



Thursday, June 24, 2004

**Contacts: Terry Collins, 416-878-8712; 416-538-8712  
Darlene Trew Crist, 401-295-1356, Sara Hickox, 401-874-6277**

*Project leaders from University of Alaska and Ron O'Dor, CoML Chief Scientist, are available for advance interviews. Please call 416-538-8712 or email [collins1@sympatico.ca](mailto:collins1@sympatico.ca) to schedule a time. They will also take part in a media conference call Thurs. June 24, 2 p.m. EDT. To join the call, dial 800-531-3250 (+1-303-928-2693 from outside North America), conference ID 2203989. For more detail of the project's research objectives: <http://www.coml.org/embargo/embargo2.htm>*

## **Melting Ice Cap Gives Urgency to Census of Marine Life in Arctic Ocean**

*Life in Huge Arctic Basins of Saltwater, Undisturbed for Millennia,  
To Undergo Profound Change if Ice Cap Thaw Continues*

*New Census of Marine Life Project Based in Alaska with Global Partners  
Seeks Lifeforms in World's Oldest Seawater*

A multinational partnership of polar scientists will take an historic census of marine life in the Arctic Ocean, including the planet's oldest seawater – a vast, still pool unstirred for millennia, walled by steep ridges and lidded with ice.

Experts in biology, geology and physics from the circumpolar and other nations will use submersibles, modern sonar detection and traditional techniques to record and inventory biodiversity in the Arctic Ocean in anticipation of additional climatic warming that, if realized, could remove the ice cap and dramatically alter aquatic life in the region.

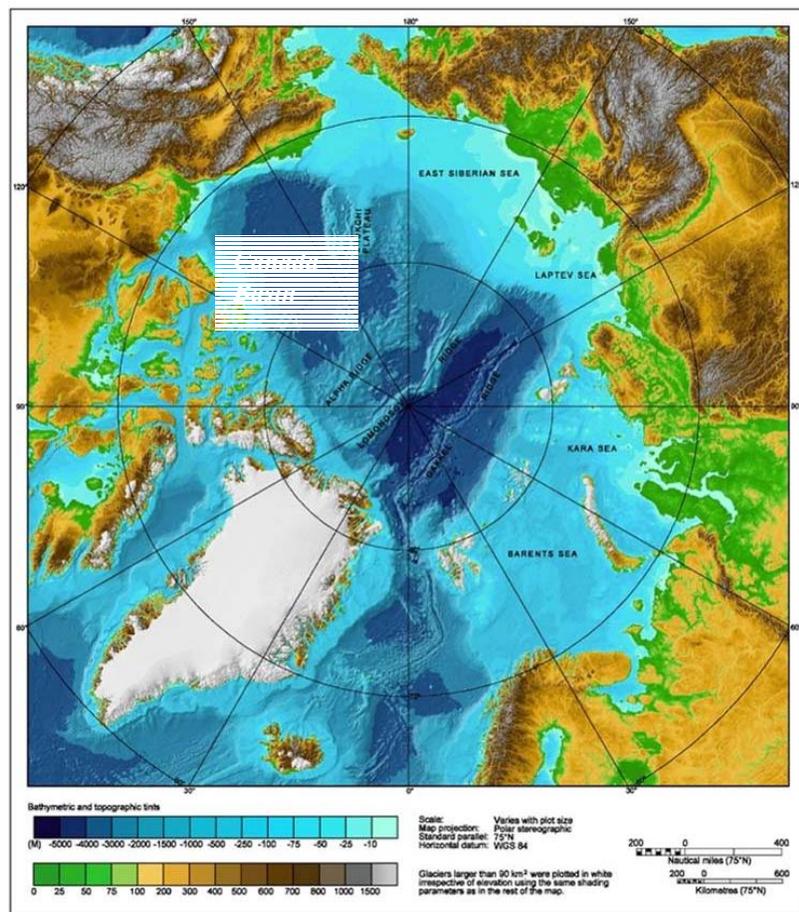
The project is part of the 10-year, \$1 billion [Census of Marine Life](#) (CoML), an unprecedented cooperative initiative involving leading marine scientists from every world region. The Arctic CoML has been seeded with a \$600,000 grant from the New York-based Alfred P. Sloan Foundation, announced today.

“The tremendous on-going changes make the effort to identify the diversity of life in the three major realms (sea ice, water column and sea floor) an urgent issue,” according to researchers Rolf Gradinger, Russ Hopcroft and Bodil Bluhm of the University of Alaska, the project’s headquarters.

The magnitude of predicted environmental change on marine life requires long-term monitoring, crucial to which is the availability of baseline data. “Species level information is essential to discussions of climate change, its expressions and effects,” the researchers say.

A team of scientists is working on a counterpart proposal for the Antarctic and Southern Oceans for initiation this autumn.

A particular focus in the North will be the Canada Basin, a huge, largely unknown ice-lidded underwater hole 3,800 meters deep immediately north of the Yukon Territory and Alaska. It connects to the Pacific Ocean through the 70-meter deep Bering Strait, and is sheltered from the North Atlantic’s influence by the narrow Fram Strait and Lomonosov Ridge, which juts up to within 1400 metres of the surface.



Many species existing in the extreme frigid depths of the Canada Basin do not travel to shallower waters and are thought to have been isolated for millions of years. The

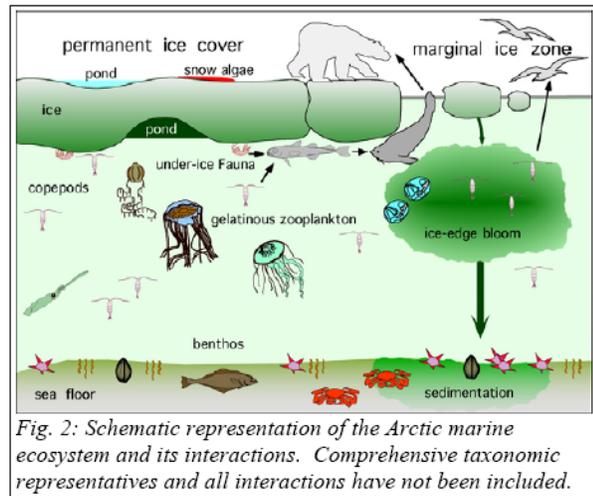
genetic characteristics that enable ‘extremophile’ species to survive in such an environment are of important interest to science.

Among animals expected to be discovered: cephalopods<sup>1</sup>, known to exist around Greenland and Russia, “probably occur in the Canadian Basin although none have yet been recorded.”

“The shelf breaks and the deep-sea basins of the Arctic Ocean are poorly studied for all taxonomic groups, with the deep Canadian Basin being the least known of all,” the researchers say. “Given the Canada Basin’s long-time separation with little exchange to other deep-sea basins, it will be a particularly interesting area.”

They will study life in the three main layers of the water column – a low-density surface layer, an intermediate layer which receives warm, salty water from the Atlantic, and a deep dense layer formed through convection.

Also of particular focus will be biodiversity around the mouths of Russian and Canadian rivers, which pour an estimated 2,000 cubic km of freshwater annually into the Arctic Ocean.



### International partnership

Central to the project’s success will be the partnership of the Russians, whose extensive Arctic research since the 1800s, including 500 articles on Arctic fauna, will be made available globally through translation and digitalization. The project will involve three leading institutions in Russia: the Zoological Institute (St.-Petersburg), the Russian Academy of Sciences; the P.P. Shirshov Institute of Oceanology (Moscow), Russian Academy of Sciences; and the Zoological Museum, Moscow State University.

<sup>1</sup> Octopus, squid, cuttlefish, or nautilus, for example, having a large head, large eyes, prehensile tentacles, and, in most species, an ink sac containing a dark fluid used for protection or defense.

The project will also consolidate and place online a large body of literature in all Arctic nations, the result of environmental studies of oil and gas exploration. Support will be extended as well to creation of a Russian Taxonomic Centre to help simplify international research.

The researchers say warming of sea surface temperature, changes of the mixed layer, and reduction of sea ice will affect algae, plankton and other ocean life, and subsequently the timing and availability of life-sustaining carbon at the sea floor. Those changes will in turn affect higher life forms, like fish, marine mammals and sea birds, impacting “the functioning and biocomplexity of the entire system.”

The Arctic is the world’s least-known ocean, its permanently ice-covered waters more isolated than those at the edges of the Antarctic continent. Because it is so isolated, scientists have been surprised by the species diversity recognized to date. And they expect to find even more by applying modern technology to the job.

“It’s certainly not the desert people thought it to be,” says Dr. Hopcroft, likening the variety of gelatinous species, for example, to that off the coast of California. “The basic biodiversity of all these gelatinous animals is grossly underestimated in polar waters. Based on submersible experience in other oceans, we expect to discover at least twice as many species in most groups as currently described.”



Dr. Gradinger says sampling to date has relied on relatively small boxes to scoop sediments from the ocean floor, or ice drills to reach the water, missing many organisms which “simply move out of the way.”

An undescribed and perhaps new species of Narco, a sub-group of the jellyfish, collected in 2002 south of Banks Island, Canadian Arctic. Photo credit: Kevin Raskoff. Download image at <http://www.coml.org/embargo/embargo2.htm>

The abundance of marine mammals and seabirds that depend on fish suggest a corresponding abundance of fish in the Arctic sea. However, “our knowledge of their diversity and abundance on the continental slope and in the deep basins, particularly of the western Arctic Ocean, is poor,” the researchers say.

The deep waters offer “great potential for species discovery ... Deep-sea areas worldwide have been shown to harbor more species than previously realized.”

“The discovery of at least five new macrofaunal species, and the collection of several species newly recorded for the area, during a small sampling effort in the Canada Basin suggests that a larger number of new species will be revealed with larger sampling efforts.” The researchers also hope to dispel a widely-held notion that species diversity declines sharply closer to the pole.

The initiative’s greatest challenges include the availability of extremely costly ice-breakers, typically scheduled two to five years in advance. Also, political boundaries complicate access to some areas. In particular, seafloor sampling and imaging “can be a ‘hot’ issue in regions valued for their underground resources or those known or suspected for dumping of nuclear and other wastes.”

While sampling the entire Arctic is unrealistic, “any effort” directed specifically at understanding biodiversity can result in “tremendous advances” to science, the researchers say.

Scientific questions to be addressed include whether biodiversity “hot-spots” exist in the Arctic, how species distribution patterns can be linked to the Arctic’s geologic history, the linkages between biodiversity and ecosystem function, and how to correlate species distribution patterns with environmental data to predict the impact of climate change on biodiversity.

A 12-member scientific steering group has been created with members from Norway, Denmark, Russia, Germany, the USA and Canada. Efforts under the project will make an important contribution to International Polar Year, 2007/2008.

“Increases in sea temperature are occurring globally with consequences that are hard to predict,” said Dr. Ron O’Dor, Chief Scientist of the Census. “Accurate measures and predictions of species distribution, abundance and natural variation through time across a range of species are urgently needed to help policy-makers respond appropriately to the consequences of changes in the ocean.”

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## **Census of Marine Life**

More than 300 scientists from 53 countries are at work on the Census, designed to assess the diversity, distribution and abundance of ocean life and explain how it changes over time. The scientists, their institutions and government agencies are pooling their findings to create a comprehensive and authoritative portrait of life in the oceans today, yesterday and tomorrow.

Support for the Census of Marine Life comes from government agencies concerned with science, environment, and fisheries in a growing list of nations as well as from private foundations and companies. The Census is associated or affiliated with several intergovernmental international organizations including the Intergovernmental Oceanographic Commission of the UN, the Food and Agriculture Organization of the UN, the UN Environment Programme and its World Conservation Monitoring Centre, the Global Biodiversity Information Facility, the International Council for the Exploration of the Seas, and the North Pacific Marine Science Organization. It is also affiliated with international nongovernmental organizations including the Scientific Committee on Oceanic Research and the International Association of Biological Oceanography of the International Council for Science. The Census is led by an independently constituted international Scientific Steering Committee, whose members serve in their individual capacities, and a growing set of national and regional implementation committees.