

Annual Report to Nunavut Research Institute – Cambridge Bay Observatory (Scientific research license #: 04 064 12N-M)

Prepared by S. Kim Juniper, Chief Scientist, Ocean Networks Canada, University of Victoria, Victoria, British Columbia

Results of 2014 Research Activities

Ocean Networks Canada (ONC) has been operating an underwater observatory in Cambridge Bay since September 2012. Underwater sensors and a camera provide continuous information on seawater properties, ice thickness and marine organism activity to a shore station on the Cambridge Bay wharf. On the wharf, a weather station and webcam are also connected to the shore station. Data from all instruments and cameras are transmitted by a WIFI link to a server in the Nunavut government building. An antenna on the government building receives Automatic Identification System transmissions from ocean going vessels, and sends these signals to the server. All observatory data are relayed via satellite to the ONC data centre at the University of Victoria where they are freely available over the Internet (www.oceannetworks.ca).

The observatory has been operating continuously since the 2012 installation, providing valuable data for researchers and for public outreach. Results from the two years of operations have been presented at several high profile research conferences including the 2013 Arctic Observing Summit in Vancouver, BC, the 2013 and 2014 Canadian Meteorological and Oceanographic Society Annual Conferences, the ArcticNet 2013 Annual Scientific Meeting in Halifax, Nova Scotia and the 2014 Arctic Change conference in Ottawa, Ontario. ONC also held science user workshops during the 2013 ArcticNet meeting and the 2014 CMOS conference, to teach scientists and graduate students how to access data from the Cambridge Bay Observatory, using online tools available on the Ocean Networks Canada website.

2014 Activities in Cambridge Bay

A six-member team from Ocean Networks Canada travelled to Cambridge Bay is September 13-29, 2014, to upgrade the underwater observatory and shore-based weather station, conduct a survey of the marine benthic fauna and launch an education program called Ocean Sense (<http://www.oceannetworks.ca/learning/ocean-sense>).

Observatory Upgrades – ONC's scientific dive team and engineers recovered the main underwater instrument platform together with the two satellite platforms that host a hydrophone and an acoustic fish tag receiver. The main platform was replaced with a new, better-adapted structure, with an expanded suite of sensors, and it and the two satellite platforms were re-deployed at the same underwater location. A second weather station was added to the wharf, along with a new high-resolution air pressure sensor.

Fauna Survey – Julie-Anne Dorval, a Master's student in Oceanography at the Université du Québec à Rimouski, worked with Ocean Networks Canada team in Cambridge Bay to undertake a survey of the seafloor fauna in the subtidal zone near the observatory platform. These near-shore ecosystems have been little studied in the Arctic and are particularly sensitive to increased human activity, especially near settlements. Divers collected underwater video and photos along a 200 metre transect at 6 metres depth, and

the benthic fauna along this same transect was sampled by divers and with a sediment grab sampler deployed from a small boat. A total of 45 separate samples were collected and transported to the Université du Québec à Rimouski for analysis.

Educational Activities - The ONC Learning team met with educators and students from Nunavut Arctic College, Kiilnik High School and Ullilik Ilihakvik (elementary school) to introduce the Ocean Sense education program. Students from Kiilnik High School will be the main participants in the program over the next year, and they will partner with students from Brentwood College near Victoria, British Columbia where ONC operates another small ocean observatory that feeds data directly to the school.

Planned 2015 Activities in Cambridge Bay

The field team will return to Cambridge Bay in late August and early September 2015. Plans for 2015 include moving the underwater instrument platform 100-200 metres to the west of the wharf, to get away from disturbance caused by tugboat and barge traffic. Some new sensors may also be added to the instrument platform in 2015. The ONC Learning team will also return to Cambridge Bay to continue the development of the Ocean Sense program, in collaboration with Kiilnik High School.