OCEAN NETWORKS CANADA CABLED OBSERVATORY **MAINTENANCE** (NA161)

#ONCabyss2024

June 6-27, 2024



Expedition port **ROV** dives Seafloor mapping

CORK

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Geographic Focus: Ocean Networks Canada Cabled Observatory offshore British Columbia

Main Operations: ROV dives, seafloor mapping, and deployment of various instruments

Sponsor: Ocean Networks Canada **Expedition Webpage:**

www.NautilusLive.org/cruise/NA161

OVERVIEW

OCEAN NETWORKS

From June 6–27, 2024, Ocean Networks Canada (ONC) and the Ocean Exploration Trust (OET) conducted a telepresence-enabled expedition aboard E/V Nautilus to provide maintenance of ONC's cabled NEPTUNE observatory. Located off the west coast of Canada, the NEPTUNE observatory consists of an 800-kilometer loop of fiber optic cable that connects numerous instruments, thereby providing high-resolution temporal observations not afforded by traditional ship-based exploration. This 21-day expedition marked the eighth year of a successful partnership between ONC and OET to support the annual maintenance program of the NEPTUNE observatory.

OPERATIONS SUMMARY

During this 21-day expedition, E/V Nautilus supported ROV and seafloor mapping operations, as well as deployed and recovered various instruments around the cabled observatory. Over 692 km² of seafloor were mapped using the mapping sonars of E/V Nautilus, focusing on previously unmapped areas between Barkley Canyon and Clayoquot Slope, in addition to 19 ROV dives at six different observatory sites.









SCIENCE SUMMARY

The expedition completed 19 successful ROV dives at depths ranging from 370 to 2,664 meters for a total dive time of close to 265 hours. ROV dives focused on deploying and recovering various sensors as part of ONC's routine maintenance, in addition to conducting visual surveys at six different observatory sites, including Barkley Canyon, Cascadia Basin, the Circulation Obviation Retrofit Kit (CORK) 1024C site, Endeavour Hydrothermal Vent Field, Middle Valley, and Clayoquot Slope. A total of 58 primary samples were collected during ROV dives, including 7 biological specimens, 15 pushcores, 25 water samples, and 11 gas-tight hydrothermal plume samples (gastights), which will support ongoing temporal studies on the physical and biological processes across ONC's observatory sites. Eight larval trap experiments were deployed and recovered. Dedicated high-resolution multibeam surveys with OET's Norbit sonar were also conducted at Endeavour and Middle Valley, and brief photogrammetry surveys were conducted at Endeavour and the Clayoquot Slope whale fall site.

The expedition also included over 61 hours of deck operations not associated with ROV dives, including the deployment off three CTD rosette casts, two moorings, six sediment traps, and five ocean bottom seismometers. In collaboration with the cable ship Cable Innovator, the team was finally able to lay a secondary replacement cable at Cascadia Basin, which had been delayed for several years due to various reasons.

ACKNOWLEDGEMENTS

Thanks to Ocean Networks Canada, Fisheries and Oceans Canada, the captain and crew of E/V *Nautilus*, the *Nautilus* Corps of Exploration, the Ocean Exploration Trust, and all who supported the expedition ashore. The expedition was funded by Ocean Networks Canada. Activities within the Endeavour Marine Protected Area and Tang.gwan – hačxwiqak – Tsigis Marine Protected Area were authorized by Fisheries and Oceans Canada.

EDUCATION & OUTREACH

Over the course of the expedition, live-stream video feeds received over 170,000 views and highlight videos garnered over 57,000 views. Expedition content on OET's TikTok channel gained over 600,000 views, plus posts on OET and ONC's Instagram, Twitter, Facebook, and LinkedIn attracted over 358,000 impressions. While at sea, the team created 14 new education and outreach products and hosted 63 live ship-to-shore interactions with schools, community events, and professional meetings, reaching over 2,190 people across North and South America, Europe, and Oceania. Three professional educators sailed on the expedition, including two from ONC and another via OET's <u>Science Communication Fellowship</u>, who worked closely alongside mission personnel in telling stories from the expedition to audiences of all ages. Early expedition results were featured in 200 media stories published in Canada and the United States.



DATA ACCESS

Data and samples collected during the expedition have been sent to ONC for archiving and public distribution via <u>Oceans 3.0</u>. This advanced data management system provides big data in the form of high-resolution sensor measurements, video, and underwater sound recordings that are openly accessible by researchers, communities, and decision-makers around the world.

BROADER IMPACTS

By bringing data to the surface, ONC provides ocean intelligence that helps communities, governments, and industry make informed decisions about our future. Using cable observatories and big data management, ONC enables evidence-based decision-making on ocean management, disaster mitigation, and environmental protection. These observatories collect data on physical, chemical, biological, and geological aspects of the ocean, and allow researchers data access from all over the world. This mission also advanced priorities on education, diversity, and inclusion by providing opportunities for underrepresented minority groups to participate in expeditions at sea. Finally, the data collected on this mission is an essential precursor to future explorations throughout the region, which will likely lead to many more discoveries.

