



## Environmental Navigation

# The Urgent Need for Ocean Data

By K. Joseph Spears

Marine shipping on Canada's West Coast is increasing both in volume and complexity as major new projects involving energy exports (such as LNG) are proposed and other Canadian exports are on the rise. The result is that we are going to see increased marine traffic and with that, an increasing likelihood of a major marine incident. This was recognized in Part 1 of the federal government's Tanker Safety Expert Panel Review. The proposed increase in marine traffic for oil is in addition to the growing marine traffic from other domestic, international, commercial and recreational vessels. In the lower portion of the Salish Sea (Gulf of Georgia), it is not uncommon to see over 20,000 recreational vessels operating in the summer months along with a complex mosaic of commercial shipping traffic. On Canada's West Coast, we need to have an accurate source of real-time ocean data in order to manage shipping and minimize marine incidents. This article will look at the need for real-time and time-series data as part of the requirement of environmental navigation in shipping governance.

Commercial marine shipping activity has an impact on the ocean environment both from normal operations as well as low-probability, high-consequence events like oil spills or the sinking of a vessel. These marine incidents will get a great deal of public and media attention and will likely have a considerable environmental impact from an ecosystem standpoint and effect a broad area in both time and space. However, with limited knowledge of the ecosystem, the impacts and severity can be difficult to ascertain.

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In many respects, our coast, with one of the last temperate rainforests in the world, is unique. There are many competing interests at play including a strong environmental protection component that has become an active player in the process of ocean governance on Canada's West Coast. There is some history with broad-area governance groups, for example, the Pacific North Coast Integrated Management Area (PNCIMA) is a multi-stakeholder process which was mandated by Fisheries and Oceans Canada but did not seek to impact core shipping legislation. This broad-area governance group managed to bring some parties together and provided good dialogue but did little to focus attention on the missing piece of the ocean governance puzzle – it is difficult to make management decisions with limited ocean data and an unclear plan on how to collect it.

Any decision on environmental navigation under shipping governance generally, and in particular on the West Coast, must be based upon the foundation of real ocean ecosystem and physical data which ideally should be time-series data. More importantly, ocean data should be accessible to all parties. Presently, that does not exist. Without an abundance of actual facts, decision-makers must employ the best-guess method when developing systems that are sensible to end users while providing real protection for the ocean environment.

This is why a robust ocean-data collection regime is required to properly assess the impact of existing and proposed marine traffic. Canada has obligations under the Law of the Sea Convention to collect this ocean data and undertake scientific research to better understand our oceans. This information has a variety of uses, of which, environmental shipping is a prime example. Whether or not we meet these international legal requirements remains to be seen.

Globally, the number of marine pollution incidents has been decreasing. The green shipping movement, a global trend, has developed to minimize the ecological footprint of commercial shipping. The green shipping movement has been highly successful in addressing some areas of the environmental impact of shipping which, incidentally, remains the most efficient means of transportation and carries 90 per cent of the world's trade. This movement is a collaborative approach bringing together a broad cross section of parties to look at this important issue and create positive long-term solutions. The reduction of air emissions is one such successful solution story. However, there is still much work to be done to protect the marine environment for future generations. It is also one of the pillars of the United Nations' International Maritime Organization (IMO). IMO's position on the subject is succinctly stated as:

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Shipping is an essential component of any program for future sustainable economic growth. Through IMO, the Organization's Member States, civil society and the shipping industry are already working together to ensure a continued and strengthened contribution towards a green economy and growth in a sustainable manner. The promotion of sustainable shipping and sustainable maritime development is one of the major priorities of IMO in the coming years.

Canada's shipping governance regime has developed since Confederation based on an international regime and "a made in Canada solution" which responds to specific domestic requirements and concerns that have arisen from marine incidents. For example, after the M/V Arrow oil spill in 1970, Canada adopted stringent response requirements under the former Canada Shipping Act. Our shipping governance developed at a time when there existed a limited acknowledgement of the ocean environment. The primary concern at the time was the safety of life at sea and protection of passengers and crew. The governance focus has now shifted and is shared, some would say, equally between safety and security and protection of the marine environment.

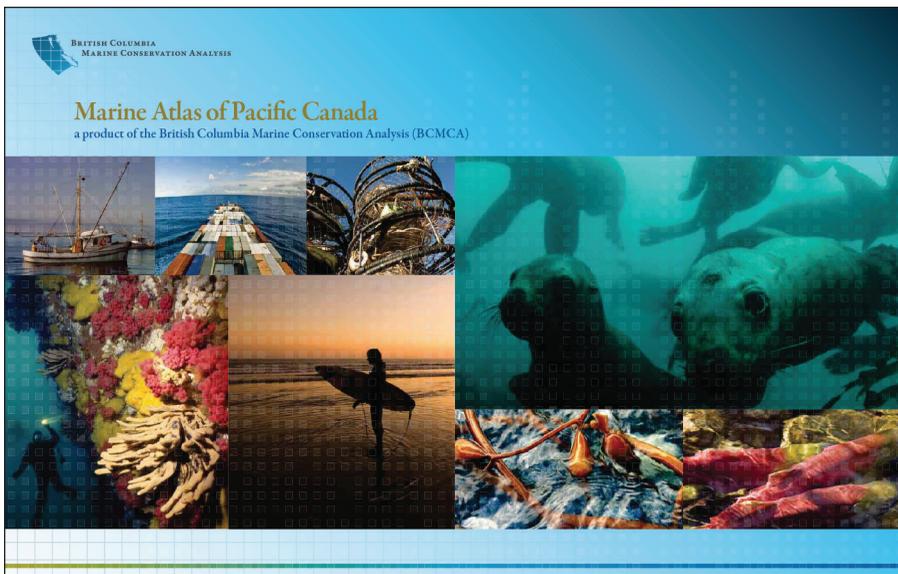
Canada's economic prosperity depends on the marine transportation of exports to world markets. Embracing green and sustainable shipping will become critically important as Canada seeks to expand its exports, especially energy exports, in

the coming years. The ongoing ocean and environmental impacts of shipping cannot be ignored and will become increasingly important in our Canadian shipping regime which seeks uniformity with the international regime. If these impacts are not taken into consideration, major projects will be blocked by impacted groups. There are mechanisms in the international regime, such as MARPOL, to designate special areas for environmental protection. Canada also has the ability to impose regulations on shipping within its Exclusive Economic Zone (EEZ) under the provisions of the Law of the Sea Convention. Most marine traffic on Canada's West Coast is destination. We also share and co-manage marine traffic with the United States in Puget Sound. The waters of the Inside Passage also have a special status which allows American vessels to transit unimpeded to Alaska. Presently, Canada has few vessels engaged in international trade and most West Coast exports are carried on foreign-flagged vessels. The global green shipping movement may be less known to West Coast residents.

There is an increasing need for a holistic approach to marine and ocean governance, of which, the regulation of shipping is an integral part. It cannot be separated from the broader concept of ocean management. Traditionally, shipping governance has operated in a specialized, highly developed regulatory regime both domestically and internationally.

At its foundation, ocean governance requires a true environmental or ocean picture which needs to be based on actual in-situ data collected by field sampling and analysis. Time-series data is required in order to understand trends and changes in the ocean environment. In the ocean, collecting data in a three-dimensional space is both costly and difficult, requiring specialized equipment, vessels and highly trained personnel. Increasingly, as technology advances, we are seeing more robotic ocean data collection using various apparatus and equipment, such as Underwater Autonomous Vehicles (UAV's), ocean gliders, offshore buoys, drifters, Remote Underwater Vehicles (ROV's), submersibles, aircraft, drones and space-based sensors such as Canada's MDA Radarsat 2 satellite. This ocean data can be streamed in real time using a satellite uplink to the end user. The potential for the collection of ocean information is huge. Much of this world-class, cutting-edge technology has been developed and manufactured here on Canada's West Coast. For example, the Institute of Ocean Sciences at Pat Bay on Vancouver Island has seen a cluster of ocean technology companies develop around it, providing innovative, technically advanced oceanographic services.

Unquestionably, the technology for ocean-data collection has advanced, however, the ability to access these various ocean-data sources has stagnated. Therefore, critical information is not widely shared between groups. In many instances, the data remains the property of the individual ocean scientist or regulatory agency, often with little connection to the marine field. There is no central catalogue of this information or a public data platform which end users can access. As well, space-based assets with a variety of sensors are increasingly being used for earth and ocean observation and provide vast amounts of raw data which require analysis. Further, much of ocean science is isolated in various groups, government departments, universities and individual scientists' files. As we have seen in the news of late regarding the search for the Malaysian Boeing 777 MH370, an understanding of oceanography and ocean currents in the Southern Indian Ocean may well be the key to finding the missing aircraft. When (if) debris is found, oceanographers will have to reverse engineer the possible point of impact using computer



*If nothing else, the BC Marine Conservation Atlas initiative showed how difficult it is to gather relevant and timely information on ocean use.*

models based on ocean-data sets which have been collected. To take a risk-based approach to management of marine activities and shipping, we need ocean data and real-time information. Much like in my article on marine domain awareness (BC Shipping News, December 2013), having an ocean awareness is the product of the analysis of many different processes and sources. We need to realize that ocean data is derived from many sources. In order to develop a baseline we must construct a multi-stakeholder plan, analyze the existing data for knowledge gaps and develop a plan to collect additional data to fill in those gaps.

It is critical to have this data with respect to vessel impacts from either operational matters or catastrophic one-time incidents. These low-frequency, high-consequential events attract the public's attention. At its cornerstone, environmental navigation requires real-time information and readily accessible ocean data that provides decision-makers with information to manage future activities and respond when the inevitable marine

incident occurs. This is a fundamental basis of risk management - having the best possible sources of information. An ocean atlas has been developed, which is a good first step, but requires constant updating. This information is critical for environmental navigation on Canada's West Coast.

Ocean science needs to be properly funded and undertaken on the West Coast if we are to have environmental navigation and sustainable shipping. Science, based on abundant data, collected for the purpose of understanding the ocean system both nearshore and offshore, will provide decision-makers with the tools necessary to make fact-based decisions when considering regulations and emergency response plans. Our understanding will change as new information is collected, analyzed and shared. We need to examine how we will collect data to develop new and improved models and approaches using traditional ocean knowledge (TOK), citizen science, input from First Nations, coastal communities, regulators and other stakeholders along

with the many new technologies available — many of which are Canadian made — to achieve this goal. Our economic future depends on collection analysis and sharing of ocean data which will allow Canada to employ world-leading environmental navigation standards to regulate its exports. This is at the heart of the global green and sustainable shipping movement - minimizing shipping's environmental impact.

Canada's West Coast can become a model for the world. The key is to approach the problem in a holistic, inclusive and collaborative fashion. In this way, the environmental impacts of shipping can be minimized and Canada can regain its world stature in the regulation of shipping. We have no choice but to get this right on Canada's West Coast. The stakes are too high.

*Joe Spears has a deep background in ocean science issues and has undertaken oceanographic research and seabird research with the Canadian Wildlife Service. He can be found at Twitter @TheNewOcean or email at kjs@oceanlawcanada.com*



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