

## Okeanos Explorer ROV Dive Summary

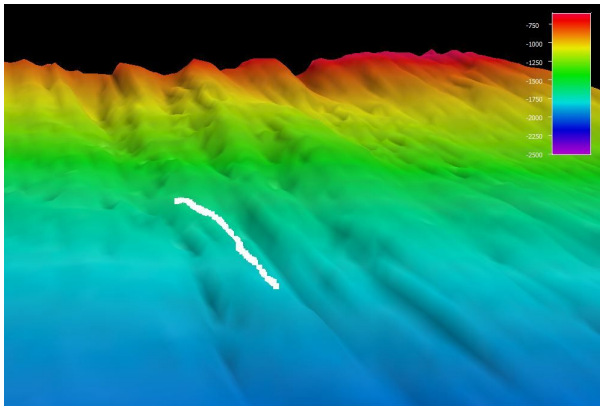
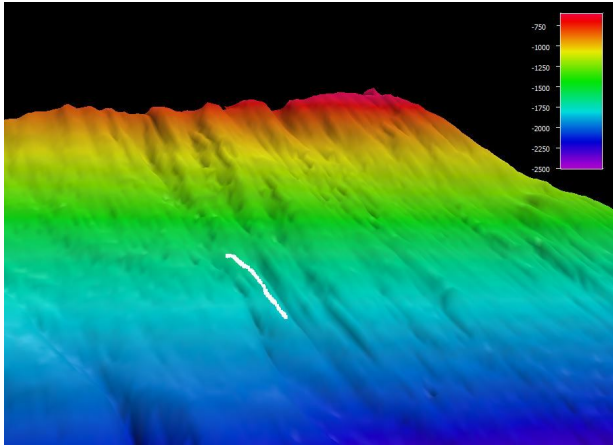
Dive Information	
General Location Map	
General Area Descriptor	U.S. Caribbean Sea
Site Name	Buck Island Reef National Monument
Science Team Leads	Stacey Williams (ISER) Steven Auscavitch (Temple)
Expedition Coordinator	Daniel Wagner (NOAA-OER)
ROV Dive Supervisor	Chris Ritter (GFOE)
Mapping Lead	Derek Sowers (NOAA-OER)
ROV Dive Name	
Cruise	EX1811
Dive Number	DIVE03
Equipment Deployed	
ROV	<i>Deep Discoverer</i>
Camera Platform	<i>Seirios</i>

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	None																																																																																						
ROV Dive Summary Data (from processed ROV data)	In Water:	2018-11-02T12:30:07.400241 17°, 50.64' N ; 64°, 37.019' W																																																																																					
	On Bottom:	2018-11-02T13:38:28.060446 17°, 50.737' N ; 64°, 36.849' W																																																																																					
	Off Bottom:	2018-11-02T19:30:34.665917 17°, 50.395' N ; 64°, 36.812' W																																																																																					
	Out Water:	2018-11-02T20:36:14.435927 17°, 50.509' N ; 64°, 36.355' W																																																																																					
	Dive duration:	8:6:7																																																																																					
	Bottom Time:	5:52:6																																																																																					
	Max. depth:	1812.0 m																																																																																					
Special Notes	N/A																																																																																						
Scientists Involved (provide name, affiliation, email)	<table border="1"> <thead> <tr> <th>Name</th> <th>Affiliation</th> <th>Email</th> </tr> </thead> <tbody> <tr> <td>Amanda Demopoulos</td> <td>US Geological Survey</td> <td>ademopoulos@usgs.gov</td> </tr> <tr> <td>Asako Matsumoto</td> <td>Chiba Institute of Technology</td> <td>amatsu@gorgonian.jp</td> </tr> <tr> <td>Ashley Perez</td> <td>Tenenbaum Puerto Rico Trench Expedition Team</td> <td>ashley.perez@bahia.pr.com</td> </tr> <tr> <td>Brian Kennedy</td> <td>Boston University</td> <td>brian@deepsu.org</td> </tr> <tr> <td>Cheryl Morrison</td> <td>US Geological Survey</td> <td>cmorrison@usgs.gov</td> </tr> <tr> <td>Chris Kelley</td> <td>University of Hawaii</td> <td>ckelley@hawaii.edu</td> </tr> <tr> <td>Clayton Pollock</td> <td>National Park Service</td> <td>clayton_pollock@nps.gov</td> </tr> <tr> <td>Colleen Peters</td> <td>URI-ISC</td> <td>innerspacecenter@googlegroups.com</td> </tr> <tr> <td>Daniel Wagner</td> <td>NOAA/OER</td> <td>daniel.wagner@noaa.gov</td> </tr> <tr> <td>Debi Blaney</td> <td>NOAA/OER</td> <td>debi.blaney@noaa.gov</td> </tr> <tr> <td>Elizabeth Gugliotti</td> <td>NOAA/NCCOS</td> <td>gugliottief@g.cofc.edu</td> </tr> <tr> <td>Jason Chaytor</td> <td>US Geological Survey</td> <td>jchaytor@usgs.gov</td> </tr> <tr> <td>Jessica Robinson</td> <td>University of Victoria</td> <td>jrobinson@uvic.ca</td> </tr> <tr> <td>Kenneth Sulak</td> <td>US Geological Survey</td> <td>jumpingsturgeon@yahoo.com</td> </tr> <tr> <td>Kevin Rademacher</td> <td>NOAA/NMFS</td> <td>kevin.r.rademacher@noaa.gov</td> </tr> <tr> <td>Les Watling</td> <td>University of Hawaii at Manoa</td> <td>watling@hawaii.edu</td> </tr> <tr> <td>Matthew Kupchik</td> <td>Louisiana State University</td> <td>mkupch1@lsu.edu</td> </tr> <tr> <td>Mashkoor Malik</td> <td>NOAA/OER</td> <td>mashkoor.malik@noaa.gov</td> </tr> <tr> <td>Megan Cromwell</td> <td>NOAA/NCEI</td> <td>megan.cromwell@noaa.gov</td> </tr> <tr> <td>Megan McCuller</td> <td>North Carolina Museum of Natural Sciences</td> <td>megan.mcculler@naturalsciences.org</td> </tr> <tr> <td>Michelle Schärer</td> <td>HJR Reefscaping</td> <td>michelle.scharer@upr.edu</td> </tr> <tr> <td>Mike Ford</td> <td>NOAA/NMFS</td> <td>michael.ford@noaa.gov</td> </tr> <tr> <td>Nolan Barrett</td> <td>Medical University of South Carolina</td> <td>barrettnh@g.cofc.edu</td> </tr> <tr> <td>Scott France</td> <td>University of Louisiana at Lafayette</td> <td>france@louisiana.edu</td> </tr> <tr> <td>Stacey Williams</td> <td>Institute for Socio-Ecological Research</td> <td>stcmwilliams@gmail.com</td> </tr> <tr> <td>Steven Auscavitch</td> <td>Temple University</td> <td>steven.auscavitch@temple.edu</td> </tr> <tr> <td>Tina Molodtsova</td> <td>P.P. Shirshov Institute of Oceanology</td> <td>tina@ocean.ru</td> </tr> </tbody> </table>			Name	Affiliation	Email	Amanda Demopoulos	US Geological Survey	ademopoulos@usgs.gov	Asako Matsumoto	Chiba Institute of Technology	amatsu@gorgonian.jp	Ashley Perez	Tenenbaum Puerto Rico Trench Expedition Team	ashley.perez@bahia.pr.com	Brian Kennedy	Boston University	brian@deepsu.org	Cheryl Morrison	US Geological Survey	cmorrison@usgs.gov	Chris Kelley	University of Hawaii	ckelley@hawaii.edu	Clayton Pollock	National Park Service	clayton_pollock@nps.gov	Colleen Peters	URI-ISC	innerspacecenter@googlegroups.com	Daniel Wagner	NOAA/OER	daniel.wagner@noaa.gov	Debi Blaney	NOAA/OER	debi.blaney@noaa.gov	Elizabeth Gugliotti	NOAA/NCCOS	gugliottief@g.cofc.edu	Jason Chaytor	US Geological Survey	jchaytor@usgs.gov	Jessica Robinson	University of Victoria	jrobinson@uvic.ca	Kenneth Sulak	US Geological Survey	jumpingsturgeon@yahoo.com	Kevin Rademacher	NOAA/NMFS	kevin.r.rademacher@noaa.gov	Les Watling	University of Hawaii at Manoa	watling@hawaii.edu	Matthew Kupchik	Louisiana State University	mkupch1@lsu.edu	Mashkoor Malik	NOAA/OER	mashkoor.malik@noaa.gov	Megan Cromwell	NOAA/NCEI	megan.cromwell@noaa.gov	Megan McCuller	North Carolina Museum of Natural Sciences	megan.mcculler@naturalsciences.org	Michelle Schärer	HJR Reefscaping	michelle.scharer@upr.edu	Mike Ford	NOAA/NMFS	michael.ford@noaa.gov	Nolan Barrett	Medical University of South Carolina	barrettnh@g.cofc.edu	Scott France	University of Louisiana at Lafayette	france@louisiana.edu	Stacey Williams	Institute for Socio-Ecological Research	stcmwilliams@gmail.com	Steven Auscavitch	Temple University	steven.auscavitch@temple.edu	Tina Molodtsova	P.P. Shirshov Institute of Oceanology	tina@ocean.ru
	Name	Affiliation	Email																																																																																				
	Amanda Demopoulos	US Geological Survey	ademopoulos@usgs.gov																																																																																				
	Asako Matsumoto	Chiba Institute of Technology	amatsu@gorgonian.jp																																																																																				
	Ashley Perez	Tenenbaum Puerto Rico Trench Expedition Team	ashley.perez@bahia.pr.com																																																																																				
	Brian Kennedy	Boston University	brian@deepsu.org																																																																																				
	Cheryl Morrison	US Geological Survey	cmorrison@usgs.gov																																																																																				
	Chris Kelley	University of Hawaii	ckelley@hawaii.edu																																																																																				
	Clayton Pollock	National Park Service	clayton_pollock@nps.gov																																																																																				
	Colleen Peters	URI-ISC	innerspacecenter@googlegroups.com																																																																																				
	Daniel Wagner	NOAA/OER	daniel.wagner@noaa.gov																																																																																				
	Debi Blaney	NOAA/OER	debi.blaney@noaa.gov																																																																																				
	Elizabeth Gugliotti	NOAA/NCCOS	gugliottief@g.cofc.edu																																																																																				
	Jason Chaytor	US Geological Survey	jchaytor@usgs.gov																																																																																				
	Jessica Robinson	University of Victoria	jrobinson@uvic.ca																																																																																				
	Kenneth Sulak	US Geological Survey	jumpingsturgeon@yahoo.com																																																																																				
	Kevin Rademacher	NOAA/NMFS	kevin.r.rademacher@noaa.gov																																																																																				
	Les Watling	University of Hawaii at Manoa	watling@hawaii.edu																																																																																				
	Matthew Kupchik	Louisiana State University	mkupch1@lsu.edu																																																																																				
	Mashkoor Malik	NOAA/OER	mashkoor.malik@noaa.gov																																																																																				
	Megan Cromwell	NOAA/NCEI	megan.cromwell@noaa.gov																																																																																				
	Megan McCuller	North Carolina Museum of Natural Sciences	megan.mcculler@naturalsciences.org																																																																																				
	Michelle Schärer	HJR Reefscaping	michelle.scharer@upr.edu																																																																																				
	Mike Ford	NOAA/NMFS	michael.ford@noaa.gov																																																																																				
	Nolan Barrett	Medical University of South Carolina	barrettnh@g.cofc.edu																																																																																				
	Scott France	University of Louisiana at Lafayette	france@louisiana.edu																																																																																				
	Stacey Williams	Institute for Socio-Ecological Research	stcmwilliams@gmail.com																																																																																				
Steven Auscavitch	Temple University	steven.auscavitch@temple.edu																																																																																					
Tina Molodtsova	P.P. Shirshov Institute of Oceanology	tina@ocean.ru																																																																																					

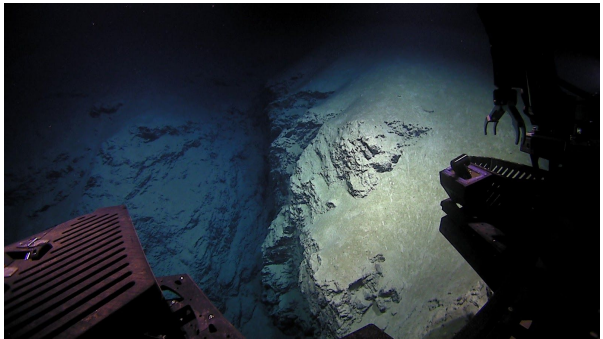
Dive Purpose	<p>The purpose of the dive was exploratory with an emphasis on surveying and characterizing deep-sea coral and sponge communities. The dive also sought to document deepwater demersal fish species, as well as their habitat preferences along the dive track. The dive track was designed to start just outside the Monument boundary and traversed southward into the Monument up a steep slope.</p>
Dive Description	<p>The dive began on a steep sedimented slope to the north of the boundary of Buck Island Reef National Monument at 1812 m. For so much sediment in first half, heading southward into the boundary and upslope, little evidence of wasting or slumping was noted by shore-side geologists. One particularly deep slump, at least 10 m in height, was seen near the half point of the dive with substantial exposed Fe-Mn crusted rock substrate. The second half of the dive from this point transitioned to rocky outcrop and ledge formations of angular black Fe-Mn crusted rocks. This portion of the dive had substantial encrusting and attached life.</p> <p>The diversity of demersal fish species was lower than Dive 02 and about the same as Dive 01. There were more fish identified and observed at the beginning of the dive at deeper depths (1,800 m) and on flat soft sediments. Four species of fish were observed during this dive, with the fish genera <i>Aldrovandia</i> and <i>Ipnops</i> being most abundant. The species observed at the beginning of the dive (UTC 14:03) in order as observed were <i>Bathysaurus</i> sp., <i>Ipnops murrayi</i>, <i>Bathypterois grillator</i>, and <i>Aldrovandia</i> sp. halosaur. At the beginning of the dive there was an isopod seen on the pectoral fin of a fish. We also observed two pieces of wood fall during this dive, both of which looked recent. The first piece has some small crustaceans inhabiting the piece, while the second piece had three squat lobsters.</p> <p>Sea cucumbers were one of the most abundant invertebrates, with three species identified (all likely new species for this cruise). There were a lot of <i>Eynpniastes</i> sp. swimming holothurians in the water column. There was also a <i>Phormosoma</i> sp. at the beginning of the dive. There were only a couple of stalked crinoids and one unstalked crinoid observed. Brittle stars (<i>Ophiocreas oedipus</i>) were more common hanging on <i>Metallogorgia melanotrichos</i> coral colonies. Some other interesting organisms spotted during the dive were gooseneck barnacles, branching bryozoans, a pinkish corallimorph, scarlet gamba prawns, and squat lobsters.</p> <p>Vase <i>Euplectella</i> sp. sponges were common on the flat soft sediment and we also spotted a couple of stalked <i>Euplectella</i> sponges. Ferreidea sponges were common and usually small. There was also a long glass sponge <i>Euritidae pleurochorium</i>. Demosponges were common on the faces of the rocks and usually small. There were a small blue and black demosponge reoccurring on the faces of the rocks, and some <i>Geodia</i> species also observed. Dr. Christopher Kelley made some identifications of sponges observed on the dive: <i>Caulophacus</i> sp., <i>Hertwigia</i> sp., Rossellidae, <i>Heteroscleromorpha</i> sp., <i>Hyalonema</i> sp., and <i>Tetractinellida</i> sp.</p> <p>Through the first half of the dive on the heavily-sedimented slope, deep-sea corals were sparse. Two species, one unidentified sea pen and one unbranched bamboo coral, were observed in this section of the dive. Upon reaching hard substrate outcrops and steep terrain, a greater coral diversity was observed. These included black corals (<i>Bathypathes</i> spp., <i>Heteropathes</i> cf. <i>americana</i>, <i>Stichopathes</i> sp.), octocorals (<i>Anthomastus</i> sp., <i>Stolonifera</i>, <i>Metallogorgia melanotrichos</i>, <i>Iridogorgia splendens</i>), stylasterids (<i>Crypthelia</i> sp.), and occasional sea pens (<i>Umbellula</i> sp.) in areas of soft bottom. <i>M. melanotrichos</i> was the most abundant coral and occurred in both advanced (no branchlets off main stem except the apical tuft of polyps) and young (numerous branchlets along the main axis) colony morphologies. Occasional small bamboo corals, possibly in the genus <i>Cladarisis</i> or similar clade, were also observed on rocky outcrops. Near the dive end black corals similar to <i>Parantipathes</i> sp. were observed. Ultimately, the final planned waypoint was never reached in favor of tracking rock hard-bottom ledges to the east of the intended dive track. Off-bottom occurred at 1607 m depth.</p>

Notable Observations	The second half of the dive yielded dramatic rocky terrain (17:45 UTC) with relatively abundant deep-sea corals and sponges.
Community Presence/Absence <i>(community is defined as more than two species)</i>	<hr/> Corals and Sponges <hr/> Chemosynthetic Community <hr/> High biodiversity Community <hr/> Active Seep or Vent <hr/> Extinct Seep or Vent <hr/> Hydrates <hr/>

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



Representative Photos of the Dive	
-----------------------------------	--



Soft-sediment bottom was the dominant substrate in the first half of the dive. Stalked sponges, echinoderms, and small fishes were commonly observed here.

Occasional deep gorges were observed as the terrain transitioned to rocky hard-bottom with significantly more attached fauna.

