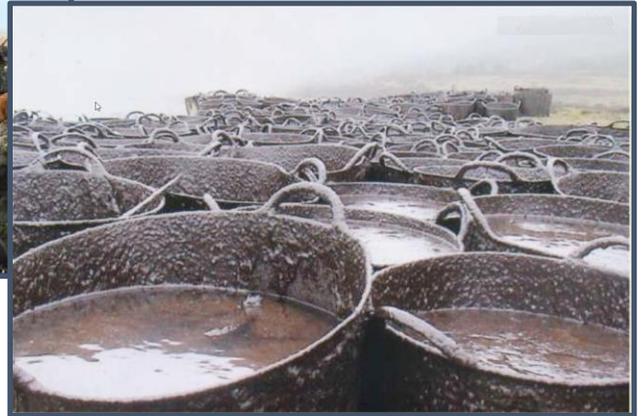


# DIRECT EVIDENCE REPORT

Prepared for: NEB Reconsideration Hearing Trans Mountain  
Pipeline Expansion Project (TMX)

Hearing Order MH-052-2018 Board File of-Fact-Oil-T260-2013-03 59

Prepared by: The Board of Friends of Ecological Reserves



December 5, 2018

Front Cover Images from Top Left:

Bulk carrier passing by Race Rocks ER,

High emulsification of dilbit increases volume by 50%. This increase creates effective oil waste management difficulties as shown with this temporary onshore storage,

Image of Dilbit tanker and escort tug passing Oak Bay Island ER,

High winds speeds on the west prevent spill response actions 40% of the year.

## EXECUTIVE SUMMARY

The Friends of Ecological Reserves<sup>1</sup> (FER) is a small non-government organization (NGO), that through volunteer efforts, supports Ecological Reserves (ERs) and BC Parks staff who manage ERs. FER was formed 34 years ago with goals to maintain and enhance ERs so that they meet their intended legislated purposes as defined under the *Ecological Reserves Act of BC*<sup>2</sup>. Those purposes are to serve as natural area benchmarks for research, education, and monitoring for the benefit of British Columbians, government agencies, scientists and First Nations while protecting high value ecosystems and species.

There are 19 marine ERs along the shipping route that the tankers and escort tugs follow. These ERs, as well as the areas between them, will be affected by the TMX project and the 600+ per cent increase in diluted bitumen (dilbit) transportation in coastal waters. It was stated in the earlier hearings that dilbit export will continue for the next 30 years, likely to the year 2048+. Long-term monitoring in ERs should be continued and supported to help inform pre-oil spill baseline conditions.

When the Trans Mountain Pipeline Expansion (TMX) is completed, there will be 40 loaded Aframax tankers and their escort tugs per month traversing the Salish Sea and the Strait of Juan de Fuca and 40 empty Aframax tanks coming to the Westridge Terminal. This means there will be 160 tankers and escort tugs per month (1920/year) related to the TMX project. There is an expectation that shipping through Vancouver as well as through the US ports in Puget Sound, will also increase. The probability of an oil spill over the life of the project is not nil.

The Board of Friends of Ecological Reserves was an intervenor in the 2014-2016 NEB Kinder Morgan/TMX Hearings. Our Evidence and links to reports, Information Requests and dialogue with the Agencies and TMX are included in Table 1-1 at the end of this opening statement. At that time, we focused entirely on the marine ecosystems and mitigation measures. We are pleased that these reconsideration hearings were mandated by the Federal Court of Appeal (FCA) as many of the earlier information requests, in our estimation were not adequately addressed.

We were not successful in influencing the NEB Board members at that initial hearing, to adopt any of the dozen Board of FER proposed mitigation measures. Now that the Federal Court of Appeal (FCA) has ruled that the marine waters are in scope for the TMX project, we hope for a different outcome from this new NEB Reconsideration Hearings Board.

### **Permit Conditions to Establish Financial Obligation and Improve Long-term Collaboration on Marine Research and Monitoring on TMX and Oil Exporters**

We seek the inclusion of TMX permit condition to establish a financial obligation on TMX to support long-term research and monitoring to improve understanding of dilbit in the marine environment. TMX and the oil exporters who use the pipeline, bring risk over the life of their project. A long-term obligation to fund environmental research, improvements in spill modeling, toxicity, monitoring and recovery/restoration options is a legitimate cost of doing business and we believe this should be a new permit condition.

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<sup>1</sup> <http://ecoreserves.bc.ca>

<sup>2</sup> [http://www.bclaws.ca/civix/document/id/complete/statreg/96103\\_01](http://www.bclaws.ca/civix/document/id/complete/statreg/96103_01)

We do not support the current model for marine research as it has largely placed a financial burden on the Federal Agencies/Universities and the Canadian public. With changes in governments and budgeting cycles, it is, over the long term, an unstable unpredictable funding model. TMX does support research now but it is discretionary. TMX selects the topic, scope, budget duration of research, vets the findings and decides whether the findings are proprietary. Our concept for long term research and monitoring is to help understand how to make incremental improvements in practices.

We seek from NEB, support for TMX permit conditions to create a formal and multi-stake holder collaboration (a forum) on long term research and monitoring of marine ecosystems along the lines of the Habitat Conservation Trust Foundation (HCTF).<sup>3</sup> A Marine Conservation Trust Foundation (MCTF) would have an oversight board with members from Federal, Provincial, State, First Nation governments, TMX, and the Non-governmental Organizations (NGO) communities. This forum would have no single agency control the research and monitoring agenda and there would be no discretion on disclosure or vetting of findings. We hope for a future where research priorities are mutually agreed on between stakeholders, and participation in marine projects are proposal driven and awarded against strategic priorities. We provided an organization chart for such a research and monitoring forum in our original Evidence Report filed on May 28, 2015 page 90.

Western Canadian Oil Producers expect an increase in netbacks of approximately \$73.5 billion over the first 20 years of the Project's operations as was stated in their evidence. A Marine Conservation Trust Foundation of \$500 million Endowment as a permit condition is an insurance policy taken out on behalf of the public for research and monitoring. A \$500 million Endowment is 6/100<sup>th</sup> of 1% of the netbacks that the Western Oil Producers identified that they stand to gain over the first 20 years of the project. This would produce a program with a similar budget scope to HCTF and similar in size to what Alaskans spent post-spill annually, 25 years after the Exxon Valdez oil spill. (March 24, 1989).<sup>4</sup>

## Permit Conditions for Mitigation Measures

We commend Federal Court of Appeal for its decision to quash the TMX permit so that the marine concerns can be more fully addressed. Canadians now own the TMX project and current practices of all Federal Agencies are in scope and under review, as well as new evidence from TMX and intervenors.

The NEB's first and second information requests of Federal Agencies and TMX, compelled greater disclosure, greater transparency on government policy to a degree not possible without this reconsideration hearing. Significant new evidence has been filed on species at risk and shipping impacts in general, and an array of mitigation options have been provided.

We reviewed the evidence and conclude that TMX can today mitigate some of its environmental impact through a change in its current shipping practices. The new evidence on noise in the marine environment by Aframax tankers and the escort tugs is now better understood and TMX can choose to include ship contract clauses that TMX vessels do not exceed 7 knots when in SRKW critical habitat. This reduced speed mitigates acoustic noise, Green House Gas (GHG) emissions and lowers

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<sup>3</sup> <https://hctf.ca/> Funded by a surcharge on hunting and fishing licenses. Allocates funding to fish and wildlife project province wide. HCTF manages of 10 million/year program.

<sup>4</sup> <http://www.evostc.state.ak.us/> Exxon Valdez Oil Spill Trust Council

the probability of marine mammal strikes and is easy to implement. The NEB could establish a slower ship speed permit condition on TMX so when the 600% increase in oil shipments begin shipping, a speed of 7 knots would be imposed on TMX contracted vessels.

The Federal Agencies, Transport Canada (TC), Canadian Coastguard (CCG), the Pacific Pilots Association and Canadian Pilots Association can work together to change current shipping practices through regulation and enforcement measures that mandate slower ship speeds. Such conditions would apply to all shipping, and would require consequences for non compliance. We support such Agencies coordination for mitigation measures that address cumulative effects of all shipping. We do not support voluntary measures as a long term approach to managing species at risk.

Although the Board of FER focuses on the integrity of ERs and species within these areas, the health of marine ecosystems is of concern since all species including humans are impacted by Green House Gas emissions – emissions such as those associated with shipping dilbit. We learned from the recent International Panel on Climate Change<sup>5</sup> that GHG continue to be a driver of climate change, so any mitigation helps to dampen the impacts of the effects of an ever-increasing fleet of ships in Canadian waters. We conclude there is more evidence needed from TMX, as there have been changes in regulations which affect GHG emissions from Aframax tankers and cleaner fuel standards are coming into effect.

### **Shipping Lane Changes (Lateral Displacement)**

The evidence that changes in shipping lanes (lateral displacement) and the trials recently completed by Transport Canada (TC), demonstrate that these are proven mitigation strategies for noise reduction. Lateral displacement away from shore has added benefits. First, if any ship has a malfunction, this would occur further from shore and allow a greater response time for rescue tugs or other vessels to provide assistance and prevent a grounding and oil spill. Second, lateral displacement away from shore would also provide a greater window of opportunity for Response Organizations (RO) to begin at sea oil recovery before the oil spill can fully spread, which would reduce length of shoreline likely to be affected.

Change in shipping lanes has been the focus on noise reduction for the Southern Resident Killer Whales (SRKW), but it can also mitigate against damage to environmentally sensitive ecosystems such as ERs. TMX tankers and all shipping currently transits within 1 to 2 km of Trial Island ER, Oak Bay Island ERs and Race Rocks ER as shown in Figure 1-1 and 1-2.

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<sup>5</sup> <https://www.ipcc.ch/> This report said we have 12 years to change our practices before exceeding the 1.5 degree limit warming is exceeded.



**Figure 0-1: Image of Dilbit Tanker and Escort Tug Passing Oak Bay Islands ER**



**Figure 0-2: Image of Bulk Carrier Passing Race Rocks ER**

There are approximately 400,000 residents in 13 Municipalities on the Saanich Peninsula and along the shores to Sooke. Figure 1-3 below shows current shipping lanes lead all ships to the Brotchie Ledge Pilot drop off area at point F. A lateral displacement towards the demarcation line between the Canadian and American boundary is precautionary and in keeping with that direction in Canada's *Oceans Act*. Such a route would move all shipping in Canadian waters away from populated areas and sensitive ecosystems.



**Figure 0-3: Lateral Displacement of Current shipping Lanes**

Lateral displacement of shipping lanes in these hearings has only been contemplated for Southern Resident Killer Whales. However where possible, it will benefit many other fragile ecosystems such as of estuaries, eel grass beds, forage fish spawning areas, marine bird breeding, foraging, migrating and overwintering habitat, marine mammal haul-out and pupping colonies, scattered throughout the region, that merit more attention and planning for protection. It is a mitigation strategy that needs to be more fully implemented and coordinated between the Federal Agencies.

### **Better Descriptions and Information on the Location of High Use Areas as Well as Critical Habitat**

We reviewed the evidence provided on species listed under the *Species at Risk Act* (SARA) (Topic 2). We also reviewed the evidence provided on marine birds (Topic 4) at the same time. We conclude there is a need for better long term baseline monitoring, research and disclosure of the occurrence and population fluctuations of this natural capital. Reviewing the agencies' evidence, we find there is a need for a more accurate description and location of high use areas as well as critical habitat. Federal Agencies lack knowledge about the toxicity of dilbit and impacts on SARA-listed as well as other species, and do not have clear recovery plans even in the absence of a dilbit or any other oil spill.

We reviewed the spill response plans of Western Canada Marine Response Corporation (WCMRC)<sup>6</sup> and failed to find any response strategies on their website to protect sensitive areas such as the habitat of species at risk in ERs and other ecologically sensitive areas. If the NEB does place permit conditions and establish a Marine Conservation Trust Foundation (MCTF), then it is more likely that

<sup>6</sup> <http://wcmrc.com/>

Agencies and First Nations and NGOs together will be able to provide more consistent environmental baselines.

### **Adopt the Economic Exclusion Zone (EEZ)**

Southern Resident Killer Whales (Topic 3) and their the survivability has been researched extensively since the last NEB report was written. Since these marine mammals are an important component of the marine ecosystems around southern British Columbia's 19 Ecological Reserves, we examined the evidence and came to the conclusion that critical habitat of SRKW whales extends beyond the 12 nautical miles imposed as the limits of these hearings. SRKW habitat goes well out to the 200 nautical mile area off southwestern Vancouver Island and dilbit tankers traverse waters listed as critical habitat.

We supported the motion to expand the area covered by these hearing to include the EEZ. We seek additional clarification of the rationale for exclusion of the EEZ from the NEB panel and the Federal Agencies, and hope to get understanding of this rationale within the time frame of this hearing. We do not see any great burden on TMX or the Federal Government from inclusion of the EEZ should it be accepted. We do see legal challenges from its omission, and delays that could have been avoided.

### **Marine Oil Spills (Topic) 5 and Marine Safety, Navigation, and Disturbance (Topic 6)**

We believe a fundamental principle for this project is that the risk-bringer "TMX" and Oil Producers who use the pipeline for export, bear long term responsibility to learn how to manage their product when spilled into the natural environment. There is much room to learn how to better model an oil spill, predict and plan recovery, describe where and how to restore or enhance alternate habitats since if damaged, some marine ecosystems may not fully recover. We have concluded that the Federal Agencies should not carry this load largely alone. The NEB can and should change the role of TMX with regard to long-term research, monitoring and restoration. It needs to shift from voluntary and discretionary as it is now, to mandatory and formally structured.

The WCMRC certificate expires on September 1, 2020 at a time when the TMX project is expected to be fully built and the 600% increase in dilbit transport becomes a reality. Western Canada Marine Resources Corporate is a subsidiary of KM, the parent company who sold the pipeline to the Canadian government. We conclude in our review of their spill plans and their equipment on hand, that they are unprepared for a major dilbit spill. We also find WCMRC does not know where important and sensitive environmental values are located and have no response strategies for them. WCMRC likely meets the 23-year old TC Response Organization (RO) standards for readiness for a spill up to 10,000 tons. However, an Aframax tanker holds over 100,000 tonnes and therefore WCMRC would only need to have capacity for recovery of 10% of a TMX Aframax tanker. This level of performance is inadequate. Canada wishes to claims it has a world class response program. The US requires a RO to have capacity to deal with 100% discharge of any tanker's contents. Dilbit is also different from other oils as it emulsifies relatively quickly so a speedy response with adequate equipment needs to be part of future RO requirements.

The over confidence of TC, CCG and WCMRC does not align with their performance as was noted in the independent evaluations completed after spills from the Marathassa and sinking of the Nathan E. Stewart.

The 23-year old TC RO standards that govern the WCMRC certificate, also means that a RO does not need to respond to a marine oil spill if wind speeds are greater than 28 km/hour or Beaufort scale Force 4 28 Km/hour winds. In our oil spill response gap assessment, this occurs at least 40% of the time. It is questionable to state that Canada has a world class system when this means no deployment of spill response 40% of the time. We find the TC and the WCMRC are communicating overly optimistic claims on how well they have the public interest covered, and they are too confident to state they have the situation in hand in the event of a spill and know what to do, when there is evidence to the contrary. The RO standards need to be revised WCMRC's spill response capacity needs to be increased in light of the TMX project.

After a review of the spill response and timing windows, we find that Vancouver Fraser Port Authority (VFPA) is zoned for a 6-hour response time while Southern Vancouver Island has an 18 to 72-hour response time. We found from the evidence filed, that the likelihood of ship collision or grounding is greater along the Gulf Islands, Saanich Peninsula and Strait of Juan de Fuca. It is unclear why the RO standards of TC for Southern Vancouver Island Zone, are significantly lower. In real terms, it means the RO does not need to have the equipment on hand for a rapid response at the same rate or speed as it does for the VFPA area. We believe these arrangements reflect long working relationships between regulatory agencies and are out of step with the need to protect environmental values. We believe that TC, CCG and the pilots associations understand the business of shipping but not the business of environmental protection and how they can really mitigate environmental impacts. We conclude that TC needs to change RO standards before the TMX project is operational. We conclude that NEB can and should make this a Permit Condition so that shipments cannot begin until the infrastructure for a Spill Response for a full Aframax tanker are in place, and until the response times on Southern Vancouver Island match those of VFPA area.

We seek support from the NEB for appointment of an independent advisor to audit and report on the current capacity of WCMRC and TC, and address the TMX project risks and make recommendations for changes in the 1993 RO standards. Such an advisor is enabled in the regulations that TC has for the management of ROs.

## **National Parks and/or National Marine Conservation Areas**

Canada's two National Parks, (Pacific Rim National Park Reserve (PRNPR) and the Gulf Islands National Park Reserve (GINPR) are located where they could experience maximum exposure in the event of a marine catastrophe involving TMX tankers carrying dilbit. This was identified as Topic 7 in the agency responses. The Board of the Friends of Ecological Reserves is concerned that the protection of critical habitat of fragile ecosystems and SARA-listed protected species is not understood, as the agencies do not appear to know where the critical habitats are and have not contemplated what to do in the event of a dilbit spill.

We question whether Parks Canada has been involved with Transport Canada, the Coast Guard and other agencies in considerations of the strategy in marine parks for protection of species at risk. We are uncertain if Parks has sought support from other agencies through regulation, such as no fishing or no harvesting within these so called 'protected areas'. There may be no differences in

management in the marine environment inside and outside of areas designated as Marine Parks. It is unclear why, if there is no difference in management, how the claim of 'protected area' meets any public expectation that this is a protected area. In addition there are proposed and new areas shown for protection. At a time when there is a desperate need for marine protection, and benefits of marine protection and harvesting restrictions are known to mitigate impacts of overfishing, we were not able to find any timing on establishment of the new protected areas.

Race Rocks ER has been considered for over two decades to be worthy of status as a marine protected area. The Province of BC knew the values at Race Rocks decades ago when it received ER status. There has been interest in adding additional protection to Race Rocks by the Federal government but after two decades of talk, nothing has been achieved. The current talk of an Oceans Protection Plan, lacks credibility as there have been few protected area established and clearly few no 'harvest policies' have been in place.

### **Human and Ecosystem Health (Topic 8)**

Human and ecosystem health must, in all cases, be a major consideration in the transport of a highly toxic substance through the waterways of Canada's Pacific Coast. Whether the work force involved in the transport of dilbit or the populations of coastal areas where impact will be felt, are aware of the dangers of a spill of such a toxic substance is a major concern for us living here. We are concerned, not only for the consequences of the immediate effects, but the implications for long-term damage to health. We examined the implications of a lack of information on the levels of toxicity, and ask for clarification from the agencies, on policies related to this problem. We are also concerned about the toxicity of dispersants, as it is unclear if used for an oil spill, they will not produce greater harm since adding two toxic substances may not be better for humans and other species.

### **Mitigation Accommodation, and Monitoring Measures Proposed by Indigenous Groups (Topic 9)**

We have not commented on this topic since we believe aboriginal people, who have been systematically marginalized for the sake of generating far-away profits, are best qualified to speak for themselves. The recognition of their traditional wisdom and rights in this process must be given careful attention. Wishing to gain from First Nations insights is part of the vision in the proposed Marine Conservation Trust Foundation, we have proposed they are so needed to help guide research and set monitoring priorities.

### **Conclusions**

Though NEB is mandated to only issue permit conditions on a TMX certificate, there is a need to communicate to Cabinet the findings with regard to the Federal Agencies role, and other practical mitigating measures that apply to all shipping and protection and recovery of environmental values. Change in shipping lanes through lateral displacement, changes in tanker speed, closure of areas to motorized vessels, closure of areas to fishing and harvesting to allow for stock recovery, increased enforcement on existing regulations are all needed. The NEB is in a unique position to provide to the Government of Canada, some observation on mitigation that can be taken for all shipping and for RO standards. We hope this happens.

The Board of FER is mostly a group of conservation biologists and citizens who seek information thresholds for species and ecosystems. Without this understanding, species and ecosystems are on the road to extinction. We note there have been many legal arguments and we present information needed to make common sense of environmental issues that may or may not be protected by current laws and regulations.

Current law and regulation are human constructs as is our economic system. There are however, real thresholds in nature which, when crossed, mean environmental productivity and biological diversity and redundancy of natural ecosystems, begin to collapse or in the case of SKRW, become extirpated. We have been watching in slow motion, the decline and collapse of natural ecosystems. Arguments of law and economics have no standing in managing ecosystem sustainability. Ecosystems, species and food webs respond to the laws of nature not the constructs of law and economics, which are human constructs.

Humans have the capability to drive the environmental systems into irreversible decline by balancing decisions for development against the imperatives of natural thresholds. This need to know, strengthens the Board of FER's case for funded research to learn about ecological thresholds from those who may be pushing systems over their limits. Humans are highly adaptive and if we do not achieve our economic aspirations and maximum return to investors, we will not become endangered, we will recover or simply get a lower return on our investment. Ecosystems on the other hand, may be resilient to a point, but when thresholds are crossed, there is no road to recovery for many species. The TMX project and the risk of a major oil spill it poses, by any reasonable measure, presents a real and persistent threat to marine species along the tanker route. There may be no road to recovery from a mass ecosystem poisoning. The TMX project is a very high risk project for marine species in British Columbia.

We believe Aboriginal people understand the need to support the natural environment as we all depend on it. Sustainability of the natural environment means that the sustaining of environmental measures are not a constraint on economic aspirations. Economic aspirations can be a constraint on environmental sustainability. We hope for a change in the status quo.

**Table 1: Evidence Filed by the Board of Friends of Ecological Reserves to NEB's Earlier Hearings 2015 and 2016**

<b>Exhibit No.</b>	<b>Evidence</b>	<b>Date filed</b>
C33-11	<a href="#">C33-11 - Board of Friends of Ecological Reserves - Final response to Motion for adequate response on Gov of Canada (A71853)</a>	08/14/2015
CS33-10	<a href="#">C33-10 - Board of the Friends of Ecological Reserves - Motion to Government of Canada for adequate responses from Board of Friends of Ecological Reserves (A71454)</a>	07/25/2015
CS33-09	<a href="#">C33-09 - Board of Friends of Ecological Reserves - IR to G of BC from Board of Friends of Ecological Reserves (A70810)</a>	06/22/2015
C33-08	<a href="#">C33-08 - Board of Friends of Ecological Reserves - IR to Government of Canada and Government of BC (A70801)</a>	05/28/2015
C33-07	<a href="#">C33-07 - Board of Friends of Ecological Reserves Notice to Provide Oral Summary Argument (A70798)</a>	06/19/2015
C33-06	<a href="#">C33-06 - Board for Friends of Ecological Reserves final evidence reports KM-TMX (A70395)</a>	05/28/2015
C33-05	<a href="#">C33-05 - Board of Friends of Ecological Reserves - Motion for adequacy IR2 (A66957)</a>	02/26/2015
CS33-04	<a href="#">C33-04 - Board of the Friends of Ecological Reserves Information Request No. 2 (A65404)</a>	01/16/2015
CS33-03	<a href="#">C33-03 - Board of Friends of Ecological Reserves - Letter of Support BC Gov motion Dec 5 from FER (A64999)</a>	12/14/2014
CS33-02	<a href="#">C33-02 - Board of Friends of Ecological Reserves - Motion to compel Trans Mountain to provide full and adequate responses to IR (A61539)</a>	07/04/2014
CS33-01	<a href="#">C33-01 - Board of Friends of Ecological Reserves - Information Request to KM on TMX by Friends of Ecological Reserves (A60256)</a>	05/11/2014
CS33-0	<a href="#">C33-0 - Board of the Friends of Ecological Reserves - Application To Participate (A57279)</a>	02/07/2014

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## List of Acronyms

Abbreviation	Full Name
CAPP	Canadian Association of Petroleum Producers
CCG	Canadian Coast Guard
CEAA 2012	<i>Canadian Environmental Assessment Act, 2012, SC 2012, c19</i>
CMAC	Canadian Marine Advisory Council
CNPA	<i>Canada National Parks Act</i>
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CPA	Canadian Pilots Association
CPCN	Certificate of Public Convenience and Necessity
CWS	Canadian Wildlife Service
Dilbit	Diluted Bitumen
DFO	Department of Fisheries and Oceans (Fisheries and Oceans Canada)
ECCC	Environment and Climate Change Canada
EEZ	Economic Exclusion Zone
ER	Ecological Reserve
ERAPS	Emergency Response Assistance Plans
FCA	Federal Court of Appeal
FER	Friends of Ecological Reserves
GHG	Green House Gas
GINPR	Gulf Islands National Park Reserve
HC	Health Canada
HCTF	Habitat Conservation Trust Foundation
IR	Information Request
MCTF	Marine Conservation Trust Foundation
MDS	Material Safety Data Sheet
MPA	Marine Protected Area
NEB	National Energy Board
NGO	Non-governmental Organization
NRCan	Natural Resources Canada
PCA	Parks Canada Agency
PPA	Pacific Pilots Association

Acronyms

Abbreviation	Full Name
PRNPR	Pacific Rim National Park Reserve
SARA	<i>Species at Risk Act, SC 2002, c.29</i>
SMPEP	Shipboard Marine Pollution Emergency Plan
SOPEP	Shipboard Oil Pollution Emergency Plan
SRKW	Southern Resident Killer Whale
TC	Transport Canada
TERMPOL	Technical Review Process of Marine Terminal Systems and Transshipment Sites
TDGA	<i>Transportation of Dangerous Goods Act, 1992</i>
TMX	Trans Mountain Pipeline Expansion Project
VFPA	Vancouver Fraser Port Authority
WCMRC	Western Canada Marine Response Organization – A subsidiary of KM responsible for oil spill preparedness and clean up ( <a href="http://wcmrc.com/">http://wcmrc.com/</a> )
WHIMS	Workplace Hazardous Materials Information System

## 1.0 INTRODUCTION

This report follows the major topic headings used by the Federal Agencies and TMX to respond to Information Requests from the NEB. We combined Topic 2 and 4 (SARA-listed species and Marine Birds) and Topic 5 and 6 (Marine Oil Spills with Marine Safety, Navigation, and Disturbance) in an effort to reduce redundancy. Topic 1: Green House Gas Emissions (GHG), Topic 3: Southern Resident Killer Whales (SRKW), Topic 7: National Parks and/or National Marine Conservation Areas and Topic 8: Mitigation and Monitoring Measures for Human Health each get their own sections.

Our Opening Statement was filed separately and repeated here as an Executive Summary within this Direct Evidence Report to make it a more standalone document. FER was an intervenor in the earlier hearings 2014 to 2016 and FER Board members chose to re-engage the same contractors as before<sup>7</sup> for the sake of familiarity with the TMX evidence.

What has changed since the earlier hearings is that Canadians now own the TMX project and the Federal Government has stated clearly that the TMX project will be built (see the McKenna-Heyman letter in Appendix 2). This new ownership, we believe, may have served to temper the Federal Agencies willingness to criticize current policy or budgets, as criticism now would be against their employer.

We could not have put together either the Opening Statement or this Direct Evidence Report were it not for the motion, put forward by the Squamish Nation, to extend the deadline by a few weeks. We thank them for that and we supported their motion and appreciate its acceptance by the NEB.

In order to read the several thousand pages of evidence, we had to download and rename most of these PDF files. The NEB filing system, which is not intervenor-friendly, does not allow opening these files on their NEB site. There was a great deal more to read and comprehend than simply the words on pages, as there were many links as well as many references to research and policies that were not filed. We also had to return to some of TMXs earlier filings and our own first NEB report.

FER was accepted by Transport Canada (TC) to participate in their Oceans Protection Plan South Coast Dialogue Forum held October 22, 2018. We came away with a better understanding of the current management regime and some of the questions they sought input on and use of structured working groups. We also met with the Canadian Coast Guard (CCG) at the Institute of Ocean Sciences<sup>8</sup> to learn about the management of shipping, what is now in place and their thoughts on lateral movements of shipping lanes. We also corresponded with Western Canada Marine Resources Corporation (WCMRC). We thank Enviromerg Consulting<sup>9</sup> for their pro bono advice.

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<sup>7</sup> <http://www.mikefengerandassociates.com/>, Mike Fenger. <http://www3.telus.net/lbeinhau/contact.htm>  
Louise Beinhauer, and Garry Fletcher independent contractor.

<sup>8</sup> [http://science.gc.ca/eic/site/063.nsf/eng/h\\_85EB3DA0.html](http://science.gc.ca/eic/site/063.nsf/eng/h_85EB3DA0.html)

<sup>9</sup> <https://enviroemerg1.jimdo.com/>

## Introduction

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For the ease of the reader, we have taken the NEB Information Requests (IRs) to the Federal Agencies and TMX and repeated them. We then reviewed the responses by the Federal Agencies and pulled statements from this evidence, adding emphasis through underlining where we thought it necessary. In the process of doing that, we formed our own IRs. These IRs are in boxes and numbered.

We did our best to estimate who is the appropriate Agency or if it is the proponent TMX, that are the best sources to follow up on our IRs. We trust the Department of Justice may help in this. If we are seeking information from wrong group we apologize. We do hope for responses and rationales so we can clearly understand the state of the environmental safeguards or perhaps gaps in such safeguards. The clarity of responses to our IRs will allow us to understand how confident those living along the tanker route should be about the next 30 years. We know also, the NEB will be able to boost our confidence if there are meaningful permit conditions applied to this TMX project.

We have made this report as complete as we could in the time given. We take responsibility for any errors and omissions.

## 2.0 TOPIC 1: GREENHOUSE GAS (GHG) EMISSIONS

### 2.1 Review of Evidence Submitted by TMX and Federal Agencies

Though FER is focused on ERs and species within these areas, the wider health of marine ecosystems is of concern as all species including humans are impacted by GHG emissions such as those associated with shipping. We concluded there is more evidence needed from TMX as there have been changes in regulations on the sulphur content of diesel fuels which affects GHG emissions from Aframax tankers.

We also found that TC needs to provide more evidence in light of these regulatory changes and whether the adoption of international standards of lower sulphur diesel will cause a delay in the use of lower sulphur diesel by the Aframax tankers. The implementation of new standards is based on a review of availability to be completed in 2018.

It is encouraging that TC indicated that there is a practical mitigation strategy available to lower GHG emissions which is to lower tanker speeds. This mitigation measure can come into effect immediately and apply to vessels currently in use. There is evidence that travelling at 7 knots is superior to higher speeds. This mitigation strategy could also be applied to Aframax tankers coming to Westridge Terminal today, as well as when the project is completed. Shipping speed as a mitigation strategy to reduce GHG, noise and whale strikes has implications for bulk carriers and container ships too. If applied to all vessels, the cumulative impacts of GHG emissions could be lowered. It is hoped that NEB takes the recommendations made by the Federal Court of Appeal (FCA) as mentioned in Trans Mountains's Opening Statement filed October 31, 2018 on [page 3 Lines 113 and 117](#) which state;

*Based on the FCA's guidance, the NEB should review and make conclusions regarding the appropriateness of regional and multi-stakeholder initiatives to address impacts from Project related marine shipping, even though these initiatives are beyond the Board's ability to impose and enforce. If the Board concludes that certain measures should be taken by federal authorities, it should make that recommendation in its Reconsideration Report for the Cabinet to consider.*

There is a bigger question on cumulative effects which TMX identified very well and that is that the NEB is in a position to recommend a closer look at the shipping industry and shipping issues as they relate to all shipping. GHG emissions are not isolated to what the TMX project will bring. The TMX project is part of the bigger cumulative effects picture of all shipping and what this contributes to overall level of Green House Gasses. TMX, on their own, may be a piece of cumulative effects but this review has had to look at all shipping.

One mitigation measure suggested by ECCC is to slow the speed of vessels as there are less GHG Emissions at slower speeds (bottom of page 93 of the Direct Evidence and Information Requested by the NEB Report filed by the Federal Agencies).

In light of the above, it seems that Cabinet should be made aware of this mitigation strategy and that it should apply to all shipping.

### 2.1.1 TMX evidence on GHG emissions, no mitigation measures proposed

TMX provided no new evidence but relied on information submitted to the last hearings. They concluded previously that: (stated on page A8-252 of the 2014 Final Report)

*No mitigation measures were considered warranted other than emission limits mandated on marine vessels as part of the North American Emissions Control Area.<sup>10</sup>*

TMX did not acknowledge a change in Sulphur in Diesel Fuel Regulations last amended on 2017-06-02. These regulations affect shipping and use of low sulphur diesel for Aframax tankers. The Sulphur in Diesel Fuel Regulations came into effect in 2017 and appear to be in scope and relevant as evidence to these hearings and the GHG topic. TMX should have made the NEB aware of their knowledge of a changing regulatory environment.

The new regulations are available on the Government of Canada website and were last amended 2017-06-02. [HTML Full Document: Sulphur in Diesel Fuel Regulations](#) | [XML Full Document: Sulphur in Diesel Fuel Regulations](#).

TMX stated, in their tanker acceptance process, that there are measures in place for mitigating air pollution from tankers.

*Trans Mountain expects that through its tanker acceptance process the calling vessels are maintained and operated to high industry standards.*

The NEB in the report [A77045-1 NEB](#) - Report - Trans Mountain - Expansion Project - OH-001-2014 (1) on page 463 in Permit condition 91 state that:

*Trans Mountain must file with the NEB, **at least 2 months prior to commencing construction**, a plan describing how it will implement, monitor, and ensure compliance with its marine shipping-related commitments identified in 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.*

We understand construction has commenced and so this plan must have been filed, the consultation meetings must have been completed by TMX with input from the regulatory agencies and the Response Organizations (RO) and there must be a list of issues and concerns that have been identified by Transport Canada (TC), the Canadian Coast Guard (CCG), the Pacific Pilotage Authority (PPA), Port Metro Vancouver, British Columbia Coast Pilots, Western Canada Marine Response Corporation (WCMRC), Fisheries and Oceans Canada (DFO) and the Province of British Columbia. Since this is new information, we seek disclosure of this TMX plan and the concerns raised by the agencies so that it too can inform the hearings once tabled as evidence.

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<sup>10</sup> From <http://www.imo.org/en/mediacentre/pressbriefings/pages/28-eca.aspx>

Emissions Control Area (ECAs) Emissions limits: Within ECAs, the Sulphur content of fuel oil (expressed in terms of % m/m – that is, by weight) must be no more than 1.00% m/m; falling to 0.10% m/m on and after 1 January 2015. This compares to 3.50% m/m outside an ECA, falling to 0.50% m/m on and after 1 January 2020. This date could be deferred to 1 January 2025, depending on the outcome of a review, to be completed by 2018, as to the availability of compliant fuel oil.

In light of the changes in regulations in the American Emissions Control area, the new Canadian diesel regulations and the mention of the TMX tanker acceptance process, it is reasonable to have this additional evidence included in these hearings. We request that TMX provide the following:

1. The plan filed with NEB as required in Permit condition 91.
2. Documentation of its TMX tanker acceptance process including the criteria used by TMX to accept/reject an Aframax tanker from loading at their terminal.
3. How TMX determines whether an Aframax tanker GHG emissions are in compliance with the sulphur limits in the Diesel Regulations. <https://laws-lois.justice.gc.ca/eng/regulations/SOR-2002-254/index.html>?
4. Information on whether TMX ever denied a contract to a tanker based on their tanker screening process and GHG emission concerns?

### **2.1.2 Assessment of the Federal Evidence on GHG emissions and proposed mitigation measures**

Table 2-1 repeats the NEB Evidence request to the Federal Agencies for the convenience of the reader. It is also a baseline against which to assess the adequacy of the response provided by the Federal Agencies. We also wish to thank the various staff in the Federal Agencies for sharing their knowledge and insights.

**Table 2-1: NEB Request to Federal Agencies**

**NEB Evidence request.** With regard to potential mitigation measures for GHG emissions from Project-related marine shipping, provide:

- a) an update of any changes to the relevant regulatory requirements since the date of the Board's Report;
- b) any information or knowledge concerning other plausible mitigation measures (including monitoring measures) to avoid, reduce, and/or offset the GHG emissions of Project related marine shipping; and
- c) any information or knowledge concerning the safety, and technical and economic feasibility, of each such mitigation measure.

We fully support TC observations that there are opportunities to mitigate GHGs as stated in the Federal Agencies Direct evidence summary ([A95292-2 2018-10-31](#) Direct Evidence DFO-EC-HC-NRC-PC-TC A6J6L9) Report, Page 93 which states:

*Of the list of candidate measures, speed reduction is unique in that it is an operational measure that has the potential to reduce emissions in the short-term from both new and existing vessels, with minimal modifications required to the existing fleet. The cubic relationship between vessel speed and power generally means that a reduction of speed will result in a proportionally greater reduction in fuel consumption for a particular voyage.*

We also note that because exiting Aframax tankers have a small tethered tug they are to proceed at a speed of 10 knots as long as the tethered tug is attached. We understand there are tethered tugs

Topic 1: Greenhouse Gas Emissions

in Segments 1,2 4, 5 and 6 but not in segments 3 and 7 and that tankers use higher speeds in sections when not tethered (see Figure 2-1 – Map of Tanker Route Segments). A mitigating strategy is to have the exiting tankers proceed at lower speeds in all 7 segments of the shipping lanes. Another mitigating strategy is to have both exiting and entering tankers reduce speeds to the ideal GHG emissions speed which appears to be 7 knots

There is also a reduction in acoustic noise achieved at lower speeds. This will be discussed under the TOPIC 3 SRKW

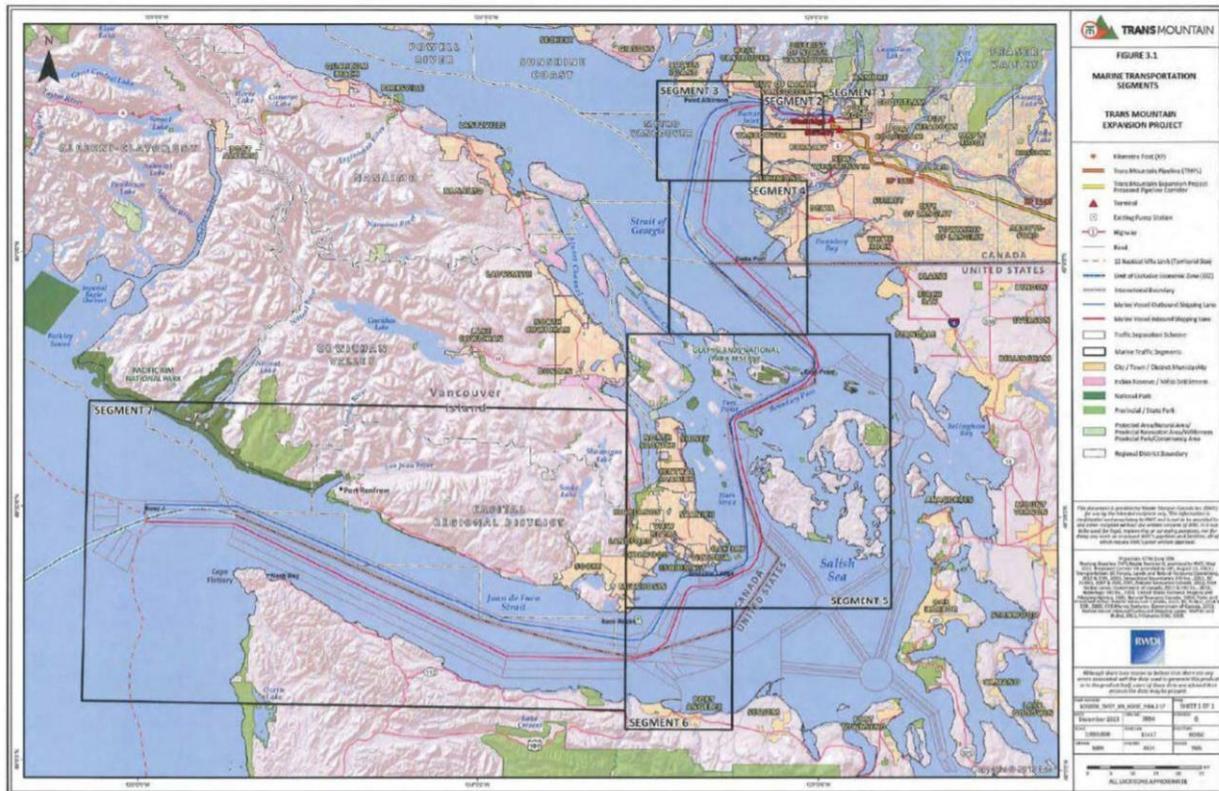


Figure 2-1: Map of Tanker Route Segments Referenced as Figure 1 in Federal Agency

Slower speeds both reduces GHGs and acoustic disturbance and whale strikes and should be considered for all shipping. NEB could make this observation known to cabinet, we hope they do.

We are encouraged to learn there is baseline data on which kinds of ships contribute what percentage of GHGs, found in Agencies Direct Evidence Summary Report, Page 94 which states:

*Clean Transportation (ICCT) published its latest global shipping GHG inventory report in 2017 and concluded that three ship classes accounted for 55% of total shipping CO2 emissions: container ships (23%), bulk carriers (19%) and oil tankers (13%) (Olmer et al., 2017). The report also found that the biggest ships are speeding up and polluting more (i.e., the largest container and oil tankers sped up between 2013 and 2015 and became less efficient, emitting more CO2/dwt-nm in 2015 than they did in 2013).*

The Direct Evidence report [A95292-2 2018-10-31](#) DFO-EC-HC-NRC-PC-TC A6J6L9, in section 6.C.1, addresses GHG emissions on pages 107 to 108. ECCC and TC did not to mention the new regulations

on limits to the sulphur content of diesel fuel used by tankers within the North American Emissions Control area nor the results of 2018 review of availability of low sulphur diesel. The review could delay the need for all ships to use lower sulphur fuels until 2025 and will be based on the availability of compliant fuel oil.

We think that recent regulatory changes not mentioned are an omission of evidence by TMX above and by TC and ECCC. We hope that the NEB will support our quest to have this information added to the evidence in these hearings.

**2.1.2.1 IR #1 – to TC and ECCC**

We request similar information from TC and ECCC as we did from TMX that they: Provide an outline of the tanker acceptance process, and the criteria used by Federal Agencies to accept an Aframax tanker. We presume the TC process for screening ships unable to meet GHG emissions standards apply to bulk carriers and container ships too.

**2.1.2.2 IR #2 – to TC**

How does TC determine whether an Aframax tanker's GHG emissions are in compliance with the Sulphur in Diesel Regulations? <https://laws-lois.justice.gc.ca/eng/regulations/SOR-2002-254/index.html>?

**2.1.2.3 IR #3 – to Federal Agencies**

Have the Federal Agencies denied tanker entry to Canadian waters based on GHG emission concerns? How often?

## 2.2 Conclusions and Recommendations

The Board of FER believes there are mitigated measures for this project that will reduce the impacts of GHGs which should be considered as permit conditions. These measures include speed reduction. We recommend TMX and the Federal Agencies disclosure their tanker acceptance standards with regard to GHG emissions and provide information on how tankers for hire are screened and accepted, and the criteria for rejection. A permit condition that requires reporting TMX screening process is within the purview of the NEB.

## 3.0 TOPIC 2: PROTECTION OF ENVIRONMENTALLY SENSITIVE AREAS AND SARA-LISTED SPECIES ON SOUTHERN VANCOUVER ISLAND

### 3.1 NEB Requests to Federal Agencies

Figure 3.1 below shows the information that the NEB requested of DFO and ECCC on SARA-listed species.

With regard to any SARA-listed species that are likely affected by Project-related marine shipping, or that have critical habitat that is likely to be affected by such shipping (including Southern resident killer whale [SRKW]), provide:

- a) a list of any species that have been newly listed, or any species that have seen a change to their designation, since the date of the Board's Report;
- b) a copy of the latest recovery documents (Recovery Strategies, Action Plans, and Management Plans) for all likely affected species (if these recovery documents have already been filed on the Board's record for the Project, provide links to them);
- c) any updates on the current status and planning for the survival and recovery actions noted in each recovery document;
- d) any updates on any monitoring that is underway or planned to determine the success of survival and recovery actions noted in each recovery document;
- e) for any species that does not have recovery documents, any information or knowledge concerning plausible mitigation measures (including monitoring measures) to avoid or lessen the effects of Project-related marine shipping; and
- f) any further information or knowledge concerning the safety, technical, and economic feasibility of each such survival, recovery, mitigation, and monitoring action or measure."

**Figure 3-1: Information NEB Requested from DFO and ECCC on SARA-listed Species**

We are encouraged by the recognition of the need to monitor species to determine whether they are declining and changing status and trend. We also think that baseline monitoring is crucial to establish pre-spill conditions.

We put an emphasis on the need for baseline monitoring in our May 2015 Final Evidence Report. Page 101-102. [May 2015 Final Evidence Report A70395](#). It appears below, as it is relevant to the monitoring of species baselines.

### 3.2 Lessons on Pre-Spill Monitoring From the Exxon Valdez Oil Spill

Robert B. Spies, the key note speaker in the 1993 Symposium held four years after the Exxon Valdez oil spill, titled his talk Why Can't Science Tell Us More about the Effects of the Exxon Valdez Oil Spill? (<http://www.arlis.org/docs/vol1/A/31970650.pdf>). He goes on to answer his own question.

Here are some excerpts on what was learned in the four years after the spill and regrets over lack of basic and relatively in expensive information. (underlining emphasis added by FER).

*“there was virtually no information on the status of the intertidal and subtidal communities in Prince William Sound”*

*“Because of the great variability in populations from place to place and at different times, scientists aim to have enough pre-impact data in a variety of areas and in enough years to be able to understand how populations change naturally. This allows a comparison of pre-impact population data to post impact population data in both affected and non-affected areas”.*

\This is a significant statement that places importance of sustained ecosystem and species baselines distributed along the tanker route and maintained over many years and this type of data is hugely beneficial in a post spill environment. He goes on to state: (underling emphasis added by FER).

*The consequences of being un-prepared seem to be greater costs and greater uncertainty about the injured resources, their recovery and need for restoration. What should we be doing now in order to be better prepared to assess damages resulting from the next oil spill? The answer seems clear in retrospect – on-going monitoring programs collecting data on intertidal and subtidal zones, annual counts of sea otters, eagles, murrees and gathering more information on toxicology of common species. A basic and relatively inexpensive monitoring program carried out over many years might tell enough ...to get better injury information at lower cost. In the process we would also learn more about the natural resources we are trying to protect.*

These statements of regret from senior government staff reviewing the Exxon spill, strengthens the rationale the Board of FER is putting to the NEB to begin a relatively inexpensive environmental monitoring program as a KM-TMX permit condition. Such a monitoring program can deliver three things:

1. we learn more about the environment we are trying to protect;
2. we will lay the foundation for damage assessment; and
3. we will develop creditable baseline data over the life of the project and against which to measure recovery.

Spies 1993 aptly notes there was very poor understanding of the many species and the natural fluctuation of populations in species in ecosystems and between years due to an absence of the baseline monitoring in Prince William Sound. After 25 years it is believed that some species like sea otter populations have recovered to pre-spill levels while species such as herring, crabs and salmon apparently have not. Had there been reasonable pre-spill monitoring in place, we would now know with much greater certainty just which species and what ecosystem elements of Prince William Sound have recovered and which remain at reduced levels and productivity. This is important in light of planning marine ecosystem restoration and recovery initiatives. Marine ecosystems and species vary naturally and a long-term monitoring program would establish elements of the range of natural variability against which to measure impacts and recovery. We believe that impacts to commonly shared resources need to be made known to those who not only enjoy the natural environment but to those who depend on it for their livelihood.

### 3.3 Ecosystems as Well as SARA Species are a Concern

Focusing the concern on only SARA-protected species as the only species that seem to matter in this reconsideration hearing, is ignoring the importance of other species in the food chains of the Salish Sea. There were a number of annexes issued by the Department of Justice, presumably for Environment Canada and DFO consisting of recovery plans for some birds, plants and cetaceans that have been SARA-listed. There are however, other species which are threatened by increased tanker traffic and a dilbit spill.

In our May 2015 Final Evidence report, we went to great lengths to list those species and other Provincially and COSEWIC-listed species which occurred in the 19 Ecological Reserves which will be affected by a catastrophic accident involving tankers carrying dilbit. A complete description of the 19 Ecological Reserves and the SARA-listed species can be found in Chapter 3 in our FINAL EVIDENCE submission in 2015 ([FINAL EVIDENCE submission in 2014 A70395](#)). A summary of what is in Chapter 3 is repeated below and we suggest why it may be best to take an ecosystems approach. We also continue to stress that as the major risk bringer, TMX has a responsibility to contribute towards studies for environmental baseline monitoring before a spill occurs. We think it is unreasonable for the highest risk bringer to off-load baseline monitoring to the Canadian public, i.e., the Federal Agencies.

*Chapter Three lists the 19 marine ERs potentially impacted by the KM-TMX project. For each reserve there is a summary description of the values, a list of the threatened and endangered species, estimated shoreline lengths, and summary of current monitoring and research gaps. The Board of FER is concerned about the inadequacy of baseline monitoring in ERs as well as research and monitoring gaps in the broader marine ecosystem.*

*We understand that KM-TMX casts this project as a minor increase in tanker traffic from six to 14 per cent but we see this project as a very major increase (>360 per cent) in oil tanker traffic. In this respect, KM-TMX is the major player bringing the highest risk to British Columbians and coastal ecosystems and with that there must be concomitant responsibilities.*

*Also in Chapter Three, we review monitoring for species (some listed) such as: killer whale, elephant seal, California sea lion, northern (Stellers) sea lion, river and sea otter, marine birds, over-wintering birds, salmon, rockfish, forage fish and invertebrates associated with ERs. These sections highlight several intervenors' calls for better assessment of the potential damage to fish resources and others too identify huge gaps in what has been presented by KM-TMX. The proximity of a number of rockfish conservation areas along the tanker route has not been given the concern that it deserves. The diverse habitats of forage fish, invertebrates, sea grasses and marine algae appear to have been entirely discounted in assessments done by KM-TMX. Essential marine food webs have been ignored from the assessment. Lack of knowledge of the abundance and importance of the highly diverse community of invertebrates is a gap. A failure to consider any indicator species shows a lack of scientific rigour in the KM-TMX assessment reporting. On some of the island reserves, the rare terrestrial plant associations were not mentioned in KM-TMX impact reporting, even though air-borne dispersal of pollution from sea spray in the event of an oil spill would very likely lead to local extirpations. Even the Committee on the Status of Endangered Wildlife in Canada (COSEWIC)-listed "species at risk" in several ERs have not been addressed, so we include what species were absent from KM-TMX reports along with our concerns and we have provided references and excerpts from more recent studies to KM-TMX.*

### 3.4 Management Plan and Critical Habitat for Abalone Found in Two of Our Ecological Reserves

Abalone are known to be present in the following Ecological Reserves: Ten Mile Point Ecological Reserve and Race Rocks Ecological Reserve. Neither of these locations are even mentioned as sensitive ecological areas and do not appear on maps or in plans for dealing with the consequences of an oil spill, in the information provided by WCMRC.

We are uncertain of the presence of abalone in other ERs along the tanker route such as Oak Bay Islands ER and Satellite Channel ER, which is a major seabottom ER at the north end of the Saanich Peninsula. Baseline presence and abundance surveys are needed as well as periodic follow up surveys. Recognition of the status of the northern abalone and their Critical Habitat occurs in the SARA Registry and is restated below:

*“Northern abalone: SARA Schedule 1 Status May 2016: Endangered SARA Schedule 1 Status October 2018: Endangered b) Recovery Strategy (RS): (Annex 7.G.1, Page 350 of 1131) [http://www.sararegistry.gc.ca/virtual\\_sara/files/plans/rs\\_Northern\\_Abalone\\_0907\\_e.pdf](http://www.sararegistry.gc.ca/virtual_sara/files/plans/rs_Northern_Abalone_0907_e.pdf) Action Plan (AP): (Annex 7.G.1, Page 1013 of 1131) [www.sararegistry.gc.ca/virtual\\_sara/files/plans/ap\\_haliotide\\_pie\\_n\\_abalone\\_0412\\_e.pdf](http://www.sararegistry.gc.ca/virtual_sara/files/plans/ap_haliotide_pie_n_abalone_0412_e.pdf) Management Plan (MP): NA Progress Report (PR): (Annex 7.G.2, Page 218 of 896) [www.sararegistry.gc.ca/virtual\\_sara/files/Pr-NorthernAbalone-v01-2015Jul13-Eng.pdf](http://www.sararegistry.gc.ca/virtual_sara/files/Pr-NorthernAbalone-v01-2015Jul13-Eng.pdf) Critical Habitat: (Annex 7.G.1, Page 350 of 1131, Section 2.6)*

*• Action Plan: Table 4, recovery action 2.4. Status: ongoing. • For DFO spill response planning, the ongoing planning effort under the Regional Response Planning pilot project, as a Federal-First Nation-BC collaborative process, will include federally listed species at risk in Pacific Region. Aquatic species listed under the Species at Risk Act will receive elevated priority when considering response and protection measures during a spill scenario*

*[www.sararegistry.gc.ca/virtual\\_sara/files/plans/rs\\_Northern\\_Abalone\\_0907\\_e.pdf](http://www.sararegistry.gc.ca/virtual_sara/files/plans/rs_Northern_Abalone_0907_e.pdf)*

We have reviewed the WCMRC spill plans and strategies and WCMRC does not seem to know where environmental values are situated and have made no mention of dealing with protection of these environmental values. We discuss more fully the current spill plans and strategies shown by WCMRC below:

***Abalone:*** *The SARA defines critical habitat as “the habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species’ critical habitat in the recovery strategy or in an action plan for the species”. While the general habitat requirements for northern abalone can be described (Section 1.4.1), the identification of critical habitat as defined under SARA requires further research.*

*Critical habitat to northern abalone may exist in certain habitats where juvenile survival is better, or where the reproducing adults contribute to a larger portion of the total recruitment. Identification of these key habitats is an important component to the abalone research and rebuilding plans.”*

We conclude from this that there is much to learn about how to improve management of Northern Abalone. We are aware of work by Scott Wallace who did research in 1997 and 1998 at Race Rocks with Lester Pearson College divers, and at William Head and one other location. He studied the

population dynamics of the Northern Abalone, *Haliotis kamtschatkana*. His research was done as part of a PhD thesis in Resource Management from the University of British Columbia in Vancouver. We refer to his research and repeat some of his findings below.

*“ABSTRACT :Marine reserves have been suggested as tools for assisting the management of fisheries by protecting vulnerable marine species from over-exploitation. Although there is a theoretical basis for believing that marine reserves may serve as management tools, there are few marine reserves in the world in which to test their effectiveness. My research evaluated three forms of marine reserve on the south coast of Vancouver Island, British Columbia, Canada. I used northern abalone (Haliotis kamtschatkana), a severely depleted shellfish in this region, as an indicator of the effectiveness of the reserves. Abalone populations in eight sites receiving different degrees of spatial protection were counted and measured in situ during the spring of 1996 and 1997. In all sites with enforced harvest closures, populations of abalone were greater, and one site with nearly 40 years of protection had on average much larger (older) abalone. Reproductive output, as a function of abundance and size, was also greater in the enforced reserve areas. Larval dispersal from reserves, and hence the benefit to exploited areas, was not formally surveyed. Nevertheless, the results of my study, combined with knowledge of present abalone populations, life history, and regional hydrodynamics, suggest that establishment of reserves is justified in the absence of perfect knowledge of larval dispersal.”<sup>11</sup>*

FER notes that there are significant areas proposed as Marine Protected Areas by DFO (see TOPIC 7) as well as other initiatives by Parks Canada for Gulf Islands National Park. There has also been Federal interest in expanding Race Rocks ER. This process has been ongoing for over 2 decades. Based on FER's involvement, and the glacial pace of establishing and enforcing any meaningful restrictions that are needed, we are not confident that the Federal Government is up to the task of creating a network of Marine Protected Areas which would provide refuge for species at risk let alone other species.

### 3.5 SARA-Listed Species in Two Ecological Reserves

The Board of FER is concerned that species at risk that have been documented in ERs were omitted from the Direct Evidence review and are not identified by the RO. The Ecological Reserves of Trial Island and Race Rocks are not included in any plans published by WCMRC for special attention in the event of an oil spill, even though they are likely some of the most sensitive ecological areas along the tanker route in the Strait of Juan de Fuca. A table of Species Listed in the 19 Ecological Reserves can be found on page 32 of the [Final Report A70395](#). In it, three Ecological Reserves lie exceptionally close to the projected tanker route (page 8).

In the Final Report of The Friends of Ecological Reserves submitted for Round 1 of the NEB hearings on the TMX/KM project, we outlined the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and SARA-listed species found in all of the 19 Ecological Reserves with Marine Shorelines. The evidence for some of these species has not been submitted in the [A95292-2](#), Evidence of Federal Departments and Agencies PDF, pages 157-198 or in [A95292-2](#), Evidence of

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<sup>11</sup> Wallace, S. S. 1999. Evaluating three forms of marine reserves on Northern Abalone (*Haliotis kamtschatkana*) populations in British Columbia, Canada. *Conservation Biology*, Vol 13 No 4, August, 1999, pages 882-887.

Federal Departments and Agencies PDF, page 232-236 , or in [A95280](#), Evidence of Trans Mountain PDF, pages 13-14.

Trial Island Ecological Reserve lies beside the tanker route. It has one of the rarest associations of plants in Canada, and yet is exposed to the full force of the wind coming from several directions. This is a very vulnerable location. Wind conditions in a storm after a dilbit/oil aerosol dispersal could result in the extirpation of several species which survive only in Canada.

**See a sample of the SARA-listed rare and endangered plants on Trial Islands Ecological Reserve in Appendix 3.**

Race Rocks Ecological Reserve has the most biologically diverse marine ecosystem of Southern Vancouver Island.

**See a sample of the SARA-listed rare and endangered species on Race Rocks Ecological Reserve in Appendix 4.**

It is of particular concern that in the report of 2015, TMX said: “that 43 SARA listed plant and lichen species and their critical habitat have the potential to occur in the supralittoral zone: and that high wind and wave conditions leading to the formation of sea spray could result in oiling and death of vascular plants, mosses or lichens.”

Trans Mountain said “with regard to SARA listed terrestrial plant and lichen species in the supratidal zone that could be affected by oiled sea spray, that although the recovery potential of such communities following oiling is unknown, in consideration of their SARA status and the documented sensitivity of some lichen species to air pollution, It must be assumed that the prognosis for recovery would be poor.”

**Table 3-1: SARA-Listed Species on Two Ecological Reserves**

SARA-listed Species on Trial Island Ecological Reserve		
Scientific name	Common Name	SARA Status ( Federal)
<i>Castilleja levisecta</i>	golden paintbrush	1-E (2003) Endangered
<i>Limnanthes macounii</i>	Macoun’s meadow-foam	1-T (2006) Threatened
<i>Lupinus densiflorus</i>	dense-flowered lupine	1-E (2006)
<i>Lotus formosissimus</i>	seaside birds-foot trefoil	1-E (2003)
<i>Sanicula arctopoides</i>	snake-root sanicle	E (2001)
<i>Sanicula bipinnatifida</i>	purple sanicle	1-T (2003) Threatened
<i>Orthocarpus bracteosus</i>	rosy owl-clover	1-E (2005) Endangered
<i>Silene scouleri ssp. grandis</i>	coastal Scouler’s catchfly	1-E (2005)
<i>Castilleja victoriae</i>	Victoria’s owl-clover	1-E (2012) Endangered
<i>Entosthodon fascicularis</i>	banded cord-moss	1-SC (2006)
<i>Aster curtus</i>	white-top aster	1-SC (2003)

Topic 2: SARA-Listed Species

SARA-listed Species on or Near Race Rocks Ecological Reserve		
Scientific Name	Common Name	SARA STATUS
<i>Orcinus orca</i>	Southern resident Killer whale	1-E (2003) Endangered
<i>Haliotis kamtschatkana</i>	Northern abalone	1-T (2003) Endangered
<i>Sebastes maliger</i>	Quillback rockfish	1 -Threatened
<i>Acipenser trnasmontanus</i>	white sturgeon	Endangered (2006)
<i>Calidris canutus</i>	Red knot	1-T/E (2010)
<i>Eschrichtius robustus</i>	Grey whale	1-SC (2005)
<i>Eumetopias jubatus</i>	Steller Sea lion	1-SC (2005)
<i>Falco peregrinus pealei</i>	Peregrine falcon, (pealei subspecies)	1-T/E 2010
<i>Enhydra lutris</i>	Sea Otter	1-SC (2003)
<i>Synthliboramphus antiquus</i>	Ancient Murrelet	1-SC (2006)
<i>Brachyramphus marmoratus</i>	Marbled Murrelet	1-T (2013)

The maps of the 'so called' sensitive sites which WCMRC designated as important in the Victoria area, shows the lack of protection of sensitive ecological areas..

We reviewed some of the online recovery strategies provided by WCMRC.

The green dots on the map in Figure 3-2 show where special strategies for managing an oil spill have been detailed. ERs, which the province has designated as highly environmentally important are absent from all WCMRC strategies.

The most endangered plants on Trial Island are apparently lower in priority for WCMRC than preventing oil on boats in the Oak Bay Marina. We believe the boats can be cleaned but endangered species on Trial Island will be extirpated when the RO mobilizes.

There appears to be no connect between environmental values and strategies developed by WCMRC. This is far from reassuring. There are no plans according to the maps (shown in the figures below) to have any strategy for protecting the SARA-listed species of Trial Island but there are plans to protect private property.

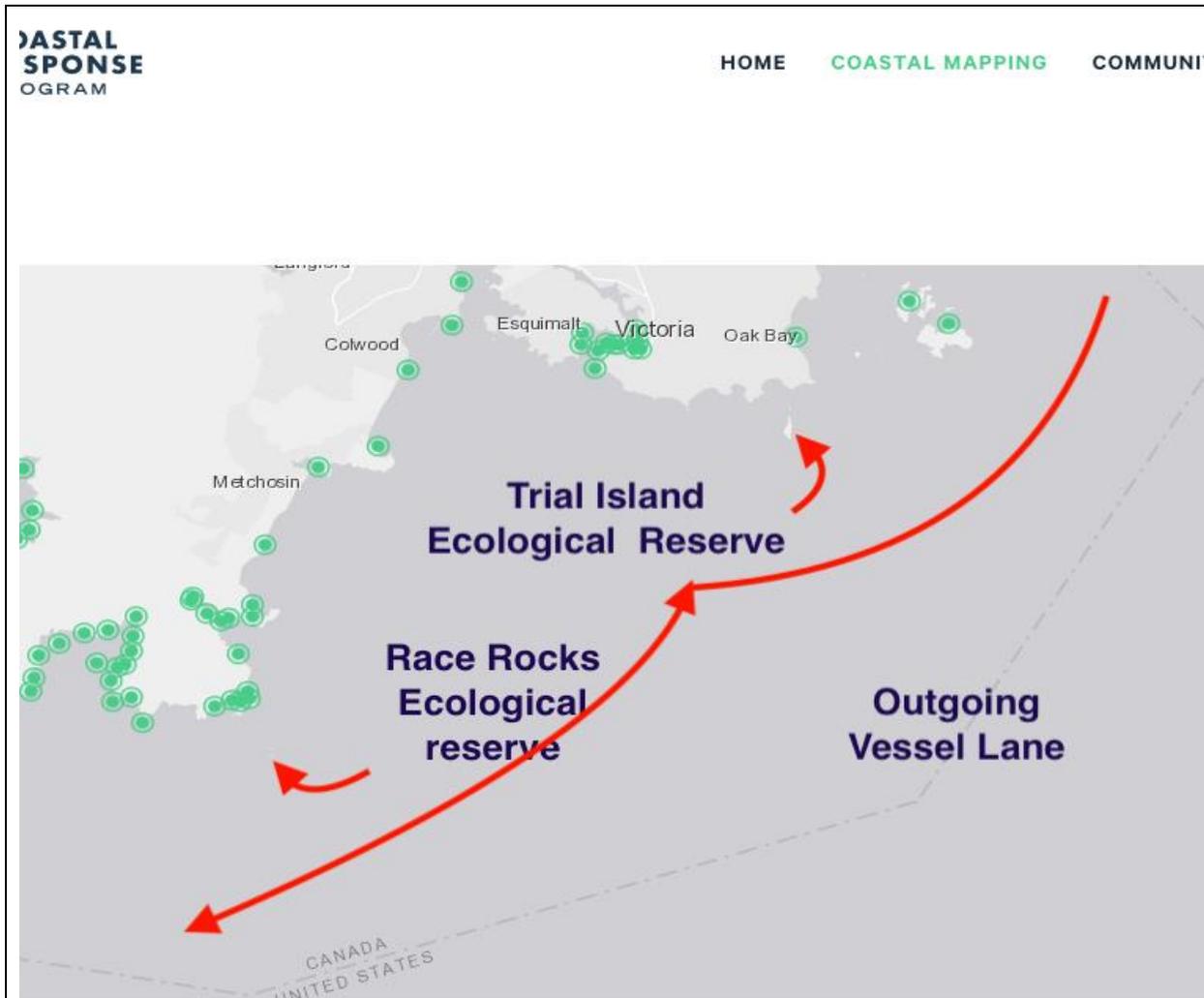


Figure 3-2: Special Strategies for Managing an Oil Spill

There does however seem to be plans to protect local marinas. This is far from reassuring.

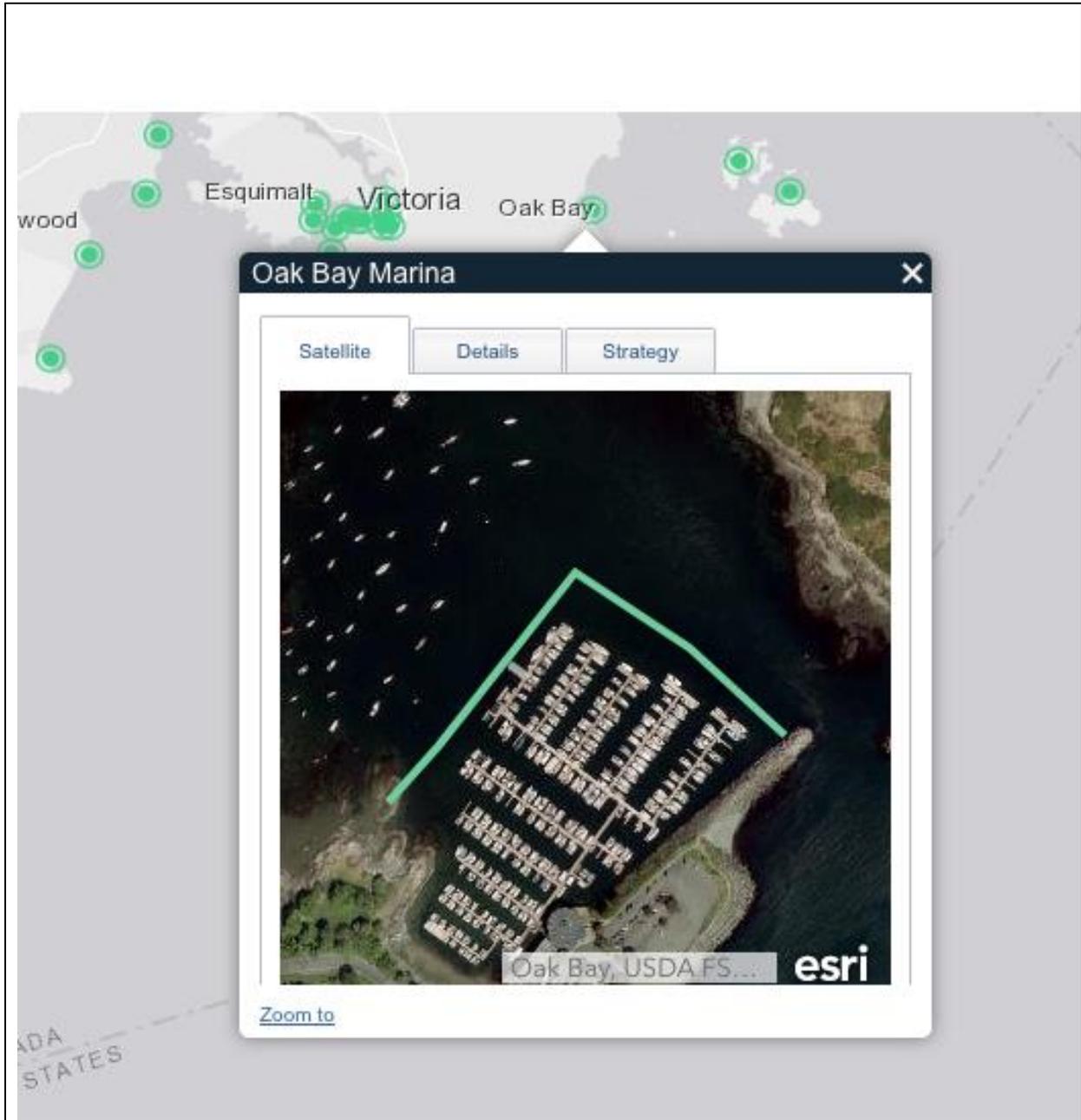


Figure 3-3: Boomed Protection of Oak Bay Marina developed by WCMRC

No consideration for protection planned for Race Rocks by WCMRC.



Figure 3-4: The view of bulk carrier from Race Rocks.

A similar pattern is seen in the vicinity of Race Rocks Ecological Reserve, where there are only plans to protect beaches on the nearby Rocky Point Military base, which aren't even accessible to the public. There are no WCMRC plans for protection of Race Rocks ER.

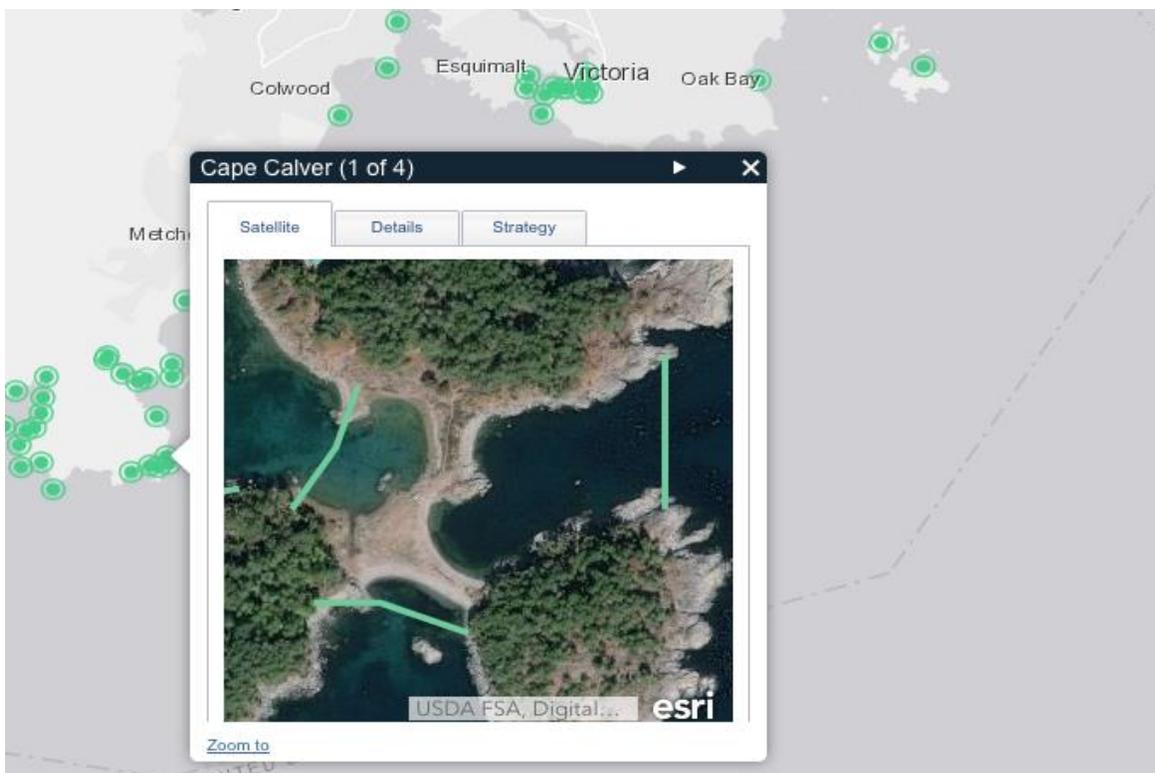


Figure 3-5: Protection for the military beaches of Bentinck Island

### 3.6 Marine and Terrestrial Birds

The issue of habitat security is not only important for SARA-listed species and nesting marine species of birds, but also for migrating and over-wintering of both terrestrial and marine species which frequent the shores and estuaries of our coast. These areas must be considered as important elements of our sensitive ecosystems that have to be monitored, and considered as vulnerable to the impacts of a dilbit spill on the coastline. There is a tremendous economic value not recognized by those who focus on GDP as a measure of success in Canada.

As documented in the records of the Rocky Point Bird Observatory, (<http://rpbo.org/about.php>) and the Victoria Christmas Bird Count ([http://www.vicnhs.bc.ca/?page\\_id=1425](http://www.vicnhs.bc.ca/?page_id=1425)) and the Christmas Bird Count at Race Rocks Ecological Reserve, (<http://www.racerocks.ca/race-rocks-animals-plants/bird-observations-at-race-rocks-3/christmas-bird-counts-starting-in-1997/>), the southern tip of Vancouver is an essential area of convergence of many species as they funnel down the island to pass over the Strait of Juan de Fuca in the fall, and find it as the first landing area when coming back on the spring migratory routes along the Pacific Coast.

On the mainland, Boundary Bay and the estuary of the Fraser Delta likewise provide habitat for foraging for thousands of migratory shorebirds and waterfowl. In the winter many other species use these areas as over-wintering habitat. There are many sources not found in formally published literature that document the numbers of species that are affected.

### 3.7 Ecologically Sensitive and Critical Areas for Environmental Protection on the Coastline of Southern Vancouver Island

#### 3.7.1.1 *IR #4 – To TC and WCMRC*

Since the posted maps on the WCMRC do not have plans to protect any environmentally identified critical habitat, we seek from TC and WCMRC their criteria and the priority in the strategies of protecting coastal features. It appears clear from these maps on the WCMRC website this RO is not aligned with the stated goals of the federal agencies. If WCMRC is the sole agency responsible for clean up, our ecological values are definitely in jeopardy.

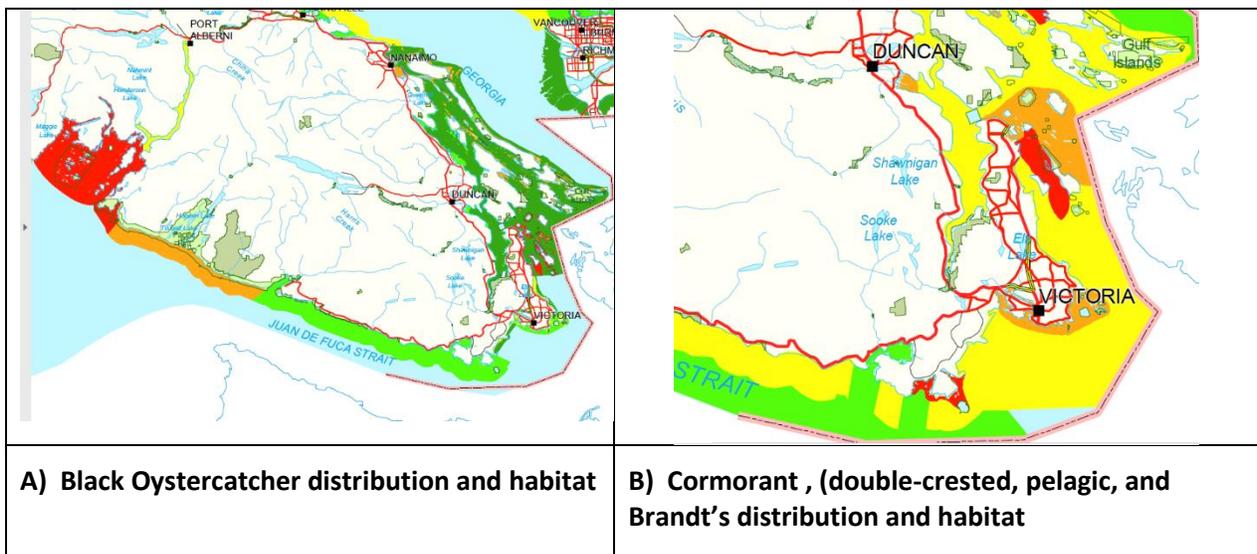
The Board of FER lacks confidence in the ability of Transport Canada to communicate priorities to WCMRC. We also understand that TC holds the responsibility for renewal of WCMRC's current certificate which expires September 1, 2020.

The Board of FER has reviewed some of the maps in the Coastal Resources Information Management System CRIMS (<https://www2.gov.bc.ca/gov/content/data/geographic-data-services/topographic-data/coast>). We looked at the maps of coastal areas along southern Vancouver Island, the rating system from for relative importance for species. <https://apps.gov.bc.ca/pub/dmf-viewer/?siteid=6615094021702782780>

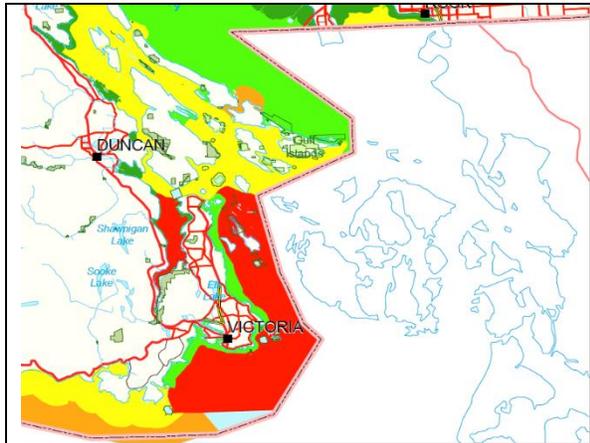
Figure 3-6 shows the relative importance of areas for a number of species. The key on the next page, when applied to the maps in Figure 3-6 from Geo BC, shows the Relative Importance of the marine bird species in the southern part of Vancouver Island.

**Relative Importance of areas to the Species.**

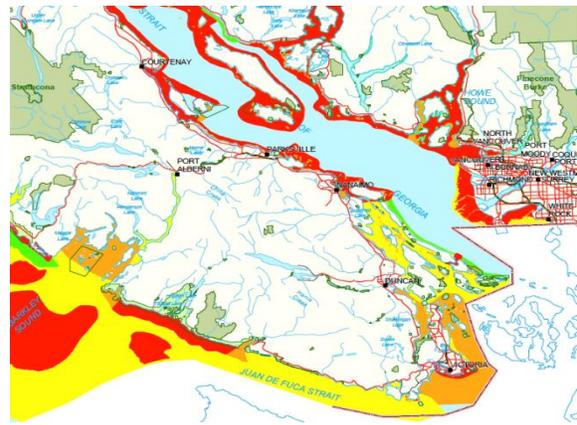
-  Area has a Very Low Importance Use to Species
-  Area has a Low Importance Use to Species
-  Area has a Moderate Importance Use to Species
-  Area has a High Importance Use to Species
-  Area has a Very High Importance Use to Species



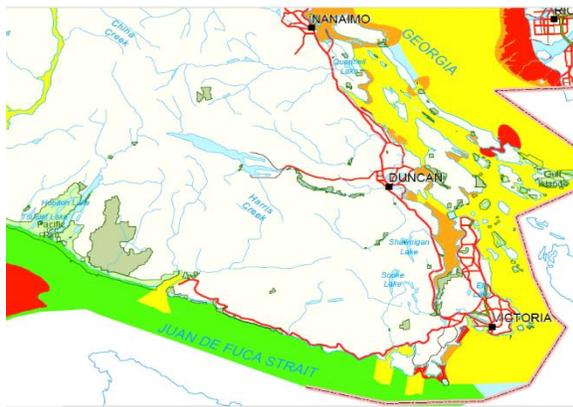
Topic 2: SARA-Listed Species



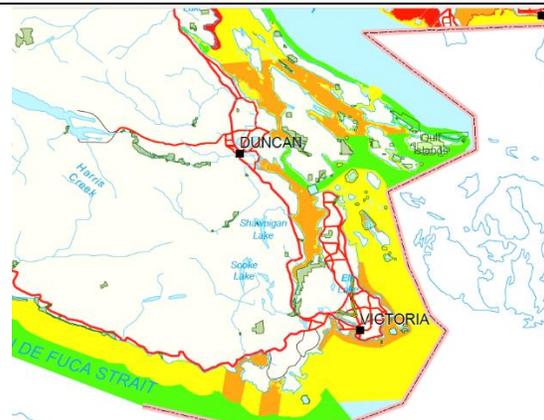
C) Alcids distribution and habitat



D) Gull distribution and habitat ( many species included)



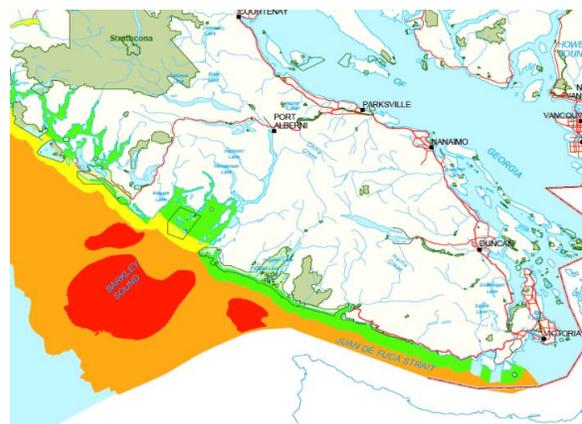
E) Loons and Grebes distribution and habitat



F) Diving Ducks distribution and habitat



G) Dabbling Ducks distribution and habitat



H) Fulmars distribution and habitat

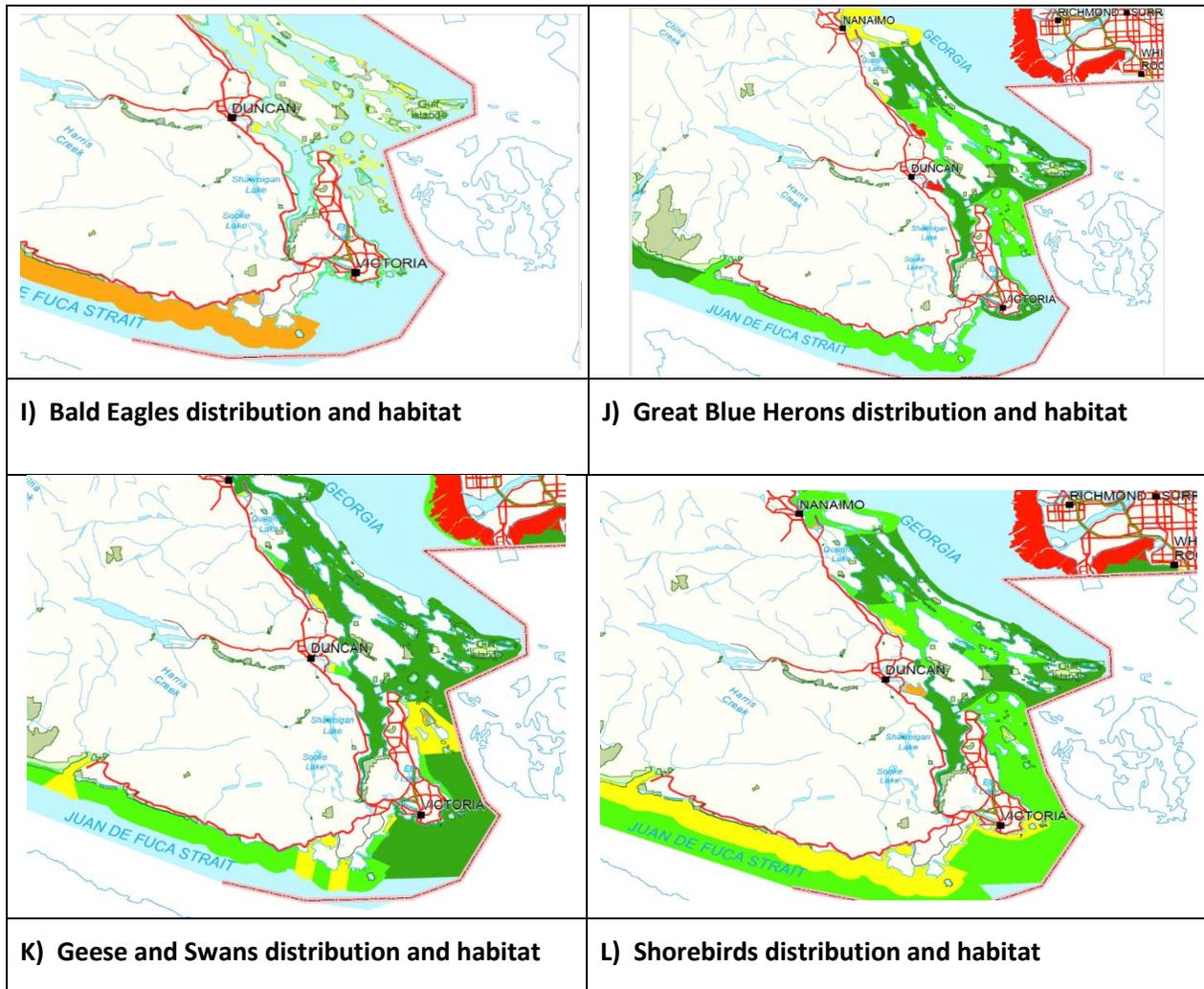


Figure 3-6: Relative Importance of Areas for a Number of Species

Our point in sharing these distribution maps is that it appears that WCMRC does not know areas important to species. TC is also providing very little direction to WCMRC on environmental values.

The NEB has also requested information from the federal ministries in [Direct Evidence A95292-2](#) 2018-10-31 on the following:

*--Pelagic and colony monitoring programs that are largely focused on the central and north coast of BC, but have also collected some limited information in sections of the south coast (this overlaps somewhat with OPP and RRP initiatives, but some of the surveys started well before those projects commenced).*

Topic 2: SARA-Listed Species

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There is further evidence of the importance of marine bird nesting colonies in another of our Ecological Reserves at Cleland Island. The implications of the catastrophic effects of oil spills on such breeding colonies is well explained in the evidence presented by Dr. Barb Beasley in “Potential Project-related Impacts of the Trans Mountain Pipeline Expansion on Birds that use Habitats within Barkley Sound and Clayoquot Sound on the Exposed Southwestern Coastline of Vancouver Island.”

Topic 1c [A96362-5 BSA Topic 1.c - A6L4E6.pdf](#)

*“Cleland Island and other smaller islands in southeastern Clayoquot Sound provide important habitat for four species of breeding birds. Fifty-four pairs of American Black Oystercatchers were recorded in 1986; which is 1% of the global population, and in some years, as many as 57 pairs have been detected on Cleland Island. In 1988, surveys found 1,687 pairs of Glaucous-winged Gulls, which is about 1% of the North American population. Also in 1988, 207 nesting Pigeon Guillemots (2% of the Canadian population) and 5,700 nesting Leach's Storm-Petrels (1% of the Canadian component of the eastern Pacific population) were recorded. Cleland Island is a diverse seabird colony as in addition to the species already mentioned, Cassin's Auklet, Rhinoceros Auklet, Tufted Puffin, and Fork-tailed Storm-Petrel also breed here.” • “During the summer, the southeast portion of Clayoquot Sound (particularly southeast of Vargas Island and southeast of Flores Island) hosts substantial numbers of Marbled Murrelets. In 1982, 4,500 birds were recorded, whereas in 1993, 2,622 birds were recorded. The latter survey still represents 5% of the Canadian population.” • “Large numbers of Black Brant use the eelgrass beds; 4,000 birds were recorded in April 1970, but in 1989 only 480 birds were seen. • “Thousands of White-winged and Surf Scoters can be seen while moulting or migrating in early spring.... over 10,000 waterfowl of various species gather here in spring...”*

*Also in the evidence by the Barkley Sound Stewardship Alliance, Dr Mark Mafti has presented an excellent explanation on the Potential Impacts of Oil Discharge in Waters off the West Coast of Vancouver Island [A96362-4 BSA topic 1b](#)*

*It is important for Canadians in less temperate areas of Canada to know that our winter resident birds are not only chickadees, ravens and snowbirds, Dr Mafti emphasizes the importance of an oil-spill free habitat for wintering waterfowl and migrating waterfowl and indicates “*

*“Barkley and Clayoquot Sounds collectively represent some of the most important habitat for non-breeding waterfowl in British Columbia. Given the predominant ocean currents, both these areas are likely to be directly affected by an oil spill or other such accidental discharge anywhere within the Strait of Juan de Fuca or adjacent nearshore or offshore areas.”*

The NEB has also requested information from the federal ministries in [Direct Evidence A95292-2 2018-10-31](#) on: marine eating fish and birds with the following

*-- Surveys around southern Vancouver Island with the objective of looking at seasonal relationships between marine fish eating birds and Pacific Sand Lance subtidal burying habitat use, and measuring seasonal changes in distribution and abundance of marine birds in relation to shipping traffic (2015-2017).*

**3.7.1.2 IR #5 – To TC and ECCC**

Since much of the work on marine migratory birds in British Columbia has been focused on activities on the north and central coasts, what evidence do we have of marine bird environmental sensitivities data being collected in marine waters of southern BC, including but not limited to the Salish Sea?

**3.7.1.3 IR #6 –To TC, WCMRC, DFO, CWS and ECCC**

Since Parry Bay on the coastline of Metchosin has a beach with a high incidence of spawning habitat for pacific sand lance and a high incidence of winter habitat for feeding by grebes , loons, buffleheads and mergansers, what effort has been made to include this area as a sensitive area and what efforts have been made to plan for protection in the case of a spill of dilbit from TMX authorized tankers?

**3.7.1.4 IR #7 – To CWS and ECCC**

What bird colony monitoring programs have been done in the Ecological Reserves on southern Vancouver island adjacent to the shipping lanes , where double crested cormorants, pigeon guillemots, glaucous winged gills and black oystercatchers have well established nesting colonies. Please also indicate the source of any collected data.

**3.7.1.5 IR.#8 – To TC, WCMRC, CWS and ECCC**

Since the posted maps on the WCMRC website do not protect any environmentally identified critical habitat, we seek from TC and WCMRC their criteria and the priority in the strategies of protecting coastal features. It appears clear from these maps on the WCMRC website this RO is not aligned with the stated goals of the federal agencies. If WCMRC is the sole agency responsible for clean up, our ecological values are definitely in jeopardy.

**3.7.1.6 IR #9 – To ECCC**

Given the importance of our coastal areas for both marine and terrestrial species would the ECCC and CWS provide an estimate of the economic value of the potential impact of a dilbit spill on marine and terrestrial birds along the proposed route of TMX dilbit carrying tankers.

**3.7.1.7 IR #10 – To CWS and ECCC**

Since much of the work on marine Migratory Birds in British Columbia funded under various initiatives and to date has been focused on activities on the north and central coasts , what evidence do we have of marine bird environmental sensitivities data being collected in marine waters of southern BC, including but not limited to the Salish Sea.

**3.7.1.8 IR.#11 – To TC and WCMRC**

Since the posted maps on the WCMRC website do not protect any environmentally identified critical habitat, we seek from TC and WCMRC their criteria and the priority in the strategies of protecting coastal features. It appears clear from these maps on the WCMRC website this RO is not aligned with the stated goals of the federal agencies. If WCMRC is the sole agency responsible for clean up, our ecological values are definitely in jeopardy.

**3.7.1.9 IR #12 – To CWS and ECCC**

Given the importance of our coastal areas for both marine and terrestrial species would the ECCC and CWS provide an estimate of the economic value of the potential impact of a dilbit spill on marine and terrestrial birds along the proposed route of TMX dilbit carrying tankers?

Because there is lack of confidence in TC communicating priorities to WCMRC and since TC holds the responsibility for renewal of WCMRC which we understand will be done in early 2019. We seek support from the NEB that they recommend to Cabinet that consistent with legislation that the Minister appoints an independent advisor for a review of WCMRC

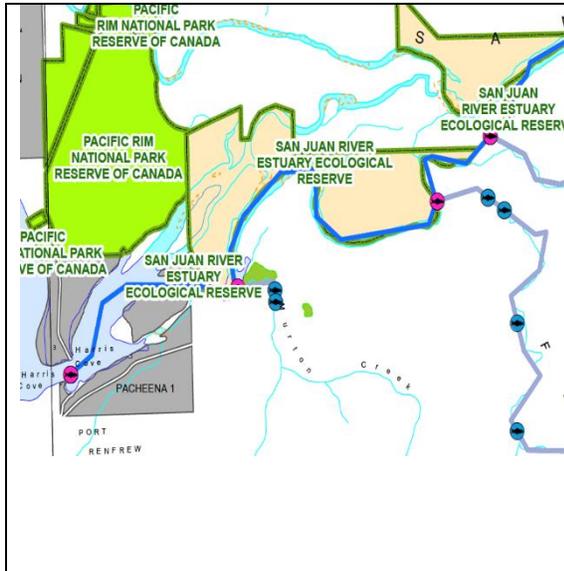
**3.8 Biological Resources of Some Ecological Reserves on the Southern Coast of Vancouver Island**

The maps below (Figure 3-7) illustrate areas of our coastline where biological resources are located as based on information from Geo BC: <https://apps.gov.bc.ca/pub/dmf-viewer/?siteid=6615094021702782780>

The legend below is used to designate the biological resources in these sets of maps. We have included maps of several of the coastal Ecological Reserves to point out the importance of the biological resources that are found within those ecologically sensitive reserves. These Geo BC maps are very generalized in their treatment of the details of sensitive biological species, and are inclusive of more than just the SARA-identified species. They do, however, place the emphasis on sensitive ecosystems which is a much better criterion for evaluating how the impact of an oil spill may result in catastrophic impacts.



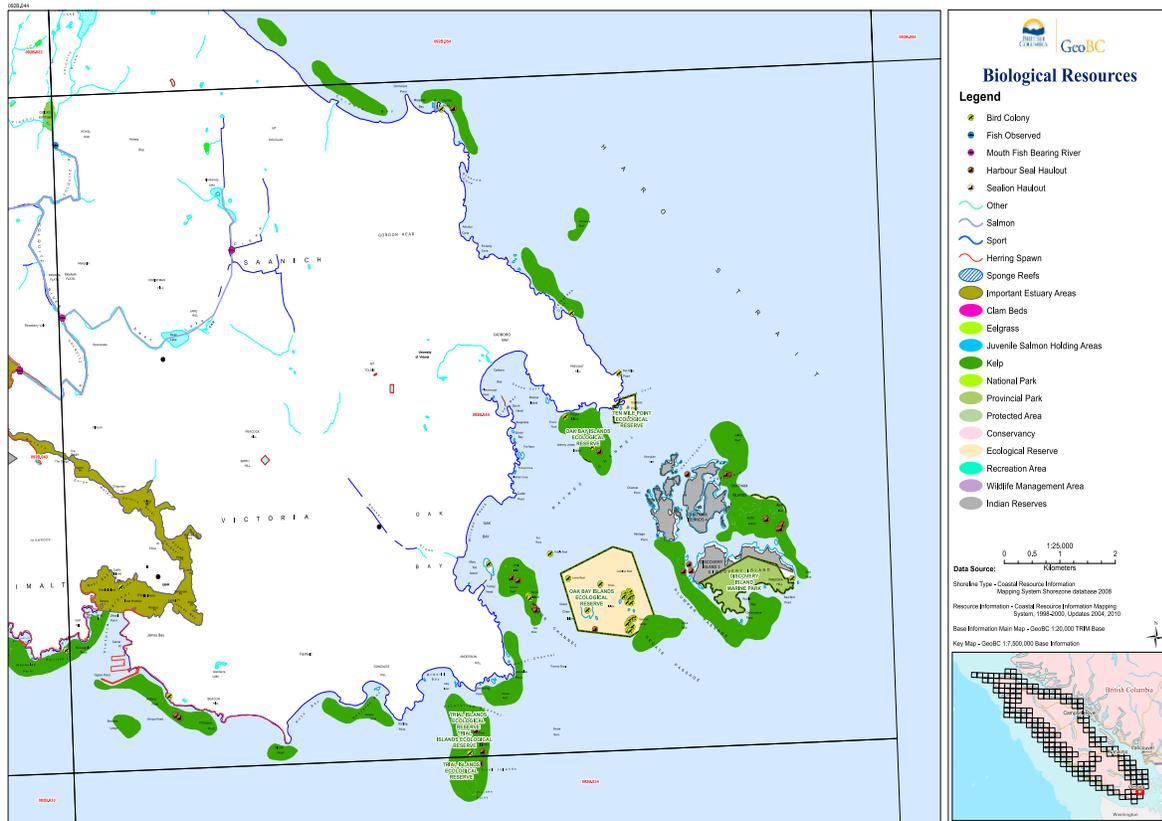
Topic 2: SARA-Listed Species

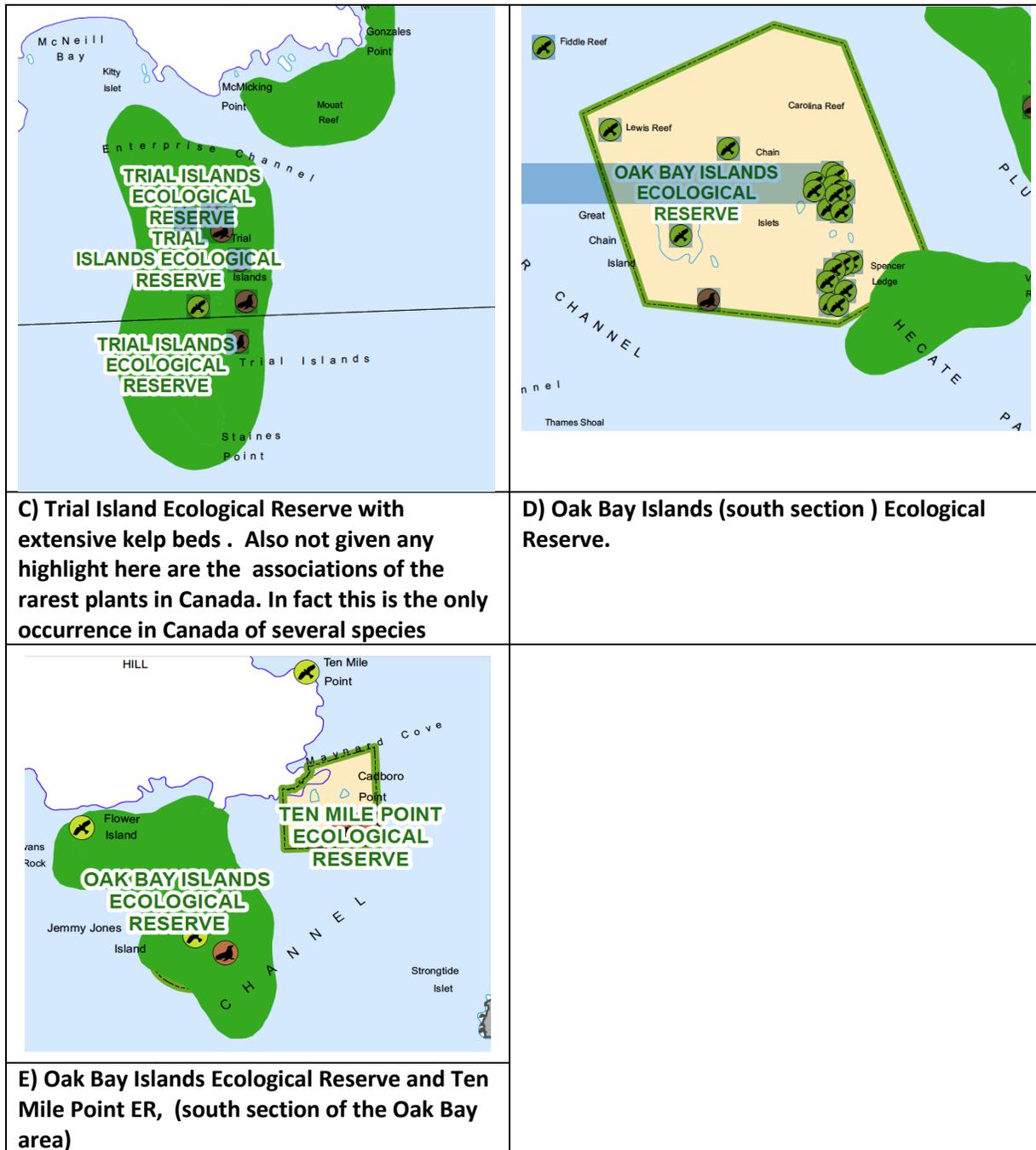


**A) The San Juan River Estuary Ecological Reserve. Important Fish habitat for breeding, mouth-fish breeding and anadromous fish in the river and estuary.**



**B) The large kelp bed distribution and high biodiversity of marine mammals, and the nesting, migratory and winter resident seabirds are reflected here**





**Figure 3-7: Ecologically Sensitive Areas in the Victoria Area**

These maps reflect all the ecologically sensitive areas in the Victoria area. WCMRC does not recognize any of these sensitive areas in its mapping and strategic planning, while recognizing areas of high visibility in marinas and beaches.

**3.8.1.1 IR #13 – To TMX and Other Federal Agencies**

Would TMX and other Federal Agencies indicate whether they consider there is any priority in protecting sensitive ecological areas with many of the SARA-protected species in the southern Vancouver Island region?

**3.9 Eel Grass Beds as Sensitive Ecosystems Needing Exceptional Protection.**

A good example of how a sensitive ecosystem must be targeted for an exceptional effort in protection from oil spills, is that of the extensive eel grass beds in the Salish Sea. Their continued existence means the continued existence of many of the SARA-protected species as well. There is a direct link in energy transfer from the protection that Eel grass beds provides for juvenile fish, to the top marine bird and mammal predators. There has been a good amount of time and effort expended by various restoration activities done by groups such [SeaChange](#) over the past few years to reclaim areas impacted by anthropogenic change in marine habitat. Eel grass bed mapping has been carried out by various groups throughout Puget Sound and Georgia Strait because of their fundamental importance to the survival of marine ecosystems. See [https://cmnbc.ca/atlas\\_gallery/eelgrass-bed-mapping](https://cmnbc.ca/atlas_gallery/eelgrass-bed-mapping).

**3.9.1.1 IR #14 – To WCMRC and TC**

Can the WCMRC provide maps of where sea grass beds are located throughout the area of potential impacts from oil spills?

**3.9.1.2 IR #15 – to WCMRC and TC**

Would the WCMRC indicate what strategies they are planning to protect these valuable habitats?

**3.10 The Physical Environments of Many Sensitive Areas Could Preclude an Effective Oil Spill Response From Any Federal Agency or WCMRC**

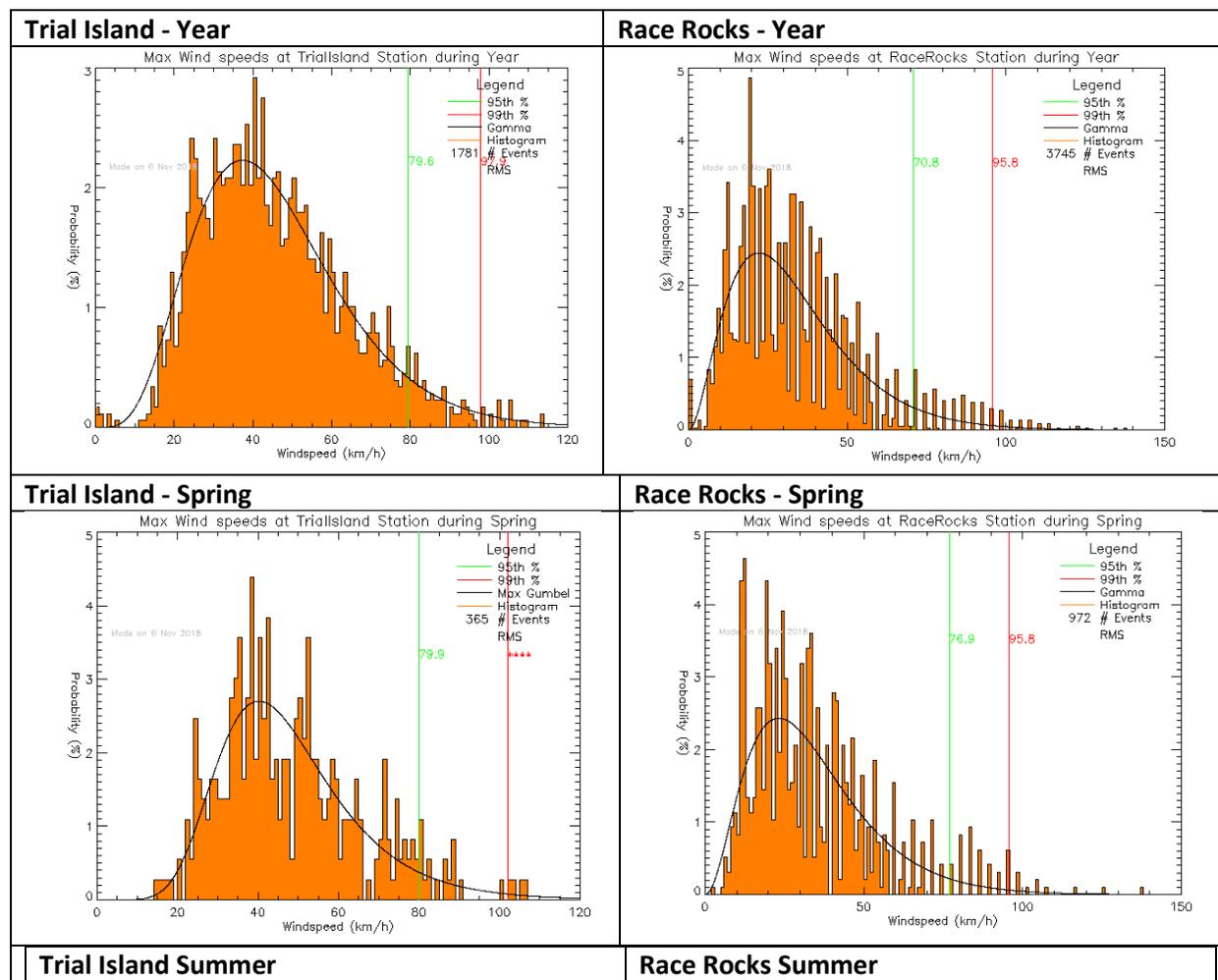
The graphs below (Figure 3-8) show the probability of the percentage of time in a year when the wind speed at both Trial Island Ecological Reserve and Race Rocks Ecological Reserve is above the level of 28 km/hr. We understand that the limit of the containment booms and the limit of the ability of WCMRC to deal with an oil spill is that they cannot deploy any containment above wind speeds of 28 km/hr. The graphs below are meant to show “response gaps” by WCMRC. A response gap is a period of time when the equipment on hand cannot be deployed because it is not suitable for the sea conditions.

We believe that in this reconsideration review, it is relevant that TC, CCG and WCMRC clearly state when and under what conditions the equipment on hand cannot be deployed. There may be two possible outcomes of a response gap analysis. Outcome 1 is that WCMRC and TC, who certifies the RO, require improvements in equipment and capacity so that the RO invests sufficient capital to have capability to deal with all weather conditions that occur along the tanker route. We anticipate that when a dilbit spill occurs, it may likely be under the worst weather conditions. There is a need to demonstrate transparently in what a response looks like under such conditions.

The following wind-speed data for Trial Island Ecological Reserve and Race Rocks Ecological Reserve is made available through the efforts of the [UVic School Based Weather Station Network](http://www.uvic.ca/research/centres/cers/research_projects/uvic_school_based_weather_station_network/). The Race Rocks data <http://www.racerocks.ca/weather/wind-as-an-abiotic-factor-at-race-rocks/> is provided through cooperation with Lester B. Pearson College. Daily wind speeds are collected and examined to produce these histograms. A curve fitted to the histogram gives the viewer a Probability Density Function (PDF). We choose the best from the following functions: Gamma, max or min Gumbel, Weibull, Gaussian and Spline. The PDF allows us to estimate the 95<sup>th</sup> and 99<sup>th</sup> percentiles of the data.

The plots are shown for the entire year and for each season. The seasons are defined as follows:

- Winter — DJF: December, January, February
- Spring — MAM: March, April, May
- Summer — JJA: June, July, August
- Autumn — SON: September, October, November



Topic 2: SARA-Listed Species

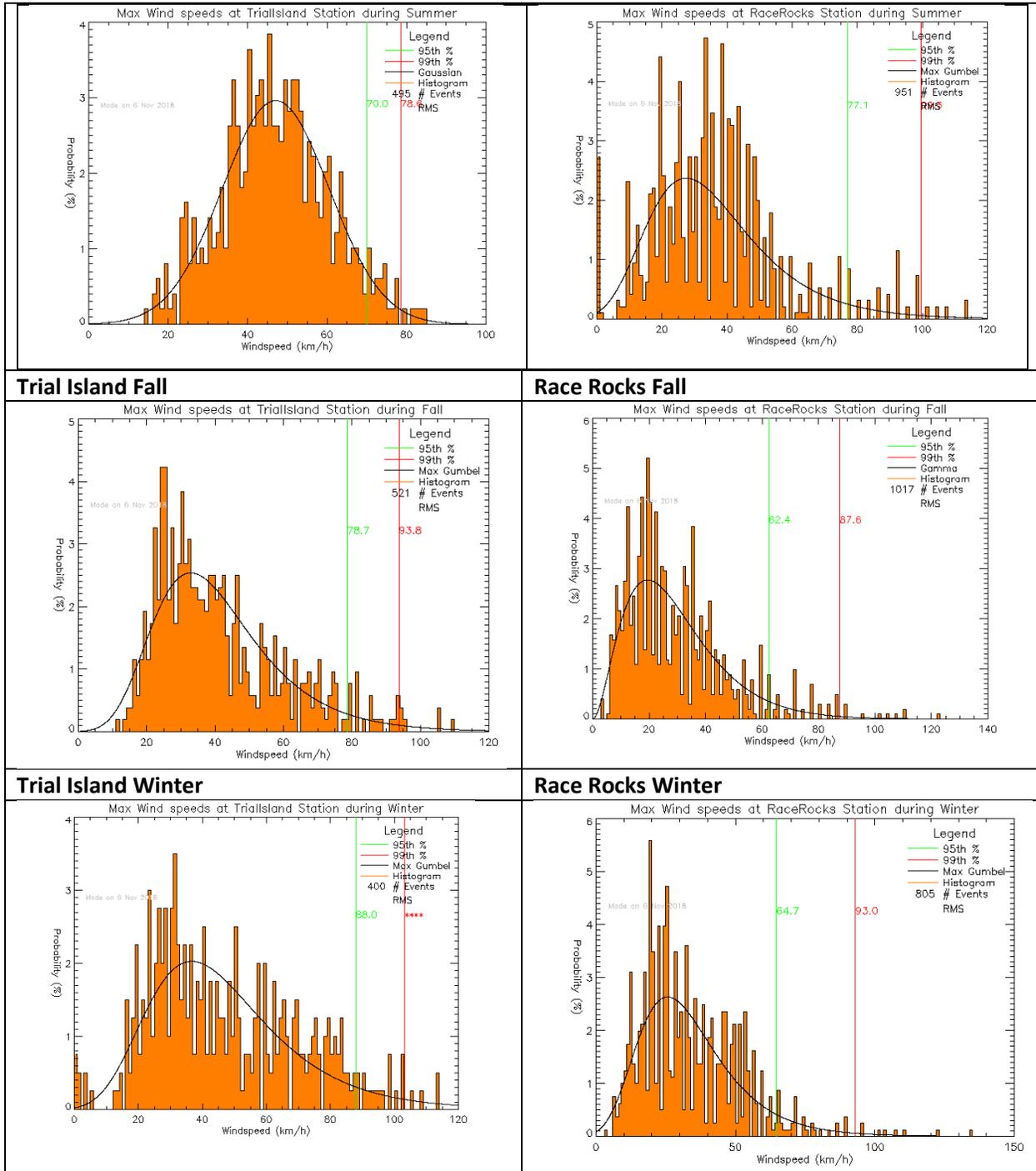


Figure 3-8: Year Maximums -Wind Speeds at Trial Island ER and Race Rocks ER

**3.10.1.1 IR #16 – To TC and WCMRC**

Based on windspeeds and the consequent wave heights, can TC and WCMRC provide insight on conditions WCMRC will not attempt open ocean recovery? We understand that WCMRC has some containment booms that can be deployed for containment up to windspeeds of 28 km/hour, but these booms are ineffective and cannot be deployed above winds of 28 km/hour.

**3.10.1.2 IR #17 – To TC, DFO, ECC and WCMRC**

Can the booms that WCMRC has for higher wind speeds encircle a leaking or burning Aframax tanker? Where are these booms located?

**3.10.1.3 IR #18 – To TC, DFO, , ECC and WCMRC**

Provide reasons why the environmentally sensitive Ecological Reserves of the Southern Coast of Vancouver Island have not been considered for protection in the event of an oil spill?

Why are no SARA species and habitats identified and no strategies posted for their protection by WCMRC in their spill response strategies?

### **3.11 Oil Spill Risk Mitigation Through Lateral Displacement of Shipping Lanes**

The Board of FER seeks a shift in the location of current shipping lanes (see Figure 3-8) to shipping lanes that are further from the ERs and SARA-Listed Species described above and highly populated areas of Oak Bay, Victoria, Esquimalt, Colwood and Metchosin.

There have been lateral displacement trials carried out for SRKWs by TC and we seek to increase the distance between ships and shore; a lateral displacement to an alignment that more closely parallels the demarcation line of the Canada-US border. An alignment further from Brotchie Ledge pilot drop off area, Point F in Figure 3-9, would allow more time to muster an oil spill response than the current location does. This mitigation strategy would mean that in future, all shipping, including the dilbit tankers, would pass further off shore and more mid-channel which also mitigates GHG emissions for the communities of Victoria, Oak Bay, Esquimalt, Colwood and Metchosin and we believe, would reduce the probability of oiling these community shorelines.

Shipping further off shore provides a shorter route for all ships but a longer commute for the pilots than the current shipping lanes. However, the three course corrections would be reduced to two as there would be no need to make the correction to reach the current Brotchie Ledge pilot drop off point. The ships would transit further south of the ERs, further off shore by Discovery Island and go directly to Point G. The correction to the current shipping lane would need to go south of the anchoring area of Constance Bank.

Topic 2: SARA-Listed Species



Figure 3-9: Location of Current Shipping Lanes near Southern Vancouver Island Communities

**3.11.1.1 IR #19 – To TC**

Are the longer tanker routes for incoming and outgoing shipping (routes that more closely parallel the Victoria water front and bring all shipping closer to Trial, Oak Bay and Race Rocks Ecological Reserves) principally for the convenience of pilot drop off at Brotchie Ledge?

**3.11.1.2 IR #20 – To TC**

Will TC realign the current shipping route as a dilbit mitigation strategy?

**3.11.1.3 IR #21 – To TC**

Since the suggested route is further from shore, does this improve response time and reduce the probability of groundings?

**3.11.1.4 IR #22 – To TC**

When can the environmentally safer and further off shore and shorter tanker route be implemented?

A change in shipping lanes appears to better meet the intent of the *Ocean Act* on the need to take a “precautionary approach”. The preamble to the *Oceans Act* is Appendix 1 of this report.

A lateral transfer of shipping lanes to new shipping lanes closer to the international US Canada boundary is sought for dilbit tankers. When shipping lanes are further offshore there is a lower probability of grounding and oil spills than provided by the current shipping lanes. The current shipping lanes force dilbit tankers to follow a route 1 to 2 km from shore. It is of interest for the 400,000 people living on the shores along the tanker route, that risks be mitigated to the full extent of options available. Moving shipping lanes further offshore provides an excellent mitigation strategy to reduce groundings and mitigate oil spill risks to many sensitive areas such as ERs of Oak Bay Island, Trial Islands and Race Rocks ER as well as other regional parks like Witty and Esquimalt Lagoons, Sidney Spit, Fort Rodd Hill and other shoreline protected areas, because in the event of an open ocean spill, RO have more time to respond and muster resources.

We understand for the pilots and the CCG that this means there will be longer commute times for pilots to reach a mid channel transfer point. This will be different from the convenience which pilots and the CCG now enjoy from the current near shore transfer point at Brotchie Ledge. Brotchie Ledge transfer has been used for many decades but we believe it is no longer appropriate to have all shipping and the ever-increasing number of bulk carriers, container ships and tankers be made to make three course changes to reach Brotchie Ledge just because it has been the “traditional” practice.

We believe this has been, over the last 100 years, a convenience for the pilots as opposed to the concern for safety of the public. We are unclear on how committed the TC and the pilots Associations are to the traditionally used and decades-old transfer point and their convenience. Historically we can understand why ships would need to make three course changes to take on a local pilot as was done 100 years ago when pilot transfer boats were smaller. We do not understand, however why today shipping still needs to alter course for the convenience of the pilots as it increases risks to the public and shorelines.

The traditional Brotchie Ledge transfer point by any reasonable measure appears to be a higher risk strategy for grounding and oil spills than a change in shipping lanes further off shore as has been proposed by the Board of FER. We think a change and shift away from convenience of pilots to one of greater protection of public health and environmental safeguards is of interest and warranted.

We understand that pilots fees are paid by shipping companies and these fees are passed on to those who hire tankers for oil export, so if more hours are needed to reach a new transfer point, it means more hours will need to be billed by pilots and this adds to the shipping costs. These costs need to be charged to those tankers they are hired to guide. We understand that it also means more fuel of CCG to transfer pilots to a mid-channel transfer point compared to the quantity of fuel currently used to get pilots from shore to Brotchie Ledge. The trade off is reduced risk to the shorelines of southern Vancouver Island against higher pilotage fees for exporters and added fuel for and crew time for CCG pilot boats.

In summary we anticipate slightly longer term costs to CCG pilots boats and CCG salaries, we see a slight increase in pilotage fees but this is balanced against much lower risks to the residents of southern Vancouver Island and sensitive ecosystems who would have their risks somewhat mitigated by a change in shipping lanes.

**3.11.1.5 IR #23 – To PPA and CPA**

Is your commute time of concern and if so how? Provide insights on how pilots would need to adapt to a transfer station closer to the international boundary than continued use of the near shore transfer point of Brotchie Ledge.

**3.11.1.6 IR #24 – To PPA and CPA**

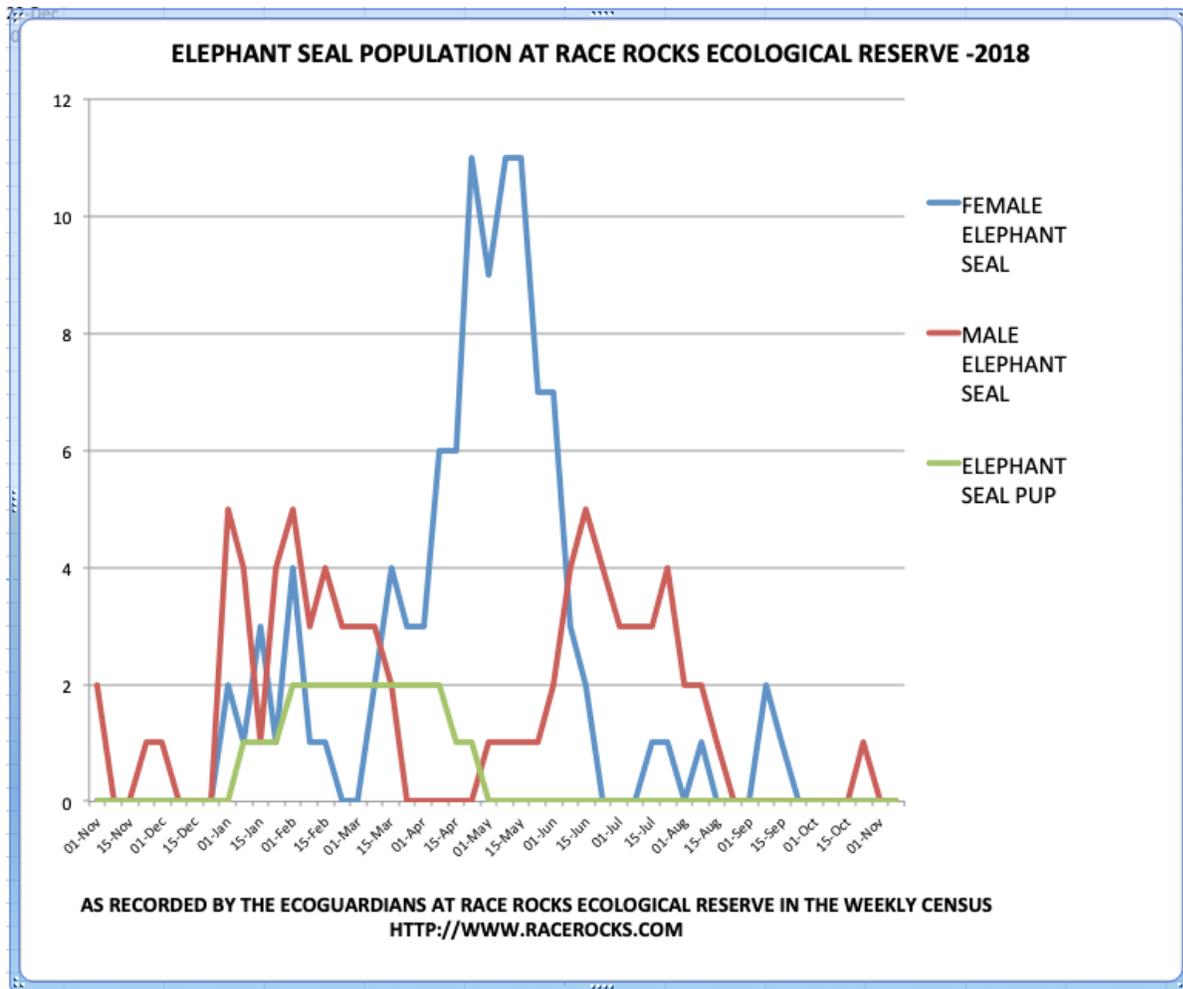
Does your Association support lower risk shipping options presented by the lateral transfer of shipping lanes to further offshore as these afford a greater response times for rescue tugs and other ships to provide assistance to ships experiencing difficulty and decreases the probability of grounding and the possibly an oil spill than do the current shipping lanes?

**3.12 The Protection of Marine Mammals in Habitats Which Will be Affected by a Catastrophic Oil Spill in The Strait of Juan de Fuca.**

In our [May 2015 Final Evidence Report A70395](#), we emphasized the significance of the marine mammal populations and the threats to their survival in areas of concentration in Ecological Reserves.

We pointed out, using graphs of Killer Whale and Humpback Whale sightings in recent years, and demonstrated that the population estimates made by Stantec were out of date and should not be used for any current policy decisions. Included here are graphs showing the current year's records of several species of marine mammals from observations made at Race Rocks Ecological Reserve.

In our final report 2015, we had presented a graph showing the buildup of a pupping colony on Race Rocks over several previous years. In Figure 3-9 below, the occurrence of males, females and the 2 successfully raised pups this year is presented. Although they are not a SARA-listed species, this is probably the only haulout and pupping area in Canada, and the most northerly colony on the Pacific Coast. This is just another example of a top carnivore in a sensitive ecosystem that would be highly threatened in the event of an oil spill in the Strait of Juan de Fuca.



**Figure 3-10: Elephant Seal Population**

It should also be noted that sea otters (SARA-listed) have been observed in small numbers in the Kelp beds at Race Rocks every summer for the past few years, and it is a pupping colony for harbour seals as well.

It staggers the imagination to consider the effects of a spill of dilbit in the vicinity of Race Rocks Ecological Reserve considering the marine mammal population which is present there year round. In the fall of 2018, over 1000 sea lions were just part of the make up of the marine mammal population as shown in the graph below.

Topic 2: SARA-Listed Species

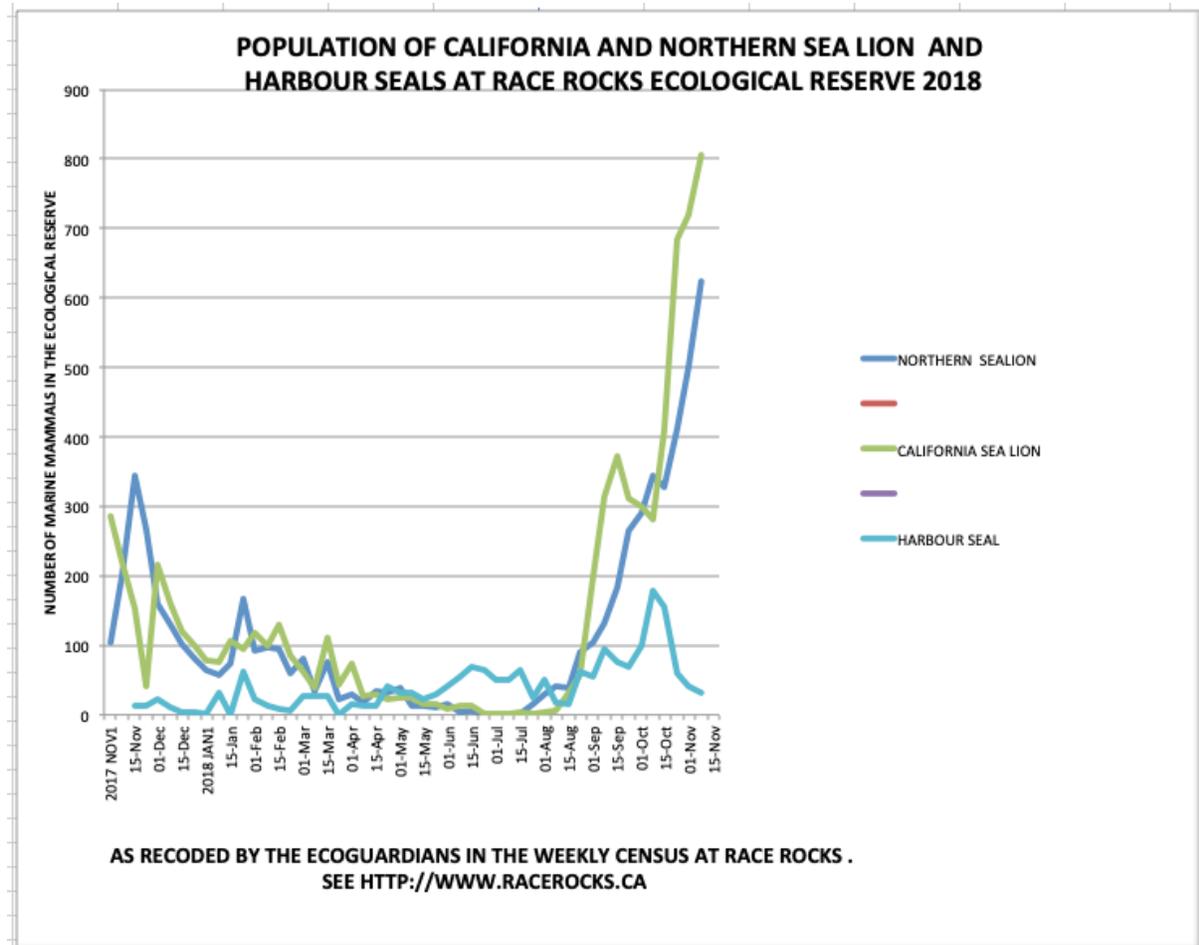


Figure 3-11: Sea Lion and Harbour Seal Populations

The STANTEC report indicating Humpback whale populations in the Southern Vancouver area were not a concern when impacts on whales from shipping was considered. However, the occurrence of Humpback whales near Race Rocks in the Strait of Juan de Fuca has risen since we presented a graph to the KM/TMX hearing showing the levels of populations in recent years. A recent post in the Ecoguardian’s Log <http://www.racerocks.ca/humpbacks-3/> at Race Rocks Ecological Reserve stated the following:

“Humpbacks

Posted on Monday, November 19, 2018 by Laas Parnell

*I have not seen any humpbacks in a couple weeks but there was a lot of humpbacks of this year between late September and most of October. I would see usually between 5-10 a day, and sometimes more, it also depends if I am looking up at the same time they are coming up for air. I would say there was even more humpback activity this year than last year. Last year there was also a lot of humpbacks around in October but I also remember there being more killer whales around, I didn’t see as many of those this year. I would see most activity around sunrise and sunset, I could count on them everyday to be coming up on the west side of the island and*

*then during the day I would often see them just south of the island. Once in a while they would get pretty close on the north side of the island but that didn't happen very often."*

**3.12.1.1 IR #25 – To the Federal Agencies and WCMRC**

We seek from the Federal agencies and WCMRC their strategies for protection of the large marine mammal population present at the south end of Vancouver Island in the event of an oil spill from any vessel in the Strait of Juan de Fuca and more particularly with a spill of dilbit in the area.

**3.12.1.2 IR #26 – To the Federal Agencies and WCMRC**

Would the Federal Agencies and WCMRC provide their strategies for treatment of the large marine mammal population present at the south end of Vancouver Island in the event of contamination from an oil spill from any vessel in the Strait of Juan de Fuca and more particularly with a spill of dilbit in the area?

We put this request in context with recent changes in legislation:

Given that amendments to key legislation have been introduced in late October, as Bill C86; specifically, amendments to the *Canada Shipping Act, 2001* (Division 22) and the *Marine Liability Act* (Division 23), as follows:

***“Enhance Marine Ecosystem Protection***

*Amendments to the Canada Shipping Act, 2001 would allow the Minister of Transport to issue an interim order if immediate action is required to address a risk to the marine environment or marine safety, including on a pre-cautionary basis. If passed, this new authority would provide the Government of Canada the ability to implement short-term measures to respond to unanticipated risks to the marine environment, while determining the appropriate longer-term solutions in collaboration with Indigenous groups and stakeholders.”*

**3.12.1.3 IR #27 – To the Minister of TC**

We therefore request to know whether the Minister of Transport will issue an interim order to prohibit the passage of vessels in the vicinity of sensitive ecological areas until WCMRC has developed adequate strategies to ensure protection of SARA species in the ecologically sensitive areas of southern Vancouver Island.

### 3.13 Questions Arising from The Auditors Report on Protecting Marine Mammals

We have examined the 2018 Fall Reports of the Commissioner of the Environment and Sustainable Development to the Parliament of Canada Report 2—Protecting Marine Mammals, which was a performance audit by the Commissioner of the Environment and Sustainable Development. This report was finished on June 26, 2018 and tabled on Oct 2, 2018.

[http://www.oag-bvg.gc.ca/internet/English/parl\\_cesd\\_201810\\_02\\_e\\_43146.html#p21.m](http://www.oag-bvg.gc.ca/internet/English/parl_cesd_201810_02_e_43146.html#p21.m) In this document we have identified some inconsistencies in how the Federal agencies have tended to be

promotional in the TMX proposal on the one hand, while they have admitted the necessity of improving on their mandate to protect marine mammals on the other hand.

*“This audit focused on whether Fisheries and Oceans Canada, Environment and Climate Change Canada, Parks Canada, and Transport Canada had adequately protected marine mammals in waters under the jurisdiction of Canada from threats posed by marine vessels and commercial fishing (not including the harvesting of marine mammals).”*

*“In this audit, there was a focus on direct threats to marine mammals. Including : threats posed by marine vessels, such as oil spills, collisions with ships, and chronic noise and disturbance.”*

*“This audit is important because marine mammals are culturally significant to Canadians. Marine mammals also provide livelihoods to Indigenous and coastal communities, contribute economically to the whale-watching and tourism industries, and support healthy ecosystems. Moreover, commercial fishing and marine vessels can affect Canada’s marine mammal populations. As Canada’s economy grows, the risk of interactions with marine mammals will increase. If not properly managed, these interactions could also affect the country’s economy and environment, as well as Canada’s reputation in wildlife protection.”*

The planned route of transit of tankers carrying Dilbit in the TMX project will run adjacent to several marine parks and marine protected areas, and these do not even cover all the ecologically sensitive marine areas. In the Exhibit 2.2, marine protected areas cover about 3% of Canada’s total marine area, Provincial marine protected areas are recognized. This is significant because the government level of a marine protected area should not matter when it comes to protection of marine mammals, as DFO has jurisdiction over all marine mammals regardless of whether they are in a provincial marine protected area such as an Ecological Reserve or a federal marine protected area.

From the audit:

*“2.28 We found that marine protected areas offered marine mammals only limited protection from threats posed by commercial fishing and marine traffic. We also found that marine mammals were not consistently considered when marine protected areas were being established.*

*‘Why this finding matters*

*2.30 This finding matters because marine protected areas are a way of protecting marine mammals from commercial fishing and marine traffic. Marine protected areas are especially useful for migratory species, as their protection will ultimately depend on a broader consideration of threats across an expanding network of these areas.’*

*2.32 Federal organizations can regulate activities within marine protected areas, to meet conservation objectives. Of the six acts governing marine protected areas, five provide organizations with the legal authority to restrict commercial fishing and vessel traffic within the marine protected areas. The [Fisheries Act](#) and the [Canada Shipping Act, 2001](#) can also be used to restrict activities within marine protected areas. These controls have specific limits, mainly involving national defence, security, safety, and law enforcement.*

*When marine mammals are identified as an ecologically and biologically significant component in areas of interest for proposed designation as an Oceans Act Marine Protected Area, they will be included in the conservation objectives developed for the area of interest.*

*Also, the design of the Oceans Act Marine Protected Area (boundaries and allowed or prohibited activities) will focus on their protection.*

*Implementation of measures is under way and will continue, to the extent possible, as marine protected areas are identified, established, and managed.*

***Parks Canada's response.*** *Agreed. Parks Canada protects and conserves representative areas of Canada's oceans, which may include important marine mammal habitats. The Agency will build on its marine protected area management process to reduce threats to marine mammals throughout its protected areas.*

***Transport Canada's response.*** *Agreed. As a core part of its mandate, Transport Canada is committed to developing and overseeing transportation networks that are green and innovative, which includes reducing the impacts of vessel traffic on marine ecosystems. Building on measures recently announced as part of the Government of Canada's Whales Initiative for the protection of endangered marine mammals, Transport Canada will identify and implement measures to mitigate the harmful effects of vessel traffic, including restrictions on vessel operations in marine protected areas as required.*

***Environment and Climate Change Canada's response.*** *Agreed. Environment and Climate Change Canada protects and conserves nationally significant habitats and wildlife, especially migratory birds. These habitats and wildlife may include marine mammals and important habitats for them in Canada's oceans. Through its collaborative management and planning approach, Environment and Climate Change Canada will include threat reduction measures in its protected areas and other protection tools, such as vessel navigation restrictions."*

**3.13.1.1 IR #28 – To the Federal Agencies**

Given that DFO is responsible for marine mammals, will the federal agencies consider changing the routing of tankers in order to avoid interference with marine mammals in provincial marine protected areas as well as federal marine protected areas?

**3.13.1.2 IR #29 – To the Federal Agencies**

Given the importance of protecting marine mammals, and the recognition that.. "As Canada's economy grows, the risk of interactions with marine mammals will increase. If not properly managed, these interactions could also affect the country's economy and environment, as well as Canada's reputation in wildlife protection."

Are there special plans for protection of the marine mammal pupping and haul-out colonies which would be impacted in the event of an oil spill from TMX and other shipping disasters?

**3.13.1.3 IR #30 – To the Federal Agencies.**

Has the increased presence of Humpback whales in the last few years provided any incentive for the federal agencies and TMX to take steps to ensure these animals are not impacted by vessels?

### 3.14 Baseline Surveys

From: [A95299-4 Annex 06.D.30](#) – Baseline Surveys of Marine Coastline in Support to Area Response Planning A6J6Y3.pdf. Since the document states that in 2014/2015 the Gov. of Canada launched its area response Planning Initiative, and southern British Columbia was designated as a pilot area, to be dealt with in the summer of 2017, please:

<p><b>3.14.1.1 <u>IR #31 - To : DFO and EC</u></b></p> <p>Provide the location of the ecologically sensitive areas assessed, and in particular which ecological reserves were sampled.</p>
<p><b>3.14.1.2 <u>IR #32 – To DFO and EC</u></b></p> <p>Provide the location of areas used for recreational purposes that were assessed.</p>
<p><b>3.14.1.3 <u>IR #33 – To DFO and EC</u></b></p> <p>Indicate whether any areas considered to be of aboriginal interest were assessed, indicating a rationale for selection of these sites.</p>
<p><b>3.14.1.4 <u>IR #34 – To DFO and EC</u></b></p> <p>Provide a map of the location of all areas assessed.</p>
<p><b>3.14.1.5 <u>IR #35 – To DFO and EC</u></b></p> <p>Provide a list of the institutions and individuals contacted for help in identifying locations and or involved in the surveys in Southern Vancouver Island British Columbia.</p>
<p><b>3.14.1.6 <u>IR #36 – To DFO and EC</u></b></p> <p>Provide references to any pre-existing data collected by research institutions and the public.</p>
<p><b>3.14.1.7 <u>IR #37 – To DFO and EC</u></b></p> <p>Identify the location of any references to the results of this study as it pertains to the the tanker route in British Columbia</p>

## 4.0 TOPIC 3: SOUTHERN RESIDENT KILLER WHALES

Table 4-1 repeats the information request from the NEB of the Federal Agencies. It is included to help the reader understand the nature of the NEB request and fullness of the Agencies' response.

Table 4-1: Information Requested by NEB from Federal Authority (ies)

<p><b>Information requested by NEB from Federal Authority (ies): DFO, TC, VFPA, and PPA on Southern Resident Killer Whales (SRKW) <a href="#">A94793-8</a> NEB Letter to Federal Authorities - Request pursuant of the CEAA 2012 - Trans Mountain Expansion - Reconsideration - French included A6I7J4</b></p>
<p><i>Request: With regard to SRKW, in addition to the request under Topic 2 above (All Species at Risk), provide:</i></p> <p><i>a) the most recent copies of the following:</i></p> <ul style="list-style-type: none"><li>• <i>Recovery Strategy and any proposed updates or amendments;</i></li><li>• <i>Action Plan and any proposed updates or amendments;</i></li><li>• <i>Southern Resident Killer Whale: imminent threat assessment;</i></li><li>• <i>Southern resident killer whale – A science based review of recovery actions for three at-risk whale populations;</i></li><li>• <i>Oceans Protection Plan, and any relevant implementation information; and</i></li><li>• <i>any status updates on the ECHO Program as it relates to mitigation measures to reduce potential threats to SRKW as a result of shipping activities, such as acoustic disturbance (underwater noise), physical disturbance (ship collisions), environmental contaminants, and availability of prey;</i></li></ul> <p><i>b) any information or knowledge concerning the relationship between a vessel's speed and tonnage (including the different types of Project-related marine vessels under both loaded and unloaded conditions) and how much underwater noise the vessel creates;</i></p> <p><i>c) any information or knowledge concerning the potential effectiveness, safety, and technical and economic feasibility of each of the following potential mitigation measures, including how each could be implemented and monitored, and who (i.e., what authority, body, or organization) would be responsible for each aspect of implementation and monitoring:</i></p> <ul style="list-style-type: none"><li>• <i>altering shipping lanes to reduce adverse effects on SRKW, such as shifting lanes away from marine mammal congregation areas; or speed restrictions and altered shipping patterns, such as convoys, in order to reduce potential adverse effects such as underwater noise or the potential for ship strikes;</i></li><li>• <i>speed restrictions and altered shipping patterns, such as convoys, in order to reduce potential adverse effects such as underwater noise or the potential for ship strikes;</i></li><li>• <i>use of marine mammal on-board observers on Project-related marine vessels, and what actions need to be taken if SRKW are observed;</i></li><li>• <i>measures to increase abundance of prey to offset adverse effects from Project related marine shipping;</i></li><li>• <i>vessel design (including hull and propeller) and maintenance measures for reducing adverse effects such as underwater noise from Project-related marine vessels;</i></li></ul>

**Information requested by NEB from Federal Authority (ies): DFO, TC, VFPA, and PPA on Southern Resident Killer Whales (SRKW) [A94793-8](#)  
NEB Letter to Federal Authorities - Request pursuant of the CEEA 2012 - Trans Mountain Expansion - Reconsideration - French included A617J4**

- *any other measure that could avoid, reduce, and/or offset the adverse effects of Project-related marine shipping on SRKW; and*
- *measures that could avoid or reduce cumulative adverse effects on SKRW cumulative adverse effects on SKRW.*

We believe that the Federal Agency response met the test for information sought by the NEB.

FER will restrict its focus to SRKW although the recovery strategy also addresses NRKWs. The recovery strategy identifies that all of the waters within the shipping lanes through which dilbit is now transported have been identified as critical habitat. The TMX project will increase the risk to these endangered whales in three ways. First: there will be added noise to the acoustic environment; second, a spill of dilbit into this critical whale habitat could well destroy the population; and third the increased tanker traffic increases the likelihood of whale strikes and mortality. We will focus on noise abatement and whale strike options here and discuss a dilbit spill and SRKW under Topic 5.

There are opportunities for the NEB to mitigate the impacts of noise on these threatened whales. We believe that reducing the speed of tankers under the control of TMX is a measure that will be of benefit to the SRKWs. Even when fully developed, TMX shipping will contribute about 6 per cent more vessels to the total overall shipping traffic. From a cumulative effects point of view any reduction in noise will be of benefit.

DFO submitted the Proposed Recovery Strategy for the Northern and Southern Resident Killer Whales (*Orcinus orca*) in Canada.<sup>12</sup> The recovery strategy identifies critical habitat for Resident Killer Whales to include and states on page 44:

*“transboundary waters in southern British Columbia, including the southern Strait of Georgia, Haro Strait, and Juan de Fuca Strait” and waters on the continental shelf off southwestern Vancouver Island, including Swiftsure and La Pérouse Banks);*

The recovery strategy describes Critical Habitat that is beyond the 12 nautical mile limit. We take issue with the project study area being limited to the 12 nautical mile limit. Critical habitat extends beyond this and so does the risk from the TMX tankers.

The NEB sought advice from intervenors on the spatial limits of the inquiry and received many responses from Aboriginal groups and other intervenors indicating that the outer limits of the EEZ should be the area for the reconsideration process.

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<sup>12</sup> Fisheries and Oceans Canada. 2018. Recovery Strategy for the Northern and Southern Resident Killer Whales (*Orcinus orca*) in Canada [Proposed]. Species at Risk Act Recovery Strategy Series, Fisheries & Oceans Canada, Ottawa, x + 84 pp.

There was no concrete rationale for the decision to limit the project to the 12 nautical mile limit. Both the waters of Swiftsure Bank and La Pérouse Banks which are well beyond the 12 mile limit, can be negatively impacted by a dilbit spill.

From the Proposed SRKW Recovery Strategy ([https://www.registrelep-sararegistry.gc.ca/virtual\\_sara/files/plans/Rs-ResidentKillerWhale-v00-2018Aug-Eng.pdf](https://www.registrelep-sararegistry.gc.ca/virtual_sara/files/plans/Rs-ResidentKillerWhale-v00-2018Aug-Eng.pdf)) on Page 47:

*“Critical habitat off southwestern Vancouver Island (Figures 4 and 5) includes the Canadian portions of Swiftsure Bank, where acoustic monitoring between August 2009 and July 2011 indicated considerable habitat use by both Southern and Northern Resident Killer Whales over much of the year. Additionally, it encompasses several other relatively shallow banks, including La Pérouse Bank which, like Swiftsure Bank, is among the most productive fishing areas for Chinook Salmon on the west coast of North America. During this acoustic monitoring, all three Southern Resident Killer Whale pods were detected in this area, with L pod being the most frequently documented (Ford et al. 2017). The area is important for Southern Resident Killer Whales, both during summer, when groups of whales spend time west of the critical habitat area in the transboundary waters in southern BC, and in winter, when whales are mostly absent from the southern BC critical habitat area, but were detected frequently off southwestern Vancouver Island (DFO 2017b).”*

Friends of Ecological Reserves sought inclusion of Critical Habitat in the shipping lanes beyond the 12 nautical mile limit and the Exclusive Economic Zone (EEZ) for areas classified as Critical Habitat for SRKW. Board of FER filing can be viewed at [A94736](#). It is our view that the scope of this project needs to include critical habitat beyond the 12 nautical mile limit especially as dilbit carrying tankers will be transiting this area.

This unexplained exclusion of SRKW habitat from the Reconsideration Hearing may open the NEB to a legal challenge.

**4.1.1.1 IR #38 – To NEB**

Please provide a clearer rationale on why the areas shown in green in Figure 4-2 (Swiftsure Bank and La Pérouse Banks) were excluded, yet dilbit tankers transit through this critical habitat and shorelines on the west coast of Vancouver Island will get oiled from a spill at sea in this area too.

The map below (Figure 4-1) is of SRKW ranges taken from Proposed SRKW recovery Strategy 2018, page 5.

Topic 3: Southern Resident Killer Whales

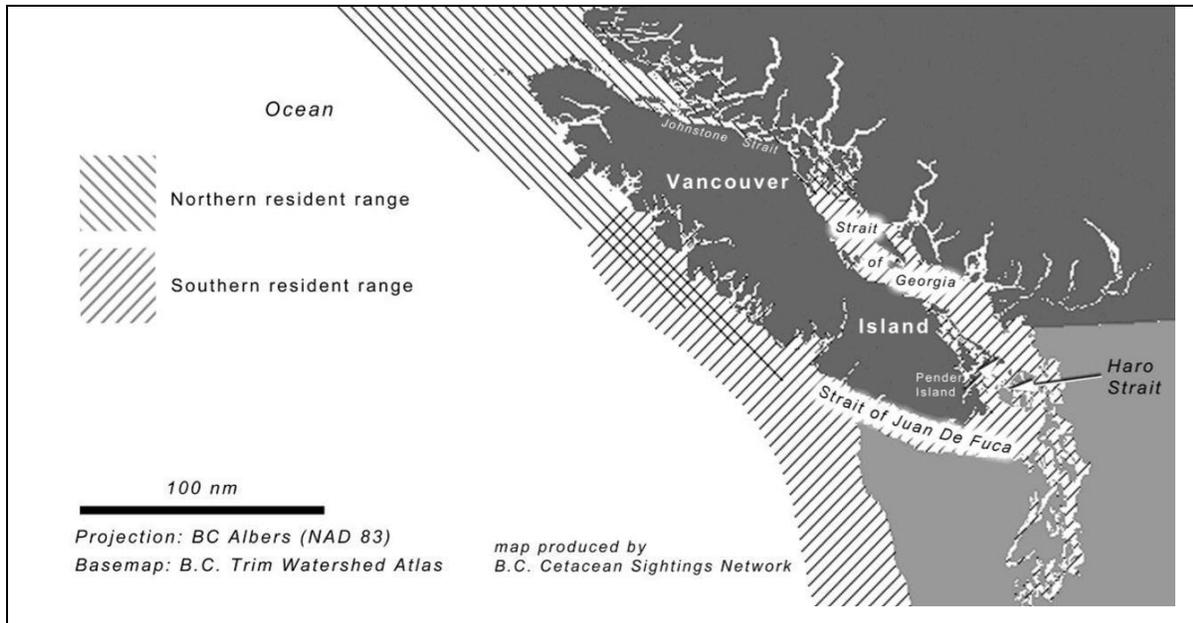


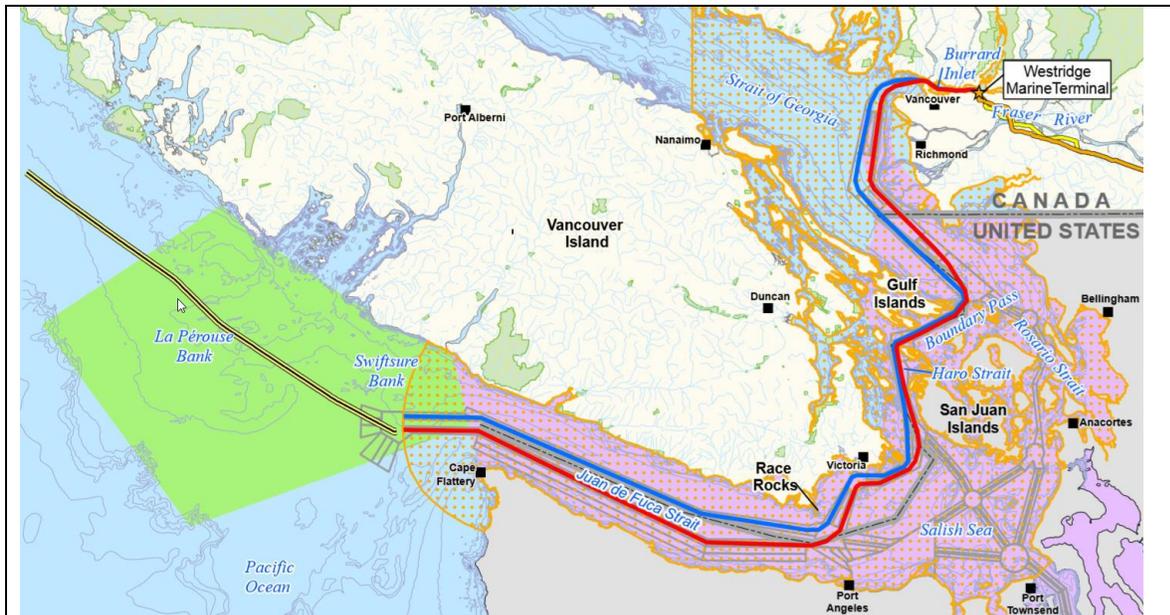
Figure 4-1: Map of SRKW Ranges Taken From Proposed RKW Recovery Strategy

The 2018 Proposed recovery plan also states on page 5: (emphasis added)

*The main area of concentration for Southern Residents is **Haro Strait** and vicinity off southeastern Vancouver Island but they are commonly seen in **Juan de Fuca Strait**, and the **southern Strait of Georgia** (Ford et al. 2000). Of the three Southern Resident pods, J pod is most commonly seen in inside waters throughout the year, and appears to seldom leave the Strait of Georgia-Puget Sound-Juan de Fuca Strait region in most years (Ford et al. 2000). K and L pods are more often found in western Juan de Fuca Strait and off the outer coasts of Washington State and Vancouver Island. **Unlike J pod**, K and L pods typically leave inshore waters in winter and return in May or June Recovery Strategy for the Northern and Southern Resident Killer Whales in Canada*

This is evidence that J pod spends most of its time in the shipping lanes and that it is reasonable to conclude that this population will benefit from any and all mitigation strategies applied to the shipping lanes.

Figure 4-2 is from evidence filed by TMX and shows the 12 limit and all of the Critical Habitat [A95280-26 - Stantec map of Killer whale Habitat A6J6H8](#).



**Figure 4-2: Critical Habitat Identified in the Proposed Recovery Strategy and SRKW Habitat Excluded from Reconsideration Hearings Swiftsure and La Pérouse Banks**

The Board of FER is concerned with the very low population of SRKWs and the negative impacts that the TMX project cumulatively adds to these low numbers. See Figure 4-3 on 40 years of population trends. We acknowledge that when the project is fully built out, TMX Aframax tankers will represent 6 per cent of shipping and there will be 40 tankers exiting with escort tugs and 40 incoming. We also realize that cumulatively, all shipping produces noise and that according to the Proposed SRKW Recovery Strategy the worst offenders in creating a noisy environment may be the Department of National Defense.

It was insightful to learn that whales in the presence of a lot of noise, need to shout to be heard and that long exposure to noise can lead to deafness in whales. We conclude that in a noisy environment, a deaf whale is a dead whale. Whales are highly social and depend on each other to be heard above the acoustic din. It was also apparent from the recovery strategy that noise travels at great speeds and for long distances. Thus whales have to contend with ever increasing noise from recreational boaters, shipping and extremely harsh noise from navy ships and others by using louder underwater acoustics to communicate and find prey. Like humans, whales also suffer hearing loss upon exposure to noise.

The Proposed Recovery Strategy for the Northern and Southern Killer Whales in Canada, shows on page 9, a Population Viability Analysis which states:

*These models predicted that prey limitation had the greatest potential to impact population growth, but that either higher levels of noise and disturbance or higher levels of PCB contamination would also be sufficient to shift population trajectories from slow positive growth into decline.*

The Board of FER recognizes that there are some direct mitigative measures available for the TMX project. The most apparent noise reduction mitigation strategy is for Aframax tankers to slow down, both entering and exiting. There is evidence that 7 knots is a significantly quieter speed.

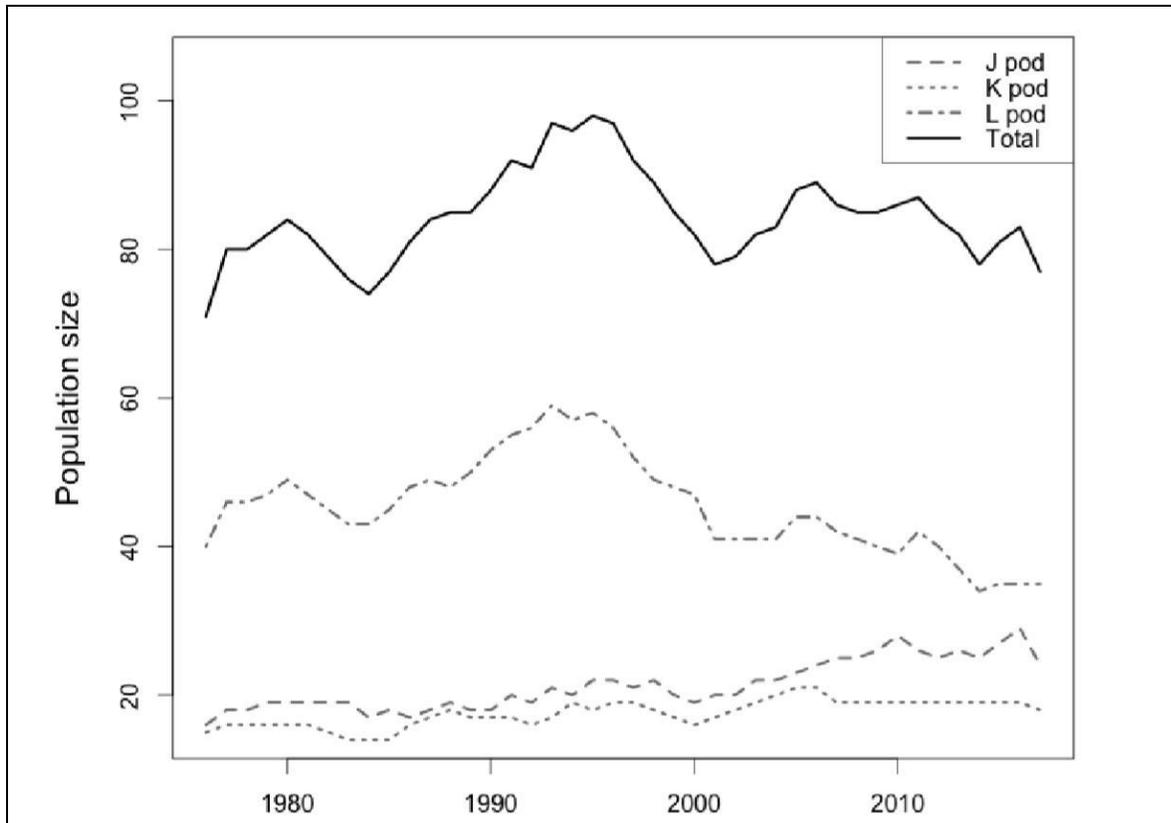


Figure 4-3: Population Trend Last 40 Years SRKWs

## 4.2 Federal Agency Evidence

FER reviewed much of the evidence filed and believes that many of these reports have clarified the marine science sufficiently so that Federal Agencies are able to make policy and regulation changes instead of maintaining the status quo or delay making a change while continuing to study SRKW.

### 4.2.1 Direct Evidence and Information Requested By The National Energy Board

We are including excerpts from the filed Federal Agencies Evidence in order to facilitate readers' understanding of our meaning. However, we are including links for the documents that we have excerpted for the purpose of completeness. From page 57: [A95292-2 2018-10-31 Direct Evidence](#) DFO-EC-HC-NRC-PC-TC A6J6L9.pdf,

*“Several regional management measures are currently underway, being tested, being developed or being explored. Through Transport Canada’s support and participation in the ECHO program, measures include:*

- *A voluntary vessel slowdown in Haro Strait*
- *A trial lateral displacement of vessel traffic in the Strait of Juan de Fuca*
- *Vessel quieting options study and port incentives for quiet design*
- *A regional noise contribution study*

- *Communication material for the education of mariners*
- *A whale report alert system to inform mariners of whale presence”*

*“Participation rates have been high for both the voluntary vessel slowdown (approx. 90%) in Haro Strait and the trial lateral displacement in the Strait of Juan de Fuca (approx. 70%). Non-participation has been principally due to operational/safety considerations. For example, it may not be safe for a vessel to comply with reduced speeds during inclement weather.”*

**4.2.1.1 IR #39 – To DFO**

When will the section on SRKW in the Proposed Recovery Strategy be finalized and not a proposed strategy? SRKW were listed as endangered in 2001.

**4.2.1.2 IR #40 – To DFO and TC**

Do the agencies plan to use any of the numerous legal and operational tools at their disposal to enforce measures when implementing the Proposed Recovery Strategy for SRKW or will they rely on voluntary compliance?

Mitigation methods, as in the quote above, have been proposed to reduce vessel traffic noise in order to permit a quieter soundscape for SRKW communication and food echolocation. The following research done on the East Coast, suggests that without limitation in regulation, rigorous enforcement and compulsory adherence, the voluntary slowdown of vessels in Haro Strait has little chance of being successful. It is noted by Silber 2014<sup>13</sup> however that *“Citations/fines appeared to have the greatest influence on improving compliance in notified vessels/companies”*

We produce the abstract below and wonder at the differences between the east and west coasts use of regulation to reduce mortality for endangered species while the agency staff on the west coast rely on voluntary measures.

*“ABSTRACT: Environmental regulations can only be effective if they are adhered to, but the motivations for regulatory compliance are not always clear. We assessed vessel operator compliance with a December 2008 regulation aimed at reducing collisions with the endangered North Atlantic right whale that requires vessels 65 feet or greater in length to travel at speeds of 10 knots or less at prescribed times and locations along the U.S. eastern seaboard. Extensive outreach efforts were undertaken to notify affected entities both before and after the regulation went into effect. Vessel speeds of 201,862 trips made between November 2008 and August 2013 by 8,009 individual vessels were quantified remotely, constituting a nearly complete census of transits made by the regulated population. Of these, 437 vessels (or their parent companies), some of whom had been observed exceeding the speed limit, were contacted through one of four non-punitive information programs. A fraction (n = 26 vessels/companies) received citations and fines. Despite the efforts to inform mariners, initial compliance was low (<5% of the trips were completely <10 knots) but improved in the latter part of the study. Each notification/enforcement program improved compliance to some degree and some may have influenced compliance across the entire regulated community. Citations/fines appeared to have the greatest influence on improving compliance in notified*

<sup>13</sup> Silber GK, Adams JD, Fonnesebeck CJ. (2014) Compliance with vessel speed restrictions to protect North Atlantic right whales. PeerJ 2:e399 <https://doi.org/10.7717/peerj.399>

*vessels/companies, followed in order of effectiveness by enforcement-office information letters, monthly summaries of vessel operations, and direct at-sea radio contact. Trips by cargo vessels exhibited the greatest change in behavior followed by tanker and passenger vessels. These results have application to other regulatory systems, especially where remote monitoring is feasible, and any setting where regulatory compliance is sought."*

### 4.3 Discussion

In the case of SRKW we are not in support of the current voluntary approach for noise mitigation, nor do we support the end of the trials for lateral displacement and going back to pre-trial shipping lanes. We are skeptical that ships need to maintain speed in inclement weather while transiting SRKW habitat as a safety measure. There are other alternatives such as anchoring until the weather changes. We believe the safety concern may be a strategy used to keep the status quo.

#### 4.3.1.1 IR #41 – To TC

Regulation on Speed: Given the results of the 2014 study by Silber et al, how can we be assured that the voluntary reduction of speed will be an effective mitigation effort in providing for less interference in the soundscape of SRKW and in collision prevention with all cetacean species in the vessel traffic lanes of southern British Columbia? Please provide as evidence, the data that supports the statements that the high compliance rates were achieved to the voluntary slower ship speed trials.

A most comprehensive study Matthews 2018<sup>14</sup> was provided by the Federal Agencies Annex 3.F.2 [A95292-7 Annex 03.F.02](#) – Vessel Noise within SRKW Critical Habitat A6J6Q4.pdf. We have selected a few conclusions from this study which support slowing vessels as a strong mitigation method.

#### Key findings page v.

##### ***Slowing vessels***

*Slow-down speeds of 10 and 7 knots were also investigated in Haro Strait. The slowest speed evaluated (7 knots) produced approximately twice the decibel reduction of the 11 knot speed limit. Slow-downs could, therefore, be beneficial to SRKW in areas near a prescribed slow-down zone in Haro Strait*

*Still, the mitigated SRKW audiogram-weighted levels were generally equal to baseline levels, indicating that slowing vessels in Strait of Georgia at least offset the added noise of increased tanker and tug traffic from Trans Mountain's project*

*This mitigation measure is likely one of the most straightforward to implement, but it does have impacts on vessel schedules and operating costs, and possibly on navigational safety that need to be considered.*

<sup>14</sup> Matthews, Marie-Noël R. Zahraalsadat Alavizadeh David E. Hannay Loren Horwich Héloïse Frouin-Mouy, 2018. Assessment of Vessel Noise within the Southern Resident Killer Whale Critical Habitat Final Report Version 2.1 by JASCO Applied Sciences (Canada) Ltd. done for Transport Canada Innovation Centre. pp271.

Overall, vessel speed reductions appear to be effective at reducing noise exposures at nearly all receiver sites in SRKW habitat in all study sub-regions except Strait of Georgia. This mitigation measure is likely one of the most straightforward to implement, but it does have impacts on vessel schedules and operating costs, and possibly on navigational safety that need to be considered.

**Rerouting Shipping lanes and traffic.**

A shift of the shipping lanes westward in Haro Strait, away from the important SRKW foraging areas on the west side of San Juan Island, reduced the audiogram-weighted noise levels at receiver sites by 0.0 to 1.9 dB. The two stations adjacent to the original lanes experienced larger decreases of 2.5 and 7.0 dB. Generally, this mitigation approach was found to be relatively effective.

The primary benefit in Juan de Fuca Strait arises from moving tug traffic, which currently transits largely outside the shipping lanes, and, therefore, closer to important SRKW habitat, into or at least closer to the shipping lane. That change should be relatively simple to implement.

**Replacing the top 10% of noisiest commercial vessels**

The reduction of 10% of noisiest vessels potentially reduces noise levels throughout the entire study area and warrants consideration since it now is possible with systems such as the ECHO listening station to at least identify these vessels. They could, therefore, be selectively mitigated through some other means (such as targeted slowing).

page 247 **Operator Behaviour** Cavitation Speed.

This could include operating their vessels just below cavitation inception speed whenever possible, especially when in critical habitat

P 249 **Changing Shipping Practices**

Marine traffic planners ..... can make recommendations to manage traffic composition to minimize noise presence in sensitive habitat areas. Specific measures resulting from spatial and temporal traffic management could result in grouping vessels with lower underwater noise emission and spacing vessels with higher noise emission farther apart.

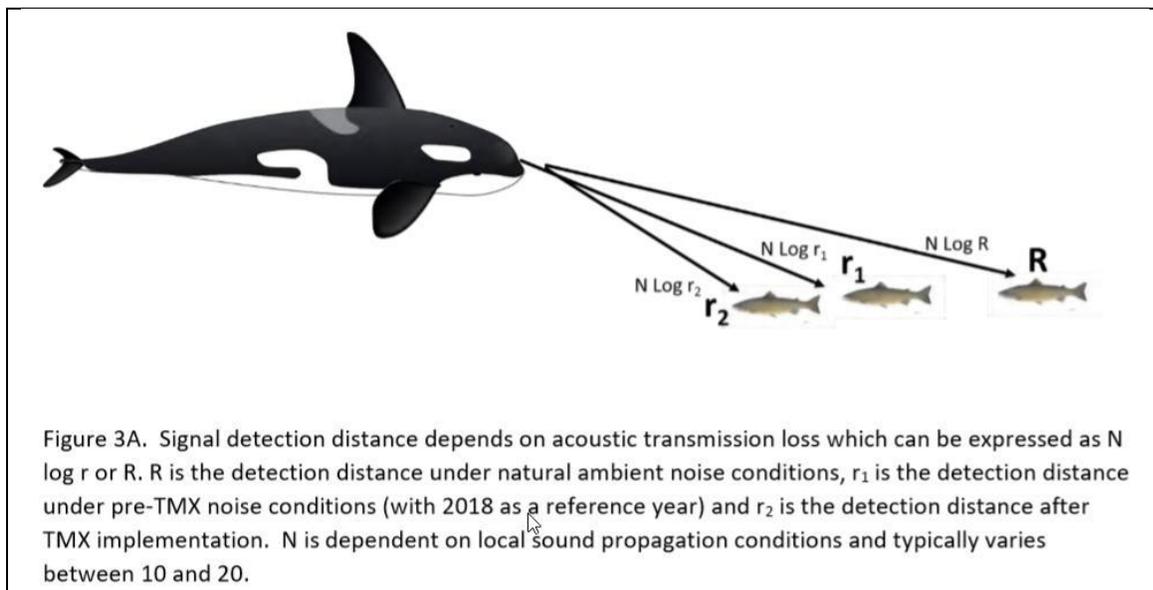
“a traffic control system (flashing lights warning ships of animal presence) could be installed in choke points (e.g., Haro Strait, Boundary Pass, and Active Pass for SRKW). The traffic control system could be used to regulate the speed of commercial vessels, but it could also limit access of other vessel classes to sensitive habitats.”

Another study by Heise 2017<sup>15</sup> provides insights on how underwater impacts SRKW and increase stresses on them. Figure 4-4 is copied from their study.

The effect of noise on SRKW was described in the Executive Summary as:

*three principal impacts of this noise. The first is behavioural disturbance, the impacts of which can be increased physiological stress, disruption of important activities such as resting and foraging, avoidance behaviours and hearing sensitivity threshold shifts. The second is communication masking, which impacts group cohesion and coordination and interferes with important social behaviours. The third is echolocation masking, which reduces foraging efficiency and may also impair navigation, orientation and hazard avoidance.*

Figure 4-4 shows the impacts for prey location and the changes when the soundscape gets louder. (taken from Heise 2017 study, page 11)



**Figure 4-4: The Impacts for Prey Location and The Changes When The Soundscape Gets Louder**

<sup>15</sup> Heise, K.A., Barrett-Lennard, L.G., Chapman, N.R., Dakin, D.T., Erbe, C., Hannay, D.E., Merchant, N.D., Pilkington, J.S., Thornton, S.J., Tollit, D.J., Vagle, S., Veirs, V.R., Vergara, V., Wood, J.D., Wright, B.M., Yurk, H. 2017. Proposed Metrics for the Management of Underwater Noise for Southern Resident Killer Whales. Coastal Ocean Report Series (2), Ocean Wise, Vancouver, 30pp.  
[https://www.researchgate.net/publication/319991492\\_PROPOSED\\_METRICS\\_FOR\\_THE\\_MANAGEMENT\\_OF\\_UNDERWATER\\_NOISE\\_FOR\\_SOUTHERN\\_RESIDENT\\_KILLER\\_WHALES\\_Coastal\\_Ocean\\_Report\\_Series/download](https://www.researchgate.net/publication/319991492_PROPOSED_METRICS_FOR_THE_MANAGEMENT_OF_UNDERWATER_NOISE_FOR_SOUTHERN_RESIDENT_KILLER_WHALES_Coastal_Ocean_Report_Series/download)

We cite research from Viers 2016:<sup>16</sup>

*“Such ship noise has the potential to mask odontocete signals, especially in coastal environments where shipping lanes are close enough to the shoreline (<10 km) that high frequency sound is not fully absorbed. In the summertime habitat of the endangered SRKWs ship noise may interfere not only with SRKW communication (vocalizations) but also foraging and navigation (echolocation clicks).” noise received from ships at ranges less than 3 km extends to frequencies used by odontocetes.*

This was important research centred on Haro Strait which is a whale habitat hot spot.

There was also evidence that marine species other than SRKW are affected by acoustic noise as shown in the report provided in the [Federal Agencies Annex 03.F.03](#).

Heise 2017 (see footnote #15) provides insight that other marine species such as other whales, seals, sealions and fish are also impacted by acoustic noise.

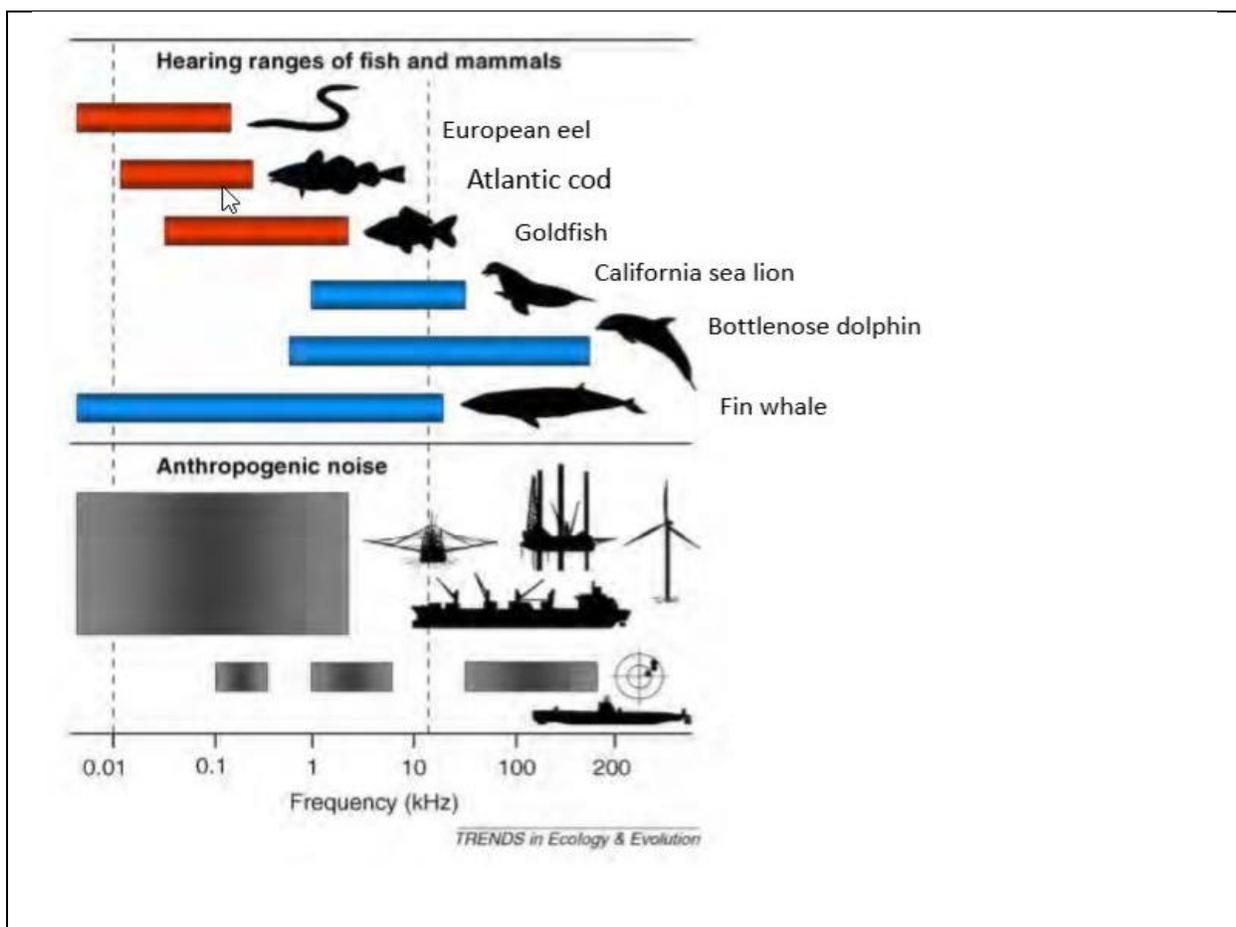


Figure 4-5: Hearing Ranges of Fish and Mammals

<sup>16</sup> Veirs S, Veirs V, Wood JD. 2016. Ship noise extends to frequencies used for echolocation by endangered killer whales. *PeerJ* 4:e1657 <https://doi.org/10.7717/peerj.1657>

Topic 3: Southern Resident Killer Whales

The following ecological reserves and conservation areas are located within 2 km of the shipping lanes and the species using these will also benefit from lower noise levels. The Canadian Rockfish Conservation areas are shown in Figure 4-6:

1. Oak Bay Islands Ecological Reserve (Canada);
2. Discovery Island Marine Park (Canada);
3. Trial Islands Ecological Reserve (Canada);
4. Eastern Burrard Inlet Rockfish Conservation Area (Canada);
5. Saturna South Rockfish Conservation Area (Canada);
6. Bedwell Harbour Rockfish Conservation Area (Canada);
7. Brethour, Domville, Forrest, and Gooch Islands Rockfish Conservation Area (Canada);
8. D'Arcy Island to Beaumont Shoal Rockfish Conservation Area (Canada);
9. Discovery and Chatham Islands Rockfish Conservation Area (Canada);
10. Trial Island Rockfish Conservation Area (Canada)
11. Olympic Coast National Marine Sanctuary (US);
12. San Juan County/Cypress Island Marine Biological Preserve (US); and
13. Haro Strait Special Management Fishery Area (US).

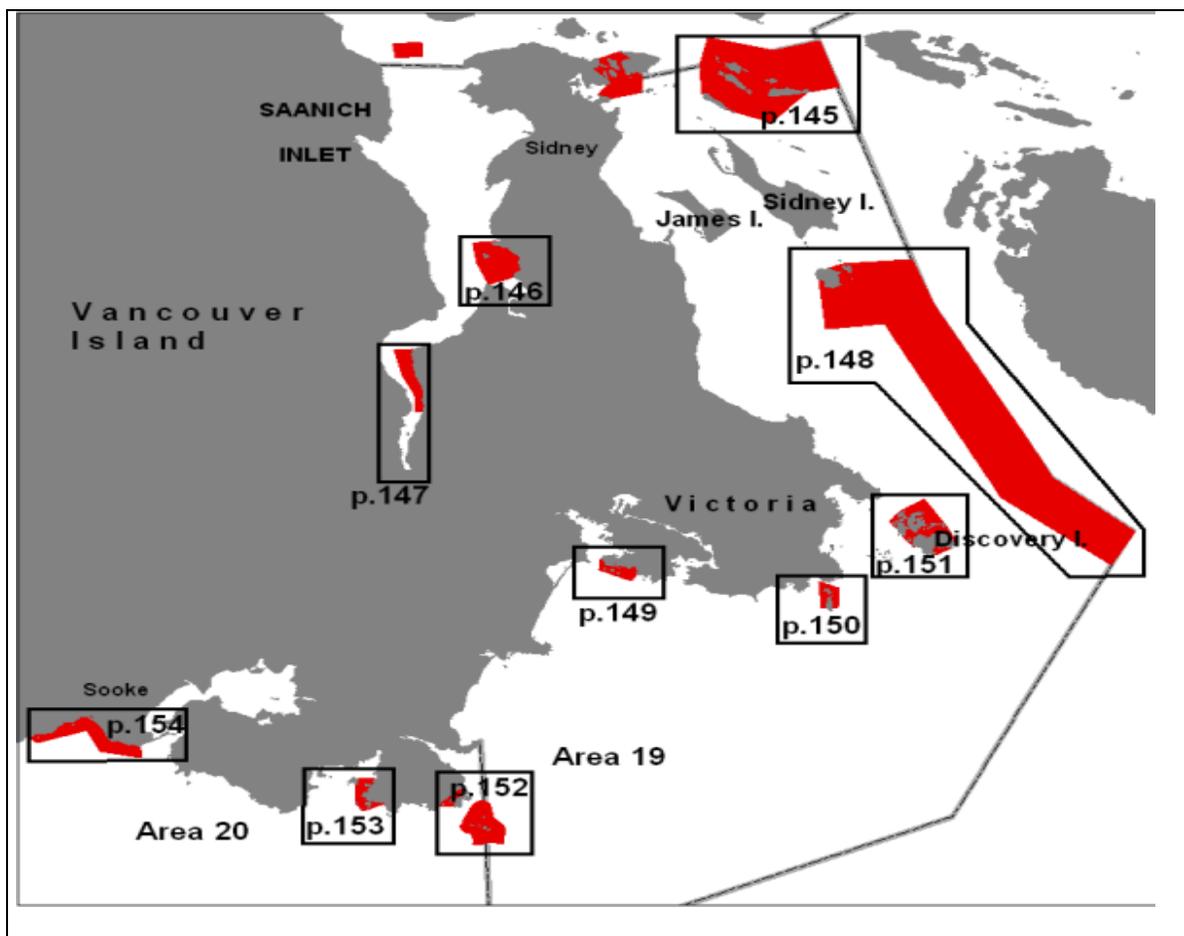


Figure 4-6: Rock Fish Conservation Areas Near Shipping Lanes

We examined evidence provided in Greenwood Risk Assessment,<sup>17</sup> 2018. Annex 3.F.4 Ship Noise Mitigation Risk Assessment [A95292-9 Annex 03.F.04 - Ship Noise Mitigation Risk Assessment A6J6Q6](#)

This invitational workshop was for marine experts only. The report summarizes what the marine experts considered and offers some mitigation strategies that would apply to all shipping if acted on. From page 18:

*The Measures deemed acceptable for further examination, towards possible implementation are:*

- 1a – the Whale Protection Zone in east Haro Strait;*
- 1b – the small craft route up the west side of Haro Strait;*
- 1e – the shift of the TSS further south at Swiftsure Bank (SJDF entrance); and*
- 4a-4d – all the Speed Reduction options for Haro Strait and SJDF*

**4.3.1.2 IR #42 – To TC and DFO**

Are Transport Canada and DFO considering an immediate application of a speed restriction regulations, with citations and fines if non-compliant, that applies to all vessels and which will be enforced here on the Pacific Coast in SRKW habitat?

**4.3.1.3 IR #43 – To DFO and TC**

If failure to achieve a 100% compliance rate occurs because it may “**not be safe for a vessel to comply with reduced speeds during inclement weather**”, has DFO and Transport Canada considered the obvious solution which would be prohibiting vessel traffic through sensitive areas such as Haro Strait in such conditions?

**4.3.1.4 IR #44 – To TC and DFO**

Given that the SRKW habitat occurs over a large extent of the intended vessel traffic lanes, it would seem to be more effective for survival of the SRKW to require speed reduction whenever SRKW are encountered within a designated distance of the vessel.

**4.3.1.5 IR #45 – To TC and DFO**

Is Haro Strait being considered as the only area for speed vessel reduction? If so explain how this is going to be of much benefit to the survival of the SRKW unless other areas of vessel traffic through SRKW habitat are treated.

<sup>17</sup> Greenwood, Nigel S. 2018, Ship Noise Mitigation Risk Assessment, GMSL Report 02/18 Version 1.3. Prepared for Transport Canada.

#### 4.4 Mitigative Measures Available to NEB Related to SRKW and TMX Permit Conditions

TMX carries some responsibility for adding more noise due to the expansion and their contracted Aframax tankers. Both arriving and departing tankers add noise and from the whales soundscape the current noise is 12 tankers going through the habitat increasing to 80 and if the tugs are added in, another 40 ships going through critical habitat. Given the benefits to other species, FER does not support measures that only slow shipping if SRKW are present as quieting of the sound scape in the Salish Sea will improve the performance of many species, including but not limited to SRKW. Nor are we in support of continued voluntary slow downs and voluntary lateral displacements.

1. The NEB could approve the TMX project and its resultant increase in Aframax tanker traffic, but impose a permit condition that would lower speeds (7knots) while in critical SRKW. This condition would apply to incoming and outgoing Aframax tankers and their escort tugs.
2. The NEB could, through permit conditions, approve TMX project if TMX were to use electric or hybrid tugs.

#### 4.5 Mitigative Measures Available to Federal Agencies

We are thankful for the amount of evidence shared by the Federal Agencies and the amount of research information that was provided since the 2016 NEB Report was written. We are fearful that Agencies, of their own volition, are unlikely to change the status quo in the short term. We think the SRKW, which was listed as Endangered in November 2001, and the status re-examined and confirmed in November 2008 will not ever get to a finalized strategy, as after 17 years, the inertia by DFO appears unlikely to change. There may be an institutional culture of inaction on conservation.

We believe there is great urgency and the NEB is in an unprecedented position to seek from the Federal Cabinet some leadership on the number of mitigation strategies that are referenced in the evidence filed.

This includes some of the following:

1. A slowing of all shipping to 7 knots to reduce noise while in SRKW habitat whether whales are present or not due to the benefits to other marine species.
2. An exclusion zone for all motorized craft in known "hotspots".
3. Moving shipping lanes to allow for greater distance from Killer whales in Haro Strait.
4. Moving shipping lanes further out of the critical habitat in Sooke.
5. Requiring tow vessels to tow further off shore when in Critical Habitat.
6. A mitigative measure that the NEB could make known to Cabinet is for Canada to follow the lead of the US and reduce stress on SRKW. On Nov 7, 2018, it was reported that the Task Force studying SRKW called on the Governor of the State of Washington to support and put into effect a ban on whale watching to protect orcas in order to increase their chances of survival and reduce disturbance especially for pregnant females. <https://www.cbc.ca/news/canada/british-columbia/washington-state-group-calls-for-whale-watching-boat-tour-ban-1.4895587>

7. Electric and highbred tugs were mentioned as a means to reduce noise. Between the Aframax tankers and the tethered tugs, there is a great deal of noise associated with shipping dilbit. After escorting the tanker, the untethering tugs will remain in SRKW habitat as they transit back to escort the next Aframax tanker. This is a mitigation strategy that should be fully explored.

We believe that some of the mitigating options revealed by the Federal Agencies may not be implemented as there are no commitments or any policy announcements. We remain concerned that the Federal departments will study and continue the inertia so the status quo can be maintained such as:

1. altering shipping lanes;
2. speed restrictions and altered shipping patterns,
3. measures to increase abundance of prey to offset adverse effects from Project related marine shipping;
4. vessel design and noise; and
5. all mitigation measures implemented to address cumulative measures.

## 5.0 TOPIC 5: MARINE OIL SPILLS

### 5.1 Assessment of TMX Opening Statement

The opening statement by TMX ([A95280 on lines 71 and 72](#)) states:

*“Trans Mountain has little direct control over the operating practices of the tankers or tugs calling at the WMT, as Project-related marine vessels will be owned and operated by third-parties.” ... Updated Tanker Acceptance Standards*

While this is true, once on contract and at work, TMX has little control over tugs and tankers however, TMX does have full control over which tankers and tugs it hires. It is of some comfort to see a TMX reference to Updated Tanker Acceptance Standards. Tanker standards are a mitigative strategy. If the tankers, for example, are screened for acoustic quietness and GHG emissions and TMX has agreed to use only the quietest of tankers and tugs and lowest GHG emissions ships in their employ, then TMX has mitigated marine impacts. This could be a best practices for TMX and also such standards could be an NEB permit condition.

#### **5.1.1.1 IR #46 – To TMX**

We request TMX file as evidence, the Shipboard Oil Pollution Emergency Plan (SOPEP) and the Shipboard Marine Pollution Emergency Plan (SMPEP) referred to in section 21.13 of their November 2018 updated Tanker Acceptance Standard.

#### **5.1.1.2 IR #47 – To TC and DFO**

Has TMX ever denied a contract to an Aframax tanker or an escort tug based on a failure to meet their standards?

In the opening statements by TMX on Lines 89 -94 ([A95280](#)), TMX provides thoughts on mitigation options. The Board of FER concludes that the 3 mitigation options presented by TMX, do not match the longer list of practical and immediate options provided in Federal Agencies filed evidence.

*“there are only three new plausible mitigation measures available to Trans Mountain to potentially reduce the effects of marine shipping: (1) instruct Project vessels to follow a slight route deviation to avoid recently proposed critical habitat for southern resident killer whale; (2) further evaluate the feasibility of using escort tugs to assist with spill response; and (3) work with Project shippers to explore optimizing and reducing the number of Project-related vessel shipments.”*

There are definitely more than the 3 mitigation options. There is evidence on ship noise mitigation from the ECHO program to which TMX has provided funding, indicating that a mitigation strategy which is immediately available to TMX is to slow ship speed. Slower tanker speeds produce less noise and improves the soundscape for SRKW, produce less GHG emissions which mitigates impacts on air quality, and slower speeds mitigate the probability of marine mammal strikes. Slowing shipping and a more complete discussion, appears in the TOPIC 3 SRKW section of this report.

We are pleased to see TMX recognize in their first mitigation strategy, that a change in shipping routes is a practical mitigation strategy that is applicable to SRKW critical habitat. It is also a mitigation strategy for many other species in the event of an oil spill, where upon the arrival of equipment on site from the RO is improved when a leaking tanker is further from shore and the probability of containment before oil reaches the shore is greater. We strongly support changes in shipping lanes as a mitigative strategy.

We also know that change in shipping lanes can mitigate risk to other high value habitat and can be used to protect high value habitats in Ecological Reserves such as Trial Island, Oak Bay Islands and Race Rocks Ecological Reserves. These reserves, just like SRKW habitat, have shipping lanes that could be moved further offshore to mitigate all shipping impacts. We thank TMX for their observation that moving shipping lanes is a practical mitigative strategy and when applied to all shipping, will reduce the risk to many high value sensitive ecosystems such as ERs and known high use SRKW areas in Haro Strait. Figures 5-1 and 5-2 show tankers passing Oak Bay, Trial Island and Race Rock ERs.



**Figure 5-1: Aframax Tanker passing by Oak Bay Islands ER**



**Figure 5-2: Bulk carrier passing Race Rocks ER**

We are pleased to learn that escort tugs are part of spill response planning by TMX. These tugs are on site and can be alongside a leaking Aframax tank immediately and long before WCMRC's resources will be able to arrive, which would be 18 to 72 hours later according to current standards for Haro and Juan de Fuca Straits. We conclude that speed is critical to containing a dilbit spill and mitigating environmental damage. It would be brilliant if escort tugs can perform double duty, first in prevention and also as an immediately available resource for containment and while waiting for RO organizations to arrive for added recovery response.

**5.1.1.3 IR #48 – To TMX**

Since TMX indicates there are plans to *further evaluate*, we request that TMX provide evidence to the hearings of the evaluation it has on hand on escort tugs as oil recovery assist vessels. Is the evaluation considering deployment of booms carried on the escort tugs? Would an escort tug carrying a containment boom require a differently configured escort tug with sufficient capacity to have on board a containment boom sufficient in length to encircle an Aframax tanker? How much deck space would be needed on such a vessel?

The third mitigation strategy referenced and offered by TMX is to increase dilbit tanker sizes. We understand that because of the width under the second Narrows Bridge, wider tankers may not be an option. We note that the only way to achieve greater volume shipment in a single tanker will be to have longer, narrower tankers. While this has benefits, as we understand there are energy efficiencies that come from longer slender vessels, such as less GHGs, fewer sailings and lower marine noise, there would also be changes needed in oil recovery response infrastructure as larger tankers can potentially spill more dilbit. There is then a need to have a new a credible Worse Case spill scenario and reconfigure ROs so they can meet the challenges of a larger spill. We also

understand the loading and berthing for long vessels requires changes from the current Westridge Marine Terminal (WMT) and a completely different build out of berths.

**5.1.1.4 IR #49 – To TMX**

What tanker sizes are being considered by TMX to increase shipping capacity over the current Aframax tankers?

**5.1.1.5 IR #50 – to TMX**

What are the TMX plans and contracts to build loading facilities for larger tankers?

We note that the expected life of this project is 30+ years. There has been in our estimation a lot of excellent research done since the last hearings 3 years ago. It is reasonable to expect many of the regional initiatives will provide future insights on reducing impacts on shipping over the life of the TMX project. TMX's opening statement below indicates that it does not see a role for itself during the life of the project or perhaps at best, a discretionary role with marine shipping. This is justified as TMX sees itself as contributing a small percentage of all shipping.

TMX states ([A95280](#)) in lines 124-130 that:

*Finally, although many regional initiatives are ongoing and may not be completed for some time, these initiatives do not need to be completed before the Project can commence. The initiatives are appropriately focused on all marine shipping in the Salish Sea, of which the Project-related shipping will represent a very small portion (approximately six per cent of total large commercial vessel traffic volume). If additional mitigation or monitoring measures are identified in the future through these regional initiatives, they can be applied to all marine shipping at that time, including Project-related marine shipping.*

We do not agree that TMX can distance itself from any role in research, monitoring, dilbit recovery science or restoration because it is presenting the highest risk to marine ecosystems and therefore it has a responsibility over the life of the project, to finance and engage with learning and developing mitigation strategies.

## 5.2 Long Term Research on Dilbit in The Marine Environment

Project related shipping of dilbit cargo in TMX tankers is the biggest single risk bringer of all marine shipping with regard to negatively impacting the environment and causing long term damage. The recovery and restoration options after a dilbit spill are entirely unclear based on the current understanding, so continued research on dilbit, toxicity, biodegradation rates and environmental recovery are absolutely needed. TMX and oil exporters using the TMX pipeline have a major role to play in advancing the science of marine dilbit spills and marine species and ecosystem recovery.

The understanding of how to deal with a dilbit spill is very uncertain. The recovery and length of time for environmental productivity to return to pre-spill conditions is largely unknown. It is likely that the regionally based initiatives will continue after the TMX permit has been issued. The Federal Government is deeply invested in the TMX project as Canadians now own TMX and once a permit is granted, it is reasonable to conclude the funds and energy currently flowing from the Federal

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Agencies will over time, diminish and research through public funding for dilbit will again be disjointed and uneven as it has been.

The Canadian Energy Pipeline Association and the Canadian Association of Petroleum Producers to their credit, funded a review of research needs associated with uncertainties of shipping petroleum products. [The Lee 2015 Expert Panel Report](#)<sup>18</sup> is available on the web.

Table 5-1 shows the findings of this panel for research into spilled oil products. We provide this table to demonstrate there needs to be a long term research and monitoring agenda and that the risk bringers, TMX and the Canadian Association of Petroleum Producers bear a level of fiscal responsibility to support such research and that this support should not be discretionary. It must be mandatory and in the case of TMX, it needs to be made mandatory through a permit condition.

**Table 5-1: High Priority Research Needs Identified by the Expert Panel.**

<p>From the Executive Summary, page 25: High Priority Research Needs Identified by the Expert Panel</p> <ol style="list-style-type: none"> <li>1. <i>Research is needed to better understand the environmental impact of spilled crude oil in high risk and poorly understood areas, such as Arctic waters, the deep ocean and shores or inland rivers and wetlands.</i></li> <li>2. <i>Research is needed to increase the understanding of effects of oil spills on aquatic life and wildlife at the population, community and ecosystem levels.</i></li> <li>3. <i>A national, priority directed program of <u>baseline research and monitoring</u> is needed to develop an understanding of the environmental and ecological characteristics of areas that may be affected by oil spills in the future and to identify any unique sensitivity to oil effects.</i></li> <li>4. <i>A program of controlled field research is needed to better understand spill behaviour and effects across a spectrum of crude oil types in different ecosystems and conditions.</i></li> <li>5. <i>Research is needed to investigate the <u>efficacy of spill responses</u> and to take full advantage of 'spills of opportunity'.</i></li> <li>6. <i>Research is needed to improve spill prevention and develop/apply response decision support systems to ensure sound response decisions and effectiveness.</i></li> <li>7. <i>Research is needed to update and refine risk assessment protocols for oil spills in Canada.</i></li> </ol>
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We believe a fundamental principle for this project is the risk bringer “TMX” and Oil Producers who use the pipeline for export, bear long-term responsibility to learn how to manage their product when spilled into the natural environment. They need to support research on how to better model, predict and plan recovery, carry out restoration and how and where to enhance damaged marine ecosystems in the event they cannot be sufficiently recovered. It is not the sole responsibility of the Federal Agencies to carry this load largely alone. The NEB can and should change the role of TMX with regard to long-term research, monitoring and restoration. It needs to shift from voluntary and discretionary as it is now to a mandator, formal and independent structure.

<sup>18</sup> Lee, Kenneth (chair), Michel Boufadel, Bing Chen, Julia Foght, Peter Hodson, Stella Swanson, Albert Venosa. (2015). Expert Panel Report on the Behaviour and Environmental Impacts of Crude Oil Released into Aqueous Environments. Royal Society of Canada, Ottawa, ON. ISBN: 978-1928140-02-3.

Currently there is poor understanding of how to deal with TMXs product recovery times, since species and ecosystem function are unknown. Baselines of current species are poorly documented. TMX is content that all baseline pre-spill studies are solely the responsibility of the Canadian public and the Federal Agencies. There is a great deal left to learn. TMX absolutely needs to support research on how to deal with the risk they bring to coastal ecosystems.

TMX relies on much of its earlier evidence to support this reconsideration hearing. Below we include an excerpt from earlier evidence submitted to the NEB 4 years ago. We include it to draw attention to the impacts anticipated with a Credible Worse Case dilbit spill modeled in Haro Strait. There is a great deal of uncertainty that remains about the impacts on the environment.

TMX provided comments to DFO in their Final Evidence Report, 2014 and these were resubmitted. The increase in shipping is described in Figure 2, on Page 5 of the TMX review of SRKW:

*Trans Mountain forecasts that of the 890,000 bbl/d capacity of the expanded system, up to 630,000 bbl/d may be delivered to the Westridge Marine Terminal; this would result in an increase of up to 34 tankers per month*

We understand there are currently 6 tankers a month exiting BC, so the total number of TMX tankers will be 40/month. Since a tanker enters Canadian waters, then takes on cargo, there are actually 80 transits of Canadian waters by Aframax tanker and there are also 80 transits by escort tugs for a total of 160 transits by tankers and tugs on hire by TMX per month.

TMX provided comments to DFO in 2014 stating:

*As part of Trans Mountain's ongoing efforts in responsible marine development in pursuit of world-class spill response, Trans Mountain and its shipping industry stakeholders recently completed an evaluation of oil spill response capability. It identified several opportunities to improve spill response time and capacity. These are outlined in Volume 8 of the TMEP facilities application (<http://application.transmountain.com/FACILITIES-APPLICATION>)*

**5.2.1.1 IR #51 – To TMX**

Please provide the improvements in spill response time and capacity that is referred in the Facilities Application. We were unsuccessful in finding it as the link had a 404 error.

### 5.3 Impacts of Oil and Risk to Marine Environment

An excerpt from the Executive Summary of Detailed Quantitative Ecological Risk Assessment For Loading Accidents And Marine Spills Technical Report for the Trans Mountain Pipeline ULC Trans Mountain Expansion Project, May 2014 [Document #SREP-NEB-TERA-00002](#) (accessed Nov 2018, A3W9K1).

*Despite the large volume of oil represented by the CWC spill at Arachne Reef, the potential for mortality of fish was found to be modest. Only one small area was identified as experiencing this potential, which was presumed to be the result of onshore winds driving crude oil into shallow water with wave action. Higher potential was identified for dissolved PAHs to harm developing fish eggs and embryos, with predicted maximum 24-hour average TPAH concentrations between 1 and 10 µg/L affecting an area of 1,962 km<sup>2</sup> in Haro Strait and part of Juan de Fuca Strait. While this is clearly a large area of habitat, it represents only a portion of the 12,249 km<sup>2</sup> of marine habitat within the regional study area (RSA). The predicted TPAH exposure is transient, and affects predominantly surface water layers. In order for this exposure to cause effects on developing fish eggs and embryos, they would have to be present at the same time and place, and in a sensitive developmental stage (e.g., the first 24-hours of development). Therefore, while biological effects of TPAH exposure are possible, they are not certain to occur and would not affect all species or all developmental stages. As a result of the multiple factors that could influence the outcome, it is concluded that effects on developing fish eggs and embryos are possible, but not likely to result in effects on fish at the population level.*

This risk assessment was done in 2014 and since that time there has been new information on SRKW and also that some of the statements made on minimizing impacts can no longer be supported.

In light of what has been learned since this earlier information has been filed, there should be an audit of the capability of the RO, Western Canada Response Organization to deal with a spill modelled and shown in Figure 5-3. The legislation governing RO allows the Minister of TC to appoint an advisor.

#### **5.3.1.1 IR #52 – To TMX**

Will TC request that the Minister appoint an independent special advisor to audit the WCMRC permit and competency as part of the renewal process for WCMRC? Please clarify the renewal process and any corrective measures TC has made while WCMRC has held the RO certificate?

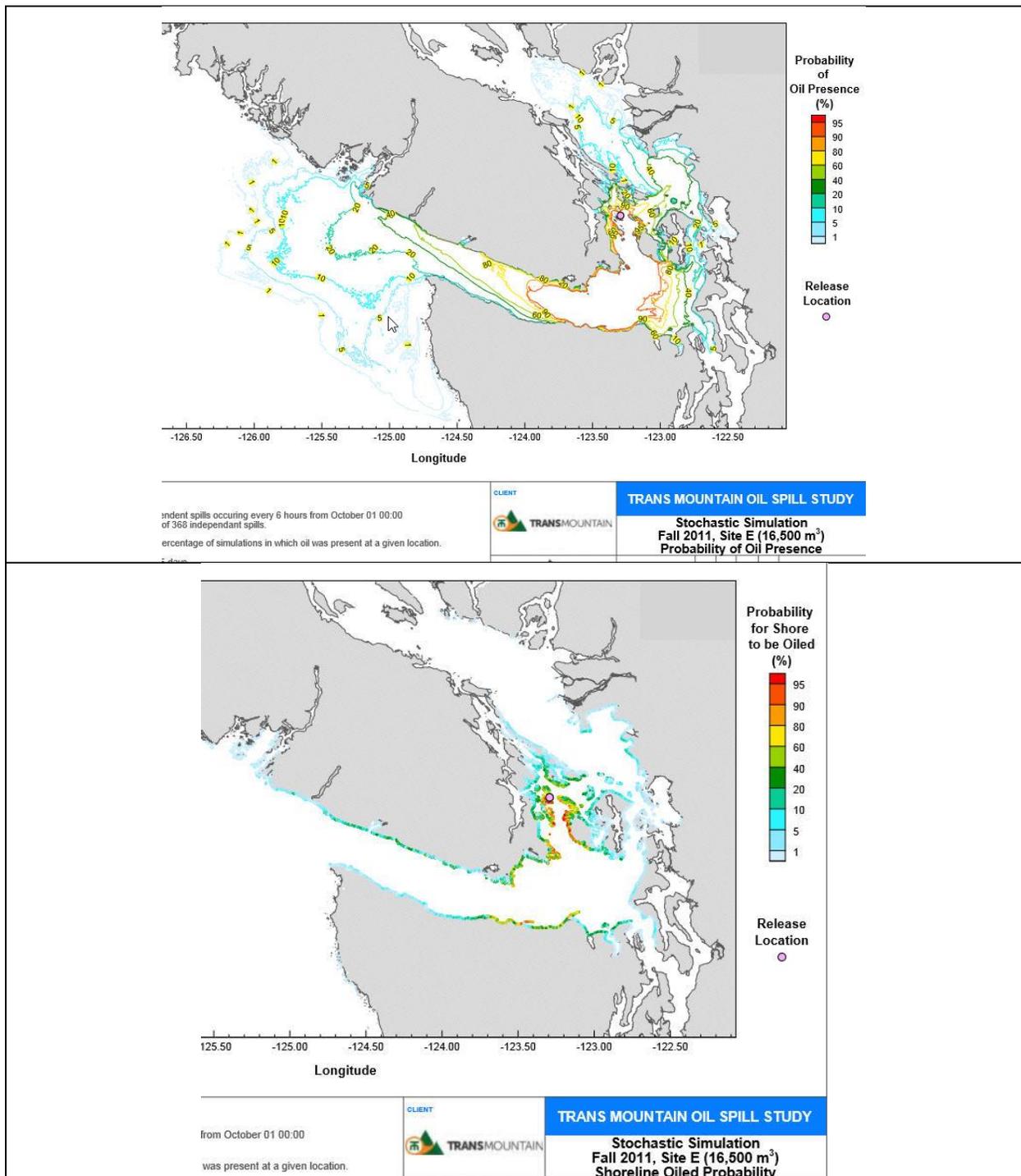


Figure 5-3: Worse Case Oil Spill Simulation - 2014 at Arachne Reef in Haro Strait, showing probability of dilbit and expected drift of oil and shorelines that will be oiled.

The NEB requested the following from government agencies:

*ECCC, DFO, TC, VFPA, and PPA Request: Provide: a) any information on research and findings, since the date of the Board's Report, related to the fate and behaviour and clean-up of oil (including diluted bitumen) spilled in marine environments that would be applicable to Project-related marine shipping; and b) any information or knowledge on any enhancements to marine oil spill prevention, emergency preparedness, and response measures since the date of the Board's Report, including any updates and information on the status of the implementation of the enhanced marine oil spill response regime, as referenced in Condition 133 set out in the Board's Report.*

One of the mitigation strategies we expected to see from the Federal Agencies' review was a mention of a willingness to relocate ship lanes away from environmental sensitive areas.

**5.3.1.2 IR #53 – To TC**

If mitigation strategy identified through science-based research are effective as some research is finding, is TC willing to relocate shipping lanes?

## 5.4 Lessons Learned From the Marathassa

### 5.4.1 Evidence from the Butler Report

There were lessons learned from the Marathassa spill and an independent report was written on what worked and what needed improvements. It is good that some of the recommendations for the independent review of Marathassa lead by John Butler in 2015 entitled an "Independent Review of the M/V Marathassa Fuel Oil Spill Environmental Response Operation"<sup>19</sup> are being implemented. <http://www.ccg-gcc.gc.ca/independent-review-Marathassa-oil-spill-ER-operation#summary>.

**5.4.1.1 IR #54 – To TMX and WCMRC**

We understand that Work Safe BC requires data safety sheets for those who work in and around Dilbit. These data safety sheets should form part of the evidence for this reconsideration hearing we would like them filed.

Butler, 2015 referenced information from the International Tanker Owners Pollution Federation, Containment and Recovery <http://www.itopf.org/knowledge-resources/documents-guides/response-techniques/containment-recovery/>.

This document shows that oil recovery rates using international best practices of on-water oil spill recovery average rates in all weather conditions of 10-15%.<sup>20</sup>

<sup>19</sup> Butler, John, 2015. Independent Review of the M/V Marathassa Fuel Oil Spill Environmental Response Operation commissioned by TC and presented to Commissioner Jody Thomas.

<sup>20</sup> See: <http://www.ccg-gcc.gc.ca/independent-review-marathassa-oil-spill-er-operation#sup12>

Butler 2015 also notes that:

*the CCG's Environmental Response (ER) Program in the Western Region is currently undergoing a significant staff turnover, and has lost long-term employees and expertise to attrition and other staffing opportunities. The program is currently comprised of a group of fifteen specialists; however, resources can be cascaded from other regions during major incidents in operational, technical and administrative positions. These jobs are demanding and require a high level of technical, management and leadership skills.*

*As there are few environmental incidents of significance in BC, the opportunity to engage and exercise leadership with partners and practice respective roles and responsibilities in an emergency is limited. It was noted by partners that real life responses are often more challenging amongst the federal, First Nations, provincial and municipal players than when exercised.*

*The CCG's approach to incident management has been characterized in a positive manner by partners as being inclusive. However, in the case of the M/V Marathassa response effort, this inclusive approach also increased the number of participants in Unified Command, many of whom were not familiar with ICS and oil spill response. In effect, this blended the Emergency Operations Centre (EOC) and Incident Command Post (ICP) causing confusion and a lack of clarity at times for all involved.*

*Most partners were notified of the spill early on the morning of April 9 via informal channels, primarily due to already-existing working relationships, and were not informed via the proper notification protocols. Additionally, many partners noted that email notification was insufficient, as they do not reflect the urgency or significance of an event, particularly if they are received during non-business hours. Furthermore, multiple key partners are not included as part of any formal notification process of oil spills in PMV, despite their significant professional expertise in areas such as oiled wildlife and scientific research.*

Butler also notes that:

*The risk assessment indicated there was a low probability of a significant oil spill on BC's coast, but if one were to happen, it would most likely occur around the southern tip of Vancouver Island. Therefore, the need to improve the "readiness to respond" and the overall preparedness of the regime is important.*

Butler also noted the Federal Agencies were less able to manage communications than the provincial government.

*The security impediments extended to the inability of partners to access printers and the CCG was compelled to purchase stand-alone printers to allow partners to print documents during the incident. In contrast, the Province of BC had a portable system equipped with Wi-Fi ports and pre-assigned email addresses that any open computer could access to facilitate information sharing within Unified Command. The City of Vancouver had similar capacity. As part of the EMBC program, both the Province of BC and City of Vancouver had prior experience planning and exercising which enabled them to communicate effectively during the incident. This issue had been identified in previous environmental and large scale incidents but has yet to be resolved. It was evident within the ICP that the Government of Canada network security protocols prevented the sharing of vital information at a critical time. The CCG and DFO staff*

*were obligated to use personal phones, laptops and email accounts to share information with partners.*

**5.4.1.2 IR #55 – To TC**

Has the Federal system been amended so that it has the same capacity as that of the City of Vancouver and the Province of BC with regard to access and sharing of information? We are concerned that as the lead agencies who are the Federal Agencies will be able to handle effectively a major spill even in a coordination role. Despite all the on going projects submitted a positive initiatives and the optimism expressed by the Federal Agencies are the agencies ready for a dilbit spill in Haro Straights today?

## 5.5 Evidence from the Greenwood Report

Annex 3.F.4 provided evidence entitled "Ship Noise Mitigation Risk Assessment, a report commissioned from Greenwood Maritime Solutions Ltd. by the Federal Agencies" [A95292-9 Annex 03.F.04](#) - Ship Noise Mitigation Risk Assessment A6J6Q6. This report provides data on ship groundings and collisions and most practical mitigation measures such as moving shipping lanes in around the southern portion of Vancouver Island and the area identified as most probable for an oil spill by Butler 2015.

The current strategy by TMX and Federal Agencies in spill prevention, as stated by some senior staff during an October 22, 2018 Ocean Protection Dialogue Workshop, was that it is not possible for an oil spill to occur. We have included (see Figure 5-4) from the Greenwood Report that shows groundings and collisions around the tanker route. We remain fearful of an oil spill and believe that although there is a low probability of a dilbit spill, there are high consequences from such an event that need to be realistically and credibly prepared for.

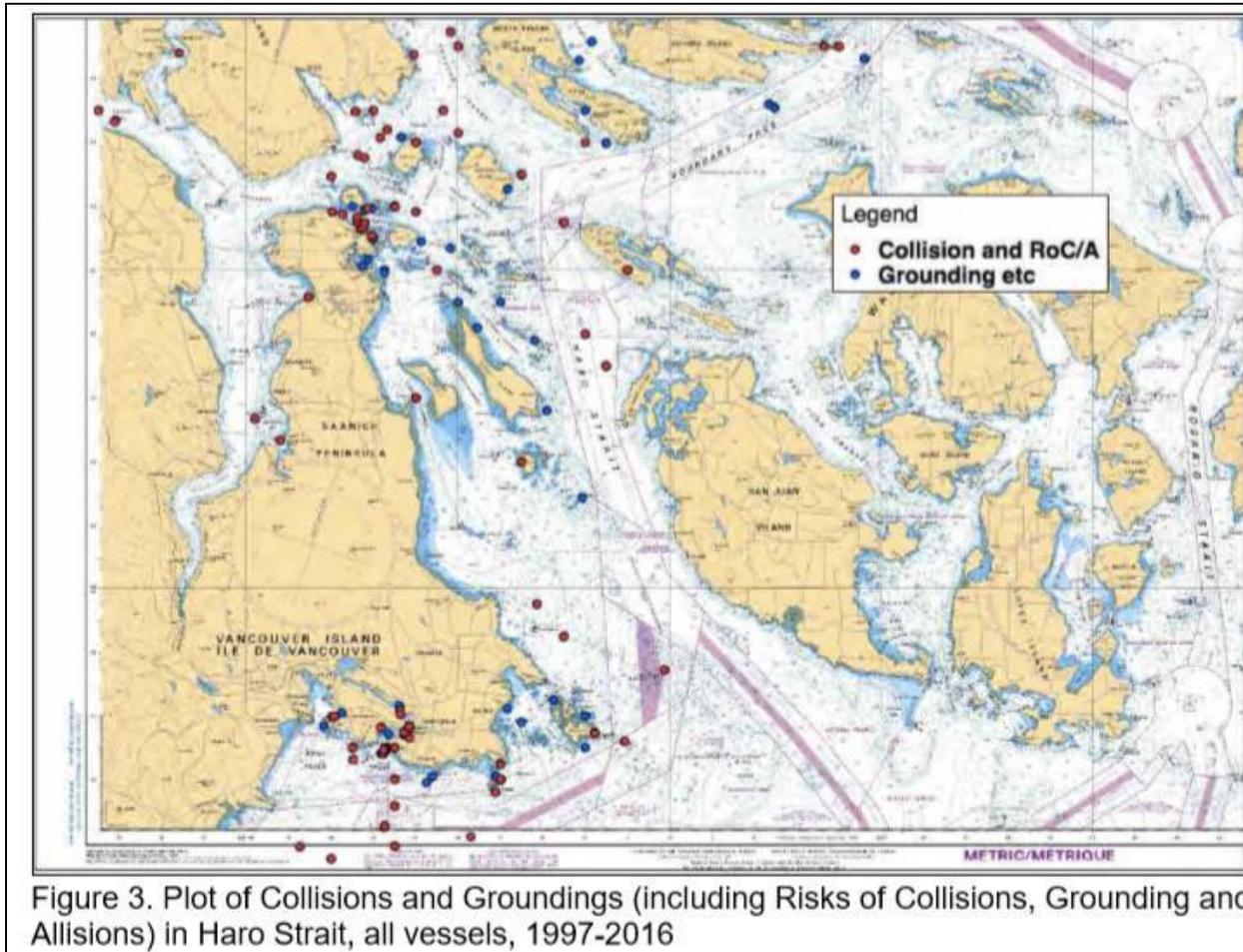


Figure 5-4: Collision and Groundings in Haro Strait

**5.5.1.1 IR #56 – To ECCC, DFO, TC, VFPA, and PPA**

Provide: a) any information on research and findings since the date of the Board’s Report, related to the fate and behaviour and clean-up of oil (including diluted bitumen) spilled in marine environments that would be applicable to Project-related marine shipping; and b) any information or knowledge on any enhancements to marine oil spill prevention, emergency preparedness, and response measures since the date of the Board’s Report, including any updates and information on the status of the implementation of the enhanced marine oil spill response regime, as referenced in Condition 133 set out in the Board’s Report.

## 5.6 Review of Response Organization (RO) Spill Plans

WCMRC is the TC Certified Response Organization (RO) for Canada's Pacific Coast.

Response Organization are enabled under *Canada Shipping Act, 2001: Response Organizations and Oil Handling Facilities Regulations Regulation 7*.<sup>21</sup> Transport Canada is responsible to oversee whether and how WCMRC complies with regulations of the *Canada Shipping Act*.

WCMRC's current certificate was issued by TC on September 1, 2017 and expires September 1, 2020. It is likely that the TMX project will be fully operational by the expiry date.

The Board of FER was concerned about the current state of readiness of the RO as there are tankers travelling near ERs, population centres, and high value habitats. Our concerns were raised because, in evidence filed with NEB in the first hearings, KM (who owned the pipeline) stated:

***“emergency management plans are proprietary and of a sensitive nature and due to security concerns are not publicly available nor will they be made available”***

In a letter from Mike Lowry, Manager of Communications for WCMRC to FER October 29, 2018, after our request to review the spill plans, we were told these were online and the links were provided. We raised this concern and the public need for greater transparency with WCMRC senior management and the evidence filed with the NEB of corporate policy of withholding information. Here is a copy of their response from Mike Lowry to FER:

*Thank-you for your note. Actually, we do post our spill response plan publicly.*

*<http://wcmrc.com/preparedness/strategies/>.*

*This is not common policy for all Response Organizations in Canada, but we realize there is significant interest on the West Coast for more information around spill response and made our plan available publicly earlier this year. Garry (Fletcher) participated in a WCMRC workshop for the development of our Geographic Response Strategies in the Sooke/Metchosin area and is familiar with our coastal protection planning work. Those strategies are available publicly as well:*

*<http://coastalresponse.ca/coastal-mapping/>. Cheers,*

*Michael Lowry, Manager, Communications cc Kevin Gardner keving@wcmrc.com*

*(604) 293-3380 | Head Office: 206-3500 Gilmore Way, Burnaby, B.C. V5G 0B8*

*Western Canada Marine Response Corp*

**\*\* It should be noted however, that yes we did go through an exercise of penciling in on a large map, all the known sensitive areas of the shores of Metchosin on Southern Vancouver Island, yet none are included in the current planning for response maps on the WCMRC website.**

We are thankful for this partial change towards disclosure and we were able to review spill plans on their coastal maps. We found the marinas being well protected with booms, but continue to find critically important information being withheld from the public and high value habitats identified in the workshop information provided to WCMRC and mentioned above, is absent from WCMRC maps. Perhaps this publicly divulged information is now proprietary as it certainly isn't public.

<sup>21</sup> <https://laws-lois.justice.gc.ca/eng/Regulations/SOR-95-405/index.html>

We looked for information that WCMRC had both an understanding of where environmentally important highly sensitive habitats were located such as Ecological Reserves, National Parks and critical SRKW habitat, and an oil spill response strategy that was sufficiently clear that the public would understand how WCMRC would respond under a number of likely scenarios such as a spill in Haro Strait. We could find no mention of Ecological Reserves, National Parks, SRKW habitat and no strategies for their protection.

We concluded that WCMRC has absolutely no idea where the environmental values worthy of priority are located and have absolutely no plan or strategy on how to protect these whether they are sensitive values within Ecological Reserves or sensitive habitats in National Parks.

There is an opportunity for the NEB to influence TC in these hearings with regard to the adequacy of 1993 RO standards and the adequacy of WCMRC to respond to a major oil spill.

It is WCMRC's intention to continue to meet the requirements for a 10,000 tonne RO, providing response to marine spills that originate from oil handling facilities during loading/unloading operations, tankers larger than 150 gross tons, and vessels other than tankers larger than 400 gross tons that have an agreement in place with WCMRC for such response.

**5.6.1.1 IR #57 – To WCMRC and TC**

What companies that move oil on the BC coast do not contract with WCMRC? Logging barges with fuel trucks like the one that sank in Robson Bight Ecological Reserve?

**5.6.1.2 IR #58 – To WCMRC and TC**

If a company does have a contract with WCMRC, then who is responsible for clean up of an spill oil?

**5.6.1.3 IR #59 – To WCMRC**

What was the percentage of fuel spilled and what was the percentage of fuel recovered during the response to Nathan E Stewart?

Response Organizations Standards (1995)<sup>22</sup> are mentioned on page 11, WCMRC Spill Plan for BC. These 23-year-old standards are out of date and the standard that WCMRC is being held to account for is also substandard.

TC is in charge of review of WCMRC and are complacent in allowing nondisclosure. This is counter to higher-level government direction for transparency and disclosure. If TC sides with WCMRC that spill plans are proprietary, it means that TC puts the interests of private corporation above the public interest. We cannot support the policy of WCMRC.

We do not think that WCMRC's permit should be renewed by TC until senior management agrees to transparency and there is an independent audit of WCMRC. We maintain that transparency and

<sup>22</sup> Available on line chrome-extension://oemmndcbldboiebfnladdacbfmadadm/  
<https://www.tc.gc.ca/media/documents/marinesafety/tp12401e.pdf>

availability of information is in the public interest and needs to outweigh WCMRC's desire for corporate secrecy.

## 5.7 Review of WCMRC Spill Response Strategies

We have reviewed strategies at <http://coastalresponse.ca/coastal-mapping/>. WCMRC indicated they had maps and strategies developed and these could be accessed by the public and they provided the location of these maps. After a review of these strategies, we find them seriously wanting. We believe WCMRC has no idea where areas are that would suffer critical environmental impacts and no strategy on how to deploy resources to protect the highest values such as in Haro Strait. As was previously stated by WCMRC:

*It is WCMRC's intention to continue to meet the requirements for a 10,000 ton RO, providing response to marine spills that originate from oil handling facilities during loading/unloading operations, tankers larger than 150 gross tons, and vessels other than tankers larger than 400 gross tons that have an agreement in place with WCMRC for such response.*

The American Definition of Worst Case Discharge and the requirements of a RO sufficient to deal with the entire contents of a spill. The RO standards in Canada set the upper limit of equipment and infrastructure at 10,000 tons. An Aframax tanker holds 10 times more than the Canadian RO standards set for readiness. The Spill modeling done by TMX and acceptable to NEB was to model as a Worst Case Oil Spill Simulation at a spill of 16,500 cubic meters. We did not find that preparing to respond to a spill of only 20% of the oil an Aframax tanker holds to be acceptable. We do not find the TC RO Standards for response at 10,000 tons world class when dilbit tankers carry 10 times that much.

Page 11 of the WCMRC Spill Plan states they have developed their capacity so that they meet the Response Organizations Standards (1995). We reviewed the response requirements set out by TC and believe they need to be revised after 23 years and in light of the TMX project which anticipates a sharp increase in oil shipments.

### 5.7.1.1 IR #60 – To TC

When will the 1993 RO Standards be revised? What consultation process will be used and who will be consulted?

### 5.7.1.2 IR #61 – To WCMRC

What as percentage of fuel was recovered during the response to Nathan E Stewart.

According to the WCMRC Spill Preparedness Plan on Page 14, (reproduced here in Figure 5-5) it is noted that Victoria is in a primary area of response in which Equipment needs to be deployed within 18 to 72 hours. However we also note that Vancouver response time is 6-12 hours. There are 300,000 people living on the Saanich Peninsula. Who made the decision the we in Victoria and the Saanich Peninsula have lower response standards than Vancouver. Given the population density on the Saanich Peninsula, the high environmental values and narrowness of Haro Strait, it is reasonable for TC to set the same standards for Saanich Peninsula as apply to Vancouver lower mainland.

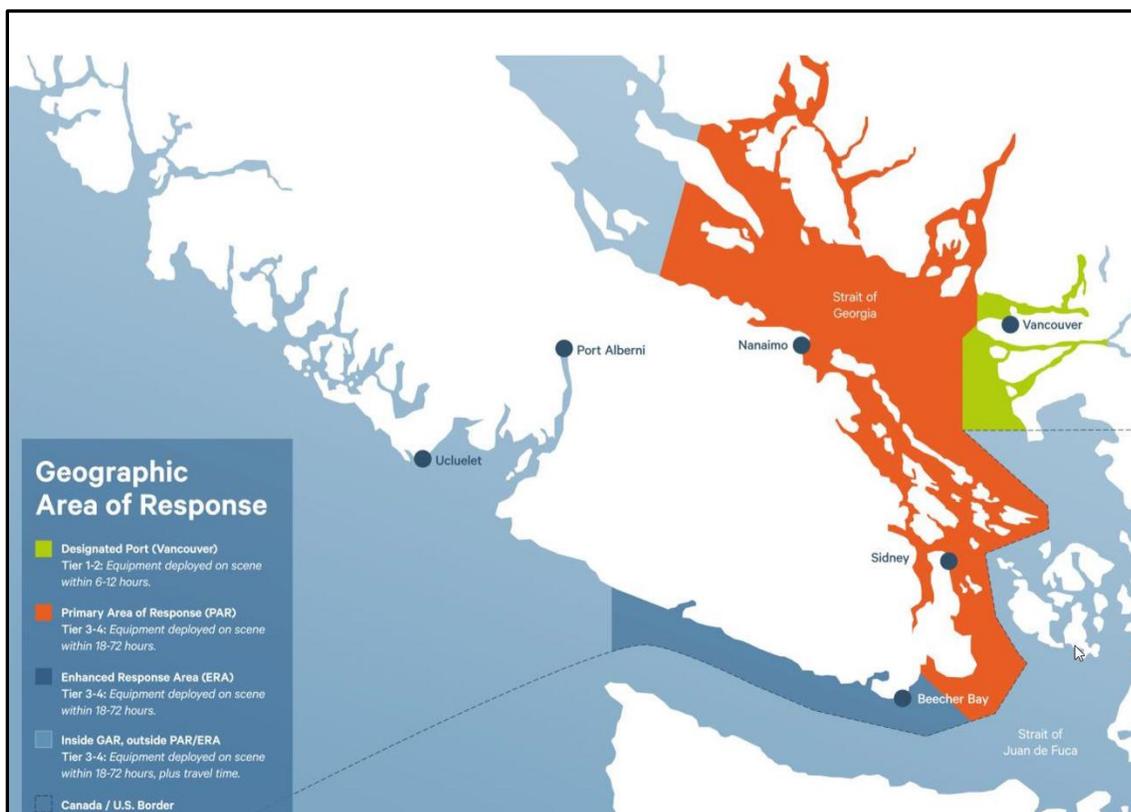
**5.7.1.3 IR #62 – To TC**

Why is the response time so much longer on Vancouver Island which has the high population density south Vancouver Island and a great deal longer shoreline?

**5.7.1.4 IR #63 – To TC**

Who made the decision that Vancouver must have a better response time than southern Vancouver Island? WCMRC - based on their equipment inventory? Identification of those who made this decision is required and their rationale is needed. If this rationale does not hold up, then southern Vancouver Island seeks parity with Vancouver on response times and extend the zone to an area west of Sooke and include SRKW frequent use areas.

Larger spills are classified as Tier 3 and 4. The Gulf Islands and Saanich Peninsula are Primary Response areas and WCMRC, CCG, will have “equipment on scene within 18 to 72 hours”. Strait of Juan De Fuca is an Enhanced Response Area. It has exactly the same criteria “equipment on scene within 18 to 72 hours”.



**Figure 5-5: Map from the WCMRC Spill Response Plan – Times and Differences between Vancouver and Saanich Peninsula**

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The WCMRC Spill Response document, page 15 states:

*This document is intended to act as a stand-alone Spill Response Manual that will assist the Incident Management Team (IMT) during the initial response to an incident and/or to aid further planning as incident complexity increases.*

A portion of the WCMRC Spill Plan, page 17, is shown here as Figure 5-6.

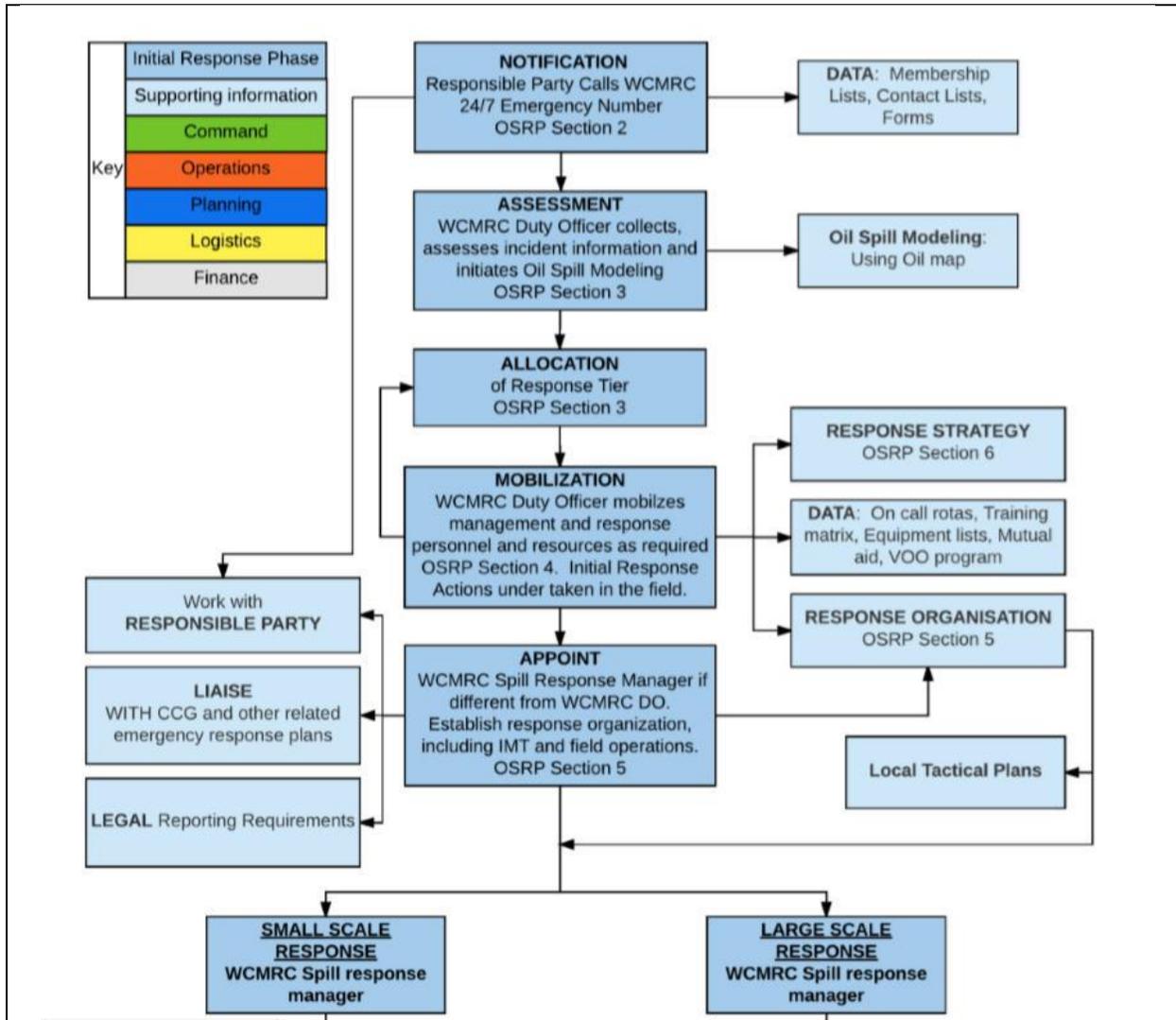


Figure 5-6: A Portion of the Procedure Tree Notification

We have already noted that the WCMRC Spill Plan states that if the Responsible Party is a non-member, a third-party agreement must be in place before deployment of resources. We understand the response process begins with a call from the Responsible Party who are the owners of the tanker spilling the oil and the priority for WCMRC is to see if they are a member in good standing before taking any action. We had thought that perhaps the CCG<sup>23</sup> would be the first to learn of a oil spill (incident) and then contact WCMRC.

<sup>23</sup> All pollution, or threats of pollution in the Marine Environment must be reported.

We also are not clear that spill modelling was the second most important step. We thought that a communication to those nearest the spill (allocation) and putting the nearest WCMRC contractors on alert while gathering more information on the nature and size of the spill winds, waves, currents at the spill site would have a priority.

The public likely believes that emergency response to an oil spill would be organized like first responders in the Ambulance, Municipal Fire Departments and BC Wildfire services, who focus on the emergency first and cost recovery second. Since TC reviews the RO certificates, it would be up to TC to change the RO to action first and cost recovery as a lower priority during an incident. That would be more in keeping with a world class spill response system.

<p><b>5.7.1.5</b>    <u><b>IR #64 – To WCMRC and TC</b></u></p> <p>How long does it take to produce a map of an incident using oil spill map?</p>
<p><b>5.7.1.6</b>    <u><b>IR #65 – To WCMRC and TC</b></u></p> <p>What factors are included? Wind speed, currents and tides and nearest equipment? Please provide an example of your modelling for a spill in Haro Strait.</p>
<p><b>5.7.1.7</b>    <u><b>IR #66 – To WCMRC</b></u></p> <p>Where are duty officers’ located and computing centre doing the spill modelling.</p>
<p><b>5.7.1.8</b>    <u><b>IR #67 – To WCMRC</b></u></p> <p>Are there duty officer’s awake and waiting in an WCMRC office 24/7?</p>
<p><b>5.7.1.9</b>    <u><b>IR #68 – To CCG</b></u></p> <p>When and under what circumstances do you contact WCMRC?</p>
<p><b>5.7.1.10</b>    <u><b>IR #69 – To CCG</b></u></p> <p>In the event that there is a an oil spill when does CCG learn whether the responsible party is or is not a member in good standing with WCMRC?</p>
<p><b>5.7.1.11</b>    <u><b>IR #70 – To CCG</b></u></p> <p>When the responsible party is not a member of WCMRC where does the CG access equip suitable for a response?</p>

<http://www.ccg-gcc.gc.ca/e0003876> The reporting number is: **1-800-889-8852** or contact any Coast Guard Marine Communications and Traffic Service (MCTS) at: Comox MCTS: 250-339-3613; Prince Rupert MCTS: 250-627-3074; Tofino MCTS: 250-726-7312; Vancouver MCTS: 604-666-6011; Victoria MCTS: 604-363-6611; Marine Channel 16 VHF.

Page 27. WCMRC Response level definitions.

What is “Large spill offshore of non-persistent oil” **Non-persistent oils** are defined as those that are generally of a volatile nature and are composed of lighter hydrocarbon fractions, which tend to dissipate rapidly through evaporation” Dilbit is diluted with a lighter solvent so does it follow that dilbit an non persistent oil?

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**5.7.1.12 IR #71 – To WCMRC**

Are there duty officer’s awake and waiting in an WCMRC office 24/7?

**5.7.2 Lessons Learned from the Sinking of the Nathan E Stewart**

We reviewed the recent sinking of the Nathan E Stewart and below is the diagram shown in Figure 3-2 of WCMRC’s Spill Response Plan on how agencies work together and the structure of the response team. We could find no mention of WCMRC nor of their role in spill modelling.

WCMRC Spill Plan states on page 29: Spill Assessment Checklist includes a question:

*Is the oil actionable? Ensure appropriate resources are deployed based on oil properties and weathering.*

**5.7.2.1 IR #72 – To WCMRC and TC**

Under what circumstances and using what criteria will there be no response to an oil spill because it is not actionable?

WCMRC Spill Plan decision tree on page 30 reproduced here as Figure 5-7, is central to size of deployment and is based on size of tankers or vessels. In reviewing the location of high value habitat, we could find no information on environmental values but this diagram on level of response implies there is awareness by WCMRC of where specific sensitivities are at risk.

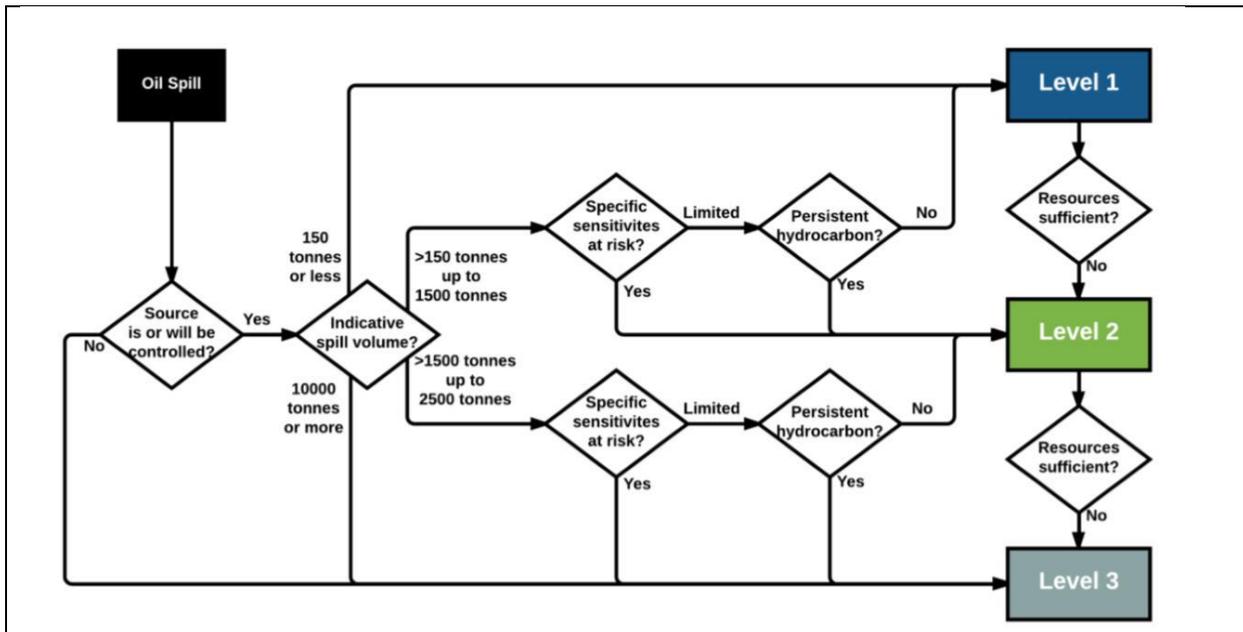
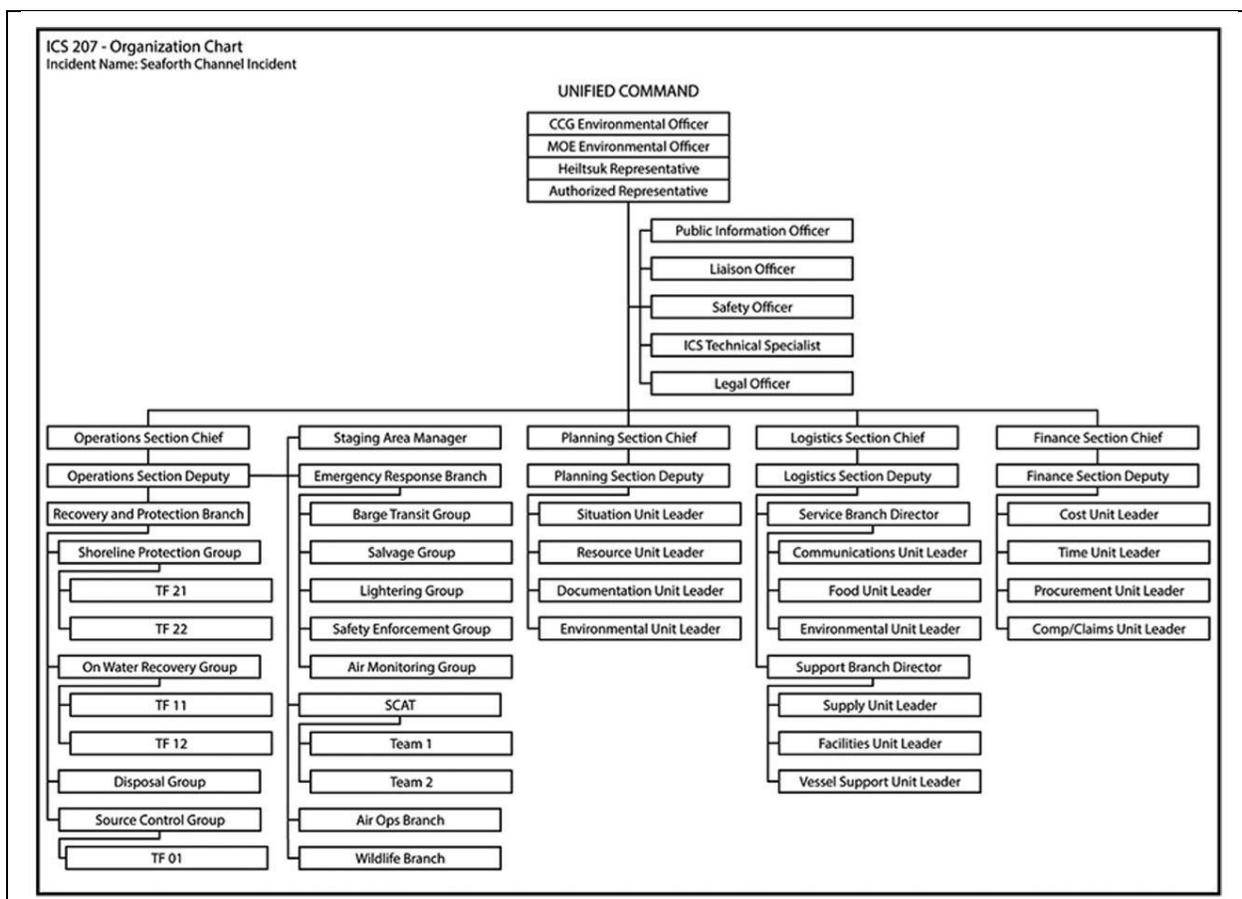


Figure 5-7: Response Level Flowchart

It is good this is promised “In all cases WCMRC over anticipate the scale of the incident initially to ensure timely mobilization of resources.” The review of the resources available to WCMRC is outlined in Response Gap Assessment.

**5.7.2.2 IR #73 – To WCMRC and TC**

What specific sensitivities does WCMRC use to apply a level 2 response based on a spill of less than 150 tons? Since we could find no identified sensitivities such as an ER or critical habitat for SARA-listed species on the maps, we can presume that all spills under 160 tons will receive a level 1 response (the lowest level of response).



**Figure 5-8: Clarification of the Incident Command System in Place for the Nathan E Stewart.**

The Board of FER was looking for the role of WCMRC in the Nathan E Stewart oil spill and assurances that WCMRC would immediately do spill modelling to understand where spill oil may be headed. We could find no reference to WCMRC in this ICS and no reference to modelling of spills.

It is unclear if WCMRC is actually involved to the level they say they are on the website.

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**WCMRC Spill Plan states on page 18, Section 2** in the box on Notifications, that the External Agencies Contact list is classified as an Internal WCMRC document with a reference to section 15.5. It is unclear why this is internal? Is it fear of a post spill audit and WCMRC did not call someone? Or is it fear that a competitor could review and improve the spill response network and out compete WCMRC?

The public, whose resources are at risk, should know which agencies WCMRC intends to contact as these agencies are funded by the public in the event of a spill. A generic list is needed showing from which WCMRC staging areas the nearest office etc. or contact information dependent on where the spill is located.

The **WCMRC Spill Plan, Page 20**, WCMRC 24/7 Emergency Number as (604) 294-9116.

**5.7.2.3 IR #74 – To TC**

Does TC periodically call this number to ensure it is working? Is it posted at any marinas?

WCMRC Spill Plan states on page 31 under the heading of Mobilization that:

*“Equipment, mobilization times, external partners are all internal WCMRC documents”.*

**5.7.2.4 IR #75 – To TC**

Given what is known about dilbit and the need for speed if recovery to successful why is this information internal? Does TC not required disclosure of this information?

WCMRC Spill Plan states on page 45, the list of WCMRC Strategy Technical Manuals and equipment on hand as:

1. Monitor and evaluate □ Dispersants/In-Situ Burn
2. At Sea Containment and Recovery
3. Shoreline Assessment - SCAT
4. Shoreline Clean up
5. Current WCMRC Equipment List

None of these manuals are linked in order to provide public access.

The WCMRC Spill Plan Page 47, shows a Decision Tree that includes dispersants. There is strong evidence on some dispersants are worse than the oil when placed into the environment. The toxicity of dispersants are acknowledged on page 52, Section 6.3.7 Dispersants of the Spill Plan:

*Dispersants must be used with caution since they can contain toxic components, or can increase the effective toxicity of the oil to certain aquatic life by promoting solution of petroleum hydrocarbons into the water column.*

*As chemical dispersants effectively disperse different oils with variable success its recommended that a basic field dispersant effectiveness test be performed beforehand.*

**5.7.2.5 IR #76 – To WCMRC and TC**

Were dispersants used on the recovery of oil from the Marathassa? Have you or other done field tests on dispersants such as dilbit? What were the results? How much dispersant does WCMRC have on Vancouver Island?

**5.7.2.6 IR #77 – To WCMRC and TC**

What dispersants and what quantities of each does WCMRC have on hand?

**5.7.2.7 IR #78 – To WCMRC and TC**

Please supply the WHIMS information for those on hand. The Workplace Hazardous Materials Information System (WHMIS) is Canada's national hazard communication standard.

**5.7.2.8 IR #79 – To WCMRC and TC**

What dispersants are approved for use by RO and CCG in Canada and which have been used in BC?

On the WCMRC Spill Plan, Figure 6.2. page 47, there is a decision tree which asks “*Is offshore containment and recovery possible?*”

**5.7.2.9 IR #80 – To WCMRC**

What criteria inform the decision not to respond to an offshore oil spill? Is it all weather over Beauford Scale 4 wind speeds? A storm warning that winds may reach Beauford Scale 5 wind , wave height and fog or limitation of equipment at hand, or time since the spill occurred and the size of the dispersed slick?

The WCMRC spill plan recognizes limitations of open ocean recovery. It states on page 4:

*The most effective method of containing oil spills on water is to use floating booms. For containment and recovery to be successful, the oil slick must be located and the response deployed in an effective arrangement. The sea state and weather conditions must be calm enough for the response to function well and for the response personnel to operate any equipment with minimal health and safety risk (up to and including a Beaufort Force 4 only). The oil must also be amenable for containment and recovery using the skimmers available. WCMRC maintains a skimmer inventory that meets the planning standards for on-water recovery of a 10,000-tonne spill in either the PAR or ERA, during this timeframe.*

Given that dilbit changes its character after a few days, it is unclear if the equipment that WCMRC is suited to dilbit recovery.

On 13 October 2016, shortly after 0100 Pacific Daylight Time, the Nathan E Stewart ran aground. A report on this grounding is on the TC web site <http://www.bst-tsb.gc.ca/eng/rapports->

[reports/marine/2016/m16p0378/m16p0378.asp](https://reports/marine/2016/m16p0378/m16p0378.asp). It is good to have such a review of the incident so that the probability of repetition is reduced.

We are concerned that the liability for damaged resources may not be the responsibility of the tanker owners. We base that on learning that FN are suing the Federal Government for lack of a world class oil spill recovery systems.<sup>24</sup>

Compensation for loss of environmental services do not appear to be covered by tanker insurance so recovery of ecosystems is a public expense as industry is not obliged to pay. WCMRC is paid to come and attempt some recovery, but after that, damages are borne by British Columbians. Costs toward ecosystem rehabilitation, habitat enhancement are not part of recoverable costs from industrial risk and accidents.

**5.7.2.10 IR #81 – To Federal Agencies and WCMRC**

Under current practices do third parties get compensation for loss of livelihood caused by an oil spill and loss or decline of elements in the natural environment following a spill?



<sup>24</sup> <https://thenarwhal.ca/why-we-re-taking-government-court-over-promise-world-class-oil-spill-response/>



Figure 5-9: Nathan E Stewart Sinking Behind its Oil Barge

## 5.8 Oil Spill Response Gap Assessment

WCMRC has stated it has the capacity to meet the response standards for a major Dilbit Spill. From page 49 of the WCMRC Spill Plan:

*WCMRC maintains a skimmer inventory that meets the planning standards for on-water recovery of a 10,000-tonne spill in either the PAR or ERA, during this timeframe.*

The Board of FER is not sure of the test to meet the standards set by TC and what tests are central to re-issuance of their certificate. WCMRC has indicated that there are limitations of weather, wind and wave height which limit their booms and skimmers and this means WCMRC will not deploy a response, for example, above Beaufort 4 wind speeds (28 km/hour wind speeds). We are also not sure what the inventory of booms capable of work up to Beaufort 4 windspeeds is, due to the proprietary nature of this information in the WCMRC plans. Based on Windspeed data collected at Race Rocks and Trial Island Ecological Reserves and shown in Figure 3-8 in Topic 2: SARA-Listed Species in this report, well over half the periods of time would, because of wave height and the windspeed, be too great for WCMRC to deploy booms.

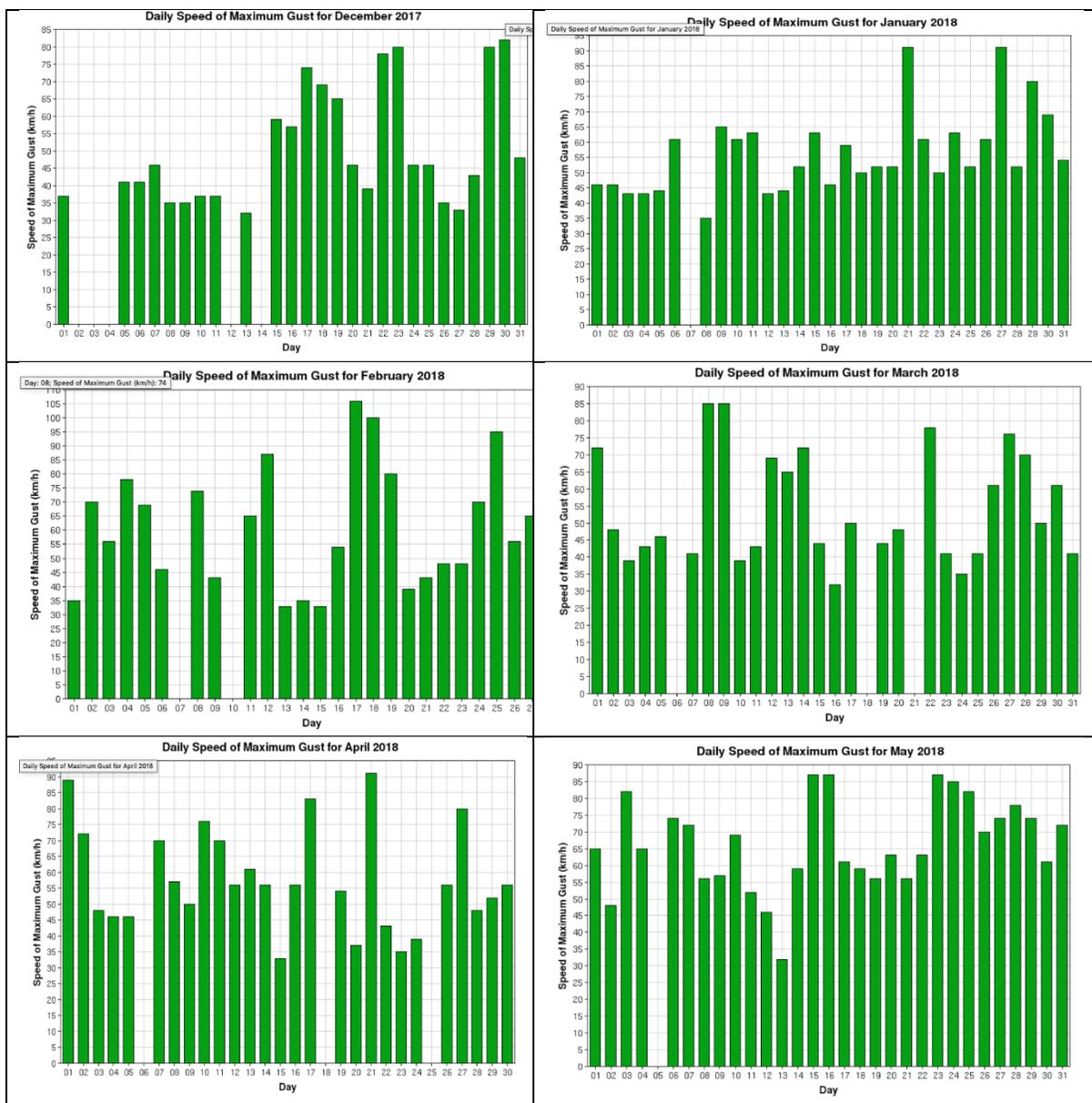
We believe the size of this response gap needs to be made known. Figure 3-8 shows there regularly are winds that exceed WCMRC ability to respond.

In addition to the limit of the WCMRC, the allowable TC timing windows for WCMRC to get to a spill site means the oil slick can spread many kilometers down wind during the allowable response window. The spread of an oil slick is further enhanced by currents and tides. Since the TC response

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times for Haro Strait and Juan de Fuca Straits are 18 to 72 hours, we envisage significant oil slick to develop even at wind speeds of less than 28 Km/hour. We envisage an open ocean oil spill to be multi kilometers in size, to have produced an oil slick that is many kilometers in length by 18 hours and quadruple in size and distribution by 72 hours. However, in any post spill assessment, the RO will have met the TC standards. WCMRC only has to arrive in that time not encircle or contain an oil spill to have met the TC standards.

Shown below in Figure 5-10 are daily speed of maximum gusts taken from the Government of Canada Past Weather, Climate website, [http://climate.weather.gc.ca/historical\\_data/search\\_historic\\_data\\_stations\\_e.html?searchType=stnName&timeframe=1&txtStationName=Race+Rocks&searchMethod=contains&optLimit=yearRange&StartYear=2000&EndYear=2018&Year=2018&Month=10&Day=27&selRowPerPage=100](http://climate.weather.gc.ca/historical_data/search_historic_data_stations_e.html?searchType=stnName&timeframe=1&txtStationName=Race+Rocks&searchMethod=contains&optLimit=yearRange&StartYear=2000&EndYear=2018&Year=2018&Month=10&Day=27&selRowPerPage=100)



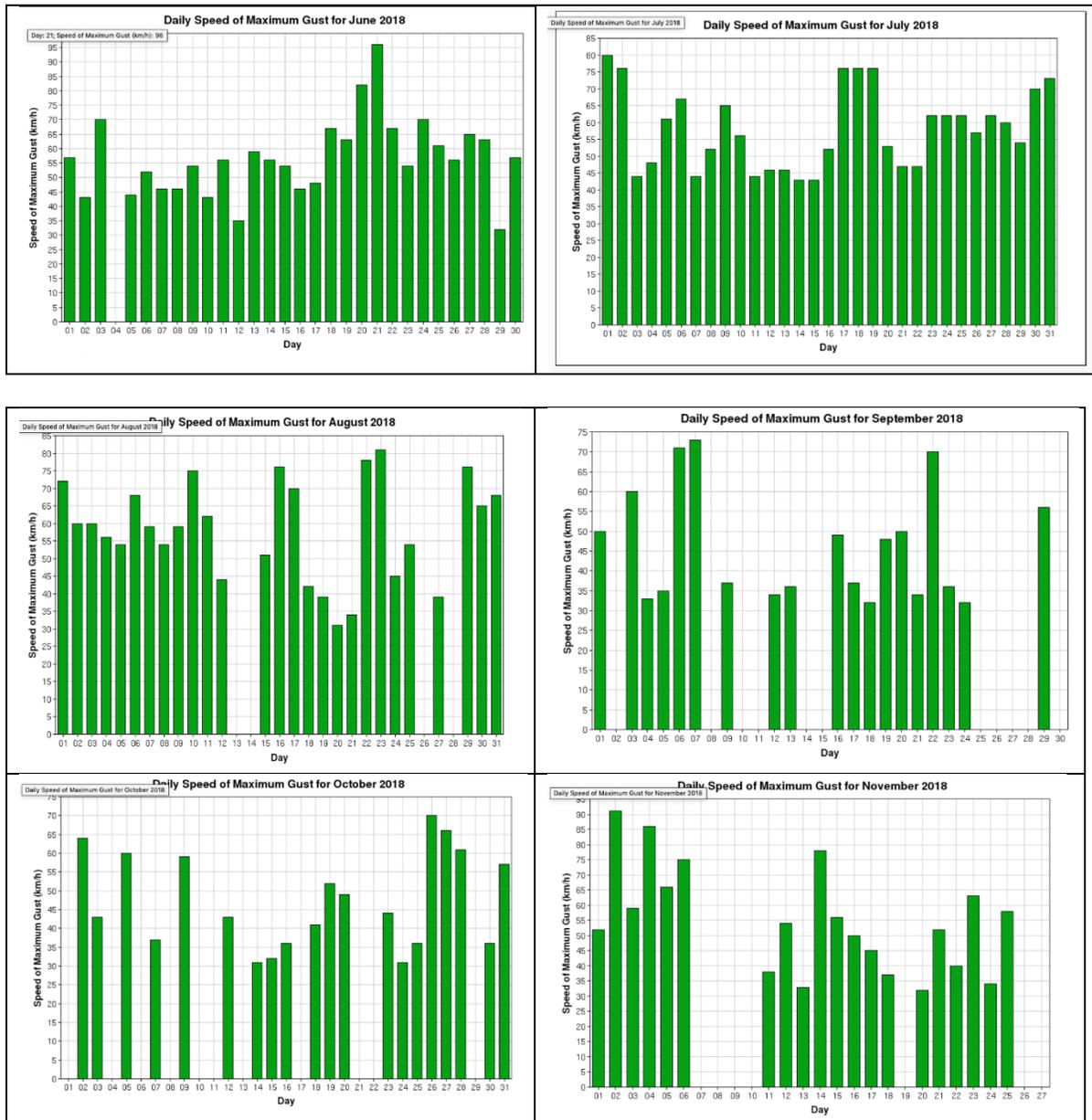


Figure 5-10: Daily Maximum Wind Gust Speeds

**Note** there are, in all months over the past year almost daily, windspeeds in excess of 28 km/hr which is the limit of WCMRC equipment.

It is also unclear what the length of the booms WCMRC needs to have on hand to meet the TC standards test for renewal of certification. Is the length of booms required of a RO based on boom length needed encircle an leaking Aframax tanker?<sup>25</sup> Open ocean oil spills may involve a second tanker. Is it sufficient to encircle two tankers? As we understand it, currently WCMRC would have to have 600 meters of boom to encircle fairly a leaking Aframax tanker.

<sup>25</sup> Aframax tankers are 245m in length with a beam of 34m.

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**5.8.1.1** *IR #82 – To TC*

Globally is there equipment capable of dealing with oil above Beaufort 4 winds? If there is technology globally that is able to respond to an oil spill above winds speeds of 28 km/hr, does TC require the RO to have these on hand?

**5.8.1.2** *IR #83 – To TC*

What lengths of containment booms does TC require WCMRC to them have on hand to meet your standards?

**5.8.1.3** *IR #84 – To TC*

How much of a response gap (days of the year) exists for BC's shipping lanes for Haro, Georgia and Juan de Fuca straits and from which the WCMRC RO cannot respond but state they met the TC standards?

We were able to see some of the current locations of the WCMRC fleet of vessels as these were shown on their web site.

FER accessed the WCMRC website and learned that response vessels around the Saanich Peninsula are as follows (shown in Figure 5-11).

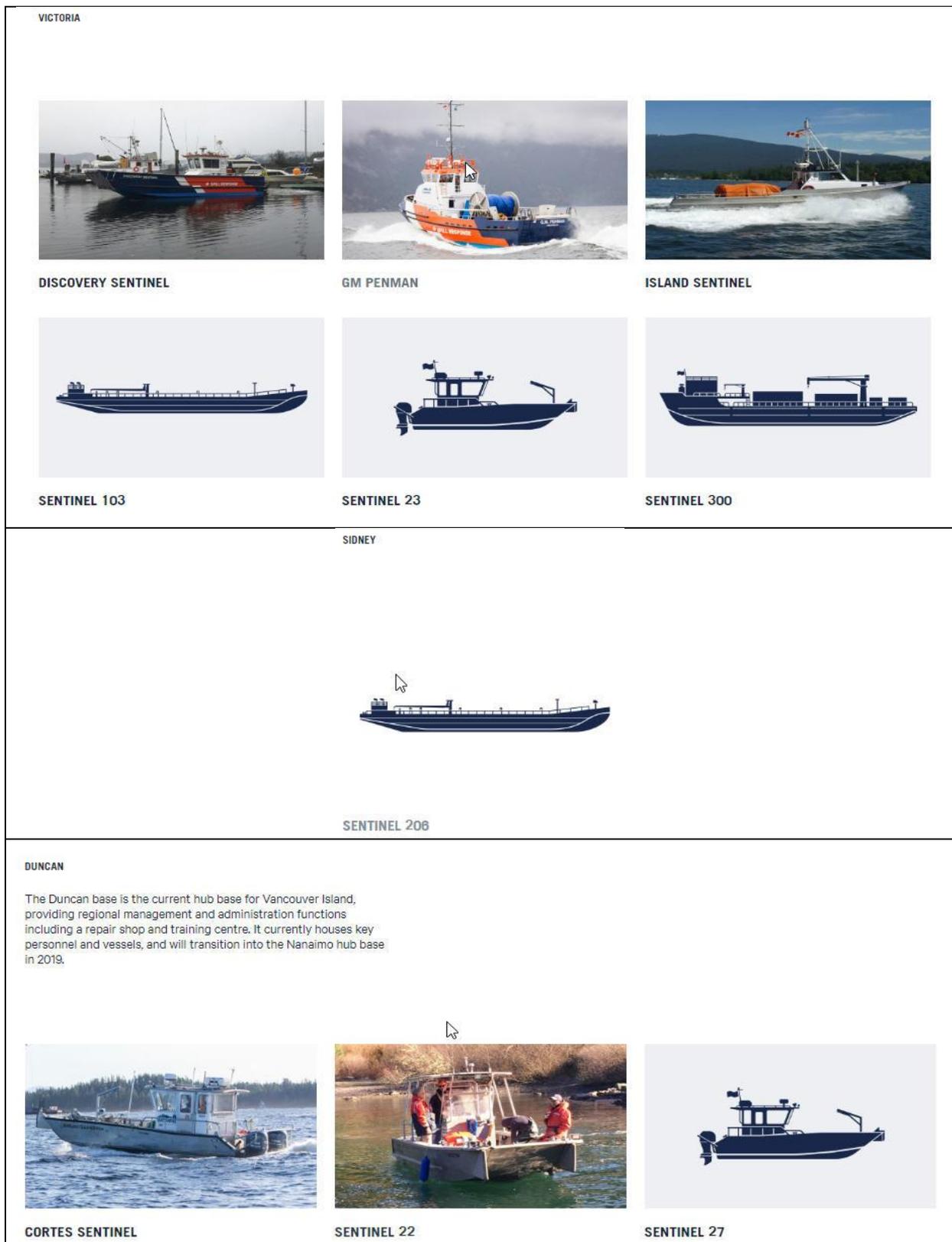


Figure 5-11: WCMRC Response Vessels Stationed in Victoria, Sidney and Duncan.

Figure 5-12 shows the location of WCMRC response vessels around southern Vancouver Island. It is somewhat unclear whether its fleet could deal with Worse Case Scenario such as that modelled for Arachne Reef (see p. 62).



Figure 5-12: WCMRC Future Capacity showing a shift towards Sidney

The Board of FER reviewed some of the articles on Enviromerg site: <https://enviroemerg1.jimdo.com/>

The evaluation undertaken in *Technical Evaluation of Project Application Related to Marine Transportation Submitted to the National Energy Board for the Trans Mountain Pipeline Expansion Project, May 2015 (Exhibit C86-19)*, identified several areas within Trans Mountain's Project application related to marine transportation that are substandard or deficient with regard to the management of a tanker casualty and spill of bitumen-based crude oils. These areas either were not considered for investing in capital equipment (e.g., rescue tugs, salvage) or pose a significant challenge in achieving the performance measures noted in Part 1 of this technical report. Since this report was done in 2015, we would like a follow-up on the state of the evaluations which were notes at the time.

**5.8.1.4 IR #85 – To TMX and TC**

**Ocean Rescue :** Are there now any provisions for an investment in a purpose-built rescue tug capable of emergency towing services for a disabled oil tanker in an ocean situation and permanently stationed on the West Coast?

**5.8.1.5 IR #86 – To TMX and TC**

**Salvage:** Are there any provisions for an investment in a regionally-based salvage company and pre-positioning of salvage equipment to facilitate hull patching, cargo removal, and other specialized salvage services for a tanker experiencing structural failure from incidents like grounding?

**5.8.1.6 IR #87 – To TMX and TC**

**Places of Refuge:** Is there now a regional plan or preparedness initiative regarding practical and equitable locations for refuge of a tanker needing servicing and/or to mitigate coast-wide environmental damages from a spill. Such a plan should be developed in consultation with First Nations and the Province? We note FNs are suing the Federal Government over the Nathan E Stewart damages and lack of such a plan.

**5.8.1.7 IR #88 – To TMX and TC**

**Limitations of Study Area:** Has there been a conclusive assessment of risks, impacts and consequence management within Canada's 200 nautical mile Economic Exclusion Zone, beyond the 12 mile Territorial Limit. In the event of a tanker casualty and oil spill in offshore Pacific waters, will the western, northern, and central Vancouver Island coastal communities be subject to lower response standards with regard to effective ocean rescue, salvage, places of refuge, logistics, workforce, and more?

**5.8.1.8 IR #89 – To TMX and TC**

**Fate and Behaviour of Diluted Bitumens:** Since the extrapolation of artificial laboratory based studies for bitumen diluted with condensate (dilbits) were based on the following factors in the 2013 KM/TMX application: small (meso-level); short-term (10-day); mild wave conditions (wavelets) and warm water (15oC and since these conditions do not match Salish Sea environments, can you now ascertain full rates and extents of oil weathering (e.g., evaporation, emulsification), and associated operational challenges (e.g., on-water oil recovery, shoreline treatments, oily waste transfer, etc.)?

**5.8.1.9 IR #90 – To TMX and TC**

**Other Bitumen-based Crude Oil Products:** Since there was a technical focus on dilbits (bitumen diluted with a natural gas condensate) with little or no technical analysis of other types of bitumen-based crude oils from Alberta that can be exported by oil tanker such as: up-graded bitumen (syncrude); bitumen diluted with syncrude (synbit); bitumen with syncrude and condensate (dilsynbit); as well as the variations within them, and these pose varied ecological impacts and operational challenges. Have you reconsidered plans on those factors?

**5.8.1.10 IR #91 – To TMX and TC**

**Social Dialogue:** Since there was an absence of a social dialogue including pictures, images, examples and comparisons that the public and First Nations can readily understand in order to determine risks, potential impacts and consequence management of a large bitumen-based crude oil spill, and since instead, there was a focus on scientific discourse using facts, figures, charts and terms that do not lend themselves to a layperson's understanding of impacts and consequences of a major tanker casualty and spill of bitumen and other crude oil products, do you believe you have rectified this situation with the current application?

**5.8.1.11 IR #92 – To TMX and TC**

**Comparative World-wide Spills:** Has there been any attempt to show or compare large marine oil spills of heavy grade oils in temperate waters in order to extrapolate and support limited scientific findings, as well as to promote a social dialogue?

**5.8.1.12 IR #93 – To TMX and TC**

**Response Operation Gaps:** Has there been any substantive analysis based on standards for response gap analysis to show when, where, and what sea conditions (such as fog, waves, winds, currents in the Salish Sea) preclude safe and practical oil spill response so as to garner realistic performance expectations?

**5.8.1.13 IR #94 – To TMX and TC**

**Incident Management:** Since the CCG adopted the Incident Command System only in March 2013, yet it takes many years to build competencies and relationships. Has there has been any recognition that the Canadian Coast Guard (“CCG”) lacks the skills and capacity to competently assume a lead federal (Incident Commander/Team) role in the event of a transfer-of-command by the Response Party to government, or a trans-boundary US/Canada initiative?

**5.8.1.14 IR #95 – To TMX and TC**

**Full Compensation:** Has there been any attempt made to provide the means to compensate for natural resource damage losses owing to temporary or permanent decline in goods and services that a healthy coastal environment confers (i.e., recreational and subsistence/cultural benefits)?

**5.8.1.15 IR #96 – To TMX and TC**

**Oily Wastes Management:** Are there robust final solutions for the disposal of large amounts of oily wastes which can result in high costs and encumber spill response operations?

**5.8.1.16 IR #97 – To TMX and TC**

**Large Shoreline Workforce:** Has there been any effort made to canvas and analyse results to determine the availability and willingness of public, including First Nations, to be members of a large, paid and supervised workforce for shoreline cleanup, oily waste management, and wildlife response?

**5.8.1.17 IR #98 – To TMX and TC**

**Response Options for Bitumen-based Crude Oils:** Do you now have a practical means or solution to track or recover bitumen-based crude oils if they submerge or sink. Such ramifications are highly likely in sediment-laden waters such as the Fraser River estuarine and open-sea environments.

**5.8.1.18 IR #99 – To TMX and TC**

**Intensive Oil Spill Mitigation Solutions:** Does TMX provide intensive solutions to contain, skim, pump, store, and treat a spill. Intensive measures including: heating oil for storage transfer; single-use of floating sea bladders; and use of a shore-washing agent to augment ambient water flushing and deluge of oil contaminated shores?

**5.8.1.19 IR #100 – To TMX and TC**

**Shoreline Treatment Beyond Ambient Water Flushing and Deluge:** Has there now been an explanation or solutions provided addressing what will happen once ambient water deluge and flushing of oiled sediment shores are no longer effective measures (due to oil weathering), even if shoreline washing agents are used to augment efforts since they are only effective for approximately one week after bitumen-based crude oil has been stranded on shores?

**5.8.1.20 IR #101 – To TMX and TC**

**Deterministic Oil Spill Trajectory Scenarios:** The proponent's spill trajectory modelling pre-determines how long and where oil will travel when applying wind conditions, rather than just based on currents alone. Has spill trajectory monitoring been done with currents alone because oil's duration on water can be longer than indicated and become more weathered over time?

**5.8.1.21 IR #102 – To TMX and TC**

**Future Marine V Oil Spill Preparedness:** Since the proponent has postulated the quantity and quality of spill response equipment to contain and recover mobile oil (e.g., vessels, barges, booms, skimmers, etc.) without factoring in the number of workforce members required, whether they will be fulltime paid employees, and the overall cost of an enhanced program, have these factors by now been considered in order to be realistic about oil spill preparedness.

**5.8.1.22 IR #103 – To TMX and TC**

**Delay in Impact Mitigation from Dilbit Flashpoint, Flammability and Toxicity:** Since the proponent's assessment of the flammability of bitumen diluted with condensate (dilbits) did not categorically determine or state whether there will be a delay in on water tactical operations by initial responders that pertains to actual oil recovery or containment at or near V the tanker casualty, and since the analysis did not include the combine hazards of flashpoint and toxicity along with flammability, have these factors now been considered and have plans been formulated to deal with them?

**5.8.1.23 IR #104 – To TMX and TC**

**Social Impact Mitigation:** Since the torn social fabric of a community is often the legacy of a major spill event, has TMX provided any new solutions towards mitigating impacts to the social and cultural fabric of coastal communities directly affected by a large oil spill and large-scale clean-up operations?

**5.8.1.24 IR #105 – To TMX and TC**

**Public Oversight:** In the past the proponent perpetuated the status quo of committees that are populated by topic-specific agency and industry experts who are not accountable to the public. This fosters a culture that lacks transparency, confidence and trust in both existing and evolving safety tanker operations, tanker casualty mitigation, and spill response preparedness conditions, rather than just based on currents alone. How has TMX decided to deal with this problem?

*Adequacy of Coastal Protection Related to Tanker Casualty Mitigation and Oil Spill Response Measures.* The evaluation undertaken in this report, identified several areas within Trans Mountain's Project application related to marine transportation that are substandard or deficient with regard to the management of a tanker casualty and spill of bitumen-based crude oils. These areas either were not considered for investing in capital equipment (e.g., rescue tugs, salvage) or pose a significant challenge in achieving the performance measures noted in Part 1 of this technical report.

## 5.9 Risk of a Spill

In statements from Trans Mountain and CCG and TC, there seems to be a belief in much of the marine industry and the Pilot association that since there have been no catastrophic collisions of oil tankers in Canadian waters, then there is little risk that it can happen.. Within the last year that level of denial has been challenged with the incidence of two tankers involved in collisions. We wish draw attention to recent marine incidents and challenge the notion that a spill cannot and will not happen in Canadian waters. Our opinion is it could happen here and the agencies need to seriously address whether they are ready.

### 5.9.1 *Recent incidents China*

The tanker Sanchi in a collision caused by human error (see Figure 5-13) took place on January 7, 2018 approximately 160 nautical miles off the coast of China with the loss of life of all the 32 crew of the Sanchi. It contained a full [natural-gas condensate](#) cargo of 136,000 tonnes (960,000 [barrels](#)), after burning and drifting for over a week, it sank on January 14. Within a month, bunker fuel from the ship washed up and contaminated the Japanese coastline.

We mention this because it is not hypothetical to be concerned about that distance (160 nautical miles) from a coastline given that the NEB refused to include the 200 mile EEZ in the reconsideration process, although that was supported by many First Nations, the Board of FER and other Intervenors.



Rescue ships work to extinguish the fire on the Panama-registered Sanchi tanker carrying Iranian oil, which went ablaze after a collision with a Chinese freight ship in the East China Sea, in this January 10, 2018 picture provided by China's Ministry of Transport and released by China Daily. China Daily via REUTERS

**Figure 5-13: Image of the Tanker, Sanchi after Collision with a Chinese Freighter**

### ***5.9.2 Recent incidents Norway***

In November 8, 2018 the Norwegian frigate 'KNM Helge Ingstad' had a collision with the tanker Sola TS, operating under a Maltese flag in Norway. This time the tanker was unharmed but the frigate was severely damaged.

In waters of the proposed TMX tanker traffic route, with military ships, cruise ships, ferries, submarines, container ships, bulk carriers and other marine vessels crossing paths and in an area often subject to periods of intensive winds or fog, the risk of collision always hangs over us. Figure 5-14 shows the damaged Frigate.

Topic 5: Marine Oil Spills



The Norwegian frigate "KNM Helge Ingstad" takes on water after a collision with the tanker "Sola TS" in Oygarden, Norway, November 8, 2018. A large gash can be seen on her starboard side. NTB Scanpix/Marit Hommedal via REUTERS

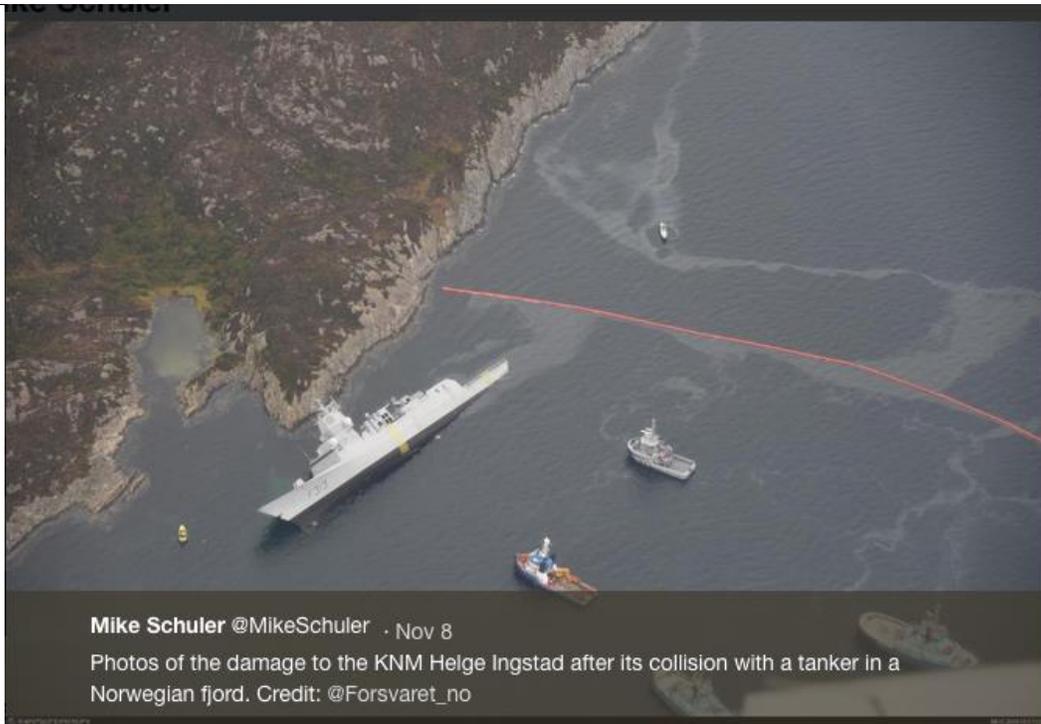


Figure 5-14: Images of Helge Ingstad Sinking Nov 8, 2018

From A95280-16 Attachment 5.3.2, Oil Spill Response Readiness in the Salish Sea: a Canada – USA Comparative Study:

*US regulations are oft cited for the requirement that tank vessels calling on US ports must plan for the Worst Case Discharge (WCD), which is defined as “ a discharge in adverse weather conditions of a vessel's entire oil cargo”. By such measure, the WCD planning volume in the case of a typical Aframax tanker (about 110,000 tonnes deadweight capacity) would be approximately 105,000 metric tonnes. However, US Federal regulations planning standards recognize that there are practical and technical constraints on response capabilities that limit an individual vessel owner or operator from contracting for full WCD resources in advance<sup>14</sup> and, as such, utilize “caps” (emphasis added) to reach the WCD threshold. “Caps” rules lay down the initial statutory response threshold required during a spill based on a tiered delivery amount of daily response capacity. According to the most conservative interpretation of US Federal Regulations, this initial daily recovery capacity is set to 50,000 bbl., although it is worth noting that more stringent regulations from Washington State set the initial daily recovery capacity at 60,000 bbl. The US Federal regulations explain this as follows: US regulations are oft cited for the requirement that tank vessels calling on US ports must plan for the Worst Case Discharge (WCD), which is defined as “... a discharge in adverse weather conditions of a vessel's entire oil cargo”<sup>13</sup>.*

It is most revealing that US standards are written so that an RO is evaluated in their response on daily recovery of spilled oil. This is in stark contrast to Canadian certified ROs who, under TC standards, simply need to arrive within a response window with sufficient equipment to have met the TC performance measure. There is no actual recovery test in the Canadian standards of performance. There were performance standards set for Shoreline clean up of 500 meters/day. So Canadian RO companies cannot be held accountable for results of oil recovery while American companies can.

In summary under TC standards, Canadian ROs simply have to show up on time to a spill with sufficient equipment and whether they recover any oil is immaterial. American standards are results based (did you recover oil?) while Canadian standards are process based (did you get their within the TC response window?). There is absolutely no possibility for prevention of serious long term environmental damage under the current TC regime as their are no incentives for RO to perform.

## 5.10 A Case for Pre-spill Research and Monitoring

There is very little or no baseline information on ecosystems at risk that would be impacted after an oil spill. It will be unclear what was lost and how to restore damaged areas, and even decades after a spill it will be unclear whether and to what extent damaged ecosystems have recovered, or whether most, some or any elements within these damaged ecosystems have recovered.

This is the experience of the post-spill situation after the 1989 Exxon Valdez grounding. There was a complete lack of baseline monitoring of what resources were present in the pre-spill period. BC is in exactly the same position today as Alaska was in 1989. There are **no baselines and no commitment** for monitoring species and environmental indicators in areas that could be potentially impacted.

Without any commitment from the Federal or Provincial government for a very basic monitoring of key environmental indicators, it will not be possible to determine loss of productivity and inform restoration/enhancement projects in a post spill environment.

The NEB made the following request of the Federal Agencies on October 12, 2018 to supply information on Oct 31<sup>st</sup> on the following topics central to the NEB reconsideration hearings. The NEB requested that:

*ECCC, DFO, TC, VFPA, and PPA Provide: a) any information on research and findings, since the date of the Board's Report, related to the fate and behaviour and clean-up of oil (including diluted bitumen) spilled in marine environments that would be applicable to Project-related marine shipping; and b) any information or knowledge on any enhancements to marine oil spill prevention, emergency preparedness, and response measures since the date of the Board's Report, including any updates and information on the status of the implementation of the enhanced marine oil spill response regime, as referenced in Condition 133 set out in the Board's Report.*

The Federal Agencies responded and summarized this information in report [A95292-2 2018-10-31](#) Direct Evidence DFO-EC-HC-NRC-PC-TC A6J6L9. In this Federally coordinated response, there are 4 pillars of the Government strategy and page 43 clarifies Pillar 4. From Annex 7 G 3:

*Pillar 4. Investing in oil spill research and spill response methods.*

*Within the first year, \$80 million in new science funding for new partnerships has been announced, to develop improved knowledge and new technologies, including:*

- *\$45.5 million to create the Multi-Partner Research Initiative, a research program to leverage collaboration on oil spill research among the best researchers across Canada and around the world;*
- *\$16.8 million to support oil spill research so that we can better understand how oil behaves and degrades in different conditions, including cold water; and,*
- *\$17.7 million towards enhancing ocean models for safer navigation and better spill drift prediction.*

At a workshop held in February, 2018 led by DFO, a report entitled, *Status Report on the Knowledge of the Fate and Behaviour of Diluted Bitumen in the Aquatic Ecosystems*<sup>26</sup> was reviewed. This report summarized what Federal scientist knew about Dilbit

In this DFO report on Page 17, in the section entitled ***Are conventional crude oil response countermeasures effective for diluted bitumen spills*** are the following statements:

*The fate and behaviour of diluted bitumen is within the spectrum observed for conventional petroleum products but the routine adaptation of response tactics (e.g., the specific type of skimmer) may need to occur more rapidly. The window-of-opportunity for surface-focused countermeasures can range from less than 24 hours to weeks.*

*page 18 Access Western Blend (AWB) and Cold Lake Blend (CL) have been used in a number of studies conducted to date.*

<sup>26</sup> DFO. 2018. [Status Report on the Knowledge of the Fate and Behaviour of Diluted Bitumen in the Aquatic Ecosystems](#). DFO Can. Sci. Advis. Sec. Sci. Resp. 2018/018.

page 19 *diluted bitumen generally has similar chemical and physical properties as other conventional petroleum products; however, its viscosity and density can change more rapidly which can necessitate a faster adaptation of response actions towards equipment (e.g., skimmers) designed for high viscosity heavy oils.*

It is unclear if WCMRC skimmers are suited to deal with dilbit. There has never been a dilbit spill. Also the BC Government and Federal Agencies have poor baselines on most environmental values and measurable indicators. The public has no idea on how to ask or seek compensation for Environmental Damage in a post-spill environment. As already mentioned, this was the lesson from the Exxon Valdez spill. They could not define what the productivity was in the pre-spill environment. BC is in exactly the same position as we have few natural ecosystem baselines. In the event of damage to the collectively held common resources, without a consistent monitoring of baselines, there is no measure for compensation and restoration or habitat enhancement to offset losses. The Province of BC and the Federal government are not monitoring baseline environmental conditions.

DFO workshop 2018, included an excerpt from a Report called, *Comparative Summary of Meso-Scale Lab Experiments Completed by Fisheries and Oceans, Natural Resources Canada, Environment and Climate Change Canada and the US Geological Survey* shown below:

*Two of the wave tanks tests and results are repeated below there about 20 marine tests.*

- 1. Saltwater Wave Tank , DB (AWB & CLB) 1 hour Seasonal (outdoor facility) Temperature > 15°C and < 8°C Breaking waves Dispersant more effective in warmer water; oil viscosity affects dispersion. Dispersants may be an effective response option in marine environments; however, window of opportunity may be limited Yes Dispersant DOR 1:10, 1:20 (Corexit 9500A, SPC 1000)*
- 2. Saltwater Flume Tank, DB (AWB & CLB), 2 weeks, Seasonal (outdoor facility), Temperature > 15°C and < 8°C Surface currents, wind, sunlight N/A Significant increase in density and viscosity in first 24 hours; some products reached a density where they would sink in freshwater after 14 days; slick thickness impacts the rate of weathering and dissolution Rapid loss of light ends limits window of opportunity for certain countermeasures, increased potential to sink and interact with sediments No dispersants Natural weathering.*

Evidence was provided by the Federal Agencies in [A95299-27 Annex 09.C.02](#) - Mixing of Diluted Bitumen and Conventional Crude Oil in Fresh and Marine Environment. We have quoted some sections in this evidence in our information requests #s 106 to 109.

The report states on page 3 in the introduction that:

*The potential increased volume of diluted bitumen product from oil sands being shipped through sensitive marine environments is a concern to environmental groups and to the general public. While the chemical composition and physical properties of conventional and non-conventional petroleum products are available, **the behaviour of these oils in a marine environment is not well understood. Currently when an oil spill occurs, response and clean-up do not occur until days after the spill due to a lack of understanding of the mixing behaviour between oil, water and sediment** (Gros et al., 2014). Responders to the scene of an oil spill must have a good understanding of the chemical and physical properties of the oil along with the water conditions (temperature, mixing intensity, salinity and sediment*

*composition), and how all of these variables interact, for an effective clean-up response plan. Understanding the risk, fate and behaviour of Canada's diluted bitumen when spilled in marine environments is needed to maintain value of the oil sands and expand to new markets. This study will focus on the behaviour of conventional crude and diluted bitumen when mixed in fresh and marine environments.*

*The tests for this paper were conducted at two temperatures , Ambient ( 15degrees and 30 degrees."*

Most of the water temperatures of the tank tests do not reflect the marine water temperature. In the 14 years of water temperature as measured at Race Rocks ER, the average temperature at Race Rocks ER is just below 10°C with range from 3.5 °C to 17.5°C (source DFO <http://www.pac.dfo-mpo.gc.ca/science/oceans/data-donnees/lightstations-phares/data/RaceRocksMonthlyTemp.txt.-> <http://www.pac.dfo-mpo.gc.ca/science/oceans/data-donnees/lightstations-phares/data/RaceRock>)

At Race Rocks in the eastern entrance of the Strait of Juan de Fuca, Light Station Keepers monitored daily sea water temperatures from 1921 to 1997 and then Ecological Reserve wardens at Race Rocks Ecological Reserve have monitored daily sea water temperatures for the past 20 years. [The mean monthly](#) temperatures for 96 years have ranged from a low of 6.2°C to a high of 12.18°C (source DFO) <http://www.pac.dfo-mpo.gc.ca/science/oceans/data-donnees/lightstations-phares/data/RaceRocksMonthlyTemp.txt.-> <http://www.pac.dfo-mpo.gc.ca/science/oceans/data-donnees/lightstations-phares/data/RaceRock>.

Like the DFO summary of tank experiments, this study too, does not reflect marine conditions along the tanker Route.

**5.10.1.1 IR #106 – To DFO**

Provide reference to research which reflects the behaviour of Dilbit within the temperature range measured at Race Rocks in the Strait of Juan de Fuca.

**5.10.1.2 IR #107 – To DFO, TC and WCMRC**

Provide reference to research which reflects the combination of physical factors including sedimentation, wave and current conditions and temperature conditions prevalent in the Strait of Juan de Fuca.

**5.10.1.3 IR #108 – To DFO, TC and WCMRC**

Since as noted above “*Responders to the scene of an oil spill must have a good understanding of the chemical and physical properties of the oil along with the water conditions (temperature, mixing intensity, salinity and sediment composition), and how all of these variables interact, for an effective clean-up response plan*”, provide a profile of these factors throughout the full range of the projected tanker route.

**5.10.1.4 IR #109 – To DFO, TC and WCMRC**

If data on the physical factors prevalent in the waters along the tanker route of Southern British Columbia are not available to oil-spill responders, provide an explanation of how a decision to decrease the possibility of dilbit entering our waters can be made until these facts are available.

Further, in the submission of the Direct Evidence by TMX to NEB on October 31, 2018 [A95280-2](#). The following was stated on Page30: 5.3.1 OH-001-2014 Proceeding:

*As described in section 3.1.2, Trans Mountain filed extensive evidence in the OH-001-2014 proceeding regarding the likelihood and consequences of a large or credible worst-case spill. As part of this work, Trans Mountain commissioned a study (the Gainford study), including meso-scale testing of representative samples of diluted bitumen (dilbit) to understand the fate and behaviour of hydrocarbons, specifically heavy crude oil from the Alberta oil sands, released into the marine environment as a result of a crude oil spill in the marine environment [A3S4Y5 PDF p.12]. The results of the Gainford Study are described in Volume 8C of the Application [A3S5G2, A3S5G4]. Neither of the two weathered dilbits sank over the course of the ten-day period of the tests under the conditions tested, which were aligned with salinity conditions corresponding to brackish water in the marine environment. In the end, the behaviour of both products proved to be no different than what might be expected of so-called conventional heavy crude oils when exposed to similar conditions.*

*Also, as part of the study a number of mechanical skimming devices were uniformly tested and their performance analyzed. All skimming devices tested were able to recover the spilled dilbit at all stages of the ten-day weathering cycle. Besides that, the Gainford study also assessed the effectiveness of dispersants, beach cleaning agents, and in-situ burning [A3S4Y6, PDF p.23]. The results of the Gainford study as well as oil spill modelling carried out at different locations along the shipping lanes served to inform the response procedures and techniques for accidental spills presented by Trans Mountain [A3S4Y6 PDF p.23]*

#### **5.10.1.5 IR #110 – To TMX**

Explain why the results of the Gainford study have been quoted in the Direct Evidence of TMX as evidence for the behaviour of Dilbit. This shows a complete lack of recognition of research reported since the Gainford Study. It has been clearly shown in research since that study was done, that one cannot make any conclusions from the Gainford study as it was not done in consideration of any physical factors which would parallel those found in the real world in the Salish sea and the Strait of Juan de Fuca. We found it astounding that TMX would use this study as rationalization for business as usual when dealing with a spill involving Dilbit.

We reviewed the evidence in the report Sergy 2017<sup>27</sup> filed by the Federal Agencies and quote from the report entitled **Scientific Support Information and Response Guidance for Dilbit Spills Impacting Marine Shorelines**. [A95299-12-Annex 6.D.38-](#)

#### *2.2 Diluted Bitumen Compared to Conventional Oil*

*The initial composition and properties of any single diluted bitumen product are different from any other single conventional crude or fuel oil. The uniqueness of diluted bitumen comes from the particular combination of composition and properties distinctive to that diluted bitumen product and which cannot be directly paired to any single conventional crude or fuel oil.*

<sup>27</sup> Sergy, G., J. Harper, S. Laforest, and P.G. Lambert, 2017. Scientific Support Information and Response Guidance for Dilbit Spills Impacting Marine Shorelines. Proceedings of the Fortieth AMOP Technical Seminar, Environment and Climate Change Canada, Ottawa, ON, pp. 50-66, 2017. [A95299-12](#)

Comparisons of properties and behaviour between conventional oils and dilbits must therefore be made with caution.

*That being said, because there have been very few bitumen product spills, there is therefore relatively little real-world experience on diluted bitumen product fate, behavior or appropriate counter-measures. Given the current lack of experience, it can be expected that decisions and guidance for dilbit shoreline response, will be largely derived from that of existing conventional oils guidance I experience I knowledge with modifications based on our existing experimental results from dilbit studies and limited real world observations. Actually, from the response perspective, the range of values of diluted bitumen product properties is similar to the range of values for properties for various different types of conventional oils. We feel generally that current response practices for conventional oil can be tailored for dilbit spills on marine shorelines (see Section 3).*

*Following the release of any oil to the environment, there is a change in oil properties due to weathering and interaction with environmental factors. The significant difference in the diluted bitumen product called dilbit, when compared to conventional oils, is the accelerated rate of weathering, primarily due to the rapid loss of the light diluent, and the relatively rapid increase in density, viscosity and adhesion properties associated with that weathering. Dilbit products may be very fluid initially but quickly (hours to tens of hours) can become highly viscous. The dramatic change can be significant in terms of fate and behaviour and has response implications.*

**5.10.1.6 IR #111 – To WCMRC**

Are the specifications of the equipment that you have been tested to pick up dilbit? Have you made specific plans to deal with dilbit?

**5.10.1.7 IR #112 – To WCMRC**

Are these dilbit spill recovery plans different from those used for conventional oil spills? If so please indicate the different actions anticipated. In particular when dealing with a spill in sensitive ecological areas.

Further assessment of the evidence of Sergy, 2017 report, *Dilbit Properties and Behavior Affecting Shoreline Response* raised concerns. Below are some additional statements from this report.

In the Background Section the report states:

*Spilled oil that is herded close to the shoreline will typically strand in the intertidal zone of the falling tide. Most will be retained in the upper intertidal zone. Some may also be deposited high in the supratidal zone by wave swash and storm surges. The fate and behaviour of stranded oil is strongly dependent on the character of the oil, the physical character of the shoreline and the physical processes occurring at the shoreline.*

*The properties and character of the oil is not however consistent or constant, and is changing over time both due to natural weathering and transformation processes. Moreover, the oil is changing both at sea before the oil reaches land, and on the shoreline after it is stranded.*

**5.10.1.8 IR #113 – To WCMRC and TC**

Given that the intertidal zones of our 19 ecological reserves in the southern mainland and Vancouver Island area are often exposed to 50 knot and above winds and currents up to 7 knots, and given that they have very high biodiversity of marine algae and invertebrates and given that some ecosystems like Race Rocks Ecological Reserve can be exposed by high wave splash well into the supratidal zone, and given that nesting seabirds including black oystercatchers, pigeon guillemots and glaucous-winged gulls are located in the supratidal zone from February to July, and migratory seabirds including SARA-listed species (see Appendix 4) are present in large numbers in the fall and spring months, and given that it is a major over-wintering habitat for at least four gull species, black oystercatchers and three cormorant species, and given that harbor seals pup in the spring months, and given that the most northerly pupping colony of elephant seals and the only known one in Canada is located, and given that over a thousand Northern and California sea lions haul out from August to March, please describe the specific plans for dealing with a spill of dilbit in such an area.

From [A95299-2 Annex D.28 - A6J6Y1.pdf](#) *The Canadian Oil Spill Shoreline Research Program: Establishing a Baseline Dataset for the Marine Coast of Northern British Columbia:*

*“There is uncertainty related to the fate of spilled diluted bitumen and potential interactions with shorelines. A Shoreline Oil Spill Research and Development Program was undertaken by Environment and Climate Change Canada (ECCC). In 2013, a 3-year study was initiated and focused on the marine shorelines of northern British Columbia (BC).*

**5.10.1.9 IR #114 – To TC, CCG and WCMRC**

Given that the intertidal zones of our 19 ecological reserves in the southern mainland and Vancouver Island area are often exposed to 50 knot and above winds and currents up to 7 knots, and given that they have very high biodiversity of marine algae and invertebrates and given that some ecosystems like Race Rocks Ecological Reserve can be exposed by high wave splash well into the supratidal zone. And given that nesting seabirds including black oystercatchers, pigeon guillemots and glaucous-winged gulls are located in the supratidal zone from February to July, and migratory seabirds including SARA listed species are present in large numbers in the fall and spring months and given that Race Rocks ER is a major over-wintering habitat for at least 4 gull species, black oystercatchers and three cormorant species, and given that harbor seals pup in the spring months, and given that the most northerly pupping colony of elephant seals and the only known one in Canada is located, and given that over a thousand Northern and California sea lions haul out from August to March, please describe the specific plans for dealing with a spill of dilbit on the shores of Race Rocks, Trial Island, Oak Bay Island and Ten Mile point ERs.

Topic 5: Marine Oil Spills

We reviewed LaForest, 2017 *Establishing a Baseline Dataset for the Marine Coast of Northern British Columbia*. This paper was presented to an international Oil Spill Conference entitled “The Canadian Oil Spill Shoreline Research Program”. We show a section of this report Laforest 2017<sup>28</sup>

*“There is uncertainty related to the fate of spilled diluted bitumen and potential interactions with shorelines. A Shoreline Oil Spill Research and Development Program was undertaken by Environment and Climate Change Canada (ECCC). In 2013, a 3-year study was initiated and focused on the marine shorelines of northern British Columbia (BC).*

**5.10.1.10 IR #115 – To ECCC**

Please indicate whether there have been any equivalent studies have been done for baseline research for the shores of the Salish Sea and the Strait of Juan de Fuca. Please provide the results of this study.

TMX filed evidence that once the TMX project is operational, within 20 years it was anticipated there would be a netbacks<sup>29</sup> of \$73.5 billion for oil producers. This netback return to investors has been used to justify this project and the economic benefits and has been advanced to override concerns about environmental risks.

There is little scientific understanding on what a marine dilbit spill would do to the long-term productivity of marine ecosystems and what a dilbit spill would do to the numerous species and ecosystems being placed at risk from this project. The probability of a dilbit spill is greater than zero.

There will be 57,600 sailings for dilbit tankers and escort tugs made over the 30+ years estimated for the TMX project. There is a need to gain a better understanding of dilbit in the marine environment, toxicity to species, recovery of dilbit, modeling on oil spills, spread and baselines for species and ecosystems impacted etc. The oil industry knows there is a need for research and monitoring to understand how to mitigate the impacts of the risk that increased dilbit export presents.

**5.10.1.11 IR #116 – To CAPP**

Does CAPP agree that more research is needed to learn how to deal with a marine-spill of dilbit?

**5.10.1.12 IR # 117 – To CAPP**

Does the Canadian Association of Oil Producers agree that they have a role to play and a need to provide financial support to understanding the impacts of a dilbit spill in BC?

<sup>28</sup> Sonia Laforest, Zeyu Yang, Patrick Lambert, Michael Goldthorp and Carl Brown 2017. *Establishing a Baseline Dataset for the Marine Coast of Northern British Columbia*. Emergency Science and Technology Section, Environment and Climate Change Canada presented a paper to an international Oil Spill Conference

<sup>29</sup> A Netback is defined as is a summary of all the costs associated with bringing one unit of oil to the marketplace and all of the revenues from the sale of all the products generated from that same unit, expressed as gross profit per barrel.

**5.10.1.13 IR #118 – To CAPP**

Does the Canadian Association of Oil Producers believe that the Federal Agencies alone and the Canadian tax payer are entirely responsible for research and the monitoring needs associated with dilbit export?

**5.10.1.14 IR #119 – To CAPP and TMX**

Does the Canadian Association of Oil Producers agree that funding research to learn how to reduce environmental risk is a corporate responsibility and is a legitimate business expense for themselves?

**5.10.1.15 IR #120 – To CAPP and TMX**

Does the Canadian Association of Oil Producers and TMX agree to support an Endowment for research over the life of their project? If not why not?

## 6.0 TOPIC 7: NATIONAL PARKS AND/OR NATIONAL MARINE CONSERVATION AREAS

### 6.1 Background to This Information Request

From [A95292-2 2018-10-31 Direct Evidence DFO-EC-HC-NRC-PC-TC A6J6L9.pdf](#) page 204:

*“10.C.2. Canada National Parks Act (CNPA) affirmed the maintenance or restoration of Ecological Integrity (EI) as the PCA’s first priority when considering all aspects of national park management. As defined in Section 2 of the CNPA, EI means with respect to a park: “a condition that is determined to be characteristic of its natural region and likely to persist, including abiotic components and the composition and abundance of native species and biological communities, rates of change and supporting processes.”*

The National Parks of Southern Vancouver Island are located in highly exposed and vulnerable areas with the imminent threat of dilbit oil spills from catastrophic events that could happen in the process of transportation of dilbit oil along the coast. The lofty goals of the Canadian National Parks Act (CPNA) as stated above would mean nothing in terms of a dilbit spill on exposed ecosystems and the many SARA-listed threatened or endangered species of plants, birds and marine mammals.

In [the Direct Evidence report A95292-2](#) DFO-EC-HC-NRC-PC-TC A6J6L9 beginning on page 205, there is clarification of which species are at risk in which National Parks, such as in the Gulf Islands National Parks Reserves (GINPR). For the convenience of other intervenors and Parks Canada staff this Table 6-1 of listed species appears below.

Table 6-1: Species Included in the Multi-species Action Plan for Gulf Islands National Park Reserve

Species	Scientific name	COSEWIC status	SARA status
<b>Contorted-pod Evening-primrose</b>	<i>Camissonia contorta</i>	Endangered	Endangered
<b>Foothill Sedge</b>	<i>Carex tumulicola</i>	Endangered	Endangered
<b>Southern Resident Killer Whale</b>	<i>Orcinus orca</i>	Endangered	Endangered
<b>Little Brown Myotis</b>	<i>Myotis lucifugus</i>	Endangered	Endangered
<b>West Coast Transient Killer Whale</b>	<i>Orcinus orca</i>	Threatened	Threatened
<b>Slender Popcornflower</b>	<i>Plagiobothrys tenellus</i>	Threatened	Threatened
<b>Marbled Murrelet</b>	<i>Brachyramphus marmoratus</i>	Threatened	Threatened
<b>Common Nighthawk</b>	<i>Chordeiles minor</i>	Special Concern	Threatened
<b>Edward's Beach Moth</b>	<i>Anarta edwardsii</i>	Endangered	Endangered
<b>Olive-sided Flycatcher</b>	<i>Contopus cooperi</i>	Special Concern	Threatened
<b>Sharp-tailed Snake</b>	<i>Contia tenuis</i>	Endangered	Endangered
<b>Ancient Murrelet</b>	<i>Synthliboramphus antiquus</i>	Special Concern	Special Concern
<b>Band-tailed Pigeon</b>	<i>Patagioenas fasciata</i>	Special Concern	Special Concern
<b>Great Blue Heron fannini subspecies</b>	<i>Ardea herodias fannini</i>	Special Concern	Special Concern
<b>Pacific Harbour Porpoise</b>	<i>Phocoena phocoena</i>	Special Concern	Special Concern
<b>Peregrine Falcon pealei subspecies</b>	<i>Falco peregrinus pealei</i>	Special Concern	Special Concern
<b>Red-legged Frog</b>	<i>Rana aurora</i>	Special Concern	Special Concern
<b>Steller Sea Lion</b>	<i>Eumetopias jubatus</i>	Special Concern	Special Concern
<b>Threaded Vertigo</b>	<i>Eumetopias jubatus</i>	Special Concern	Special Concern
<b>Short-eared Owl</b>	<i>Asio flammeus</i>	Special Concern	Special Concern
<b>Western Screech-owl kennicottii subspecies</b>	<i>Megascops kennicottii kennicottii</i>	Threatened	Special Concern
<b>Barn Swallow</b>	<i>Hirundo rustica</i>	Threatened	Threatened
<b>Silky Beach Pea</b>	<i>Lathyrus littoralis</i>	Threatened	Not listed
<b>Georgia Basin Bog Spider</b>	<i>Gnaphosa snohomish</i>	Special Concern	Special Concern
<b>Horned Grebe, western population</b>	<i>Podiceps auritus</i>	Special Concern	Special Concern
<b>Western Grebe</b>	<i>Aechmophorus occidentalis</i>	Special Concern	Special Concern

The Friends of Ecological Reserves would like to know the location of critical habitat for these species. We would also like to know if Parks Canada has made known the location of these critical habitats to other agencies such as the Coast Guard, who are, in the event of an oil spill or marine incident, the lead agency for oil spills including dilbit and other hazardous toxic substances.

Transport Canada is responsible to set standards on marine transport and the private Response Organizations (RO) on contract to respond to oil spills are responsible when a spill occurs. The rationale behind this information request by the Board of Friends of Ecological Reserves (FER) is that in the evidence provided by Parks Canada, we are not sure the critical habitat for species at risk

has been shared with other agencies and we are concerned that in the event of an oil spill there is no strategy on how best to protect critical habitat of most species listed at risk within National Parks.

Figure 6-1 shows there is both terrestrial and ocean floor habitat within the NP. In total, Parks Canada administers 63.17 km<sup>2</sup> in GINPR, including approximately 34 km<sup>2</sup> of marine areas.

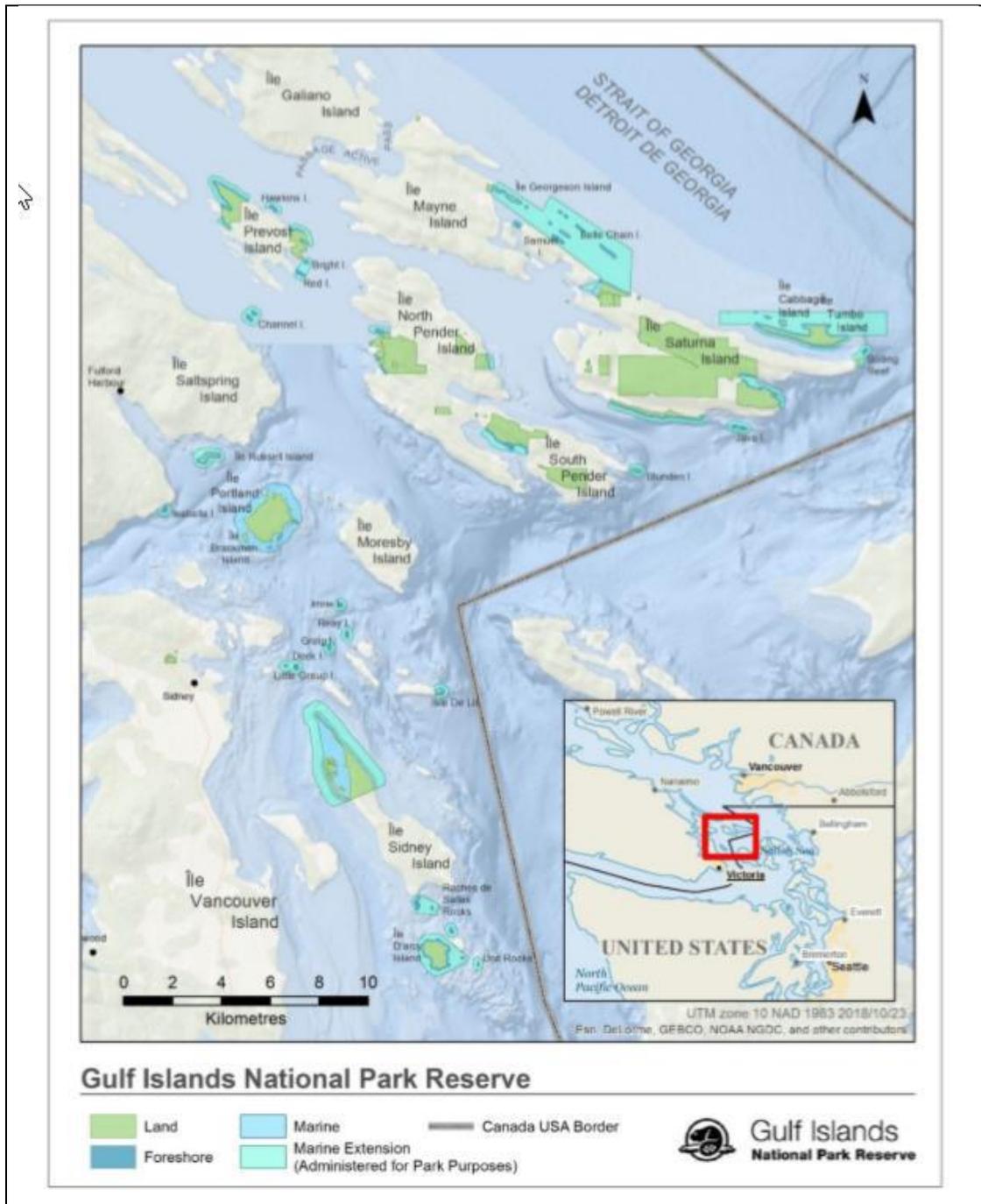


Figure 6-1: Areas Currently Protected in GINP

On page 204, (In [the Direct Evidence report A95292-2](#) DFO-EC-HC-NRC-PC-TC A6J6L9) parks states that:

*“While maintaining or restoring EI (Ecological Integrity) is the objective for park management, ecosystem management is the process used to achieve that outcome.”*

We note that of the Species listed in Table 6-1, many depend on the health and productivity of the marine ecosystems. Parks did not offer any mitigating strategies to offset the cumulative impacts of continued expansion of marine shipping. A mitigation strategy that could offset some cumulative effects of shipping would be measures that improved productivity for these species. Canada Parks can mitigate impacts to environmental values within the Parks by a change in management practices so conservation measure are given higher priority than some recreational pursuits. We understand that there is, for example, no hunting in a National Park but no similar closure for ocean fishing.

**6.1.1.1 IR #121 – To Parks Canada**

How are the marine habitats shown in figure 6-2 managed differently than the marine areas outside of the NP?

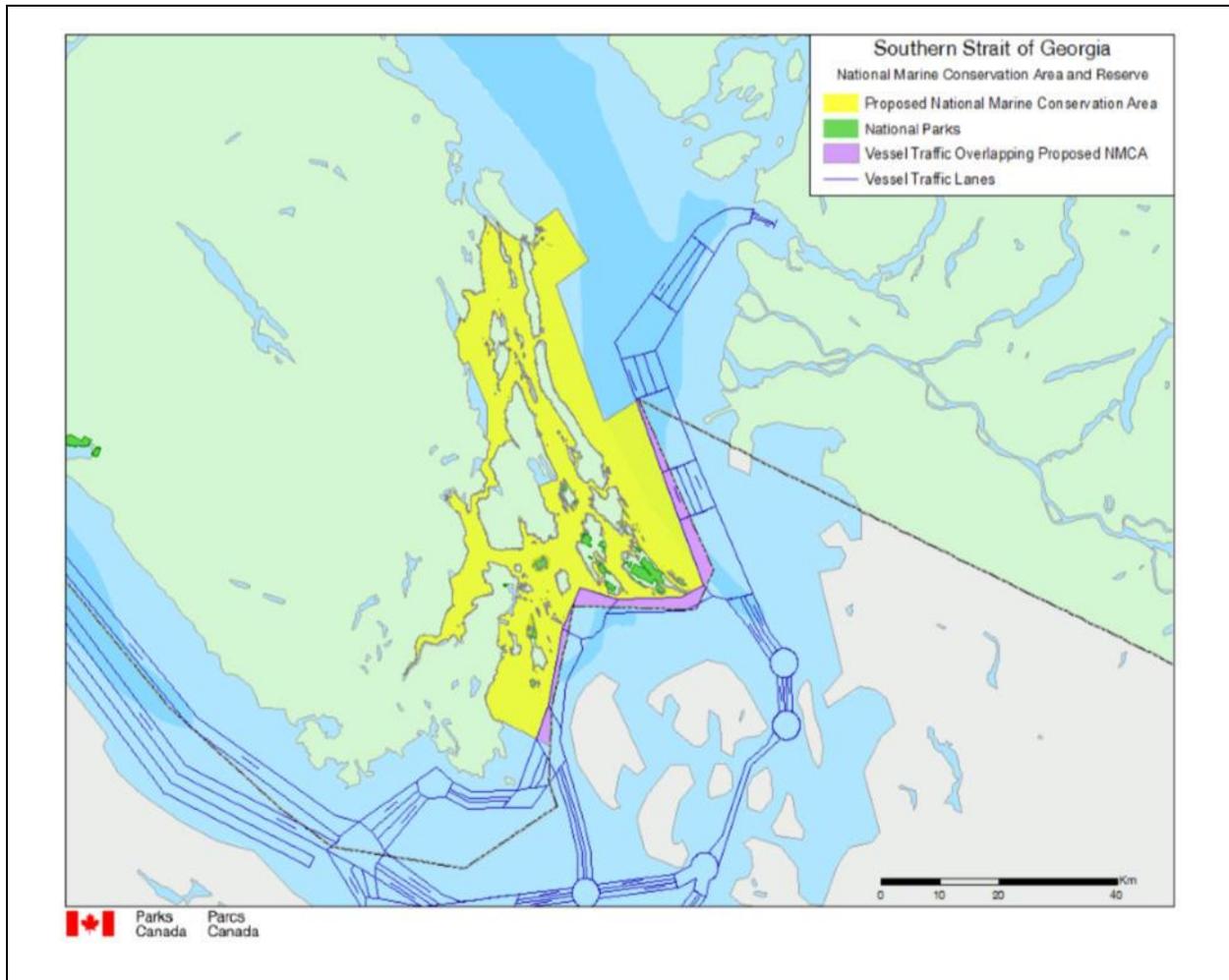
**6.1.1.2 IR #122 – To Parks Canada**

Are any areas closed to fishing? crabbing, shell fish harvest?

**6.1.1.3 IR #123 – To Parks Canada**

Has PC asked for closures from DFO to better achieve conservation objectives for listed species?

The area in the shipping lanes is also critical habitat for SRKW. The proposed Southern Strait of Georgia National Marine Conservation Area Reserve (SSG NMCAR) covers approximately 1,400 km<sup>2</sup> from the southern tip of Gabriola Island in the north to Saanich Inlet and Cordova Bay in the south.



**Figure 6-2: Overlap of Proposed Marine Protected Area, Critical Habitat of SRKW in GINP and Shipping Lanes**

We have reviewed the spill response plans on the Western Canada Marine Response Corporation (WCMRC) site <http://wcmrc.com/preparedness/strategies/> and the maps that identify areas with high environmental and infrastructure values: <http://coastalresponse.ca/coastal-mapping/>. We are aware that this oil spill response organization (RO) has developed a strategy in the event of an oil spill and has some strategies developed for some areas such as anchoring booms across bays to prevent oiling of beaches in the bay. We are not sure that Parks Canada has made known to the RO where the critical habitats are. Impacts on critical habitats can be mitigated to some extent if there is a dilbit spill only if RO teams and the Canadian Coast Guard know where the critical habitat is located and have developed a strategy for prioritizing efforts within the NP.

Locations of WCMRC response strategies for some of the areas in NP are available on WCMRC web site at: <http://coastalresponse.ca/coastal-mapping/>. The website contains a map of BC. In order to see the particular site, zoom into the area in question and click on the green circle for information and an illustration of a strategy.

From our understanding of the Reconsideration Process, the NEB is interested in practical mitigation measures to reduce risks to listed species as it has been directed to consider these by the court decision that mandated this reconsideration process. If Parks Canada makes known the critical habitat of listed species, then it will be easier for Canadian Coast Guard, Transport Canada and the Western Canada Marine Response organization to develop the best plans possible to protect the identified values. This may qualify as a mitigation strategy even though it may not be an action that involves TMX and any permit conditions that NEB can put on TMX as a condition for approval.

From the webpage: <https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/action-plans/multi-species-gulf-islands-reserve-final.html>

## 6.2 Information Requests

### **6.2.1.1 IR #124 – To Parks Canada**

What is the description of highly suitable habitat and where are these critical habitats located for species at risk? Given that most of the species listed in Table 6-1, live on islands within the Gulf Island National Park and that their home and seasonal ranges are within close proximity to the projected tanker route of the TMX project, and given that many have ecological niches that involve near shore habitat, foraging areas or breeding areas.

### **6.2.1.2 IR #125 – To Parks Canada**

What does Parks Canada plan to do for mitigation of impact on these rare populations in the event of dispersal of aerosol contaminants, deposits of toxic substances in the sub-tidal, intertidal and supra-littoral zones or emissions of toxic gases in the event of an oil spill involving dilbit in the Salish sea?

### **6.2.1.3 IR #126 – To Parks Canada**

If Parks Canada knows the location of high value habitats and critical habitats for species listed in Table 1 have these been shared with other agencies such as the CCG or WCMRC?

We are pleased to see that the location of critical habitat of SRKW within the Parks mandate have been provided. We are, however, unclear if there is any strategy or set of priorities for response from marine accidents in place with other agencies.

### **6.2.1.4 IR #127 – To Parks Canada**

What is known about winds, tides and currents in the National Parks systems that can inform oil spill response and improve the probability of safeguarding endangered species? Have physical environmental factors specific to locations on the islands, such as seasonal variations in onshore winds, current directions, and records of the effects of extreme storm events been provided to the RO agencies?

**6.2.1.5 IR #128 – To Parks Canada**

Interagency cooperation and setting priorities. Has Parks Canada ever met with Canadian Coast Guard or WCMRC to discuss how to protect highly important and vulnerable habitats in Parks and agreed on how to prioritize oil spill response actions and inform oil response agencies?

**6.2.1.6 IR #129 – To Parks Canada**

Moving shipping lanes as a mitigation strategy. Has Parks Canada provided advice to other government agencies that regulate shipping Transport Canada (TC) on how to mitigate impacts on critical habitat within National Parks? We note that there is overlap between critical habitat from SRKW and shipping lanes. Has Parks Canada requested of TC that a move in the shipping lanes away from identified Critical Habitat as a mitigation strategy?

**6.2.1.7 IR #130 – To Parks Canada**

Assessment of damaged ecosystems and critical habitat. Please provide an assessment of the recovery potential for ecosystems of the Southern Gulf Islands and for the SARA and COSEWIC-listed species which may be affected by a dilbit spill in the Salish Sea. Please list strategies that are currently being implemented to recover species listed in Table 6-1.

### 6.3 Pacific Rim Critical Habitat

(page 207, [A95292-2](#) 2018-10-31 Direct Evidence DFO-EC-HC-NRC-PC-TC A6J6L9.pdf.)

Both terrestrial and Marine components are protected in this park. The marine unit of the Long Beach Area (64km<sup>2</sup>) and the West Coast Trail (66km<sup>2</sup>) are defined as the area from the mean high tide mark to the 20 metre isobaths depth which ranges from 0.4 to 3.3 kilometers seaward from shore. In addition the Broken Island Group is 92 km<sup>2</sup> of marine waters. In all there are 222 km<sup>2</sup> or 43% of the Pacific Rim Park of waters protected under the CPNA. This large marine area which experiences regular onshore winds passing over the waters of the projected TMX tanker route provides the location for “the perfect storm” for a possibility of extensive oiling from a catastrophic oil spill.

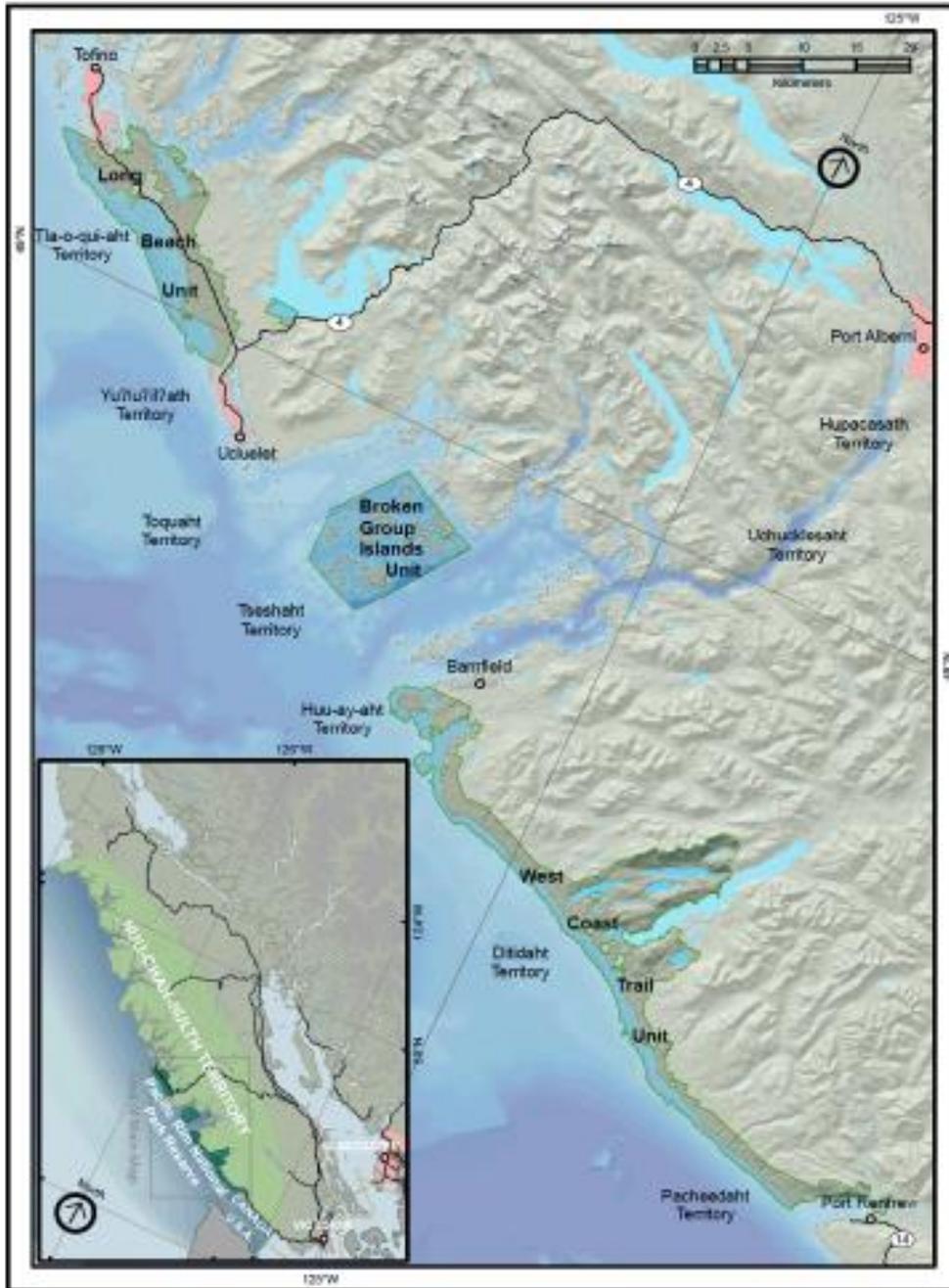


Figure 6-3: The Pacific Rim National Park Reserve

In the Multi-species action plan, ([A95299-38 Annex 10.G.02 - Multi-species Action Plan for Pacific Rim National Park Reserve of Canada A6J7D0.pdf](#)) a great number of species which occur in the National Parks of the Pacific Rim are SARA listed as endangered or threatened. In the action plan there is the statement :

*“Species at risk, their residences, and their habitat are protected by existing regulations and management regimes in national parks as well as by the SARA. Additional measures that will contribute to the survival and recovery of the species at the site are described in this plan. These measures were identified based on threats and actions outlined in federal and provincial status assessments and recovery documents, as well as knowledge of the status and needs of each species at the site. Population monitoring measures are also identified for the species for which management activities at the site can contribute to recovery.”*

**6.3.1.1 IR #131 – To Parks Canada**

Please provide population monitoring sites and locations of on going monitoring. What evidence does Parks Canada have that protection of the habitat of these species is assured in the event of an oil spill in the offshore seas when prevailing winds and storms will subject the areas to contaminated sea spray?

**6.3.1.2 IR #132 – To Parks Canada**

Provide plans from the RO agency for protection of the habitat of these species.

## 6.4 Critical habitat of Seaside Centipede Lichen

From the reference [http://www.registrelp-sararegistry.gc.ca/document/default\\_e.cfm?documentID=1125](http://www.registrelp-sararegistry.gc.ca/document/default_e.cfm?documentID=1125)

*“The Seaside Centipede Lichen (*Heterodermia sitchensis* Goward and Noble) was described in the mid 1980s from the west coast of Vancouver Island, British Columbia (Goward 1984). It received official status in 1996 as endangered in Canada on the basis of its highly restricted global distribution, its endemic status in Canada, its specialized ecological requirements, and its extreme vulnerability to habitat degradation. The known population in Canada numbers 212 thalli, almost 90 percent of these in only five localities. Repeated surveys indicate a declining population at many sites.”*

Whereas Parks Canada has identified the general steps and anticipated effects for recovery of Seaside Centipede Lichen (*Heterodermia sitchensis*) and whereas they have recommended

- Improved understanding of species vulnerability and critical habitat (including characteristics).
- Improved ability to mitigate threats

**6.4.1.1 IR #133 – To Parks Canada**

What evidence does Parks Canada have that protection of the habitat of this rare species is assured in the event of an oil spill in the offshore seas when prevailing winds and storms will subject the areas to contaminated sea spray

**6.4.1.2 IR #134 – To Parks Canada**

Provide plans from the RO agency for protection of the habitat of these species.

## 6.5 Critical Habitat of the Sand Verbena

From: [A95299-45 Annex 10.G.09](#) Statement of how the critical habitat of Pink Sand-verbena (*Abronia umbellata*) is legally protected A6J7D7.pdf

*“The critical habitat for Pink Sand-verbena is located on federal land, specifically within the Pacific Rim National Park Reserve of Canada (“Pacific Rim NPRC”). The recovery strategy includes examples of activities that are likely to result in the destruction of the critical habitat in Pacific Rim NPRC:*

- *hiking,*
- *camping,*
- *use of off-road vehicles,*
- *creation of fire pits,*
- *the introduction of non-native invasive plants (e.g., grasses like *Ammophila arenaria* and *A. breviligulata*), and*
- *beach development (including but not limited to breakwaters, seawalls, docks, and sand mining).”*

**6.5.1.1 IR #135 – To Parks Canada**

Given that the Critical habitat for Pink Sand-verbena was identified in the Final Recovery Strategy for the Pink Sand-verbena in Canada posted in February 2007 on the SARA Public Registry. Please indicate what evidence does Parks Canada have that protection of the habitat of this species is assured in the event of an oil spill in the offshore seas when prevailing winds and storms will subject the areas to contaminated sea spray.

**6.5.1.2 IR #136 – To Parks Canada**

Provide plans from the oil-spill recovery agency for protection of the habitat of this species.

## 6.6 Critical Habitat of the Contorted-Evening Primrose

From [A95299-41 Annex 10.G.05](#) - Critical Habitat of Contorted-pod Evening-primrose Gulf Islands National Park Reserve A6J7D3.pdf

### **6.6.1.1 IR #137 – To Parks Canada**

Given that the critical habitat of the Contorted-pod Evening-primrose was identified in the Recovery Strategy for the Contorted-pod Evening-primrose (*Camissonia contorta*), in Canada, please indicate what evidence does Parks Canada have that protection of the habitat of this species is assured in the event of an oil spill in the offshore seas when prevailing winds and storms will subject the areas to contaminated sea spray.

### **6.6.1.2 IR #138 – To Parks Canada**

Provide plans from the RO for protection of the habitat of this species.

## 6.7 Critical Habitat of the Edwards' Beach Moth

From [A95299-42 Annex 10.G.06](#) -Critical Habitat of Edwards' Beach Moth (*Anarta edwardsii*) in Gulf Islands NP A6J7D4.pdf.

*Pursuant to subsection 6(4) of the Parks Canada Agency Act, the Parks Canada Agency is responsible for the administration and enforcement of the CNPA.*

*The CNPA provides legal protection against the destruction of critical habitat for the Edwards' Beach Moth: (Canada National Parks Act (CNPA), S.C.2000,*

### **6.7.1.1 IR #139– To Parks Canada**

What evidence does Parks Canada have that protection of the habitat of this rare species is assured in the event of an oil spill in the offshore seas when prevailing winds and storms will subject the areas to contaminated sea-spray.

### **6.7.1.2 IR #140 – To Parks Canada**

Provide plans from the RO for protection of the habitat of the Edwards' Beach Moth (*Anarta edwardsii*) in Gulf Islands.

## 6.8 Critical Habitat of Contorted-pod Evening-primrose (*Camissonia contorta*) in Gulf Islands National Park Reserve of Canada

From: [A95299-41 Annex 10.G.05](#) - Critical Habitat of Contorted-pod Evening-primrose Gulf Islands National Park Reserve A6J7D3.pdf.

Given that the critical habitat of the Contorted-pod Evening-primrose was identified in the Recovery Strategy for the Contorted-pod Evening-primrose (*Camissonia contorta*), in Canada, as

posted on the Species at Risk Public Registry. The Multi-species Action Plan for Gulf Islands National Park Reserve of Canada identifies additional critical habitat for the species in the Gulf Islands National Park Reserve of Canada.

**6.8.1.1 IR #141 – To Parks Canada**

What evidence does Parks Canada have that protection of the habitat of this rare species is assured in the event of an oil spill in the offshore seas when prevailing winds and storms will subject the areas to contaminated sea spray.

**6.8.1.2 IR #142 – To Parks Canada**

Provide plans from the RO for protection of the habitat of the Contorted-pod Evening-primrose (*Camissonia contorta*) in the Gulf Islands National Park Reserve of Canada.

## 6.9 Fort Rodd Hill Multi-Species Action Plan

From page 7: [A95299-39 Annex 10.G.03](#) –

*“The proposed measures seek a balanced approach to reducing or eliminating threats to species at risk populations and habitats, and include protection of individuals and their occupied by the species, combined with ongoing research and monitoring), potential species re-establishment, and increasing public awareness and stewardship (e.g., signage, visitor programs, and dissemination of information about species at risk and the conservation program at Fort Rodd Hill through various media).*

*Potential economic benefits of the recovery of the species at risk found in these sites cannot be easily quantified, as many of the values derived from wildlife are non-market commodities that are difficult to appraise in financial terms. Wildlife, in all its forms, has value in and of itself, and is valued by Canadians for aesthetic, cultural, spiritual, recreational, educational, historical, economic, medical, ecological and scientific reasons. The conservation of wildlife at risk is an important component of the Government of Canada’s commitment to conserving biological diversity, and is important to Canada’s current and future economic and natural wealth.*

*Implementing this action plan is expected to have positive benefits for site visitors, local residents, and Indigenous groups. Some activities in the plan may create opportunities for local residents to become actively involved in ecosystem restoration, including species at risk recovery. Opportunities for involvement will be available to all local residents. These include opportunities to learn about and take part in the recovery of culturally important species at risk, opportunities for visitors and local communities to be involved in conservation issues, opportunities for integration of Indigenous Traditional Knowledge into conservation issues at Fort Rodd Hill, and greater awareness of Indigenous values and culture among local residents and visitors to the site. In doing so the plan supports the goals under the Species at Risk Act that “the traditional knowledge of the aboriginal peoples of Canada should be considered in the assessment of which species may be at risk and in developing and implementing recovery measures”.*

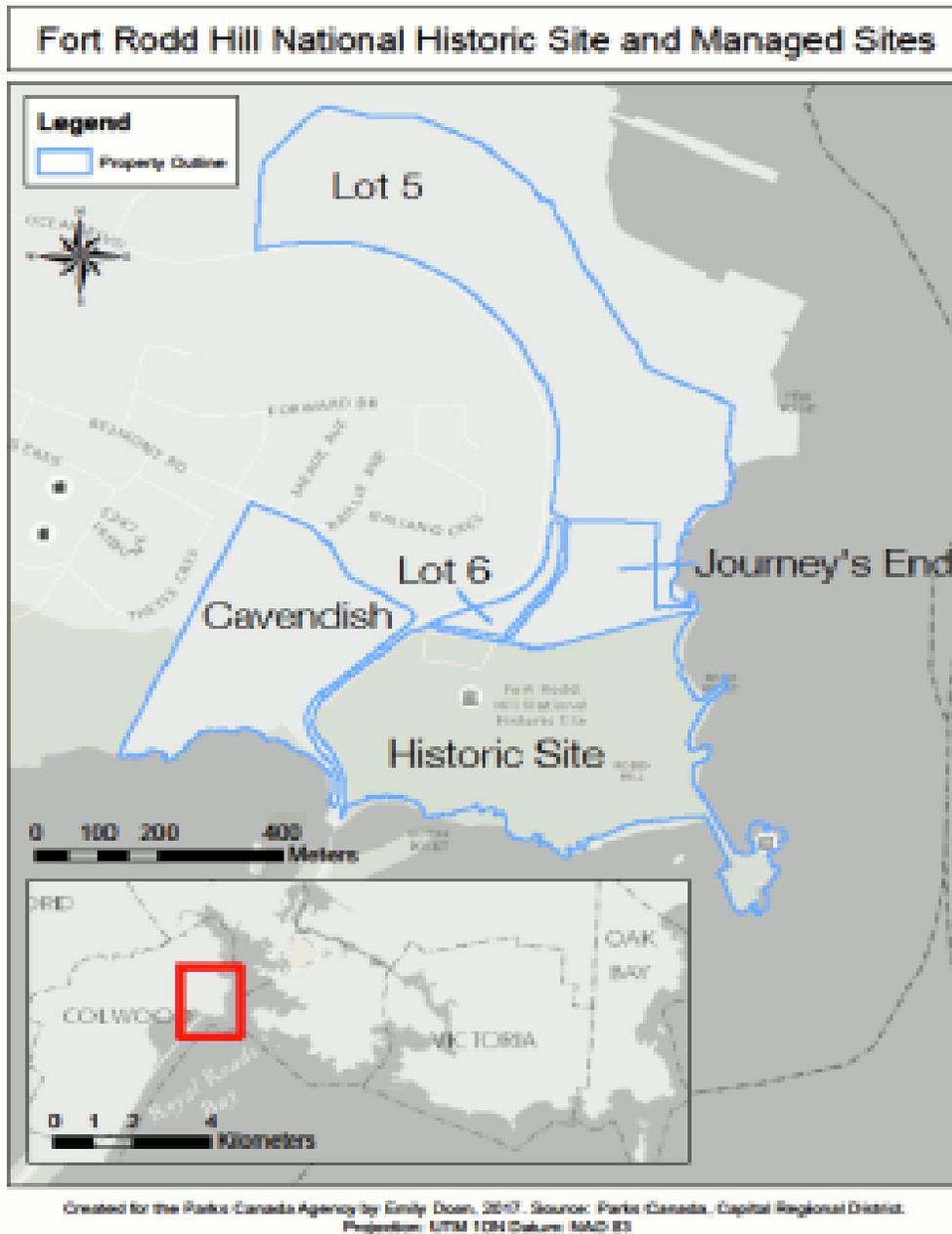


Figure 6-4: Fort Rodd Hill National Historic Site and Managed Sites

**6.9.1.1 IR #143 – To Parks Canada**

Given that this Multi-species action plan seeks a balanced approach to reducing or eliminating risks and that potential economic benefits of the recovery of the species at risk found in these sites cannot be easily quantified, what are the estimated expenditures which are not reflected in your current budget that would be necessary to ensure protection of this unique area from the effects of a dilbit-involved oil spill?

**6.9.1.2 IR #144 – To Parks Canada**

What baseline studies on ecosystems and species have been completed within the Fort Rodd Hill National Historic site?

**6.9.1.3 IR #145– To Parks Canada**

What contact with RO (i.e. WCMRC) has Parks Canada had about this sensitive area and how are actions planned for protection reflected in present RO plan?

**6.9.1.4 IR #146 – To Parks Canada**

Has your department requested a re-location of tanker traffic lanes to a more direct route which would put them much further from the Victoria water-front, providing more protection for Fort Rodd Hill ecosystems and historical values in the event of a spill of dilbit, or in fact for any oil spill?

**6.9.1.5 IR #147 – To Parks Canada**

Do you think it would be important to remove tanker traffic from along the coast of Victoria and route it in a more direct trajectory out into the Strait of Juan de Fuca?

## 7.0 TOPIC 8: MITIGATION AND MONITORING MEASURES FOR HUMAN HEALTH EFFECTS

### 7.1 Review of Evidence Submitted by TMX

TMX submitted a 26-page draft report as part of the public outreach program. This report has a focus on safety [A95280-attachment 9.2.2](#). In this summary report we could not find any mention made of what the public should know in the event of a dilbit spill. We understand that dilbit and diluents used to make it viscous are toxic substances. We are concerned that critical public health information has been withheld.

Permit condition 131 required TMX to prepare a *Marine Public Outreach Program*. This condition are repeated here for the convenience of the reader.

*Marine Public Outreach Program: Trans Mountain must file with the NEB, at least 3 months prior to commencing operations, a report describing completed activities and observed outcomes of Trans Mountain's Marine Public Outreach Program, and any further planned activities for this program. The report must also include:*

- a) *a summary of Trans Mountain's consultation with the Pacific Pilotage Authority regarding the scope of work and activities to be undertaken through the program, including:
  - i) *the resources and information that Trans Mountain has provided or will provide to the Pacific Pilotage Authority to addresses the impacts of increased Project-related tanker traffic in the Salish Sea;*
  - ii) *the activities or actions that Trans Mountain will undertake to communicate applicable information on Project-related vessel timing and scheduling to fishing industry organizations, commercial and recreational vessel operators, Aboriginal groups, and other affected , in conjunction with the Pacific Pilotage Authority's activities; and*
  - iii) *any issues or concerns raised by the Pacific Pilotage Authority and how Trans Mountain has or will address them;**
- b) *a description of the actions or activities that Trans Mountain has or will undertake to incorporate into its own public engagement efforts the activities of the Pacific Pilotage Authority and Transport Canada regarding enhanced safe boating practice education for small vessel operators;*
- c) *a plan and schedule for all ongoing and future activities and actions under the program, including anticipated completion dates; and*
- d) *a summary of its consultations with Transport Canada, the Canadian Coast Guard, the Chamber of Shipping for British Columbia, commercial and tourism associations and potentially affected Aboriginal groups.*

TMX did provide an update and insight into what this permit condition requires of them ([A95280 Attachment 9.2.2 Marine Public Outreach Program](#)). The focus of the Marine Public Outreach Program is outlined in this report on Table 1 page 3 and repeated below. There is no mention of dilbit as a hazardous substance. The program is on boating safety and the mammal protection program.

- *Navigable waters affected by the increase in Project-related vessel traffic*
- *Concerns of indigenous and non-indigenous marine waterway users regarding Project effects (e.g. commercial, recreational, tourism)*
- *PPA boating safety campaign: "Safe Boating in Deep Sea Shipping Navigation Areas"*
- *Transport Canada Boating Safety Office and resources such as the Safe Boating Guide*
- *Vessel timing and scheduling with affected stakeholders (e.g. through Second Narrows)*
- *Tug requirements (e.g. MRA rules, tug matrix, potential effects on tug availability) • Potential navigation safety effects of construction footprint for WMT • Potential effects of proposed WMT Marine Fisheries Offsets on navigable waters (i.e. proposed rock reefs)*
- *Marine Mammal Protection Program (i.e. mitigating interactions with marine mammals)*

These conditions appear to equate human health with marine accidents and collisions. Since TMX when fully operational will create a 6% increase in all shipping, it is unclear why this program is aimed at what is arguably marine accidents of all shipping and avoids the much greater risk unique to the project; that is the toxic nature of dilbit and what the public needs to know in the event of a dilbit spill.

## 7.2 Communication With the public

We note that TMX works closely with WCMRC who are the TC-certified RO on the BC coast. We are concerned that the obligations for the marine outreach program in Condition 131 of their permit, excludes any reference to outreach on what to do in the event of a dilbit spill. It is our understanding that a 600% increase in tanker traffic means there is 600% increase in the likelihood of a dilbit spill. The outreach program focuses on increased boating accident risk, but the real public concern, we believe is the risk to public health which has not been addressed. It must be clear to the public what the health risks are and what the best thing the public can do in the event of a dilbit spill. There needs to be a new permit condition that is explicit about TMX's obligation on the outreach needed for a public exposed to toxic substances. From a human health and safety point of view, that seems to be a common sense minimum. Having a public outreach program in name masquerading as a public relations exercise is unacceptable. What the public needs to know with regard to a dilbit spill, needs to be either included in a revisited permit condition or in a new permit condition. The real outreach is also needed for first responders who put their lives and health on the line. That is not mentioned in the outreach program.

This Marine Public Outreach Program is seriously flawed as the focus of the program has been defined by the proponent and appears to be a Public Relations exercise.

### 7.2.1.1 **IR #148 – To TMX and WCMRC**

We request that TMX and WCMRC supply the information sheets required by WorkSafe BC and clarify why human health and oil spills are not included in their Marine Public Outreach Program? We note that this program has only recently been issued for External Review. Who are the external reviewers?

### 7.3 Federal Agency Evidence

[A95292-27](#) Annex 06.D.04 -Response to BC Policy Paper for Engagement to spill management A6J6S4.pdf page 15, states:

*“The marine safety system is designed to prevent incidents from happening. This is achieved by establishing regulations, enacting vessel construction standards, conducting ship and equipment inspections, and establishing requirements for the competency of crews.”*

Nowhere in that document can we find any mention of obligations to deal with the toxic substances resulting from a catastrophic accident along the transportation corridor. Saying that the system is designed to prevent incidents from happening is just not good enough.

Two Federal government departments in Canada are responsible for toxic substances. In the letter of comment by the Regional director general – BC Region ([Health Canada TMX Letter of Comment August 11 2015 - A4S0Z6.pdf](#)) the statement is made that:

*“Health Canada is the federal department responsible for helping Canadians maintain and improve their health. Its participation in the environmental assessment process as a Federal Authority as defined under Section 20 of the Canadian Environmental Assessment Act 2012 (CEAA 2012) is to provide the NEB in its capacity as Responsible Authority with specialist or expert knowledge in its possession with respect to the Project. Accordingly Health Canada provided its expertise in the areas of air Quality, drinking and recreational water quality, noise, contamination of country foods, and human health risk assessment (HHRA). Consistent with subsection 5(1)c of CEAA2012, Health Canada focused its review on impacts of the project on the health of Aboriginal peoples, and paid special attention to health concerns raised by Aboriginal peoples during the environmental assessment process. Health Canada reviewed key documents provided by the Proponent and intervenors submitted to the NEB up until May 27, 2015.”*

Annex 8.E.1 of the Canada Health submissions involves a very recently published report (August 2018) entitled: *Guidance for the Environmental Public Health Management of Crude Oil Incidents – A Guide Intended for Public Health and Emergency Management Practitioners* (<http://www.nccch.ca/documents/guide/guidance-environmental-public-health-management-crude-oil-incidents>). Several examples from Marine disasters are mentioned, and the health effects and carcinogenicity are indicated. We find it incredible that this report does not use the term Dilbit and makes no reference to the danger of it being shipped in pipelines or at sea, and although it recognizes that there may be human health issues involved, it does not give any indication of how toxic substances such as Dilbit will be handled once a catastrophic spill happens.

*“Non-cancer and chronic health effects considerations, such as reproductive and developmental toxicity, are beyond the scope of this document. However, it is important to note that the compounds discussed do possess many of these other toxicology attributes and human exposure may result in a range of negative health outcomes.”*

There is also no mention of the current shipment of any type of oil from the West Coast of Canada. From page 15, **“1.8.3 Ship”**:

*There are two types of oil tankers: crude carriers for unrefined products and product carriers for refined products. Crude oil tankers are mainly used to transport crude oil from production areas in the Arabian Gulf and West Africa to refineries in Asia, Europe, and the United States.*

*Product tankers are used to transport refined oil products (e.g., gasoline, diesel, kerosene, jet, or fuel oil) to the market.”*

The quote below is from page 6 of : Potential Health and Safety Concerns for Oil Spill Responders working in Proximity to Spills of Unconventional Crude Oil ([A95299-6 Annex 06.D.32](#))A6J6Y5 in referring to a spill involving Dilbit”

*“Combined, all the data demonstrates a potential for inhalation exposure with elevated levels of volatile organic compounds (VOCs) in air during the initial response period. Exposure modelling results predict a potential scenario where some individual compounds may even exceed American Conference of Governmental Industrial Hygienists (ACGIH, 2015) workplace safety values. A risk of a crude oil explosion and fire is also present as a consequence of the volatiles in air which may result in the presence of an enriched atmospheric air and volatile hydrocarbon mix resulting in an environment with a potential hydrocarbon explosive limit. In a fire scenario, inhalation exposure may include hydrocarbons as well as combustion by-products. Inhalation exposure by responders is a concern.*

*When preparing site safety plans the inhalation risks are higher at the initial site entry, the first day and if a fire is ongoing, then is expected to decline over time as the light hydrocarbons either evaporate to air or are consumed in a fire and after the fire is suppressed, when the burn by-products have deposited to the surface. Contact exposure of unprotected skin is a second potential route of attack for responders. Some non-polar compounds, particularly in a condensate, can result in localized skin irritation. Many chemicals present in crude oils, such as benzene, may result in skin permeation or damage under certain conditions. A risk of skin exposure would increase with proximity to the spilled crude oil and length of time working on site. No single reference with comprehensive chemical composition data for dilbits and synbits is readily available.*

*The 5-year average BTEX concentrations for AWB are 0.28, 0.48, 0.05 and 0.36 volume % respectively and for CLB BTEX concentrations are 0.23, 0.39, 0.05 and 0.32 volume % respectively. The Condensate Blend (CRW) used as the diluent in the heavy crude blending has 5-year average BTEX concentrations of 0.81, 1.53, 0.18, and 1.28 volume % respectively (Crude Quality, 2015). The BTEX in dilbit is proportionally derived from its diluent condensate. Benzene is a known skin permeating compound (ACGIH, 2015). In an initial assessment, a catastrophic release of fresh dilbit involving large volumes into a confined location may result in localized inhalation risks from airborne concentrations as well as increased risk of direct contact with skin permeating benzene. However, a review of the available BTEX chemical composition data for AWB and CLB, taking into consideration evaporation rates, exposure pathways and the role of different responder groups, chemical permeation risk is low but not zero for all potential dilbit spill scenarios. Ingestion and injection are the final routes of attack or exposure. For the purpose of this paper, it is assumed that the site safety plan will address best preventative practices for worker hygiene..”*

## 7.4 Toxicological Effects Listed

If the following listing of toxicological effects are of real concern to the Government of Canada, then there has to be specific plans for handling them.

### *“2.3.2 Toxicological effects*

*Crude oil spill materials are a diverse family of compounds with a wide spectrum of toxicities. This subsection provides a summary of crude oil acute health effects and carcinogenicity. Non-cancer and chronic health effects considerations, such as reproductive and developmental toxicity, are beyond the scope of this document. However, it is important to note that the compounds discussed do possess many of these other toxicology attributes and human exposure may result in a range of negative health outcomes.*

*“Acute effects Acute exposure during a spill may lead to neurological (central and peripheral nervous systems), respiratory, gastrointestinal, dermatological (skin), and ophthalmological (eye) complications. The effects are dose- and duration-dependent, and among clean-up workers dependent on the proper use of PPE [Suarez, 2005].*

*In a meta-analysis of 13 studies of acute exposure in seven oil spills, ). the reported toxicological symptoms in order of decreasing frequency were: respiratory, ophthalmological, headache, dermatological, nausea, dizziness, and tiredness or fatigue [Levy, 2011, Table 3] (see also Annex D: Examples of reported toxicological health effects from acute crude oil exposure and Annex E: Epidemiological studies on physical/physiological effects experienced by humans exposed to oil spills*

*The principal complaints of oil spill clean-up workers participating in Deepwater Horizon (DWH) clean-up activity along the coast of Louisiana are illustrated in Figure 9 [D’Andrea, 2014, Figure 2].*

## 7.5 The Environmental Risks of Using Corexit:

The report also indicates that human health problems can result in the use of the toxic dispersant Corexit:

*“An association between exposure to dispersants, specifically Corexit™ EC9527A or Corexit™ EC9500A, and adverse acute health effects (burning in the nose, throat, or lungs, tightness in chest, and burning eyes) during clean-up operations and in some case persisting 1 to 3 years later was reported [McGowan, 2017].”*

### Abstract

**Background:** The large quantities of chemical oil dispersants used in the oil spill response and cleanup (OSRC) work following the *Deepwater Horizon* disaster provide an opportunity to study associations between dispersant exposure (Corexit™ EC9500A or EC9527A) and human health.

**Objectives:** Our objectives were to examine associations between potential exposure to the dispersants and adverse respiratory, dermal, and eye irritation symptoms.

**Methods:** Using data from detailed Gulf Long-term Follow-up (GuLF) Study enrollment interviews, we determined potential exposure to either dispersant from participant-reported tasks during the OSRC work. Between 27,659 and 29,468 participants provided information on respiratory, dermal, and eye irritation health. We estimated prevalence ratios (PRs) to measure associations with symptoms reported during the OSRC work and at study enrollment, adjusting for potential confounders including airborne total hydrocarbons exposure, use of cleaning chemicals, and participant demographics.

**Results:** Potential exposure to either of the dispersants was significantly associated with all health outcomes at the time of the OSRC, with the strongest association for burning in the nose, throat, or lungs [adjusted PR (aPR) = 1.61 (95% CI: 1.42, 1.82)], tightness in chest [aPR = 1.58 (95% CI: 1.37, 1.81)], and burning eyes [aPR = 1.48 (95% CI: 1.35, 1.64)]. Weaker, but still significant, associations were found between dispersant exposure and symptoms present at enrollment.

**Conclusions:** Potential exposure to Corexit™ EC9527A or EC9500A was associated with a range of health symptoms at the time of the OSRC, as well as at the time of study enrollment, 1–3 y after the spill. <https://doi.org/10.1289/EHP1677>

#### 7.5.1.1 *IR #149 – To TC, HC, CCCE and WCMRC*

Whereas research done on dispersants has indicated serious health and environmental problems even several years after the use of certain dispersant have shown these effects, are there any plans for using any of these dispersants in the event of a dilbit spill?

## 7.6 Dilbit and its Toxicity

It is well known that several of the chemicals in Dilbit are carcinogens and the report duly lists those as being common in crude oil in general. What is not mentioned, incredibly, is the high level of danger that the diluents of Dilbit produce when released into the environment.

### **“Carcinogenicity**

*The risk of carcinogenesis due to crude oil exposure is a common concern among members of the public after a release. To date, there is no epidemiological evidence to link crude oil spill exposure to carcinogenic effects. Furthermore, the International Agency for Research on Cancer (IARC) has determined that there is “limited evidence for the carcinogenicity in experimental animals of crude oil” and “inadequate evidence for the carcinogenicity in humans of crude oil.” IARC concludes that “crude oil is not classifiable as to its carcinogenicity to humans (Group 3)” [IARC, 1989].*

*“However, some components of crude oil are carcinogenic or possibly carcinogenic (see CDC, 2010a for a listing of hazardous components found in light crude oil).*

***Benzene** has been considered a possible carcinogen by IARC since 1979 based on a suggested relationship between benzene exposure and leukaemia (predominantly myelogenous leukaemia) [IARC, 1979]. Benzene was classified as a Group-I carcinogen, by IARC in 1987 citing additional evidence of acute nonlymphocytic leukemia in workers exposed to benzene [IARC, 1987]. In 2017 IARC confirmed the carcinogenicity to humans on the basis of sufficient evidence in humans, sufficient evidence in experimental animals, and strong mechanistic*

*evidence. In adult humans, benzene causes acute non-lymphocytic leukaemia, including acute myeloid leukaemia. Previous observations of limited evidence for chronic lymphocytic leukaemia, multiple myeloma, and non-Hodgkin lymphoma were also confirmed. Positive associations with exposure to benzene were also observed for chronic myeloid leukaemia and for lung cancer in several studies [Loomis, 2017]."*

*"Toluene has been categorized by IARC as Group 3 (not classifiable as to its carcinogenicity in humans) with a supporting statement that there is inadequate evidence in humans and that available evidence suggest a lack of carcinogenicity of toluene in experimental animals [IARC, 1999; EPA, 2005].*

*Xylenes have also been categorized by IARC as Group 3 [IARC, 1999; ATSDR, 2007].*

*Of the PAHs found in crude oil,*

*benzo[a]pyrene is carcinogenic to humans (Group 1) [IARC, 2010] (see IARC 2010 for discussion of other PAHs).*

*Ethylbenzene has been evaluated as a Group 2B carcinogen (possibly carcinogenic to humans) based on the findings that there is inadequate evidence in humans for carcinogenicity but sufficient evidence in experimental animals [IARC, 2000; ATSDR, 2010b]."*

#### ***"Toxicology of burning oil***

*Burning crude oil generally produces heat and dense clouds of thick black smoke. The smoke is composed of solid unburned carbon (soot) and other "particulate" pollutants (in both the solid and liquid states), as well as gases of volatile substances and vaporized matter.*

*The chemical pollutants found in the smoke vary with the composition of the crude oil and factors related to how it is burned. There are several combustion products that may be present and could be significant health hazards. These products include non-carbon substances (like acids and metals) as additional free particles or stuck to the surface of the soot; gases (like carbon dioxide, carbon monoxide, sulfur oxides, nitrogen oxides, and hydrogen sulfide); and vaporized liquids and solids.*

*Generally, the harmful substances decrease with distance from fire and smoke [Barnea, 2017; CB&1, 2015]. health effects related to exposure to oil spills). Adverse effects include higher rates of mental distress, an inability to concentrate, memory loss, anxiety, depression and post-traumatic stress disorder (PTSD) [Palinkas, 1993; Lyons, 1999; Rung, 2016; Jung, 2017; G n reux, 2015].*

*For residents who (1) suffered high levels of clinically significant anxiety and depression and (2) lived in coastal communities affected by the Deepwater Horizon (DHW) oil spill, income loss rather than direct contact with the oil was the most significant driver of the psychological effects [Morris, 2013].*

*It has been suggested that the resources mobilized to reduce the economic and behavioural health impacts on the DHW spill on coastal residents (including compensation for lost income from British Petroleum and increases in available mental health services) may have resulted in a reduction in potential health problem [Gould, 2014]."*

## 7.7 Health Canada's Concern in 2015

We note that Health Canada in the 2015 Letter of Comment to TMX (included below) has expressed “a concern for uncertainties in the Proponent's air dispersion modelling” which reduced HC's confidence in the TMX conclusion that their assessment indicated a low potential for adverse human health effects due to marine vessel emissions.

### **Health Canada TMX Letter of Comment August 11 2015 - [A4S0Z6.pdf](#)“1.**

*The Proponent's SLHHRA air emissions from marine vessel traffic, predicted several exceedances of risk benchmarks for short-term inhalation of COPCs. For example, in the Base, Application and Cumulative cases, residents and area users may experience exceedances for NO<sub>2</sub>, nickel, respiratory irritants and immunotoxicants (5). These exceedances suggest the possibility of some potential risk. To better understand the health risks, a detailed HHRA using a more refined set of assumptions was completed (6), e.g., locations of receptors corresponded to where people actually live or spend time rather than assumed to be at MPOI. The detailed HHRA predicted exceedances for short-term inhalation of NO<sub>2</sub> and the respiratory irritants mixture. As predicted for emissions from WMT, there is little change in the health risks for all assessment cases (Base, Application, and Cumulative cases), suggesting that there is little effect of project-related marine emissions on short-term health risks.*

*Overall, the Proponent's assessment indicates a low potential for adverse human health effects due to marine vessel emissions. As discussed earlier, uncertainties in the Proponent's air dispersion modelling reduce HC's confidence of this conclusion. Individuals with existing respiratory or cardiovascular conditions may experience reactions to even small changes in project-related emissions.”*

#### **7.7.1.1 IR #150 – To TMX and HC**

Would TMX indicate if the findings that initiated this assessment have altered in any way since the 2015 letter, and would HC indicate if it is still concerned with this level of uncertainty.

## 7.8 The Effects on Communities

The potential impacts on communities are serious. These alone would suggest that the shipment of dilbit through narrow channels that are in close proximity to many communities in the southern mainland, the Gulf Islands, the San Juan Islands, Southern Vancouver Island and the Strait of Juan de Fuca might have raised a red flag of concern to Health Canada. No precautionary note about these dangers or plans to deal with population treatment and evacuation is mentioned and no precautionary principle is mentioned with respect to the sensitive ecosystems of those areas.

### **“2.3.4 Community Impacts**

*Epidemiological research from past disasters has provided insight regarding the extent to which crude oil releases may impact entire communities. These impacts include concerns over **food safety and livelihoods** [Palinkas, 1993; Goodlad, 1996].*

*In addition, **social disruption** (e.g., breakdown of family and social structures) was reported*

*following the Exxon Valdez oil spill [Picou, 1992; Arata, 2000]. After both the Exxon Valdez and DWH oil spills, higher rates of domestic conflict among exposed subjects and their partners were reported [Palinkas, 1993; Rung, 2016].*

*Crude oil releases have also been implicated in **cultural erosion**, which occurs when traditional activities or practices can no longer occur (e.g., destruction of a cultural site, loss of a traditional food). Communities may be impacted by **litigation stress**, which broadly refers to anxiety, conflict, and/or dissatisfaction that arises from having to seek compensation through legal means [Picou, 2004; Mayer, 2015]. “*

## 7.9 Concern Regarding Toxicity of Dilbit

In the KM/TMX hearings, a detailed report was presented as evidence titled: [\*Major Human Health Impacts of the Kinder Morgan Trans Mountain Pipeline Expansion\*](#).

It is important to note the following statement in the executive summary:

*“In the two rounds of Information Requests, TM would not provide the necessary information regarding model inputs to adequately access the human health risk assessment (HHRA) undertaken as part of the proposal. Citing proprietary aspects of the modelling, the TMEP effectively circumvents important scrutiny of the model inputs and therefore its conclusions lack validation.”*

In the Key conclusions of that report, the authors state:

*“1.4 Key Conclusions We conclude that the proposal does not adequately assess the human health risks posed by the proposed expansion. Information to understand the human health impacts in the community surrounding the terminal and the exit for ships through First and Second Narrows needs to be generated in order to better understand the impacts outlined in this report. This information should include a focus on those most vulnerable to the effects of petroleum products transported by TM, namely the developing foetus, young children and those with genetic susceptibility to carcinogens such as benzene. Accidents happen and they appear to happen frequently at TM installations. The risk of a significant spill by TM has been amply demonstrated twice in Burnaby in the past eight years. Though not TM, the April 2015 tanker spill in English Bay is only the latest in a string of bad events all of which could have been much worse. The increased pipeline and tanker traffic is likely to increase human health risk. Such a risk is unacceptable to the communities likely to be affected.*

### 7.9.1 Bitumin (Dilbit) Material Safety Data Sheet (MDS)

These safety sheets are shown below in Figures 7-1. They are from the National Energy Board at the following link [https://docs.neb-one.gc.ca/ll-eng/llisapi.dll/fetch/2000/90464/90552/548311/956726/2392873/2450810/2478758/2522888/Material\\_Safety\\_Data\\_Sheet\\_-\\_Diluted\\_Bitumen\\_-\\_A4A9D1.pdf?nodeid=2508614&vernum=-2](https://docs.neb-one.gc.ca/ll-eng/llisapi.dll/fetch/2000/90464/90552/548311/956726/2392873/2450810/2478758/2522888/Material_Safety_Data_Sheet_-_Diluted_Bitumen_-_A4A9D1.pdf?nodeid=2508614&vernum=-2)

Cenovus Energy Inc. Heavy Crude Oil/Diluent Mix		Material Safety Data Sheet		Page 1 of 2	
<b>SECTION 1 – MATERIAL IDENTIFICATION</b>					
<b>Material Name:</b>	HEAVY CRUDE OIL/DILUENT MIX				
<b>Synonyms:</b>	Bow River (BR); Cold Lake Blend (CLB); Christina Lake Dil-bit Blend (CDB), Christina Lake Blend (CSB); Western Canadian Blend (WCB); Western Canadian Select (WCS); Wabasca Heavy (WH)				
<b>Use:</b>	Process stream, fuels and lubricants production				
<b>WHMIS Classification:</b>	Class B, Div. 2, Class D, Div. 2, Sub-Div. A and B				
<b>NFPA:</b>	<b>Fire:</b> 2	<b>Reactivity:</b> 0	<b>Health:</b> 3		
<b>TDG Shipping Name:</b>	Petroleum Crude Oil				
<b>TDG Class:</b>	3	<b>UN:</b> 1267			
<b>TDG Packing Group:</b>	II (boiling point 35 deg. C or above, and flash point less than 23 deg. C)				
<b>Manufacturer/Supplier:</b>	CENOVUS ENERGY INC. 500 Centre Street SE, PO Box 766 Calgary, AB T2P 0M5				
<b>Emergency Telephone:</b>	1-877-458-8080,		CANUTEC 1-613-996-6666 (Canada)		
<b>Chemical Description:</b>	A naturally occurring mixture of paraffins, naphthalenes, aromatic hydrocarbons and small amounts of sulphur and nitrogen compounds mixed with condensate				
<b>SECTION 2 – HAZARDOUS INGREDIENTS OF MATERIAL</b>					
Hazardous Ingredients	Approximate Concentrations (%)	C.A.S. Nos.	LD50/LC50 Specify Species & Route	Exposure Limits	
Bitumen	50 – 90	8052-42-4		5 mg/m <sup>3</sup> (OEL, PEL oil mist)	
Hydrocarbon Diluent	10 – 50	N.Av.	N.Av.	900 mg/m <sup>3</sup> (OEL)*	
Benzene	0.03 - 0.3	71-43-2	LD50, rat, oral, 930 mg/kg	0.5 ppm (OEL, TLV)	
			LC50, rat, 4 hr, 13200 ppm	10 ppm (PEL)	
Hydrogen Sulphide <sup>§</sup>	<0.1	7783-06-04	LC50, rat, 4 hrs, 444 ppm	10 ppm (OEL), 1 ppm (TLV), 20 ppm (PEL-C)	
OEL = AB Occupational Exposure Limit; TLV = ACGIH Threshold Limit Value; PEL = OSHA Permissible Exposure Limit; C = Ceiling; *OEL for gasoline; <sup>§</sup> Hydrogen Sulfide in liquid, vapour phase may contain higher concentrations					
<b>SECTION 3 – PHYSICAL DATA FOR MATERIAL</b>					
<b>Physical State:</b>	Liquid	<b>Vapour Pressure, Reid (kPa):</b> 76 @ 38°C			
<b>Specific Gravity:</b>	0.91 – 0.94	<b>Odour Threshold (ppm):</b> N.Av.			
<b>Vapour Density (air=1):</b>	2.5 -5.0 (estimated)	<b>Evaporation Rate:</b> N.Av.			
<b>Percent Volatiles, (v/v):</b>	15 - 30 (estimated)	<b>Boiling Pt. (deg.C):</b> 35 – 180°C			
<b>pH:</b>	N.Av.	<b>Freezing Pt. (deg.C):</b> <20			
<b>Coefficient of Water/Oil Distribution:</b>	<0.1				
<b>Odour &amp; Appearance:</b>	Brown/black liquid, hydrocarbon odour (N.Av. = not available N.App. = not applicable)				
<b>SECTION 4 – FIRE AND EXPLOSION</b>					
<b>Flammability:</b> Yes	<b>Conditions:</b> Material will ignite at normal temperatures.				
<b>Means of Extinction:</b>	Foam, CO <sub>2</sub> , dry chemical. Explosive accumulations can build up in areas of poor ventilation.				
<b>Special Procedures:</b>	Use water spray to cool fire-exposed containers, and to disperse vapors if spill has not ignited. Cut off fuel and allow flame to burn out.				
<b>Flash Point (deg.C) &amp; Method:</b>	<-35 (PMCC)				
<b>Upper Explosive Limit (% by vol.):</b>	8 (estimated)	<b>Sensitivity to Impact:</b> No			
<b>Lower Explosive Limit (% by vol.):</b>	0.8 (estimated)	<b>Sensitivity to Static Discharge:</b> Yes, at normal temperatures			
<b>Auto-Ignition Temp. (deg.C):</b>	250 (estimated)	<b>TDG Flammability Classification:</b> 3			
<b>Hazardous Combustion Products:</b>	Carbon monoxide, carbon dioxide, sulphur oxides				
<b>SECTION 5 – REACTIVITY DATA</b>					
<b>Chemical Stability:</b> Stable	<b>Conditions:</b> Heat				
<b>Incompatibility:</b> Yes	<b>Substances:</b> Oxidizing agents (e.g. chlorine)				
<b>Reactivity:</b> Yes	<b>Conditions:</b> Heat, strong sunlight				
<b>Hazardous Decomposition Products:</b>	Carbon monoxide, carbon dioxide, sulphur oxides				

<p>Cenovus Energy Inc. Heavy Crude Oil/Diluent Mix</p>	<p>Material Safety Data Sheet</p>	<p>Page 2 of 2</p>
<p><b>SECTION 6 – TOXICOLOGICAL PROPERTIES OF PRODUCT</b></p> <p><b>Routes of Entry:</b></p> <p><b>Skin Absorption:</b> Yes                      <b>Skin Contact:</b> Yes                      <b>Eye Contact:</b> Yes  <b>Inhalation: Acute:</b> Yes                      <b>Chronic:</b> Yes                      <b>Ingestion:</b> Yes</p> <p><b>Effects of Acute Exposure:</b> Vapour may cause irritation of eyes, nose and throat, dizziness and drowsiness. Contact with skin may cause irritation and possibly dermatitis. Contact of liquid with eyes may cause severe irritation/burns.  <b>Effects of Chronic Exposure:</b> Due to presence of benzene, long term exposure may increase the risk of anemia and leukemia. Repeated skin contact may increase the risk of skin cancer.  <b>Sensitization to Product:</b> No.  <b>Exposure Limits of Product:</b> 0.5 ppm (OEL for benzene)  <b>Irritancy:</b> Yes  <b>Synergistic Materials:</b> None reported  <b>Carcinogenicity:</b> Yes    <b>Reproductive Effects:</b> Possibly    <b>Teratogenicity:</b> Possibly    <b>Mutagenicity:</b> Possibly</p> <p><b>SECTION 7 – PREVENTIVE MEASURES</b></p> <p><b>Personal Protective Equipment:</b> Use positive pressure self-contained breathing apparatus, supplied air breathing apparatus or cartridge air purifying respirator approved for organic vapours where concentrations may exceed exposure limits (note: cartridge respirator not suitable for hydrogen sulfide, oxygen deficiency or IDLH situations) – see also Storage below).  <b>Gloves:</b> Viton (nitrile adequate for short exposure to liquid)  <b>Eye:</b> Chemical splash goggles.    <b>Footwear:</b> As per safety policy    <b>Clothing:</b> As per fire protection policy  <b>Engineering Controls:</b> Use only in well ventilated areas. Mechanical ventilation required in confined areas. Equipment must be explosion proof.  <b>Leaks &amp; Spills:</b> Stop leak if safe to do so. Use personal protective equipment. Use water spray to cool containers. Remove all ignition sources. Provide explosion-proof clearing ventilation, if possible. Prevent from entering confined spaces. Dyke and pump into containers for recycling or disposal. Notify appropriate regulatory authorities.  <b>Waste Disposal:</b> Contact appropriate regulatory authorities for disposal requirements.  <b>Handling Procedures &amp; Equipment:</b> Avoid contact with liquid. Avoid inhalation. Bond and ground all transfers. Avoid sparking conditions.  <b>Storage Requirements:</b> Store in a cool, dry, well ventilated area away from heat, strong sunlight, and ignition sources.  <b>Special Shipping Provisions:</b> N.App.</p> <p><b>Caution:</b> Hydrogen sulfide may accumulate in headspaces of tanks and other equipment, even when concentrations in the liquid product are low. Overexposure to hydrogen sulphide may cause dizziness, headache, nausea and possibly unconsciousness and death. Factors increasing this risk include heating, agitation and contact of the liquid with acids or acid salts. Assess the exposure risk by gas monitoring. Wear air supplying breathing apparatus if necessary.</p> <p><b>SECTION 8 – FIRST AID MEASURES</b></p> <p><b>Skin:</b> Flush skin with water, removing contaminated clothing. Get medical attention if irritation persists or large area of contact. Decontaminate clothing before re-use.</p> <p><b>Eye:</b> Immediately flush with large amounts of lukewarm water for 15 minutes, lifting upper and lower lids at intervals. Seek medical attention if irritation persists.</p> <p><b>Inhalation:</b> Ensure own safety. Remove victim to fresh air. Give oxygen, artificial respiration, or CPR if needed. Seek medical attention immediately.</p> <p><b>Ingestion:</b> Give 2-3 glasses of milk or water to drink. DO NOT INDUCE VOMITING. Keep warm and at rest. Get immediate medical attention.</p> <p><b>SECTION 9 – PREPARATION DATE OF MSDS</b></p> <p>Prepared By: Cenovus Energy Inc. Health and Safety  Phone Number: 1-403-766-2000  Preparation Date: April 10, 2013</p>		

Figure 7-1: Bitumen Material Safety Data Sheet

**7.9.1.1 IR #151 – To TMX and HC**

Provide an update of whether the recommendations of “Major Human Health Impacts of the Kinder Morgan Trans Mountain Pipeline Expansion” have been considered and implemented.

**7.9.1.2 IR #152 – To TMX and HC**

Provide an update on what information will be provided to the public in the area affected by a dilbit spill whether it occurs on the land portion or at the Westridge terminal area or in areas along the populated portion of the route of tanker traffic.

## 7.10 Independent Auditor’s Report

We have selected excerpts from the Independent Auditor’s Report<sup>30</sup> completed 2018. that are relevant to this hearing. This audit is called Reports of the Commissioner of the Environment and Sustainable Development to the Parliament of Canada [Report 1—Toxic Substances](#)” The findings of the audit indicate there are some problems with the operations of the federal departments and this leaves us very concerned as to how the regulations for the handling and transport of Dilbit, an extremely toxic substance, are being regulated. Below are some of the comments made by the auditor:

***Background: Toxic substances in Canada***

*1.1 Canadians use many goods and services that can release toxic substances. Exposure to these substances from computers, fabrics, fuels, dry cleaning, and other goods and services may lead to a variety of serious health issues—including cancer, autoimmune diseases, and nerve disorders. These substances can also affect wildlife and the quality of Canada’s air, soil, and water.*

*1.2 The [Canadian Environmental Protection Act, 1999](#) requires the Government of Canada to control and prevent the risks of toxic substances. Under the Act, a substance is considered toxic if it can enter the environment in a way that endangers the environment or human health, or both. As of December 2017, there were 138 substances considered toxic under the Act.*

*Responsibilities for controlling toxic substances*

*1.3 Both Environment and Climate Change Canada and Health Canada have responsibilities for controlling and reducing toxic substance release and exposure. The departments’ responsibilities include:*

- *developing control actions, such as regulations;*
- *evaluating progress to reduce the risks of toxic substances;*
- *increasing awareness, understanding, and compliance with the Act’s requirements; and*
- *communicating information to the public about the effects of toxic substances on human health and the environment.*

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<sup>30</sup> [2018 Fall Reports of the Commissioner of the Environment and Sustainable Development.](#)

1.5 The federal government allocated \$1.13 billion during the 2005–06 to 2017–18 fiscal years to help implement the Chemicals Management Plan. This plan, established in 2006, is part of the government’s strategy to reduce the risks of toxic substance release and exposure.

1.11 This audit is important because Canadians depend on the federal government to reduce the risks of toxic substances to human health and the environment, and to communicate these risks.

### **“Findings, Recommendations, and Responses**

#### **Overall message**

1.14 Overall, we found that despite long-standing efforts, Environment and Climate Change Canada and Health Canada still had significant work to do in selected areas to effectively control the risks of toxic substances and to inform Canadians about those risks.”

1.15 Environment and Climate Change Canada had improvements to make in some aspects of its approach to enforcing toxic substance regulations under the [Canadian Environmental Protection Act, 1999](#). The department conducted inspections and other enforcement activities to ensure that businesses complied with regulations on toxic substances, but in most cases, it did not base its enforcement priorities on risks to human health and the environment. For example, some 2,200 of the more than 10,000 inspections the Department carried out during the 2014–15 to 2016–17 fiscal years targeted a single toxic substance used by dry cleaners. However, there was no documented evidence that this substance presented a higher risk to human health or the environment than other substances.

1.16 In addition, Environment and Climate Change Canada had not fully addressed selected recommendations from our previous audits. The Department lacked timely access to information about which businesses were regulated, had not yet set time frames to follow up on violations, and had not addressed all of the enforceability issues it had identified in regulations.

1.18 Both Health Canada and Environment and Climate Change Canada play a role in informing the public about health and environmental risks from toxic substances. We found that information on Health Canada’s website was often unclear and difficult to find.

1.19 For example, visitors to Health Canada’s home page had to click through several web pages for information about toxic substances and then navigate to a different Government of Canada website to access “Chemicals at a glance.” Environment and Climate Change Canada’s communication activities to explain environmental risks were limited. These weaknesses made it difficult for Canadians to find information to make informed choices about toxic substances.

1.31 However, we found overall that risk to the environment and human health was not a key criterion in prioritizing most of Environment and Climate Change Canada’s enforcement activities. According to the Department, it prioritized enforcement activities mainly on the basis of businesses’ potential for non-compliance. Consequently, the Department did not know whether its targeted enforcement activities focused on businesses that posed the greatest risks to human health and the environment.

1.32 We found that most toxic substance regulations received few inspections and enforcement measures ([Exhibit 1.4](#)). The Department carried out 10,180 inspections in the 2014–15 to 2016–17 fiscal years. Of these, 2,231 (about 22%) focused on tetrachloroethylene, a single toxic substance used by dry cleaners. No documentation indicated that this substance, a toxic air pollutant, posed a higher risk to human health and the environment than other substances.

**—Environment and Climate Change Canada did little enforcement for most of the regulations to control toxic substances during the 2014–15 to 2016–17 fiscal years**

1.79 Both Health Canada and Environment and Climate Change Canada are responsible for communicating the risks of toxic substances to the public. However, we found that Health Canada's website information for the public was often unclear and difficult to find. We also found that Environment and Climate Change Canada had limited communication activities.

1.98 We concluded that Environment and Climate Change Canada and Health Canada still had significant work to do in selected areas to effectively control the risks of toxic substances. Environment and Climate Change Canada did not base most of its enforcement priorities on the risks to the environment and human health. The Department also had not fully addressed selected recommendations found in previous audits related to the [Canadian Environmental Protection Act, 1999](#). Moreover, although Environment and Climate Change Canada and Health Canada had developed action plans for the substances we examined, neither department had completed evaluations on whether they had met the plans' objectives to reduce threats to the environment and human health.

1.99 We concluded that Health Canada communicated to the public the risks of toxic substances using various communication tools. However, the information on its website was often unclear and difficult to find. Environment and Climate Change Canada had undertaken only limited communication activities on environmental risks.

**7.10.1.1 IR #153 – To HC**

What are the health risks of dilbit?

**7.10.1.2 IR #154 – To HC**

Are the health risks posted on your website, if so please provide a link.

**7.10.1.3 IR # 155 – To HC**

What information have you sought from TMX on the toxicity of Dilbit and the plans to inform the public who would be involved in the event of an oil spill involving dilbit.

## 7.11 Emergency Response Assistance Plans (ERAPS)

### From *Environmental Response Standards* drafted by Transport Canada

<http://www.gazette.gc.ca/rp-pr/p1/2016/2016-11-26/html/reg3-eng.html>. In Canada, the transportation of dangerous goods is regulated under the *Transportation of Dangerous Goods Act, 1992* (TDG Act), the Regulations made under the TDG Act and standards incorporated by reference into the TDGR.

Excerpt below from the Emergency Response Assistance Plans (ERAPS)

<https://www.tc.gc.ca/eng/tdg/erap-menu-72.htm>:

#### **Section 1: What is an ERAP**

*An ERAP or Emergency Response Assistance Plan is a plan that describes what is to be done in the event of a transportation accident involving certain higher risk dangerous goods. The*

*ERAP is required by the Transportation of Dangerous Goods Regulations (TDGR) for dangerous goods that require special expertise and response equipment to respond to an incident. The plan is intended to assist local emergency responders by providing them with technical experts and specially trained and equipped emergency response personnel at the scene of an incident.*

*The ERAP will describe the specialized response capabilities, equipment and procedures that will be used to support a response to incidents involving high risk dangerous goods. The plan will also address emergency preparedness, including personnel training, response exercises and equipment maintenance. The ERAP plans supplement those of the carrier and of the local and provincial authorities, and must be integrated with other organizations to help mitigate the consequences of an accident. This integration is usually accomplished by working within an incident management system – usually an Incident Command System or ICS. The ICS is a system where multiple authorities and response organizations are integrated into a common organizational structure designed to improve emergency response operations. The Incident Commander is the person with overall responsibility for the response and is usually a senior member of the local fire or police department. <https://laws-lois.justice.gc.ca/eng/acts/T-19.01/page-2.html#h-8>.*

## 7.12 Discussion

The stated objective of the audit above was:

*“The objective of this audit was to determine whether Environment and Climate Change Canada and Health Canada controlled and communicated the risks of toxic substances to reduce threats to the environment and human health.”*

We on the Board of Friends of Ecological Reserves believe that both Health Canada and Environment Canada failed to meet this objective. The avoidance of dealing with the toxic substances involved in the TMX project cannot be shuffled off with the excuse that the Oil Spill Response Agency will deal with it.

We cannot find any reference to the ERAP required by law for the transportation of toxic substances.

### **7.12.1.1 IR #156 – To TC**

Could Transport Canada provide the ERAP for the existing transport of Dilbit on the BC Coast and indicate what modifications to that ERAP are planned for the increased transport of Dilbit from the TMX project:

### **7.12.1.2 IR #157 – To HC and CCCE**

Given that “no single reference with comprehensive chemical composition data for dilbit and synbits is readily available,” please provide specific site safety plans that will address this problem given the importance of worker safety.

**7.12.1.3 IR #158 – To HC and CCCE**

Will the comprehensive composition data for dilbit and synbits be made public and available to the responding organizations?

**7.12.1.4 IR #159 – To HC and CCCE**

Prior to the possible occurrence of a spill of dilbit on a coastline, what information will be provided to the public living nearby on what precautions will be necessary in the event of a spill.

**7.12.1.5 IR #160 – To HC and CCCE**

For members of the public living near shorelines that may be impacted, please provide the procedure for informing and evacuating if necessary once a spill occurs.

**7.12.1.6 IR #161 – To HC and CCCE**

Where agricultural communities are involved, such as in the coastline of the District of Metchosin, Vancouver Island on the Strait of Juan de Fuca please outline the procedures for protection of livestock from harmful exposure to these chemicals.

### **7.13 Mitigative Measures available to NEB**

Require all recommendations of the audit referred to above be performed by Health Canada and Environment Canada.

Require Environment Canada and Health Canada to include dilbit in their list of toxic substances along with required actions to protect the public and the environment in case of a dilbit spill on our coastline.



## APPENDIX 1: PREAMBLE TO THE OCEANS ACT

Underlining provided by Board of FER for emphasis.

### Sections of the Oceans Act Preamble that are specific to environmental understanding and management. (Underlined sections highlighted by FER)

WHEREAS Parliament wishes to reaffirm Canada's role as a world leader in oceans and marine resource management;

WHEREAS Canada promotes the understanding of oceans, ocean processes, marine resources and marine ecosystems to foster the sustainable development of the oceans and their resources;

WHEREAS Canada holds that conservation, based on an ecosystem approach, is of fundamental importance to maintaining biological diversity and productivity in the marine environment;

WHEREAS Canada promotes the wide application of the precautionary approach to the conservation, management and exploitation of marine resources in order to protect these resources and preserve the marine environment;

WHEREAS Canada promotes the integrated management of oceans and marine resources; AND WHEREAS the Minister of Fisheries and Oceans, in collaboration with other ministers, boards and agencies of the Government of Canada, with provincial and territorial governments and with affected aboriginal organizations, coastal communities and other persons and bodies, including those bodies established under land claims agreements, is encouraging the development and implementation of a national strategy for the management of estuarine, coastal and marine ecosystems



## APPENDIX 2: MCKEENA-HEYMAN STATEMENT

<https://www.canada.ca/en/environment-climate-change/news/2018/04/dear-minister-george-heyman.html> Emphasis added through underlining

Dear Minister Heyman:

I am writing to follow up on the meeting the Prime Minister held with British Columbia Premier John Horgan and Alberta Premier Rachel Notley in Ottawa on April 15, 2018 to discuss the twinning of the Trans Mountain Expansion (TMX) project.

The Government of Canada has a strong regime in place to protect the environment in land and marine areas under its jurisdiction, and is committed to continuous improvement in this respect. We are dedicated to ensuring that Canada's resources are developed in a way that is informed by rigorous science and evidence, aligns to Canada's climate change plan, protects Canada's rich natural environment, including our Oceans, respects the rights of Indigenous Peoples, and supports our economy. Our priority remains to effectively advance both Canada's economic progress and our environmental responsibilities.

In this context, I wanted to underscore our government's commitment to seeing the TMX project go ahead, as this vital infrastructure is in Canada's national interest, and to outline why our government has confidence this project can proceed in a manner that is safe, environmentally responsible, and can be built and operated to the highest standards. I also outline measures we have taken, and propose potential areas for future collaboration, to ensure concerns about the project and the protection of B.C.'s coast are addressed in a comprehensive and meaningful way.

### **Protecting the coast**

The Government of Canada firmly stands by its decision to approve the TMX project. The project was approved, with 157 legally-binding conditions, within the context of Canada's climate action plan and after a rigorous review based on science and evidence, as well as extensive consultations with Indigenous peoples and other relevant parties. These conditions, including for marine safety, are among the most stringent ever imposed. We believe the marine safety requirements alone are more onerous than those imposed for any other project proponent.

### **The Oceans Protection Plan**

In addition, the federal government has launched the \$1.5 billion Oceans Protections Plan (OPP), the largest investment Canada has ever made to protect our coasts and marine environments. This plan will provide far greater protections to our coast after this project is built than we have today, despite the small increase in tanker traffic. This funding will enhance marine safety along Canada's entire coastline, the longest in the world – supporting new and ongoing prevention, preparedness and response measures. This directly responded to recommendations, including those from the Royal Society of Canada in 2015, to fill the gaps that existed in Canada's system at that time. These improvements will be completed on the BC coast before the pipeline infrastructure expansion is operational.

We are developing a marine safety system that rivals any in the world. The marine safety improvements from the Oceans Protection Plan, coupled with the stringent project conditions for the TMX project, and building on the robust system already in place, will put extraordinary safeguards in place for all vessels, including those carrying petroleum products. Those safeguards include:

**APPENDIX 2: McKenna-Heyman Statement**

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- Requirements for, and the use of, experienced pilots and tethered tugs to escort resources safely out to sea;
- Increasing the towing capacity of the Coast Guard by adding two large vessels capable of towing large vessels and installing towing equipment on 25 large vessels;
- Five new spill-response stations funded by industry to enhance emergency response capacity, as well as new, significantly shorter response time which could benefit Burrard Inlet;
- Based on the polluter-pay principle, removal of the Ship-Source Oil Pollution Fund per-incident limit of liability, and making an unlimited amount of compensation available for spill response;
- Strong partnerships on monitoring and spill response with coastal and Indigenous communities; and,
- The Kitsilano Coast Guard Station has been re-opened.

Crude oil has been shipped safely through the Vancouver harbour for over 60 years, and diluted bitumen for over 30 years. We are confident that these improvements will help maintain this impressive record, and not only address concerns about tanker traffic, but will increase marine safety for all vessels, the over 3100 large vessels that use the port of Vancouver and 206,000 vessel movements in the Salish Sea annually. Once the expansion project is complete, Trans Mountain tankers will represent less than seven per cent of the total large commercial marine vessels transiting the Juan de Fuca Strait.

**Science**

To complement Canada's world-leading marine safety regime and response capacity, the Oceans Protection Plan will add to the already significant body of scientific knowledge concerning petroleum products in the marine context and incorporate Indigenous knowledge.

Our government has invested substantially in oil spill and response research for over 35 years, and has produced over 60 peer-reviewed publications in the last five years alone focused on the science of diluted bitumen spills. As a result of this research, and ongoing work by Canadian and international researchers, Canada has advanced overall understanding of the fate and behaviour of petroleum products in ocean and fresh water.

Based on current scientific evidence and limited real-world spill experience, diluted bitumen behaves similarly to conventional crude oils; it will float initially for several days depending on the environmental conditions.

Since 2013, the Government of Canada has made concerted efforts to increase investment, collaboration and coordination of work among Fisheries and Oceans Canada, Natural Resources Canada and Environment and Climate Change Canada to increase understanding of spills of diluted bitumen in marine and freshwater environments. That investment was augmented in 2016 with additional funding provided to implement the Oceans Protection Plan, which includes focusing research on the fate, behaviour and effects of various oil products in different spill conditions and under extreme Canadian climates, to improve the security of transport of oil products, spill recovery and responses.

Collectively, the Government of Canada has dedicated some 50 scientists, technologists, chemists and engineers in four major programs to study oil spill behaviour and recovery technologies. There is a significant body of work in the public domain that have been peer reviewed domestically and internationally, which helped inform decisions on pipeline projects as well as oil spill planning and preparedness. This body of knowledge, coupled with continued research, means we can say with

confidence that responders will be able to better understand and predict the behavior of petroleum products in marine and freshwater environments—enhancing Canada’s ability to prepare for and respond to spills.

### **Working with Indigenous peoples and industry**

We are collaborating with coastal and Indigenous communities and industry, industry, provinces, and territories, to realize the goals outlined in the Oceans Protection Plan, and working in partnerships with Indigenous peoples to ensure strong marine safety and environmental protection.

### **Pipeline and Rail Safety**

The Railway Safety Act, the Pipeline Safety Act, the National Energy Board Act, the Canada Shipping Act, 2001, the Marine Liability Act, the Fisheries Act, as well as the Canadian Environmental Protection Act, 1999, establish a comprehensive world-leading federal regime in Canada related to the transportation of petroleum and other products.

The highest safety and security standards are in place in all modes of transportation to prevent incidents and accidents, while enabling rapid, science-based planning and response actions in the unlikely event of a spill.

The robust federal system is built on the “polluter pays” principle, whereby the industry transporting the product is responsible for costs related to cleanup and pollution damage. Further, a world-leading suite of liability and compensation measures is in place, addressing activities under federal jurisdiction and protecting Canadians from damages and costs associated with spills.

The recent measures enacted under the Pipeline Safety Act and amendments to the National Energy Board Act also demonstrate our government’s commitment to world-leading pipeline safety, as does Canada’s commitment of \$65 million in new funding to support activities and priorities of the co-developed Indigenous Advisory and Monitoring Committee for the TMX project. This Committee provides a mechanism for Indigenous communities to provide advice to federal regulators, and participate in the monitoring of the existing line, the expansion project, and associated marine shipping.

### **Marine Sector**

The Government of Canada has established a national ship-source oil spill regime comprised of three key areas: prevention, preparedness and response, and liability and compensation. This world-leading regime has its foundation in international obligations and is built on international and domestic cooperation and standards. Through new legislation and major investments, such as the Oceans Protection Plan, the Government of Canada is dramatically strengthening this already robust regime.

The more than 100 regulations, 30 acts and international agreements and commitments that make up Canada’s marine safety regime, are first and foremost, focused on preventing accidents from occurring.

We are confident that the full suite of measures in the Oceans Protection Plan and beyond will ensure comprehensive environmental protection, minimize any risks to the land and marine environments arising from TMX or similar infrastructure projects, and allow for a quick, efficient and effective response in the unlikely event that such actions were necessary. The Oceans Protection Plan and additional project-specific safeguards are rooted in scientific research, and our commitment to evidence-based decision making is unwavering.

### Looking ahead

I understand that our senior officials have met a number of times over the past few months to provide further clarity and information on the Oceans Protection Plan, and on the science, including diluted bitumen, to discuss areas of concern to British Columbia, and to consider possible solutions. In this context, we remain open to explore those solutions further – such as examining ways to ensure more effective towing capacity on the West Coast, or to strengthen loss and damage provisions under rail safety legislation. In February, we also announced federal programs to reduce reliance on diesel fuel in rural and remote communities along British Columbia’s coast, and we are committed to working with Indigenous communities and B.C. to support access to these programs.

Our officials have been meeting to consider how we can advance collaboration and alleviate any ongoing concerns regarding spill response capacity. One proposal that we would like to highlight is a potential partnership among the Government of Canada, the Government of British Columbia and Indigenous peoples, to articulate a seamless land-to-sea system to protect British Columbia from spill risks through integrated work on planning, preparedness, response, and recovery and critical alignment of safety and response systems in our respective jurisdictions. Initial steps would include identifying any potential incidents whose impacts are most likely to cross jurisdictions, and improving upon joint systems and protocols to address environmental risks and incidents, including spills.

Should your government wish to further collaborate on science, we could consider establishing a joint Scientific Expert Advisory Panel. Such a panel would build on our science investments and results, take stock of work on the fate, behaviour, and effects of various oil products in different spill conditions and under extreme Canadian climates in order to inform further scientific work under the OPP and spill response modelling, preparedness and response measures. Such a panel would be made up of independent experts, be national in scope, and examine all types of petroleum products.

In addition to these measures, I also wanted to advise you that the Government of Canada has today submitted its response to the Government of British Columbia’s “Policy Intentions Paper for Engagement: Phase Two Enhancements to Spill Management in British Columbia”. Canada’s submission outlines the full scope of federal activities that underpin our confidence that the TMX project can be developed and operated safely, given that British Columbia did not address in its Consultation Paper the robust Canadian safety regimes, the long-standing scientific expertise, and significant recent investments made by the Government of Canada related to spill management. It is essential that Canadians have access to a complete and accurate picture of federal jurisdiction, spill management in Canada, and the world-leading federal measures in place to protect Canada’s coast, communities and environment.

Yours sincerely,

Catherine McKenna, P.C., M.P.  
Minister of Environment and Climate Change

**APPENDIX 3: SARA-LISTED SPECIES AT TRIAL ISLAND ER**

A short distance from the proposed TMX tanker route south of Victoria, Trial Island Ecological Reserve harbours more SARA-listed species in such a small area than in all of Canada. Exposed as it is to high winds, the island with these rare SARA-listed terrestrial species are threatened by wind-born toxic spray from a predictable catastrophic accident involving vessels in the Strait of Juan de Fuca carrying diluted bitumen. See topic 2 .

		
California buttercup, ( <i>Ranunculus californicus</i> ) SARA=Endangered	Dense-flowered lupine, ( <i>Lupinus microcarpus</i> ) SARA=Endangered	Purple sanicle, ( <i>Sanicula bipinnatifida</i> ), SARA=Threatened
		
Coastal Scouler's catchfly, ( <i>Silene scouleri</i> ssp. <i>grandis</i> ) SARA=Endangered	Golden paintbrush, ( <i>Castilleja levisecta</i> ) SARA=Endangered	Bears-foot sanicle, ( <i>Sanicula arctopoides</i> ) SARA=Endangered
		
Macoun's meadowfoam, ( <i>Limnanthes macounii</i> ) SARA=Endangered	Rosy owl clover, ( <i>Orthocarpus bracteosus</i> ) SARA=Endangered	Seaside bird's-foot lotus, ( <i>Lotus formosissimus</i> ) SARA=Endangered

		
<p>White-top aster, (<i>Sericocarpus rigidus</i>) SARA=Special concern</p>	<p>Victoria's owl clover, (<i>Castilleja victoriae</i>) SARA=Endangered</p>	<p>Kincaid's lupine, (<i>Lupinus sulphureus</i>) SARA=Extirpated</p> <p>Photos : Matt Fairbarns, Ecological Reserve warden for Trial Island.</p>

## APPENDIX 4: SARA-LISTED SPECIES AT RACE ROCKS ER

During various times of the year, Race Rocks Ecological Reserve serves as a habitat for stopover of many [SARA-listed](#) species and rare species. In the following table we list some of those species and provide images, all taken from Race Rocks, courtesy of Lester Pearson College and the Ecoguardians of Race Rocks Ecological reserve. Refer to Topic 2.

		
<p><a href="#"><i>Megaptera novaeangliae</i></a> <b>(Humpback whale):</b> SARA=Special Concern</p>	<p><a href="#"><i>Orcinus orca</i></a> <b>(Killer whale):</b> (SRKW) SARA= Endangered</p>	<p><a href="#"><i>Enhydra lutris</i></a> <b>(Northern Sea Otter):</b> SARA=Special Concern</p>
		
<p><a href="#"><i>Mirounga angustirostris</i></a> <b>(Northern Elephant Seal):</b> SARA=Listed</p>	<p><a href="#"><i>Synthliboramphus antiquus</i></a> <b>(ancient murrelet):</b> SARA=Special Concern</p>	<p><a href="#"><i>Brachyramphus marmoratus</i></a> <b>(marbled murrelet ):</b>SARA=Threatened</p>
		
<p><a href="#"><i>Bubo scandiacus</i></a> <b>(Snowy Owl):</b> SARA=listed</p>	<p><a href="#"><i>Phalaropus lobatus</i></a> <b>(Red-necked Phalarope):</b> Cosewic=Special Concern</p>	<p><a href="#"><i>Calidris canutus</i></a> <b>(Red Knot):</b> SARA=Threatened</p>

		
<p><u><i>Hirundo rustica</i></u> (<b>Barn Swallow</b>): SARA=Threatened</p>	<p><u><i>Falco peregrinus peali</i></u> (<b>Peregrine falcon</b>): SARA=Special Concern</p>	<p><u><i>Phalacrocorax auritas</i></u> (<b>Double Crested Cormorant</b>): SARA= listed</p>
		
<p><u><i>Hydroprogne caspia</i></u> (<b>Caspian Tern</b>): SARA=listed</p>	<p><u><i>Ardea herodias</i></u>(<b>Great Blue Heron</b>): SARA:Special Concern</p>	<p><u><i>Haliotis kamtschatkana</i></u> (<b>Northern abalone</b>): SARA=Endangered</p>
		
<p><u><i>Acipenser transmontanus</i></u> (<b>White Sturgeon</b>): SARA=Special Concern</p>	<p><u><i>Histrionicus histrionicus</i></u> (<b>Harlequin duck</b>): SARA=Special Concern</p>	<p><u><i>Sebastes maliger</i></u> (<b>Quillback rockfish</b>): SARA= listed</p>
		
<p><u><i>Opalia chacei</i></u> (<b>Chace's Wentletrap</b>): rare</p>	<p><u><i>Romanzoffia tracyi</i></u> (<b>Mist Maidens</b>): rare</p>	<p><u><i>Aegolius funereus</i></u> (<b>Boreal Owl</b>): SARA: listed</p>