



Arctic Seafloor Mapping Project Web Site - arcticseafloormapping.gov

2010 Extended Continental Shelf Survey

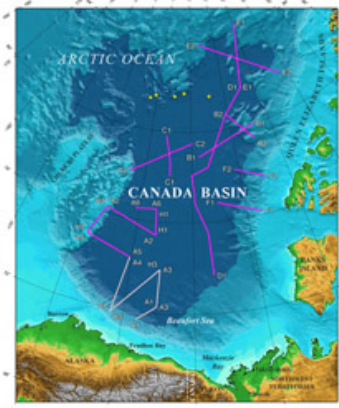
The 2010 Extended Continental Shelf survey is a 5-week-long expedition involving two icebreakers: U.S. Coast Guard Cutter (USCGC) Healy (at sea August 2 to September 6) and the Canadian Coast Guard Ship (CCGS) Louis S. St-Laurent (at sea August 4 to September 14).

This is the sixth in a series of U.S. cruises to the Arctic Ocean and the third in which U.S. and Canadian scientists are working together to map areas of the seafloor and to image the underlying sediment layers. The data will be used to determine the limits of the "extended continental shelf." Previous joint missions were conducted in 2008 and 2009.

Under international law, as reflected in the U.N. Convention on the Law of the Sea, every coastal country has a continental shelf out to 200 nautical miles (nm) from its coastal baselines, or to a maritime boundary with another coastal country. However, the continental shelf of a coastal country extends beyond 200 nm (the "extended continental shelf") if it meets criteria outlined in Article 76 of the Convention. (Note that this legal definition of "continental shelf" is different from that traditionally used by marine geologists.) Knowing where these limits lie is important because coastal states have sovereign rights over the continental shelf for the purpose of exploring and exploiting its natural resources—including those resources on the seabed (such as deep-water coral communities or mineral crusts and nodules) and beneath the seabed (such as oil and gas).

The criteria for determining the limits of the extended continental shelf relate to the depth and shape of the seafloor and the thickness of underlying sediment layers. The primary mission of the 2010 U.S.-Canada Arctic survey is to gather data so that these criteria can be applied to the U.S. and Canadian continental margins in the Arctic.

USCGC Healy is collecting multibeam bathymetric data, which provide high-resolution information about the depth and shape of the seafloor; and *CCGS Louis S. St-Laurent (Louis)* is collecting multichannel seismic reflection and refraction data, which can provide information about the thickness and characteristics of sediment layers down to several kilometers beneath the seafloor. *Healy* is also collecting high-resolution seismic-reflection data to image details of sediment layers in the



Planned tracklines for the 2010 U.S.-Canada Extended Continental Shelf survey. "EEZ" stands for Exclusive Economic Zone, which extends from a nation's coastline out 200 nautical miles (or to a maritime boundary with another nation). nm, nautical miles; km, kilometers. Click image for larger version or download a [hi-res pdf](#). *Credit: USGS*



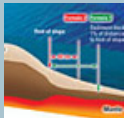
[2010 Mission](#)



[Mission Plan](#)



[Law of the Sea](#)



[Continental Shelf](#)



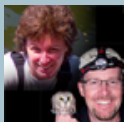
[USCGC Healy](#)



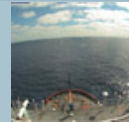
[CCGS Louis S. St-Laurent](#)



[Healy's Science Team](#)



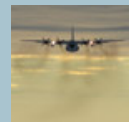
[Teachers](#)



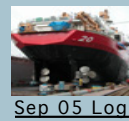
[Hourly Photos from Healy's Aloft Conn](#)



[USCG Logs](#)



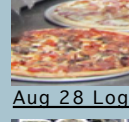
[Photos of the Day](#)



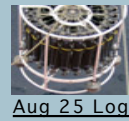
[Sep 05 Log](#)



[Aug 29 Log](#)



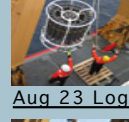
[Aug 28 Log](#)



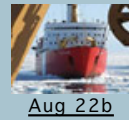
[Aug 25 Log](#)



[Aug 24 Log](#)



[Aug 23 Log](#)



[Aug 22b Log](#)

uppermost 10s of meters beneath the seafloor. Both ships are collecting gravity data, which help delineate density anomalies in the sediments and deeper rocks.



The Canadian Coast Guard vessel *Louis S. St. Laurent* (left) follows the US Coast Guard vessel *Healy* boundary with another nation). Click image for larger version.

Credit: Natural Resources Canada

In light to moderate ice, *Healy* will clear a path through the ice for *Louis* to tow its seismic gear. In heavy ice that precludes operation of the *Louis* seismic system, and where bathymetric data is a priority, *Louis* will break ice for *Healy*. As operational conditions permit, *Healy* will also collect seafloor samples of rock, sediment, and possibly metalliferous nodules to assist in delineating the extended continental shelf and to advance knowledge of Arctic geology.

New this year is a subsidiary study of ocean acidification, in which seawater samples are being collected and analyzed to examine the effect of increasing levels of atmospheric CO₂ on Arctic waters. As in previous years, ice extent and characteristics are being recorded and, as conditions permit, open-ocean

and ice buoys are being deployed to track water currents and ice movement. Marine mammal observers are also aboard, recording mammal sightings in areas where observations are rarely made and alerting the ship's officers when a mammal is close enough that operations should be adjusted in order to avoid disturbing it.

The U.S. part of the mission is being led by the U.S. Geological Survey (USGS) with additional funding and scientific support from the U.S. Coast Guard. Dr. Brian Edwards, USGS, is Chief Scientist of the expedition aboard *Healy*. Dr. David Mosher of Natural Resources Canada, Geological Survey of Canada, is leading the Canadian part of the mission. Jonathan Childs of the USGS is the U.S. liaison aboard *Louis* and head of the U.S. Interagency Task Force Seismic Data Operations Team.



US Coast Guard icebreaker *Healy* and the Canadian Coast Guard icebreaker *Louis S. St-Laurent* side by side. Click image for larger version. **Credit:** USGS

This collaboration continues to save millions of dollars for both countries, provide data both countries need, ensure that data are collected only once in the same area, and increase scientific and diplomatic cooperation. Expectations are that the two nations will work together again in the summer of 2011.



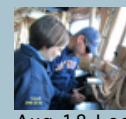
[Aug 22a Log](#)



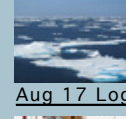
[Aug 21 Log](#)



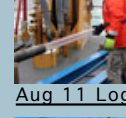
[Aug 20 Log](#)



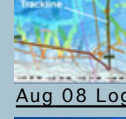
[Aug 18 Log](#)



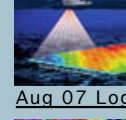
[Aug 17 Log](#)



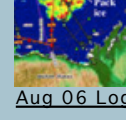
[Aug 11 Log](#)



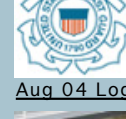
[Aug 08 Log](#)



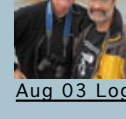
[Aug 07 Log](#)



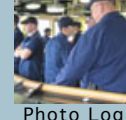
[Aug 06 Log](#)



[Aug 04 Log](#)



[Aug 03 Log](#)



[Photo Log](#)



Revised January 14, 2011 | [Contact Us](#) | [Report Error On This Page](#) | [Site Map](#)
Web site hosted by: [National Ocean Service](#) | [National Oceanic and Atmospheric Administration](#)
| [U.S. Department of Commerce](#) | [USA.gov](#)
[Disclaimer](#) | [Privacy Policy](#) | [Freedom of Information Act \(FOIA\)](#) | [Information Quality](#)
<http://continentalshelf.gov/missions/10arctic/welcome.html>