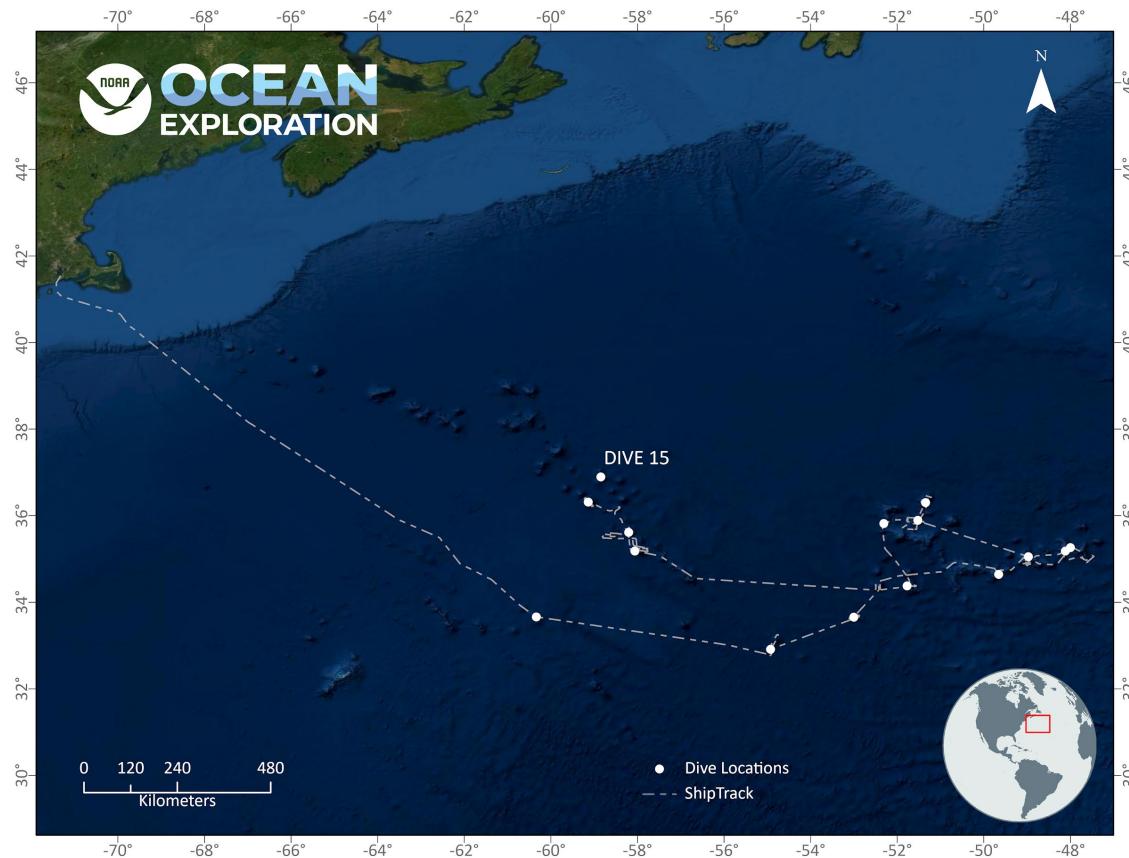


# ROV Dive Summary, EX-21-04, Dive 15, July 20, 2021

## General Location Map



## Dive Information

Site Name	Allegheny Seamount
General Area Descriptor	Easterm end of the New England Seamount Chain
Science Team Leads	Rhian Waller, Jason Chaytor
Expedition Coordinator	Kasey Cantwell, Kimberly Galvez (Expedition Coordinator in Training)
ROV Dive Supervisor	Chris Ritter
Mapping Lead	Shannon Hoy
Dive Purpose	Explore deep Allegheny seamount

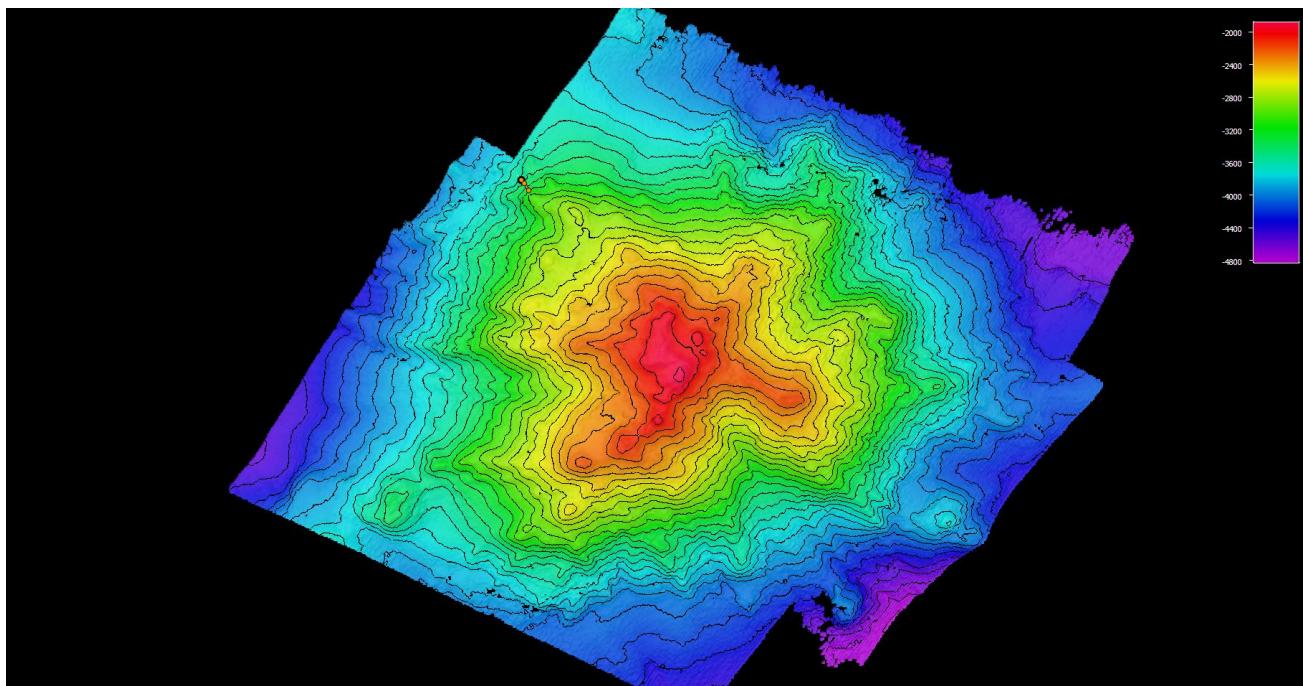
Was the dive restricted for Underwater Cultural Heritage?	No
ROV Dive Summary Data	<p>Dive Summary: EX2104_DIVE15 ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^ Dive Type: Normal</p> <p>In Water: 2021-07-20T13:00:38.203983 36.9321420421547 ; -58.86100929882872</p> <p>On Bottom: 2021-07-20T15:03:04.960454 36.93040644101286 ; -58.8585935839148</p> <p>Off Bottom: 2021-07-20T18:37:18.894673 36.92930048474664 ; -58.8574432995497</p> <p>Out Water: 2021-07-20T20:37:38.805163 36.91903531625265 ; -58.869469617860574</p> <p>Dive Duration: 7:37:0</p> <p>Bottom Time: 3:34:13</p> <p>Max Vehicle Depth: 3446.6 m</p> <p>Min Seafloor Depth: 3336.5 m</p> <p>Distance Travelled: 558.8 m</p>
Dive Description	<p>The geology and substrate morphology of the deep NW section of Allegheny Seamount was perhaps some of the most varied and diagnostic of the construction and destruction processes that have acted on the seamounts seen during the expedition so far. The dive began on a rock debris apron with a mix of sediment and both small and large (as big or bigger than the ROV) blocks of FeMn-coated volcanic material that had moved downslope, perhaps only a small distance. The patchy sediment in this area had distinct, but limited ripple development and appeared primarily biogenic/volcanoclastic in origin. Two samples were collected at the landing site, both of which were fully encrusted with FeMn. Moving upslope, the debris apron transitioned into a series of blocky sheet flow outcrops with sharp angles that formed a prominent step in the overall slope. Above this step, and for most of the remainder of the dive, the ROV crossed over mixed pavement, rock debris, sediment and tabular failure substrate on an overall moderate-gradient sloped bottom. Upslope propagating tabular failure of thin-to-moderate-thickness sheet flows produced an extremely dynamic bottom that switched between continuous pavement and blocky debris (with thin interspersed sediment), all of which provided suitable substrate to host extensive benthic communities. A third sample was collected in this region. Smoother FeMn crust textures were noted, suggesting a higher current flow regime, although botryoidal textures were present as well. For the last ~ 1 hour of the dive, a spectacular downslope-dipping outcrop of stacked sheet flows of different thicknesses was traversed, providing the opportunity to investigate an extensive cross section of the volcanic flow morphologies from a perspective only seen in a few small outcrops on other seamounts during the expedition. Differential erosion of the dipping layers created an extended overhang, with broken rock and sediment accumulated below.</p> <p>Biological observations were much more diverse than expected given the depth of this dive. Coral morphology sponges (<i>Stelodoryx</i> sp.) were send throughout the dive track and were particularly abundant towards the end of the dive. <i>Hylanomena</i> spp. sponges were also observed (both stalked and unstalked), barrel sponges, encrusting sponges and a collection of</p>

	<p>an unusual (not observed before on this expedition) creme colored sponge that is thought to be a hexactinellid. Multiple feeding traces were observed on rocks throughout the dive, and on one zoom we discovered a slit limpet similar to that discovered (and collected) in a previous dive. Corals were well represented, particularly by Anthomastus, which was observed in large aggregations (20+ individuals), and bamboo corals thought to be of the J1 clade. There were also potential <i>Bathygorgia</i> whip corals, <i>Staurophathes</i> black corals, small Primnoid, stoloniferous and Anthothelid octocorals, and a small clustered yellow anemone. In deep cracks within the final sloped overhang we observed a potentially new and unusual <i>Chrysogorgia</i> coral, however it was unable to be collected due to its position in the crack. Fish were sparse but we did observe one cusk eel and two <i>Synaphobranchus kaupi</i>. Overall this dive showed a surprising diversity for one of the deeper dives during this expedition.</p>
Notable Observations	Unusual J1 clade Jasonisis Bamboo corals Unusual Chrysogorgia
Community and habitat observations	Corals and Sponges - (Present) Chemosynthetic Community - (Absent) High biodiversity Community - (Present - for a deep community this was high biodiversity) Active Seep or Vent - (Absent) Extinct Seep or Vent - (Absent) Hydrates - (Absent)
CMECS Feature Type(s)	Rock, Sediment (Fine & coarse unconsolidated)
SeaTube Link (science annotation system)	<a href="https://data.oceannetworks.ca/SeaTubeV3?resourceTypeId=600&amp;resourceId=2383">https://data.oceannetworks.ca/SeaTubeV3?resourceTypeId=600&amp;resourceId=2383</a>

## Equipment Deployed

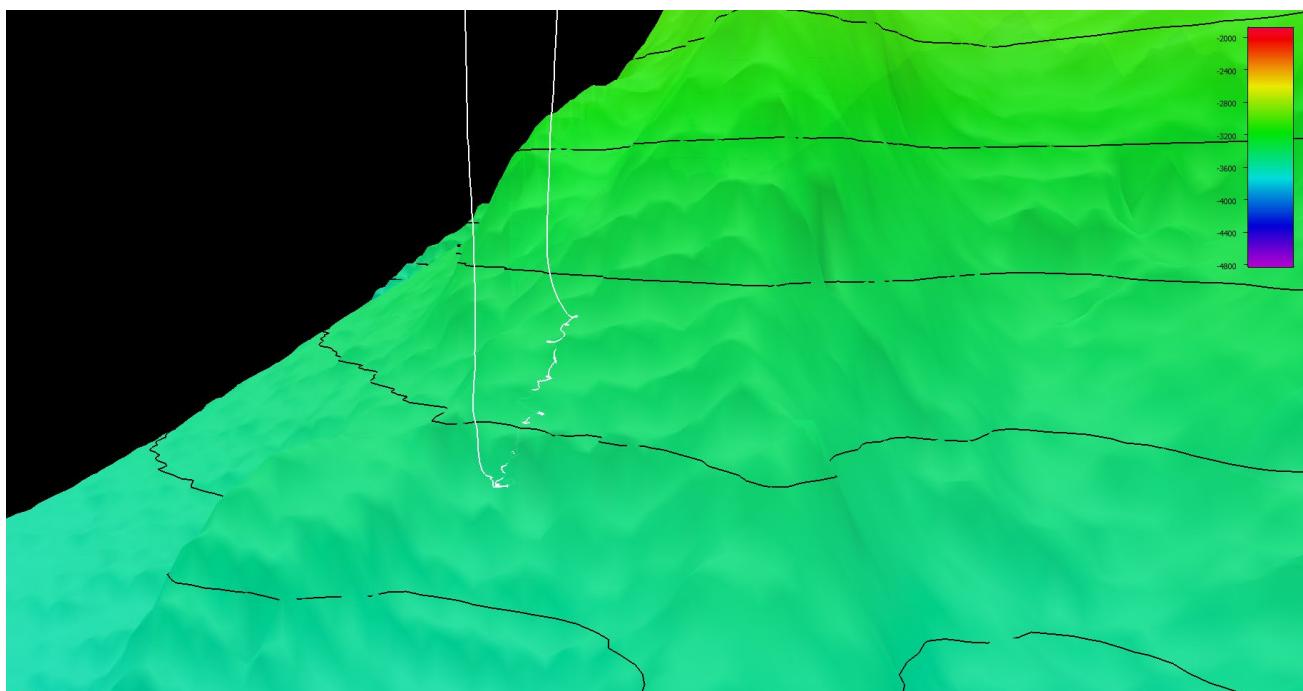
ROV	<i>Deep Discoverer</i>
Camera Platform	<i>Seirios</i>
ROV Measurements	The following ROV measurements, data streams and equipment are used on each ROV deployment: CTD, depth, scanning sonar, USBL position, altitude, heading, attitude, high-resolution cameras, low resolution cameras, manipulator arms, suction sampler, sample drawers and thrusters. The section below notes if any of these sensors were malfunctioning or not operational
Equipment Malfunctions	none

## Overview of Dive Site



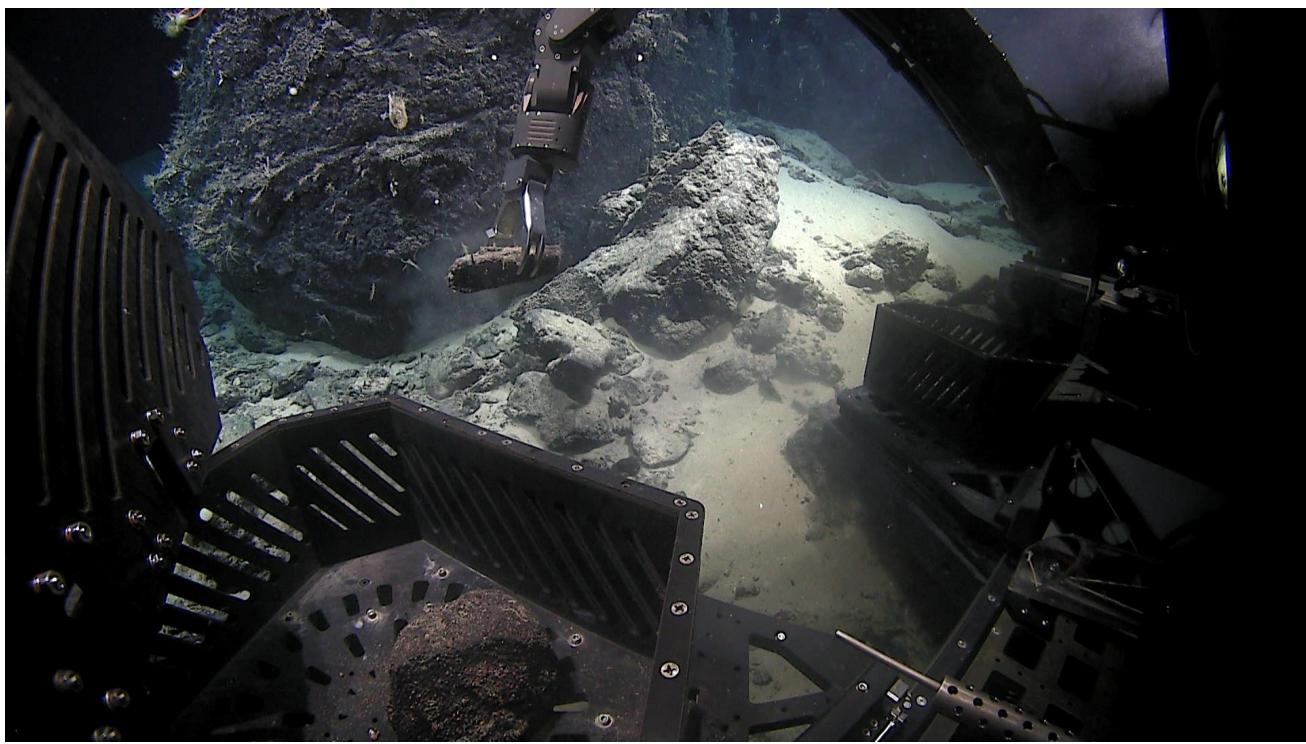
Smoothed ROV dive track (orange) on an overview bathymetry of the seamount, 3x vertical exaggeration.

## Close-up Map of Main Dive Site



Smoothed ROV dive track in white on 25x25 cell size bathymetry, 3x vertical exaggeration, depth in meters, 100 meter contours

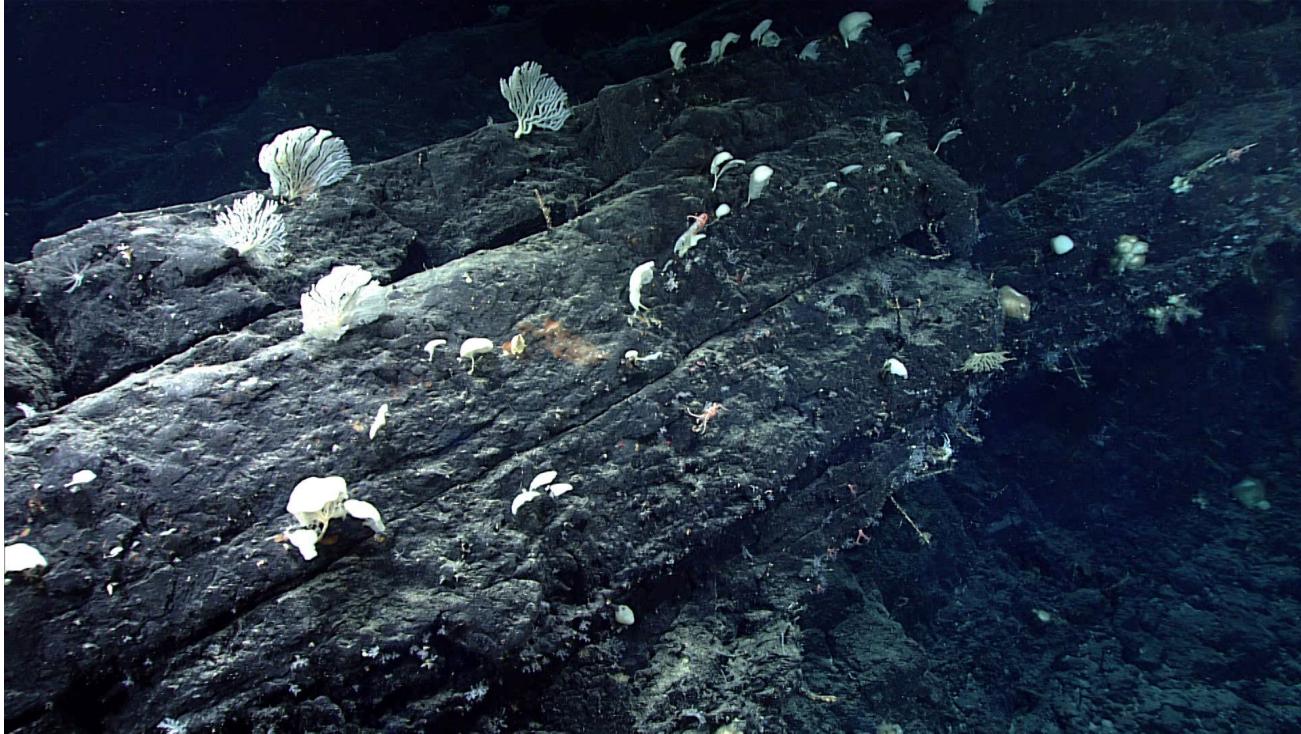
## Representative Photos of the Dive



[The second of two rock samples collected at the beginning of the dive being placed in the port rock box. These rock samples were taken from within a debris apron containing a wide range of displaced rocks]



[The large black cerianthid was seen in multiple locations during this dive, and was collected using the suction sampler.]



[Dipping sheet flow layers with multiple *Stelodoryx* sp. and other sponges. On the bottom side of the underhang we discovered brisingid (*Freyella* sp.) seastars, an unusual form of *Chrysogorgia*, stoloniferous octocoral, and an unusual yellow sponge that formed colonies]

## Samples Collected -



Sample ID	EX2104_D15_01G
Date (UTC)	20210720
Time (UTC)	151654
Depth (m)	3448.577
Latitude (decimal degrees)	36.930140
Longitude (decimal degrees)	-58.858000

Temp. (°C)	2.509
Field ID(s)	Large rock FeMn Coated
Comments	fissile (crumbly), botryoidal, underlying rock is coarse grained, not heavily cemented, tan-beige in color, 28 cm long, 13.5 cm wide, 8cm tall, potentially a hyaloclastite

Associates Sample ID	Field Identification	Count
NA	NA	NA



Sample ID	EX2104_D15_02G
Date (UTC)	20210720
Time (UTC)	151738
Depth (m)	3447.374
Latitude (decimal degrees)	36.930470
Longitude (decimal degrees)	-58.858290
Temp. (°C)	2.51

Field ID(s)	Flatter FeMn coated Rock
Comments	15cm long, 14cm wide, 11 cm tall, broken to pieces, potentially "altered basalt" with FeMn crust

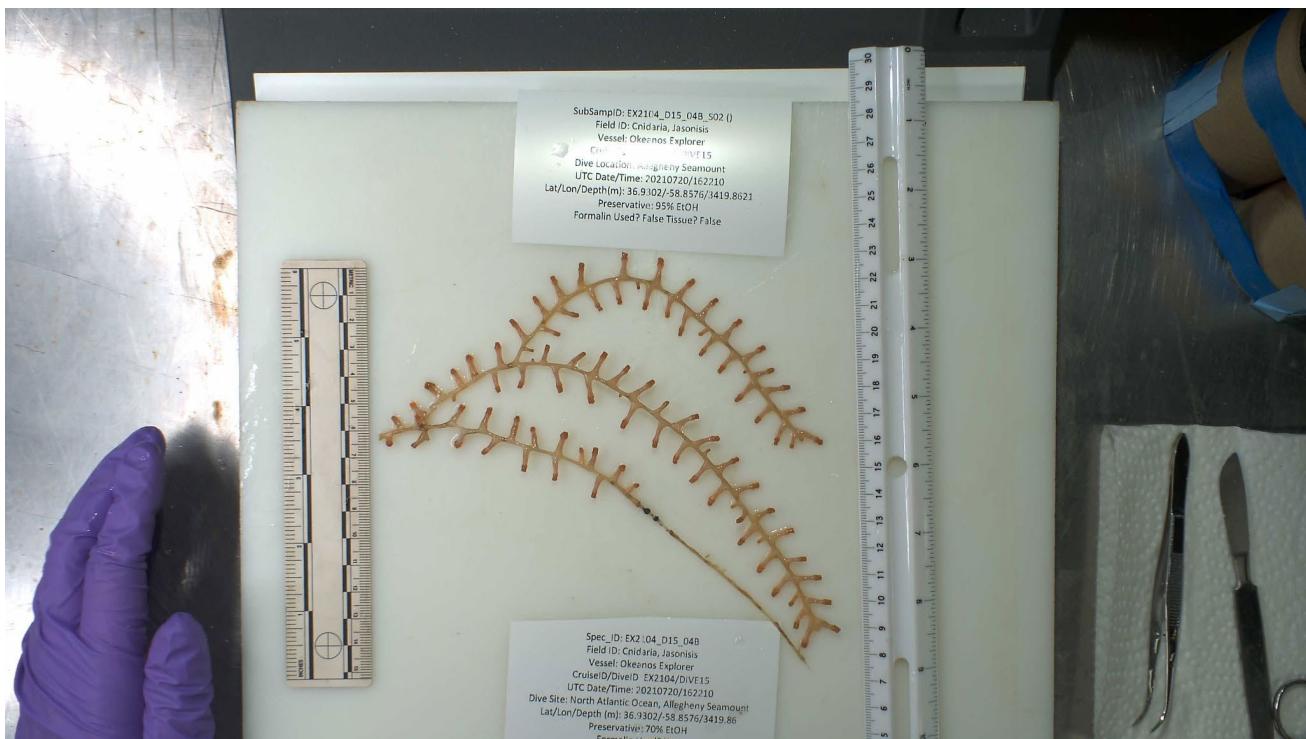
Associates Sample ID	Field Identification	Count
NA	NA	NA



Sample ID	EX2104_D15_03B
Date (UTC)	20210720
Time (UTC)	153355
Depth (m)	3443.716
Latitude (decimal degrees)	36.930340
Longitude (decimal degrees)	-58.858500
Temp. (°C)	2.512

Field ID(s)	Cerianthidae
Comments	black Cerianthidae, images taken with specimen suspended in water to show shape, most tentacles have detached, 7 cm

Associates Sample ID	Field Identification	Count
NA	NA	NA



Sample ID	EX2104_D15_04B
Date (UTC)	20210720
Time (UTC)	162210
Depth (m)	3419.862
Latitude (decimal degrees)	36.930210
Longitude (decimal degrees)	-58.857600
Temp. (°C)	2.584

Field ID(s)	Jasonisis
Comments	under 20 cm

Associates Sample ID	Field Identification	Count
NA	NA	NA



Sample ID	EX2104_D15_05G
Date (UTC)	20210720
Time (UTC)	171830
Depth (m)	3388.389
Latitude (decimal degrees)	36.929630
Longitude (decimal degrees)	-58.857640
Temp. (°C)	2.604

Field ID(s)	Rounded FeMn rock
Comments	20 cm long, 13cm wide, 10.5 cm tall, botryoidal, fissile, with encrusting worm tubes

Associates Sample ID	Field Identification	Count
NA	NA	NA



Sample ID	EX2104_D15_06B
Date (UTC)	20210720
Time (UTC)	174202
Depth (m)	3370.703
Latitude (decimal degrees)	36.929300

Longitude (decimal degrees)	-58.857680
Temp. (°C)	2.639
Field ID(s)	Hexactinellidae
Comments	soft and spongy, 20cm, sample was yellow and peach in color, ethanol turned pink in reaction to sample

Associates Sample ID	Field Identification	Count
NA	NA	NA

### Scientists Involved (provide name, email, affiliation)

First Name	Last Name	Email	Affiliation
Christopher	Mah	brisinga@gmail.com	Dept. Invertebrate Zoology, National Museum of Natural History
Cindy	Van Dover	clv3@duke.edu	Duke University
Dhugal	Lindsay	dhugal@jamstec.go.jp	JAMSTEC
Emily	Crum	emily.crum@noaa.gov	NOAA Ocean Exploration
Hannah	Miller	hannah.miller@noaa.gov	NOAA EIT
Harold	Carlson	harold.carlson@noaa.gov	NOAA, USC
Jason	Chaytor	jchaytor@usgs.gov	USGS
Jaymes	Awbrey	C00227433@louisiana.edu	University of Louisiana at Lafayette
Jocelyn	Cooper	jocelyn.cooper@maine.edu	University of Maine
Kasey	Cantwell	kasey.cantwell@noaa.gov	NOAA Ocean Exploration
Kelsey	Viator	ksviator2000@gmail.com	University of Louisiana at Lafayette
Kenneth	Sulak	jumpingsturgeon@yahoo.com	USGS
Kevin	Konrad	Kevin.Konrad@unlv.edu	University of Nevada, Las Vegas
Kimberly	Galvez	kimberly.galvez@noaa.gov	NOAA Ocean Exploration
Kira	Mizell	kmizell@usgs.gov	USGS
Les	Watling	watling@hawaii.edu	University of Hawaii at Manoa
Lu	Wang	lu.wang@noaa.gov	NOAA
Meagan	Putts	meagan.putts@noaa.gov	University of Hawaii
Michael	Vecchione	vecchiom@si.edu	NOAA & NMNH
Noelle	Helder	noelle.helder@noaa.gov	NOAA NOAA Ocean Exploration
Nolan	Barrett	barretttnh56@gatech.edu	Georgia Institute of Technology
Peter	Auster	peter.auster@uconn.edu	UConn & Mystic Aquarium
Rhian	Waller	rhian.waller@maine.edu	University of Maine
Scott	France	france@louisiana.edu	University of Louisiana at Lafayette

Steve	Auscavitch	steven.auscavitch@temple.edu	Boston University
Tina	Molodtsova	tina@ocean.ru	P.P.Shirshov Institute of Oceanology RAS
Upasana	Ganguly	upasana.ganguly1@louisiana.edu	University of Louisiana at Lafayette
Vonda	Wareham-Hayes	vonda.wareham-hayes@dfo-mpo.gc.ca	DFO Newfoundland and Labrador Region
Elizabeth	Fraser		NOAA NCEI
Lu	Wang		NOAA Ocean Exploration

**Please direct inquiries to:**

NOAA Office of Ocean Exploration & Research  
 1315 East-West Highway, SSMC3 RM 10210  
 Silver Spring, MD 20910  
[oceanexplorer@noaa.gov](mailto:oceanexplorer@noaa.gov)