Deep Connections 2019:
Exploring Atlantic Canyons and Seamounts of the United States and Canada

From August 6 through September 15, 2019, NOAA and partners will conduct a two-part telepresence-enabled ocean exploration expedition on NOAA Ship *Okeanos Explorer* to collect critical baseline information about unknown and poorly understood deepwater areas off the U.S. and Canadian Atlantic Continental Margin. During the **Deep Connections 2019: Exploring Atlantic Canyons and Seamounts of the United States and Canada** expedition, our at-sea and shore-based science teams will work together to explore deepwater areas of this largely unexplored region.

NOAA Ship *Okeanos Explorer* is the only U.S. federal vessel dedicated to exploring our largely unknown ocean for the purpose of discovery and the advancement of knowledge. The ship is equipped with a state-of-the-art, dual-body ROV capable of diving to 6,000-meter depths, and four different types of mapping sonars that collect high-resolution seafloor and water column data. The *Okeanos Explorer* takes every opportunity to explore the ocean and identify new species, habitats, and resources, thereby contributing critical information to enhance our understanding of the deep ocean.

Objectives

The **Deep Connections 2019: Exploring Atlantic Canyons and Seamounts of the United States and Canada** expedition will address science and management priorities put forward by scientists and managers from the United States and Canada as well as international working groups supporting the Atlantic Ocean Research Alliance and the European Union's Horizon 2020 program. NOAA priorities for the expedition include a combination of science, education, outreach, and open data objectives that will provide a better understanding of this important, yet mostly unexplored, region:

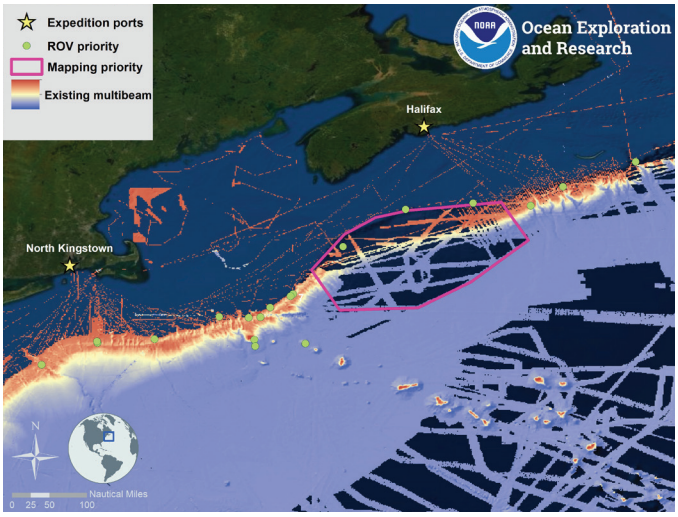
The team preparing the ROVs for deployment. During the **Deep Connections 2019** expedition, NOAA ROV *Deep Discoverer* will be used to acquire high-definition visual data and collect limited samples in poorly explored deepwater areas.

- Acquire data on deepwater habitats to support science and management needs in North Atlantic waters of the United States and Canada and further the goals of the Atlantic Seafloor Partnership for Integrated Research and Exploration (ASPIRE)
- Explore deepwater areas relevant to resource managers, such as marine protected areas, essential fish habitat, habitat areas of particular concern, and other priority management areas
- Map, explore, and characterize the diversity and distribution of deep-sea benthic communities, particularly those found within deep-sea coral and sponge habitats, fish habitats, and other vulnerable marine habitats
- Investigate biogeographic patterns and connectivity of deep-sea organisms across the U.S. and Canadian Atlantic Continental Margin for use in broader comparisons of deepwater habitats throughout the Atlantic Basin
- Map, survey, and sample geologic features to better understand the geological context of the region and improve knowledge of past and potential future geohazards
- Collect high-resolution bathymetry and backscatter data in areas with no or low-quality sonar data to fill in data gaps, support remotely operated vehicle (ROV) operations, and identify potential maritime heritage sites

- Acquire a foundation of ROV, sonar, and oceanographic data to better understand the characteristics of the water column and the fauna that live there
- Engage a broad spectrum of the scientific community and public in telepresence-based exploration and provide a foundation of publicly accessible data products to spur further exploration, research, and management activities

Why This Area?

The **Deep Connections 2019** expedition will be one of several expeditions from 2018–2020 that will contribute directly to the ASPIRE campaign, a major multiyear, multinational collaborative field program focused on raising our collective knowledge of the North Atlantic Ocean.



Map of the priority areas for the **Deep Connections 2019** expedition's ROV and mapping operations overlaid onto existing mapping data in the region from the NOAA National Centers for Environmental Information Multibeam Bathymetry Mosaic.

The North Atlantic is of vital importance to humankind, providing a variety of goods and services (e.g., seafood, recreation, tourism, and transportation) that provide employment and livelihood opportunities for millions of people. Despite its critical importance, we have only begun to understand the region's deep-sea resources, oceanography, bathymetry, geology, ecosystems, and trans-Atlantic biological connectivity.

Besides being largely unexplored, the deep waters of the U.S. and Canadian Atlantic Continental Margin contain a wide diversity of deepwater habitats and geological features, including escarpments, slope habitats, seamounts, and submarine canyons that are of interest to resource managers and scientists. Seamounts and submarine canyons in particular are regarded as hotspots of deep-sea biodiversity, as these habitats harbor a great abundance and diversity of sensitive marine organisms, including commercially, recreationally, and ecologically important species. As a result, seamounts and submarine canyons have become a priority for resource management in both the United States and Canada. By exploring these habitats across the U.S.-Canadian boundary, we will gain a better understanding of the North Atlantic Ocean as a whole.

Why It Matters

By leading efforts to explore our ocean, and by making ocean exploration more accessible, the NOAA Office of Ocean Exploration and Research and partners are filling gaps in the basic understanding of deep ocean areas. This work provides critical deepwater data needed to maintain the health of our ocean, sustainably manage our marine resources, accelerate economies, and build a better appreciation of the value and importance of the ocean in our everyday lives.

Follow Along Live!

Anyone with an Internet connection can follow along with the expedition as high-definition video of dives is streamed live to shore from NOAA ROV *Deep Discoverer* from August 27 through September 14, 2019. The same technology that allows scientists from around the world to participate in the expedition from land also enables interested members of the public to experience deep-sea exploration, the wonder of discovery, and the fascination of science in real time. Additionally, mission logs, daily updates, educational materials, and multimedia elements will be added to the Ocean Explorer website throughout the expedition.

oceanexplorer.noaa.gov/okeanos/explorations/ex1905/

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Ocean Exploration and Research

ASPIRE