seabrook
NA072-117	NA072-116-01-D-OSU	H1523	2016-06-18T05:41:20.580Z	41.427483	-124.891762	734.2	Push Core	4.1	34.3	5.3	sediment core from sediment channel, soft sediment and clam bed (core 2of 2)	Macrofauna, many clams, similar to -116, clams separated and frozen	Sieved into bottle with filtered seawater/ formalin	Seabrook
NA072-117	NA072-116-02-D-OSU	H1523	2016-06-18T05:41:20.580Z	41.427483	-124.891762	734.2	Push Core	4.1	34.3	5.3			Sieved into bottle with filtered seawater/ formalin	Seabrook

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-117	NA072-116-03-E-OSU	H1523	2016-06-18T05:41:20.580Z	41.427483	-124.891762	734.2	Push Core	4.1	34.3	5.3			-80C freezer	Seabrook
NA072-118	NA072-118-01-A-MCZ	H1523	2016-06-18T06:19:36.008Z	41.427372	-124.891989	733.8	Slurp	4.1	34.3	5.2	microbial mat and clam bed area, slurping sediment for the mat and other associate organisms (submitted late)	Slurp with brown sediment, no microbial mat stuck to the fine mesh so only small associates were sampled, including small clams and tiny gastropods	95% EtOH	MCZ
NA072-118	NA072-118-01-B-MCZ	H1523	2016-06-18T06:19:36.008Z	41.427372	-124.891989	733.8	Slurp	4.1	34.3	5.2			RNA later	MCZ
NA072-118	NA072-118-02-A-MCZ	H1523	2016-06-18T06:19:36.008Z	41.427372	-124.891989	733.8	Slurp	4.1	34.3	5.2			95% EtOH	MCZ
NA072-118	NA072-118-02-B-MCZ	H1523	2016-06-18T06:19:36.008Z	41.427372	-124.891989	733.8	Slurp	4.1	34.3	5.2			RNA later	MCZ
NA072-119	NA072-119-01-E-OSU	H1523	2016-06-18T07:10:33.062Z	41.427236	-124.892625	735.8	Slurp	4.1	34.3	5.1	Microbial mats and other small organisms from the pulsating seep ('burpy seep') in between the slabs of carbonate	Bacterial mat (white and yellow), snails, varied polychaetes	-80C freezer	Seabrook
NA072-119	NA072-119-01-A-MCZ	H1523	2016-06-18T07:10:33.062Z	41.427236	-124.892625	735.8	Slurp	4.1	34.3	5.1			95% EtOH	MCZ
NA072-119	NA072-119-01-B-MCZ	H1523	2016-06-18T07:10:33.062Z	41.427236	-124.892625	735.8	Slurp	4.1	34.3	5.1			RNA later	MCZ
NA072-119	NA072-119-02-A-OSU	H1523	2016-06-18T07:10:33.062Z	41.427236	-124.892625	735.8	Slurp	4.1	34.3	5.1			95% EtOH	Seabrook
NA072-119	NA072-119-02-A-MCZ	H1523	2016-06-18T07:10:33.062Z	41.427236	-124.892625	735.8	Slurp	4.1	34.3	5.1			95% EtOH	MCZ
NA072-119	NA072-119-02-B-MCZ	H1523	2016-06-18T07:10:33.062Z	41.427236	-124.892625	735.8	Slurp	4.1	34.3	5.1			RNA later	MCZ
NA072-119	NA072-119-03-A-MCZ	H1523	2016-06-18T07:10:33.062Z	41.427236	-124.892625	735.8	Slurp	4.1	34.3	5.1			95% EtOH	MCZ

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-119	NA072-119-03-B-MCZ	H1523	2016-06-18T07:10:33.062Z	41.427236	-124.892625	735.8	Slurp	4.1	34.3	5.1			RNA later	MCZ
NA072-119	NA072-119-04-A-MCZ	H1523	2016-06-18T07:10:33.062Z	41.427236	-124.892625	735.8	Slurp	4.1	34.3	5.1			95% EtOH	MCZ
NA072-119	NA072-119-05-A-MCZ	H1523	2016-06-18T07:10:33.062Z	41.427236	-124.892625	735.8	Slurp	4.1	34.3	5.1			95% EtOH	MCZ
NA072-119	NA072-119-05-B-MCZ	H1523	2016-06-18T07:10:33.062Z	41.427236	-124.892625	735.8	Slurp	4.1	34.3	5.1			RNA later	MCZ
NA072-120	NA072-120-C-GSO	H1523	2016-06-18T07:19:34.649Z	41.427224	-124.892625	735.7	ROV grab	4.1	34.3	5.1	Rock sample in hopes of containing some bacterial mat slurped in 119.	Large (~40x20x10cm) carbonate, grey-white with some rusty color patches, associated gastropods, polychaetes	air dried	GSO
NA072-120	NA072-120-01-A-MCZ	H1523	2016-06-18T07:19:34.649Z	41.427224	-124.892625	735.7	ROV grab	4.1	34.3	5.1			95% EtOH	MCZ
NA072-120	NA072-120-01-B-MCZ	H1523	2016-06-18T07:19:34.649Z	41.427224	-124.892625	735.7	ROV grab	4.1	34.3	5.1			RNA later	MCZ
NA072-120	NA072-120-02-A-MCZ	H1523	2016-06-18T07:19:34.649Z	41.427224	-124.892625	735.7	ROV grab	4.1	34.3	5.1			95% EtOH	MCZ
NA072-120	NA072-120-02-B-MCZ	H1523	2016-06-18T07:19:34.649Z	41.427224	-124.892625	735.7	ROV grab	4.1	34.3	5.1			RNA later	MCZ
NA072-120	NA072-120-03-A-MCZ	H1523	2016-06-18T07:19:34.649Z	41.427224	-124.892625	735.7	ROV grab	4.1	34.3	5.1			95% EtOH	MCZ
NA072-120	NA072-120-03-B-MCZ	H1523	2016-06-18T07:19:34.649Z	41.427224	-124.892625	735.7	ROV grab	4.1	34.3	5.1			RNA later	MCZ

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-121	NA072-121-C-GSO	H1523	2016-06-18T07:59:09.253Z	41.427326	-124.893438	756.2	ROV grab	4.1	34.3	5.1	Black rock from talus slope.	Carbonate with manganese crust? Large, heavy, ~15x20x10cm rock. 2 layers: top ~5cm is dark brown-black colored; bottom is lighter grey/brown with some rusty colored patches. Holes are present throughout rock. Top of rock has some unidentified biofuzz (not sampled), and 2 small chitons	air dried	GSO
NA072-121	NA072-121-01-A-MCZ	H1523	2016-06-18T07:59:09.253Z	41.427326	-124.893438	756.2	ROV grab	4.1	34.3	5.1			95% EtOH	MCZ
NA072-121	NA072-121-01-B-MCZ	H1523	2016-06-18T07:59:09.253Z	41.427326	-124.893438	756.2	ROV grab	4.1	34.3	5.1			RNA later	MCZ
NA072-122	NA072-122-ME	H1523	2016-06-18T09:15:35.702Z	41.428035	-124.891397	744.7	Niskin	4.1	34.3	5.2	Lillipathes?	Vial label: 2016 coral, eDNA26	Filter stored in cryo vial	Everett
NA072-123	NA072-123-A-MCZ	H1523	2016-06-18T11:01:31.425Z	41.427476	-124.891995	732.4	Scoop	4.1	34.3	5.3	clams near white bacterial mat in fissures(same vicinity as PC 115-117); hard underlying substrate (difficult to scoop); couple scoops taken a few meters apart	Crushed clams, 4 intact clams, 4 small rocks, no associate organisms	95% EtOH	MCZ
NA072-123	NA072-123-B-MCZ	H1523	2016-06-18T11:01:31.425Z	41.427476	-124.891995	732.4	Scoop	4.1	34.3	5.3			RNA later	MCZ
NA072-123	NA072-123-01-C-GSO	H1523	2016-06-18T11:01:31.425Z	41.427476	-124.891995	732.4	Scoop	4.1	34.3	5.3			air dried	GSO
NA072-124	NA072-124-ME	H1523	2016-06-18T12:20:59.527Z	41.425779	-124.889324	740.2	Niskin	4.2	34.3	5.3	water sample near paragorgia corals, swiftia, NB#9	Vial label: 2016 coral, eDNA27	Filter stored in cryo vial	Everett

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
NA072-125	NA072-125-C-GSO	H1523	2016-06-18T12:47:01.153Z	41.425382	-124.889839	732.1	ROV grab	4.2	34.3	5.2	small Paragorgia sample on basalt	Dark rock attached to lighter striated rock at base. (May be lighter carbonate at base, carbonate-manganese crust on top portion?) Paragorgia attached to one side. 2 small polychaete worms and 1 tiny sponge.	air dried	GSO
NA072-125	NA072-125-A-MCZ	H1523	2016-06-18T12:47:01.153Z	41.425382	-124.889839	732.1	ROV grab	4.2	34.3	5.2			95% EtOH	MCZ
NA072-125	NA072-125-B-MCZ	H1523	2016-06-18T12:47:01.153Z	41.425382	-124.889839	732.1	ROV grab	4.2	34.3	5.2			RNA later	MCZ
NA072-125	NA072-125-A-ME	H1523	2016-06-18T12:47:01.153Z	41.425382	-124.889839	732.1	ROV grab	4.2	34.3	5.2			95% EtOH	MCZ
NA072-125	NA072-125-01-A-MCZ	H1523	2016-06-18T12:47:01.153Z	41.425382	-124.889839	732.1	ROV grab	4.2	34.3	5.2			95% EtOH	MCZ
NA072-125	NA072-125-01-B-MCZ	H1523	2016-06-18T12:47:01.153Z	41.425382	-124.889839	732.1	ROV grab	4.2	34.3	5.2			RNA later	MCZ
NA072-125	NA072-125-02-A-MCZ	H1523	2016-06-18T12:47:01.153Z	41.425382	-124.889839	732.1	ROV grab	4.2	34.3	5.2			95% EtOH	MCZ
NA072-126	NA072-126-ME	H1523	2016-06-18T12:50:32.271Z	41.425367	-124.889848	732.1	Niskin	4.2	34.3	5.3	water sample next to paragorgia -125 sample, NB#8	Vial label: 2016 coral, eDNA28	Filter stored in cryo vial	Everett
NA072-127	NA072-127-C-GSO	H1524	2016-06-18T23:11:43.359Z	41.138525	-124.944347	2149.6	ROV grab	2.0	34.6	56.9	Piece of carbonate from wall	9x9x6cm rock, brown-grey color with slight sediment dusting. Very solid. Internal axis of Swiftia (?) coral attached, no associate fauna.	air dried	GSO
NA072-128	NA072-128-ME	H1524	2016-06-18T23:55:59.192Z	41.139120	-124.944546	2116.8	Niskin	2.0	34.6	54.0	water sample next to several Swiftia corals, NB#12	Vial label: 2016 coral, eDNA29	Filter stored in cryo vial	Everett
Total bulk samples attempted (without subsamples):														**128**

Event Log ID	Sample ID	Dive	Date / Time Logged (UTC)	Lat	Long	*Zm*	Sample type	*Tc*	*Spsu*	O2	Eventlog description	Wetlab	Preservation	Recipient
Total samples attempted (with subsamples):														**582**
# in EtOH:														**168**
# in RNA later:														**137**
# dried:														**36**
# in formalin:														**36**
# frozen:														**161**
# other:														**37**
# lost:														**7**
Sum:														**582**

Table 7: Seafloor Markers

Marker	Dive	Site	Zm	Latitude	Longitude
208	H1513	Strait of JDF	151	48.102198	-125.554290
216	H1518	Nehalem Bank	186	45.883821	-124.643297
244	H1519	Astoria Canyon	494	46.222493	-124.656443
273	H1519	Astoria Canyon	849	46.242192	-124.649430
220	H1520	Heceta SW	1227	43.910851	-125.076410
233	H1521	Coquille SW	619	42.712506	-124.901413
288	H1521	Coquille SW	615	42.710627	-124.901387

NA072 Dive Summaries

Note: Dive summaries provided by E/V *Nautilus* science manager and scientific personnel

H1510 NAUTILUS DIVE REPORT

Site: NA070 Seep

Launch Time UTC: 2 June 2016, 04:09:01
On Bottom Time UTC: 2 June 2016, 05:55:28
Latitude: *On Bottom:* 48.038062 N
Longitude: *On Bottom:* 125.804017596 W
Vehicle Depth: *On Bottom:* 844.65 m

Recovery Time UTC: 2 June 2016, 14:14:26
Off Bottom Time UTC: 2 June 2016, 12:52:44
Off Bottom: 48.040525 N
Off Bottom: 125.8069355 W
Off Bottom: 776.95 m

Samples: NA072-001 (Carbonate grab sample)

Objective: The goal of this dive is to investigate a methane seep found during the NA070 shakedown cruise. We will re-aquire the plume using the EM302 and conduct a visual survey of the area around the seep. Gastight, carbonate, sediment, and biological samples may be taken, as directed by scientists on shift and at shore.

Dive Summary:

04:17 – 05:18 Both vehicles in water. Many small fish were visible on the surface. A loose daisy chain on the tether prompted a recovery of Argus to fix the daisy chain, then a redeployment.

05:19 – 05:55 Both vehicles in water, descending towards bottom around 845 m depth. Salps and gelatinous organisms were observed throughout the water column.

05:56 – 06:07 On bottom, scattered bottom feeders including rattails, thornyheads, sea stars, and sea cucumbers were observed on a flat, sedimented seafloor. Waypoint 1 was reached without any sign of the expected methane seep.

06:08 – 06:21 As we continued searching for the methane seep, the density of organisms increased in regions with carbonate substrate. Additional biology, including gastropods, sea pens, clams, shrimp, and black corals, was observed in these locations.
06:21 – 06:46 Approached a large carbonate formation with crabs, sea cucumbers, sea pens, sea whips, rockfish, and other associated fauna. An ROV grab sample of carbonate was taken. Note: the oxygen sensor was either not on or operating at the time of this sample collection.
06:47 – 07:43 Continued to head upslope looking for bubbles, observing hagfish, rockfish, flat fish, jellies, black corals, crabs, and anemones along the way.
07:44 – 08:21 Transited from waypoint 2 to 3, observing similar fauna.
08:22 – 11:18 Transited from waypoint 3 to 4. Strong sonar returns turned out to be rocks, with no sign of bubbles. Similar fauna observed throughout transit.
11:19 – 11:30 Passed over beds of gastropod shells and large mounds of carbonate topped with gastropod egg case towers.
11:31 – 12:03 Continued slowly downslope over muddy seafloor with occasional white patchy mounds that may have been due to bioturbation. Observed similar organisms as earlier in dive.
12:04 – 12:51 Continued to search for methane seeps in a large box pattern, observing similar fauna with more frequent black corals. After reaching the end of the time allotted for this dive, vehicles were prepared for ascent. **No bubbles or evidence of active seeps were observed during this dive.**
12:52 – 14:18 Off bottom. Salps, comb jellies, and dinner plate jellies were visible during the ascent. Both vehicles on deck.

H1511 NAUTILUS DIVE REPORT

Site: Coast Trader

Launch Time UTC: 2 June 2016, 18:03:37
Recovery Time UTC: 3 June 2016, 03:02:24
On Bottom Time UTC: 2 June 2016, 18:18:39
Off Bottom Time UTC: 3 June 2016, 02:23:41

Samples: N/A

Objective: To verify the identity and conduct an archaeological and pollution potential assessment of the historic steamship Coast Trader sunk at this location on 7 June 1942 by the Japanese submarine I25. The EM302 multibeam sonar will be used to map the wreck prior to the dive. During the dive, a visual survey will be conducted as well as assessments taken of potential trawling impacts, torpedo impacts, structural integrity, and oil leakage.

Dive Summary:

18:03 – 18:19 Both vehicles in water, descended towards bottom around 150 m depth.

18:19 – 18:50 On bottom. Observed fauna including spiny dogfish and hermit crabs.

18:50 – 19:41 Explored waypoint with potential of an archaeological find. Evaluation suggests geologic formation consisting of an erratic series of large, linear boulders, likely a result of glacial deposits.

19:41 – 20:19 Transit from waypoint to wreck. Fauna observed included flatfish, spiny dogfish, sea pens, crabs, sea stars and krill. High turbidity waters possibly due to biologic and wave activity.

20:19 – 20:32 Continue transit from waypoint to wreck. Increased presence of large fishes, such as Ling cod, and gastropods on approach to the wreck. Partially buried cables, netting, and other small steel structures sighted.

20:25 Captured sonar screen grab <50 m from wreck.

20:32 – 21:00 Approached southern end of wreck. Viewed decking and deck cranes, ladders, hatch opening and winches. Biology included large groups of Ling cod laying on ship as well as an ROV trap encased in plumose anemones.

21:00 – 21:04 Viewed torpedo impact zone at starboard stern quarter noting visible signs of ship distress. Shore-side confirmation of SS Coast Trader.

21:04 – 21:38 Moving port side, other winches and hatches were located, as well as a smoke stack opening near the lifeboat area. A

few fish were viewed in netting.

21:38 – 21:51 Moving towards bow, superstructure interior observed, noting collapsed roof and booms, as well as holes in the deck. A possible casting instrument was also located.

21:21 – 21:55 Reached bow. Increased sponge abundance on hull as well as patches of visible corrosion.

21:55 – 21:59 Anchor located hosting possible coral species.

21:59 – 22:11 Frontal view of wreck. Great Argus and Hercules views of bow. Sonar screen grab outlining frontal view of SS Coast Trader.

22:11 – 22:41 Continued surveying. Notable findings include bell, rivets, and spare anchor. Zooming in on the ship hull showed great abundances of worms and gastropods as well as metal corrosion. Steel cables were found on seafloor while looking under hull.

22:41 – 23:15 Continued surveying. Notable findings include captain's and officer's mess. Siphonophore chain and crabs were seen, as well as the previously described fauna.

23:15 – 01:15 Second trip around wreck to continue surveying. Trawling gear made operations flying down the center line of the wreck difficult in places. Dinner plate jellies observed.

01:15 – 02:20 Continued survey. More detailed analyses of torpedo impact zone conducted. Blast hole noted at No. 3 hold approximately 24 m forward of stern, farther forward of the expected hit at the No. 4 hold reported after the sinking.

02:20 Dive objectives met to satisfaction of shore crew.

02:23 – 03:03 Off bottom. Dogfish in water column during ascent. Both vehicles on deck.

H1512 NAUTILUS DIVE REPORT

Site: USBL Beacon

Launch Time UTC: 3 June 2016, 13:58:37
On Bottom Time UTC: 3 June 2016, 15:15:46
Latitude: *On Bottom:* 47.633341251 N
Longitude: *On Bottom:* 126.019816031 W
Vehicle Depth: *On Bottom:* 1517.65 m

Recovery Time UTC: 3 June 2016, 18:00:29
Off Bottom Time UTC: 3 June 2016, 15:53:57
Off Bottom: 47.6338275 N
Off Bottom: 126.0186185 W
Off Bottom: 1516.82 m

Samples: N/A

Objective: To locate the USBL beacon by pinging it from the ship, and to recover the USBL beacon.

Dive Summary:

13:58 – 14:05 Both vehicles in water, beginning full descent towards bottom depth of about 1530 m.
14:05 – 14:14 CTD turned on at about 175 m into the dive. Hercules now at about 250 m.
14:14 – 14:56 Dinner plate jellies, salps, poralia jellies, possible lanternfish, squid observed along descent. Hercules at 1000 m.
14:56 – 15:34 Many sea stars, holothurians, bottom fish, eels, octopus, brittle stars observed while searching for beacon.
15:34 – 15:50 Visual on beacon, movement to cut loose and retrieve beacon. Preparing to cut beacon loose. Beacon cut loose and released.
15:53 ROV Hercules off the bottom and ascending up to surface.
15:57 USBL beacon ping at 1000 m.
16:07 Beacon located on the surface.
18:00 Hercules, Argus, and USBL beacon retrieved and on deck.

H1513 NAUTILUS DIVE REPORT

Site: Juan de Fuca Seep (Washington Margin Mega Seep)

Launch Time UTC: 3 June 2016, 21:54:38
On Bottom Time UTC: 3 June 2016, 22:08:34
Latitude: *On Bottom:* 48.1017555 N
Longitude: *On Bottom:* 125.554385 W
Vehicle Depth: *On Bottom:* 139.25. m

Recovery Time UTC: 4 June 2016, 07:18:56
Off Bottom Time UTC: 4 June 2016, 06:44:22
Off Bottom: 48.101858 N
Off Bottom: 125.55436242 W
Off Bottom: 129.02 m

Samples: NA072-002 (Niskin), NA072-003 (Push Core), NA072-004 (Push Core), NA072-005 (Carbonate ROV grab), NA072-006 (Push Core), NA072-007 (Push Core)

Objective: **T**o dive on a series of concentrated plumes detected during a mapping leg early in the NA072 cruise. During the dive, a visual survey will be conducted of the area around the seeps and gas tight, carbonate, representative fauna, water, and push core samples will be collected at the direction of scientists aboard the ship.

Dive Summary:

21:58 – 22:11 Both vehicles in water, descended towards bottom around 140 m depth. Oil bubbles visible at sea surface.

22:12 – 22:43 On bottom and transiting towards waypoint 1 of dive plan, where visibility was poor due to high turbidity. Observed fauna including sea stars, sea pens, dogfish, flat fish, rock fish, and Puget king crabs. Small patches of white bacterial mats as well as patches of discolored seafloor sediments were observed, suggesting possible reducing environments. The first stream of bubbles was noted near waypoint 1.

22:44 – 00:07 Transited slowly from waypoint 1 towards waypoint 2, panning from side to side during transit with all lights on to help spot bubble streams. Passed authigenic carbonate boulders, shell fragments, bacterial mats, and several bubble streams close to waypoint 1; fewer seeps were noted as we proceeded towards waypoint 2. One seep noted as Seep3 had “wobbly” bubbles, possibly indicating coating present on bubbles. Flat fish, dog fish, rock fish, king crabs, sea pens, and a broad skate were observed during the transit.

00:07 – 00:57 Transit to WP4. Targets dropped for seeps 4-6. Passed bubbles and bacterial mats characterized by nearby discolored

sediments and carbonate chunks. Fauna encountered include shell material, flatfish, sea stars, sea pens, spiny dogfish, and rockfish. Decision made to continue following targets 4-7, but skip additional WP's due to the fact that some seeps were already located.

00:57 – 01:42 Headed back to WP4 and then further back to Seeps 1-3 in attempt to gather samples. Patchy bacterial mats observed but no signs of bubbles. Similar fauna observed along transit.

01:42 – 01:56 Bubbles observed over bacterial mat. A sudden strong stream of bubbles lasted for approximately 15 seconds. Attempt to collect Gas tight sample failed due to early trigger release. Temperature probe measurements were taken in the seep with readings of 6.36C before and 6.38C after bubbles started.

01:56 - 02:21 Two failed attempts to take push cores due to hardness of substrate characterized by fine, dark-colored sediment near bacterial mats. “Seep2 label” was corrected to “seep_7_bacterialmats.”

02:21 – 02:35 Tprobe series taken from bubble plumes and bacterial mats target marked as “Temp_ProbSeries_atSeepandMats.” Tprobe measurements from bubble plume read 6.30C as surface and 6.53C hitting carbonate at depth. Tprobe measurements from bacterial mat read 6.35C at surface and 6.63C at depth. Tprobe measurements form bubble hole just below mat read 6.32C at surface. No at-depth measurements taken at bubble hole due to inability to insert probe deeper into site. Began transit back to WP1.

02:35 - 03:31 Changed heading to move to WP10. Stopped at microbial mat near target 7 for temperature reading. Differential between mat temp (6.4C) and ocean temp (6.2C). Noted that agitation of mat during temp samples caused release of bubbles from mat. Niskin sample taken near sea pens.

03:31 – 04:17 At target 7, “steady stream of bubbles,” a set of push cores were taken near bubbling, which indicates a crack in the plate. Temperature readings of 6.28C ambient and 6.29C were taken near the steady stream of bubbles and 6.28C ambient and 6.61C at depth near bacterial mats with associated bubbling. Began transit to Target 8.

04:17 - 04:46 More microbial mats sighted. Target dropped for “bubble city 2.” Tprobe measurements taken at a steady stream of bubbles read 6.58C ambient, 6.75C at floor near bubbles, and 6.70C near associated mat. Fauna observed included yellowtail rockfish, crabs, and sea whips. Began transit to target 9.

04:46 – 05:29 Changed heading to transit towards target 11, Seep 11, and Target 1, with no bubbles observed. Fauna observed included flatfish and spiny dogfish.

05:29 – 05:51 Scattered bacterial mats, carbonate structures, crabs, and fish indicated possible presence of a seep, but no bubbles were observed. Transited to seeps 1 and 2 in attempt to collect push cores and carbonate samples as well as place a marker.

05:51-06:01 Bacterial mats and bubbles located.

06:01 – 06:15 Moved on towards target labeled “Bubble City.” A small carbonate ROV grab sample was taken and marker #208 was left on a carbonate structure near a steady stream of bubbles.

06:16 – 06:41 Two push core samples were taken directly next to a steady stream of bubbles, completing the sampling goals for this dive, after which the vehicles were prepared for ascent.

06:44 – 07:19 Off-bottom. Dogfish in water column during ascent. Both vehicles on deck.

H1514 NAUTILUS DIVE REPORT

Site: Quinault Shelf

Launch Time UTC: 4 June 2016, 15:34:42
On Bottom Time UTC: 4 June 2016, 15:45:40
Latitude: *On Bottom:* 47.4900796857 N
Longitude: *On Bottom:* 124.8755495 W
Vehicle Depth: *On Bottom:* 166.03 m

Recovery Time UTC: 5 June 2016, 01:43:24
Off Bottom Time UTC: 5 June 2016, 01:04:03
Off Bottom: 47.5231494649 N
Off Bottom: 124.93054645 W
Off Bottom: 125.24 m

Samples: NA072-008 (ROV grab); NA072-009 (Slurp); NA072-010 (Niskin)

Objective: To dive on surficial geology targets identified from the April 2016 OCS *Rainier* survey to help characterize seafloor habitats in the Olympic Coastal National Marine Sanctuary (OCNMS). At all sites, visual surveys of surface substrates will be used for seafloor characterization ground-truthing, with sampling of representative rocks and push cores for geological evaluation. Collection of representative corals and sponges will be used for species identification and genetics analysis.

Dive Summary:

15:35 – 15:45 Both vehicles in water, descended towards bottom around 165 m depth.

15:46 – 16:02 On bottom and heading towards OCNMS target 3. Water column full of krill causing low visibility. Prepared to survey ecological habitats and substrates and to groundtruth at sites with varying backscatter.

16:02 – 17:26 Glacial erratics encountered on sea floor and were seemingly correlated with areas of high reflectivity, while sedimented regions had low reflectivity. Fauna observed included sea cucumbers, sea anemones, sedentary remnants on rocks, sea stars (cushion, sun, velcro), sea pens, rockfish (copper, yellowtail, rosy), shrimp, sponges (ball, *pacifica*), hard coral colonies (*swiftia, stilastrrid*), crinoids, sea urchins (*Allocentrotus fragilis)*, and bivalves.

16:26 Anemone and shrimp

16:58 Fish eating velcro sea star

17:06 Krill and fish feeding frenzy

17:13 Sea star growing back legs

17:26 – 18:06 ROV grab of rock sample in area of high reflectivity near trawl tracks. Slurp sample taken of rounded pebble sand gravel thought to be result of river deposits or weathered anticline.

18:06 – 18:45 Additional fauna observed included rockfish (green-striped), encrusting sponges (gray, yellow), leopard nudibranch, sea cucumbers (California, *parastichopus*), zooanthids, Ling cod, flatfish, and polychaetes. Overall decrease in water turbidity and krill density.

18:29 Leopard nudibranch

18:33 Polychaetes with feeding appendages out

18:45 – 19:24 Transit to bright triangular backscatter region. Similar fauna observed with additional skate and rattail fish.

19:24 – 19:46 Bacterial mat. In attempt to take sample, the slurp tube broke and was not used for the remainder of the dive. Niskin sample taken near coral.

19:46 – 21:27 Transit to next target. Similar fauna observed as well as occasional glacial erratics, bacterial mats, and trash.

21:12 Brittle stars nestled in sponge

21:27 – 21:44 Octopus hiding in crevice. Probed sediment with temperature probe to test thickness and found soft sediment to ~30cm depth. Navigational correction noted that all 3 samples previously taken were originally documented as zone 5 but were actually in zone 6 once WP's were corrected.

21:44 – 22:09 Began transit to OCNMS Site 5 fighting strong eastward current and low visibility. Traversed over muddy sediment with much sparser fauna (sea cucumber, sea star, flatfish, rockfish, sea anemone, sponge, krill, crab, skate, and sea pen) than previously observed.

22:09 – 22:50 Transit over possible sand waves. Occasional glacial erratics and similar fauna.

22:50 – 00:05 Hercules and Argus ascended in water column in preparation for tow to site 4. Troubleshooting and science planning during tow. Jellies observed in water column.

00:05 – 00:17 Possible track lines observed. New start point for zone 4 marked in Hypac kas “OCNMS 4 Revised Start.”

00:17 – 00:34 The tether became wrapped around the Argus main cable after the ship suddenly slowed due to heavy wind and current. The tether was successfully cleared by spinning Argus.

00:34 – 01:00 While continuing the transit to target 4, ship movement was stalled by wind and current; due to the weather conditions, the dive was ended and vehicles were recovered early.

01:04 – 01:41 Off-bottom and ascending; both vehicles on deck.

H1515 NAUTILUS DIVE REPORT

Site: Grays Sponge Area

Launch Time UTC: 5 June 2016, 17:46:10
On Bottom Time UTC: 5 June 2016, 17:58:52
Latitude: *On Bottom:* 46.9959259401 N
Longitude: *On Bottom:* 124.94651256 W
Vehicle Depth: *On Bottom:* 149.88 m

Recovery Time UTC: 5 June 2016, 18:48:39
Off Bottom Time UTC: 5 June 2016, 18:24:18
Off Bottom: 46.9958037557 N
Off Bottom: 124.9487725 W
Off Bottom: 137.19 m

Samples: N/A

Objective: To observe and sample areas with a high density of sponges. Samples of three specific sponges, *Poecillastra*, *Acanthascus*, and *Heterochone calyx*, are identified as most important. Time permitting, potential seep sites will also be sampled and observed.

Dive Summary:

17:46 – 17:58 Argus and Hercules in water and descended to bottom at approximately 150 m water depth.
17:58 – 18:16 Fauna observed include flatfish, corals, and white sponges
18:16 – 18:20 Pan tilt jammed on Hercules HD camera. Recover to make repairs. **Dive aborted.**
18:20 – 18:48 Vehicles off-bottom and recovered on deck.

H1516 NAUTILUS DIVE REPORT

Site: Grays Reef Sponge Area

Launch Time UTC: 5 June 2016, 19:46:43
On Bottom Time UTC: 5 June 2016, 20:10:03
Latitude: *On Bottom:* 46.9957377951 N
Longitude: *On Bottom:* 124.947057658 W
Vehicle Depth: *On Bottom:* 151.54 m

Recovery Time UTC: 6 June 2016, 03:06:08
Off Bottom Time UTC: 6 June 2016, 02:43:19
Off Bottom: 47.0096252597 N
Off Bottom: 124.951238778 W
Off Bottom: 139.34 m

Samples: NA072-011 (ROV Grab); NA072-012 (ROV Grab); NA072-013 (ROV Grab); NA072-014 (ROV Grab); NA072-015 (ROV Grab); NA072-016 (ROV Grab); NA072-017 (ROV Grab); NA072-018 (Slurp); NA072-019 (Push Core); NA072-020 (ROV Grab); NA072-021 (ROV Grab)

Objective: To observe and sample areas with a high density of sponges. Samples of three specific sponges, *Poecillastra*, *Acanthascus*, and *Heterochone calyx*, are identified as most important. Time permitting, potential seep sites will also be sampled and observed.

Dive Summary:

19:46 – 20:10 Both vehicles in water, descended towards bottom around 150 m depth.

20:10 – 21:01 On bottom and encountering sponges (*Poecillastra, Acanthascus, Heterochone calyx* [white and yellow color morphs]) immediately. Substrate appears to be cobbular rock amongst muddy sediment with occasional boulders, likely glacial deposits. It is noted that areas of high SONAR backscatter tend to correlate with areas of high sponge density. Some of the sponges are partially or entirely covered in sediment. Faunal associations include skate (longnose), rockfish (canary, seabastomus), sea stars, bottom-feeding fish, lobsters, and ctenophores.

20:35 Pregnant canary rockfish with sponges in backdrop.

21:01 – 21:32 Encountered more dynamic topography. Observed a school of juvenile fishes, suggesting that sponge aggregations may provide a faunal nursery habitat.

21:32 – 22:13 Evaluation of substrate sponges are growing on suggests hard material (possibly carbonate) overlain with thick layers

of sediment (>30cm). Sample taken.

22:13 – 22:29 *Acanthascus* sample taken.

22:29 – 23:03 Changes in topography as well as bottom composition, as areas of little to no sponges were interspersed amongst high density aggregations. Similar fauna with additional to flat fish and crabs. Began transit north to next site, chosen due to backscatter and topography change noted on multibeam.

22:49 Rectangular-shaped debris.

23:03 – 00:28 Transit to northern site. Soft, muddy sediment with clusters of sponges. Similar fauna in addition to rattail fish and ling cod.

00:28 – 01:33 Arrived at large mound with various sponges and associated fauna, including flat fish, sea stars, skate, and rosethorn rockfish. Sponge samples (yellow and white *Heterochone, Poecillastra,* unknown white sponge) and semi-successful push core taken.

01:33 – 01:54 Moved due west to the edge of the low-reflectivity backscatter. White *Heterochone* and orange, round, knobby, unknown sponge samples taken.

01:54 – 02:28 Attempted substrate sample failed due to fragility. Flew over substrate with occasional zooms on fauna, including cushion star, serpulid worms, and rockfish. Seafloor composition is muddy with sparse cobble and rocks.

02:28 – 02:42 After flying down to take a look at the edge of a mound encrusted in sponges, attempted to take a push core into the ledge failed. Having completed the dive sampling requests and having reached the allotted dive time, the vehicles prepared for ascent.

02:43 – 03:07 Off-bottom and ascending; both vehicles on deck.

H1517 NAUTILUS DIVE REPORT

Site: Astoria Canyon Seeps (dive 1)

Launch Time UTC: 7 June 2016, 17:20
On Bottom Time UTC: 7 June 2016, 18:00
Latitude: *On Bottom:* 46.2442595 N
Longitude: *On Bottom:* 124.64875 W
Vehicle Depth: *On Bottom:* 843.6 m

Recovery Time UTC: 8 June 2016, 15:12
Off Bottom Time UTC: 8 June 2016, 14:05
Off Bottom: 46.2231292985 N
Off Bottom: 124.653035 W
Off Bottom: 493.23 m

Samples: NA072-022 (Slurp); NA072-023 (Push Core); NA072-024 (Push Core); NA072-025 (Push Core); NA072-026 (Push Core); NA072-028 (Niskin); NA072-029 (ROV Grab); NA072-030 (Niskin); NA072-031 (Niskin); NA072-032 (Push Core); NA072-033 (Push Core); NA072-034 (Slurp); NA072-035 (Niskin); NA072-036 (Slurp)

Objective: To locate, map, characterize, and sample seeps in the floor of Astoria canyon (850 m) and on the south rim (500 m.)

Dive Summary:

17:20 – 18:01 Both vehicles in water, descended towards bottom around 850 m depth.

18:02 – 18:15 On bottom and headed towards target 2, passing over a very rich environment of sea stars, sea cucumbers, jellies, rockfish, thornyheads, and crabs.

18:16 –19:12 Continued survey to targets 3 and 4 before spotting a large return on the sonar. This site revealed large microbial mats, strongly bubbling seeps, gas hydrates, gelatinous organisms, and worms.

19:13 – 20:56 Noted a vent that stopped bubbling; probing this vent with the temperature probe regenerated the release of bubbles. Bubbles in this region wobbled, indicating oil coatings. One slurp sample was taken from a bacterial mat, and 4 push cores were taken in pairs on and near the mats. Temperature probe readings taken away on and near the mats increased with depth. Rope and other trash were observed near the sample site.

20:57 – 22:12 Began transiting to potential deep plume site target from mapping survey, observing sea stars, fish, jellies, sea cucumbers, hagfish, and trawling lines. Partway through transit, returned to initial sampling site and observed a new stream of

bubbles had restarted. While attempting to take gas tight samples at this site, one sampler triggered prematurely and the funnel on the second filled with methane hydrates.

22:14 – 00:39 Transited east towards waypoint 2 (1800 m away), passing many sablefish and ling cod in addition to the fauna observed earlier in the dive. Decided to fly along the bottom towards the target site along the canyon floor axis. A significant along-canyon current (westward) at 0.2-0.4 knots caused sea cucumbers to align east-west along the canyon axis.

00:40 – 02:08 Continued transit, noting that the density of sea stars and sea cucumbers was decreasing. Occasional sun stars, sea whips, flat fish, and eelpouts were observed. Occasional shallow, straight depressions (~2-3cm across) were observed on the seafloor, apparently from something dragged along the seafloor.

02:09 – 04:26 Headed south towards canyon wall, passing occasional Brisingid sea stars, *Tiburonia* and *Voragonema* jellies, puffball anemones, and trawling scars. By 02:52, the current had lessened enough that sea cucumbers were no longer aligned on the seafloor.

04:27 – 06:11 While moving close to and up the canyon wall, many octopi, glass sponges, brittle stars, and squat lobsters were observed while the density of sea cucumbers decreased dramatically. A Niskin bottle water sample was taken near a pink *Anthomastus* mushroom coral for eDNA analysis. The substrate along the canyon wall was primarily crumbly, layered rock, with some carbonate chimney structures, one spire of which was sampled.

06:12 – 06:53 While continuing up the canyon wall, Niskin bottle water samples were taken near mushroom and *Paragorgia* corals.

06:54 – 10:12 Large colonies of orange *Swiftia* and mushroom corals and high densities of sea pens, crinoids, flat fish, thornyheads, octopi, pompom anemones, and bacterial mats were observed. Trash (crab pots, nets, and oxygen tanks) were observed on the transit upslope to waypoints 4/5.

10:13 – 10:50 Transiting towards potential seeps at waypoint 6, passing more octopi, fragile pink urchins, and carbonate outcrops on a harder substrate.

10:51 – 12:35 Arrived at bacterial mat with many clams near the edge of a large cliff face. Continued upslope to seep 7, passing several streams of intermittent bubbles. Temperature probe readings at the bubbling seeps typically reflected ambient conditions. Took 2 push cores near the bacterial mats, and realized that the 3 push core quivers attached to the Mongo arm (samples NA072-023,-024) had been lost sometime after 00:00.

12:36 – 13:12 Continued towards seep 7, passing leopard nudibranches near gastropod egg towers and black corals. A bacterial mat sample was taken via slurp suctioning. Several large, constant bubble streams were noted from sources filled with clams on the

muddy seafloor.

13:13 – 13:30 Continued south towards seep 10, passing gonathid and cockatoo squid. A Niskin bottle water sample was taken near 3 red *Swiftia* corals, 2 of which were sampled via slurp suctioning.

13:31 – 13:49 While moving east towards waypoints 8 and 9, several cockatoo squid, sun stars, urchins (*Strongylocentruotus fragilis*), clams (*Calyptogena sp*.), an anemone, salp, and skate were observed over sulfidic, dark sediment.

13:50 – 14:02 Several more seeps were discovered in the center of a large field of clam shells over sulfidic sediment and bacterial mats. While attempting to circle the clam field to determine its size, the lights on Hercules began to fluctuate, which was at first attributed to several sablefish swimming around the vehicle.

14:03 – 14:13 After Hercules flew into view of Argus, it was determined that the lights fluctuating on Hercules and Argus were not due to fish. Hercules began spinning uncontrollably and suffered a loss of hydraulic pressure. The ROV pilots were able to remove wraps in the tether immediately after which the vehicles prepared for a dead vehicle recovery.

14:15 – 15:12 Off-bottom and ascending; both vehicles on deck.

H1518 NAUTILUS DIVE REPORT

Site: Nehalem Bank Seeps

Launch Time UTC: 10 June 2016, 23:52
On Bottom Time UTC: 11 June 2016, 00:04
Latitude: *On Bottom:* 45.8858415885 N
Longitude: *On Bottom:* 124.63911905 W
Vehicle Depth: *On Bottom:* 174.05 m

Recovery Time UTC: 11 June 2016, 14:12
Off Bottom Time UTC: 11 June 2016, 13:31
Off Bottom: 45.886917 N
Off Bottom: 124.636565689 W
Off Bottom: 165.41 m

Samples: NA072-037 (Gas Tight); NA072-038 (Push Core); NA072-039 (ROV grab); NA072-040 (Push Core); NA072-041 (Push Core); NA072-042 (Push Core); NA072-043 (Push Core); NA072-044 (ROV grab); NA072-045 (Niskin); NA072-046 (Slurp); NA072-047 (Niskin)

Objective: To locate, map, characterize, and sample seeps at Nehalem bank.

Dive Summary:

23:52 – 00:03 Both vehicles in water, descended towards bottom around 175 m depth.

00:04 – 00:18 On bottom, where high turbidity caused limited visibility. This region appears to be highly productive, with large schools of ling cod, ratfish, canary rockfish, krill, many anemones, sea stars, and several halibut observed.

00:18 – 01:00 Headed south towards waypoint 5, passing many rocky outcrops with juvenile rockfish, gastropods, and fragile pink urchins.

01:01 – 01:49 A visual survey between waypoints 5 and 6 did not provide any sign of a methane seep. After leaving this area, diffuse bubbling was spotted southwest while headed towards waypoint 1. However, the bubbling quickly stopped and did not reappear.

01:50 – 02:45 Several active bubble sources were seen midway between waypoints 1 and 2 from the base of carbonate boulders. Small patches of dark, discolored sediment were visible, as were some bacterial mats, small worms, many sponges, crabs, orange cup corals, and hagfish.

02:46 – 05:49 Continued to waypoint 3, observing several; small, discontinuous bubble streams with white, filamentous bacterial mats that increased in density towards the waypoint. More bubbles were spotted while moving towards target 4, along with large

ling cod and halibut, many sea urchins, shrimp, and ratfish.

05:50 – 07:28 Headed southwest towards seep 11 to begin taking samples. Visibility decreased, causing difficulty in locating a large bacterial mat and bubble source observed earlier in the dive. After thoroughly examining the site and finding very few bubbles, we headed towards seep 12, and flew across a new seep.

07:29 – 09:20 Took several samples at a continuously bubbling seep, including temperature probe measurements, a seemingly successful gas tight sample (NA072-037), 3 push cores (NA072-038, -040, -041), and a grab sample of carbonate (NA072-039).

09:21 – 10:18 Continued searching for new seeps. Placed one marker at a bacterial mat and took 2 more push cores near a white bacterial mat (NA072-042, -043). A bolt failed on the attachment holding these 2 push cores on the Mongo arm, which were readjusted to set on the front porch for extra support.

10:19 – 12:47 Transited to waypoint 8, passing sea stars, rockfish, halibut, fragile pink urchins, ling cod, hagfish, ratfish, and anemones. Continued towards waypoint 11, observing several diffuse seeps. A carbonate sample (NA072-044) was taken from an outcrop with many cup corals, sharp nosed crabs, squat lobsters, and several corals.

12:48 – 13:30 A Niskin water sample (NA072-045) for eDNA analysis was taken next to a pink gorgonian bubblegum coral, which was then sampled via slurp suctioning (NA072-046). Conducted a visual survey of the coral grove and took a final Niskin water sample (NA072-047) next to a small *Swiftia* coral. Having completed the sampling objectives of the dive, the vehicles were prepared for recovery.

13:31 – 04:12 Off-bottom and ascending; both vehicles on deck.

H1519 NAUTILUS DIVE REPORT

Site: Astoria Canyon Seeps (dive 2)

Launch Time UTC: 11 June 2016, 20:23
On Bottom Time UTC: 11 June 2016, 20:54
Latitude: *On Bottom:* 46.221768 N
Longitude: *On Bottom:* 124.655931 W
Vehicle Depth: *On Bottom:* 500.01 m

Recovery Time UTC: 12 June 2016, 07:31
Off Bottom Time UTC: 12 June 2016, 06:06
Off Bottom: 46.2421997905 N
Off Bottom: 124.64947293 W
Off Bottom: 847.83 m

Samples: NA072-048 (Gas Tight); NA072-049 (Push Core); NA072-050 (Push Core); NA072-051 (Scoop); NA072-052 (Slurp); NA072-053 (Niskin); NA072-054 (ROV grab); NA072-055 (Niskin); NA072-056 (Push Core); NA072-057 (Push Core); NA072-058 (Push Core); NA072-059 (Gas Tight)

Objective: To return to seeps at Astoria south rim (~500 m depth) and canyon (~850 m depth), continuing objectives of H1517 in surveying, characterizing, and sampling sites.

Dive Summary:

20:23 – 20:53 Both vehicles in water, descended towards bottom at south rim at around 500 m depth. Pteropod observed on descent as well as occasional jellies and other gelatinous organisms.

20:54 – 21:07 On bottom. The seafloor was muddy with shell fragments and occasional carbonate cobbles. A high density of sea life included small bacterial mats, sea stars, sun stars, anemones, tanner crabs, deep sea soles, hagfish, rockfish, and halibut.

21:08 – 21:48 Approached three steadily bubbling seeps surrounded by shells at waypoint 1. Exploration of this area revealed >12 visible seep streams. A gas tight sample was taken at one of these plumes (NA072-048), and temperature probe data from a bubble source revealed <0.3C increase in temperature from the sediment surface to 20cm depth.

21:49 – 22:51 Two push cores (NA072-049, NA072-050), 1 scoop (NA072-051), and a slurp sample (NA072-052) were taken at a clam bed in this seep region. Marker #244 was dropped near a steadily flowing seep near sample NA072-048. A Niskin water sample (NA072-053) was taken near an *Anthomastus* coral by the marker.

22:52 – 23:21 Approached an outcrop to take a carbonate sample (NA072-054).

23:22 – 00:09 Proceeded towards waypoint 8, passing octopi, crabs, sun stars, anemones, gastropod egg towers, thornyheads, hagfish, and sablefish. A Niskin water sample (NA072-055) was taken next to a bubblegum coral.
00:10 – 00:26 Approached waypoint 4, passing a net and 2 shrimp pots, a large coral, brittle stars, sea stars, gastropods, flat fish, and a large sponge.
00:27 – 02:05 Entered ROV tow mode at 0.5 knots and 470 m depth, heading towards canyon plume site at 850 m depth. Passed occasional shrimp, squid, and lanternfish during transit. Observed many large jellies (*Poralia*, *Tiburonia*) after descending >500 m depth.
02:06 – 02:50 Landed on bottom at 850 m depth and headed towards waypoint 10. Seafloor was flat and sandy with sea cucumbers, sea stars, sun stars, anemones, small white eelpouts, thornyhead, flat fish, hagfish and sable fish observed throughout transit.
02:51 – 04:05 No bubbles were observed at waypoint 10. Proceeded towards waypoints 17/31, where methane seeps with gastropods were found. Exploration of the surrounding area found extensive bacterial mats and bubbling north of point 2. Four strong bubble seeps were found along a fracture between points 2 and 3.
04:06 – 06:05 Took 3 push cores (NA072-056, NA072-057, NA072-058) in a soft spot near the bubbling fracture. Continued south and took a gas tight sample from another very steady stream near point 3 (NA072-059). Deployed marker #273 next to the gas tight sample. Temperature probe readings revealed a >2C increase from surface to 20 cm depth at the bubble source, >0.5C increase from surface to 20 cm depth ~0.5 m from the bubbles, and no change in temperature to 20 cm depth 3 m away from the bubble source. Having completed all sampling objectives, the vehicles were prepared for recovery.
06:06 – 07:31 Off-bottom and ascending; both vehicles on deck.

H1520 NAUTILUS DIVE REPORT

Site: Heceta SW Seeps

Launch Time UTC: 13 June 2016, 23:46
On Bottom Time UTC: 14 June 2016, 00:55
Latitude: *On Bottom:* 43.9121290675 N
Longitude: *On Bottom:* 125.07698884 W
Vehicle Depth: *On Bottom:* 1231.3 m

Recovery Time UTC: 14 June 2016, 19:28
Off Bottom Time UTC: 14 June 2016, 17:29
Off Bottom: 43.9104556735 N
Off Bottom: 125.075824734 W
Off Bottom: 1209.58 m

Samples: NA072-060 (Gas Tight); NA072-061 (Slurp); NA072-062 (ROV grab); NA072-063 (Slurp); NA072-064 (Scoop); NA072-065 (Push Core); NA072-066 (Push Core); NA072-067 (Slurp); NA072-068 (Push Core); NA072-068 (Push Core); NA072-069 (Push Core); NA072-070 (Slurp); NA072-071 (Scoop); NA072-072 (Push Core); NA072-073 (Push Core); NA072-074 (Niskin); NA072-075 (ROV grab); NA072-076 (Niskin); NA072-077 (Niskin); NA072-078 (Niskin); NA072-079 (Niskin)

Objective: To dive on deep seep site southwest of Heceta bank, characterizing, mapping, and sampling methane seeps identified via multibeam sonar mapping. A hydrophone will be deployed near an active seep and recovered at the end of the dive.

Dive Summary:

23:46 – 00:55 Both vehicles in water, descended towards bottom at south rim at around 1230 m depth. Apendicularian net, shrimp, squid, fish, salps, and jellies observed during descent.

00:56 – 01:22 On bottom north of target B. The seafloor was flat with occasional large eelpouts, pom pom anemones, stubby sea cucumbers, and sun stars. Ship continued to move south.

01:23 – 01:37 Hercules is about 97 m from the target site; several more gastropods and rattails observed while the sea cucumbers have mostly disappeared.

01:38 – 01:41 SONAR detection of a possibly large seep is about 25 m away. More large sea stars, shells, crabs, rattails, bacterial mats among the sediment. Passing over some mounds with pockets of bacterial mat and dense shell patches.

01:42 – 01:48 Active seep with bubbles coming out from the depression in the edge of the mound from bacterial mats. A collapsed hard structure in the sediment was observed near cracks in the mound. Series of small fractures in the sediment are consistent

throughout the area.

01:49 – 02:08 Continuing southeast toward the SONAR target. Pom pom anemones, many patches of clams, large patches of tube worms with bacterial mats observed as the perimeter of the shell bed is surveyed. Dense fluffy white microbial mats are more fibrous and filamentous in comparison to previously observed mats. King crab in sediment patch with mounds of dark sediment in the region. Several thornyheads, eelpouts, ophiuroids, and polychaetes observed.

02:07 – 02:37 Tanner crabs, several patches of live clams with fewer patches of tubeworms. Continuing southeast towards some strong SONAR targets. Tracking along the trend of the fault and looking at carbonate. Many more large tubeworms observed. Visibility obscured by sediment cloud. More microbial mats, sponges, some netting (marine debris), small clam patches, irregular tall mounds, collapsed hole with overall hummocky chaotic terrain. Bacterial mats, hydrates, and bubble plumes were found in and around the mound. hole of the mound. Snailfish, tiny gastropods, and frilled mussels observed.

02:38 – 04:14 Left the frilled mussel site after a failed grab sample attempt (shells were too fragile). Approached a possible SONAR target which seemed to be rocks instead of bubbles. More spiny thornyheads, jellies, anemones, sea stars, tanner crabs observed during transit to as new target. Scanned around the deep fissure that may have hydrates inside. Rich clam beds observed at the sonar target.

04:15 – 05:16 Turned on multibeam to try to detect local seeps, was not successful. Returned to a previous seep site. Steady and strong stream of bubbles, gas tight sample collected (NA072-060). Deployed the hydrophone at the gas tight sample site. Left seafloor marker (number 220) at this same site. Collected temperature probe readings indicating ambient/ surface temperatures of 1.65C, 1.90C at 10cm depth, and 2.58C at 20cm depth.

05:17 – 07:11 Tube worm communities rich with life including white microbial mats, tanner crabs, anemones, fish, and clams. Followed terrain along depressions and clusters of tubeworms and clams. Collected a slurp sample of fauna around tubeworms (NA072-061), a grab sample of tube worms (NA072-062), and another slurp of the area around the tubeworm sample (NA072-063). Observed hydrate bubbles forming in sample jars on Hercules.

07:12 – 08:17 Two attempts to take push cores in the area around the tube worm sample failed due to hard substrate and large pieces of shell rubble. Collected a scoop sample (NA072-064) of clams, worms, and shell material, followed by two push core samples (NA072-065, NA072-066) and a slurp sample in the clam bed (NA072-067).

08:18 – 08:55 Located an edge of a clam bed with smaller clams more suited to coring, and took two push core samples (NA072-068, NA072-069). Collected an additional slurp (NA072-070) of frilled mussels at the same site, followed by a scoop (NA072-071) of

more clams.

08:56 – 09:37 Located a flat sedimented area away from the clam beds where two push cores were taken (NA072-072, NA072-073). Transited to WP10 and took temperature probe measurements that recorded a less than 0.5C decrease in temperature from the sediment surface to 20 cm depth.

09:38 – 10:55 Began transit to secondary site, observing pom-pom anemones, sea stars, sea pigs, crabs, sunstars, eelpouts, and sea cucumbers despite poor visibility due to turbid conditions. A Niskin water sample was taken near to an *Anthoptilum* sea pen (NA072-074).

10:56 – 12:34 Near the end of the transit to the secondary site, Hercules lost feed from the HD camera and began to have power fluctuation issues. Towed Argus to 1000 m depth to troubleshoot. Engineers on the ship shut down and replaced part of the rotary converter, after which voltage became stable again on Hercules.

12:35 – 14:03 Descended back to seafloor and continued transit, observing pacific flatnose, rattails, and snailfish in addition to earlier fauna. The transit was slowed significantly due to wind and current conditions that made it difficult for the ship to hold its heading in the desired direction.

14:04 – 14:06 Cameras and lights failed briefly on Hercules due to a crew member accidentally hitting the emergency stop by the winch on the back deck.

14:07 – 15:20 Continued to clam bed at target "S," observing a line in the water column and plastic debris. Circled around and surveyed the clam bed.

15:21 – 17:04 Continued on to where the hydrophone was left next to a bubbling seep earlier in the dive. The seep was still bubbling upon arrival at the site, and the hydrophone was safely recovered.

17:04 – 17:27 Collected a carbonate sample (NA072-075) and a Niskin water sample (NA072-076) before preparing the vehicles for recovery.

17:28 – 19:28 Off-bottom and ascending. Three Niskin water samples were taken during the ascent at 50 m off bottom (NA072-077), 400 m off bottom (NA072-078), and 50 m below the surface (NA072-079). Both vehicles on deck.

H1521 NAUTILUS DIVE REPORT

Site: Coquille SW Seeps

Launch Time UTC: 16 June 2016, 00:49
On Bottom Time UTC: 16 June 2016, 01:32
Latitude: *On Bottom:* 42.712198 N
Longitude: *On Bottom:* 124.9022235 W
Vehicle Depth: *On Bottom:* 618.78 m

Recovery Time UTC: 16 June 2016, 14:03
Off Bottom Time UTC: 16 June 2016, 13:01
Off Bottom: 42.7100585 N
Off Bottom: 124.902140586 W
Off Bottom: 610.12 m

Samples: NA072-080 (Gas Tight); NA072-081 (Niskin); NA072-082 (Slurp); NA072-083 (ROV grab); NA072-084 (Push Core); NA072-085 (Push Core); NA072-086 (Scoop); NA072-087 (Slurp); NA072-088 (Gas Tight); NA072-089 (Scoop); NA072-090 (ROV grab); NA072-091 (ROV grab); NA072-092 (Push Core); NA072-093 (Push Core); NA072-094 (Push Core); NA072-095 (Push Core); NA072-096 (Niskin); NA072-097 (ROV grab); NA072-098 (Niskin); NA072-099 (Niskin);

Objective: To dive on SW Coquille Bank, locating, mapping, and sampling the source of 2 large plumes identified via multibeam sonar mapping. A hydrophone will be deployed near an active seep and recovered at the end of the dive.

Dive Summary:

00:49 – 01:32 Both vehicles in water, descended towards bottom at around 600 m depth. Observed many gelatinous organism and several small squid during descent.

01:32 – 01:41 On bottom. Strong currents from the NE measuring greater than 0.5 kts. Bottom substrate in this region is expected to be hard, providing attachment sites for corals, and is likely to contain some carbonates. Observed fauna include sea stars, deep-sea sole, small bacterial mats, thornyheads, sablefish, hagfish, jellies, and *Anthomastus* mushroom corals.

01:41 - 02:19 Arrived at target N1. This area is characterized by a methane seep releasing clumps of bubbles, as opposed to a steady stream. Scattered shells and bacterial mats were also visible. After surveying the site, a gas tight sample was taken (NA072-080). The hydrophone was also deployed in this area on top of a ledge between two “blurping” bubble seeps. Marker #233 was dropped to mark the area for easy retrieval of the hydrophone later in the dive.

02:19 – 03:16 Remaining in the same area, many samples were taken including a Niskin sample near a S*wiftia* coral (NA072-081),

a slurp of filamentous bacterial mat (NA072-082), a rock sample (NA072-083), two push cores (NA072-084, NA072-085), a scoop from a clam bed (NA072-086), and temperature probe measurements. Before leaving the site, a fly-by of the hydrophone/bubble site was taken, during which hydrate ice was observed on the ROV lens.

03:16 – 03:32 During transit to the southern site, the seafloor become much more sedimented with fewer signs of life. A frogfish was seen in addition to the fauna observed earlier in the dive. Transited to navigation target 'H1521 Dive Site.'

03:32 – 04:06 The seafloor at 'H1521 Dive Site' was characterized by transitions between sandy areas and elevated carbonate ledges. Soft-bodied organisms and shrimp were visible on some of these ledges, as well as pink and purple anemones and corals along the base of the ledges. A slurp (NA072-087) was taken of a white bacterial mat with associate snails and worms.

04:06 – 04:30 Discovery of a very steady gas stream provided a good location to take a gas tight sample (NA072-088) and associated temperature readings. A marker was placed in the area.

04:30 – 05:38 A scoop (NA072-089) was taken of a clam bed with too hard of substrate to core. Two rock samples were also collected from each area of a carbonate ledge structure with distinct layering (NA072-090, NA072-091).

05:38 – 06:14 Soft-substrate located in a clam bed. Four push cores were taken (NA072-092, NA072-093, NA072-094, NA072-095).

06:14 – 06:54 Moving around the sampling area, many more carbonate mounds and tiers were observed. Filamentous bacterial mats and octocorals were found around these structures, as well as a few octopi. Began moving toward survey points 8 and 12.

06:54 – 07:36 During transit to new survey points, flaky carbonate substrate was littered with fauna including thornyhead, sea star (*Rathbunaster californicus*), mushroom coral (*Anthomastus),* hagfish, deep-sea sole, sea stars, and small patches of bacterial mats. The new bacterial mats appeared gray and were not filamentous in nature like those previously viewed in the dive. A Niskin (NA072-096) was triggered near a stressed *swiftia* coral, as determined by discontinuous tissue throughout the axis.

07:36 – 08:29 Moving around the seafloor, other patches of bacterial mats and clam beds were found near or on carbonate structures. Many close looks were also taken at various fauna including an octopus, eelpout, giant nudibranchs, longnose skate, and hagfish.

08:29 – 08:57 Moved into an area characterized by fewer carbonates and muddier substrate. Many bacterial mats of various sizes observed. Particular interest was taken in a gray, filamentous bacterial mat approximately 8-10m in diameter. Prodding the mat revealed hard underlying substrate as well as black sediment and bubbles. Faunal associates included sablefish, mushroom coral (*Anthomastus*), and thornyheads.

08:57 – 10:00 Encountered a large but diffuse area of bacterial mats, but found no bubbles. A physical sample of a suspected red stoloniferous coral (NA072-097).

09:37 Hatchet fish.

10:00 – 11:17 Explored around seafloor. Similar geologic features and biological organisms observed as previously recorded in this dive, noting an increase in the density of marine snow. A 50 gallon diesel oil drum was also encountered.

11:17 – 11:43 Transited back to hydrophone. Similar geologic features and biological organisms observed with additional tanner crabs and gastropods.

11:43 – 11:50 The hydrophone was recovered and placed on Hercules. The seep around the hydrophone was still bubbling upon retrieval.

11:50 – 12:59 Transit to target 'S2.' Two Niskin samples were taken over dense areas of coral (NA072-098, NA072-099), completing the sampling goals of this dive.

13:01 – 14:03 Off-bottom and ascending. Both vehicles on deck.

H1522 NAUTILUS DIVE REPORT

Site: Bamboo Coral Site

Launch Time UTC: 16 June 2016, 20:15
On Bottom Time UTC: 16 June 2016, 21:03
Latitude: *On Bottom:* 42.040778 N
Longitude: *On Bottom:* 125.01609658 W
Vehicle Depth: *On Bottom:* 1125.17 m

Recovery Time UTC: 17 June 2016, 07:00
Off Bottom Time UTC: 17 June 2016, 05:22
Off Bottom: 42.0395044117 N
Off Bottom: 125.017375547 W
Off Bottom: 1124.9 m

Samples: NA072-100 (ROV grab); NA072-101 (Niskin); NA072-102 (ROV grab); NA072-103 (Niskin); NA072-104 (ROV grab); NA072-105 (ROV grab); NA072-106 (ROV grab); NA072-107 (Niskin); NA072-108 (Niskin); NA072-109 (Niskin)

Objective: To dive on a Bamboo Coral site identified by a 2000 NOAA trawl, surveying and collecting coral samples and water samples for eDNA analysis.

Dive Summary:

20:15 – 21:03 Both vehicles in water, descended towards bottom at around 1125 m depth. Observed several myctophids, ctenophores, dragonfish, squid, jellies, and an apendicularian net during descent.

21:03 – 21:23 On bottom. Seafloor is mostly hard-bottomed covered with a thin veneer of sediment and silt. Fauna observed include crab, sea star (*Zoroasterid*), anemone, rattail, thornyhead, sea pens (*Anthoptilium*), deep-sea sole, sea cucumbers, and crinoids.

21:23 – 21:53 Encountered first bamboo corals. A Niskin (NA072-101) was triggered in an area of high density bamboo corals for use in eDNA work, in addition to a physical sample (NA072-100) for groundtruthing purposes. Associate and nearby fauna include sponges, shrimp, brachiopods, anemones, egg cases (shark?), crinoids, bubble gum coral, sea pens, and amphipods. One notable bamboo coral was half eaten by an orange, predatory nudibranch.

21:53 – 22:24 Three new coral species observed. Two were positively identified, *Paragorgia* and *Bathypathes*, while the other were suspected to be *Anthothela* (white). Other notable fauna included a stand of large white sponges littered with red crabs and sea cucumbers with a branching gill structure. A single glass bottle was also lying on the seafloor.

22:24 – 23:14 Zoomed in on a species of black coral thought to be *Lillipathes* or *Parantipathes.* The specimen was approximately 25-30 cm tall with no substantial branching except off the main axis and had associate brittle stars. Other specimens of coral seen included *Bathypathes*, *Swiftia*, and *Isadella.* Other miscellaneous fauna included white gastropods, pacific flatnose, curious rattails, deep-sea soles, and anemones.

23:14 - 23:34 Transit northwest from WP2 to WP3. Noted a bamboo coral with all polyps extended, a nudibranch feeding on a *Swiftia*, and the first sighting of two *Anthomastus* (mushroom) corals. After arriving at WP3, the vehicles began the transit northeast towards WP4.

23:34 – 00:03 Bamboo corals appeared to be congregated on the 1135 m contour; straying from that area leads to muddy sediment and low biological diversity. Several more bamboo corals observed while continuing further north on the same contour, now between WP4 and WP5.

00:03 – 00:18 Observed several bamboo corals which have toppled over. Close looks at individual specimens show the base of the corals are attached to the rock substrate they grew on. Continuing northeast along contour to WP6.

00:18 – 00:29 Small excursion towards promising sonar returns yielded no results, as the corals had largely disappeared. Heading back NW towards 1135m contour.

00:29 – 01:17 Transit through WP8 towards WP10. Occasional encounters with bamboo corals, but at a much lower frequency than earlier in the dive. Similar fauna observed, with an additional *Acantogorgia* and a few pieces of pipe debris colonized by crinoids.

01:17 – 01:51 Density of bamboo corals decreased throughout the end of the transit to WP10. Seafloor mainly characterized by muddy sediment.

01:51 – 02:12 Upon arrival at WP10, the decision was made to head west until a hard boundary was crossed, at which time it would be followed south. At the 1148 m contour, characterized by increased rock exposure, bamboo corals became more abundant. Several other small corals, including *Swiftia,* were seen, as well as similar fauna described throughout the dive.

02:12 – 02:58 Continued slightly SE to cover western edge of survey pattern. Seafloor characterized by rocky cobbles. Corals encountered include *Bathypathes, Swiftia,* and *Acanthagorgia.* A Niskin (NA072-103) was triggered near the *Acanthagorgia and* a physical sample (NA072-102) was taken. Many octopi observed.

02:58 – 03:57 Moving over rocky substrate, more S*wiftia, Isadella, Paragorgia*, cup, and *Bathypathes* corals were encountered. Physical samples were taken of the light pink *Isadella* (NA072-106) and white bamboo (NA072-105) coral. More sightings of dead

bamboo corals: their attachments to rocky substrate suggest top-heavy tip-overs as opposed to trawl damage.

03:57 – 04:35 Transited back to the original site. Many sightings of bamboo corals, however their average size was much smaller than those viewed at the beginning of the dive. Niskin (NA072-107) fired near an unidentified coral species.

04:35 – 04:51 Arrived back at the original dive site. Another Niskin was fired (NA072-108) for eDNA purposes. A closer look was taken of corals seen early in the dive. Other notable fauna include a giant sea slug.

04:51 – 05:21 Before ascending, a visual survey was taken of the contour found to have the highest density of bamboo corals. One final Niskin (NA072-109) was fired, completing the eDNA sampling for the dive.

05:21 – 07:00 Off-bottom and ascending. Both vehicles on deck.

H1523 NAUTILUS DIVE REPORT

Site: Klamath Knoll Seeps

Launch Time UTC: 17 June 2016, 23:40
On Bottom Time UTC: 18 June 2016, 00:19
Latitude: *On Bottom:* 41.425716 N
Longitude: *On Bottom:* 124.891385 W
Vehicle Depth: *On Bottom:* 730.32 m

Recovery Time UTC: 18 June 2016, 14:09
Off Bottom Time UTC: 18 June 2016, 12:53
Off Bottom: 41.425360707 N
Off Bottom: 124.889887 W
Off Bottom: 729.18 m

Samples: NA072-110 (ROV grab); NA072-111 (ROV grab); NA072-112 (ROV grab); NA072-113 (Niskin); NA072-114 (ROV grab); NA072-115 (Push Core); NA072-116 (Push Core); NA072-117 (Push Core); NA072-118 (Slurp); NA072-119 (Slurp); NA072-120 (ROV grab); NA072-121 (ROV grab); NA072-122 (Niskin); NA072-123 (Scoop); NA072-124 (Niskin); NA072-125 (ROV grab); NA072-126 (Niskin)

Objectives: To explore the knolls and craters, locating the source of the gas plume spotted in multibeam, taking representative geological and biological samples.

Dive Summary:

23:40 – 00:19 Both vehicles in water, descended towards bottom at around 730 m depth. Observed several comb jellies, cockatoo squid, solmissus jelly, and myctophids during descent.

00:19 – 00:29 Explored the carbonate outcrops on the bottom of the seafloor. Lanternfish, clam shells, bamboo corals, flatfish, crabs, thornyheads, *Swiftia*, and mushroom corals observed while approaching waypoint 1. Large carbonate ledges observed at the edge of a pit at WP 1.

00:29 – 00:57 Sampled two pieces the carbonate ledges, near the depression (NA072-110) and midway between the depression and knoll (NA072-111). Paragorgia, tanner crabs, deep sea soles, and many mushroom corals throughout the area.

00:58 – 01:23 Passed over waypoint 2. Dark triangular marine debris observed under a ledge. Many mushroom corals, sea soles, microbial mats, and more rocky carbonate outcrops observed as we passed over waypoint 3 and approached the summit of the knoll. A sample of carbonate with small white sponges was collected with the ROV grab tool (NA072-112). A Niskin water sample for

eDNA analysis was collected near mushroom corals (NA072-113).

01:24 – 02:03 Passed over microbial mats and circled around boulders. More thornyheads, hagfish, and layered carbonate slabs. Bubbles detected around jagged broken rocks. Scattered anemones and flatfish throughout the carbonate slabs. Continued NW towards target S2 around tall, thin carbonate wall. Beyond the wall, mushroom corals disappeared, while the density of bacterial mats and encrusting white and orange sponges increased. Bubbles were observed from under the edge of a carbonate ledge, released in steady clumps.

02:04 – 04:20 Continued SE towards target S1. Observed more mushroom corals, scattered anemones, hagfish, flatfish, and crabs. Close to S1, clams around small dark microbial mats were observed. No bubbles were observed in this region. Carbonate formations included elevated sheets and bridge-like features. Dark black rocks were observed that may be manganese-encrusted carbonates; one of these rocks was collected as a grab sample (NA072-113).

04:21 – 06:27 Continued survey along NE edge of knoll site. Carbonate sheets and outcropping decreased away from the knoll as more dark colored boulders were observed. Several clam beds inspected in sedimented channels among boulders. Three push cores were taken in one of these softer sedimented channels (NA072-114, NA072-115, NA072-116). A slurp sample was taken from the edge of a clam bed (NA072-117), though a scoop sample of clams failed.

06:28 – 07:20 Returned to the previously observed bubbling seep beyond the carbonate wall. A slurp sample was taken of bacterial mat near the seep (NA072-118), and a grab sample of a piece of carbonate ledge with some bacterial mat was taken at the same site (NA072-119).

07:21 – 09:20 Continued west to a region of high relief where carbonate fragments were observed from a possible slumping event. A black rock was sampled from the talus slope (NA072-121). Followed fissures in carbonate, observing mushroom corals, anemones, thornyheads, hagfish, clams, and bacterial mats. Observed a single tube worm on a carbonate structure near a clam bed. Took a Niskin water sample near a *Lillipathes* black coral and *Paragorgia* bubblegum corals.

09:21– 11:05 Continued transit towards S7, observing several pieces of trash (tubing, cans). Several bacterial mats, clam beds, and black corals were observed, as well as an iridescent comb jelly. A scoop sample (NA072-123) was taken of clams near a bacterial mat in a fissure close to the earlier push core sampling site.

11:06 – 11:51 Headed east to look at the periphery of the knoll. Several sablefish were observed, as well as many more blocky black boulders. Several black corals and *Paragorgia* corals were observed in and near the boulder field heading away from the carbonate knoll.

11:52 – 12:22 Headed south towards smaller knoll target, observing large sponges, black corals, *Paragorgia,* and *Swiftia* corals on carbonate ledges and dark boulders. Collected a Niskin sample near this site (NA072-124).

12:23 – 12:52 A sample of *Paragorgia* on a dark rock was collected (NA072-125) and a Niskin water sample was taken (NA072-126). Having used the time allotted for this dive, the vehicles were prepared for recovery.

12:53 – 14:10 Off-bottom and ascending. Both vehicles on deck.

H1524 NAUTILUS DIVE REPORT

Site: Trinidad Canyon Seep

Launch Time UTC: 18 June 2016, 20:27
On Bottom Time UTC: 18 June 2016, 21:53
Latitude: *On Bottom:* 41.135817 N
Longitude: *On Bottom:* 124.944151413 W
Vehicle Depth: *On Bottom:* 2182.18 m

Recovery Time UTC: 19 June 2016, 06:29
Off Bottom Time UTC: 19 June 2016, 04:37
Off Bottom: 41.1449755 N
Off Bottom: 124.943539 W
Off Bottom: 1879.93 m

Samples: NA072-127 (ROV grab); NA072-128 (Niskin)

Objective: To dive on Trinidad Canyon, traversing possibly thrust zones and surveying the canyon wall from ~2200 to 1850 m depth, taking samples of geologic substrate and representative biology as possible.

Dive Summary:

20:15 – 21:57 Both vehicles in water, descending towards bottom at around 2200 m depth. Observed many jellies and lanternfish during descent.

21:58 – 22:51 On bottom, where white and black sea cucumbers, brittle stars, Brisingid stars, sea spiders, glass sponges, swimming polychaetes, zooanthids, octopi, pacific flatnose, eelpouts, and fly trap anemone were observed. Headed towards the canyon wall.

22:52 – 23:41 Arrived at wall which was characterized by steeply dipping rock layers. Headed up the steepest part of the wall, collecting a rock sample at 2150 m depth (NA072-127). Octopi (*Graneledone pacifica*) were observed clinging upside down to crevices in the wall tending eggs. *Swiftia* corals, black corals, gastropods, flytrap anemones, purple anemones, crinoids, shrimp, white sponges, Brisingid stars, *Paelopatides* sea cucumbers, possible small tubeworms in the sediment, and several Pacific flatnose observed.

23:42 – 23:54 Rock layers appear to be tectonically tilted lithified sediment. Began a survey pattern of lateralling along the wall between rocky outcrops until the wall became mostly sediment-covered with low biological density, rising several meters, and lateralling back the other direction. On the rocky outcrops, biological diversity was high as described above; on the sedimented portions, occasional seastars, gastropods, and sea cucumbers were observed and some small burrows and worms were visible.

23:55 – 00:59 Collected a Niskin water sample near several *Swiftia* corals (NA072-128). Occasional galatheid crabs and cusk-eels observed in addition to fauna previously described. Continued survey along wall.

01:00 – 01:56 Observed a baby *Graneledone pacifica* while continuing up wall at approximately 2075 m depth, in addition to dozens of adults brooding eggs, many close together along overhanging ledges in rock outcrops. Observed similar fauna throughout vertical transit with an additional skate and gastropods laying egg towers.

01:57 – 04:08 Began to follow 1950 m contour to the northeast along the canyon wall, observing fewer rock outcrops. Biological density and diversity decreased, though occasional small patches of tubeworms began to appear. Observed several small snailfish and several large ratfish.

04:09– 04:38 Continued to lateral along wall at 1920 m depth, observing several large polychaetes, more scattered clam shells, and some dark sediment showing signs of sulfate reduction near small tube worm clumps. May have found a very diffuse seep site, though no active bubbling was observed. Having used the time allotted for the dive, the vehicles were prepared for recovery.

04:37 – 06:29 Off-bottom and ascending. Both vehicles on deck.

NA072 Dive Logs

Note: Dive logs provided by E/V *Nautilus* science manager and scientific personnel

Description: H1510 NA072 Seep	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Argus in water	6/2/2016	4	16	15	48.039457	-125.803491	6.3	cam1_20160602041448.png
A lot of biology in the water column, several fish observed	6/2/2016	4	27	18	48.039180	-125.802680	226.4	cam2_20160602042724.png
plan to bring Argus back on deck to fix the loose daisy chain	6/2/2016	4	34	57	48.038977	-125.802412	384.1	
preparing to bring Argus back on deck to troubleshoot a loose daisy chain	6/2/2016	5	6	37	48.037708	-125.804862	24.1	
Argus back on deck	6/2/2016	5	13	22	48.037920	-125.804754	1.3	
Daisy chain fixed. Argus back in water	6/2/2016	5	17	56	48.037970	-125.803522	1.5	
at depth of 327m and water column still very full of biology	6/2/2016	5	32	11	48.037688	-125.803866	333.0	cam1_20160602053928.png
long skinny organism	6/2/2016	5	40	51	48.037627	-125.803971	555.0	cam1_20160602054235.png
more gelatinous organisms	6/2/2016	5	43	24	48.037644	-125.804065	619.2	cam2_20160602054031.png
on bottom, sedimented with some small organisms in sight	6/2/2016	5	57	21	48.038049	-125.804106	845.7	cam1_20160602055845.png
rattail fish	6/2/2016	5	58	39	48.038144	-125.804168	845.2	cam1_20160602055824.png
several pink-colored fish on the sedimented floor	6/2/2016	5	59	29	48.038147	-125.804205	841.4	cam1_20160602055845.png
heading upslope	6/2/2016	5	59	45	48.038157	-125.804206	840.2	cam1_20160602055845.png
eel	6/2/2016	6	2	15	48.038180	-125.804206	842.7	cam1_20160602060752.png
fish	6/2/2016	6	3	18	48.038239	-125.804229	841.3	cam1_20160602060752.png
many detritus feeders including bottom fish, sea stars and sea cucumbers	6/2/2016	6	5	29	48.038323	-125.804197	840.2	cam1_20160602060828.png
mottled bottom fish common to location	6/2/2016	6	6	39	48.038361	-125.804202	840.0	cam1_20160602060752.png
arrived at WP 1, no sight of the seep yet	6/2/2016	6	6	51	48.038368	-125.804219	840.0	cam1_20160602060752.png
carbonate substrate	6/2/2016	6	7	52	48.038415	-125.804196	838.3	cam1_20160602060752.png

Description: H1510 NA072 Seep	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
carbonate substrate with several gastropods, density of organisms are increasing. perhaps carbonate are an indicator of our proximity to the seep	6/2/2016	6	9	31	48.038409	-125.804220	838.8	cam1_20160602060828.png
sea pen	6/2/2016	6	10	43	48.038412	-125.804210	838.1	cam1_20160602061614.png
sea pens	6/2/2016	6	13	36	48.038544	-125.804333	835.7	cam1_20160602061614.png
old coral structure	6/2/2016	6	14	54	48.038555	-125.804385	835.2	cam1_20160602061610.png
clams, snails, shrimp, several other animals all on a coral structure (not actually an "old coral")	6/2/2016	6	16	51	48.038580	-125.804369	836.1	cam1_20160602061609.png
no bubbles	6/2/2016	6	17	3	48.038577	-125.804377	836.1	cam1_20160602061609.png
clams and bacteria, also polychaetes	6/2/2016	6	17	38	48.038573	-125.804383	836.1	cam1_20160602061609.png
hydrozoa	6/2/2016	6	18	4	48.038565	-125.804346	836.0	cam1_20160602061614.png
clams, crabs, shrimp	6/2/2016	6	18	30	48.038572	-125.804391	834.7	cam1_20160602061614.png
steep slope	6/2/2016	6	20	2	48.038822	-125.804424	830.2	cam1_20160602062650.png
steep slide, carbonate on the side of the slope	6/2/2016	6	20	23	48.038826	-125.804427	829.5	cam1_20160602062650.png
bowl shaped feature is a slide, perhaps why the seep is here	6/2/2016	6	20	46	48.038832	-125.804415	829.9	cam1_20160602062650.png
large carbonate structure viewable in the Argus cam	6/2/2016	6	21	12	48.038807	-125.804424	829.9	cam1_20160602062827.png
Argus close up on the carbonate structure	6/2/2016	6	22	6	48.038717	-125.804350	828.4	cam1_20160602062819.png
very large carbonate formation	6/2/2016	6	22	36	48.038730	-125.804327	826.5	cam1_20160602062819.png
excellent Herc and Argus views of the large carbonate formation	6/2/2016	6	22	56	48.038778	-125.804342	826.4	cam1_20160602062819.png
sea cucumber, sea pen, sea whip, rockfish, several other organisms	6/2/2016	6	23	15	48.038786	-125.804349	826.3	cam1_20160602062835.png
unclear how much of the carbonate is in place	6/2/2016	6	28	16	48.038892	-125.804372	824.2	cam1_20160602062819.png
zoom in on crab	6/2/2016	6	28	39	48.038893	-125.804409	823.9	cam1_20160602062819.png

Description: H1510 NA072 Seep	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
lasers on crab for scale	6/2/2016	6	29	40	48.038894	-125.804433	824.0	cam1_20160602062825.png
lots of little crabs and other organisms hiding in the cracks of the carbonate formation	6/2/2016	6	30	35	48.038901	-125.804417	823.8	cam1_20160602063329.png
carbonate sample dropped and new sample collected now	6/2/2016	6	39	5	48.038900	-125.804479	825.9	cam1_20160602063329.png
manipulator arm unable to reach all the way around vehicle to place a sample in the stbd bio boxes. troubleshooting why there is a limit	6/2/2016	6	41	4	48.038903	-125.804470	825.9	cam2_20160602064527.png
continuing to head upslope after successful sample collection of carbonate substrate	6/2/2016	6	51	38	48.038950	-125.804437	825.5	cam1_20160602065955.png
heading upslope still looking for active seep, no bubbles observed yet	6/2/2016	6	53	41	48.038868	-125.804381	825.8	cam1_20160602065955.png
still surrounded by large carbonate substrate	6/2/2016	6	56	6	48.038920	-125.804445	825.5	cam1_20160602065955.png
Rockfish and Hagfish visible	6/2/2016	7	7	13	48.039265	-125.804538	817.5	cam1_20160602070443.png
Argus Transfer	6/2/2016	7	8	31	48.039265	-125.804502	815.4	cam1_20160602070443.png
Huge Jellyfish	6/2/2016	7	10	17	48.039254	-125.804579	816.5	cam2_20160602071726.png
Cleaning robots	6/2/2016	7	22	48	48.039281	-125.804607	816.8	cam1_20160602072908.png
Fishes, Black Corals, Anemones	6/2/2016	7	27	47	48.039402	-125.804725	811.1	cam1_20160602072908.png
Sea Pen	6/2/2016	7	29	34	48.039463	-125.804732	810.8	cam1_20160602072629.png
Crab and Coral	6/2/2016	7	32	54	48.039652	-125.804865	807.2	
Possible shells? - likely trash	6/2/2016	7	40	34	48.039854	-125.804962	808.7	cam1_20160602074543.png
Flatfish, Sea pen, Sea Star	6/2/2016	7	42	46	48.039949	-125.805122	806.7	cam1_20160602074543.png
Step from waypoint 2 to 3 in small increments	6/2/2016	7	44	22	48.039882	-125.804966	806.9	cam1_20160602074543.png
Sea pen - umbellula	6/2/2016	7	46	10	48.039939	-125.805166	806.4	cam1_20160602074543.png
holothurians	6/2/2016	7	48	26	48.039886	-125.805176	805.3	cam1_20160602074543.png
Disturbed sediments	6/2/2016	7	54	9	48.039642	-125.805399	797.0	
Carbonate Outcrops - thin sediment on top	6/2/2016	7	56	37	48.039576	-125.805725	794.7	

Description: H1510 NA072 Seep	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Man-made, metal	6/2/2016	7	57	10	48.039565	-125.805792	794.1	
Large, red, bottom-dwelling fish	6/2/2016	8	0	42	48.039461	-125.806073	795.7	cam2_20160602080014.png
Sea stars, fish, anemones, sea pens	6/2/2016	8	6	44	48.039311	-125.806588	799.3	cam2_20160602080014.png
Corals, shrubby, <'10 cm	6/2/2016	8	9	42	48.039230	-125.806539	804.1	cam2_20160602080014.png
Flatfish, rockfish, hagfish	6/2/2016	8	14	42	48.039262	-125.806900	799.0	cam2_20160602081921.png
Large plastic bag - covered in bio, indicate age of environment.	6/2/2016	8	19	40	48.039252	-125.807155	797.9	cam2_20160602081921.png
Black coral	6/2/2016	8	20	45	48.039225	-125.807293	797.9	cam1_20160602082850.png
Heading straight to WP4 in search of bubbles	6/2/2016	8	26	14	48.039261	-125.807735	791.2	cam1_20160602082850.png
Holothurian	6/2/2016	8	28	16	48.039298	-125.807913	790.6	cam2_20160602082850.png
Polychaete attached	6/2/2016	8	29	15	48.039268	-125.807917	790.7	cam1_20160602082850.png
Transit to WP4	6/2/2016	8	40	18	48.039665	-125.808455	780.0	cam1_20160602084539.png
Zoom in on rockfish and ctenophore	6/2/2016	8	46	11	48.039764	-125.808641	779.9	cam1_20160602084539.png
Visible rows in bottom structure on Argus, also apparent on SONAR	6/2/2016	8	55	59	48.040102	-125.808925	772.2	cam2_20160602085517.png
360 SONAR scan	6/2/2016	8	59	8	48.040152	-125.809043	766.6	cam2_20160602085517.png
Heading back to seafloor	6/2/2016	9	7	37	48.040240	-125.808710	769.5	
Attempting ship move toward possible bubble location	6/2/2016	9	16	41	48.040371	-125.808847	767.3	
Investigating strong SONAR return - appears to be a rock	6/2/2016	9	24	39	48.040371	-125.808997	769.3	cam1_20160602092806.png
Zoom in on large rock - anomalous due to angular formation	6/2/2016	9	29	6	48.040278	-125.809144	768.3	cam1_20160602092806.png
Passing west of WP4 - no sightings	6/2/2016	9	42	45	48.039752	-125.809303	774.0	cam2_20160602094741.png
Still seeing similar biology as previously noted, transiting back towards WP4 still in search of bubbles	6/2/2016	9	59	29	48.039081	-125.809253	783.5	cam1_20160602095320.png
Zoom in on "bubble-gum" coral, also chiton and anemone inhabiting same rock	6/2/2016	10	3	28	48.038967	-125.809257	784.5	cam1_20160602100635.png
Zoom in on black coral	6/2/2016	10	7	22	48.038796	-125.809286	783.1	cam1_20160602100635.png

Description: H1510 NA072 Seep	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Zoom in on deep sea sole (flatfish)	6/2/2016	10	19	31	48.039089	-125.808603	787.5	cam1_20160602101845.png
Slow-moving transit NE due to wind and current conditions	6/2/2016	10	37	42	48.039384	-125.808160	785.4	
Thornyheads, sea cucumber. Just finished watch change.	6/2/2016	11	0	42	48.039895	-125.807931	778.8	
Continuing to search for bubbles to northeast (HDG 050)	6/2/2016	11	7	48	48.039945	-125.807897	778.2	
crusty flat rock on seafloor	6/2/2016	11	11	23	48.040068	-125.807727	776.6	cam1_20160602111942.png
CNI	6/2/2016	11	13	16	48.040149	-125.807647	775.9	cam1_20160602111942.png
Adjusted ship bearing to 072d	6/2/2016	11	16	59	48.040261	-125.807589	774.6	cam1_20160602111942.png
FSH	6/2/2016	11	17	31	48.040328	-125.807589	774.1	cam1_20160602111942.png
Clam bed	6/2/2016	11	18	44	48.040391	-125.807573	774.6	cam1_20160602111942.png
Correction	6/2/2016	11	20	11	48.040412	-125.807556	774.6	cam1_20160602112722.png
Scattered anemones, coral, thornyhead, and hagfish in bed of snail shell	6/2/2016	11	22	40	48.040470	-125.807615	775.0	cam1_20160602112722.png
Potential carbonate crusts ahead	6/2/2016	11	23	26	48.040495	-125.807611	774.8	cam1_20160602112722.png
Oxidizing white debris?	6/2/2016	11	26	6	48.040472	-125.807602	774.7	cam1_20160602112722.png
Red rockfish	6/2/2016	11	27	15	48.040494	-125.807616	773.2	cam1_20160602112722.png
On top of a mound of carbonate with gastropod egg cases	6/2/2016	11	27	54	48.040506	-125.807628	773.0	cam1_20160602112722.png
Crab, sea pen	6/2/2016	11	28	22	48.040498	-125.807656	772.8	cam1_20160602112722.png
Large and small crabs around base of/ on top of rock	6/2/2016	11	30	4	48.040515	-125.807699	770.8	cam2_20160602113024.png
CNI	6/2/2016	11	30	54	48.040513	-125.807694	770.4	cam2_20160602113024.png
Slowly continuing northeast at ROV heading 072d	6/2/2016	11	36	34	48.040706	-125.807197	774.3	cam2_20160602113024.png
CNI	6/2/2016	11	38	3	48.040713	-125.807145	775.4	cam2_20160602113024.png
CNI	6/2/2016	11	41	6	48.040747	-125.807020	777.8	
Continuing on 072d , then will eventually turn southeast =	6/2/2016	11	42	56	48.040788	-125.806841	782.3	
CNI	6/2/2016	11	44	42	48.040834	-125.806651	787.6	
Salp	6/2/2016	11	46	43	48.040867	-125.806516	791.4	
Continuing slowly down slope over muddy seafloor, sparse fauna	6/2/2016	11	49	17	48.040869	-125.806425	793.0	
Crab, thornyheads, patchy seafloor	6/2/2016	11	52	14	48.040943	-125.806314	793.4	cam1_20160602115709.png

Description: H1510 NA072 Seep	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Sea pens	6/2/2016	11	52	51	48.040941	-125.806277	793.4	cam1_20160602115709.png
ROV turning to head south at heading 160d	6/2/2016	11	53	20	48.040932	-125.806256	793.3	cam1_20160602115709.png
Thornyhead, flatfish, sea cucumbers	6/2/2016	11	55	10	48.040760	-125.806052	796.1	cam1_20160602115709.png
Continuing over a small white, patchy mound	6/2/2016	11	56	43	48.040671	-125.806010	797.1	cam1_20160602115709.png
Some of these white patchy spots may be due to bioturbation.	6/2/2016	11	57	55	48.040609	-125.805996	797.2	cam1_20160602115709.png
Continuing over muddy seafloor with scattered thornyheads, sea cucumbers	6/2/2016	12	0	11	48.040497	-125.805905	798.1	
Possible configuration required on ROV sonar	6/2/2016	12	2	59	48.040389	-125.805855	798.6	
Will continue southeast across earlier line, then parallel it southwest	6/2/2016	12	6	20	48.040263	-125.805708	798.8	
Crab, thornyhead	6/2/2016	12	7	60	48.040203	-125.805658	799.0	
Possible trawling scar ahead?	6/2/2016	12	8	33	48.040190	-125.805632	799.1	
Correction	6/2/2016	12	10	16	48.040028	-125.805603	797.9	cam1_20160602121159.png
Zooming in on rock and rockfish	6/2/2016	12	10	55	48.040019	-125.805595	797.8	cam1_20160602121159.png
Coral, thornyhead, rockfish, sea cucumber, hagfish, sea star	6/2/2016	12	12	32	48.039934	-125.805526	797.9	cam1_20160602121041.png
Turning ROV to heading 250d to continue southwest	6/2/2016	12	13	35	48.039887	-125.805527	797.0	cam1_20160602121159.png
Another black coral	6/2/2016	12	14	7	48.039867	-125.805536	795.3	cam1_20160602121159.png
Just passed over a clump of two black corals, bathypathes	6/2/2016	12	15	19	48.039684	-125.805756	792.0	cam1_20160602121159.png
With remaining 20 minutes, turning Northeast along ROV heading 335d	6/2/2016	12	21	23	48.039531	-125.806268	793.3	cam1_20160602122222.png
Scattered anemones, holothurians, thornyheads	6/2/2016	12	23	11	48.039670	-125.806414	790.4	cam1_20160602122222.png
Sablefish	6/2/2016	12	25	55	48.039689	-125.806364	789.8	cam1_20160602122222.png
Missed changing author tag! Mallory logging since watch change at 1100 UCT.	6/2/2016	12	27	18	48.039699	-125.806387	789.5	cam1_20160602122222.png
Slowly moving the ship due north; DP heading is having trouble moving at 335	6/2/2016	12	29	13	48.039693	-125.806414	789.3	cam1_20160602122222.png
sablefish	6/2/2016	12	33	59	48.039949	-125.806484	786.2	cam1_20160602123627.png
Continuing to head north over muddy seafloor with some white patches	6/2/2016	12	35	31	48.040016	-125.806515	786.8	cam1_20160602123627.png
Small grove of black corals	6/2/2016	12	35	50	48.040019	-125.806510	787.2	cam1_20160602123627.png
Adjusting course back to 330d after heading due north	6/2/2016	12	38	22	48.040171	-125.806584	790.2	cam1_20160602123627.png
Sablefish; anemones; thornyheads	6/2/2016	12	42	14	48.040311	-125.806766	787.5	

Description: H1510 NA072 Seep	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Dinner plate jelly (Solmissus) briefly visible from Argus	6/2/2016	12	43	12	48.040375	-125.806806	786.0	
Changing ship course to 270, headed due west towards snail egg towers	6/2/2016	12	47	53	48.040547	-125.807032	781.1	
Back at the edge of the carbonate outcrop/ mound where snail egg towers were found	6/2/2016	12	49	58	48.040470	-125.807206	775.6	
Flat fish	6/2/2016	12	50	19	48.040472	-125.807203	775.7	cam1_20160602125049.png
Crab, thornyhead	6/2/2016	12	51	0	48.040461	-125.807201	775.5	cam1_20160602125049.png
Undoing wrap in ROV tether, then preparing for recovery	6/2/2016	12	51	22	48.040461	-125.807207	774.8	cam1_20160602125049.png
Dinner plate jelly (Solmissus)	6/2/2016	12	54	35	48.040640	-125.806531	756.7	cam1_20160602125049.png
Salp, jelly	6/2/2016	12	56	36	48.040689	-125.806675	732.7	cam1_20160602125049.png
Hercules at 650 m	6/2/2016	13	3	11	48.040523	-125.807145	649.1	
Salp, jelly	6/2/2016	13	7	26	48.040498	-125.807525	592.9	
Hercules at 500 m	6/2/2016	13	14	44	48.040390	-125.808115	498.7	
Salp	6/2/2016	13	17	36	48.040284	-125.808469	459.4	
salp	6/2/2016	13	21	17	48.040194	-125.808674	409.0	
salp	6/2/2016	13	24	55	48.040148	-125.809004	357.0	
Hercules at 350 m	6/2/2016	13	25	28	48.040141	-125.809012	349.9	
salp	6/2/2016	13	33	11	48.039999	-125.809766	240.0	
comb jelly	6/2/2016	13	34	22	48.039998	-125.809796	224.1	
Dinner plate jelly (Solmissus); mucus net	6/2/2016	13	35	28	48.040008	-125.809831	209.4	
Hercules at 200 m	6/2/2016	13	36	28	48.040014	-125.809858	195.7	
Hercules at 100 m	6/2/2016	13	43	30	48.040073	-125.810481	98.5	
Held at 50 m	6/2/2016	13	46	57	48.039958	-125.810847	50.4	
High density of marine snow	6/2/2016	13	48	6	48.040059	-125.810775	42.8	
Beginning recovery of ROVs	6/2/2016	13	51	40	48.040192	-125.810943	51.9	
Many comb jellies	6/2/2016	13	54	22	48.040073	-125.811187	24.7	
Stretching out tether to remove lift line	6/2/2016	14	6	59	48.040095	-125.813118	7.9	

Description: H1511 NA072 Coast Trader	date	hr	min	sec	framegrabs
on bottom, approaching target site (southern, larger target)	6/2/2016	18	19	10	
small shark (perhaps dogfish)	6/2/2016	18	30	10	
shark swimming in and out	6/2/2016	18	31	13	
small hermit crab	6/2/2016	18	43	10	cam1_20160602184251.png
spiny dogfish shark	6/2/2016	18	50	45	cam1_20160602185047.png
Explore hard target - thought to be geology rather than archaeology	6/2/2016	19	32	39	cam1_20160602193550.png
Geologic formation consisting of a linear series of large boulders	6/2/2016	19	35	24	cam1_20160602193336.png
Flatfish	6/2/2016	19	38	24	cam1_20160602193550.png
During transit to wreck - sharks, flatfishes, anemone	6/2/2016	19	39	11	cam1_20160602193550.png
flatfish flyby	6/2/2016	19	44	39	cam1_20160602194428.png
Flatfish swam through Herc cam	6/2/2016	19	45	7	cam1_20160602194929.png
dogfish keep following. At least 2 individuals. now	6/2/2016	19	46	39	cam1_20160602194929.png
Sea pen	6/2/2016	19	48	43	cam1_20160602194929.png
Large crab	6/2/2016	19	49	46	cam1_20160602194428.png
High turbidity waters - possibly due to fish activity	6/2/2016	19	54	31	cam2_20160602195121.png
Many dogfish and plankton inhabiting turbid waters	6/2/2016	19	59	51	cam2_20160602195121.png
Krill is getting dense	6/2/2016	20	0	19	cam2_20160602200221.png
Passing over large sea stars	6/2/2016	20	4	50	cam2_20160602200221.png
echinoid	6/2/2016	20	7	45	cam2_20160602200221.png
On-shore scientist input - "turbid" water may be marine snow as a consequence of large amounts of productivity occurring in the waters this time of year (high light)	6/2/2016	20	7	53	cam2_20160602200221.png
Lingcod	6/2/2016	20	11	55	cam1_20160602201726.png
Many crabs and snails in close proximity to one another	6/2/2016	20	18	11	cam1_20160602201726.png
several lingcod	6/2/2016	20	18	54	cam1_20160602201726.png
Increasing presence of large fishes (Link cod?) as we approach the ship	6/2/2016	20	19	20	cam1_20160602201819.png
Took screen grab of SONAR while approaching ship <50m	6/2/2016	20	25	8	cam1_20160602202549.png
Partially buried cable and square structure	6/2/2016	20	26	24	cam1_20160602202839.png
Many large rockfish and cod	6/2/2016	20	31	27	cam1_20160602203610.png
netting	6/2/2016	20	31	43	cam1_20160602203610.png

Description: H1511 NA072 Coast Trader	date	hr	min	sec	framegrabs
structure steel	6/2/2016	20	32	47	cam1_20160602203544.png
Structure located	6/2/2016	20	32	54	cam1_20160602203544.png
on wreck	6/2/2016	20	32	57	cam1_20160602203544.png
ROV trap encased in anemones	6/2/2016	20	37	52	cam1_20160602203544.png
Decking and deck cranes	6/2/2016	20	39	41	cam1_20160602203610.png
ladder on steel plate.	6/2/2016	20	46	30	cam1_20160602204538.png
Looking at hatch opening	6/2/2016	20	53	29	cam1_20160602205617.png
Large group of link cod	6/2/2016	20	56	9	cam1_20160602205617.png
Seeing a winch	6/2/2016	20	59	55	cam1_20160602205550.png
If coast trader - viewing torpedo impact zone	6/2/2016	21	0	35	cam1_20160602210349.png
Looking likely at torpedo impact zone starboard stern quarter	6/2/2016	21	0	48	cam1_20160602210349.png
Corner of hatch with hull break	6/2/2016	21	1	35	cam1_20160602210312.png
Confirmation that we are on the SS Coast Trader	6/2/2016	21	2	56	cam1_20160602210413.png
shoreside confirms SS Coast Trader	6/2/2016	21	4	40	cam1_20160602210349.png
Visible distress of ship	6/2/2016	21	10	18	cam1_20160602211514.png
fish caught in fouled netting	6/2/2016	21	16	50	cam1_20160602211514.png
Fish tied up in net	6/2/2016	21	17	3	cam1_20160602211514.png
Attempting to locate rivets - may be difficult due to presence of marine growth	6/2/2016	21	18	54	cam1_20160602211514.png
Looking at another winch on deck	6/2/2016	21	22	39	cam1_20160602212204.png
moving port side	6/2/2016	21	22	45	cam1_20160602212204.png
The winch is located next to the deckhouse structure.	6/2/2016	21	23	33	cam1_20160602212204.png
approximately 16 m up	6/2/2016	21	24	18	cam1_20160602212154.png
deckhouse structure	6/2/2016	21	24	46	cam1_20160602212154.png
stack	6/2/2016	21	24	52	cam1_20160602212154.png
stack structure	6/2/2016	21	25	29	cam1_20160602212212.png
smoke stack opening	6/2/2016	21	28	39	cam1_20160602212212.png
Lifeboat Area	6/2/2016	21	29	14	cam1_20160602212212.png
STACK OPENING	6/2/2016	21	29	17	cam1_20160602212212.png
Hatch door	6/2/2016	21	29	35	cam1_20160602212212.png
Looking at smoke stake hole with air hatches on each side. There is also a door with light openings visible next to air hatches	6/2/2016	21	32	1	cam1_20160602213438.png
Another fish caught in net	6/2/2016	21	35	6	cam1_20160602213550.png
SUPERSTRUCTURE interior. Collapsed roof.	6/2/2016	21	38	31	cam1_20160602213550.png

Description: H1511 NA072 Coast Trader	date	hr	min	sec	framegrabs
possible casting?	6/2/2016	21	42	7	cam1_20160602214242.png
Zoom in on instrument	6/2/2016	21	42	9	cam1_20160602214242.png
Moving forward past the superstructure to the main cargo bays	6/2/2016	21	45	43	cam1_20160602214242.png
holes in deck	6/2/2016	21	45	55	cam1_20160602214242.png
collapsed booms	6/2/2016	21	46	12	cam1_20160602214242.png
shackles	6/2/2016	21	47	21	cam1_20160602214303.png
ladder	6/2/2016	21	50	56	cam1_20160602215556.png
Bow coming up	6/2/2016	21	51	51	cam1_20160602215556.png
Increased Sponge abundance toward bow	6/2/2016	21	52	29	cam1_20160602215556.png
Patches of corrosion	6/2/2016	21	54	7	cam1_20160602215556.png
stem, bow section	6/2/2016	21	55	20	cam1_20160602215534.png
In search of anchor	6/2/2016	21	55	23	cam1_20160602215534.png
Anchor	6/2/2016	21	56	1	cam1_20160602215534.png
Anchors at bow visible on both sides	6/2/2016	21	56	53	cam1_20160602215534.png
Anchor located, in search of name	6/2/2016	21	57	54	cam1_20160602215534.png
At bow	6/2/2016	21	59	35	cam1_20160602215508.png
possible corals in the anchor	6/2/2016	21	59	44	cam1_20160602215508.png
Looking at anchor again	6/2/2016	21	59	53	cam1_20160602215508.png
Front view of SS Coast Trader	6/2/2016	22	3	57	cam1_20160602220458.png
Sonar screen grab	6/2/2016	22	5	24	cam1_20160602220736.png
Front view again with anchor chains in the background	6/2/2016	22	8	16	cam1_20160602220736.png
Great Argus view of bow and Herc	6/2/2016	22	8	39	cam1_20160602220736.png
Hanging out on the bow section waiting for instructions from shoreside	6/2/2016	22	11	8	cam1_20160602221440.png
Bell on bow	6/2/2016	22	11	50	cam1_20160602221440.png
ship's bell	6/2/2016	22	14	46	cam1_20160602221414.png
Sonar grab	6/2/2016	22	19	28	cam1_20160602221440.png
spare anchor on deck	6/2/2016	22	20	16	cam1_20160602222533.png
Bird's eye view of deck	6/2/2016	22	22	56	cam1_20160602222533.png
white striped red colored fish	6/2/2016	22	26	2	cam1_20160602222542.png
Looking at rivets	6/2/2016	22	26	14	cam1_20160602222542.png
Looking under hull	6/2/2016	22	32	31	cam1_20160602223249.png
Corrosion on the metal; hole in wreck	6/2/2016	22	34	10	cam1_20160602223257.png
Worms and snails covering outside of ship	6/2/2016	22	34	42	cam1_20160602223257.png

Description: H1511 NA072 Coast Trader	date	hr	min	sec	framegrabs
Zoom in survey of life on ship hull - gastropods, polychaetes, crabs, tunicates (gray)	6/2/2016	22	40	27	cam1_20160602224930.png
Steel cable on seafloor	6/2/2016	22	41	12	cam1_20160602224930.png
Hierarchy on hull	6/2/2016	22	43	9	cam1_20160602224930.png
Sonar screen grab	6/2/2016	22	46	22	cam1_20160602224930.png
Officer's mess space, bridge and chart room	6/2/2016	22	46	38	cam1_20160602224930.png
Looking down into captains mess	6/2/2016	22	48	7	cam1_20160602224802.png
Siphonophore chain	6/2/2016	22	48	28	cam1_20160602224802.png
rope 25m up	6/2/2016	22	50	34	
Several crabs hanging on trailing (snagged trawling) line ~21 m off bottom, likely synthetic	6/2/2016	23	6	30	cam1_20160602230546.png
Maneuvered around trailing line, aiming for a better sonar image before moving in.	6/2/2016	23	10	19	cam1_20160602231721.png
Rockfish	6/2/2016	23	15	3	cam1_20160602231721.png
Squaring up to hull at 4 m off bottom	6/2/2016	23	15	17	cam1_20160602231721.png
Hull folded inward at torpedo impact area	6/2/2016	23	17	18	cam1_20160602231630.png
Scattered white sponges, lingcod, rockfish, sea stars	6/2/2016	23	22	14	cam1_20160602232457.png
Rivet head and frame visible along wreckage of impact	6/2/2016	23	22	30	cam1_20160602232457.png
Scattered white plumose anemones	6/2/2016	23	22	46	cam1_20160602232457.png
at stern of wreck	6/2/2016	23	22	56	cam1_20160602232457.png
Gastropods and ventilator on seafloor	6/2/2016	23	24	14	cam1_20160602232452.png
Net	6/2/2016	23	26	1	cam1_20160602232457.png
Broken, crumpled stern may have been caused by impact with sea floor	6/2/2016	23	27	35	cam1_20160602232452.png
Deck gun	6/2/2016	23	28	2	cam1_20160602232457.png
Another fishing net	6/2/2016	23	28	40	cam1_20160602232457.png
Waiting on ship move to shift Argus out of the way of 12 m line in water column	6/2/2016	23	36	11	cam1_20160602233345.png
Approaching net and circling around stern	6/2/2016	23	38	5	cam1_20160602233345.png
Orientation of wreck is ~346, from stern to bow	6/2/2016	23	40	45	cam1_20160602234445.png
Trawling gear	6/3/2016	0	24	28	cam1_20160603002426.png
Many lingcod and rockfish	6/3/2016	0	26	28	cam1_20160603002445.png
Anchor	6/3/2016	0	28	52	cam1_20160603002445.png
(That was the port anchor, secured in the hawse hole)	6/3/2016	0	29	55	cam1_20160603002426.png
Looking over bow at 15 m off bottom	6/3/2016	0	30	42	cam1_20160603003520.png

Description: H1511 NA072 Coast Trader	date	hr	min	sec	framegrabs
Bell	6/3/2016	0	31	13	cam1_20160603003513.png
Still looking over bow as we wait for a ship move	6/3/2016	0	34	20	cam1_20160603003513.png
Continuing aft over centerline	6/3/2016	0	37	13	cam1_20160603003524.png
Forecastle ahead	6/3/2016	0	40	54	cam1_20160603004008.png
Rising over officer's mess	6/3/2016	0	41	25	cam1_20160603004044.png
Netting	6/3/2016	0	41	31	cam1_20160603004044.png
Forward mast has fallen aft on center line over cargo hold No. 2	6/3/2016	0	41	48	cam1_20160603004044.png
Fishing line crossing deck may make it difficult to continue flying down centerline	6/3/2016	0	44	33	cam1_20160603004044.png
Circling around trawling net	6/3/2016	0	48	48	cam1_20160603004031.png
Flying over new net	6/3/2016	0	53	35	cam1_20160603005956.png
Maneuvered around to other side of nets, facing northeast over centerline near torpedo hit	6/3/2016	0	58	14	cam1_20160603005956.png
Continuing down centerline towards stern	6/3/2016	1	0	57	cam1_20160603010647.png
Net in view at stern	6/3/2016	1	4	48	cam1_20160603010610.png
CNI	6/3/2016	1	5	24	cam1_20160603010610.png
Flying back north towards bow	6/3/2016	1	6	46	cam1_20160603010610.png
Holding for ship move	6/3/2016	1	11	33	cam1_20160603011510.png
Flying past line/net on port, over machinery space skylight (?)	6/3/2016	1	15	9	cam1_20160603011430.png
Catwalks are visible inside the ship looking down through the stack hole	6/3/2016	1	16	9	cam1_20160603011510.png
Catwalks and ladders lead down into the boiler room	6/3/2016	1	16	58	cam1_20160603011510.png
Coming up on line and net again on starboard side	6/3/2016	1	19	23	cam1_20160603011510.png
Returning to torpedo impact to southeast by flying south down west side and circling back over stern	6/3/2016	1	21	45	cam1_20160603012141.png
Flying east across ship towards torpedo impact	6/3/2016	1	26	20	cam1_20160603012141.png
Directly above torpedo impact	6/3/2016	1	30	24	cam1_20160603013613.png
Rising up alongside over torpedo impact	6/3/2016	1	36	44	cam1_20160603013423.png
Dropping back down to blast hole	6/3/2016	1	37	41	cam1_20160603013613.png
Discussion on shore about how far forward torpedo impacted	6/3/2016	1	39	19	cam1_20160603013423.png
Zoomed in on piece of hull with popped rivets	6/3/2016	1	43	11	cam1_20160603014521.png
Zooming in on heavily corroded sides of hull near blast point	6/3/2016	1	45	37	cam1_20160603014442.png
Returning to stern to continue to survey damage there	6/3/2016	1	52	14	cam1_20160603015854.png

Description: H1511 NA072 Coast Trader	date	hr	min	sec	framegrabs
Back at the stern	6/3/2016	1	58	49	cam1_20160603015551.png
Surveying back of stern; suspected screw is underneath wreckage	6/3/2016	1	59	46	cam1_20160603015551.png
From shore	6/3/2016	2	6	21	cam1_20160603020255.png
Discussion from shore	6/3/2016	2	8	5	cam1_20160603020255.png
Flying over stern towards gun	6/3/2016	2	8	26	cam1_20160603020255.png
Torpedo blast is ~24 m forward of stern	6/3/2016	2	18	24	cam1_20160603021311.png
Dive objectives have been met to the satisfaction of those on shore. Thoughts at this time	6/3/2016	2	20	11	cam1_20160603022245.png
There is some intact hull from stern to blast hole	6/3/2016	2	20	53	cam1_20160603022245.png
ASCENT	6/3/2016	2	27	52	cam1_20160603022245.png
salp	6/3/2016	2	27	57	cam1_20160603022245.png
ASCENT	6/3/2016	2	31	42	
Dogfish up in water column during recovery	6/3/2016	2	37	41	

Description: H1512 NA072 USBL Beacon	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Argus joins Herc in water	6/3/2016	14	1	55	47.634432	-126.018530	1.6	
At 50m	6/3/2016	14	5	8	47.634437	-126.018807	52.4	
Beginning full descent	6/3/2016	14	5	29	47.634429	-126.018840	58.7	
CTD was turned on ~175 m into dive	6/3/2016	14	14	2	47.633916	-126.019343	240.9	
Hercules at ~250 m	6/3/2016	14	14	26	47.633897	-126.019353	249.4	
DLVNAV	6/3/2016	14	15	16	47.633853	-126.019390	268.2	
Scattered CNI	6/3/2016	14	15	46	47.633851	-126.019423	278.7	
Restarting tracklink	6/3/2016	14	16	40	47.633768	-126.019886	298.2	
salp	6/3/2016	14	16	56	47.633729	-126.020093	304.3	
Both transponders up in tracklink	6/3/2016	14	22	24	47.633575	-126.019782	417.8	
Hercules at 500 m, descending at ~21m/min	6/3/2016	14	26	9	47.633534	-126.020107	497.0	
Herc is showing up on DVLNAV again	6/3/2016	14	26	25	47.633545	-126.020100	502.6	
CNI	6/3/2016	14	30	26	47.633396	-126.020296	587.4	
Hercules at 650 m	6/3/2016	14	33	20	47.633285	-126.020379	649.2	
ship course change to 070d to move closer to the USBL mooring	6/3/2016	14	36	19	47.633263	-126.020689	713.1	
Hercules at ~800 m	6/3/2016	14	40	46	47.633390	-126.020056	798.2	
Lanternfish?	6/3/2016	14	41	40	47.633435	-126.019907	817.1	
Hercules at 1000 m depth	6/3/2016	14	50	32	47.634066	-126.019396	998.9	cam1_20160603145752.png
squid	6/3/2016	14	56	40	47.633935	-126.019820	1121.6	cam1_20160603145752.png
Many sea stars, some holothurians, bottom fish (black),decent POC rain	6/3/2016	15	16	54	47.633339	-126.019857	1518.8	cam1_20160603151816.png
basket star, fish and eels	6/3/2016	15	18	14	47.633393	-126.019547	1518.9	cam1_20160603151816.png
octopus and star	6/3/2016	15	21	1	47.633385	-126.019572	1520.3	cam1_20160603152215.png
sun brittle star	6/3/2016	15	21	37	47.633392	-126.019581	1520.5	cam1_20160603152215.png
nice Argus shots of Herc	6/3/2016	15	23	10	47.633406	-126.019543	1520.0	cam1_20160603152215.png
fish	6/3/2016	15	25	23	47.633508	-126.019236	1520.7	cam1_20160603152215.png
visual on beacon, going to retrieve	6/3/2016	15	34	44	47.633783	-126.018758	1521.6	cam1_20160603153659.png
preparing to cut beacon loose	6/3/2016	15	44	3	47.633792	-126.018866	1524.2	cam1_20160603154512.png
beacon cut loose now	6/3/2016	15	50	54	47.633805	-126.018751	1524.2	cam1_20160603155042.png
ping at 1000m	6/3/2016	15	57	39	47.633999	-126.018171	1475.8	cam1_20160603155052.png
no pings in 5 minutes	6/3/2016	16	1	12	47.633965	-126.018227	1434.4	cam2_20160603160650.png
it has been 10mins since it left the bottom	6/3/2016	16	1	24	47.633965	-126.018227	1431.8	cam2_20160603160650.png
beacon located on the surface	6/3/2016	16	7	1	47.634014	-126.018526	1360.4	cam2_20160603160650.png
jelly	6/3/2016	17	0	22	47.629627	-126.011893	583.4	

Description: H1513 Juan de Fuca Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Descending to 150 m	6/3/2016	22	5	32	48.101461	-125.553967	135.6	cam1_20160603220604.png
Surrounded by a diversity of line upon descent - schools of fish, dogfish, other fish species	6/3/2016	22	7	32	48.101719	-125.554505	139.2	cam1_20160603220604.png
Sea stars	6/3/2016	22	11	35	48.101491	-125.554340	145.9	cam2_20160603221049.png
boulders small	6/3/2016	22	12	32	48.101491	-125.554342	145.9	cam1_20160603221246.png
much turbidity	6/3/2016	22	12	43	48.101490	-125.554339	146.0	cam1_20160603221246.png
FSH	6/3/2016	22	12	57	48.101489	-125.554340	145.9	cam1_20160603221246.png
Shark	6/3/2016	22	13	4	48.101489	-125.554340	145.9	cam2_20160603221049.png
Headed to WP2	6/3/2016	22	13	18	48.101489	-125.554341	145.9	cam2_20160603221049.png
sea pens	6/3/2016	22	14	14	48.101511	-125.554345	145.9	cam2_20160603221049.png
CPEN	6/3/2016	22	20	8	48.101591	-125.554307	146.9	cam1_20160603222428.png
More sharks and sea pens	6/3/2016	22	20	23	48.101666	-125.554299	146.5	cam1_20160603222428.png
Bacterial mat, small patches, white	6/3/2016	22	20	37	48.101672	-125.554282	147.8	cam1_20160603222428.png
dark-ish mud white CPENs	6/3/2016	22	21	22	48.101737	-125.554284	147.1	cam1_20160603222428.png
flatfish	6/3/2016	22	21	31	48.101780	-125.554283	148.1	cam1_20160603222428.png
dense CPENS	6/3/2016	22	21	47	48.101794	-125.554281	148.3	cam1_20160603222428.png
flatfish	6/3/2016	22	22	24	48.101856	-125.554367	147.2	cam1_20160603222421.png
Seafloor sediments have darkish spots. possible a first indication for reduced chemical below	6/3/2016	22	22	25	48.101856	-125.554367	147.2	cam1_20160603222421.png
flatfish, Puget king crab, kelp	6/3/2016	22	22	55	48.101977	-125.554380	148.1	cam1_20160603222421.png
flatfish	6/3/2016	22	23	6	48.101993	-125.554387	147.6	cam1_20160603222428.png
Flatfish	6/3/2016	22	23	14	48.101993	-125.554400	147.5	cam1_20160603222428.png
bacterial mat, spiny dogfish	6/3/2016	22	24	36	48.102010	-125.554461	148.3	cam1_20160603222412.png
bacterial mat	6/3/2016	22	24	59	48.102009	-125.554462	148.5	cam1_20160603222412.png
Bacterial mat - white, fluffy	6/3/2016	22	26	2	48.102012	-125.554461	148.1	cam1_20160603222428.png
Target dropped for bacterial mat	6/3/2016	22	26	51	48.102011	-125.554470	148.1	cam1_20160603222428.png
Second bacterial mat	6/3/2016	22	28	12	48.102036	-125.554417	148.4	cam1_20160603222421.png

Description: H1513 Juan de Fuca Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
bacterial mat, we will drop a target	6/3/2016	22	28	34	48.102041	-125.554420	148.4	cam1_20160603222421.png
Community near bacterial mat - sea pens, spiny dogfish, flatfishes	6/3/2016	22	29	30	48.102039	-125.554405	148.1	cam1_20160603222428.png
still darkish patches in sediment	6/3/2016	22	30	31	48.102076	-125.554427	147.7	cam1_20160603223738.png
Third bacterial mat	6/3/2016	22	30	53	48.102087	-125.554429	147.5	cam1_20160603223738.png
bacterial mat small (~10cm)	6/3/2016	22	30	60	48.102089	-125.554427	147.3	cam1_20160603223738.png
bacterial mat	6/3/2016	22	31	7	48.102089	-125.554432	147.6	cam1_20160603223738.png
Approaching many mats	6/3/2016	22	33	25	48.102107	-125.554440	147.9	cam1_20160603223713.png
more bac mats, larger patches	6/3/2016	22	33	28	48.102107	-125.554437	147.8	cam1_20160603223713.png
Possible shell material	6/3/2016	22	34	46	48.102176	-125.554365	148.4	cam1_20160603223713.png
shell material	6/3/2016	22	34	52	48.102176	-125.554336	148.6	cam1_20160603223713.png
Rocks	6/3/2016	22	35	13	48.102194	-125.554330	148.6	cam1_20160603223713.png
boulders, not sure what it is, getting closer	6/3/2016	22	35	27	48.102196	-125.554330	148.6	cam1_20160603223713.png
Rockfish	6/3/2016	22	37	2	48.102219	-125.554307	148.2	cam1_20160603223557.png
crab sitting on boulders feeding on something, maybe kelp	6/3/2016	22	38	24	48.102215	-125.554310	147.7	cam1_20160603223557.png
In rock area - crab feeding on kelp debris, fish, possible debris	6/3/2016	22	38	31	48.102214	-125.554309	147.7	cam1_20160603223557.png
Sea Star	6/3/2016	22	39	19	48.102215	-125.554277	147.5	cam1_20160603223713.png
Bubbles!!!	6/3/2016	22	39	30	48.102216	-125.554273	147.3	cam1_20160603223713.png
bubbles	6/3/2016	22	39	34	48.102216	-125.554272	147.3	cam1_20160603223713.png
WPSeep1 - first stream of bubbles, dark sediment surrounding, bacterial mats, crabs, sea pens, sea star, other rocks	6/3/2016	22	43	13	48.102220	-125.554280	147.4	cam1_20160603224433.png
Seep 1	6/3/2016	22	43	17	48.102221	-125.554284	147.4	cam1_20160603224433.png
green plastic	6/3/2016	22	45	52	48.102232	-125.554285	147.7	cam1_20160603224415.png
Plastic debris	6/3/2016	22	45	56	48.102232	-125.554285	147.7	cam1_20160603224415.png
bacterial mat growing around bubble outlet	6/3/2016	22	46	6	48.102231	-125.554285	147.7	cam1_20160603224416.png
WPSeep2	6/3/2016	22	46	8	48.102231	-125.554285	147.8	cam1_20160603224416.png
bubbles, bigger in diameter, but lower flow rate	6/3/2016	22	47	2	48.102234	-125.554292	147.6	cam1_20160603224449.png
Rockfish, bivalves, other small organisms (stringy)	6/3/2016	22	48	40	48.102267	-125.554304	147.7	cam1_20160603224453.png

Description: H1513 Juan de Fuca Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
more bacterial mats and small bubble seep as well. Seems a larger volume seep in this area.	6/3/2016	22	48	57	48.102266	-125.554304	147.8	cam1_20160603224453.png
Dark patches in sediment - typical of seep environments	6/3/2016	22	50	16	48.102259	-125.554281	147.5	cam1_20160603225221.png
several bubble streams in this area. One with a very high flow rate.	6/3/2016	22	52	35	48.102233	-125.554277	148.4	cam1_20160603225137.png
Large stream of bubbles near WP1 and 2. One black seep with continuous stream of smaller bubbles. Fish living in crevice near/under seep	6/3/2016	22	54	11	48.102237	-125.554279	148.3	cam1_20160603225215.png
Spiny dogfish swam very near black seep	6/3/2016	22	54	43	48.102235	-125.554276	147.7	cam1_20160603225215.png
10 minute break in operations was due to watch change, discussion of seep locations	6/3/2016	23	7	34	48.102171	-125.554284	147.1	
Reorganizing ship/vehicle locations and continuing towards larger bubble streams from multibeam sonar	6/3/2016	23	8	28	48.102166	-125.554318	146.9	
Passing back over previously noted bacterial mats	6/3/2016	23	11	2	48.102037	-125.554395	146.8	
Stepping forward very slowly to let Hercules get ahead of Argus, keeping the tether in view	6/3/2016	23	15	9	48.101965	-125.554427	146.8	
Halipteris sp. fields	6/3/2016	23	16	59	48.101969	-125.554443	146.7	
Proceeding from Waypoint 1 to Waypoint 2, panning back and forth along transect	6/3/2016	23	18	12	48.101964	-125.554438	146.6	
Shell fragments, some bubbles, grey outcropping	6/3/2016	23	20	26	48.101971	-125.554469	146.9	cam1_20160603232154.png
Target dropped for "seep 3" ("Seep 3 Wobbly", as in wobbly bubbles)	6/3/2016	23	21	32	48.101973	-125.554473	147.1	cam1_20160603232154.png
Grey bacterial mat at Seep 3	6/3/2016	23	22	10	48.101974	-125.554471	146.9	cam1_20160603232154.png
Flounder	6/3/2016	23	24	13	48.101975	-125.554474	146.6	cam1_20160603232154.png
Wobbly Seep3 bubbles rising in area with shall fragments and mat.	6/3/2016	23	25	27	48.101942	-125.554533	146.7	cam1_20160603232154.png
Spiny dogfish, large crab	6/3/2016	23	28	33	48.101869	-125.554697	146.7	cam1_20160603232154.png
Dog fish	6/3/2016	23	28	50	48.101866	-125.554700	146.8	cam1_20160603232154.png
Rock, maybe carbonate, on left of Herc cam	6/3/2016	23	32	19	48.101765	-125.554904	146.8	cam1_20160603233246.png
Carbonates and shell fragments	6/3/2016	23	32	45	48.101750	-125.554902	146.9	cam1_20160603233246.png
Note from Paul Johnson on shore	6/3/2016	23	34	40	48.101696	-125.555000	146.9	cam1_20160603233246.png
Turned off porch lights, allowing us to see further, though bubbles will be less visible	6/3/2016	23	37	41	48.101636	-125.555116	146.7	cam1_20160603233246.png

Description: H1513 Juan de Fuca Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Flat fish	6/3/2016	23	39	51	48.101550	-125.555253	146.9	cam1_20160603233246.png
Roughly halfway between waypoints 1 and 2, slowly continuing southwest to waypoint 2	6/3/2016	23	43	41	48.101464	-125.555397	146.7	
This looks like a broad skate	6/4/2016	0	0	3	48.101010	-125.555930	147.8	
Dark patchy coloring on seafloor could be indicative of a reductive environment, seep could be nearby	6/4/2016	0	4	4	48.100908	-125.556040	148.0	
Sea Pens, crabs inhabiting sediment with dark patches	6/4/2016	0	6	31	48.100904	-125.556119	147.9	
Over WP2	6/4/2016	0	6	45	48.100901	-125.556100	148.1	
Shell fragments	6/4/2016	0	11	45	48.100949	-125.556055	147.9	cam1_20160604001440.png
Small white fragments - zoom reveals shell fragments, and whole shells, such as bivalves	6/4/2016	0	17	39	48.101008	-125.556223	147.9	cam1_20160604001431.png
Fish swimming around Argus	6/4/2016	0	20	36	48.101057	-125.556352	147.7	cam2_20160604002015.png
Arrived at target	6/4/2016	0	24	19	48.101124	-125.556498	147.8	cam1_20160604002015.png
shell material	6/4/2016	0	28	36	48.101220	-125.556376	147.7	cam1_20160604002015.png
Small patch of bacterial mat	6/4/2016	0	29	59	48.101287	-125.556268	147.5	cam1_20160604002015.png
Another bacterial mat with nearby flatfish	6/4/2016	0	31	37	48.101338	-125.556184	147.5	cam1_20160604003746.png
Large sea star along with consistent sea pens	6/4/2016	0	32	29	48.101378	-125.556104	147.4	cam1_20160604003746.png
Bubbles	6/4/2016	0	35	35	48.101423	-125.555958	147.6	cam1_20160604003746.png
Target dropped for seep 4	6/4/2016	0	36	15	48.101423	-125.555958	147.5	cam1_20160604003746.png
Bacterial mat, discolored sediments	6/4/2016	0	37	20	48.101407	-125.555939	147.6	cam1_20160604003739.png
Target dropped for seep 5	6/4/2016	0	38	26	48.101405	-125.555937	147.5	cam1_20160604003743.png
some shell fragments	6/4/2016	0	39	21	48.101406	-125.555940	147.5	cam1_20160604003743.png
We will continue to follow to targets 4-7, probably will skip additional waypoints since we have already found some seeps	6/4/2016	0	41	38	48.101431	-125.555936	147.6	cam1_20160604004508.png
young rockfish	6/4/2016	0	42	18	48.101461	-125.555879	147.6	cam1_20160604004508.png
Bacterial mat	6/4/2016	0	43	19	48.101480	-125.555851	147.6	cam1_20160604004349.png
Carbonate chunks	6/4/2016	0	43	39	48.101495	-125.555809	147.7	cam1_20160604004349.png
May have just passed some more bubbles	6/4/2016	0	44	12	48.101521	-125.555795	147.8	cam1_20160604004349.png
Target dropped for seep 6	6/4/2016	0	44	41	48.101528	-125.555770	147.5	cam1_20160604004349.png
Flounder, spiny dogfish, rockfish	6/4/2016	0	45	7	48.101547	-125.555770	147.6	cam1_20160604004349.png

Description: H1513 Juan de Fuca Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Correction-- not a flounder, halibut	6/4/2016	0	45	27	48.101547	-125.555771	147.6	cam1_20160604004349.png
Flounder	6/4/2016	0	48	32	48.101626	-125.555634	147.4	cam1_20160604004508.png
Herc has reached waypoint 4, turning east to head to waypoint 5	6/4/2016	0	57	53	48.101861	-125.555369	147.2	
Kelp	6/4/2016	0	58	16	48.101865	-125.555367	147.4	
Bacterial mat to the side of kelp	6/4/2016	0	58	32	48.101865	-125.555363	147.4	
Update	6/4/2016	0	59	56	48.101867	-125.555363	147.3	
Note	6/4/2016	1	1	18	48.101882	-125.555275	147.3	
Transiting 70 m at 078 d to get to bacterial mats between seeps 1 and 3	6/4/2016	1	3	53	48.101884	-125.555211	147.1	
carbonate	6/4/2016	1	5	47	48.101918	-125.555147	147.2	
crab	6/4/2016	1	11	40	48.101963	-125.554815	147.3	
Herc is ~20 m from seep 3 and bacterial mats	6/4/2016	1	14	48	48.101981	-125.554652	147.2	
Hercules is back at Seep 3 by Waypoint 1	6/4/2016	1	20	43	48.101966	-125.554472	147.2	cam1_20160604012556.png
Target dropped at bacterial mats	6/4/2016	1	25	54	48.101984	-125.554490	147.4	cam1_20160604012556.png
Near seep 3, but no bubbles	6/4/2016	1	27	26	48.101980	-125.554497	147.4	cam1_20160604012556.png
Heading northeast towards seep 2 via bacterial mat targets	6/4/2016	1	28	34	48.101985	-125.554494	147.5	cam1_20160604012556.png
Target dropped on additional bacterial mat	6/4/2016	1	32	57	48.102040	-125.554438	147.5	cam1_20160604013242.png
Spiny dogfish	6/4/2016	1	33	16	48.102042	-125.554437	147.5	cam1_20160604013242.png
Still no bubbles over bacterial mats, moving to the next one due north	6/4/2016	1	35	31	48.102038	-125.554406	147.5	cam1_20160604013245.png
Flying over beginning of patchy bacterial mat field	6/4/2016	1	38	40	48.102117	-125.554406	147.4	cam1_20160604013245.png
Still no bubbles; many patchy bacterial mats, scattered shell fragments, sea pens	6/4/2016	1	41	52	48.102167	-125.554401	147.6	cam1_20160604014610.png
Bubbles over bacterial mat	6/4/2016	1	42	55	48.102199	-125.554398	147.6	cam1_20160604014246.png
Sudden stream of strong bubbling, lasted for maybe 15 seconds and stopped again	6/4/2016	1	44	5	48.102204	-125.554401	147.5	cam1_20160604014610.png
Gas Tight 12 sample-- accidentally triggered. NA072-002-GT12 lost. (Navtarget was seep 7 bacterialmats GasTightSample)	6/4/2016	1	49	47	48.102199	-125.554401	147.7	cam1_20160604014610.png
TProbe at seep 7 bacterialmats GasTightSample	6/4/2016	1	52	8	48.102206	-125.554413	148.3	cam1_20160604015205.png

Description: H1513 Juan de Fuca Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
TProbe taken a few cm into bubble hole, measurement was at 6.36C before bubbles, 6.38 C after bubbles started	6/4/2016	1	53	7	48.102203	-125.554411	148.3	cam1_20160604015205.png
Tprobe deeper in bubble hole reads 6.59C about 20 cm into seafloor without bubbles. Ambient Temperature is 6.25C.	6/4/2016	1	53	60	48.102207	-125.554409	148.3	cam1_20160604015205.png
Note	6/4/2016	1	56	8	48.102206	-125.554406	148.4	cam1_20160604015305.png
Getting ready to take push core (dropped, recovering it now)	6/4/2016	1	58	27	48.102201	-125.554409	148.3	cam1_20160604015305.png
(Forward black taped core) Attempted push core in sediment in bacterial mats at target "seep 7 bacterialmats GasTightSample." Core pushed into sediment at 02	6/4/2016	2	4	38	48.102210	-125.554404	146.2	cam1_20160604020217.png
Continuing up towards seep 1	6/4/2016	2	5	24	48.102211	-125.554389	146.8	cam1_20160604020217.png
bubbles, arriving over seep 2	6/4/2016	2	7	56	48.102247	-125.554299	147.5	cam1_20160604020217.png
ROV team does not expect that sediments will be easy to collect here	6/4/2016	2	8	29	48.102245	-125.554299	147.4	cam1_20160604020217.png
Green plastic	6/4/2016	2	8	38	48.102244	-125.554299	147.8	cam1_20160604020217.png
Can't take core sample over carbonate or seeps, looking for bacterial mat	6/4/2016	2	8	57	48.102245	-125.554298	147.7	cam1_20160604020217.png
Bubbles	6/4/2016	2	11	39	48.102263	-125.554264	147.7	cam1_20160604021717.png
Targets dropped at "Bubble City" and "NA072-002" sample location	6/4/2016	2	16	31	48.102265	-125.554268	148.6	cam1_20160604021717.png
Attempted NA072-002 push core sample lost, could not push far enough into bacterial mat site, fine dark colored sediment fell from core before sample could be stored in quiver.	6/4/2016	2	18	30	48.102265	-125.554250	148.5	cam1_20160604021717.png
Nav corrected error in labeling, "seep2" at this timestamp and later is accurate; "seep 7 bacterialmats" has been relabeled to remove "GasTightSample" tag.	6/4/2016	2	20	57	48.102266	-125.554246	148.5	cam1_20160604022544.png
crab	6/4/2016	2	21	51	48.102264	-125.554244	148.5	cam1_20160604022544.png
TProbe series here will be taken from bubble plume locations and mat	6/4/2016	2	23	36	48.102264	-125.554247	148.6	cam1_20160604022527.png
Tprobe measurement from bubble plume	6/4/2016	2	25	8	48.102267	-125.554247	148.6	cam1_20160604022527.png
Tprobe measurement from bacterial mat where we last attempted to core	6/4/2016	2	26	52	48.102266	-125.554247	148.5	cam1_20160604022544.png
Tprobe measurement from bubble hole just below mat	6/4/2016	2	29	29	48.102266	-125.554244	148.7	cam1_20160604022544.png

Description: H1513 Juan de Fuca Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Note	6/4/2016	2	29	44	48.102266	-125.554244	148.6	cam1_20160604022544.png
Heading back towards waypoint 1 again.	6/4/2016	2	35	45	48.102224	-125.554296	147.3	
Pausing back over bacterial mat fields again	6/4/2016	2	37	60	48.102134	-125.554366	147.2	
Fish	6/4/2016	2	38	36	48.102135	-125.554370	147.2	
Tprobe measurement from bacterial mat	6/4/2016	2	42	13	48.102137	-125.554361	144.8	cam1_20160604024845.png
Heading back towards waypoint 1	6/4/2016	2	42	26	48.102136	-125.554363	146.7	cam1_20160604024845.png
Heading toward Waypoint 10. On the way, will trigger a Niskin bottle at a sea pen grove.	6/4/2016	2	45	34	48.102066	-125.554403	147.2	cam1_20160604024845.png
Dogfish	6/4/2016	2	59	6	48.102053	-125.554407	147.5	
microbial mat, stopping for temp	6/4/2016	3	18	45	48.101518	-125.554608	147.4	cam1_20160604031829.png
temp probe bacterial mat, ocean temp here is 6.2degrees C and mat temp was 6.4degrees C	6/4/2016	3	27	49	48.101511	-125.554615	148.4	cam1_20160604032543.png
temp sample caused bubbles to leave mat	6/4/2016	3	27	49	48.101511	-125.554615	148.4	cam1_20160604032543.png
many bubbles came up from the mat as it was agitated from temp probe	6/4/2016	3	28	32	48.101523	-125.554600	145.7	cam1_20160604032543.png
bacterial mat temp differential = 0.2 degrees C	6/4/2016	3	29	7	48.101535	-125.554572	146.7	cam1_20160604032545.png
bubbles and bacterial mats at target 7	6/4/2016	3	31	22	48.101545	-125.554460	147.5	cam1_20160604033523.png
preparing to core where there are bubbles which indicate a crack in the plates	6/4/2016	3	32	15	48.101549	-125.554465	147.9	cam1_20160604033543.png
bubbles coming out strongly, great shots	6/4/2016	3	33	57	48.101547	-125.554461	148.5	cam1_20160604033326.png
we are at "steady stream of bubbles" a target plotted by nav	6/4/2016	3	34	46	48.101550	-125.554457	148.9	cam1_20160604033543.png
temp probe at bubble site	6/4/2016	3	38	35	48.101536	-125.554455	149.2	cam1_20160604033531.png
exploring this bubble site, several features	6/4/2016	3	39	8	48.101541	-125.554457	149.1	cam1_20160604033525.png
bubbles all over	6/4/2016	3	41	49	48.101572	-125.554466	147.5	cam1_20160604034450.png
bacterial mats with bubbles (and lasers for scale), prepping to do a temp probe here as well	6/4/2016	3	43	8	48.101537	-125.554486	148.4	cam1_20160604034458.png
6.28C temp reading to start	6/4/2016	3	46	26	48.101532	-125.554489	149.4	cam1_20160604034450.png
pushing probe in deeper, temp going up to 6.61C	6/4/2016	3	47	60	48.101530	-125.554487	149.3	cam1_20160604034453.png
total temp differential for this site is 0.33C	6/4/2016	3	48	29	48.101530	-125.554490	149.4	cam1_20160604034458.png
preparing to collect push core samples	6/4/2016	3	49	1	48.101529	-125.554489	149.4	cam1_20160604034458.png

Description: H1513 Juan de Fuca Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
prepping for second push core	6/4/2016	3	56	18	48.101525	-125.554492	149.3	cam1_20160604035603.png
lots of bubbles	6/4/2016	4	13	4	48.101407	-125.554359	148.4	cam1_20160604041554.png
shark	6/4/2016	4	16	55	48.101407	-125.554486	148.3	cam1_20160604041554.png
more microbial mats sighted as we approach target 8 from target 7	6/4/2016	4	17	18	48.101407	-125.554501	148.3	cam1_20160604041648.png
bubbles sighted	6/4/2016	4	17	24	48.101409	-125.554501	148.2	cam1_20160604041648.png
bubble city 2, target for temp measurements	6/4/2016	4	18	55	48.101422	-125.554496	149.1	cam1_20160604041442.png
steady stream of bubbles, ambient at 6.58C, in floor near bubbles at 6.75C	6/4/2016	4	35	49	48.101417	-125.554496	149.9	cam1_20160604043644.png
at bacterial mat deep in floor near bubbles site, temp at 6.70C	6/4/2016	4	36	50	48.101419	-125.554493	149.9	cam1_20160604043643.png
yellow tail rockfish	6/4/2016	4	42	2	48.101414	-125.554537	148.7	cam1_20160604044151.png
small crabs	6/4/2016	4	42	58	48.101375	-125.554564	148.7	cam1_20160604044151.png
light bubbles	6/4/2016	4	45	2	48.101377	-125.554648	148.7	cam1_20160604044151.png
on the move to target 8 again, bacterial mats and bubbles in the area	6/4/2016	4	45	29	48.101321	-125.554662	148.6	cam1_20160604044151.png
sea whips	6/4/2016	4	46	5	48.101322	-125.554748	148.6	cam1_20160604044203.png
past target 8 and now transiting to target 9	6/4/2016	4	51	8	48.101211	-125.555103	148.8	cam1_20160604045048.png
still approaching target 9	6/4/2016	4	57	13	48.101130	-125.555205	149.1	cam1_20160604045048.png
haven't seen consistent bubbles in a little while, now moving from current position (just NE of target 9) to Target 11	6/4/2016	5	4	29	48.100933	-125.555596	149.2	cam1_20160604050134.png
another dog fish shark	6/4/2016	5	4	47	48.100922	-125.555622	149.2	cam1_20160604050134.png
flounder	6/4/2016	5	5	6	48.100912	-125.555631	149.3	cam1_20160604050325.png
flatfish (maybe sole or flounder)	6/4/2016	5	5	35	48.100895	-125.555674	149.2	cam1_20160604050325.png
heading to Seep 11 now	6/4/2016	5	6	22	48.100865	-125.555751	149.5	cam1_20160604050325.png
sole	6/4/2016	5	11	55	48.100997	-125.555704	149.1	cam1_20160604051452.png
moving back to target 1	6/4/2016	5	25	11	48.101599	-125.555210	149.2	cam1_20160604052902.png
more flatfish	6/4/2016	5	28	52	48.101696	-125.555043	149.2	cam1_20160604052902.png
scattered bacterial mats	6/4/2016	5	29	12	48.101696	-125.555046	149.2	cam1_20160604052603.png
carbonate structure, several crabs and fish, also bacterial mats - several indictors that there should be bubbles	6/4/2016	5	32	49	48.101730	-125.554967	149.4	cam1_20160604053214.png

Description: H1513 Juan de Fuca Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
still cruising round looking for more microbial mats. 1 hour to go until recovery so we are now moving on to bubbles 1 and 2 (or seep 1 and seep 2). plan is to pick up carbonate sample, place marker, and find place to get cores	6/4/2016	5	36	27	48.101737	-125.555053	149.2	cam1_20160604053214.png
still transiting to seep 1 and 2 area	6/4/2016	5	43	49	48.101855	-125.554755	149.0	cam1_20160604054030.png
more bacterial mats	6/4/2016	5	51	10	48.101997	-125.554525	149.5	cam1_20160604055120.png
some bubbles	6/4/2016	5	53	44	48.101974	-125.554373	149.4	cam1_20160604055132.png
bubbles! and more bubbles	6/4/2016	5	58	38	48.102188	-125.554388	149.6	cam1_20160604055132.png
moving on again to bubble city	6/4/2016	6	0	52	48.102197	-125.554387	150.3	cam1_20160604060545.png
seeking a good carbonate sample	6/4/2016	6	2	10	48.102195	-125.554305	150.1	cam1_20160604060545.png
searching for a good carbonate sample, bubbles near sample location	6/4/2016	6	3	59	48.102200	-125.554293	150.6	cam1_20160604060526.png
leaving marker #208 on carbonate structure near a steady stream of bubbles	6/4/2016	6	15	10	48.102198	-125.554290	150.7	cam1_20160604061640.png
yellow tail rockfish in Argus view	6/4/2016	6	18	37	48.102180	-125.554349	149.8	cam1_20160604061623.png
flatfish possibly halibut	6/4/2016	6	19	54	48.102217	-125.554357	148.8	cam1_20160604061624.png
more bacterial mats	6/4/2016	6	20	55	48.102215	-125.554441	150.2	cam1_20160604062328.png
looking for a place to core	6/4/2016	6	22	54	48.102195	-125.554408	150.7	cam1_20160604062326.png
now sampling complete	6/4/2016	6	40	9	48.102195	-125.554401	150.7	cam1_20160604064007.png
preparing to return to surface and recover the vehicles	6/4/2016	6	41	22	48.102200	-125.554400	149.5	cam2_20160604064007.png
nice rockfish in Argus view	6/4/2016	6	42	38	48.101908	-125.554364	147.9	cam1_20160604064836.png
holding at 50m and approaching surface	6/4/2016	6	50	47	48.102469	-125.554541	50.1	cam1_20160604065016.png

H1514 NA072 Quinault Shelf	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
krill	6/4/2016	15	47	43	47.48984609	-124.875883	168.4	cam1_20160604154615.png
water column very full of krill and other things, visibility not very clear	6/4/2016	15	50	45	47.48981511	-124.8756253	168.2	cam1_20160604155924.png
sea cucumber	6/4/2016	15	53	14	47.48974368	-124.8754871	168.3	cam1_20160604155924.png
preparing to map out ecological habitat, search for substrates	6/4/2016	15	59	17	47.48976184	-124.8755005	168.7	cam1_20160604155924.png
heading toward target 3	6/4/2016	16	0	34	47.48975963	-124.8755163	168.9	cam1_20160604160052.png
will be crossing over a series of backscatter, planning to do some groundtruthing	6/4/2016	16	0	50	47.489766	-124.875515	168.8	cam1_20160604160052.png
sea cucumber	6/4/2016	16	2	31	47.48975613	-124.8755643	168.6	cam1_20160604160949.png
anemones	6/4/2016	16	14	9	47.4902481	-124.8766575	168.5	cam1_20160604161419.png
remnants of sedentary organisms on a hard substrate	6/4/2016	16	14	44	47.49025033	-124.8766776	168.5	cam1_20160604161419.png
possibly glacial rock, anemone and California sea cucumber	6/4/2016	16	17	19	47.49023561	-124.876714	168.6	cam1_20160604161505.png
sea star and sea pens	6/4/2016	16	20	38	47.49030655	-124.876678	168.9	cam1_20160604162643.png
several medium to large boulders are picked up on the sonar	6/4/2016	16	24	2	47.4904255	-124.876789	167.7	cam1_20160604162622.png
rock fish and anemones	6/4/2016	16	25	29	47.4904284	-124.8768034	169.3	cam1_20160604162548.png
stunning anemone and shrimp	6/4/2016	16	26	20	47.49043405	-124.8768127	169.4	cam1_20160604162601.png
several great images from substrates	6/4/2016	16	28	22	47.49042431	-124.876801	169.4	cam1_20160604162605.png
sponges	6/4/2016	16	28	40	47.49043164	-124.8768038	169.4	cam1_20160604162605.png
copper rockfish	6/4/2016	16	29	29	47.4904291	-124.8768037	169.4	cam1_20160604162601.png
sponges are specifically ball sponges	6/4/2016	16	30	6	47.49042876	-124.8768018	168.9	cam1_20160604163711.png
more sea cucumbers	6/4/2016	16	32	34	47.49057539	-124.8769291	166.7	cam1_20160604163712.png
highly sedimented and stirred up water column	6/4/2016	16	35	24	47.4906075	-124.8771	166.2	cam1_20160604163711.png
more anemones	6/4/2016	16	37	31	47.492145	-124.8773705	166.2	cam1_20160604163711.png
current activity	6/4/2016	16	39	20	47.49068	-124.8772845	166.3	cam1_20160604163643.png
sponges and hard coral colonies	6/4/2016	16	40	17	47.49066672	-124.8773097	166.2	cam1_20160604164406.png
recent sponge species is Pacifica	6/4/2016	16	40	53	47.49067053	-124.8773635	165.9	cam1_20160604164406.png
smaller rocks and boulders in region	6/4/2016	16	43	27	47.49063756	-124.8775467	166.0	cam1_20160604164403.png
to be clear from earlier	6/4/2016	16	45	47	47.4908169	-124.877698	162.7	cam1_20160604164406.png
moving into area of lower reflectivity on the backscatter, more sedimented region. less hard ground in this area	6/4/2016	16	49	19	47.490633	-124.8783121	165.0	cam1_20160604164354.png
in low reflectivity region, zoom on large rock	6/4/2016	16	50	28	47.49060738	-124.8783585	165.0	cam1_20160604165326.png
crinoids and bivalves	6/4/2016	16	50	46	47.4906111	-124.8783573	165.2	cam1_20160604165326.png
stilastrid - hard corals	6/4/2016	16	51	3	47.4906115	-124.878356	165.0	cam1_20160604165326.png
moving toward center of dark or low backscatter region	6/4/2016	16	54	59	47.4906505	-124.878444	165.2	cam1_20160604165346.png

H1514 NA072 Quinault Shelf	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
more sea stars	6/4/2016	16	57	24	47.49077742	-124.8783883	165.4	cam1_20160604165326.png
fish eating or velcro seastar	6/4/2016	16	58	15	47.49078607	-124.8783723	166.8	cam1_20160604165318.png
shrimp swimming around the area	6/4/2016	16	59	27	47.49078263	-124.8783695	166.8	cam1_20160604165346.png
continuing on to the center of the low backscatter area	6/4/2016	17	0	41	47.49080795	-124.8783103	166.3	cam1_20160604170628.png
just sediment, essentially what we expected it to be	6/4/2016	17	0	58	47.4908105	-124.878307	166.1	cam1_20160604170628.png
krill and fish - feeding frenzy!!	6/4/2016	17	6	50	47.4908545	-124.8782524	165.8	cam1_20160604170614.png
copper rockfish and yellowtails - and euphausiids	6/4/2016	17	8	4	47.4908615	-124.878484	165.8	cam1_20160604170626.png
boulder	6/4/2016	17	8	58	47.49084722	-124.8786225	165.6	cam1_20160604170626.png
continuing to the high reflectivity region	6/4/2016	17	9	21	47.490842	-124.878629	165.6	cam1_20160604170628.png
scientist suggestion	6/4/2016	17	13	10	47.49083112	-124.8787518	165.1	cam1_20160604171445.png
sea star growing back both legs	6/4/2016	17	13	53	47.49080599	-124.8787279	165.1	cam1_20160604171445.png
first sea urchin	6/4/2016	17	15	20	47.49080179	-124.8787288	164.7	cam1_20160604171445.png
Allocentrotus fragilis is urchin ID - many images	6/4/2016	17	15	49	47.4908075	-124.878722	163.4	cam1_20160604171445.png
continuing to the higher backscatter region	6/4/2016	17	18	11	47.49082894	-124.8788702	164.8	cam1_20160604171447.png
much more rocks visible here	6/4/2016	17	19	0	47.4908323	-124.8789692	164.1	cam1_20160604171445.png
healthy cushion star, or called slime star	6/4/2016	17	20	12	47.490828	-124.8790047	164.1	cam1_20160604172124.png
rosy rockfish	6/4/2016	17	21	4	47.49081099	-124.8790133	164.0	cam1_20160604172127.png
healthy large sun star	6/4/2016	17	21	44	47.4908075	-124.8790155	163.5	cam1_20160604172127.png
again headed toward area of highest reflectivity to get our first rock sample	6/4/2016	17	23	32	47.49083151	-124.8790691	162.9	cam1_20160604172409.png
urchin	6/4/2016	17	24	6	47.49086208	-124.8791256	162.6	cam1_20160604172133.png
sea urchin, sea cucumber, sea star	6/4/2016	17	24	37	47.4908805	-124.8792195	162.6	cam1_20160604172133.png
prepping to get rock sample from central high reflectivity region	6/4/2016	17	26	27	47.49088409	-124.8793373	162.6	cam1_20160604172133.png
Trawl tracks?	6/4/2016	17	26	36	47.49088474	-124.8793302	162.6	cam1_20160604172133.png
moving out of this high backscatter region	6/4/2016	17	39	47	47.4909145	-124.879325	163.4	cam1_20160604173527.png
2x sea star	6/4/2016	17	44	39	47.49105826	-124.8793989	164.1	cam1_20160604174433.png
for the last starfish	6/4/2016	17	47	7	47.49105997	-124.8792104	164.0	cam1_20160604174547.png
Henricia sanguinolenta	6/4/2016	17	51	3	47.4910827	-124.87914	164.0	cam1_20160604175525.png
urchin	6/4/2016	17	51	25	47.49108096	-124.8791421	164.2	cam1_20160604175525.png
first testing slurp sampler to check which chamber is which	6/4/2016	17	56	22	47.491082	-124.8791428	165.8	cam1_20160604175525.png
if the gravel is composed of rounded rock that only occurs in river deposits, which means it was brought here by glaciers. And gravel has very high acoustic impedance, would give the bright backscatter.	6/4/2016	17	57	54	47.49107642	-124.8791423	165.7	cam1_20160604175525.png

H1514 NA072 Quinault Shelf	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
perhaps these pebbles are not from rivers but rather this area could be underlain by an anticline, so some of the rocks may be weathered and exposed accretionary wedge rocks exposed but in situ.	6/4/2016	18	4	28	47.4910815	-124.879138	165.9	cam1_20160604180215.png
moving on from sampling	6/4/2016	18	6	44	47.4910772	-124.8791237	165.3	cam1_20160604180219.png
sponges	6/4/2016	18	9	45	47.49113645	-124.8791713	164.1	cam1_20160604180215.png
several anemones, rockfish, sponges	6/4/2016	18	11	2	47.49113549	-124.8792699	164.7	cam1_20160604181254.png
green striped rockfish	6/4/2016	18	11	11	47.49113614	-124.8792723	164.4	cam1_20160604181254.png
encrusting sponge on an angular large boulder	6/4/2016	18	12	54	47.49113361	-124.8793586	162.4	cam1_20160604181227.png
perhaps the angular rock is a glacial erratic	6/4/2016	18	16	0	47.49111898	-124.8794215	165.1	cam1_20160604181241.png
grey color on rock is an encrusting sponge	6/4/2016	18	16	44	47.49111903	-124.8794259	165.2	cam1_20160604181241.png
grey encrusting sponge	6/4/2016	18	17	33	47.49111548	-124.8794204	165.2	cam1_20160604181258.png
this rock must have been moved recently or it wouldn't have such a clean face	6/4/2016	18	18	0	47.49111941	-124.8794155	165.2	cam1_20160604181254.png
darker sediment	6/4/2016	18	19	57	47.49116729	-124.879489	165.4	cam1_20160604181258.png
transitioning into lower backscatter segment	6/4/2016	18	20	12	47.49116825	-124.8794901	165.4	cam1_20160604182512.png
large boulders	6/4/2016	18	22	38	47.49132466	-124.8796375	165.5	cam1_20160604182423.png
California sea cucumber and anemone	6/4/2016	18	23	15	47.49133175	-124.8796503	165.5	cam1_20160604182512.png
urchin	6/4/2016	18	25	48	47.49137443	-124.8796835	165.5	cam1_20160604182510.png
water column overall much more clear and less sediment and krill filled, possibly a tidal phenomenon	6/4/2016	18	27	11	47.49137745	-124.8797465	165.3	cam1_20160604182510.png
anemone pair	6/4/2016	18	29	16	47.49139077	-124.8798195	166.2	cam1_20160604182315.png
lepoard dored nudibranch	6/4/2016	18	29	56	47.4913945	-124.8798205	166.3	cam1_20160604182315.png
parastichopus sea cucumber	6/4/2016	18	32	6	47.491432	-124.8798723	165.2	cam1_20160604183623.png
gray sponge, many polychaetes with feeding appendages out, zoanthids on leftward rock	6/4/2016	18	33	33	47.49142706	-124.8799234	166.2	cam1_20160604183538.png
shrimp and yellow encrusting sponge	6/4/2016	18	34	41	47.49141998	-124.8799215	166.2	cam1_20160604183623.png
seastar	6/4/2016	18	37	45	47.491497	-124.8799469	166.1	cam1_20160604183534.png
lingcod	6/4/2016	18	41	29	47.49161494	-124.8799191	166.1	cam1_20160604184229.png
seastar	6/4/2016	18	42	49	47.49172102	-124.8799915	166.3	cam1_20160604184325.png
from Paul Johnson - pelagic sedimentation rate on this part of the shelf is about 1 g/m2/year	6/4/2016	18	43	49	47.49171939	-124.8799753	166.4	cam1_20160604184325.png
more large boulders and encrusting organisms	6/4/2016	18	44	48	47.49174171	-124.8799248	166.2	cam1_20160604184248.png
seastar	6/4/2016	18	45	26	47.49173551	-124.8799209	166.3	cam1_20160604184248.png
seastars encrusting large boulders	6/4/2016	18	45	31	47.49173418	-124.87992	166.3	cam1_20160604184248.png

H1514 NA072 Quinault Shelf	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
now heading towards position -124.901 47.499 to look for a "bright triangular spot" requested by Liam	6/4/2016	18	46	48	47.49168967	-124.8799371	165.6	cam1_20160604184357.png
flatfish, possibly a flounder	6/4/2016	18	51	41	47.4916255	-124.8802046	166.0	cam1_20160604185150.png
halibut	6/4/2016	18	51	50	47.49162588	-124.880205	166.0	cam1_20160604185150.png
halibut or sand ab, right eye	6/4/2016	18	51	58	47.49162081	-124.880207	166.0	cam1_20160604185150.png
lasers indicate that the flat fish is 40+ cm long	6/4/2016	18	53	17	47.49161097	-124.8802148	165.5	cam1_20160604185408.png
Boulder with anemone attached	6/4/2016	18	59	12	47.4922085	-124.8818327	164.0	cam1_20160604185408.png
Another rock with anemone attached	6/4/2016	19	1	2	47.49231998	-124.8820677	164.8	cam1_20160604190820.png
Sea pens	6/4/2016	19	1	36	47.49233259	-124.8821017	165.6	cam1_20160604190820.png
Sea stars	6/4/2016	19	4	1	47.49243953	-124.882407	165.3	cam1_20160604190820.png
Rockfish	6/4/2016	19	4	22	47.49246949	-124.8825058	165.3	cam1_20160604190820.png
Large anemone	6/4/2016	19	5	14	47.49249994	-124.8825694	165.3	cam1_20160604190820.png
rounded boulders	6/4/2016	19	6	21	47.4925889	-124.8827785	165.3	cam1_20160604190820.png
more rounded boulders	6/4/2016	19	8	37	47.49265983	-124.883	164.9	cam1_20160604190751.png
Reddish/Pink sea cucumber	6/4/2016	19	9	36	47.49274	-124.8832757	164.7	cam1_20160604190758.png
Ray or skate on seafloor	6/4/2016	19	9	51	47.49274	-124.883394	164.7	cam1_20160604190758.png
skate, sea cucumber, canary rockfish, rattail fish	6/4/2016	19	11	10	47.49282	-124.883697	164.6	cam1_20160604191158.png
big boulders here in a very crumbly area	6/4/2016	19	11	32	47.49283579	-124.8837679	164.5	cam1_20160604191158.png
Pin cushion sea star	6/4/2016	19	12	12	47.4929125	-124.883873	164.7	cam1_20160604191830.png
big rounded boulder	6/4/2016	19	15	52	47.49323807	-124.884585	164.7	cam1_20160604191830.png
Lots of rattail fish	6/4/2016	19	17	36	47.493352	-124.884963	165.8	cam1_20160604191830.png
Zoom in on rock - large anemone (about 10cm), brachiopods, sponges, rockfish	6/4/2016	19	19	59	47.49346761	-124.8853465	167.5	cam1_20160604191830.png
Shore-side - rocks thought to be glacial erratics	6/4/2016	19	20	33	47.493526	-124.885468	167.9	cam1_20160604192356.png
likely crossing an field of glacial erratic rocks (see comment Paul Johnson also)	6/4/2016	19	21	22	47.4936005	-124.885638	168.2	cam1_20160604192356.png
Anemone, skate, rockfish, sea cucumber	6/4/2016	19	24	23	47.49378768	-124.8861453	169.6	cam1_20160604192356.png
Bacterial mat	6/4/2016	19	25	45	47.49377751	-124.8861673	169.6	cam1_20160604192240.png
bacterial mat, looks kind of hairy. There are shell fragments next to it. Take a slurp sample of this mat.	6/4/2016	19	26	48	47.49377175	-124.8861887	169.8	cam1_20160604192356.png
The slurp tube broke at the front. We cannot use it anymore on this dive.	6/4/2016	19	38	22	47.49381912	-124.886356	169.6	cam1_20160604193855.png
Shrimp	6/4/2016	19	39	21	47.49386044	-124.886438	169.5	cam1_20160604193855.png
Coral, we are taking a Niskin water sample here.	6/4/2016	19	42	50	47.4939751	-124.8866282	171.7	cam1_20160604194108.png
Skate	6/4/2016	19	48	12	47.494089	-124.8869302	172.3	cam1_20160604194108.png
more boulders on the seafloor.	6/4/2016	19	48	16	47.494089	-124.8869317	172.3	cam1_20160604194108.png

H1514 NA072 Quinault Shelf	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
another bac mat about 20 seconds ago	6/4/2016	19	51	8	47.49423841	-124.887225	173.6	cam1_20160604195955.png
Sea cucumbers, anemones, rockfish	6/4/2016	19	57	22	47.49471786	-124.8884228	178.4	cam1_20160604195955.png
Rock with sea stars, anemone, and rockfish	6/4/2016	20	0	19	47.49493341	-124.888953	179.7	cam1_20160604200701.png
Field of rocks	6/4/2016	20	1	41	47.49500348	-124.8890985	180.1	cam1_20160604200701.png
White patch at the seafloor. Might have been a bac mat, but we are at pretty high speed, difficult to spot.	6/4/2016	20	4	22	47.4951485	-124.8894412	180.9	cam1_20160604200701.png
Canary rockfish following camera	6/4/2016	20	8	2	47.495281	-124.8898814	181.6	cam1_20160604200701.png
Depressions in sediment	6/4/2016	20	9	54	47.49533837	-124.8901324	181.9	cam1_20160604200701.png
Spiny dogfish shark	6/4/2016	20	10	9	47.49534144	-124.8901775	181.8	cam1_20160604201906.png
Flatfish	6/4/2016	20	11	34	47.49538881	-124.890394	182.0	cam1_20160604201906.png
changed dive number to H1514, was previously H1314	6/4/2016	20	12	23	47.49542273	-124.8905757	182.2	cam1_20160604201906.png
Increased water turbidity	6/4/2016	20	12	41	47.4954335	-124.8906865	182.4	cam1_20160604201906.png
Lots of krill	6/4/2016	20	13	45	47.495642	-124.8913452	182.7	cam1_20160604201807.png
Lots of krill	6/4/2016	20	14	35	47.49577512	-124.8914269	182.8	cam1_20160604201906.png
crab	6/4/2016	20	18	23	47.4959925	-124.8921315	183.0	cam1_20160604201807.png
echinoids, holothurians, flatfish	6/4/2016	20	20	4	47.49611895	-124.8923433	183.0	cam1_20160604202306.png
flatfish, anemone, sea cucumber	6/4/2016	20	20	14	47.496122	-124.892394	183.1	cam1_20160604202306.png
fish school	6/4/2016	20	23	6	47.49626	-124.8929022	183.4	cam1_20160604202301.png
School of fish following camera	6/4/2016	20	24	38	47.49645536	-124.8933204	183.4	cam1_20160604202306.png
Attempt to capture discernible pic of krill	6/4/2016	20	26	40	47.49662096	-124.8937175	183.6	cam1_20160604202301.png
flatfish,	6/4/2016	20	31	18	47.49686905	-124.8945891	184.0	cam1_20160604203106.png
possible slope to the left of Herc screen	6/4/2016	20	37	52	47.49725402	-124.8955195	184.1	cam1_20160604203106.png
Consistent rockfish and sea cucumbers	6/4/2016	20	40	26	47.4973795	-124.895963	184.1	
Still lots of krill	6/4/2016	20	43	47	47.4976095	-124.8965232	184.1	
Fish settling on ground creating large dust clouds	6/4/2016	20	44	60	47.49769827	-124.8968075	184.4	
soft sediment	6/4/2016	20	46	10	47.4977811	-124.8970755	184.4	
Bag	6/4/2016	20	47	21	47.4978405	-124.897214	184.4	
approaching 250m to target REQUEST	6/4/2016	20	49	36	47.497975	-124.89769	184.8	
muddy bottom, sparse life	6/4/2016	20	49	37	47.497975	-124.89769	184.8	
Increased turbidity	6/4/2016	20	52	60	47.498205	-124.8980466	184.7	
still flying over mud deposits	6/4/2016	20	56	25	47.49833535	-124.8983155	184.6	
FSH x2	6/4/2016	20	57	6	47.49835239	-124.8984102	184.5	
bottom feeding fish	6/4/2016	20	57	15	47.49835213	-124.8984106	184.5	
Slight dip in topography	6/4/2016	20	59	36	47.49843139	-124.8987475	184.6	
urchins	6/4/2016	21	0	4	47.498498	-124.898879	184.7	cam1_20160604210829.png
A few scattered boulders	6/4/2016	21	1	42	47.4985873	-124.8992015	185.4	cam1_20160604210829.png

H1514 NA072 Quinault Shelf	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Approaching hard target - no signs of change in substrate yet	6/4/2016	21	5	47	47.49894687	-124.9001612	184.7	cam1_20160604210829.png
harder substrate coming up, few rocks	6/4/2016	21	8	39	47.49903	-124.9004995	184.4	cam1_20160604210826.png
Zoom-in on harder substrate	6/4/2016	21	9	12	47.4990285	-124.9004972	184.4	cam1_20160604210826.png
target dropped at exposed rock	6/4/2016	21	9	58	47.49902635	-124.9005058	184.3	cam1_20160604210826.png
boulder	6/4/2016	21	11	31	47.49899346	-124.9006772	184.5	cam1_20160604211155.png
Zoom-in on sponges - brittle stars inhabiting	6/4/2016	21	12	53	47.49897747	-124.9007164	184.6	cam1_20160604211155.png
decrease in krill density	6/4/2016	21	14	29	47.4989275	-124.90086	184.9	cam1_20160604211210.png
flatfish	6/4/2016	21	14	33	47.4989275	-124.90086	185.0	cam1_20160604211210.png
flatfish	6/4/2016	21	14	39	47.4989275	-124.900865	185.0	cam1_20160604211210.png
crab	6/4/2016	21	15	17	47.4989835	-124.9010287	184.8	cam1_20160604211210.png
sponges	6/4/2016	21	16	36	47.499002	-124.9011905	185.0	cam1_20160604211210.png
hard substrate covered with a thin layer of sediment	6/4/2016	21	17	52	47.499009	-124.9012036	184.9	cam1_20160604211200.png
possible bacterial mat?	6/4/2016	21	19	13	47.49900616	-124.9012055	185.2	cam1_20160604211210.png
going to probe sediment to confirm thin veneer	6/4/2016	21	19	26	47.499006	-124.90121	185.0	cam1_20160604211210.png
Observed a white spot on the sediment, but difficult to say if it is a microbial mat or just brighter spots on the sediment. Camera is not very stable, cannot see anything fluffy. But might be a different type of mat.	6/4/2016	21	19	33	47.4990025	-124.9012142	184.7	cam1_20160604211210.png
octopod	6/4/2016	21	26	60	47.49895298	-124.9012184	185.1	cam1_20160604212710.png
Octopus	6/4/2016	21	27	45	47.49895248	-124.9012301	185.3	cam1_20160604212251.png
The octopus is hiding in a whole in the sediment and moving a bit disturbed by our light.	6/4/2016	21	29	1	47.49895349	-124.901252	185.4	cam1_20160604212710.png
setting down to probe the sediment	6/4/2016	21	29	16	47.49895181	-124.9012516	185.5	cam1_20160604212710.png
Cobbly area	6/4/2016	21	29	41	47.49894948	-124.9012523	185.4	cam1_20160604212710.png
Probing sediment with Tprobe to test thickness - evaluation	6/4/2016	21	34	59	47.49894871	-124.901253	185.5	cam1_20160604213001.png
All 3 samples taken to this point are actually in zone 6, but previously noted as zone 5	6/4/2016	21	42	56	47.498935	-124.9013951	184.6	
Moving to OCNMS Site 5 START	6/4/2016	21	44	33	47.49893875	-124.9014728	184.7	
Distance is about 845m	6/4/2016	21	44	44	47.49893788	-124.9015099	184.8	
Very large rock housing sea stars and anemones	6/4/2016	21	45	22	47.49893426	-124.9015748	184.8	
crab	6/4/2016	21	46	19	47.49907064	-124.901725	184.5	
flatfish, sea cucumber	6/4/2016	21	46	49	47.4991195	-124.9017345	184.3	
large rock	6/4/2016	21	47	6	47.49914161	-124.9017645	184.5	
Very turbid water, fighting strong eastward current as we move to next target	6/4/2016	21	47	43	47.49917221	-124.9019074	184.3	

H1514 NA072 Quinault Shelf	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
difficult to see tether via Argus	6/4/2016	21	49	33	47.49918903	-124.9019955	184.3	
flatfish	6/4/2016	21	49	49	47.499214	-124.901976	184.1	
visibility is very low in this area	6/4/2016	21	50	31	47.499305	-124.901907	184.1	
flatfish (x3)	6/4/2016	21	50	46	47.499305	-124.901926	184.3	
flatfish x3	6/4/2016	21	50	48	47.499305	-124.901926	184.2	
rock on the muddy sediment	6/4/2016	21	51	37	47.49935618	-124.9019935	184.2	
Sea Cucumbers	6/4/2016	21	52	57	47.499418	-124.9020421	184.0	
flatfish	6/4/2016	21	53	54	47.4995105	-124.9021592	183.6	
flatfish	6/4/2016	21	54	6	47.4995105	-124.9022102	183.7	
Sparse fauna consistent throughout transit	6/4/2016	21	56	10	47.5000105	-124.9025683	182.9	
occasional	6/4/2016	21	56	30	47.50006043	-124.9027232	182.9	
Dominated by mud deposits. Not many rocks present anymore. But general visibility still low. Could miss out on some.	6/4/2016	21	56	51	47.5000975	-124.902749	182.8	
skate (also occasional)	6/4/2016	21	57	27	47.5001545	-124.9028636	182.8	
flatfish	6/4/2016	22	0	58	47.50046021	-124.9031913	182.4	cam1_20160604220314.png
sea cucumber, rockfish	6/4/2016	22	1	30	47.5005579	-124.9032091	182.3	cam1_20160604220314.png
big boulder	6/4/2016	22	3	23	47.500736	-124.9033566	180.7	cam1_20160604220314.png
large boulder	6/4/2016	22	3	24	47.500736	-124.9033566	180.7	cam1_20160604220314.png
large rock with sea star and anemone	6/4/2016	22	3	33	47.500736	-124.9034106	182.1	cam1_20160604220314.png
continued low visibility	6/4/2016	22	3	51	47.500742	-124.9035905	182.0	cam1_20160604220314.png
crab	6/4/2016	22	5	0	47.500867	-124.9037605	182.1	cam1_20160604220314.png
skate	6/4/2016	22	7	42	47.50111768	-124.9042147	181.8	cam1_20160604220314.png
Skate, rattail fish	6/4/2016	22	8	2	47.5011445	-124.9042592	181.9	cam1_20160604220314.png
large boulder	6/4/2016	22	9	12	47.50118336	-124.90448	180.9	cam1_20160604220314.png
large rock with rockfish perched on top. also sea stars, anemones, and encrusting animals	6/4/2016	22	9	33	47.501226	-124.9045675	182.0	cam1_20160604220314.png
muddy bottom as we transit over possible sand waves as determined by map	6/4/2016	22	12	11	47.5014235	-124.904826	181.6	
crab	6/4/2016	22	15	4	47.50179276	-124.9050974	181.3	
seastar	6/4/2016	22	16	43	47.50199632	-124.90538	180.8	
boulder	6/4/2016	22	16	47	47.50205051	-124.905403	180.8	
rock with sea star	6/4/2016	22	17	2	47.5021195	-124.9054135	180.7	
flatfish	6/4/2016	22	17	15	47.5021195	-124.9054353	180.8	
sponge	6/4/2016	22	21	24	47.50261266	-124.905949	180.4	
anemone and sponge	6/4/2016	22	21	28	47.50261192	-124.9059562	180.4	
sponge, sea star, sea cucumber	6/4/2016	22	22	17	47.50266995	-124.9061176	180.4	

H1514 NA072 Quinault Shelf	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
still mud deposits, no ripples or waves seen so far. Only small holes (fauna).	6/4/2016	22	22	22	47.5026895	-124.906124	180.3	
echinoid	6/4/2016	22	23	17	47.502771	-124.9062335	180.2	
sea cucumbers, sea anemones	6/4/2016	22	24	24	47.5028926	-124.906425	180.1	
transit muddy substrate with possible sand waves. Occasional glacial erratics. Very high turbidity creating low visibility	6/4/2016	22	26	22	47.50325082	-124.9067055	179.6	
boulder	6/4/2016	22	26	35	47.5032829	-124.9067366	179.7	
sponge	6/4/2016	22	26	54	47.50330651	-124.9067995	179.7	
REFER TO PREVIOUSLY OUTLINED BIO SUMMARIES	6/4/2016	22	26	59	47.50330547	-124.9067995	179.8	
FSH	6/4/2016	22	30	13	47.5034585	-124.9071446	179.9	cam1_20160604223602.png
closed plumose anemone	6/4/2016	22	34	9	47.50382655	-124.9073907	179.4	cam1_20160604223602.png
sponge outcrop	6/4/2016	22	35	7	47.503906	-124.9075955	179.4	cam1_20160604223602.png
school of fish, flatfish	6/4/2016	22	35	15	47.503906	-124.907605	179.5	cam1_20160604223602.png
krill density increasing	6/4/2016	22	37	11	47.504245	-124.9080185	179.2	cam1_20160604223602.png
sea cucumbers and anemone	6/4/2016	22	39	8	47.50456652	-124.9084145	178.5	cam1_20160604223602.png
Sea cucumbers	6/4/2016	22	40	21	47.50466497	-124.908541	178.7	cam1_20160604224640.png
boulders	6/4/2016	22	44	7	47.5047729	-124.9087972	178.6	cam1_20160604224640.png
fish	6/4/2016	22	44	44	47.504909	-124.908884	178.4	cam1_20160604224640.png
School of fish	6/4/2016	22	45	15	47.5049715	-124.9090577	178.5	cam1_20160604224640.png
flatfish, sea anemone	6/4/2016	22	50	20	47.50488277	-124.9091371	178.4	
Hercules and Argus ascending in water column in preparation for tow	6/4/2016	22	52	17	47.50466844	-124.9089195	172.7	
Hercules at depth 128m, 50m off bottom, towing to next site	6/4/2016	22	59	11	47.50492524	-124.909358	126.3	
Heading/towing to site 4	6/4/2016	22	59	24	47.50493187	-124.9093653	125.2	
Transit is 2.8km to NW	6/4/2016	23	0	54	47.50491704	-124.9094355	123.4	
Restarting Hypack survey, Herc/Argus icons are not moving. Working on troubleshooting.	6/4/2016	23	8	41	47.505928	-124.9102754	123.8	
Many jellies in water column during transect	6/4/2016	23	16	23	47.50785184	-124.9125835	118.3	
Scattered CNI	6/4/2016	23	18	44	47.5085288	-124.913238	118.2	
Continuing transit	6/4/2016	23	29	46	47.51099643	-124.9162203	128.2	
Continuing transit, 117 m depth	6/4/2016	23	38	27	47.51312739	-124.9185113	115.7	
Continuing transit; receiving recommendations from shore about rock samples and transit lines	6/5/2016	0	5	3	47.519598	-124.926021	118.2	
*track lines	6/5/2016	0	5	17	47.5196829	-124.9260463	118.1	

H1514 NA072 Quinault Shelf	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Recommended to move start point for zone 4 a quarter of the distance between the first and second marker locations on dive plan.	6/5/2016	0	7	57	47.5204365	-124.9270686	117.6	
New start point for Zone 4 marked in Hypack "OCNMS 4 RevisedStart"	6/5/2016	0	9	34	47.5208765	-124.9275231	117.5	
Suction sampler was damaged earlier in the dive? Will not be taking new Slurp samples.	6/5/2016	0	10	23	47.52107804	-124.927904	117.6	
*Slurp handle issue	6/5/2016	0	10	40	47.52116334	-124.927904	117.5	
Continuing transit to zone 4	6/5/2016	0	15	56	47.52238103	-124.9289575	112.4	
Tether in Argus cam	6/5/2016	0	17	2	47.5224045	-124.929124	112.3	
Tether visible in Argus cam. taking actions to bring Herc back down under Argus	6/5/2016	0	17	22	47.5223095	-124.929272	120.2	
ETA 20 minutes (0040) to zone 4 start site	6/5/2016	0	17	38	47.52230322	-124.9293641	126.0	
tether appears to be wrapped around Argus, somewhere	6/5/2016	0	18	9	47.5222995	-124.9294855	132.7	
Tether wrapped around Argus (after ship movement slowed?)	6/5/2016	0	19	4	47.5223226	-124.9295385	140.8	
Pausing ship move	6/5/2016	0	19	49	47.5223325	-124.9296118	130.3	
Working out vehicle turns to unwrap tether	6/5/2016	0	24	17	47.52259305	-124.929758	125.6	
Continuing to work on tether wraps. Ship may have slowed due to wind and waves, change in ship speed was not requested by nav.	6/5/2016	0	30	9	47.522645	-124.929806	124.4	cam2_20160605003255.png
Tether situation cleared	6/5/2016	0	33	41	47.52268671	-124.929863	133.2	cam2_20160605003255.png
Ship movement is stalled by wind and current and is having trouble maintaining station on DP. Conferring with bridge watch.	6/5/2016	0	59	47	47.52294273	-124.9301578	125.5	
Preparing vehicles for recovery due to weather conditions, ship cannot safely maintain heading and continue on track line	6/5/2016	1	4	49	47.52317116	-124.9303743	123.9	
Preparing deck for recovery	6/5/2016	1	8	21	47.52328196	-124.9304417	124.1	
Hercules at 100 m depth	6/5/2016	1	17	32	47.52383983	-124.931088	99.2	

H1515 Aborted

H1516 NA072 Grays Reef	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Jellies and other gelatinous creatures upon descent	6/5/2016	20	9	19	46.995747	-124.947084	150.1	cam2_20160605200649.png
Once on bottom, encountered sponges right away, as well as sea stars	6/5/2016	20	11	40	46.995762	-124.947067	152.1	cam1_20160605201625.png
Barrel sponges	6/5/2016	20	15	22	46.995704	-124.947114	152.1	cam1_20160605201625.png
trawl lines	6/5/2016	20	16	44	46.995611	-124.947109	152.2	cam1_20160605201031.png
rockfish	6/5/2016	20	17	3	46.995605	-124.947163	152.2	cam1_20160605201625.png
fish, spot prawn	6/5/2016	20	18	5	46.995563	-124.947175	152.1	cam1_20160605201625.png
boulder	6/5/2016	20	18	25	46.995545	-124.947190	152.1	cam1_20160605201625.png
small rocks	6/5/2016	20	18	37	46.995507	-124.947229	152.0	cam1_20160605201625.png
fish	6/5/2016	20	19	52	46.995396	-124.947283	152.0	cam1_20160605201625.png
sponges	6/5/2016	20	19	60	46.995395	-124.947291	152.1	cam1_20160605201625.png
Dense area of sponges	6/5/2016	20	20	32	46.995366	-124.947344	152.1	cam1_20160605202459.png
sponges	6/5/2016	20	20	37	46.995354	-124.947342	152.0	cam1_20160605202459.png
Associated fauna with sponges include skate, rockfish, sea stars, bottom feeding fish	6/5/2016	20	21	9	46.995346	-124.947340	152.1	cam1_20160605202252.png
zoom in on cluster of sponges with yellow and white color morphs, rockfish hiding within sponge crevices	6/5/2016	20	23	31	46.995353	-124.947348	152.2	cam1_20160605202516.png
Cobbular rock interspersed within sponges	6/5/2016	20	25	57	46.995273	-124.947379	152.1	cam1_20160605202459.png
From shore	6/5/2016	20	28	3	46.995248	-124.947403	152.1	cam1_20160605202516.png
some sponges covered in sediment	6/5/2016	20	30	8	46.995221	-124.947499	152.8	cam1_20160605203430.png
Sponge half covered in sediment, half clear	6/5/2016	20	31	17	46.995203	-124.947723	152.5	cam1_20160605203452.png
Another large cluster of sponges	6/5/2016	20	33	45	46.995034	-124.948057	152.5	cam1_20160605203434.png
sponges and large gravid fish	6/5/2016	20	33	54	46.995032	-124.948060	152.7	cam1_20160605203434.png
Pregnant canary rockfish with sponges in backdrop	6/5/2016	20	35	37	46.995022	-124.948066	152.6	cam1_20160605203418.png
pregnant rockfish	6/5/2016	20	35	43	46.995023	-124.948066	152.6	cam1_20160605203418.png
potential old reefs in the background	6/5/2016	20	36	38	46.994949	-124.948116	152.7	cam1_20160605203452.png
several fishes in sponge	6/5/2016	20	36	41	46.994949	-124.948116	152.7	cam1_20160605203452.png
Fish (particularly rockfish) using sponges as habitat. also sea stars	6/5/2016	20	36	52	46.994944	-124.948120	152.6	cam1_20160605203452.png
red fish with white spots are some sort of sebastomus	6/5/2016	20	36	53	46.994942	-124.948122	152.6	cam1_20160605203452.png
Areas of high backscatter seem to correspond with sponge aggregations	6/5/2016	20	41	37	46.994774	-124.948514	152.3	cam1_20160605204638.png
Possible bacterial mat, zoom suggests sponge material	6/5/2016	20	45	51	46.994670	-124.948664	152.3	cam1_20160605204626.png
skate	6/5/2016	20	47	22	46.994645	-124.948679	152.5	cam1_20160605204619.png

H1516 NA072 Grays Reef	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Zoom in on white bowl-shaped sponge - tiny lobsters hiding beneath	6/5/2016	20	48	41	46.994647	-124.948719	152.4	cam1_20160605204638.png
ctenophore strand on Argus cam	6/5/2016	20	51	4	46.994482	-124.948864	152.2	cam1_20160605205559.png
Large cluster of various sponges and faunal associates	6/5/2016	20	51	39	46.994470	-124.948860	152.0	cam1_20160605205559.png
Rocks likely glacial deposits, not carbonate structure	6/5/2016	20	51	60	46.994481	-124.948882	151.5	cam1_20160605205559.png
Thin rocky outcrop near barrel sponges	6/5/2016	20	56	20	46.994325	-124.949207	152.9	cam1_20160605205559.png
rocky outcrop with numerous sponges	6/5/2016	20	57	47	46.994278	-124.949078	153.0	cam1_20160605205559.png
Looks like this whole area has some hard substrate below the sediment. Could be the sponge reef.	6/5/2016	20	58	28	46.994262	-124.949019	152.7	cam1_20160605205638.png
interesting bottom topography	6/5/2016	21	1	48	46.994238	-124.948740	151.5	cam1_20160605210336.png
Somewhat hilly topography	6/5/2016	21	2	26	46.994223	-124.948718	153.3	cam1_20160605210438.png
Very high density of sponges on hard substrate	6/5/2016	21	3	56	46.994087	-124.948689	151.9	cam1_20160605210336.png
Confirmation that backscatter is corresponding with density of sponges	6/5/2016	21	4	20	46.994020	-124.948596	151.4	cam1_20160605210336.png
Surveying area of sponges, attempt to get thickness measurement	6/5/2016	21	10	22	46.994063	-124.948582	152.5	cam1_20160605211345.png
Associated fauna noted during survey	6/5/2016	21	11	58	46.994024	-124.948590	153.5	cam1_20160605211352.png
Wide variety of sponges including	6/5/2016	21	13	40	46.993989	-124.948618	153.7	cam1_20160605211352.png
school of fishes	6/5/2016	21	21	26	46.993932	-124.948801	153.2	cam1_20160605212522.png
School of juvenile fish, sponges providing possible nursery habitat?	6/5/2016	21	21	49	46.993934	-124.948800	153.2	cam1_20160605212522.png
crab	6/5/2016	21	25	17	46.993937	-124.948936	154.0	cam1_20160605212435.png
Zoom in on Heterochone calyx? - crab living inside, rosethorn rockfish living near base	6/5/2016	21	26	54	46.993931	-124.948952	151.5	cam1_20160605212527.png
Fairly large drop-off	6/5/2016	21	29	47	46.993938	-124.948649	151.7	cam1_20160605212514.png
Settling to bottom in attempt to take a sediment core and probe sediment to test strength of substrate	6/5/2016	21	32	12	46.993997	-124.948623	154.5	cam1_20160605213631.png
Testing substrate sponges are growing on - confirmation that substrate is hard, not likely remnant sponge material	6/5/2016	21	35	35	46.993998	-124.948626	154.5	cam1_20160605213636.png
zoom in on sponge (Heterochone calyx) - fish nestled inside	6/5/2016	21	38	38	46.994001	-124.948624	154.5	cam1_20160605213636.png
There is already something in one of the bioboxes.	6/5/2016	21	46	7	46.993960	-124.948615	154.7	cam1_20160605214900.png
Sampling of substrate. Porous.	6/5/2016	21	50	38	46.993959	-124.948622	154.6	cam1_20160605215654.png
Can't remember if I typed substrate with corals or sponges growing on it - THEY WERE SPONGES!!!!!	6/5/2016	21	55	21	46.993799	-124.949138	151.0	cam1_20160605215654.png

H1516 NA072 Grays Reef	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Barrel sponges, sea stars, rockfish, bowl-shaped sponges	6/5/2016	21	57	23	46.993721	-124.949343	150.8	cam1_20160605215654.png
Dropstone	6/5/2016	21	59	49	46.993621	-124.949521	153.3	cam1_20160605215654.png
Possible carbonate structure exposed beneath sponges	6/5/2016	22	4	18	46.993561	-124.949646	154.2	cam1_20160605220340.png
Hard looking rock at the base of a bunch of sponges. Looks like carbonate.	6/5/2016	22	7	51	46.993559	-124.949660	154.4	cam1_20160605220426.png
We try to sample this hard, carbonate looking rock. But it seems extremely hard and difficult to catch	6/5/2016	22	10	26	46.993559	-124.949660	154.4	cam1_20160605221416.png
Attempted second rock sample. Determined to be same material as first sample, aborted.	6/5/2016	22	12	32	46.993565	-124.949660	154.3	cam1_20160605221416.png
Sampling for barrel sponge	6/5/2016	22	13	50	46.993559	-124.949658	154.4	cam1_20160605221336.png
Another change in bottom topography	6/5/2016	22	34	33	46.993935	-124.949643	153.4	cam1_20160605223815.png
Large cluster of sponges	6/5/2016	22	36	30	46.994080	-124.949645	153.4	cam1_20160605223753.png
Many fish hiding near, within sponges	6/5/2016	22	39	20	46.994215	-124.949574	154.2	cam1_20160605223803.png
Mixture of sponges covered/not covered in sediment	6/5/2016	22	40	42	46.994283	-124.949586	153.6	cam1_20160605224700.png
large sponges	6/5/2016	22	41	9	46.994294	-124.949588	153.2	cam1_20160605224403.png
flatfish	6/5/2016	22	41	11	46.994294	-124.949588	153.2	cam1_20160605224403.png
dropstone	6/5/2016	22	41	26	46.994294	-124.949584	152.8	cam1_20160605224403.png
Track on the seafloor. From an animal? Does not look like a trawl line	6/5/2016	22	43	56	46.994547	-124.949593	152.4	cam1_20160605224700.png
plenty of sticking around here	6/5/2016	22	47	20	46.994897	-124.949747	153.5	cam1_20160605224403.png
Sea stars, bottom fish, rockfish, all associated with sponges	6/5/2016	22	47	44	46.994902	-124.949786	153.1	cam1_20160605224403.png
debris	6/5/2016	22	49	31	46.995149	-124.949665	153.1	cam1_20160605224700.png
rectangular in shape	6/5/2016	22	49	35	46.995162	-124.949658	153.2	cam1_20160605224700.png
muddy sediment	6/5/2016	22	49	60	46.995235	-124.949642	153.1	cam1_20160605224700.png
Sponges starting up again after a few 10 meters of sediment only	6/5/2016	22	51	10	46.995580	-124.949628	153.1	cam1_20160605225213.png
Skate	6/5/2016	22	51	14	46.995590	-124.949626	153.1	cam1_20160605225213.png
Large sponges (Heterochrone)	6/5/2016	22	53	39	46.995848	-124.949590	151.8	cam1_20160605225213.png
just passed some harder looking substrate	6/5/2016	22	54	56	46.996114	-124.949615	152.4	cam1_20160605225313.png
Skate and rockfish	6/5/2016	22	56	5	46.996170	-124.949652	152.3	cam1_20160605225313.png
Will transit north to next site, low backscatter and raised area on multibeam, ~1.5km	6/5/2016	23	3	37	46.996797	-124.949497	148.9	cam1_20160605230434.png
Acanthascus barrel sponges	6/5/2016	23	7	51	46.997511	-124.949577	148.6	cam1_20160605230434.png

H1516 NA072 Grays Reef	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Red rockfish with white dots, Sebastomus spa.	6/5/2016	23	16	41	46.998492	-124.949572	150.6	cam1_20160605231601.png
Brown sponges-- likely dead.	6/5/2016	23	16	55	46.998582	-124.949577	150.4	cam1_20160605231601.png
sea stars	6/5/2016	23	17	5	46.998597	-124.949569	150.4	cam1_20160605231601.png
Just passed over a skate	6/5/2016	23	26	43	46.999893	-124.949520	149.6	cam2_20160605232522.png
Lingcod	6/5/2016	23	26	49	46.999930	-124.949518	149.7	cam2_20160605232522.png
Rattail (Chimera)	6/5/2016	23	27	12	46.999965	-124.949517	149.8	cam2_20160605232522.png
~1hr from transit target, flying at 2.5m altitude over scattered sponges	6/5/2016	23	35	43	47.001156	-124.949592	150.6	cam1_20160605233637.png
Skate	6/5/2016	23	41	48	47.001863	-124.949576	150.0	cam1_20160605234441.png
sardine can?	6/5/2016	23	42	28	47.001953	-124.949567	150.2	cam1_20160605234219.png
Skate	6/5/2016	23	44	34	47.002300	-124.949557	150.6	cam1_20160605234219.png
cluster of sponges	6/6/2016	0	13	55	47.006126	-124.949650	150.4	cam1_20160606001042.png
Small group of sponges. sea stars	6/6/2016	0	14	17	47.006222	-124.949672	150.6	cam1_20160606001042.png
soft sediment mud	6/6/2016	0	14	22	47.006222	-124.949675	150.6	cam1_20160606001042.png
skate	6/6/2016	0	15	12	47.006355	-124.949679	150.8	cam1_20160606001042.png
Skates are longnose skates	6/6/2016	0	16	10	47.006464	-124.949640	150.7	cam1_20160606001042.png
FSH	6/6/2016	0	16	38	47.006671	-124.949639	150.5	cam1_20160606001042.png
Change in bottom topography	6/6/2016	0	23	28	47.007500	-124.949636	151.2	cam1_20160606002534.png
Swimming skate	6/6/2016	0	25	52	47.008003	-124.949579	150.5	cam1_20160606002354.png
Terrain feature	6/6/2016	0	28	28	47.008337	-124.949560	150.8	cam1_20160606002534.png
flatfish	6/6/2016	0	32	24	47.008744	-124.949776	151.6	cam1_20160606003923.png
Targets have been marked for potential subbottom work	6/6/2016	0	37	49	47.009248	-124.950171	151.8	cam1_20160606003923.png
Passing over another mound with various sponges, sea stars, and rosethorn rockfish; holding position here	6/6/2016	0	38	22	47.009341	-124.950206	150.6	cam1_20160606003923.png
Pausing for sampling	6/6/2016	0	38	38	47.009330	-124.950215	150.9	cam1_20160606003923.png
Continuing again to keep ahead of Argus; dropping target in Hypack as "sponges"	6/6/2016	0	39	23	47.009466	-124.950290	151.3	cam1_20160606003750.png
Skate	6/6/2016	0	39	31	47.009472	-124.950290	151.3	cam1_20160606003750.png
Pausing at another mound	6/6/2016	0	39	47	47.009443	-124.950359	151.3	cam1_20160606003750.png
Yellow and white heterochrome sponges	6/6/2016	0	40	54	47.009390	-124.950364	151.4	cam1_20160606004453.png
Will sample yellow and white heterochone sponges here and Poecillastra	6/6/2016	0	42	30	47.009407	-124.950356	151.4	cam1_20160606004453.png
Attempted push core, sediment/substrate too hard to core	6/6/2016	1	9	50	47.009482	-124.950389	152.4	cam1_20160606010857.png
Looking for a white, non heterochone sponge to sample	6/6/2016	1	12	48	47.009550	-124.950383	151.9	cam1_20160606011614.png

H1516 NA072 Grays Reef	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Zoom in on yellow sponge	6/6/2016	1	13	49	47.009550	-124.950351	152.4	cam1_20160606011606.png
Planning to take white non-heterochone sponge sample; will wait to open biobox to avoid losing earlier samples to thrusters	6/6/2016	1	19	40	47.009494	-124.950325	153.5	cam1_20160606011614.png
Slurping unknown white sponge pieces instead of grabbing them for biobox (breaking apart too rapidly.)	6/6/2016	1	27	49	47.009498	-124.950331	153.3	cam1_20160606012418.png
Yellow and white heterochones, Poecillastra, and slurp of white sponge of unknown species (morph?)	6/6/2016	1	27	59	47.009498	-124.950330	153.4	cam1_20160606012418.png
Attempting push core next to NA072-018	6/6/2016	1	30	34	47.009506	-124.950327	153.4	cam1_20160606013640.png
Unsuccessful push core	6/6/2016	1	30	51	47.009505	-124.950328	153.4	cam1_20160606013640.png
2nd try semi-successful, only got a few cm	6/6/2016	1	31	29	47.009502	-124.950323	153.3	cam1_20160606013705.png
Moving due west to the edge of the low reflectivity backscatter	6/6/2016	1	33	39	47.009482	-124.950395	150.2	cam1_20160606013705.png
found a white heterochone and planning to sample	6/6/2016	1	38	27	47.009431	-124.950537	150.6	cam1_20160606013705.png
zooming on orange round knobby organism	6/6/2016	1	48	56	47.009418	-124.950537	150.7	cam1_20160606014329.png
looking at an angular grey rock on the seafloor near the sponge mound	6/6/2016	1	55	35	47.009417	-124.950516	151.5	cam1_20160606015327.png
Grey rock crushes in 2nd lowest grip setting	6/6/2016	1	58	32	47.009411	-124.950519	152.2	cam1_20160606015327.png
rock too crumbly and fell apart, not sampling. Clayey or friable material	6/6/2016	1	59	2	47.009411	-124.950519	152.2	cam1_20160606015327.png
Flying over downslope	6/6/2016	2	1	57	47.009322	-124.950625	150.1	cam1_20160606020802.png
moving west to the edge of the low backscatter spot now	6/6/2016	2	2	27	47.009302	-124.950717	151.5	cam2_20160606020113.png
Nice Argus and Herc images at sponge-covered slope	6/6/2016	2	7	58	47.009380	-124.950879	151.4	cam1_20160606020736.png
Halibut	6/6/2016	2	8	9	47.009386	-124.950934	151.4	cam2_20160606020113.png
still moving west	6/6/2016	2	11	2	47.009387	-124.951075	151.2	cam1_20160606021926.png
muddy seafloor	6/6/2016	2	16	41	47.009521	-124.951418	151.0	cam1_20160606021926.png
2-3 large cobbles	6/6/2016	2	18	42	47.009527	-124.951819	151.6	cam1_20160606021926.png
cobble and rock, sparsely scattered over high backscatter area	6/6/2016	2	18	60	47.009537	-124.951825	151.6	cam1_20160606021926.png
some sponge,	6/6/2016	2	19	15	47.009537	-124.951853	151.6	cam1_20160606021926.png
lots of little cobble	6/6/2016	2	20	39	47.009545	-124.952003	151.8	cam1_20160606022606.png
Zoom in on sediment; white spots-- some sponges, some worms	6/6/2016	2	22	5	47.009548	-124.952003	151.6	cam1_20160606022606.png
serpulid worms on small cobbles	6/6/2016	2	22	9	47.009547	-124.952003	151.6	cam1_20160606022606.png
Scattered rockfish	6/6/2016	2	24	29	47.009717	-124.951789	151.4	cam1_20160606022606.png

H1516 NA072 Grays Reef	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
moving north to ensure we're within the high backscatter area	6/6/2016	2	24	30	47.009716	-124.951789	151.4	cam1_20160606022606.png
spiny cushion star (zoomed)	6/6/2016	2	25	48	47.009725	-124.951737	151.5	cam1_20160606022558.png
Great Argus view	6/6/2016	2	26	20	47.009728	-124.951730	151.2	cam1_20160606022152.png
Flying down over edge of mound and spinning around to look at substrate	6/6/2016	2	28	24	47.009946	-124.951689	150.3	cam1_20160606022606.png
taking a look at the mounds	6/6/2016	2	28	37	47.009981	-124.951689	150.3	cam1_20160606022606.png
Encrusting sponge	6/6/2016	2	31	8	47.009969	-124.951595	152.4	cam1_20160606023328.png
Nice view of edge of mound in both Herc and Argus	6/6/2016	2	32	60	47.009957	-124.951601	152.5	cam1_20160606023331.png
Encrusting sponges	6/6/2016	2	33	40	47.009961	-124.951617	152.7	cam1_20160606023328.png
Push core attempt in ledge	6/6/2016	2	35	39	47.009953	-124.951623	151.5	cam1_20160606023356.png
attempting to core into the side of the ledge	6/6/2016	2	35	52	47.009952	-124.951624	151.6	cam1_20160606023356.png
Push core attempts failed	6/6/2016	2	37	40	47.009960	-124.951636	152.7	cam1_20160606023331.png
failed to get the sample	6/6/2016	2	37	49	47.009960	-124.951633	152.5	cam1_20160606023331.png
Preparing for recovery	6/6/2016	2	42	13	47.009905	-124.951469	149.9	cam1_20160606024155.png
Pteropods on Herc cam	6/6/2016	2	53	43	47.009832	-124.951607	26.1	

H1517 NA072 Astoria Canyon	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
descending through a slush of marine snow and biological matter	6/7/2016	17	47	18	46.242573	-124.648229	546.9	
jellyfish in water column	6/7/2016	17	54	17	46.242614	-124.648277	724.2	cam1_20160607175455.png
lots of jellyfish	6/7/2016	17	59	11	46.242482	-124.648324	840.1	cam1_20160607175503.png

H1517 NA072 Astoria Canyon	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Herc surrounding by a smack of jellies	6/7/2016	18	1	30	46.242547	-124.648850	846.6	cam1_20160607180133.png
many seastars on the seafloor and sea cucumbers	6/7/2016	18	1	53	46.242543	-124.648822	847.9	cam1_20160607180133.png
rockfish	6/7/2016	18	4	3	46.242638	-124.648810	847.5	cam1_20160607180658.png
heading toward target 2	6/7/2016	18	5	29	46.242655	-124.648545	847.6	cam1_20160607180658.png
huge pile of seastars together, maybe sharing a meal	6/7/2016	18	7	23	46.242554	-124.648544	847.7	cam1_20160607180658.png
possible mat	6/7/2016	18	7	47	46.242567	-124.648556	847.4	cam1_20160607180658.png
possible tanner crab	6/7/2016	18	12	21	46.242434	-124.648767	848.1	cam1_20160607181035.png
at target 2, no interesting sites as of now	6/7/2016	18	14	42	46.242379	-124.648718	848.1	cam1_20160607181035.png
single fish, large and unidentified	6/7/2016	18	17	37	46.242389	-124.648751	848.4	cam1_20160607181033.png
the crab from earlier is a tanner crab, and the fish just now was a sablefish	6/7/2016	18	18	42	46.242389	-124.648739	848.5	cam1_20160607181035.png
moving on from target 2, going beyond target 3 to the south	6/7/2016	18	19	17	46.242406	-124.648747	848.4	cam1_20160607181035.png
great Argus shot of Herc with jellies	6/7/2016	18	22	2	46.242224	-124.648760	848.4	cam1_20160607182826.png
sablefish, flatfish, sea cucumbers, starfish	6/7/2016	18	24	7	46.242184	-124.648707	848.0	cam1_20160607182905.png
eel pout	6/7/2016	18	30	1	46.242009	-124.648723	848.0	cam1_20160607183658.png
heading back up towards target 4 to survey	6/7/2016	18	35	30	46.241909	-124.648699	847.8	cam1_20160607183658.png
SONAR picked up some signal that appears to possibly be bubbles. steering off course slightly to check it out before returning to the survey	6/7/2016	18	42	55	46.242314	-124.648955	848.5	
as approaching SONAR target, more carbon is observed and discoloration in sediments as well	6/7/2016	18	51	7	46.242198	-124.649325	847.8	cam1_20160607185316.png
SONAR site is a great find! lots of bubbling and huge microbial mats	6/7/2016	18	52	2	46.242236	-124.649403	847.7	cam1_20160607185321.png
gas hydrates !!	6/7/2016	18	52	15	46.242205	-124.649402	847.9	cam1_20160607185321.png
Clathrates (ice form of methane)	6/7/2016	18	52	51	46.242222	-124.649412	847.8	cam1_20160607185321.png
really stunning find of hydrates, methane seeps, microbial mats	6/7/2016	18	55	55	46.242234	-124.649433	849.4	cam1_20160607185331.png
gas bubbles coming up continuously in large volume	6/7/2016	18	56	29	46.242230	-124.649444	849.3	cam1_20160607185333.png
much more detection in the SONAR, more of these sites all around this area!	6/7/2016	18	57	21	46.242225	-124.649438	849.4	cam1_20160607185333.png
Large streams of consistent bubbles. Possible hydrates in bubbles and along sides of small overhang. White substance along overhang of crevice, possible bacteria? Surrounding sediment appears loose and dark in color in crevice, with associated white particles in further surrounding area. Red solo cup in right hand corner of screen grabs. Lots of associated fauna in	6/7/2016	19	4	29	46.242231	-124.649430	849.5	cam1_20160607190653.png

H1517 NA072 Astoria Canyon	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Zoom in at sample site indicates that white specks on sediment may be solid. Other suggestions include hydrate bubbles.	6/7/2016	19	7	52	46.242207	-124.649424	849.6	cam1_20160607190653.png
Bubbles stop occasionally - try probing w/ TProbe	6/7/2016	19	11	2	46.242242	-124.649414	849.6	cam1_20160607191352.png
Yellow creature? on side of crevice visible in full-wide screen. Possible worm (Scale worm?)	6/7/2016	19	12	5	46.242238	-124.649407	849.6	cam1_20160607191709.png
2.91C holding on surface near outer edge of crevice, 2.95C attempted at depth	6/7/2016	19	19	15	46.242231	-124.649404	849.9	cam1_20160607191709.png
Seep appears to have entirely shut off for a while, hopefully probing will regenerate the bubble stream	6/7/2016	19	20	26	46.242245	-124.649411	849.9	cam1_20160607192837.png
Probing regenerated bubbles	6/7/2016	19	21	19	46.242233	-124.649418	850.0	cam1_20160607192833.png
When probed inside crevice, large black clouds appear	6/7/2016	19	29	32	46.242242	-124.649391	849.9	cam1_20160607192837.png
Other associated fauna include jellyfish, gelatinous worms, along with rockfish and sea stars sitting on ledge above crevice	6/7/2016	19	30	20	46.242233	-124.649393	850.0	cam1_20160607193852.png
bubbles regenerated again. Moving in wobbly way indicating hydrate skin.	6/7/2016	19	42	47	46.242237	-124.649396	850.1	cam1_20160607194543.png
Lots of starfish on top side of crevice.	6/7/2016	19	44	60	46.242268	-124.649418	848.5	cam1_20160607194535.png
Worm tubes surrounding patches of white, possibly bacterial mats	6/7/2016	19	48	1	46.242284	-124.649418	849.7	cam1_20160607194535.png
Try for 2 cores on mat, 2 cores off mat	6/7/2016	19	51	48	46.242283	-124.649421	849.8	cam1_20160607195534.png
Zoom in on mat indicates presence of worms and tiny shells	6/7/2016	19	52	22	46.242286	-124.649428	849.8	cam1_20160607195537.png
Third core (first off mat) not enough sediment. Decided to shake out sediment and try again, pushing both cores a bit deeper	6/7/2016	20	11	24	46.242273	-124.649420	849.9	cam1_20160607201425.png
near off-mat sample site - Ambient	6/7/2016	20	28	32	46.242248	-124.649460	850.3	cam1_20160607202057.png
Temperatures near on mat sample	6/7/2016	20	31	40	46.242204	-124.649374	850.3	cam1_20160607203955.png
Rope	6/7/2016	20	37	25	46.242353	-124.649455	848.8	cam1_20160607203947.png
Zoom in on possible icy methane hydrate - many screen grabs	6/7/2016	20	42	41	46.242168	-124.649461	850.4	cam1_20160607204449.png
Dual set of push cores placed in simultaneously as to have as little disturbance as possible, So consecutive set of push cores (ex	6/7/2016	20	46	44	46.242278	-124.649250	849.6	cam1_20160607204653.png
while leaving first sample site, flatfish	6/7/2016	20	47	13	46.242324	-124.649361	850.0	cam1_20160607204653.png
Water very turbid due to sediment kick-up	6/7/2016	20	47	32	46.242334	-124.649361	849.9	cam1_20160607204653.png
Rope	6/7/2016	20	48	5	46.242375	-124.649384	850.6	cam1_20160607204744.png
shrimp and small fish	6/7/2016	20	49	44	46.242361	-124.649409	850.1	cam1_20160607204543.png
Waiting for sediment to settle in order to evaluate second site	6/7/2016	20	50	24	46.242372	-124.649405	849.5	cam1_20160607205750.png

H1517 NA072 Astoria Canyon	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
After sedimentation clears, it is noted that other trash (possible bag) is also near the rope previously noted during evaluation of second possible sample site	6/7/2016	20	52	33	46.242348	-124.649395	849.3	cam1_20160607205750.png
second ample site evaluation	6/7/2016	20	56	18	46.242390	-124.649436	849.3	cam1_20160607205638.png
Many sea stars	6/7/2016	20	59	19	46.242360	-124.649337	849.9	cam1_20160607205745.png
trawl line	6/7/2016	20	59	44	46.242324	-124.649382	850.2	cam1_20160607205745.png
Flatfish	6/7/2016	21	0	18	46.242337	-124.649601	850.0	cam1_20160607210623.png
Heading to site Deep Plume 1	6/7/2016	21	3	38	46.242274	-124.649501	849.7	cam1_20160607210615.png
During transit - red/orange sea stars, fish, rockfish, jellies, sun sea star	6/7/2016	21	6	36	46.242312	-124.649047	850.3	cam1_20160607210443.png
Zoom-in on sea star and clear sea cucumber - red orange sea stars also visible in frame	6/7/2016	21	7	30	46.242341	-124.649029	850.4	cam1_20160607210623.png
Water very turbid during transit	6/7/2016	21	8	0	46.242368	-124.649010	850.3	cam1_20160607210623.png
Hagfish	6/7/2016	21	10	60	46.242376	-124.648851	850.5	cam1_20160607211920.png
labeled Koala on nav computer	6/7/2016	21	16	60	46.242135	-124.649287	850.0	cam1_20160607211923.png
Lots of Holothurians	6/7/2016	21	17	20	46.242125	-124.649292	850.0	cam1_20160607211920.png
Zoom-in on deep-sea sole screen grabs	6/7/2016	21	19	59	46.242045	-124.649593	850.0	cam1_20160607211858.png
Still transiting - similar fauna	6/7/2016	21	22	31	46.241916	-124.649668	851.7	cam1_20160607212939.png
Eel Pout	6/7/2016	21	28	49	46.241654	-124.650138	852.9	cam1_20160607212939.png
debating plan	6/7/2016	21	29	14	46.242310	-124.649782	852.9	cam1_20160607212728.png
Zoom-in on Hagfish	6/7/2016	21	31	40	46.241498	-124.650304	852.9	cam1_20160607213059.png
Return to sample site to check if bubble stream has restarted before moving on to WP2	6/7/2016	21	32	5	46.241440	-124.650306	853.1	cam1_20160607213101.png
Circle of starfish	6/7/2016	21	33	33	46.241937	-124.649767	852.0	cam1_20160607213103.png
Back to sample site 1. New stream of bubbles started up above crevice	6/7/2016	21	39	28	46.242187	-124.649442	849.8	cam1_20160607213103.png
First GT (GT18) triggered prematurely. Trying second GT	6/7/2016	21	49	12	46.242186	-124.649442	850.4	cam1_20160607214645.png
In case GT18 did get any gas, recorded as NA072-027	6/7/2016	21	50	53	46.242212	-124.649459	850.3	cam1_20160607215946.png
Attempt GT16 at same site as NA072-027. No GT triggered. When filter is moved, the bubbles release from funnel, still possible some bubbles in tubing. Hydrates noted in funnel.	6/7/2016	22	5	6	46.242210	-124.649455	850.2	cam1_20160607220949.png
Near attempted GT sample site bubble stream. Ambient	6/7/2016	22	12	1	46.242224	-124.649429	850.6	cam1_20160607221255.png
Heading due East	6/7/2016	22	13	43	46.242216	-124.649366	849.3	cam1_20160607221939.png
Lots of fish - possibly sablefish?	6/7/2016	22	15	2	46.242319	-124.649151	847.6	cam1_20160607221540.png
Large jelly near screen on Herc	6/7/2016	22	20	33	46.242323	-124.648858	850.5	cam1_20160607222741.png
Similar fauna during transit.	6/7/2016	22	20	53	46.242303	-124.648844	850.3	cam1_20160607222741.png

H1517 NA072 Astoria Canyon	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Scanning SONAR for possible returns of interest to guide next site approach	6/7/2016	22	21	18	46.242294	-124.648848	851.3	cam1_20160607222332.png
Zoom in on large chunk of hydrate. Mostly black with some white	6/7/2016	22	22	38	46.242263	-124.648736	850.4	cam1_20160607222839.png
Large jellyfish floating toward Herc screen - screen grabs	6/7/2016	22	27	26	46.242304	-124.648519	850.3	cam1_20160607222830.png
Headed to WP2	6/7/2016	22	28	7	46.242286	-124.648452	849.8	cam1_20160607222741.png
Several large jellies floating by Herc cam	6/7/2016	22	30	52	46.242199	-124.648339	849.8	cam1_20160607223335.png
Note about WP@	6/7/2016	22	31	42	46.242184	-124.648360	849.7	cam1_20160607223931.png
WP2 is approximately 1800m away. Debate crawl along bottom or tow.	6/7/2016	22	32	21	46.242215	-124.648495	849.8	cam1_20160607223335.png
zoom-in on Sablefish	6/7/2016	22	41	11	46.241764	-124.649133	851.1	cam1_20160607224954.png
Zoom-in on tumbling holothurians with very small sea stars beneath them	6/7/2016	22	44	31	46.241741	-124.649111	851.2	cam1_20160607224931.png
Zoom-in on rockfish	6/7/2016	22	45	19	46.241732	-124.649096	851.4	cam1_20160607224946.png
Note that we are waiting for confirmation of dive time in order to set up plan of attack. Zooming in on interesting Bio while we wait	6/7/2016	22	46	10	46.241715	-124.649091	851.4	cam1_20160607224954.png
Zoom-in on sunstars, shrimp	6/7/2016	22	50	6	46.241622	-124.649065	851.2	cam1_20160607225050.png
Continuing over similar fauna	6/7/2016	23	14	44	46.241880	-124.647330	849.2	cam2_20160607231510.png
sedimented seafloor with many seastars and holothurians, some groundfish	6/7/2016	23	14	51	46.241882	-124.647332	849.2	cam2_20160607231510.png
Neat view of Hercules with scattered Poralia jellies in Argus cam	6/7/2016	23	17	44	46.241833	-124.647067	848.7	cam2_20160607231510.png
large white seastar	6/7/2016	23	20	33	46.241901	-124.646780	848.3	cam1_20160607232104.png
Scattered Poralia jellies	6/7/2016	23	23	1	46.241857	-124.646691	848.3	cam1_20160607232304.png
lots of large jellyfish	6/7/2016	23	23	7	46.241863	-124.646688	848.2	cam1_20160607232304.png
cusk-eel?	6/7/2016	23	24	57	46.241861	-124.646545	848.1	cam1_20160607232304.png
Zoom in on seastars and shrimp surrounding kelp/algal mat?	6/7/2016	23	26	11	46.241839	-124.646535	848.0	cam1_20160607232304.png
group of seastars with yellow filamentous/kelp? and shrimp	6/7/2016	23	26	23	46.241860	-124.646499	847.5	cam1_20160607232304.png
Sea cucumbers and seastars seem to be thinning out slightly	6/7/2016	23	33	44	46.241843	-124.645586	846.1	
Occasional hagfish	6/7/2016	23	35	15	46.241827	-124.645442	845.9	
sea pen	6/7/2016	23	35	57	46.241808	-124.645360	845.6	
crab amongst lots of starfish and holothurians	6/7/2016	23	40	6	46.241811	-124.644963	845.6	
2 Sun stars	6/7/2016	23	40	32	46.241815	-124.644933	845.5	
Heading south	6/7/2016	23	41	4	46.241974	-124.644928	845.4	
flat fish (port); sun star (starboard)	6/7/2016	23	42	4	46.241760	-124.644847	845.5	
moving 50 m south to lateral west along the canyon floor axis	6/7/2016	23	44	7	46.241463	-124.644694	845.2	

H1517 NA072 Astoria Canyon	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Ling cod	6/8/2016	0	2	44	46.241246	-124.646451	846.5	
ling cod	6/8/2016	0	5	28	46.241335	-124.646784	847.6	cam1_20160608000648.png
Density of starfish has increased	6/8/2016	0	7	5	46.241134	-124.647124	848.1	
Curled fish floating in water column	6/8/2016	0	10	44	46.241264	-124.647315	849.0	
flat fish	6/8/2016	0	11	16	46.241255	-124.647366	848.2	
Density of sea stars decreasing (outside of clusters around fallen jellies)	6/8/2016	0	17	15	46.241336	-124.648380	850.5	
crab	6/8/2016	0	26	25	46.241347	-124.649937	852.7	cam1_20160608002640.png
Holding ship position to look at rock	6/8/2016	0	29	6	46.241317	-124.650326	853.8	cam1_20160608002635.png
Rock with hagfish, anemones, sea stars, bivalves?	6/8/2016	0	29	38	46.241302	-124.650312	853.7	cam1_20160608002635.png
Clams/brachiopods on rocks	6/8/2016	0	30	4	46.241292	-124.650277	853.5	cam1_20160608003006.png
Continuing on	6/8/2016	0	30	38	46.241286	-124.650284	853.8	cam1_20160608003006.png
Sea cucumbers all aligned in same direction - possibly due to current?	6/8/2016	0	39	6	46.241377	-124.651477	854.9	cam1_20160608003012.png
Sea Whip	6/8/2016	0	42	17	46.241342	-124.652221	856.0	cam1_20160608004749.png
Significant along canyon current (westward), approximately .2-.4 kts, causing sea cucumbers to align east-west along the axis.	6/8/2016	0	44	47	46.241342	-124.652579	856.6	cam1_20160608004749.png
Crabs	6/8/2016	0	45	15	46.241372	-124.652795	856.8	cam1_20160608004749.png
Similar fauna throughout transit	6/8/2016	0	48	16	46.241287	-124.653377	857.9	cam1_20160608004749.png
Sablefish eating something	6/8/2016	0	54	25	46.241263	-124.654140	859.8	cam2_20160608005007.png
Very small sea stars, lower density than previously in dive	6/8/2016	0	56	52	46.241271	-124.654482	860.3	cam2_20160608005007.png
sablefish	6/8/2016	0	57	52	46.241176	-124.654654	860.8	cam2_20160608005007.png
crab	6/8/2016	0	58	52	46.241227	-124.654925	861.4	cam2_20160608005007.png
Several sablefish	6/8/2016	1	1	13	46.241303	-124.655435	863.3	cam1_20160608010847.png
Sea cucumbers are all lined up into the current	6/8/2016	1	3	27	46.241253	-124.655906	864.6	cam1_20160608010327.png
Kelp	6/8/2016	1	3	35	46.241252	-124.655906	864.6	cam1_20160608010327.png
crab, scattered sun stars	6/8/2016	1	4	34	46.241230	-124.656116	864.9	cam1_20160608010847.png
Lizardfish?	6/8/2016	1	8	45	46.241181	-124.656753	865.9	cam1_20160608010327.png
Zoom in on sun star	6/8/2016	1	15	14	46.241251	-124.657873	867.4	cam1_20160608011301.png
Flat fish	6/8/2016	1	17	35	46.241261	-124.658327	868.2	cam1_20160608011529.png
Few sea stars	6/8/2016	1	18	30	46.241230	-124.658501	868.4	cam1_20160608011529.png
Many more (scattered) sun stars than before	6/8/2016	1	18	57	46.241230	-124.658603	868.7	cam1_20160608011529.png
large crab	6/8/2016	1	21	25	46.241210	-124.659100	869.3	cam1_20160608012234.png
sea whip, flat fish	6/8/2016	1	23	44	46.241203	-124.659543	869.9	cam1_20160608012234.png
Density of sea cucumbers is decreasing	6/8/2016	1	29	6	46.241306	-124.660380	870.6	cam1_20160608012234.png

H1517 NA072 Astoria Canyon	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
A few more sea stars, far fewer sea cucumbers	6/8/2016	1	31	17	46.241303	-124.660467	870.8	cam1_20160608013330.png
Cnidarian	6/8/2016	1	32	2	46.241309	-124.660589	871.2	cam1_20160608013330.png
lizardfish	6/8/2016	1	33	24	46.241306	-124.660655	871.3	cam1_20160608013325.png
Holding position to look at line in sediment	6/8/2016	1	36	46	46.241285	-124.661068	871.7	cam1_20160608013328.png
Line at heading 315.	6/8/2016	1	37	26	46.241245	-124.661076	872.0	cam1_20160608013330.png
"Lizardfish" from earlier may be eelpouts.	6/8/2016	1	37	37	46.241246	-124.661077	871.8	cam1_20160608013330.png
Target dropped in Hypack for "Line in Sand" for 2-3cm straight line bearing 313, looks almost like a buried cable	6/8/2016	1	40	15	46.241391	-124.661268	872.0	cam2_20160608014942.png
Holothurians and small sun stars	6/8/2016	1	41	28	46.241420	-124.661353	872.1	cam2_20160608014942.png
Shallow, straight depression on the seafloor, approx 2-3 cm across, apparently from something dragged along the seafloor. Tending 315 degrees true.	6/8/2016	1	42	1	46.241396	-124.661357	872.0	cam2_20160608014942.png
tanner crab	6/8/2016	1	44	47	46.241393	-124.661400	872.1	cam2_20160608014942.png
zoom in on sole	6/8/2016	1	48	25	46.241394	-124.661466	872.4	cam1_20160608014812.png
Kelp floating in current	6/8/2016	1	51	19	46.241382	-124.661852	872.8	ccam1_20160608015618.png
Continuing to transit west	6/8/2016	1	53	49	46.241334	-124.662253	873.7	cam1_20160608015618.png
Very few sea cucumbers. Occasional sun stars, thornyheads, hagfish. Several sablefish. Remaining sea stars are very small.	6/8/2016	1	55	2	46.241310	-124.662523	874.0	cam1_20160608015618.png
Passed over sea pen	6/8/2016	2	3	5	46.241297	-124.664180	876.2	
Rockfish	6/8/2016	2	4	58	46.241346	-124.664549	876.8	
sole	6/8/2016	2	7	6	46.241069	-124.665103	877.3	
Beginning to head south towards canyon wall	6/8/2016	2	8	57	46.241348	-124.665139	878.4	
rope	6/8/2016	2	10	18	46.241081	-124.665436	878.7	cam1_20160608021044.png
CNI	6/8/2016	2	12	39	46.241257	-124.665514	878.6	cam1_20160608021057.png
Trawling scars	6/8/2016	2	15	14	46.240941	-124.665423	878.6	cam1_20160608021225.png
Brisingid sea star	6/8/2016	2	19	52	46.240336	-124.665741	878.9	cam1_20160608021225.png
CNI	6/8/2016	2	24	43	46.240225	-124.665635	879.2	
Just passed over another line in the sediment	6/8/2016	2	26	2	46.240083	-124.665660	879.8	
Still continuing south	6/8/2016	2	29	60	46.239776	-124.665528	879.0	
Brisingid star	6/8/2016	2	31	48	46.239679	-124.665553	879.1	
crab	6/8/2016	2	33	9	46.239493	-124.665758	879.0	
Sea cucumbers are still mostly lined up, but beginning to curl up out of the direction of the current	6/8/2016	2	36	38	46.239229	-124.665566	878.8	
CNI	6/8/2016	2	38	56	46.239165	-124.665623	878.8	
hagfish	6/8/2016	2	40	16	46.239055	-124.665774	879.1	cam1_20160608024252.png

H1517 NA072 Astoria Canyon	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Slowly increasing Hercules speed towards 0.5 knots, ship speed to 0.6 knots	6/8/2016	2	44	45	46.238787	-124.665577	878.5	cam1_20160608024252.png
Mostly scattered sea cucumbers, no longer lined up with current; some eelpouts	6/8/2016	2	52	4	46.238032	-124.665629	878.3	cam1_20160608025705.png
Another line in sediment	6/8/2016	2	52	16	46.237961	-124.665631	878.2	cam1_20160608025705.png
crab, another line in sediment	6/8/2016	2	54	5	46.237654	-124.665708	877.4	cam1_20160608025705.png
Puffball anemone	6/8/2016	2	54	31	46.237543	-124.665707	877.1	cam1_20160608025705.png
Sole	6/8/2016	2	54	44	46.237516	-124.665713	876.8	cam1_20160608025705.png
Fields of holothurians	6/8/2016	2	57	5	46.237299	-124.665636	875.7	cam1_20160608025705.png
sunstars, seastars, and tons of sea cucumbers	6/8/2016	3	0	48	46.236523	-124.665610	873.8	cam1_20160608030644.png
northern sunstars and orange sunstars	6/8/2016	3	2	37	46.236134	-124.665573	873.2	cam1_20160608030644.png
thorny-heads, similar to rockfish	6/8/2016	3	3	12	46.236013	-124.665531	872.7	cam1_20160608030644.png
eel pout and crabs (maybe tanner crabs)	6/8/2016	3	4	8	46.235904	-124.665556	872.5	cam1_20160608030644.png
very tranquil region, sandy region. trash and sponge spotted	6/8/2016	3	5	29	46.235691	-124.665583	871.9	cam1_20160608030638.png
Proceeding to wpt 2, then planning to slow down just before. going up slope now seeing several tanner crabs, jellies, sea cucumbers, sea stars, eel pouts, hagfish, and other biology	6/8/2016	3	8	11	46.235200	-124.665727	869.2	cam1_20160608030638.png
deep sea sole	6/8/2016	3	11	14	46.234985	-124.665663	867.0	cam1_20160608031257.png
coming upslope, gaining elevation	6/8/2016	3	13	22	46.234747	-124.665701	866.1	cam1_20160608031258.png
small microbial mat	6/8/2016	3	14	14	46.234646	-124.665704	865.0	cam1_20160608031333.png
hagfish	6/8/2016	3	17	25	46.234210	-124.665758	858.0	cam1_20160608031258.png
again many sea stars and sea cucumbers - very rich environment, lots of carbon down here transferred from the rivers. very dynamic place	6/8/2016	3	20	24	46.233764	-124.665868	851.6	cam1_20160608032837.png
thorny heads	6/8/2016	3	25	12	46.232900	-124.665601	849.4	cam1_20160608032837.png
many jellies in water column but few near the bottom	6/8/2016	3	26	29	46.232529	-124.665514	846.9	cam1_20160608032837.png
marine debris	6/8/2016	3	29	22	46.232128	-124.665514	838.3	cam1_20160608032701.png
more flat fish and soles	6/8/2016	3	43	5	46.231210	-124.665728	821.3	cam1_20160608034253.png
sea stars appear to be on or feeding near a microbial mat	6/8/2016	3	49	15	46.230693	-124.665840	810.7	cam1_20160608034253.png
at the base of the wall now	6/8/2016	3	52	5	46.230801	-124.665385	813.4	cam1_20160608035324.png
Umbellula (a cnidarian that looks like a palm tree)	6/8/2016	3	54	49	46.230750	-124.665384	810.0	cam1_20160608035324.png
smack of jellies in Argus	6/8/2016	3	56	56	46.230654	-124.665338	808.0	cam1_20160608035324.png
tons of sea cucumbers	6/8/2016	3	58	33	46.230544	-124.665382	804.3	cam1_20160608035321.png

H1517 NA072 Astoria Canyon	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
biomass of sea cucumbers appears to be greater and the animals possibly appear to be larger	6/8/2016	4	1	1	46.230439	-124.665399	799.6	cam1_20160608040024.png
holothurian genus is - Pannychia	6/8/2016	4	8	55	46.229779	-124.665375	780.1	cam2_20160608040106.png
burrowing sea cucumber	6/8/2016	4	19	56	46.229526	-124.665886	768.9	cam1_20160608041224.png
looking around now for possible signs of seepage	6/8/2016	4	21	21	46.229497	-124.665870	768.7	cam1_20160608042645.png
on a mound of sediment, near a small erosional channel to the east	6/8/2016	4	22	0	46.229490	-124.665811	767.7	,cam1_20160608042651.png
agglutinated foraminifera	6/8/2016	4	22	19	46.229494	-124.665811	767.1	,cam1_20160608042651.png
sablefish	6/8/2016	4	24	26	46.229513	-124.665836	766.8	cam1_20160608042645.png
octopus	6/8/2016	4	26	35	46.229415	-124.665847	763.9	cam1_20160608042622.png
giant pacific octopus	6/8/2016	4	28	57	46.229390	-124.665786	763.1	cam1_20160608042622.png
many octopus	6/8/2016	4	33	45	46.229302	-124.665831	756.1	cam1_20160608043441.png
many octopus	6/8/2016	4	35	2	46.229307	-124.665857	756.3	cam1_20160608043504.png
glass sponge and squat lobsters	6/8/2016	4	37	42	46.229260	-124.665907	752.5	cam1_20160608043441.png
looks like the red rings may be gill structures for Serpulids - steve	6/8/2016	4	40	7	46.229240	-124.665920	748.5	cam1_20160608044706.png
moving towards a ravine	6/8/2016	4	45	23	46.229088	-124.666057	744.3	cam1_20160608044725.png
another octopus, perhaps the 4th in this area	6/8/2016	4	47	37	46.228916	-124.666097	742.1	cam1_20160608044657.png
brittle star on a sea pen	6/8/2016	4	50	46	46.228953	-124.666058	740.0	cam1_20160608045026.png
brittle star on a sea whip**	6/8/2016	4	51	21	46.228954	-124.666210	739.9	cam1_20160608045036.png
snake star	6/8/2016	4	53	50	46.229001	-124.666289	739.9	cam1_20160608045038.png
far less sea cucumber now that we are on the rim and moving up the canyon wall.	6/8/2016	4	54	52	46.229032	-124.666329	740.5	cam1_20160608045038.png
moving upward higher up the rim	6/8/2016	4	57	41	46.228997	-124.666345	739.0	cam1_20160608045038.png
maybe the overhang contains some octopus eggs	6/8/2016	4	59	32	46.229013	-124.666363	739.6	cam1_20160608045038.png
this rocky little overhang is right near some darker colored sediment, possibly a clue to nearby seepage	6/8/2016	4	59	59	46.229020	-124.666391	739.3	cam1_20160608045038.png
black dark solid crust, unknown	6/8/2016	5	3	34	46.228999	-124.666431	739.8	cam1_20160608050231.png
another octopus, so many	6/8/2016	5	5	53	46.229000	-124.666418	737.7	cam1_20160608050308.png
high abundance of brittle stars, very few sea cucumbers compared to before. overall high abundance of life as we progress up the rim	6/8/2016	5	8	8	46.228929	-124.666416	732.7	cam1_20160608050308.png
many thornyheads and eel pouts and sablefish	6/8/2016	5	8	24	46.228930	-124.666421	731.9	cam1_20160608050308.png
very pink, Anthomastus mushroom coral	6/8/2016	5	11	38	46.228922	-124.666434	731.6	cam1_20160608051314.png
planning to capture a Niskin sample of the Anthomastus mushroom coral	6/8/2016	5	11	59	46.228919	-124.666408	731.6	cam1_20160608051314.png

H1517 NA072 Astoria Canyon	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
another rock and Anthomastus mushroom coral	6/8/2016	5	15	42	46.228864	-124.666248	730.4	cam1_20160608051316.png
more octopus	6/8/2016	5	18	27	46.228797	-124.666425	724.8	cam1_20160608051314.png
octopus X3 !	6/8/2016	5	21	54	46.228760	-124.666580	721.6	cam1_20160608052255.png
some layering	6/8/2016	5	24	41	46.228745	-124.666647	721.4	,cam1_20160608052303.png
another octopus	6/8/2016	5	26	0	46.228772	-124.666595	721.8	,cam1_20160608052303.png
friable layering of the substrate in this area provides nice homes from organisms to burrow in the cracks	6/8/2016	5	26	32	46.228783	-124.666594	722.0	,cam1_20160608052303.png
2 more octopus	6/8/2016	5	27	39	46.228777	-124.666601	721.8	cam1_20160608052255.png
high abundance of life again, lots of brittle stars and seastars	6/8/2016	5	28	35	46.228777	-124.666605	722.3	,cam1_20160608052303.png
again, progressing on the wall of the south side of the canyon, lots of sea stars and life here	6/8/2016	5	31	28	46.228741	-124.666518	717.9	cam1_20160608053537.png
eel pout, sablefish, sole, shrimp, tons of sea stars and brittle stars	6/8/2016	5	32	25	46.228698	-124.666589	716.1	cam1_20160608053742.png
sea cucumbers on rock	6/8/2016	5	35	23	46.228635	-124.666652	714.0	cam1_20160608053537.png
chitin on rock is a mollusk	6/8/2016	5	36	19	46.228645	-124.666650	714.0	cam1_20160608053626.png
clams as well in this area	6/8/2016	5	36	41	46.228659	-124.666641	714.0	cam1_20160608053626.png
octocoral swiftia simplex, pink whip-like	6/8/2016	5	38	41	46.228682	-124.666647	714.3	cam1_20160608053527.png
possibly a white microbial mat	6/8/2016	5	39	23	46.228671	-124.666639	713.9	cam1_20160608053626.png
appear to be more crumbly rocks in this area, still very abundant sea stars and brittle stars, some flat fish as well, tanner crabs	6/8/2016	5	42	2	46.228752	-124.666946	713.1	cam1_20160608054640.png
a few minutes ago a strange exposed white line appeared in the sediment, possibly exposed carbonate	6/8/2016	5	44	21	46.228809	-124.667150	713.3	cam1_20160608054644.png
rock covered in life including brittle stars and a bright purple anemone	6/8/2016	5	47	47	46.228704	-124.667252	716.3	cam1_20160608054640.png
many more cobbles in this area, perhaps a different kind of rock from upslope	6/8/2016	5	49	34	46.228786	-124.667287	715.8	cam1_20160608054640.png
again lots of cobbles	6/8/2016	5	52	5	46.228773	-124.667437	711.5	cam1_20160608055455.png
another octopus	6/8/2016	5	52	45	46.228697	-124.667419	709.2	cam1_20160608055455.png
starting to see some fragile pink urchins	6/8/2016	5	53	2	46.228688	-124.667337	709.2	cam1_20160608055339.png
again, a lot of layering in the substrate	6/8/2016	5	53	31	46.228635	-124.667232	707.8	cam1_20160608055339.png
another octopus	6/8/2016	5	54	7	46.228645	-124.667144	708.2	cam1_20160608055358.png
crinoids	6/8/2016	5	54	13	46.228648	-124.667144	707.9	cam1_20160608055358.png
this darker cobble probably transported downslope through gully from upslope	6/8/2016	5	55	41	46.228624	-124.667035	707.0	cam1_20160608055455.png
sea cucumber and orange anemone	6/8/2016	5	57	11	46.228587	-124.666910	708.2	,cam1_20160608055459.png
sablefish	6/8/2016	5	58	11	46.228597	-124.666754	707.6	,cam1_20160608055459.png

H1517 NA072 Astoria Canyon	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
passing over wpts 3, 4, and 5 - moving south, doing a zig zag pattern to get there	6/8/2016	5	59	20	46.228531	-124.666612	704.4	cam1_20160608055347.png
two octopus, anemone (same purple one), sea stars	6/8/2016	6	0	9	46.228534	-124.666600	705.8	cam1_20160608060520.png
another octopus	6/8/2016	6	2	48	46.228430	-124.666720	695.5	cam1_20160608060520.png
Liponema brevicornis (pom pom anemone) possibly, also hagfish spotted	6/8/2016	6	4	27	46.228479	-124.666952	696.6	cam1_20160608060502.png
interesting spire, perhaps a leftover from a slide, or a chimney of some kind (indentation and layering)	6/8/2016	6	5	24	46.228440	-124.666721	696.3	cam1_20160608060437.png
spire is covered in sediments and life	6/8/2016	6	5	57	46.228451	-124.666911	696.3	cam1_20160608060437.png
last ID of possible Liponema brevicornis is incorrect (noted by steve)	6/8/2016	6	6	54	46.228459	-124.666971	696.9	cam1_20160608060520.png
tapping chimney structure, possibly an old carbonate plumbing system from below	6/8/2016	6	8	2	46.228465	-124.666994	697.5	cam1_20160608060502.png
another octopus	6/8/2016	6	15	52	46.228411	-124.667089	694.0	cam1_20160608061509.png
another octopus	6/8/2016	6	18	4	46.228338	-124.666751	687.2	cam1_20160608061513.png
overhanging rocks sticking out of the wall	6/8/2016	6	18	22	46.228346	-124.666758	686.9	cam1_20160608061513.png
a big gully in the downslope	6/8/2016	6	18	43	46.228347	-124.666772	686.8	cam1_20160608061513.png
trying to move in the zig-zag pattern is more challenging than expected in order to get to the next target that is SE of our location.	6/8/2016	6	22	23	46.228255	-124.666588	682.9	cam1_20160608062357.png
again a high abundance of brittle stars and sea stars	6/8/2016	6	28	51	46.228106	-124.666071	674.0	cam1_20160608062122.png
layering in the rocks, some animals line up along the layers, more mushroom corals as well	6/8/2016	6	29	60	46.228075	-124.666331	669.0	cam1_20160608062122.png
higher population of crinoids	6/8/2016	6	30	48	46.227982	-124.666484	666.1	cam1_20160608063702.png
strong current along this canyon	6/8/2016	6	35	5	46.227932	-124.666963	661.8	cam1_20160608063702.png
quite steep here	6/8/2016	6	35	15	46.227914	-124.666971	661.8	cam1_20160608063702.png
more mushroom corals, planning to do another Niskin since the abundance is greater	6/8/2016	6	37	41	46.227920	-124.666919	657.0	cam1_20160608063447.png
deep sediment slide possibly recent	6/8/2016	6	42	17	46.227900	-124.667027	657.2	cam1_20160608064306.png
slide possibly from Nisqually earthquake 2001	6/8/2016	6	44	30	46.227854	-124.666927	653.3	cam1_20160608064308.png
sponges in the headwall possibly this area was exposed from the Nisqually earthquake	6/8/2016	6	44	36	46.227859	-124.666918	652.8	cam1_20160608064308.png
Nisqually earthquake from 2001	6/8/2016	6	44	58	46.227807	-124.666889	652.1	cam1_20160608064308.png
fighting a current as we try to get up the wall	6/8/2016	6	45	29	46.227788	-124.666880	652.8	cam1_20160608064306.png
thorny head or rockfish species	6/8/2016	6	45	52	46.227775	-124.666853	651.9	cam1_20160608064306.png
SONAR returns are maybe a result of the strong current	6/8/2016	6	47	32	46.227759	-124.666865	652.4	cam1_20160608064308.png
squid	6/8/2016	6	51	38	46.227597	-124.666689	650.1	cam1_20160608065253.png

H1517 NA072 Astoria Canyon	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
prepping for a Niskin for eDNA of this paragorgia coral	6/8/2016	6	51	54	46.227597	-124.666692	650.0	cam1_20160608065253.png
strong current nearing top of steep wall. no outcrop here	6/8/2016	6	56	51	46.227589	-124.666683	650.2	cam1_20160608065257.png
maybe more sea pens (or sea whips)	6/8/2016	6	57	40	46.227551	-124.666680	650.2	cam1_20160608065253.png
Large colony of swiftia. Orangish in color	6/8/2016	7	3	40	46.227276	-124.666773	647.1	cam1_20160608070229.png
Mushroom coral, swiftia, flatfish, thornyhead	6/8/2016	7	5	58	46.227216	-124.666828	644.3	cam1_20160608070229.png
Cobbly substrate.	6/8/2016	7	6	18	46.227200	-124.666802	643.4	cam1_20160608070229.png
Octopus, Crinoids	6/8/2016	7	7	44	46.227143	-124.666694	639.6	cam1_20160608070229.png
bacterial mat. bivalve shells	6/8/2016	7	12	2	46.226992	-124.666979	631.2	cam1_20160608071628.png
Zoom-in on bacterial mat. Presence of bivalve shells, a snail, and thornyhead nearby	6/8/2016	7	12	26	46.227023	-124.666977	631.3	cam1_20160608071628.png
Black material towards right of mat	6/8/2016	7	13	3	46.227027	-124.666967	631.1	cam1_20160608071407.png
bacterial mat is white. small dark sediment patch nearby	6/8/2016	7	13	22	46.227034	-124.666963	631.1	cam1_20160608071407.png
clams	6/8/2016	7	14	10	46.227049	-124.666964	631.4	cam1_20160608071407.png
Black material near mat - bivalves living within, at least some live	6/8/2016	7	14	35	46.227057	-124.666967	631.5	cam1_20160608071407.png
bacterial mats and black sediment	6/8/2016	7	15	32	46.226963	-124.666956	629.4	cam1_20160608071628.png
sea pen	6/8/2016	7	15	36	46.226954	-124.666948	628.7	cam1_20160608071628.png
Sea Whip/Pen	6/8/2016	7	15	40	46.226940	-124.666930	628.3	cam1_20160608071628.png
second patch of bac mat	6/8/2016	7	16	12	46.226974	-124.666920	630.3	cam1_20160608071407.png
second mat has many clams	6/8/2016	7	16	56	46.227055	-124.666904	630.7	cam1_20160608071407.png
Can see living clams (pink siphons visible)	6/8/2016	7	16	59	46.227055	-124.666891	630.8	cam1_20160608071407.png
another patch of bacterial mat	6/8/2016	7	16	60	46.227055	-124.666891	630.8	cam1_20160608071407.png
Zoom-in on bacterial mat, again near pile of clams	6/8/2016	7	18	51	46.227065	-124.666869	629.2	cam1_20160608071628.png
white bacterial mat	6/8/2016	7	19	43	46.227035	-124.666859	630.1	cam1_20160608071315.png
Lots of white splotches near mats, possible shell material?	6/8/2016	7	22	49	46.227058	-124.666947	631.5	,cam1_20160608072657.png
Crabs	6/8/2016	7	26	37	46.226943	-124.667166	633.8	cam1_20160608072652.png
Zoom-in on crab missing leg	6/8/2016	7	27	40	46.226825	-124.667025	633.5	cam1_20160608072655.png
Zoom-in on burrowing anemones and brittle stars	6/8/2016	7	31	1	46.226850	-124.667307	634.2	cam1_20160608073955.png
baby deep-sea sole	6/8/2016	7	32	48	46.226942	-124.667075	632.8	cam1_20160608073631.png
Zoom-in on baby deep-sea sole. Also in frame	6/8/2016	7	32	57	46.226940	-124.667073	632.7	cam1_20160608073631.png
Large orange sea star	6/8/2016	7	34	28	46.226983	-124.666928	630.6	cam1_20160608073952.png
Comb jelly?	6/8/2016	7	36	16	46.226970	-124.666858	629.2	cam1_20160608073952.png
sea pen	6/8/2016	7	36	50	46.226949	-124.666849	628.9	cam1_20160608073952.png
hagfish	6/8/2016	7	37	3	46.226950	-124.666721	628.9	cam1_20160608073955.png
Anthomastus	6/8/2016	7	37	45	46.226965	-124.666627	628.0	cam1_20160608073955.png

H1517 NA072 Astoria Canyon	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Cool Argus shot showing contours on wall	6/8/2016	7	37	49	46.226968	-124.666627	627.9	cam1_20160608073955.png
Cool "leggy" jelly on Argus cam	6/8/2016	7	39	42	46.226885	-124.666419	628.1	cam1_20160608073416.png
Zoom-in on octopus (GPO)	6/8/2016	7	40	31	46.226905	-124.666340	628.0	cam1_20160608074513.png
sea pens	6/8/2016	7	40	57	46.226876	-124.666296	629.5	cam1_20160608074513.png
Field of Pom-pom anemone	6/8/2016	7	43	34	46.226889	-124.665958	631.7	cam1_20160608074520.png
Large algae stalk	6/8/2016	7	44	23	46.226907	-124.665976	632.5	cam1_20160608074520.png
Liponema brevicornis	6/8/2016	7	44	25	46.226907	-124.665989	632.4	cam1_20160608074520.png
Zoom-in on large oxygen tank	6/8/2016	7	46	3	46.226918	-124.665898	634.5	cam1_20160608074520.png
compressed gas cylinder	6/8/2016	7	46	10	46.226915	-124.665896	634.5	cam1_20160608074520.png
a tank of compressed oxygen (label only partly readable)	6/8/2016	7	46	16	46.226911	-124.665896	634.6	cam1_20160608074520.png
Zoom-in on bubble gum coral and pom-pom anemone	6/8/2016	7	47	32	46.226939	-124.665872	635.2	cam1_20160608074212.png
paragorgia sp.	6/8/2016	7	47	39	46.226947	-124.665861	635.2	cam1_20160608074212.png
Zoom-in on 2 color morphs of paragorgia	6/8/2016	7	50	56	46.226947	-124.665793	635.7	cam1_20160608075536.png
paragorgia and swiftia???	6/8/2016	7	51	54	46.227025	-124.665633	636.3	cam1_20160608075541.png
Many deep-sea sole	6/8/2016	7	52	16	46.227024	-124.665558	634.6	cam1_20160608075538.png
sea pen	6/8/2016	7	52	17	46.227025	-124.665557	634.5	cam1_20160608075538.png
Steadily crossing scattered mushroom corals	6/8/2016	7	54	54	46.226949	-124.665424	620.9	cam1_20160608075538.png
Zoom-in on mushroom coral - also in frame	6/8/2016	7	56	17	46.227037	-124.665377	620.1	cam1_20160608075541.png
octopod	6/8/2016	7	57	13	46.227027	-124.665170	618.3	cam1_20160608075530.png
Zoom-in on GPO	6/8/2016	7	58	3	46.226849	-124.665068	617.4	cam1_20160608075541.png
Zoom-in on sponge in cave - (VERY SCARY), also in frame	6/8/2016	8	1	57	46.227004	-124.665110	614.7	cam1_20160608080106.png
Sablefish, deep-sea sole, thornyhead	6/8/2016	8	4	37	46.227113	-124.664479	623.3	cam1_20160608080111.png
thornyhead	6/8/2016	8	16	25	46.226453	-124.664608	596.8	cam1_20160608081614.png
Frequent	6/8/2016	8	22	41	46.226092	-124.664843	597.2	
tentaculate ctenophore	6/8/2016	8	31	60	46.225699	-124.664879	598.9	
Overall much lower abundance and diversity of life during transit	6/8/2016	8	35	32	46.225611	-124.664826	594.8	
Pin cushion star	6/8/2016	8	45	19	46.225726	-124.664240	583.7	cam1_20160608084456.png
Similar fauna as previously described - LOTS of crinoids	6/8/2016	8	57	16	46.226165	-124.663815	582.9	
still continuing upslope. communities are primarily crinoids, rockfishes, and occasional sea pens. hagfish	6/8/2016	9	0	44	46.226231	-124.663554	586.3	,cam1_20160608090428.png
Zoom-in on "Waving" crinoid - likely feeding	6/8/2016	9	4	58	46.226050	-124.663620	581.8	cam1_20160608090421.png
sea pen	6/8/2016	9	6	29	46.225948	-124.663574	578.8	cam1_20160608090425.png
large net	6/8/2016	9	7	4	46.225808	-124.663636	577.7	cam1_20160608090425.png
Large net - possible crab pot	6/8/2016	9	7	15	46.225809	-124.663642	577.0	cam1_20160608090425.png

H1517 NA072 Astoria Canyon	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
octopus	6/8/2016	9	18	7	46.225175	-124.663529	575.3	
Difficult to detect bubble plumes from backscatter due to topography changes	6/8/2016	9	20	18	46.225293	-124.663498	573.7	
still crinoids.....	6/8/2016	9	21	0	46.225326	-124.663393	573.3	
occasional flatfish and sablefish	6/8/2016	9	21	16	46.225319	-124.663253	572.4	
octopus	6/8/2016	9	24	41	46.225153	-124.662972	570.1	
whelk shells and brachiopods	6/8/2016	9	33	32	46.224760	-124.662563	563.4	cam1_20160608093839.png
Zoom-in on white shell fragments	6/8/2016	9	33	35	46.224760	-124.662561	563.4	cam1_20160608093839.png
Overall very similar, sparse fauna	6/8/2016	9	33	52	46.224774	-124.662556	563.6	cam1_20160608093839.png
Zoom-in on possible mat - determined to be bioturbation	6/8/2016	9	37	49	46.224654	-124.662243	559.4	cam1_20160608093840.png
Large, white sunstar	6/8/2016	9	39	14	46.224588	-124.661966	558.7	cam1_20160608093839.png
Previously noted white sunstar determined to be Rathbuaster californicus from ONC Marine Field Guide	6/8/2016	9	42	14	46.224506	-124.661686	556.5	
umbellula sp. octocoral	6/8/2016	9	51	2	46.224289	-124.661135	549.7	
Very sandy sediment - even less biomass	6/8/2016	10	3	4	46.223960	-124.659732	533.0	
cusk eel	6/8/2016	10	4	19	46.223939	-124.659592	529.9	
Sandy/muddy bottom since the past two hours survey	6/8/2016	10	5	17	46.223951	-124.659545	529.2	
hagfish	6/8/2016	10	9	14	46.223757	-124.659129	522.8	
Large group of mushroom coral	6/8/2016	10	10	45	46.223612	-124.658941	519.9	cam1_20160608101109.png
zoanthids on crab	6/8/2016	10	11	58	46.223601	-124.659022	520.3	cam1_20160608101109.png
Crab with zooanthids growing on it	6/8/2016	10	12	7	46.223598	-124.659022	519.9	cam1_20160608101617.png
echinoids	6/8/2016	10	15	11	46.223553	-124.658823	516.7	cam1_20160608101548.png
octopus in cave	6/8/2016	10	16	43	46.223594	-124.658754	515.0	cam1_20160608101102.png
Zoom-in on outcrop - octopus inside (GPO)	6/8/2016	10	17	2	46.223586	-124.658753	514.1	cam1_20160608101617.png
Getting out of the sediments. Passed an outcrop. Possibly carbonate.	6/8/2016	10	17	32	46.223514	-124.658690	513.0	cam1_20160608101617.png
High abundance of white sea stars	6/8/2016	10	18	35	46.223357	-124.658348	508.9	cam1_20160608101617.png
Previous mention to "groups of mushroom coral" may in fact be pink urchins	6/8/2016	10	21	36	46.223389	-124.658322	509.0	cam1_20160608102323.png
Longnose Skate	6/8/2016	10	23	38	46.223284	-124.658186	506.3	cam1_20160608102323.png
still having harder substrate	6/8/2016	10	23	42	46.223284	-124.658180	506.1	cam1_20160608102323.png
Approaching harder substrate, also a few outcrops/crevices	6/8/2016	10	24	23	46.223251	-124.658132	504.5	cam1_20160608102323.png
echinoderm close up	6/8/2016	10	35	28	46.223037	-124.657811	502.2	cam1_20160608103625.png
Zoom-in on pink urchin (Echinus)	6/8/2016	10	37	40	46.223018	-124.657830	502.1	cam1_20160608103625.png
boulder with cave	6/8/2016	10	43	39	46.222869	-124.657718	501.8	cam1_20160608104853.png

H1517 NA072 Astoria Canyon	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Pink urchins - Fragile pink urchins	6/8/2016	10	46	38	46.222674	-124.657293	503.2	cam1_20160608104853.png
Still very low biomass	6/8/2016	10	47	24	46.222579	-124.657258	507.2	cam1_20160608104853.png
carbonate and shells	6/8/2016	10	49	10	46.222470	-124.657168	507.6	cam1_20160608104840.png
Possible mat, lots of clam shells	6/8/2016	10	49	18	46.222470	-124.657170	507.6	cam1_20160608104840.png
clams shells present in the bac mat	6/8/2016	10	50	29	46.222441	-124.657199	507.5	cam1_20160608105219.png
clams and bacterial mat. Mat has a less fluffy occurrence then the last ones we have been looking at.	6/8/2016	10	51	55	46.222432	-124.657203	508.3	cam1_20160608105455.png
Lots of clams near bacterial mat. Living. Good views of Siphons in screen grabs	6/8/2016	10	53	0	46.222392	-124.657199	507.8	cam1_20160608105455.png
Large cliff face creating steep drop-off	6/8/2016	10	54	49	46.222329	-124.657182	507.7	cam1_20160608105219.png
carbonates	6/8/2016	10	56	55	46.222331	-124.657113	507.6	cam1_20160608105219.png
octopus	6/8/2016	10	58	31	46.222354	-124.657195	506.1	cam1_20160608105455.png
Zoom in on bacterial mat in crevice	6/8/2016	11	5	1	46.222254	-124.657020	503.0	cam1_20160608110647.png
Black coral, Bathypathes	6/8/2016	11	6	28	46.222230	-124.657004	502.5	cam1_20160608110552.png
Continuing upslope to seep 7	6/8/2016	11	10	55	46.222307	-124.656899	499.8	cam1_20160608111633.png
Scattered flat fish, hagfish, thornyheads	6/8/2016	11	11	20	46.222291	-124.656873	499.6	cam1_20160608111633.png
Patchy bacterial mats and scattered shells	6/8/2016	11	13	24	46.222244	-124.656729	498.8	cam1_20160608111633.png
CNI	6/8/2016	11	14	28	46.222265	-124.656733	497.4	cam1_20160608111519.png
Small patch of dark sediment with occasional bubbles	6/8/2016	11	16	32	46.222331	-124.656636	497.7	cam1_20160608111519.png
Definitely bubbles, slow stream of them	6/8/2016	11	17	4	46.222344	-124.656683	498.8	cam1_20160608111519.png
Holding position to see if we want to sample sediment here	6/8/2016	11	17	53	46.222379	-124.656689	498.6	cam1_20160608111519.png
Several streams of intermittent bubbles	6/8/2016	11	19	44	46.222394	-124.656640	499.1	cam1_20160608111633.png
Young thornyhead	6/8/2016	11	21	36	46.222387	-124.656630	499.2	,cam1_20160608112121.png
Many bubbles released as Herc landed	6/8/2016	11	29	28	46.222384	-124.656736	499.9	cam1_20160608112127.png
At bubble hole	6/8/2016	11	34	11	46.222392	-124.656690	500.2	cam1_20160608113815.png
At second hold <0.5m from 1st, Ambient	6/8/2016	11	35	60	46.222371	-124.656722	500.0	cam1_20160608113815.png
Continuing to explore area on way to site 7	6/8/2016	11	36	25	46.222368	-124.656734	499.4	cam1_20160608113815.png
Some rocky substrate on muddy sediment	6/8/2016	11	38	14	46.222425	-124.656649	499.5	cam1_20160608113815.png
Shrimp pot	6/8/2016	11	39	48	46.222461	-124.656611	499.6	cam1_20160608113413.png
Large overhang	6/8/2016	11	45	12	46.222512	-124.656463	495.2	cam1_20160608114513.png
Many bubbles	6/8/2016	11	47	30	46.222491	-124.656504	493.6	cam1_20160608114513.png
hagfish and seastars	6/8/2016	11	49	5	46.222499	-124.656470	494.8	cam2_20160608114513.png
Several bubbling seeps	6/8/2016	11	52	27	46.222492	-124.656431	496.0	cam1_20160608115312.png
At bubble hole	6/8/2016	11	53	4	46.222501	-124.656428	496.0	cam1_20160608115312.png
At second bubble hole	6/8/2016	11	54	35	46.222478	-124.656414	496.0	cam1_20160608115312.png

H1517 NA072 Astoria Canyon	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
At third bubble hole	6/8/2016	11	57	17	46.222472	-124.656385	495.9	cam1_20160608115312.png
At bacterial mat right by core, sediment is harder	6/8/2016	11	58	49	46.222477	-124.656319	495.9	cam1_20160608115312.png
Want to take a core at a bacterial mat a little further from bubbles	6/8/2016	11	59	3	46.222477	-124.656365	495.9	cam1_20160608115312.png
Attempting to find a place to core	6/8/2016	12	6	18	46.222461	-124.656403	495.7	cam1_20160608120753.png
Coring failed	6/8/2016	12	10	33	46.222492	-124.656412	495.7	,cam1_20160608121436.png
Push core -032 was a poor sample, but we couldn't shake it out. Keeping that sample and trying the next	6/8/2016	12	13	52	46.222488	-124.656410	495.7	,cam1_20160608121436.png
Noted 3 push cores lost from Mongo arm (Samples NA072-023, -024)	6/8/2016	12	19	19	46.222495	-124.656418	494.7	,cam1_20160608121436.png
Mongo arm push cores were present at least till midnight local time.	6/8/2016	12	19	45	46.222500	-124.656415	494.4	,cam1_20160608121436.png
Just realized that the core samples which Mongo had been holding were lost sometime since midnight.	6/8/2016	12	21	41	46.222506	-124.656425	493.9	
Continuing on towards seep 7, want to slurp bacterial mat as well. Plan to be off bottom by 7am local time.	6/8/2016	12	22	11	46.222485	-124.656421	494.0	
Fragile pink sea urchins	6/8/2016	12	25	11	46.222542	-124.656191	491.2	
Continuing towards seep 7	6/8/2016	12	35	24	46.222609	-124.655629	490.7	cam1_20160608123941.png
Most shells have disappeared; muddy seafloor with occasional sea stars	6/8/2016	12	35	51	46.222608	-124.655606	490.8	cam1_20160608123941.png
Rocky outcrop to port side	6/8/2016	12	36	7	46.222658	-124.655591	490.4	cam1_20160608123941.png
Another ledge	6/8/2016	12	39	36	46.222664	-124.655368	488.1	cam1_20160608123941.png
Nudibranch	6/8/2016	12	41	18	46.222641	-124.655309	488.0	cam1_20160608124121.png
Leopard nudibranch stacks of gastropod egg towers; black coral	6/8/2016	12	41	56	46.222632	-124.655292	487.9	cam1_20160608124121.png
Crab	6/8/2016	12	45	41	46.222652	-124.655047	484.6	cam1_20160608124200.png
Bubbles	6/8/2016	12	46	20	46.222654	-124.654936	485.3	cam1_20160608124200.png
Many more clam shells; considering slurping a bacterial mat	6/8/2016	12	47	47	46.222673	-124.654912	486.1	cam1_20160608124200.png
Bubbling seeps	6/8/2016	12	47	56	46.222668	-124.654915	486.0	cam1_20160608124200.png
Dead crab; hagfish; gastropod and clam shells; sablefish	6/8/2016	12	52	34	46.222665	-124.654856	487.9	cam1_20160608125055.png
More bubbles	6/8/2016	12	52	60	46.222658	-124.654845	487.7	cam1_20160608125055.png
Continuing east	6/8/2016	12	53	19	46.222669	-124.654845	487.8	cam1_20160608125055.png
Bubbles	6/8/2016	13	1	32	46.222820	-124.654549	485.6	cam1_20160608130459.png
Several large bubble plumes	6/8/2016	13	2	25	46.222871	-124.654502	486.2	cam1_20160608130459.png
At Seep 7	6/8/2016	13	3	19	46.222861	-124.654506	486.2	cam1_20160608130459.png
Zoom in on bubble source	6/8/2016	13	4	30	46.222856	-124.654534	488.3	cam1_20160608130437.png
Muddy sedimented seafloor with clams at bubble source; sablefish	6/8/2016	13	5	53	46.222853	-124.654523	488.1	cam1_20160608130459.png
many very active seeps	6/8/2016	13	7	31	46.222836	-124.654547	487.8	cam1_20160608130459.png

H1517 NA072 Astoria Canyon	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Fragile pink urchin	6/8/2016	13	8	12	46.222859	-124.654545	487.0	cam1_20160608130452.png
Squid	6/8/2016	13	8	24	46.222859	-124.654546	486.5	cam1_20160608130452.png
small squid	6/8/2016	13	8	38	46.222856	-124.654552	485.9	cam1_20160608130452.png
gastropod by the bubbles	6/8/2016	13	8	47	46.222845	-124.654541	486.0	cam1_20160608130452.png
a few small pink anemones	6/8/2016	13	9	1	46.222849	-124.654549	486.9	cam1_20160608130459.png
Strong, consistent bubble flows by target for seep 7. Bubble streams are more diffuse and intermittent further south.	6/8/2016	13	11	14	46.222794	-124.654531	486.5	cam1_20160608131857.png
two more distinct plumes of oily bubbles	6/8/2016	13	11	31	46.222786	-124.654534	486.1	cam1_20160608131857.png
red, beautiful jelly	6/8/2016	13	11	51	46.222792	-124.654575	486.3	cam1_20160608131857.png
Red jelly, unknown	6/8/2016	13	11	55	46.222794	-124.654573	486.3	cam1_20160608131857.png
Flying south towards seep 10	6/8/2016	13	14	35	46.222796	-124.654465	485.6	cam1_20160608131857.png
moving to seep search target 10, south of where we're seeing the seeps	6/8/2016	13	14	57	46.222783	-124.654471	485.9	cam1_20160608131857.png
small coral, solitary	6/8/2016	13	16	52	46.222740	-124.654448	484.0	cam1_20160608131857.png
looks like some carbonate outcropping here	6/8/2016	13	17	26	46.222718	-124.654466	481.6	cam1_20160608131857.png
Cockatoo squid fly by a minute ago; earlier squid was a gonathid squid	6/8/2016	13	18	25	46.222551	-124.654469	479.4	cam1_20160608131857.png
Line in the sediment	6/8/2016	13	18	52	46.222537	-124.654474	478.6	cam1_20160608131857.png
(mini-ridge)	6/8/2016	13	19	55	46.222476	-124.654473	478.3	cam1_20160608131857.png
2 coral near a seastar	6/8/2016	13	20	28	46.222476	-124.654472	478.5	cam1_20160608132008.png
taking a water sample at coral	6/8/2016	13	20	45	46.222481	-124.654468	478.4	cam1_20160608132008.png
Triggered Niskin 8	6/8/2016	13	22	36	46.222482	-124.654478	478.3	cam1_20160608132023.png
slurp of a pink coral, swiftia	6/8/2016	13	25	28	46.222440	-124.654500	480.1	cam1_20160608132023.png
Cluster of fragile pink urchins	6/8/2016	13	27	54	46.222332	-124.654554	477.6	cam1_20160608132023.png
One coral may have ended up in flush jar	6/8/2016	13	29	50	46.222268	-124.654561	478.4	cam1_20160608132023.png
one of the coral samples is in the flush jar	6/8/2016	13	30	4	46.222276	-124.654561	478.3	cam1_20160608133418.png
moving east towards markers 8 and 9	6/8/2016	13	31	27	46.222240	-124.654562	478.1	cam1_20160608133418.png
Cockatoo squid	6/8/2016	13	31	51	46.222241	-124.654575	479.4	cam1_20160608133418.png
sunstars and sea stars	6/8/2016	13	33	30	46.222270	-124.654537	478.3	cam1_20160608133418.png
urchins and sablefish	6/8/2016	13	33	49	46.222304	-124.654518	478.0	cam1_20160608133418.png
Cluster of fragile pink urchins on remains of a crab	6/8/2016	13	34	27	46.222322	-124.654490	478.0	cam1_20160608133418.png
lots of sablefish over a muddy seafloor, not much else	6/8/2016	13	41	27	46.222673	-124.653941	479.5	cam1_20160608134627.png
Siphonophore	6/8/2016	13	42	55	46.222679	-124.653893	479.4	cam1_20160608134627.png
very large salp	6/8/2016	13	43	3	46.222686	-124.653892	479.5	cam1_20160608134627.png
Cockatoo squid	6/8/2016	13	44	27	46.222783	-124.653838	481.4	cam1_20160608134627.png
cocatoo squid	6/8/2016	13	44	31	46.222783	-124.653834	481.5	cam1_20160608134627.png

H1517 NA072 Astoria Canyon	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Skate	6/8/2016	13	45	52	46.222874	-124.653805	484.0	cam1_20160608134627.png
skate	6/8/2016	13	45	53	46.222872	-124.653805	484.0	cam1_20160608134627.png
anemone and some similar corals as before	6/8/2016	13	47	33	46.222936	-124.653731	485.3	cam1_20160608134627.png
Passing over small ridge	6/8/2016	13	48	12	46.222992	-124.653701	486.8	cam1_20160608134627.png
seep....bubbles	6/8/2016	13	49	11	46.222986	-124.653635	487.2	cam1_20160608134627.png
lots of clams and gastropods, possible bacterial mats, anemones	6/8/2016	13	51	11	46.223028	-124.653583	493.6	cam1_20160608135245.png
very large field of clam shells and oxidized sediment/bacterial mats?	6/8/2016	13	51	42	46.223037	-124.653579	493.2	cam1_20160608135245.png
Rockfish over field of clams, some seeps	6/8/2016	13	53	1	46.223053	-124.653508	495.1	cam1_20160608135043.png
Fragile pink urchins, some small bacterial mats	6/8/2016	13	53	55	46.223038	-124.653469	495.4	cam1_20160608135043.png
Occasional gastropods	6/8/2016	13	54	28	46.223056	-124.653470	495.8	cam1_20160608135245.png
zoom on the clam beds and some possible bacterial mats, gastropods	6/8/2016	13	55	6	46.223062	-124.653450	495.9	cam1_20160608135245.png
From Lisa Levin onshore	6/8/2016	13	55	6	46.223061	-124.653449	496.0	cam1_20160608135245.png
Cockatoo squid	6/8/2016	13	55	22	46.223086	-124.653444	496.5	cam1_20160608135245.png
cocatoo squid	6/8/2016	13	55	22	46.223086	-124.653442	496.5	cam1_20160608135245.png
From Lisa Levin onshore, snails may be Neptunea	6/8/2016	13	55	37	46.223080	-124.653427	496.5	cam1_20160608135245.png
two more seeps in the center of the clam field	6/8/2016	13	56	56	46.223110	-124.653427	497.3	cam1_20160608135245.png
three, not two!	6/8/2016	13	57	5	46.223110	-124.653431	497.4	cam1_20160608135245.png
Passing over outcropping	6/8/2016	13	58	1	46.223144	-124.653384	498.6	cam1_20160608135245.png
mound with sediment and outcropping carbonate with thornyheads and seastars, anemones	6/8/2016	13	58	14	46.223152	-124.653374	498.6	cam1_20160608135245.png
Sole	6/8/2016	13	58	14	46.223156	-124.653370	498.6	cam1_20160608135245.png
More bubbles	6/8/2016	13	58	27	46.223178	-124.653349	498.8	cam1_20160608135245.png
more bubbles and a bacterial mat on edge of carbonate outcrop	6/8/2016	13	58	45	46.223190	-124.653340	498.9	cam1_20160608135245.png
Tall ledge/wall	6/8/2016	13	59	39	46.223246	-124.653306	499.7	cam1_20160608135245.png
large rock with an encrusting sponge patches	6/8/2016	13	59	53	46.223260	-124.653307	500.2	cam1_20160608135245.png
Will try to drive around the perimeter of the clam bed to estimate its size	6/8/2016	14	2	9	46.223312	-124.653292	501.1	
low visibility, lots of sediment stirred up by fish. fewer clams and some outcropping layers of carbonate	6/8/2016	14	2	59	46.223350	-124.653279	501.1	
fluctuating lights on the vehicles	6/8/2016	14	3	30	46.223350	-124.653245	499.4	
Fluctuation in lights; originally thought it was due to fish, but we don't see any from Argus cam	6/8/2016	14	3	40	46.223346	-124.653252	498.8	
Herc has no control	6/8/2016	14	3	49	46.223342	-124.653254	498.6	
Hercules is spinning, not under control of pilot	6/8/2016	14	3	52	46.223341	-124.653252	498.5	
Argus still has control	6/8/2016	14	4	14	46.223349	-124.653242	497.5	

H1517 NA072 Astoria Canyon	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Spin has stopped	6/8/2016	14	4	20	46.223350	-124.653242	497.0	
Hercules continuing to spin, pilot has no control	6/8/2016	14	4	49	46.223350	-124.653229	495.6	
Ship move north at 2 knots	6/8/2016	14	5	10	46.223348	-124.653225	495.2	
Flashing of lights has stopped	6/8/2016	14	5	23	46.223342	-124.653225	495.0	
Herc coming off bottom, without control	6/8/2016	14	5	30	46.223343	-124.653225	494.7	
Preparing to recover ROVs	6/8/2016	14	5	35	46.223325	-124.653223	494.5	
Holding ship position to try to spin out wraps in tether	6/8/2016	14	7	3	46.223229	-124.653336	492.8	
Holding ROV at 9m off bottom	6/8/2016	14	8	24	46.223227	-124.653303	491.6	
Losing pressure on main hydraulics	6/8/2016	14	8	53	46.223219	-124.653300	489.1	
Herc losing pressure on hydraulics. Trying to take wraps out	6/8/2016	14	9	0	46.223219	-124.653296	489.7	
coming up at 10 m/min	6/8/2016	14	11	58	46.223179	-124.653164	489.3	cam1_20160608141230.png
Bringing ship forward at 0.2 knots to begin recovery, vehicles ascending at 10m/min	6/8/2016	14	12	47	46.223136	-124.653084	494.1	cam1_20160608141230.png
Hercules is being lifted by Argus at this point	6/8/2016	14	13	16	46.223117	-124.653035	491.3	cam1_20160608141230.png
Most likely problems caused by hydraulics issue	6/8/2016	14	15	6	46.222969	-124.653041	467.2	cam1_20160608141230.png
Continuing to ascend at ~10m/min with 0 wraps in tether, Hercules depth ~400m	6/8/2016	14	20	49	46.223218	-124.653341	400.9	
Hercules at ~250m depth	6/8/2016	14	34	13	46.224052	-124.653558	249.2	
Hercules depth ~150m	6/8/2016	14	42	17	46.224391	-124.653542	149.2	
Argus and Herc at 50m	6/8/2016	14	52	31	46.225580	-124.654023	10.5	
Argus at surface	6/8/2016	15	0	24	46.226120	-124.654154	10.5	

H1518 NA072 Nehalem Bank Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
many jellies in water column	6/11/2016	0	2	45	45.885724	-124.639043	137.9	cam1_20160611000951.png
On bottom at 176 m, many ratfish, ling cod, anemones on bottom	6/11/2016	0	4	40	45.885870	-124.639193	175.2	cam1_20160611000951.png
lots of lingcod and ratfish and anemones and some low rocks in the sediment	6/11/2016	0	4	52	45.885957	-124.639360	174.8	cam1_20160611000951.png
high turbidity	6/11/2016	0	5	18	45.886063	-124.639547	175.7	cam1_20160611000951.png
cloudy water, lots of flock and some seastar	6/11/2016	0	5	21	45.886068	-124.639556	175.6	cam1_20160611000951.png

H1518 NA072 Nehalem Bank Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Canary rockfish feeding on school of krill	6/11/2016	0	8	39	45.886141	-124.639648	176.4	cam1_20160611000951.png
mottled seafloor with lots of fish	6/11/2016	0	9	30	45.886025	-124.639656	174.3	cam1_20160611000951.png
Large halibut	6/11/2016	0	10	8	45.886017	-124.639563	176.5	cam1_20160611001912.png
Very productive environment	6/11/2016	0	10	21	45.886021	-124.639554	175.9	cam1_20160611001912.png
Bacterial mat?	6/11/2016	0	10	29	45.886028	-124.639534	175.4	cam1_20160611001912.png
large ray	6/11/2016	0	11	21	45.886042	-124.639506	175.4	cam1_20160611001912.png
Troubleshooting lighting on Argus cam	6/11/2016	0	11	45	45.886047	-124.639541	175.9	cam1_20160611001912.png
Heading towards waypoint 5	6/11/2016	0	18	43	45.886127	-124.639555	176.2	cam1_20160611001912.png
(Heading south to waypoint 5, then working north east towards 8)	6/11/2016	0	19	11	45.886114	-124.639551	176.8	cam1_20160611001912.png
halibut	6/11/2016	0	19	16	45.886114	-124.639547	176.8	cam1_20160611001912.png
Halibut, lingcod	6/11/2016	0	19	26	45.886114	-124.639534	176.8	cam1_20160611001912.png
Waypoint 5 is 98 m from current position at launch	6/11/2016	0	20	17	45.886105	-124.639500	177.3	cam1_20160611002031.png
chimera	6/11/2016	0	21	15	45.886097	-124.639523	177.1	cam1_20160611002031.png
ling cod city	6/11/2016	0	21	44	45.886054	-124.639545	176.9	cam1_20160611002031.png
Occasional sea stars	6/11/2016	0	21	54	45.886050	-124.639544	177.0	cam1_20160611002031.png
Ling cod all appear to be lined up into the current	6/11/2016	0	22	36	45.885939	-124.639546	176.1	cam1_20160611002145.png
Long siphonophore chain	6/11/2016	0	24	17	45.885896	-124.639552	174.6	cam1_20160611002145.png
Biology has cleared out	6/11/2016	0	26	9	45.885819	-124.639531	175.4	cam1_20160611002145.png
chimera	6/11/2016	0	28	26	45.885733	-124.639492	174.4	cam1_20160611002145.png
Large Ling Cod and Halibut. Also rattails	6/11/2016	0	29	30	45.885618	-124.639476	174.0	cam1_20160611002145.png
Zoom-in on whitish colored sediment.	6/11/2016	0	32	16	45.885561	-124.639456	171.6	cam1_20160611003053.png
metridium anemone	6/11/2016	0	39	5	45.885334	-124.639435	162.8	cam1_20160611003053.png
halibut	6/11/2016	0	39	14	45.885335	-124.639440	163.2	cam1_20160611003053.png
yellow eye rockfish	6/11/2016	0	39	30	45.885330	-124.639441	162.6	cam1_20160611003053.png
plumose anemone?	6/11/2016	0	39	42	45.885316	-124.639440	162.9	cam1_20160611003053.png
lots of rocky outcrops	6/11/2016	0	39	45	45.885312	-124.639439	163.0	cam1_20160611003053.png
consolidated sediment, possibly carbonate layers	6/11/2016	0	40	32	45.885295	-124.639449	163.3	cam1_20160611004534.png
ling cod	6/11/2016	0	41	3	45.885299	-124.639479	163.3	cam1_20160611004534.png
not much sediment present	6/11/2016	0	42	43	45.885224	-124.639559	166.0	cam1_20160611004534.png
nice reef-like old carbonate rock structures with yellow eye rockfish and some shellhash	6/11/2016	0	46	2	45.885228	-124.639565	166.3	cam1_20160611004532.png
Yellow-eye rockfish, rattail, plumose anemone, Ling Cod	6/11/2016	0	46	11	45.885240	-124.639530	166.0	cam1_20160611004532.png
plumose anemones on reef-like structures	6/11/2016	0	46	28	45.885237	-124.639523	165.1	cam1_20160611004532.png
skate	6/11/2016	0	47	48	45.885246	-124.639419	163.9	cam1_20160611004534.png

H1518 NA072 Nehalem Bank Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
halibut	6/11/2016	0	49	19	45.885290	-124.639276	165.7	cam1_20160611004532.png
Ling cod and halibut hiding among rock pile	6/11/2016	0	49	41	45.885324	-124.639274	164.9	cam1_20160611004532.png
"Remarkably large rockfish"	6/11/2016	0	50	18	45.885350	-124.639217	163.9	cam1_20160611005530.png
platy carbonate with lots of lingcod	6/11/2016	0	50	31	45.885355	-124.639218	164.3	cam1_20160611005530.png
White-spotted red sea cucumber	6/11/2016	0	50	56	45.885385	-124.639212	164.2	cam1_20160611005530.png
sea cucumber and large halibut	6/11/2016	0	50	57	45.885385	-124.639212	164.2	cam1_20160611005530.png
Giant white nudibranch	6/11/2016	0	51	31	45.885399	-124.639216	163.0	cam1_20160611005530.png
nudibranch	6/11/2016	0	51	32	45.885399	-124.639213	162.9	cam1_20160611005530.png
(or a flat anemone?)	6/11/2016	0	51	49	45.885397	-124.639211	163.1	cam1_20160611005530.png
plumose anemone, not nudibranch	6/11/2016	0	51	55	45.885394	-124.639212	163.3	cam1_20160611005530.png
Some spotted juvenile rockfish	6/11/2016	0	53	35	45.885421	-124.639193	163.9	cam1_20160611005530.png
juvenile rockfish	6/11/2016	0	53	50	45.885448	-124.639193	164.7	cam1_20160611005530.png
halibut and many urchins sandier substrate	6/11/2016	0	55	8	45.885481	-124.639094	166.9	cam1_20160611005110.png
gastropod	6/11/2016	0	55	30	45.885481	-124.639081	166.8	cam1_20160611005110.png
Many fragile pink urchins	6/11/2016	0	55	51	45.885442	-124.639093	166.1	cam1_20160611005110.png
seastars and lots of urchins lingcod	6/11/2016	0	56	35	45.885400	-124.639117	165.8	cam1_20160611005530.png
climbing up carbonate cap	6/11/2016	0	57	13	45.885373	-124.639151	163.6	cam1_20160611005530.png
Turning northeast	6/11/2016	0	57	40	45.885376	-124.639151	162.6	cam1_20160611005530.png
lots of urchins in sediment	6/11/2016	0	59	55	45.885402	-124.639174	164.0	cam1_20160611005530.png
orange plumose anemone	6/11/2016	1	0	23	45.885471	-124.639151	166.1	
Searching between waypoints 5 and 6 for expected seep	6/11/2016	1	4	35	45.885599	-124.638921	170.0	
continuing to seep hunt around waypoints 5 & 6	6/11/2016	1	6	21	45.885435	-124.639035	165.0	
Turning Herc again; mowing the lawn SW-NE to look for plume	6/11/2016	1	8	3	45.885360	-124.639148	164.2	
Heading southeast	6/11/2016	1	14	4	45.885638	-124.638806	170.8	cam1_20160611011538.png
gastropods and urchins, lingcod and rockfish, shellhash	6/11/2016	1	14	15	45.885640	-124.638818	170.7	cam1_20160611011538.png
Zooming in on old shell bed/ sediment	6/11/2016	1	15	10	45.885625	-124.638821	171.0	cam1_20160611011538.png
Closing in on waypoint 6, still no signs of bubbles	6/11/2016	1	17	15	45.885679	-124.638732	170.8	cam1_20160611011538.png
Heading southeast, then southwest to waypoints 1-2	6/11/2016	1	18	6	45.885698	-124.638700	170.9	cam1_20160611011538.png
ratfish	6/11/2016	1	18	55	45.885703	-124.638707	170.5	cam1_20160611011538.png
lingcod and halibut over the carbonate rocks	6/11/2016	1	20	39	45.885698	-124.638681	170.6	cam1_20160611012755.png
heading over waypoints 6 and 5 one more time, towards points 1 and 2 to the SW	6/11/2016	1	21	58	45.885672	-124.638768	170.7	cam1_20160611012755.png
Ledge/ broken edge of carbonate. Potential trawl scar?	6/11/2016	1	27	53	45.885399	-124.639148	164.7	cam1_20160611012755.png

H1518 NA072 Nehalem Bank Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
top of the bank, possible trawl scar	6/11/2016	1	27	57	45.885400	-124.639148	164.8	cam1_20160611012755.png
broken carbonate and grey sediment	6/11/2016	1	28	8	45.885398	-124.639161	165.0	cam1_20160611012755.png
Could just be a natural feature, though.	6/11/2016	1	29	11	45.885392	-124.639162	164.8	cam1_20160611012755.png
Currently ~midway between 5&6, heading SW	6/11/2016	1	29	36	45.885386	-124.639169	164.4	cam1_20160611012755.png
think it was just a broken carbonate cap. Trawl scar	6/11/2016	1	29	38	45.885385	-124.639175	164.4	cam1_20160611012755.png
Octopus behind anemone	6/11/2016	1	31	30	45.885328	-124.639298	163.4	cam1_20160611013441.png
(GPO)	6/11/2016	1	32	6	45.885321	-124.639311	163.4	cam1_20160611013441.png
Pausing by waypoint 5 for a ship move; potential diffuse flow from crack in carbonates	6/11/2016	1	34	50	45.885276	-124.639470	164.6	cam1_20160611013441.png
Big rockfish emerged from crack. So not a methane seep, just a good hiding spot.	6/11/2016	1	35	48	45.885278	-124.639519	163.9	cam1_20160611013221.png
Flying downhill past waypoint 5, heading toward waypoint 1 (200m SW)	6/11/2016	1	36	51	45.885223	-124.639582	166.8	cam1_20160611013452.png
Sylasterid hydrocoral (sp?)	6/11/2016	1	37	14	45.885205	-124.639591	167.3	cam1_20160611013452.png
stylasterid hydrocoral	6/11/2016	1	37	18	45.885204	-124.639591	167.1	cam1_20160611013452.png
moving to waypoint 1, off the carbonate cap	6/11/2016	1	37	36	45.885204	-124.639602	166.9	cam1_20160611013452.png
Left the carbonate outcrop behind; substrate appears to be sand	6/11/2016	1	38	54	45.885155	-124.639638	168.3	cam1_20160611013452.png
Some carbonate outcrops reappearing; old bivalve shells; sablefish	6/11/2016	1	40	42	45.885078	-124.639776	171.2	cam1_20160611014519.png
some sponge and shell hash	6/11/2016	1	43	39	45.885046	-124.640015	172.6	cam1_20160611014544.png
Diffuse bubbles	6/11/2016	1	44	50	45.884989	-124.640094	172.6	cam1_20160611014544.png
methane seep diffuse flow	6/11/2016	1	45	7	45.884976	-124.640098	172.7	cam1_20160611014519.png
Looking for source of occasional bubbles. Small bacterial mat, some darker sediments among old shells?	6/11/2016	1	46	44	45.884988	-124.640111	172.8	cam1_20160611014519.png
No luck spotting any more bubbles. Waiting another minute then moving on.	6/11/2016	1	48	46	45.884983	-124.640109	172.8	cam1_20160611014544.png
Continuing southwest	6/11/2016	1	49	3	45.884987	-124.640107	172.7	cam1_20160611014544.png
no seep source found	6/11/2016	1	49	42	45.884969	-124.640119	172.1	cam1_20160611014544.png
orangey anemone	6/11/2016	1	50	27	45.884944	-124.640161	171.7	
sediment and shell hash, some carbonate blocks	6/11/2016	1	56	35	45.884604	-124.640598	173.1	
Continuing to fly over shell beds, carbonates, and sandy seafloor; many ling cod	6/11/2016	1	58	43	45.884325	-124.641028	174.7	
several ratfish, ling cod density has decreased	6/11/2016	2	0	25	45.884310	-124.641072	175.4	cam1_20160611020857.png
Zooming in on shells	6/11/2016	2	2	53	45.884173	-124.641119	176.6	cam1_20160611020857.png
Approaching waypoint 1	6/11/2016	2	4	15	45.884163	-124.641208	177.5	cam1_20160611020857.png

H1518 NA072 Nehalem Bank Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Back into ling cod territory	6/11/2016	2	4	59	45.884148	-124.641207	177.3	cam1_20160611020857.png
hagfish	6/11/2016	2	6	60	45.884109	-124.641331	177.1	cam1_20160611020857.png
hagfish	6/11/2016	2	7	51	45.884093	-124.641268	177.3	cam1_20160611020857.png
at waypoint 1	6/11/2016	2	7	60	45.884094	-124.641269	177.0	cam1_20160611020857.png
Zoom in on bacterial mat/ or discolored sediment?	6/11/2016	2	9	17	45.884079	-124.641258	177.0	cam1_20160611020243.png
Continuing to waypoint 2, SW	6/11/2016	2	10	8	45.884062	-124.641299	176.3	
Approaching potential plume site midway between waypoints 1 and 2	6/11/2016	2	13	29	45.883946	-124.641489	178.2	
shell hash and carbonate rocks	6/11/2016	2	14	57	45.883938	-124.641540	179.1	
Looking around at potential seep target site; carbonate outcroppings/boulders, few fish, declining visibility	6/11/2016	2	15	54	45.883953	-124.641581	178.8	
Rope?	6/11/2016	2	21	25	45.883898	-124.641695	179.1	cam1_20160611022300.png
Coral tucked into crevice	6/11/2016	2	22	6	45.883928	-124.641737	179.4	cam1_20160611022229.png
sponge in carbonate rock	6/11/2016	2	22	27	45.883882	-124.641734	179.6	cam1_20160611022229.png
Actually a sponge and a sharp nosed crab	6/11/2016	2	22	28	45.883882	-124.641735	179.6	cam1_20160611022229.png
Wire cable debris?	6/11/2016	2	23	27	45.883895	-124.641604	179.5	cam1_20160611022229.png
old metal cable	6/11/2016	2	23	28	45.883895	-124.641603	179.5	cam1_20160611022229.png
more carbonate structures	6/11/2016	2	24	16	45.883865	-124.641615	179.6	cam1_20160611022300.png
Diffuse bubbles?	6/11/2016	2	27	40	45.883738	-124.641733	180.4	cam1_20160611022300.png
Bubbles from dark discolored sediment	6/11/2016	2	28	0	45.883736	-124.641739	180.2	cam1_20160611022229.png
Waiting for visibility to clear	6/11/2016	2	29	18	45.883746	-124.641726	180.0	cam1_20160611022300.png
active seep in sediment near carbonate overhang	6/11/2016	2	30	8	45.883745	-124.641740	179.3	cam1_20160611023441.png
Bubbles are coming intermittently from a variety of spots at this site	6/11/2016	2	30	40	45.883745	-124.641739	178.8	cam1_20160611023441.png
Checking on potential for sampling sediment at this site	6/11/2016	2	33	57	45.883746	-124.641747	180.4	cam1_20160611023441.png
following the carbonate cap and finding more seeps just below it in the sediment	6/11/2016	2	37	33	45.883738	-124.641761	180.4	cam1_20160611023441.png
Lateralling around site looking for bubble streams	6/11/2016	2	39	49	45.883701	-124.641806	180.4	cam1_20160611023441.png
white sponges	6/11/2016	2	40	32	45.883699	-124.641807	180.1	cam1_20160611024022.png
little worms and some bacterial mats, small, grey/white	6/11/2016	2	41	6	45.883706	-124.641815	180.2	cam1_20160611024022.png
Orange cup corals; crab	6/11/2016	2	41	30	45.883704	-124.641807	180.2	cam1_20160611024022.png
orange cup corals and crab	6/11/2016	2	41	36	45.883703	-124.641806	180.3	cam1_20160611024022.png
Continuing to explore around feature	6/11/2016	2	43	48	45.883720	-124.641782	180.5	cam1_20160611024028.png

H1518 NA072 Nehalem Bank Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
orange encrusting sponge	6/11/2016	2	44	48	45.883715	-124.641813	180.8	cam1_20160611024028.png
orange encrusting sponge	6/11/2016	2	44	53	45.883714	-124.641814	180.9	cam1_20160611024028.png
Continuing to waypoint 2 (10m NW)	6/11/2016	2	47	45	45.883725	-124.641848	180.8	cam1_20160611024028.png
more carbonate rocks, no overhang, shell hash	6/11/2016	2	47	55	45.883714	-124.641836	180.5	cam1_20160611024028.png
moving towards waypoint 3 by way of 2	6/11/2016	2	48	8	45.883674	-124.641889	180.1	cam1_20160611024028.png
increasing turbidity	6/11/2016	2	49	4	45.883741	-124.641860	180.6	cam1_20160611024028.png
Diffuse bubbles	6/11/2016	2	50	30	45.883746	-124.641886	180.8	cam1_20160611025945.png
School of krill	6/11/2016	2	51	19	45.883768	-124.642012	181.5	cam1_20160611025945.png
seep	6/11/2016	2	51	20	45.883767	-124.642014	181.5	cam1_20160611025945.png
Pausing for watch change	6/11/2016	2	54	41	45.883834	-124.642205	182.3	cam1_20160611025945.png
lingcod and sea cucumber	6/11/2016	2	59	44	45.883932	-124.642211	181.6	cam1_20160611025816.png
bubbles	6/11/2016	3	2	35	45.883925	-124.642211	181.6	cam1_20160611030822.png
heading to Target 3, will meander on the way there	6/11/2016	3	4	10	45.883900	-124.642248	180.0	cam1_20160611030824.png
bubbles and bacterial mats	6/11/2016	3	7	11	45.883733	-124.642125	182.0	cam1_20160611030824.png
seeing small seeps on Nehalem bank, several of which are discontinuous bubble streams. Looks like carbonate shelves and small mounds	6/11/2016	3	8	18	45.883725	-124.642135	183.1	cam1_20160611030236.png
white filamentous bacterial mat next to an orange one	6/11/2016	3	9	3	45.883716	-124.642157	183.2	cam1_20160611030822.png
more bubbles	6/11/2016	3	10	36	45.883617	-124.642309	180.8	cam1_20160611031417.png
white microbial mat, interesting structure to it	6/11/2016	3	13	58	45.883631	-124.642329	182.7	cam1_20160611031359.png
bubbles	6/11/2016	3	14	39	45.883635	-124.642339	182.8	cam1_20160611031338.png
very intermittent bubbles (seep 4)	6/11/2016	3	15	11	45.883637	-124.642336	182.8	cam1_20160611031411.png
more consistent stream of bubbles	6/11/2016	3	16	15	45.883644	-124.642357	182.6	cam1_20160611031411.png
canary rockfish	6/11/2016	3	18	17	45.883720	-124.642513	180.6	cam1_20160611031411.png
bubbles	6/11/2016	3	20	4	45.883842	-124.642687	184.0	cam1_20160611032238.png
seep 6 (in hypack)	6/11/2016	3	20	29	45.883851	-124.642664	184.0	cam1_20160611032238.png
seeing more orange mats	6/11/2016	3	20	38	45.883860	-124.642662	184.9	cam1_20160611032238.png
fragile pink urchins	6/11/2016	3	22	6	45.883860	-124.642633	184.9	cam1_20160611032215.png
carbonate feature and more bubbles	6/11/2016	3	22	38	45.883864	-124.642626	185.0	cam1_20160611032215.png
steady flow bubbles, possible gas sampler spot	6/11/2016	3	24	20	45.883876	-124.642624	185.6	cam1_20160611032240.png
more bubbles	6/11/2016	3	28	25	45.883926	-124.642685	186.0	cam1_20160611032240.png
most consistent bubbler seen at Nehalem - according to Bob	6/11/2016	3	29	11	45.883940	-124.642685	186.2	cam1_20160611032240.png

H1518 NA072 Nehalem Bank Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
it's possible that setting down the ROV affects the equilibrium of the gas in the sediments sometimes and turns off the seep momentarily	6/11/2016	3	29	42	45.883957	-124.642706	186.2	cam1_20160611032240.png
nice mat and consistent bubbles	6/11/2016	3	32	28	45.884013	-124.642861	185.6	cam1_20160611033624.png
still heading towards target 3	6/11/2016	3	32	54	45.884006	-124.642865	185.6	cam1_20160611033624.png
more bubbles	6/11/2016	3	35	31	45.883887	-124.642818	185.7	cam1_20160611033703.png
many bacterial mats and seeps	6/11/2016	3	36	50	45.883896	-124.642821	186.9	cam1_20160611033624.png
fairly consistent flow of bubbles with light bacterial mats (stereo seeps)	6/11/2016	3	38	27	45.883898	-124.642825	186.9	cam1_20160611033703.png
pink fragile urchin	6/11/2016	3	43	34	45.883905	-124.642830	186.8	cam1_20160611034456.png
bubbles coming out regularly	6/11/2016	3	45	9	45.883903	-124.642825	186.8	cam1_20160611034456.png
carbonate structures	6/11/2016	3	48	45	45.883976	-124.642958	185.8	cam1_20160611034456.png
arrived at Target 3	6/11/2016	3	53	56	45.883857	-124.643106	185.1	cam1_20160611035357.png
moving toward a target identified from the backscatter map	6/11/2016	3	55	48	45.883841	-124.643132	184.9	cam1_20160611035942.png
pretty good sized white microbial mat	6/11/2016	4	0	0	45.883763	-124.643244	183.3	cam1_20160611040338.png
general increase in the density of white and orange microbial mats	6/11/2016	4	0	28	45.883737	-124.643284	183.1	cam1_20160611040338.png
large carbonate rock (this was the sonar target, not bubbles)	6/11/2016	4	4	1	45.883629	-124.643452	181.2	cam1_20160611040242.png
some thornyheads, lingcod's, and sea stars	6/11/2016	4	6	29	45.883710	-124.643501	181.4	cam1_20160611040242.png
sponge and fish burrowed in the sediment	6/11/2016	4	14	33	45.883766	-124.643424	182.6	cam1_20160611041333.png
bubbles	6/11/2016	4	15	36	45.883771	-124.643292	182.6	cam1_20160611041333.png
at bubble site - seep 11	6/11/2016	4	15	57	45.883750	-124.643348	182.9	cam1_20160611041333.png
more continuous bubbles and white bacterial mats	6/11/2016	4	18	52	45.883778	-124.643246	183.3	cam1_20160611041332.png
black microbial mat with somewhat steady bubbles	6/11/2016	4	20	6	45.883743	-124.643252	183.8	cam1_20160611042507.png
shrimp	6/11/2016	4	21	36	45.883770	-124.643252	183.7	cam1_20160611042507.png
starting to move toward Target 4, zig-zag our way there	6/11/2016	4	22	21	45.883786	-124.643251	183.5	cam1_20160611042507.png
at least 100m2 so far have many many small seepages	6/11/2016	4	22	57	45.883789	-124.643263	183.7	cam1_20160611042507.png
dark microbial mat, nice bubble flow. also hermit crab	6/11/2016	4	25	12	45.883817	-124.643236	184.5	cam1_20160611042222.png
line of seeps	6/11/2016	4	27	50	45.883813	-124.643210	184.6	cam1_20160611042507.png
planning to start moving toward Target 4	6/11/2016	4	30	12	45.883843	-124.643127	184.8	cam1_20160611043249.png
more bubbling	6/11/2016	4	34	9	45.883849	-124.643121	183.5	cam1_20160611043249.png
steady stream	6/11/2016	4	39	22	45.883750	-124.643005	182.1	cam1_20160611043249.png
continuing on to Target 4	6/11/2016	4	43	14	45.883762	-124.642949	183.0	cam1_20160611044814.png
very steady bubbles	6/11/2016	4	43	41	45.883777	-124.642977	183.0	cam1_20160611044814.png

H1518 NA072 Nehalem Bank Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
more spiny pink urchins and microbial mats	6/11/2016	4	50	25	45.884013	-124.642919	185.2	cam1_20160611045356.png
little shrimp in the bubbles	6/11/2016	4	56	11	45.883962	-124.642808	186.6	cam1_20160611045456.png
sea urchins together sharing a meal	6/11/2016	5	5	48	45.883977	-124.642738	185.5	cam1_20160611050454.png
due to ship currents and wind, we need to move N and a little W rather than NE to Target 4, so the plan is to move NW and then E	6/11/2016	5	8	49	45.884015	-124.642530	184.1	cam1_20160611050538.png
large white microbial mat	6/11/2016	5	15	3	45.884111	-124.642414	183.4	cam1_20160611051632.png
ratfish, lingcod, and some more bubbles	6/11/2016	5	22	4	45.884235	-124.641992	182.8	cam1_20160611052324.png
another mat and an anemone also ratfish	6/11/2016	5	23	49	45.884293	-124.642034	182.9	cam1_20160611052324.png
fish size are quite large, many fish down here	6/11/2016	5	25	32	45.884281	-124.641978	182.3	cam1_20160611052324.png
small spurts of bubbles observed	6/11/2016	5	30	26	45.884495	-124.641937	179.5	cam1_20160611053008.png
small mat	6/11/2016	5	35	24	45.884477	-124.641660	179.0	cam1_20160611053726.png
still many large fish (halibut!)	6/11/2016	5	37	46	45.884638	-124.641537	178.9	cam1_20160611053008.png
very large halibut	6/11/2016	5	41	5	45.884651	-124.641509	178.7	cam1_20160611054352.png
lingcod with a fish in its mouth!	6/11/2016	5	44	51	45.884538	-124.641453	178.4	cam1_20160611054352.png
another stream of bubbles	6/11/2016	5	47	6	45.884607	-124.641309	177.5	cam1_20160611054412.png
vermillion sea stars	6/11/2016	5	48	18	45.884817	-124.641132	176.9	cam1_20160611054412.png
just arrived at Target 4	6/11/2016	5	49	1	45.884873	-124.641131	177.5	cam1_20160611054352.png
pink anemone	6/11/2016	5	49	13	45.884879	-124.641132	177.4	cam1_20160611054352.png
rosy rockfish	6/11/2016	5	49	60	45.884893	-124.641138	177.7	cam1_20160611054352.png
conferring about which seeps should be returned so that we can go back to the best sites for sampling	6/11/2016	5	52	9	45.884886	-124.641289	177.8	
here are some bubbles again	6/11/2016	6	2	57	45.884652	-124.641349	178.1	cam1_20160611060241.png
moving ship to the general SW	6/11/2016	6	5	26	45.884686	-124.641585	178.6	cam1_20160611060241.png
seep with a nice stream	6/11/2016	6	10	24	45.884448	-124.641940	179.1	cam1_20160611061806.png
still working our way down to sample sites in the SW	6/11/2016	6	11	33	45.884470	-124.642048	180.6	cam1_20160611061806.png
water is getting murkier	6/11/2016	6	12	37	45.884330	-124.641951	179.6	cam1_20160611061806.png
more seepage and associated biology	6/11/2016	6	15	34	45.884323	-124.642120	183.3	cam1_20160611061806.png
more white microbial mats	6/11/2016	6	18	17	45.884292	-124.642174	183.4	cam1_20160611061447.png
still heading to the SW back to target Seep 11, for some samples	6/11/2016	6	21	11	45.883991	-124.642284	181.7	
skate	6/11/2016	6	23	32	45.884079	-124.642484	183.0	
more seepage	6/11/2016	6	31	45	45.884011	-124.642731	184.9	cam1_20160611063252.png
consistent bubbles	6/11/2016	6	33	22	45.883904	-124.642876	184.9	cam1_20160611063252.png
hagfish	6/11/2016	6	33	37	45.883904	-124.642959	184.5	cam1_20160611063252.png
really steady bubble flow	6/11/2016	6	35	27	45.883988	-124.643102	184.8	cam1_20160611063252.png
4 armed sea star	6/11/2016	6	35	48	45.883987	-124.643147	184.6	cam1_20160611063252.png

H1518 NA072 Nehalem Bank Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
more seepage!	6/11/2016	6	36	8	45.883984	-124.643170	184.5	cam1_20160611063252.png
nice orange microbial mat and bubbles	6/11/2016	6	38	29	45.883795	-124.643106	183.4	cam1_20160611063252.png
close to the sites marked earlier that we plan to get samples from	6/11/2016	6	41	5	45.883746	-124.643364	182.0	cam1_20160611064149.png
circling around to locate seep 11	6/11/2016	6	41	26	45.883746	-124.643333	182.0	cam1_20160611064149.png
orange sea stars	6/11/2016	6	41	59	45.883741	-124.643345	181.9	cam1_20160611064149.png
trying to locate steady seeping with mats	6/11/2016	6	42	57	45.883746	-124.643364	181.5	cam1_20160611064204.png
some white sponges in view	6/11/2016	6	44	36	45.883735	-124.643414	181.0	cam1_20160611064149.png
1.5 m to the point of interest, struggling to locate it because the water is so murky	6/11/2016	6	46	8	45.883780	-124.643398	181.7	cam1_20160611064204.png
very challenging to locate the large mat from earlier	6/11/2016	6	48	1	45.883731	-124.643339	180.8	cam1_20160611064243.png
moved NE again to seep 12, still looking for what we thought was at seep 11	6/11/2016	6	49	28	45.883815	-124.643257	182.9	cam1_20160611064243.png
again lots of scattered sedimented carbonate structures	6/11/2016	6	51	23	45.883716	-124.643197	181.5	cam1_20160611065512.png
clear sedimented bottom very scattered white microbial mats - we are now SE of seep 11, in new territory	6/11/2016	6	54	8	45.883714	-124.643272	181.4	cam1_20160611065512.png
still haven't located that section of large mats and seeps	6/11/2016	6	54	28	45.883708	-124.643300	181.6	cam1_20160611065512.png
bubbles and white microbial mats, near rocks	6/11/2016	6	55	55	45.883766	-124.643350	182.4	cam1_20160611065330.png
still not located seep 11 on the ground although we have been all around its target location (entered into hypack earlier in the dive)	6/11/2016	6	56	29	45.883769	-124.643347	182.3	cam1_20160611065512.png
flatfish	6/11/2016	6	57	24	45.883765	-124.643348	182.6	cam1_20160611065512.png
again seeing more bubbles near scattered white microbial mats, lots of rocks around as well	6/11/2016	6	59	27	45.883711	-124.643281	181.9	cam1_20160611065512.png
Searching around target named "seep11" to find previously located site with both white and orange bacterial mats in order to sample	6/11/2016	7	6	39	45.883926	-124.643598	184.2	
Still searching for the elusive seep11. Bubbles are a good sign!	6/11/2016	7	17	21	45.883765	-124.643417	182.1	
Decided not to sample at seep 11 due to very few bubbles. Currently at seep 12 evaluating	6/11/2016	7	25	40	45.883764	-124.643263	182.7	cam1_20160611072808.png
At entirely new seep site. Deciding whether or not to sample	6/11/2016	7	28	43	45.883834	-124.643317	184.0	cam1_20160611072803.png
Decided to sample at unknown site. Both white and orange mats as well as a few bubble streams. Bubbles seem to be coming out of very dark patches in sediment, suggesting reduction. Associated fauna include rattails, fragile pink urchins, halibut	6/11/2016	7	31	53	45.883845	-124.643299	185.0	cam1_20160611073851.png

H1518 NA072 Nehalem Bank Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Sampling aborted due to diffuse flow. Trying for another target, possibly at "stereo seeps" or "seepstring"	6/11/2016	7	34	55	45.883837	-124.643303	184.9	cam1_20160611073851.png
Going to attempt sample at a new seep, somewhere between "orangeandwhite2" and "seep12"	6/11/2016	7	38	5	45.883809	-124.643293	184.3	cam1_20160611073825.png
Few minutes ago Ling Cod swam into Herc	6/11/2016	7	58	14	45.883816	-124.643282	184.4	cam1_20160611075220.png
readjust GT hold. Re-sampling for bubbles before again attempting to trigger. Using Herc Bubble cam to determine location of bubble seep.	6/11/2016	8	2	33	45.883821	-124.643248	184.7	cam1_20160611080428.png
Attempt #3 collecting bubbles for GT.	6/11/2016	8	9	45	45.883813	-124.643287	184.7	cam1_20160611080421.png
Near sample 037. Ambient	6/11/2016	8	25	43	45.883821	-124.643286	184.8	cam1_20160611082841.png
krill	6/11/2016	8	28	1	45.883925	-124.643279	185.2	cam1_20160611082841.png
GT complete at 08	6/11/2016	8	36	33	45.883858	-124.643279	185.5	cam1_20160611083302.png
PC attempt #1-too shallow. test depth w/ poker, seems deep enough. try again	6/11/2016	8	37	4	45.883858	-124.643266	185.5	cam1_20160611083302.png
core tube 2/3 full with thick silt plug on bottom	6/11/2016	9	0	50	45.883850	-124.643264	185.7	cam1_20160611090248.png
rock sample was mostly mud that broke into the box. still had cup corals on it	6/11/2016	9	4	16	45.883846	-124.643261	185.7	cam1_20160611090252.png
Heading to seep string WP for cores	6/11/2016	9	6	15	45.883841	-124.643253	185.7	cam1_20160611090252.png
cores still only go in ~2/3. Under substrate appears to be non-rock but stiff	6/11/2016	9	16	36	45.883856	-124.643248	185.5	cam1_20160611091444.png
1/3 mat, 1/3 water, 1/3 glacial mud cores	6/11/2016	9	19	28	45.883834	-124.643278	185.5	cam1_20160611091407.png
squid	6/11/2016	9	21	23	45.883830	-124.643284	185.6	cam1_20160611092135.png
taking samples. Large wind gusts are causing navigation challenges. Getting back on course, then will retrieve poker.	6/11/2016	9	25	40	45.883831	-124.643295	185.5	cam1_20160611092309.png
bacterial mat (orange) **marker placed**	6/11/2016	9	28	16	45.883852	-124.643296	185.6	cam1_20160611092309.png
Poker retrieved. In search of white bacterial mat for PC	6/11/2016	9	28	51	45.883849	-124.643313	185.6	cam1_20160611092309.png
lost position when wind spiked to 27kt. able to regain position	6/11/2016	9	34	7	45.883789	-124.643281	184.3	cam1_20160611093544.png
Wind dying down. Persistent rain.	6/11/2016	9	36	31	45.883739	-124.643287	183.4	cam1_20160611093544.png
possible new bac mat?	6/11/2016	9	37	38	45.883741	-124.643288	183.6	cam1_20160611093518.png
possible white mat turned out to be sediment. Still searching.	6/11/2016	9	38	21	45.883743	-124.643297	183.4	cam1_20160611093544.png
Lots of halibut	6/11/2016	9	40	51	45.883829	-124.643283	185.3	cam1_20160611094032.png
Exposed grayish substrate/sediment making finding white mats a challenge. Still searching	6/11/2016	9	45	16	45.883807	-124.643444	184.5	cam1_20160611094413.png

H1518 NA072 Nehalem Bank Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
setting down to test the depth of sediment near white-ish mat	6/11/2016	9	49	27	45.883766	-124.643425	183.5	cam1_20160611094039.png
School of small squid visible behind Herc arm as poker attempted to be grabbed	6/11/2016	9	49	50	45.883765	-124.643430	183.4	cam1_20160611094039.png
sediment is 30+ cm depth; good for cores. trying to take 2 more replicates	6/11/2016	9	50	33	45.883765	-124.643434	183.4	cam1_20160611095608.png
sediment core insertion looks good. ~5cm water overhead	6/11/2016	9	55	11	45.883773	-124.643418	183.7	cam1_20160611095608.png
two cores inserted well	6/11/2016	9	59	23	45.883766	-124.643417	183.7	cam1_20160611095503.png
mongo quiver is only being held on by one set of bolts...	6/11/2016	10	4	42	45.883767	-124.643419	183.8	cam1_20160611100209.png
Potential issue with front PC's. worry that they may detach upon ascent. Trying to find more stable position.	6/11/2016	10	10	23	45.883772	-124.643420	183.8	cam1_20160611101955.png
PC Quivers readjusted to set on front porch for extra support.	6/11/2016	10	17	44	45.883769	-124.643420	183.9	cam1_20160611101955.png
Still lots of halibut swimming in/out of frame. Occasional ling cod.	6/11/2016	10	22	45	45.883775	-124.643419	183.8	cam1_20160611102217.png
transit to WP8	6/11/2016	10	23	7	45.883772	-124.643420	183.8	cam1_20160611102217.png
many rocks in the area	6/11/2016	10	35	53	45.884233	-124.642097	184.4	cam1_20160611103908.png
seep	6/11/2016	10	36	31	45.884255	-124.641965	182.8	cam1_20160611103908.png
During transit	6/11/2016	10	37	19	45.884333	-124.641746	179.9	cam1_20160611103908.png
During transit, passing over previously marked seeps and bacterial mats	6/11/2016	10	37	47	45.884353	-124.641595	178.7	cam1_20160611103908.png
anemone	6/11/2016	10	39	26	45.884438	-124.641277	178.8	cam1_20160611103908.png
hagfish	6/11/2016	10	45	12	45.884870	-124.640418	173.8	cam2_20160611104756.png
sea stars (cushion stars) and lingcod	6/11/2016	10	45	27	45.884973	-124.640373	173.5	cam2_20160611104756.png
shell material	6/11/2016	10	49	24	45.885100	-124.640035	170.7	cam2_20160611104756.png
Lots of ling cod on top of mound	6/11/2016	10	51	21	45.885228	-124.639637	165.1	cam1_20160611105204.png
outcrops	6/11/2016	10	51	30	45.885266	-124.639583	163.7	cam1_20160611105204.png
Cushion star, fragile pink urchin, plumose anemone, sea stars	6/11/2016	10	52	59	45.885385	-124.639368	163.2	cam1_20160611105204.png
Occasional very dense patches of urchins	6/11/2016	10	54	55	45.885482	-124.639041	166.4	cam1_20160611105219.png
Heading NE towards waypoint 11	6/11/2016	11	3	35	45.886011	-124.637833	168.5	
ling cod, high turbidity	6/11/2016	11	7	23	45.886023	-124.637833	169.1	
carbonate cap with lingcod	6/11/2016	11	8	45	45.886020	-124.637875	170.4	
Holding in place to look for seep	6/11/2016	11	11	5	45.885990	-124.637861	169.9	cam1_20160611111701.png
Bubbles	6/11/2016	11	12	48	45.885907	-124.637801	169.7	cam1_20160611111701.png
Bubble flow stopped; waiting for it to start again	6/11/2016	11	13	25	45.885904	-124.637799	169.8	cam1_20160611111701.png
A few more individual bubbles	6/11/2016	11	13	57	45.885901	-124.637792	169.9	cam1_20160611111701.png

H1518 NA072 Nehalem Bank Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
seep 23 re-acquired from carbonate rock	6/11/2016	11	14	29	45.885899	-124.637792	170.0	cam1_20160611111642.png
Pink anemone, more bubbles	6/11/2016	11	16	23	45.885889	-124.637747	170.1	cam1_20160611111642.png
bubble stream from seep near anemone and lingcod	6/11/2016	11	16	47	45.885893	-124.637768	170.1	cam1_20160611111642.png
Beginning to head NW towards target p24	6/11/2016	11	21	35	45.885884	-124.637770	170.0	cam1_20160611112453.png
headed to point 24	6/11/2016	11	22	42	45.885894	-124.637793	170.1	cam1_20160611112453.png
Zoom in on sediment patch among carbonates	6/11/2016	11	24	45	45.885998	-124.637986	171.4	cam1_20160611112448.png
anemones and lingcod over shellhash sediment	6/11/2016	11	26	29	45.886031	-124.638026	171.6	cam1_20160611112453.png
Halibut	6/11/2016	11	26	41	45.886034	-124.638029	171.7	cam1_20160611112453.png
halibut x 2	6/11/2016	11	28	36	45.886111	-124.638078	171.7	cam1_20160611112453.png
light colored sediment and urchins and lingcod	6/11/2016	11	31	26	45.886233	-124.638174	171.6	
Sandier seafloor; many ling cod and ratfish, handful of halibut	6/11/2016	11	32	44	45.886291	-124.638199	171.1	
Approaching target p24	6/11/2016	11	33	17	45.886306	-124.638175	171.2	
area is mostly sediment, very little or smaller carbonate rocks	6/11/2016	11	33	29	45.886310	-124.638169	171.6	
Holding position at p24	6/11/2016	11	34	58	45.886362	-124.638188	171.5	
gastropod and urchins	6/11/2016	11	43	51	45.886438	-124.638166	171.5	
Bubble hunting	6/11/2016	11	44	22	45.886453	-124.638161	171.5	
Continuing NE to p22	6/11/2016	11	46	32	45.886388	-124.638345	171.6	
rockfish	6/11/2016	11	49	47	45.886330	-124.638056	171.5	
heading to waypoint 22 didn't find the seep 24	6/11/2016	11	52	29	45.886341	-124.637833	170.7	
~midway between p24 and p22	6/11/2016	11	56	29	45.886432	-124.637741	170.5	
some shell hash, low carbonate rocks	6/11/2016	11	59	49	45.886436	-124.637604	170.9	
Bubbles	6/11/2016	12	3	53	45.886440	-124.637398	168.8	cam1_20160611120558.png
seep	6/11/2016	12	4	10	45.886440	-124.637396	169.2	cam1_20160611120558.png
Several small, diffuse bubble sources under ling cod	6/11/2016	12	7	35	45.886428	-124.637390	169.5	cam1_20160611120558.png
approaching p22	6/11/2016	12	10	22	45.886453	-124.637273	169.4	cam1_20160611121607.png
diffuse bubble flow	6/11/2016	12	11	32	45.886465	-124.637241	169.7	cam1_20160611121607.png
holding position	6/11/2016	12	11	45	45.886454	-124.637247	169.8	cam1_20160611121607.png
couple sources of methane seeps along the side of the carbonate cap rocks at seep 22 target	6/11/2016	12	12	31	45.886453	-124.637254	169.9	cam1_20160611121550.png
small white patch of bacteria near seep in rocky area, cup corals on rock	6/11/2016	12	13	50	45.886451	-124.637250	170.1	cam1_20160611121550.png
cup corals	6/11/2016	12	13	56	45.886451	-124.637248	170.2	cam1_20160611121550.png
looking for a rock sample to grab	6/11/2016	12	14	52	45.886447	-124.637247	169.2	cam1_20160611121607.png
anemone	6/11/2016	12	16	14	45.886424	-124.637221	170.8	cam1_20160611121550.png

H1518 NA072 Nehalem Bank Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
looking for a piece of carbonate to break off and samples. found one to attempt a grab of	6/11/2016	12	16	23	45.886424	-124.637230	171.0	cam1_20160611121550.png
crab	6/11/2016	12	19	51	45.886416	-124.637225	171.4	cam1_20160611121550.png
hairy crab	6/11/2016	12	20	3	45.886415	-124.637226	171.4	cam1_20160611122543.png
trying another carbonate	6/11/2016	12	21	39	45.886419	-124.637238	170.7	cam1_20160611122543.png
very rocky carbonate area, still looking for a good rock sample	6/11/2016	12	23	17	45.886417	-124.637259	171.1	cam1_20160611122440.png
seep in rocky area	6/11/2016	12	23	34	45.886420	-124.637256	171.4	cam1_20160611122440.png
Looking for a better rock sample	6/11/2016	12	23	46	45.886421	-124.637255	171.3	cam1_20160611122440.png
having trouble breaking off carbonate	6/11/2016	12	26	30	45.886421	-124.637253	171.4	cam1_20160611122543.png
rock sample with much bioencrustation	6/11/2016	12	30	42	45.886406	-124.637227	171.7	cam1_20160611123121.png
two crabs below	6/11/2016	12	31	6	45.886406	-124.637229	171.7	cam1_20160611123121.png
Zoom in on crabs	6/11/2016	12	33	37	45.886405	-124.637227	171.7	cam1_20160611123121.png
sharp nosed crab, squat lobster, decorator crab (?)	6/11/2016	12	34	11	45.886406	-124.637231	171.7	cam1_20160611123153.png
dropping weight plate to lighten Herc	6/11/2016	12	35	27	45.886410	-124.637228	171.7	cam1_20160611123153.png
moving NE towards p21	6/11/2016	12	37	24	45.886464	-124.637275	169.0	cam1_20160611123308.png
canary rockfishes	6/11/2016	12	40	44	45.886571	-124.637126	170.2	cam1_20160611124740.png
plumose anemone	6/11/2016	12	40	55	45.886571	-124.637118	170.1	cam1_20160611124740.png
gorgonian coral on rock	6/11/2016	12	44	29	45.886690	-124.636744	170.2	cam1_20160611124740.png
shrimp	6/11/2016	12	45	55	45.886687	-124.636749	169.9	cam1_20160611124740.png
pink gorgonian coral	6/11/2016	12	47	60	45.886705	-124.636752	170.8	cam1_20160611124740.png
water sample for the eDNA over the coral area	6/11/2016	12	48	47	45.886709	-124.636753	170.7	cam1_20160611124424.png
taking a coral sample to go with the eDNA water sample	6/11/2016	12	53	18	45.886724	-124.636738	170.9	cam1_20160611125525.png
coral and squat lobster in suction sample	6/11/2016	12	57	20	45.886735	-124.636736	171.8	cam1_20160611125525.png
scanning coral grove	6/11/2016	12	57	43	45.886737	-124.636736	171.7	cam1_20160611125525.png
visually surveying for coral in the site where we collected the samples	6/11/2016	12	59	17	45.886723	-124.636690	171.4	cam1_20160611125525.png
finding many more individuals on rocks	6/11/2016	12	59	33	45.886719	-124.636680	171.4	cam1_20160611125525.png
many scattered corals of same species	6/11/2016	13	0	5	45.886691	-124.636646	171.8	cam1_20160611130026.png
paler morph of the same coral?	6/11/2016	13	0	59	45.886704	-124.636623	171.6	cam1_20160611130026.png
Zoom in on 2 whiter, shorter corals. May be a lighter color morph.	6/11/2016	13	1	7	45.886704	-124.636622	171.8	cam1_20160611130044.png
at least 9 coral in view now	6/11/2016	13	2	32	45.886696	-124.636615	171.8	cam1_20160611130044.png
branched coral	6/11/2016	13	3	19	45.886698	-124.636618	171.7	cam1_20160611130026.png
Zoom in on pale branched coral	6/11/2016	13	3	21	45.886698	-124.636615	171.7	cam1_20160611130026.png

H1518 NA072 Nehalem Bank Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
end of coral patch, back to the carbonate rocks and sediment	6/11/2016	13	4	40	45.886712	-124.636585	171.5	cam1_20160611130044.png
moving on to p21, NW	6/11/2016	13	5	34	45.886771	-124.636588	170.5	cam1_20160611130044.png
moving towards point 21	6/11/2016	13	5	38	45.886779	-124.636590	170.5	cam1_20160611130044.png
another branching coral and singular	6/11/2016	13	10	19	45.886888	-124.636720	171.5	
several more coral	6/11/2016	13	11	43	45.886938	-124.636654	171.6	
rockier, crust area with seastar and lingcod	6/11/2016	13	13	16	45.887036	-124.636669	172.2	
approaching p21	6/11/2016	13	14	20	45.887048	-124.636667	170.6	
some coral	6/11/2016	13	17	4	45.887094	-124.636738	171.3	
coral	6/11/2016	13	20	48	45.887195	-124.636670	172.6	cam1_20160611132712.png
cushion star and two coral	6/11/2016	13	21	36	45.887229	-124.636652	173.1	cam1_20160611132712.png
spiny cushion star; still seeing some corals	6/11/2016	13	21	40	45.887230	-124.636651	173.0	cam1_20160611132712.png
poor visibility due to krill	6/11/2016	13	22	7	45.887232	-124.636645	172.6	cam1_20160611132712.png
swarm of krill with some fish feeding, two more coral	6/11/2016	13	22	16	45.887235	-124.636646	172.5	cam1_20160611132712.png
more coral on the rock	6/11/2016	13	24	10	45.887238	-124.636573	172.7	cam1_20160611132712.png
several more coral, one branching	6/11/2016	13	25	6	45.887093	-124.636572	172.3	cam1_20160611132712.png
sea cucumber and coral	6/11/2016	13	25	39	45.887070	-124.636570	172.3	cam1_20160611132712.png
more coral	6/11/2016	13	26	41	45.887063	-124.636555	172.1	cam1_20160611132712.png
zoom in on coral	6/11/2016	13	26	60	45.887060	-124.636557	172.2	cam1_20160611132712.png
Niskin sample at new time of coral, swiftia	6/11/2016	13	27	25	45.887059	-124.636559	172.2	cam1_20160611132712.png
Niskin 11	6/11/2016	13	29	21	45.887061	-124.636562	172.2	cam1_20160611132712.png
Preparing for recovery	6/11/2016	13	30	16	45.887062	-124.636569	170.7	
lots of jellies	6/11/2016	13	35	34	45.886720	-124.636771	114.2	
Argus on deck	6/11/2016	13	56	32	45.888112	-124.639111	8.5	

H1519 NA072 Astoria Canyon Seeps 2	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Pteropod upon descent	6/11/2016	20	28	13	46.222442	-124.656356	10.0	cam2_20160611202559.png
Occasional jellies and other gelatinous organisms viewed upon descent.	6/11/2016	20	36	18	46.221547	-124.656498	186.4	
at bottom	6/11/2016	20	55	24	46.222003	-124.656184	496.9	cam2_20160611205629.png
Myctophid	6/11/2016	20	59	10	46.222193	-124.656417	496.7	cam2_20160611205629.png
Immediately at bottom, fauna visible	6/11/2016	21	2	7	46.222361	-124.656405	494.4	cam1_20160611210724.png
Small bacterial mat (<10 cm). white	6/11/2016	21	2	38	46.222365	-124.656400	495.1	cam1_20160611210724.png
Seafloor	6/11/2016	21	3	43	46.222394	-124.656401	494.3	cam1_20160611210724.png
Zoom-in on hagfish	6/11/2016	21	5	29	46.222440	-124.656394	493.3	cam1_20160611210724.png
anthomastus	6/11/2016	21	6	43	46.222463	-124.656435	493.1	cam1_20160611210712.png
seeps	6/11/2016	21	6	48	46.222463	-124.656437	493.3	cam1_20160611210712.png
Three bubble plumes with steady flow. Surrounding substrate lots of white shell material. Right on WP1.	6/11/2016	21	7	41	46.222480	-124.656448	493.0	cam1_20160611210710.png
Near many plumes. Rathbunaster sea stars, other sea stars, rockfish	6/11/2016	21	8	26	46.222470	-124.656434	493.2	cam1_20160611210716.png
>12 visible seep streams in this area	6/11/2016	21	8	54	46.222473	-124.656432	494.0	cam1_20160611210716.png
Starting gas sampling at these intense venting bubble plumes	6/11/2016	21	8	55	46.222472	-124.656431	494.1	cam1_20160611210716.png
setting down near the most vigorous to take gastight	6/11/2016	21	9	7	46.222473	-124.656431	494.2	cam1_20160611210712.png
seep depth 495	6/11/2016	21	11	0	46.222477	-124.656433	494.3	cam1_20160611211704.png
Hagfish	6/11/2016	21	22	19	46.222472	-124.656419	494.5	cam1_20160611212953.png
Near GT2 Sample site. Ambient from data screen	6/11/2016	21	28	58	46.222478	-124.656442	494.5	cam1_20160611212953.png
Taken many photos of plume GT2 sampled from. Preparing to move to get better images of entire area.	6/11/2016	21	36	46	46.222488	-124.656429	494.3	cam1_20160611213939.png
SO MANY PICTURES!!!!!!!!!!	6/11/2016	21	47	12	46.222519	-124.656556	493.9	cam1_20160611214933.png
Gorgeous shots of bubble plumes on Argus and Herc	6/11/2016	21	47	34	46.222518	-124.656450	494.1	cam1_20160611214933.png
Zoom-in on sediment to look for live clams. Appears sea star is sitting right on top of a vent.	6/11/2016	21	51	34	46.222498	-124.656432	494.4	cam1_20160611215519.png
Zoom-in on site with many live clams (as determined by visible siphons). Possible food for sea stars. Planning to core near this area (hopefully getting a clam), as small tufts of white bacterial mat is also visible nearby.	6/11/2016	21	54	47	46.222486	-124.656403	494.5	cam1_20160611215531.png
core tubes should have 1+clams each	6/11/2016	22	4	51	46.222481	-124.656436	495.0	cam1_20160611220414.png

H1519 NA072 Astoria Canyon Seeps 2	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
two good cores; going to use the scooper to grab extra clams and possibly foraminifera	6/11/2016	22	7	24	46.222507	-124.656425	495.0	cam1_20160611220425.png
taking samples. 2 PC's, scoop, and potential slurp.	6/11/2016	22	20	36	46.222486	-124.656436	495.0	cam1_20160611222931.png
clams are small and buried deep. siphons are visible. Will try to find more exposed clam beds after sampling attempt	6/11/2016	22	23	12	46.222501	-124.656429	495.0	cam1_20160611222914.png
sample 052 sucked up at least 8 clams (mostly alive). and polychaete	6/11/2016	22	29	47	46.222515	-124.656412	495.1	cam1_20160611222852.png
Picking up zip tie	6/11/2016	22	33	6	46.222517	-124.656407	495.1	cam1_20160611223132.png
Marker 244. dropped near 048 sample site.	6/11/2016	22	47	1	46.222471	-124.656558	495.1	cam1_20160611224722.png
dropped marker near vigorous flow	6/11/2016	22	47	40	46.222480	-124.656496	495.1	cam1_20160611224722.png
Niskin 12 popped near Anthomastus at marker	6/11/2016	22	48	49	46.222444	-124.656437	495.1	cam1_20160611224825.png
Bottom triggered label 12 but actuated sample in forward most Niskin	6/11/2016	22	50	37	46.222463	-124.656407	494.2	cam1_20160611225213.png
flakey rock? outcrop trying to sample to see if its carbonate	6/11/2016	22	51	53	46.222466	-124.656485	495.5	cam1_20160611225151.png
Looking for rock sample	6/11/2016	22	53	41	46.222507	-124.656509	494.4	cam1_20160611225212.png
last attempt was consolidated mud. no sample	6/11/2016	22	53	59	46.222519	-124.656562	495.1	cam1_20160611225212.png
shrimp pot	6/11/2016	22	53	60	46.222519	-124.656562	495.1	cam1_20160611225212.png
Approaching carbonate ledge to take a sample	6/11/2016	23	3	1	46.222498	-124.656560	496.0	cam1_20160611230552.png
Tiny fluorescing black fish; lanternfish?	6/11/2016	23	11	9	46.222485	-124.656552	495.6	cam1_20160611231708.png
Trying to find a good location to hover and to grab a piece of the ledge	6/11/2016	23	12	39	46.222453	-124.656596	495.7	cam1_20160611231708.png
Waiting for visibility to clear	6/11/2016	23	15	1	46.222460	-124.656594	496.9	cam1_20160611231708.png
Marker in view, 244	6/11/2016	23	22	31	46.222473	-124.656472	493.4	capture_20160611/
Proceeding towards waypoint 8	6/11/2016	23	26	0	46.222555	-124.656351	493.1	cam1_20160611232233.png
octopus	6/11/2016	23	31	19	46.222365	-124.656819	499.6	cam1_20160611233515.png
sun star	6/11/2016	23	32	54	46.222371	-124.656848	499.5	cam1_20160611233520.png
Dropping weight	6/11/2016	23	35	22	46.222349	-124.656847	498.7	cam1_20160611233515.png
Anemone, thornyhead	6/11/2016	23	38	46	46.222395	-124.656932	500.3	cam1_20160611233520.png
coral	6/11/2016	23	39	18	46.222403	-124.656988	500.0	cam1_20160611233515.png
Bubblegum Coral, approximately 0.5m tall	6/12/2016	0	0	24	46.222397	-124.657125	510.6	cam1_20160612000450.png
gastropod egg towers	6/12/2016	0	4	24	46.222373	-124.657366	513.6	cam1_20160612000430.png
hagfish	6/12/2016	0	4	55	46.222359	-124.657306	513.7	cam1_20160612000430.png
crab	6/12/2016	0	6	11	46.222236	-124.657440	517.7	cam1_20160612000450.png
Burrowing anemones on crab; sablefish	6/12/2016	0	6	34	46.222221	-124.657440	516.9	cam1_20160612000450.png
Large carbonate boulder with sponge	6/12/2016	0	7	51	46.222150	-124.657297	516.4	cam1_20160612000450.png

H1519 NA072 Astoria Canyon Seeps 2	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
octopus	6/12/2016	0	8	21	46.222157	-124.657256	517.1	cam1_20160612000430.png
Approaching waypoint 4	6/12/2016	0	11	10	46.222166	-124.657134	512.4	cam1_20160612001342.png
net	6/12/2016	0	12	4	46.222171	-124.657119	511.9	cam1_20160612001321.png
Large coral with some other colonization on it; brittle star; hagfish	6/12/2016	0	13	41	46.222147	-124.657141	514.4	cam1_20160612001321.png
gastropod egg tower	6/12/2016	0	14	21	46.222183	-124.657116	513.4	cam1_20160612001342.png
shrimp pot	6/12/2016	0	17	14	46.222180	-124.657108	509.3	cam1_20160612001342.png
(Correction	6/12/2016	0	17	33	46.222183	-124.657157	510.2	cam1_20160612001342.png
Large carbonate outcrop	6/12/2016	0	18	39	46.222132	-124.657040	507.6	cam1_20160612001342.png
large sponge on carbonate	6/12/2016	0	19	28	46.222101	-124.657014	506.3	cam1_20160612001321.png
seastar draped over ledge	6/12/2016	0	21	3	46.222177	-124.656915	506.5	cam1_20160612002052.png
flat fish	6/12/2016	0	25	49	46.222197	-124.657181	519.4	cam2_20160612002132.png
at points 3 and 4 looking for a seep	6/12/2016	0	26	5	46.222188	-124.657184	519.1	cam2_20160612002132.png
lots of gastropods	6/12/2016	0	26	13	46.222192	-124.657234	519.0	cam2_20160612002132.png
halibut	6/12/2016	0	26	18	46.222193	-124.657256	519.1	cam2_20160612002132.png
Going into tow mode. Speed 0.5 knots. Heading to "deep plume" depth 850m	6/12/2016	0	31	22	46.221835	-124.657223	510.9	
Towing at 470m depth	6/12/2016	0	52	20	46.225213	-124.655900	468.8	
occasional jellies, shrimp, lanternfish during transit	6/12/2016	1	9	53	46.229658	-124.653946	468.8	
squid	6/12/2016	1	16	30	46.231206	-124.653177	468.7	
shrimp	6/12/2016	1	18	29	46.231709	-124.652969	468.6	
Continuing to tow at 469 m	6/12/2016	1	23	3	46.232904	-124.652539	468.7	
~30 min from drop point	6/12/2016	1	26	11	46.233591	-124.652200	468.7	
Solmissus jelly	6/12/2016	1	38	48	46.236785	-124.650803	468.6	
Beginning descent from 500m	6/12/2016	1	47	32	46.238922	-124.649787	514.3	
More large jellies appearing (Poralia, Tiburonia)	6/12/2016	1	51	22	46.239672	-124.649338	598.2	
Holding position to allow Herc to catch up to Argus, Herc depth 670m	6/12/2016	1	54	21	46.239991	-124.649215	671.1	
dragonfish	6/12/2016	1	59	53	46.239560	-124.648670	787.0	
large salp in Argus cam a minute ago?	6/12/2016	2	1	30	46.239741	-124.648904	826.4	
Herc ~12 m off bottom (840m depth), catching up to Argus	6/12/2016	2	2	6	46.239974	-124.648902	839.2	
Many Poralia jellies, Hercules has caught up to Argus	6/12/2016	2	4	6	46.240439	-124.649171	844.9	
Proceeding NW to waypoint 10	6/12/2016	2	4	25	46.240532	-124.649153	847.7	
flat, sandy seafloor; sea cucumbers, sea stars	6/12/2016	2	4	54	46.240587	-124.649122	849.3	
Voragonema jelly	6/12/2016	2	5	53	46.240588	-124.649321	849.3	
small white eelpouts	6/12/2016	2	7	50	46.240585	-124.649540	850.6	

H1519 NA072 Astoria Canyon Seeps 2	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
thornyhead, sunstar	6/12/2016	2	9	12	46.240677	-124.649458	851.3	
sablefish	6/12/2016	2	12	11	46.240753	-124.649492	851.6	
flat fish	6/12/2016	2	13	2	46.240722	-124.649361	851.8	
large salp in Argus cam	6/12/2016	2	14	34	46.240809	-124.649720	852.5	
sole	6/12/2016	2	16	52	46.240916	-124.649641	852.3	
sea whip, crab	6/12/2016	2	18	59	46.241052	-124.649695	852.3	
~100 m out from waypoint 10	6/12/2016	2	26	6	46.241586	-124.650043	852.1	
sablefish	6/12/2016	2	27	57	46.241766	-124.650184	852.2	
sole, sablefish	6/12/2016	2	29	41	46.242005	-124.650298	852.1	
hagfish	6/12/2016	2	31	12	46.242091	-124.650376	852.8	cam1_20160612023257.png
pom pom anemone	6/12/2016	2	32	60	46.242185	-124.650467	852.0	cam1_20160612023257.png
hagfish	6/12/2016	2	35	49	46.242293	-124.650373	852.4	cam1_20160612023257.png
approaching waypoint 10	6/12/2016	2	36	13	46.242343	-124.650386	852.6	cam1_20160612023257.png
similar fauna throughout	6/12/2016	2	37	59	46.242426	-124.650714	852.8	cam1_20160612023257.png
lateralling through an East->west current	6/12/2016	2	40	4	46.242470	-124.650545	852.8	cam2_20160612024204.png
Bubble hunting around waypoint 10	6/12/2016	2	42	39	46.242375	-124.650466	852.6	cam2_20160612024145.png
density of sea cucumbers has deceased	6/12/2016	2	43	4	46.242378	-124.650463	852.8	cam2_20160612024204.png
large eelpout	6/12/2016	2	48	59	46.242451	-124.650392	852.6	cam2_20160612024204.png
no bubbles near waypoint 10	6/12/2016	2	49	50	46.242439	-124.650336	853.0	cam2_20160612024204.png
proceeding towards waypoint 12	6/12/2016	2	50	1	46.242411	-124.650236	852.8	cam2_20160612025928.png
sablefish	6/12/2016	2	50	55	46.242403	-124.650119	853.0	cam2_20160612025928.png
Altered course	6/12/2016	2	54	13	46.242258	-124.649957	852.2	cam2_20160612025928.png
Holding for watch change	6/12/2016	2	55	54	46.242220	-124.649980	852.1	cam2_20160612025928.png
amazing bacterial mats and methane seep area (hydrates expected at this site)	6/12/2016	3	3	47	46.242272	-124.649455	849.4	cam1_20160612030322.png
beautiful methane seep environment with gastropods scattered on the surface, moving away from this to explore other nearby seeps	6/12/2016	3	11	58	46.242323	-124.649349	849.2	cam2_20160612031317.png
nice Argus shot of Herc	6/12/2016	3	13	33	46.242351	-124.649244	849.5	cam2_20160612031317.png
sea stars sharing a meal	6/12/2016	3	21	7	46.242578	-124.648564	849.9	cam1_20160612032109.png
Conferring with nav to determine where to head to in order to survey and search for more bubbles. planning to survey in about a half hour to an hour	6/12/2016	3	30	0	46.242354	-124.648800	850.2	cam1_20160612033609.png
tanner crab	6/12/2016	3	31	23	46.242381	-124.648957	849.9	cam1_20160612033330.png
starting toward search point 1	6/12/2016	3	32	49	46.242273	-124.649153	849.6	cam1_20160612033609.png
near search point 1	6/12/2016	3	36	52	46.242343	-124.649132	849.6	cam1_20160612033330.png

H1519 NA072 Astoria Canyon Seeps 2	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
on the way to search point 2, nothing of note has been observed yet.	6/12/2016	3	39	13	46.242340	-124.649366	849.2	cam1_20160612033330.png
trawl marks	6/12/2016	3	39	24	46.242347	-124.649369	849.5	cam1_20160612033330.png
coming up on point 12 from last time, large bacterial mat and hydrates, nearly at search point 2	6/12/2016	3	40	16	46.242367	-124.649380	849.4	cam1_20160612034129.png
north of point 2, very extensive bacterial mats and bubbling	6/12/2016	3	41	8	46.242374	-124.649398	849.1	cam1_20160612034114.png
rope	6/12/2016	3	41	27	46.242410	-124.649397	848.9	cam1_20160612034114.png
on an upper ridge looking down upon this large microbial mat area	6/12/2016	3	42	57	46.242404	-124.649361	847.7	cam1_20160612034138.png
checking out a spot that we could possibly sample soon	6/12/2016	3	49	56	46.242384	-124.649481	848.8	cam1_20160612034129.png
really steady flow of bubbles to the NW of waypoint 2	6/12/2016	3	52	21	46.242364	-124.649489	848.9	cam1_20160612035145.png
dropping a point here for where the bubble vantage point is	6/12/2016	3	55	12	46.242365	-124.649542	848.8	cam1_20160612035056.png
moving south of waypoint 2 down toward the next point (3)	6/12/2016	3	57	57	46.242391	-124.649483	849.4	cam1_20160612035145.png
really really heavy flow of bubbles	6/12/2016	4	2	53	46.242218	-124.649424	848.4	cam1_20160612040619.png
four strong flows of methane along a fracture	6/12/2016	4	5	28	46.242196	-124.649430	848.3	cam1_20160612040524.png
bubbles look somewhat oily - paul johnson	6/12/2016	4	18	29	46.242252	-124.649396	848.0	cam1_20160612041510.png
planning to get push cores then later gastights	6/12/2016	4	18	46	46.242253	-124.649394	848.9	cam1_20160612041510.png
rubber won't lay down on the second core	6/12/2016	4	27	49	46.242250	-124.649366	850.1	cam1_20160612042451.png
since the rubber won't lay flat, the seal won't remain so the core won’t stay in the tube and we need to use a different core tube, which means we can only get 3 of the 4 left over tubes	6/12/2016	4	29	45	46.242243	-124.649373	850.1	cam1_20160612042450.png
in search for the site to do gastight sampling	6/12/2016	4	40	18	46.242232	-124.649434	849.7	cam1_20160612044743.png
still in search for a really steady and good location for the gas tight to grab samples	6/12/2016	4	48	8	46.242240	-124.649439	847.9	cam1_20160612044636.png
bubbles are starting to stream out more	6/12/2016	4	50	37	46.242223	-124.649430	847.7	cam1_20160612045308.png
continuing on with the search pattern (at search pt3)	6/12/2016	5	12	24	46.242136	-124.649555	848.5	cam1_20160612051602.png
sea stars have been observed to be situated directly over bubbles	6/12/2016	5	13	10	46.242170	-124.649442	848.4	cam1_20160612051602.png
still in search for more steady streams of bubbling	6/12/2016	5	13	31	46.242169	-124.649417	849.0	cam1_20160612051602.png
the "remarkable bubble stream" just picked up really well	6/12/2016	5	17	26	46.242202	-124.649413	848.8	cam1_20160612051549.png
beautiful bubbles!	6/12/2016	5	17	44	46.242206	-124.649385	848.9	cam1_20160612051549.png
successful gastight collection!	6/12/2016	5	25	11	46.242194	-124.649424	848.7	cam1_20160612052355.png
previous GT sampler is GT5	6/12/2016	5	27	16	46.242212	-124.649400	848.6	cam1_20160612052359.png
deploying the marker, number 273	6/12/2016	5	30	17	46.242192	-124.649430	848.7	cam1_20160612053147.png

H1519 NA072 Astoria Canyon Seeps 2	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
temperature probe reading of the GT5 sampler site and the location that the marker was dropped at; temp is 2.49dC ambient, 2.63dC surface, 4.18dC at the 10 cm, 4.55dC at the 20cm	6/12/2016	5	46	32	46.242216	-124.649451	849.5	cam1_20160612054147.png
temp probe reading round 2	6/12/2016	5	53	41	46.242237	-124.649425	849.4	
Here is a full summary of the temp probe data	6/12/2016	6	1	17	46.242249	-124.649472	848.2	
now totally done with temp probe and planning to come up now	6/12/2016	6	1	35	46.242309	-124.649481	848.2	
just entered in off bottom, but now we are really coming off the bottom	6/12/2016	6	5	34	46.241921	-124.649423	837.3	
final out of water entered in by nav	6/12/2016	6	7	60	46.241835	-124.649420	808.6	

H1520 NA072 Heceta SW Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Lots of little jellies and organic material in the water column	6/14/2016	0	0	9	43.910450	-125.076958	96.2	cam1_20160614000503.png
Apendicularian net	6/14/2016	0	3	6	43.910511	-125.076954	159.7	cam1_20160614000503.png
shrimp	6/14/2016	0	5	37	43.910602	-125.077189	210.5	cam1_20160614000503.png
several small fish, occasional salps, squid in Argus cam	6/14/2016	0	10	49	43.910997	-125.077577	320.3	cam1_20160614001510.png
lots of fish	6/14/2016	0	13	7	43.911145	-125.077635	368.5	cam1_20160614001510.png
several larger fish appearing	6/14/2016	0	13	14	43.911174	-125.077622	371.3	cam1_20160614001510.png
large salp	6/14/2016	0	16	12	43.911206	-125.077559	432.7	cam1_20160614001510.png
Solmissus jelly	6/14/2016	0	19	18	43.911372	-125.077363	491.9	cam1_20160614001510.png
Fish have mostly disappeared	6/14/2016	0	19	42	43.911384	-125.077275	498.9	cam1_20160614001510.png
Herc at 860 m depth	6/14/2016	0	36	0	43.911925	-125.077344	851.4	
Aiming for descent at target "B" in the center of survey lines around expected methane seep	6/14/2016	0	37	47	43.912008	-125.077371	888.3	
lanternfish?	6/14/2016	0	42	57	43.912009	-125.077371	991.9	
white balance	6/14/2016	0	43	2	43.912012	-125.077370	993.6	
large salp in Argus cam	6/14/2016	0	47	22	43.912008	-125.077391	1077.1	
Solmissus jelly	6/14/2016	0	55	16	43.912129	-125.077054	1231.3	cam2_20160614005809.png
flat seafloor with occasional large eelpouts, pom pom anemones, stubby sea cucumbers, sun stars	6/14/2016	0	56	43	43.912041	-125.076617	1230.2	cam2_20160614005809.png
~1231 m depth at bottom	6/14/2016	0	57	1	43.911936	-125.076522	1229.8	cam2_20160614005809.png
Currently north of B (midway between 9/10), headed south to target B	6/14/2016	0	57	26	43.911915	-125.076543	1228.9	cam2_20160614005809.png
shrimp	6/14/2016	1	0	55	43.911829	-125.076512	1228.2	cam1_20160614010627.png
Unknown dark colored fish	6/14/2016	1	1	51	43.911841	-125.076443	1227.8	cam1_20160614010627.png
Continuing south after ship moves	6/14/2016	1	6	7	43.911579	-125.076476	1227.8	cam1_20160614010115.png
Small, dark octopus	6/14/2016	1	6	44	43.911818	-125.076968	1227.9	cam1_20160614010115.png
(Graneledone boreopacifica octopus)	6/14/2016	1	8	1	43.911614	-125.076354	1227.6	cam1_20160614010627.png
Pacific flatnose	6/14/2016	1	10	41	43.911762	-125.076471	1229.3	cam1_20160614011138.png
Zoomed in on small hole in seafloor; some stubby sea cucumbers	6/14/2016	1	11	51	43.911717	-125.076517	1229.0	cam1_20160614011138.png
Waiting for Argus to catch up with ship move	6/14/2016	1	13	14	43.911715	-125.076685	1229.6	cam1_20160614011138.png
thornyhead	6/14/2016	1	13	40	43.911674	-125.076714	1230.3	cam1_20160614011138.png
occasional gastropod shells	6/14/2016	1	14	12	43.911663	-125.076684	1229.5	cam1_20160614011138.png
DP issue; ship was backing up instead of moving towards targets; resetting thrusters	6/14/2016	1	17	22	43.912009	-125.076769	1231.4	cam1_20160614011138.png

H1520 NA072 Heceta SW Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
eelpout and puffball anemone	6/14/2016	1	18	1	43.911962	-125.076774	1232.0	cam1_20160614011138.png
Density of sea cucumbers slightly increased	6/14/2016	1	18	40	43.911800	-125.076796	1232.8	cam1_20160614011138.png
orange anemone	6/14/2016	1	19	18	43.911811	-125.076987	1233.6	cam1_20160614011138.png
grenadier? sole.	6/14/2016	1	19	34	43.911806	-125.076996	1233.7	cam1_20160614011138.png
Ship is heading SE at 151 again	6/14/2016	1	22	11	43.911920	-125.076997	1233.9	cam1_20160614012019.png
Hercules is ~97m from target	6/14/2016	1	22	45	43.911921	-125.077022	1233.8	cam1_20160614012019.png
rattails	6/14/2016	1	26	33	43.911813	-125.076837	1232.2	cam1_20160614012019.png
Gastropods	6/14/2016	1	27	34	43.911757	-125.076703	1230.1	cam1_20160614012019.png
Sea cucumbers have mostly disappeared again	6/14/2016	1	28	0	43.911680	-125.076695	1230.5	cam1_20160614012019.png
zoom in on snail	6/14/2016	1	28	50	43.911659	-125.076638	1229.7	cam1_20160614012019.png
pink anemone on a snail?	6/14/2016	1	30	17	43.911588	-125.076599	1228.9	cam1_20160614013004.png
Skate	6/14/2016	1	32	20	43.911439	-125.076600	1228.1	cam1_20160614013007.png
Large rattail	6/14/2016	1	34	54	43.911379	-125.076571	1227.8	cam1_20160614013007.png
very large rat tail fish	6/14/2016	1	35	3	43.911357	-125.076574	1227.7	cam1_20160614013007.png
crab	6/14/2016	1	35	13	43.911339	-125.076577	1227.6	cam1_20160614013007.png
Large sonar hit ~25 m ahead and to Herc's port side	6/14/2016	1	37	17	43.911290	-125.076549	1227.4	cam1_20160614013007.png
seastar	6/14/2016	1	37	23	43.911290	-125.076518	1227.1	cam1_20160614013007.png
large sea star	6/14/2016	1	37	30	43.911290	-125.076491	1227.0	cam1_20160614013007.png
shellhash	6/14/2016	1	37	48	43.911286	-125.076485	1226.9	cam1_20160614013007.png
pile of shells	6/14/2016	1	37	52	43.911281	-125.076485	1226.8	cam1_20160614013007.png
crab and some fish	6/14/2016	1	38	7	43.911189	-125.076481	1226.5	cam1_20160614013007.png
rattails, large crabs	6/14/2016	1	38	9	43.911187	-125.076481	1226.4	cam1_20160614013007.png
white patch, may be a small bacterial mat	6/14/2016	1	38	52	43.911200	-125.076481	1226.4	cam1_20160614013007.png
bacteria amongst sediment	6/14/2016	1	38	53	43.911200	-125.076481	1226.4	cam1_20160614013007.png
shell hash increased	6/14/2016	1	39	48	43.911072	-125.076374	1225.9	cam1_20160614013007.png
many more shells; the crabs we just passed were short spine king crabs	6/14/2016	1	39	60	43.911063	-125.076373	1225.9	cam1_20160614013007.png
Bacterial mats	6/14/2016	1	40	12	43.911023	-125.076370	1225.7	cam1_20160614014501.png
possible pock mark with shellhash	6/14/2016	1	40	40	43.911000	-125.076276	1224.6	cam1_20160614014501.png
flying over mound with pocket full of bacteria; zoom in on dense shell patch	6/14/2016	1	40	44	43.910973	-125.076264	1224.6	cam1_20160614014501.png
Live clams and gastropods	6/14/2016	1	40	58	43.910948	-125.076257	1224.9	cam1_20160614014501.png
live clams and gastropods	6/14/2016	1	41	8	43.910952	-125.076262	1225.0	cam1_20160614014501.png
Flying back over mound with bacteria	6/14/2016	1	41	36	43.910991	-125.076268	1224.5	cam1_20160614014501.png
Bacteria and shellhash	6/14/2016	1	41	45	43.910994	-125.076270	1225.3	cam1_20160614014501.png

H1520 NA072 Heceta SW Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Bubbles	6/14/2016	1	42	2	43.911006	-125.076251	1225.4	cam1_20160614014501.png
active seep	6/14/2016	1	42	6	43.911026	-125.076246	1225.3	cam1_20160614014501.png
deep sea sole	6/14/2016	1	43	3	43.911034	-125.076212	1225.7	cam1_20160614014520.png
Bubbles coming from depression in edge of mound from bacterial mat	6/14/2016	1	43	36	43.911034	-125.076207	1225.6	cam1_20160614014520.png
collapse structure in sediment	6/14/2016	1	44	58	43.911060	-125.076285	1226.0	cam1_20160614014520.png
cracks in mound; collapsing in somehow?	6/14/2016	1	44	60	43.911061	-125.076284	1226.0	cam1_20160614014520.png
small gastropods and bacterial mat	6/14/2016	1	46	8	43.911068	-125.076239	1226.0	cam1_20160614014501.png
Hole in escarpment; small gastropods, bacterial mat	6/14/2016	1	46	14	43.911064	-125.076238	1225.9	cam1_20160614014501.png
panning over mound	6/14/2016	1	48	5	43.911067	-125.076211	1226.0	cam1_20160614014501.png
moving dense patch of shells to southeast	6/14/2016	1	48	33	43.911067	-125.076215	1225.6	cam1_20160614014501.png
series of small fractures in sediment	6/14/2016	1	48	42	43.911030	-125.076210	1225.3	cam1_20160614014501.png
lots of small fractures in the sediment	6/14/2016	1	48	47	43.910957	-125.076207	1225.4	cam1_20160614014501.png
Continuing southeast toward sonar target	6/14/2016	1	49	24	43.910953	-125.076194	1225.8	cam1_20160614014520.png
pompom anemone	6/14/2016	1	49	59	43.910929	-125.076215	1226.6	cam1_20160614014520.png
lots of patches of clams	6/14/2016	1	49	59	43.910929	-125.076215	1226.6	cam1_20160614014520.png
larger section of shells with tubeworms	6/14/2016	1	50	51	43.910856	-125.076199	1226.4	cam1_20160614015445.png
tubeworms lamellibrachia and bacteria	6/14/2016	1	51	48	43.910878	-125.076182	1226.3	cam1_20160614015408.png
Stringier bacteria on live tubeworms	6/14/2016	1	51	51	43.910879	-125.076183	1226.3	cam1_20160614015408.png
Orangey anemone	6/14/2016	1	52	10	43.910856	-125.076183	1226.4	cam1_20160614015458.png
large anemone	6/14/2016	1	52	13	43.910851	-125.076183	1226.4	cam1_20160614015458.png
darker purple anemone on tube worms	6/14/2016	1	52	57	43.910854	-125.076183	1226.4	cam1_20160614015458.png
very large clam bed with bacteria	6/14/2016	1	53	20	43.910860	-125.076184	1226.5	cam1_20160614015445.png
Moving along perimeter of shell bed	6/14/2016	1	53	20	43.910858	-125.076184	1226.6	cam1_20160614015445.png
Some dark sediments among white bacterial mats	6/14/2016	1	54	33	43.910814	-125.076153	1227.1	cam1_20160614015445.png
Very dense, fuzzy white mat	6/14/2016	1	55	9	43.910852	-125.076160	1226.9	cam1_20160614015445.png
different, filamentous, fibrous bacterial mat, white colored	6/14/2016	1	56	8	43.910794	-125.076146	1226.9	cam1_20160614015458.png
more tubeworms	6/14/2016	1	56	15	43.910822	-125.076159	1227.0	cam1_20160614015458.png
fluffy, mounded white bacteria	6/14/2016	1	56	17	43.910833	-125.076164	1227.0	cam1_20160614015458.png
king crab, clams and dark sediment patch	6/14/2016	1	57	44	43.910818	-125.076162	1227.1	cam1_20160614015458.png
mound of dark sediment in middle of clam bed; king crab, thornyhead, small eelpouts	6/14/2016	1	58	4	43.910825	-125.076149	1227.3	cam1_20160614015507.png
another patch of live clams and ophiuroids, polychaetes	6/14/2016	1	59	34	43.910796	-125.076152	1227.5	cam1_20160614015445.png
Healthy clam bed with some small seastars	6/14/2016	1	59	45	43.910795	-125.076149	1227.3	cam1_20160614015445.png

H1520 NA072 Heceta SW Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
galatheids and gastropods	6/14/2016	2	0	35	43.910780	-125.076107	1227.4	cam1_20160614020322.png
gastropods with trails in sediment	6/14/2016	2	1	18	43.910821	-125.076300	1227.4	cam1_20160614020231.png
Headed to tube worms ahead	6/14/2016	2	3	3	43.910803	-125.076178	1227.2	cam1_20160614020231.png
live tubeworms, polychaete, crab	6/14/2016	2	3	44	43.910760	-125.076134	1227.3	cam1_20160614020231.png
another patch of tubeworms, lamellibrachia, polychaete, crab feeding	6/14/2016	2	4	7	43.910802	-125.076129	1227.2	cam1_20160614020322.png
Shortspine king crab eating something	6/14/2016	2	4	58	43.910790	-125.076151	1227.3	cam1_20160614020322.png
amphipods on crab's legs	6/14/2016	2	5	11	43.910796	-125.076112	1227.2	cam1_20160614020329.png
tanner crab	6/14/2016	2	8	26	43.910799	-125.076153	1227.2	cam1_20160614020329.png
tanner crab	6/14/2016	2	8	31	43.910796	-125.076137	1227.3	cam1_20160614020329.png
lots of patches of live clams with fewer patches of tubeworms	6/14/2016	2	8	49	43.910797	-125.076123	1227.1	cam1_20160614020329.png
continuing southeast to strong sonar targets	6/14/2016	2	9	53	43.910835	-125.076163	1227.3	cam1_20160614020329.png
sole	6/14/2016	2	11	6	43.910766	-125.075945	1226.9	cam1_20160614021422.png
tracking along the trend of the fault and looking at carbonate	6/14/2016	2	11	57	43.910780	-125.075964	1226.7	cam1_20160614021422.png
many more tube worms	6/14/2016	2	12	4	43.910784	-125.075953	1226.5	cam1_20160614021240.png
small mound of carbonate	6/14/2016	2	12	19	43.910771	-125.075909	1226.7	cam1_20160614021240.png
Nemertian worm	6/14/2016	2	12	34	43.910778	-125.075933	1226.7	cam1_20160614021240.png
anemone	6/14/2016	2	12	39	43.910774	-125.075933	1226.6	cam1_20160614021240.png
looking at a mound of carbonate with worms and anemones	6/14/2016	2	13	10	43.910782	-125.075951	1226.6	cam1_20160614021422.png
mostly tubeworms	6/14/2016	2	14	1	43.910789	-125.075884	1226.5	cam1_20160614021240.png
longer tubeworms	6/14/2016	2	14	13	43.910782	-125.075893	1226.5	cam1_20160614021240.png
clams have largely disappeared in this direction, replaced by tubeworms with small bacterial patches	6/14/2016	2	16	3	43.910761	-125.075931	1225.7	cam1_20160614021422.png
visibility obscured by dust cloud	6/14/2016	2	16	14	43.910760	-125.075907	1225.9	cam1_20160614021422.png
dark sediment patches	6/14/2016	2	16	53	43.910733	-125.075907	1225.5	cam1_20160614021422.png
must have brushed mound with side of vehicle; coming off bottom to shake off sediment	6/14/2016	2	17	15	43.910747	-125.075922	1224.9	cam1_20160614021422.png
more bacterial mat patches	6/14/2016	2	17	43	43.910699	-125.075801	1224.6	cam1_20160614021422.png
a couple of sponges	6/14/2016	2	18	17	43.910721	-125.075790	1223.5	cam1_20160614021422.png
Readjusting mongo arm position	6/14/2016	2	19	20	43.910702	-125.075745	1223.0	cam1_20160614021240.png
zooming in on white sponge	6/14/2016	2	20	20	43.910807	-125.075662	1223.5	cam2_20160614022352.png
sponge growing on tubeworm	6/14/2016	2	20	37	43.910818	-125.075635	1223.7	cam2_20160614022352.png
piece of net	6/14/2016	2	23	11	43.910757	-125.075768	1224.5	cam1_20160614022941.png
patchy clams, tube worms and bacteria	6/14/2016	2	24	25	43.910769	-125.075771	1225.5	cam1_20160614022646.png
unknown white sponge patch	6/14/2016	2	25	24	43.910737	-125.075806	1225.6	cam1_20160614022811.png
sponge, white and small lattice	6/14/2016	2	25	45	43.910745	-125.075805	1225.6	cam1_20160614022811.png

H1520 NA072 Heceta SW Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
taller mounds	6/14/2016	2	26	6	43.910678	-125.075795	1225.7	cam2_20160614022352.png
irregular peak followed by a large collapsed hole?	6/14/2016	2	26	46	43.910590	-125.075769	1225.8	cam2_20160614022352.png
dark sediment patches	6/14/2016	2	27	8	43.910567	-125.075757	1225.8	cam2_20160614022352.png
hummocky chaotic terrain	6/14/2016	2	27	28	43.910610	-125.075760	1225.9	cam2_20160614022352.png
bacteria mat covering other side of hummock	6/14/2016	2	29	26	43.910650	-125.075748	1226.0	cam1_20160614022941.png
large bacterial mats covering the other side of these mounds, leading down into dark sediments, then into clam beds	6/14/2016	2	29	39	43.910650	-125.075978	1225.9	cam1_20160614022941.png
Hole in side of mound	6/14/2016	2	30	35	43.910606	-125.075970	1227.7	cam1_20160614023234.png
Hydrate inside hole?	6/14/2016	2	30	58	43.910608	-125.075903	1227.4	cam1_20160614023234.png
Zoom in on hydrate	6/14/2016	2	31	20	43.910606	-125.075906	1227.4	cam1_20160614023454.png
methane hydrate inside the mound	6/14/2016	2	31	34	43.910601	-125.075972	1227.4	cam1_20160614023454.png
Bubbles from lower hole	6/14/2016	2	31	47	43.910618	-125.075982	1227.5	cam1_20160614023454.png
Holes from collapse due to melting ice, maybe?	6/14/2016	2	32	32	43.910613	-125.075632	1227.3	cam1_20160614023237.png
tiny gastropods	6/14/2016	2	32	50	43.910606	-125.075566	1227.5	cam1_20160614023237.png
little gastropods and clams, bacteria, more methane hydrate	6/14/2016	2	33	2	43.910598	-125.075593	1227.3	cam1_20160614023533.png
No more bubbles from holes since that last group	6/14/2016	2	34	15	43.910659	-125.075743	1227.2	cam1_20160614023533.png
looking into crevice/ underside of overhang near top of mound	6/14/2016	2	35	13	43.910616	-125.075810	1226.6	cam1_20160614023454.png
snailfish	6/14/2016	2	35	46	43.910568	-125.075790	1226.6	cam1_20160614023454.png
snailfish	6/14/2016	2	35	46	43.910568	-125.075790	1226.6	cam1_20160614023454.png
dark sediment around overhang	6/14/2016	2	36	21	43.910584	-125.075774	1226.6	cam1_20160614023533.png
mussel with frills	6/14/2016	2	38	15	43.910580	-125.075931	1226.5	cam1_20160614023454.png
weird dark fringed bivalve	6/14/2016	2	38	20	43.910580	-125.075929	1226.4	cam1_20160614023454.png
leaving a target in Hypack, "frilled mussels"	6/14/2016	2	39	28	43.910594	-125.075869	1226.7	cam1_20160614023533.png
Attempting to collect weird frilled mussels via ROV grab	6/14/2016	2	44	5	43.910546	-125.075765	1227.2	cam1_20160614024439.png
Shattered it	6/14/2016	2	44	47	43.910555	-125.075800	1227.2	cam1_20160614024439.png
Gave up attempts to collect mussels, too risky to use slurp now with gas tight in the way	6/14/2016	2	46	26	43.910522	-125.075884	1226.9	cam1_20160614024439.png
Lifting up to try searching for bubbles in sonar	6/14/2016	2	49	58	43.910597	-125.075852	1225.2	cam1_20160614024439.png
rising off the bottom to look on the sonar for bubbles	6/14/2016	2	50	2	43.910596	-125.075847	1224.7	
sablefish	6/14/2016	2	50	8	43.910596	-125.075838	1224.1	
large sablefish	6/14/2016	2	50	9	43.910596	-125.075835	1223.9	
5m off bottom, surveying site via sonar from above	6/14/2016	2	50	52	43.910588	-125.075822	1223.3	

H1520 NA072 Heceta SW Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
sonar target 20m to east	6/14/2016	2	51	53	43.910597	-125.075839	1223.4	
approached possible sonar target which no seems to just be rocks not bubbles	6/14/2016	3	9	0	43.910812	-125.075458	1224.3	cam1_20160614030032.png
more sparse in biological life compared to earlier, but still quite rich overall	6/14/2016	3	14	21	43.910808	-125.075660	1221.4	cam2_20160614031109.png
sonar bubbles clear, heading towards target	6/14/2016	3	19	38	43.910881	-125.075705	1222.1	cam2_20160614031109.png
jelly	6/14/2016	3	20	15	43.910905	-125.075910	1222.6	cam1_20160614032731.png
short spined thorny heads	6/14/2016	3	27	11	43.910976	-125.076316	1226.8	cam1_20160614032702.png
deep crack or fissure that may have hydrates inside, definitely bubbles present	6/14/2016	3	28	28	43.911047	-125.076172	1227.0	cam1_20160614032728.png
scanning around the 'seep and bacteria' nav site, scattered bubbles and many clams present with microbial mats	6/14/2016	3	32	16	43.910933	-125.076266	1226.7	cam2_20160614033924.png
continuing the survey now, moving towards target B. consistent scattered clams and bacterial mats	6/14/2016	3	34	16	43.910941	-125.076309	1225.6	cam2_20160614033924.png
just about at Target B, seafloor is highly sedimented with few to no microbial mats, scattered substrate is covered in clams and other life	6/14/2016	3	39	8	43.910887	-125.076463	1227.6	cam1_20160614033050.png
multi-rayed seastar	6/14/2016	3	44	60	43.910708	-125.076518	1228.6	cam1_20160614034503.png
anemone	6/14/2016	3	46	59	43.910730	-125.076660	1231.1	cam1_20160614034619.png
tanner crab	6/14/2016	3	47	12	43.910730	-125.076760	1231.6	cam1_20160614034619.png
approaching the sonar target to the SW of Target B	6/14/2016	3	47	59	43.910753	-125.076807	1232.6	cam1_20160614034619.png
starting to get more microbial	6/14/2016	3	48	9	43.910777	-125.076809	1233.0	cam1_20160614034619.png
small scattered bubbles	6/14/2016	3	48	56	43.910829	-125.076898	1232.9	cam1_20160614034619.png
sea pig city	6/14/2016	3	49	36	43.910788	-125.076818	1233.3	cam1_20160614034619.png
arrived at sonar target, many clam beds	6/14/2016	3	49	54	43.910807	-125.076774	1233.7	cam1_20160614034619.png
sea pig close up	6/14/2016	3	50	27	43.910759	-125.076795	1233.5	cam1_20160614035028.png
targeted area that we are at now (from sonar)	6/14/2016	3	56	4	43.910815	-125.077020	1233.2	cam1_20160614035140.png
Clam bed	6/14/2016	4	10	26	43.910599	-125.077005	1235.0	cam1_20160614041430.png
pacific grenadier	6/14/2016	4	19	5	43.910524	-125.076998	1235.0	cam1_20160614041430.png
Used multibeam to try to detect the seeps, this was not successful (it turned out to be an artifact). now returning to site 'seep and bacteria' and going a different route on our way there	6/14/2016	4	22	32	43.910552	-125.076912	1234.2	
again back at previous seep and bacteria site, little streams of bubbles	6/14/2016	4	32	3	43.910988	-125.076413	1226.9	cam1_20160614043413.png
many bubbles streams, small but ferocious bubbles	6/14/2016	4	34	10	43.911003	-125.076455	1226.8	cam1_20160614043413.png
preparing to sample bubbles for Tamara	6/14/2016	4	35	12	43.910989	-125.076402	1226.6	cam1_20160614043345.png

H1520 NA072 Heceta SW Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
thorny head visits the GT sample site	6/14/2016	4	45	16	43.910902	-125.076098	1226.8	cam1_20160614044321.png
still at GT sampler site, deployed the hydrophone and a seafloor marker (number 220)	6/14/2016	4	53	8	43.910851	-125.076410	1226.7	cam1_20160614045535.png
hydrophone is placed at bubble site	6/14/2016	4	53	25	43.910832	-125.076448	1226.8	cam1_20160614045535.png
marker is now placed at the same spot that the hydrophone is at	6/14/2016	4	55	11	43.910928	-125.076429	1226.7	cam1_20160614045227.png
now we are going to do some temp readings with the temp probe	6/14/2016	4	55	34	43.910929	-125.076456	1226.7	cam1_20160614045227.png
Temp read 1 (at site of GT sampling)	6/14/2016	5	5	46	43.910944	-125.076439	1226.7	cam1_20160614050830.png
moving up and getting shots of the hydrophone	6/14/2016	5	6	43	43.911201	-125.076415	1225.6	cam1_20160614050728.png
great shots of marker with bubbles	6/14/2016	5	8	51	43.911157	-125.076359	1225.4	cam1_20160614050728.png
tanner crab	6/14/2016	5	9	18	43.911152	-125.076474	1225.8	cam1_20160614050732.png
clam beds	6/14/2016	5	16	45	43.910869	-125.076325	1225.2	cam1_20160614051833.png
great Argus view!!	6/14/2016	5	17	51	43.910900	-125.076324	1225.2	cam1_20160614051804.png
remarkable tube worm site with a lot of life including tanner crabs, anemones, fish, clams, etc	6/14/2016	5	21	32	43.911033	-125.076058	1225.3	cam1_20160614052815.png
tube worm ecosystem close up	6/14/2016	5	23	51	43.910938	-125.076204	1224.8	cam1_20160614052815.png
planning to slurp some bio	6/14/2016	5	24	1	43.910939	-125.076159	1224.8	cam1_20160614052816.png
carbonate structures	6/14/2016	5	31	60	43.910806	-125.075979	1223.7	cam1_20160614053521.png
fuzzy white bacterial mats	6/14/2016	5	37	22	43.910718	-125.075970	1222.0	cam1_20160614053545.png
big tube worm bush	6/14/2016	5	42	11	43.910584	-125.076066	1222.9	cam1_20160614054358.png
very dense assemblage of tube worms	6/14/2016	5	44	36	43.910536	-125.076058	1224.4	cam1_20160614054339.png
following these large carbonate structures and depressions, dense biology including large tube worm assemblages and clams	6/14/2016	5	53	40	43.910562	-125.075871	1224.0	cam1_20160614055623.png
bubbles!	6/14/2016	5	57	57	43.910429	-125.076032	1225.2	cam1_20160614055143.png
terrain has many depressions and clusters of these tube worms and clams	6/14/2016	6	0	50	43.910625	-125.075866	1221.7	cam1_20160614060717.png
searching for the large depression observed from previous watches	6/14/2016	6	4	14	43.910722	-125.076016	1221.3	cam1_20160614060717.png
down in the depression of the ridge SW of the hydrate target	6/14/2016	6	8	60	43.910624	-125.075961	1221.2	cam1_20160614060717.png
preparing for tube worm sampling, located a larger plot of tube worms but still in search for even bigger and more dense assemblages	6/14/2016	6	17	56	43.910860	-125.075782	1221.8	cam1_20160614061758.png
south of the nav target sponge, and north of the hydrate target; prepping to sample with slurp	6/14/2016	6	22	35	43.910916	-125.075735	1223.2	cam1_20160614062705.png
Zoom-in on sample jars in Herc. Can see Hydrate bubbles formed	6/14/2016	7	11	15	43.910909	-125.075839	1222.6	cam1_20160614071929.png

H1520 NA072 Heceta SW Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Zoom-in on clam bed. Thornyhead, sea star, crab, tube worms also in frame	6/14/2016	7	12	46	43.910810	-125.075877	1222.2	cam1_20160614071937.png
setting up to core	6/14/2016	7	19	33	43.910839	-125.075869	1224.6	cam1_20160614071834.png
first PC unsuccessful. trying again.	6/14/2016	7	24	33	43.910808	-125.076028	1224.6	cam1_20160614072906.png
shell rubble is prohibiting taking a good core	6/14/2016	7	30	12	43.910810	-125.076113	1224.6	cam1_20160614073713.png
second PC attempt. substrate too hard, clams too large. abort. will look for smaller clams.	6/14/2016	7	30	39	43.910812	-125.076115	1224.6	cam1_20160614073713.png
scoop 2.0 to take clam samples	6/14/2016	7	32	45	43.910823	-125.076118	1224.6	cam1_20160614073704.png
worms, clams, shell material collected	6/14/2016	7	50	11	43.910928	-125.075889	1224.5	cam1_20160614075843.png
push core. first trial sediment fell out once removed. trying other edge of mat.	6/14/2016	8	3	3	43.910948	-125.075917	1224.6	cam1_20160614080933.png
core sediments are very loosely packed. sample NA072-064 was half full but still loosely packed	6/14/2016	8	4	46	43.910937	-125.075867	1224.6	cam1_20160614080934.png
preparing to slurp	6/14/2016	8	6	49	43.910945	-125.075851	1224.6	cam1_20160614080937.png
exploring for smaller clam bed (size of clams) in order to PC	6/14/2016	8	17	28	43.911033	-125.075733	1222.7	cam1_20160614081914.png
Zoom-in on clam bed. Associated fauna include thornyhead, hagfish, brittle stars, frilled mussels, snail, anemone	6/14/2016	8	25	37	43.911018	-125.075664	1224.9	cam1_20160614082732.png
biology cores inserted well	6/14/2016	8	30	25	43.910977	-125.075736	1224.8	cam1_20160614083229.png
edge of clam beds seem to be better for coring	6/14/2016	8	30	39	43.910969	-125.075731	1224.8	cam1_20160614083229.png
rattail tentative ID Coryphanoides sp.	6/14/2016	8	33	46	43.911005	-125.075678	1224.8	cam1_20160614083330.png
two successful cores	6/14/2016	8	34	46	43.910948	-125.075652	1224.8	cam1_20160614083742.png
frilled mussels in suction??	6/14/2016	8	38	38	43.910951	-125.075681	1224.8	cam1_20160614083742.png
slurp complete	6/14/2016	8	45	47	43.910982	-125.075668	1224.8	cam1_20160614084754.png
scoops starting for clams	6/14/2016	8	48	19	43.910962	-125.075700	1224.8	cam1_20160614084754.png
Several (4-ish) clams from scoop sample fell into stbd bio inboard 2nd from front bio box with worms.	6/14/2016	8	51	9	43.911062	-125.075326	1224.8	cam1_20160614085255.png
scoop complete. going to slurp up disturbed sediment	6/14/2016	8	55	4	43.911042	-125.075686	1224.7	cam1_20160614085255.png
sea pigs, cf. Scotoplanes	6/14/2016	9	2	51	43.911079	-125.075587	1224.8	cam1_20160614090915.png
flat sedimented area for cores	6/14/2016	9	4	53	43.911048	-125.075538	1224.9	cam1_20160614090904.png
cores went in very easily	6/14/2016	9	5	9	43.911034	-125.075526	1224.9	cam1_20160614090915.png
two good bio cores mostly full	6/14/2016	9	10	43	43.911065	-125.075590	1224.9	
Lots of sampling occurring, including	6/14/2016	9	13	42	43.911050	-125.075517	1224.7	
transit to WP10 to take temp reading before heading to secondary site.	6/14/2016	9	14	29	43.911066	-125.075487	1223.7	

H1520 NA072 Heceta SW Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Liponema brevicornis	6/14/2016	9	21	58	43.911420	-125.075399	1225.9	cam1_20160614092419.png
Lots of sea pigs	6/14/2016	9	22	36	43.911438	-125.075394	1226.1	cam1_20160614092406.png
White strings sticking out from sediment = brittle star arms	6/14/2016	9	28	4	43.911699	-125.075229	1228.8	cam1_20160614092419.png
small, black, starburst-looking organisms in sediment = tube-dwelling anemone	6/14/2016	9	28	51	43.911685	-125.075248	1229.3	cam1_20160614092419.png
1.76 deg C	6/14/2016	9	32	16	43.911776	-125.075108	1229.6	cam2_20160614093453.png
temp at 20cm depth	6/14/2016	9	34	23	43.911780	-125.075189	1229.7	cam2_20160614093453.png
Herc TProbe	6/14/2016	9	34	51	43.911722	-125.075188	1229.6	cam2_20160614093453.png
last observation was at 10cm, not 20cm	6/14/2016	9	35	17	43.911733	-125.075211	1229.7	cam2_20160614093453.png
Last 20cm reading actually at 10 cm. actual 20 cm reading	6/14/2016	9	36	46	43.911753	-125.075185	1229.6	cam2_20160614093453.png
Begin transit to secondary site	6/14/2016	9	38	59	43.911781	-125.075112	1228.7	cam2_20160614093453.png
During transit	6/14/2016	9	42	28	43.911858	-125.075020	1228.0	
Water very turbid during transit. Very minimal visibility	6/14/2016	9	44	43	43.911899	-125.075001	1227.9	
starting to see eelpouts in the herds of cukes	6/14/2016	9	47	35	43.912018	-125.074886	1229.3	
Pteraster	6/14/2016	10	4	35	43.913076	-125.073125	1226.2	cam1_20160614100735.png
rattail, macrouridae	6/14/2016	10	7	53	43.913276	-125.072729	1225.1	cam1_20160614100712.png
Zoom-in on sea pen	6/14/2016	10	9	44	43.913307	-125.072653	1224.4	cam1_20160614100722.png
Anthoptilum	6/14/2016	10	10	10	43.913295	-125.072454	1224.3	cam2_20160614101243.png
zoom-in on sea pen	6/14/2016	10	13	22	43.913639	-125.071923	1222.2	cam2_20160614101243.png
Anthoptilum	6/14/2016	10	16	38	43.913910	-125.071430	1220.9	cam1_20160614101620.png
took a Niskin near Anthoptilum	6/14/2016	10	18	43	43.913970	-125.071169	1220.9	cam2_20160614101243.png
almost finished transit. similar fauna as previously noted	6/14/2016	10	54	60	43.916355	-125.067163	1216.1	
camera failure	6/14/2016	10	58	31	43.916409	-125.067220	1214.3	
cameras back	6/14/2016	10	58	47	43.916297	-125.067324	1213.2	
Holding position to sort out power issues on Herc	6/14/2016	11	6	1	43.916507	-125.066960	1213.7	
Using Argus to tow Herc off bottom to sort out power issues	6/14/2016	11	8	12	43.916529	-125.066799	1211.2	
Herc lost power again, Argus did not	6/14/2016	11	11	46	43.916478	-125.066696	1179.5	
Argus ascending, towing Herc at 10m/min until ROV figures out power issue	6/14/2016	11	12	47	43.916521	-125.066704	1172.0	
Ascending to 1000 m	6/14/2016	11	13	22	43.916539	-125.066715	1169.4	
Continuing to wait for power troubleshooting	6/14/2016	11	47	6	43.918285	-125.066723	1070.0	
Bridge is shutting off rotary power	6/14/2016	11	59	45	43.919054	-125.066590	1052.7	
Trying to power up again	6/14/2016	12	32	35	43.920192	-125.066612	1046.4	
Lights and cameras on	6/14/2016	12	32	54	43.920192	-125.066618	1046.6	

H1520 NA072 Heceta SW Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
voltage is stable	6/14/2016	12	33	38	43.920193	-125.066519	1053.7	
Descending	6/14/2016	12	35	13	43.920264	-125.066580	1061.0	
back on seafloor	6/14/2016	12	48	38	43.920499	-125.067239	1226.1	cam1_20160614124908.png
on bottom, sea pigs on generally empty seafloor; grenadier	6/14/2016	12	49	7	43.920741	-125.067002	1228.2	cam1_20160614124908.png
Heading south to return to target	6/14/2016	12	49	30	43.920892	-125.067066	1227.9	cam1_20160614124908.png
pacific flatnose; grenadier	6/14/2016	12	50	49	43.920633	-125.067120	1227.8	cam2_20160614125028.png
crab	6/14/2016	12	51	48	43.920761	-125.066501	1227.2	cam2_20160614125028.png
anemones	6/14/2016	12	55	21	43.920309	-125.066905	1226.5	cam2_20160614125028.png
Continuing to head south at about 0.4knots	6/14/2016	12	56	27	43.920282	-125.066902	1226.3	cam2_20160614125028.png
sea pen	6/14/2016	12	58	19	43.920318	-125.066792	1226.2	cam2_20160614125028.png
seastar	6/14/2016	12	59	9	43.920096	-125.066775	1226.1	cam2_20160614125028.png
snailfish	6/14/2016	13	0	12	43.919989	-125.066885	1226.0	cam1_20160614130814.png
kelp	6/14/2016	13	0	24	43.919952	-125.066976	1226.0	cam1_20160614130814.png
Plan to explore "S" site, return to "B" to recover hydrophone, then take some water samples during ascent. Dive may be extended to 1100 local on deck time.	6/14/2016	13	0	49	43.919887	-125.066910	1225.8	cam1_20160614130814.png
rockfish	6/14/2016	13	1	24	43.919653	-125.066649	1225.9	cam1_20160614130814.png
large rattail	6/14/2016	13	3	52	43.919675	-125.066782	1225.2	cam1_20160614130814.png
sole	6/14/2016	13	4	11	43.919747	-125.066822	1225.5	cam1_20160614130814.png
sea whip with basket star	6/14/2016	13	7	1	43.919580	-125.067145	1225.0	cam1_20160614130814.png
sea pen	6/14/2016	13	7	30	43.919497	-125.066960	1225.1	cam1_20160614130814.png
zoom on crab	6/14/2016	13	8	4	43.919406	-125.067275	1225.2	cam1_20160614130814.png
pompom anemone	6/14/2016	13	8	56	43.919312	-125.067276	1225.0	cam1_20160614130814.png
many small holes in seafloor	6/14/2016	13	10	26	43.919206	-125.066780	1224.4	
hagfish	6/14/2016	13	11	16	43.919066	-125.067000	1224.3	
sunstar	6/14/2016	13	13	28	43.918752	-125.067295	1223.8	
sole	6/14/2016	13	14	6	43.918695	-125.067336	1223.4	
Anthoptilum sea pen (fat stubby one)	6/14/2016	13	15	54	43.918560	-125.067238	1222.9	
Still heading directly towards "S", 194 m; another anthuptilum sea pen	6/14/2016	13	17	20	43.918287	-125.067236	1222.3	
large tanner crab	6/14/2016	13	18	46	43.918245	-125.067301	1222.1	
pompom anemone	6/14/2016	13	18	53	43.918278	-125.067379	1221.7	
sunstar	6/14/2016	13	19	22	43.918147	-125.067244	1221.8	
Voltages remain stable	6/14/2016	13	20	55	43.918007	-125.067391	1221.2	
continuing over similar seafloor	6/14/2016	13	23	48	43.917780	-125.067340	1219.5	
shells	6/14/2016	13	24	5	43.917756	-125.067245	1219.1	

H1520 NA072 Heceta SW Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
anthuptilum sea pen	6/14/2016	13	24	29	43.917779	-125.066821	1218.6	
gastropod with trail	6/14/2016	13	26	22	43.917436	-125.067263	1217.4	
pacific flatnose	6/14/2016	13	27	23	43.917328	-125.067225	1216.9	
~54 m to target	6/14/2016	13	31	12	43.916863	-125.066959	1216.0	cam2_20160614133455.png
clam bed	6/14/2016	13	34	59	43.916661	-125.066980	1215.5	cam1_20160614133453.png
continuing east towards strong sonar return; currently 20m SW of "S"	6/14/2016	13	35	39	43.916531	-125.066855	1214.7	cam2_20160614133455.png
large clam bed, tube worms, king crabs, carbonates	6/14/2016	13	36	1	43.916938	-125.066930	1214.2	cam1_20160614133453.png
Paused, waiting for ship move; adjusting heading to fight current	6/14/2016	13	42	18	43.916203	-125.067234	1217.9	
sea whip	6/14/2016	13	43	8	43.916214	-125.067354	1218.2	
Having trouble bringing the ship back to the north	6/14/2016	13	50	25	43.915879	-125.067336	1219.0	
Herc is now ~126m southwest of target	6/14/2016	13	54	42	43.915678	-125.067332	1219.1	
another large A. sea pen	6/14/2016	14	0	47	43.916327	-125.067380	1218.1	
Poralia jelly	6/14/2016	14	3	26	43.916434	-125.067315	1217.5	
Cameras/lights out	6/14/2016	14	4	32	43.916423	-125.067325	1217.2	
Holding ship position	6/14/2016	14	5	26	43.916455	-125.067262	1215.7	
Cameras/lights back on (problem related to someone hitting an emergency stop?)	6/14/2016	14	5	58	43.916465	-125.067217	1217.9	
Continuing ship move NE	6/14/2016	14	6	12	43.916463	-125.067207	1217.7	
Herc 50m from target	6/14/2016	14	8	41	43.916407	-125.067311	1217.5	
white balance	6/14/2016	14	10	23	43.916542	-125.067288	1217.6	cam1_20160614141915.png
zoom on seastar	6/14/2016	14	12	19	43.916535	-125.067291	1217.6	cam1_20160614141913.png
waiting for Argus to catch up to ship move	6/14/2016	14	18	50	43.916537	-125.067098	1217.8	cam1_20160614141915.png
zoom in on pompom anemone	6/14/2016	14	18	58	43.916546	-125.067101	1217.7	cam1_20160614141915.png
Ship is still struggling to head NE	6/14/2016	14	21	14	43.916674	-125.067126	1217.2	cam1_20160614142916.png
back to old clam bed	6/14/2016	14	26	11	43.916693	-125.067042	1216.8	cam1_20160614142001.png
At old clam bed	6/14/2016	14	27	20	43.916734	-125.067004	1215.9	cam1_20160614142916.png
Approaching target "S" larger clam bed again	6/14/2016	14	29	28	43.916752	-125.066929	1214.9	cam1_20160614142001.png
tube worm cluster with snails/ egg towers; snail with anemone on back	6/14/2016	14	31	14	43.916812	-125.066854	1215.4	cam1_20160614143306.png
line in water column	6/14/2016	14	31	26	43.916824	-125.066814	1215.0	cam1_20160614143306.png
Circling around line to look at mound with bacterial mats, slump	6/14/2016	14	31	50	43.916834	-125.066814	1215.7	cam1_20160614143306.png
zoom in on snails on tube worms	6/14/2016	14	33	4	43.916843	-125.066786	1215.9	cam1_20160614143043.png
A. sea pen	6/14/2016	14	39	24	43.916959	-125.066861	1215.0	cam1_20160614143311.png

H1520 NA072 Heceta SW Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Passed northern end of clam bed, turning and heading back south	6/14/2016	14	39	43	43.916939	-125.066834	1215.0	cam1_20160614143311.png
Returning south to clam bed	6/14/2016	14	43	38	43.917016	-125.066875	1214.9	cam1_20160614144645.png
back into clam bed	6/14/2016	14	45	11	43.916943	-125.066642	1215.5	cam1_20160614144634.png
end of line in view	6/14/2016	14	45	40	43.916542	-125.066762	1215.6	cam1_20160614144634.png
bacterial mats, some dark sediments, reaching slump/depression again under the line	6/14/2016	14	46	16	43.916729	-125.066831	1215.9	cam1_20160614144621.png
zoom in on plastic box	6/14/2016	14	47	5	43.916670	-125.066103	1215.9	cam1_20160614144645.png
Attempting to circle around to other side of mound, other side of line	6/14/2016	14	47	23	43.916684	-125.066632	1215.9	cam1_20160614144645.png
sole	6/14/2016	14	48	20	43.916735	-125.066920	1215.3	cam1_20160614144621.png
tube worm patch	6/14/2016	14	48	34	43.916735	-125.066912	1214.9	cam1_20160614144621.png
some live worms within this bunch	6/14/2016	14	49	21	43.916714	-125.066905	1214.8	cam1_20160614144645.png
continuing along clam bed	6/14/2016	14	49	35	43.916712	-125.066910	1215.1	cam1_20160614144645.png
watch change, then sampling around tube worm bush	6/14/2016	14	57	11	43.916733	-125.066835	1214.7	cam1_20160614145905.png
on route to the hydrophone	6/14/2016	15	8	56	43.916760	-125.066801	1213.7	cam1_20160614150300.png
sea pigs, anemones, maybe a few clams - mostly sediment not very extensive life as we move away from the seepage	6/14/2016	15	13	27	43.916582	-125.067025	1216.1	cam1_20160614151640.png
baby hagfish	6/14/2016	15	13	50	43.916565	-125.067026	1216.2	cam1_20160614151640.png
rattail fish	6/14/2016	15	16	3	43.916597	-125.067049	1216.5	cam1_20160614151635.png
pom pom anemone	6/14/2016	15	20	5	43.916468	-125.066885	1218.4	cam1_20160614152021.png
now really continuing on to the hydrophone	6/14/2016	15	23	34	43.916419	-125.066960	1216.0	cam1_20160614152021.png
sand cloud on route to hydrophone	6/14/2016	15	34	25	43.916396	-125.066579	1211.8	
sea cucumber	6/14/2016	15	43	59	43.915599	-125.068078	1219.0	
very fat sea star	6/14/2016	16	28	7	43.912265	-125.074111	1228.6	cam1_20160614162746.png
rattail with a hagfish buddy, and another swollen sea star	6/14/2016	16	41	34	43.911418	-125.075009	1226.8	cam1_20160614164110.png
arriving at the western seep nav target	6/14/2016	16	47	9	43.911137	-125.075758	1222.9	cam1_20160614164110.png
looking for the marker	6/14/2016	16	47	17	43.911137	-125.075756	1222.8	cam1_20160614164110.png
cute purple unidentified fish	6/14/2016	16	51	3	43.910876	-125.076064	1224.8	cam1_20160614165239.png
identified the hydrophone and the marker	6/14/2016	16	52	57	43.910907	-125.076316	1224.2	cam1_20160614165239.png
preparing to recollect the hydrophone	6/14/2016	16	54	3	43.910992	-125.076350	1226.4	cam1_20160614165259.png
collecting the hydrophone now	6/14/2016	16	58	21	43.910976	-125.076362	1226.4	cam1_20160614165239.png
still steadily bubbling and still in the same place it was left at from the beginning of the dive (did not slide downslope at all)	6/14/2016	16	59	9	43.910946	-125.076368	1226.0	cam1_20160614165240.png

H1520 NA072 Heceta SW Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
hydrophone collected and safely secured in the FWD biobox with the GT sampler, the larger marker is left behind	6/14/2016	17	4	7	43.910952	-125.076288	1225.1	cam1_20160614170609.png
hydrophone officially recovered at 17	6/14/2016	17	4	57	43.910949	-125.076313	1224.8	cam1_20160614170609.png
skate?	6/14/2016	17	6	49	43.910885	-125.076259	1225.9	cam1_20160614170434.png
looking for a good carbonate sample to collect, south of the 2typesbacteria site, moving toward the nav site called Carbonate	6/14/2016	17	11	2	43.910754	-125.076177	1224.1	cam1_20160614171631.png
hydrates coming off the bottom end of Herc	6/14/2016	17	35	60	43.910337	-125.075798	1141.8	cam1_20160614173525.png
still ascending through the water column	6/14/2016	17	44	50	43.910589	-125.075909	1061.2	cam1_20160614174436.png
dropping a weight	6/14/2016	17	52	6	43.911007	-125.076592	983.1	

H1521 Coquille SW Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Descending to the west of N1 site	6/16/2016	0	49	58	42.712544	-124.902597	9.2	
Many gelatinous organisms in water column; small salps; small squid	6/16/2016	0	53	21	42.711814	-124.902686	80.8	
Herc at ~100m depth	6/16/2016	0	54	29	42.711821	-124.902741	106.0	
Herc at ~300 m depth	6/16/2016	1	4	33	42.711949	-124.903104	299.4	
small squid	6/16/2016	1	7	9	42.711988	-124.903147	349.0	
Herc at ~500m depth	6/16/2016	1	15	36	42.712084	-124.903096	509.8	
flashing jelly in Argus cam a few moments ago	6/16/2016	1	18	16	42.712287	-124.903184	552.7	
dragging Herc towards N2 site at ~550 m depth	6/16/2016	1	18	35	42.712287	-124.903143	552.5	
white balance	6/16/2016	1	19	37	42.712356	-124.903087	552.6	
Continuing descent	6/16/2016	1	23	10	42.712409	-124.902852	552.4	
Herc at ~600m depth	6/16/2016	1	27	38	42.712564	-124.902513	598.5	
A strong current at seafloor from NE. Bottom in view but visibility is poor.	6/16/2016	1	32	34	42.712197	-124.902228	618.3	cam1_20160616013546.png
Scattered sea stars	6/16/2016	1	32	57	42.712216	-124.902199	618.3	cam1_20160616013546.png
Heading NE 60m to target N1	6/16/2016	1	33	12	42.712220	-124.902184	618.1	cam1_20160616013546.png
sole, small bacterial mat, anemones	6/16/2016	1	35	13	42.712414	-124.902154	620.0	cam1_20160616013540.png
Some carbonates	6/16/2016	1	35	54	42.712411	-124.902160	620.2	cam1_20160616013540.png
Thornyhead, small coral, sablefish	6/16/2016	1	36	10	42.712406	-124.902161	620.3	cam1_20160616013540.png
Poralia jelly	6/16/2016	1	38	23	42.712525	-124.902075	619.9	cam1_20160616013546.png
Expected hard bottom in this location because the corals have to attach to something.	6/16/2016	1	38	45	42.712447	-124.901800	619.9	cam1_20160616013546.png
pipe	6/16/2016	1	39	32	42.712481	-124.901792	620.5	cam1_20160616013546.png
Many dark pink Anthomastus mushroom corals	6/16/2016	1	40	18	42.712522	-124.901757	620.4	cam1_20160616014805.png
Current estimated at >0.5knot	6/16/2016	1	41	41	42.712498	-124.901651	620.2	cam1_20160616014805.png
hagfish	6/16/2016	1	41	48	42.712498	-124.901648	620.0	cam1_20160616014805.png
Approaching target N1	6/16/2016	1	42	36	42.712493	-124.901638	619.5	cam1_20160616014646.png
scattered shells	6/16/2016	1	43	9	42.712428	-124.901635	619.0	cam1_20160616014805.png
Bacterial mats	6/16/2016	1	45	24	42.712466	-124.901506	618.2	cam1_20160616014646.png
Bubbles	6/16/2016	1	45	52	42.712495	-124.901505	618.2	cam1_20160616014646.png
Checking on gas tight sampling request	6/16/2016	1	47	13	42.712493	-124.901465	618.1	cam1_20160616014805.png
This bubble source is releasing bubbles in clumps ("blurps")	6/16/2016	1	47	36	42.712503	-124.901464	618.1	cam1_20160616014805.png
Continuing to look around site	6/16/2016	1	48	30	42.712508	-124.901457	618.2	cam1_20160616014646.png

H1521 Coquille SW Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
gastropods, clam shells, another active bubbling source	6/16/2016	1	49	16	42.712507	-124.901448	618.1	cam1_20160616014646.png
Discussing feasibility of sampling at this location and dropping hydrophone. Need to return against the current.	6/16/2016	1	59	12	42.712516	-124.901448	618.2	cam1_20160616015007.png
Will drop off hydrophone here and take a gas tight sample	6/16/2016	1	59	54	42.712496	-124.901461	618.4	cam1_20160616015007.png
Preparing to take gas tight sample; readjusting funnel	6/16/2016	2	6	38	42.712518	-124.901438	618.8	cam1_20160616020704.png
Hydrate ice is forming in funnel	6/16/2016	2	8	52	42.712508	-124.901428	618.9	cam1_20160616020734.png
Triggered gas tight, stowing it in forward bio box	6/16/2016	2	11	7	42.712513	-124.901429	618.9	cam1_20160616021225.png
Dropped hydrophone on top of ledge between 2 blurping bubble seeps	6/16/2016	2	12	58	42.712538	-124.901416	618.9	cam1_20160616021225.png
Dropping marker #233 next to gas tight sampling site	6/16/2016	2	13	46	42.712506	-124.901413	618.9	cam1_20160616021225.png
Shifting marker back so that it doesn't bump into the hydrophone in this strong bottom current	6/16/2016	2	14	24	42.712472	-124.901418	618.9	cam1_20160616021246.png
Niskin sample just taken was also near a swiftia coral	6/16/2016	2	20	37	42.712569	-124.901377	617.9	cam1_20160616022607.png
Attempting to poke seafloor here to see if push cores are possible	6/16/2016	2	21	41	42.712568	-124.901365	619.0	cam1_20160616022607.png
Expected hard substrate here for corals to grow	6/16/2016	2	22	16	42.712562	-124.901374	619.1	cam1_20160616022607.png
Seafloor is rocky throughout	6/16/2016	2	23	6	42.712562	-124.901364	619.1	cam1_20160616022607.png
Adding second rock to that sample, NA072-083 (part of same sample)	6/16/2016	2	35	16	42.712503	-124.901446	618.9	cam1_20160616023814.png
Adding slurp of less filamentous bacterial mat to same slurp jar (#3) for NA072-082, nearby previous site but slightly moved.	6/16/2016	2	41	14	42.712464	-124.901428	619.2	cam1_20160616024336.png
huge bubble swarm when temp probe pushed into sediment	6/16/2016	2	53	39	42.712509	-124.901399	619.2	cam1_20160616025349.png
Near bubbles/many bubbles released during probe: ambient: ~3.10C; surface: ~3.18C; at 15cm: 3.25C	6/16/2016	2	55	47	42.712521	-124.901420	619.1	cam1_20160616025349.png
At same location, readjusting Tprobe angle: at 15cm, 3.25C	6/16/2016	2	57	9	42.712542	-124.901409	619.1	cam1_20160616025535.png
Ambient seawater above surface: 3.12C	6/16/2016	2	58	55	42.712555	-124.901398	619.1	cam1_20160616025535.png
Hydrate ice on lens	6/16/2016	2	59	54	42.712536	-124.901456	618.5	cam1_20160616025327.png
looking over the hydrophone site and bubbles flowing around it	6/16/2016	3	14	11	42.712541	-124.901433	618.5	cam1_20160616031527.png
marker nearby the hydrophone	6/16/2016	3	14	26	42.712553	-124.901433	618.5	cam1_20160616031527.png
now leaving the hydrophone site and going south	6/16/2016	3	16	14	42.712503	-124.901419	618.4	cam1_20160616031527.png
mushroom corals all around	6/16/2016	3	17	44	42.712327	-124.901577	618.3	cam1_20160616031527.png
many sea stars and thornyheads	6/16/2016	3	18	5	42.712333	-124.901577	618.2	cam1_20160616031527.png
steady current flowing by as we move south	6/16/2016	3	19	25	42.712366	-124.901592	618.8	cam1_20160616031527.png
very sedimented and less bio	6/16/2016	3	22	30	42.712131	-124.901700	618.5	cam1_20160616032600.png

H1521 Coquille SW Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
frogfish	6/16/2016	3	26	4	42.711401	-124.901927	616.0	cam1_20160616032207.png
many corals	6/16/2016	3	26	10	42.711325	-124.901958	616.2	cam1_20160616032207.png
very seepy area, nav target dropped	6/16/2016	3	27	49	42.710896	-124.902091	615.4	cam1_20160616032657.png
at southern site, trying to determine where is best to continue onward to	6/16/2016	3	29	49	42.711097	-124.902239	615.9	cam1_20160616032657.png
starting to move to nav target '1521 Dive Site'	6/16/2016	3	32	5	42.710995	-124.901986	614.8	cam1_20160616033810.png
and then work our way toward nav target 'S2'	6/16/2016	3	32	35	42.711010	-124.901892	614.9	cam1_20160616033810.png
slight drop off here	6/16/2016	3	32	58	42.711046	-124.901884	615.0	cam1_20160616033810.png
close up of octocoral (mushroom coral)	6/16/2016	3	33	23	42.711050	-124.901885	614.8	cam1_20160616033810.png
passing over ledge, still in the nav target area called 'large clam bed'	6/16/2016	3	34	1	42.711104	-124.901894	615.1	cam1_20160616033810.png
sandy area transitions around carbonate elevated ledges	6/16/2016	3	35	13	42.711082	-124.901931	615.2	cam1_20160616033811.png
carbonate rock structures, ledge overhang	6/16/2016	3	38	22	42.711059	-124.901419	615.3	cam1_20160616033402.png
some fluffy biological structures and shrimps living on this ledge	6/16/2016	3	39	49	42.711013	-124.901393	615.2	cam1_20160616033448.png
carbonate ledge surface	6/16/2016	3	42	28	42.710884	-124.901514	615.4	cam1_20160616034344.png
thornyhead	6/16/2016	3	43	40	42.710821	-124.901449	614.2	cam1_20160616034448.png
right around the nav target, H1521 Dive Site, lots of bacterial mats, rugged seafloor, pink and purple anemones and corals	6/16/2016	3	46	21	42.710803	-124.901268	612.6	cam1_20160616034448.png
tiny snails and worms here around white microbial mats	6/16/2016	3	50	27	42.710848	-124.901356	614.0	cam1_20160616035803.png
doing a poking test to see how much giveway the ground has	6/16/2016	3	52	13	42.710801	-124.901209	614.0	cam1_20160616035803.png
collected zip ties	6/16/2016	4	0	31	42.710797	-124.901315	614.1	cam1_20160616040503.png
exploring around the edge of this area, trying to determine in the carbonate is forming this way or if it was collapsed	6/16/2016	4	2	46	42.710784	-124.901257	612.4	cam1_20160616040503.png
big ledges and drop off points	6/16/2016	4	3	5	42.710750	-124.901249	612.7	cam1_20160616040441.png
terraces of carbonate ledges	6/16/2016	4	3	38	42.710711	-124.901196	612.9	cam1_20160616040441.png
very large thornyheads, short spined old thornyheads	6/16/2016	4	5	1	42.710658	-124.901212	612.5	cam1_20160616040441.png
very steady gas stream, maybe a good place to GT sample	6/16/2016	4	6	55	42.710599	-124.901374	614.8	cam1_20160616040414.png
Temp reading now	6/16/2016	4	16	2	42.710643	-124.901394	614.6	cam1_20160616041238.png
Temp probe reading: 3.23C at surface, 8.48C peak at 10cm, 6.40 average (after breaking open surface) at 10cm	6/16/2016	4	26	28	42.710617	-124.901403	614.7	cam1_20160616042944.png
temp probe is not lowering below about 5.6C, maybe something broke	6/16/2016	4	27	6	42.710616	-124.901396	614.7	cam1_20160616042944.png
placed the marker now? Huh? I thought it was earlier	6/16/2016	4	30	23	42.710627	-124.901387	614.4	cam1_20160616043301.png
leaving to test if we can core somewhere around here	6/16/2016	4	30	37	42.710662	-124.901387	614.6	cam1_20160616043301.png

H1521 Coquille SW Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
softer in middle are but overall not able to penetrate the poker very far	6/16/2016	4	32	2	42.710635	-124.901411	614.5	cam1_20160616043222.png
looking at the clams and sediment, probably too difficult to core. perhaps best to move on to look other areas and settle with a scoop here	6/16/2016	4	33	47	42.710624	-124.901348	614.5	cam1_20160616043248.png
preparing to do a scoop	6/16/2016	4	36	9	42.710646	-124.901379	614.6	cam1_20160616043248.png
still panning around the area looking for what's in the Dive Site nav target region	6/16/2016	4	55	6	42.710845	-124.901467	612.9	cam2_20160616045945.png
very layered area of carbonate ledges, west of the 087 sample site	6/16/2016	5	0	12	42.710803	-124.901127	610.5	cam1_20160616050741.png
distinct layering	6/16/2016	5	3	16	42.710757	-124.901191	613.3	cam1_20160616050741.png
get samples at each ledge	6/16/2016	5	3	26	42.710757	-124.901191	613.9	cam1_20160616050741.png
white branching sponges	6/16/2016	5	9	47	42.710718	-124.901217	614.3	cam1_20160616050714.png
small chunk collected	6/16/2016	5	11	26	42.710719	-124.901202	614.3	cam1_20160616051324.png
bigger chunk to be added to sample	6/16/2016	5	16	28	42.710683	-124.901222	614.2	cam1_20160616051324.png
moving around to look for softer ground to possibly core samples	6/16/2016	5	25	17	42.710736	-124.901318	612.8	cam1_20160616052632.png
still searching around for more soft sites	6/16/2016	5	27	24	42.710757	-124.901254	612.9	cam1_20160616052458.png
thick assemblage of clams	6/16/2016	5	29	20	42.710722	-124.901165	614.0	cam1_20160616052618.png
small eel pout	6/16/2016	5	29	43	42.710720	-124.901153	614.1	cam1_20160616052618.png
poking around to determine how soft sediment is, but poker fell	6/16/2016	5	30	10	42.710721	-124.901167	614.0	cam1_20160616053806.png
poker shows that its VERY soft sediment, planning to do some coring	6/16/2016	5	38	27	42.710726	-124.901157	614.0	cam1_20160616053215.png
sediment closer to the clam beds is harder to get deep	6/16/2016	5	46	31	42.710707	-124.901164	614.0	cam1_20160616054600.png
really cool octopus	6/16/2016	6	28	51	42.710719	-124.901902	617.2	cam1_20160616062747.png
more carbonate mounds	6/16/2016	6	46	31	42.710425	-124.902079	614.7	cam1_20160616064632.png
shelves of carbonate, step-like tiers	6/16/2016	6	46	48	42.710389	-124.902077	614.6	cam1_20160616064632.png
looks like the edges of the mound cracked off	6/16/2016	6	47	6	42.710385	-124.902058	614.5	cam1_20160616064649.png
octocorals all around the carbonate structures	6/16/2016	6	48	25	42.710340	-124.902033	615.0	cam1_20160616064648.png
white frilly bacteria, fioploca?	6/16/2016	6	52	5	42.710330	-124.902090	614.9	cam1_20160616065124.png
thioploca**	6/16/2016	6	52	53	42.710322	-124.902005	614.9	cam1_20160616065124.png
south west of the sampling area	6/16/2016	6	54	34	42.710294	-124.901987	614.2	cam1_20160616065124.png
moving around, possibly going up to survey point 8 or 12 then looking around for a while	6/16/2016	6	54	55	42.710222	-124.902008	613.6	cam1_20160616065124.png
Zoom-in on thornyhead and rathbunaster californicus (sunstar)	6/16/2016	7	2	37	42.710265	-124.902079	614.3	cam1_20160616070153.png
Heading to far left edge of site to explore	6/16/2016	7	4	47	42.710294	-124.902106	613.7	cam1_20160616070259.png

H1521 Coquille SW Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Common fauna: mushroom coral, thornyhead, hagfish, rathbunaster, sea stars, deep-sea soles, small patches of bacterial mats	6/16/2016	7	8	20	42.710430	-124.902386	615.1	cam1_20160616070259.png
Pteraster	6/16/2016	7	15	31	42.710581	-124.902840	622.3	cam1_20160616071808.png
red stoloniferous octocoral	6/16/2016	7	19	54	42.710553	-124.903156	623.6	cam1_20160616071806.png
Zoom-in on encrusting coral on some type of old sea pen/sponge stalk- hot pink, octocoral (stoleniferous?)	6/16/2016	7	20	0	42.710556	-124.903180	623.3	cam1_20160616072745.png
some swiftia? few minutes ago	6/16/2016	7	22	30	42.710728	-124.903353	625.2	cam1_20160616072745.png
flaky carbonate	6/16/2016	7	26	42	42.710925	-124.903214	624.0	cam1_20160616072745.png
small bac mat, lone clam	6/16/2016	7	27	56	42.710994	-124.903253	624.3	cam1_20160616072742.png
zoom-in on bacterial mat; not filamentous as seen previously, grayish color. Few associate clams	6/16/2016	7	28	26	42.710994	-124.903284	624.3	cam1_20160616072742.png
bac mat	6/16/2016	7	29	45	42.711063	-124.903272	624.0	cam1_20160616072745.png
water sample on top of red stoloniferous octocoral	6/16/2016	7	35	21	42.711288	-124.903263	624.1	cam1_20160616073405.png
octopus	6/16/2016	7	39	11	42.711431	-124.903266	624.4	cam1_20160616073208.png
zoom-in on octopus	6/16/2016	7	41	40	42.711521	-124.903305	625.5	cam1_20160616074014.png
zoom-in on eelpout	6/16/2016	7	53	49	42.711779	-124.903076	624.1	
many small bacterial mats	6/16/2016	8	2	12	42.711592	-124.902524	620.7	cam1_20160616080248.png
many shell fragments	6/16/2016	8	4	38	42.711741	-124.902433	617.7	cam1_20160616080608.png
bacterial mat	6/16/2016	8	7	31	42.711468	-124.902376	616.8	cam1_20160616080608.png
bac mat under rock lip	6/16/2016	8	7	44	42.711466	-124.902382	616.5	cam1_20160616080608.png
bacterial mat under carbonate lip	6/16/2016	8	7	59	42.711476	-124.902363	616.9	cam1_20160616080608.png
plastic	6/16/2016	8	8	1	42.711475	-124.902363	617.0	cam1_20160616080442.png
ridge along track has a lot of mat underneath	6/16/2016	8	15	27	42.711504	-124.902193	614.5	cam1_20160616081150.png
bacterial map on side of carbonate flake	6/16/2016	8	15	29	42.711495	-124.902191	614.5	cam1_20160616081150.png
shell beds	6/16/2016	8	17	14	42.711492	-124.902004	613.4	cam1_20160616081150.png
nudibranch	6/16/2016	8	24	15	42.711494	-124.901628	615.1	cam1_20160616082341.png
Giant nudibranchs	6/16/2016	8	24	47	42.711487	-124.901612	614.9	cam1_20160616082341.png
skate with dark spots	6/16/2016	8	27	25	42.711511	-124.901210	615.3	cam1_20160616082344.png
Zoom-in on longnose skate; note 2 distinct black dots	6/16/2016	8	28	15	42.711546	-124.901087	614.9	cam1_20160616082344.png
hagfish	6/16/2016	8	29	13	42.711510	-124.901014	614.1	cam1_20160616082344.png
muddy sediments, less carbonates present	6/16/2016	8	29	22	42.711520	-124.901009	614.1	cam1_20160616082344.png
bac mat	6/16/2016	8	32	41	42.711531	-124.900901	612.7	cam1_20160616083318.png
bacterial mat	6/16/2016	8	32	43	42.711531	-124.900895	612.8	cam1_20160616083318.png
Zoom-in on retracted mushroom coral with nearby brittle star	6/16/2016	8	34	51	42.711529	-124.900863	612.9	cam1_20160616083320.png
large bacterial mat	6/16/2016	8	37	29	42.711490	-124.900734	611.0	cam1_20160616083312.png

H1521 Coquille SW Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Large bacterial mat area, gray, associate fauna: mushroom coral, sablefish, thornyhead	6/16/2016	8	38	6	42.711480	-124.900731	611.7	cam1_20160616083320.png
Previously described mat area approx. 8-10 m	6/16/2016	8	41	23	42.711497	-124.900705	610.9	cam1_20160616084138.png
going to poke the bacterial mat	6/16/2016	8	42	38	42.711458	-124.900649	611.2	cam1_20160616084149.png
bacterial mat area of about 10 meters diameter	6/16/2016	8	42	60	42.711513	-124.900662	611.6	cam1_20160616084149.png
After poking area with bacterial mat (gray, filamentous); hard substrate, black sediment below; few bubbles released	6/16/2016	8	45	32	42.711483	-124.900691	611.6	cam1_20160616084149.png
poked bacterial mat. hard substrate. few (3 bubbles)	6/16/2016	8	45	48	42.711493	-124.900694	611.2	cam1_20160616084149.png
broken flat rocks	6/16/2016	8	49	46	42.711556	-124.900155	606.3	cam1_20160616084149.png
bac mat	6/16/2016	8	51	0	42.711534	-124.900021	604.9	cam1_20160616085935.png
small bact. mat	6/16/2016	8	51	0	42.711534	-124.900021	604.9	cam1_20160616085935.png
bacterial mats along carbonates and reduced sediment visible	6/16/2016	8	57	15	42.711250	-124.900050	604.8	cam1_20160616085935.png
large but semi diffuse bacterial mat area	6/16/2016	8	57	37	42.711254	-124.900054	604.5	cam1_20160616085935.png
no active bubble seepage observed so far	6/16/2016	8	57	55	42.711254	-124.900002	604.4	cam1_20160616085935.png
zoom-in on anemone and mushroom coral w/ all polyps out	6/16/2016	9	0	35	42.711241	-124.900094	605.1	cam1_20160616090850.png
mushroom corals everywhere!	6/16/2016	9	3	23	42.710813	-124.900134	604.8	cam1_20160616090858.png
long thin bac mat, clams	6/16/2016	9	7	56	42.710778	-124.900058	604.9	cam1_20160616090858.png
Dense bacterial mat; whitish color; filamentous; associate fauna: clams, mushroom coral, thornyhead, deep-sea sole	6/16/2016	9	10	8	42.710685	-124.900100	605.4	cam1_20160616091158.png
flatfish also common fauna	6/16/2016	9	10	27	42.710631	-124.900105	606.0	cam1_20160616091158.png
octopus	6/16/2016	9	12	9	42.710233	-124.900015	607.1	cam1_20160616091158.png
large animal (fish/shark?) swam through Argus approx 2 min. ago. no captures	6/16/2016	9	16	49	42.710520	-124.900277	607.4	cam1_20160616091158.png
clam beds	6/16/2016	9	19	35	42.710634	-124.900794	608.2	cam1_20160616091158.png
still mostly anthomastus sp., hagfish, anemones, sunstars, thornyheads	6/16/2016	9	34	5	42.711171	-124.900648	610.1	cam1_20160616093706.png
hatchet fish	6/16/2016	9	37	46	42.711191	-124.900703	610.5	cam1_20160616093647.png
possible hatchetfish	6/16/2016	9	38	6	42.711303	-124.900705	609.9	cam1_20160616093706.png
octopus	6/16/2016	9	47	45	42.711940	-124.900748	611.0	cam1_20160616094729.png
large area of bacterial mats	6/16/2016	9	50	8	42.712297	-124.900644	610.6	cam1_20160616095909.png
large bac mat, stalked encrusting stoloniferous octocoral	6/16/2016	9	50	49	42.712345	-124.900683	610.8	cam1_20160616095909.png
setting down to sample red stalked stoloniferous coral	6/16/2016	9	57	47	42.712656	-124.900721	613.4	cam1_20160616095909.png
shell fragments	6/16/2016	10	3	52	42.712835	-124.900574	610.9	cam1_20160616100450.png
many shell fragments	6/16/2016	10	3	52	42.712835	-124.900574	610.9	cam1_20160616100450.png

H1521 Coquille SW Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Zoom-in on sea pen with brittle star attached	6/16/2016	10	5	20	42.712925	-124.900562	611.1	cam1_20160616100450.png
Pterasteridae star	6/16/2016	10	20	23	42.713569	-124.901258	617.1	cam1_20160616102626.png
small pelagic organisms (i.e. jellies, shrimp) in water column. Similar benthic fauna as previously described throughout transit, varying in density across location	6/16/2016	10	21	52	42.713665	-124.901358	618.0	cam1_20160616102626.png
bacterial mat	6/16/2016	10	21	56	42.713665	-124.901384	618.0	cam1_20160616102626.png
large skate	6/16/2016	10	26	15	42.713603	-124.901713	620.4	cam1_20160616102618.png
zoom-in on longnose skate	6/16/2016	10	27	8	42.713599	-124.901688	620.4	cam1_20160616102626.png
holothurian	6/16/2016	10	30	52	42.713798	-124.901659	619.6	cam1_20160616103519.png
Giant barrel - possibly oil drum (diesel on label)	6/16/2016	10	36	49	42.713936	-124.901727	620.1	cam1_20160616103458.png
bacterial mat	6/16/2016	10	40	11	42.713824	-124.902206	624.1	cam1_20160616104754.png
carbonates and bacterial mat	6/16/2016	10	40	15	42.713850	-124.902210	624.2	cam1_20160616104754.png
50 gal drum, BP Diesel Oil, covered in oxidized rusticles	6/16/2016	10	40	36	42.713857	-124.902211	624.1	cam1_20160616104754.png
shell fragments and clams	6/16/2016	10	46	49	42.713711	-124.902508	626.1	cam1_20160616104754.png
live clams; small bed, flatfish	6/16/2016	10	50	5	42.713678	-124.902459	626.6	
clam bed	6/16/2016	10	50	10	42.713676	-124.902458	626.5	
octopus	6/16/2016	10	51	20	42.713563	-124.902562	626.8	
Looking around this area then heading to small sonar target, then will recover hydrophone	6/16/2016	11	4	45	42.712963	-124.902784	625.6	
Exploring the little bump north of the launch site with lots of carbonates and sediment, halibut, sea stars	6/16/2016	11	6	32	42.712878	-124.902777	625.1	
lots of marine snow and hagfish	6/16/2016	11	10	26	42.712825	-124.902918	625.3	
large rockfish	6/16/2016	11	10	55	42.712811	-124.902964	625.1	
carbonate rock pieces, platy, with sediment cover	6/16/2016	11	11	35	42.712853	-124.902998	625.3	
Continuing southeast towards point 15	6/16/2016	11	12	39	42.712826	-124.903042	626.1	
mushroom coral, thornyhead, sole	6/16/2016	11	14	15	42.712827	-124.903005	625.5	
seastars and thornyhead fish	6/16/2016	11	15	9	42.712840	-124.902884	625.3	
hagfish	6/16/2016	11	15	54	42.712818	-124.902833	625.0	
Heading back towards hydrophone	6/16/2016	11	17	10	42.712801	-124.902747	625.0	
mound feature was carbonate rubble around the sides and sediment on top	6/16/2016	11	17	31	42.712801	-124.902734	624.8	
zoom on coral	6/16/2016	11	19	50	42.712746	-124.902662	623.7	
coral and oph	6/16/2016	11	20	28	42.712752	-124.902645	623.6	cam1_20160616112026.png
sablefish	6/16/2016	11	22	37	42.712745	-124.902549	623.6	cam1_20160616112047.png
sablefish	6/16/2016	11	22	41	42.712746	-124.902548	623.5	cam1_20160616112047.png
more carbonate rubble, rockfish, shrimp, seastars	6/16/2016	11	24	7	42.712749	-124.902444	622.8	cam1_20160616112047.png

H1521 Coquille SW Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
linear exposed slabs of carbonate and frilled mussel	6/16/2016	11	26	40	42.712716	-124.902298	622.7	cam1_20160616112026.png
Voragonema jelly	6/16/2016	11	27	21	42.712699	-124.902314	622.7	cam1_20160616112047.png
heading back to the hydrophone for recovery. sediment covered seafloor	6/16/2016	11	32	1	42.712687	-124.902161	622.2	cam1_20160616113534.png
many seastars	6/16/2016	11	33	26	42.712642	-124.902029	621.3	cam1_20160616113534.png
several sole, scattered sea stars	6/16/2016	11	34	26	42.712615	-124.901981	620.6	cam1_20160616113534.png
more carbonate rubble	6/16/2016	11	34	33	42.712615	-124.901959	620.5	cam1_20160616113534.png
octopus	6/16/2016	11	35	8	42.712603	-124.901941	620.3	cam1_20160616113555.png
octocoral	6/16/2016	11	37	16	42.712548	-124.901832	620.5	cam1_20160616113534.png
pipe	6/16/2016	11	37	46	42.712532	-124.901725	619.7	cam1_20160616113534.png
scattered shells, more seastars	6/16/2016	11	39	7	42.712571	-124.901530	618.3	cam1_20160616113534.png
patchy bacterial mats	6/16/2016	11	39	20	42.712594	-124.901530	617.9	cam1_20160616113534.png
bacterial mats and seastars	6/16/2016	11	39	35	42.712607	-124.901446	618.1	cam1_20160616113534.png
tanner crab	6/16/2016	11	40	1	42.712605	-124.901443	617.7	cam1_20160616114837.png
mushroom and gorgonian corals	6/16/2016	11	41	18	42.712555	-124.901411	617.7	cam1_20160616114837.png
gastropods and seastars	6/16/2016	11	41	46	42.712549	-124.901397	617.4	cam1_20160616114837.png
more shell hash	6/16/2016	11	42	21	42.712521	-124.901387	617.1	cam1_20160616114837.png
Hydrophone in view	6/16/2016	11	43	6	42.712492	-124.901470	616.6	cam1_20160616114837.png
hydrophone in sight	6/16/2016	11	44	0	42.712465	-124.901402	616.3	cam1_20160616114837.png
current has disappeared	6/16/2016	11	44	15	42.712460	-124.901401	616.4	cam1_20160616114837.png
landing to recover hydrophone	6/16/2016	11	45	47	42.712445	-124.901339	617.2	cam1_20160616114837.png
area around hydrophone still actively bubbling	6/16/2016	11	47	41	42.712462	-124.901308	617.4	cam1_20160616114837.png
picked up hydrophone	6/16/2016	11	48	25	42.712447	-124.901287	617.3	cam1_20160616114826.png
hydrophone stowed in forward bio box	6/16/2016	11	49	30	42.712459	-124.901305	617.4	cam1_20160616114826.png
hydrophone stowed on Herc	6/16/2016	11	50	8	42.712454	-124.901313	617.3	cam1_20160616115943.png
Returning to corals	6/16/2016	11	51	0	42.712436	-124.901291	617.3	cam1_20160616115943.png
bacterial mats along the fractured carbonate at the seep site and many sable fish	6/16/2016	11	52	53	42.712430	-124.901294	616.1	cam1_20160616115943.png
several more sablefish	6/16/2016	11	53	7	42.712451	-124.901375	616.1	cam1_20160616115943.png
back to the coral site for a Niskin	6/16/2016	11	54	3	42.712458	-124.901532	617.5	cam1_20160616115943.png
more coral and seastars	6/16/2016	11	55	5	42.712465	-124.901660	618.3	cam1_20160616115553.png
preparing for a Niskin at coral area	6/16/2016	11	58	10	42.712410	-124.901700	618.5	cam1_20160616115943.png
1hr left to explore, heading south towards S2	6/16/2016	12	3	51	42.712481	-124.901770	618.9	cam1_20160616120221.png
moving south to target S2	6/16/2016	12	11	7	42.712310	-124.901807	617.7	cam1_20160616121623.png
tanner crab and sediment, some coral and seastar	6/16/2016	12	11	60	42.712244	-124.901809	617.8	cam1_20160616121623.png
many gastropods	6/16/2016	12	12	22	42.712217	-124.901806	618.0	cam1_20160616121623.png

H1521 Coquille SW Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
more continuous carbonate structures covered in sediment	6/16/2016	12	14	35	42.712062	-124.901812	617.0	cam1_20160616121623.png
linear carbonate features under sediment cover, n/s strike	6/16/2016	12	15	19	42.712044	-124.901804	616.7	cam1_20160616121539.png
huge thornyhead	6/16/2016	12	15	26	42.712041	-124.901809	616.6	cam1_20160616121539.png
continuing transit; giant thornyhead	6/16/2016	12	15	26	42.712038	-124.901810	616.5	cam1_20160616121539.png
carbonate ridge, halibut and coral, some shell hash	6/16/2016	12	16	32	42.711957	-124.901839	615.6	cam1_20160616121539.png
some bacteria mat	6/16/2016	12	17	13	42.711919	-124.901992	615.7	cam1_20160616121623.png
lots of seastars	6/16/2016	12	17	27	42.711887	-124.902010	616.5	cam1_20160616121623.png
many seastars and mushroom corals	6/16/2016	12	17	44	42.711736	-124.902034	616.9	cam1_20160616121623.png
more carbonate rubble and coral with seastar and shell hash	6/16/2016	12	17	54	42.711737	-124.902110	616.1	cam1_20160616121623.png
flounder or sole, not halibut on this dive	6/16/2016	12	18	20	42.711675	-124.902141	614.4	cam1_20160616121623.png
continuing over carbonate ridge	6/16/2016	12	18	40	42.711651	-124.902163	613.6	cam1_20160616121623.png
brisingid stars	6/16/2016	12	21	24	42.711409	-124.902203	613.0	cam1_20160616122717.png
large ridge, sediment covered, with coral and seastars, some bacteria patches	6/16/2016	12	23	16	42.711258	-124.902181	614.4	cam1_20160616122450.png
Niskin in large field of coral	6/16/2016	12	24	11	42.711185	-124.902171	614.7	cam1_20160616122450.png
successful Niskin	6/16/2016	12	27	43	42.711136	-124.902192	615.5	cam1_20160616122450.png
lots of marine snow	6/16/2016	12	32	13	42.710961	-124.902306	617.0	cam1_20160616123558.png
continuing south	6/16/2016	12	32	59	42.710947	-124.902312	617.1	cam1_20160616123558.png
several hagfish, many sea stars and mushroom corals	6/16/2016	12	35	16	42.710796	-124.902227	616.3	cam1_20160616123558.png
large siphonophore	6/16/2016	12	36	6	42.710746	-124.902236	615.7	cam1_20160616123558.png
small bacterial mat	6/16/2016	12	36	36	42.710701	-124.902186	615.7	cam1_20160616123558.png
zoom on coral	6/16/2016	12	37	23	42.710614	-124.902197	615.4	cam1_20160616123149.png
skeleton of a coral	6/16/2016	12	37	48	42.710614	-124.902182	615.4	cam1_20160616123149.png
not a coral, tree branch?	6/16/2016	12	38	38	42.710607	-124.902188	615.3	cam1_20160616123558.png
actually a tree branch, not a coral skeleton	6/16/2016	12	38	50	42.710599	-124.902185	615.3	cam1_20160616123558.png
bacteria patches	6/16/2016	12	40	40	42.710476	-124.902206	614.2	cam1_20160616124851.png
some shell hash	6/16/2016	12	40	47	42.710475	-124.902207	614.2	cam1_20160616124851.png
hummocky ridge, terrain	6/16/2016	12	43	46	42.710380	-124.902239	614.4	cam1_20160616124851.png
broken carbonate mound with corals and bacterial mats	6/16/2016	12	45	22	42.710292	-124.902357	616.3	cam1_20160616124851.png
bacterial mats and shell hash on crusty carbonate ridge	6/16/2016	12	45	39	42.710301	-124.902377	616.2	cam1_20160616124851.png
fluffy bacteria	6/16/2016	12	47	46	42.710279	-124.902369	616.2	cam1_20160616124744.png
zoom on bacteria mat with small clams and gastropods	6/16/2016	12	49	11	42.710274	-124.902332	616.3	cam1_20160616124744.png
zoom in on stringy bacterial mat	6/16/2016	12	49	44	42.710276	-124.902341	616.3	cam1_20160616124744.png
heading east	6/16/2016	12	49	50	42.710272	-124.902341	616.4	cam1_20160616124744.png
Heading east while changing ship's heading into the current, N/NW	6/16/2016	12	51	42	42.710187	-124.902336	614.9	

H1521 Coquille SW Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
large thornyhead	6/16/2016	12	52	12	42.710191	-124.902341	615.0	
extensive carbonate crust overhang	6/16/2016	12	55	2	42.710183	-124.902165	614.4	
Beginning recovery	6/16/2016	12	59	9	42.710222	-124.902126	614.2	

H1521 Coquille SW Seeps	date	hr	min	sec	latitude	longitude	Z(m)	grab
Descending to the west of N1 site	6/16/2016	0	49	58	42.712544	-124.902597	9.2	
Many gelatinous organisms in water column; small salps; small squid	6/16/2016	0	53	21	42.711814	-124.902686	80.8	
Herc at ~100m depth	6/16/2016	0	54	29	42.711821	-124.902741	106.0	
Herc at ~300 m depth	6/16/2016	1	4	33	42.711949	-124.903104	299.4	
small squid	6/16/2016	1	7	9	42.711988	-124.903147	349.0	
Herc at ~500m depth	6/16/2016	1	15	36	42.712084	-124.903096	509.8	
flashing jelly in Argus cam a few moments ago	6/16/2016	1	18	16	42.712287	-124.903184	552.7	
dragging Herc towards N2 site at ~550 m depth	6/16/2016	1	18	35	42.712287	-124.903143	552.5	
white balance	6/16/2016	1	19	37	42.712356	-124.903087	552.6	
Continuing descent	6/16/2016	1	23	10	42.712409	-124.902852	552.4	
Herc at ~600m depth	6/16/2016	1	27	38	42.712564	-124.902513	598.5	
Strong currents at seafloor from NE. Bottom in view but visibility is poor.	6/16/2016	1	32	34	42.712197	-124.902228	618.3	cam1_20160616013546.png
Scattered sea stars	6/16/2016	1	32	57	42.712216	-124.902199	618.3	cam1_20160616013546.png
Heading NE 60m to target N1	6/16/2016	1	33	12	42.712220	-124.902184	618.1	cam1_20160616013546.png
sole, small bacterial mat, anemones	6/16/2016	1	35	13	42.712414	-124.902154	620.0	cam1_20160616013540.png
Some carbonates	6/16/2016	1	35	54	42.712411	-124.902160	620.2	cam1_20160616013540.png
Thornyhead, small coral, sablefish	6/16/2016	1	36	10	42.712406	-124.902161	620.3	cam1_20160616013540.png
Poralia jelly	6/16/2016	1	38	23	42.712525	-124.902075	619.9	cam1_20160616013546.png
Expected hard bottom in this location because the corals have to attach to something.	6/16/2016	1	38	45	42.712447	-124.901800	619.9	cam1_20160616013546.png
pipe	6/16/2016	1	39	32	42.712481	-124.901792	620.5	cam1_20160616013546.png
Many dark pink Anthomastus mushroom corals	6/16/2016	1	40	18	42.712522	-124.901757	620.4	cam1_20160616014805.png
Current estimated at >0.5knot	6/16/2016	1	41	41	42.712498	-124.901651	620.2	cam1_20160616014805.png
hagfish	6/16/2016	1	41	48	42.712498	-124.901648	620.0	cam1_20160616014805.png
Approaching target N1	6/16/2016	1	42	36	42.712493	-124.901638	619.5	cam1_20160616014646.png
scattered shells	6/16/2016	1	43	9	42.712428	-124.901635	619.0	cam1_20160616014805.png
Bacterial mats	6/16/2016	1	45	24	42.712466	-124.901506	618.2	cam1_20160616014646.png
Bubbles	6/16/2016	1	45	52	42.712495	-124.901505	618.2	cam1_20160616014646.png
Checking on gas tight sampling request	6/16/2016	1	47	13	42.712493	-124.901465	618.1	cam1_20160616014805.png
This bubble source is releasing bubbles in clumps ("blurps")	6/16/2016	1	47	36	42.712503	-124.901464	618.1	cam1_20160616014805.png
Continuing to look around site	6/16/2016	1	48	30	42.712508	-124.901457	618.2	cam1_20160616014646.png
gastropods, clam shells, another active bubbling source	6/16/2016	1	49	16	42.712507	-124.901448	618.1	cam1_20160616014646.png

H1521 Coquille SW Seeps	date	hr	min	sec	latitude	longitude	Z(m)	grab
Discussing feasibility of sampling at this location and dropping hydrophone. Need to return against the current.	6/16/2016	1	59	12	42.712516	-124.901448	618.2	cam1_20160616015007.png
Will drop off hydrophone here and take a gas tight sample	6/16/2016	1	59	54	42.712496	-124.901461	618.4	cam1_20160616015007.png
Preparing to take gas tight sample; readjusting funnel	6/16/2016	2	6	38	42.712518	-124.901438	618.8	cam1_20160616020704.png
Hydrate ice is forming in funnel	6/16/2016	2	8	52	42.712508	-124.901428	618.9	cam1_20160616020734.png
Triggered gas tight, stowing it in forward bio box	6/16/2016	2	11	7	42.712513	-124.901429	618.9	cam1_20160616021225.png
Dropped hydrophone on top of ledge between 2 blurping bubble seeps	6/16/2016	2	12	58	42.712538	-124.901416	618.9	cam1_20160616021225.png
Dropping marker #233 next to gas tight sampling site	6/16/2016	2	13	46	42.712506	-124.901413	618.9	cam1_20160616021225.png
Shifting marker back so that it doesn't bump into the hydrophone in this strong bottom current	6/16/2016	2	14	24	42.712472	-124.901418	618.9	cam1_20160616021246.png
Niskin sample just taken was also near a swiftia coral	6/16/2016	2	20	37	42.712569	-124.901377	617.9	cam1_20160616022607.png
Attempting to poke seafloor here to see if push cores are possible	6/16/2016	2	21	41	42.712568	-124.901365	619.0	cam1_20160616022607.png
Expected hard substrate here for corals to grow	6/16/2016	2	22	16	42.712562	-124.901374	619.1	cam1_20160616022607.png
Seafloor is rocky throughout	6/16/2016	2	23	6	42.712562	-124.901364	619.1	cam1_20160616022607.png
Adding second rock to that sample, NA072-083 (part of same sample)	6/16/2016	2	35	16	42.712503	-124.901446	618.9	cam1_20160616023814.png
Adding slurp of less filamentous bacterial mat to same slurp jar (#3) for NA072-082, nearby previous site but slightly moved.	6/16/2016	2	41	14	42.712464	-124.901428	619.2	cam1_20160616024336.png
huge bubble swarm when temp probe pushed into sediment	6/16/2016	2	53	39	42.712509	-124.901399	619.2	cam1_20160616025349.png
Near bubbles/many bubbles released during probe: ambient: ~3.10C; surface: ~3.18C; at 15cm: 3.25C	6/16/2016	2	55	47	42.712521	-124.901420	619.1	cam1_20160616025349.png
At same location, readjusting Tprobe angle: at 15cm, 3.25C	6/16/2016	2	57	9	42.712542	-124.901409	619.1	cam1_20160616025535.png
Ambient seawater above surface: 3.12C	6/16/2016	2	58	55	42.712555	-124.901398	619.1	cam1_20160616025535.png
Hydrate ice on lens	6/16/2016	2	59	54	42.712536	-124.901456	618.5	cam1_20160616025327.png
looking over the hydrophone site and bubbles flowing around it	6/16/2016	3	14	11	42.712541	-124.901433	618.5	cam1_20160616031527.png
marker nearby the hydrophone	6/16/2016	3	14	26	42.712553	-124.901433	618.5	cam1_20160616031527.png
now leaving the hydrophone site and going south	6/16/2016	3	16	14	42.712503	-124.901419	618.4	cam1_20160616031527.png
mushroom corals all around	6/16/2016	3	17	44	42.712327	-124.901577	618.3	cam1_20160616031527.png
many sea stars and thornyheads	6/16/2016	3	18	5	42.712333	-124.901577	618.2	cam1_20160616031527.png
steady current flowing by as we move south	6/16/2016	3	19	25	42.712366	-124.901592	618.8	cam1_20160616031527.png
very sedimented and less bio	6/16/2016	3	22	30	42.712131	-124.901700	618.5	cam1_20160616032600.png
frogfish	6/16/2016	3	26	4	42.711401	-124.901927	616.0	cam1_20160616032207.png
many corals	6/16/2016	3	26	10	42.711325	-124.901958	616.2	cam1_20160616032207.png
very seepy area, nav target dropped	6/16/2016	3	27	49	42.710896	-124.902091	615.4	cam1_20160616032657.png
at southern site, trying to determine where is best to continue onward to	6/16/2016	3	29	49	42.711097	-124.902239	615.9	cam1_20160616032657.png
starting to move to nav target '1521 Dive Site'	6/16/2016	3	32	5	42.710995	-124.901986	614.8	cam1_20160616033810.png

H1521 Coquille SW Seeps	date	hr	min	sec	latitude	longitude	Z(m)	grab
and then work our way toward nav target 'S2'	6/16/2016	3	32	35	42.711010	-124.901892	614.9	cam1_20160616033810.png
slight drop off here	6/16/2016	3	32	58	42.711046	-124.901884	615.0	cam1_20160616033810.png
close up of octocoral (mushroom coral)	6/16/2016	3	33	23	42.711050	-124.901885	614.8	cam1_20160616033810.png
passing over ledge, still in the nav target area called 'large clam bed'	6/16/2016	3	34	1	42.711104	-124.901894	615.1	cam1_20160616033810.png
sandy area transitions around carbonate elevated ledges	6/16/2016	3	35	13	42.711082	-124.901931	615.2	cam1_20160616033811.png
carbonate rock structures, ledge overhang	6/16/2016	3	38	22	42.711059	-124.901419	615.3	cam1_20160616033402.png
some fluffy biological structures and shrimps living on this ledge	6/16/2016	3	39	49	42.711013	-124.901393	615.2	cam1_20160616033448.png
carbonate ledge surface	6/16/2016	3	42	28	42.710884	-124.901514	615.4	cam1_20160616034344.png
thornyhead	6/16/2016	3	43	40	42.710821	-124.901449	614.2	cam1_20160616034448.png
right around the nav target, H1521 Dive Site, lots of bacterial mats, rugged seafloor, pink and purple anemones and corals	6/16/2016	3	46	21	42.710803	-124.901268	612.6	cam1_20160616034448.png
tiny snails and worms here around white microbial mats	6/16/2016	3	50	27	42.710848	-124.901356	614.0	cam1_20160616035803.png
doing a poking test to see how much giveway the ground has	6/16/2016	3	52	13	42.710801	-124.901209	614.0	cam1_20160616035803.png
collected zip ties	6/16/2016	4	0	31	42.710797	-124.901315	614.1	cam1_20160616040503.png
exploring around the edge of this area, trying to determine in the carbonate is forming this way or if it was collapsed	6/16/2016	4	2	46	42.710784	-124.901257	612.4	cam1_20160616040503.png
big ledges and drop off points	6/16/2016	4	3	5	42.710750	-124.901249	612.7	cam1_20160616040441.png
terraces of carbonate ledges	6/16/2016	4	3	38	42.710711	-124.901196	612.9	cam1_20160616040441.png
very large thornyheads, short spined old thornyheads	6/16/2016	4	5	1	42.710658	-124.901212	612.5	cam1_20160616040441.png
very steady gas stream, maybe a good place to GT sample	6/16/2016	4	6	55	42.710599	-124.901374	614.8	cam1_20160616040414.png
Temp reading now	6/16/2016	4	16	2	42.710643	-124.901394	614.6	cam1_20160616041238.png
Temp probe reading: 3.23C at surface, 8.48C peak at 10cm, 6.40 average (after breaking open surface) at 10cm	6/16/2016	4	26	28	42.710617	-124.901403	614.7	cam1_20160616042944.png
temp probe is not lowering below about 5.6C, maybe something broke	6/16/2016	4	27	6	42.710616	-124.901396	614.7	cam1_20160616042944.png
placed the marker now	6/16/2016	4	30	23	42.710627	-124.901387	614.4	cam1_20160616043301.png
leaving to test if we can core somewhere around here	6/16/2016	4	30	37	42.710662	-124.901387	614.6	cam1_20160616043301.png
softer in middle are but overall not able to penetrate the poker very far	6/16/2016	4	32	2	42.710635	-124.901411	614.5	cam1_20160616043222.png
looking at the clams and sediment, probably too difficult to core. perhaps best to move on to look other areas and settle with a scoop here	6/16/2016	4	33	47	42.710624	-124.901348	614.5	cam1_20160616043248.png
preparing to do a scoop	6/16/2016	4	36	9	42.710646	-124.901379	614.6	cam1_20160616043248.png
still panning around the area looking for what is in the Dive Site nav target region	6/16/2016	4	55	6	42.710845	-124.901467	612.9	cam2_20160616045945.png
very layered area of carbonate ledges, west of the 087 sample site	6/16/2016	5	0	12	42.710803	-124.901127	610.5	cam1_20160616050741.png
distinct layering	6/16/2016	5	3	16	42.710757	-124.901191	613.3	cam1_20160616050741.png

H1521 Coquille SW Seeps	date	hr	min	sec	latitude	longitude	Z(m)	grab
get samples at each ledge	6/16/2016	5	3	26	42.710757	-124.901191	613.9	cam1_20160616050741.png
white branching sponges	6/16/2016	5	9	47	42.710718	-124.901217	614.3	cam1_20160616050714.png
small chunk collected	6/16/2016	5	11	26	42.710719	-124.901202	614.3	cam1_20160616051324.png
bigger chunk to be added to sample	6/16/2016	5	16	28	42.710683	-124.901222	614.2	cam1_20160616051324.png
moving around to look for softer ground to possibly core samples	6/16/2016	5	25	17	42.710736	-124.901318	612.8	cam1_20160616052632.png
still searching around for more soft sites	6/16/2016	5	27	24	42.710757	-124.901254	612.9	cam1_20160616052458.png
thick assemblage of clams	6/16/2016	5	29	20	42.710722	-124.901165	614.0	cam1_20160616052618.png
small eel pout	6/16/2016	5	29	43	42.710720	-124.901153	614.1	cam1_20160616052618.png
poking around to determine how soft sediment is, but poker fell	6/16/2016	5	30	10	42.710721	-124.901167	614.0	cam1_20160616053806.png
poker shows that its VERY soft sediment, planning to do some coring	6/16/2016	5	38	27	42.710726	-124.901157	614.0	cam1_20160616053215.png
sediment closer to the clam beds is harder to get deep	6/16/2016	5	46	31	42.710707	-124.901164	614.0	cam1_20160616054600.png
really cool octopus	6/16/2016	6	28	51	42.710719	-124.901902	617.2	cam1_20160616062747.png
more carbonate mounds	6/16/2016	6	46	31	42.710425	-124.902079	614.7	cam1_20160616064632.png
shelves of carbonate, step-like tiers	6/16/2016	6	46	48	42.710389	-124.902077	614.6	cam1_20160616064632.png
looks like the edges of the mound cracked off	6/16/2016	6	47	6	42.710385	-124.902058	614.5	cam1_20160616064649.png
octocorals all around the carbonate structures	6/16/2016	6	48	25	42.710340	-124.902033	615.0	cam1_20160616064648.png
white frilly bacteria, fioploca?	6/16/2016	6	52	5	42.710330	-124.902090	614.9	cam1_20160616065124.png
thioploca**	6/16/2016	6	52	53	42.710322	-124.902005	614.9	cam1_20160616065124.png
south west of the sampling area	6/16/2016	6	54	34	42.710294	-124.901987	614.2	cam1_20160616065124.png
moving around, possibly going up to survey point 8 or 12 then looking around for a while	6/16/2016	6	54	55	42.710222	-124.902008	613.6	cam1_20160616065124.png
Zoom-in on thornyhead and rathbunaster californicus (sunstar)	6/16/2016	7	2	37	42.710265	-124.902079	614.3	cam1_20160616070153.png
Heading to far left edge of site to explore	6/16/2016	7	4	47	42.710294	-124.902106	613.7	cam1_20160616070259.png
Common fauna: mushroom coral, thornyhead, hagfish, rathbunaster, sea stars, deep-sea soles, small patches of bacterial mats	6/16/2016	7	8	20	42.710430	-124.902386	615.1	cam1_20160616070259.png
Pteraster	6/16/2016	7	15	31	42.710581	-124.902840	622.3	cam1_20160616071808.png
red stoloniferous octocoral	6/16/2016	7	19	54	42.710553	-124.903156	623.6	cam1_20160616071806.png
Zoom-in on encrusting coral on some type of old sea pen/sponge stalk- hot pink, octocoral (stoleniferous?)	6/16/2016	7	20	0	42.710556	-124.903180	623.3	cam1_20160616072745.png
some swiftia? few minutes ago	6/16/2016	7	22	30	42.710728	-124.903353	625.2	cam1_20160616072745.png
flaky carbonate	6/16/2016	7	26	42	42.710925	-124.903214	624.0	cam1_20160616072745.png
small bac mat, lone clam	6/16/2016	7	27	56	42.710994	-124.903253	624.3	cam1_20160616072742.png
zoom-in on bacterial mat; not filamentous as seen previously, grayish color. Few associate clams	6/16/2016	7	28	26	42.710994	-124.903284	624.3	cam1_20160616072742.png
bac mat	6/16/2016	7	29	45	42.711063	-124.903272	624.0	cam1_20160616072745.png
water sample on top of red stoloniferous octocoral	6/16/2016	7	35	21	42.711288	-124.903263	624.1	cam1_20160616073405.png

H1521 Coquille SW Seeps	date	hr	min	sec	latitude	longitude	Z(m)	grab
octopus	6/16/2016	7	39	11	42.711431	-124.903266	624.4	cam1_20160616073208.png
zoom-in on octopus	6/16/2016	7	41	40	42.711521	-124.903305	625.5	cam1_20160616074014.png
zoom-in on eelpout	6/16/2016	7	53	49	42.711779	-124.903076	624.1	
many small bacterial mats	6/16/2016	8	2	12	42.711592	-124.902524	620.7	cam1_20160616080248.png
many shell fragments	6/16/2016	8	4	38	42.711741	-124.902433	617.7	cam1_20160616080608.png
bacterial mat	6/16/2016	8	7	31	42.711468	-124.902376	616.8	cam1_20160616080608.png
bac mat under rock lip	6/16/2016	8	7	44	42.711466	-124.902382	616.5	cam1_20160616080608.png
bacterial mat under carbonate lip	6/16/2016	8	7	59	42.711476	-124.902363	616.9	cam1_20160616080608.png
plastic	6/16/2016	8	8	1	42.711475	-124.902363	617.0	cam1_20160616080442.png
ridge along track has a lot of mat underneath	6/16/2016	8	15	27	42.711504	-124.902193	614.5	cam1_20160616081150.png
bacterial map on side of carbonate flake	6/16/2016	8	15	29	42.711495	-124.902191	614.5	cam1_20160616081150.png
shell beds	6/16/2016	8	17	14	42.711492	-124.902004	613.4	cam1_20160616081150.png
nudibranch	6/16/2016	8	24	15	42.711494	-124.901628	615.1	cam1_20160616082341.png
Giant nudibranchs	6/16/2016	8	24	47	42.711487	-124.901612	614.9	cam1_20160616082341.png
skate with dark spots	6/16/2016	8	27	25	42.711511	-124.901210	615.3	cam1_20160616082344.png
Zoom-in on longnose skate; note 2 distinct black dots	6/16/2016	8	28	15	42.711546	-124.901087	614.9	cam1_20160616082344.png
hagfish	6/16/2016	8	29	13	42.711510	-124.901014	614.1	cam1_20160616082344.png
muddy sediments, less carbonates present	6/16/2016	8	29	22	42.711520	-124.901009	614.1	cam1_20160616082344.png
bac mat	6/16/2016	8	32	41	42.711531	-124.900901	612.7	cam1_20160616083318.png
bacterial mat	6/16/2016	8	32	43	42.711531	-124.900895	612.8	cam1_20160616083318.png
Zoom-in on retracted mushroom coral with nearby brittle star	6/16/2016	8	34	51	42.711529	-124.900863	612.9	cam1_20160616083320.png
large bacterial mat	6/16/2016	8	37	29	42.711490	-124.900734	611.0	cam1_20160616083312.png
Large bacterial mat area, gray, associate fauna: mushroom coral, sablefish, thornyhead	6/16/2016	8	38	6	42.711480	-124.900731	611.7	cam1_20160616083320.png
Previously described mat area approx. 8-10 m	6/16/2016	8	41	23	42.711497	-124.900705	610.9	cam1_20160616084138.png
going to poke the bacterial mat	6/16/2016	8	42	38	42.711458	-124.900649	611.2	cam1_20160616084149.png
bacterial mat area of about 10 meters diameter	6/16/2016	8	42	60	42.711513	-124.900662	611.6	cam1_20160616084149.png
After poking area with bacterial mat (gray, filamentous); hard substrate, black sediment below; few bubbles released	6/16/2016	8	45	32	42.711483	-124.900691	611.6	cam1_20160616084149.png
poked bacterial mat. hard substrate. few (3 bubbles)	6/16/2016	8	45	48	42.711493	-124.900694	611.2	cam1_20160616084149.png
broken flat rocks	6/16/2016	8	49	46	42.711556	-124.900155	606.3	cam1_20160616084149.png
bac mat	6/16/2016	8	51	0	42.711534	-124.900021	604.9	cam1_20160616085935.png
small bact. mat	6/16/2016	8	51	0	42.711534	-124.900021	604.9	cam1_20160616085935.png
bacterial mats along carbonates and reduced sediment visible	6/16/2016	8	57	15	42.711250	-124.900050	604.8	cam1_20160616085935.png
large but semi diffuse bacterial mat area	6/16/2016	8	57	37	42.711254	-124.900054	604.5	cam1_20160616085935.png
no active bubble seepage observed so far	6/16/2016	8	57	55	42.711254	-124.900002	604.4	cam1_20160616085935.png
zoom-in on anemone and mushroom coral w/ all polyps out	6/16/2016	9	0	35	42.711241	-124.900094	605.1	cam1_20160616090850.png

H1521 Coquille SW Seeps	date	hr	min	sec	latitude	longitude	Z(m)	grab
mushroom corals everywhere!	6/16/2016	9	3	23	42.710813	-124.900134	604.8	cam1_20160616090858.png
long thin bac mat, clams	6/16/2016	9	7	56	42.710778	-124.900058	604.9	cam1_20160616090858.png
Dense bacterial mat; whitish color; filamentous; associate fauna: clams, mushroom coral, thornyhead, deep-sea sole	6/16/2016	9	10	8	42.710685	-124.900100	605.4	cam1_20160616091158.png
flatfish also common fauna	6/16/2016	9	10	27	42.710631	-124.900105	606.0	cam1_20160616091158.png
octopus	6/16/2016	9	12	9	42.710233	-124.900015	607.1	cam1_20160616091158.png
large animal (fish/shark?) swam through Argus approx 2 min. ago. no captures	6/16/2016	9	16	49	42.710520	-124.900277	607.4	cam1_20160616091158.png
clam beds	6/16/2016	9	19	35	42.710634	-124.900794	608.2	cam1_20160616091158.png
still mostly anthomastus sp., hagfish, anemones, sunstars, thornyheads	6/16/2016	9	34	5	42.711171	-124.900648	610.1	cam1_20160616093706.png
hatchet fish	6/16/2016	9	37	46	42.711191	-124.900703	610.5	cam1_20160616093647.png
possible hatchetfish	6/16/2016	9	38	6	42.711303	-124.900705	609.9	cam1_20160616093706.png
octopus	6/16/2016	9	47	45	42.711940	-124.900748	611.0	cam1_20160616094729.png
large area of bacterial mats	6/16/2016	9	50	8	42.712297	-124.900644	610.6	cam1_20160616095909.png
large bac mat, stalked encrusting stoloniferous octocoral	6/16/2016	9	50	49	42.712345	-124.900683	610.8	cam1_20160616095909.png
setting down to sample red stalked stoloniferous coral	6/16/2016	9	57	47	42.712656	-124.900721	613.4	cam1_20160616095909.png
shell fragments	6/16/2016	10	3	52	42.712835	-124.900574	610.9	cam1_20160616100450.png
many shell fragments	6/16/2016	10	3	52	42.712835	-124.900574	610.9	cam1_20160616100450.png
Zoom-in on sea pen with brittle star attached	6/16/2016	10	5	20	42.712925	-124.900562	611.1	cam1_20160616100450.png
Pterasteridae star	6/16/2016	10	20	23	42.713569	-124.901258	617.1	cam1_20160616102626.png
small pelagic organisms (i.e. jellies, shrimp) in water column. Similar benthic fauna as previously described throughout transit, varying in density across location	6/16/2016	10	21	52	42.713665	-124.901358	618.0	cam1_20160616102626.png
bacterial mat	6/16/2016	10	21	56	42.713665	-124.901384	618.0	cam1_20160616102626.png
large skate	6/16/2016	10	26	15	42.713603	-124.901713	620.4	cam1_20160616102618.png
zoom-in on longnose skate	6/16/2016	10	27	8	42.713599	-124.901688	620.4	cam1_20160616102626.png
holothurian	6/16/2016	10	30	52	42.713798	-124.901659	619.6	cam1_20160616103519.png
Giant barrel - possibly oil drum (diesel on label)	6/16/2016	10	36	49	42.713936	-124.901727	620.1	cam1_20160616103458.png
bacterial mat	6/16/2016	10	40	11	42.713824	-124.902206	624.1	cam1_20160616104754.png
carbonates and bacterial mat	6/16/2016	10	40	15	42.713850	-124.902210	624.2	cam1_20160616104754.png
50 gal drum, BP Diesel Oil, covered in oxidized rusticles	6/16/2016	10	40	36	42.713857	-124.902211	624.1	cam1_20160616104754.png
shell fragments and clams	6/16/2016	10	46	49	42.713711	-124.902508	626.1	cam1_20160616104754.png
live clams; small bed, flatfish	6/16/2016	10	50	5	42.713678	-124.902459	626.6	
clam bed	6/16/2016	10	50	10	42.713676	-124.902458	626.5	
octopus	6/16/2016	10	51	20	42.713563	-124.902562	626.8	
Looking around this area then heading to small sonar target, then will recover hydrophone	6/16/2016	11	4	45	42.712963	-124.902784	625.6	

H1521 Coquille SW Seeps	date	hr	min	sec	latitude	longitude	Z(m)	grab
Exploring the little bump north of the launch site with lots of carbonates and sediment, halibut, sea stars	6/16/2016	11	6	32	42.712878	-124.902777	625.1	
lots of marine snow and hagfish	6/16/2016	11	10	26	42.712825	-124.902918	625.3	
large rockfish	6/16/2016	11	10	55	42.712811	-124.902964	625.1	
carbonate rock pieces, platy, with sediment cover	6/16/2016	11	11	35	42.712853	-124.902998	625.3	
Continuing southeast towards point 15	6/16/2016	11	12	39	42.712826	-124.903042	626.1	
mushroom coral, thornyhead, sole	6/16/2016	11	14	15	42.712827	-124.903005	625.5	
seastars and thornyhead fish	6/16/2016	11	15	9	42.712840	-124.902884	625.3	
hagfish	6/16/2016	11	15	54	42.712818	-124.902833	625.0	
Heading back towards hydrophone	6/16/2016	11	17	10	42.712801	-124.902747	625.0	
mound feature was carbonate rubble around the sides and sediment on top	6/16/2016	11	17	31	42.712801	-124.902734	624.8	
zoom on coral	6/16/2016	11	19	50	42.712746	-124.902662	623.7	
coral and oph	6/16/2016	11	20	28	42.712752	-124.902645	623.6	cam1_20160616112026.png
sablefish	6/16/2016	11	22	37	42.712745	-124.902549	623.6	cam1_20160616112047.png
sablefish	6/16/2016	11	22	41	42.712746	-124.902548	623.5	cam1_20160616112047.png
more carbonate rubble, rockfish, shrimp, seastars	6/16/2016	11	24	7	42.712749	-124.902444	622.8	cam1_20160616112047.png
linear exposed slabs of carbonate and frilled mussel	6/16/2016	11	26	40	42.712716	-124.902298	622.7	cam1_20160616112026.png
Voragonema jelly	6/16/2016	11	27	21	42.712699	-124.902314	622.7	cam1_20160616112047.png
heading back to the hydrophone for recovery. sediment covered seafloor	6/16/2016	11	32	1	42.712687	-124.902161	622.2	cam1_20160616113534.png
many seastars	6/16/2016	11	33	26	42.712642	-124.902029	621.3	cam1_20160616113534.png
several sole, scattered sea stars	6/16/2016	11	34	26	42.712615	-124.901981	620.6	cam1_20160616113534.png
more carbonate rubble	6/16/2016	11	34	33	42.712615	-124.901959	620.5	cam1_20160616113534.png
octopus	6/16/2016	11	35	8	42.712603	-124.901941	620.3	cam1_20160616113555.png
octocoral	6/16/2016	11	37	16	42.712548	-124.901832	620.5	cam1_20160616113534.png
pipe	6/16/2016	11	37	46	42.712532	-124.901725	619.7	cam1_20160616113534.png
scattered shells, more seastars	6/16/2016	11	39	7	42.712571	-124.901530	618.3	cam1_20160616113534.png
patchy bacterial mats	6/16/2016	11	39	20	42.712594	-124.901530	617.9	cam1_20160616113534.png
bacterial mats and seastars	6/16/2016	11	39	35	42.712607	-124.901446	618.1	cam1_20160616113534.png
tanner crab	6/16/2016	11	40	1	42.712605	-124.901443	617.7	cam1_20160616114837.png
mushroom and gorgonian corals	6/16/2016	11	41	18	42.712555	-124.901411	617.7	cam1_20160616114837.png
gastropods and seastars	6/16/2016	11	41	46	42.712549	-124.901397	617.4	cam1_20160616114837.png
more shell hash	6/16/2016	11	42	21	42.712521	-124.901387	617.1	cam1_20160616114837.png
Hydrophone in view	6/16/2016	11	43	6	42.712492	-124.901470	616.6	cam1_20160616114837.png
hydrophone in sight	6/16/2016	11	44	0	42.712465	-124.901402	616.3	cam1_20160616114837.png
current has disappeared	6/16/2016	11	44	15	42.712460	-124.901401	616.4	cam1_20160616114837.png
landing to recover hydrophone	6/16/2016	11	45	47	42.712445	-124.901339	617.2	cam1_20160616114837.png

H1521 Coquille SW Seeps	date	hr	min	sec	latitude	longitude	Z(m)	grab
area around hydrophone still actively bubbling	6/16/2016	11	47	41	42.712462	-124.901308	617.4	cam1_20160616114837.png
picked up hydrophone	6/16/2016	11	48	25	42.712447	-124.901287	617.3	cam1_20160616114826.png
hydrophone stowed in forward bio box	6/16/2016	11	49	30	42.712459	-124.901305	617.4	cam1_20160616114826.png
hydrophone stowed on Herc	6/16/2016	11	50	8	42.712454	-124.901313	617.3	cam1_20160616115943.png
Returning to corals	6/16/2016	11	51	0	42.712436	-124.901291	617.3	cam1_20160616115943.png
bacterial mats along the fractured carbonate at the seep site and many sable fish	6/16/2016	11	52	53	42.712430	-124.901294	616.1	cam1_20160616115943.png
several more sablefish	6/16/2016	11	53	7	42.712451	-124.901375	616.1	cam1_20160616115943.png
back to the coral site for a Niskin	6/16/2016	11	54	3	42.712458	-124.901532	617.5	cam1_20160616115943.png
more coral and seastars	6/16/2016	11	55	5	42.712465	-124.901660	618.3	cam1_20160616115553.png
preparing for a Niskin at coral area	6/16/2016	11	58	10	42.712410	-124.901700	618.5	cam1_20160616115943.png
1hr left to explore, heading south towards S2	6/16/2016	12	3	51	42.712481	-124.901770	618.9	cam1_20160616120221.png
moving south to target S2	6/16/2016	12	11	7	42.712310	-124.901807	617.7	cam1_20160616121623.png
tanner crab and sediment, some coral and seastar	6/16/2016	12	11	60	42.712244	-124.901809	617.8	cam1_20160616121623.png
many gastropods	6/16/2016	12	12	22	42.712217	-124.901806	618.0	cam1_20160616121623.png
more continuous carbonate structures covered in sediment	6/16/2016	12	14	35	42.712062	-124.901812	617.0	cam1_20160616121623.png
linear carbonate features under sediment cover, n/s strike	6/16/2016	12	15	19	42.712044	-124.901804	616.7	cam1_20160616121539.png
huge thornyhead	6/16/2016	12	15	26	42.712041	-124.901809	616.6	cam1_20160616121539.png
continuing transit; giant thornyhead	6/16/2016	12	15	26	42.712038	-124.901810	616.5	cam1_20160616121539.png
carbonate ridge, halibut and coral, some shell hash	6/16/2016	12	16	32	42.711957	-124.901839	615.6	cam1_20160616121539.png
some bacteria mat	6/16/2016	12	17	13	42.711919	-124.901992	615.7	cam1_20160616121623.png
lots of seastars	6/16/2016	12	17	27	42.711887	-124.902010	616.5	cam1_20160616121623.png
many seastars and mushroom corals	6/16/2016	12	17	44	42.711736	-124.902034	616.9	cam1_20160616121623.png
more carbonate rubble and coral with seastar and shell hash	6/16/2016	12	17	54	42.711737	-124.902110	616.1	cam1_20160616121623.png
flounder or sole, not halibut on this dive	6/16/2016	12	18	20	42.711675	-124.902141	614.4	cam1_20160616121623.png
continuing over carbonate ridge	6/16/2016	12	18	40	42.711651	-124.902163	613.6	cam1_20160616121623.png
brisingid stars	6/16/2016	12	21	24	42.711409	-124.902203	613.0	cam1_20160616122717.png
large ridge, sediment covered, with coral and seastars, some bacteria patches	6/16/2016	12	23	16	42.711258	-124.902181	614.4	cam1_20160616122450.png
Niskin in large field of coral	6/16/2016	12	24	11	42.711185	-124.902171	614.7	cam1_20160616122450.png
successful Niskin	6/16/2016	12	27	43	42.711136	-124.902192	615.5	cam1_20160616122450.png
lots of marine snow	6/16/2016	12	32	13	42.710961	-124.902306	617.0	cam1_20160616123558.png
continuing south	6/16/2016	12	32	59	42.710947	-124.902312	617.1	cam1_20160616123558.png
several hagfish, many sea stars and mushroom corals	6/16/2016	12	35	16	42.710796	-124.902227	616.3	cam1_20160616123558.png
large siphonophore	6/16/2016	12	36	6	42.710746	-124.902236	615.7	cam1_20160616123558.png
small bacterial mat	6/16/2016	12	36	36	42.710701	-124.902186	615.7	cam1_20160616123558.png
zoom on coral	6/16/2016	12	37	23	42.710614	-124.902197	615.4	cam1_20160616123149.png
skeleton of a coral	6/16/2016	12	37	48	42.710614	-124.902182	615.4	cam1_20160616123149.png

H1521 Coquille SW Seeps	date	hr	min	sec	latitude	longitude	Z(m)	grab
not a coral, tree branch?	6/16/2016	12	38	38	42.710607	-124.902188	615.3	cam1_20160616123558.png
actually a tree branch, not a coral skeleton	6/16/2016	12	38	50	42.710599	-124.902185	615.3	cam1_20160616123558.png
bacteria patches	6/16/2016	12	40	40	42.710476	-124.902206	614.2	cam1_20160616124851.png
some shell hash	6/16/2016	12	40	47	42.710475	-124.902207	614.2	cam1_20160616124851.png
hummocky ridge, terrain	6/16/2016	12	43	46	42.710380	-124.902239	614.4	cam1_20160616124851.png
broken carbonate mound with corals and bacterial mats	6/16/2016	12	45	22	42.710292	-124.902357	616.3	cam1_20160616124851.png
bacterial mats and shell hash on crusty carbonate ridge	6/16/2016	12	45	39	42.710301	-124.902377	616.2	cam1_20160616124851.png
fluffy bacteria	6/16/2016	12	47	46	42.710279	-124.902369	616.2	cam1_20160616124744.png
zoom on bacteria mat with small clams and gastropods	6/16/2016	12	49	11	42.710274	-124.902332	616.3	cam1_20160616124744.png
zoom in on stringy bacterial mat	6/16/2016	12	49	44	42.710276	-124.902341	616.3	cam1_20160616124744.png
heading east	6/16/2016	12	49	50	42.710272	-124.902341	616.4	cam1_20160616124744.png
Heading east while changing ship's heading into the current, N/NW	6/16/2016	12	51	42	42.710187	-124.902336	614.9	
large thornyhead	6/16/2016	12	52	12	42.710191	-124.902341	615.0	
extensive carbonate crust overhang	6/16/2016	12	55	2	42.710183	-124.902165	614.4	
Beginning recovery	6/16/2016	12	59	9	42.710222	-124.902126	614.2	

H1522 NA072 Bamboo Coral	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Myctophids	6/16/2016	20	35	56	42.040757	-125.016556	368.0	cam1_20160616203433.png
several myctophids and few large predators in the midwater	6/16/2016	20	39	2	42.040820	-125.016465	459.0	cam1_20160616203254.png
appendicularian housing, mucus ball	6/16/2016	20	51	12	42.041016	-125.016113	812.4	cam1_20160616205730.png
Fauna observed during descent	6/16/2016	21	4	20	42.040746	-125.016108	1126.4	cam1_20160616210735.png
color balance	6/16/2016	21	8	13	42.039987	-125.016381	1125.8	cam1_20160616210735.png
On bottom	6/16/2016	21	11	33	42.040075	-125.016486	1126.0	
ROV checks complete, ready to explore!	6/16/2016	21	11	54	42.040153	-125.016468	1126.2	
In sight on bottom	6/16/2016	21	11	58	42.040157	-125.016461	1126.1	
Sediments, flat	6/16/2016	21	12	10	42.040164	-125.016462	1126.3	
Looks mostly hard bottom covered with a thin veneer of sediment/silt	6/16/2016	21	12	17	42.040163	-125.016466	1126.5	
also some deep sea sole	6/16/2016	21	13	2	42.040160	-125.016543	1126.3	
few crinoids	6/16/2016	21	15	12	42.040321	-125.016966	1127.9	
Other fauna include	6/16/2016	21	19	7	42.040413	-125.017194	1128.5	
Zoom-in on sea pen; also in frame	6/16/2016	21	23	39	42.040480	-125.017505	1130.1	cam1_20160616212623.png
Zoom-in on bamboo coral. Associate fauna include	6/16/2016	21	29	47	42.040527	-125.017708	1131.4	cam1_20160616212607.png
Lots of bamboo corals	6/16/2016	21	37	53	42.040497	-125.017670	1131.1	cam1_20160616213544.png
White branching organism - lack of visible polyps is leaning toward sponge ID	6/16/2016	21	40	13	42.040524	-125.017677	1130.3	cam1_20160616214448.png
Zoom-in on rock	6/16/2016	21	45	41	42.040533	-125.017714	1131.4	cam1_20160616214441.png
Zoom-in on bamboo coral	6/16/2016	21	52	19	42.040582	-125.017748	1130.3	cam1_20160616215305.png
Sea cucumber w/ branching gill structure	6/16/2016	22	2	50	42.040760	-125.018097	1132.9	cam1_20160616220356.png
glass bottle	6/16/2016	22	5	41	42.040742	-125.018065	1132.0	cam1_20160616220425.png
Zoom in on sunstar hanging on hydroid. Also in frame	6/16/2016	22	8	26	42.040753	-125.018156	1132.8	cam1_20160616220526.png
Zoom-in on black coral (Bathypathes). Also in frame	6/16/2016	22	10	34	42.040831	-125.018128	1134.5	cam1_20160616221911.png
Zoom-in on stand of large white sponges littered with large red crabs	6/16/2016	22	19	9	42.041029	-125.018524	1141.1	cam1_20160616221028.png
white coral next, to swiftia maybe Anthothela	6/16/2016	22	24	22	42.040936	-125.018806	1145.5	cam1_20160616222219.png
Zoom-in on black coral (Lillipathes?), 25-30 cm tall. No branching except off main axis. Also in frame	6/16/2016	22	30	49	42.040957	-125.018223	1134.0	cam1_20160616223014.png
Amendment to previous coral ID	6/16/2016	22	32	33	42.041002	-125.018011	1132.6	cam1_20160616223309.png
Lots of white gastropod shells	6/16/2016	22	33	27	42.041036	-125.018020	1130.2	cam1_20160616223014.png
Zoom-in on pacific flatnose (antimora microlepis)	6/16/2016	22	45	43	42.041447	-125.017409	1130.6	cam1_20160616224434.png

H1522 NA072 Bamboo Coral	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Zoom-in on rattail	6/16/2016	22	49	45	42.041519	-125.017297	1129.8	cam1_20160616224334.png
Red Screen. Channel 1 down shoreside	6/16/2016	22	51	55	42.041658	-125.017292	1130.3	cam1_20160616225525.png
Zoom-in on rattail exploring camera lens	6/16/2016	22	56	23	42.041678	-125.017217	1130.8	cam1_20160616225524.png
Bathypathes black coral	6/16/2016	23	5	36	42.041677	-125.017417	1129.0	cam1_20160616230704.png
Crab on coral skeleton	6/16/2016	23	7	14	42.041709	-125.017565	1128.9	cam1_20160616230702.png
Zoom in on bamboo coral Isadella	6/16/2016	23	10	9	42.041930	-125.017866	1130.5	cam1_20160616231045.png
Black coral, swiftia, crinoids	6/16/2016	23	11	57	42.041971	-125.017767	1130.3	cam1_20160616231140.png
Deep sea sole and scattered anemones	6/16/2016	23	14	40	42.042013	-125.017956	1131.2	cam1_20160616231140.png
About midway between WP2 and 3, heading northwest	6/16/2016	23	14	58	42.042036	-125.017998	1131.4	cam1_20160616231140.png
flytrap anemones	6/16/2016	23	17	11	42.042069	-125.018031	1131.6	cam1_20160616231140.png
Black coral lillipathes	6/16/2016	23	18	25	42.042078	-125.018062	1131.6	cam1_20160616231140.png
Tunicates at base of black coral	6/16/2016	23	18	35	42.042074	-125.018065	1131.6	cam1_20160616231140.png
sunstar, several small swiftia corals, scattered sea cucumbers	6/16/2016	23	20	53	42.042127	-125.018187	1132.3	cam1_20160616232755.png
zoom in on swiftia	6/16/2016	23	21	36	42.042131	-125.018173	1132.5	cam1_20160616232700.png
Bamboo coral with all its polyps out; nudibranch feeding on swiftia	6/16/2016	23	25	22	42.042175	-125.018264	1134.5	cam1_20160616232737.png
Zoom in on coral with several crabs; Argus glamour shot	6/16/2016	23	27	54	42.042154	-125.018305	1134.4	cam1_20160616232653.png
shrimp	6/16/2016	23	33	11	42.042306	-125.018494	1138.3	cam1_20160616233644.png
Approaching WP3	6/16/2016	23	33	20	42.042310	-125.018494	1138.8	cam1_20160616233644.png
2 anthomastus mushroom corals	6/16/2016	23	33	35	42.042329	-125.018522	1139.8	cam1_20160616233644.png
rattail	6/16/2016	23	33	54	42.042339	-125.018545	1140.3	cam1_20160616233644.png
Turning to NE to head to WP4	6/16/2016	23	34	24	42.042347	-125.018543	1140.2	cam1_20160616233644.png
Heading into a thicker grove of corals	6/16/2016	23	36	44	42.042397	-125.018372	1134.8	cam1_20160616233606.png
rockfish	6/16/2016	23	38	31	42.042585	-125.018104	1130.5	cam1_20160616233607.png
bamboo corals have thinned out again	6/16/2016	23	38	51	42.042581	-125.018046	1129.9	cam1_20160616233607.png
Midway between WP3/4, heading west back to the contour where there was a grouping of bamboo corals	6/16/2016	23	40	4	42.042646	-125.018037	1130.2	cam1_20160616234203.png
black coral lillipathes	6/16/2016	23	41	17	42.042765	-125.018008	1132.3	cam1_20160616234203.png
returned to contour with several more bamboo corals	6/16/2016	23	42	32	42.042794	-125.018048	1131.7	cam1_20160616234203.png
Heading north along contour	6/16/2016	23	44	3	42.042777	-125.018153	1134.6	cam1_20160616234203.png
hagfish	6/17/2016	0	1	36	42.043332	-125.017958	1135.2	cam1_20160617000734.png
Heading north along contour again between WP4/5. Muddy seafloor, flytrap anemone, no corals in view yet	6/17/2016	0	2	13	42.043376	-125.017961	1135.4	cam1_20160617000734.png
Some cobbles on seafloor again with anemones	6/17/2016	0	3	30	42.043442	-125.018027	1136.3	cam1_20160617000734.png
Bamboo corals on contour heading NW to WP5	6/17/2016	0	3	47	42.043458	-125.018071	1136.2	cam1_20160617000734.png

H1522 NA072 Bamboo Coral	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
skate	6/17/2016	0	5	35	42.043572	-125.018136	1136.6	cam1_20160617000734.png
rattail	6/17/2016	0	6	45	42.043627	-125.018030	1135.4	cam1_20160617000734.png
Pipe (PVC?) colonized by crinoids, anemones, tunicates	6/17/2016	0	8	0	42.043650	-125.017972	1137.3	cam1_20160617000734.png
rattail	6/17/2016	0	8	33	42.043714	-125.017925	1136.1	cam1_20160617000734.png
Zoomed in on base of toppled bamboo coral, appears to still be attached to rock, not broken off	6/17/2016	0	9	49	42.043764	-125.017872	1136.7	cam1_20160617000727.png
hermit crab	6/17/2016	0	12	41	42.043911	-125.017897	1137.2	cam1_20160617001627.png
fallen over bamboo skeleton	6/17/2016	0	13	20	42.043931	-125.017980	1136.2	cam1_20160617001627.png
continuing due north along contour	6/17/2016	0	14	19	42.043928	-125.018019	1139.0	cam1_20160617001627.png
deep sea sole	6/17/2016	0	15	20	42.043914	-125.018043	1137.8	cam1_20160617001627.png
Zoom in on swiftia with brittle stars, anemones, cup corals	6/17/2016	0	16	51	42.043917	-125.018040	1139.0	cam1_20160617001219.png
Continuing NE along contour towards WP6	6/17/2016	0	18	0	42.044022	-125.017992	1139.0	cam1_20160617001627.png
Muddy seafloor; 2 sea stars, anemone, thornyhead, corals have disappeared	6/17/2016	0	25	17	42.044127	-125.017490	1133.5	cam1_20160617002908.png
continuing to step east to look at potential contours in sonar	6/17/2016	0	26	18	42.044144	-125.017399	1133.4	cam1_20160617002908.png
strikes in sonar have largely disappeared	6/17/2016	0	28	21	42.044133	-125.017160	1131.6	cam1_20160617002837.png
barrel sponges on cobble; rattail	6/17/2016	0	28	35	42.044134	-125.017160	1131.5	cam1_20160617002837.png
crab and anemone on same cobble	6/17/2016	0	29	18	42.044116	-125.017120	1131.6	cam1_20160617002837.png
turning back and heading NW towards 1135m contour	6/17/2016	0	29	22	42.044128	-125.017119	1131.4	cam1_20160617002837.png
Anthiptilum sea pen	6/17/2016	0	30	50	42.044275	-125.017423	1133.6	cam2_20160617003014.png
Pipe with one crinoid growing on it	6/17/2016	0	38	29	42.044457	-125.017779	1136.3	cam2_20160617003014.png
Zoom-in on Acantogorgia	6/17/2016	0	45	25	42.044763	-125.017904	1137.5	cam1_20160617004447.png
Passing over more black corals	6/17/2016	0	49	0	42.044926	-125.017744	1137.3	cam1_20160617004452.png
continuing towards WP 8	6/17/2016	0	57	13	42.045362	-125.017733	1138.7	
large bamboo and a lot of fallen debris	6/17/2016	1	3	41	42.045589	-125.017725	1140.6	cam1_20160617010508.png
small white sponges	6/17/2016	1	3	42	42.045589	-125.017723	1140.6	cam1_20160617010508.png
Tunicates, anemones, crinoids on patchy cobble	6/17/2016	1	5	29	42.045610	-125.017769	1140.8	cam1_20160617010541.png
Passed another section of pipe colonized by crinoids	6/17/2016	1	12	8	42.045824	-125.017835	1143.8	cam1_20160617011532.png
bamboo coral	6/17/2016	1	12	20	42.045828	-125.017835	1144.0	cam1_20160617011532.png
zoom in on anemones, tunicates, brachiopods, thornyhead in small rocky outcropping	6/17/2016	1	14	8	42.045896	-125.017752	1143.1	cam1_20160617011414.png
crab, rattail	6/17/2016	1	15	23	42.045946	-125.017736	1144.3	cam1_20160617011410.png
bamboo coral	6/17/2016	1	15	31	42.045946	-125.017745	1143.7	cam1_20160617011410.png
Continuing up towards WP 10. If corals are sparse there, might return to southern sites.	6/17/2016	1	17	47	42.045951	-125.017766	1143.2	cam1_20160617011532.png

H1522 NA072 Bamboo Coral	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
bamboo coral	6/17/2016	1	23	3	42.046026	-125.017970	1145.9	cam1_20160617012806.png
bamboo corals	6/17/2016	1	24	26	42.046099	-125.017959	1146.5	cam1_20160617012806.png
continuing N	6/17/2016	1	24	35	42.046103	-125.017939	1146.3	cam1_20160617012806.png
bamboo coral with sea star at base; anemones; deep sea sole	6/17/2016	1	25	17	42.046144	-125.017878	1145.6	cam1_20160617012806.png
zooming in on purple coral by rock	6/17/2016	1	27	56	42.046282	-125.017894	1145.4	cam1_20160617012806.png
This purple coral is a swiftia with a crinoid on top. Little bubblegum coral on rock.	6/17/2016	1	28	37	42.046282	-125.017909	1145.2	cam1_20160617012417.png
2 small bamboo coral on right hand side of frame; taller bamboo coral behind them	6/17/2016	1	29	28	42.046288	-125.017899	1145.6	cam1_20160617012806.png
rattail, rock fish	6/17/2016	1	31	15	42.046372	-125.017957	1146.8	cam1_20160617013147.png
bamboo coral	6/17/2016	1	31	50	42.046456	-125.018047	1148.9	cam1_20160617013147.png
heading NE towards WP10	6/17/2016	1	33	46	42.046562	-125.017861	1146.6	cam1_20160617013147.png
zoom in on bamboo coral	6/17/2016	1	36	17	42.046600	-125.017764	1146.0	cam1_20160617013018.png
bamboo coral; pacific flatnose; rattail	6/17/2016	1	41	22	42.046690	-125.017698	1145.8	
waiting for ship move	6/17/2016	1	42	24	42.046777	-125.017667	1145.5	
midway between WP9/10	6/17/2016	1	42	56	42.046805	-125.017681	1145.9	
pacific flatnose again	6/17/2016	1	47	9	42.046815	-125.017752	1145.9	
almost to waypoint 10 sparse coral, some bamboo colonies, mostly mud	6/17/2016	1	48	7	42.046885	-125.017664	1144.8	
bamboo coral	6/17/2016	1	48	37	42.046927	-125.017597	1144.4	
zoom in on bamboo coral	6/17/2016	1	50	1	42.046966	-125.017510	1143.7	cam1_20160617015041.png
Approaching WP10; 2 large bamboo corals	6/17/2016	1	51	32	42.047049	-125.017314	1142.7	cam1_20160617015752.png
~480m to WP16	6/17/2016	1	52	23	42.047117	-125.017210	1142.1	cam1_20160617015752.png
heading due west	6/17/2016	1	54	41	42.047116	-125.017166	1142.7	cam1_20160617015752.png
skate	6/17/2016	1	55	29	42.047146	-125.017183	1142.8	cam1_20160617015534.png
heading west after finding mud at waypoint 10,planning to continue until we cross a hard boundary and then follow it south	6/17/2016	1	56	41	42.047109	-125.017739	1146.4	cam1_20160617015752.png
Swiftia with crinoids	6/17/2016	1	58	7	42.047092	-125.017756	1147.1	cam1_20160617015133.png
rattail, anemones, bamboo coral	6/17/2016	2	1	45	42.047106	-125.017850	1148.0	cam1_20160617020135.png
we're at 1148 m and seeing more abundant bamboo coral colonies and more exposed rock	6/17/2016	2	2	10	42.047132	-125.017863	1148.6	cam1_20160617020625.png
several small corals	6/17/2016	2	3	24	42.047127	-125.017990	1150.0	cam1_20160617020625.png
turning to south	6/17/2016	2	3	32	42.047126	-125.017994	1150.1	cam1_20160617020625.png
stalked sponge?	6/17/2016	2	6	44	42.047130	-125.018076	1152.8	cam1_20160617020135.png
coral skeleton with crinoids, crab, swiftia, anemones, stalked sponge?	6/17/2016	2	6	44	42.047129	-125.018075	1152.8	cam1_20160617020135.png

H1522 NA072 Bamboo Coral	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Anthuptilum sea pen	6/17/2016	2	7	15	42.047106	-125.018119	1152.4	cam1_20160617020625.png
rattail	6/17/2016	2	9	10	42.047058	-125.018138	1151.9	cam1_20160617020625.png
Will continue south/slightly SE to cover western edge of survey pattern	6/17/2016	2	12	1	42.046959	-125.018118	1152.0	cam1_20160617021448.png
heading south now to explore back, parallel to the line we took north	6/17/2016	2	13	47	42.046939	-125.018092	1151.9	cam1_20160617021448.png
zoom in on single stalked coral (young bamboo); tanner crab, anemone	6/17/2016	2	14	39	42.046911	-125.018049	1151.7	cam1_20160617021446.png
juvenile bamboo coral	6/17/2016	2	14	48	42.046919	-125.018012	1151.8	cam1_20160617021446.png
more exposed rock	6/17/2016	2	15	31	42.046895	-125.018012	1151.2	cam1_20160617021448.png
big seastar	6/17/2016	2	15	49	42.046865	-125.018029	1151.1	cam1_20160617021448.png
shrimp, seastar, crinoids, exposed rock	6/17/2016	2	16	28	42.046880	-125.018021	1150.9	cam1_20160617021448.png
one bamboo coral off to the west down ridge	6/17/2016	2	16	48	42.046893	-125.018021	1150.3	cam1_20160617021448.png
sessile sea cucumber	6/17/2016	2	20	54	42.046769	-125.018061	1151.6	cam1_20160617022517.png
sessile cucumber	6/17/2016	2	21	2	42.046762	-125.018069	1151.8	cam1_20160617022517.png
scattered brachiopods	6/17/2016	2	21	52	42.046764	-125.018065	1151.5	cam1_20160617022517.png
octopus	6/17/2016	2	24	0	42.046763	-125.018026	1150.5	cam1_20160617022517.png
octopus	6/17/2016	2	24	32	42.046731	-125.018024	1150.9	cam1_20160617022517.png
(Graneledone pacifica)	6/17/2016	2	25	33	42.046733	-125.018031	1151.6	cam1_20160617022506.png
rattails, sunstar, thornyheads, sea cucumbers, anemones, some scattered brachiopods	6/17/2016	2	30	39	42.046571	-125.018009	1149.6	cam1_20160617023622.png
rocky cobbles; rockfish; large anemone	6/17/2016	2	33	12	42.046392	-125.017956	1149.3	cam1_20160617023622.png
bathypathys and seafans	6/17/2016	2	35	53	42.046243	-125.017907	1147.7	cam1_20160617023622.png
swiftia	6/17/2016	2	36	30	42.046243	-125.017917	1147.9	cam1_20160617023619.png
zoom on swiftia	6/17/2016	2	36	32	42.046243	-125.017924	1148.0	cam1_20160617023619.png
skate	6/17/2016	2	39	16	42.046063	-125.017941	1148.4	cam1_20160617023619.png
zoom on gold swiftia, anemone eating sea cucumber	6/17/2016	2	40	6	42.046061	-125.017950	1148.4	cam1_20160617024604.png
planning to sample the golden seafan	6/17/2016	2	40	46	42.046049	-125.017961	1147.7	cam1_20160617024604.png
may actually be acanthagorgia-- attempting to sample	6/17/2016	2	40	55	42.046050	-125.017957	1147.5	cam1_20160617024604.png
Looking for an acathagorgia on an individual rock to pick up	6/17/2016	2	42	11	42.046079	-125.017930	1148.5	cam1_20160617024604.png
oil bubbles escaping from Kraft wrist	6/17/2016	2	48	12	42.046048	-125.017916	1149.7	cam1_20160617024604.png
Gauges look good, will continue this sample	6/17/2016	2	49	8	42.046050	-125.017904	1149.7	cam1_20160617024601.png
ROV pilots discussing oil leak from arm	6/17/2016	2	57	19	42.046043	-125.017911	1148.9	cam1_20160617025827.png
swiftia and isabella	6/17/2016	3	6	5	42.045864	-125.017837	1146.6	cam1_20160617030657.png
pipe with a couple corals around it	6/17/2016	3	7	13	42.045804	-125.017859	1145.8	cam1_20160617030723.png

H1522 NA072 Bamboo Coral	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
isadella	6/17/2016	3	10	6	42.045750	-125.017917	1146.7	cam1_20160617031541.png
flat nose or grenadier fish	6/17/2016	3	11	17	42.045733	-125.017875	1146.1	cam1_20160617031541.png
bottom half of isadella dead and top live polyps	6/17/2016	3	12	15	42.045721	-125.017855	1146.5	cam1_20160617031541.png
crinoid on top of a coral to get in the flow of the current for feeding	6/17/2016	3	14	26	42.045663	-125.017908	1146.6	cam1_20160617031513.png
large anemone	6/17/2016	3	14	36	42.045641	-125.017912	1146.8	cam1_20160617031513.png
fish oriented into the current	6/17/2016	3	15	1	42.045616	-125.017912	1146.7	cam1_20160617031525.png
king crab	6/17/2016	3	15	38	42.045651	-125.017883	1147.1	cam1_20160617031525.png
great Argus view of Herc, very clear	6/17/2016	3	17	37	42.045579	-125.017928	1145.8	cam1_20160617031513.png
rocky substrate with some scattered corals and sea pen/whips	6/17/2016	3	21	38	42.045445	-125.017931	1145.8	cam1_20160617032608.png
perhaps isadella tentaculum described by Etnoyer was just observed	6/17/2016	3	22	9	42.045409	-125.017905	1145.2	cam1_20160617032608.png
very large thornyhead rockfish and flytrap anemone	6/17/2016	3	22	50	42.045372	-125.017871	1143.4	cam1_20160617032608.png
many dead corals, either too big for the rocks they are attached to or from trawling	6/17/2016	3	23	50	42.045365	-125.017862	1142.7	cam1_20160617032608.png
rocky ledge and maybe black coral up to the left	6/17/2016	3	25	46	42.045187	-125.017926	1143.8	cam1_20160617032606.png
small white swiftia and gorgogia	6/17/2016	3	26	26	42.045214	-125.017920	1143.9	cam1_20160617032603.png
isadella tentaculum perhaps, very large	6/17/2016	3	28	32	42.045170	-125.017807	1140.0	cam1_20160617032632.png
another large isadella	6/17/2016	3	29	18	42.045168	-125.017791	1141.4	cam1_20160617032608.png
paragorgia bathypathes	6/17/2016	3	43	41	42.044821	-125.017762	1139.7	cam1_20160617034645.png
moving back to the original site, transiting there	6/17/2016	3	57	58	42.044650	-125.017793	1135.6	cam1_20160617035130.png
bathypathes	6/17/2016	4	5	7	42.043972	-125.017819	1137.3	cam1_20160617040449.png
roughtail skate	6/17/2016	4	7	29	42.043689	-125.017763	1136.1	cam1_20160617040322.png
fewer bamboo coral skeletons	6/17/2016	4	9	36	42.043419	-125.017625	1132.8	cam1_20160617040452.png
crinoids	6/17/2016	4	9	43	42.043396	-125.017624	1132.9	cam1_20160617040452.png
nothing of the size we were seeing north of here	6/17/2016	4	10	7	42.043347	-125.017572	1132.2	cam1_20160617041325.png
quite bare and sedimented	6/17/2016	4	12	38	42.042850	-125.017534	1131.7	cam1_20160617041240.png
more grenadiers	6/17/2016	4	24	2	42.041027	-125.017561	1130.4	cam1_20160617042528.png
large branching corals	6/17/2016	4	24	40	42.041034	-125.017680	1131.0	cam1_20160617042528.png
sedimented area with a consistent number of 2-5 large isadella corals in the view of Hercules as we continue to transit southward	6/17/2016	4	29	9	42.040987	-125.017913	1132.7	cam1_20160617042528.png
small flatnose	6/17/2016	4	29	19	42.040981	-125.017912	1132.8	cam1_20160617042528.png
sea whip mixed around with bamboo corals	6/17/2016	4	31	1	42.040887	-125.017858	1132.7	cam1_20160617043421.png
planning to fire a Niskin	6/17/2016	4	33	31	42.040803	-125.017903	1132.9	cam1_20160617043446.png
back in the area that the dive started	6/17/2016	4	37	42	42.040673	-125.017780	1132.1	cam1_20160617043446.png

H1522 NA072 Bamboo Coral	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
more corals that have tipped over	6/17/2016	4	38	18	42.040662	-125.017709	1131.7	cam1_20160617043446.png
more impressive isadella	6/17/2016	4	38	37	42.040625	-125.017732	1131.5	cam1_20160617043446.png
tritonia on a white skeleton of an old coral	6/17/2016	4	38	59	42.040627	-125.017731	1131.5	cam1_20160617043446.png
it's a giant sea slug!!!	6/17/2016	4	39	7	42.040623	-125.017721	1131.3	cam1_20160617043421.png
close up on isadella	6/17/2016	4	42	47	42.040383	-125.017668	1131.9	cam1_20160617044430.png
another bathypathes	6/17/2016	4	43	57	42.040359	-125.017667	1131.7	cam1_20160617044457.png
more consistent anemones and crinoids	6/17/2016	4	45	50	42.040282	-125.017772	1131.5	cam1_20160617044457.png
close up on pink fallen over coral	6/17/2016	4	47	6	42.040215	-125.017833	1132.1	cam1_20160617044403.png
pink coral is bubblegum paragorgia	6/17/2016	4	47	34	42.040217	-125.017869	1133.9	cam1_20160617044403.png
polychaete worms, crinoids, and shrimp on bubblegum coral	6/17/2016	4	48	49	42.040216	-125.017895	1132.7	cam1_20160617044457.png
moving right along the contour line to do another visual survey of this region	6/17/2016	4	54	54	42.039971	-125.017494	1128.9	cam1_20160617045430.png
another paragorgia	6/17/2016	4	57	25	42.039895	-125.017911	1133.9	cam1_20160617045428.png
covered in crinoids and crabs around but nonetheless this paragorgia is still quite healthy	6/17/2016	4	58	6	42.039880	-125.017879	1134.2	cam1_20160617045430.png
another paragorgia but lighter in color	6/17/2016	4	59	30	42.039754	-125.017894	1134.5	cam1_20160617045533.png
more sedimented, perhaps the edge of the coral rich region, still some large isadella but not in the density as before	6/17/2016	5	1	46	42.039654	-125.017477	1128.1	cam1_20160617050945.png
appears to thin out a bit but still have some consistent large corals	6/17/2016	5	9	16	42.039283	-125.017376	1127.3	cam1_20160617050945.png
another bathypathes, black coral again	6/17/2016	5	11	8	42.039272	-125.017486	1129.2	cam1_20160617051521.png
another large bamboo coral	6/17/2016	5	14	43	42.039164	-125.017755	1132.1	cam1_20160617051521.png
reached the edge	6/17/2016	5	15	35	42.039139	-125.017578	1130.4	cam1_20160617051521.png
not edge! still corals	6/17/2016	5	16	7	42.039149	-125.017450	1129.8	cam1_20160617051521.png
several more isadella corals	6/17/2016	5	16	49	42.039153	-125.017452	1129.6	cam1_20160617051521.png
blue water	6/17/2016	5	23	28	42.039500	-125.017396	1100.4	cam1_20160617052028.png

H1523 NA072 Klamath Knoll Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
many comb jellies	6/17/2016	23	41	52	41.426526	-124.891740	10.4	
Herc at ~400 m depth	6/18/2016	0	2	10	41.425830	-124.892043	398.3	
Cockatoo squid	6/18/2016	0	8	28	41.425730	-124.892184	526.2	
squid	6/18/2016	0	8	31	41.425730	-124.892182	527.7	
FSH	6/18/2016	0	8	56	41.425727	-124.892152	536.2	
Solmissus jelly	6/18/2016	0	9	28	41.425722	-124.892138	547.1	
FSH myctophid	6/18/2016	0	11	49	41.425752	-124.892025	596.4	
FSH	6/18/2016	0	14	34	41.425786	-124.891857	653.2	
Herc is at ~700 m depth	6/18/2016	0	16	49	41.425741	-124.891806	698.2	
Solmissus jelly	6/18/2016	0	19	6	41.425690	-124.891692	725.6	
carbonate outcrops	6/18/2016	0	19	55	41.425742	-124.891384	729.9	
Arriving on bottom, large carbonate outcrops	6/18/2016	0	20	0	41.425729	-124.891365	729.1	cam1_20160618002930.png
lanternfish	6/18/2016	0	20	53	41.425790	-124.890964	727.4	cam1_20160618002930.png
Transiting towards WP1	6/18/2016	0	21	16	41.425888	-124.890670	727.0	cam1_20160618002930.png
clam debris	6/18/2016	0	22	54	41.425982	-124.890518	735.1	cam1_20160618002930.png
2 small bamboo corals; flatfish, some clams	6/18/2016	0	22	57	41.425981	-124.890520	734.9	cam1_20160618002930.png
crab	6/18/2016	0	23	7	41.425983	-124.890528	733.9	cam1_20160618002930.png
thornyhead	6/18/2016	0	23	35	41.425978	-124.890440	736.7	cam1_20160618002930.png
Zoom on paragorgia bubblegum coral; rockfish, sponge	6/18/2016	0	24	57	41.426007	-124.890436	736.5	cam1_20160618002912.png
Small swiftia corals	6/18/2016	0	26	40	41.426001	-124.890378	736.9	cam1_20160618002912.png
Approaching carbonate ledge at edge of pit (waypoint 1)	6/18/2016	0	28	32	41.426072	-124.890341	737.8	cam1_20160618002912.png
Mushroom coral; black corals; tanner crab	6/18/2016	0	29	29	41.426078	-124.890322	740.6	cam1_20160618002651.png
Approaching carbonate ledge to sample rock	6/18/2016	0	29	39	41.426078	-124.890329	740.6	cam1_20160618002651.png
Zoom on round barrel shaped carbonates on seafloor with bacterial mats on top	6/18/2016	0	37	47	41.426165	-124.890286	740.2	cam1_20160618003251.png
hagfish, many tanner crabs	6/18/2016	0	39	1	41.426281	-124.890334	740.1	cam1_20160618003251.png
More paragorgia, swiftia, mushroom corals	6/18/2016	0	39	26	41.426293	-124.890330	739.7	cam1_20160618003251.png
Continuing to waypoint 2	6/18/2016	0	39	35	41.426293	-124.890329	739.6	cam1_20160618003251.png
Left carbonate ledge area; many carbonate cobbles on sedimented seafloor.	6/18/2016	0	42	27	41.426309	-124.890566	741.5	cam1_20160618004926.png
More carbonate ledges	6/18/2016	0	43	25	41.426315	-124.890667	741.0	cam1_20160618004926.png
Mushroom coral	6/18/2016	0	43	44	41.426313	-124.890669	740.6	cam1_20160618004926.png
2 large paragorgia; several tanner crabs, deep sea soles, many mushroom corals	6/18/2016	0	46	25	41.426472	-124.891013	736.9	cam1_20160618004926.png

H1523 NA072 Klamath Knoll Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Completed rock sample, heading to WP 2	6/18/2016	0	57	10	41.426522	-124.891307	733.0	cam1_20160618005443.png
Passing over WP2	6/18/2016	1	0	4	41.426700	-124.891253	732.2	cam1_20160618010934.png
skate	6/18/2016	1	4	6	41.426761	-124.891403	731.7	cam1_20160618010934.png
Some sort of dark triangular debris under ledge?	6/18/2016	1	4	53	41.426802	-124.891481	730.8	cam1_20160618010934.png
Continuing over many mushroom corals on top of carbonate ledge; many deep sea soles	6/18/2016	1	5	49	41.426801	-124.891571	728.9	cam1_20160618010934.png
continuing around the SW edge of the knoll; rocky carbonate outcrops covered in mushroom corals	6/18/2016	1	10	35	41.426868	-124.892079	724.9	cam1_20160618011839.png
(Mushroom corals = Anthomastus)	6/18/2016	1	10	48	41.426916	-124.892138	724.9	cam1_20160618011839.png
Possibly some bacterial mat	6/18/2016	1	11	6	41.426918	-124.892151	725.1	cam1_20160618011839.png
Approaching knoll summit at WP 3	6/18/2016	1	12	41	41.427013	-124.892015	724.9	cam1_20160618011852.png
At summit	6/18/2016	1	13	26	41.427060	-124.891982	724.5	cam1_20160618011852.png
Continuing to north side of knoll	6/18/2016	1	13	47	41.427078	-124.891977	724.8	cam1_20160618011852.png
Bacterial mat under carbonate boulder	6/18/2016	1	16	11	41.427019	-124.892150	723.9	cam1_20160618011839.png
Zoom in on sampling site	6/18/2016	1	18	51	41.427020	-124.892174	725.3	cam1_20160618011800.png
Carbonate boulder covered with Anthomastus coral. Rock sample obtained.	6/18/2016	1	22	58	41.427017	-124.892167	724.2	cam1_20160618012315.png
Zooming in on bacterial mat	6/18/2016	1	25	40	41.427010	-124.892196	724.6	cam1_20160618012315.png
Circling around the boulder	6/18/2016	1	29	4	41.427016	-124.892182	724.4	cam1_20160618012545.png
Going to go poke bacterial mat (or encrusting sponge?) at base of carbonate to get an idea of texture/hardness	6/18/2016	1	31	16	41.426973	-124.892242	724.8	cam1_20160618013906.png
It is bacterial mat	6/18/2016	1	32	20	41.426987	-124.892217	726.0	cam1_20160618013844.png
Continuing to circle around boulder	6/18/2016	1	34	9	41.427004	-124.892236	723.4	cam1_20160618013906.png
Great view of Argus looking at carbonate with mushroom corals	6/18/2016	1	36	16	41.427056	-124.892266	724.2	cam1_20160618013915.png
Zoom in on mushroom corals, anemones at edge of boulder	6/18/2016	1	39	32	41.427042	-124.892239	724.7	cam1_20160618013906.png
Continuing around boulder	6/18/2016	1	42	44	41.427100	-124.892298	724.9	cam1_20160618014809.png
"Boulder" appears to be part of/ attached to substrate	6/18/2016	1	43	28	41.427028	-124.892277	724.9	cam2_20160618014257.png
Bubbles?	6/18/2016	1	43	59	41.427047	-124.892329	725.3	cam2_20160618014257.png
Maybe no bubbles.	6/18/2016	1	46	13	41.427052	-124.892293	725.7	cam1_20160618014809.png
Continuing NW to target S2	6/18/2016	1	46	41	41.427029	-124.892284	725.8	cam1_20160618014809.png
Tall carbonate cliff ahead	6/18/2016	1	47	26	41.427089	-124.892328	725.5	cam1_20160618014727.png
Moved around end of mystery wall	6/18/2016	1	49	44	41.427279	-124.892540	727.0	cam2_20160618014257.png
Heading west to S2	6/18/2016	1	49	57	41.427278	-124.892565	727.3	cam2_20160618014257.png
Zoom in on carbonate covered in sponge (?); clam shells in sediment	6/18/2016	1	53	7	41.427289	-124.892716	733.8	cam1_20160618015845.png
Carbonate covered in sponge	6/18/2016	1	54	52	41.427292	-124.892799	734.3	cam1_20160618015845.png

H1523 NA072 Klamath Knoll Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Orange encrusting sponge under carbonate ledge	6/18/2016	1	55	40	41.427368	-124.892854	735.0	cam1_20160618015845.png
Bubbles!	6/18/2016	1	55	59	41.427338	-124.892816	735.2	cam1_20160618015845.png
Bubbles are coming from under edge of carbonate ledge, released in steady clumps	6/18/2016	1	56	50	41.427237	-124.892733	735.4	cam1_20160618015709.png
Bacterial mat	6/18/2016	1	57	5	41.427237	-124.892732	735.4	cam1_20160618015841.png
Watching bubbles	6/18/2016	1	58	57	41.427236	-124.892665	735.4	cam1_20160618015736.png
Edging around to the right of ledge	6/18/2016	2	1	44	41.427236	-124.892659	735.4	cam1_20160618020435.png
Under the ledge is colonized by orange and white sponges and bacteria	6/18/2016	2	2	53	41.427207	-124.892657	736.0	cam1_20160618020254.png
Waiting for visibility to clear	6/18/2016	2	3	11	41.427189	-124.892653	736.0	cam1_20160618020428.png
Continuing to S1	6/18/2016	2	5	47	41.427199	-124.892643	734.6	cam1_20160618020435.png
Heading back southeast toward WP 6	6/18/2016	2	12	19	41.427339	-124.892734	734.0	cam1_20160618021525.png
which will allow us to explore S5, S6	6/18/2016	2	12	33	41.427336	-124.892731	734.3	cam1_20160618021525.png
lightly smushed Mongo push cores into ledge	6/18/2016	2	15	24	41.427238	-124.892486	729.3	cam1_20160618021457.png
Bubbles spotted in Argus cam behind Herc	6/18/2016	2	16	8	41.427237	-124.892484	728.7	cam1_20160618021525.png
Bubbles could be coming from the vent we spotted.	6/18/2016	2	18	32	41.427229	-124.892517	730.4	cam1_20160618021525.png
Moving on	6/18/2016	2	18	45	41.427232	-124.892513	729.9	cam1_20160618021525.png
Noted that there was no coral on the other side of the wall towards the seep. Heading back SE over the wall, mushroom corals have reappeared.	6/18/2016	2	22	15	41.427023	-124.892320	725.3	cam2_20160618022702.png
waiting for ship move	6/18/2016	2	24	26	41.427011	-124.892286	724.8	cam2_20160618022702.png
Ship is pivoting to find a better heading to hold against wind	6/18/2016	2	30	12	41.426885	-124.892228	728.1	cam2_20160618023018.png
Waiting for the ship to swing around	6/18/2016	2	37	38	41.426764	-124.892214	724.2	cam2_20160618023018.png
Moving on slowly towards S5	6/18/2016	2	43	30	41.426593	-124.892657	732.0	cam2_20160618024907.png
Sponge on top of carbonate outcrop	6/18/2016	2	51	27	41.426585	-124.892305	723.7	cam1_20160618025131.png
Continuing down over cliff	6/18/2016	2	52	49	41.426651	-124.892168	726.6	cam2_20160618025900.png
Solmissus jelly	6/18/2016	2	53	25	41.426594	-124.892095	729.1	cam2_20160618025900.png
Thornyheads	6/18/2016	2	53	59	41.426591	-124.891961	732.3	cam2_20160618025900.png
Approaching target S5, some shells on seafloor; crab, mushroom corals, thornyheads	6/18/2016	2	54	59	41.426495	-124.891882	733.7	cam2_20160618025900.png
Paused for watch change	6/18/2016	2	57	26	41.426490	-124.891814	732.8	gcam2_20160618025900.png
fascinating layered carbonate structures, rich geologic features just barely sedimented	6/18/2016	3	7	50	41.426355	-124.891905	732.6	cam1_20160618030131.png
breathtaking rocks' - sarah	6/18/2016	3	8	39	41.426401	-124.891904	732.9	cam1_20160618030704.png
hagfish	6/18/2016	3	9	4	41.426412	-124.891920	732.7	cam1_20160618030704.png
layered slabs	6/18/2016	3	9	58	41.426425	-124.891927	732.1	cam1_20160618030704.png

H1523 NA072 Klamath Knoll Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
bubbles	6/18/2016	3	11	45	41.426455	-124.891937	733.9	cam1_20160618031725.png
knoll is a small plateau (about half a football field in size), all carbonate rock features in this region	6/18/2016	3	19	3	41.426274	-124.891721	731.4	cam1_20160618031725.png
great Argus shots of Herc with lights adjusted	6/18/2016	3	21	8	41.426417	-124.891735	734.1	cam1_20160618032923.png
jagged broken rocks	6/18/2016	3	22	42	41.426543	-124.891821	733.0	cam1_20160618032755.png
several scattered anemones and some hagfish in this part of the knoll, some flatfish and crabs also present	6/18/2016	3	24	29	41.426734	-124.891843	729.7	cam1_20160618032755.png
clams	6/18/2016	3	26	54	41.426529	-124.891691	734.4	cam1_20160618032729.png
clams surround small dark microbial mats	6/18/2016	3	28	12	41.426517	-124.891689	735.6	cam1_20160618032923.png
possible sample site	6/18/2016	3	28	54	41.426527	-124.891665	735.6	cam1_20160618032923.png
now it appears that there are some boulders in this area	6/18/2016	3	29	55	41.426519	-124.891667	735.6	cam1_20160618032729.png
short spined thornyheads	6/18/2016	3	30	14	41.426503	-124.891674	734.6	
circling the carbonate knoll clockwise and eventually plan to return to the bubble site	6/18/2016	3	34	13	41.426652	-124.891680	729.1	
move ship east and lateral back and forth	6/18/2016	3	35	56	41.426808	-124.891827	725.1	
some more flat slabs of carbonate, terrain is consistently interesting	6/18/2016	3	42	19	41.426643	-124.891721	731.6	cam1_20160618034814.png
same clams, back to the same place we were just at	6/18/2016	3	44	21	41.426558	-124.891662	733.5	cam1_20160618034814.png
can't seem to find the bubbles here even though they are definitely expected considering the SONAR target	6/18/2016	3	44	51	41.426548	-124.891671	733.9	cam1_20160618034814.png
searching for a bubbles site	6/18/2016	3	45	54	41.426527	-124.891685	734.3	cam1_20160618034814.png
can't find bubbles so planning to move on	6/18/2016	3	50	49	41.426473	-124.891718	733.9	cam1_20160618035306.png
clams	6/18/2016	3	53	11	41.426435	-124.891686	734.1	cam1_20160618035306.png
skate and anemones throughout this region	6/18/2016	3	57	57	41.426760	-124.891544	728.3	cam1_20160618035306.png
still very rocky, possibly slightly more sediment than in the south of the knoll	6/18/2016	3	58	19	41.426780	-124.891530	729.8	cam1_20160618035306.png
bridge like feature of the carbonate	6/18/2016	4	0	13	41.426975	-124.891262	734.5	cam1_20160618040157.png
close up on the under part of the bridge like feature	6/18/2016	4	1	56	41.426883	-124.891293	735.5	cam1_20160618040141.png
squat lobster close up	6/18/2016	4	2	8	41.426878	-124.891292	735.5	cam1_20160618040200.png
holes in carbonate	6/18/2016	4	3	59	41.426934	-124.891334	735.5	cam1_20160618040159.png
tanner crab	6/18/2016	4	4	3	41.426938	-124.891328	735.5	cam1_20160618040200.png
really interesting terrain, sheets elevated above the surface	6/18/2016	4	5	6	41.426985	-124.891295	734.1	cam1_20160618040234.png
most detailed carbonate formations on this whole cruise	6/18/2016	4	5	21	41.426964	-124.891303	733.9	cam1_20160618040234.png
still moving around the base of the knoll looking for active seeps	6/18/2016	4	7	33	41.426810	-124.891271	731.9	cam1_20160618040234.png
tanner crabs and large thornyhead	6/18/2016	4	9	23	41.426999	-124.891148	732.9	cam1_20160618040157.png
hagfish	6/18/2016	4	10	50	41.426944	-124.891076	733.2	cam1_20160618041803.png

H1523 NA072 Klamath Knoll Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
dark black rock, unlike carbonate and appears to almost be basalt but unlikely	6/18/2016	4	11	15	41.426908	-124.891067	733.8	cam1_20160618041803.png
trying to reach for sample but too far out of reach, rotating Herc around and settling down to perhaps reach the rock in a closer position	6/18/2016	4	15	56	41.426869	-124.891049	734.4	cam1_20160618041804.png
NE edge of seep site	6/18/2016	4	27	59	41.427095	-124.891116	730.9	cam1_20160618042418.png
some sink holes	6/18/2016	4	28	5	41.427109	-124.891125	731.1	cam1_20160618042418.png
on top of mound, preparing to move west	6/18/2016	4	28	50	41.427126	-124.891198	731.6	cam1_20160618042418.png
more black rocks	6/18/2016	4	29	30	41.427117	-124.891213	731.6	cam1_20160618042418.png
microbial mat, white fluffy, also clams and snails	6/18/2016	4	30	50	41.427136	-124.891320	735.0	cam1_20160618043337.png
live clams but buried	6/18/2016	4	31	17	41.427135	-124.891309	735.0	cam1_20160618043337.png
possibly a very small seep ecosystem	6/18/2016	4	32	29	41.427114	-124.891331	733.4	cam1_20160618043523.png
consistent anemones and flatfish as well as tanner crabs	6/18/2016	4	33	57	41.426973	-124.891408	733.7	cam1_20160618043338.png
more black rocks	6/18/2016	4	34	7	41.426957	-124.891413	733.8	cam1_20160618043523.png
perhaps the darker rocks have a manganese crust which are indicative of age	6/18/2016	4	35	50	41.427000	-124.891555	733.9	cam1_20160618043338.png
definitely possible that it is a manganese crust on top on old carbonate or other rocks features	6/18/2016	4	38	6	41.427058	-124.891646	733.7	cam1_20160618043337.png
hagfish tumble	6/18/2016	4	38	54	41.427056	-124.891661	735.5	cam1_20160618043337.png
live clams	6/18/2016	4	40	22	41.427037	-124.891675	735.3	cam1_20160618044123.png
mat and clams, sparse but healthy	6/18/2016	4	41	54	41.427022	-124.891682	735.4	cam1_20160618044123.png
clams genus is claptoginia	6/18/2016	4	42	54	41.427124	-124.891702	734.2	cam1_20160618044135.png
more thornyheads and sponges, as well as anemones and crabs	6/18/2016	4	45	4	41.427076	-124.891821	731.2	cam1_20160618044136.png
continuing onward in the NE direction	6/18/2016	4	45	20	41.427103	-124.891833	730.4	cam1_20160618044136.png
calyptogena seep clams observed earlier	6/18/2016	4	47	42	41.427265	-124.891662	734.2	cam1_20160618044136.png
sheet carbonate flow again	6/18/2016	4	50	33	41.427410	-124.891426	732.6	cam1_20160618045847.png
looking around in the more NE region of the knoll, fewer sheets and consistent biology throughout this area	6/18/2016	4	55	33	41.427354	-124.891369	729.1	cam1_20160618045858.png
huge clams and mat all along the rough rocky region to the W view from the NE area	6/18/2016	4	59	33	41.427424	-124.891715	731.3	cam1_20160618045847.png
dead clams	6/18/2016	5	1	5	41.427411	-124.891607	731.4	cam1_20160618050322.png
clam shells appear less broken apart in some parts of this region and in others it looks like the clams area just shells and not alive	6/18/2016	5	4	6	41.427413	-124.891732	731.9	cam1_20160618050320.png
some larger living clams are present, fairly buried in sediment	6/18/2016	5	5	23	41.427472	-124.891748	732.0	cam1_20160618050413.png
darker anemone and encrusting sponge	6/18/2016	5	5	40	41.427465	-124.891748	732.5	cam1_20160618050413.png
clam bed all in this soft large depressed sediment channels	6/18/2016	5	6	15	41.427430	-124.891744	732.3	cam1_20160618050322.png

H1523 NA072 Klamath Knoll Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
more of these darker (possibly manganese crusted) rocks among the many anemones and bio in this area	6/18/2016	5	7	48	41.427382	-124.891784	734.0	cam1_20160618050413.png
encrusting sponge and mat	6/18/2016	5	8	56	41.427370	-124.891791	734.5	cam1_20160618050320.png
possibly a frilled mussel shell	6/18/2016	5	9	38	41.427360	-124.891797	734.5	cam1_20160618050322.png
tons of mushroom corals	6/18/2016	5	11	36	41.427400	-124.891802	733.1	cam1_20160618051650.png
these sediment channels collect sediment and form effective habitat for the clams	6/18/2016	5	13	1	41.427346	-124.891748	733.0	cam1_20160618051728.png
poke test in the sediment to see how deep it goes	6/18/2016	5	14	39	41.427464	-124.891706	731.7	cam1_20160618051650.png
perhaps another frilled mussel	6/18/2016	5	15	46	41.427481	-124.891706	734.5	cam1_20160618051728.png
trying to get the poky stick	6/18/2016	5	18	20	41.427484	-124.891732	734.5	cam1_20160618051649.png
if sediment is soft and deep then will plan to core this area	6/18/2016	5	18	35	41.427482	-124.891712	734.5	cam1_20160618051649.png
very soft but the shells area all over the surface	6/18/2016	5	19	29	41.427463	-124.891720	734.5	cam1_20160618051649.png
shook out first attempt of coring and now trying to do another not directly over the clams	6/18/2016	5	27	5	41.427470	-124.891741	734.4	cam1_20160618052349.png
weird large eelpout	6/18/2016	5	47	55	41.427386	-124.891961	733.7	cam1_20160618054509.png
big mat	6/18/2016	5	47	59	41.427386	-124.891962	733.3	cam1_20160618054509.png
after big core sampling spree, moving onward	6/18/2016	5	48	16	41.427377	-124.891972	732.7	cam1_20160618054628.png
another frilled mussel	6/18/2016	5	48	25	41.427371	-124.891975	733.0	cam1_20160618054628.png
prepping the slurp sample by flushing but the flush is now full of some sediment	6/18/2016	5	54	53	41.427384	-124.891962	733.9	cam1_20160618055656.png
previous slurp sample was collected from 0554 to 0611	6/18/2016	6	21	31	41.427360	-124.891962	733.8	cam1_20160618062928.png
attempted a scoop of clams but failed. now continuing on back to previous seep site so that the next watch can do some sampling in that area	6/18/2016	6	27	9	41.427372	-124.891996	733.6	cam1_20160618062928.png
short ten minute transit back to previous site	6/18/2016	6	28	49	41.427337	-124.892179	730.3	cam1_20160618062816.png
more wall!	6/18/2016	6	30	15	41.427272	-124.892372	726.2	cam1_20160618063917.png
back at the nav marker called 'seep' - many ledges and sheets of carbonate, possibly bubbles in the area (observed a moment ago)	6/18/2016	6	37	30	41.427182	-124.892667	734.2	cam1_20160618063912.png
two large carbonate sheets with big bubbles pulses coming out	6/18/2016	6	39	53	41.427216	-124.892603	734.9	cam1_20160618063856.png
yellow mat below the crack line where the carbonate slabs meet	6/18/2016	6	40	16	41.427214	-124.892615	734.7	cam1_20160618064416.png
stunning geology in this area	6/18/2016	6	40	25	41.427225	-124.892611	735.0	cam1_20160618064416.png
not streams of bubbles but rather a steady large pulse of bubbles	6/18/2016	6	40	46	41.427225	-124.892619	734.4	cam1_20160618064416.png
amazing close up of bubbles pulses coming from a lower ledge of a slab of carbonate, white and yellow microbial mats line the area	6/18/2016	6	42	25	41.427212	-124.892615	736.0	cam1_20160618064357.png

H1523 NA072 Klamath Knoll Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
thioploca (orange and yellow) microbial mat, both present here (most commonly its usually one or the other) here it's both	6/18/2016	6	45	34	41.427222	-124.892620	735.9	cam1_20160618064435.png
interesting rebound effect of bubbles up against the wall in the view from Argus	6/18/2016	6	47	50	41.427228	-124.892594	735.9	cam1_20160618064435.png
trying to settle down for a possible slurp sample	6/18/2016	6	56	28	41.427229	-124.892594	735.9	cam1_20160618065230.png
slurp sample quality debatable due to lack of mesh	6/18/2016	7	12	24	41.427239	-124.892617	735.9	cam1_20160618071427.png
Rock sample in hopes of containing some bacterial mat slurped in 119.	6/18/2016	7	19	36	41.427224	-124.892625	735.7	cam1_20160618071427.png
Moving to check out an area of high relief due west	6/18/2016	7	26	4	41.427221	-124.892734	733.8	cam1_20160618072642.png
Possible fissure in carbonate	6/18/2016	7	33	12	41.427254	-124.893236	739.6	cam1_20160618073519.png
In crevice, very dense orange and filamentous white bacterial mats	6/18/2016	7	34	29	41.427279	-124.893255	739.4	cam1_20160618073944.png
Zoom-in on black patch at base of carbonate structure. Different type of mat as just seen.	6/18/2016	7	38	3	41.427232	-124.893317	744.3	cam1_20160618073914.png
Surveying around carbonate mound	6/18/2016	7	42	35	41.427525	-124.893355	748.4	cam1_20160618074908.png
Exploring further from base of carbonate mound, carbonate fragments (possible rockslide?)	6/18/2016	7	46	58	41.427331	-124.893759	760.0	cam1_20160618074909.png
Rock cobbles becoming rock slabs as we move back towards mound.	6/18/2016	7	49	44	41.427306	-124.893701	759.3	cam1_20160618074857.png
Zoom-in on red patch - no ID	6/18/2016	7	49	58	41.427279	-124.893709	758.6	cam1_20160618074857.png
Fauna observed in cobble/slab area include	6/18/2016	7	51	19	41.427269	-124.893683	757.7	cam1_20160618075759.png
Make a circumference run around carbonate mound at around 755m depth	6/18/2016	7	54	50	41.427364	-124.893456	753.5	cam1_20160618075714.png
Black rock from talus slope.	6/18/2016	7	56	23	41.427321	-124.893454	756.3	cam1_20160618075759.png
Hollow, black rock structures (tube-like); possibly pillow lava	6/18/2016	8	7	7	41.427458	-124.893366	753.5	cam1_20160618080642.png
basaltic basement?	6/18/2016	8	9	51	41.427505	-124.893283	748.3	cam1_20160618080642.png
line of living clams	6/18/2016	8	12	37	41.427606	-124.893115	745.0	cam1_20160618081855.png
Large white bacterial mat between two ridges of carbonate	6/18/2016	8	17	50	41.427759	-124.893060	740.0	cam1_20160618081755.png
large fracture	6/18/2016	8	20	5	41.427769	-124.893020	740.3	cam1_20160618082845.png
Bearing of fault line (carbonate division)	6/18/2016	8	21	16	41.427749	-124.892968	740.4	cam1_20160618082814.png
Clams following a small fracture	6/18/2016	8	21	32	41.427808	-124.892950	740.5	cam1_20160618082814.png
Clams and bacterial mats dense in fractures of carbonate	6/18/2016	8	21	35	41.427811	-124.892950	740.5	cam1_20160618082814.png
Fissure seems to extend around carbonate mound	6/18/2016	8	24	16	41.427963	-124.892897	742.5	cam1_20160618082932.png
frequently observed fauna include	6/18/2016	8	25	20	41.427964	-124.892891	742.4	cam1_20160618082932.png
*crabs	6/18/2016	8	25	39	41.427966	-124.892887	742.6	cam1_20160618082932.png
flatfish	6/18/2016	8	27	31	41.428006	-124.892855	742.2	cam1_20160618082845.png
hippasteria	6/18/2016	8	35	27	41.428102	-124.892804	743.6	cam1_20160618083949.png

H1523 NA072 Klamath Knoll Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Zoom-in on a pair of crabs - fighting? mating (most likely)? cannibalism?	6/18/2016	8	41	40	41.428158	-124.892566	740.3	cam1_20160618084450.png
single tube worm on carbonate structure. Near a clam bed	6/18/2016	8	44	25	41.428150	-124.892408	740.4	cam1_20160618084417.png
one tubeworm	6/18/2016	8	44	30	41.428151	-124.892412	740.3	cam1_20160618084417.png
single worm tube	6/18/2016	8	44	31	41.428152	-124.892413	740.2	cam1_20160618084417.png
orange and white bacterial mat	6/18/2016	8	53	35	41.428097	-124.892195	738.3	cam1_20160618085148.png
zoom-in on coral - likely black coral (Lillipathes?) - NISKIN	6/18/2016	9	15	37	41.428035	-124.891397	744.7	cam1_20160618091916.png
zoom-in on paragorgia - pink bubblegum coral	6/18/2016	9	19	36	41.428046	-124.891293	745.7	cam1_20160618091851.png
still on transit to S7	6/18/2016	9	21	7	41.428030	-124.891263	746.0	cam1_20160618092906.png
hollow plastic tube	6/18/2016	9	24	1	41.427980	-124.891207	745.4	cam1_20160618092906.png
zoom-in on snailfish	6/18/2016	9	24	12	41.427984	-124.891206	745.1	cam1_20160618092906.png
zoom-in on another black coral	6/18/2016	9	29	30	41.427960	-124.891069	741.2	cam1_20160618092743.png
planning to follow line from WP8-WP9	6/18/2016	9	34	52	41.427889	-124.891146	741.2	
zigzag up to peak	6/18/2016	9	45	48	41.427967	-124.891239	745.9	cam1_20160618094454.png
schaffer beer can	6/18/2016	9	46	3	41.427967	-124.891231	745.1	cam1_20160618094517.png
clam shells, lots of bacmat, single tube worm	6/18/2016	9	55	1	41.427887	-124.891674	736.7	cam1_20160618095727.png
white bacterial mat and one tubeworm	6/18/2016	9	55	1	41.427886	-124.891674	736.5	cam1_20160618095727.png
Zoom in on dense, white bacterial mat. Associate fauna include	6/18/2016	9	55	54	41.427882	-124.891663	736.6	cam1_20160618095727.png
black coral	6/18/2016	10	0	33	41.427946	-124.891452	735.9	cam1_20160618100727.png
Zoom-in on live clams and bacterial mat; reduced sediment; fissure	6/18/2016	10	7	54	41.427902	-124.891801	735.1	cam1_20160618100344.png
bacterial mat and some clams	6/18/2016	10	9	13	41.427894	-124.891796	733.5	cam1_20160618100727.png
dinner plate jelly	6/18/2016	10	14	10	41.427900	-124.891983	729.1	cam1_20160618101619.png
dense white bacterial mat (two holes make it look like a ghost!)	6/18/2016	10	16	54	41.427925	-124.891921	732.6	cam1_20160618101311.png
large white bacterial mat	6/18/2016	10	21	12	41.427715	-124.891828	730.0	cam1_20160618102522.png
zoom-in on lantern fish	6/18/2016	10	22	51	41.427565	-124.891866	728.3	cam1_20160618102227.png
zoom-in on iridescent comb jelly	6/18/2016	10	34	23	41.427477	-124.891910	732.3	cam1_20160618103914.png
clams near white bacterial mat in fissures (same vicinity as PC 115-117); hard underlying substrate (difficult to scoop); couple scoops taken a few meters apart	6/18/2016	11	1	30	41.427475	-124.891992	732.4	cam2_20160618110944.png
Heading east to check out the periphery of the site	6/18/2016	11	4	59	41.427491	-124.892083	731.8	cam2_20160618110944.png
Checking out periphery of mound after ship move	6/18/2016	11	6	16	41.427460	-124.891858	732.3	cam2_20160618110944.png
sablefish, flatfish, mushroom corals, anemone, sea star	6/18/2016	11	6	27	41.427454	-124.891857	732.2	cam2_20160618110944.png
large sponge at top of carbonate ledge	6/18/2016	11	9	15	41.427460	-124.891517	730.9	cam1_20160618110216.png
checking out deep fractures and canyons	6/18/2016	11	9	58	41.427428	-124.891409	730.8	cam1_20160618110216.png
hagfish	6/18/2016	11	16	15	41.427487	-124.891151	735.9	cam1_20160618111822.png

H1523 NA072 Klamath Knoll Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Some basalt boulders on seafloor next to carbonate ledge	6/18/2016	11	16	49	41.427484	-124.891149	736.8	cam1_20160618111822.png
hydroids and bryozoans on carbonate ledge	6/18/2016	11	18	45	41.427445	-124.891019	738.0	cam1_20160618111643.png
basalt blocky rocks under this ledge	6/18/2016	11	19	2	41.427441	-124.891013	737.7	cam1_20160618111829.png
large tanner crabs and carbonate outcrop	6/18/2016	11	19	23	41.427448	-124.891006	737.8	cam1_20160618111829.png
more hagfish, thornyhead, mushroom corals, crabs	6/18/2016	11	20	7	41.427412	-124.890965	737.0	cam1_20160618112816.png
mushroom corals	6/18/2016	11	20	14	41.427412	-124.890955	737.0	cam1_20160618112816.png
black corals	6/18/2016	11	21	11	41.427429	-124.890909	735.9	cam1_20160618112710.png
2 black corals	6/18/2016	11	21	15	41.427433	-124.890909	735.8	cam1_20160618112710.png
lonely basalt block	6/18/2016	11	25	35	41.427517	-124.890756	733.1	cam1_20160618112710.png
coral area, paragorgia	6/18/2016	11	27	9	41.427476	-124.890630	735.0	cam1_20160618112710.png
paragorgia corals	6/18/2016	11	27	9	41.427476	-124.890629	735.0	cam1_20160618112710.png
black corals	6/18/2016	11	28	11	41.427488	-124.890486	738.5	cam1_20160618112521.png
black corals, basalt and sediment	6/18/2016	11	28	31	41.427495	-124.890465	738.6	cam1_20160618112521.png
basalt block field	6/18/2016	11	28	55	41.427500	-124.890444	738.3	cam1_20160618112521.png
Off carbonate cap	6/18/2016	11	29	12	41.427502	-124.890433	738.6	cam1_20160618112710.png
Waiting for visibility to clear	6/18/2016	11	30	19	41.427496	-124.890441	738.5	
lots of small blocky basalt	6/18/2016	11	30	47	41.427493	-124.890447	738.5	
many black coral	6/18/2016	11	33	1	41.427520	-124.890409	738.0	
continuing east away from knoll	6/18/2016	11	34	26	41.427538	-124.890304	738.3	
bubblegum corals	6/18/2016	11	38	9	41.427564	-124.890143	739.0	
paragorgia	6/18/2016	11	40	4	41.427570	-124.890038	741.4	cam1_20160618114436.png
tanner crabs and low basalt blocks	6/18/2016	11	41	34	41.427570	-124.889946	743.8	cam1_20160618114324.png
continuing over basalt field	6/18/2016	11	41	39	41.427570	-124.889939	743.9	cam1_20160618114324.png
gastropods	6/18/2016	11	42	55	41.427547	-124.889910	744.5	cam1_20160618114436.png
more carbonate ahead	6/18/2016	11	43	12	41.427545	-124.889858	744.3	cam1_20160618114324.png
continuing over ledge	6/18/2016	11	44	18	41.427563	-124.889817	744.5	cam1_20160618114324.png
Basalt chunks in channel between carbonates	6/18/2016	11	47	12	41.427572	-124.889688	743.8	cam1_20160618114436.png
bubblegum coral and swiftia coral	6/18/2016	11	48	39	41.427584	-124.889647	743.9	cam1_20160618114436.png
low carbonate ledge	6/18/2016	11	50	4	41.427549	-124.889310	743.9	cam1_20160618115824.png
large rockfish	6/18/2016	11	51	35	41.427551	-124.889235	744.5	cam1_20160618115824.png
beginning to head south	6/18/2016	11	52	25	41.427513	-124.889192	744.5	cam1_20160618115824.png
passing over crabs, thornyheads, hagfish, sole, and black corals	6/18/2016	11	53	46	41.427428	-124.889213	744.4	cam1_20160618115824.png
large sponge on carbonate	6/18/2016	11	54	44	41.427145	-124.889274	743.6	cam1_20160618115824.png
large sponge, vase	6/18/2016	11	54	48	41.427145	-124.889284	743.3	cam1_20160618115824.png
getting back up towards the carbonate knoll	6/18/2016	11	58	40	41.426725	-124.889300	741.4	cam1_20160618115824.png

H1523 NA072 Klamath Knoll Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Headed toward smaller knoll target to the south	6/18/2016	11	59	59	41.426695	-124.889320	741.6	cam1_20160618115824.png
swiftia coral	6/18/2016	12	0	3	41.426696	-124.889320	741.5	cam1_20160618120600.png
lots of rifted carbonate with large cracks	6/18/2016	12	1	22	41.426688	-124.889323	741.3	cam1_20160618120830.png
black coral and paragorgia grove more sediment	6/18/2016	12	6	2	41.426310	-124.889234	740.5	cam1_20160618120600.png
Some small swiftia mixed in with paragorgia and black corals	6/18/2016	12	7	24	41.426158	-124.889328	739.7	cam1_20160618120830.png
zoom in on basalt with swiftia	6/18/2016	12	9	8	41.426077	-124.889272	738.9	cam1_20160618120830.png
continuing to move south	6/18/2016	12	9	46	41.426019	-124.889285	740.1	cam1_20160618120830.png
basalt rubble	6/18/2016	12	10	7	41.425875	-124.889328	740.4	cam1_20160618121221.png
paragorgia	6/18/2016	12	10	46	41.425819	-124.889337	740.8	cam1_20160618121221.png
pompom anemone	6/18/2016	12	12	6	41.425784	-124.889331	740.5	cam1_20160618121217.png
large anemone hanging from underside of ledge	6/18/2016	12	12	11	41.425784	-124.889334	740.5	cam1_20160618121217.png
waiting on ship move	6/18/2016	12	13	59	41.425785	-124.889322	740.0	cam1_20160618121221.png
Setting up for an eDNA water sample in area with several types of coral	6/18/2016	12	17	39	41.425802	-124.889297	740.0	cam1_20160618121221.png
Argus camera/lights issue?	6/18/2016	12	18	25	41.425806	-124.889296	740.0	cam1_20160618121221.png
smaller basalt chunks	6/18/2016	12	23	13	41.425676	-124.889344	737.7	cam1_20160618122353.png
basalt rubble and carbonate mounds	6/18/2016	12	23	51	41.425590	-124.889385	735.6	cam1_20160618122353.png
more coral, paragorgia on wall with swiftia and barrel sponge	6/18/2016	12	24	13	41.425591	-124.889405	734.6	cam1_20160618122651.png
lot of paragorgia, some swiftia, barrel sponge, vase sponge, mushroom corals, crab	6/18/2016	12	24	23	41.425590	-124.889405	733.4	cam1_20160618122651.png
continuing up to small knoll summit	6/18/2016	12	29	23	41.425328	-124.889431	731.4	cam1_20160618122353.png
approaching the summit of the knoll to the SE	6/18/2016	12	29	55	41.425316	-124.889440	731.5	cam1_20160618122353.png
zoom on swiftia	6/18/2016	12	31	12	41.425302	-124.889393	730.6	cam1_20160618123209.png
large, mushroom shaped carbonate cap (summit) with coral	6/18/2016	12	31	54	41.425274	-124.889407	730.6	cam1_20160618123209.png
many crabs	6/18/2016	12	33	11	41.425210	-124.889474	729.8	cam1_20160618123209.png
Continuing past summit over carbonate with paragorgias, tanner crabs, thornyheads, seastars	6/18/2016	12	33	41	41.425187	-124.889532	729.2	cam1_20160618123209.png
paragorgia grove	6/18/2016	12	38	51	41.425304	-124.889756	728.7	cam1_20160618123209.png
moving northwest between contours, rift with sediment	6/18/2016	12	39	5	41.425336	-124.889794	729.4	cam1_20160618123209.png
heading back to the NW toward depression	6/18/2016	12	39	56	41.425360	-124.889810	730.0	cam1_20160618123209.png
Squid in Argus cam	6/18/2016	12	40	5	41.425360	-124.889810	730.1	cam1_20160618124421.png
Attempting to sample paragorgia on basalt	6/18/2016	12	45	52	41.425371	-124.889834	732.1	cam1_20160618124348.png
Preparing ship heading for recovery, ROVs headed west	6/18/2016	12	51	49	41.425374	-124.889834	730.5	cam1_20160618125029.png
at least 4 species of coral in this area where we took Niskin and sample	6/18/2016	12	52	23	41.425366	-124.889849	730.5	cam1_20160618125029.png

H1523 NA072 Klamath Knoll Seeps	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Noted that a swiftia was also in close range of that last water sample	6/18/2016	12	52	29	41.425366	-124.889849	730.4	cam1_20160618125029.png
setting up for recovery	6/18/2016	12	52	30	41.425366	-124.889850	730.4	cam1_20160618125029.png
dropping weight	6/18/2016	12	57	44	41.425080	-124.889582	699.0	cam1_20160618125029.png

H1524 NA072 Trinidad Canyon	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
MAPRs started logging at 1pm local time (20	6/18/2016	20	29	11	41.134997	-124.944054	9.8	
vehicles both in water, descending to 2100m	6/18/2016	20	30	18	41.134916	-124.944014	9.5	cam1_20160618203930.png
dense layer of lanternfish	6/18/2016	20	46	13	41.133991	-124.944455	351.2	cam1_20160618204944.png
noticed min O2 at around 850m	6/18/2016	21	7	59	41.134110	-124.943116	907.4	cam2_20160618210311.png
large siphonophore	6/18/2016	21	14	44	41.134535	-124.942725	1099.0	
Upon descent	6/18/2016	21	53	56	41.135768	-124.944156	2186.0	
On bottom	6/18/2016	21	57	0	41.134929	-124.943913	2171.0	
upon settlement	6/18/2016	22	5	34	41.134719	-124.944451	2178.8	cam1_20160618220524.png
zoom-in on brittle stars	6/18/2016	22	6	11	41.134665	-124.944449	2179.0	cam1_20160618220550.png
Holothurians	6/18/2016	22	8	4	41.134673	-124.944608	2180.9	cam1_20160618220624.png
Octopus, fly trap anemone	6/18/2016	22	8	23	41.134667	-124.944610	2181.1	cam1_20160618220624.png
Zoom-in on octopus - Graneledone pacifica	6/18/2016	22	13	43	41.134672	-124.944640	2180.6	cam1_20160618221144.png
Pacific flatnose, eelpout, slime star	6/18/2016	22	16	18	41.134640	-124.945081	2182.6	cam1_20160618221144.png
Plastic cup	6/18/2016	22	18	14	41.134865	-124.944952	2184.2	cam1_20160618221144.png
anemone	6/18/2016	22	19	1	41.135021	-124.944846	2184.7	cam1_20160618221144.png
muddy bottom, low visibility due to marine snow	6/18/2016	22	19	22	41.135043	-124.944718	2184.5	cam1_20160618221144.png
Large, rectangular in shape	6/18/2016	22	20	30	41.135030	-124.944676	2184.4	cam1_20160618222027.png
Frilled mussel	6/18/2016	22	24	59	41.135347	-124.944866	2188.2	cam1_20160618222731.png
Brisingid stars (many arms), pannychia sea cucumbers	6/18/2016	22	31	7	41.136125	-124.944642	2189.2	cam1_20160618223516.png
Mostly muddy substrate with holothurians - occasionally other species previously described	6/18/2016	22	32	57	41.136179	-124.944575	2189.3	cam1_20160618223516.png
Zoom-in on a corallimorph anemone?	6/18/2016	22	36	10	41.136314	-124.944748	2189.6	cam1_20160618223516.png
Pacific flatnose	6/18/2016	22	38	11	41.136807	-124.944806	2189.2	cam1_20160618223516.png
crinoid, black	6/18/2016	22	42	22	41.137274	-124.944607	2187.9	cam1_20160618224523.png
Group of flytrap anemones	6/18/2016	22	44	8	41.137470	-124.944698	2184.5	cam1_20160618224523.png
snailfish?	6/18/2016	22	44	30	41.137571	-124.944706	2183.9	cam1_20160618224523.png
Zoom-in on sea spiders (orange)	6/18/2016	22	45	52	41.137570	-124.944765	2183.3	cam1_20160618224350.png
glass sponge (white)	6/18/2016	22	49	19	41.137764	-124.944653	2176.0	cam1_20160618224523.png
Wall in view	6/18/2016	22	50	57	41.137800	-124.944578	2169.6	cam1_20160618225549.png
2 octopi	6/18/2016	22	51	5	41.137800	-124.944582	2169.3	cam1_20160618225549.png
Group of orange brisingid stars, octopus (Graneledone pacifica)	6/18/2016	22	57	16	41.138518	-124.944469	2149.9	cam1_20160618225549.png
Beginning to follow sedimented wall of carbonate	6/18/2016	23	0	52	41.138493	-124.944452	2147.7	cam1_20160618230738.png
Orange crinoids and purple anemones	6/18/2016	23	1	12	41.138513	-124.944507	2147.7	cam1_20160618230738.png

H1524 NA072 Trinidad Canyon	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Thinking about taking a carbonate sample	6/18/2016	23	2	31	41.138544	-124.944378	2148.1	cam1_20160618230627.png
Flytrap anemone	6/18/2016	23	2	37	41.138544	-124.944378	2147.9	cam1_20160618230627.png
very steeply dipping rock layers	6/18/2016	23	4	42	41.138499	-124.944264	2147.6	cam1_20160618230738.png
Layered carbonate, almost appears to be tipped 45deg counterclockwise (from right)	6/18/2016	23	5	9	41.138518	-124.944253	2147.6	cam1_20160618230738.png
Heading up the steepest wall, north of point 2	6/18/2016	23	6	33	41.138484	-124.944300	2148.9	cam1_20160618230627.png
Small crab	6/18/2016	23	6	35	41.138515	-124.944287	2148.9	cam1_20160618230627.png
First grab sample failed	6/18/2016	23	8	59	41.138532	-124.944355	2148.8	cam1_20160618230738.png
Rock sample at 2150 m	6/18/2016	23	10	44	41.138573	-124.944330	2149.5	cam1_20160618231352.png
Octopus	6/18/2016	23	12	58	41.138527	-124.944354	2149.3	cam1_20160618231408.png
Octopus tucked into wall	6/18/2016	23	13	49	41.138630	-124.944390	2147.4	cam1_20160618231352.png
focusing on the wall and rock layers, octopus	6/18/2016	23	14	15	41.138639	-124.944381	2147.3	cam1_20160618231359.png
(Octopus is a Graneledone pacifica)	6/18/2016	23	14	30	41.138593	-124.944380	2147.0	cam1_20160618231359.png
swiftia and gastropods	6/18/2016	23	14	48	41.138575	-124.944380	2144.4	cam1_20160618231359.png
Swiftia coral	6/18/2016	23	14	57	41.138575	-124.944379	2143.0	cam1_20160618231359.png
Will not be following planned survey for time; will continue north up wall	6/18/2016	23	15	30	41.138561	-124.944356	2142.2	cam1_20160618231359.png
Pacific flatnose, another Graneledone pacifica , swiftia coral, brisingid stars	6/18/2016	23	15	48	41.138592	-124.944352	2142.4	cam1_20160618231359.png
This octopus is a female tending eggs	6/18/2016	23	16	1	41.138592	-124.944346	2142.1	cam1_20160618231352.png
female octopus tending eggs	6/18/2016	23	16	2	41.138592	-124.944346	2142.1	cam1_20160618231352.png
shrimp, purple anemones and gastropods	6/18/2016	23	18	45	41.138617	-124.944401	2139.8	cam1_20160618231359.png
black coral	6/18/2016	23	19	24	41.138673	-124.944378	2138.5	cam1_20160618231408.png
some small, white sponge	6/18/2016	23	20	25	41.138750	-124.944355	2137.8	cam1_20160618232607.png
Zoom in on eating anemone; tubeworms in sediment on canyon wall?	6/18/2016	23	21	4	41.138653	-124.944417	2136.1	cam1_20160618232605.png
possible small tubeworms	6/18/2016	23	21	19	41.138625	-124.944384	2135.7	cam1_20160618232605.png
fly trap anemone	6/18/2016	23	22	15	41.138703	-124.944371	2134.7	cam1_20160618232605.png
2 dark Purple sea cucumbers	6/18/2016	23	23	1	41.138733	-124.944386	2134.5	cam1_20160618232607.png
purple wide sea cucumber and sea star	6/18/2016	23	23	10	41.138730	-124.944384	2134.3	cam1_20160618232607.png
(Sea cucumbers may be Paelopatides?)	6/18/2016	23	23	29	41.138742	-124.944382	2133.0	cam1_20160618232607.png
Purple anemones, orange brisingid stars, flytrap anemones, 2 large swiftia corals	6/18/2016	23	26	28	41.138683	-124.944296	2130.3	cam1_20160618232303.png
large corals and brisingid seastars	6/18/2016	23	26	32	41.138683	-124.944296	2130.5	cam1_20160618232303.png
Some small white brittle stars	6/18/2016	23	27	9	41.138783	-124.944355	2131.7	cam1_20160618232303.png
Many more swiftia following around to the more exposed wall	6/18/2016	23	28	9	41.138871	-124.944408	2128.7	cam1_20160618232607.png

H1524 NA072 Trinidad Canyon	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Lateralling NE along wall	6/18/2016	23	28	32	41.138884	-124.944406	2128.0	cam1_20160618232607.png
Pacific flatnose	6/18/2016	23	30	26	41.138918	-124.944411	2127.7	cam1_20160618233522.png
Continuing up sedimented portion of wall again	6/18/2016	23	31	5	41.138914	-124.944412	2127.9	cam1_20160618233517.png
Some small burrows and some small worms visible in this part of wall	6/18/2016	23	31	38	41.138939	-124.944420	2127.9	cam1_20160618233517.png
sea cucumber, large brittle star	6/18/2016	23	33	18	41.138997	-124.944280	2126.1	cam1_20160618233522.png
sponge, 3 species of coral	6/18/2016	23	34	6	41.139016	-124.944286	2125.5	cam1_20160618233522.png
Sponge, Swiftia pacifica, black coral, and small white coral?	6/18/2016	23	34	19	41.139025	-124.944293	2123.4	cam1_20160618233522.png
2 Graneledone pacifica octopi	6/18/2016	23	34	57	41.139027	-124.944321	2122.9	cam1_20160618233522.png
octopus close ups	6/18/2016	23	35	19	41.139031	-124.944372	2122.8	cam1_20160618233458.png
(Both are brooding eggs upside-down	6/18/2016	23	35	58	41.139075	-124.944353	2121.7	cam1_20160618233458.png
swiftia seafans	6/18/2016	23	36	11	41.139070	-124.944361	2121.7	cam1_20160618233534.png
frilled mussel shell; 2 large purple sea cucumbers	6/18/2016	23	37	56	41.139009	-124.944482	2121.5	cam1_20160618233522.png
large purple seacucmbers	6/18/2016	23	38	27	41.139009	-124.944452	2120.3	cam1_20160618233522.png
seastars	6/18/2016	23	38	35	41.139015	-124.944451	2120.4	cam1_20160618233522.png
Continuing up wall (Herc at 2120m depth)	6/18/2016	23	39	38	41.139055	-124.944595	2119.7	cam1_20160618233517.png
many anemones and a seafan and brisingid seastars	6/18/2016	23	39	48	41.139055	-124.944588	2119.7	cam1_20160618233517.png
Another hanging ledge with sponge, Graneledone pacifica, anemones, Brisingid stars, swiftia	6/18/2016	23	40	14	41.139048	-124.944588	2119.5	cam1_20160618234136.png
some sort of yellow trash	6/18/2016	23	40	43	41.139007	-124.944634	2119.4	cam1_20160618234136.png
large, vertical outcrop with white sponge and many anemones and seastars	6/18/2016	23	40	56	41.139013	-124.944633	2119.0	cam1_20160618234136.png
feather duster/polychaetes on wall	6/18/2016	23	41	39	41.139001	-124.944512	2119.0	cam1_20160618234115.png
Nice wide shot of outcrop on canyon wall	6/18/2016	23	42	15	41.139059	-124.944521	2118.6	cam1_20160618234137.png
The layers in the carbonate seem to have leveled out significantly	6/18/2016	23	42	34	41.139059	-124.944605	2119.0	cam1_20160618234137.png
horizontal carbonate layers, sculpted, thin sediment veneer	6/18/2016	23	43	26	41.139027	-124.944617	2118.6	cam1_20160618234136.png
White sponge with crab living in it	6/18/2016	23	44	16	41.138966	-124.944638	2119.6	cam1_20160618234134.png
white sponge with small white crab	6/18/2016	23	44	22	41.138966	-124.944636	2119.5	cam1_20160618234134.png
Graneledone pacifica	6/18/2016	23	45	10	41.138993	-124.944635	2119.4	cam1_20160618234137.png
another Graneledone pacifica	6/18/2016	23	45	16	41.138992	-124.944640	2119.5	cam1_20160618234137.png
third Graneledone pacifica	6/18/2016	23	45	22	41.138986	-124.944646	2119.4	cam1_20160618234137.png
galatheid crabs?	6/18/2016	23	46	45	41.138958	-124.944618	2118.8	cam1_20160618234137.png
Continuing up wall again	6/18/2016	23	46	46	41.138959	-124.944618	2118.7	cam1_20160618234137.png

H1524 NA072 Trinidad Canyon	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Note from shore that rock wall could be lithified sediment (as layering is not as characteristic of carbonate) (Lisa Levin)	6/18/2016	23	47	32	41.138982	-124.944607	2117.0	cam1_20160618234137.png
Lateralling back across wall	6/18/2016	23	47	58	41.138979	-124.944594	2116.8	cam1_20160618234137.png
large eelpout	6/18/2016	23	48	38	41.139014	-124.944591	2117.1	cam1_20160618234137.png
large number of seafans and possible eelpout	6/18/2016	23	48	38	41.139014	-124.944591	2117.1	cam1_20160618234137.png
That eelpout label may be incorrect, might be cusk-eel (has no dorsal fin)	6/18/2016	23	49	44	41.139049	-124.944573	2117.1	cam1_20160618234137.png
Several more Graneledone pacifica octopi	6/18/2016	23	49	55	41.139032	-124.944541	2116.9	cam1_20160618234137.png
zoom on white anemone, may be coralimorph anemone	6/18/2016	23	51	2	41.139078	-124.944532	2116.7	
Another observation from shore	6/18/2016	23	53	26	41.139108	-124.944562	2116.6	
2 more Graneledone pacifica octopi above	6/18/2016	23	54	8	41.139040	-124.944559	2116.5	
Several more Swiftia	6/18/2016	23	54	18	41.139050	-124.944558	2116.6	
Niskin near the seafans	6/18/2016	23	55	12	41.139103	-124.944520	2116.7	
white sponge and four octopus	6/18/2016	23	57	29	41.139100	-124.944567	2115.1	
5 Graneledone pacifica octopi	6/18/2016	23	57	53	41.139122	-124.944588	2114.9	
zoom in on sponge hanging from ledge	6/18/2016	23	59	30	41.139168	-124.944532	2114.2	
Continuing up. another Graneledone pacifica	6/19/2016	0	5	14	41.139089	-124.944672	2111.7	cam1_20160619000612.png
octopus with eggs and coral	6/19/2016	0	6	44	41.139098	-124.944661	2112.5	cam1_20160619000548.png
ledge with many seafans	6/19/2016	0	7	33	41.139100	-124.944659	2111.5	cam1_20160619000623.png
small crab	6/19/2016	0	7	40	41.139091	-124.944636	2111.8	cam1_20160619000623.png
Zoom on sponge	6/19/2016	0	7	46	41.139090	-124.944620	2112.2	cam1_20160619000623.png
large barrel/vase sponge	6/19/2016	0	8	42	41.139147	-124.944602	2111.9	cam1_20160619000557.png
Burrowing white polychaete behind sponge	6/19/2016	0	8	47	41.139148	-124.944602	2112.2	cam1_20160619000557.png
sea spider	6/19/2016	0	10	0	41.139159	-124.944602	2112.0	cam1_20160619001403.png
pycnogonid	6/19/2016	0	10	1	41.139159	-124.944602	2112.0	cam1_20160619001403.png
Graneledone pacifica	6/19/2016	0	14	6	41.139183	-124.944610	2107.1	cam1_20160619001451.png
trumpet sponge	6/19/2016	0	16	50	41.139169	-124.944678	2107.4	cam1_20160619001454.png
Zoom in on shrimp on sponge	6/19/2016	0	17	32	41.139205	-124.944678	2107.9	cam1_20160619001454.png
galatheid crab under anemone	6/19/2016	0	17	59	41.139174	-124.944689	2107.4	cam1_20160619001454.png
snail egg tower, though we haven't seen any sort of snail yet	6/19/2016	0	18	38	41.139192	-124.944677	2106.5	cam1_20160619001451.png
Graneledone pacifica	6/19/2016	0	18	53	41.139197	-124.944727	2106.2	cam1_20160619001451.png
Tree branch	6/19/2016	0	20	23	41.139184	-124.944736	2104.8	cam1_20160619002215.png
zoom on sponge	6/19/2016	0	21	58	41.139222	-124.944746	2104.1	cam1_20160619002232.png
galatheid crab on sponge	6/19/2016	0	23	1	41.139165	-124.944721	2104.5	cam1_20160619002232.png
Continuing to NE	6/19/2016	0	23	21	41.139171	-124.944709	2103.9	cam1_20160619002232.png

H1524 NA072 Trinidad Canyon	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Graneledone pacifica	6/19/2016	0	24	5	41.139168	-124.944698	2105.1	cam1_20160619002225.png
Small eelpout (?)	6/19/2016	0	27	11	41.139274	-124.944675	2104.0	cam1_20160619002242.png
Graneledone pacifica walking along wall	6/19/2016	0	28	38	41.139281	-124.944583	2104.3	cam1_20160619002232.png
Large bathypathes black coral	6/19/2016	0	29	56	41.139327	-124.944515	2103.7	cam1_20160619002225.png
very large bathypathes	6/19/2016	0	30	14	41.139341	-124.944511	2103.8	cam1_20160619003040.png
This coral appears to be ~0.5m across, top may have been broken off	6/19/2016	0	31	19	41.139325	-124.944510	2103.3	cam1_20160619003101.png
ledge with sponge, seafans and octopus	6/19/2016	0	32	51	41.139309	-124.944452	2102.9	cam1_20160619003101.png
2 octopi near a white sponge	6/19/2016	0	39	4	41.139383	-124.944223	2105.6	cam1_20160619003101.png
ear-shaped sponge and 3 octopus	6/19/2016	0	40	13	41.139396	-124.944214	2105.2	cam1_20160619004733.png
lots of brisingid seastars and anemones as we climb the wall at 2105 m	6/19/2016	0	43	22	41.139484	-124.944155	2103.8	cam1_20160619004733.png
possible octocoral	6/19/2016	0	47	54	41.139564	-124.944009	2103.0	cam1_20160619004612.png
Zoom-in on white stalk structure - likely gorgonian octocoral	6/19/2016	0	48	9	41.139588	-124.944048	2103.3	cam1_20160619004733.png
Tilted rock structure, more sedimentary	6/19/2016	0	49	17	41.139587	-124.944075	2101.8	cam1_20160619004733.png
lots of brisingid seastars and anemones, tilted sediment rock layers	6/19/2016	0	50	35	41.139570	-124.944130	2100.1	cam1_20160619005013.png
octopus, brisingid star, and purple anemones near interesting rock outcrop	6/19/2016	0	50	48	41.139567	-124.944136	2098.4	cam1_20160619005013.png
Tilted layers again	6/19/2016	0	51	41	41.139672	-124.944196	2091.9	cam1_20160619005017.png
coral and brisingid stars and rock	6/19/2016	0	54	37	41.139780	-124.944260	2084.1	cam1_20160619005017.png
scattered Brisingids over mostly sedimented portion of wall	6/19/2016	0	55	14	41.139820	-124.944267	2083.7	cam1_20160619005017.png
Zoom on sediment	6/19/2016	0	57	42	41.139954	-124.944089	2084.2	cam1_20160619005013.png
tiny octopus	6/19/2016	0	59	35	41.139995	-124.944139	2079.1	cam1_20160619005017.png
purple sea urchin	6/19/2016	0	59	53	41.139994	-124.944135	2079.4	cam1_20160619005017.png
walking baby octopus, Graneledone pacifica	6/19/2016	1	0	20	41.139986	-124.944126	2079.2	cam1_20160619010004.png
rattail	6/19/2016	1	0	56	41.139982	-124.944145	2077.9	cam1_20160619010004.png
grenadier	6/19/2016	1	1	1	41.139996	-124.944145	2077.8	cam1_20160619010030.png
Herc is at 2070m depth	6/19/2016	1	2	56	41.140157	-124.944152	2070.5	cam1_20160619010030.png
White anemone	6/19/2016	1	3	18	41.140158	-124.944197	2068.9	cam1_20160619010023.png
Another rock outcrop	6/19/2016	1	3	30	41.140169	-124.944198	2068.1	cam1_20160619010023.png
Flytrap anemones, purple anemones, large seastar, crinoid, clear sea cucumbers	6/19/2016	1	6	19	41.140258	-124.944233	2062.7	cam1_20160619010030.png
Continuing up along another sedimented portion of wall	6/19/2016	1	8	44	41.140317	-124.944253	2056.4	cam1_20160619010023.png

H1524 NA072 Trinidad Canyon	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
another outcrop with Swiftia, Brisingid, purple anemones, flytrap anemone	6/19/2016	1	11	40	41.140547	-124.944371	2039.7	cam1_20160619011553.png
Zoom in on 3 Brisingid stars	6/19/2016	1	14	54	41.140551	-124.944395	2036.4	cam1_20160619011553.png
Continuing up wall	6/19/2016	1	15	0	41.140547	-124.944395	2036.0	cam1_20160619011544.png
Graneledone pacifica	6/19/2016	1	15	22	41.140588	-124.944400	2034.0	cam1_20160619011544.png
Graneledone pacifica	6/19/2016	1	15	41	41.140588	-124.944417	2031.5	cam1_20160619011544.png
Graneledone pacifica	6/19/2016	1	15	50	41.140602	-124.944399	2030.8	cam1_20160619011544.png
Graneledone pacifica	6/19/2016	1	16	34	41.140676	-124.944456	2027.2	cam1_20160619011553.png
Graneledone pacifica	6/19/2016	1	16	43	41.140678	-124.944456	2026.4	cam1_20160619011553.png
large sponge, crab	6/19/2016	1	17	12	41.140702	-124.944476	2025.1	cam1_20160619011553.png
Large sponge, many Swiftia, two more snail egg towers	6/19/2016	1	17	55	41.140735	-124.944468	2022.3	cam1_20160619011553.png
Graneledone pacifica	6/19/2016	1	18	24	41.140767	-124.944463	2020.8	cam1_20160619011544.png
Paragorgia coral on left of outcrop	6/19/2016	1	20	34	41.140760	-124.944473	2020.7	cam1_20160619012230.png
Curlicue black coral with brittle stars	6/19/2016	1	22	20	41.140843	-124.944518	2015.7	cam1_20160619012249.png
Correction, not a black coral	6/19/2016	1	22	47	41.140844	-124.944507	2015.8	cam1_20160619012249.png
Nice view of Hercules in Argus cam	6/19/2016	1	24	29	41.141029	-124.944503	2004.9	cam1_20160619012249.png
Sea spiders	6/19/2016	1	25	24	41.141142	-124.944393	2001.0	cam1_20160619012400.png
Herc at 2000 m depth	6/19/2016	1	26	44	41.141127	-124.944442	1997.5	cam1_20160619012525.png
Anemone	6/19/2016	1	27	23	41.141203	-124.944451	1996.6	cam1_20160619012525.png
Many Swiftia	6/19/2016	1	29	36	41.141341	-124.944580	1979.8	cam1_20160619012400.png
rattail	6/19/2016	1	30	40	41.141463	-124.944584	1974.4	cam1_20160619013215.png
Pacific flatnose	6/19/2016	1	31	49	41.141520	-124.944597	1972.1	cam1_20160619013215.png
Another Pacific flatnose	6/19/2016	1	33	2	41.141595	-124.944560	1970.3	cam1_20160619013253.png
Continuing over sedimented portion of wall	6/19/2016	1	34	19	41.141669	-124.944496	1969.0	cam1_20160619013253.png
large shrimp	6/19/2016	1	35	58	41.141758	-124.944497	1967.0	cam1_20160619013253.png
frilled mussel shell	6/19/2016	1	37	6	41.141762	-124.944521	1964.8	cam1_20160619013253.png
Pacific flatnose	6/19/2016	1	38	16	41.141836	-124.944557	1962.1	cam1_20160619013253.png
sponge	6/19/2016	1	42	50	41.142114	-124.944558	1955.9	cam1_20160619014624.png
Maybe not a sponge, tunicate?	6/19/2016	1	43	17	41.142118	-124.944566	1956.1	cam1_20160619014624.png
Sea spider	6/19/2016	1	43	29	41.142113	-124.944572	1956.0	cam1_20160619014624.png
Herc at 1950 m depth	6/19/2016	1	45	34	41.142252	-124.944601	1951.0	cam1_20160619014624.png
Sandstone	6/19/2016	1	46	31	41.142248	-124.944599	1951.2	cam1_20160619014602.png
Shiny snails, brittle stars, large shrimp, crinoid	6/19/2016	1	46	43	41.142257	-124.944577	1951.1	cam1_20160619014602.png
Sandstone with seastars, shrimp	6/19/2016	1	47	21	41.142258	-124.944561	1950.2	cam1_20160619014634.png
Graneledone pacifica taking a walk	6/19/2016	1	48	37	41.142352	-124.944539	1948.8	cam1_20160619014624.png
Readjusting position of Mongo arm push cores	6/19/2016	1	49	2	41.142346	-124.944543	1948.9	cam1_20160619014621.png

H1524 NA072 Trinidad Canyon	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
Snail building an egg tower	6/19/2016	1	49	46	41.142360	-124.944536	1949.0	cam1_20160619014621.png
skate	6/19/2016	1	50	43	41.142382	-124.944506	1948.8	cam1_20160619015002.png
Swiftia corals	6/19/2016	1	53	50	41.142643	-124.944280	1948.5	cam1_20160619015018.png
Following 1950m contour to the NE	6/19/2016	1	55	43	41.142700	-124.944250	1947.4	cam1_20160619015021.png
Gastropod	6/19/2016	1	56	48	41.142783	-124.944199	1947.5	cam1_20160619015018.png
baby octopus	6/19/2016	2	1	43	41.142874	-124.944167	1947.2	cam1_20160619020155.png
Continuing NE; mostly sedimented wall, few outcrops	6/19/2016	2	5	42	41.143030	-124.943963	1947.4	cam1_20160619020200.png
A few small outcrops with little colonization	6/19/2016	2	8	13	41.143157	-124.943892	1947.1	cam1_20160619020200.png
snail egg towers on very small outcrop with flytrap anemones, purple anemones	6/19/2016	2	10	30	41.143304	-124.943845	1947.1	cam1_20160619021339.png
Giant barnacle next to egg towers, which also have brittle stars on them	6/19/2016	2	13	58	41.143318	-124.943745	1947.6	cam1_20160619021314.png
A few more rocky outcrops, also relatively uncolonized	6/19/2016	2	16	28	41.143441	-124.943747	1946.2	cam1_20160619021314.png
Layered structure of wall visible here	6/19/2016	2	21	15	41.143619	-124.943530	1948.3	cam1_20160619022515.png
Graneledone pacifica walking	6/19/2016	2	24	25	41.143868	-124.943461	1948.2	cam1_20160619022459.png
Continuing NE along wall, some rocky outcrops, limited colonization (crinoid, 1 clear sea cucumber)	6/19/2016	2	28	52	41.144043	-124.943389	1948.3	cam1_20160619022515.png
baby Graneledone pacifica	6/19/2016	2	29	47	41.144098	-124.943369	1948.6	cam1_20160619022515.png
pacific flatnose; scattered shell debris	6/19/2016	2	35	59	41.144351	-124.943227	1948.3	cam1_20160619023639.png
tubeworms	6/19/2016	2	36	39	41.144352	-124.943137	1948.3	cam1_20160619023346.png
small green bottle	6/19/2016	2	37	31	41.144340	-124.943129	1950.6	cam1_20160619023639.png
Live tubeworms, empty fringed mussel shells	6/19/2016	2	39	3	41.144352	-124.943098	1951.5	cam1_20160619023346.png
Additional small patches of tubeworms (Lamellibrachia (barhami) - Lisa Levin	6/19/2016	2	41	43	41.144352	-124.943111	1952.0	cam1_20160619024218.png
Pacific flatnose photo bomb	6/19/2016	2	42	18	41.144370	-124.943104	1951.8	cam1_20160619024731.png
skate	6/19/2016	2	44	34	41.144434	-124.943033	1951.8	cam1_20160619024731.png
Graneledone pacifica	6/19/2016	2	48	1	41.144542	-124.942890	1953.9	cam1_20160619024218.png
Zoom in on tubeworms with brisingid star, flytrap anemone	6/19/2016	2	49	58	41.144518	-124.942811	1953.3	cam1_20160619024218.png
Difficult to tell substrate	6/19/2016	2	50	33	41.144578	-124.942831	1950.6	cam1_20160619025450.png
Pacific flatnose	6/19/2016	2	50	40	41.144552	-124.942816	1950.9	cam1_20160619025450.png
zoomed in on small tube worm clump during watch change	6/19/2016	2	55	41	41.144711	-124.942675	1954.1	cam1_20160619025432.png
barnacles in tube worm clump	6/19/2016	2	56	22	41.144674	-124.942766	1954.1	cam1_20160619025450.png
exploring the canyon walls, many brittle stars, hagfish, and tubeworms	6/19/2016	3	15	40	41.144834	-124.942093	1952.9	cam1_20160619031924.png
previously saw a graneladone octopus	6/19/2016	3	18	14	41.144850	-124.942151	1952.8	cam1_20160619031924.png

H1524 NA072 Trinidad Canyon	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
moving southwest along the canyon wall	6/19/2016	3	30	42	41.145021	-124.942387	1941.1	cam1_20160619033159.png
snailfish spotted!!	6/19/2016	3	30	54	41.145018	-124.942504	1941.2	cam1_20160619033159.png
carbonate sliding down hill	6/19/2016	3	31	26	41.145127	-124.942510	1940.8	cam1_20160619033108.png
crinoids	6/19/2016	3	44	33	41.145011	-124.942505	1933.3	cam1_20160619034805.png
approaching previous nav targets 'Tubeworms'	6/19/2016	3	45	8	41.144941	-124.942532	1933.1	cam1_20160619034805.png
fractures in the rock form patterns	6/19/2016	3	46	16	41.144786	-124.942727	1933.6	cam1_20160619034809.png
picnogonid	6/19/2016	3	47	55	41.144921	-124.942665	1933.3	cam1_20160619034809.png
small snailfish, anemone (purple), picnogonid	6/19/2016	3	48	30	41.144948	-124.942639	1933.4	cam1_20160619034550.png
very very large rattail fish	6/19/2016	3	52	1	41.145013	-124.942625	1932.1	cam1_20160619035303.png
returning to the first tube worm site, more shallow	6/19/2016	3	53	1	41.145017	-124.942681	1931.7	cam1_20160619035229.png
clam shell	6/19/2016	3	53	10	41.145010	-124.942695	1931.4	cam1_20160619035229.png
another sediment channel	6/19/2016	3	53	44	41.144975	-124.942719	1932.0	cam1_20160619035229.png
sediment channel bringing organisms perhaps from above, clams and other animals	6/19/2016	3	57	34	41.145083	-124.942765	1925.0	cam1_20160619035303.png
following along contour but this shoot appears to have carried organisms down the wall	6/19/2016	3	59	53	41.145094	-124.942759	1922.0	cam1_20160619035303.png
large rocky carbonate and sedimentary rock	6/19/2016	4	3	19	41.145196	-124.942869	1917.3	cam1_20160619040636.png
more scattered brittle stars	6/19/2016	4	5	34	41.145366	-124.942733	1916.9	cam1_20160619040637.png
snail shell and clam shells	6/19/2016	4	6	33	41.145236	-124.942830	1916.8	cam1_20160619040636.png
false peaks of the canyon walls, now at a depth of 1917	6/19/2016	4	7	46	41.145245	-124.942848	1915.8	cam1_20160619040637.png
broken clam shells and large polychaetes	6/19/2016	4	8	51	41.145254	-124.942921	1913.1	cam1_20160619040636.png
another very large rattail fish	6/19/2016	4	10	5	41.145193	-124.942842	1911.3	cam1_20160619041314.png
parasite on the tail of the rattail fish	6/19/2016	4	10	56	41.145227	-124.942919	1911.3	cam1_20160619041314.png
sedimentary rocks layered, possibly Pleistocene in age	6/19/2016	4	13	59	41.145284	-124.942936	1904.0	cam1_20160619041314.png
more scattered broken clam shells and a fly trap anemone	6/19/2016	4	15	9	41.145309	-124.942965	1900.8	cam1_20160619041317.png
as we move up the canyon wall it starts to flatten out a bit	6/19/2016	4	15	27	41.145318	-124.942956	1899.9	cam1_20160619041317.png
many distinct layers in the rock	6/19/2016	4	16	33	41.145295	-124.943038	1897.5	cam1_20160619041315.png
falling small shrimp	6/19/2016	4	16	44	41.145302	-124.943036	1896.9	cam1_20160619041315.png
darker sediment showing signs of sulfate reduction	6/19/2016	4	17	50	41.145336	-124.943064	1897.5	cam1_20160619041315.png
a lot of tube worms and potential seepage coming out of the wall	6/19/2016	4	23	15	41.145398	-124.943199	1895.9	cam1_20160619042625.png
looks like possibly lamella brachia tubeworms	6/19/2016	4	23	29	41.145390	-124.943209	1895.7	cam1_20160619042625.png
large frilled mussel shell	6/19/2016	4	23	52	41.145350	-124.943240	1895.7	cam1_20160619042625.png
just found a possibly extinct or active seep site	6/19/2016	4	24	4	41.145356	-124.943242	1895.7	cam1_20160619042656.png

H1524 NA072 Trinidad Canyon	date	hr	min	sec	latitude	longitude	Z(m)	framegrabs
probably had some actively bubbling methane but now is just diffuse in flow	6/19/2016	4	24	36	41.145374	-124.943220	1895.5	cam1_20160619042656.png
more tectonically tilted sediments (lithified sediments likely)	6/19/2016	4	26	5	41.145281	-124.943309	1893.0	cam1_20160619042625.png
definitely more active here, much more clam shells	6/19/2016	4	26	25	41.145199	-124.943318	1892.5	cam1_20160619042625.png
another snail tower	6/19/2016	4	26	55	41.145220	-124.943310	1892.2	cam1_20160619042625.png
snails build towers and crawl on top of them for periods of time	6/19/2016	4	27	12	41.145219	-124.943297	1894.5	cam1_20160619042656.png
different kind of seep, not active bubbles but still lots of life and possible diffuse flow	6/19/2016	4	27	59	41.145219	-124.943348	1894.1	cam1_20160619042656.png
mussels and polychaetes, some alive and some dead	6/19/2016	4	29	42	41.145237	-124.943341	1894.1	cam1_20160619042439.png
large scale worm crawling quickly on top of the mussel	6/19/2016	4	30	7	41.145259	-124.943326	1894.1	cam1_20160619043239.png
many of these polychaetes moving all over	6/19/2016	4	31	9	41.145255	-124.943323	1894.0	cam1_20160619043239.png
yellow husk-like features are old egg towers from snails	6/19/2016	4	32	18	41.145222	-124.943373	1893.3	cam1_20160619043210.png
large fly trap anemone	6/19/2016	4	33	15	41.145201	-124.943378	1893.3	cam1_20160619043235.png
white microbial mat, very small	6/19/2016	4	33	38	41.145228	-124.943383	1893.4	cam1_20160619043235.png
long skinny tube worms	6/19/2016	4	33	47	41.145230	-124.943389	1893.4	cam1_20160619043235.png
fascinating site, evidence of past and current seepage - excellent view of the canyon walls	6/19/2016	4	34	23	41.145245	-124.943409	1891.6	cam1_20160619043245.png
planning to start the journey up soon	6/19/2016	4	34	37	41.145245	-124.943414	1890.2	cam1_20160619043245.png
coming up now!! last dive.	6/19/2016	4	38	48	41.145006	-124.943457	1857.5	cam1_20160619043249.png

Table 8: Bubble streams discovered in the EM302 water column data

Bubble stream positions deciphered by Susan G. Merle using the Fledermaus FMMidwater program.

Position type refers to the method used to pin-point the bubble stream location on the seafloor. Zm is seafloor depth. Rise is the height the plume rises above the seafloor as gleaned from the midwater beamfan data.

Longitude	Latitude	Position type	Fledermaus project	EM302 line #	time (UTC)	Zm	Rise	Description
-125.458971	48.161292	3d cluster and pts	0601.fmproj	0006_20160602_000320	00:58 - 00:58:56	126	75	
-125.459232	48.161535	3d cluster and pts	0601.fmproj	0006_20160602_000320	00:58 - 00:58:56	125	75	
-125.459457	48.161088	3d cluster and pts	0601.fmproj	0006_20160602_000320	00:58 - 00:58:56	127	75	
-125.554246	48.102324	3d cluster and pts	0601.fmproj	0007_20160602_010321	01:35:57 - 01:37:21	150	100	
-125.553938	48.102144	3d cluster and pts	0601.fmproj	0007_20160602_010321	01:35:57 - 01:37:21	150	100	
-125.553772	48.101868	3d cluster and pts	0601.fmproj	0007_20160602_010321	01:35:57 - 01:37:21	150	100	
-125.553950	48.101994	3d cluster and pts	0601.fmproj	0007_20160602_010321	01:35:57 - 01:37:21	150	100	
-125.554403	48.102120	3d cluster and pts	0601.fmproj	0007_20160602_010321	01:35:57 - 01:37:21	150	100	
-125.554110	48.102134	3d cluster and pts	0601.fmproj	0007_20160602_010321	01:35:57 - 01:37:21	150	100	
-125.554178	48.101680	3d cluster and pts	0601.fmproj	0007_20160602_010321	01:35:57 - 01:37:21	150	100	
-125.554251	48.101600	3d cluster and pts	0601.fmproj	0007_20160602_010321	01:35:57 - 01:37:21	150	100	
-125.554465	48.101600	3d cluster and pts	0601.fmproj	0007_20160602_010321	01:35:57 - 01:37:21	150	100	
-125.554749	48.101656	3d cluster and pts	0601.fmproj	0007_20160602_010321	01:35:57 - 01:37:21	150	100	
-125.554460	48.101190	3d cluster and pts	0601.fmproj	0007_20160602_010321	01:35:57 - 01:37:21	150	100	
-125.555750	48.101298	3d cluster and pts	0601.fmproj	0007_20160602_010321	01:35:57 - 01:37:21	150	100	
-125.556040	48.101301	3d cluster and pts	0601.fmproj	0007_20160602_010321	01:35:57 - 01:37:21	150	100	
-125.556067	48.101273	3d cluster and pts	0601.fmproj	0007_20160602_010321	01:35:57 - 01:37:21	150	100	
-125.555898	48.101145	3d cluster and pts	0601.fmproj	0007_20160602_010321	01:35:57 - 01:37:21	150	100	
-125.556147	48.101216	3d cluster and pts	0601.fmproj	0007_20160602_010321	01:35:57 - 01:37:21	150	100	
-125.774533	48.027352	3d cluster	0601.fmproj	0010_20160602_024837	03:17:12	996	450	to stbd - 2 bright but in sidelobe
-125.776079	48.026544	3d cluster and pts	0601.fmproj	0010_20160602_024837	03:17:29	986	540	
-125.804776	48.039525	3d cluster and pts	0601.fmproj	0010_20160602_024837	03:26:06 - 03:29:00	807	300	
-125.807884	48.040833	3d cluster and pts	0601.fmproj	0010_20160602_024837	03:26:06 - 03:29:00	772	240	
-125.808203	48.041314	3d cluster and pts	0602.fmproj	0000_20160602_142859	15:00:55	772	317	same as line10 in 0601.fmproj.
-125.805250	48.039468	3d cluster and pts	0602.fmproj	0000_20160602_142859	15:01:18	800	350	same as line10 in 0601.fmproj.
-125.666261	48.039342	3d cluster and pts	0602.fmproj	0001_20160602_152901	15:43:56	489	200	2 faint plumes in haze
-125.665718	48.039356	3d cluster and pts	0602.fmproj	0001_20160602_152901	15:43:56	485	80	
-125.699404	48.269999	beamfan&stack	0603.fmproj	0000_20160603_035551	03:59:32	162	40	
-126.000300	48.110536	beamfan&stack	0603.fmproj	0004_20160603_053114	05:42:51	1552	1120	Nearly vertical seep
-126.015400	48.091464	beamfan&stack	0603.fmproj	0004_20160603_053114	05:50:42	1411	900	Bright, nearly vertical seep
-125.561309	48.108909	beamfan&stack	0604.fmproj	0004_20160604_091457	09:47:23	149	35	
-125.560091	48.108957	beamfan&stack	0604.fmproj	0004_20160604_091457	09:47:30	149	60	part of strait mega-plumes?
-125.560175	48.106573	beamfan&stack	0604.fmproj	0004_20160604_091457	09:47:40	147	45	stbd
-125.558600	48.105534	beamfan&stack	0604.fmproj	0004_20160604_091457	09:48:44	148	60	faint wispy
-125.556194	48.101362	beamfan&stack	0604.fmproj	0004_20160604_091457	09:50:17	150	60	
-125.555825	48.101501	beamfan&stack	0604.fmproj	0004_20160604_091457	09:50:17	150	50	
-125.555023	48.100706	beamfan&stack	0604.fmproj	0004_20160604_091457	09:50:37	149	50	brighter
-125.552560	48.099262	beamfan&stack	0604.fmproj	0004_20160604_091457	09:51:21	149	60	

Longitude	Latitude	Position type	Fledermaus project	EM302 line #	time (UTC)	Zm	Rise	Description
-125.082905	47.631875	beamfan&stack	0604.fmproj	0009_20160604_123831	13:27:30	195	65	3+ bright seeps
-125.082698	47.632008	beamfan&stack	0604.fmproj	0009_20160604_123831	13:27:30	195	50	
-125.082253	47.632088	beamfan&stack	0604.fmproj	0009_20160604_123831	13:27:24	194	45	
-125.082526	47.632119	beamfan&stack	0604.fmproj	0009_20160604_123831	13:27:30	195	75	
-125.072029	47.620790	beamfan&stack	0604.fmproj	0009_20160604_123831	13:32:34	194	55	
-125.070393	47.619741	beamfan&stack	0604.fmproj	0009_20160604_123831	13:33:10	195	60	
-125.070381	47.619138	beamfan&stack	0604.fmproj	0009_20160604_123831	13:33:20	195	65	
-125.067989	47.618368	beamfan&stack	0604.fmproj	0009_20160604_123831	13:34:00	192	50	
-125.067141	47.618517	beamfan&stack	0604.fmproj	0009_20160604_123831	13:34:07	191	50	
-125.068226	47.617509	beamfan&stack	0604.fmproj	0009_20160604_123831	13:34:13	194	65	
-125.066160	47.615857	beamfan&stack	0604.fmproj	0009_20160604_123831	13:35:05	194	80	
-125.063873	47.612853	beamfan&stack	0604.fmproj	0009_20160604_123831	13:36:23	194	100	tall bright plume in stbd sidelobe
-125.062731	47.612692	beamfan&stack	0604.fmproj	0009_20160604_123831	13:36:40	193	95	
-125.044984	47.598115	beamfan&stack	0604.fmproj	0010_20160604_134335	13:44:13	192	55	
-125.046069	47.598286	beamfan&stack	0604.fmproj	0010_20160604_134335	13:43:57	193	60	
-125.045382	47.597574	beamfan&stack	0604.fmproj	0010_20160604_134335	13:44:18	192	50	
-125.044098	47.597899	beamfan&stack	0604.fmproj	0010_20160604_134335	13:44:26	191	60	
-125.044819	47.596896	beamfan&stack	0604.fmproj	0010_20160604_134335	13:44:35	195	70	
-125.043564	47.596430	beamfan&stack	0604.fmproj	0010_20160604_134335	13:44:58	192	55	
-125.042266	47.594947	beamfan&stack	0604.fmproj	0010_20160604_134335	13:45:39	192	50	
-125.040145	47.594320	beamfan&stack	0604.fmproj	0010_20160604_134335	13:46:13	190	85	
-125.041184	47.593687	beamfan&stack	0604.fmproj	0010_20160604_134335	13:46:13	192	50	
-125.040463	47.593208	beamfan&stack	0604.fmproj	0010_20160604_134335	13:46:30	191	65	
-125.040402	47.592660	beamfan&stack	0604.fmproj	0010_20160604_134335	13:46:30	192	75	
-125.039195	47.593241	beamfan&stack	0604.fmproj	0010_20160604_134335	13:46:43	190	70	
-125.040177	47.592432	beamfan&stack	0604.fmproj	0010_20160604_134335	13:46:47	192	55	
-125.038900	47.593097	beamfan&stack	0604.fmproj	0010_20160604_134335	13:46:49	190	70	
-125.039623	47.592262	beamfan&stack	0604.fmproj	0010_20160604_134335	13:46:56	192	90	
-125.039330	47.591315	beamfan&stack	0604.fmproj	0010_20160604_134335	13:47:16	192	90	
-125.038071	47.590437	beamfan&stack	0604.fmproj	0010_20160604_134335	13:47:45	191	50	
-125.037531	47.590832	beamfan&stack	0604.fmproj	0010_20160604_134335	13:47:45	191	55	
-124.947268	47.458389	beamfan&stack	0605.fmproj	0002_20160605_040428	04:06:29	464	150	Quinault canyon rim
-124.946844	47.457018	beamfan&stack	0605.fmproj	0002_20160605_040428	04:06:56	472	100	faint plume to stbd
-124.899526	47.098425	beamfan&stack	0605.fmproj	0004_20160605_060428	06:10:26	151	30	
-124.899100	47.095899	beamfan&stack	0605.fmproj	0004_20160605_060428	06:11:21	152	45	
-124.899570	47.095548	beamfan&stack	0605.fmproj	0004_20160605_060428	06:11:26	152	55	
-124.899459	47.093828	beamfan&stack	0605.fmproj	0004_20160605_060428	06:12:02	152	80	
-124.900031	47.093184	beamfan&stack	0605.fmproj	0004_20160605_060428	06:12:14	152	50	
-124.899731	47.093081	beamfan&stack	0605.fmproj	0004_20160605_060428	06:12:17	152	50	
-124.899455	47.093032	beamfan&stack	0605.fmproj	0004_20160605_060428	06:12:18	153	45	
-124.900460	47.092412	beamfan&stack	0605.fmproj	0004_20160605_060428	06:12:29	152	55	
-124.900233	47.092431	beamfan&stack	0605.fmproj	0004_20160605_060428	06:12:37	151	50	
-124.899800	47.091685	beamfan&stack	0605.fmproj	0004_20160605_060428	06:12:45	153	50	
-124.899859	47.090886	beamfan&stack	0605.fmproj	0004_20160605_060428	06:13:02	153	75	
-124.898978	47.090837	beamfan&stack	0605.fmproj	0004_20160605_060428	06:13:04	153	55	
-124.927434	46.989540	beamfan&stack	0605.fmproj	0008_20160605_064544	06:56:57	160	60	2 plumes side by side stbd
-124.927443	46.989620	beamfan&stack	0605.fmproj	0008_20160605_064544	06:56:57	160	40	
-124.927330	46.990301	beamfan&stack	0605.fmproj	0008_20160605_064544	06:57:00	161	40	port

Longitude	Latitude	Position type	Fledermaus project	EM302 line #	time (UTC)	Zm	Rise	Description
-124.932187	46.957713	beamfan&stack	0605.fmproj	0009_20160605_070332	07:18:08	197	30	
-125.047804	46.628314	beamfan&stack	0605.fmproj	0020_20160605_120616	12:35:24	926	400	far to stbd big plume
-124.983549	46.861011	beamfan&stack	0605.fmproj	0021_20160605_130614	13:57:56	493	125	plumes
-124.980508	46.860645	beamfan&stack	0605.fmproj	0021_20160605_130614	13:57:56	488	130	
-124.981701	46.861051	beamfan&stack	0605.fmproj	0021_20160605_130614	13:58:03	489	160	
-124.982590	46.862742	beamfan&stack	0605.fmproj	0021_20160605_130614	13:58:34	492	160	
-124.983063	46.862794	beamfan&stack	0605.fmproj	0021_20160605_130614	13:58:34	494	170	
-124.982801	46.864132	beamfan&stack	0605.fmproj	0021_20160605_130614	13:59:03	496	120	
-124.939314	46.997165	beamfan&stack	0605.fmproj	0022_20160605_140613	14:49:43	153	40	
-124.939806	46.997154	beamfan&stack	0605.fmproj	0022_20160605_140613	14:49:43	152	40	
-124.939419	46.998059	beamfan&stack	0605.fmproj	0022_20160605_140613	14:50:06	152	25	
-124.929445	47.009819	beamfan&stack	0605.fmproj	0024_20160605_151754	15:29:06	160	15	
-124.939695	47.002681	beamfan&stack	0605.fmproj	0024_20160605_151754	15:33:31	154	40	
-124.939996	47.002721	beamfan&stack	0605.fmproj	0024_20160605_151754	15:33:35	153	80	
-124.939026	47.001623	beamfan&stack	0605.fmproj	0024_20160605_151754	15:33:39	151	70	
-124.973712	46.977757	beamfan&stack	0605.fmproj	0024_20160605_151754	15:48:29	248	60	
-124.995060	46.965605	beamfan&stack	0605.fmproj	0024_20160605_151754	15:56:13	251	85	
-124.943395	47.015739	beamfan&stack	0605.fmproj	0027_20160605_164722	16:49:45	158	50	
-124.943227	47.017311	beamfan&stack	0605.fmproj	0027_20160605_164722	16:50:11	160	45	
-124.943851	47.017377	beamfan&stack	0605.fmproj	0027_20160605_164722	16:50:07	158	50	
-124.942111	47.017920	beamfan&stack	0605.fmproj	0027_20160605_164722	16:50:30	160	70	
-124.941586	47.017873	beamfan&stack	0605.fmproj	0027_20160605_164722	16:50:33	162	30	
-124.933639	47.023574	beamfan&stack	0605.fmproj	0027_20160605_164722	16:53:06	233	80	
-124.923187	47.013003	beamfan&stack	0605.fmproj	0028_20160605_170001	17:11:18	171	55	
-124.935424	46.995515	beamfan&stack	0605.fmproj	0028_20160605_170001	17:18:01	155	45	
-124.972509	47.043068	beamfan&stack	0606.fmproj	0000_20160606_033631	03:53:43	485	90	
-124.972000	47.043131	beamfan&stack	0606.fmproj	0000_20160606_033631	03:53:40	466	80	
-124.912153	46.952285	beamfan&stack	0606.fmproj	0003_20160606_045050	05:00:19	173	25	
-124.969349	47.020690	beamfan&stack	0606.fmproj	0008_20160606_061252	06:22:31	177	75	
-124.967998	47.021128	beamfan&stack	0606.fmproj	0008_20160606_061252	06:22:55	174	75	
-125.072443	46.942879	beamfan&stack	0606.fmproj	0016_20160606_084252	09:20:38	1321	650	
-125.258797	46.726303	beamfan&stack	0606.fmproj	0021_20160606_110358	11:42:45	824	435	
-124.729064	46.290340	beamfan&stack	0606.fmproj	0027_20160606_152451	15:28:39	544	140	
-124.728750	46.290578	beamfan&stack	0606.fmproj	0027_20160606_152451	15:28:42	542	150	
-124.727764	46.291027	beamfan&stack	0606.fmproj	0027_20160606_152451	15:28:52	543	170	
-124.727654	46.289015	beamfan&stack	0606.fmproj	0027_20160606_152451	15:29:15	562	160	
-124.730744	46.284808	beamfan&stack	0606.fmproj	0027_20160606_152451	15:29:15	604	180	N rim
-124.649555	46.242148	beamfan&stack	0606.fmproj	0028_20160606_155828	15:58:56	840	300	N canyon floor - high plume - bright but in sidelobe
-124.639403	46.253946	beamfan&stack	0606.fmproj	0028_20160606_155828	15:59:05	833	310	
-124.637893	46.250506	beamfan&stack	0606.fmproj	0028_20160606_155828	16:00:03	844	400	S? canyon floor - high plume - bright but in sidelobe
-124.628998	46.250864	beamfan&stack	0606.fmproj	0028_20160606_155828	16:02:37	821	300	
-124.621654	46.251845	beamfan&stack	0606.fmproj	0028_20160606_155828	16:04:22	795	270	
-124.612161	46.244749	beamfan&stack	0606.fmproj	0028_20160606_155828	16:06:29	790	300	
-124.610526	46.243980	beamfan&stack	0606.fmproj	0028_20160606_155828	16:06:45	780	175	
-124.619934	46.251497	beamfan&stack	0606.fmproj	0029_20160606_160846	16:13:53	794	270	
-124.638737	46.253495	beamfan&stack	0606.fmproj	0029_20160606_160846	16:18:39	837	320	duplicate? Of 155905?
-124.649092	46.242508	beamfan&stack	0606.fmproj	0030_20160606_162206	16:26:56	850	400	canyon floor - bright and straight
-124.653174	46.223641	beamfan&stack	0606.fmproj	0031_20160606_163232	16:36:02	500	200	S Canyon rim 500m vents

Longitude	Latitude	Position type	Fledermaus project	EM302 line #	time (UTC)	Zm	Rise	Description
-124.656276	46.222879	beamfan&stack	0606.fmproj	0031_20160606_163232	16:36:41	494	300	
-124.657215	46.213157	beamfan&stack	0606.fmproj	0031_20160606_163232	16:42:08	517	130	
-124.643110	46.230567	beamfan&stack	0606.fmproj	0033_20160606_170955	17:31:02	722	255	
-124.636720	46.249720	beamfan&stack	0606.fmproj	0033_20160606_170955	17:38:48	845	400	canyon floor
-124.639390	46.253194	beamfan&stack	0606.fmproj	0033_20160606_170955	17:40:33	841	400	
-124.680094	46.164109	beamfan&stack	0606.fmproj	0036_20160606_182730	18:31:26	365	230	1-2 tall skinny flares
-124.681396	46.163281	beamfan&stack	0606.fmproj	0036_20160606_182730	18:31:48	357	210	2-3 tall skinny flares
-124.729144	46.125475	beamfan&stack	0606.fmproj	0037_20160606_184307	18:49:05	502	125	clump of plumes
-124.728815	46.125186	beamfan&stack	0606.fmproj	0037_20160606_184307	18:49:05	501	80	
-124.731125	46.125712	beamfan&stack	0606.fmproj	0037_20160606_184307	18:49:25	528	100	faint
-125.145187	45.358451	beamfan&stack	0606.fmproj	0054_20160606_021313	02:33:43	1247	800	Tall plume
-124.801246	45.993512	beamfan&stack	0607.fmproj	0001_20160607_115841	12:50:32	476	90	faint
-124.802186	45.995687	beamfan&stack	0607.fmproj	0001_20160607_115841	12:51:36	473	90	faint
-124.653443	46.223267	3d cluster	0608.fmproj	0000_20160608_155417	15:56:30	500	325	S rim - repeat??
-124.654454	46.223324	3d cluster	0608.fmproj	0000_20160608_155417	15:56:30	488	170	S rim - repeat??
-124.656381	46.222791	3d cluster	0608.fmproj	0000_20160608_155417	15:56:54	498	300	S rim - repeat??
-124.636400	45.934360	3d cluster	0608.fmproj	0001_20160608_165408	17:35:38	~186	~100	Nehalem - finish rise heights here and double check Z
-124.636590	45.933880	3d cluster	0608.fmproj	0001_20160608_165408	17:35:48	183	80	Nehalem - finish rise heights here and double check Z
-124.635900	45.932840	3d cluster	0608.fmproj	0001_20160608_165408	17:36:10	180	100	Nehalem - finish rise heights here and double check Z
-124.636700	45.932350	3d cluster	0608.fmproj	0001_20160608_165408	17:36:20	182	40	Nehalem - finish rise heights here and double check Z
-124.633729	45.895096	3d cluster	0608.fmproj	0002_20160608_174908	17:49:07	172	60	a few faint plumes stbd
-124.632140	45.896600	3d cluster	0608.fmproj	0003_20160608_180120	18:01:00	170	50	Nehalem - finish rise heights here and double check Z
-124.632840	45.896560	3d cluster	0608.fmproj	0003_20160608_180120	18:02:04	172	90	BIG-Nehalem - finish rise heights here and double check Z
-124.633980	45.895880	3d cluster	0608.fmproj	0003_20160608_180120	18:02:38	175	85	Nehalem - finish rise heights here and double check Z
-124.637520	45.894350	3d cluster	0608.fmproj	0003_20160608_180120	18:04:24	187	90	Nehalem - finish rise heights here and double check Z
-124.637990	45.893750	3d cluster	0608.fmproj	0003_20160608_180120	18:04:24	188	120	Nehalem - finish rise heights here and double check Z
-124.639450	45.892550	3d cluster	0608.fmproj	0003_20160608_180120	18:05:09	190	90	BIG-Nehalem - finish rise heights here and double check Z
-124.639760	45.892010	3d cluster	0608.fmproj	0003_20160608_180120	18:05:20	198	120	Nehalem - finish rise heights here and double check Z
-124.640850	45.890870	3d cluster	0608.fmproj	0003_20160608_180120	18:05:55	190	95	MULTIPLE-Nehalem check rise heights
-124.641420	45.891590	3d cluster	0608.fmproj	0003_20160608_180120	18:05:55	191	100	MULTIPLE-Nehalem check rise heights
-124.640060	45.890600	3d cluster	0608.fmproj	0003_20160608_180120	18:05:55	186	95	MULTIPLE-Nehalem check rise heights
-124.641600	45.890800	3d cluster	0608.fmproj	0003_20160608_180120	18:06:12	191	95	Nehalem check rise heights
-124.644580	45.875300	3d cluster	0608.fmproj	0007_20160608_184548	18:52:02	192		
-124.644870	45.876220	3d cluster	0608.fmproj	0007_20160608_184548	18:52:22	191		
-124.635820	45.887570	3d cluster	0608.fmproj	0009_20160608_190921	19:11:21	177		BIG-BEST-Nehalem - finish rise heights here and double check Z
-124.636710	45.887130	3d cluster	0608.fmproj	0009_20160608_190921	19:11:41	173		BIG-BEST-Nehalem - finish rise heights here and double check Z
-124.637180	45.886490	3d cluster	0608.fmproj	0009_20160608_190921	19:12:03	172		BIG-BEST-Nehalem - finish rise heights here and double check Z
-124.637800	45.886010	3d cluster	0608.fmproj	0009_20160608_190921	19:12:24	172		BIG-BEST-Nehalem - finish rise heights here and double check Z
-124.638910	45.885600	3d cluster	0608.fmproj	0009_20160608_190921	19:12:50	171		BIG-BEST-Nehalem - finish rise heights here and double check Z
-124.641520	45.884640	3d cluster	0608.fmproj	0009_20160608_190921	19:13:53	182		BIG-BEST-Nehalem - finish rise heights here and double check Z

Longitude	Latitude	Position type	Fledermaus project	EM302 line #	time (UTC)	Zm	Rise	Description
-124.641750	45.883980	3d cluster	0608.fmproj	0009_20160608_190921	19:14:11	182		BIG-BEST-Nehalem - finish rise heights here and double check Z
-124.642960	45.883970	3d cluster	0608.fmproj	0009_20160608_190921	19:14:11	187		BIG-BEST-Nehalem - finish rise heights here and double check Z
-124.661368	45.864809	3d cluster	0608.fmproj	0010_20160608_192340	19:26:53	202	100	Nehalem
-124.632143	45.877076	3d cluster	0608.fmproj	0011_20160608_193115	19:42:34	184	100	Nehalem
-125.024182	45.501520	midwater pos	0608-0609-the-rest	0023_20160609_003319	00:48:16	1630	1000	Deep bright plume
-125.015405	45.496940	midwater pos	0608-0609-the-rest	0023_20160609_003319	00:47:37	1650	950	Deep bright plume
-125.101801	45.443786	midwater pos	0608-0609-the-rest	0025_20160609_013252	01:41:57	1642	970	Deep bright plume Kulm Plume
-125.107750	45.440198	midwater pos	0608-0609-the-rest	0025_20160609_013252	01:43:14	1640	990	
-125.198585	45.607347	midwater pos	0608-0609-the-rest	0031_20160609_043148	04:33:13	1275	650	faint plume to port - hazy data. Position is not that great due to haze in data.
-125.240320	45.814388	midwater pos	0608-0609-the-rest	0035_20160609_061607	06:20:50	1236	575	bright to port - hazy data
-125.318828	45.902035	midwater pos	0608-0609-the-rest	0037_20160609_064325	07:17:20	1154	570	bright to stbd - hazy data
-125.320658	45.904726	midwater pos	0608-0609-the-rest	0037_20160609_064325	07:18:38	1142	600	brighter to stbd
-124.599858	46.230614	midwater pos	0608-0609-the-rest	0053_20160609_142942	15:04:30	780	270	tall and skinny
-124.568345	46.235346	midwater pos	0608-0609-the-rest	0055_20160609_153146	15:39:52	734	235	bright
-124.563599	46.235260	midwater pos	0608-0609-the-rest	0055_20160609_153146	15:41:04	730	240	tall and bright
-124.488263	46.238261	midwater pos	0608-0609-the-rest	0056_20160609_160624	16:17:19	587	125	
-124.485477	46.239602	midwater pos	0608-0609-the-rest	0056_20160609_160624	16:17:23	580	120	
-124.484850	46.241581	midwater pos	0608-0609-the-rest	0056_20160609_160624	16:17:55	560	165	bright
-124.487987	46.240455	midwater pos	0608-0609-the-rest	0056_20160609_160624	16:17:57	577	155	
-124.491858	46.240087	midwater pos	0608-0609-the-rest	0056_20160609_160624	16:18:17	576	85	bright
-124.489732	46.241388	midwater pos	0608-0609-the-rest	0056_20160609_160624	16:18:26	573	130	
-124.492743	46.247993	midwater pos	0608-0609-the-rest	0056_20160609_160624	16:20:55	541	110	
-124.475014	46.023533	midwater pos	0609.fmproj	0002_20160609_215856	22:24:19	128	70	
-124.480250	46.021917	midwater pos	0609.fmproj	0002_20160609_215856	22:27:15	148	75	
-124.476802	46.024480	midwater pos	0609.fmproj	0002_20160609_215856	22:24:37	147	80	
-124.496193	46.013910	midwater pos	0609.fmproj	0002_20160609_215856	22:40:52	151	65	
-124.575192	45.950136	midwater pos	0609.fmproj	0004_20160609_235856	00:18:06	147	40	
-125.174010	45.942189	midwater pos	0610.fmproj	0010_20160610_062157	07:12:15	1365	650	Big and bright and deep (0000 repeat of nehalem data)
-125.176729	45.942985	midwater pos	0610.fmproj	0010_20160610_062157	07:12:45	1368	650	Big and bright and deep
-124.889801	45.702270	midwater pos	0610.fmproj	0029_20160610_163102	17:06:58	1019	455	Big and bright and deep
-124.889862	45.702809	midwater pos	0610.fmproj	0029_20160610_163102	17:07:04	1018	540	Big and bright and deep
-124.884330	45.702758	midwater pos	0610.fmproj	0029_20160610_163102	17:08:13	1028	480	
-124.889938	45.702722	midwater pos	0610.fmproj	0031_20160610_173048	17:30:58	1010	550	
-124.888906	45.702860	midwater pos	0610.fmproj	0031_20160610_173048	17:31:12	1014	575	
-124.884660	45.703757	midwater pos	0610.fmproj	0031_20160610_173048	17:32:08	1014	355	
-124.884290	45.703886	midwater pos	0610.fmproj	0031_20160610_173048	17:32:17	1028	365	big plumes
-124.644239	45.887637	midwater pos	0611.fmproj	0000_20160611_143413	14:34:51	192	60	Nehalem area
-124.698485	45.826500	midwater pos	0611.fmproj	0000_20160611_143413	15:08:50	268	125	faint to stbd
-124.703047	46.085926	midwater pos	0611.fmproj	0005_20160611_171740	17:41:26	232	65	faint to stbd (line 6 plume is a repeat)
-124.656440	46.222484	midwater pos	0611.fmproj	0007_20160611_184006	18:42:04	494	425	very tall skinny 500m S AC plume. Bright - not a repeat
-124.655551	46.221687	midwater pos	0611.fmproj	0007_20160611_184006	18:41:51	498	255	very tall skinny 500m S AC plume. Bright - not a repeat
-124.654377	46.222679	midwater pos	0611.fmproj	0007_20160611_184006	18:42:23	487	375	very tall skinny 500m S AC plume. Bright - not a repeat
-124.653588	46.223023	midwater pos	0611.fmproj	0007_20160611_184006	18:42:35	502	430	very tall skinny 500m S AC plume. Bright - not a repeat
-124.666116	46.224842	midwater pos	0611.fmproj	0007_20160611_184006	18:47:07	653	200	more faint - W of AC 500m site

Longitude	Latitude	Position type	Fledermaus project	EM302 line #	time (UTC)	Zm	Rise	Description
-124.650168	46.242131	midwater pos	0612-pt1.fmproj	0000_20160612_091317	09:21:15	860	385	not ID'd earlier S AC canyon floor
-124.649662	46.242327	midwater pos	0612-pt1.fmproj	0000_20160612_091317	09:26:12	861	425	not ID'd earlier S AC canyon floor
-124.649600	46.242658	midwater pos	0612-pt1.fmproj	0000_20160612_091317	09:27:16	859	400	not ID'd earlier S AC canyon floor
-124.807281	45.980745	midwater pos	0612-pt1.fmproj	0003_20160612_113502	11:37:38	518	180	very faint plume in stbd
-124.893480	45.933361	midwater pos	0612-pt1.fmproj	0004_20160612_115313	12:10:15 - 12:10:34	706	315	excursion to W of 500m contour. 1 - 2? Plumes
-124.776137	45.723413	midwater pos	0612-pt1.fmproj	0007_20160612_135422	14:21:50	493	185	faint-ish - port side
-124.776760	45.722982	midwater pos	0612-pt1.fmproj	0007_20160612_135422	?	500	115	faint-ish "blob" of plumes
-124.766027	45.706452	midwater pos	0612-pt1.fmproj	0008_20160612_142908	14:29:47	500	185	a bit more intense
-124.759049	45.615440	midwater pos	0612-pt1.fmproj	0010_20160612_145706	15:01:22	488	100	
-124.758777	45.612079	midwater pos	0612-pt1.fmproj	0010_20160612_145706	15:02:27	480	75	small faint plume stbd
-124.700391	45.390459	midwater pos	0612-pt1.fmproj	0014_20160612_160635	16:30:01	475	120	Same plumes as in line 15-using this one. 3 plumes
-124.720642	45.305322	midwater pos	0612-pt1.fmproj	0017-20160612-170449	17:05:54	493	90	very faint wispy plumes to port
-124.708713	45.279750	midwater pos	0612-pt1.fmproj	0017-20160612-170449	17:16:57	483	110	port plume
-124.756124	45.167965	midwater pos	0612-pt1.fmproj	0017-20160612-170449	18:57:22	499	180	
-124.757000	45.169590	nadir position but accurate for central plume (same plume as in line 23)	0612-pt1.fmproj	0025_20160612_190303	19:03:11 - 19:04:03	504	~100	faint plumes rising from stbd to port. 2 plumes
-124.768193	45.137913	midwater pos central pos	0612-pt1.fmproj	0025_20160612_190303	19:17:36	470	240	Brighter reflectors. Tall straight on stbd little knoll (also seen end of line23 and on line24 turn) - 2-3 plumes
-124.743700	45.051230	nadir position - accurate	0612-pt1.fmproj	0027_20160612_193534	19:57:31 - 19:58:10	465	100	short faint plumes
-124.734041	45.033752	midwater pos	0612-pt1.fmproj	0028_20160612_200546	20:06:04	502	80	short fairly bright plume in stbd
-124.730770	45.028490	midwater pos	0612-pt1.fmproj	0029_20160612_200814	20:08:36	504	100	short straight fairly bright plume just stbd of nadir
-124.727185	45.024150	midwater pos	0612-pt1.fmproj	0029_20160612_200814	20:10:36	501	110	Brightest tallest plume seen at 20:10:45 - to port
-124.726626	45.023965	midwater pos	0612-pt1.fmproj	0029_20160612_200814	20:10:44	505	155	Brightest tallest plume seen at 20:10:45 - to port
-124.727215	45.015056	midwater pos	0612-pt1.fmproj	0029_20160612_200814	20:14:15	508	100	stbd plume
-124.721591	45.003367	midwater pos	0612-pt1.fmproj	0029_20160612_200814	20:19:22	498	60	3? PLUMES RISE INTO TH E THERMOCLINE
-124.721752	45.003340	midwater pos	0612-pt1.fmproj	0030_20160612_291908	20:19:22	505	75m	3 short plumes just stbd of nadir - Fade into haze layer
-124.719638	45.003439	midwater pos	0612-pt1.fmproj	0030_20160612_291908	20:19:22	499	75	1 short to port
-124.885115	44.913903	midwater pos	0612-pt1.fmproj	0043_20160612_225115	22:58:26	504	85	faint short plume just port of nadir
-124.910871	44.909449	midwater pos	0612-pt1.fmproj	0043_20160612_225115	23:06:27	504	145	short faint plumes to port
-124.924400	44.834254	midwater pos	0612-pt1.fmproj	0047_20160612_234616	00:03:42	491	165	2+ plumes
-124.924460	44.834690	midwater pos	0612-pt1.fmproj	0047_20160612_234616	00:03:42	495	170	2+ plumes
-124.880858	44.801072	midwater pos	0612-pt1.fmproj	0048_20160613_002456	00:38:46 - 00:38:53	347	130	short faint plume(s) to stbd
-124.879261	44.794222	midwater pos	0612-pt1.fmproj	0049_20160613_004139	00:41:52	305	140	several plumes; faint but quite visible.
-124.878848	44.794284	midwater pos	0612-pt1.fmproj	0049_20160613_004139	00:41:43 - 00:42:04	297	140	several plumes; faint but quite visible.
-124.867888	44.594097	midwater pos	0612-pt1.fmproj	0060_20160613_015428	02:25:21	501	160	faint stbd
-124.864756	44.594212	midwater pos	0612-pt1.fmproj	0060_20160613_015428	02:25:33	500	115	faint port
-124.897478	44.553028	midwater pos	0612-pt1.fmproj	0062_20160613_024603	02:57:05	505	100	faint port
-124.897701	44.553747	midwater pos	0612-pt1.fmproj	0062_20160613_024603	02:57:11	511	90	faint port
-124.915943	44.455658	midwater pos	0612-pt1.fmproj	0067_20160613_042726	04:30:54	449	160	
-124.916443	44.455372	midwater pos	0612-pt1.fmproj	0062_20160613_024603	04:31:01	448	150	
-124.893775	44.389376	midwater pos	0612-pt1.fmproj	0068_20160613_050000	05:06:54	509	100	bright-ish short plume
-124.917224	44.389308	midwater pos	0612-pt1.fmproj	0068_20160613_050000	05:12:13	527	65	bright-ish short plume
-124.916991	44.389788	midwater pos	0612-pt1.fmproj	0068_20160613_050000	05:12:13	527	45	bright-ish short plume

Longitude	Latitude	Position type	Fledermaus project	EM302 line #	time (UTC)	Zm	Rise	Description
-124.918224	44.388666	midwater pos	0612-pt1.fmproj	0068_20160613_050000	05:12:23	529	55	
-124.881416	44.326394	midwater pos	0612-pt1.fmproj	0070_20160613_061537	06:22:07	512	75	
-124.882222	44.327206	midwater pos	0612-pt1.fmproj	0070_20160613_061537	06:22:10	519	90	
-124.933607	44.297134	midwater pos	0612-pt1.fmproj	0072_20160613_064049	06:43:17	500	115	
-124.935321	44.297041	midwater pos	0612-pt1.fmproj	0072_20160613_064049	06:43:29	505	125	
-124.937280	44.297154	midwater pos	0612-pt1.fmproj	0072_20160613_064049	06:43:34	522	200	
-124.936401	44.294896	midwater pos	0612-pt1.fmproj	0072_20160613_064049	06:44:28	508	100	
-124.952822	44.284869	midwater pos	0612-pt1.fmproj	0073_20160613_064807	06:52:18	497	150	several plumes to port 2+
-124.960869	44.286083	midwater pos	0612-pt1.fmproj	0074_20160613_065521	06:56:20	487	100	wispy plumes to port
-124.968716	44.274934	midwater pos	0612-pt1.fmproj	0074_20160613_065521	07:01:43	500	130	
-124.969756	44.275103	midwater pos	0612-pt1.fmproj	0074_20160613_065521	07:01:43	513	95	
-124.970884	44.269702	midwater pos	0612-pt1.fmproj	0074_20160613_065521	07:03:50	487	135	
-124.971750	44.269197	midwater pos	0612-pt1.fmproj	0074_20160613_065521	07:04:07	504	250	
-124.972153	44.269263	midwater pos	0612-pt1.fmproj	0074_20160613_065521	07:04:07	502	250	
-124.973829	44.269540	midwater pos	0612-pt1.fmproj	0074_20160613_065521	07:04:05	508	65	
-124.980626	44.257362	midwater pos	0612-pt1.fmproj	0074_20160613_065521	07:09:11	495	200?	Bright to stbd
-124.979880	44.257273	midwater pos	0612-pt1.fmproj	0074_20160613_065521	07:09:12	487	100	Bright
-124.979778	44.255531	midwater pos	0612-pt1.fmproj	0075_20160613_070920	07:09:44	478	120	Continuation of previous plumes - wisps from previous location.
-124.975930	44.252232	midwater pos	0612-pt1.fmproj	0075_20160613_070920	07:11:31	496	120	
-124.972726	44.252415	midwater pos	0612-pt1.fmproj	0076_20160613_071137	07:12:31	502	140	Bright and big - bending
-124.972287	44.251081	midwater pos	0612-pt1.fmproj	0076_20160613_071137	07:12:52	512	120	
-124.972287	44.251081	midwater pos	0612-pt1.fmproj	0076_20160613_071137	07:12:52	510	115	
-124.969883	44.252515	midwater pos	0612-pt1.fmproj	0076_20160613_071137	07:13:26	506	195	
-124.969722	44.252840	midwater pos	0612-pt1.fmproj	0076_20160613_071137	07:13:26	505	190	
-124.960092	44.248641	midwater pos	0612-pt1.fmproj	0076_20160613_071137	07:17:25	505	155	Bright and big - bending
-124.958389	44.248223	midwater pos	0612-pt1.fmproj	0076_20160613_071137	07:18:04	503	205	
-124.958236	44.248425	midwater pos	0612-pt1.fmproj	0076_20160613_071137	07:18:06	497	190	
-124.957683	44.249033	midwater pos	0612-pt1.fmproj	0076_20160613_071137	07:18:14	490	140	
-124.957400	44.248094	midwater pos	0612-pt1.fmproj	0076_20160613_071137	07:18:25	498	130	
-124.957379	44.248707	midwater pos	0612-pt1.fmproj	0076_20160613_071137	07:18:21	492	110	2 plumes far to port
-124.955975	44.247427	midwater pos	0612-pt1.fmproj	0076_20160613_071137	07:19:00	493	130	
-124.956065	44.247100	midwater pos	0612-pt1.fmproj	0076_20160613_071137	07:19:00	495	100	
-124.955291	44.246336	midwater pos	0612-pt1.fmproj	0076_20160613_071137	07:19:21	497	85	
-124.994899	44.222378	midwater pos	0612-pt1.fmproj	0080_20160613_072612	07:39:45	492	120	
-124.995340	44.221797	midwater pos	0612-pt1.fmproj	0080_20160613_072612	07:40:01	486	120	several plumes
-124.996126	44.221773	midwater pos	0612-pt1.fmproj	0080_20160613_072612	07:40:14	489	85	
-124.995742	44.221453	midwater pos	0612-pt1.fmproj	0080_20160613_072612	07:40:11	484	75	
-124.996706	44.221673	midwater pos	0612-pt1.fmproj	0080_20160613_072612	07:40:24	490	100	two? Plumes
-124.997031	44.221761	midwater pos	0612-pt1.fmproj	0080_20160613_072612	07:40:28	490	100	
-125.007680	44.196747	midwater pos	0612-pt1.fmproj	0084_20160613_085241	09:02:23	507	70	
-125.008411	44.196893	midwater pos	0612-pt1.fmproj	0084_20160613_085241	09:02:22	514	105	
-125.007591	44.196410	midwater pos	0612-pt1.fmproj	0084_20160613_085241	09:02:32	507	115	
-124.977472	44.059152	midwater pos	0612-pt1.fmproj	0095_20160613_100818	10:08:48	506	105	
-124.977642	44.058286	midwater pos	0612-pt1.fmproj	0095_20160613_100818	10:08:59	510	70	
-124.971793	44.055676	midwater pos	0612-pt1.fmproj	0095_20160613_100818	10:11:23	540	180	big bright tall straight in fan
-124.969583	44.056118	midwater pos	0612-pt1.fmproj	0095_20160613_100818	10:11:48	535	180	big bright tall straight in fan
-124.968916	44.055044	midwater pos	0612-pt1.fmproj	0095_20160613_100818	10:12:18	535	160	big bright tall straight in fan

Longitude	Latitude	Position type	Fledermaus project	EM302 line #	time (UTC)	Zm	Rise	Description
-124.968392	44.055466	midwater pos	0612-pt1.fmproj	0095_20160613_100818	10:12:18	531	200	big bright tall straight in fan
-124.968309	44.051938	midwater pos	0612-pt1.fmproj	0095_20160613_100818	10:13:27	524	180	big bright tall straight in fan
-124.967033	44.052891	midwater pos	0612-pt1.fmproj	0095_20160613_100818	10:13:29	524	190	big bright tall straight in fan
-124.968664	44.051046	midwater pos	0612-pt1.fmproj	0095_20160613_100818	10:13:35	534	185	big bright tall straight in fan
-124.966845	44.050898	midwater pos	0612-pt1.fmproj	0095_20160613_100818	10:14:08	525	180	big bright tall straight in fan
-124.966745	44.050285	midwater pos	0612-pt1.fmproj	0095_20160613_100818	10:14:23	522	195	large plume (2?)
-125.067207	43.916887	midwater pos	0612-pt1.fmproj	0109_20160613_155506	16:08:59	1220	640	tall and bright Bob plume?
-125.076457	43.911097	midwater pos	0612-pt1.fmproj	0109_20160613_155506	16:06:54	1221	715	bright and tall to stbd - Susan plumme)
-124.928332	43.877630	midwater pos	0612-pt1.fmproj	0110-20160613_161213	16:52:44	502	110	several plumes
-124.788896	43.790292	midwater pos	0612-pt1.fmproj	0118-20160613_175229	18:05:32	465	85	
-124.788367	43.789064	midwater pos	0612-pt1.fmproj	0118-20160613_175229	18:05:51	470	100	
-124.788353	43.788461	midwater pos	0612-pt1.fmproj	0118-20160613_175229	18:05:56	468	125	
-124.788366	43.787569	midwater pos	0612-pt1.fmproj	0118-20160613_175229	18:06:04	475	125	several plumes
-125.076142	43.911055	midwater pos	0612-pt1.fmproj	0118-20160613_175229	20:27:02	1220	690	copynofmbobmsusan
-125.075949	43.910822	midwater pos	0612-pt1.fmproj	0128_20160613_203415	20:43:35	1224	720	copynofmbobmsusan
-125.074926	43.910385	midwater pos	0612-pt1.fmproj	0129_20160613_213415	21:12:53	1236	645	copynofmbobmsusan
-125.034875	43.774044	midwater pos	0614.fmproj	0002_20160614_211907	21:22:58	1226	880	1 very bright large plume to stbd
-124.789372	43.789843	midwater pos	0614.fmproj	0010_20160614_232322	23:25:33	466	110	2? Seriesàà
-124.789059	43.789574	midwater pos	0614.fmproj	0010_20160614_232322	23:25:40	470	140	2? Seriesàà
-124.789270	43.788402	midwater pos	0614.fmproj	0010_20160614_232322	23:25:45	474	95	
-124.789085	43.787587	midwater pos	0614.fmproj	0010_20160614_232322	23:25:53	478	180	brighter higher
-124.787493	43.786479	midwater pos	0614.fmproj	0010_20160614_232322	23:26:58	479	120	
-124.787703	43.786031	midwater pos	0614.fmproj	0010_20160614_232322	23:26:58	479	130	
-124.701561	43.680090	midwater pos	0614.fmproj	0023_20160615_013024	01:35:57	479	125	
-124.703929	43.677761	midwater pos	0614.fmproj	0023_20160615_013024	01:36:23	455	130	2? Plumes
-124.895987	43.177944	midwater pos	0614.fmproj	0052_20160615_074324	08:06:34	450	55	
-124.898090	43.175848	midwater pos	0614.fmproj	0052_20160615_074324	08:07:24	466	140	stbd higher plume
-124.896075	43.175881	midwater pos	0614.fmproj	0052_20160615_074324	08:07:26	453	80	port (position between adjacent seeps) - 2 plumes
-124.898046	43.175331	midwater pos	0614.fmproj	0052_20160615_074324		467	80	near nadir - seep clump - ~3 seeps
-124.897527	43.174588	midwater pos	0614.fmproj	0052_20160615_074324	08:07:58	462	70	
-124.897568	43.171788	midwater pos	0614.fmproj	0052_20160615_074324	08:09:14	467	65	
-124.898100	43.170206	midwater pos	0614.fmproj	0052_20160615_074324	08:09:54	471	85	2 plumes
-124.895494	43.169326	midwater pos	0614.fmproj	0052_20160615_074324	08:10:19	460	170	tall - stbd
-124.897999	43.168630	midwater pos	0614.fmproj	0052_20160615_074324	08:10:36	476	100	2 plumes
-124.897512	43.167284	midwater pos	0614.fmproj	0052_20160615_074324	08:11:12	474	100	
-124.897245	43.166771	midwater pos	0614.fmproj	0052_20160615_074324	08:11:27	476	105	near nadir
-124.896520	43.166722	midwater pos	0614.fmproj	0052_20160615_074324	08:11:28	472	80	port small plumes - 2?
-124.899490	43.156848	midwater pos	0614.fmproj	0053_20160615_081433	08:15:47	511	115	double plume stbd
-124.898648	43.156073	midwater pos	0614.fmproj	0053_20160615_081433	08:16:07	506	135	
-124.898019	43.155993	midwater pos	0614.fmproj	0053_20160615_081433	0816:11	502	110	
-124.898913	43.155106	midwater pos	0614.fmproj	0053_20160615_081433	08:16:34	511	350	brightest tallest plume
-124.897969	43.153054	midwater pos	0614.fmproj	0053_20160615_081433	08:17:27	505	125	
-124.897969	43.153054	midwater pos	0614.fmproj	0053_20160615_081433	08:17:56	505	95	
-124.897646	43.150776	midwater pos	0614.fmproj	0053_20160615_081433	08:18:28	509	120	
-124.897533	43.150204	midwater pos	0614.fmproj	0053_20160615_081433	08:18:43	510	120	
-124.902139	43.038088	midwater pos	0614.fmproj	0053_20160615_081433	09:07:32	506	220	
-124.902270	43.038010	midwater pos	0614.fmproj	0053_20160615_081433	09:07:35	507	150	
-124.902808	43.035789	midwater pos	0614.fmproj	0053_20160615_081433	09:08:35	509	205	2 seeps stbd

Longitude	Latitude	Position type	Fledermaus project	EM302 line #	time (UTC)	Zm	Rise	Description
-124.902393	43.034339	midwater pos	0614.fmproj	0053_20160615_081433	09:09:11	511	180	
-124.902121	43.031909	midwater pos	0614.fmproj	0053_20160615_081433	09:10:16	513	150	short stout plume
-124.909663	43.035128	midwater pos	0614.fmproj	0054_20160615_091250	09:31:44	573	215	big and intense
-124.907684	43.035463	midwater pos	0614.fmproj	0054_20160615_091250	09:32:19	547	215	big and intense
-124.906626	43.037977	midwater pos	0614.fmproj	0054_20160615_091250	09:32:33	540	210	tall skinny fainter
-124.903762	43.025767	midwater pos	0614.fmproj	0055_20160615_093733	09:38:31	522	135	
-124.908919	43.016529	midwater pos	0614.fmproj	0055_20160615_093733	09:42:29	491	100	3 seep group to port
-124.909762	43.016916	midwater pos	0614.fmproj	0055_20160615_093733	09:42:32	497	80	to port
-124.911571	43.017699	midwater pos	0614.fmproj	0055_20160615_093733	09:42:43	506	90	single plume just to stbd of nadir
-124.911677	43.015880	midwater pos	0614.fmproj	0055_20160615_093733	09:43:18	498	100	
-124.914807	43.015967	midwater pos	0614.fmproj	0055_20160615_093733	09:43:58	506	110	
-124.914901	43.015825	midwater pos	0614.fmproj	0055_20160615_093733	09:44:01	507	135	
-124.914852	43.015070	midwater pos	0614.fmproj	0055_20160615_093733	09:44:14	504	125	
-124.916871	43.014640	midwater pos	0614.fmproj	0055_20160615_093733	09:44:49	506	105	
-124.916781	43.012798	midwater pos	0614.fmproj	0055_20160615_093733	09:45:23	497	100	2 plumes adjacent (mid-position)
-124.917848	43.013038	midwater pos	0614.fmproj	0055_20160615_093733	09:45:31	504	175	
-124.918897	43.012005	midwater pos	0614.fmproj	0055_20160615_093733	09:46:05	503	225	tall bright plume just to stbd
-124.919539	43.011843	midwater pos	0614.fmproj	0055_20160615_093733	09:46:16	506	135	
-124.919423	43.011333	midwater pos	0614.fmproj	0055_20160615_093733	09:46:25	500	205	
-124.919821	43.010762	midwater pos	0614.fmproj	0055_20160615_093733	09:46:40	498	175	bright
-124.919276	43.009642	midwater pos	0614.fmproj	0055_20160615_093733	09:46:53	489	75	small individdual
-124.918278	43.008941	midwater pos	0614.fmproj	0055_20160615_093733	09:46:54	477	160	group of longer plumes (still faint)
-124.919406	43.008627	midwater pos	0614.fmproj	0056_20160615_094708	09:47:24	483	150	group of stocky low intensity plumes
-124.919522	43.008498	midwater pos	0614.fmproj	0056_20160615_094708	09:47:31	478	140	
-124.921392	43.009020	midwater pos	0614.fmproj	0056_20160615_094708	09:47:35	496	155	
-124.920246	43.007424	midwater pos	0614.fmproj	0056_20160615_094708	09:48:10	483	100	group of stocky low intensity plumes
-124.922822	43.007310	midwater pos	0614.fmproj	0056_20160615_094708	09:48:24	500	140	
-124.923181	43.006972	midwater pos	0614.fmproj	0056_20160615_094708	09:48:34	501	150	
-124.924254	43.006023	midwater pos	0614.fmproj	0057_20160615_094843	09:49:05	508	100	to stbd
-124.921010	43.005093	midwater pos	0614.fmproj	0057_20160615_094843	09:49:05	480	150	to port
-124.924539	43.005100	midwater pos	0614.fmproj	0057_20160615_094843	09:49:40	510	240	tall faint plume to stbd
-124.923776	43.004275	midwater pos	0614.fmproj	0057_20160615_094843	09:49:46	498	70	near nadir
-124.924521	43.003445	midwater pos	0614.fmproj	0057_20160615_094843	09:50:10	503	80	faint near nadir
-124.923283	42.998925	midwater pos	0614.fmproj	0057_20160615_094843	09:51:52	480	145	group of faint plumes far to port (center plume pos)
-124.927449	42.996005	midwater pos	0614.fmproj	0057_20160615_094843	09:53:28	503	75	short fat little plumes to port of nadir (center pos)
-124.928203	42.992299	midwater pos	0614.fmproj	0057_20160615_094843	09:55:03	500	85	brighter - to port
-124.929310	42.990241	midwater pos	0614.fmproj	0057_20160615_094843	09:55:59	502	100	
-124.929697	42.988859	midwater pos	0614.fmproj	0057_20160615_094843	09:56:34	502	120	group (3 short vents - middle pos
-124.932232	42.986147	midwater pos	0614.fmproj	0057_20160615_094843	09:57:55	512	100	
-124.931559	42.985344	midwater pos	0614.fmproj	0057_20160615_094843	09:58:09	504	75	
-124.931671	42.983029	midwater pos	0614.fmproj	0057_20160615_094843	09:59:04	493	200	plume blob
-124.933216	42.983065	midwater pos	0614.fmproj	0057_20160615_094843	09:59:13	512	400	Bright high plumes to port
-124.937513	42.973063	midwater pos	0614.fmproj	0057_20160615_094843	10:03:50	520	150	
-124.936643	42.972356	midwater pos	0614.fmproj	0058_20160615_100354	10:04:34	509	190	thick hazy plumes to port
-124.936576	42.965319	midwater pos	0614.fmproj	0059_20160615_100514	10:07:51	515	125	
-124.907035	42.744325	midwater pos	0614.fmproj	0063_20160615_113109	11:43:51	547	135	port straight plume 3+? Plumes?
-124.901563	42.712543	midwater pos	0614.fmproj	0063_20160615_113109	11:54:38	621	300	3d point cluster and xyz (fainter of 2)

Longitude	Latitude	Position type	Fledermaus project	EM302 line #	time (UTC)	Zm	Rise	Description
-124.901507	42.712540	midwater pos	0614.fmproj	0063_20160615_113109		620		3d point cluster and xyz (fainter of 2)
-124.900979	42.710783	midwater pos	0614.fmproj	0063_20160615_113109	11:55:15	610	150	
-124.901484	42.710674	midwater pos	0614.fmproj	0063_20160615_113109	11:55:15	610	175	
-124.902011	42.710559	midwater pos	0614.fmproj	0063_20160615_113109	11:55:15	612	180	
-124.901541	42.710839	point cluster pos	0614.fmproj	0063_20160615_113109	11:55:17	616		3d point cluster and xyz
-124.902076	42.710661	point cluster pos	0614.fmproj	0063_20160615_113109	11:55:17	618		3d point cluster and xyz
-124.876848	42.664562	midwater pos	0614.fmproj	0063_20160615_113109	12:11:54 - 12:12:46	650	240	1 bright plume and a few faint plumes to port. Info from 3d object
-124.876880	42.664651	point cluster pos	0614.fmproj	0063_20160615_113109		654		3d point cluster and xyz
-124.876810	42.664570	point cluster pos	0614.fmproj	0063_20160615_113109		653		3d point cluster and xyz
-124.838367	42.456877	midwater pos	0614.fmproj	0066_20160615_132300	13:39:11	502	70	small plumes just to port of nadir
-124.836807	42.455749	midwater pos	0614.fmproj	0066_20160615_132300	13:39:30	500	150	larger plumes to outside port
-124.836055	42.455655	midwater pos	0614.fmproj	0066_20160615_132300		495	135	
-124.883096	42.442933	midwater pos	0614.fmproj	0069_20160615_144333	13:56:41	1282	590	large intense plume
-124.903707	42.207159	midwater pos	0614.fmproj	0073_20160615_163744	17:15:33	889	480	large intense plume on knoll
-124.904634	42.697508	cluster and fan	0616.fmproj	0000_20160616_142053	14:39:13 - 14:40:12	662	400	SW Coquille bank area (cluster and fan pos)
-124.913404	42.451574	cluster and fan	0616.fmproj	0002_20160616_1555325	16:18:02	1723	700	3d point cluster and fan
-124.970022	42.207047	midwater pos	0616.fmproj	0004_20160616_170322	17:55:33	1070	515	beam fan position (no 3d)
-125.000298	41.959074	midwater pos	0617.fmproj	0000_20160617_080125	08:34:42	766	445	far to port - sidelobe
-125.001344	41.957608	midwater pos	0617.fmproj	0000_20160617_080125	08:35:18	788	350	
-124.961613	41.929490	midwater pos	0617.fmproj	0002_20160617_085106	09:02:26	801	335	
-124.960994	41.931130	midwater pos	0617.fmproj	0002_20160617_085106	09:02:38	802	295	
-124.861260	41.929932	midwater pos	0617.fmproj	0002_20160617_085106	09:35:58	606	450	
-124.861275	41.930201	midwater pos	0617.fmproj	0002_20160617_085106	09:35:58	595	320	
-124.861250	41.929739	midwater pos	0617.fmproj	0002_20160617_085106	09:35:58	599	420	
-124.835596	41.892398	midwater pos	0617.fmproj	0007_20160617_104456	10:49:44	545	245	Bright
-124.838184	41.892313	midwater pos	0617.fmproj	0007_20160617_104456	10:50:32	548	285	
-124.838033	41.894413	midwater pos	0617.fmproj	0007_20160617_104456	10:50:16	546	280	
-124.837902	41.893028	midwater pos	0617.fmproj	0007_20160617_104456	10:50:24	540	265	
-124.883913	41.672020	midwater pos	0617.fmproj	0017_20160617_135903	14:12:54	708	350	Trehus plume: Single tall seep on small ridge. In stbd sidelobe
-124.944286	41.593900	midwater pos	0617.fmproj	0018_20160617_142637	14:51:29	1006	435	Double tall seep in port sidelobe.
-124.943964	41.593745	midwater pos	0617.fmproj	0018_20160617_142637	14:51:29	996	460	
-124.891062	41.429065	midwater pos	0617.fmproj	0023_20160617_165611	16:59:51	758	285	
-124.892770	41.427257	midwater pos	0617.fmproj	0023_20160617_165611	17:00:28	738	320	
-124.892350	41.426630	midwater pos	0617.fmproj	0023_20160617_165611	17:00:25	737	390	
-124.754881	40.670099	midwater pos	0619.fmproj	0014_20160619_115722	12:09:04	1367	1040	
-124.746710	40.667277	midwater pos	0619.fmproj	0014_20160619_115722	12:09:09	1178	800	Eel River plumes
-124.747719	40.668334	midwater pos	0619.fmproj	0014_20160619_115722	12:09:00	1141	600	Eel River plumes
-124.753419	40.665765	midwater pos	0619.fmproj	0014_20160619_115722	12:10:15	1488	1000	Eel River plumes
-124.759791	40.665075	midwater pos	0619.fmproj	0014_20160619_115722	12:11:02	1619	1010	Eel River plumes
-124.770343	40.663352	midwater pos	0619.fmproj	0014_20160619_115722	12:12:22	1606	875	Eel River plumes
-124.761357	40.652236	midwater pos	0619.fmproj	0014_20160619_115722	12:14:57	1793	840	Eel River plumes
-124.762712	40.646732	midwater pos	0619.fmproj	0014_20160619_115722	12:16:41	1860	1060	Eel River plumes
-124.789553	40.579044	midwater pos	0619.fmproj	0014_20160619_115722	12:39:21	1775	215	
-124.788321	40.576815	midwater pos	0619.fmproj	0014_20160619_115722	12:39:49	1785	200	
-124.780550	40.539177	midwater pos	0619.fmproj	0016_20160619_124536	12:55:00	1799	1000	

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-124.781597	40.538883	midwater pos	0619.fmproj	0016_20160619_124536	12:55:00	1791	1000	
-124.785638	40.537749	midwater pos	0619.fmproj	0016_20160619_124536	12:55:00	1815	1000	
-124.800259	40.538185	midwater pos	0619.fmproj	0016_20160619_124536	12:53:40	2050	1280	
-124.745501	40.323184	midwater pos	0619.fmproj	0018_20160619_132640	14:04:48	1179	610	