

SECOND EDITION



Citizen's Guide to
**TANKER
SAFETY
& SPILL
RESPONSE**

**on British Columbia's
South Coast**



Resource Works

Citizen's Guide to Tanker Safety & Spill Response on British Columbia's South Coast

A FRAMEWORK FOR UNDERSTANDING THE
TRANS MOUNTAIN PIPELINE EXPANSION PROJECT

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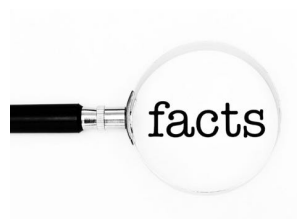
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Executive Summary

The Trans Mountain Pipeline Expansion Project (TMEP) was announced in May 2012 and approved four and one half years later in December 2016. Much work has been done but the most costly and substantive pieces still lie in the future. The Project is expected to be in service by late 2020.

Yet many are rightly asking: Will it ever be finished? A fair question. At this writing, in May 2018, we can only wait and see.

This document has been independently prepared to provide a compendium of fact-based information to assist the public during a period of robust discussion on TMEP in general and the subject of marine risk in particular. It may not contain all the answers, but the authors have done their best. We intend it as a starting point from which to have a meaningful discussion on the risk posed by increased marine tanker traffic with the expansion of TMEP and energy exports from Canada's west coast.

For Canada as a trading nation, marine activities have for decades produced extensive economic benefit. They have allowed the transportation of the nation's goods and commodities to the global market. And they have enabled other activities such as the cruise industry, eco-tourism and the diverse array of commodity production that characterizes the western Canadian economy.

This document determines that the TMEP is a project that addresses maritime issues in a risk-based and cooperative way with industry and government, informed by three principles:

- Expand within the existing regime,
- Be geographically specific and risk-based, and
- Benefit affected communities.

While marine response is federally-led, all response is local. Canada through the Oceans Protection Plan is building on a solid foundation for continuous improvement and has sought to identify gaps and then address them through leadership, funding and operational marine response that benefits this project as well as the marine shipping sector overall.

Most importantly, Canada has sought to include all parties in the discussion and enhance Canada's marine response capability. These include First Nations, environmental NGOs, commercial interests, local

governments, the province and our neighbour to the south, the United States. This incorporation of local, First Nations and the province is seen as a further strengthening of an already robust regime.

Regulation

A mature and dynamic system of governance is in place for marine safety and spill prevention on the west coast of Canada with additional risk-control measures for oil tankers. The national system adopts into Canadian law, via the *Canada Shipping Act 2001*, international rules and regulations that are meant to protect the marine environment.

The regulatory environment for oil tankers includes these characteristics:

- Governance of ship movement, navigation safety and spill compensation by international marine conventions by Transport Canada, a federal regulatory agency.
- Regulation, oversight and inspection of tankers by national and regional marine authorities led by Transport Canada.
- Compulsory use of experienced local marine pilots to navigate ships in local waters.
- Industry-led vetting and preloading inspections of all marine tankers to ensure the protection of the public interest as well as a port state inspection of every foreign flag tanker in Canadian west coast waters.
- Of the National Energy Board's 157 conditions for project approval, 11 that require specific marine commitments to be fulfilled.
- Advancements resulting from the federal Oceans Protection Plan, which provides \$1.5 billion over a 5-year period to achieve a world-leading marine safety system that will increase the Government of Canada's capacity to prevent and improve response to marine pollution incidents.

Risk

The existing pipeline has been operating since 1953 without a drop of oil being spilled by a tanker visiting its terminal. The spill-prevention movement in the global oil shipping industry has yielded extraordinary results in recent decades. The total volume of cargo oil spilled has declined significantly while the total tonnes miles of cargo has increased. When reviewing the marine risks posed by the Project, the following should be considered:

- Hazards and risks related to the sailing route are prevented and mitigated by implemented risk control measures.
- Trans Mountain will not introduce new oil spill consequences, since the tankers from the project will be of similar size, carry similar cargo in similar volume sizes and travel the same route as present.
- There is already a substantial amount of tanker traffic in the region. The risk of a cargo oil spill already exists in the region. The probability of a spill from cargo oil for the entire study area would remain similar to the existing level after additional marine safety measures have been implemented.
- The level of care and safety in the Salish Sea is well above globally-accepted shipping standards. This is reflected in the area's marine safety record.
- All reasonable measures to prevent spills are being taken including:

- Expansion of the use of tugs that will now provide laden tankers with tug escort for the entire passage through Canadian waters between Westridge Marine Terminal and the Pacific Ocean,
 - Increased local pilot use to navigate vessels, and
 - Enhanced tools for situational awareness.
- In addition to the tugs that TMEP will bring to the region, the federal Oceans Protection Plan is also sourcing larger tugs for the west coast that will enhance the level of marine safety by increasing availability of salvage-capable tugs on the BC coast.
 - The definitive expert maritime risk assessment for TMEP concluded that “the [Salish Sea] region is capable of safely accommodating the additional one laden crude oil tanker per day increase that will result from the Project.”
 - For an Aframax type of tanker, the credible worst-case scenario oil spill according to globally qualified risk experts is the loss of the entire contents of two of a ship’s internal oil tanks (out of 12 to 14) to the sea, or 16,500 cubic metres of crude oil.
 - With all required risk-reducing measures put into place, it is conservatively estimated that a credible worst case oil spill from a tanker transporting crude oil from the project could occur once in every 2,841 years.
 - There is no credible reason to believe the entire contents of a full tanker could be lost in a spill incident.

Response

Steps are being taken to significantly improve oil spill response capabilities, and the project will enhance BC’s already-robust spill response capacity.

- Transport Canada regulations require all commercial vessels, including tankers, to establish an arrangement with a certified oil spill response organization prior to entering Canada.
- Western Canada Marine Response Corporation (WCMRC) is the industry-funded Transport Canada certified marine oil spill response organization on the BC coast.
- The Trans Mountain Expansion Project is facilitating WCMRC to carry out oil spill response enhancements that will cost \$150 million and help to improve the level of protection currently available to the British Columbia coastline.
- WCMRC is establishing six new response bases, adding about 115 new personnel and 43 new vessels including spill response craft and barges.
- Under the Oceans Protection Plan, the Government of Canada is funding additional resources for the Canadian Coast Guard who will work with Indigenous communities to design and launch new Indigenous Community Response Teams, starting in British Columbia.
- After a review of the considerable literature about diluted bitumen spills in water, the authors of the present study found that in such cases its fate and behaviour is much the same as that of other heavy oils.
- Research initiatives funded by industry and the Government of Canada continue to expand the level of knowledge on the fate and behaviour of different oils, which assists in further improvements in oil spill response planning.

Social and Economic Returns

The final section looks briefly at the question: If we are taking risks, what are the rewards? It turns out that there are quite a few economic arguments.

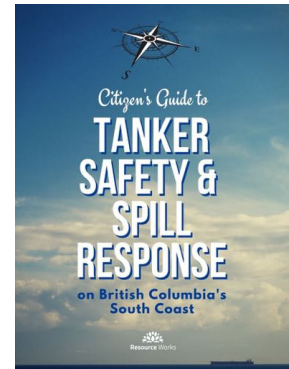
Preface

British Columbians have consistently demanded that their voices be heard when it comes to protecting the environment when transporting hydrocarbons. And rightly so. The personal connection British Columbians have with the environment is matched by a passion for ensuring it is not put at undue risk from potential oil spills. The risks of engaging in successful maritime shipping must be understood not simply in technical terms, but also in ways that cover the economic, social and environmental perspectives influencing the public debate.

The *Citizen's Guide to Tanker Safety & Spill Response on the British Columbia South Coast* is intended as a work for everyone. It may appeal especially to those in the role of explainer of complex public policy, and who are in need of authoritative, accessible, reference materials.

However, we have also endeavoured to make it as accessible as possible by using jargon-free language as well as maps, infographics and web links.

Citations and links to validated information sources are plentiful, as the authors assume everyone in this day and age shares a healthy skepticism about nearly everything. When it comes to multi-year regulatory processes, like a pipeline application, this is not merely good practice. The amount of information available is vast. Google may be a great leveller and provider of apparent transparency, yet searches do turn up a bewildering array of often contradictory information that is difficult to critically appraise. The regulators may be transparent yet their offerings are voluminous, covering years of process involving tens of thousands of pages of highly technical material. It's possible to waste a lot of time looking for the right document. For those seeing the print version, the online edition at www.resourceworks.com offers all the links.



Our intention was to collect together, into one place, this authenticated and definitive inventory of the information relevant to maritime safety in connection with the Trans Mountain Pipeline Expansion Project (TMPEP), along with some other contextual information that we concluded would be helpful for understanding the project.

As a public issue, TMPEP has demanded the utmost dedication to ensuring ongoing transparency and accessibility for the public. This guide is organized to facilitate understanding of what can be a thicket of operational, technical and legal frameworks. The authors have identified an inclusive framework divided into four topic areas (with some possible overlaps):

- Regulation
- Risk¹
- Response
- Social and Economic Returns

One of the barriers for a non-expert – whether that individual is an elected official who must communicate truthfully and coherently on complex matters of public policy; a journalist; an enterprise leader; or simply a concerned citizen – is understanding the sheer scale of shipping and the continuous advancements in technology and operating practices that contribute to maritime safety. This is

¹ Including prevention, protection, intervention and compensation.

particularly so when it comes to discussions on tanker safety where very often the conversations tend to focus on major shipping disasters, such as the *Exxon Valdez* spill that occurred 29 years ago.

One of the patterns that emerges from our approach is how the project's shipping activities and the assorted commitments related to it are contained within a multi-layered, multi-jurisdictional regime. Global shipping is an international activity regulated by both the flag and the coastal states. International uniformity is provided by the International Maritime Organization (IMO), a highly successful United Nations organization, which seeks to achieve global uniformity in marine shipping governance and liability and compensation for marine risks which are in a constant state of evolution. It is a dynamic process with input from coastal states, shipowners and ancillary organizations including environmental groups. As a founding member of the IMO, Canada has played a key role and continues to do so at the IMO which is based in London, England.² In addition, there is technical oversight provided by classification societies as well as industry oversight on emerging marine risk and the impact of shipping on the ocean environment.

As we looked deeper, the significance of some apparent “details” became much clearer. For example, it's noteworthy that while Canada is an exporting nation, it is not a ship-owning nation. Canadians have very little experience with commercial shipping. Our exporters have no say over who carries cargoes and it is left to regulatory oversight by Canada via internationally agreed port state control to ensure compliance. Canadian interest and attention is limited – until a marine incident occurs. Out of 90,000 commercial ocean going vessels globally, Canada has fewer than 100 that are engaged in coastal trade; none trade internationally. Yet, on any given day, there are over 300 commercial vessels in Canadian waters, many of them on the west coast. With over 244,000 kms of coastline, Canada has established a strong shipping governance regime to protect the marine environment from all marine risk including shipping. This includes rolling out an Oceans Protection Plan (OPP) that takes into account the huge range of marine conditions along all the coasts of Canada including on the west coast with its 28,000 kilometres of coastline, 4,000 islands and strong ocean currents. The OPP initiative exceeds, in some cases, international standards and it allows for input from all interested parties. It has identified four priority areas:

1. PROGRESS: Increasing our capacity to prevent and improve responses to marine incidents,
2. ENVIRONMENT: Preserving and restoring marine ecosystems and habitats,
3. PARTNERING: Strengthening partnerships with indigenous and coastal communities, and
4. EVIDENCE: Ensuring Canada's marine safety system is built on a stronger evidence base, supported by science and local knowledge.

Although we aimed for the Citizen's Guide document to be comprehensive, we also understand that concise explanation is a virtue. Many thousands of pages of original material, from multiple sources, were consulted in preparing this “Coles Notes” document. We have worked carefully, and in consultation with subject-matter experts, to ensure the contents are accurate and complete. Input in the process is welcomed and encouraged. For those who support an open discussion on responsibly developed infrastructure investment in general, it's critically important that all voices be heard and respected. That particularly includes those concerned about potential spills and tanker safety. While extensive measures are in place to meet and in many cases exceed the legislative and industry imposed requirements,

² The goal of IMO, where Canada has played a key leadership role is “safer ships and protection of the marine environment.” Canada has lead thinking at IMO. A Canadian, former Canadian Coast Guard Commissioner, William O'Neil was elected by other shipping nations to three successive five-year terms as Secretary General of IMO.

increased marine tanker traffic in and of itself inevitably reinforces the perception that marine risks are higher.

We have chosen a simple organizational structure and done our best to contain what is often a sprawling topic into the chapter headings seen here.

We have not set out to recommend one specific policy direction over another. This text will be useful for anyone seeking to ensure that when they do analyse a policy, whatever it may be, they have had a chance to do so in a rich context of relevant and validated information. With clear, factual information and an overview perspective, real rather than perceived risk can be the focus of analysis.

— *The authors*

Role of Resource Works

This publication is the latest in a growing collection of topical papers from Resource Works. Resource Works is a not-for-profit group supported by volunteers that communicates with British Columbians about the importance of the province's resource sectors to their personal well-being. It demonstrates how responsible development of British Columbia's resources creates jobs and incomes throughout the province, both directly and indirectly, while maintaining a clean and healthy environment.

And Resource Works explores the long-term economic future of British Columbia as a place that depends on the responsible development, extraction and transportation of the province's resources. Since its founding in 2014, Resource Works has published numerous expert reports examining a range of issues.

About the Authors

Don Hauka

Don Hauka is a communications professional and former journalist who spent nearly 20 years covering politics at all levels of government for the *Province* newspaper. A student of BC history, his non-fiction book, *McGowan's War: The Birth of Modern British Columbia on the Fraser River Gold Fields*, was published by New Star Books in 2003. He has also collaborated with his former newspaper colleague Salim Jiwa to produce two books on the Air India tragedy. A novelist, screenwriter and playwright, he currently works with non-profit organizations concerned with housing, First Nations reconciliation and heritage as well as technological innovation.

Kim Lonsdale

Kim Lonsdale is a Vancouver Island-based business analyst and project manager with experience in resource development. Kim believes that to be truly sustainable, resource developments must be socially, environmentally and financially viable. This means science-based vigilance in assessing major projects and effective long-term regulatory compliance systems. Kim believes that Canada's carbon emissions will continue to increase until people take personal responsibility and act to reduce the carbon intensity of their consumption.

Stewart Muir (project editor)

Stewart Muir is Executive Director of Resource Works. He is a historian and award-winning journalist with a passion for the natural legacies of British Columbia. He was a deputy managing editor and business editor at The Vancouver Sun, and a divisional managing director with The Canadian Press. He served as editor and lead writer of *The Night the City Became a Stadium: Independent Review of the 2011 Vancouver Stanley Cup Playoffs Riot* that submitted 53 recommendations to government, all of which were accepted. A graduate of Simon Fraser University and the University of British Columbia, he was a director of The Nature Trust of British Columbia from 2006 until 2014. He studied economic botany and the long-term consequences of deforestation and climate change at Leiden University in The Netherlands. Muir, whose great-grandfather was master of the Daunt Rock lightship outside of Cork harbour in Ireland, was a contributing author to *The Sea Among Us: Life and History of The Strait of Georgia*, an award-winning 2015 book from Harbour Publishing edited by Richard Beamish and Sandy McFarlane.

Scott Simpson

Scott Simpson is a former journalist who spent 32 years at the Vancouver Sun as a reporter, columnist and editor, covering a wide range of topics including 10 years on the energy beat. He is a five-time Jack Webster Award nominee including three for science writing, and won a Webster for Business, Industry and Economics for a series of stories examining the implications of the Site C Dam project. He has been honoured three times for conservation writing including an award from the Canadian Electricity Association for his coverage of sustainability issues. He shared a National Newspaper Award with Sun colleagues for a series about the future of the Strait of Georgia. He is currently self-employed, working with clients in the natural resource sector.

Joe Spears

Joe Spears is a mariner, lecturer at Memorial University of Newfoundland, and retired maritime lawyer with over 40 years' experience in the maritime sector. As a lawyer, he appeared in Canadian admiralty courts and undertook a Lloyd's Salvage Arbitration. He was an outside consultant to the Office of the Auditor General (Canada) and has advised government on marine response and acted for the State of Washington Department of Ecology. Joe helped develop marine response capacity in Canada for the public and private sector including the development and delivery of a National Marine Investigation Course for Transport Canada. He researched marine risk for Transport Canada while a student at the London School of Economics and the Lloyd's of London marine insurance market with a focus on Arctic shipping. He is an Honorary Canadian Ranger with 2 CPRG Canadian Rangers. His consultancy, Horseshoe Bay Marine Group, engages in marine problem-solving worldwide. He has operated a marine charter business and with Parks Canada developed the first whale-watching operation in Cape Breton Highlands National Park. He is a former field researcher on Arctic seabirds with the Canadian Wildlife Service. He holds degrees in economics, biology, law and ocean policy-making. He is a frequent writer and media commentator on ocean issues who looks at these issues in a holistic way. Joe trains Labrador Retrievers, is an avid sailor, wilderness canoeist and fisherman whose passion is protecting Canada's oceans.

Citizen's Guide to Tanker Safety & Spill Response on British Columbia's South Coast

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Statement: The Chartered Institute of Logistics and Transport

Originally founded in 1919 in the United Kingdom, the Chartered Institute of Logistics and Transport (CILT) today is recognized globally as the leading professional organization in the field of logistics and transportation, with over 30,000 members in more than 30 countries.

As the professional certification body, members are granted post-nominal letters which represent their level of education and experience in the fields of logistics and transport (MILT - Member; CILT - Chartered Member and FCILT - Chartered Fellow)

In the Pacific Chapter, Chartered Institute of Logistics and Transport North America (CILTNA), our goal is to promote professional development for our members through a series of speaker events throughout the year. We place special emphasis on including post-secondary students in these fields with sponsorships to attend our events. We produce Proceedings of our events, (which always feature a senior speaker from a Gateway Sector) which are published on our web sites and widely disseminated to the transportation/logistics and broader business community.

Pacific Chapter members represent all modes of transport, supply chain/logistics organizations, all levels of government, academics, legal engineering and accounting firms, as well as the broader business community.

Recently our Pacific Chapter was invited to review and comment on the draft document entitled “Citizen's Guide to Tanker Safety & Spill Response on BC's South Coast”. As Chair of the Pacific Chapter, I nominated four members of our Executive, with particular expertise in marine matters, to undertake this task. Just a word about each member...

- George Adams is a retired senior shipping executive and former member of the Board of the Vancouver Fraser Port Authority, who closely follows marine issues;
- Darryl Anderson, Wave Point Consulting, Victoria has done a great deal of policy work and writing on marine issues and in particular, tanker traffic;
- Bonnie Gee, Vice President, Chamber of Shipping of BC and directly involved day to day in tanker movements on the BC coastline; and
- Paul Levelton, who heads up the Infrastructure Practice at KPMG and has had international experience in port/marine projects.

This group has reviewed the draft document and has found it to be both factual and credible.

Marian Robson, FCILT
Chair, Pacific Chapter
Chartered Institute of Logistics and Transport
North America



Introduction

Why the Trans Mountain Pipeline Expansion Project?

The Trans Mountain pipeline expansion project is a key piece of transportation infrastructure for driving up the value of Canadian oil. Its completion will show the world that Canada is a firm but fair and stable jurisdiction in which to operate — and to invest in job-creating enterprises.

The Trans Mountain Expansion Project can help all Canadians share the prosperity that our country's abundant natural resources have provided for millennia. Particularly for non-renewable resources such as oil, it's critical for Canadians to squeeze the most value from each drop while we can. Oil is Canada's number one export. If we get more value for our oil, the benefit here at home is more well-paying jobs, more money for government services and more flexibility to cut the tax burden on homeowners and renters. For future generations, a more prosperous natural resources sector helps maintain public health care, education and financially secure, stable government.



In pursuit of market access

The marine transportation of crude energy products to international markets is of strategic importance to Canada. Recent research suggests that with better market access and new pipeline development, our nation's oil reserves could deliver an additional \$131 billion to Canada's GDP by 2030.

Unlocking the wealth of the oil sands has long been central to the vision of achieving Canadian prosperity and energy independence. For decades, the United States was the sole customer for oil and gas from Canada. Access to new, overseas markets became a necessity in recent years with the advent of technology to tap massive shale resources in the U.S. Yet Canadian oil and gas remains landlocked. Canada is left in the unfortunate position of having to sell its crude oil to U.S. refineries at a discount, costing tens of millions a day in lost revenues.

In Western Canada, various feeder pipelines gather and move oil sands production from northern Alberta and converge at two main hubs in the Edmonton region. The Edmonton hub has two main transmission pipelines. Enbridge Pipelines Inc. is the major carrier of crude oil to eastern Canadian and U.S. markets, while Kinder Morgan's Trans Mountain Pipeline System moves crude oil to the Pacific coast. Traditionally, the largest export markets for Alberta crude oil are the Midwest and Rocky Mountain regions of the United States. For a number of years the Alberta Energy and Utilities Board and the Canadian Association of Petroleum Producers have been reporting that there's not enough pipeline capacity to meet year-over-year growth in oil sands production. This bottleneck can only be alleviated by new pipeline development, and the Trans Mountain Expansion Project is a cornerstone for producers and shippers looking to get oil to market.

With the British Columbia coast the closest tidewater point that would allow Alberta oil producers to resolve the market access problem, two pipeline proposals won approval in recent years: the Northern Gateway pipeline (NGP) to Kitimat, and the Trans Mountain Pipeline Expansion (TMPE) to Metro Vancouver. NGP was killed by the Trudeau government, leaving TMPE as Canada's sole west coast option.

Too much crude oil, too few pipelines

Pipeline bottlenecks and insufficient transportation infrastructure are long running themes in the Canadian oil industry. Canada is blessed with the world's third-largest proven oil reserves behind only Venezuela and Saudi Arabia, but Alberta's oil sands bounty is more than one thousand kilometres from Pacific ports in British Columbia and three-times that distance from major refineries on the US Gulf Coast. The relatively isolated nature of Canadian energy resources in the Western Canadian Sedimentary Basin (WCSB) comes at a cost—producers pay roughly \$10–12/bbl to move their product south by pipeline to refineries on the US Gulf Coast (USGC) and \$20/bbl or more to make the same trip by railcar.³

Rationale for the expansion project

The Trans Mountain Expansion Project (the Project) is a \$7.4-billion construction project. The expansion will parallel the 1,150-km route of the existing Trans Mountain Pipeline, which was built in 1953 and has already been expanded several times. Although Canada holds one of the world's largest petroleum reserves, the Trans Mountain Pipeline remains today the Canadian oil industry's only pipeline conduit to the west coast. TMPL moves crude oil and refined products from Edmonton, Alberta, to marketing terminals and refineries in the BC Interior, the Metro Vancouver area and the Puget Sound area in Washington state. A small amount is shipped from Trans Mountain's Westridge Marine Terminal in North Burnaby via tanker to California and other US and international markets — but it's not nearly enough to leverage a better price for Canadian oil.

After a three-year regulatory approval process, the Government of Canada approved the expansion project in November 2016. The National Energy Board determined that the project is in the Canadian public interest and recommended that the federal Governor in Council approve the expansion. These approvals allowed the project to proceed with 157 conditions.

The expansion represents a near-tripling of Trans Mountain's capacity, rising from 300,000 to 890,000 barrels of oil per day. This expansion will give producers and shippers the flexibility they need to negotiate higher prices for their products.

Many Canadian producers have made significant 15- and 20-year commitments to the expansion that add up to roughly 80 per cent of the capacity in an expanded Trans Mountain Pipeline system.

The project will add approximately 980 km of new pipeline and reactivate 193 km of existing pipeline. To support the expanded pipeline system, new facilities will include 12 new pump stations, 19 new tanks will be added to existing storage terminals, and three new berths will be built at the Westridge Marine Terminal.

³ [Scotiabank, February 2018: http://www.gbm.scotiabank.com/scpt/gbm/scotiaeconomics63/pipeline_approval_delays_2018-02-20.pdf](http://www.gbm.scotiabank.com/scpt/gbm/scotiaeconomics63/pipeline_approval_delays_2018-02-20.pdf)

Routing of the expansion will remain along the existing Trans Mountain Pipeline route where practical – 89 per cent of the new pipeline will parallel the existing pipeline system or linear infrastructure, minimizing environmental and community impacts.

Hearing local voices

Residents of BC's coastal communities can often be heard to state that they are exposed to most of the risks with increased tanker traffic and doubt that sufficient resources from the economic wealth generated by an expanding oil sands industry will be directed towards protecting their interests and the marine environment. The cities of Vancouver and Burnaby in particular have vigorously opposed the project – despite a lack of jurisdiction over federal responsibilities such as inter-provincial and marine transportation of energy resources. This opposition persists despite the exceedingly low risk of a spill. Elsewhere in BC and throughout Alberta, particularly in communities with a more direct understanding of the economic impacts of natural resource development, the project has strong support.

First Nations

At present, we believe that 33 First Nations in British Columbia and 10 First Nations in Alberta have mutual benefit agreements with Kinder Morgan around the pipeline expansion. (This number has fluctuated in the past.) Two nations are opposed, and both are in the area that would be most affected by a spill in Burrard Inlet.

Indigenous people lived along the shores of Burrard Inlet before European contact, occupying villages of cedar plank houses constructed along shoreline or riverbank at sites offering defence from their enemies, freshwater, access to food sources, and easy transportation.

The Tsleil-Waututh (“People of the Inlet”) have historically made intensive use of natural resources in the area, especially marine and intertidal zones. The Squamish Nation claims Aboriginal title and rights to an area encompassing the entire Squamish Valley drainage system, all of Howe Sound, and all of Burrard Inlet. The Musqueam have lived in the Fraser River estuary for thousands of years and identify their traditional territory in Vancouver, North Vancouver, South Vancouver, Burrard Inlet, New Westminster, Burnaby, and Richmond.

At least 24 species of fish, 15 species of beach foods, 10 species of land mammals, 3 species of sea mammals, 25 species of birds, and 47 species of plants comprised the traditional diet in Burrard Inlet. The single most important element was the five species of anadromous Pacific salmon that could be caught in local waters.

The Squamish and Tsleil-Waututh nations have both emphasized their responsibility to protect or restore conditions that provide the environmental, cultural, spiritual, and economic foundation for their communities to thrive. It is an important issue, as Aboriginal rights are enshrined in the Canadian Constitution. These rights are not absolute, but consultation is mandatory. Positions of the three key maritime First Nations with Burrard Inlet interests:

- The Tsleil-Waututh assert that the expansion will adversely impact their traditional territory, including allegedly higher environmental risks associated with increased oil tanker activity in the inlet. The Tsleil-Waututh describe a stewardship obligation, handed down from their ancestors, that includes the responsibility to protect or restore conditions that provide the environmental, cultural, spiritual, and economic foundation for their community to thrive.

- Squamish Nation's desire and interest is to have a meaningful collective collaborative partnership to address any deleterious spills into Burrard Inlet. All bureaucracies must work together for the health and safety of Burrard Inlet; all future societies/generations depend on our environment cleanup plans today.
- In April 2018, the Musqueam issued a statement saying: "Musqueam knows the serious risks of increased oil transport via rail if the pipeline project is cancelled. While Musqueam is not one of those First Nations who have negotiated agreements we are preparing a list of conditions and voicing our concerns. Musqueam maintains the right to speak on behalf of our territory and respects the views of other First Nations who are impacted by this proposal. We have chosen the path of negotiations through engaging with government. Musqueam understands this perilous situation and we seek a reasonable solution. We support the Prime Minister's efforts to find a positive resolution, which would be in the vital strategic interest of Canada: including the Musqueam First Nation."

Climate leadership plans bridge climate, oil and tanker safety

The Trudeau government deserves credit for making action on climate change a central organizing principle of its tenure. In December 2016, the government, along with most provinces and territories, agreed to the Pan-Canadian Framework on Clean Growth and Climate Change to meet greenhouse gas emissions reduction targets and grow the economy. Pricing carbon pollution is central to the framework. While significant political challenges remain to implementation, few Canadians would agree that doing nothing is an acceptable alternative.

For many who question the Project, climate change rather than tanker safety or even pipelines *per se* is the central issue. Yet blocking pipelines is a very expensive means of lowering emissions, and far above the likely damages from a tonne of GHG emissions. Economist Trevor Tombe has shown⁴ that if forgone Alberta oil production is fully replaced by increased Saudi production, then the implied cost per tonne of global GHG emissions avoided is over \$1,000 – quite a difference for a nation targeting \$50 per tonne by 2022.

Global GHG emissions from fossil fuels and industry were on track to grow by 2 per cent in 2017.⁵ The bulk of the growth is coming from emerging markets and developing countries that continue to emerge from energy poverty. Canada's share of total global emissions has decreased slightly and is now less than 2 per cent of the global total.

Alberta has committed to a hard cap on total annual oil sands production, a remarkable move which has satisfied critics such as Sandy Garossino, [who wrote in the National Observer](#) that it was time to back off on pipeline opposition now that the bigger long-term struggle over carbon restraint is won.⁶ Alberta's Climate Leadership Plan was implemented to reduce greenhouse gas emissions that cause climate change. The annual emissions limit was jointly recommended to the Alberta government by the Alberta Oil Sands Advisory Group, which included Canadian and international leaders in Alberta's oil sand industry and leaders in Canadian and international environmental organizations. (Notably, some of the environmental organizations who participated continue to oppose pipelines.)

⁴ <http://www.macleans.ca/economy/economicanalysis/blocking-pipelines-is-a-costly-way-to-lower-emissions/>

⁵

<http://theconversation.com/fossil-fuel-emissions-hit-record-high-after-unexpected-growth-global-carbon-budget-2017-87248>

⁶ <https://www.nationalobserver.com/2016/12/21/opinion/garossino-why-kinder-morgan-isnt-hill-fight-and-die>

Key aspects of the Alberta plan include:

- capping oil sands emissions to 100 mega tonnes per year,
- reducing methane emissions by 45 per cent by 2025,
- an initial \$30 per tonne price on greenhouse gas emissions,
- ending pollution from coal-generated electricity by 2030, and
- developing more renewable energy.

The belief was that if Alberta accepted an emissions cap on the oilsands that this would enable Canada to meet its commitment to the Paris Accord and that demonstrating climate leadership at such a high level would result in public acceptance for pipelines to tidewater. Prime Minister Justin Trudeau has cited Alberta's actions on climate change in his Cabinet's decision to approve the Kinder Morgan Trans Mountain pipeline and on [February 4, 2018, Prime Minister Trudeau indicated](#) that the emissions cap, pipeline and Oceans Protection Plan are a package deal.⁷ If Trans Mountain pipeline is cancelled, Alberta will not proceed with the emissions cap and the federal government will not proceed with the Oceans Protection Plan.

Evolving perceptions

A broad trend of greater public concern around environmental issues has been accentuated by rising climate concerns. The oil and gas industry has responded, in Canada, with unrelenting commitments to increased environmental performance that has been delivering results.

New pipeline proposals were identified as an activist pressure point in the past decade. Stop a pipeline, and prevent the passage of fossil fuels to market. Although no one would dispute that the fossil fuels themselves are a real problem, suddenly the public started hearing about safety fears tied to pipelines. In the case of the Canadian west coast pipelines, added to this was elevated awareness that tanker shipping exists in a risk environment.

A variety of organizations invested in focussing public and political attention on spill risk. This proved to be a positive factor, to a great extent, because it ensured that no aspect of the TMEP was left unscrutinized. When it was approved in December 2016, TMEP was given 157 conditions to fulfill, most of them focused on the various safety concerns. The maritime safety question was addressed by a variety of measures, resulting in a mature and evolving spill response regime being brought forward as TMEP is completed.

The Greater Vancouver Integrated Response Plan states that “today’s aspirations are to work with like-minded entities to build a strong defense to protect/enhance Greater Vancouver/Burrard Inlet ... All bureaucracies must work together for the health and safety of Burrard Inlet, all future societies/generations depend on our environment cleanup plans today.”

There will always be those for whom nothing in the tanker and spill response measures will mitigate other concerns they may have. It is worth working to separate those concerns from what is actually happening in Canadian waters to improve shipping safety. No maritime safety program, no matter how complete, will satisfy those for whom safety is a proxy issue for other concerns. That’s something to remember as construction of the TMEP is completed and the new pipeline is brought into service.

⁷ <http://www.cbc.ca/news/canada/british-columbia/trudeau-bc-alberta-pipeline-nanaimo-town-hall-1.4516737>



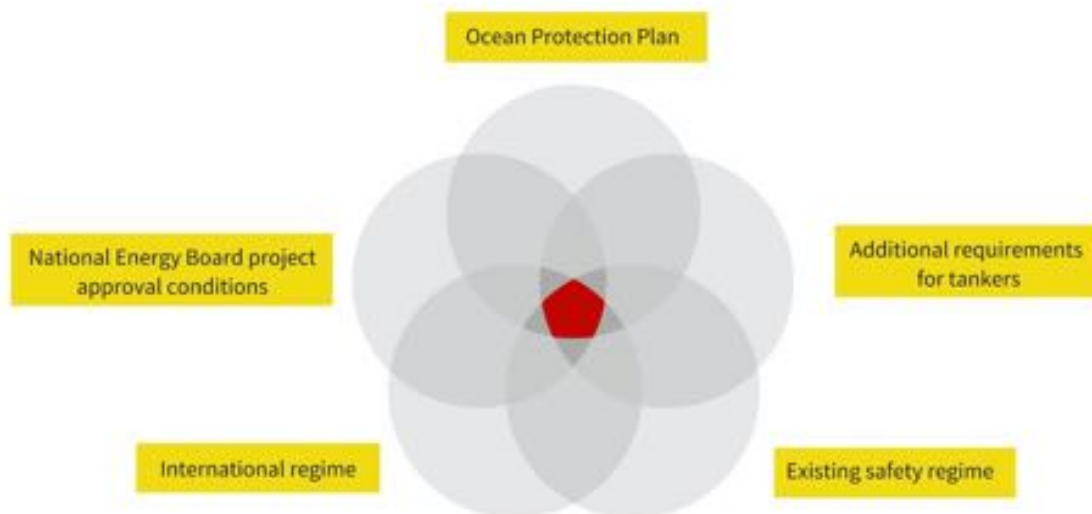
I. Regulation

Globally, marine tankers are subject to more scrutiny and regulation than other commercial vessels because of the potential environmental impacts in the event of a marine spill. In Canada, oil tankers operate within a highly developed, robust, and sophisticated regime. This includes:

- Governance of ship movement, navigation safety and spill compensation by international marine conventions,
- Regulation, oversight and inspection of tankers by national and regional marine authorities,
- Compulsory use of experienced local marine pilots to guide ships in and out of local waters, and
- Industry-led vetting of all vessels to ensure the protection of the public interest.

These layers of oversight continue to evolve as authorities recognize that opportunities for improvement are further supplemented, in the case of TMEP, by National Energy Board project approval conditions. The Government of Canada has taken a more proactive approach, with increased transparency, in conjunction with the pipeline expansion approval process for Trans Mountain Expansion Project. Together with the OPP the result is a multi-layered approach to prevention.

Trans Mountain oil tanker safety has many layers



Overview of the maritime safety regime

The National Energy Board, in its May 2016 recommendation report for the Trans Mountain Project, noted that its regulatory jurisdiction over the transportation of oil ends with Trans Mountain's tanker loading facility, the Westridge Marine Terminal in Burrard Inlet. As laden tankers depart Westridge, other governmental departments and agencies bear the responsibility for managing their movement. It's a system that has evolved over centuries. It remains dynamic — and multi-layered. However, the National Energy Board included several recommendations aimed at further minimizing spill risk.

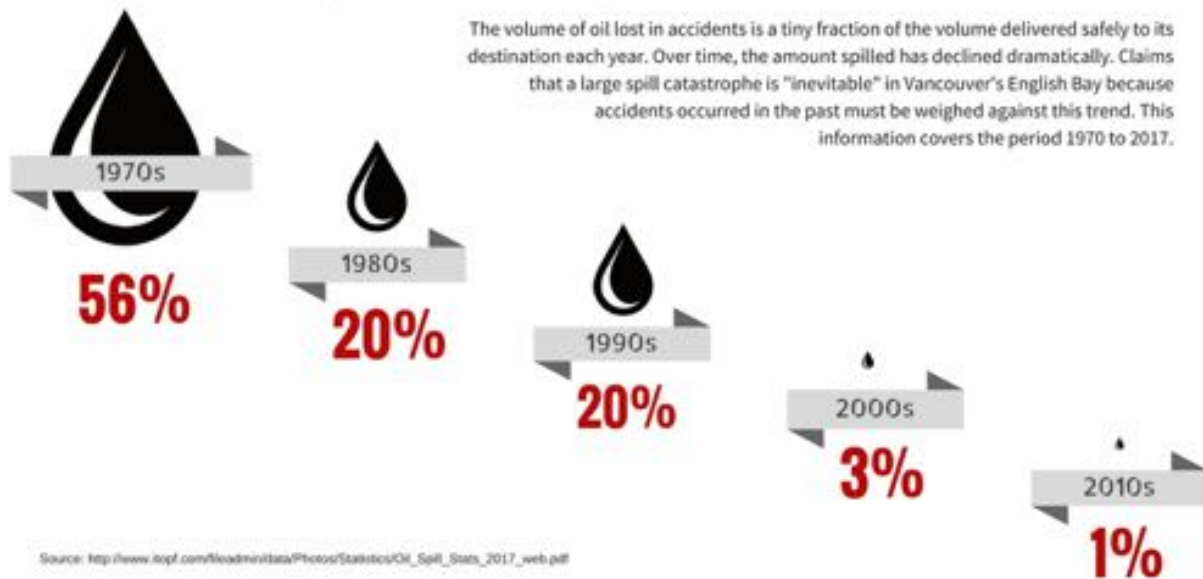
Canadians want to know that any infrastructure project — whether it's a pipeline, a bridge or a highway — is safe and well managed. In the marine sector, of course, Canadians cannot act alone. Government regulation here at home is critical, but it's just one many aspects of a venerable, complex and sophisticated international marine industry that moves our products to foreign markets — and brings back others in trade.

On a global scale, this chart shows how increasing volume of fuel shipping has been accompanied by greatly decreased spill incidence:

More traffic, vastly fewer spills



Since 1970, sharp decline in oil spills from tankers worldwide



Compensation: Who pays for a spill?

Canada's compensation regime is based on the polluter-pays principle, and upon many international conventions. This regime has been tested both in Canada and internationally. It works and has been updated in light of past incidents and gaps.

Transport Canada advises that in combination, this regime could provide up to \$1.5 billion for a single incident.

Compensation for a spill in the Canadian marine environment is available from three sources: shipowners' liability, the [International Oil Pollution Compensation Fund](#), and Canada's [Ship-Source Oil Pollution Fund](#).⁸⁹

- **Shipowners liability** — Liability depends on the size of the ship, and must be backed by the shipowner's insurance. If damages exceed the liability, international and Canadian funds provide more compensation. The [International Convention on Civil Liability for Oil Pollution Damage](#) makes shipowners legally responsible for tanker spills.¹⁰ The [International Convention on Civil Liability for Bunker Oil Pollution Damage](#) makes shipowners legally responsible for bunker oil fuel spills from the engine system of any type of international vessel.¹¹

⁸ <http://www.iopcfunds.org/>

⁹ <http://sopf.gc.ca>

¹⁰ <https://www.tc.gc.ca/eng/marinesafety/oep-environment-liability-conv-oil-pollu-damg-506.htm>

¹¹ <https://www.tc.gc.ca/eng/marinesafety/oep-environment-liability-conv-bunker-oil-pollu-damg-1777.htm>

- **International Oil Pollution Compensation Funds** —It administers two international compensation funds for oil pollution damages caused by persistent oil (oils that do not break down easily after a spill). Combined with the shipowner's liability coverage, these funds provide about \$1.3 billion in compensation for a tanker spill of persistent oil.
- **The Ship-Source Oil Pollution Fund (SOPF)** — The [SOPF](#) is a Canadian fund created from levies collected from oil cargo companies.¹² It provides compensation for damages caused by spills of any type of oil from any type of ship. Any person in Canada, including private corporations or the Crown, may file a claim for losses or expenses caused by oil spills from ships.

Some critics have alleged that the ultimate cost of a cleanup will fall upon taxpayers; this is not borne out by the facts.

Under Canada's *Marine Liability Act*, the SOPF is liable to pay claims for oil pollution damage or anticipated damage at any place in Canada, or in Canadian waters including the exclusive economic zone, caused by the discharge of oil from a ship. It is Canada's national fund.

The SOPF is intended to pay claims regarding oil spills from ships of all classes and is not limited to sea-going tankers. In addition to persistent oil, it covers petroleum, fuel oil, sludge, oil refuse and oil mixed with wastes. In the SOPF's most recent fiscal year, 2016-17, \$5.1 million was paid out to settle all Canadian compensation claims.

The Government of Canada announced in November 2016 as part of the Oceans Protection Plan that there will be "unlimited compensation" provided by reactivating a dormant levy on exported oil. A levy would be collected through the federal government's Ship-Source Oil Pollution Fund (SOPF). The levy was originally collected for five years in the 1970s but has not been depleted. The current balance in the SOPF is \$402 million. The fund is considered fully capitalized. The levy's current rate is 50 cents per barrel, indexed, if and when necessary.

Here's what the Government of Canada stated about spill compensation in its announcement of the Oceans Protection Plan:

Stronger polluter-pay principle

Funds must be easily accessible for response and clean-up. Canadians should not be responsible for cleaning up spills in our oceans. This is the responsibility of the polluter. The Government of Canada will strengthen the polluter-pay principle by amending the Canadian Ship-Source Oil Pollution Fund to ensure adequate industry-funded compensation is available for those affected by oil spills.

This will include:

- *Unlimited compensation: Adequate and sufficient compensation in the event of a spill. The Government of Canada will remove the Ship-Source Oil Pollution Fund per-incident limit of liability, and make an unlimited amount of compensation available for spill response.*

¹² <http://sopf.gc.ca>

- *Guaranteed fund top-up: In the unlikely event that the Fund is depleted, a modernized levy on those who ship oil would be instated, ensuring that the compensation continues to be funded by industry, not by middle class Canadians.*
- *Funding into the hands of who needs it: Quickly providing funds to responders and victims of spills is crucial to the system's integrity.*

National Energy Board approval: 157 conditions

The National Energy Board reviewed a veritable mountain of documents prior to recommending that the Trans Mountain Expansion Project proceed. The outcome of its deliberations, on May 19, 2016 after a 29-month hearing, was a recommendation to Canada's Governor In Council (effectively, federal cabinet) that the project proceed.

As a result of its deliberations the NEB imposed 157 conditions covering pre-construction, construction and operational phases of the \$7.4 billion project.

The NEB's 544-page report and list of conditions cover all aspects of the Project, such as pipeline and terminal construction, emergency preparedness, project economics, job creation, community impacts noise, air quality, protection of rare and endangered species of plants and animals — and dozens of other topics reflecting Canada's interest in a safe and well-managed oil pipeline.

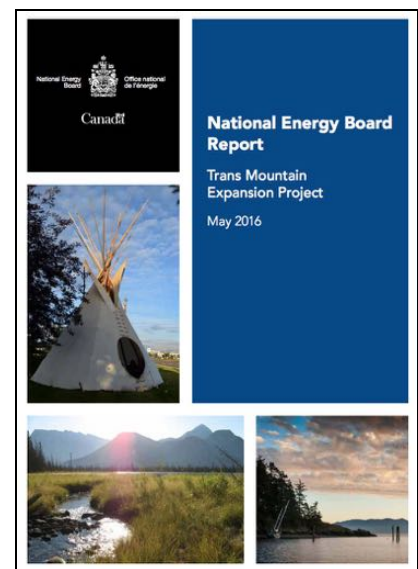
Several chapters of the report focused on marine-related topics such as minimizing spill risks, protecting the environment, emergency preparedness and the environmental behaviour of spilled oil.

The Board reviewed more than 20,000 questions and answers posed to Trans Mountain during the written portion of the formal hearing for TMEP.

As the Board noted, "marine shipping beyond the WMT (Westridge Marine Terminal) is not part of the Project and is not within the Board's regulatory jurisdiction. Other governmental departments and agencies are charged with those responsibilities."

However, the Board did complete a comprehensive environmental assessment of the Project in accordance with its authority under the *National Energy Board Act* and the *Canadian Environmental Assessment Act, 2012*.

"Although marine shipping is not regulated by the Board, as part of its overall public interest determination under the *NEB Act*, the Board considered the potential environmental and socio-economic effects of Project-related marine shipping. This included the potential effects of accidents or malfunctions."



Marine issues reviewed by the Board included the impact of increased tanker traffic upon Southern resident killer whales. (Tanker traffic associated with Trans Mountain Expansion Project would increase to about one ship per day from about one per week at present).

The Board found that Project-related vessel traffic would have what it described as “significant adverse effects” on these mammals and on Aboriginal cultural uses associated with them. However, the Board noted that the established southern shipping route already has high volumes of vessel traffic and that regardless of the Trans Mountain expansion, overall vessel traffic including commercial and recreational traffic will increase in future.

The Board is encouraged by current initiatives being undertaken by Trans Mountain, Fisheries and Oceans Canada, and other organizations to support the recovery of the Southern resident killer whales.

Transport Canada [notes on its website](#) that “Oil tankers have been moving along Canada’s West Coast since the 1930s. In 2015, there were about 197,513 departures and arrivals of vessels at West Coast ports. Tankers accounted for about 1,487 of them, or 0.75 per cent . . . Much of the oil shipped out of Vancouver is transported to and from communities on the BC coast. Oil is carried by barges, container ships, ferries, and other types of commercial and private vessels.”¹³

The Board added that it “took into consideration the likelihood and potential consequence of a spill from the Project or from a Project-related tanker. The Board found that while the consequences of large spills could be high, the likelihood of such events occurring would be very low given the extent of the mitigation and safety measures that would be implemented.”

Here are NEB Conditions for the Trans Mountain Expansion Project which apply to construction at Westridge Marine Terminal and the transport of oil, setting the stage for extensive federal oversight of all activity prior to, during and after construction. As the Conditions demonstrate, NEB oversight is detail-oriented and ongoing throughout the life of the project, and during pipeline operations that follow. A large portion of Trans Mountain’s regulatory compliance involves developing and carrying out detailed plans for work and other actions followed by reporting back to the NEB on that work. This exceeds internationally agreed levels of risk prevention and this buttresses an existing robust regime.

Key maritime-related conditions

CONDITION 48 - Navigation and Navigation Safety Plan

This plan is already in place, as per an NEB requirement that it be ready at least four months before the start of construction. For the Westridge Marine Terminal Expansion, Trans Mountain was required to consult with government authorities such as the Vancouver Fraser Port Authority and the Canadian Coast Guard, as well as Aboriginal, commercial and recreational waterway users. Trans Mountain compiled a list of the Project’s effects on navigation and safety for waterways such as Burrard Inlet and developed a plan to support and manage local ship traffic while construction is underway at Westridge.

CONDITION 57 – Commercial Support for the Project

The NEB required Trans Mountain to confirm that it has minimum 15-year agreements with oil shippers who will take up at least 60 per cent of the total 890,000 barrels-per-day capacity of the expanded

¹³ <https://www.tc.gc.ca/eng/marinesafety/facts-oil-tanker-safety-canada-4513.html>

pipeline system. Trans Mountain [announced in March 2017](#) that shippers have booked 77 per cent of the system, significantly more than the NEB's requirement.¹⁴

CONDITION 81 - Westridge Marine Terminal Environmental Protection Plan

The plan requires Trans Mountain to provide “a comprehensive compilation of all environmental protection procedures, mitigation measures, and monitoring commitments” covering Westridge construction.

CONDITION 91 — Plan for implementing, monitoring, and complying with marine shipping-related commitments

Trans Mountain must file “at least 2 months prior to commencing Westridge construction, a plan describing how it will implement, monitor, and ensure compliance with its marine shipping-related commitments.” (Those commitments are identified in NEB Condition 133.)

“The plan must be prepared in consultation with Transport Canada, the Canadian Coast Guard, the Pacific Pilotage Authority, Port Metro Vancouver, British Columbia Coast Pilots, Western Canada Marine Response Corporation, Fisheries and Oceans Canada and the Province of British Columbia, and must identify any issues or concerns raised and how Trans Mountain has addressed or responded to them.”

CONDITION 109 — Authorizations under the *Fisheries Act* - Westridge Marine Terminal

Trans Mountain is required to obtain authorizations from Fisheries and Oceans Canada, as required, for construction work at Westridge.

CONDITION 131 — Marine Public Outreach Program

Trans Mountain is required to file to the NEB a report on its Marine Public Outreach Program at least three months before commencing operations at an expanded Westridge terminal. The program reflects Trans Mountain's consultations with the Pacific Pilotage Authority, a federal agency. The pilotage authority oversees local ship pilots who are responsible for guiding large vessels, including oil tankers, in and out of BC ports. The NEB requires Trans Mountain to communicate with fishing industry organizations, commercial and recreational vessel operators, Aboriginal groups and others who may be affected by increased tanker traffic. This Condition requires Trans Mountain to participate with the pilotage authority and Coast Guard on a campaign to educate small vessel operators about safe boating practices.

CONDITION 132 — Marine Mammal Protection Program

At least three months before commencing operations at Westridge, Trans Mountain must file to the NEB a report including a discussion on Project-related marine vessel effects on marine mammals. The report has to include a summary of initiatives Trans Mountain has taken to support Fisheries and Oceans marine mammal Recovery Strategies and Action Plans.

¹⁴

<https://www.transmountain.com/news/2017/trans-mountain-completes-final-cost-estimate-review-with-shippers-maintains-strong-commercial-support-for-expansion-project>

CONDITION 133 — Marine shipping-related commitments

At least three months before loading the first tanker at Westridge, Trans Mountain must file to the NEB a confirmation that it has implemented or caused to be implemented the following commitments related to oil tanker traffic and enhanced oil spill response:

- Enhanced tug escort for laden tankers departing Westridge and details for minimum tug capabilities required to escort outbound laden tankers between the Westridge and the shipping lane at Buoy Juliet about 16 kilometres off the southern end of Vancouver Island.
- An enhanced marine oil spill response regime capable of delivering 20,000 tonnes of capacity within 36 hours of notification, with dedicated resources staged along the southern shipping route. (Note: Spill response resources being developed by the Western Canada Spill Response Corporation, the designated spill responder for the Pacific Coast, will substantially exceed these requirements.)
- Reporting on these commitments is also required by NEB Condition 6.

CONDITION 134 — Updated Tanker Acceptance Standards

For five years following the expansion, Trans Mountain must annually file to the NEB its most recent Tanker Acceptance Standard — in other words, the criteria it will use to determine whether or not a tanker is qualified to call and load at Westridge. The criteria will include, for example, a requirement that the tanker be double-hulled.

CONDITION 136 — Pre-operations full-scale emergency response exercises

Before it commences ship loading operations at an expanded Westridge terminal, Trans Mountain must complete a full-scale exercise for each of the following scenarios:

- A 160-cubic-metre diluted bitumen release into Burrard Inlet as a result of a release from the Westridge Marine Terminal.
- A credible worst-case release volume at the Burnaby Terminal.

Trans Mountain must notify the NEB and all potential exercise participants and observers, including Appropriate Government Authorities, first responders, and potentially affected Aboriginal groups, at least 45 days prior to the date of each exercise.

Trans Mountain must file with the NEB and provide to Appropriate Government Authorities, first responders and potentially affected Aboriginal groups, a report on the exercise that includes:

- The results of the completed exercise
- Areas for improvement
- Steps to be taken to correct deficiencies
- Confirmation that an independent third party has evaluated and assessed the emergency response exercises and that Trans Mountain will consider the comments generated for future exercises

CONDITION 144 — Ongoing implementation of marine commitments

Trans Mountain must annually file a report to the NEB showing that it continues to implement its marine shipping-related commitments, any non-compliances with its commitments and actions taken to correct non-compliances.

Trans Mountain must provide each report to Transport Canada, the Canadian Coast Guard, the Pacific Pilotage Authority, Port Metro Vancouver, British Columbia Coast Pilots, Western Canada Marine Response Corporation, Fisheries and Oceans Canada and the Province of British Columbia at the same time.

Regulatory regimes

Transport Canada

A federal regulatory agency, Transport Canada, oversees and regulates all transportation activity including shipping, rail, air and roads.

Transport Canada is the lead federal regulatory agency responsible for Canada's Marine Oil Spill Preparedness and Response Regime, which was established in 1995 and is built on a partnership between government and industry. Within the framework of the regime, Transport Canada sets the guidelines and regulatory structure for the preparedness and response to marine oil spills.

The guiding principles for the regime are:

- Effective and responsive legislation
- Potential polluters pay for preparedness
- Polluter pays for reasonable response costs
- Based on partnership with industry
- Comprehensive contingency plans
- Mutual agreements with neighbours (i.e., the United States)

All aspects of the marine transport industry are highly regulated in Canada, adding a significant element of safety to the movement of all vessels, including oil tankers, in Canadian waters. It has strong enforcement powers and can prosecute foreign flag vessels. It has the power to ban vessels if there is a marine safety or environmental risk. It works closely with other countries to ensure uniformity and identify problem shipping. Canada is also active at the IMO to further strengthen marine and environment safety requirements including vessel noise and air emissions.

One of Transport Canada's responsibilities is serving as chair of TERMPOL (Technical Review Process of Marine Terminal Systems and Transshipment Sites). One of TERMPOL'S primary responsibilities is assessing the navigational risks associated with marine terminals for oil tankers such as Trans Mountain's Westridge Marine Terminal. TERMPOL is a voluntary process. Trans Mountain submitted plans for Westridge, and for an increase in tanker traffic as a result of the Westridge expansion, to a TERMPOL review prior to its application to the National Energy Board in 2013. The following agencies and organizations have been involved in the TERMPOL review process:

- Transport Canada
- Fisheries and Oceans Canada
- Canadian Coast Guard
- Environment Canada
- Canadian Hydrographic Service
- Pacific Pilotage Authority Canada
- British Columbia Coast Pilots
- Port of Vancouver

Important legislation governing marine transport includes the *Canada Shipping Act, 2001*, the *Pilotage Act*, and the *Marine Transportation Security Act*.

CANADA SHIPPING ACT, 2001 — This is the principal law that governs safety in marine transportation, including the protection of the marine environment. The Act applies to all vessels operating in Canadian waters and Canadian vessels worldwide and in some cases, to foreign vessels. Under the *CSA, 2001*, vessels are subject to specific rules to prevent collisions while in Canadian waters, which are based on the Convention on the International Regulations for Preventing Collisions at Sea.

PILOTAGE ACT — Vessels operating within specified waters, such as the Port of Vancouver, are required to take on-board a marine pilot with local knowledge of the waterway to help guide the vessel safely to its destination. On the west coast, the Pacific Pilotage Authority is the regional authority under the Act.

MARINE TRANSPORTATION SECURITY ACT — The MTSA provides the legislative framework for the security of the marine transportation system in Canada. It applies to vessels and marine facilities in Canada, Canadian vessels outside of Canada and marine installations and structures. The MTSA provides the Minister of Transport with the authority to create regulations, [security measures](#) and rules to protect the security of Canada's marine transportation system.

SUBORDINATE REGULATIONS — There are different regulations that are subordinate to various acts that apply to marine transport. They include the *Marine Personnel Regulations*; *Vessel Pollution and for Dangerous Chemicals Regulations*; *Ballast Water Control and Management Regulations*; *Environmental Response Arrangements Regulations*; *Small Vessel Regulations*; *Load Line Regulations*; as well as the *Canada Labour Code*.

**Note: Full text of Canadian acts and regulations can be found at <http://www.laws-lois.justice.gc.ca>.*

Vancouver Fraser Port Authority

Within the Port of Vancouver, ships are subject to the requirements of the **Vancouver Fraser Port Authority**. The VFPA is responsible for maintaining the safe and efficient movement of marine traffic and cargo within its jurisdiction. The authority's operations centre runs 24 hours a day, seven days a week. Port personnel include office staff, harbour patrol officers and security teams that monitor activities within the Port, communicate with other agencies and help coordinate response efforts in emergency situations.

The VFPA's practices and procedures are designed to promote marine safety within the local waters and to protect the marine environment. The Harbour Master oversees all marine navigation, security and

emergency response aspects within the Port's jurisdiction. Efficiency and safety are the highest priorities and are managed through planning, tracking and collaborating with the marine community.

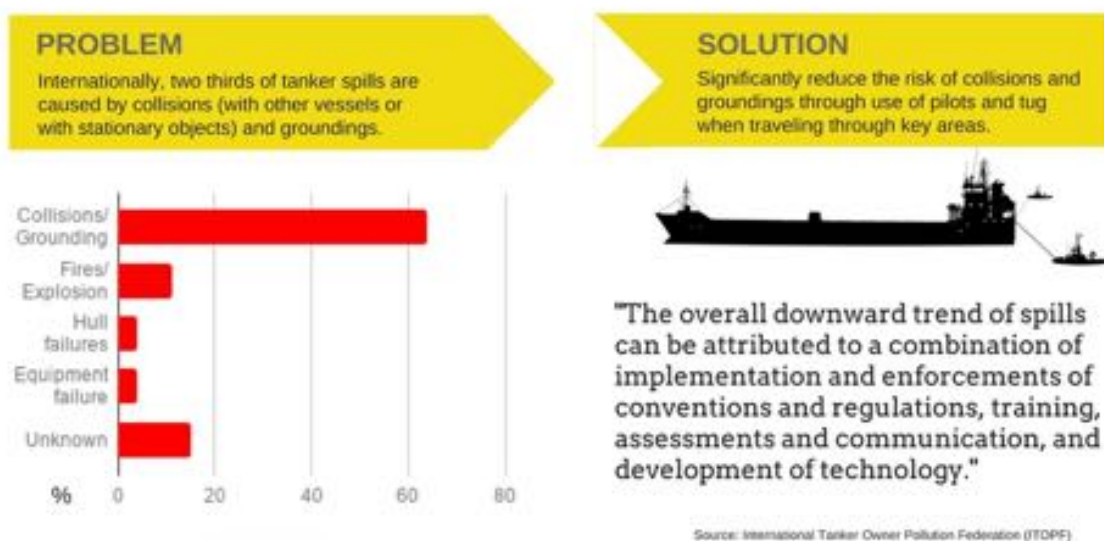
All ships travelling in the Port are subject to collision regulations under the *Canada Shipping Act, 2001*. The Authority has enhanced the national system with its own locally focused rules for navigation and safety. It has all the necessary power to control movements with the Port. It has a good working relationship with marine operators. When there is a problem identified it is solved in a collaborative way in short order. Most importantly, it's up to the Port Authority's Harbour Master, not the ship operator, to interpret and apply the regulations.

The VFPA's Regulations, for example, focus on areas within the Port where mariners may encounter congestion or locally unique challenges. As an example, the Authority maintains a Movement Restriction Area for commercial vessels through the Second Narrows. Oil tankers moving through this area must have qualified, local ship pilots aboard, with tug escort and must be loaded to draft calculated basis of a vessel's beam to available channel width ratio. In respect of this requirement, laden Aframax tankers departing Westridge are restricted to 70 to 80 per cent of their capacity, depending on the height of high tide during passage through Second Narrows.

There are additional restrictions depending on the velocity of the tidal currents and the time of day, and must have clear visibility along the full extent of the MRA. Tankers have priority in the area and other vessels must wait for a tanker to exit the Second Narrows before entering it. VFPA measures were developed after years of testing and collaboration with marine industry and stakeholders, including Trans Mountain which has been a long standing supporter of continual improvement initiatives.

Out on the water, the Port Authority's harbour patrol officers board deep sea vessels for compliance checks and monitor all marine activities within Port jurisdiction. They maintain communication with the operations centre and ensure that daily operations are being carried out safely.

Reducing risk, improving safety



International regulations and oversight

Worldwide shipping safety is highly regulated through a range of measures that have been developed and are subject to continuous improvement. International organizations and global conventions develop rules, regulations and best practices that are then adopted and applied universally; for example –

INTERNATIONAL MARITIME ORGANIZATION (IMO) — Established in 1948 at an international conference in Geneva, the IMO Convention entered into force in 1958 and the new organization met for the first time the following year. The IMO's main task has been to develop and maintain a comprehensive global regulatory framework for shipping. Its scope today includes safety, environmental concerns, legal matters, technical cooperation, maritime security and the efficiency of shipping.

SOLAS (INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA) — An international maritime safety treaty with a marine security component. It is generally seen as the most important international treaty on merchant ship safety. The first version was adopted in 1914, in response to the Titanic disaster. Signatory states, including Canada are required to ensure that their ships meet minimum construction, equipment, and operational standards.

CONVENTION ON THE INTERNATIONAL REGULATIONS FOR PREVENTING COLLISIONS AT SEA — The Convention includes 38 rules, set out by the International Marine Organization, for avoiding collisions at sea. These 'rules of the road' are divided into five sections covering topics such as steering and signalling.

INTERNATIONAL CONVENTION FOR THE PREVENTION OF POLLUTION FROM SHIPS (MARPOL) — The main international convention aimed at preventing pollution of the marine environment by ships from operational or accidental causes.

INTERNATIONAL CONVENTION ON STANDARDS OF TRAINING, CERTIFICATION AND WATCHKEEPING (STCW) FOR SEAFARERS — This Convention sets minimum standards relating to training, certification, and watchkeeping for seafarers, that countries must meet or exceed.

PARIS MEMORANDUM OF UNDERSTANDING — The Paris MOU aims to eliminate the operation of substandard ships to ensure that ships meet international safety, security and environmental standards, and that crew members have adequate living and working conditions. The organization consists of 27 participating maritime administrations, including Canada, and covers the waters of the European coastal states and the North Atlantic basin from North America to Europe.

TOKYO MEMORANDUM OF UNDERSTANDING — The Tokyo MOU aims to eliminate substandard shipping so as to promote maritime safety, to protect the marine environment and to safeguard working and living conditions on-board ships.

OIL COMPANIES INTERNATIONAL MARINE FORUM (OCIMF) — A voluntary association of oil companies with an interest in the shipment and terminalling of crude oil, oil products, petrochemicals and gas whose mission is to be the foremost authority on the safe and environmentally responsible operation of oil tankers, terminals, and offshore support vessels,

promoting continuous improvement in standards of design and operation. Recommendations made by the OCIMF are adopted by the oil and gas shipping industry as best practices.

Canada's Oceans Protection Plan

Background

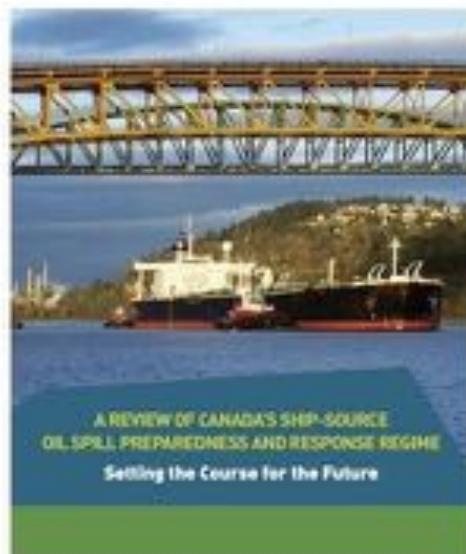
In November 2016, Prime Minister Justin Trudeau announced a \$1.5-billion Oceans Protection Plan, declaring that the funds would be spent over five years starting in 2017. This plan represents a comprehensive plan for the Pacific, Atlantic and Arctic oceans that besides addressing tanker and fuel spills includes funding to create a more advanced marine-safety system, restore ocean ecosystems and develop new methods and research into oil spill cleanup methods.

The Prime Minister's Oceans Protection Plan announcement represents the federal government's response to the second of the [Five Conditions](#) that the Province of British Columbia had insisted be met before the province would offer its support for heavy-oil projects, including Kinder Morgan's Trans Mountain expansion.¹⁵ The second condition was a requirement for a world-leading marine oil spill response, prevention and recovery system for the province's coastline and ocean to manage and mitigate the risks and costs of heavy oil pipelines and shipments. On the BC south coast, the contribution of OPP would be on top of the substantial spill prevention and response measures committed to by Kinder Morgan that are part of TMEP project-approval conditions from the NEB.

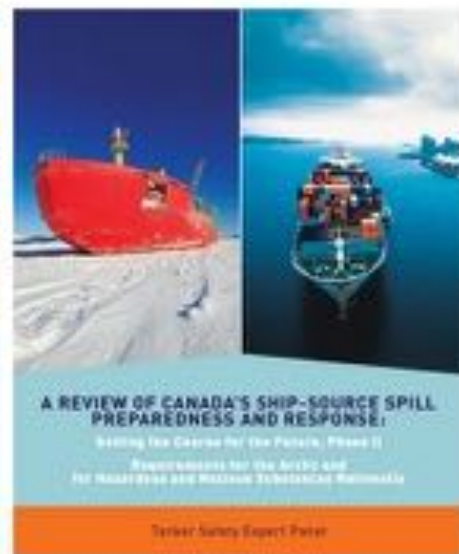
An important earlier work was the federal Ministry of Transport's [Tanker Safety Expert Panel](#), which produced two reports and included three risk assessments.¹⁶

SPILL PLANS - CANADA

Federal expert panel reports in 2013 and 2014 examined ship-source spill preparedness and response. The Ocean Protection Program was announced in 2016.



2013



2014

¹⁵ http://www.env.gov.bc.ca/main/docs/2012/TechnicalAnalysis-HeavyOilPipeline_120723.pdf

¹⁶ <https://www.tc.gc.ca/eng/tankersafetyexpertpanel/menu.htm>

Oceans Protection Plan Overview

The Oceans Protection Plan provides \$1.5 billion over a 5-year period to achieve a world-leading marine safety system that will increase the Government of Canada's capacity to prevent and improve response to marine pollution incidents. The health and protection of Canada's coasts are critical to the environment, the economy and to all Canadians. The plan recognized that, as a trading nation, marine transportation is a key economic driver for Canada that accounts for approximately \$30 billion in economic impact and 99,000 jobs across the country.

Transport Canada's Regional Director - Marine Safety & Security Pacific, Yvette Myers, described the internal federal government players on the OPP as follows:



The plan builds on existing safeguards and includes:

Protection of the southern resident killer whale pods

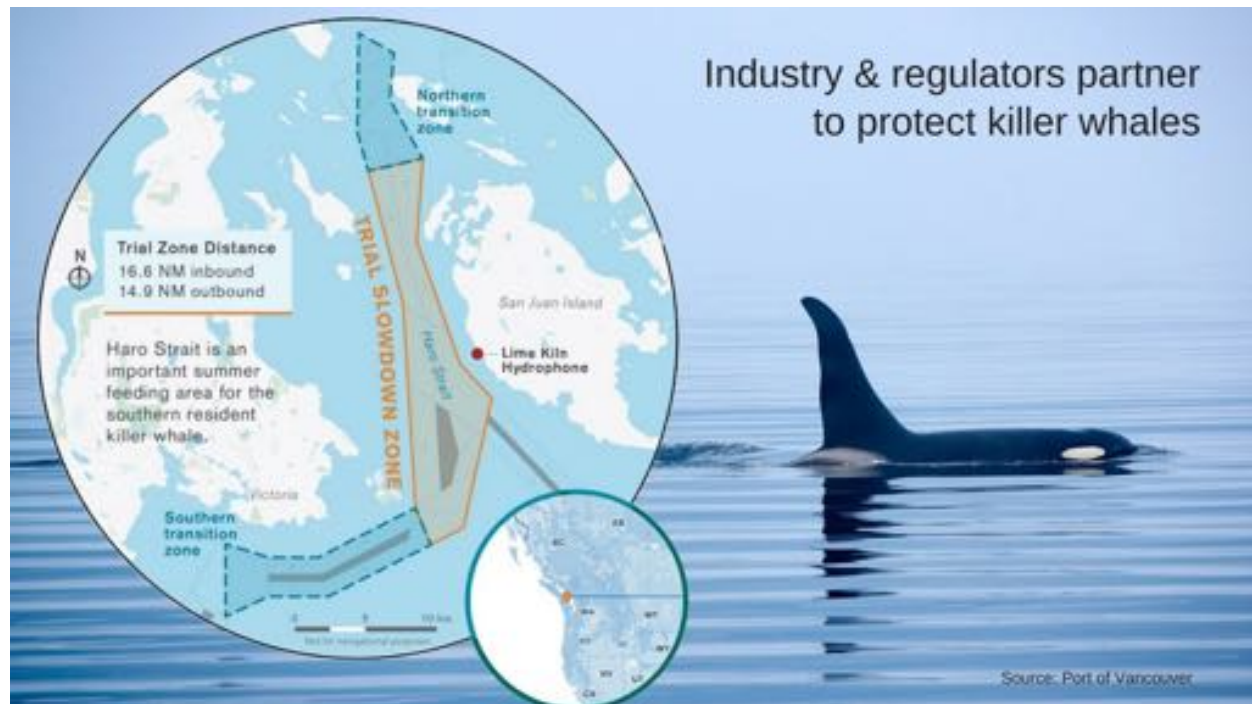
The Oceans Protection Plan is an important step forward in addressing the threats to marine mammals. The key threats include contaminants, prey availability and noise in the marine environment. The Government of Canada will:

- Address priority issues on each coast through the coastal habitat restoration fund.
- Take action to better understand and address the cumulative effects of shipping on marine mammals, such as the Southern Resident Killer Whales, belugas and northern right whales. This includes work to better establish baselines for noise and consideration of options to mitigate these effects.
- Work with partners to implement a real-time whale detection system in specific areas of the species' habitat to alert mariners to the presence of whales, which will allow them to better avoid interactions with this and other marine mammal species.
- Will immediately launch a science-based review of the effectiveness of current management and recovery actions under way for the Southern Resident Killer Whales, the northern right whale and the St. Lawrence beluga. The review will be completed by Summer 2017 and will seek to identify areas for immediate improvement in recovery efforts and priorities for new or enhanced action efforts.

Of relevance to British Columbia, the OPP includes funding for the Enhancing Cetacean Habitat and Observation (ECHO) Program, which is a Vancouver Fraser Port Authority-led initiative aimed at better

understanding and managing the impact of shipping activities on at-risk whales throughout the southern coast of British Columbia. Kinder Morgan provided significant early funding to the ECHO Program.

The long-term goal of the ECHO Program is to develop mitigation measures that will lead to a quantifiable reduction in potential threats to whales as a result of shipping activities. In 2017, members of the BC South Coast shipping industry undertook a 6 week trial slowdown of ships in order for the ECHO Program to obtain valuable information on the effect of vessel slowdown towards reducing underwater noise.



Better information sharing of marine traffic with coastal communities

- Improved Data Sharing
- Proactive vessel management
- Strengthened marine communications and traffic services centres
- Radar Capacity

Safer navigation in Canada's waters through better information in the hands of mariners

- Modern hydrography for charting in priority areas
- Enhanced Marine Weather Forecasting

Tougher requirements for industry response to incidents

- Regional response planning
- Stronger polluter-pay principle
- Better identification of where ships can find refuge
- Greater leadership internationally
- Modernize the ship pilotage regulatory regime

Proactive monitoring and response capacity on water

- 24/7 Emergency response capacity
- Canadian Coast Guard to take command in marine emergencies
- Increase Canadian Coast Guard vessel towing capacity
- Modern response equipment
- New logistics depots
- Increase on-scene environmental response
- Expand duties and training of the Canadian Coast Guard Auxiliary
- Increase search and rescue capacity

Develop comprehensive response systems for spills on water

- Working with partners to build a seamless response system

Preservation and restoration of marine ecosystems

The Government of Canada's Oceans Protection Plan aims to preserve and restore marine ecosystems vulnerable to increased marine shipping and development.

Develop a coastal environmental baseline and cumulative effects program

The Government of Canada will launch environmental monitoring plans in six high-use areas on all three coasts, which will include environmental indicators, monitoring protocols and strategies.

Baseline environmental data collection will help detect changes in the ecosystem and improve our understanding of the cumulative effects of shipping.

Coastal habitat restoration fund

The Government of Canada will create a fund to protect and restore abundant coastal marine ecosystems that are vulnerable to increased marine shipping and development activities. This fund will support the establishment of coastal habitat zone plans and the identification of habitat restoration priorities located on the West, East and Arctic coasts.

The habitat restoration projects would contribute to the mitigation of stressors affecting marine life and their habitats and would work with Indigenous communities, local groups and communities leading restoration activities.

Other measures

Baseline data for Northern British Columbia coast

The Government of Canada will work with local and regional partners, including Indigenous communities, to design and launch a five-year project to collect and update baseline biological, ecological, social, cultural and economic data to support effective environmental stewardship and improve the ability to react to potential incidents and spills.

Reduce abandonment of ships, and clean up existing shipwrecks

The Oceans Protection Plan includes a comprehensive strategy based on the best international models to reduce abandoned, derelict and wrecked vessels and to minimize the associated risks of environmental harm.

While most vessel owners properly dispose of their property, the Government of Canada recognizes the risks that abandoned, derelict and wrecked vessels pose to safe navigation, the marine environment, public health and local economies. This is why it has developed a comprehensive plan that focuses on prevention and removal, including a robust, polluter-pay approach for future vessel clean-up. This new plan will prohibit owners from abandoning their vessels.

Negotiating meaningful Indigenous partnerships

The Canadian government will partner with Indigenous and coastal communities and seek their advice in a number of areas, including:

- understanding the combined effects of shipping;
- creating local vessel control areas to minimize safety risks and/or environmental impacts;
- updating and modernizing regulations and other tools to better respond to community issues related to marine traffic;
- setting habitat restoration priorities and taking the most appropriate measures when monitoring clean-up, in the event of a spill; and
- developing training programs to increase participation of Indigenous group members, particularly women, in marine safety jobs.

These partnerships will be integrated within the multi-agency Incident Command System, a standardized on-site management system designed to enable effective and efficient incident management.

Agreements will build on existing initiatives and dialogues to create new opportunities for Indigenous communities, who will receive capacity funding to participate in the negotiations.

Safer resupply in Arctic communities

- Basic equipment and tools for safer resupply

The OPP also contains a number of specific spill response measures that are detailed in section 2, Risk.

Additional voluntary and regulatory protections

The Trans Mountain Expansion Project is expected to increase tanker traffic to Westridge Marine Terminal to approximately 34 tankers per month, or slightly more than one vessel per day. Since Westridge began shipping oil in 1956 there have been no tanker spills. Trans Mountain is incorporating voluntary marine safety measures to complement regulatory and other measures that protect BC's coast.

The number of other vessels in the region, unrelated to the Project, is also expected to increase between now and the time the expanded Westridge terminal becomes operational. Based on data analysed in the TMEP navigation risk analysis, tankers calling at Westridge constitute about 1.1 per cent of all large commercial ships operating in the Salish Sea, which includes tankers calling with crude oil from Alaska

and other places for the large US refineries in Puget Sound. In the future it's estimated that the proportion of Westridge tankers would increase to about 6.6 per cent and make up about 50 per cent of all tanker traffic in this area.

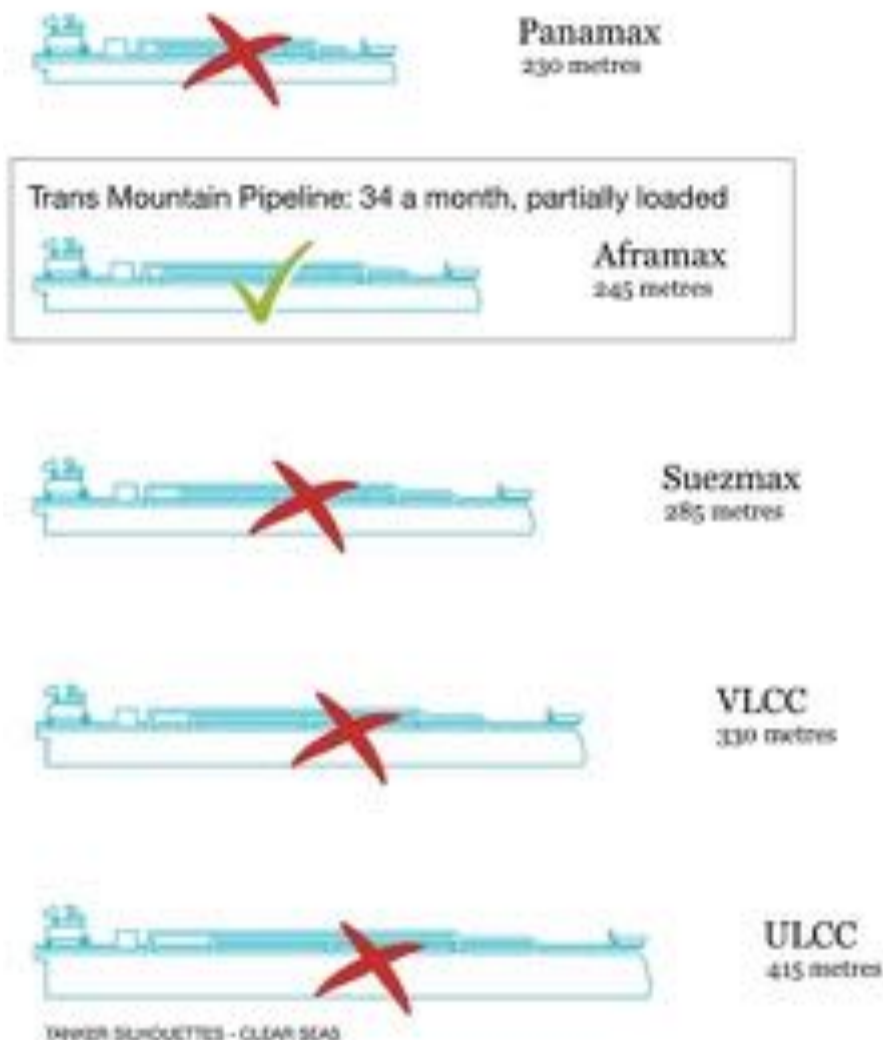
The size of tankers calling at Westridge will not change with the largest tankers remaining Aframax-size vessels. These vessels will continue to use the well-established commercial shipping route between Vancouver Harbour and the Pacific Ocean through the Salish Sea. They will continue to carry similar product as they do today, crude oil from Alberta.

What size of tanker will be calling on Vancouver?

The expanded Trans Mountain pipeline system will be capable of serving up to 34 partially-laden Aframax vessels per month.

An Aframax ship is an oil tanker smaller than 120,000 metric tonnes, with a breadth narrow enough to let it pass through the original Panama canal. The maximum size of vessels served at the terminal is not forecast to change as part of the Project.

Supertankers (tankers with more than 275,000 tons capacity) are not going to be calling on Vancouver. In addition to tanker traffic, the terminal will continue to load a small number of barges.



Proposed Enhanced Oil Spill Response Regime for the Salish Sea

Oil spill response enhancements that are being implemented by the Western Canada Marine Response Corporation (WCMRC), with funding from Kinder Morgan, are based on the results of risk assessment, product testing, oil spill modelling and engagement, and would create an increased response area for the Salish Sea and Strait of Juan de Fuca. See page 49 for complete details.



II. Risk

Tanker spills are a dominant theme in the public debate about pipeline expansions in Canada. But what is the risk of a spill incident? What measures are in place to prevent them? And what do the experts say? The key is that while incidents are possible, the system is designed to respond to the low probability, high consequence event. Canada looks at this as a “non-fail mission”. We have not had a major spill on the west coast for over 30 years. The regime in fact is being further strengthened and enhanced by the Trans Mountain Expansion Project and that benefits *all* shipping activities, including cruise, container and bulk export shipments.

The definitive expert maritime risk assessment concluded that “the region is capable of safely accommodating the additional one laden crude oil tanker per day increase that will result from the Project.”¹⁷

It is not a static process. The risks are mitigated by a longstanding system of marine navigation that is constantly evolving to incorporate lessons learned and new technologies.

Where risk is noted, increased requirements have been put in place.¹⁸ Much work has been done and goes unnoticed at the prevention phase of shipping governance. These measures include aids to navigation, increased marine domain awareness via radar and AIS and marine VHF coverage, fusion of this information in Canadian Coast Guard MCTS Centres, compulsory marine pilotage, port control

¹⁷ <https://apps.neb-one.gc.ca/REGDOCS/File/Download/2393360>, page 3.

¹⁸ For example, escort tugs have been added at the request of the Pacific Pilotage Authority who completed their Risk Assessment. PPA requires owners of laden tankers to employ a tethered escort tug in Haro Strait. This is not a legislative requirement but rather an operational requirement imposed by the PPA. It is an example of industry working cooperative to identify a risk and then creating and mandating a navigational requirement to minimize risk.

inspections, vessel traffic management and cooperation with the United States Coast Guard in our shared waters.

How often could a spill occur?

Risk is generally defined as the probability or threat of quantifiable damage, injury, liability, loss or any other negative occurrence that is caused by external or internal vulnerabilities, and that may be avoided through preemptive action.

Risk control in action

By insisting on a suite of risk control measures that prevent spills from occurring, the Project has kept the overall oil cargo spill risk in the region at a level similar to that prevailing today. This is despite a seven-fold increase in tanker traffic from Westridge. The risk assessment shows the probability of an oil spill from a future Trans Mountain tanker is less than half that from other oil cargo vessels.

Highlights of TMEP shipping risk:¹⁹

- Oft-heard claims that the project will be “seven times riskier” than at present do not take into account risk-management measures being implemented. The extensively documented worldwide trend toward fewer and smaller tanker spills is another factor that should be acknowledged.
- After the project enters service in 2020 with all current and future proposed risk control measures implemented, the probability of oil spill in the study area from the Trans Mountain tanker traffic will be 23 per cent higher than the risk of such an occurrence if the project did not take place.
- Trans Mountain tankers will contribute about 32 per cent of the total oil spill risk from cargo oil in the region.
- When it comes to a credible worst case marine oil spill for Trans Mountain project, the frequency will be 1 in every 2,841 years. (If no additional risk reducing measures are implemented the frequency will be 1 in every 901 years. However the pipeline could not receive its permits without the measures being in place.)
- Experts have shown compellingly evidence that the spill of a tanker’s entire contents is not a credible risk scenario.
- It is reasonable to assume that the frequency of a credible worst case cargo oil spill will be less because of the continued steady improvement in marine safety globally, the improvements that will result from the Trans Mountain expansion project and also those proposed under the OPP for the BC coast.

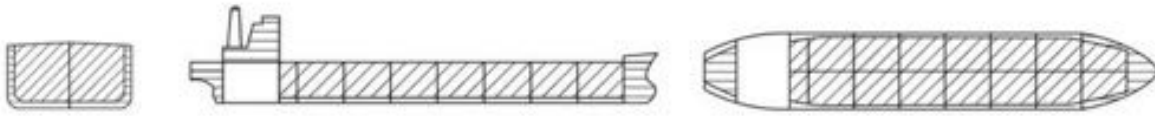
How much oil could be spilled?

Tankers are double hulled with the hulls constructed using special shipbuilding grade steel that offers increased protection during collisions and grounding. The following illustration makes it clear why double hulls plus compartmentalization means that a spill incident would be of a limited nature.²⁰

¹⁹ Ibid.

²⁰ <https://apps.neb-one.gc.ca/REGDOCS/File/Download/2393360>, page 25.

Double hull and 12-14 compartments



This illustration shows a typical Aframax tanker that will be calling on Vancouver for dilbit cargoes. In addition to the double hull, a ship features 12-14 oil compartments. The maximum credible spill scenario involves the breach of no more than two of them.

- Inside the double hull are up to 14 individually segregated cargo tanks. If there is a break, the potential leak can be limited to the product within the affected cargo tank only, and further contained within the inter-hull space.
- For oil to enter the sea, both layers of the double hull have to be breached.
- For an Aframax type of tanker loaded from Westridge Marine Terminal, the credible worst-case scenario according to globally qualified risk experts is the loss of the entire contents of two of the internal oil tanks to the sea, or 16,500 cubic metres of crude oil.
- The average total oil spill volume per year has decreased by a factor of 18 from the 1970s until the last decade.

Thus there is no credible basis for statements that the entire contents of a full tanker could be lost.

A risk-based way of seeing

In approving the project in 2016, the National Energy Board determined that a risk-based methodology is a rational approach to the design of the proposed new pipeline segments. As part of its Application to the [National Energy Board, TMEP proposes](#) additional risk controls and enhancements that will build on the [current marine safety regime](#).²¹²² Once implemented, the enhanced regime is expected to raise the level of care and safety in the study area to well above globally-accepted shipping standards.

With or without the project, tanker traffic will continue in the region. Risk analysis included not only Project traffic, but also oil barge traffic in the area, i.e., the barges that supply Vancouver Island with oil products.

International trend

Since 1970 the tanker industry has seen a dramatic increase in safety performance, even while the amount of oil products shipped grew significantly. In [the view of the International Tanker Owner Pollution Federation Ltd.](#), (ITOPF), the overall downward trend of spills is due to a combination of factors: Implementation and enforcement of conventions and regulations; training; assessments; communications; and the development of technology.²³

²¹ <http://www.neb-one.gc.ca/index-eng.html>

²² <https://www.transmountain.com/existing-marine-safety>

²³ <http://www.itopf.com/fileadmin/data/Documents/Papers/amop12.pdf>



factors that changed tanker safety for the better



Implementation & enforcement of conventions and regulations



Training



Assessments



Communications



Technology

Source: International Tanker Owner Pollution Federation Ltd.

TANKER SAFETY & SPILLS BY THE NUMBERS



67%

of oil spills in Canadian waters from 2003 to 2012 were between 100 and 1,000 litres in size – at most the volume of a 5-person jacuzzi.



POSSIBLE RISK OF A
MAJOR OIL SPILL EVERY

2,841

YEARS

based on expert study accepted by the National Energy Board, when additional protections are put into place.



2 HOURS

Upgrades in response time for the Project mean in the event of a spill in Burrard Inlet or the Fraser River, equipment will be deployed within 2 hours - down from a 6-12 hour commitment.

Expanded shipping from twinned Trans Mountain pipeline means an increase in probability of an oil spill of

23%

if all risk control measures followed.

RESPONSE PLAN



All tankers entering Canadian waters have to be registered with oil spill response authorities, who administer a detailed, multi-layer plan for tackling spills.

\$1.5 billion

from federal government for Oceans Protection Plan includes dollars for oil spill response & enhanced resources for Canadian Coast Guard.

0.75%

Share of oil tankers among shipping movements from west coast ports, 2015. Oil is also carried by barges, container ships, ferries, and other types of commercial and private vessels.

\$1.55
BILLION

Combined possible compensation for a single oil tanker spill that occurs in Canadian waters, drawn from international and domestic funds that are in place.

Three

Number of tugs tethered to a loaded tanker from terminal to 2nd Narrows.



De-risking tanker movements: A step-by-step journey

The existing pipeline has been operating since 1953 without a drop of oil being spilled by a tanker visiting its terminal. All tankers visiting the terminal are double-hulled, and the speed of the vessels are restricted, which makes it very much less likely that a grounding could cause a breach of both hulls. When passing through portions of the route nearer to shore or through the harbour the tankers are guided by local pilots and accompanied by local tugs.

Tanker safety precautions to and from terminal

Here are the steps that must be followed for all tankers travelling to and from Westridge Marine Terminal.

1. They must be double-hull construction, which is a Canadian and international regulation.
2. Before it's allowed to call at Westridge, a tanker must submit to an assessment against Trans Mountain's Vessel Acceptance Standard, using submitted information and review of international databases.
3. A tanker cannot call at Westridge unless it has met all the criteria, including certificate and insurance requirements.
4. Prior to entry into Canadian waters the tanker must seek permission from the Canadian Coast Guard MCTS and also enter into an arrangement with WCMRC for spill response readiness.
5. The tanker is boarded near Victoria by a BC coast pilot who then directs the vessel's navigation to Westridge Marine Terminal. Along the way, through Burrard Inlet to the berth, tugs tie up to the ship to ensure its transit is always in a well-controlled manner.
6. The tanker as well as the terminal is required to have its own oil spill response plans. That includes having pre-arrangements with Western Canada Marine Response Corporation for on-water oil spill response if required.
7. At the berth, the tanker is boarded by a Loading Master and undergoes a number of safety checks in line with international tanker operating best practices.
8. The Loading Master conducts a ship-shore safety meeting that is attended by the ship's officers and Westridge terminal staff. The meeting is used to review safe loading practices, communication protocols and emergency response requirements.
9. The entire cargo loading takes place under the supervision of the Loading Master who stays onboard for the entire time.
10. The vessel is always enclosed within a pre-deployed oil spill boom and a second boom remains ready to be deployed in case any oil is spilled from the tanker to the water during the cargo transfer.

Laden tankers leaving Westridge must carry two pilots. In addition, there are additional requirements for tug escort through Vancouver Harbour and at critical portions of a laden tanker's route.

Transiting First and Second Narrows bridges

When a vessel commences its transit from Westridge Marine Terminal, two coast pilots are onboard with three tugs tethered to the vessel (two at the stern and one on the bow). These remain with the vessel through the Second Narrows transit.

The Port of Vancouver's Port Information Guide defines the Second Narrows as a Movement Restriction Area (MRA). Rules for transits through this area include vessel size and draft restrictions, slack water transit windows, requirements for tug escorts, and passage is limited to one vessel at a time.

Tethered tugs will stay with the vessel for transit through the remainder of the harbour until past First Narrows and English Bay. Tethered escort tug requirements resume when the tanker approaches Boundary Pass in the Gulf Islands.

The vessel's transit through the Vancouver Harbour, including the MRA, is monitored by the Canadian Coast Guard.

Retrofits of two bridges in tankers' path

In March 2018, the Province of British Columbia released two studies, one for the Lions Gate Bridge and one for the Ironworkers Memorial Bridge, on the topic of vessel collision risk assessment mitigation.²⁴ The bridges, built to the standards of the day, have operated safely since opening in 1938 and 1960, respectively.

A review found that both bridges satisfied vessel impact criteria for new bridges of regular importance (Class 2), but they did not meet the criteria for new bridges of critical importance (Class 1). The Ministry of Transportation and Infrastructure announced in March 2018²⁵ that it would be pursuing “tangible measures” to bring both bridges up to the more stringent Class 1 criteria, to further strengthen their resilience in the unlikely event of a vessel impact:

- Lions Gate Bridge: The existing concrete collar protection at the base of the south tower will be enhanced with an in-water rock-fill berm. (The north tower is already protected by a rock-fill berm.)
- Ironworkers Memorial Bridge: A steel barrier will be added to protect the trusses, and in-water deflection structures will be installed close to the bridge.

These measures would appear to address citizen concerns raised by a group calling itself Concerned Professional Engineers, which argued that the project “will incur risks of collision and spills that are 5-times greater than what we accept for earthquake damage to buildings and infrastructure, and 20-times riskier than that which we accept for ship collision with new bridge designs.” CPE had asked the NEB and the federal government to deny the project.

Preventative measures at Westridge

Trans Mountain has stated it is committed to the safety of its employees and the environment and for this purpose takes all precautions that will help prevent spills and incidents while ensuring safe loading of petroleum products.

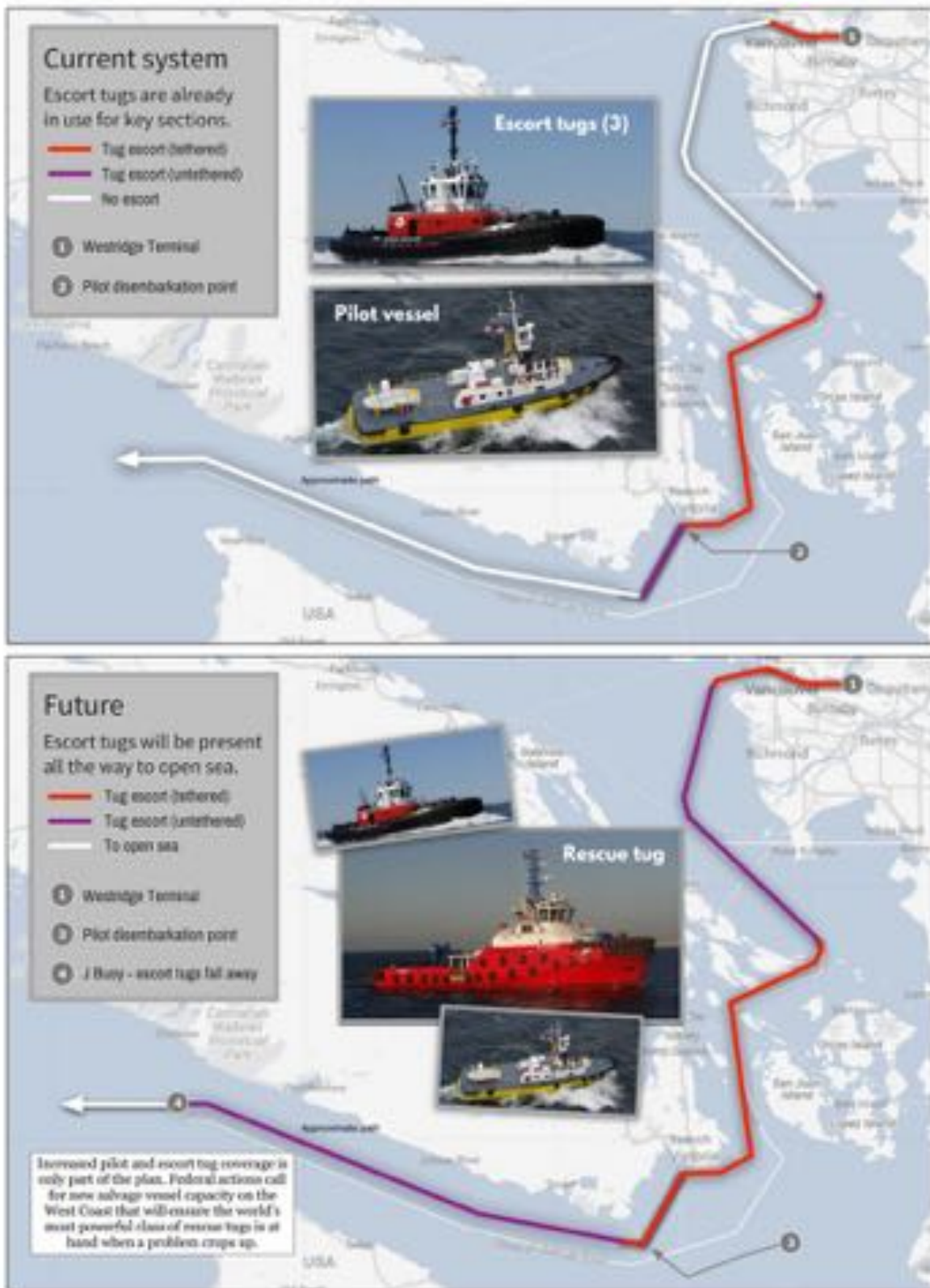
²⁴

<https://www2.gov.bc.ca/assets/gov/driving-and-transportation/reports-and-reference/reports-and-studies/lower-mainland/2018-03-16-ironworkers-risk-assessment.pdf>;
<https://www2.gov.bc.ca/assets/gov/driving-and-transportation/reports-and-reference/reports-and-studies/lower-mainland/2018-03-16-lions-gate-risk-assessment.pdf>

²⁵ <https://news.gov.bc.ca/releases/2018TRAN0040-000530>

- The Westridge facilities are designed and operated to meet *Canada Shipping Act*, National Energy Board and Transport Canada requirements.
- All employees are trained in operations, safety and emergency response procedures.
- Regular field testing of Westridge-specific emergency response plan.
- Westridge-specific Western Canadian Marine Response Corporation (WCMRC) spill response plan.
- Pre-screening of vessels before acceptance and scheduling.
- Physical inspection of vessels with ability to deny access and cargo transfer rights to vessels that fail to meet the stringent requirements established by Kinder Morgan Canada.
- Boom enclosure of vessel throughout loading operations.
- Westridge Loading Master remains onboard ship throughout loading to monitor performance and ship-shore communications.
- Vapours discharged from vessel during loading are collected and incinerated onshore. As part of the expansion, Trans Mountain will spend more than \$20 million on a new vapour recovery system that will capture more than 99 per cent of the hydrocarbon vapours generated during tanker loading operations. These vapours will be re-liquefied and piped back into the loading tankers. In circumstances when three ships are simultaneously loading — representing only about three per cent of Westridge operations — vapours from the third ship will be incinerated.

FROM PORT TO OPEN SEA: NOW AND FUTURE



Additional measures along the tanker route

Trans Mountain has proposed additional risk controls, specific to project tankers, to further prevent navigation incidents:

- Key among the proposed risk control measures is the expansion of tug escort of laden project tankers to the entire shipping route and extension of the time the pilot is onboard. In fact, a tug will escort the laden tanker to Buoy J where the Juan De Fuca Strait ends at the Pacific Ocean. These measures significantly reduce the likelihood of navigation incidents, which in turn reduces the likelihood of a cargo oil spill.
- Pilot disembarkation will be extended to take place near Race Rocks instead of Victoria (pilots have been trained to disembark by helicopter).
- Some of the safety measures proposed by Trans Mountain are already in place. For example, a tug now remains tethered to the departing tanker until the vessel has entirely cleared English Bay. Thereafter the tug remains in close escort of the tanker through the entire Strait of Georgia.
- Enhanced Situational Awareness techniques will be applied that will require:
 - Safety calls by pilots and masters of laden tankers.
 - Notices to industry issued by Pacific Pilotage Authority.
 - Tactical use of escort tug along shipping route.
 - Boating safety engagement and awareness program led by Pacific Pilotage Authority.

The navigation safety regime for tankers constitutes internationally accepted best practices such as a well-defined Traffic Separation Scheme with direct oversight and supervision by two of the world's most competent maritime authorities, the Canadian Coast Guard and the United States Coast Guard. For example, tankers are inspected by Transport Canada at their first arrival in Canada and once a year after that for subsequent calls.

Risk-reduction tools

The hazards and risks related to the sailing route are prevented and mitigated by implemented risk control measures. Risk reducing measures taken into account in the project risk assessment:²⁶

- VTS²⁷
- Traffic Separation Scheme
- Pilotage
- PPU²⁸
- ECDIS/ENC²⁹
- Ship vetting
- Escort tugs (tethered and non-tethered tugs)
- One-way traffic

²⁶ <https://apps.neb-one.gc.ca/REGDOCS/File/Download/2393360>, page 2.

²⁷ Vessel Traffic Services, an aid for safe and efficient movement of vessels.

²⁸ Portable Pilot Devices, which improve safety during ship manoeuvring by providing independent navigation information to pilots and masters.

²⁹ An ECDIS system displays the information from Electronic Navigational Charts (ENC) or Digital Nautical Charts (DNC) and integrates position information from position, heading and speed through water reference systems and optionally other navigational sensors.

Interconnected and linked these create a “system of systems.” The built in redundancy is key to risk mitigation. Probably the most important component is the people in the system. Canada’s professional mariners make this system work both operationally and in the governance. They are the key to its success. The incident record of 30 years bears this out. Our compulsory marine pilotage system ensures a highly experienced marine pilot is on board and can prove invaluable in navigating our local waters.

What is the answer for critics who say process got it wrong?

A number of studies have been published that claim the opposite of what federal regulators accepted as fact in approving the pipeline expansion, with regard to spill risk. The authors of these studies have been energetic in promoting them in news media, with the recurring suggestion that information emanating from government and industry sources cannot be trusted. For news media trying to provide balanced coverage, such reports have served the time-honoured journalistic practice of telling “both sides of the story.” Frustratingly for those who are professionally obliged to stick to the facts and nothing but the facts, it is difficult or impossible to respond to alarming claims based on speculative scenarios based on hypotheses that can be neither proved nor disproved.

Fortunately, the National Energy Board in its May 2016 Final Report on the Trans Mountain Expansion Project did adjudicate on all external submissions, including those that had resulted in the more alarming headlines along the way. Key adjudications:

1. **RISK OF A SPILL OVER TIME:** Participants such as the Tsawout First Nation and Concerned Registered Professional Engineers commented on interpreting the results of Trans Mountain’s marine shipping risk analysis. The Tsawout First Nation said that Trans Mountain’s estimates should not be relied upon as an accurate estimate of tanker spill risk. Concerned Registered Professional Engineers said that the spill return periods estimated by Trans Mountain are mathematically equivalent, for example, to a 10 per cent probability that a spill of 8.25 million or more litres will occur in a 50 year operating period, even taking into account all the proposed mitigation strategies (e.g., use of escort tugs). The NEB rejected those arguments, stating:
 - “Having considered these participants’ comments, the Board accepts Trans Mountain’s evidence that there are no proposed or widely accepted risk acceptance criteria for marine oil spills.”
 - “The Board understands that the marine shipping risk assessment performed for the Project-related tankers and the marine shipping risk assessment undertaken for Transport Canada and the report of the Tanker Safety Expert Panel do not recommend stoppage of marine shipping in the area. Rather, such risk assessments are intended to inform mitigation to lessen the potential for an accident to occur, and for spill response planning. That is, the Board does not view the results of these risk assessments as absolute indicators of the actual probability of a spill occurring.”
2. **BURRARD INLET SPILLS:** Specific to potential spills in Burrard Inlet, the Board heard considerable concern regarding potential spill risk, the resultant potential effects from a large spill and Trans Mountain’s exclusion of assessment of those effects from its environmental effects assessment. As discussed further in this chapter and Chapter 10, the Board finds that based on evidence filed by Trans Mountain and intervenors, a large spill in Burrard Inlet would result in significant adverse environmental and socio-economic effects. The NEB stated:
 - “Evidence filed by parties such as the City of Vancouver, City of Burnaby and the Tsleil-Waututh First Nation indicate the potential extent of such effects. However, based

on the evidence before it, the Board finds that a large spill in Burrard Inlet is not a likely event.”

3. **WHAT IS A WORST CASE SCENARIO?:** The Board does not accept the assertion made by participants that spill volumes ranging from 8 000 m³ at the Westridge Marine Terminal to 16,000 m³ at other locations in Burrard Inlet are credible worst-case scenarios. The NEB stated:
- “The Board notes that Trans Mountain’s risk assessments show a very low likelihood of major oil spills within Burrard Inlet and English Bay.”
 - “No credible large oil spill scenarios in these segments of the transit were identified and this view is supported by the TERMPOL Review Committee’s report.”
 - “Further, in response to a question from Port Metro Vancouver, Trans Mountain filed additional evidence indicating that an incident in Burrard Inlet would not be likely to puncture a double-hulled tanker.”
 - “Trans Mountain also discussed specific marine safety mitigation measures within Burrard Inlet and area such as pilotage, tug escort and traffic restrictions.”
 - “The Board accepts Trans Mountain’s evidence in response to the assertion made by Tsleil-Waututh Nation, City of Vancouver and the City of Burnaby that a potential large spill for a tanker at anchor in English Bay is not credible. Among other reasons, Trans Mountain said that there is no incident on record of a vessel being struck by another while at anchor in English Bay; in the event of a collision, there would not be sufficient energy to puncture both hulls of a double hull tanker; and a laden tanker would not be likely to anchor in English Bay.”

For the complete National Energy Board ruling that includes all of the Board’s comments on submission, [see this link](#) to the May 2016 report.³⁰

³⁰ <https://www.ceaa-acee.gc.ca/050/documents/p80061/114562E.pdf>



III. Response

All British Columbians share an interest in protecting our ocean environment. Any reasonable review of the facts lead to the conclusion that maritime response capability attached to the TMEP project is safe, that all reasonable measures to prevent spills are being taken and the project will enhance BC's already-robust spill response capacity.

Whereas the TMEP has already committed to expanding tug use, including larger tugs, to prevent a marine incident such as a disabled tanker grounding and causing a large spill, as part of the Oceans Protection Plan additional salvage capability with two emergency towing vessels will be provided by the federal government to the BC coast. Given that marine tankers are double-hull, the greater risk is posed by older bulk carriers and cruise ships who carry their fuel in single-hull tanks. Newer vessels now have a requirement for double-hull bunker tanks.

The Greater Vancouver Integrated Response Plan for Marine Pollution Incidents (GVIRP) is the response plan for marine oil spills in the Greater Vancouver area, providing guidance for multi-agency response to serious oil pollution events in the area of English Bay and Burrard Inlet. GVIRP, a 177-page document, was signed off in 2017 by the Canadian Coast Guard and is described as “the product of a cooperative effort by Federal Departments, First Nations, Provincial Ministries, Municipalities, and other local response partners.”

The preamble to GVIRP provides useful context that illuminates not only the specifics for Greater Vancouver, but also current-day thinking when it comes to cross-organizational coordination to deal with rapidly evolving and unpredictable events:

Born of experience and necessity, it is the product of an impressive cooperative effort by Federal Departments, First Nations, Provincial Ministries, Municipalities, the Port Authority and private enterprise, including the Vancouver Aquarium and Western Canada Marine Response Corporation.

The GVIRP is, for the moment at least, comparatively unique in its goal to bring together a geographically focused, comparatively detailed, operational plan that will bring dozens of entities under a single command umbrella. It is designed to inform and steer, but will also serve as a basis to gather a team and adapt to complex, rapidly changing events. It is a localized, tactical plan for managing and supporting operations in the marine environment in the event of a major pollution incident. It is designed to be finite in its application, from alarm to denouement and mission

closure. It may help inform longer-term efforts, and must be able to serve an effective segue to those requirements, but the Plan cannot take into account such long-term necessities.

Any major incident on the waters of the Port of Vancouver will invariably impact on hundreds of thousands of people and touch on multiple jurisdictions that abut or overlap in the area. Bringing the capabilities of those jurisdictions to bear, coherently and effectively, is the underlying aim of this Plan.

In the unlikely event of a marine spill, the response and clean-up regime for a broader geography is well-developed and enhanced by the TMEP-funded expansion of WCMRC response capacity, and these safeguards benefit all shipping.

In dealing with a spill on water, the key is to undertake an effective combined response consisting of:

- spill containment,
- protection of sensitive areas and shorelines, and
- mechanical on-water response.

In jurisdictions outside Canada, alternate response measures can also be considered, such as the use of dispersions and burning. Canada too is investigating the use of such alternate methods in order to strengthen its tool box of oil-spill response measures.

Capability for prevention

Marine response is a complex web of private and public capabilities that respond to a marine incident. The key with marine safety is to have the capability to prevent an incident from developing into a marine casualty.

For example, an emergency towing vessel can prevent a disabled vessel from grounding and thus averting a marine pollution incident. The Canadian regime has evolved to make the polluter pay with oversight by the Canadian Coast Guard in a federal monitoring role and private sector input from third parties as required.

On the west coast, a federally certified and regulated Response Organization, Western Canada Marine Response Corporation, provides marine pollution response capability. Transport Canada requires specific response capabilities. This is buttressed by Canadian Coast Guard assets as well as private sector resources that can be cascaded if needed, including from international sources. These responses are regularly practiced and there are also international agreements with the US Coast Guard.

The Province of British Columbia has been active in evaluating and suggesting enhancements to the west coast spill response regime. Gaps have been identified by the Office of the Auditor General in 2010 and this was also the subject of the Tanker Review Panel which made a series of recommendations. Many of these have been implemented or are in the process of being implemented.

One major change is area response planning, where environmental sensitivities are noted and preplanned.

In addition, Canada provides scientific and oceanographic support in real time response. The process is a transparent one that is constantly evolving. One major factor under the OPP is the provision of a

dedicated vessel salvage capability with two emergency towing vessels that will operate in west coast waters.

The Coast Guard is developing a dedicated marine response centre that integrates public and private operations to ensure prompt and timely response with the necessary funding in place. It is important to remember marine response is both an art and a science. It requires a team approach and Canada is working hard to ensure all interested parties are included.

Spill response in the Oceans Protection Plan

The OPP plans to advance Canada's spill response capability and capacity significantly. While the plans under the OPP are not directly related to TMEP, they do validate to a large extent the approach to oil spill response regime enhancements proposed by TMEP and now part of the project's NEB conditions.

Better Indigenous capacity in design and delivery of marine safety

Building on the success of the Canadian Coast Guard Auxiliary model, the Government of Canada will work with Indigenous communities to design and establish new national Indigenous Auxiliary chapters in the Arctic and the Pacific to enroll those Indigenous individuals and groups who want to be part of the federal marine safety system.

As an additional measure to support Arctic coastal communities, the Canadian Coast Guard will extend its community boats pilot program and will provide Arctic communities with up to eight vessels for incident response purposes.

Indigenous community response teams

The Canadian Coast Guard will work with Indigenous communities to design and launch new Indigenous Community Response Teams, starting in British Columbia. Interested Indigenous communities will gain the skills to support search and rescue missions, environmental response and incident management activities. These formal training activities will be centered at Canadian Coast Guard facilities and in communities where applicable.

Multi-partner oil spill response technology research for spill clean-up

The Government of Canada will fund improved research capacity to seek safe, reliable and more effective technologies to clean up oil spills. Research into new clean-up technologies is an essential part of a world-leading marine safety plan.

New investments will fund research to help improve emergency response to marine pollution incidents on the water drawing on the expertise and experience of the science community both in Canada and abroad.

New international partnerships will give Canadians access to the best technology available for spill clean-up. A program will build on the work of Fisheries and Oceans Canada's world-leading Centre for

Offshore Oil, Gas and Energy Research and will encourage collaboration on scientific research with Indigenous and local communities, international research facilities and industry.

A \$150 million plan to protect the coast

The Trans Mountain Expansion Project is providing \$150 million to cover the cost of investments in enhancing spill response capacity to protect the British Columbia coastline. This private sector investment supports new personnel, new vessels, new equipment caches and new, permanent operations bases for the Western Canada Marine Response Corporation (WCMRC). It is the largest-ever expansion of spill response capacity on the Pacific coast.

This planning work reflects the recommendations of the federal Tanker Safety Expert Panel, which handed down its first report in 2014. Since that time WCMRC has been working with stakeholders — including representatives of Transport Canada, Coast Guard, Environment and Climate Change Canada, Fisheries and Oceans Canada and the BC Ministry of Environment and Climate Change Strategy — to develop the best possible set of [marine response planning standards](#).³¹

Western Canada Marine Response Corporation (WCMRC)

If an oil spill occurs in the marine environment, multiple organizations quickly take a coordinated approach to mitigate public and environmental impacts. Although vessels transporting petroleum are responsible for any release or spill on water, Kinder Morgan Canada (KMC) has committed to working in advance with spill responders and other stakeholders to help minimize impacts to the environment and people.

Transport Canada has jurisdiction under the *Canada Shipping Act, 2001* to oversee and regulate all aspects of shipping, including the spill prevention, preparedness, response and recovery. To operate in Canada all bulk oil carriers, 150 GT and greater, and all other vessels (non-bulk), 400 GT and greater (e.g. ferries, cruise ships, cargo ships), must have an arrangement with a certified response organization. Oil Handling Facilities receiving or shipping oil by marine delivery are also required to maintain similar arrangements. This ensures that oil spill response plans, teams and equipment are always available to commercial vessels and oil handling facilities.

³¹ <http://wcmrc.com/app/uploads/WCMRC-Oil-Spill-Response-Plan.pdf>



WCMRC vessels taking part in Port of Vancouver exercise “Full Throttle” with partners the Canadian Coast Guard, Vancouver Police Department, and the Department of Fisheries and Oceans, April 2018.

KMC has extensive emergency response plans ready to activate in case of a spill at the Westridge Marine Terminal – follow the link [here](#) to review.³² This includes having an arrangement with [Western Canada Marine Response Corporation](#) (WCMRC), a certified response organization, pursuant to subsection 168.(1) of the *Canada Shipping Act, 2001*.³³ WCMRC’s team of spill response professionals is trained specifically in the response to, and recovery of, water-based oil spills. Their ability to effectively manage and direct spill response procedures within the first few hours after response activation significantly reduces the negative impacts oil can have on the environment.

In the event of a spill, WCMRC personnel immediately respond with carefully designed geographic response strategies and counter measures. WCMRC maintains various response-oriented warehouses and equipment caches that can be activated such as containment booms, skimmers and vessels.

About WCMRC

The Western Canada Marine Response Corporation is the only Transport Canada-certified marine response organization on the Pacific coast. It is an industry-funded organization with more than 2,300 members. Membership is mandatory for vessels of a certain size calling on Canadian ports, as well as for oil-handling facilities receiving or shipping oil across their docks.

³² https://transmountain.s3.amazonaws.com/ERP/Westridge_Marine_Terminal_ERP_Sept_2016/index.html

³³ <http://www.wcmrc.com/>

The organization's mandate is to ensure a state of preparedness is in place in when a marine spill occurs and to mitigate the impacts to BC's coast. This includes the protection of wildlife, economic and environmental sensitivities, and the safety of both the responders and the public.

WCMRC has a marine spill response plan outlining procedures and processes for responding to incidents across BC's entire coastline.

Since its inception in 1976, WCMRC has responded to 750 spills, an average of about 20 per year. None of these spills has involved an oil tanker departing from Trans Mountain's Westridge Marine Terminal in Burrard Inlet, the only tanker terminal on the BC coast. Tankers have travelled to and from Westridge without spilling a drop of oil since the terminal began shipping in 1956.

The WCMRC enhancements associated with the Trans Mountain expansion will cut response times dramatically and significantly increase response capabilities along BC's southern shipping route. This expansion supports response to any potential spill incident — whether it involves a pleasure boat, a commercial fishing vessel, a cargo ship, a BC ferry or a tanker.

Wherever possible, new personnel will be from the immediate community. WCMRC's first preference is to hire locally — people with marine experience who will be trained in spill response tactics and will be taught to operate booms, skimmers and the tactics for containing and recovering oil.

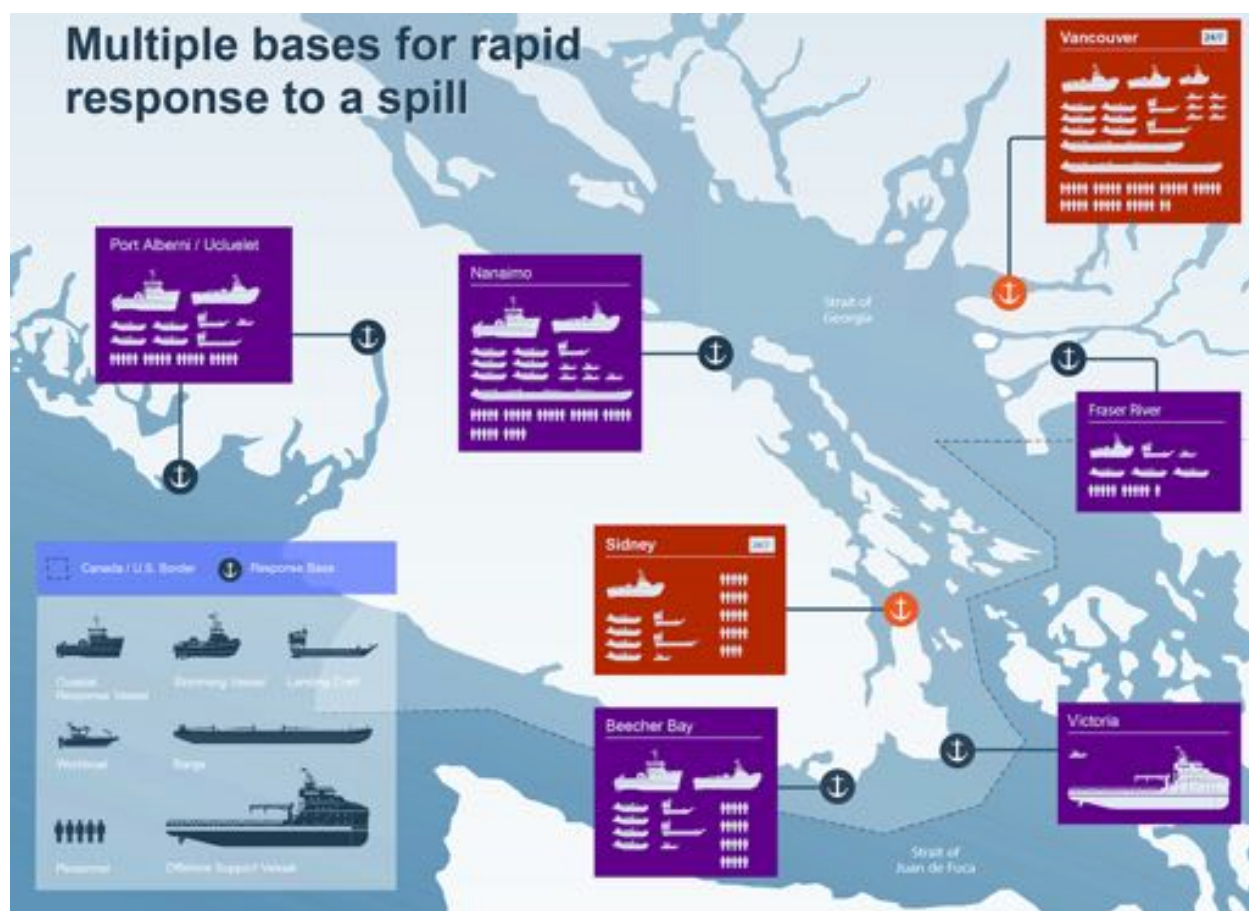
Base locations, personnel and equipment

- **Vancouver Harbour and Lower Fraser River.** Both are components of the Port of Vancouver Response Strategy.
- **Nanaimo,** a hub base on Nanaimo Port Authority property, staffed seven days a week.
- **Saanich Peninsula,** operating 24 hours a day, seven days a week.
- **Port Alberni and Ucluelet,** the initial rapid response locations for the west coast of Vancouver Island.
- **Beecher Bay,** a strategically located response base near the southern tip of Vancouver Island on First Nation territory.
- Among the new bases and equipment, WCMRC will procure an offshore response and support vessel, which will be based near Victoria.

WCMRC calculates that personnel will grow from 60 at present to 180 with the Trans Mountain Expansion. Its vessel fleet is more than doubling, from 35 to 75.

The enhancements will cut spill response time to two hours in Burrard Inlet and the Fraser River, and six hours anywhere else in the Strait of Georgia and Juan de Fuca Strait.

Although TMEP is providing the funding, the new WCMRC personnel, vessels and equipment will be available for any spill incident along the BC southern marine shipping route.



Already, WCMRC's response capacity is 2.6 times larger than *Canada Shipping Act* requirements for a 10,000 tonne spill based on federal planning standards. Because of the Trans Mountain expansion, WCMRC will have 62,890 tonnes of spill recovery capacity — more than six times what's required.

WCMRC is also enhancing its response capabilities by identifying, through a GIS mapping program, environmentally sensitive locations where additional protection measures will be carried out in the event of a spill. As a result of this work, it has created more than 400 individual Geographic Response Strategies. Each of these locations has been mapped, and each has a specific strategy for setting booms to contain spilled oil.



Western Canada Marine Response Corporation spill response vessel. Red and white balloon atop the ship is a Hawk Owl Overhead Wireless Lookout System, used to support containment and recovery operations for oil spill response operations. Visual range is up to 8 km in every direction.

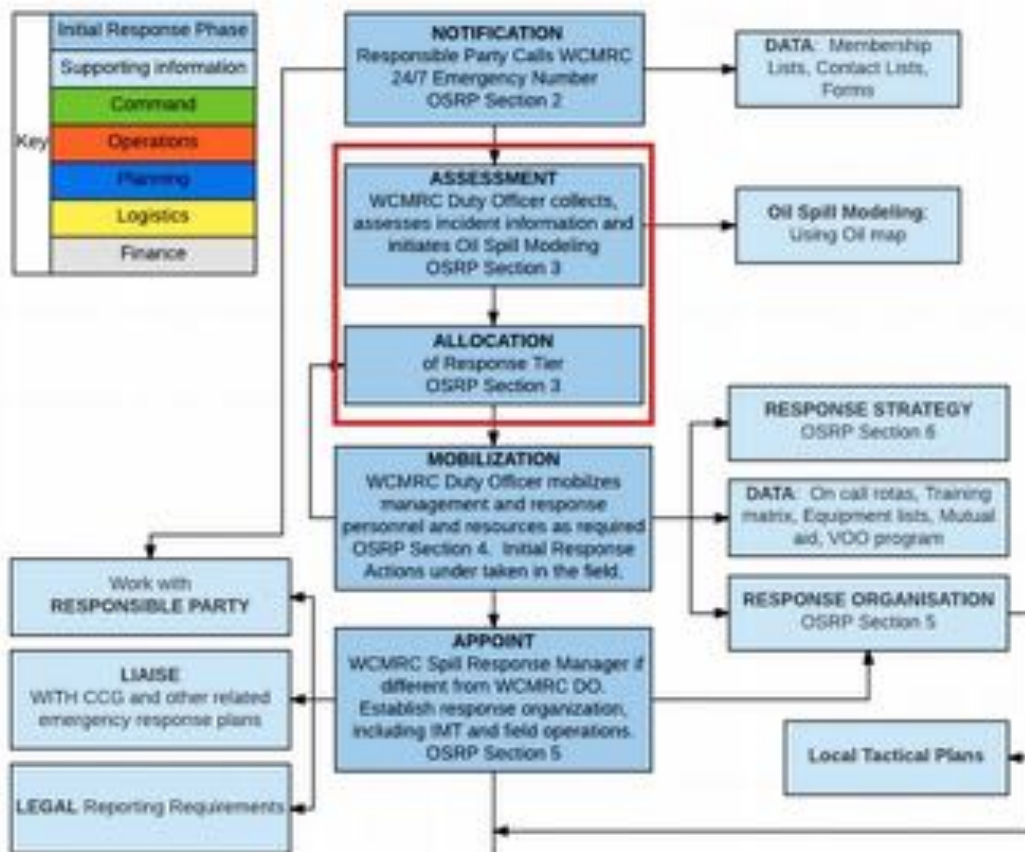
Improve localized ocean circulation knowledge to inform oil spill trajectories

Government of Canada scientists will conduct research to better understand how different petroleum products behave in Canada's waters and specific environmental conditions. This will include work to build and refine ocean models using information such as currents, winds and waves to allow responders to accurately track spills and predict their path.

Kinder Morgan experts developed a highly sophisticated ocean circulation model for the south BC shipping route in order to carry out oil spill dispersion modelling, which contributed greatly to developing the enhanced oil spill response regime.

ASSESSING A SPILL INCIDENT

This diagram is representative of the type of planning that has been put into place by Western Canada Marine Response Corporation (WCMRC) to deal with spills on Canada's west coast. The organization has been around since 1976 and during that time says it has responded to more than 750 incidents.



Better ability to predict behaviour of oil in water

In response to concerns raised by indigenous and coastal communities regarding risks posed by existing tanker traffic, under the Oceans Protection Plan the Government of Canada will ensure that its scaled-up research initiative includes further analysis on how various types of oil and petroleum products behave when spilled in a marine environment. This will provide scientific advice to oil spill responders that will improve the Net Environmental Benefit Analysis approach to a spill and the resulting decision-making process.

Kinder Morgan Canada has undertaken considerable research in oil fate and behaviour to inform and improve oil spill response. Industry is continuing this type of research in collaboration with government scientists as part of continuous improvements in the area of spill response planning. The Canadian Science Advisory Secretariat, in an attempt to deal in a single place with the sprawling amount of research done on dilbit in water, [issued a useful research summary](#) in 2018.³⁴

Diluted bitumen behaves much the same as other heavy oils

A major aspect of spill response has been ongoing work to understand the exact nature of the spill risk. One of the concerns for oil spill recovery has been how heavy crude oils such as diluted bitumen, or dilbit, behave if such oils are spilled on water. The definitive answer is that extensive research shows that diluted bitumen behaves much the same way as other heavy oils. Trans Mountain carried out research in 2012 which determined this to be the case. This research, which also involved the Western Canada Marine Response Corporation, confirmed that oil recovery equipment currently stockpiled by response organizations can successfully remove spilled dilbit from the water's surface.

Subsequent studies carried out by Government of Canada researchers — now widely reported in the media — have confirmed this. At the national scale, authoritative, independent and peer-reviewed work to refine scientific understanding of the behavior and environmental impacts of bitumen in water continues, overseen in 2018 by experts from federal departments, provincial ministries and universities in five provinces including Alberta, Saskatchewan, Manitoba, Ontario and Quebec. This work includes research taking place at the world's foremost freshwater ecosystem science research centre, Canada's Experimental Lakes Area (ELA) in northern Ontario. The ELA is an internationally administered facility operated by the International Institute for Sustainable Development (IISD). The IISD receives funding from the United Nations, the Organization for Economic Co-operation and Development (OECD), the World Bank, OXFAM, 18 countries spread across three continents and a wide range of other sponsors.

The Canadian Association of Petroleum Producers has noted that “asserting dilbit is different from other crude oils is a fallacy that allows critics to lament a lack of dilbit-specific research or regulations.” During Ministerial Panel hearings for the Trans Mountain Expansion Project, it was expressed that diluted bitumen was less safe for transportation than other heavy oils because it would not float. The scientific evidence does not support this claim.

Bitumen is a heavier, thicker form of petroleum. The oilsands of northern Alberta are one of the world's largest known deposits of bitumen. This oil has fewer lighter hydrocarbon molecules — such as those used to manufacture gasoline or diesel fuel — compared to conventional crude. In order to make it flow through a pipeline, it is either partially refined into a synthetic crude which is very similar to conventional

³⁴ http://www.dfo-mpo.gc.ca/csas-sccs/Publications/ScR-RS/2018/2018_018-eng.pdf

crude oil, or natural gas liquids or condensate (diluents) are added to allow it to flow more easily through a pipeline. Synthetic crude may also be added.

Dilbit can be refined to make gasoline, diesel and jet fuel and a wide range of consumer products including plastics for making clothing and sports gear, kayaks and canoes, medical equipment, containers, automotive lubricants, fertilizer and many other essential day-to-day items.

Research shows that the diluent and bitumen together comprise a single-phase product that does not simply separate into its various components. The product floats on water and can be contained using booms and recovered using mechanical recovery methods such as skimmers.

Transportation safety concerns

During Ministerial Panel hearings for the Trans Mountain Expansion Project, it was expressed that diluted bitumen was less safe for transportation than other heavy oils because it would not float. The scientific evidence does not support this claim.

Canadian research to date has determined there is no difference between the behaviour of diluted bitumen and other heavy crudes in the very unlikely event of a spill into the marine environment. It floats on water unless exposed to high water temperatures and weathering.

As part of its Application to the National Energy Board, TMEP carried out a 10-day meso-scale test that included oil sample analysis of representative samples of dilbit as well as assessing their behaviour or ‘weathering’ in brackish water such as would be found in Burrard Inlet.

The results of TMEP’s research, known as the Gainford Study, were submitted as evidence to the NEB. The study found that spilled dilbit behaved similarly to conventional heavy crudes during the 10-day weathering cycle of the research and could be recovered at all stages from the surface using conventional methods and equipment.

Research has subsequently been carried out by researchers from Fisheries and Oceans Canada, Environment and Climate Change Canada, and Natural Resources Canada. This work has corroborated the findings of the Gainford Study.

The following Q&A looks at some key findings of [the Gainford Study](#) on the behaviour of dilbit in water, considered by the National Energy Board:³⁵

Question	Answer
Does dilbit sink in water when spilled?	Both Cold Lake Blend (CLB) and Access Western Blend (AWB) dilbits are lighter than freshwater. Dilbit spilled into fresh, brackish, or saltwater will stay on the water surface unless another mechanism mixes it into the water column, as would be the case for any oil. Only after extensive weathering may some portion become submerged or sink in freshwater, without invoking additional parameters that can modify the density of the spilled product.
Can dilbit be recovered from water using conventional spill response skimmers?	Fresh dilbit oil is much like most medium to heavy crude oils and can be recovered using a variety of skimmer systems, ranging from weirs to oleophilic units. As dilbit weathers, the oil viscosity increases significantly but skimmers designed for more viscous oils, including brush, belt, and mechanical systems, can continue to effectively recover weathered oil (demonstrated in up to 10 days of weathering in tank tests).
Can chemical dispersants be effectively used on dilbit spills?	Given appropriate safety, environmental, and operating conditions, dispersants may be effective within the first day of a spill before weathering results in oil that is too viscous to effectively disperse.
How toxic is dilbit relative to other crude oils?	The BTEX (benzene, toluene, ethylbenzene, and xylene) components in crude oils are some of the key chemicals of concern for toxicity. The BTEX content in CLB and AWB dilbits is approximately 1 to 1.2 per cent by volume, respectively, which is slightly less than that found in Alaska North Slope or Alberta Sweet crude oils.
How variable are the weathering patterns and oil properties between different dilbits and synbits?	The Gainford tests showed that the weathering patterns between CLB and AWB are similar and that oil physical and chemical properties are consistent with other heavy crude oil. The full range of properties of dilbit blends are well known and published (see CrudeMonitor), although weathering characterization of the range of oils is the subject of ongoing research.
Can spilled dilbit be effectively cleaned off shorelines?	The Gainford meso-scale tests showed that fresh to very weathered CLB can be effectively removed from a hard substrate through a combination of shoreline cleaner (Corexit 9580) and low to moderate water pressure flushing. These techniques may not be suited for all types of shorelines; however, they generally are appropriate for coarse-grained materials (gravel, cobbles, and boulders and including coarse sediment mixes).

Dilbit does not separate in pipelines, tanks or tankers. It floats, just like any crude oil, in calm or slow-moving water. Petroleum products float on water if they are lighter than water. The American Petroleum Institute has developed a standard (API gravity) for measuring the density of any particular

³⁵ <https://apps.neb-one.gc.ca/REGDOCS/File/Download/2393697>

petroleum liquids. The higher the number, the lighter the liquid. For example, the API gravity of water is 10 degrees and the API gravity of dilbit is 20 to 22 degrees, which means it floats easily.

Over an extended period of "weathering" or if mixing with sediments, surface oil could submerge and be driven below the water surface by waves or currents. Research carried out by Natural Resources Canada — widely reported in the media since 2016 — indicates that the recovery strategy for dilbit would be the same as other heavy crudes. In fact, research indicates that dilbit is easier to recover from water than conventional light oils — which are more likely to disperse into the water column.

Three weeks to clean up before risk of sinking

According to a June 2016 [Bloomberg News story](#), the NRCAN study results “may help dispel some concern that a spill of diluted bitumen would be more difficult to clean up and help companies make the case for pipeline projects such as Kinder Morgan Inc.’s Trans Mountain expansion.”³⁶

This study, led by NRCAN researcher Heather Dettman, diverged from a 2015 US National Academy of Science report which stated that dilbit tended to sink quickly when spilled into freshwater. This report bases much of its conclusions from experience gained through response to a pipeline spill on land affected by overflow of the Kalamazoo River where water temperatures ranged to 29 degrees. This is about [double the typical summer maximum sea temperature](#) along the southern BC coast as measured for communities such as Richmond and Vancouver by the US National Ocean Administration.³⁷

“Under typical Canadian climatic conditions you’ve got up to three weeks to clean it up before you’ve got any major sinking,” Merv Fingas, a former Environment Canada spill science expert who was one of the authors of the US National Academy report, [told Macleans magazine](#) in 2016.³⁸

Dettman is a senior research scientist working at the CanmetENERGY laboratory in Devon, Alberta. She told the Globe and Mail in a [January 2018 story](#) that, based on her research, the claim that bitumen sinks in water is “misinformation.”³⁹ The Globe’s lead on the story was that the BC government’s intention to strike a scientific advisory panel to investigate interactions between dilbit and waterways and wildlife “is seen as an attempt to block Kinder Morgan Canada Ltd.’s proposed expansion of its Trans Mountain pipeline.”

In a [February 2018 interview](#) with CBC Early Edition hosts Stephen Quinn, Dettman said NRCAN’s tests, carried out in a 1,200-litre tank, focused on whether or not dilbit would sink in freshwater.⁴⁰ She said her team chose freshwater because it is less dense than salt water and therefore more likely to allow oil to sink into it. The tests also included buffeting dilbit with breaking waves in various temperature conditions to see if that made a difference in how quickly it would sink.

³⁶

http://business.financialpost.com/news/energy/study-showing-that-spilled-oilsands-crude-floats-on-fresh-water-could-help-unlock-stalled-pipelines?_lsa=4bd5-739a

³⁷ <https://www.seatemperature.org/north-america/canada/vancouver.htm>

³⁸ <http://www.macleans.ca/society/does-spilled-pipeline-bitumen-sink-or-float/>

³⁹

<https://www.theglobeandmail.com/news/british-columbia/what-we-know-and-dont-know-about-diluted-bitumen/article37799406/>

⁴⁰ <http://www.cbc.ca/listen/shows/the-early-edition/episode/15517888>

In tests ranging to 10 days, she told Quinn, the bitumen continued to float. Subsequent tests were extended to four weeks of exposure. “The first diluted bitumen product that came out, that started to sink, was actually after three weeks. As you can imagine, three weeks is a fair chunk of time to be recovering it.”

The Vancouver Sun in a subsequent [interview with Dettman](#) said “Dettman’s tests, between 2014 and now, using varying grades of diluted bitumen typical of oilsands production, shows that the material will float on the surface for up to three to four weeks, even under wave conditions that would cause conventional crude to mix in with the water column.

“The fear is that as soon as (diluted bitumen) hits the water it sinks,” Dettman said. “That’s the messaging that’s been out there and that’s not what we’ve been finding, even in freshwater.”⁴¹

Ongoing research

In its Application to the NEB, Trans Mountain asserted that existing information about dilbit and other fuel oils is sufficient for modelling of their fate and behaviour for purposes of the Expansion Application and spill response planning. The NEB in its report published in May 2016 has corroborated this.

The NEB’s comment that research “should continue to inform the potential fate and behaviour of spilled oils and assist companies and spill response agencies in spill response planning” is widely supported by industry, including Trans Mountain which says it is committed to continual improvement into oil spill response planning supported by research and better understanding of the fate and behaviour of oil in water.

Following up on the NEB’s comments on this topic and recognizing the research initiatives recommended by the Royal Society of Canada, the Canadian Association of Petroleum Producers, the Canadian Energy Pipeline Association and other stakeholders are funding a multi-million dollar independent scientific study encompassing the behaviour of a variety of conventional and unconventional crude oils in freshwater, saltwater and estuaries in a wide range of temperature and water conditions.

This work, which began in 2017, is intended to be authoritative on the topic of oil fate and behaviour resulting from spills in Canadian waters. It is being carried out by an independent third-party researcher who is evaluating the fate and behaviour of a wide variety of crude oil products including dilbit. A scientific advisory committee, including representatives from Environment and Climate Change Canada, Fisheries and Oceans Canada, the National Energy Board and Natural Resources Canada is providing technical knowledge and guidance.

Research scheduled for 2018 also includes two [investigations of the behavior of dilbit](#) in Canada’s largest outdoor laboratory, the Experimental Lakes Area which is operated near Kenora, Ontario, by the International Institute for Sustainable Development (IISD).⁴²

The Experimental Lakes Area is a globally unique research station encompassing 58 lakes and their watersheds in the Kenora, Ontario area. It was established 50 years ago in a remote area where human activity was unlikely to compromise research results. It was originally funded by Fisheries and Oceans Canada but taken over by the IISD in 2014. Hundreds of peer-reviewed articles based on ELA research

⁴¹

<http://vancouversun.com/news/local-news/bitumen-floats-longer-than-expected-natural-resources-canada-research-shows>

⁴² <https://www.iisd.org/ela/blog/research-highlights/exploring-oil-spills/>

have been published in science journals and the facility itself has received several international awards for landmark discoveries in water-based research.

In November 2017 the IISD announced a three-stage project to learn more about what oils do in freshwater systems.

As the IISD notes on its website, “Several studies are currently being pursued at the IISD-ELA to address public and regulatory concerns regarding potential environmental effects of oil spills and uncertainty regarding the best cleanup methods following a spill, especially for freshwater environments. One study, led by Drs. Jules Blais (University of Ottawa), Mark Hanson (University of Manitoba) and Diane Orihel (Queen’s University) will examine the ecological impacts of contained diluted bitumen model spills in a freshwater boreal lake. A companion study, led by Dr. Vince Palace (IISD-ELA) will compare the effectiveness of different methods for cleaning spilled oil from shorelines. Both studies are part of a large multidisciplinary program that includes participation from governments (Environment and Climate Change Canada, Fisheries and Oceans Canada, Natural Resources Canada, Ontario Municipal Employees Coordinating Committee, Ontario Ministry of Natural Resources and Forestry), regulators (National Energy Board), academic partners (universities of Manitoba, Ottawa, Queen’s, Institut national de la recherche scientifique, Calgary, Saskatchewan, McGill) and industry (Canadian Association of Petroleum Producers, Canadian Energy Pipelines Association).”

The first stage of the project, a pilot study examining the chemical and physical behaviour of dilbit in freshwater, is complete.

“The second stage is a field study,” the IISD stated. “Researchers will use large enclosures (10 m diameter) placed in a lake to examine how diluted bitumen reacts in freshwater over longer periods of time. Researchers will also be directly testing changes in the oil’s toxicity in freshwater bugs, fish and amphibians.

“The information from these first two studies will guide a third study, where researchers will examine the most effective methods of cleaning spilled oil from shorelines. Again, only small, contained model spills in an IISD-ELA lake will be used. This study will focus on the shoreline, which is most sensitive to oil and presents the biggest difficulty in terms of cleanup efforts.”

Scientific studies of bitumen in water

There is a considerable literature of diluted bitumen research, and the work continues. (Each link below initiates the downloading of a PDF.)

Completed

2013 — Federal Government Technical Report: [Properties, Composition and Marine Spill Behaviour, Fate and Transport of Two Diluted Bitumen Products from the Canadian Oil Sands](#). Study carried out by Environment Canada, Fisheries and Oceans Canada, Natural Resources Canada. The behaviour of the diluted bitumen products was studied under laboratory conditions, including a wave-tank experiment and literature review. The major results of the studies were that two high-volume bitumen products from Western Canada, Access Western Blend and Cold Lake Blend, floated on saltwater even after evaporation and exposure to light and mixing with water. It said “typical marine temperature ranges seen in Canada (0 to 15 degrees Celsius) is not sufficient

to cause oil sinking” in fully salt marine waters. The products sank or dispersed as floating tarballs when exposed to sediment and high-energy wave action.

2013 — Gainford, Alberta, Study (Witt O'Briens, Polaris Applied Sciences, Western Canada Marine Response Corporation): [A Study of Fate and Behaviour of Diluted Bitumen Oils on Marine Waters](#). The study carried out for Trans Mountain Expansion Project and presented as evidence to the National Energy Board in 2013 confirmed that dilbit is a stable homogeneous mixture that behaves in a similar manner to other natural crude oils. It did not separate into bitumen and diluent during a 10-day weathering test, nor did it sink.

2013 — (US) National Academy of Sciences: [Effects of Diluted Bitumen on Crude Oil Transmission Pipelines](#). The study found no evidence of any causes of pipeline failure that are unique to the transportation of diluted bitumen.

2015 — (US) National Academy of Sciences: [Spills of Diluted Bitumen from Pipelines](#): The report found that weathering can cause bitumen to sink but noted that weathering process slow as temperature falls. It also reported that “even the heaviest oils will usually float on seawater.”

2015 — Royal Society of Canada Expert Panel: [The Behaviour and Environmental Impacts of Crude Oil Released into Aqueous Environments](#). The Society recommended seven priorities for further research. These included research to better understand the environmental impact of spilled oil, the effects of oil spills on aquatic organisms and a program of controlled research to better understand spill behaviour and effects across a spectrum of crude oil types in different ecosystems and conditions.

2016 — [Science of Crude Oil Behavior During Spills in Fresh Water Environments](#): Test Tank Study Results, a presentation to the Senate Committee on Transport and Communications by Heather Dettman, Natural Resources Canada. Dettman reported that laboratory tests show weathered bitumen continued to float during an eight-day test at temperatures of 15 degrees celsius — which is within the normal annual seawater temperature range on the BC south coast. At a water temperature of 26 degrees, more than 85 per cent of weathered dilbit continued to float and was recoverable. She noted that there was 95 per cent recovery from a spill of diluted bitumen into Burrard Inlet in 2007 (after a road contractor working for the City of Burnaby breached the Trans Mountain pipeline).

Ongoing

NRCan, led by senior researcher Heather Dettman, is carrying out more extensive testing of the behaviour of bitumen in water.

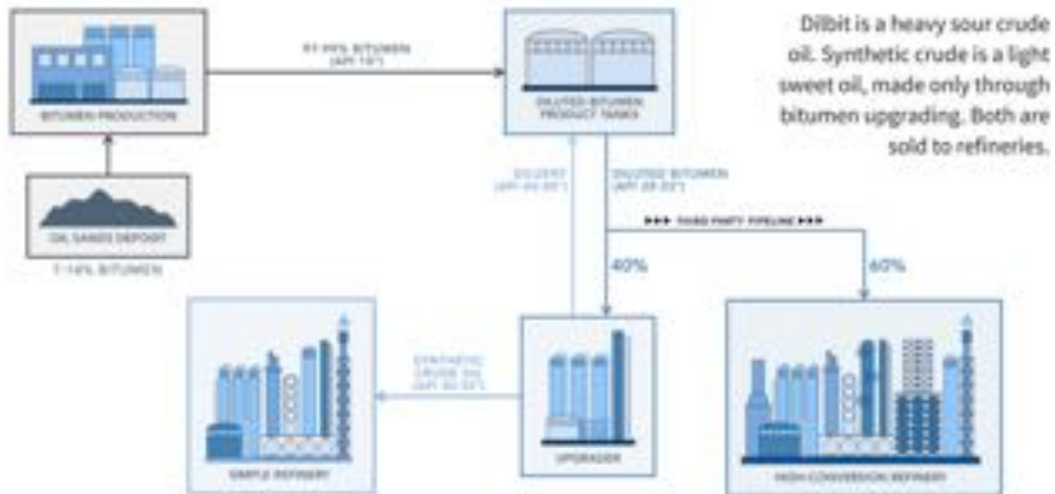
IISD's 2017-2018 study of bitumen in water in the Experimental Lakes Area.

Trans Mountain must provide a report to the National Energy Board regarding current and future research programs. The NEB requires the report include research on the behaviour of oil in water and cleanup and remediation options. Trans Mountain must also report how it is incorporating oil research results into its emergency preparedness and response plans. The report must be developed in consultation with Indigenous groups in British Columbia, the BC Ministry of Environment, BC Ministry of Natural Gas Development, BC Oil and Gas Commission, Canadian Coast Guard and Environment and Climate Change Canada. Trans Mountain must report to these

groups prior to the start of expanded operations at Westridge and provide progress updates one year and five years after operations start.

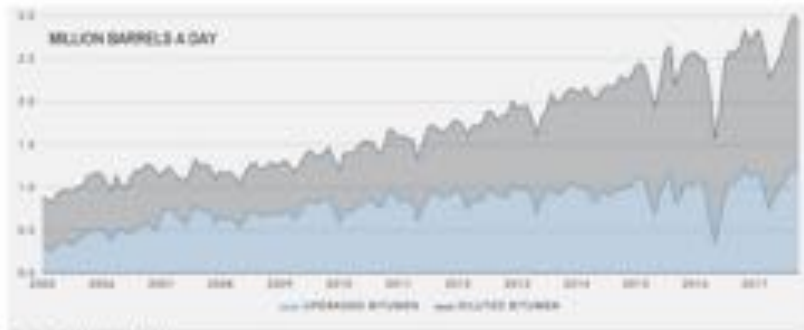
WHAT IS DILUTED BITUMEN?

Oil sands facilities produce one of two crude oil products: either a heavy marketable diluted bitumen (commonly referred to as Dilbit), or a light synthetic crude oil. Infographics from OIL SANDS MAGAZINE.



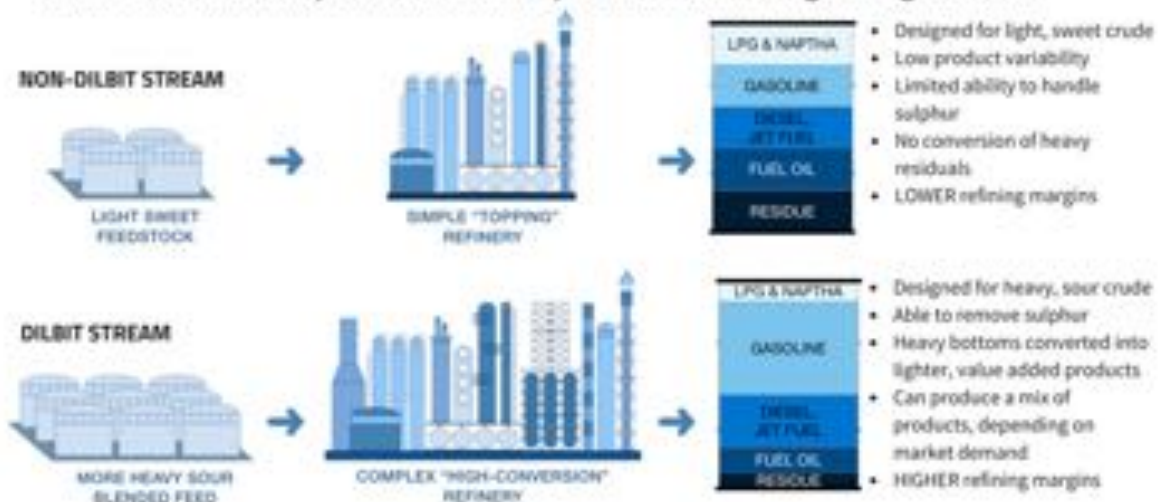
Oil sands output by type

The Trans Mountain Expansion will send blended bitumen to markets in Asia. It will also send more product to California refineries, which are cut-off from pipelines and source most of their crude from overseas.



SOURCE: STATISTICS CANADA

Dilbit: Versatile and profitable refinery feedstock meets growing demand



Evolving pilotage and regulatory regimes

Minimizing risk through training and education

Tanker spills are a dominant theme in the public debate about pipeline expansions in Canada. But what are the odds? And what do the experts say?

Statistics collected over nearly 50 years by the International Tanker Owners Pollution Federation (ITOPF) [show that spill risks are plummeting](#).⁴³ Globally, pilot and ship operator training standards are high, ship designs add new layers of safety and regulatory regimes — especially in locales such as the Port of Vancouver — recognize the need for prudent and conservative guidance of oil transport.

Plans to expand oil tanker shipments through Burrard Inlet sound substantial if you describe them as a “sevenfold increase” in tanker activity, but perhaps not so significant if you understand that an expanded Trans Mountain Pipeline will support slightly more than one ship per day, seven days a week, up from about one per week at present. The “sevenfold increase” represents one partially laden Aframax tanker departing Westridge Marine Terminal per day.

Included in Trans Mountain’s December 2013 Application to the National Energy Board were details of a study commissioned from a consultant with global expertise in calculating risk in the marine sector. The company, DNV GL (formerly Det Norske Veritas), has been operating in the maritime sector for more than a century. DNV GL is a world-leading maritime ‘classification society,’ an independent organization relied upon by the marine industry to guide and certify construction, reliability and operation of large ships. It helps marine-focused companies determine if ships are fit for sailing, provides ship design, management and operations software, trains and certifies ship operators and certifies materials and components for ship construction.

West Coast in context: Oil transported as cargo in Canadian waters



⁴³ http://www.itopf.com/fileadmin/data/Photos/Statistics/Oil_Spill_Stats_2017_web.pdf

At a time when tanker traffic has never been higher, an extraordinary number of vessels are navigating the world's oceans at any given time. This map shows the position of all oil tankers on March 13, 2018:



Vessels of varying sizes and capacity use the waterway, which in some areas is relatively narrow with several turns and required course adjustments. The Pacific Pilotage Authority requires compulsory pilotage between Westridge Marine Terminal and Victoria, together with the use of tethered and untethered escort tugs for various portions of the route.

Oil spill simulation

For Trans Mountain, DNV GL carried out a study to calculate the risks of an oil spill. It took into account all current and future marine traffic tracked in the Salish Sea study area by AIS, the Automatic Information System used around the world to track and monitor vessel movements.

This includes the approximately 550 tankers per year travelling into the region today — many to and from US refineries in Washington state. The tanker number is expected to increase to about 1,000 tankers annually (400 attributed to Westridge including current and expanded vessel movement) should TMEP receive permission to proceed.

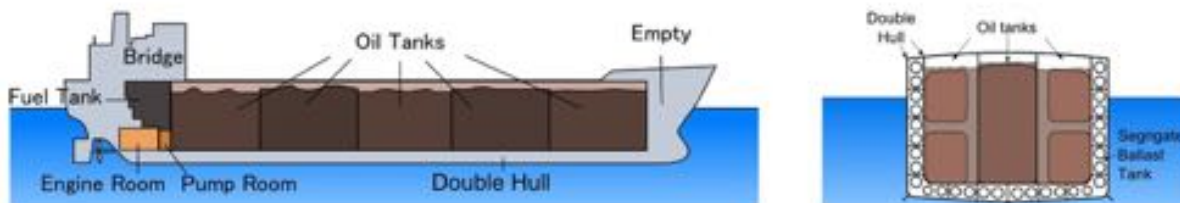
The entire marine network was computer-modelled incorporating 12 consecutive months of weather and tested with the risk controls currently in place and additional measures that will be implemented as a result of the project.

The conclusion — a major spill is highly unlikely. As a more conservative case, Trans Mountain supported DNV GL's selection of a side impact (vessel collision) scenario rather than a vessel grounding as the

results showed a higher spill volume resulting from a collision. This spill volume is equivalent to the loss of entire cargo from two of the 12 to 14 separate individual tanks within the double hull of the tanker.

Staying out of trouble by going double

12 to 14 separate individual tanks are enclosed within the double hull of a modern oil tanker. From 1992, in the wake of the Exxon Valdez disaster, international law required all newly built tankers to have double hulls.



Trans Mountain presented the DNV GL study to the NEB to TERMPOL, a Transport Canada process that reviews safety and technical aspects of the marine aspects of oil and gas projects — along with TMEP's proposals for enhanced tanker safety.

The Port of Vancouver has some of the lowest density of marine traffic anywhere in the developed world.⁴⁴ The Port receives just over 3,000 vessels a year. By contrast, Rotterdam currently averages around 36,000 port calls — vessels — per year. The Port of Singapore in 2014 handled 140,000 vessels, which means that a ship is arriving every five minutes. While our ports are not destined to become as busy as Rotterdam or Singapore in future, they can certainly manage more traffic quite easily.

The region's marine safety regime adopts risk controls for all traffic and for oil tankers in particular. [Transport Canada](#), the [Canadian Coast Guard](#), [Pacific Pilotage Authority](#) and [Port of Vancouver](#) establish, implement and monitor regulations and practices for oil tankers.⁴⁵⁴⁶⁴⁷⁴⁸

44

<https://www.transmountain.com/news/2015/meet-capt-stephen-brown-president-chamber-of-shipping-of-british-columbia>

⁴⁵ <http://www.tc.gc.ca/eng/marinesafety/menu-4100.htm>

⁴⁶ <http://www.ccg-gcc.gc.ca/eng/CCG/Home>

⁴⁷ <http://www.ppa.gc.ca/text/index-e.html>

⁴⁸ <http://www.portvancouver.com/marine-operations/>

Unique approach to pilotage conditions

British Columbia's 15,000 miles of coastline are protected by Coast Pilots mandated to board and guide any foreign ship coming in or out of Canada's west coast ports for safety, efficiency and environmental protection.

- Tankers and other large ships calling on the Port of Vancouver are guided in and out of local waters by qualified local mariners who are members of the British Columbia Coast Pilots Association.
- The 110 pilots are highly trained and qualified to ensure tankers navigate our local waters safely.
- You cannot bring a ship from deep sea anywhere on the West Coast of Canada without taking a pilot.
- There is one pilot aboard anytime the vessel moves, and two if it's loaded — even if the vessel is just moving from anchor to dock or back.
- A ship requires two pilots if the bridge watch is going to be more than eight hours or more than 105 nautical miles.
- One pilot sleeps while the other works. Every five hours or so the shift changes.



For the specific challenges of the Second Narrows, the BC pilots collaborated on a new navigation technology, called Portable Pilot Units (PPUs).

- Now required to be carried by every pilot who works in the Second Narrows transits.
- Also used coast-wide in the province.
- Software constantly updated for tide and weather patterns, hazards such as rocks, marine traffic trends and other factors to help pilots navigate more safely, efficiently and accurately.

Ensuring ships are safe

Tankers are held to strict internationally accepted build, manning, maintenance and operating quality standards mandated by the International Maritime Organization and the *Canada Shipping Act, 2001*, and verified by marine vessel Class Societies. Additionally, [marine spill response plans](#) ensure quick action in the event of a spill.⁴⁹ Trans Mountain has proposed additional risk controls and enhancements, which build on the current marine safety regime.

Many of Trans Mountain's proposals have already been incorporated to guide movement of current tanker traffic and the NEB's conditions for the Project. Some of these measures include:

- **EXTENDED ESCORT:** Trans Mountain will extend tug escort of laden Project tankers for the entire outbound shipping route, i.e., from Westridge to Buoy J (the western entrance to the Strait of Juan de Fuca). Tugs used for escorting tankers are already highly capable, however, the tugs escorting tankers through the Strait of Juan de Fuca will be more powerful, larger and more capable than other tugs currently available in the region.
- **LENGTH OF PILOT ROUTE:** Pilot disembarkation will be extended to take place near Race Rocks further west than the pilot boarding station on Brothie Ledge in Victoria (pilots have been trained to disembark by helicopter).
- **ENHANCEMENTS:** Enhanced Situational Awareness techniques will be applied that will require:
 - Safety calls by pilots and masters of laden tankers
 - Notices to industry issued by Pacific Pilotage Authority
 - Tactical use of escort tug along shipping route
 - Boating safety engagement and awareness program led by Pacific Pilotage Authority

⁴⁹ <https://www.transmountain.com/marine-response>

Enhanced protection all the way to this traffic separation marker

Trans Mountain will extend tug escort of laden Project tankers for the entire outbound shipping route, i.e., from Westridge Marine Terminal to Buoy J at the western entrance to the Strait of Juan de Fuca.



In its Reply Evidence to the NEB, Trans Mountain asserted its confidence in its assessments of risk for increased oil transport. A marine risk assessment by some Intervenor in the TMEP Application, by contrast, contains inaccuracies and misrepresentations, including an assessment of DNV GL's work that is based on an incorrect premise that greatly overstates the level of risk for a marine incident.

In an interview, Captain Bikramjit Kanjilal, Marine Development lead for TMEP, said "I think people sometimes misplace their viewpoints based on thinking of consequences of very large spills which, probability-wise are very uncommon, very unlikely," Kanjilal said.

Trans Mountain has stated its commitment to preventing spills in the first place but also ensuring that should a spill take place, the response to it is fast and effective.

"To put that into some sort of perspective, there hasn't been any large oil spill in Canada (including none involving a tanker departing Westridge since shipping operations began in 1956). When the tanker safety expert panel was doing its risk assessment, when it went through all the records, it couldn't find any spill over 1,000 cubic metres, 1,000 tonnes, in Canada for the past so many years."

Data from the Transportation Safety Board of Canada, displayed in the following table, shows that Canada's western region, far from having an elevated inherent risk, posted by far the lestnumber of marine occurrences during the period 2000 to 2009.⁵⁰

⁵⁰ Table drawn from "Marine Transport of Hydrocarbons – A Perspective on Risk & Regulation" presented in June 2013 to the Standing Senate Committee on Energy, the Environment and Natural Resources by Darryl Anderson of Wave Point Consulting Ltd. Large or extremely large marine oil spills have been rare in Canada. The largest spill, 10,000 tonnes or 68,000 barrels, involved a laden inbound tanker, the SS Arrow, which ran aground off the east coast of Nova Scotia in 1970. The only similar sized incident, in 1979, involved the MV *Kurdistan* which spilled 6,000 tonnes or 41,000 barrels when it broke up in Cabot Strait while travelling from Nova Scotia to Quebec. Under current requirements, neither of those single-hulled vessels would be allowed to call on Canadian ports.

Along with technology advances, industry and regulators are refining measures to protect the environment. Already, the marine industry is demonstrating continuing improvement in overall safety performance when it comes to the transportation of oil by tanker ship. Industry experts cite a strong commitment to the safety culture onboard tankers and by the companies that operate them. This is supported by strict vetting standards by the oil companies that charter the tankers to safely transport cargoes. In addition to industry efforts, international safety standards are tightening.

Average number of marine occurrences per year, by region (2000 to 2009)

Shipping accidents	Newfoundland region	Maritime region	Laurentian region	Central region	Western region
Tankers	0.6	1	5.3	3.1	0.1
All vessels	62.4	100.2	72.5	56.6	130.7

Data: Transportation Safety Board of Canada

Marine spill risks in steep decline

Globally, despite growth in the number of tankers and the volume of oil transported, the size and frequency of marine spills has been in steep decline, decade over decade, since 1970. That's verified in the database maintained by the International Tanker Owners Pollution Federation, which annually publishes an Oil Tanker Spill Statistics report.

The ITOPF operates as a provider of objective technical advice on accidental ship-source pollution. Its information is gathered from published sources such as the shipping press and other specialist publications, as well as from vessel owners, their insurers and from ITOPF's own experience at incidents.

Its membership includes almost 8,000 tanker owners and charterers, who among them own or operate more than 13,500 tankers, barges and other vessels representing virtually all of the world's marine bulk oil, chemical and gas carrier tonnage.

The federation has been keeping statistics on oil spills since 1970, two years after its founding. More than half the total volume of oil spilled in the marine environment from 1970 through 2017 was spilled in the 1970s. The amount spilled in this decade, by contrast, represents just one per cent of all oil spilled since 1970. By contrast, the industry last year transported twice as much oil as it did in 1970.

The ITOPF classifies any spill above 700 tonnes (about 5,000 barrels) as large. Last year, for example, the ITOPF reports a total of two large spills worldwide. In an interview, ITOPF Managing Director Karen Purnell noted that at the time of the ITOPF's inception, there was a major spill about once every 14 days.

"If we look at the volume of oil spills in the 1970s we were talking over that decade of some three million tonnes of oil spilled through tanker accidents. Today on average it's about 30,000 tonnes (per decade) — so it's a hundredfold reduction. We think that's an impressive achievement (arising) from government and industry initiatives and those kinds of initiatives often go untold.

"People think there shouldn't be any spills. We have to bear in mind that accidents, by their very nature are unpredictable. Something like three billion tonnes of oil, crude and light products have moved by sea every year. So the fact there are only 30,000 tonnes spilled in last six years means 99.999 per cent of oil arrives at its destination safely."

Purcell said the ITOPF attributes this achievement to “the combination of industry and government initiatives. Over the decades a number of things have been put in place by industry to reduce first of all the chances of an incident happening and then if it does happen to try to minimize the consequences.”

Industry-led organizations promoting tanker safety include the Oil Companies International Marine Forum (OCIMF) and the International Chamber of Shipping and its International Safety Guide for Oil Tankers and Terminals (ISGOTT).

“If you take for example the tanker owners themselves, they are proactive in using the tanker management and self assessment system. They go through checklists of the quality of the crew, the ship and its onboard safety management systems,” Purcell said.

“There is also the Oil Companies International Marine Forum. They produce a number of publications, have a number of initiatives from the charterers’ perspective. That places a requirement on OCIMF members, the oil companies, the charterers themselves, to vet the quality of the ships and to pass certain inspections and safety criteria before they will even charter it.”

From a government regulatory perspective, initiatives include requirements that all oil tankers calling at Canadian and US ports — and many others around the world — be double-hulled.

Purcell said the international convention on Oil Pollution Preparedness, Response and Co-operation, adopted in 1990, establishes measures for dealing with marine oil pollution incidents nationally and in co-operation with other countries.

“Over 97 countries have ratified that convention. It puts in place a system of preparedness for oil spills. Canada has ratified that convention, for example. It means that all terminals, oil handling facilities, have to have in place contingency plans for an oil spill and they have to conduct exercises.

“You’ve also got now a system of compensation for oil spills and tankers and again, Canada has ratified that.” Compensation is provided through International Oil Pollution Compensation Funds, she noted. “It’s a two-tier system that provides for compensation in case of an accident from an oil tanker. The first part of compensation is paid by the ship owner and insurer and the second half is paid by the charterers, the oil companies themselves.

“God forbid there is an incident but if there is, there is no longer a need for fishermen and the like to prove cause. It’s a strict liability regime and there is a system available to rapidly compensate for damages. All of those initiatives have taken place over the last 50 years. That means that not only has it contributed to better prevention of accidents but also ensures there’s a better system of preparedness and response and a better system of compensation should an accident happen.”

What’s the plan for responding to emergencies?

In the event of a spill or other emergency involving the transport of oil, Kinder Morgan Canada and its employees work with regulators to follow the process outlined in KMC’s Emergency Management Program. Kinder Morgan Canada uses the Incident Command System — the same system used in BC’s Provincial Emergency Program, in the United States, and by the United Nations — to effectively manage its response. For large incidents, government agencies, such as the National Energy Board (NEB), and provincial or municipal agencies will often share in the responsibility for command of the situation. ICS allows for the integration of equipment, facilities, personnel and communications within a common

organizational structure. This system also allows for seamless coordinated action with government agencies and Aboriginal communities.

Emergency management regulators include:

The National Energy Board — The NEB is the primary regulator for all interprovincial and international pipelines. It is responsible for monitoring how companies comply with regulations and commitments concerning the safety of employees, the public and the environment throughout the entire pipeline lifecycle. The NEB verifies the regulated company conducts an adequate and appropriate clean-up and remediation of any environmental effects caused by an incident.

Transport Canada — Transport Canada regulates marine vessel traffic, has jurisdiction over shipping safety and is actively involved in the regulation of KMC's Westridge Marine Terminal as an Oil Handling Facility under the *Canada Shipping Act, 2001*. It develops and administers policies, regulations and programs to protect the marine environment; reduce the impact on the environment of marine pollution incidents in Canadian waters; and promote the safety of the general public.

The Pipeline Hazardous Material Safety Administration — The PHMSA regulates the Puget Sound Pipeline System in Washington State. Its mission is to protect people and the environment by advancing the safe transportation of energy and other hazardous materials. It establishes national policy, sets and enforces standards, educates and conducts research to prevent incidents.

Provincial/State Authorities — Alberta, British Columbia and Washington State authorities coordinate and take actions within their respective jurisdiction to coordinate and support emergency response activities.

- Both provinces have a one-window reporting structure through Emergency Management British Columbia (EMBC) and Alberta Emergency Management Agency (AEMA) which will trigger a call-down of additional resources if required to support the emergency response actions of the responsible party.
- Washington State has a comprehensive Spills Program to protect Washington's environment, public health, safety and economy.

A new generation of marine safety

On March 24, 1989, the single-hull tanker *Exxon Valdez* grounded on Bligh Reef in Prince William Sound, in the Gulf of Alaska, after departing the port of Valdez, Alaska. This incident subsequently led to the spillage of 260,000 to 750,000 barrels (41,000 to 119,000 m³) of crude oil from the tanker. At the time, the navigation of the tanker through was being undertaken by a junior officer and the tanker did not have a pilot onboard, nor was it under the attendance of tugs — all conditions, quite unlike those that will be followed by tankers leaving the Westridge Marine Terminal.

Soon after this incident, the Government of Canada appointed the Public Review Panel on Tanker Safety and Marine Spill Response Capacity (Brander-Smith Panel) and adopted a large number of its

recommendations. In the 24 years since the *Exxon Valdez* incident, many safety improvements have been undertaken by governments and the tanker industry including:

- Double-hulled tankers with increased use of bulkheads to provide segmentation of tankers and minimize potential spill volumes.
- Tankers escort practices have been refined for added safety and tugs are often used in longer tethered escort passages with two licensed pilots on board, as in the Port of Vancouver, which help minimize the probability of powered groundings such as the one suffered by the *Exxon Valdez*.
- Improved technology provides superior bridge navigational aids and ship control systems (e.g., GPS, AIS, radar).
- Communications and monitoring of all vessels in Canadian waters, including specific monitoring of tankers, is undertaken by the coast guard vessel traffic service.
- A government-certified spill response organization must be in place to ensure a prompt response (the *Valdez* languished for almost 72 hours before spill response efforts began). The certified response organization in BC is the Western Canada Marine Response Corporation. As a result of \$150 million in upgrades to personnel, vessels and new response bases along the southern BC marine shipping route, WCMRC's spill response time will be two hours in Burrard Inlet and the Fraser River, and six hours anywhere else in the Strait of Georgia and Juan de Fuca Strait — compared to a *Canada Shipping Act* standard of six hours within the Port of Vancouver boundary and 72 hours plus travel time outside the port area.
- Governments have introduced or strengthened various laws to act as deterrent and incentivize good behaviour amongst companies and persons engaged in the shipping industry, including tankers.

Shipping companies must comply with the strict standards imposed on them by the International Safety Management (ISM) Code. This is verified through annual external audits. Systemic failure of a company safety management system (SMS) could result in the operator being shut down.

In Canada, vessels are detained and prevented from continuing their voyages if Transport Canada finds things are not in order on-board any vessel, Canadian or foreign.

Bills such as C-16 in Canada have given authorities the power to prosecute sub-standard persons/organizations (including CEOs), if found polluting Canadian waters.

All of the initiatives above have contributed to improved safety standards, and a significant measurable reduction in tanker incidents and oil spills.

The MV *Marathassa* incident

Canada's ability to deliver prompt marine response capability is very much a live issue in public opinion, particularly considering possible future incidents resulting from proposed increased energy exports. As energy exports are of vital economic importance to Canada, an effective marine response capability is indispensable. To date, marine shipping in and around Canada has had a very good environmental record based on the existing risk management regime. The challenge, however, is how we respond to possible low probability, high consequence events such as a major spill.

The MV *Marathassa* incident in Vancouver Harbour in April 2015 generated extensive public, political and media attention. Although the ship in question was not a tanker, the incident was instantly held up as

an example of the then-current state of maritime spill response. The Canadian Coast Guard moved quickly to initiate an independent review of the environmental response, and make recommendations based on inputs from all stakeholders. [The Independent Review of the M/V Marathassa Fuel Oil Spill Environmental Response Operation](#) was the resulting independent review that brought together over 23 different groups involved in the response, including the provincial government and all levels of municipal governments to examine the lessons learned.⁵¹

The review ultimately presented 25 recommendations to improve oil spill response. This was a prompt, positive step forward and highlights the importance of examining events that are not common. The review provided a solid foundation for operational improvements that were implemented immediately. The Oceans Protection Plan and the protections put into place by the Trans Mountain Expansion Project.

Although the MV *Marathassa* incident is frequently held up by pipeline critics as a “gotcha” moment proving that accidents can happen, for marine response professionals there was a very different lesson: when there is a willingness to accept criticism, look critically at the lessons learned, and engage in new partnerships across a broad spectrum, the result is a solid foundation for operational improvement.

⁵¹ <http://www.ccg-gcc.gc.ca/independent-review-Marathassa-oil-spill-ER-operation>

IV. Social and Economic Returns

The prospect of failing to proceed with the TMEP project has been decried by business groups and financial experts as a poor outcome for BC and all of Canada.

In a statement released on April 8, 2018, the Canadian Chamber of Commerce said: “Job creators and investors expect a fair, transparent and reliable regulatory process whose outcome will be respected. By not taking concrete action now, Canada would send a powerful negative signal to investors, both at home and abroad, at a time when we urgently need to encourage investment.”

- Canada does not have enough pipeline capacity to ship our oil to the world market, and is thus forced to sell it below market rates to refineries in the U.S. That hurts us all in higher gas prices, lost tax revenue, lost business opportunities and lost jobs.
- Notwithstanding the very small contribution to global GHG by Canada, many Canadians want to shift away from a carbon economy, which could be facilitated through funds generated by the Project being deployed in advancing clean technology.
- The pipeline itself causes a very small carbon footprint. It is the consumption of fuel that has the most contribution, which is projected to continue well into the future regardless of TMEP.
- Every day of delay costs Canada \$30 - \$40 million in foregone value from the sale of Canadian oil.
- The pipeline will create 37,000 permanent new jobs once complete, and inject \$5.7 billion into BC government coffers in new tax and royalty revenue over just its first 20 years. That will pay for a lot of healthcare, education, and transit. Resources pay for our social services.
- We have a responsibility to get every possible penny from non-renewable resources to support social services and our transition away from fossil fuels.

PIPELINE BENEFITS BY THE NUMBERS



80%

of the capacity of the TMEP is committed under 15- and 20-year contracts.

THIRTEEN

oil producers have committed to long-term contracts to move their products through the expanded pipeline.

COMBINED IMPACT OF

\$46.7

BILLION

impact on government revenue from construction and the first 20 years of expanded pipeline operations.

\$30/BARREL DISCOUNT

American buyers of oil sands heavy crude from Canada are getting it for a song because they are our sole customer. Scotiabank says this adds up to lost revenue of \$15.6 billion a year.



\$2 BILLION

B.C. residents who work in Alberta brought home \$2 billion in pay in 2014.



+20%

Total global energy production will increase by more than 20% from 2016 through 2040, led by increases in renewables, natural gas and crude oil production.

15,000

During construction, the equivalent of 15,000 people will be working on the pipeline expansion.



131

Number of Vancouver companies that supplied goods and services to Canada's oil sands in 2016, according to the Canadian Association of Petroleum Producers.



738
COMPANIES

in all parts of British Columbia supplied goods and services to the oil sands in 2016, with a total spend of \$1.3 billion. More than 10 per cent of those companies were in Burnaby.

9 MILLION

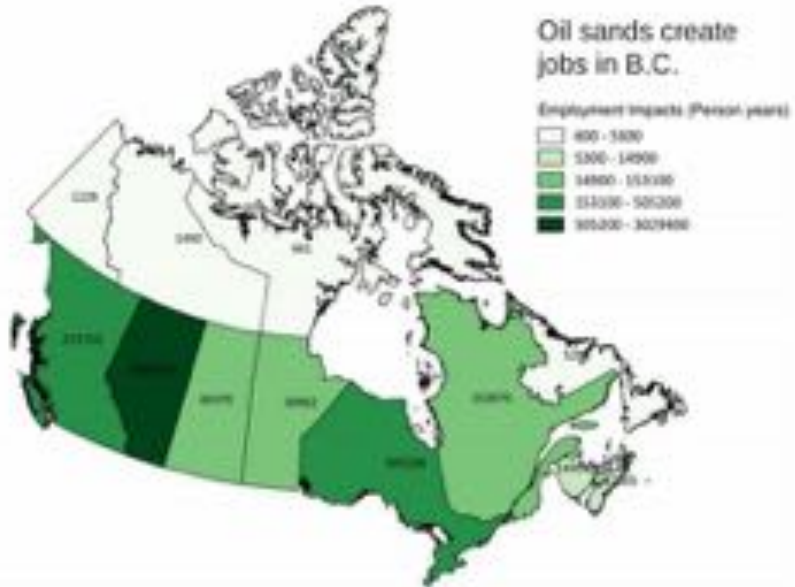


Asia's combined crude oil import needs will rise by 9 million barrels a day to around 30 million barrels a day by 2040.

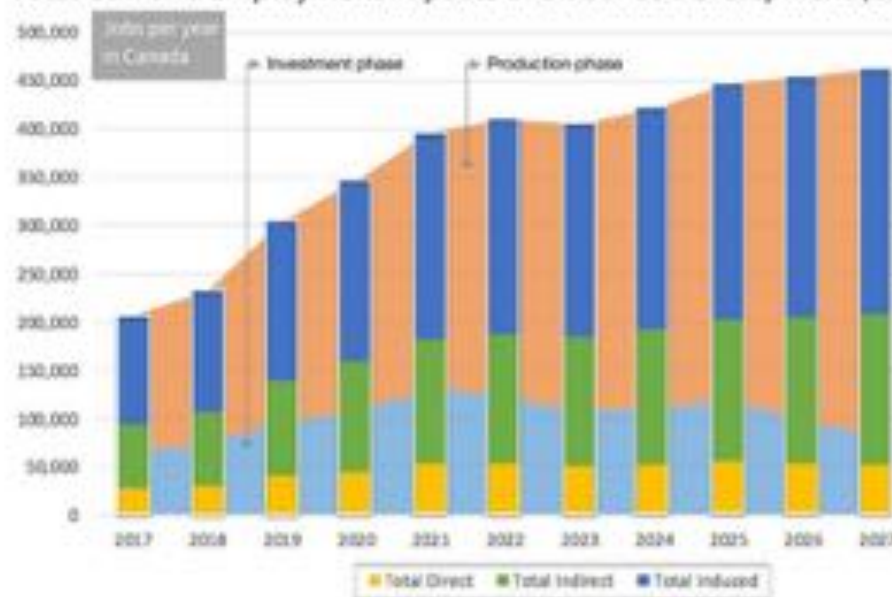
GROWTH STORY

CANADA'S OIL SANDS 2017-2027

Although pipeline proponents tend to focus on employment related to building the conduit infrastructure itself, it's the stuff inside the pipeline that really counts. The Alberta oil sands, where bitumen is sourced, will create 273,000 person years of employment in British Columbia during the period 2017 to 2027. Among Canadian provinces, that is second only to Ontario.



Total GDP and Employment Impacts of Oil Sands Development (2017-2027)



The chart at left shows how investments in oil sands capacity today create wider economic impacts tomorrow. With many major oil sands investments now complete or nearing completion, Canada will move into the phase of collecting the benefits from those investments. Over the decade to 2027, total tax revenues generated from oil sands development to the federal government will amount to \$158 billion. British Columbia's GDP will see a \$48 billion boost from the oil sands in this period.

Completing the Trans Mountain Pipeline Expansion will increase these benefits by gaining a better price for Canadian crude oil.

SOURCE: CANADIAN ENERGY RESEARCH INSTITUTE, ECONOMIC IMPACTS OF CANADIAN OIL AND GAS SUPPLY IN CANADA AND THE US (2017-2027)

Other benefits

A number of opportunities to benefit local environmental stewardship at the community level have arisen from the Trans Mountain proposal.

Province of BC's Clean Communities Program (CCP)

In January 2017, the Province of British Columbia announced a \$1 billion agreement between it and Kinder Morgan for the purpose of protecting the environment and benefiting communities. Notwithstanding the subsequent change of government, the CCP has the potential to build trust and understanding. The company will pay the province between \$25 million and \$50 million annually for 20 years. The actual amount paid will depend whether the expanded pipeline is operating at full capacity on its spot market contracts. As well, the Province will receive more revenues if the life of project extends beyond 20 years. No funding will come in for the CCP until oil starts shipping through a completed pipeline, and there is no precedent for how it might be spent.

These arrangements were made under the previous, BC Liberal government. The new government in Victoria under the BC NDP is not legislatively bound to it but has not announced it will change the program. The program was not included in the three-year NDP budget released in February 2018. Community-based projects named by the previous government included:

- restoring historic sites and purchasing land for parks;
- controlling invasive species, conserving and monitoring marine life;
- restoring and preserving habitat and cleaning up beaches and rivers.

\$1 billion for the Clean Communities Program



\$25-\$50 million a year for community efforts

Grant application similar to the current gaming grant application process.

Revenues dispersed as grants for grassroots, community-led environmental protection or enhancement initiatives.

B.C.'s polluter pay principle will remain paramount. Funds from BC Clean Communities will not be allowed to replace a polluter's requirement to pay for clean-up and compensation.

Source: Province of British Columbia news release, Jan. 11, 2017

First Nations salmon fishery

The Pacific Salmon Foundation (PSF) is partnering with the Trans Mountain Expansion Project on measures to protect wild Pacific salmon. Under a Memorandum of Understanding (MOU) signed in 2017 there will be multi-year salmon programs, including a third-party assessment by PSF of Trans Mountain's construction across sensitive salmon-bearing water courses. The agreement provides \$2.5 million in funding to support grants to community groups for salmon conservation, coastal research, and post-secondary education bursary program and up to \$500,000 for the third-party construction assessment. [More information here.](https://www.transmountain.com/news/2017/pacific-salmon-foundation-to-conduct-third-party-assessment-of-pipeline-construction-across-sensitive-salmon-bearing-watercourses)⁵²

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<https://www.transmountain.com/news/2017/pacific-salmon-foundation-to-conduct-third-party-assessment-of-pipeline-construction-across-sensitive-salmon-bearing-watercourses>

Afterword: Canada's future as a trading nation

Canada is a trading nation. Vancouver and Prince Rupert were developed as ports and they grew and prospered because of tidewater access to global markets. Mariners like to solve problems and they have been doing this for centuries to address marine risk. They do it every day in west coast waters. Mariners are also guardians and protectors of the marine environment on our sacred coasts. They take this obligation very seriously and strive to do their very best every day. It is more than a matter of pride, it is a professional obligation.

Canada is an ocean nation. Oceans sustain its economy and make up a large part of its environment, and increasingly this makes the oceans part of a sustainable “blue” economy. Canada, in the 21st century, remains a maritime country that must look outward to foreign markets and diversify its trading partners and move away from a reliance on the American market. This will require a robust shipping and port infrastructure as well as protection of the marine environment operating in tandem. There are inclusive goals for ocean and shipping governance.

Shipping is key to Canada's future. With 90 per cent of world trade carried by sea, maritime shipping is the conveyor belt of globalization. Shipping, a truly international activity, continues to evolve as seen by the constant work of the International Maritime Organization (IMO). Strong efforts are being made to lessen the environmental impact of shipping, such as underwater noise and air emissions. It is a work in progress.

The Trans Mountain Expansion Project is on the cusp of the movement to protect the marine environment in an innovative and comprehensive way. It can be an example to the world of holistic environmental navigation. In the past, Canada led the way in innovative shipping governance. What was once considered radical in shipping regulation has become standard operating procedure.

Achieving the potential will take dialogue and hard work and the courage to face outward and ask the hard questions and have a truth-to-power discussion on marine risk. That starts when Canadians come together seek a solution to evolving marine risks that are unique to Canadian west coast waters. The strength of Canada's innovative Oceans Protection Plan is that it includes input for dialogue, identification of risk, and continuous improvement in a collaborative way. The OPP is a major change in focus and policy.

Our marine regulators work hand in hand with industry to develop solutions at the international, national and local levels. That is the age-old way that mariners solve problems in a cooperative spirit. Inputting local and First Nations knowledge and concerns into the shipping regime will buttress and strengthen and improve the marine governance regime and achieve protection of the marine environment. This will ensure Canada's prosperity and protect the nation's environment for future generations. These are the mutual goals of all Canadians citizens, for together we share a stake in our future.

— Joe Spears

Further learning

Find An Expert

The following experts are confirmed as of March 18 as being actively engaged in their organizations and are available for media comment.

Key contacts

Organization	Person	Email
WCMRC	Michael Lowry	Michael@wcmrc.com
COSBC	Robert Lewis-Manning	robert@cosbc.ca
International Shipowners Alliance of Canada		Office@ISACcanada.com
Shipping Federation of Canada	Bill McKinstry	bmckinstry@shipfed.ca
Canadian Association of Petroleum Producers	Geoff Morrison	geoff.morrison@capp.ca
Canadian Energy Pipelines Association	Carla Beynon	cbeynon@cepa.com

Other resources

Organization	Contact address
Port of Vancouver (Harbour Master)	via Danielle.Jang@portvancouver.com
Pacific Pilotage Authority	info@ppa.gc.ca
Transport Canada	marinesafety-securitemaritime@tc.gc.ca
ITOPF (International Tanker Owners Pollution Federation Ltd.)	central@itopf.com

OCIMF (Oil Companies International Maritime Federation)	enquiries@ocimf.org
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Reporting a spill

EMERGENCY NUMBERS: SPILL REPORTING AND NOTIFICATIONS

SHIP-SOURCE OR MYSTERY-SOURCE SPILL, call: Canadian Coast Guard Marine Pollution Reporting Line: 1-800-889-8852

SPILL FROM WESTRIDGE TERMINAL, call: National Energy Board regulated pipelines and facilities: Transportation Safety Board (TSB) Reporting Hotline at 1-819-997-7887

LAND-BASED SPILL, call: BC Spills Reporting Line: 1-800-663-3456

CANUTEC: 1-888-226-8832

Local Emergency Services: 911

Source: Greater Vancouver Integrated Response Plan for Marine Pollution Incidents, 2017

Some Relevant Information Sources

The [Project itself](#), as well as the [WCMRC](#) response group, have actively maintained websites. As helpful as a simple Google search can be, the plethora of technical documents from myriad organizations that it presents can sometimes create more confusion than clarity. The links below are verified sources of relevant data relating to the topic of tanker safety and spill response. For those reading this guide in print, we suggest viewing the online version of this guide for access to the below links.

National Energy Board

The National Energy Board (NEB) is an independent economic regulatory agency created in 1959 by the Government of Canada to oversee "international and inter-provincial aspects of the oil, gas and electric utility industries" including regulating pipelines. (It will soon be renamed the Canadian Energy Regulator.)

The NEB files on the Trans Mountain project run to thousands of pages. The following documents proved to be of particular relevance to the authors' inquiry:

- [General Risk Analysis and Intended Methods of Reducing Risks](#)
- [Response to Tsleil-Waututh Nation, Tsawout First Nation,. Upper Nicola Indian Band](#)
- [Marine Transportation reply evidence](#)
- [Definitive catalogue of all reported oil spill events on the pipeline](#)
- [TERMPOL Review Process Report on the Trans Mountain Expansion Project](#)
- [Project info on floating diluted bitumen](#)
- [SAFECO Safety of Shipping in Coastal Waters](#)

Clear Seas Centre for Responsible Marine Shipping

An independent research centre that promotes safe and sustainable marine shipping in Canada. [Website](#).
Two relevant articles:

- <https://clearseas.org/blog/marine-shipping-industry-regulated/>
- <https://clearseas.org/blog/responsible-responding-ship-source-oil-spill-canada/>

Bureau d'Information Maritime

- <http://www.st-laurent.org/bim/en/get-to-know-the-marine-industry/marine-safety/conventions-laws-regulations/international-regulations/>
- <http://www.st-laurent.org/bim/en/get-to-know-the-marine-industry/marine-safety/conventions-laws-regulations/canadian-regulations/>
- <http://www.st-laurent.org/bim/en/get-to-know-the-marine-industry/marine-safety/application-of-regulations/>

Transport Canada

- [Oil tankers have been moving along Canada's West Coast since the 1930s - and more.](#)

Reports, Studies and Legislation

- [Canada's Marine Liability Act](#)
- [The Tanker Safety Expert Panel's Phase I report](#)
- [Tanker Safety Expert Panel Phase II report](#)
- [2010 Fall Report of the Commissioner of the Environment and Sustainable Development](#)
- [Canada's Ocean Supercluster](#)
- [Canadian Oil Tanker Policy in the International Context](#)
- [Moving Energy Safely: A Study of the Safe Transport of Hydrocarbons by Pipelines, Tankers and Railcars in Canada, Standing Senate Committee on Energy, the Environment, and Natural Resources](#)
- [The West Coast Spill Response Study](#)

Glossary

Aids to navigation — Devices or systems, external to a vessel, that help mariners determine their position and course, warn of dangers or obstructions or advise on the location of the best or preferred route.

Automated Identification System (AIS) — AIS automatically provides information, including the vessel's identity, type, position, course, speed, navigational status and other safety-related information, to equipped shore stations, other vessels and aircraft. It is required on vessels of 300 GT or more (other than fishing vessels) on an international voyage and domestic vessels of 500 GT or more (other than fishing vessels).

Canadian exclusive economic zone (EEZ) — An area of the sea beyond and adjacent to the territorial sea of Canada, extending out to 200 NM from the nearest point of the baselines. Within the EEZ, Canada has sovereign and jurisdictional rights for the purpose of exploring and exploiting, conserving and managing the natural resources of the waters, the seabed and its subsoil and rights of economic exploitation of the zone.

Classification societies — Organizations such as Lloyd's Register, the American Bureau of Shipping, Det Norske Veritas and others, with the expertise and capabilities to inspect, verify and certify that vessels are built, maintained and operated according to established and recognized rules, regulations and standards to ensure vessel safety.

Collision Regulations — Under the *CSA, 2001*, rules that vessels must follow to prevent collisions while in Canadian waters, which are based on the *Convention on the International Regulations for Preventing Collisions at Sea*.

Double-hull vessel — A vessel with a bottom and sides that have two complete layers of watertight hull surface.

Electronic Chart Display and Information System (ECDIS) — A computer-based navigation information system that complies with International Maritime Organization regulations. It displays information from electronic navigational charts or digital nautical charts and integrates position information from the Global Positioning System and other navigational sensors, such as radar and automatic identification systems. It may also display additional navigation-related information, such as sailing directions and fathometer readings.

Escort tug — A small vessel able to provide assistance to and accompany another vessel, typically a ship. The scope and range of assistance capabilities are determined by those establishing and using the service. Depending on the need, escort tugs can be tethered to the vessel to provide different levels of service.

Fisheries Act — An Act to protect the productivity of recreational, commercial and Aboriginal fisheries.

Flag state — Country of registry of a vessel, often a seagoing one. A flag state sets the safety standards and pollution prevention requirements that apply to the vessels flying its flag.

GMDSS (Global Maritime Distress and Safety System): An international system that uses improved terrestrial and satellite technology and ship-board radio systems.

Marine Communications and Traffic Services (MCTS) — The Canadian Coast Guard MCTS program provides safety radio-communication services, vessel traffic information and a commercial marine telephone call service on a 24/7 basis. MCTS falls under the responsibility of the Minister of Fisheries and Oceans under the *CSA, 2001*.

Marine Liability Act (MLA) — In force since August 2001, the MLA is the principal law dealing with ship owner and vessel operator liability towards passengers, cargo, pollution and property damage. Its intent is to set limits of liability and establish uniformity by balancing the interests of ship owners and other parties. The MLA gives many IMO international conventions the force of law.

Port State Control — The inspection of foreign vessels in national ports to verify that they meet major international conventions related to condition and equipment as well as crew and operations. In Canada, inspections determine compliance with the conventions that Canada has implemented.

Ship Inspection Report Program — Launched in 1993 by the Oil Companies International Marine Forum to address concerns about substandard shipping, it serves as a unique tanker risk assessment tool of value to charterers, vessel operators, terminal operators and government bodies concerned with vessel safety. The program operates a very large database of up-to-date information about tankers and barges.

Vessel Traffic Services (VTS) — A means of exchanging information between vessels and a shore-based centre. Canada's VTS system is operated by certified Marine Communications and Traffic Services officers who monitor vessel movements using VHF (very high frequency) radio and direction-finding equipment, tracking computers and, in areas of high traffic density, surveillance radar. The Canadian Coast Guard, Pacific Region, operates two VTS zones: Victoria and Prince Rupert, which together provide coverage for the entire Pacific coast of Canada..

Vessel Pollution and Dangerous Chemicals Regulations — Under the *CSA, 2001*, rules that implement standards to reduce air pollution and greenhouse gas emissions from vessels.

Vessel Traffic Services Zones Regulations — Under the *CSA, 2001*, rules that outline the requirements for Canadian and foreign vessels to report information before entering, while operating within and upon leaving Canadian waters.

Vetting — Extensive inspection programs oil and gas exporters follow to prevent unsafe bulk oil and gas carriers from entering into service.

VHF Radiotelephone Practices and Procedures Regulations — Under the *CSA, 2001*, rules that set out the practices and procedures that personnel on board ships must follow when using bridge-to-bridge VHF radio telephones to ensure safe navigation.

Media links

Suggested articles from a diverse range of sources:

- Oilsands Magazine: Products from the Oil Sands: Dilbit, Synbit & Synthetic Crude Explained [Read the article.](#)
- For an informative treatment of how tugs will escort oil tankers through Juan de Fuca Strait, check out [the Times Colonist newspaper's account.](#)
- The Globe & Mail followed the Eser K, carrying more than 356,000 barrels of Alberta crude oil destined for California, through the most hazardous stretch in BC waters to observe the risks and safeguards in place. May 2017. [Read the article.](#) Then follow a [pictorial illustration](#) that describes What Kinder Morgan's Trans Mountain pipeline will mean for BC's coast.
- The Globe and Mail, January 30, 2018, What we know – and don't know – about diluted bitumen. Article provides an update of the research conducted by Natural Resources Canada scientist, Dr. Heather Dettman, "The misinformation is that diluted bitumen will sink," Dr. Dettman said. "But it's not sinking." Dr. Dettman has dispelled a myth that continues to be perpetuated by environmental opponents. [Read the article.](#)
- Penspen confirms 'diluted bitumen' is no more corrosive than conventional crude. Penspen is a highly respected provider of engineering and management services to the oil and gas industry for over 60 years. After reviewing 40 peer reviewed studies on the topic, David Eyre, Principal Consultant at Penspen dispelled a myth that continues to be perpetuated by environmental opponents. [Read the article.](#)
- Bloomberg reports Investors Are Bailing on Landlocked Canadian Oil. "I'm not crazy about Canada," Paul Tepsich, founder and portfolio manager at hedge fund High Rock Capital Management Inc. in Toronto, said by phone. "We've got taxes going up and regulations going up." [Read the article.](#)
- The Financial Post reports that an investigation by United States lawmakers that links Russian-sponsored agents to manipulation of U.S. energy markets — including activism against pipelines such as TransCanada Corp.'s Keystone XL pipeline — is a wake-up call to Canadian governments that foreign interests have a big hand in campaigns to block Canadian oil and gas exports. [Read the article.](#)
- National Post reports that we've reached a crisis resulting from unrelenting opposition to pipeline construction, abetted by foreign funding and a federal government obsessed with green ideology. Joe Oliver: Yet more proof foreign radicals (yes, radicals) are sabotaging Canada's economy. [Read the article.](#)
- Globe and Mail reports CorpEthics Website. In 2008, two major U.S. foundations asked CorpEthics to recruit the groups, develop the strategy, create a coordinated campaign and act as a re-granting agency for the North American Tar Sands Campaign - a strategy to de-market Canada's natural resources. They claim to have played a role in helping to electing new governments in Alberta, BC and nationally. [Review the site.](#)

Public opinion on tanker safety

Angus Reid Institute

There's a big gap between the realities of tanker safety and the public's confidence that spills can be avoided when oil is transported along Canada's coastlines. Canadians, according to a 2016 Angus Reid poll, have an exaggerated belief in the risks associated with the movement of oil in tankers.

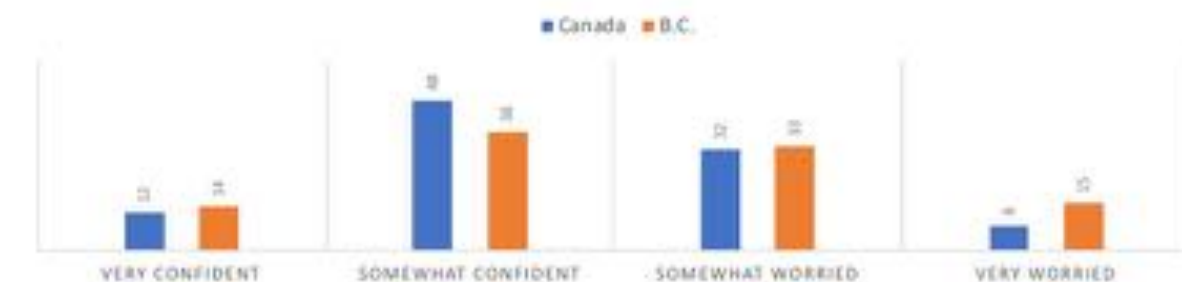
- [Poll](#)
- [Data tables](#)

How many major oil spills happened in Canadian waters over the past 10 years?

Asked to estimate how many "major" oil spills have occurred in Canadian waters in the past 10 years, most respondents thought the true number lay between 1 and 5. Only about one in seven guessed the correct answer: zero.



Would you describe yourself as confident or worried about the safety of marine shipping of petroleum products in Canadian waters?



SOURCE: ANGUS REID INSTITUTE

Globally, the frequency of major oil spills has dropped from one every two weeks to about two per year since the 1970s, according to data collected by the International Tanker Owners Pollution Federation. In Canada, the last major spill was in 1979. Spill risk evaluations for the Trans Mountain, carried out by an international consulting company with more than 100 years' experience in the marine sector, determined that the likelihood of a major spill is just once in more than 2,800 years. As well, tankers have been moving oil on the BC south coast without incident since the 1930s, including more than 60 years at Trans Mountain's Westridge Marine Terminal.

Canada is one of the world's largest maritime nations, bordered by three oceans, (Pacific, Atlantic, Arctic) and almost six-in-ten Canadians told an Angus Reid Institute poll in 2016 that they identify strongly or a

fair amount as citizens of a maritime or seafaring nation. Eighty-two per cent ranked the shipping industry as critically or very important to the Canadian economy. Ninety-four per cent think shipping in Canadian waters is very safe or generally safe. Only six per cent think it's generally unsafe and just one per cent think it's very unsafe.

Nonetheless, a narrow majority of poll respondents (55 per cent) in BC stated their opposition to increased tanker traffic along the BC south coast. Their concerns are not borne out by the facts. Even in the absence of compelling proof to the contrary, a strong majority of Canadians (67 per cent) believe the biggest safety issue for the marine industry is the risk of a oil spill from tanker spill.

"Oil spills' top ranking on Canadians' list of shipping safety concerns is accompanied by an overestimation on the part of the public regarding the frequency of such spills," the pollster reported.

"Asked to estimate how many 'major' oil spills have occurred in Canadian waters in the past 10 years, roughly equal numbers (approximately three-in-ten) guessed 'one or two', 'three to five', or 'six or more' major spills. One-in-seven (14 per cent) opted for the correct answer: no *major* oil spill has occurred in Canada in the last decade."

The report suggests that "Canadians' assessment of these specific policies, not surprisingly, has a great deal to do with their overall orientation on the safety of shipping petroleum products. The four-in-ten Canadians who are 'worried' about shipping oil solidly reject all of these proposed expansions (of pipelines to tidewater) and are especially adamant about increased tanker traffic in the Bay of Fundy or the south coast of BC. On the other hand, these proposals are supported by most of those who are 'confident' about the safety of marine shipping of oil and gas."

Abacus Data

[This report from Abacus Data](#) in March 2018 spoke to the divided nature of British Columbia public opinion on the issue, and on where the fracture lines may lie. It found stronger overall support for completing the project.

Advocates for and against the project may feel that the public is rigid, dug in, and now largely unresponsive to any argument. But the truth is, there is a lot of soft opinion, a lot of people have heard both sides of the argument and many believe that both opponents and supporters have good points to make.

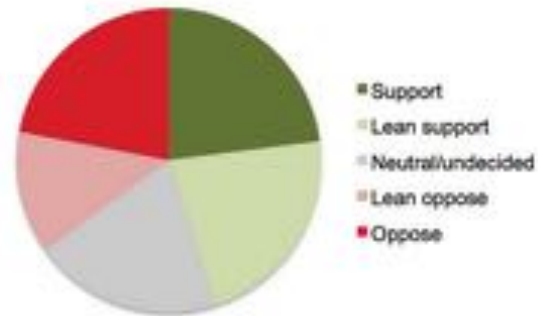
According to Abacus:

- 45 per cent have firm opinions, evenly split between support (23 per cent) oppose (22 per cent).
- 35 per cent have a leaning: more likely to lean support (22 per cent) than oppose (13 per cent).
- 20 per cent are completely neutral or undecided.

According to Abacus: "Soft opponents of this project are probably more likely to accept its approval when they hear that those making the decision have listened to and paid respect to the counter-arguments, especially those having to do with spills and climate change."

Polarization is far from entrenched

The results paint a picture where many people feel torn and exhibit mixed feelings, feeling that arguments both in favour and opposed to the project are persuasive. This is far from entrenched polarization. More adult residents of BC are leaning to support the project than are leaning to oppose it, while one in five are neutral or undecided.



In this sort of situation, people will tend to tune out rhetoric which sounds overly simplistic and one-sided. They instead will respond better to stakeholders who acknowledge that a decision like this isn't easy, and involves a willingness to compromise or to have something that you care about put at risk.

As much as some pro-pipeline advocates want to hear politicians going to battle with opponents, voters would probably prefer that their politicians reduce rather than increase the drama. When asked how persuasive 8 different arguments were (4 supportive/4 opposing), similar proportions of respondents felt all arguments were persuasive, a range which went from 46 per cent to 63 per cent:





Resource Works

www.resourceworks.com