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#### Purpose of the Dive

To survey the deep fish and coral/sponge communities in state waters around Ni'ihau, where the Hawaiian Islands Humpback Whale National Marine Sanctuary is considering expansion.

#### Description of the Dive:

The dive track explored the slope of a pinnacle on the southwest side of Ni'ihau. The geological setting at the target site was dramatic pillow lava structures with little sedimentation. The vesiculation of the pillow lavas was thought to suggest a relatively shallow eruption. Many corals were immediately observed, including octocorals *Anthomastus*, *Chrysogorgia stellata*, *?Anthomuricea tenuispina*, stony corals *Enallopsammia rostrata* (with many dead skeletons as well), and black corals *Umbellapathes*, *Leiopathes annosa*. Several of the *Chrysogorgia* colonies had squat lobster (Chirostylidae) associates, and *Asteroschema*-like ophiuroids and asteroid brisingids (*Novodinia pacifica*) were seen on other corals. Sponges, thought to be *Farrea* cf. *occa* and *Regadrella* sp., sea anemones, sea urchins (echinothurids or *Micropyga tuberculata*, and *Histocidaris variabilis*), crabs (Homolidae, possibly *Paramola* sp.) and shrimp (*Heterocarpus laevigatus*) were also seen. A few fish were seen in the early parts of the dive, including a few macrourids (*?Nezumia*) and *Setarches guentheri*. We collected a rock sample from the deep section of the dive track, likely a basalt, from a depth of 567 m.

Further up the pinnacle, we saw additional species, including a small sea pen, perhaps *Pennatula inflata*, *Narella ?vermifera*, *Paracalyptrophora*, *Isidella* sp., *Corallium*, *Siphonogorgia alexandri*, *Stauropathes*, cup corals, both yellow and purple morphs of *Enallopsammia*, and colonial hydroid fans (*Hydrodendron gorgonoide*). On one colony we observed cowries (Olividae) that may have been feeding. More urchins were seen, including *Histocidaris variabilis*, with attached barnacles (*Megalasma* sp.) on the spines, and *Sterocidaris hawaiiensis*.

At ≈400 m, a striking field of rock pens (Pennatulacea, likely the genus *Anthoptilum*), in very high densities was observed; a specimen was collected. Such densities have not previously been reported. Some of the rock pens were being preyed upon by *Hippasteria* sea stars, and two asteroid species were commonly seen among the rock pen fields. Another interesting observation included an extensive mat of zoanthids growing on the high point of a pillow lava formation, and a collection of at least 10 large *Anthomastus* colonies with an intricately branched basketstar (Gorgonocephalidae) atop them. More sponges were present at the shallower depths, including *Poecilastra* sp., *?Gymnorette* and an unidentified Demosponge.

Fish were also more commonly observed at the shallower depths of the dive track, including alfonsino *Beryx spendens* (one with ectoparasite), *Epigonus glossodontus*, *Polymixia* sp, and several *Hollardia goslinei*.

In addition to the change in substrate as we climbed the pinnacle (pillow lava flows to carbonate and hard packed sediment), there was also a dramatic change in dissolved oxygen, increasing almost threefold to the top of the pinnacle. On the upper part of the pinnacle, we saw *Bathypathes*, *Stichopathes* sp. (white), *?Dendropathes* or *Chrysopathes*, *Eguchisammia fistula*, and *Lepidisis olapa*, *Anthomastus fisheri*, and *Callogorgia gilberti*. Even more fish were present in this depth range, including *Epigon*, *Setarches*, *Symphysanodon maunaloae*, *Chironema chryseres*, the morid *Laemonema rhodochir*, *Grammatonotus laysanus*, *Chaunax umbrinus*, and *Antigonia* in high abundance. Commercially targeted bottomfish species fished around the Hawaiian Islands were not seen. However, typical bottomfish prey were seen, including the fish *Symphysanodon*, suggesting that this may be suitable habitat for bottomfish species. Different crabs appeared, including *Progeron ?mus* and a decorator crab, *Paramola* sp.

The summit of the pinnacle was largely carbonate and sedimented. *Heterolepas* barnacles, sea urchins (*Caenopedina pulchella*) and an octopus, likely an undescribed species, were observed here, as was the bamboo coral *Lepidisis olapa*, which is known to be bioluminescent. We conducted an experiment where the ROV lights were turned off and the claw of the manipulator arm used to stroke the coral. The disturbance triggered both a bioluminescence response (a faint blue light) and the secretion of mucus.

#### Fauna observed

**Cnidarians: Octocorallia:** *Anthomastus*, *Chrysogorgia ?stellata*, *Narella ?vermifera*, *Paracalyptrophora*, *Callogorgia gilberti*, *Isidella*, *Acanella*, *Keratoisis*, *Lepidisis olapa*, *Hemicorallium* cf. *lauense*, Plexauridae (maybe *Anthomuricea tenuispina*), *Paracis*, possible Gorgoniidae or Ellisellidae, soft coral *Siphonogorgia alexandri*, *Pennatula inflata*, rock pen (*?Anthoptilum*); **Hexacorallia:**

*Enallopsammia* (yellow morph and purple morph), *Eguchisammia fistula*, cup corals; Actiniaria actinostolid, Hormathiidae; Antipatharia *Umbellapathes*, *Leiopathes annosa*, *Stauropathes*, *Bathypathes*, ?*Chrysopathes*, *Stichopathes*; zoanths, *Kulamanamana haumaea*; Corallimorpharia; **Hydrozoa**: Narcomedusae ?*Solmissus*, colonial fan *Hydrodendron gorgonoide*

**Sponges** Farreidae, *Farrea* cf. *occa*, *Regadrella* sp., *Poecilastra* sp., Demosponge, *Gymnorette* sp.?

**Echinoderms: Echinoids**: cidarids, *Histocidaris variabilis*, possible Echinothurid or *Micropyga tuberculata*, *Caenopedina pulchella*;  
**Asteroidea**: brisingids (*Novodinia pacifica*), *Hippasteria*, ? *Astroceramus*, *Sphaeriodiscus ammophilis*, *Mediaster* ?*ornatus*;  
**Ophiuroids**: basket star Gorganocephalidae, tiny red ophiuroids; **Crinoidea**

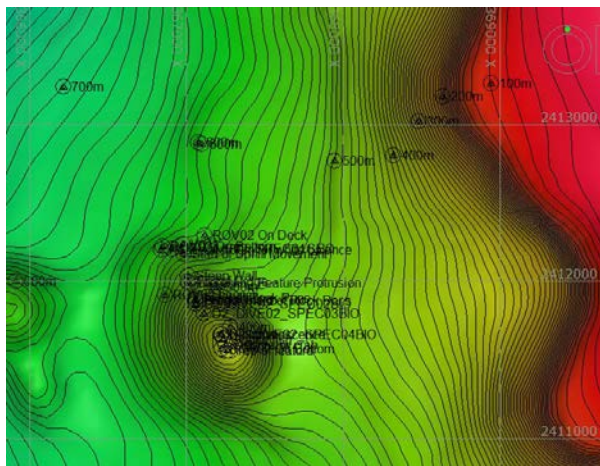
**Arthropods**: Squat lobsters *Eumunida* and chirostylids, lithodid crab *Progeryon mus*, *Cyrotomaia*, Calappidae?, decorator crab (Homolidae, ?*Paramola*), shrimp *Heterocarpus laevigatus*, *Plesionika*, gooseneck barnacles *Heterolepas*, sea spider Pycnogonida

**Fishes** Macrourid, *Setarches guentheri*, Macrourid – *Nezumia*, *Beryx splendens*, Epigonidae, *Hollardia goslinei*, *Epigonus glossodontus*, *Polymixia berndti*, *Antigonia* sp., *Symphysanodon maunaloae*, *Setarches guentheri*, *Grammatonotus laysanus*, *Chaunax umbrinus*

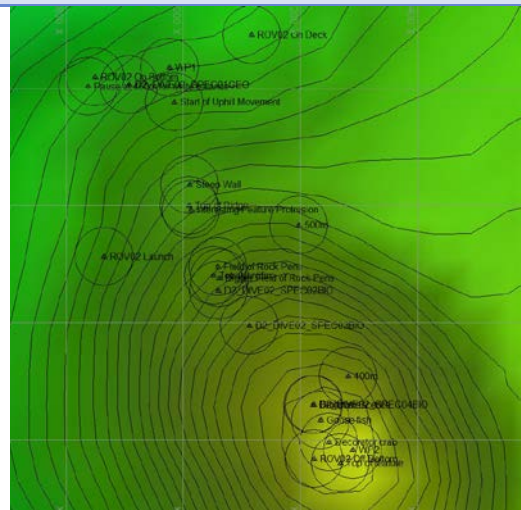
**Other**

Cowry snails (Gastropoda, Oluvidae) on *Hydrodendron*, snail on dead bamboo coral whip skeleton, Octopus ?*Callistoctopus*

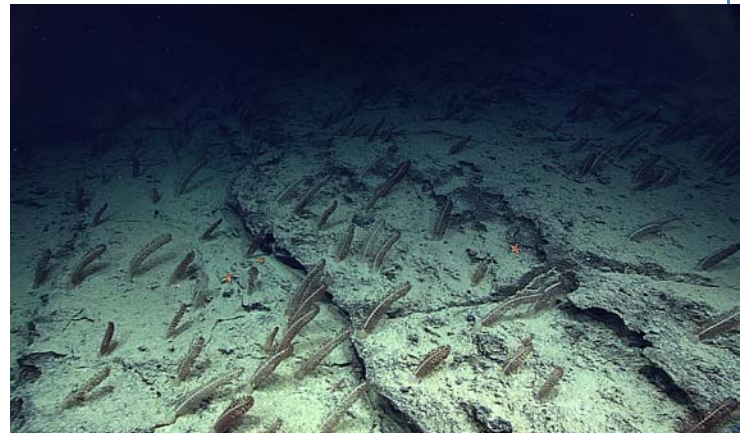
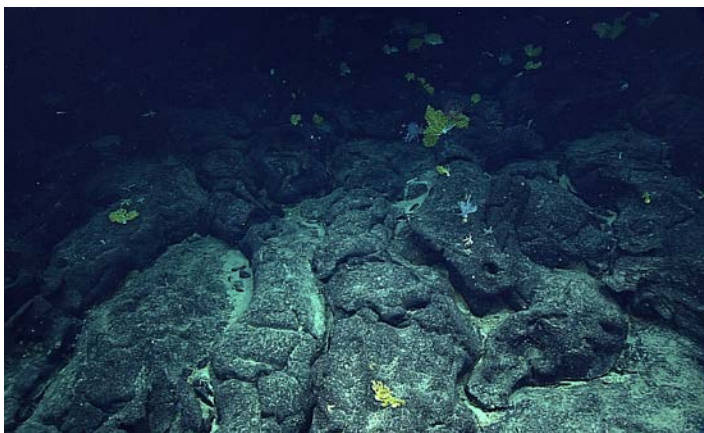
**Overall Map of ROV Dive Area**



**Close-up Map of Main Dive Site**



**Representative Photos of the Dive**





**Samples Collected**

Sample ID	EX1504L4_20150913T195328_D2_DIVE02_SPEC01GEO
Date (UTC)	20150913
Time (UTC)	195328
Depth (m)	567.37
Temperature (°C)	6.13
Field ID(s)	Basalt



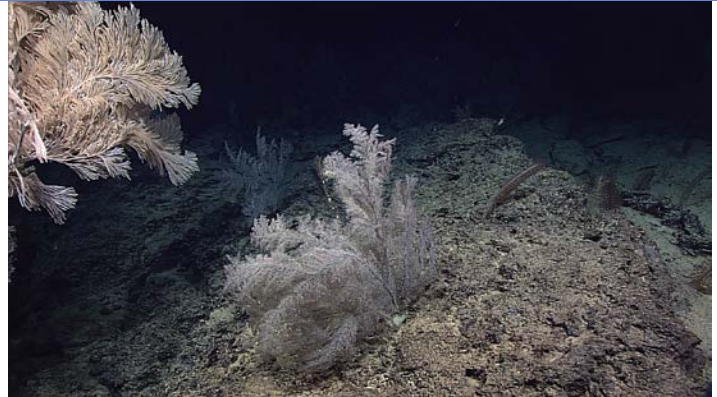
**Comments** *Cube shaped, brown orange oxydized, vesicular surface*

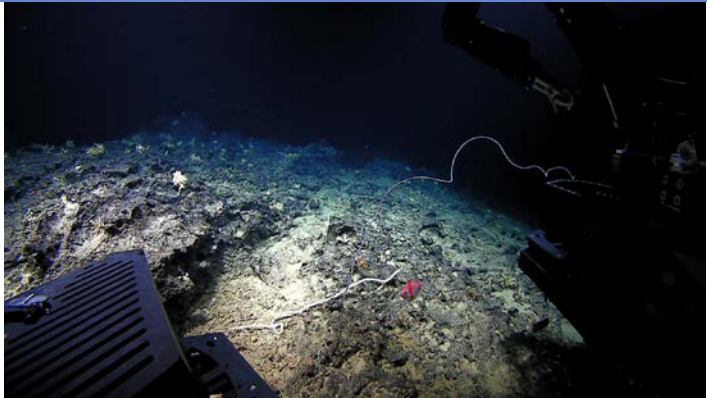
Sample ID	EX1504L4_20150913T225945_D2_DIVE02_SPEC02BIO
Date (UTC)	20150913
Time (UTC)	225945
Depth (m)	418.95
Temperature (°C)	2.23
Field ID(s)	Rock Pen - Anthoptilum



**Comments** *Broken during sampling 2/3 up the stalk*

Sample ID	EX1504L4_20150914T000302_D2_DIVE02_SPEC03BIO
Date (UTC)	20150914
Time (UTC)	000302
Depth (m)	370.82
Temperature (°C)	8.35
Field ID(s)	Antipatharian fan



<b>Comments</b>		
<b>Sample ID</b>	EX1504L4_20150914T012838_D2_DIVE02_SPEC04BIO	
<b>Date (UTC)</b>	20150914	
<b>Time (UTC)</b>	012838	
<b>Depth (m)</b>	327.47	
<b>Temperature (°C)</b>	9.17	
<b>Field ID(s)</b>	Lepidisis olapa	
<b>Comments</b>	Lost from sample box	
<b>Please direct inquiries to:</b>	NOAA Office of Ocean Exploration & Research 1315 East-West Highway (SSMC3 10 <sup>th</sup> Floor) Silver Spring, MD 20910 (301) 734-1014	