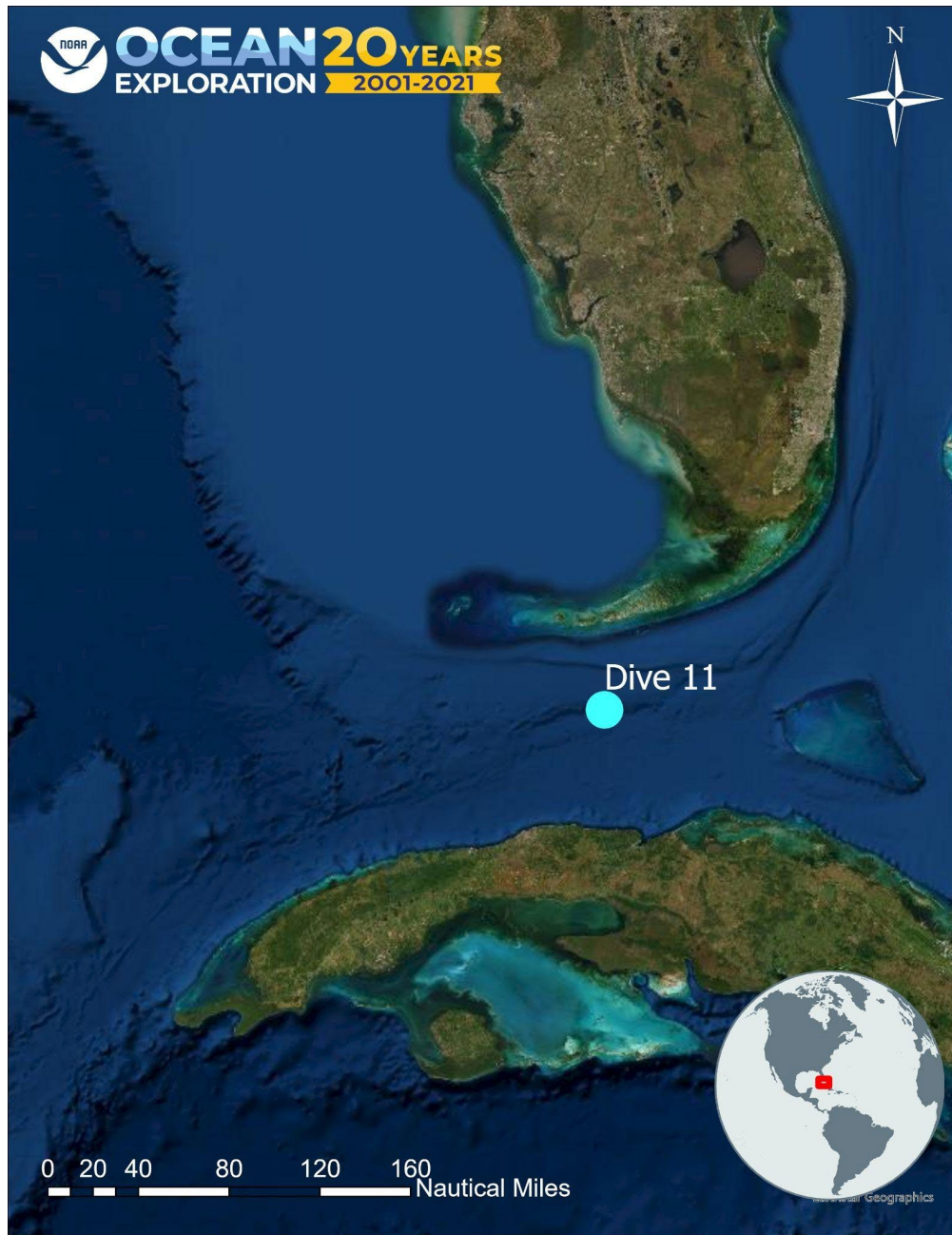


ROV Dive Summary, EX-21-07, Dive 11, November 10, 2021

General Location Map



During the dive, five water samples were taken for eDNA processing: **EX2107_D11_01W** at 500 m during descent; **EX2107_D11_02W** at 1152 m after achieving bottom; **EX2107_D11_05W** at 1131 about 2 hours into the transect after ascending the scarp wall about 20 meters; **EX2107_D011_10W** at 1114 m near the top of the escarpment wall; and **EX2107_D11_14W** at 1111 m at the end of our transect before leaving bottom.

When we reached our target depth, we encountered 100% flat silty sandy sediment with light bioturbation. The first organisms encountered were a few red crabs *Chaceon quinquegens*, one that was infested with amphipods. Other invertebrates spotted on the sandy bottom were Pectinidae- scallops, a sea star (*Zoroaster fulgens*) and a cirrate octopod (*Opisthoteuthis* sp.). Fish observed at the beginning of the dive were a *Halosaurus* sp., cut throat eels, a gulper shark (*Centrophorus granulosus*), the rattail *Gadomus longifilis*, and notably a large black fish identified by Ken Sulak as *Bythites gerdæ*. This cusk eel "swims in super slow-motion, a very rare fish, perhaps only imaged subsea once or twice. And, this dive is a depth record by about 200 m or more deeper than the known bathy range of 800 m." Additional fish included a *Polyacanthonotus rissoanus* (shortspine tapirfish) that was stuffed full of food. Also in the water column were numerous *Illex* squid, the rhopalonematid jellyfish *Crossota alba*, and water walker isopods (Munnopsidae).

As we made our way up the slope of the escarpment, we encountered a few boulders, white/cream in color with lots of pock holes. These rocks were inhabited by a yellow *Farrea* with zoanthid anemones (**EX2107_D11_03B**), *Sladenia shaeferi* – Shaffer's Anglerfish perched on top of a rock, a living *Solenasmilla* coral (<10 cm; our first encounter of several throughout the dive), numerous small encrusting demosponges, hydroids, and some small octocoral colonies (including the primnoid *Candidella imbricata* that was hosting with worm tubes).

As we continued the transect, the slope increased to a nearly ~90° wall. The wall was solid FeMg crusted, pocked hard rock, with large scintillation holes. Fossils were observed, suggesting the underlying formation was a fossilized reef. With the harder substrate, the sessile biota increased. Numerous black corals were encountered, including many orange *Aphanostichopathes* and more rarely *Tanacetipathes* with robust polyps, *Parantipathes* and *Stauropathes*. Red *Anthomastus*-like colonies were observed. Among the sponges observed, were a few small, white ball sponges (the hexactinellid *Leucopsacus*?), a strikingly beautiful, large Cladorhizidae - *Chondrocladia*, a carnivorous sponge that was collected (**EX2107_D11_04B**), another yellow *Farrea* glass sponge hosting bright yellow zoanthids (**EX2107_D11_06B**), and a second small white, spiky cladorhizid ball sponges (**EX2107_D11_07B**) that are thought to represent an undescribed species of *Abyssocladia*. We also encountered a diversity of other cnidarians, including solitary cup corals, the colonial scleractinian *Cladocora*, an anemone (flytrap?), a dandelion siphonophore, and a gorgonian of the family Chrysogorgiidae (**EX2107_D11_08B**). With the development of a rich fauna of filter feeders, we observed numerous comatulid crinoids (*Atelecrinus*, with long bare tips on their 10 arms). Near the top of the wall, we observed a great deal of standing dead scleractinian coral and coral rubble, some quite eroded, likely *Solenosmilia*.

Near the top of the wall, we observed more clear geological layering, with steps alternating between flat tops and ~90° rises. The hard substrate continued to be very white/pale with pock holes. In one of the sandy patches, we collected *Hyalonema* cf. *conqueror* (**EX2107_D11_09B**) with Zoanthids (**09B_A01**) on its long stalk made up of long unconsolidated basal spicules. The stalk of the sponge didn't make it into the tube completely and when they rotated the buckets, the stalk was bent and many of the zoanthids and associates were scraped off. Much of it was

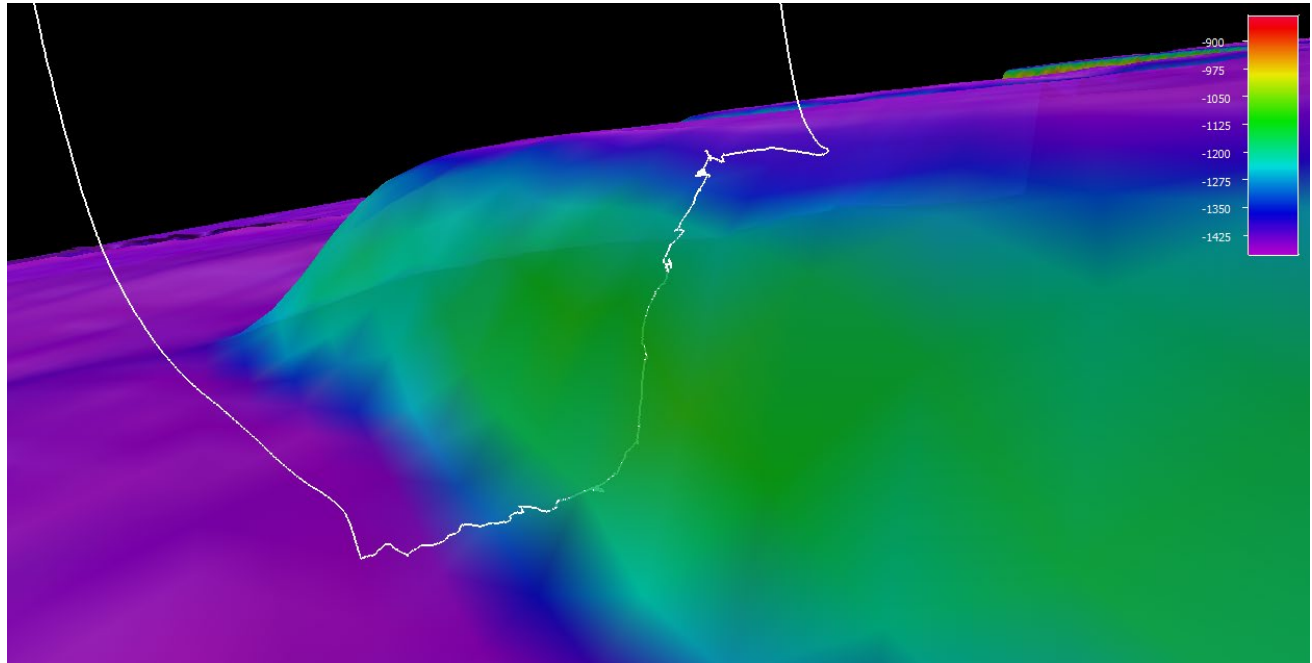
| | |
|--|--|
| | <p>recovered on the surface and processed normally. A female <i>Aldrovandia affinis</i> (long snouted with jet black nostrils) was imaged above the Hyalonema prior to collection.</p> <p>The final portion of the wall, from bottom to top, had a reduced slope (25-30°), with sharp rocks eroded black on top of white smooth base rock wall. At the very top, the wall flattened out (<10° slope), becoming 100% sediment. As we traversed along the top of the wall, the sides of the slope were hard bottomed and dominated by large, white/cream boulders with scintillation holes with dead coral rubble and standing dead coral between. This upper slope was supporting a wide variety of cnidarians including a royal purple soft coral, <i>Clavularia</i>, colonies of <i>Solenasmilla</i> (10-20 cm in size; collection made to confirm ID: EX2107_D11_12B). Among the abundant fans, we observed <i>Candidella imbricata</i>, including a large colony hosting worm tubes of the polychaete genus <i>Gorgoniapolynoe</i>, <i>Acanthogorgia</i>, and <i>Chrysogorgia</i>. Many of the fans were hosting commensal squat lobsters of the genus <i>Uroptychus</i>, and we collected an exemplar <i>Chrysogorgia</i> (EX2107_D11_11B) with associate squat lobsters (both escaped capture). We observed the asteroid <i>Floriaster maya</i> feeding on mostly dead fan coral. Among the other fauna observed in this part of the transect were soft corals (<i>Pseudodrifa</i> and <i>Anthomastus-like</i>), black corals (<i>Leiopathes</i>, <i>Bathypathes</i>, <i>Aphanostichopathes</i>), a pleurogorgiid hosting a hermit crab, a bright blue desmocellid sponge, additional <i>Farrea</i> with zoanthids, stylaterids, and white <i>Echinus</i> (but with tinges of orange, likely <i>E. tylodes</i>).</p> <p>The sand on the upper part of the reef had several colonies of an unusual gorgonian specialized to inhabit soft bottoms (with a root system), <i>Acanella aurelia</i>. One colony with 2 <i>Uroptychus</i> squat lobsters [(EX2107_D11_13B and 13B_A01 (n=1; second escaped))] were collected, just the 2nd known sample of <i>A. aurelia</i>. <i>Bathynomus</i> was spotted swimming by in the water column and our final organism imaged was the skate <i>Raja purpuriventralis</i>.</p> <p>Human Debris: Fishing line, plastics, fabrics</p> |
| Notable Observations | <ul style="list-style-type: none"> • We observed the cusk eel <i>Bythites gerdæ</i>, perhaps imaged in situ only once or twice before, and this at a depth 200 meters or more below its known depth range • We observed and collected two carnivorous sponges, both perhaps representing species that have yet to be described • We made just the second collection of an unusual gorgonian specialized to inhabit soft bottoms (with a root system), <i>Acanella aurelia</i> |
| Community and habitat observations | <p>Corals and Sponges - Present Chemosynthetic Community - Absent High biodiversity Community - Present Active Seep or Vent - Absent Extinct Seep or Vent - Absent Hydrates - Absent</p> |
| CMECS Feature Type(s) | Scarp/Wall |
| SeaTube Link (science annotation system) | https://data.oceannetworks.ca/SeaTubeV3?resourceTypeId=600&resourceId=2523 |

Equipment Deployed

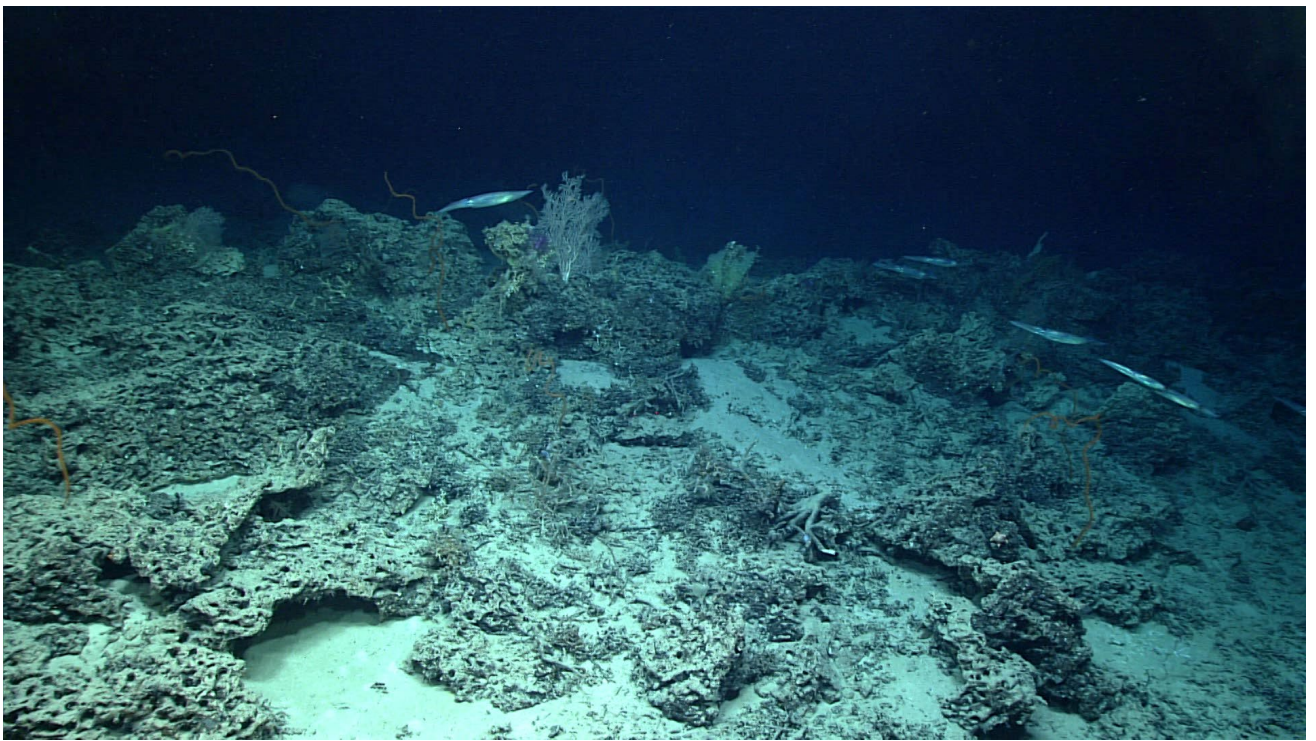
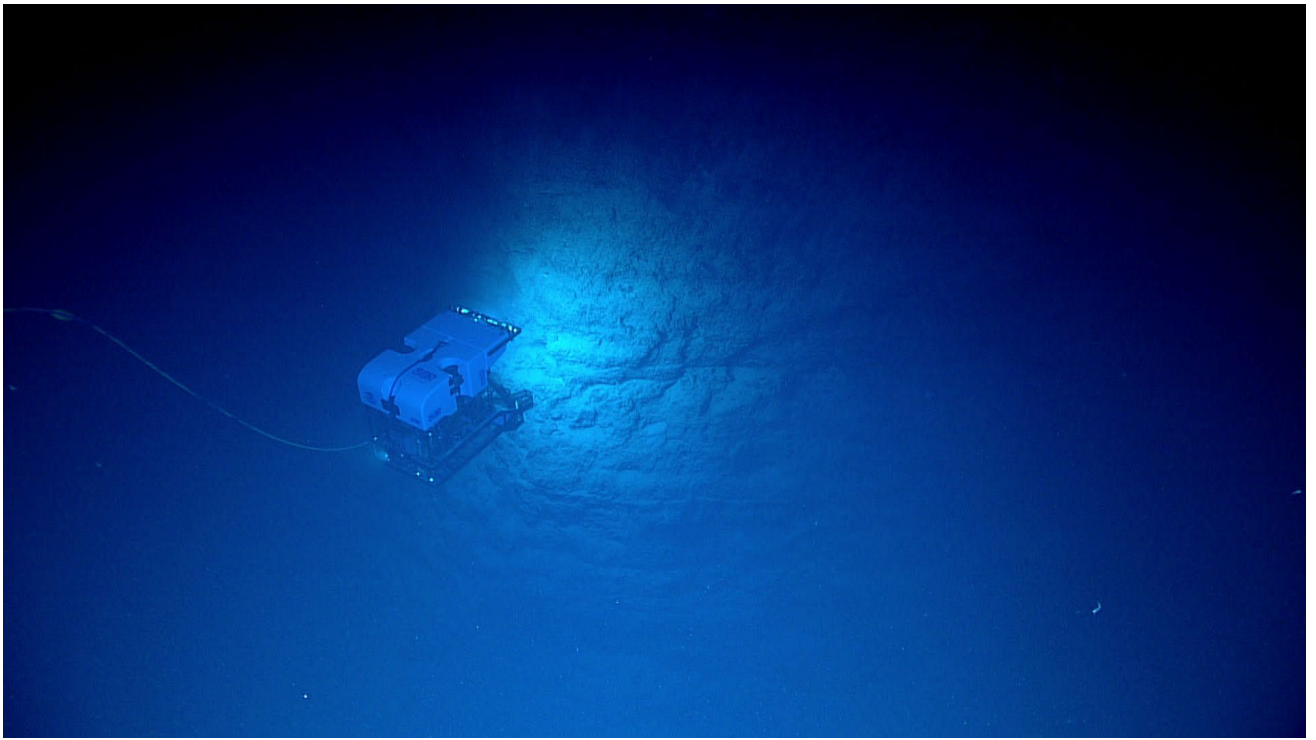
| | |
|-----------------|------------------------|
| ROV | <i>Deep Discoverer</i> |
| Camera Platform | <i>Seirios</i> |

| | |
|------------------------|--|
| 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 | |

Close-up Map of Main Dive Site



Representative Photos of the Dive

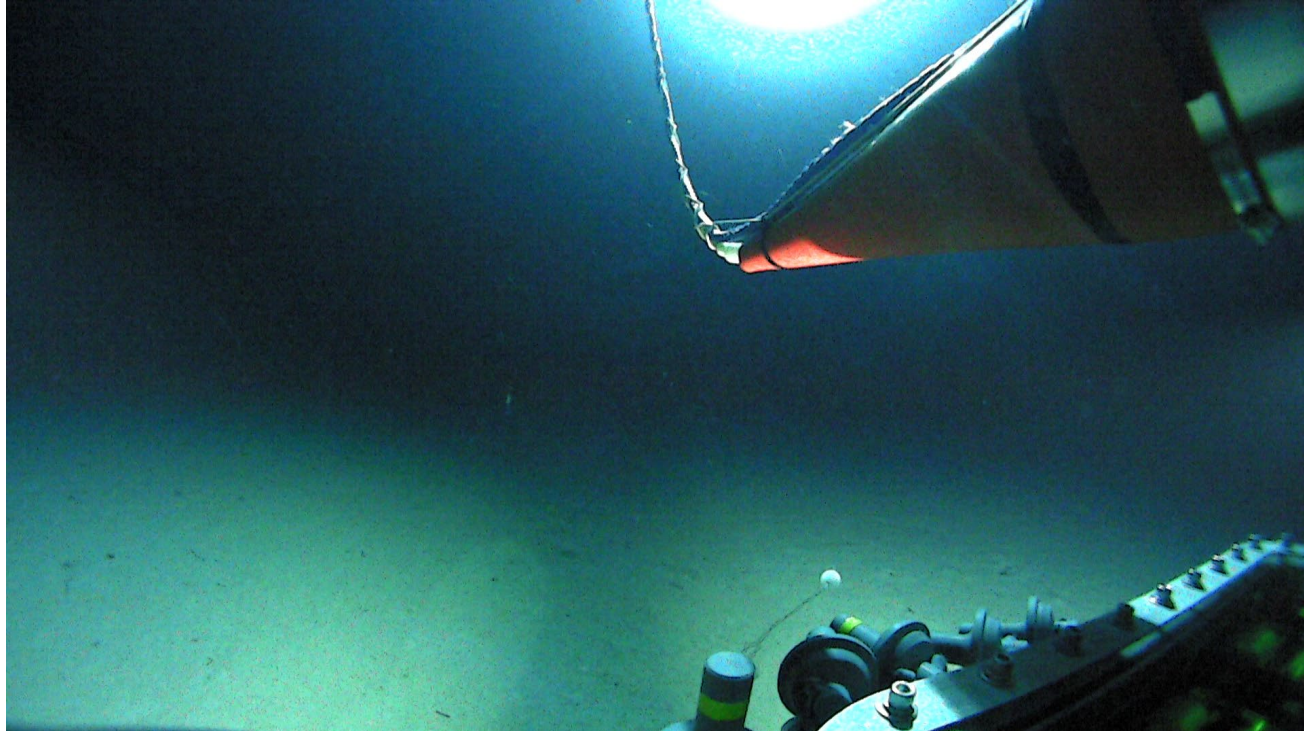


Samples Collected -



| | |
|-----------------------------|----------------|
| Sample ID | EX2107_D11_01W |
| Date (UTC) | 20211110 |
| Time (UTC) | 143135 |
| Depth (m) | 502.188 |
| Latitude (decimal degrees) | 23.9695 |
| Longitude (decimal degrees) | -81.79865 |
| Temp. (°C) | 13.613 |
| Field ID(s) | Water sample |
| Comments | eDNA |

| Associates Sample ID | Field Identification | Count |
|----------------------|----------------------|-------|
| N/A | N/A | N/A |



| | |
|-----------------------------|----------------|
| Sample ID | EX2107_D11_02W |
| Date (UTC) | 20211110 |
| Time (UTC) | 151140 |
| Depth (m) | 1152.242 |
| Latitude (decimal degrees) | 23.96935 |
| Longitude (decimal degrees) | -81.799160 |
| Temp. (°C) | 4.401 |
| Field ID(s) | Water sample |
| Comments | eDNA |

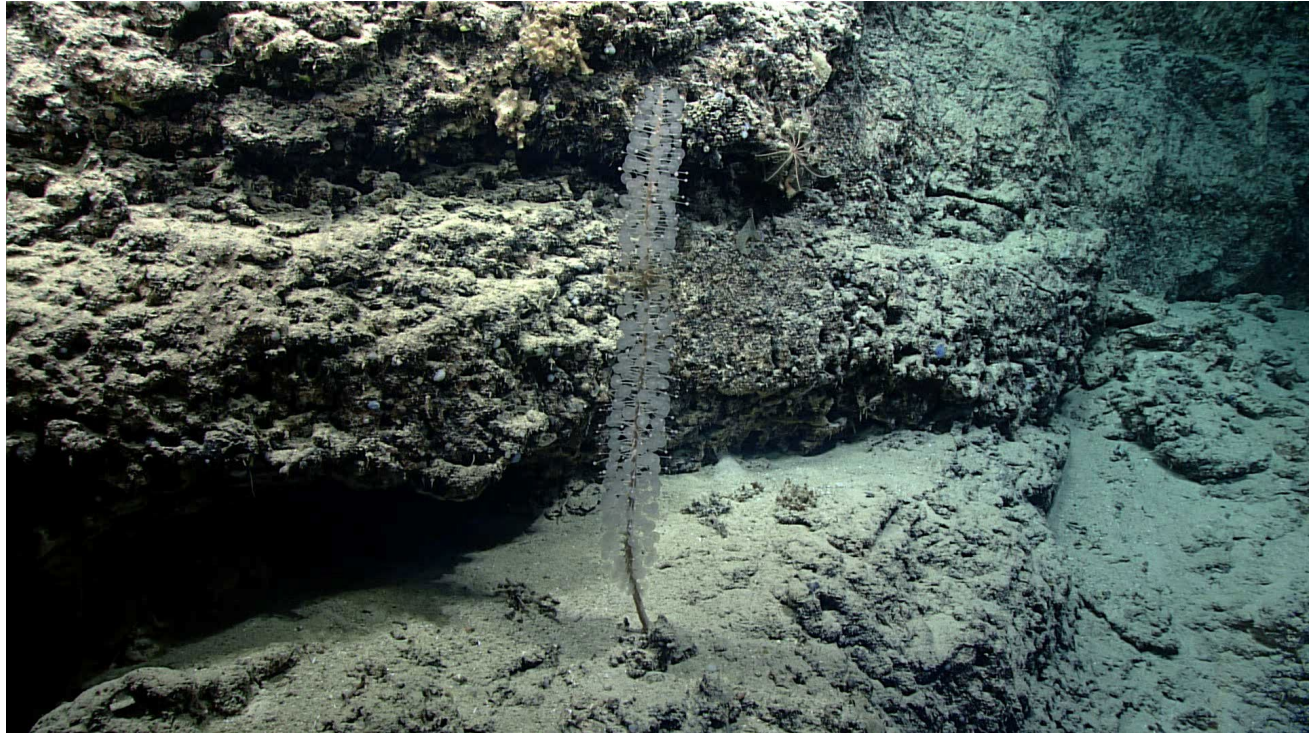
| Associates Sample ID | Field Identification | Count |
|----------------------|----------------------|-------|
| N/A | N/A | N/A |

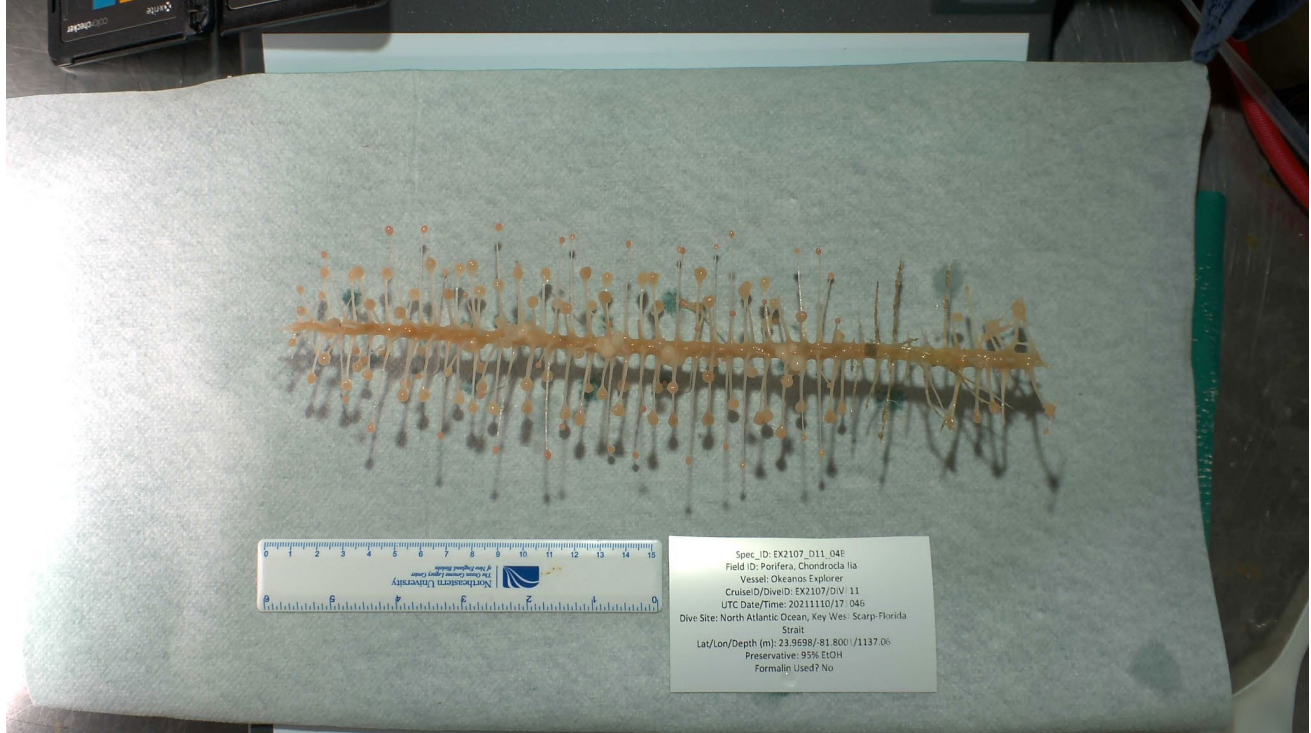


| | |
|-----------------------------|----------------|
| Sample ID | EX2107_D11_03B |
| Date (UTC) | 20211110 |
| Time (UTC) | 161659 |
| Depth (m) | 1155.005981 |
| Latitude (decimal degrees) | 23.96971321 |
| Longitude (decimal degrees) | -81.79990387 |
| Temp. (°C) | 4.40100023 |

| | |
|-------------|-----------------------|
| Field ID(s) | Farreidae |
| Comments | Crispy, mostly yellow |

| Associates Sample ID | Field Identification | Count |
|----------------------|----------------------|-------|
| EX2107_D11_03B_A01 | Zoantharia | 2 |
| EX2107_D11_03B_A02 | Polychaeta | 1 |
| EX2107_D11_03B_A03 | Amphipoda | 1 |





Spec_ID: EX2107_D11_04B
 Field ID: Porifera, Chondrocladia
 Vessel: Okeanos Explorer
 Cruise/DiveID: EX2107/04B
 UTC Date/Time: 20211110/17:046
 Dive Site: North Atlantic Ocean, Key West Scarp-Florida Strait
 Lat/Lon/Depth (m): 23.9698/-81.8001/1137.06
 Preservative: 95% EtOH
 Formalin Used? No

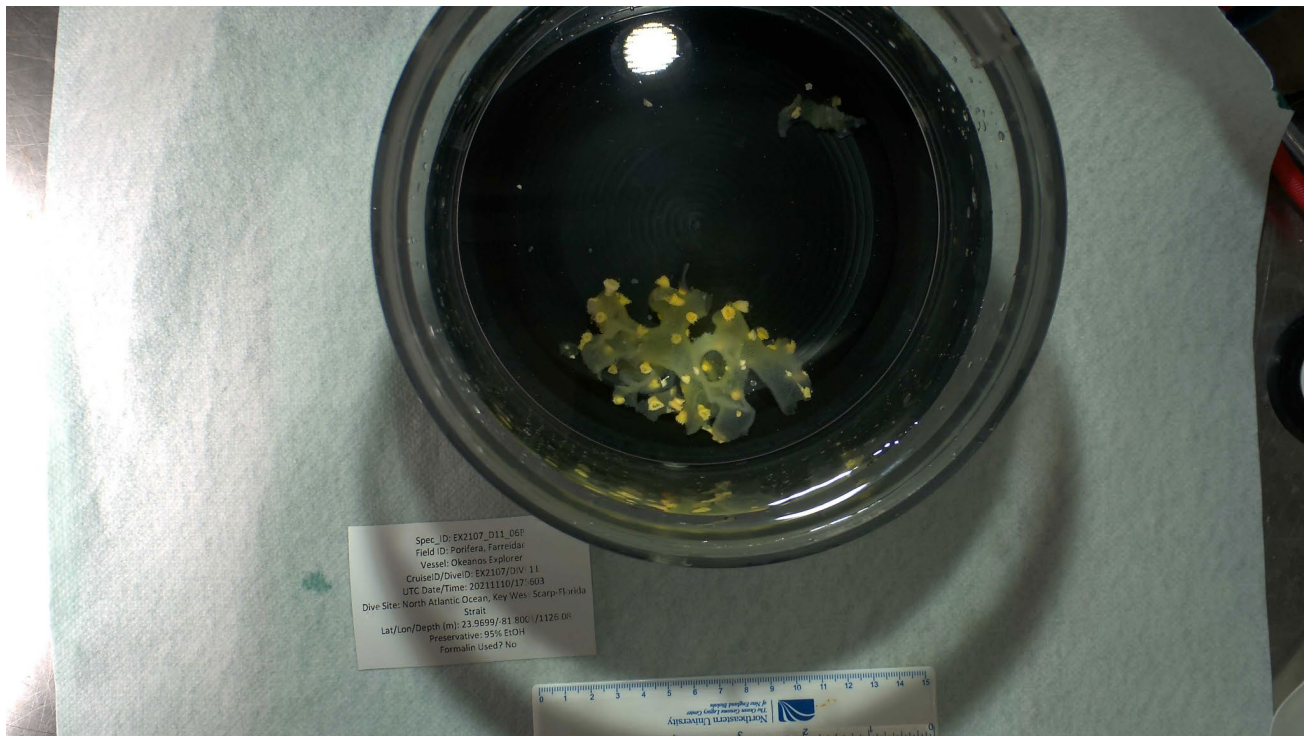
| | |
|-----------------------------|--|
| Sample ID | EX2107_D11_04B |
| Date (UTC) | 20211110 |
| Time (UTC) | 171046 |
| Depth (m) | 1137.055054 |
| Latitude (decimal degrees) | 23.9697876 |
| Longitude (decimal degrees) | -81.80013275 |
| Temp. (°C) | 4.492000103 |
| Field ID(s) | Chondrocladia |
| Comments | Sturdy central stalk with 1-2 cm large spherical semi-transparent lobe on tips of horizontal spines, deflated in lab; 0.5 cm spherical lobes on longer spines; cream colored on surface. Central stalk 0.5 cm diameter made up of spicule conglomerate |

| Associates Sample ID | Field Identification | Count |
|----------------------|----------------------|-------|
| N/A | N/A | N/A |



| | |
|-----------------------------|----------------|
| Sample ID | EX2107_D11_05W |
| Date (UTC) | 20211110 |
| Time (UTC) | 172010 |
| Depth (m) | 1131.014 |
| Latitude (decimal degrees) | 23.969830 |
| Longitude (decimal degrees) | -81.800070 |
| Temp. (°C) | 4.432 |
| Field ID(s) | Water sample |
| Comments | eDNA |

| Associates Sample ID | Field Identification | Count |
|----------------------|----------------------|-------|
| N/A | N/A | N/A |



| | |
|-----------------------------|----------------|
| Sample ID | EX2107_D11_06B |
| Date (UTC) | 20211110 |
| Time (UTC) | 175603 |
| Depth (m) | 1126.078979 |
| Latitude (decimal degrees) | 23.96988487 |
| Longitude (decimal degrees) | -81.80012512 |
| Temp. (°C) | 4.429999828 |

| | |
|-------------|---|
| Field ID(s) | Farreidae |
| Comments | Yellow, crispy, white at growing end, fluted, fragile |

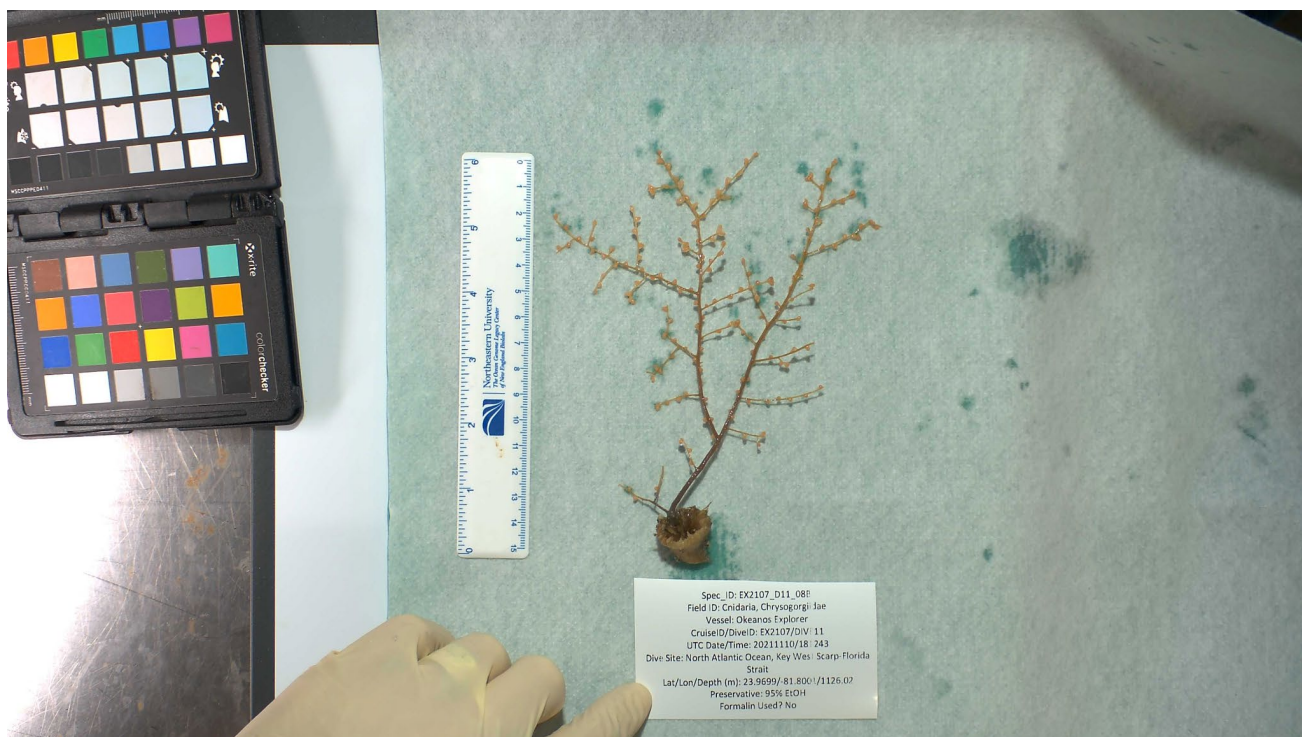
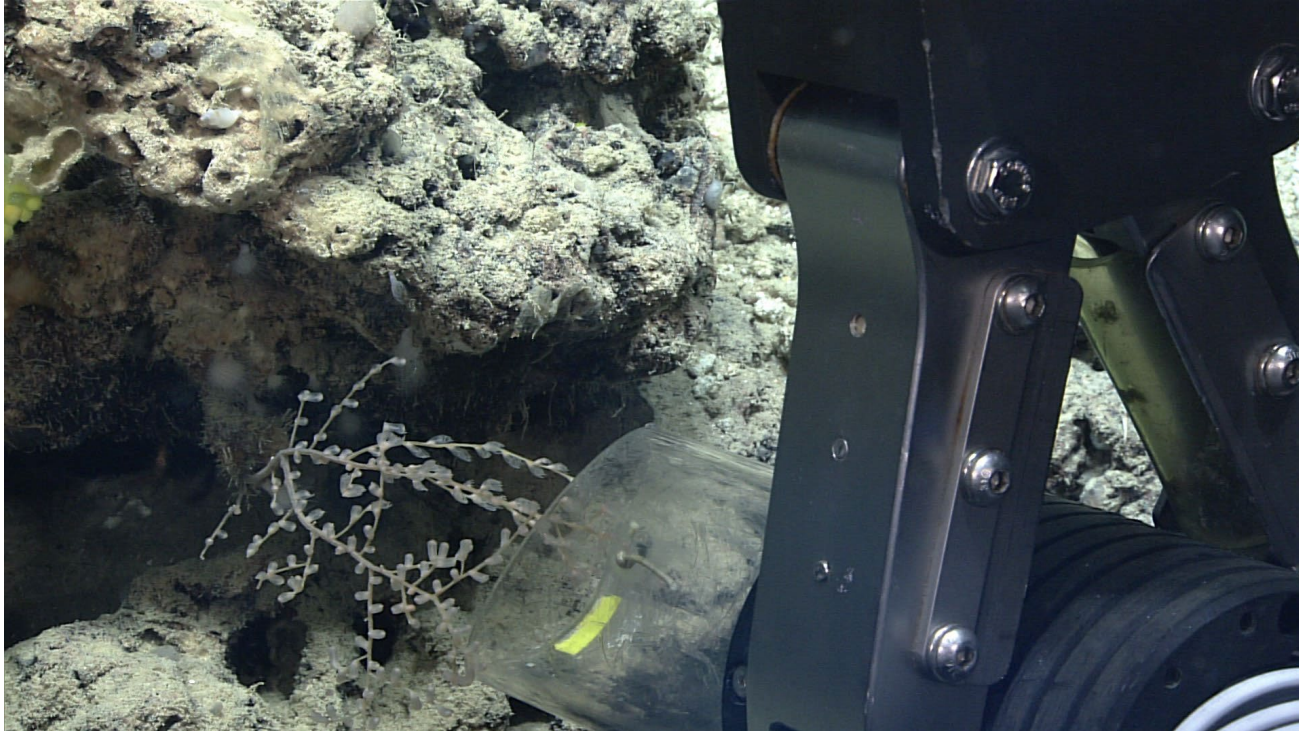
| Associates Sample ID | Field Identification | Count |
|----------------------|----------------------|-------|
| EX2107_D11_06B_A01 | Zoantharia | 2 |





| | |
|-----------------------------|--|
| Sample ID | EX2107_D11_07B |
| Date (UTC) | 20211110 |
| Time (UTC) | 180003 |
| Depth (m) | 1125.969971 |
| Latitude (decimal degrees) | 23.96988487 |
| Longitude (decimal degrees) | -81.80012512 |
| Temp. (°C) | 4.443999767 |
| Field ID(s) | Abyssocladia |
| Comments | Spherical spiky ball, white, deflated in lab |

| Associates Sample ID | Field Identification | Count |
|----------------------|----------------------|-------|
| N/A | N/A | N/A |



| | |
|-----------------------------|----------------|
| Sample ID | EX2107_D11_08B |
| Date (UTC) | 20211110 |
| Time (UTC) | 181243 |
| Depth (m) | 1126.024048 |
| Latitude (decimal degrees) | 23.9698658 |
| Longitude (decimal degrees) | -81.80013275 |
| Temp. (°C) | 4.44299984 |

| | |
|-------------|---|
| Field ID(s) | Chrysogorgiidae |
| Comments | Yellow, polyps exert, planar, attached to dead solitary cup coral |

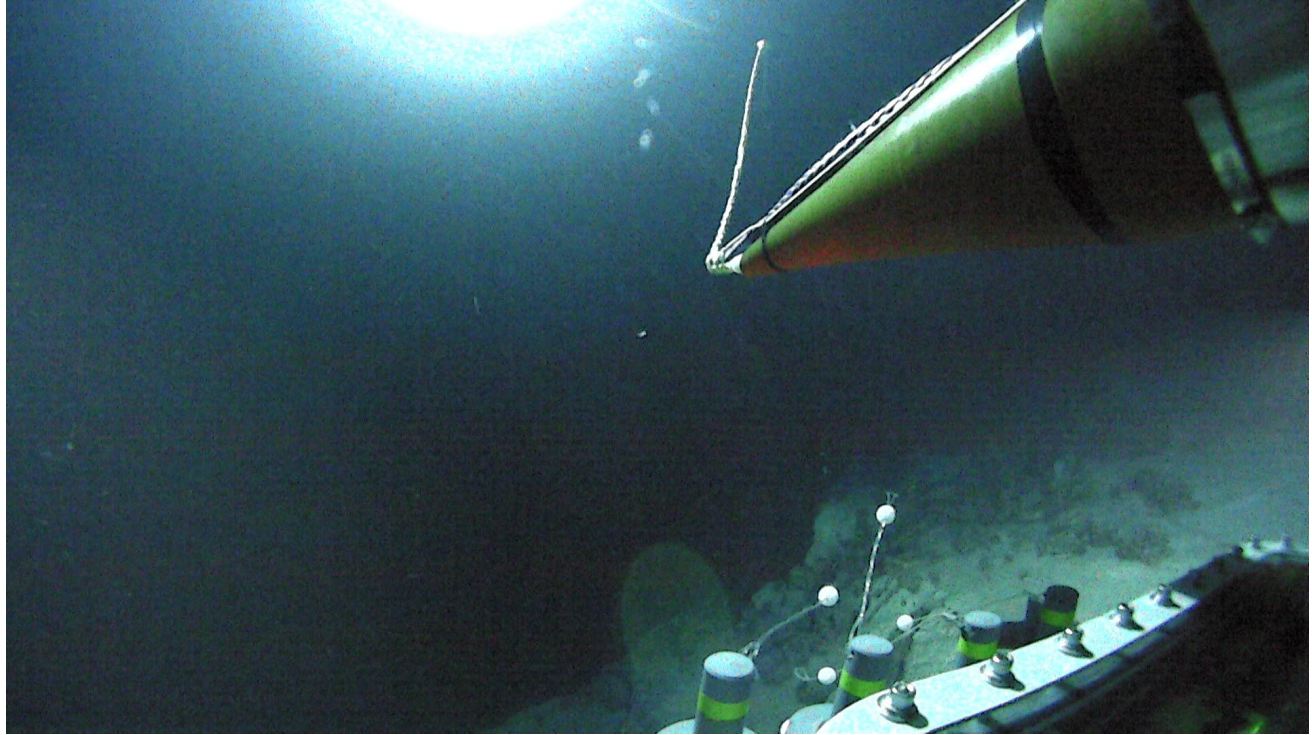
| Associates Sample ID | Field Identification | Count |
|----------------------|----------------------|-------|
| N/A | N/A | N/A |





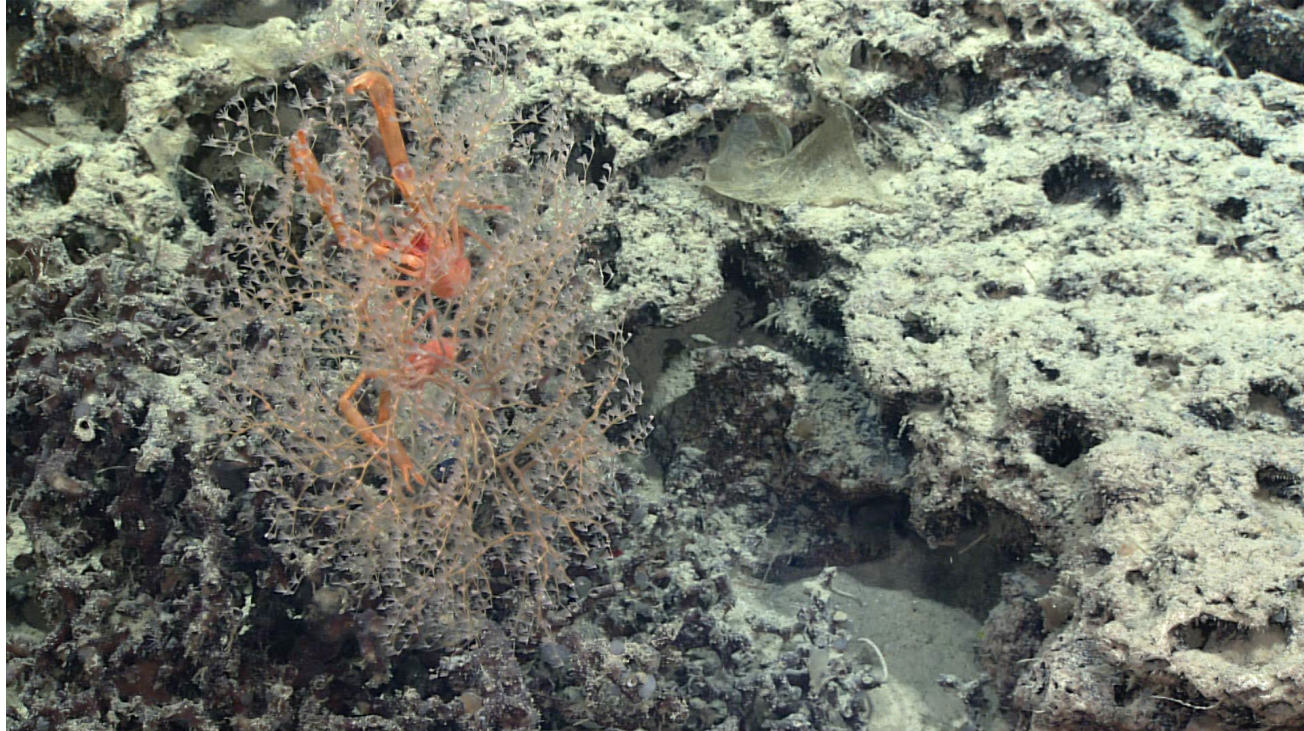
| | |
|-----------------------------|--|
| Sample ID | EX2107_D11_09B |
| Date (UTC) | 20211110 |
| Time (UTC) | 184302 |
| Depth (m) | 1116.713013 |
| Latitude (decimal degrees) | 23.96994972 |
| Longitude (decimal degrees) | -81.80025482 |
| Temp. (°C) | 4.459000111 |
| Field ID(s) | Hyalonema |
| Comments | Spicule stalk, cream colored, spongy top, goblet-shaped, very soft sponge, compressible, resilient |

| Associates Sample ID | Field Identification | Count |
|----------------------|----------------------|-------|
| EX2107_D11_09B_A01 | Zoantharia | 2 |
| EX2107_D11_09B_A01 | Paguridae | 1 |



| | |
|-----------------------------|----------------|
| Sample ID | EX2107_D11_10W |
| Date (UTC) | 20211110 |
| Time (UTC) | 185447 |
| Depth (m) | 1115.246 |
| Latitude (decimal degrees) | 23.96998 |
| Longitude (decimal degrees) | -81.800260 |
| Temp. (°C) | 4.462 |
| Field ID(s) | Water sample |
| Comments | eDNA |

| Associates Sample ID | Field Identification | Count |
|----------------------|----------------------|-------|
| N/A | N/A | N/A |

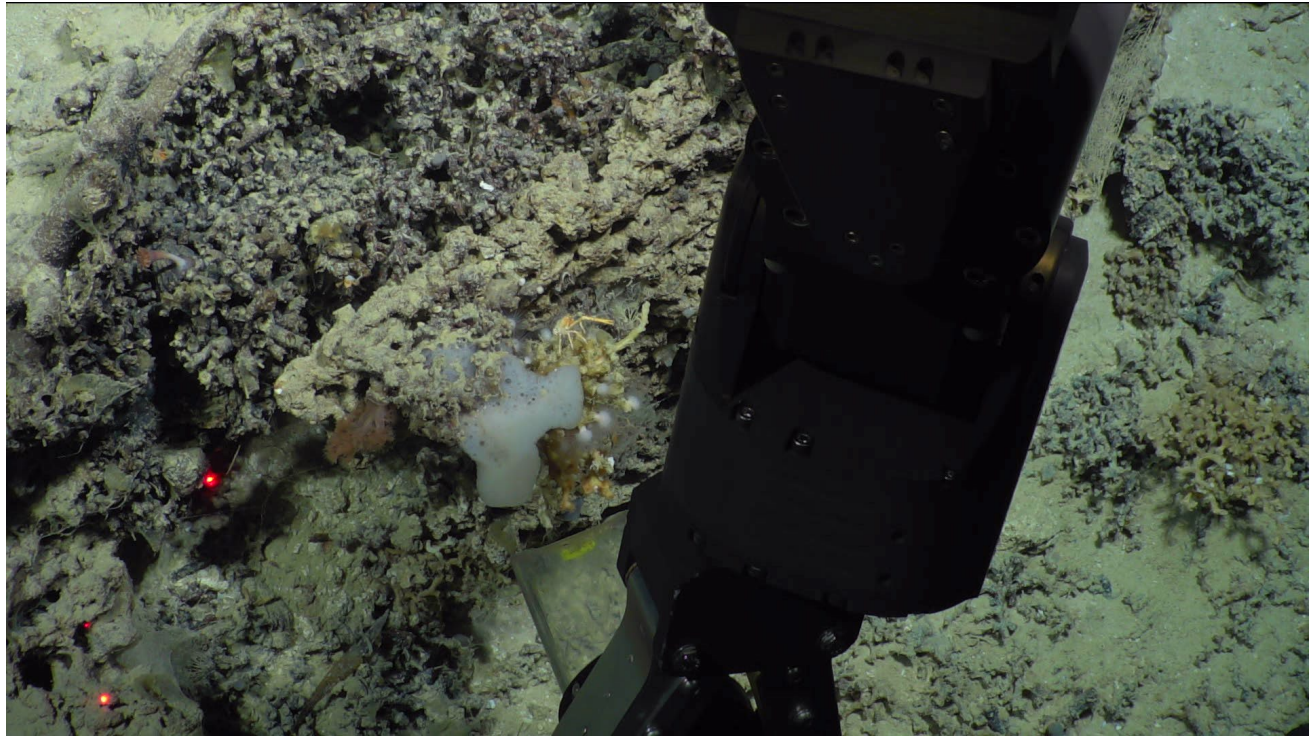


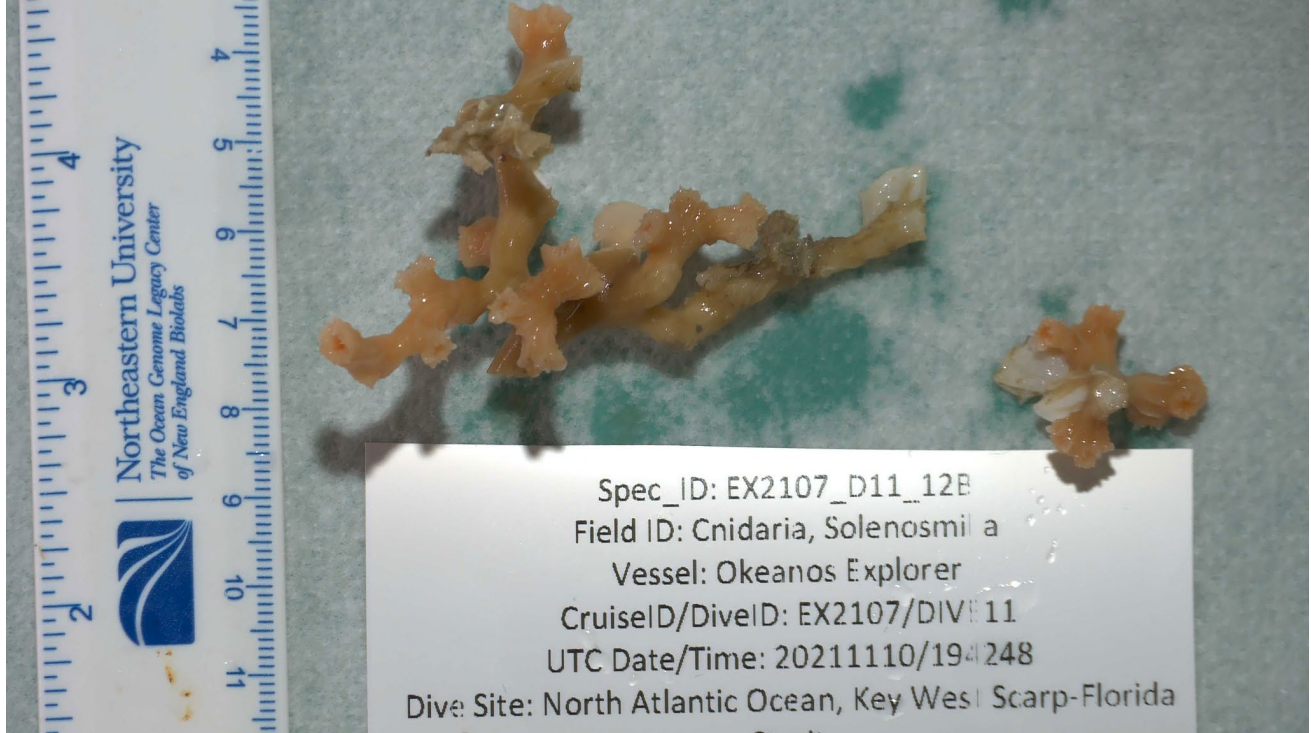
Spec_ID: EX2107_D11_11B
 Field ID: Cnidaria, Chrysozonia
 Vessel: Okeanos Explorer
 CruiseID/DivID: EX2107/DIV_11
 UTC Date/Time: 20211110/19:758
 Dive Site: North Atlantic Ocean, Key West-Scarp-Florida
 Strait
 Lat/Lon/Depth (m): 23.9700/-81.8001/1114.06
 Preservative: 95% EtOH
 Formalin Used? No

| | |
|-----------------------------|----------------|
| Sample ID | EX2107_D11_11B |
| Date (UTC) | 20211110 |
| Time (UTC) | 191758 |
| Depth (m) | 1114.057007 |
| Latitude (decimal degrees) | 23.96997261 |
| Longitude (decimal degrees) | -81.80020142 |
| Temp. (°C) | 4.46999979 |

| | |
|-------------|---|
| Field ID(s) | Chrysogorgia |
| Comments | Zig-zag central axis, bushy in three dimensions, fine |

| Associates Sample ID | Field Identification | Count |
|----------------------|----------------------|-------|
| N/A | N/A | N/A |





| | |
|-----------------------------|---|
| Sample ID | EX2107_D11_12B |
| Date (UTC) | 20211110 |
| Time (UTC) | 194248 |
| Depth (m) | 1113.725952 |
| Latitude (decimal degrees) | 23.96998405 |
| Longitude (decimal degrees) | -81.80023193 |
| Temp. (°C) | 4.478000164 |
| Field ID(s) | Solenosmilia |
| Comments | Slimey, ridges underneath coralites, barnicles on dead part of coral but still on |

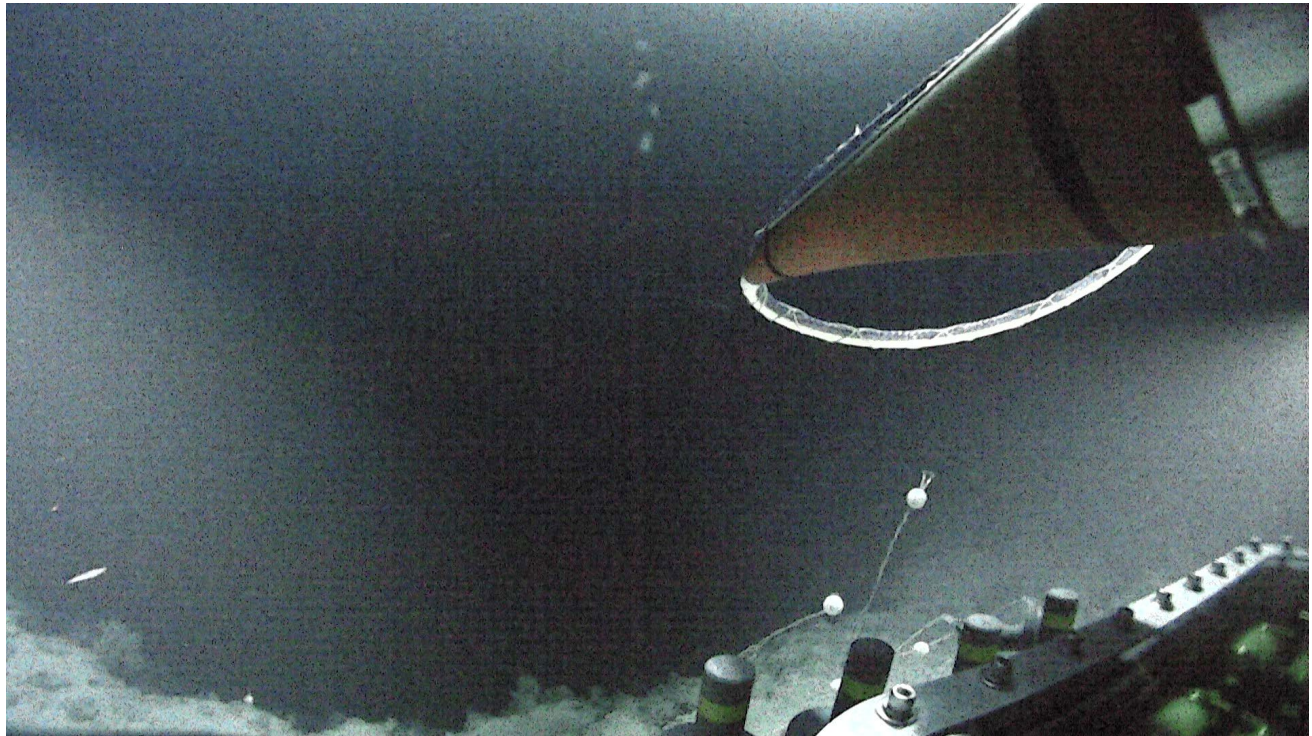
| Associates Sample ID | Field Identification | Count |
|----------------------|----------------------|-------|
| N/A | N/A | N/A |



| | |
|-----------------------------|----------------|
| Sample ID | EX2107_D11_13B |
| Date (UTC) | 20211110 |
| Time (UTC) | 200653 |
| Depth (m) | 1113.887939 |
| Latitude (decimal degrees) | 23.97003555 |
| Longitude (decimal degrees) | -81.80021667 |

| | |
|-------------|---|
| Temp. (°C) | 4.47300005 |
| Field ID(s) | Acanella aurelia |
| Comments | Gold nodes, nodal branching, up to 4 branches per node, 3D, bushy, slimey |

| Associates Sample ID | Field Identification | Count |
|----------------------|----------------------|-------|
| EX2107_D11_13B_A01 | Uroptychus | 1 |



| | |
|-----------------------------|----------------|
| Sample ID | EX2107_D11_14W |
| Date (UTC) | 20211110 |
| Time (UTC) | 203457 |
| Depth (m) | 1111.065 |
| Latitude (decimal degrees) | 23.97042 |
| Longitude (decimal degrees) | -81.80019 |
| Temp. (°C) | 4.479 |
| Field ID(s) | Water sample |
| Comments | eDNA |

| Associates Sample ID | Field Identification | Count |
|----------------------|----------------------|-------|
|----------------------|----------------------|-------|

| | | |
|-----|-----|-----|
| N/A | N/A | N/A |
|-----|-----|-----|

Scientists Involved (provide name, email, affiliation)

| First Name | Last Name | Email | Affiliation |
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