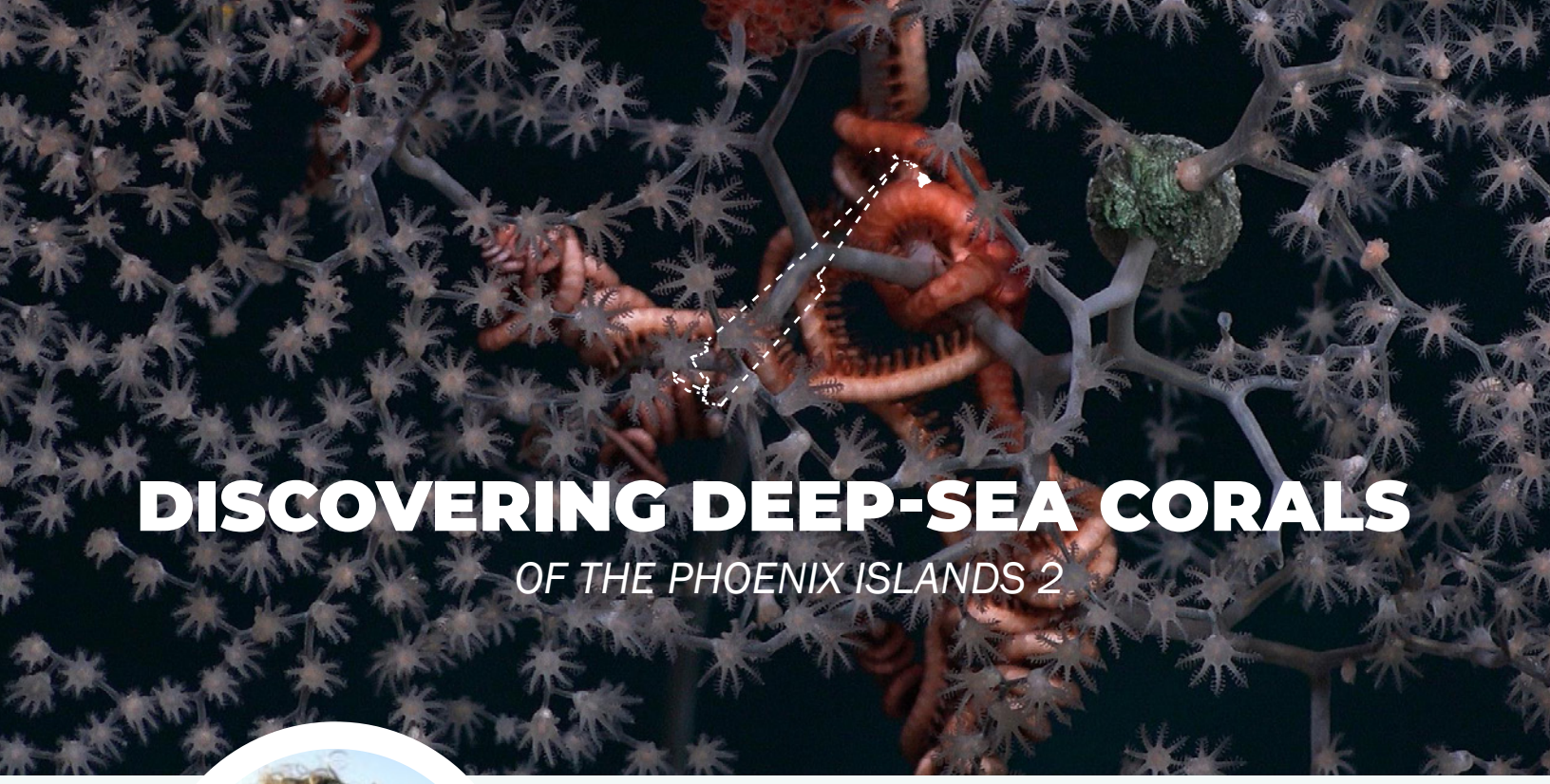


DISCOVERING DEEP-SEA CORALS

OF THE PHOENIX ISLANDS 2

#PhoenixIslandsCoral

June 5, 2021 – July 8, 2021
Honolulu, HI, USA
Chief Scientist: Dr. Randi Rotjan
Co-Chief Scientist: Dr. Tim Shank and Dr. Jonathan Kagan

Boston University, Woods Hole Oceanographic Institution, Boston Children's Hospital, Harvard Medical School, Conservation International, NOAA Deep Sea Coral Research and Technology Program, USGS, USFW Pacific Remote Islands Marine National Monument, Republic of Kiribati, Phoenix Islands Protected Area Conservation Trust

Corallivory is the term for predation upon live corals. While corals usually survive these interactions, they are left with open wounds and little is known about how deep-sea corals' immune systems respond to wound infliction. The science team began the expedition brimming with questions about deep-sea microbes and how ancient cold-water corals survive predation by corallivores and the team also sought to understand mechanisms and patterns of coral associates.

Another fundamental component of the expedition was mapping, exploring, and characterizing new seamounts in Areas Beyond National Jurisdiction (ABNJ), the Howland and Baker unit of the Pacific Remote Islands Marine National Monument (PRIMNM), and the US EEZ surrounding the Howland and Baker unit. Prior to the expedition, this area was the least explored and least mapped part of the US marine protected areas.

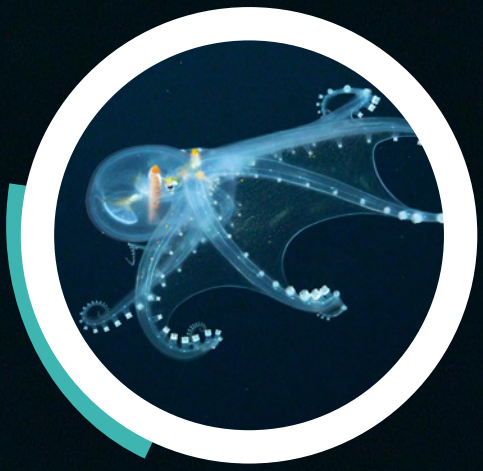
Expedition Objectives

Map, explore, and characterize new seamounts in the high seas.

Characterize, identify, and describe deepwater corals, sponges, and their inter-species associates, predators, and surrounding microbes in the environment

Investigate deepwater coral and sponge immune responses and possibility for infection.

Observed and collected the first ever high-quality footage of 2 glass octopuses, both recorded outside of marine protected areas



600
ROV samples collected

34
days at sea

21
ROV dives

6
CTD casts

44,745
km² mapped

The cruise conducted the first ever comprehensive survey of deep-sea coral and sponge predation to investigate how corals respond to grazing scars and wounding. A series of novel experiments were conducted onboard *Falkor* to determine how the immune systems of corals and sponges reacted to a variety of different microbial stimuli. The results of this research will be multi-faceted and will make important contributions to the understanding of deep-sea ecology, deepwater biogeography, and conservation in the equatorial Pacific.

The mapping, visual data, and new research conducted on the cruise will be helpful to Marine National Monument managers as they develop management plans and priorities in the coming decade. Additionally, research in ABNJ sites may contribute to the justification for international ABNJ conservation and management.

In addition to achieving all the team's goals and objectives, the scientists also characterized water samples for microbial diversity and eDNA analysis. They collected rocks for the US Geological Survey to characterize the crusts and give geological insight into seamount age and formation. They also were able to construct photomosaics to provide 3D spatial context and enable spatial analysis, and scan and print several deep-sea corals.

Generated the largest deepwater microbial culture collection from the Central Pacific Ocean.

Documented over 10 associations (species pairs) between corals and other invertebrates that had not been documented or published prior to this cruise.

Mapped 5 new seamounts in ABNJ and 5 new seamounts within the US EEZ surrounding the Howland and Baker unit of the PRIMNM.

Created a new piece of experimental ROV Equipment: the "Coral Push Popinator 3000" – designed by the SOI ROV team and deployed twice in the deep sea.