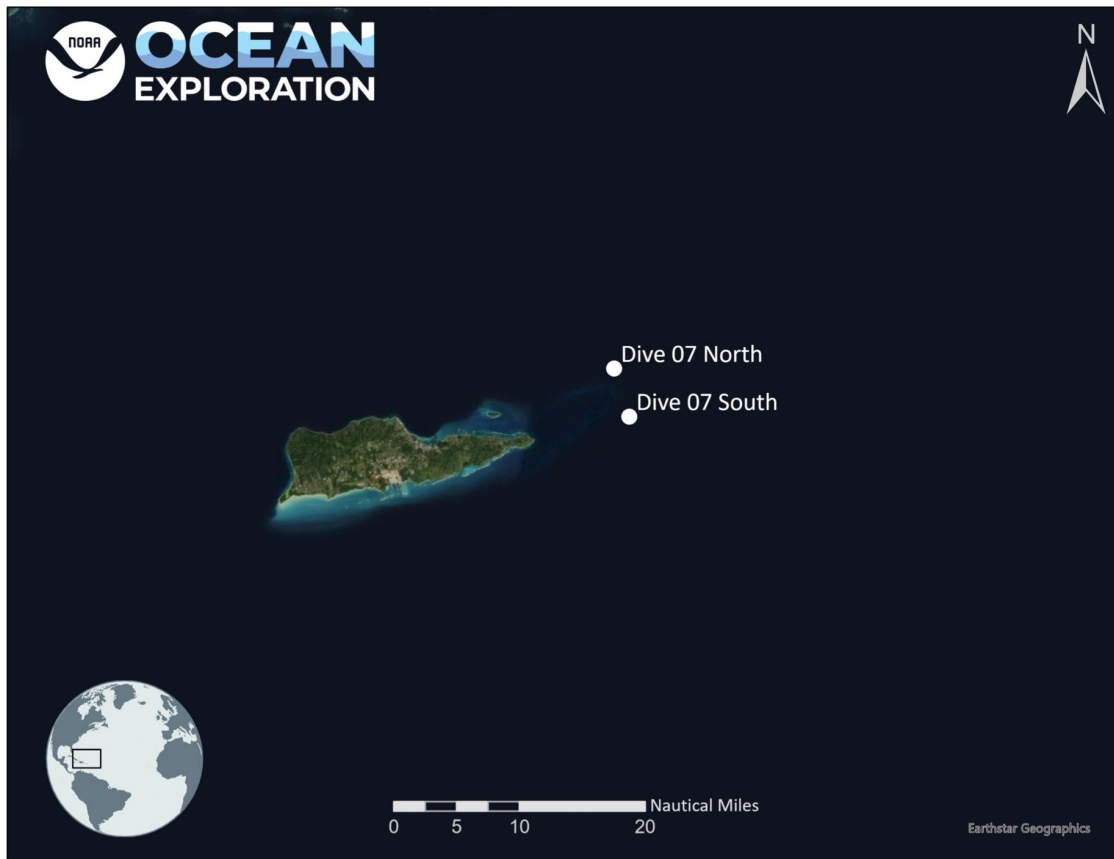


ROV Dive Summary, EX-22-06, Dive 07 August 29, 2022

General Location Map



Dive Information

Site Name	Dive 07 - Lang Bank
General Area Descriptor	Puerto Rico and the USVI
Science Team Leads	Joana Xavier (Biology), Deb Glickson (Geology)
Expedition Coordinator	Thomas Morrow
ROV Dive Supervisor	Levi Unema

Dive Description

During our descent, we collected a water sample in the deep scattering layer at 520 m (1243 UTC). At 1259/688 m, we acquired the bottom, which was composed of carbonate sediment and areas of hardbottom. After settling the ROV, we saw a Halosaur, some other fish, and a Sticopathes. We began to move upslope, encountering another Sticopathes with an associated brittle star (1318, 682 m). At 1326/670 m, we found a large, dead sponge hosting a brisingid and squat lobster. This was the first of many dead sponges we saw that had probably rolled down the slope we were ascending.

As we continued, we saw some small outcrops of rock that were hypothesized to be limestone blocks, surrounded by mostly biogenic sediment. At 1338/670 m we saw a tripod fish (*Bathypterois bigelow*) and soon after, a holothurian and another large, circular, dead sponge. At 1353/663 m we found a shrimp with big multi-color eyes.

A few minutes later, we saw a collection of large traces on the seafloor (best seen in Serios view), which turned out to be caused by a sea urchin, *Conolampas*. These urchins are irregular, meaning that they are modified to dig or plow through sediment. The tracks could have been months to years old. We saw these tracks several times along the dive – the last time we saw them we finally found a live *Conolampas*.

At 1407/658 m we encountered a large rocky outcrop with many benthic animals on it – oysters, serpulid worms, bathypathis psuedoalternata, sticopathes, shrimp, a halopus crinoid, and a flytrap anemone. At 1440-1445, we saw an echinothuriid pancake urchin and a siderus urchin, which is known from the fossil record.

At 1526/610 m, another rock outcrop was seen, covered in biota including *Crysgorgia*, aspidodoa urchin, several shrimp, brittle stars, ophiaster, and a fish. As we continued to move upslope, it was mostly sedimented. We saw a number of yellow terabellid polychaete worms, which we originally confused for a pom pom anemone. At 1612, we saw a cerianthid anemone and the nymphaster subspinosus, and at 1629/545 m encountered a coronaster briarius, which are endemic in the tropical Pacific and Atlantic.

Continuing upslope through soft sediment, we saw a grenadier, stalked crinoid, and a pom pom anemone. At 1706/510 m we saw an anthomastus and the stalked crinoid *Endocrinus*, followed by a queen snapper at 1710/495 m. This was an important finding, as looking for commercially valuable fish was part of our objective. We also encountered a small rocky outcrop that hosted shrimp, *Antipathies*, sponges, diastichopathes, and two types of pom pom anemones.

Back on a very sedimented surface, we saw a plexaurid coral, a striped brittle star, a fish, and a goniasterid. At 1814/407 m, we saw our first living *Conolampas*, the urchin that had been making the traces on the seafloor, followed by a slimehead and some very strange looking limestone boulders. These might have been subaerially exposed and eroded before falling downslope, as they looked out of place. At 1836/396 m, we saw a light colored corymorphus and zooanthids growing on a dead coral.

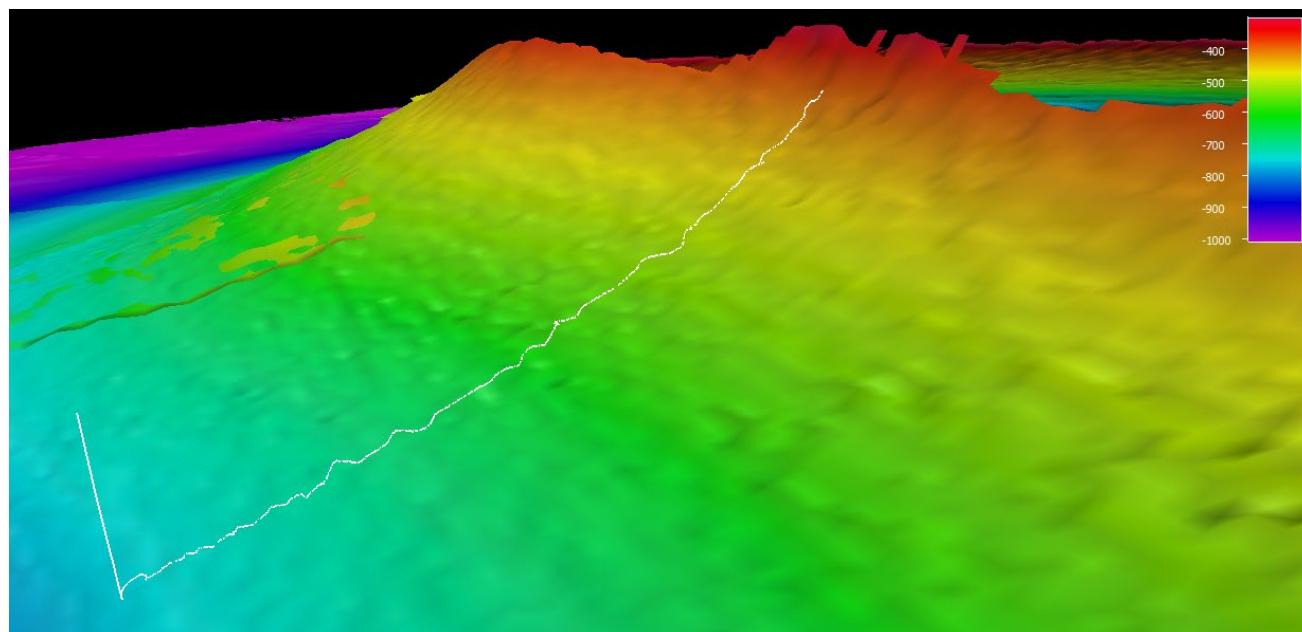
After the boulders, were back in sediment, with very little hardbottom. By about 330 m, we saw a variety of rock sponges, crinoids, rockfish, scorpion fish, pink coralline algae (probably from upslope), encrusting sponges, and serpulid worms. The sediment was biogenic at these sites. At 1920/318 m, we saw a fire worm and several small fish, followed by a goniasterid. Slightly higher upslope, at 1937/303 m, we saw a pink sponge, a shell, aspidodiadematid, and more coralline algae. An exciting behavioral moment at 1942 was when a stalked crinoid fought off an ophiroid that was attempting to climb onto its stalk. We then saw a *Symphysanodon* fish, a live sponge fragment from upslope, and an ellisidae coral. Another exciting behavioral moment was when we were observing an anemone living in an overhang under a rock ledge that very quickly predated on a small fish. We ended on the slope at 2001/272 m, looking at a small pink object that was not identified on the dive.

Notable Observations	Giant isopod (genus <i>Bathynomus</i>); queen snapper observation at 499 m depth; predation event with an anemone capturing a small fish; a juvenile Darwin's slimehead; great diversity of echinoderms (several species of urchins, sea stars, brittle stars and crinoids).
Community and habitat observations	Corals and Sponges - Present Chemosynthetic Community - Absent High biodiversity Community - Absent Active Seep or Vent - Absent Extinct Seep or Vent - Absent Hydrates - Absent
CMECS Feature Type(s)	Island Shelf Submarine Bank
SeaTube Link (science annotation system)	https://data.oceannetworks.ca/SeaTubeV3?resourceTypeId=600&resourceId=2713

Equipment Deployed

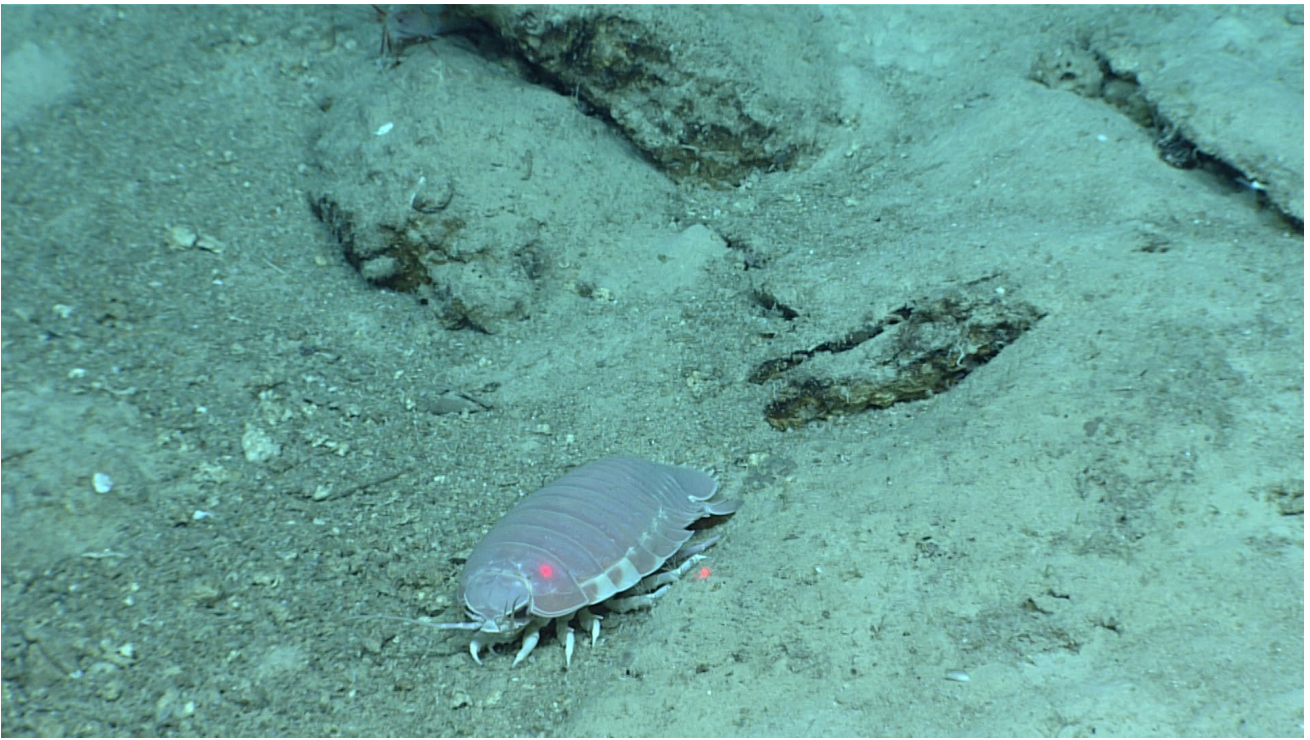
ROV	<i>Deep Discoverer</i>
Camera Platform	<i>Seirios</i>
ROV Measurements	The following ROV measurements, data streams and equipment are used on each ROV deployment: CTD, depth, scanning sonar, USBL position, altitude, heading, attitude, high-resolution cameras, low resolution cameras, manipulator arms, suction sampler, sample drawers and thrusters. The section below notes if any of these sensors were malfunctioning or not operational
Equipment Malfunctions	There was a small leak in the ship's generator and another small leak on the stern thruster. This did not impact the dive.

Close-up Map of Main Dive Site

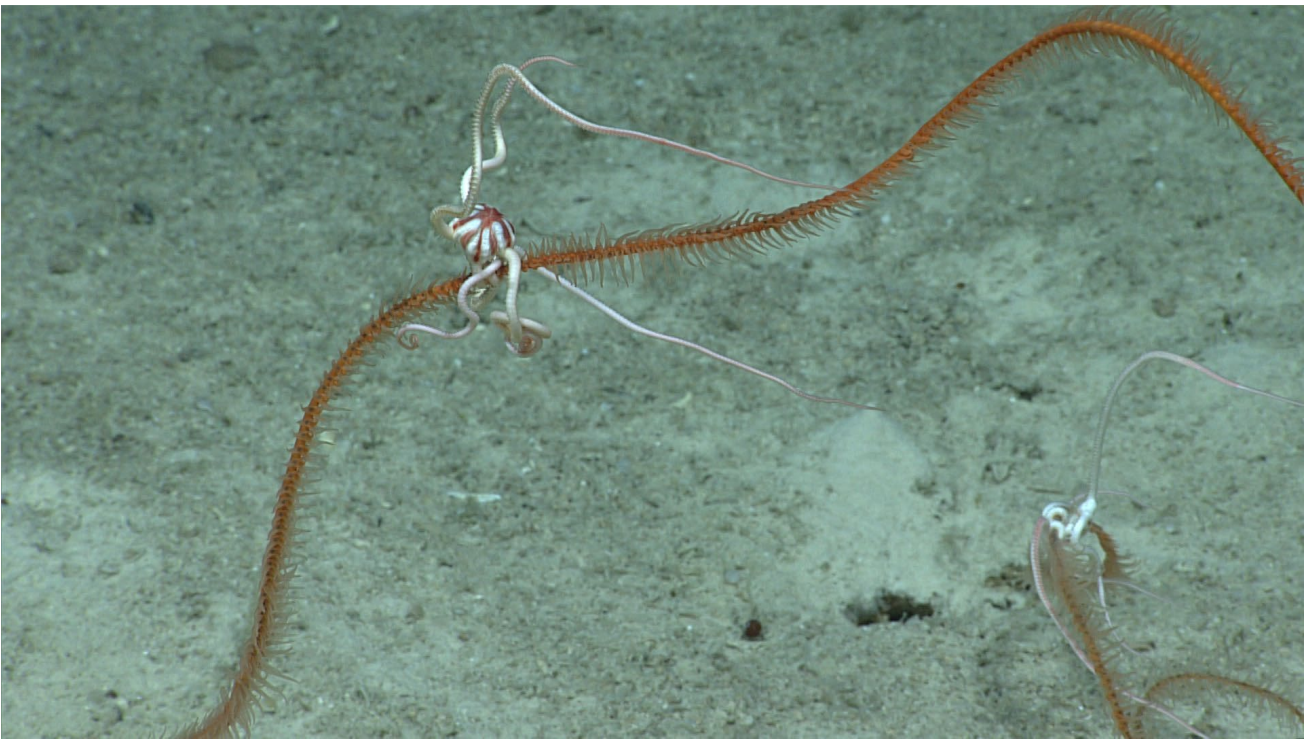


Smoothed ROV dive track in white on a 32 m resolution bathymetric grid, 1x vertical exaggeration, depth in meters.

Representative Photos of the Dive



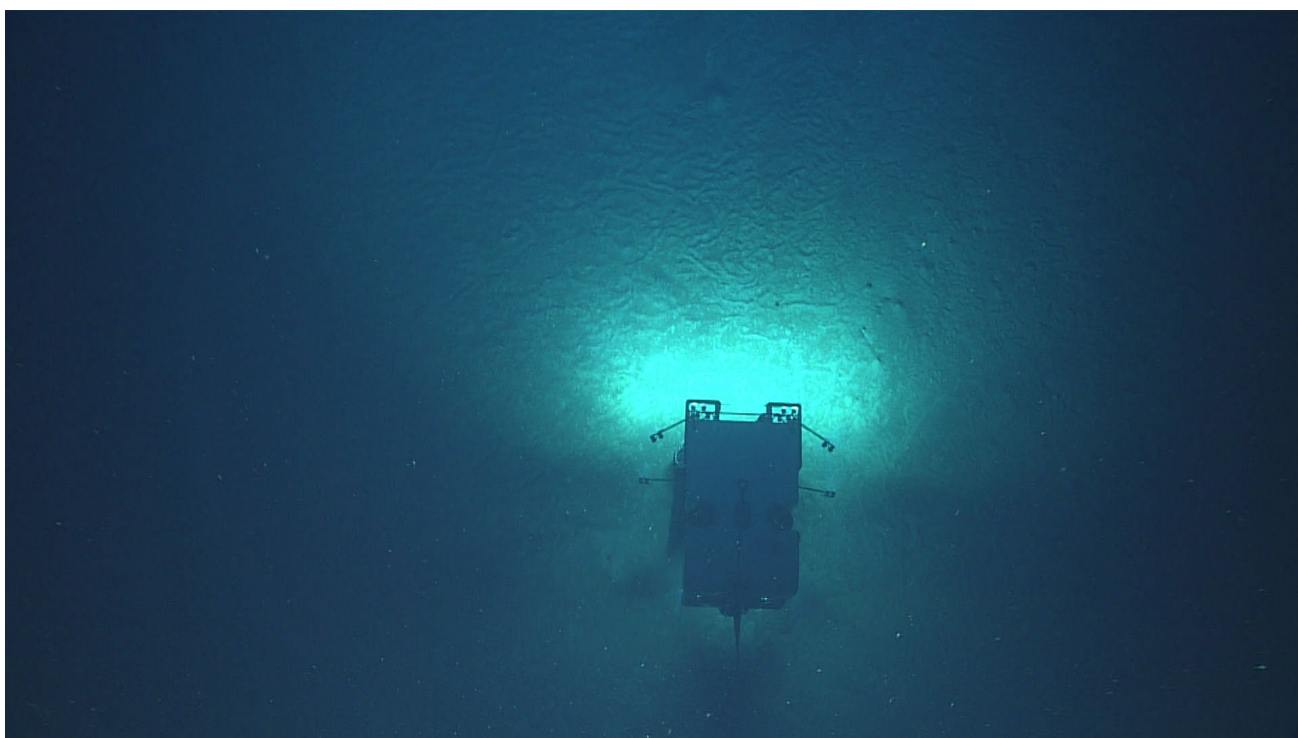
Giant isopod, genus *Bathynomus*, with rocky outcrop and biogenic sediment.



Black coral (genus *Stichopathes*) with its associate brittlestar.



Large (40 cm long) seastar, *Coronaster briareus*.



Seirios view of trail marks in soft sediment, produced by a sea urchin in the genus *Conolampas*.



Terebellid worm (initially thought to be a pom-pom anemone).



Carbonate (probably limestone) boulder with a variety of associated fauna (glass and rock sponges, crinoids, black corals and anemones).



Juvenile Darwin's slimehead.



Limestone boulders that were not in place. These may have been subaerially exposed and eroded/weathered at one point.



Various holopodid crinoids, possibly *Holopus mikihe*.

Samples Collected

None except water samples, as we were within the 12nm boundary of St. Croix's territorial waters and did not have a permit to sample.

Niskin Sampling Summary

Sample ID	EX2206_D07_01W
Date (UTC)	20220829
Time (UTC)	124335
Depth (m)	517.808
Latitude (decimal degrees)	17.84611
Longitude (decimal degrees)	-64.44189
Bottle number	NISKIN 1
Temperature (°C)	12.997
Dissolved Oxygen (ml/L)	3.694
Treatment	eDNA

Sample ID	EX2206_D07_02W
Date (UTC)	20220829

Time (UTC)	170444
Depth (m)	513.314
Latitude (decimal degrees)	17.84174
Longitude (decimal degrees)	-64.440660
Bottle number	NISKIN 2
Temperature (°C)	11.854
Dissolved Oxygen (ml/L)	3.075
Treatment	eDNA

Sample ID	EX2206_D07_03W
Date (UTC)	20220829
Time (UTC)	172001
Depth (m)	496.736
Latitude (decimal degrees)	17.8415
Longitude (decimal degrees)	-64.44048
Bottle number	NISKIN 3
Temperature (°C)	12.587
Dissolved Oxygen (ml/L)	3.402
Treatment	eDNA

Sample ID	EX2206_D07_04W
Date (UTC)	20220829
Time (UTC)	200604
Depth (m)	268.161
Latitude (decimal degrees)	17.83796
Longitude (decimal degrees)	-64.440070
Bottle number	NISKIN 4
Temperature (°C)	19.241
Dissolved Oxygen (ml/L)	3.406

Scientists Involved

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