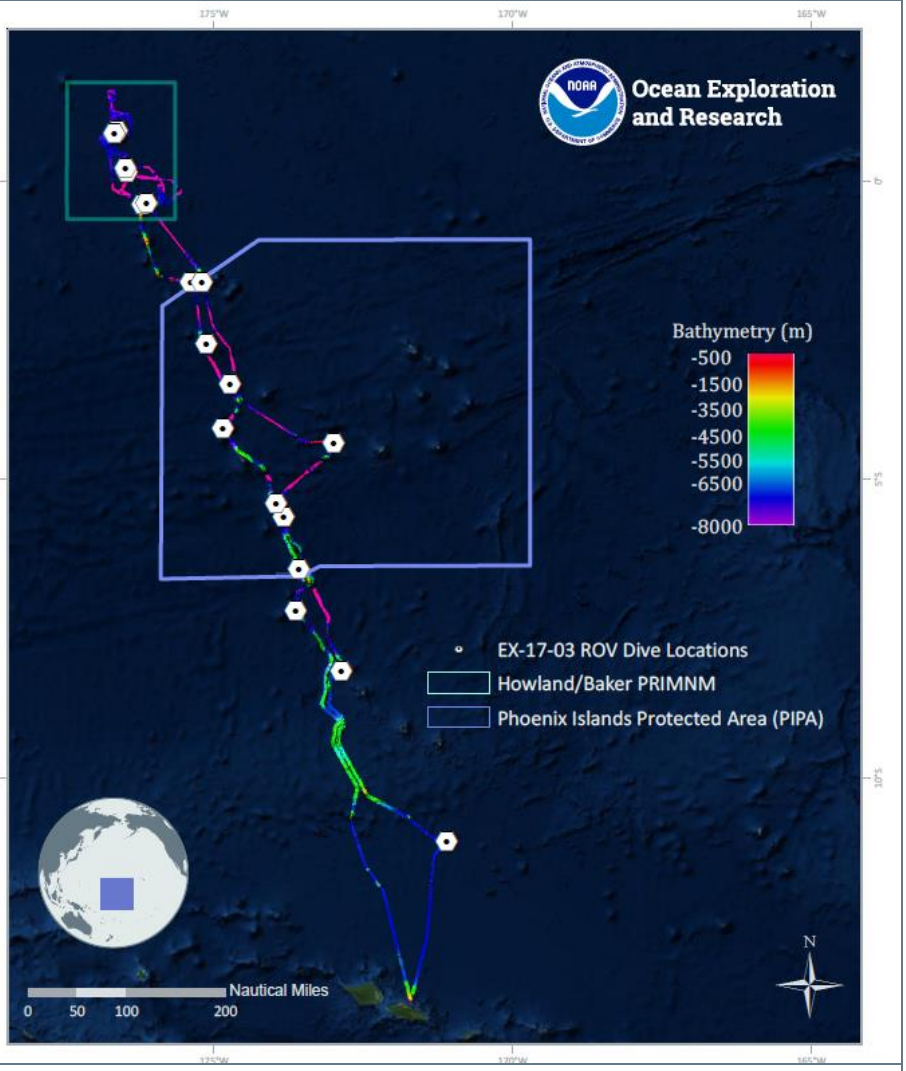
Ocean Exploration and Research

Okeanos Explorer ROV Dive Summary

Dive Information	
Dive Map	
Site Name	Howland Island Deep 1
Expedition Coordinator(s)	Brian RC Kennedy, Nick Pawlenko
ROV Lead(s)	Karl McLetchie
Science Team Lead(s)	Amanda Demopoulos and Steven Auscavitch
General Area Descriptor	Pacific Remote Islands Marine National Monument
ROV Dive Name	
Cruise	EX-17-03

Leg	0		
Dive Number	09		
Equipment Deployed			
ROV	Deep Discoverer (D2)		
Camera Platform	Seirios		
ROV Measurements	☒ CTD	☒ Depth	☒ Altitude
	☒ Scanning Sonar	☒ USBL Position	☒ Heading
	☒ Pitch	☒ Roll	☒ HD Camera 1
	☒ HD Camera 2	☒ Low Res Cam 1	☒ Low Res Cam 2
	☒ Low Res Cam 3	☒ Low Res Cam 4	☒ Low Res Cam 5
Equipment Malfunctions			
ROV Dive Summary (from processed ROV data)	Dive Summary: EX1703_DIVE09 ^^ In Water: 2017-03-16T18:38:54.250000 00°, 48.139' N ; 176°, 40.481' W Out Water: 2017-03-17T02:30:01.491000 N/A ; N/A Off Bottom: 2017-03-17T01:15:08.573000 00°, 48.252' N ; 176°, 40.447' W On Bottom: 2017-03-16T20:07:11.706000 00°, 48.155' N ; 176°, 40.435' W Dive duration: 7:51:7 Bottom Time: 5:7:56 Max. depth: 2420.1 m		
Special Notes			
Scientists Involved (please provide name, location, affiliation, email)	**Name**: Amanda Demopoulos	**Affiliation**: USGS	**Email Address**: ademopoulos@usgs.gov

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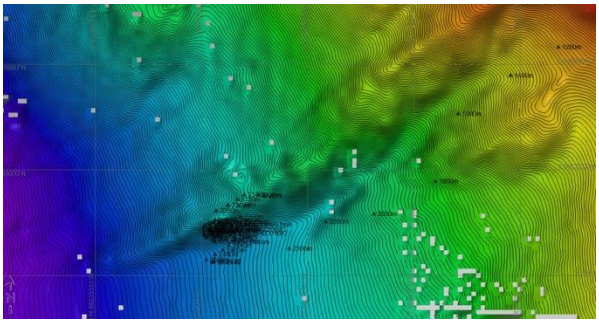
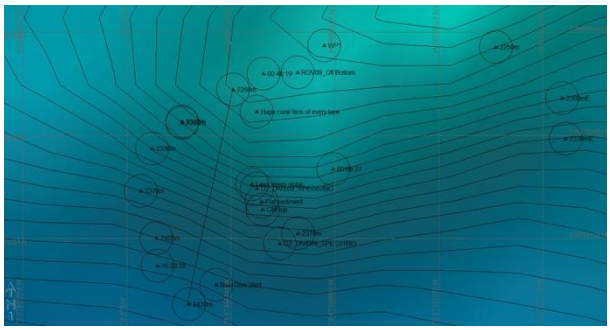
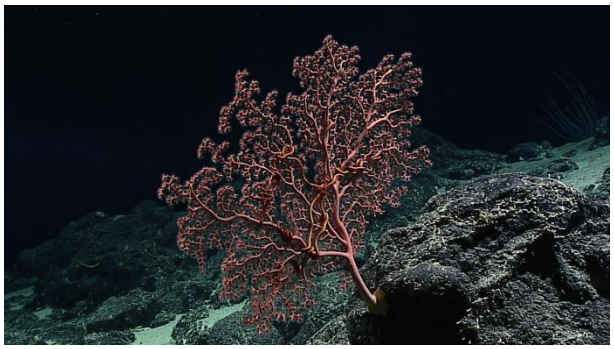
Purpose of the Dive	The goal of this dive is to acquire baseline information on deep sea habitats, seafloor geology, and biological communities on Howland Island in the Howland & Baker Unit of the Pacific Remote Islands Marine National Monument. Deep-sea environments around Howland & Baker Islands are virtually unexplored leading to poor knowledge of biological resources protected by these reserves. Two dives will be conducted at Howland Island, one deep (this dive) and one shallow (following day). Understanding deep-sea coral biological resources as well as bathyal fish communities is of great importance to inform management in the area. This feature has been dated to 70-74MY old (*see Koppers et al 2007 Geochem. Geophys. Geosyst.)		
Description of the Dive	EX1703 dive 9 was our deepest of the expedition, starting at a depth of 2420 on a sedimented slope. There were several exposed rock features but most of the seafloor was composed of sandy sediments. As we transited upslope, the pilot noted a relatively high current. We observed a few different fish species along the sedimented slope, including spiny eels (Halosouridae: *Aldrovandia* spp.), cusk eels (Ophidiidae: *Bassozetus*), rattails (Macrouridae: *Kumba*?, *Coryphaenoides*), and an unknown snailfish (Liparidae) representing a new record for this region. Several of the fish observed had gnathiids and other isopod ectoparasites, which was also observed at the shallow dive at Baker Island. Other animals found on the sediment surface and rock debris included xenophyophores, holothurians, brachiopods, hexactinellid sponges, stalked crinoids, a pycnogonid, a brisingid seastar, and scaleworms (Polychaeta: Polynoidae). At 2366 m, the ROV encountered a steep wall composed of intact and collapsed pillow lava. Few fish were observed along the wall, including rattails (Macrouridae: *Coryphaenoides*) and cusk eels (Ophidiidae: *Bassozetus* and unknown). Several glass sponges were observed, including vase-type euplectellids and *Walteria*-like branched sponges (e.g., *Walteria* cf. *flemingi*). We collected two sponges, a carnivorous sponge (Cladorhizidae) and a *Walteri*a-like hexactinellid, both with multiple associates (polychaete,		

	ctenophores, ophiuroid, hydroids, aplacophorans, amphipods, crinoids). Scattered corals occurred on the steep face, including an unusual planar chrysogorgid (with aplacophoran associate), cup corals, black corals (*Bathypathes* and *Stichopathes*), single stalk bamboo colony and stoloniferans. We observed and tried to collect an unknown goniasterid seastar, occurring deeper than any previous record (2332 m), but unfortunately were unable to collect it. We also saw a purple seastar (Pterasteridae: *Hymenaster*). At the peak of the steep slope, the terrain transitioned to a flatter feature with local topographic highs, including large boulders. This area represented a plateau before the start of the main ridgeline. The boulders and exposed rocks were populated with the largest and most diverse corals that we had seen on the entire dive. We imaged a few different species of primnoids (e.g., *Narella*?), paragorgiids, branched bamboo corals (internodal [*Keratoisis* and *Eknomisis*], and nodal [*Jasonisis* or *Orstomisis*]), hydroid (*Solanderia*), and huge chrysgorgiids (~1.5 m wide). Each of the large colonies had at least one associate, including ophiuroids, chyrostylids, zoanthids, and crinoids. If possible, it will be interesting to continue this dive upslope to see if these multiple fan colonies continue up along the ridgeline.

Overall Map of the ROV Dive Area	**Close-up Map of Main Dive Site**
	

Representative Photos of the Dive

An unusual planer chrysogorgiidae with an aplacophoran



A large Paragorgiidae

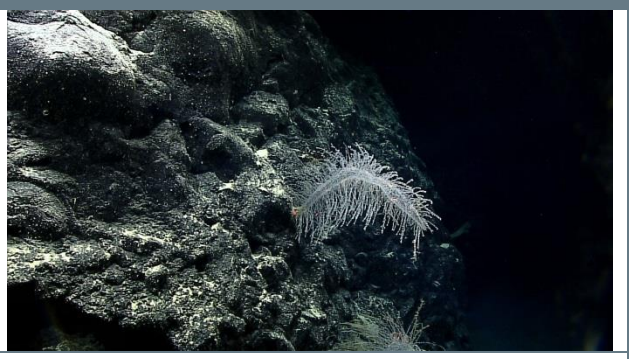
Samples Collected

Sample

Sample ID	EX1703_20170316T213634_D2_DIVE09_SPEC01BIO
Date (UTC)	20170316
Time (UTC)	21:36:34
Depth (m)	2346.35
Temperature (°C)	1.87
Field ID(s)	Cladorhizidae
Comments	

Sample

Sample ID	EX1703_20170316T234328_D2_DIVE09_SPEC02BIO
Date (UTC)	20170316
Time (UTC)	23:43:28
Depth (m)	2290.07
Temperature (°C)	1.95
Field ID(s)	Walteria sp.
Comments	



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