

# Report in Focus

## COMMERCIAL MARINE SHIPPING ACCIDENTS: UNDERSTANDING THE RISKS IN CANADA

Canada's economic and social development has benefited immensely from centuries of marine shipping. Today, the industry supports economies from coast to coast to coast, shipping hundreds of millions of tonnes of cargo, ranging from fuels to food to consumer goods lining store shelves.



Public scrutiny of shipping has heightened in recent years. The risks associated with opening the Arctic to greater ship traffic, increasing marine shipments of oil from Canada's oil sands, and the growth in vessel size, especially of container ships, have all contributed to this discussion.

*Commercial Marine Shipping Accidents: Understanding the Risks in Canada* identifies the risks of commercial marine shipping accidents across Canada's regions and for different cargo types, while highlighting gaps in understanding and areas for further research.

Overall, it is clear that Canada's waters have been getting safer over the past decade, with fewer commercial marine shipping accidents. Commercial marine shipping has benefited from a number of developments ranging from improved traffic control technology and better ship designs, to a strengthened regulatory regime and enhanced industry safety procedures. Accidents nonetheless do occur, yet typically do not result in large impacts.

### Workshop Report Key Findings

Commercial marine shipping risks are mitigated by a large body of regulations, safety protocols and practices, and navigation technologies, which have made marine shipping, in Canada and globally, much safer in recent decades.

Commercial marine shipping operates in a complex risk environment where a variety of factors interact to increase or decrease the likelihood of an accident and the severity of its impact.

The nature of commercial marine shipping risk varies by region due to differences in cargo, regulation, physical traits of the marine environment, and economic, social, and cultural uses of waterways and coastlines.

Risks associated with major oil spills are significant and well documented, and they underscore how resulting environmental impacts can bring about social, economic, and health impacts.

Better-quality marine shipping data are needed if the likelihood of incidents and accidents is to be better understood and measured for different cargo types, stages of shipping, and types of impacts.

Further research would address gaps in the understanding of Canada's marine risk environment, particularly with respect to impacts of hazardous and noxious substances (HNS) and diluted bitumen, spills in freshwater and cold environments, and on the multi-agency system that oversees marine safety in Canada.




## Regional Risk Profiles of Commercial Marine Shipping Accidents


Each region faces very different risk profiles owing to differences in main types of cargo; risk prevention policies, such as moratoriums or pilotage zones; and waterway characteristics, including the degree of ecological sensitivity or the extent of constrained waterways. Varying economic, social, and cultural contexts also contribute to the differences across regions.


### PACIFIC REGION


Despite constrained waterways, the presence of Canada's busiest port (Metro Vancouver), and high traffic levels, the risks from shipping in this region are relatively low due to a low accident rate and the nature of the cargo shipped.

 Top region for shipment of coal, agriculture and food products, and forestry by-products

 **54%**

 Sensitive marine ecology; First Nations coastal communities; tourism


 **1.2 per 1,000**


 *British Columbians are more likely than other Canadians to have chosen their residence for access to nature, making the environmental concerns about shipping particularly significant in this region.*

60<sup>th</sup> Parallel


### CENTRAL REGION


Constrained waterways and high traffic density contribute to the risks in this region; while the accident rate is greater than in other high-traffic regions, accidents in this region are often minor and unlikely to result in fatalities or serious injuries.

 Top region for shipment of minerals, including iron ores and salt

 Proximity to population centres; potential economic disruption; source of drinking water

 **29%**

 **5.1 per 1,000**

 *Ships travelling in the Central region are subject to enhanced regulatory oversight owing to the shared jurisdiction with the United States.*

Commercial marine shipping operates in a complex risk environment. The likelihood of an accident and the severity of its impact are influenced by a variety of factors. Some are controllable — such as the condition of a vessel or safety practices — and others less so — such as strong currents or harsh

weather conditions. These factors come into play first in the likelihood that an accident will occur and, second, in the extent to which impacts will be realized after the accident. The effect is a high level of complexity in characterizing commercial marine shipping risks.

### NORTHERN REGION

A lack of infrastructure and navigational aids, harsh weather, and the presence of ice contribute to the risks of commercial shipping in the North; this region has the highest accident rate.



Variable, includes community resupply



Sensitive environment; limited response capacity



1%



10.3 per 1,000



Ice affects the behavior and fate of oil, and is therefore a key factor in determining the impact of an oil spill in the Arctic.

### ATLANTIC REGION

Harsh weather and the presence of ice increase shipping risks in this region, but the overall accident rate is low.



Top region for shipment of fuels, including crude petroleum, gasoline, and fuel oils



16%



Tanker traffic; reliance on fisheries; tourism



1.5 per 1,000



The offshore oil industry is a key driver of shipping in Newfoundland.

#### LEGEND

British Columbia (Pacific)  
Northern Canada

Great Lakes (Central)  
St. Lawrence (Central)

Newfoundland and Labrador (Atlantic)  
Maritimes (Atlantic)



Cargo type



% of total commercial vessel movements in Canada (2004–2011)



Key factors influencing accident impacts



# incidents and accidents per 1,000 vessel movements (2004–2011)

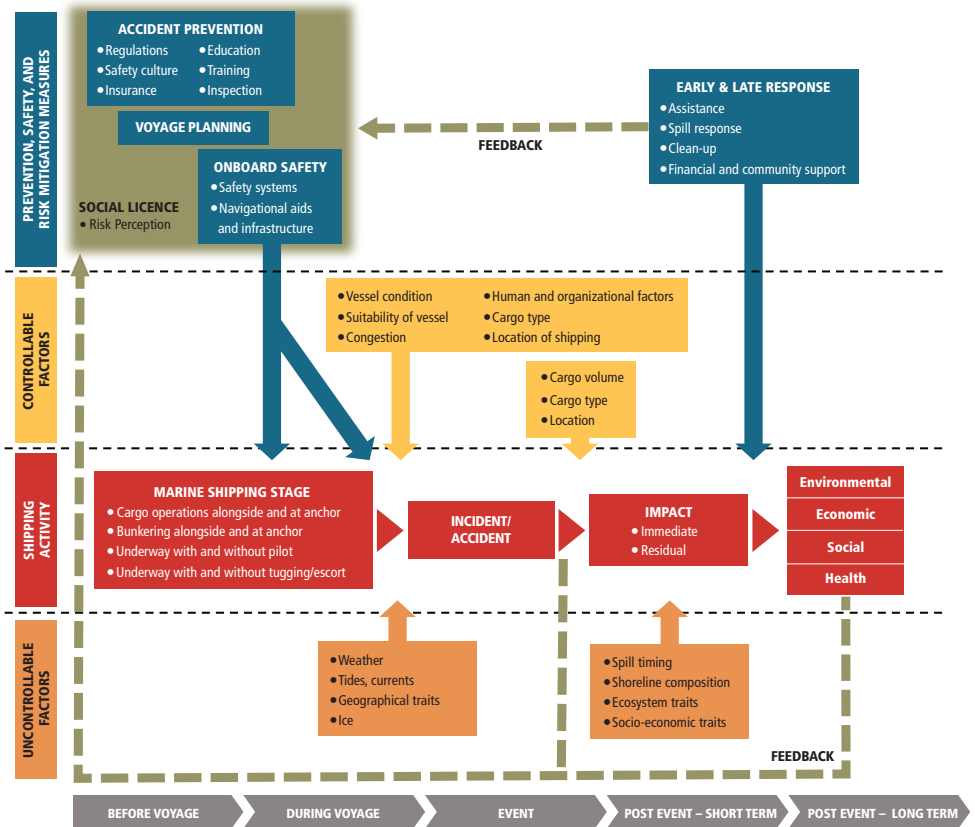


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## COMMERCIAL MARINE SHIPPING ACCIDENTS: UNDERSTANDING THE RISKS IN CANADA

This workshop report was prepared for the Clear Seas Centre for Responsible Marine Shipping and results from a two-day expert workshop informed by a survey and a review of the literature. The workshop brought together a diverse group of experts from across Canada with backgrounds in academia, industry, and government to build consensus on the risks of marine shipping in Canadian waters.

Download the full report at [www.scienceadvice.ca](http://www.scienceadvice.ca) to learn about the ways in which risks of commercial marine shipping accidents vary across Canada.



This figure developed by workshop participants demonstrates how different factors influence the risk of a marine shipping accident. The feedback arrows show that the shipping industry's social licence to operate can be influenced by public satisfaction with response measures and the nature of accident impacts.

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This *Report in Focus* was prepared by the Council based on the Workshop Report *Commercial Marine Shipping Accidents: Understanding the Risks in Canada*. It does not necessarily represent the views or opinions of the sponsoring organization, Clear Seas.