



Okeanos Explorer ROV Dive Summary

Dive Information

<p>General Location Map</p>	
<p>General Area Descriptor</p>	<p>U.S. Southeast, Offshore NC</p>
<p>Site Name</p>	<p>Bodie Island Seep</p>
<p>Science Team Leads</p>	<p>Amy Wagner (CSUS) and Alexis Weinnig (Temple)</p>
<p>Expedition Coordinator</p>	<p>Kasey Cantwell (NOAA-OER)</p>
<p>ROV Dive Supervisor</p>	<p>Chris Ritter (GFOE)</p>
<p>Mapping Lead</p>	<p>Shannon Hoy (NOAA-OER)</p>

ROV Dive Name

<p>Cruise</p>	<p>EX1903L2</p>
<p>Dive Number</p>	<p>Dive 14</p>

Scientists Involved (provide name, affiliation, email)

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Dive Purpose	The primary objective of this dive was to explore and characterize a small canyon that has the potential to be suitable habitat for deep-water coral, sponges, and associated fauna.
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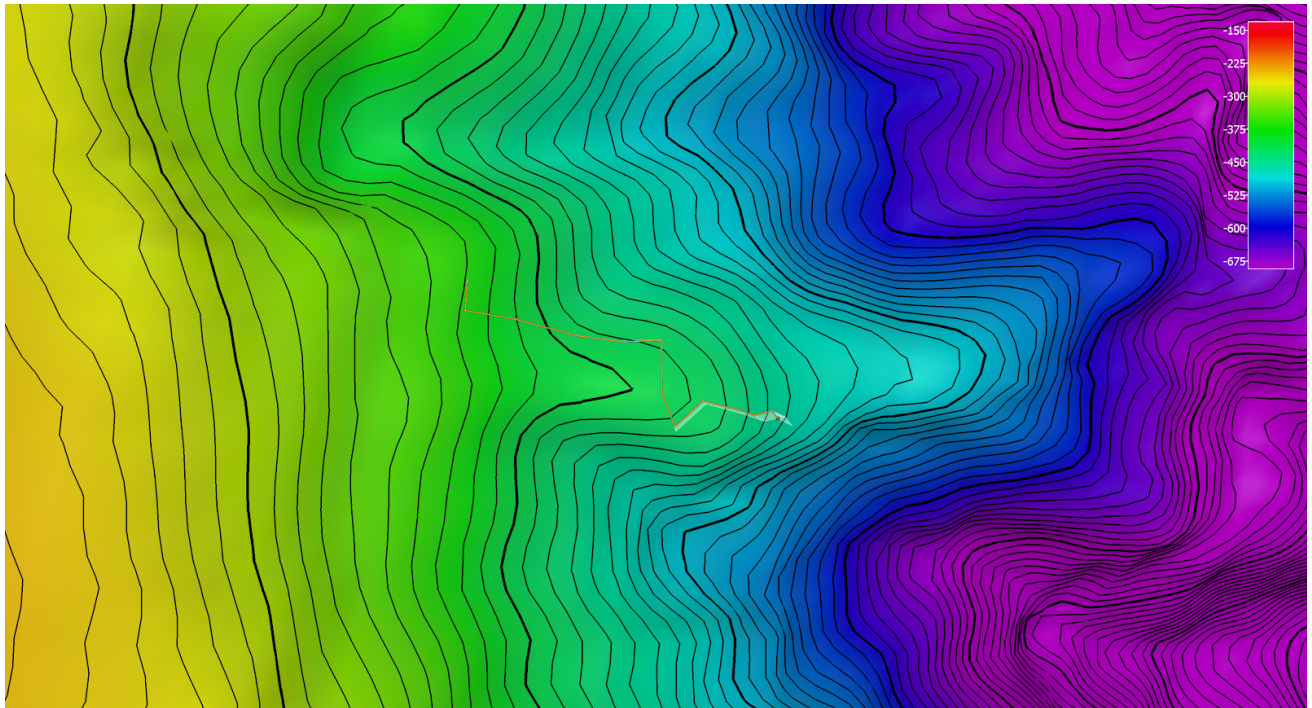


Dive Description	<p>This dive on Bodie Island Seep (named for the closest land based area), was a target provided by Adam Skarke (Mississippi State) and Carolyn Ruppel (USGS) that had a high potential of being an area with methane seeps. Overnight multibeam mapping during the current expedition confirmed active bubble plumes in the water column. We reached the bottom 12:59 UTC at 439 meters among a very dense midwater community with shrimp and fish swarming around the ROV. This site proved to be very interesting and we found multiple areas with methane bubbles present as well as bacterial mats. In addition, we observed a sizable mussel bed (thought to be <i>Bathymodiolus childressi</i>) and live mussels growing on and around carbonate rocks; some of the mussels had bacteria growing on them as well. In addition to the mussels there was a number of other organisms around the mussel beds and other seepage areas including spider crabs, quill worms, blackbelly rosefish, eelpouts, seastars, anemones, and more. We also encountered an area of large carbonate boulders with a few colonies of <i>Lophelia pertusa</i> growing at the top. We ended the dive with a transect through the deep scattering layer and ended the transect surrounded by small lanternfish. One geological sample of an authigenic carbonate rock and one biological sample of a mussel (<i>Bathymodiolus childressi</i>) were collected. Additionally, three fish and two shrimp were “self-sampled” in the suction sampler canisters and on the ROV platform.</p> <p>Interestingly, the seeps on the southeastern side of the ridge had a much higher diversity of fauna associated with the sites, including mussels and crabs, and larger authigenic carbonate outcrops. The seeps on the northwestern side of the ridge were in mostly soft sediment covered with bacterial mats and only a few small ledges of outcropped carbonate. Notably, the mussels were not present at these seeps.</p> <p>We conducted an exploration of the midwater on this dive. The midwater region of the Earth’s oceans is the largest biome on the planet by an order of magnitude. As Deep Discoverer moved through the water column, taxa were identified along a 300m transect for 1 hour 7 minutes. We encountered several squid (<i>Illex argentinas</i>). The dive might be marked by the very dense aggregation of mesopelagic fishes from the genus <i>Cyclothone</i> and Family Myctophidae (and perhaps other groups). These aggregations, perhaps schools, were following the motion of Deep Discoverer and at times were observed at abundances of 100 or more fishes per field of view. Sea water temperature at the time and location of these observations was near 10 C.</p>
Notable Observations	Mussel bed of <i>Bathymodiolus childressi</i> - area of large carbonate rocks with evidence of active seepage (mussels and bacterial mat) around the base and live <i>Lophelia pertusa</i> on the top - numerous sites of active methane bubbles. We also observed a large authigenic carbonate outcrops.
Community Presence/ Absence (community is defined as more than two species)	<ul style="list-style-type: none"> ✓ Corals and Sponges ✓ Chemosynthetic Community ✓ High biodiversity Community ✓ Active Seep or Vent ✓ Extinct Seep or Vent ✓ Hydrates

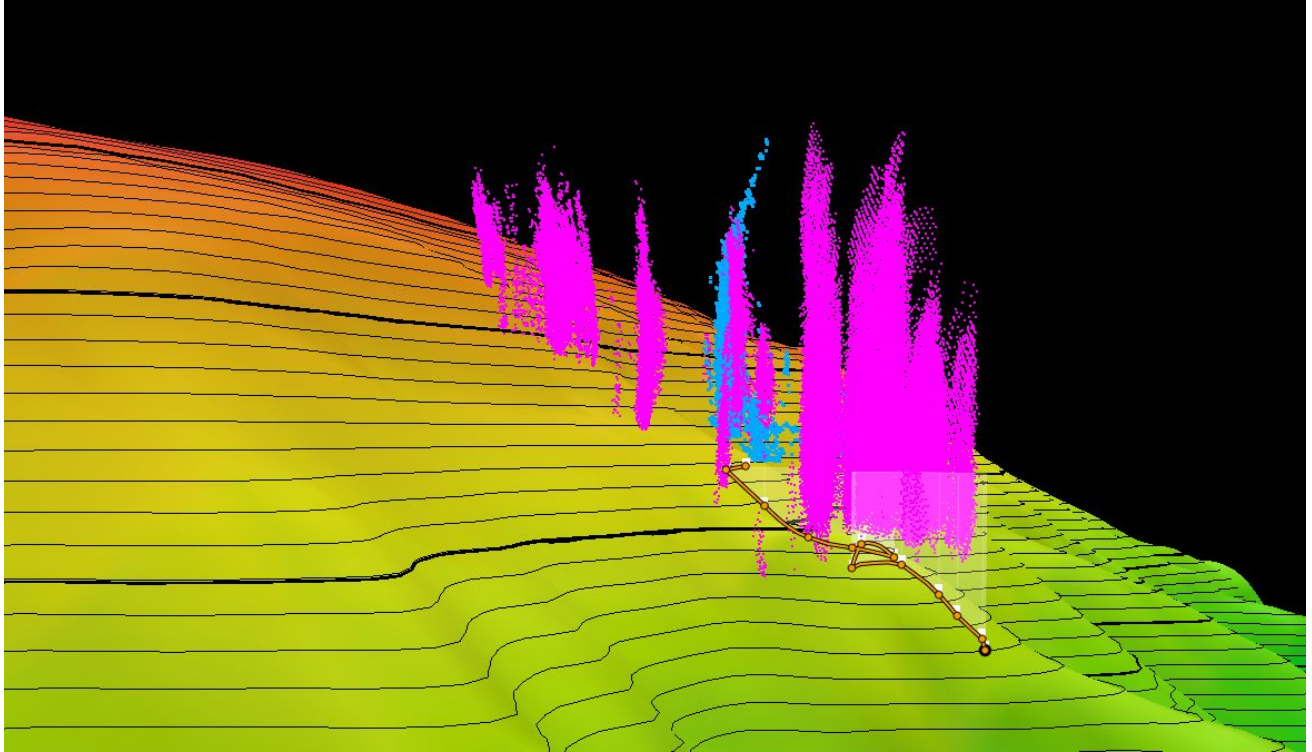


Feature Type	Cold-water methane seep, Scarp/Wall, Authigenic Carbonate Outcrop
SeaTube Link (science annotation system)	https://data.oceannetworks.ca/SeaTubeV2?resourceTypeId=1000&resourceId=23621&divId=1473

Overall Map of the ROV Dive Area

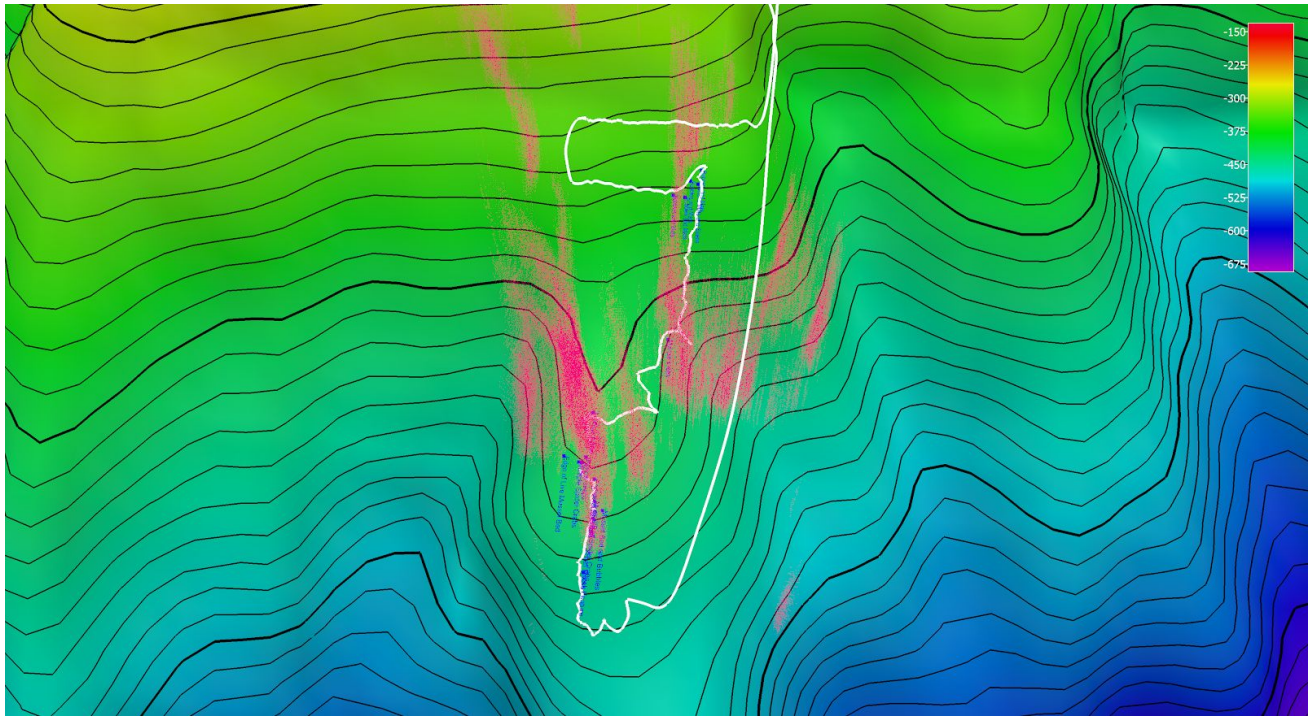


Close-up Map of Main Dive Site



Pink and blue dots are bubble plumes as detected in overnight mapping and waypoints provided by Carolyn Ruppel (USGS) and Adam Skarke (Mississippi State).





Representative Photos of the Dive



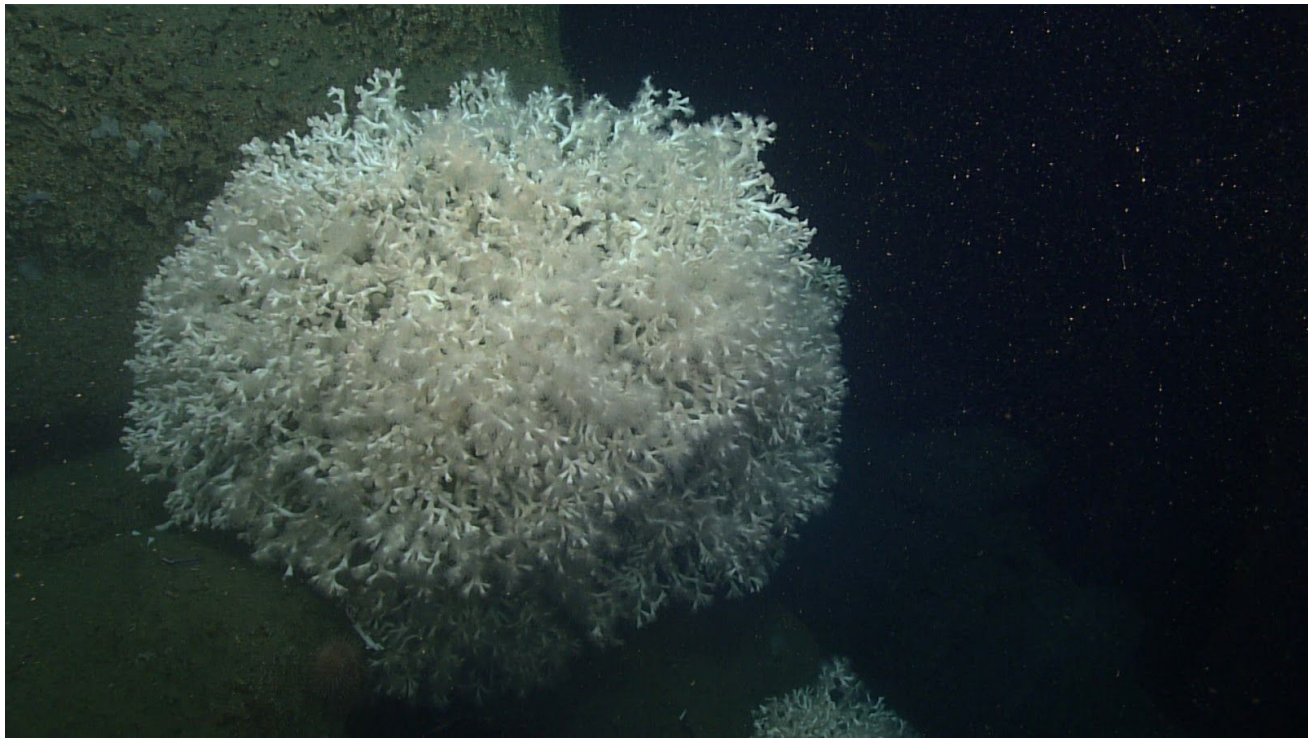
Many small shrimp and short-finned squid seen at the seafloor



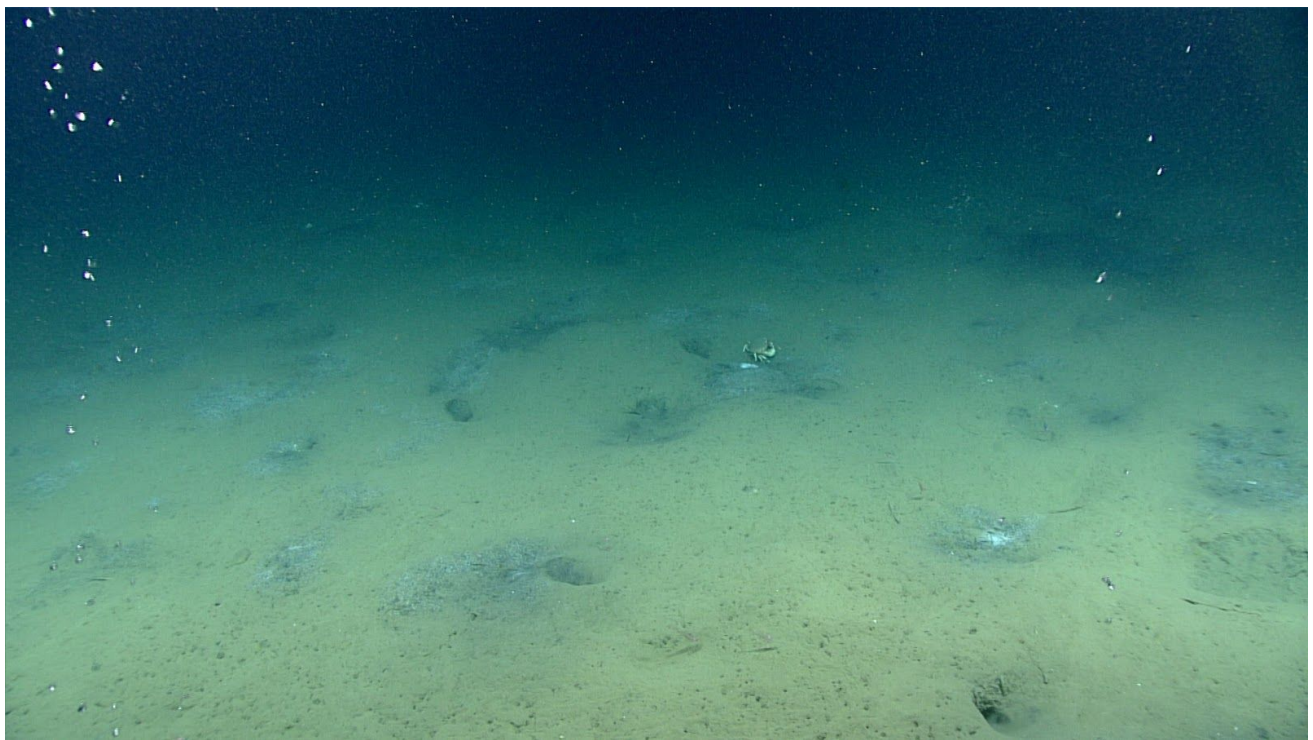
Mussel bed with spider crab and blackbelly rosefish. Bacterial mat growing on and around live mussels.



Another view of mussel bed with spider crabs, blackbelly rosefish, and bacterial mat.



Very large *Lophelia pertusa* colony on large authigenic carbonate outcrop.

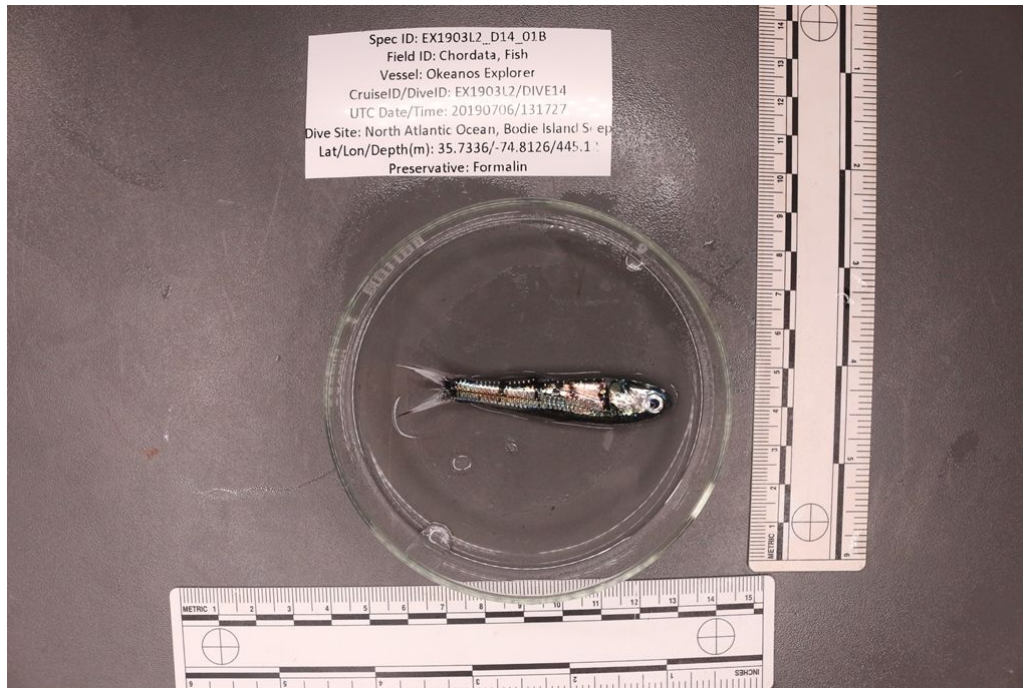


Example of seep site without high abundance of mussels. More typical of seep sites in this region (per Carolyn Ruppel).



Large number of lanternfish seen during mid-water transect at 300 m.

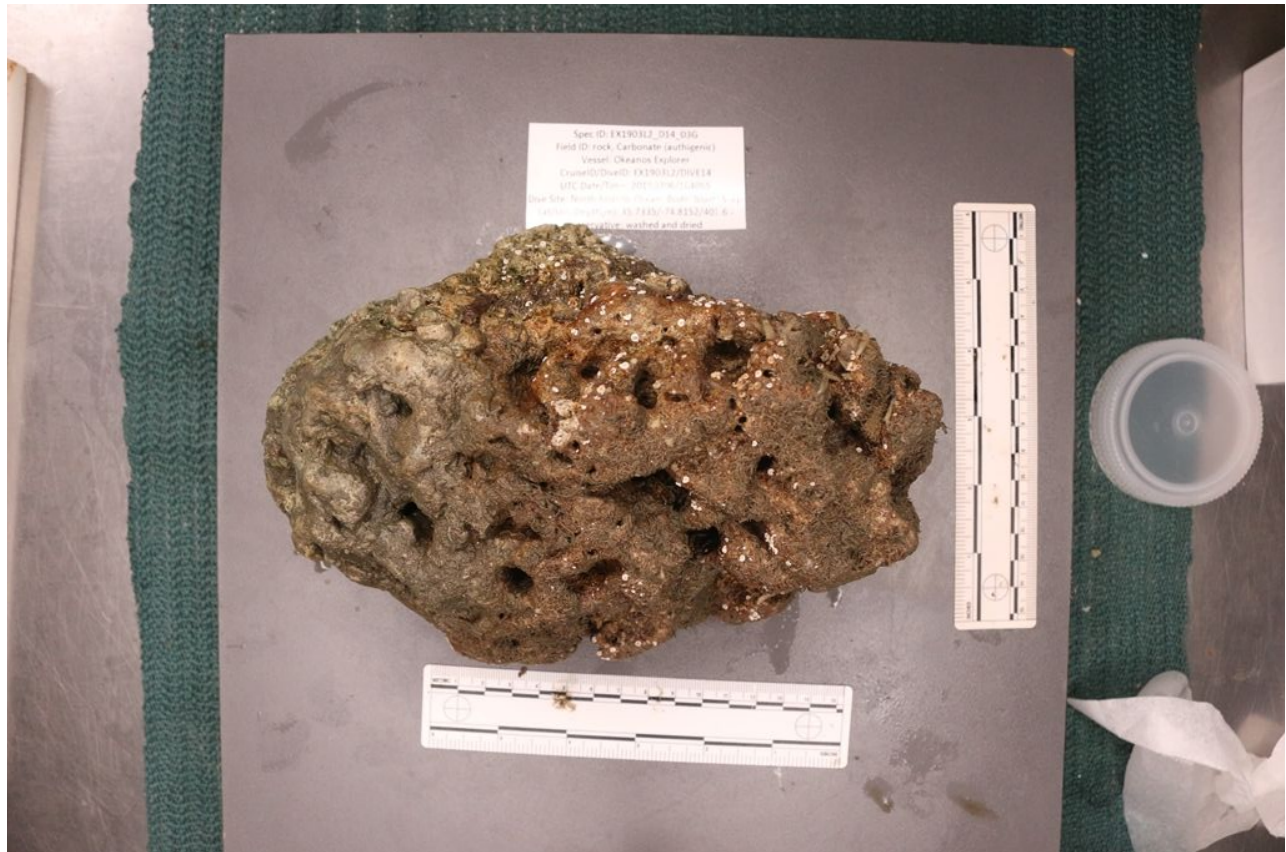
Samples Collected



Sample ID	EX1903L2_D14_01B	
Date (UTC)	20190706	
Time (UTC)	131727	
Depth (m)	445.1	
Temp. (°C)	6.152	
Field ID(s)	Fish (Osteichthyes)	
Associates	Associates Sample ID	Field Identification
	No associates	
Comments		

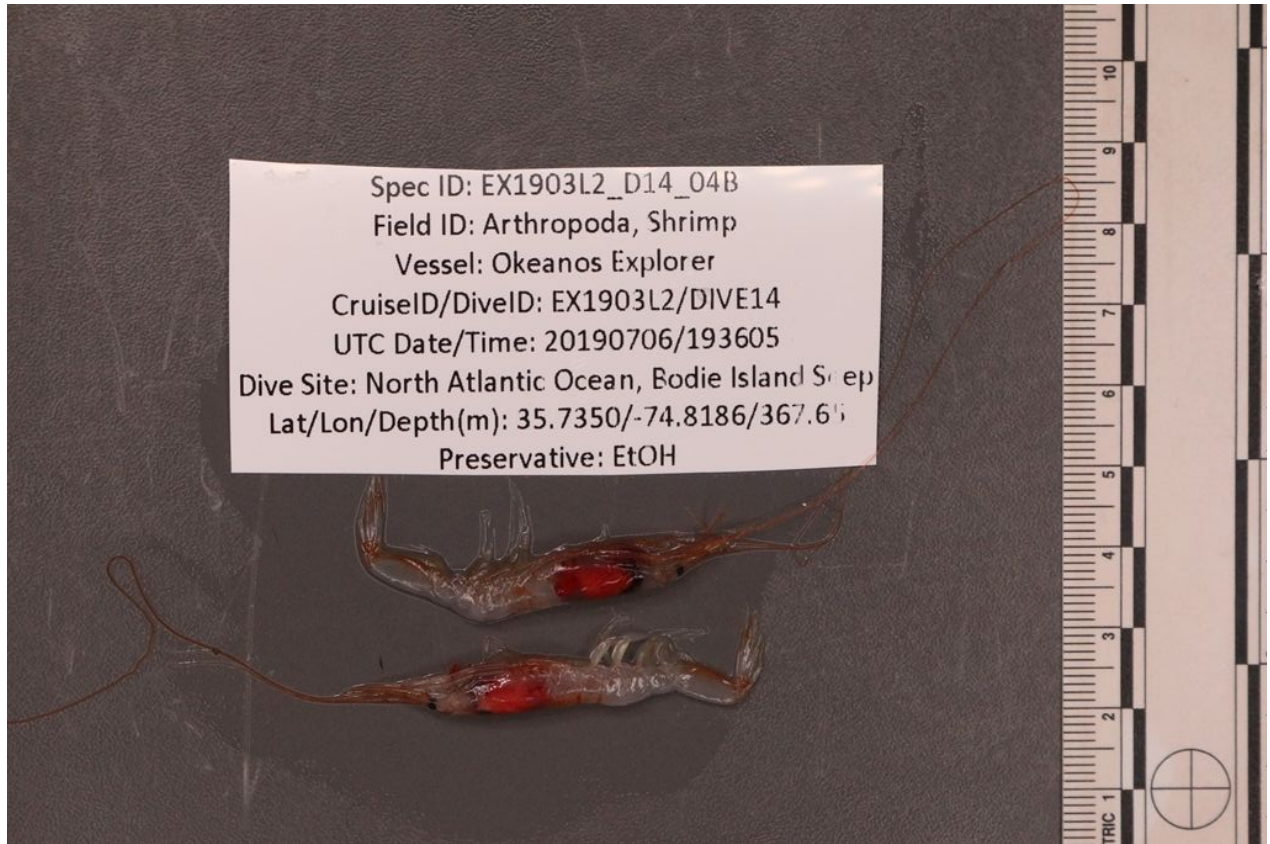


Sample ID	EX1903L2_D14_02B	
Date (UTC)	20190706	
Time (UTC)	143536	
Depth (m)	413.2	
Temp. (°C)	7.092	
Field ID(s)	Mussel (Bathymodiolus childressi)	
Associates	Associates Sample ID	Field Identification
	EX1903L2_D14_02B_A01	Mussel (Bathymodiolus childressi)
	EX1903L2_D14_02B_A02	Caprellidae
	EX1903L2_D14_02B_A03	Mussel (Bathymodiolus childressi)
Comments	Subsamples were taken and frozen for isotope analysis	



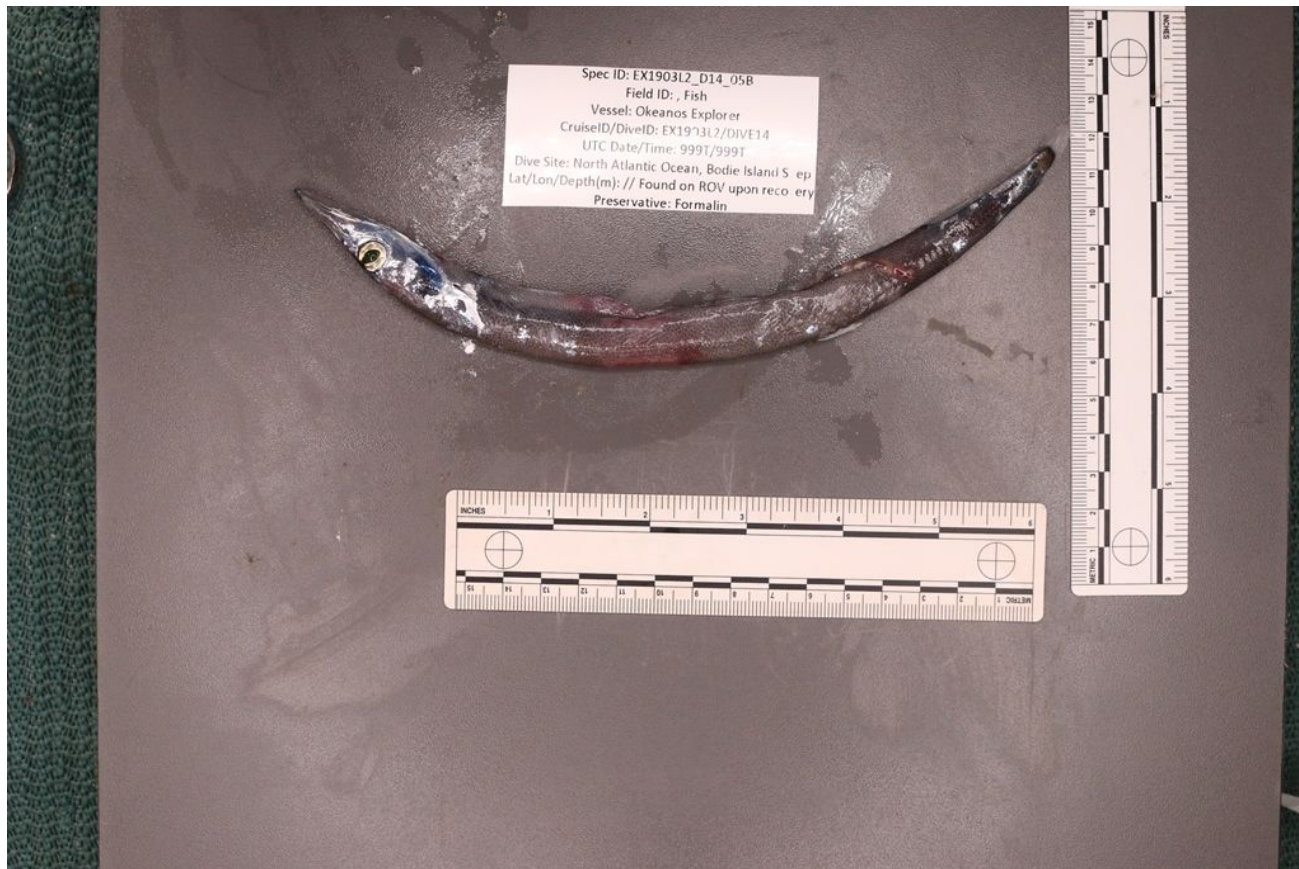
Sample ID	EX1903L2_D14_03G					
Date (UTC)	20190706					
Time (UTC)	164055					
Depth (m)	401.7					
Temp. (°C)	7.148					
Field ID(s)	Carbonate (authigenic)					
Associates	<table border="1"> <thead> <tr> <th>Associates Sample ID</th> <th>Field Identification</th> </tr> </thead> <tbody> <tr> <td>EX1903L2_D14_03G_A01</td> <td>Porifera</td> </tr> </tbody> </table>		Associates Sample ID	Field Identification	EX1903L2_D14_03G_A01	Porifera
	Associates Sample ID	Field Identification				
	EX1903L2_D14_03G_A01	Porifera				
Comments						



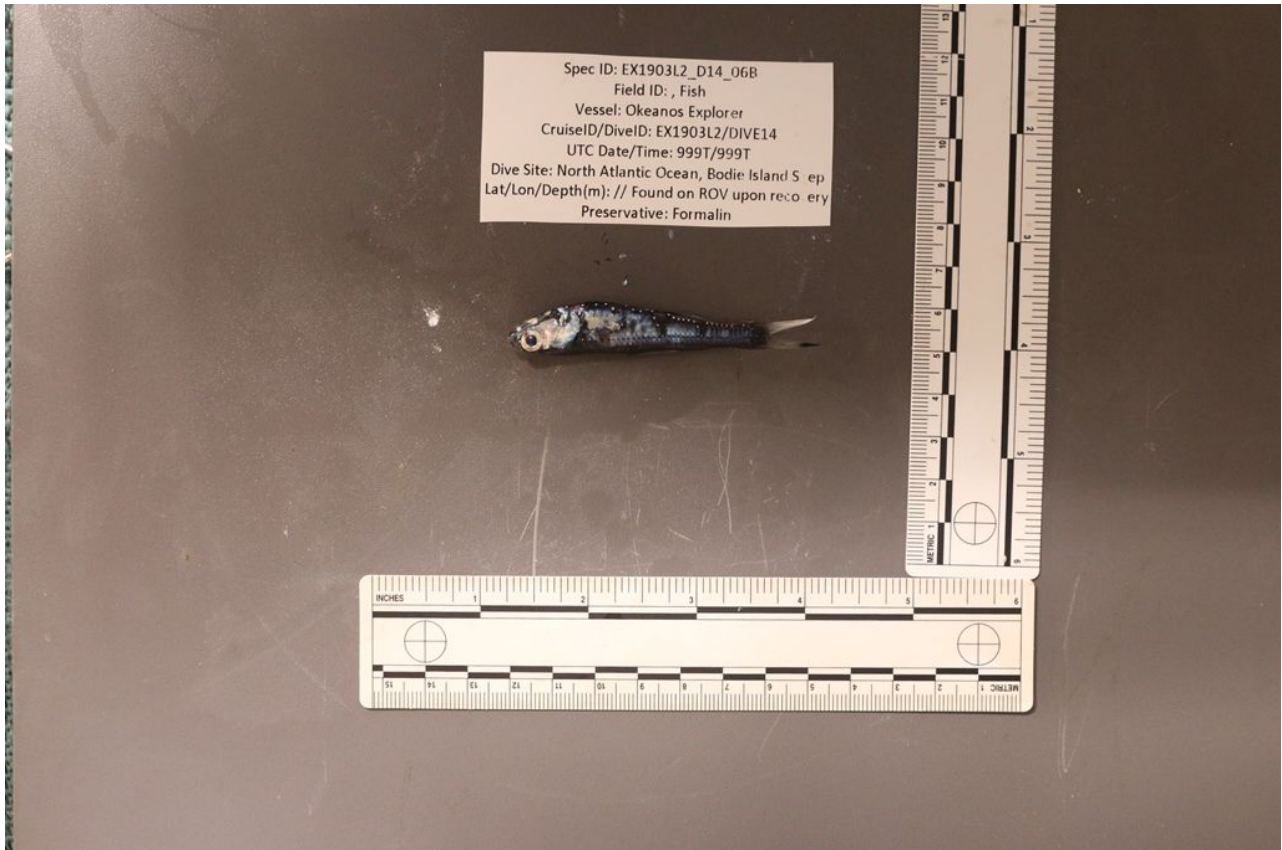


Sample ID	EX1903L2_D14_04B	
Date (UTC)	20190706	
Time (UTC)	193605	
Depth (m)	367.6	
Temp. (°C)	8.301	
Field ID(s)	Shrimp (Decapoda)	
Associates	Associates Sample ID	Field Identification
	No associates	
Comments		





Sample ID	EX1903L2_D14_04B	
Date (UTC)	20190706	
Time (UTC)	- (opportunistic collection)	
Depth (m)	- (opportunistic collection)	
Temp. (°C)	- (opportunistic collection)	
Field ID(s)	Fish (Osteichthyes)	
Associates	Associates Sample ID	Field Identification
	No associates	
Comments	Found on ROV upon recovery	



Sample ID	EX1903L2_D14_05B	
Date (UTC)	20190706	
Time (UTC)	- (opportunistic collection)	
Depth (m)	- (opportunistic collection)	
Temp. (°C)	- (opportunistic collection)	
Field ID(s)	Fish (Osteichthyes)	
Associates	Associates Sample ID	Field Identification
	No associates	
Comments	Found on ROV upon recovery	

Please direct inquiries to:

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