Canadian Consortium of Ocean Research Universities (CCORU)

2015 Budget Submission

Submitted by
Martha Crago, Chair
Canadian Consortium of Ocean Research Universities
martha.crago@dal.ca
902.494.6513 (office)
902.499.8845 (mobile)

August 6, 2014

Growing Canada's blue economy

CCORU recommends to the Government of Canada that it invest an additional, strategically targeted $250 million over five years for marine and Arctic science through its research agencies, the Canada Foundation for Innovation and Genome Canada.

The future of Canada, as with other coastal nations, is closely tied to the ocean that surrounds us. It is science that unlocks the ocean's mysteries and allows us to harness its potential and protect its future. Marine and Arctic science is required to grow Canada's blue economy.

Harnessing our ocean potential

The ocean covers 71 per cent of the planet's surface area. It also contains 97 per cent of our water. The economic sectors that have grown in and around the ocean are considered to be part of the "blue economy."

According to the United Nations, over three billion people depend on marine and coastal biodiversity for their livelihoods. The market value of marine and coastal resources and industries is estimated at $US 3 trillion annually.

Challenges and opportunities for Canada in the evolving blue economy

Canada is truly an ocean nation. Its three oceans collectively touch eight of ten provinces and all three territories. We have the longest coastline of any nation in the world, and our "ocean estate" covers a surface area of approximately 7.1 million square kilometres, an area that would cover about 70 per cent of our land mass. Canada's exclusive economic zone has a surface area of approximately 2.9 million square kilometres and extends our reach 200 nautical miles beyond its territorial sea.

Canada's coastlines and exclusive economic zone will undergo dramatic changes at an unprecedented pace as Arctic ice melts. The loss of sea ice cover will open access to previously inaccessible resources in ocean waters and under the ocean floor.

Melting ice is also increasing the amount of fresh water making its way into the ocean. This, in turn, has an impact on ocean currents, circulation and weather patterns with major effects felt further south in the Atlantic and Pacific zones. In addition, more potential commercial fish stocks are migrating to northern waters. Environmental

changes that affect ice routes, livelihoods, infrastructures and economic development will have a profound impact on northerners.

Governance of the region is also increasingly complicated, with non-Arctic States more and more interested in the region. As a result, sovereignty and maritime law issues are becoming crucial to address. Research will play a critical role as we grapple with these changes.

Currently, Fisheries and Oceans Canada estimates that, at a minimum, the industries working in, on and around the ocean employ about 315,000 Canadians and contribute more than $26 billion a year to the nation's wealth. As an example, 15.5 per cent of Nova Scotia's gross domestic product is generated by ocean-related activities. Without a doubt, the potential for growth is enormous. In the case of our closest neighbor, the United States, one of every six jobs is marine-related and over one-third of the U.S. gross national product originates in coastal areas.

An ocean knowledge economy

We simply do not have a clear understanding of the resources that exist in and under the ocean. In addition, we do not have the knowledge necessary to access the resources that we do know about. It is clear that Canada is not tapping into the full potential of the blue economy because the ocean is in many ways unexplored, untapped and changing rapidly. The blue economy is an ocean knowledge economy.

Research builds the knowledge to help us understand what new and old resources exist, how to develop and access them and, importantly, how to maintain those resources far into the future. We are seeing significant change on the global and regional scales in the economic use of the ocean. Furthermore, the ocean itself is changing. These changes require not only better knowledge about the current state of the ocean and coastal regions but also an ability to predict and adapt to changes. As the *Oceans Info* website published by the Government of Canada says, "Science provides a solid basis for oceans management decisions".

Simply put, ocean research opens the door to the blue economy. The more we know, the more we can grow our participation in this significant economic sector.

Canada's ocean research universities

Canada's top ocean research universities have come together in an effort to build a new level of alignment in Canadian ocean research. The aim of the Consortium of Canadian Ocean Research Universities (CCORU) is to maximize Canada's investments in ocean research and maintain its global leadership in marine and Arctic science. CCORU is made up of ten universities whose expertise covers our nation from coast to coast to coast: Memorial University of Newfoundland, the University of Prince Edward Island,

Dalhousie University, the University of New Brunswick, Université du Québec à Rimouski, Université Laval, the University of Manitoba, Simon Fraser University, the University of British Columbia, and the University of Victoria.

Some examples of world-leading projects that are based at CCORU universities include:

ArcticNet, based at Université Laval, is a Network of Centres of Excellence that brings together scientists and managers in the natural, human health and social sciences with their partners from Inuit organizations, northern communities, federal and provincial agencies and the private sector. The central objective of the network is to translate a growing understanding of the changing Arctic into impact assessments, national policies and adaptation strategies.

Institut des sciences de la mer de Rimouski (ISMER), located at the Université du Québec à Rimouski, provides researchers and students access to leading-edge equipment, including an ocean-going research vessel and a seawater aquaculture laboratory. ISMER is devoted to the discovery and advancement of basic and applied knowledge of coastal environments through national and international research partnerships.

The ***Marine Environmental Observation Prediction and Response Network (MEOPAR)***, hosted at Dalhousie University, is a Network of Centres of Excellence with the aim of understanding and predicting the impact of marine hazards on human activities and ecosystems and improving response. Researchers from 12 Canadian universities work with 18 federal and provincial departments and agencies, and 30 industrial and other partners worldwide.

Ocean Networks Canada (ONC), headquartered at the University of Victoria, is using world-leading undersea cabled networks to explore the ocean in novel ways. Long-term observations by ONC will have wide-ranging policy applications in the areas of ocean and climate change, earthquakes and tsunamis, pollution, port security and shipping, resource development, sovereignty and security, and ocean management.

The ***Ocean Tracking Network (OTN)*** is a global ocean research and technology development platform headquartered at Dalhousie University. OTN deploys acoustic receivers and oceanographic monitoring equipment in key ocean locations around the world to track the movements and survival of marine animals. OTN is working with over a dozen industrial partners to help research, design and develop new products and services for the ocean science and technology sector. These partnerships have resulted in the commercialization of a number of pioneering products that have found an international market.

The ***Sea-ice Environmental Research Facility***, established at the University of Manitoba in 2011, is the first experimental sea-ice facility in Canada. Knowledge generated by researchers working at this facility improves our ability to predict the impact of the rapid sea-ice loss on everything from transportation to climate to resource development.

CCORU's goal is to leverage and enhance Canada's investments in these and other projects by working in collaboration and partnership among the universities and with government and private industry in Canada and abroad.

The state of Canada's ocean research

CCORU commissioned the Council of Canadian Academies to write an expert report on ocean science in Canada. The report documented that funding for ocean research has been declining in recent years. Canadian ocean science outputs have grown at a slower pace than other fields of science from 2003 to 2011[i]. This slowing is coming at a time exactly when Canada should be securing its place as a leader in the blue economy. Canada's science capacity is critical to developing our ocean resources and maintaining them as sustainable areas of our economy.

The global context: growing investment in the blue economy

Our global partners and competitors have clearly recognized the critical role that the ocean plays in their economies. They are pouring resources and energy into better understanding how to explore and sustain the vast resources in the ocean. They are investing in long-term strategic Arctic and marine research programs.

For example, the European Union has recently adopted a strategy, *Blue Growth*, to support "smart, sustainable and inclusive growth" in the marine and maritime economies[ii]. The European Union's new research funding framework, Horizon 2020, has a "focus area" on blue growth, with a budget of €145 million for 2014-2015. In addition to that base of funding, the EU is providing significant marine research funding for associated areas such as food security, energy, transport, materials, information technology and research infrastructure.[iii]

There is a strong emphasis in Horizon 2020 on leveraging research funding through international partnerships. In light of Canada's shared economic interests with many European Union nations, the recently-signed Galway Statement on Atlantic Ocean Cooperation and its strong research connections to influential European research organizations, this is a partnering opportunity that Canada cannot afford to miss.

Turning to China, policy makers in that country are also looking to the ocean for sustainable economic growth. China's marine economic output expanded 7.6 per cent last year, accounting for 9.5 per cent of that nation's economy.[iv] China is growing its place in the blue economy through ocean science initiatives. For example it plans to spend $US 165 million on a recently launched research project[v]. In addition China has invested in ocean-related higher education. It has new and established programs in a number of its universities including the Ocean University of China. That university, dedicated to ocean education and research, currently has more than 20,000 registered students, with 4,500 at the graduate level.

A number of other countries such as Scotland and Brazil have also increased their investments in the blue economy through funding of ocean-related research and development and in the education of highly qualified personnel.

Recommendation: A strategic investment in building the foundation for Canada's blue economy

The future of Canada, as with other coastal nations, is closely tied to the ocean that surrounds us. It is ocean science that unlocks the ocean's mysteries and allows us to harness its potential and protect its future.

Canada is in a position to lead the world in ocean research and in the development of the blue economy based on the knowledge derived from leading-edge research. Taking a leadership role will require further development of our natural sciences, engineering and social sciences as well as major marine and Arctic research infrastructure. In order to lead or, indeed, to simply keep up with our global partners and competitors, a significant investment in Canadian marine and Arctic research is required.

CCORU recommends to the Government of Canada that it invest an additional, strategically targeted $250 million over five years for marine and Arctic science through its research agencies, the Canada Foundation for Innovation and Genome Canada.

---

[i] Council of Canadian Academies, *Meeting the Challenge, Seizing the Opportunity*, 2013, p. 47.
[ii] European Commission. *Blue Growth* http://ec.europa.eu/maritimeaffairs/policy/blue_growth/
[iii] European Commission. *Innovation in the Blue Economy: realizing the potential of our seas and oceans for jobs and growth.* Brussels. 2014 May 13.
[iv] Xinhua. "Resources demand shores up China's slowing marine economy" 2014 July 22 http://english.peopledaily.com.cn/business/n/2014/0722/c90778-8759283.html
[v] Jeff Tollefson *Nature News,* "China plunges into ocean research" 2014 Feb 18 http://www.nature.com/news/china-plunges-into-ocean-research-1.14732