Major Marine Vessel Casualty Risk and Response Preparedness in British Columbia

Prepared for
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Sointula/Vancouver, BC
Canada

by
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July 2008

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Preface and Disclaimer

The analysis of major marine vessel casualty risk and response preparedness in British Columbia is commissioned by *Living Oceans Society*. The analysis is done by Stafford Reid - *EnviroEmerg Consulting Services*. For the purpose of this report:

- "Major marine vessels" include oil tankers and barges of 150 gross tons (GT) and above, and all other vessels of over 400 GT.
- "Marine vessel casualty" refers to an accident resulting in damage to the vessel such as a grounding, sinking, collision or allision. The results can be cargo loss, spill, ship wreck, or other consequences resulting in environmental damage.
- "Marine vessel casualty risk" are probable vessel casualty scenarios examined within the context of current vessel types and traffic patterns in British Columbia.

Information sources for the analysis are noted in the report's footnotes. Extensive use of web-links (blue underlined text) serves as a "road-map" to a large body of information related to the report's subject. The web-links also assist to substantiate the analysis and suggested policy directions.

This report is based on independent research and expert opinion of Stafford Reid of *EnviroEmerg Consulting Services*. The policy recommendations in this report are those of the author. They are not necessarily those of *Living Oceans Society*, but are provided for their consideration. Any errors or disagreement in the report's findings are the responsibility of the author and not that of *Living Oceans Society*.

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Living Oceans Society, Funding Organizations & EnviroEmerg Consulting

Living Oceans Society is Canada's largest organization focusing exclusively on marine conservation issues. The society's vision is to ensure the long-term health of the ocean and coastal communities on the Pacific Coast of Canada. To support this vision, the society works to see that the people who live and work on this coast have a voice in how the ocean and its resources are protected. This report supports the society's marine planning program. For information about *Living Oceans Society*, visit its website at: www.livingoceans.org

LIVING OCEANS SOCIETY

Healthy Oceans. Healthy Communities

Living Oceans Society wishes to acknowledge the funders of this report, *Georgia Strait Alliance* and *The Bullitt Foundation*.

Georgia Strait Alliance (GSA) is a citizens' group focused on protecting the marine environment in and around the Strait of Georgia – Canada's most at-risk natural environment, and the place where 70% of British Columbians live, work and play. *Georgia Strait Alliance* is committed to a future for this region that includes clean water and air, healthy wild salmon runs, rich marine life and natural areas, and sustainable communities. For information about GSA, visit its website at: www.georgiastrait.org.

Georgia Strait Alliance

The Bullitt Foundation is a private philanthropic foundation providing funding to nonprofit organizations working to safeguard the natural environment by promoting responsible human activities and sustainable communities in the Pacific Northwest. For information about *The Bullitt Foundation*, visit its website at: www.bullitt.org.

The Bullitt Foundation

EnviroEmerg Consulting Services focuses on emerging regional, national and international environmental issues related to oil and hazardous material spill risk, prevention, preparedness and response. Sectors include transportation (vessel, rail, road, pipeline) and industrial (manufacturing, storage). Clients include government, companies and non-government organizations.

Stafford Reid (M.Sc., R.P. Bio.) - principal of *EnviroEmerg* - has over 30 years in multi-disciplinary environmental management. Over the last 18 years, work has focused on marine vessel risk assessment and spill response preparedness. For information about *EnviroEmerg Consulting Services,* visit its website at: EnviroEmerg.ca

Summary

Purpose:

The analysis of major marine vessel casualty risk and response preparedness in British Columbia was commissioned by *Living Oceans Society*. The purpose of the analysis is to assist in determining policy direction for the Society so that they may foster improved marine coastal protection. This is achieved by explaining vessel casualty risk and consequences, as well as effective emergency response to mitigate environmental damages. These damages from a vessel casualty include ecological impacts stemming from cargo loss, oil spill, or the ship wreck itself. The report focuses on institutional, financial, and technical strengths and weakness in both vessel casualty and oil spill response in British Columbia.

Context:

The 1988 *Nestucca* oil barge rupture off of the west coast of Vancouver Island followed soon after by the 1989 *Exxon Valdez* oil tanker grounding in Alaska, galvanized public attention on oil spill prevention, preparedness and response along the Pacific west coast. The public and government focus after these events was on the oil spill consequence of the vessel casualties, not the casualty itself. More recent vessel casualties have drawn attention to other environmental consequences, notably the grounding of two freighters: the *New Carissa* in Oregon (1999) and the *Selendang Ayu* (2004) in Alaska. These incidents raised awareness in the United States to the need to address all aspects of a major vessel casualty, and not just the oil spill impact or threat. This includes measures to salvage the vessel, to off load its cargo and fuels, and to remove wreckage so as to prevent or minimize environmental damage.

Along Canada's Pacific coast there have only been a few near-misses. Therefore, vessel casualty risk and their impact management have not garnered the same level of public and government attention as in the United States. It has been recent vessel and barge accidents in British Columbia that have caught public attention to both oil spill risk and the problem of addressing sunken ship wrecks; notably the 2006 sinking of the *Queen of the North* ferry in Wright Sound, and the 2007 LeRoy Trucking Barge equipment dumping into Johnstone Strait.

Issues:

Canada has a marine response regime to address only one consequence of a vessel casualty - an oil spill or threat. Even within Canada's oil spill response regime there are deficiencies related to narrowly defined emergency preparedness standards for a Transport Canada certified Response Organization. There are operational gaps in: rescuing oiled wildlife, handling oily wastes, deciding to use oil dispersants or to *in-situ* oil burn, managing a large shore workforce, and responding to oil types not defined under the *Canada Shipping Act* and hazardous substances.

Furthermore, Canada does not have response capability that addresses all consequences of a major vessel casualty to the social, economic and ecological values of its coastal environment. For example, there is a lack of emergency planning and preparedness in: vessel salvage, cargo and fuel removal, places of refuge decision-making, rescue of a disabled vessel, and tug escort of oil tankers.

There are also institutional and financial gaps related to how marine emergencies are managed, funded, and damages compensated. For example, there is financial and political vulnerability to government when the Responsible Party (ship owner) has reached their legally defined limit of financial responsibility. In Canada, the ship owner is responsible for incident management and impact mitigation from an oil spill or other environmental consequences, not the cargo owner or vessel charterer. Once reaching their budget for response, the ship owner may no longer be either "willing" or "able" to continue with response activities. A "transfer-of-command" is undertaken where government then assumes all incident management responsibilities, including response cost. There are potential circumstances of this occurring much sooner than expected, and before there is incident closure.

Of particular concern is the lack of harmonization and positive relationship between the province (represented by BC Ministry of Environment) and federal (represented by Canadian Coast Guard) governments pertaining to incident management for an oil spill, let alone a major vessel casualty. This long standing issue (20 + years) is rooted in both their incident management paradigms for emergencies, and the very culture of their organizations. This divergence could be the most salient factor to undermine effective response to a vessel casualty. Public, political and stakeholder expectations might not be met unless remedied. There needs to be an arrangement that is more respectful and inclusive of each other's jurisdictional responsibilities.

Canadian Coast Guard (CCG) uses an incident management system that industry and other responding jurisdictions might not fully understand. Also, CCG does not share command with provincial and local governments, and First Nations, or accept integration of other personnel outside their agency within their team. These two factors could significantly reduce response capacity for them. In contrast, the province does use an international standard of incident management called the "Incident Command System." This system is used by the shipping and oil industry in the United States, United Kingdom, and Australia, as well as throughout BC by fire, police and ambulance. BC Ministry of Environment has Incident Management Teams for major spills. As stated, the federal and provincial response teams may never mesh. Any "transfer-of-command" under the federal response policy of only "one lead agency" could result in operational and political discord. The change from CCG just "monitoring" a Responsible Party's response efforts to them assuming a single command has never been tested in British Columbia.

There are issues around achieving response reciprocity between the United States and Canada. Each country has their own funding and compensation regimes for oil spills and vessel casualties. For example, compensation (monetary award) for natural resource damages from the Responsible Party - after cleanup has been completed - is a matter-of-course in the United States. The Natural Resource Damage Assessment (NRDA) provisions in the United States are legislated. In enacting this legislation, there is recognition that natural resources (beaches and habitats) provide valuable services to society. The NRDA process and compensation is a step toward making a coastal community "whole" for the loss of ecological services. This money is used to undertake habitat enhancement and other ecology projects.

In Canada, natural resource damage assessment policy and process hasn't progressed. Environment Canada (EC) and BC Ministry of Environment (MoE) governments have gone only so far to have established separate, and potentially competing, "bank accounts" to receive a damage award (EC's Environmental Damages and MoE's Habitat Conservation Trust). As one

country has a NRDA process and another does not, reciprocity for environmental damages is not assured if there is a cross-border oil spill incident.

The financial health of Canada's *Ship-source Oil Spill Fund* is $363.7 million compared to the United States' *Oil Spill Liability Fund* of $600 million - with a peak amount $1.2 billion in 2002. The US is concerned about this low level of financial preparedness. Whereas Canada is not, largely because owners of oil tankers and barges can get additional funds from international sources for a spill of a persistent oil. Nevertheless, Canada has about one-half the amount of financial resources to manage a large oil spill compared to the United States. It is also interesting that Canada's compensation regime is based on taxpayers paying interest on a small sum of money provided by oil receiving industries to the federal government back in 1976. Industry has not paid a dollar into either Canada's domestic or the international funds since then. The US *Oil Spill Liability Fund* is based on a nickel a barrel levy from oil importing industries.

These issues are lurking in the background in British Columbia because there has not been a major oil spill or vessel casualty to truly test response capabilities and performance by industry and government. Where there are institutional, financial, and technical deficiencies in environmental protection and emergency response, they should be fixed.

The Shipping Industry

Vessels that frequent coastal waters of British Columbia are generally well managed. Major vessel casualties have been few, though some near-groundings have occurred. The shipping system works well under *International Maritime Organization's* convention regime and Canada's shipping laws. The low number of vessel accidents also attests to *due diligence* of the vessel owners, their agents, and their charterers. BC's west coast vessel traffic management and navigational systems are also effective. Nevertheless, there is always room for improvement and a need for monitoring and promoting (oversight) by the public, government and industry to ensure continued enhancements in all areas that reduce vessel casualty risk. For example, the current standard for tugs to escort laden oil tankers through Haro Strait is over 19 years old. The lack of transparency on whether these standards are being met or remain relevant leaves one wondering about tug escort efficacy. It doesn't serve industry nor coastal communities well to let complacency slip in. British Columbians should expect world-wide "best achievable" practices to be used both in vessel casualty prevention and response measures.

Vessels and Vessel Traffic

The report describes the types of vessels common along British Columbia west coast, as well as three vessel traffic routes: *Port Access*, *Inside Passage*, and *Great Circle*.

Vessel casualty scenarios are provided as a means to explore the nature of various types of marine vessel accidents that could happen. The scenarios also provide an opportunity to introduce some of the response dynamics and issues that may result.

The marine risk in British Columbia is increasing as vessel traffic volume and ship sizes grow to meet current and pending industrial projects. The report describes eleven projects that are proposed or underway. They relate to port terminal developments, oil pipeline expansions and proposals, and liquid natural gas plants.

Risk Assessments

Since 1978, there have been marine risk assessments for British Columbia. The intent of these studies is generally to guide marine transport decisions on accident prevention. The report examines a few of them and lists others. The risks assessments demonstrate that: 1) marine accidents happen, 2) they can occur anywhere, and 3) for any reason.

In British Columbia, there is an "ad hoc" approach to implementing the recommendations from enquiries, assessments, studies, and post-incident reviews. Recommendations are either not implemented or are undertaken in a piece-meal manner by several industry and government staffed committees and councils. Public understanding and involvement are required for both risk mitigation and response preparedness measures to be meaningfully engaged. In British Columbia, this monitoring and promoting (oversight) of vessel casualty risk mitigation and response preparedness are weak. There is a lack of broad representation in committees and councils that includes local and provincial governments, First Nations and environmental NGOs that have a stake in coastal environmental protection.

Emergency Response Preparedness Capacity

For about the last 13 years, there has been a marked decline in emergency planners that address marine vessel casualty risk, prevention and response preparedness. There was focused government and industry energy soon after the 1988 *Nestucca* barge and 1999 *Exxon Valdez* tanker oil spills, but that declined quickly. If one combined all the time allotted to emergency preparedness directed towards oil spills and marine vessel casualties by government, one would be stretching it to say there are more than 3 or 4 full-time people engaged. This planning and preparedness level is simply not enough capacity. The challenges to build emergency planning and response capacity in British Columbia can be summarized as: overcoming complacency, avoiding faith-based preparedness, thinking someone else will do the job, applying authority properly, and building relationships.

There needs to be coordinated executive leadership by: Transport Canada, Environment Canada, Fisheries and Oceans Canada, BC Ministry of Environment, as well as by the BC Chamber of Shipping. There also requires coastal community involvement with First Nations and environmental NGOs. Over $13 billion of federal and provincial government, shipping industry, port and railway money is being directed to the *Asia-Pacific Gateway Project* to make intermodal container and bulk cargo management larger and more efficient. This initiative increases vessel casualty risk. Some expenditure and effort should be made to ensure vessel traffic continues to be safe. Also additional funds are required for government, industry and coastal communities to be better prepared to respond to a vessel casualty. There is significant "catching-up" to be made. It is better to be proactive, than reactive to foster public confidence that coastal industrial development is in the best interest of, and equitable to, all British Columbians.

Suggested Policy Directions

The report explores institutional, financial, and technical gaps in marine vessel casualty and oil spill response. Suggested policy direction for improvements are provided. The list indicates that there are opportunities to protect and prepare coastal environments and communities.

Subject areas examined are:

- ➡ Limitations to Canada's Oil Spill Response Organization Regime.
- ➡ Financial Risk and Vulnerability.
- ➡ Divergent Response Paradigms between Federal and Provincial Governments.
- ➡ Geographic Response Plans to Guide and to Engage Local Response Preparedness.
- ➡ Rescue Tug Capability.
- ➡ Oil Tanker Escort.
- ➡ Salvage Operations.
- ➡ Places of Refuge Decision Making.
- ➡ Natural Resource Damage Assessments.
- ➡ Building Emergency Planning and Preparedness Capability.

Suggested Policy Directions

The following policy suggestions are not necessarily new. A thorough examination of the plethora of recommendations from public enquires, post-incident reports, risk assessments, and studies will reveal that they have been raised before - often several times. Many have been debated by industry, government, and environmental NGOs. Nevertheless, there are still issues and gaps to be addressed. Suggested mechanisms for delivery of these suggestions are provided in the report.

Suggested Policy Directions	
Suggested Policy Direction related to Canada's Oil Spill Response Regime	
Oiled Wildlife Rescue and Rehabilitation	Canada's oil spill Response Organization (RO) regime should expand their wildlife response capability and capacity to include hazing, capture, assessment, rehabilitation and release of oiled birds and mammals. Within 24 hours of a spill, a RO should have capability to mobilize personnel and equipment to haze, capture and transport oiled wildlife. There should be at least two mobile (vehicle or trailer) facilities for a Tier 3 response capability and four for a Tier 4. Within 72 hours of a spill, a RO should have capability to establish a fully operational temporary Wildlife Care (Rehabilitation) Centre for the continued assessment, stabilization, and treatment of oiled wildlife. The capacity of the centre should be able to handle a minimum of 200 birds, 10 sea otters, and 10 seals for a Tier 4 response capability. These mobile and fixed facilities are deployed, constructed and operated under established oiled wildlife care protocols. Management of oiled response should be provided by a professional (fee-for-service) contractor. Oiled wildlife tactical response is delivered by a paid, trained, supervised and qualified workforce primarily from the British Columbia's wildlife rehabilitators groups. These oiled wildlife response measures should be stipulated in the *Response Organizations and Oil Handling Facilities Regulation* and guiding *Response Organization Standards* as part of Transport Canada's *CSA 2001 Regulatory Reform Project.* Government agencies with trustee (stewardship) mandates for coastal marine wildlife protection need to develop an operational guideline that reflects "reasonable actions/costs", best oiled wildlife care practices, and oiled wildlife response implementation under the Incident Command System for emergency response. Recognizing that captured wildlife must be cared for until a decision has been made to either euthanize or rehabilitate, a Response Organization and/or their sub-contracted services require financial indemnification if there is no – or a protracted – government decision on their final disposition.

Suggested Policy Directions	
Managing a Large Oil Spill Workforce	The *Response Organizations and Oil Handling Facilities Regulation* and guiding *Response Organization Standard* should focus on oil spill workforce capacity, not on the minimum length of shoreline treated *per* day. The regulation should make it explicit that unpaid convergent volunteers for shore cleanup and wildlife response are not allowed to be used by a Response Organization for oil spill response. Public interested or canvassed to work on spill response must be managed as a registered, trained, equipped, supervised and paid "workforce". For tier 4 response planning, the workforce capacity building should be a minimum of 1,000 workforce members that is readily expandable to 5,000 members within 48 hours and 72 hours respectively. Timelines should begin after areas of shore are no longer subject to "re-oiling" and the Shoreline Cleanup Assessment Technique (Team) process has fully begun. For oiled wildlife response, timelines should begin 24 hours before oiled wildlife are expected to be found.
Oily Waste Management	The *Response Organizations and Oil Handling Facilities Regulation* and guiding *Response Organization Standard* should not be based on a time-frame for holding temporary oily wastes, but specify holding capacities that are in the range of 4 to 5 times the tier level oil spill preparedness (*e.g.,* tier 4 would be 40,000 to 50,000 metric tons of oily wastes). Furthermore, the standards should specify a need for a "systematic approach" to oily waste management as *per* the BC Ministry of Environment's 1993 *Waste Management Guideline during a Marine Oil Spill*, the *International Petroleum Industry Environmental Conservation Association* (IPIECA), Rpt. Series ,Vol. 12 *Guidelines for Oil Spill Waste Minimization and Management*, or combinations thereof.
In-situ Oil Burning and Dispersant Use	The *Response Organizations and Oil Handling Facilities Regulation* and guiding *Response Organization Standard* should require Response Organizations to have both in-situ oil burning and dispersant use equipment to augment mechanical-based response for a tier 4 (10,000 tonne) preparedness level. When the conditions are deemed suitable, fire-boom and monitoring equipment should be fully deployed within 10 hours of a spill - subject to daily-light limitations. This capability also includes operational guidelines, training, and air monitoring equipment. Industry needs to build public and agency confidence in their ability to successfully conduct in-situ oil burning and dispersant operations. Environment Canada should revise their existing national dispersant use decision-making guideline with written endorsement by Fisheries and Oceans Canada. The draft *BC/Canada In-situ Oil Burning Decision Guideline* should be completed by the Ministry of Environment and endorsed by Environment Canada, Fisheries and Oceans Canada, and Transport Canada. Government "approving" agencies need to build public and industry confidence in their ability to make a timely and definitive decision to use these tools when appropriate.
Response to Oils not Defined Under the *Canada Shipping Act*	The *Response Organizations and Oil Handling Facilities Regulation* and guiding *Response Organization Standard* should broaden the definition of "oil" to include other types that pose an environmental risk if spilled. Certain products should be explicitly referenced such as condensates, biofuels, and canola. A Response Organization should be required to prepare and respond to these types of products carried by vessels and/or off-loaded at facilities. Government should examine whether Response Organizations should expand their response mandates to include hazardous materials carried on vessels - either in bulk or packaged.
Financial Assurances for a Response Organization	The *Response Organizations and Oil Handling Facilities Regulation* and/or the *Marine Liability Act* should provide financial assurances to both Response Organizations and other contracted services should they incur a financial loss due to a client not fully paying for emergency services provided. Considerations should be given to Response Organizations and other contractors having access to the *Ship-source Oil Pollution Fund* for business losses. A mechanism should be in place to address reasonable charge-out-rates for a Response Organization and other contracted services, so that when applied during a spill response these rates cannot be disputed by the client. The membership fees should reflect the particular sector's spill risk and consequences, and reflect any new services provided under an amended *Response Organizations and Oil Handling Facilities Regulation* and its standard.

Suggested Policy Directions

Suggested policy directions related to marine vessel casualties and all environmental consequences:

Financial Risk and Vulnerability from a Major Vessel Casualty

Financial risk pertains to a Responsible Party defaulting on response commitments or exceeding their limit of financial responsibility for the management of a major vessel casualty. This includes all environmental and socio-economic consequences - not just an oil spill. Both outcomes result in the Responsible Party passing the remaining incident management for the vessel casualty on to government. Financial vulnerability pertains to the likelihood of this happening with adverse operational and political consequences. The public and coastal communities are entitled to have a clear understanding provided by both government and the shipping industry of this risk and vulnerability. Opportunities and mechanisms to reduce financial risk and vulnerability should be fully explored.

The likelihood of changing the current response funding and damage compensation regime for seagoing and other major vessels is remote due to international constraints. Nevertheless, there are two underutilized opportunities that should be explored:

1. Canada adopts the International Maritime Organization's Protocol 2003 that establishes *Supplementary Fund* which provides additional funds for spill response and compensation.

2.Minister of Transport responsible for Canada's domestic *Ship-Source Oil Pollution Fund* reinstates a levy of 44.85 cents *per* metric tonne of "contributing oil" imported into or shipped from a place in Canada in bulk as cargo on a ship.

Transport Canada should also undertake a study to determine whether the *Ship-source Oil Pollution Fund* is the best value for Canadians, compared to industry establishing their own fund, investing its own contributions, administrating the fund themselves, and paying their own annual contribution to the *International Oil Compensation Fund*. (IOCP Fund). As well, consideration should be given to expand the fund mandate to be inclusive of all environmental consequences of a major vessel casualty - not just oil pollution. As such, contributors to the fund should include both convention and non-convention vessels that pose an environmental and socio-economic risk to Canada's coastal marine waters and communities.

There should be a legislative requirement for a party responsible for a marine casualty to report the allocation of funds during the course of the incident to assess what amount are being held-back as a contingency compared to the amount allocated to impact mitigation. The legal requirement should also require the Responsible Party to provide a detailed post-incident report (audit) on all response costs.

The federal government should undertake a comprehensive comparison of the US and Canadian regimes for both oil spill and vessel casualty response to ensure fair and equitable reciprocity. Where there are gaps, such as in natural resource damage assessment and compensation, they need to be adequately addressed.

Harmonizing the Response Paradigms of Provincial and Federal Governments

The 1981 *An Understanding between Canada and British Columbia Concerning Federal and Provincial Responsibilities in Oil and Hazardous Material Spills* (*1981 Spill Agreement*) needs to be rescinded, as it does not serve the interests of the province, First Nations, Local Government or industry who seek an integrated response to a marine vessel casualty - whether the incident results in a spill or not. The agreement promotes a "one lead agency" approach, rather than a unified (shared) command and integrated response team with other jurisdictions.

The process of achieving a federal and provincial agreement on the draft *Memorandum of Understanding between Canada/British Columbia on Environmental Emergency Interaction* needs to be initiated again.

As the Province has historically and consistently taken the initiative to resolve the divergent response paradigms, the resolution of the problem should be a specific initiative of the BC Minister of Environment and undertaken by the Minister himself.

Geographic Response Plans

Geographic Response Plans should be developed for British Columbia's coast that utilizes the full capability of the provincial coastal resource and oil sensitivity mapping capabilities, the expert knowledge of the oil response community (industry and government), and local knowledge of coastal communities and First Nations. The process of preparing these plans should foster agency understanding and relationships with coastal communities.

Suggested Policy Directions	
West coast Rescue Tug for Major Vessels	Transport Canada (Marine Safety) should undertake an oil tanker drift and rescue tug analysis to reevaluate the efficacy of the Tanker Exclusion Zone. Transport Canada should ensure the recommendations of the Pacific States/BC Oil Spill Task Force are fully considered to mitigate groundings of a major vessel, such as issuing a notice to mariners of the lack of tug rescue (assist) along the west coast. A dedicated rescue (assist) tug should be considered for the central coast of British Columbia to remedy current deficiencies for both oil tankers and other major vessels. This tug's size, specifications, equipment and training should include salvage, cargo and bunker lightering, fire-fighting and other response capabilities. Canadian shipping industry should share in the funding of the Neah Bay (Washington State) dedicated tug as it confers a direct benefit to the industry and to British Columbia's south coast protection. Federal government and shipping industry should consider dedicated rescue tug(s) to be part of an integrated major marine vessel casualty response regime for British Columbia and funded under the same model as for Canada's oil spill response regime.
Tug Escort for Laden Oil Tankers	Transport Canada (Marine Safety) needs to reassess the *Canadian Escort Tug Standard for Haro Strait and Boundary Pass* and be prepared to write a new standard that is founded on world wide "best practices" for tug escort of laden oil tankers. Consideration should be given to ensure that these standards are consistent with tug escort requirements for oil tankers transiting the State of Washington's waters and requirements under the *US Oil Pollution Act of 1990*. Transport Canada should ensure current tug escort service for laden oil tankers is fully transparent to other agencies and the public regarding such matters of frequency of tug escort, what tugs are used (with specifications), escort positioning/emergency protocols, crew training (nature and frequency), exercises and field tests, near misses and other information that fosters confidence pertaining to the efficacy of this coastal protection measure. Transport Canada should undertake a study to determine a maximum tanker size allowed through Haro Strait given its narrow confines, difficult currents, and high traffic volumes, and the limitations of the tug escort to mitigate a collision or grounding.
Vessel Salvage Operations	Transport Canada (Marine Safety) and the industry should establish a domestic or internationally arranged vessel salvage capability for the west coast of BC, and integrate this capability with response preparedness for other consequences of a marine vessel casualty, such as tug rescue, fire-fighting, and spill response.
Places-of-Refuge Decision Making	Transport Canada (Marine Safety) needs to establish an extensive local coastal community outreach program on the nature and challenges of places of refuge decision-making. Special attention should be given to identify local community representatives that have the mandate, authority and expertise to facilitate a decision. Places of Refuge decision making process and information should be incorporated into Geographic Response Plans for coastal communities.
Natural Resource Damage Assessment	Environment Canada and the BC Ministry of Environment should prepare a Natural Resource Damage Assessment harmonization agreement that is inclusive of each other as well as First Nations and local coastal governments such as the establishment of a "NRDA Trustee Committee" Transport Canada (Marine Services) needs to examine with their US counterparts the full scope of marine vessel casualty funding and damage award (private and natural resource) arrangements to foster cross-border financial reciprocity. Where financial reciprocity does not exist, or is uncertain, Transport Canada should make a public account of them.

Suggested Policy Directions

Building Emergency Planning and Preparedness Capacity	Transport Canada, Environment Canada, Fisheries and Oceans Canada, BC Ministry of Environment, and the BC Chamber of Shipping should establish a marine vessel casualty task force with full representation of all jurisdictions (provincial, federal, local governments, and First Nations) and other organizations with coastal protection interests. The task force's mandate should be to address all consequences of a major vessel casualty. The task force's mission should be: to demonstrate leadership in address marine vessel casualty risk factors, implement risk mitigation and response preparedness recommendations, remedy institutional, financial, and technical gaps in emergency response, and break down barriers (silos) between industry and environmental sectors. The task force's focus should be on worldwide "best-practices" for incident management and operational response measures that builds emergency preparedness capacity in British Columbia for vessel casualty response.

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Conversions and Measurements

1 barrel = 42 US gallons = 0.16 cubic meters
1 cubic meter = 1,000 liters = 6.29 barrels = 264 US gallons**
1 mile = 0.87 nautical miles = 1.61 kilometers

** Note: *volume* and *mass* relationships vary with density of product in that: *density=mass/volume*. Most oils are less dense than water. For example, 1 metric ton of intermediate fuel oil (IFO) used for operating large vessels is about 6.60 barrels or 277 US gallons; 1 metric ton of crude oil carried as cargo is about 7.30 barrels or 306.6 US gallons, and 1 metric ton of diesel either as cargo of fuel is about 7.29 barrels or 306 US gallons. All volumes for capacity of fuels stored or as bulk cargo noted in this report are approximate.

Vessel Tonnages:

- **Dead-weight ton** (DWT): A vessel's cargo-carrying capacity measured in the number of long tons (2,240 pounds). Generally used for bulk carriers, tankers and barges. Measures the displacement of a vessel.
- **Gross Tonnage** (GT): A unit of volume used for the cargo capacity of a ship, defined as 100 cubic feet (roughly 2.83 cubic meters). Also termed Gross-weight ton (GWT), or Gross-registered ton (GRT). Generally used for ships with little cargo capacity, such as cruise ships. Gross tonnage is not a measure of the ship's weight or displacement such as deadweight tonnage and net tonnage

Tonnage measurements are governed by an IMO Convention (*International Convention on Tonnage Measurement of Ships, 1969* (London-Rules) which applies to all ships built after July 1982.

Web-based information about: maritime dictionary, marine acronyms, about marine fuels, conversion tables)

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Major Marine Vessel Casualty Risk and Response Preparedness in British Columbia

Accidents Happen, Consequences Result, Accountability Follows

Introduction

Purpose

The purpose of the analysis is to assist in determining policy direction for the *Living Oceans Society* so that they and their clients may foster improved marine coastal protection. This is achieved by explaining vessel casualty risk and consequences, as well as effective emergency response to mitigate environmental damages. These damages from a vessel casualty include marine ecological impacts stemming from cargo loss, oil spill, and/or the ship wreck itself.

Context

The 1988 *Nestucca* oil barge rupture off of the west coast of Vancouver Island followed soon after by the 1989 *T/V Exxon Valdez* oil tanker grounding in Alaska, galvanized public attention on oil spill prevention, preparedness and response along the Pacific west coast. Public enquiries were held and task forces established.[1] By 1993, regulation under the *Canada Shipping Act* required major vessels and barges that pose a spill risk to have an arrangement with a Transport Canada certified Response Organization.[2] On October 6, 1995, *Burrard Clean Operations* located in Burnaby became the first industry-funded Response Organizations established in Canada under the new oil spill response regime.[3]

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[1] Enquiries include: federal Brander-Smith, 1990. *Public Review Panel on Tanker Safety and Marine Spills Response Capability,* and provincial David Anderson, 1989. *Report to the Premier on Oil Transportation and Oil Spills.* Task forces include the Pacific States/BC Oil Spill Task Force.

[2] The *2001 Canada Shipping Act* and its Response Organization and Oil Handling Facilities Regulations outline Canada's marine oil spill preparedness and response regime.

[3] *Burrard Clean Operations* is a division of the *Western Canada Marine Response Corporation* which is certified as a Response Organization by Transport Canada to respond to marine oil spills. Its geographic area of response is all navigable waters of British Columbia from Alaska to Washington States, and to the Alberta border within Canada. Its clients include owners and operators of tankers, barges, freighters, ferries, cruise ships and oil handling facilities operating in B.C.'s navigable waters.

As stated, the public and government focus after these events was on the oil spill consequence of a vessel casualty, not the casualty itself. Subsequent vessel casualties - particularly in the United States - have drawn attention on other environmental consequences.

Notable vessel casualties on the Pacific west coast are the grounding of two freighters *New Carissa* in Oregon (1999) and the *Selendang Ayu* (2004) in Alaska. These incidents raised awareness in the United States to the need to address all aspects of a major vessel casualty, and not just the oil spill impact or threat. This includes measures to salvage or remove cargo, fuels, and wreckage to prevent or minimize environmental damage. Dealing with the vessel and its cargo can be as problematic and expensive as an oil spill.

Along Canada's west coast, there have only been a few near-misses; therefore vessel casualty risk and incident management have not garnered the same level of public and government attention as in the United States. In February 1998, the container vessel *Hanjin Elizabeth* and the general cargo vessel *Caria* engines failed within a day of each other. Both vessels became disabled off of Brooks Peninsula on Vancouver Island and drifted towards the northerly end of the island. Six ocean-going tugs were dispatched to rescue them. The *Caria* was rescued by a tug-of-opportunity within 10 nautical miles of Cape Scott Provincial Park. The *Hanjin Elizabeth* managed to regain engine function, but after drifting past Triangle Island within the Scott Island chain.

In December 2003, the container vessel *Zois* lost engine power while *en route* to Seattle *via* Canadian waters. It drifted to within approximately 400 meters of Trial Island near Victoria before regaining propulsion.

A notable vessel grounding in British Columbia was the bulk carrier *Bovec* in March 2000.[4] It dragged anchor in high winds and grounded in Tuck Inlet within Prince Rupert Harbour. No oil was released.

***Bovec* - Grounded in Prince Rupert Harbour**

Recent vessel and barge sinkings in British Columbia have garnered public attention to both oil spill risk and the problem of addressing sunken wrecks. In March 2006, the *Queen of the North* ferry sank after running aground on Gil Island in Wright Sound, 135 kilometers (70 nautical miles) south of Prince Rupert. In August 2007, *Ted LeRoy Trucking Ltd's* equipment barge sank in Johnstone Strait dumping logging machinery and a fuel truck within the *Robson Bight (Michael Biggs) Ecological Reserve*. Both incidents released diesel oil and resulted in wreck debris resting within coastal locations of high ecological and cultural value.

Issue Identification

Though major vessel casualties have been few along British Columbia's coast, accidents can happen. The matter of understanding this risk and being prepared to respond has been recognized as early as 1978, where a federal report on potential coastal oil ports stated:

> *It is further necessary to develop explicit procedures concerning rescue, provision of refuge for disabled vessels, or alternatively, disposal at sea of wrecks which pose too great of risk to shoreline values.* [5]

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[4] The *Bovec* contained 293 metric tonsmetric tons of heavy fuel oil located mainly in a centre double bottom fuel tank. In addition, to the heavy fuel oil, the day tank contained 15 metric tons of diesel and the engine room contained 12 metric tons of diesel. Source: *Canadian Coast Guard (Pacific Region) - Bovec situation report.*

[5] 1978. *Potential Pacific Coast Oil Ports: A Comparative Environmental Risk Analysis*, (Vol. 1): A report by Fisheries and Environment Canada (Vancouver)

Canada has a marine oil spill response regime to address only one consequence of a vessel casualty - an oil spill or threat. Even within Canada's oil spill response regime, there are significant deficiencies related to narrowly-defined emergency preparedness standards.

Canada does not have response capability that addresses all of the consequences of a major vessel casualty to the social, economic and ecological values of its coastal environment. There is a lack of emergency planning and preparedness in vessel salvage, cargo and fuel removal (lightering), places of refuge decision-making, and tug rescue of disable vessels.

These issues are lurking in the background in British Columbia because there has not been a major oil spill or vessel casualty to truly test response capabilities and performance by industry and government.

The issues of vessel casualty risk and emergency response preparedness are compounded by current and pending coastal industrial developments (railways, terminals, pipelines). If these projects become operational - subject to government and stakeholder approvals - there will inevitably be a large growth in major vessel traffic. This growth increases environmental risk.

The intent of this report is to explore these issues within the context of vessel types and traffic patterns and probable vessel casualty scenarios along the west coast of British Columbia.

Report Scope

The scope of the marine casualty risk and response preparedness analysis is limited to examining:

- Vessels greater than 150 gross tonnage (GT) carrying oil in bulk such as oil tankers and barges carrying either persistent and non-persistent oil, and all other vessels over 400 GT such as cruise ship, bulk carrier, general cargo, container, and ferry vessels;
- Marine casualties that have potential coastal ecological impacts such as vessel groundings, sinkings, collision and allision;
- Marine vessel casualty risk based on accident scenarios within the context of vessel types and traffic patterns along Canada's west coast.

The report focuses on institutional, financial, and technical strengths and weakness in both vessel casualty and oil spill response in British Canada, Canada. An objective is to provide insights into the complex world of the marine vessel industry and the nature of environmental emergency response to an accidental casualty.

The report's purpose is to suggest policy direction that could improve emergency planning, preparedness and response for to marine vessel casualty for British Columbia.

The analysis does not address marine casualty and spill prevention, *per se*. The report recognizes that those companies whose ships and barges frequent British Columbia's coastal waters have good safety records.

About the Shipping Industry

Where nature provides the right-of-way, transportation by water is an efficient and low-cost way to ship goods. Canada's deep harbours make its commercial shipping possible - although it does require substantial investments in terminal infrastructure to complete the marine transport system.

Canada's marine industry can be categorized into two shipping sectors: 1) domestic and 2) international.[6] Domestic vessels are generally Canadian owned and operated ships such as ferries, fishing boats, and barges, whereas international ones include mostly major seagoing vessels such as tankers, container, bulk carriers, general cargo, and cruise ships. International vessels are chartered by companies that need their services. These vessels are commonly referred to as "convention" vessels.

The shipping industry - particularly the international sector - is generally out-of-sight, out-of-mind as soon as a vessel leaves port. The industry is generally well-managed; operating under long-standing, proven shipping management practices and protocols. The time when the shipping industry practices are questioned is when there is a marine casualty. This is when the industry becomes highly visible.

The world global markets and economies drive the shipping industry - both strategically and operationally. This is because consumer goods are seldom produced in one plant or even one country today. Consumer and industrial goods are now assembled from component parts made around the world. Similarly, raw materials are largely refined in places other than where they were extracted. All this has created a production and market system that is highly dependent on the shipping industry. For example, as consumers seek more goods - the greater the demand for more and larger container vessels. The countries that produce these goods, then require more raw materials, hence the greater demand for bulk carriers and oil tankers. The cycle continues; the shipping industry responds. Other industries also respond to these demands. Hence, the numerous industrial proposals on British Columbia's coast such as vessel terminal expansions, Liquid Natural Gas plants, oil pipelines, and more. This industrial growth in-turn means more and bigger vessels, and hence greater environmental risk from a vessel grounding, burning, rupturing, or sinking.

The oceans are the "freeway highway" upon which much of the world's business depends. It is in the collective interest of the trading countries, such as Canada, to make sure that trade continues to flow with minimal restrictions. As such, Canadian marine laws - such as the 2001 *Canada Shipping Act* and its regulations [7]- tend to mirror established shipping conventions of the *International Maritime Organization* related to environmental protection, vessel design, operation and management, and crew safety. Canada legislatively accedes to these conventions. However, the federal government only marginally - if at all - enhances safety or environmental measures over-and-above these international shipping requirements.

The trading countries and the multinational corporations naturally want to prevent any disruption of their trade. Hence, vessel casualties are not in their best interest. Their motivation for safe shipping is: first economics; second protecting corporate image; and third avoiding additional (reactive) country-based regulatory burden.

The global economy now depends on the uninterrupted flow of shipping among producers of raw materials based on a "just in time delivery" approach to shipping. This is where industries no

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[6] For listings of Canadian "domestic" vessels and their descriptions can be found at *Canadian Transportation Agency's* Canadian Vessels Information System.

[7] The 1985 *Canada Shipping Act* was repealed on July 1, 2007 as published in the *Canada Gazette* Part II, Volume 141, No. 10 on May 16, 2007.

longer stockpile or maintain reserves of energy, raw materials, and key components, but instead time their shipments to just meet customer needs. It is this global economic environment that drives initiatives such as British Columbia/Canada Asian-Pacific Gateway project.

The *1982 UN Convention on the Law of the Sea* created what has been referred to as a "New Constitution for the Oceans." The convention has significantly changed the way countries use and administer their oceans. New and expanded jurisdictional zones include:

1) The 12 nautical mile (nm) territorial sea over which a country has full control;

2) The 24 nm contiguous zone over which a country has limited jurisdiction concerning various aspects of domestic law; and 3), and

3) The 200 nm Economic Exclusion Zone (EEZ) over which a country has resource and environmental jurisdiction.

These three zones define Canada's marine jurisdiction and is reflected in the federal *Oceans Act* (Part 1-Maritime Zones).

The international shipping sector is a complex structure of national and open registries (*flag of convenience*) in which some 29 thousand vessels above 1,000 GT in size are engaged in seaborne trade. Of these, nearly half are registered in the open registries of Panama, Liberia, Cyprus, Bahamas, Bermuda, and Vanuatu, as well as in the alternative international ship registries of Norway and Denmark. This erosion of national "flag" domestic fleets raises the question of who is ultimately responsible, or accountable, for a particular ship involved in a vessel casualty or spill? This is particularly the case when a ship owner is merely a holding company, or when each of its ships is registered as a single-company. In the event of a major liability - say from a spill - each individual ship can then be written off with little effect on the fleet as a whole.

Accountability for a major oil spill is now more commonly at arms-length after the 1989 *Exxon Valdez* oil tanker incident in Alaska. One will rarely see an oil company's corporate name on an oil tanker after this event. This is because oil corporations no longer own oil tankers, but charter them instead - as is the case in Canada. In Canada, it is the ship owner, not the product owner, that is legally the Responsible Party (RP) if there is an oil spill.[8] [9] .

The *International Maritime Organization* (IMO) has worked hard and effectively at addressing safety at sea and environmental protection issues. The IMO has made significant progress with their international conventions such as *Safety of Life at Sea* (SOLAS), *Safety Management Systems* (ISM/SMS) and *Certification of Ship Officers* (STCW). Nevertheless, there are essentially only two "drivers" that make Canadian waters safer from marine casualties, spills and other pollution (ballast, waste water):

1. The shipping industry's corporate willingness to abide - if not exceed - both IMO convention standards and federal regulations, and

2. The federal government's willingness to enforce the "laws-of-the-sea" and of Canada.

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[8] Responsible Party (RP) refers an agency or company taking responsibility for impact mitigation (e.g. cleanup, response management) as a possible consequence of their actions or that of a third party - generally referred to as either the spiller or polluter.

[9] Under the *Marine Liability Act*: the liability for environmental damage, if oil pollution damage from a ship results in impairment to the environment, states that: *"the owner of the ship is liable for the costs of reasonable measures of reinstatement actually undertaken or to be undertaken"*.

For both measures to be meaningfully engaged, public understanding of and effective oversight on how well the shipping industry is working to mitigate the risks of vessel casualties is required. As well, oversight is needed to ensure an adequate industry and government response when an incident happens. Where there are institutional and technical deficiencies in environmental protection and emergency response, they should be fixed.

The prevention and preparedness "benchmark" is the public clearly knowing whether Canada's existing coastal protection capability from the shipping industry is commensurate with the marine casualty and spill risks they pose. This level is further raised when considering the additional and cumulative risks from expanding major vessel volumes that would result from the many pending industrial projects on British Columbia's west coast.

Part 1: Vessel Types and Traffic in British Columbia

1.0 Types of Major Vessels

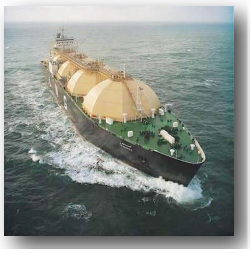
The following provides a synopsis of the type, nature and size of major vessels that currently travel the coastal and territorial waters of western Canada (Figure 1). These include:

Oil Tankers

Ferries

Chemical Tankers

General Cargo Vessels



LNG Tankers

Container Vessels

Bulk Carriers

Cruise Ships

Barges

RO-RO Vessels

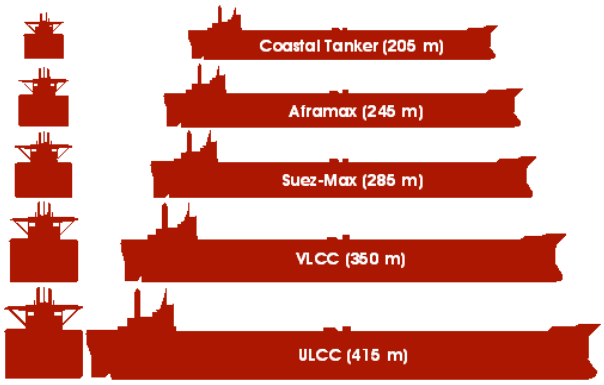
Figure 1: Types of Vessels within Canadian West Coast Waters[10]

[10] These are just a small sampling of vessel categories and ship designs

Oil Tanker

There are different sizes of tankers used in the international transportation of oil from modest coastal tanker to Very Large Crude Containers (VLCC) or Ultra Large Crude Container (ULCC). The VLCC and ULCCs are often referred to as "Supertankers".

DWT = Dead Weight Tonnage L: length, B: beam, D: draft



Source: Dr. Jean-Paul Rodrigue, Dept. of Economics & Geography, Hofstra University. Use provided with permission.

Coastal: *Handysize*: Less than 50,000 DWT (L: 205m, B: 29m, D: 16m), mainly used for transportation of refined products (gasoline, diesel).

Panamax up to 80,000 DWT. - maximum size for Panama Canal

Aframax: 80,000 DWT up to 120,000 DWT (L: 245m, B: 34m, D: 20m). The most common tanker worldwide. Oil volume: 70 to 80 thousand metric metric tons. The standard 80,000 DWT tanker holds 700,000 barrels

Suez-Max: Between 120,000 and 200,000 DWT (L: 285m, 45m, 23m), originally the maximum capacity of the Suez Canal. Oil volume: 100 to 130 thousand metric tons The standard 130,000 DWT tanker holds about 1 million barrels.

Very Large Crude Carrier (Malaccamax): Between 200,000 DWT and 300,000 DWT (L: 350m B: 55m, D:28m). Oil volume: 200 to 285 thousand metric tons. The standard 260,000 DWT tanker holds about 2 million barrels.

Ultra Large Crude Carrier. Capacity exceeding 300,000 DWT (L: 415m, B: 63m, D: 35m) and up to 550,000 DWT. The standard 320,000 DWT tanker holds about 3 million barrels

The common rule is that the volume carried in a tanker increases as a function of the cube of its length. For instance, a ULCC is about twice the length of a coastal tanker, but can carry about 8 times the volume (50,000 metric tons *versus* 400,000 metric tons). Because of their huge mass, tankers have a large inertia, making them very difficult to steer. A loaded supertanker could take as much as 3 kilometres (km) and 15 minutes to come to a full stop and has a turning diameter of about 2 km. As a result, specialized escort tugs often accompany a laden oil tanker through narrow passages.

Even an oil tanker in ballast (carrying water rather than oil) has over 3 to 6 thousand metric tons of Heavy Fuel to operate its engines and ship systems.

The first tankers generally had single hulls divided into a series of tanks. Due to environmental concerns, modern tankers now have double-hulls, so that if the outer hull is damaged the cargo in the inner hull will be protected. In 1992, the *International Maritime Organization* (IMO) recommended making double hulls mandatory for all tankers carrying heavy crudes and fuel. The IMO opted for a staggered phase-out of 2015 and 2025 depending on tanker size/design. However, the *Erika* oil tanker spill, off the coast of France in 1999, led to the timetable for the global phasing out of single-hulls being accelerated to 2010. The amendments to Regulation 13G in Annex I of MARPOL 73/78 were adopted by the MEPC's 46th session in April 2001. Canada follows the IMO phase-out schedules. The United States has its own schedule under the *1990 Oil Pollution Act*. In the U.S. it is mandatory for all tankers calling at U.S. ports to have double hulls also by 2010.

Aframax size tanker export oil from the Kinder-Morgan Canada's Westridge Marine Terminal located the Port of Vancouver. "Coastal" tankers that once to carried petroleum within BC's inside waters have now been replaced by tug and barge systems.

Chemical Tanker

Chemical tankers are designed to transport chemicals in bulk in separated and protected compartments.

Ocean-going chemical tankers generally range from 5,000 metric tons of Dead Weight Tonnage (DWT) to 40,000 DWT in size. They are smaller than the average size of other tanker types - such as an oil tanker - due to the specialized nature of their cargoes and vessel size restrictions of the port terminals.

Chemical tankers have a series of separate cargo tanks which are either coated with specialized material such as phenolic epoxy or zinc paint, or made from stainless steel. The coating or cargo tank material determines what types of cargo a particular tank can carry: stainless steel tanks are required for aggressive acid cargoes such as sulfuric and phosphoric acid, while 'easier' cargoes can be carried in epoxy coated tanks.

Many modern chemical tankers feature double hull construction and have one tank for each pump with separate piping to prevent product mixing and contamination. Most new chemical tankers are built by shipbuilders in Japan, Korea or China, with other builders in Turkey, Italy, Germany and Poland.

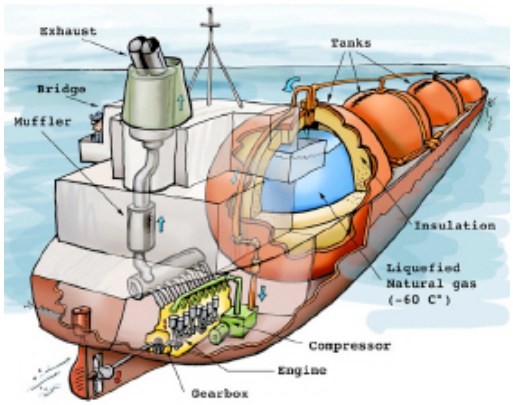
The chemical tanker market is dominated by the "big 3" chemical shipowners - Stolt-Nielsen, Odfjell and Berlian Laju Tanker.

The Port of Vancouver is the primary location for chemical tankers in British Columbia. The terminals that trans-ship chemicals are Dow Chemical and, CANEXUS Chemicals.

Most chemical tanker incidents occur at the on and off-loading of their products, such as the Styrene spill in Burrard Inlet in April, 1994. Worldwide, chemical tanker spill and accidents are few due to their design and careful handling of their products.

Liquid Natural Gas Tanker

Liquid Natural Gas (LNG) tankers are designed to transport liquid natural gas in bulk in a liquid state.



A typical LNG ship is 290 meters long and 45 meters wide. Many new ships being built are even bigger. Their usual loading capacity is 140,000 m^3 in its liquid state.

Liquefied Natural Gas [LNG] tankers look different from tankers carrying oil and chemicals. Most LNG tankers have two hulls, so that, if a collision or grounding punctures the outer hull, the ship will still float and the LNG will not spill out. LNG tanks are either spherical (and the upper half of the sphere sticks out above the deck), or box-shaped. The ships tend to ride high in the water, even when loaded.

A catastrophic release of LNG volume expands as the cryogenically (-162ºC) cooled liquid converts to a gas - expanding 600%. The gas is highly explosive if ignited. The ensuing fire ball and blast radius is a particular public safety concern and often results in community pressure not to have a LNG terminal, storage or ship nearby. To date, there has been no such catastrophic LNG tanker event partly do to the rigorous protective design of these vessels and their low relative numbers compared to other types of tankers worldwide. There is often very high port security around the access and egress of LNG tankers to mitigate the risk of purposeful damage and ignition of the product. LNG tankers are very much on the minds of government, industry and the public as they are becoming a major contributor to meet energy needs. About 1/5th of the world consumption of natural gas is transported by LNG tankers.

To date, LNG tankers do not enter Canadian west-coast waters, but there are LNG terminals and re-gasification plants being proposed in both northern and southern British Columbia that would result in such tanker traffic.

Bulk Carrier

Bulk Carriers are vessels that carry cargo in bulk such as coal, grains, cement, etc. Often referred to as "bulkers"

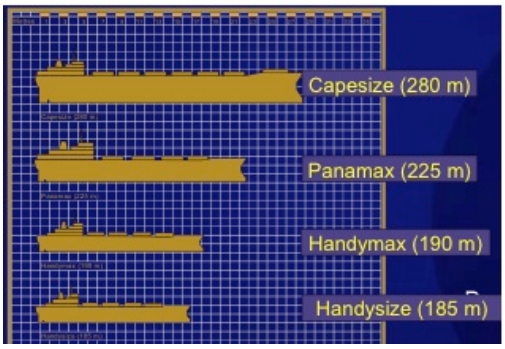
Handysize, from 10,000 to 35,000 DWT. These smaller *Handysize* and *Handymax* vessels are general purpose in nature and comprise 71% of all bulk carriers.

Supramax, from 45,000 to 59,000 DWT and typically are 150–200 meters in length with five cargo holds and four cranes.

Panamax, from 60,000 to 80,000 DWT. Size is determined by the Panama canal's lock chambers.

Capesize, from 100,000 to 200,000 DWT. Too large to traverse the Suez or Panama Canals and must round the Cape of Good Hope to travel between oceans. *Capesize* bulkers are specialized. 93% of their cargoes being iron ore and coal.

Very Large Bulk Carriers, for ships over 200,000 DWT. The *Berge Stahl* is 364,768 DWT and is the world's largest bulk carrier. Bulk carriers of this size mostly carry iron ore.



Bulk carriers make up a third of the world's merchant fleet and range from small coastal trading vessels of under 500 DWT to mammoths of 365,000 DWT. Bulkers must be carefully designed and maintained to withstand the rigors of their work. They often carry cargo that is very dense, corrosive, or abrasive. They are vulnerable to cargo shifting which can cause a ship to capsize. A bulker's large hatchways, important for efficient cargo handling, can add to the risk of catastrophic flooding if a large ocean wave breaches a hold's cover.

Bulk carriers also carry a lot of fuel to operate their engines - referred to as "bunker fuel". This fuel is typically heavy Bunker C (an oil residue). For Cargo-Bulk carriers that travel the Great Circle Route past British Columbia and Alaska, the fuel volume ranged from 512 metric tons (135,190 gallons) to 3,674 metric tons (970,704 gallons), with a median being 2,842 metric tons (750,918 gallons). A Capesize carrier can carry nearly 4,000 metric tons of heavy fuel oils such as Bunker C and IFO 380. This volume is about a third of the amount of oil spilled by the *Hebei Spirit* tanker in South Korea on December 7th, 2007.

The vessel's outer hull typically serves as part of the fuel tank and therefore is susceptible to rupture on collision or grounding.

The full range of bulk carrier sizes frequent British Columbia's coastal waters The Port of Vancouver offers 17 bulk terminals to handle a diversity of cargoes including coal, grain, sulphur, potash, liquid and dry chemicals. Stewart also has a small bulk handling terminal. The Port of Prince Rupert's Ridley Terminal has handed 250,000 DWT vessels and readily handle VLBC vessels of 350,000 DWT.

Ferry and RO-RO Vessels

A **ferry** is a vessel carrying (or *ferrying*) passengers and sometimes their vehicles. Ferries are also used to transport freight in trucks and railway cars. Most ferries operate on regular, frequent, return services.

RO-RO (Roll-on/roll-off**)** vessels are designed to carry wheeled cargo such as automobiles, trucks and railcars. Various types of RO-RO vessels include ferries, cruise ferries, cargo ships, and barges. New automobiles that are transported by ship around the world are often moved on a large type of RO-RO called a *Pure Car Carrier* (PCC) or *Pure Car Truck Carrier* (PCTC).

RO-RO Ferry

Unlike elsewhere in the shipping industry where cargo is normally measured by the metric tonne, RO-RO cargo will typically be measured in the more convenient unit of lanes in meters (LIMs). This is calculated by multiplying cargo length in meters by the number of decks and by its width in lanes.

RO-RO Deep Sea Car Transporter

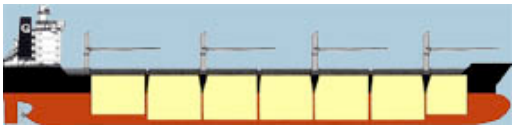
Ferry designs depend on the length of the route, the passenger or vehicle capacity required, speed requirements and the water conditions the craft must deal with. Double-ended ferries have interchangeable bows and sterns, allowing them to shuttle back-and-forth between two terminals without having to turn around. Most fjord and coastal ferries are double-ended vessels - as are the ferries in British Columbia. In 2008, BC Ferries launches three of the largest double-ended ferries in the world - referred to as Super C-class. As well, BC Ferries bought the Northern Adventure to replace the Queen of the North Ferry that sank after hard grounding on Gil Island, 70 nautical miles south of Prince Rupert (March 22, 2006). The new ferry will also travel the Inside Passage.

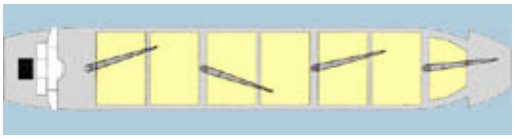
Large ocean going RO-RO vessels also transit the outer coast of British Columbia, taking vehicles from southern States to Alaska, as well as vehicles from Asian-Pacific countries to North America by the Great Circle route. Some of them have run in to trouble, such as *Cougar Ace*. On July 23, 2006, this RO-RO vessel listed 60 degrees while undertaking a mid-ocean ballast-water exchange. It had 4,812 vehicles on board, but did not sink.

Large ocean going RO-RO vessels can carry over 1,500 metric tons (1/2 million gallons) of persistent oil as their bunker fuel.

General (Breakbulk) Cargo Vessel

Cargo vessels that carry non-containerized and/or piece-handled cargos such as wood, metals, construction materials, bagged products (often referred to as “breakbulk”). These vessels are also referred to as “breakbulk” or “general” cargo freighters.





General cargo vessels tend to be smaller than “bulk carriers” - they look quite similar. General cargo vessels range from the 50,000 - 56,000 DWT which are considered as Super Handymax size. Fleximax vessels are smaller than 50,000 DWT.

The Breakbulk or General Cargo vessels typically consist mainly of open hatch ships with box shaped holds. These vessels are designed to transport “unitized” cargoes, such as forest products and non-ferrous metals. The vessels are interchangeable and adaptable to customer requirements. A combination of box shaped holds with specific lifting equipment enables loads to be placed directly in alloted locations within the vessel. Some vessels have dehumidification capability to protect sensitive cargoes from changes in temperature and humidity levels that occur between different climatic zones.

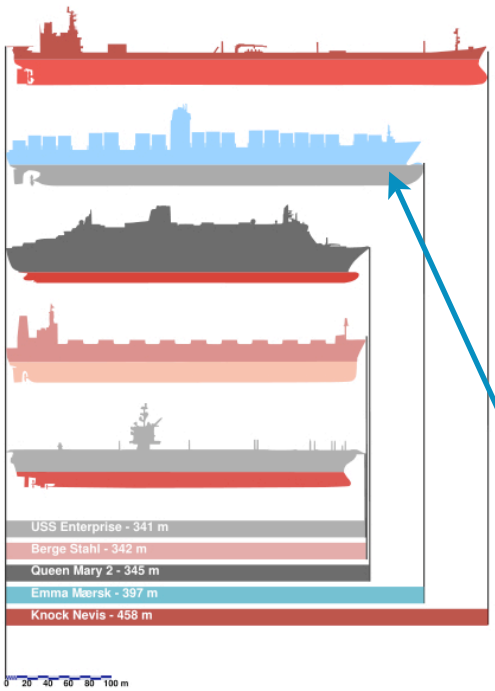
As with Bulk Carriers, General Cargo vessels also carry a lot of fuel to operate their engines. This fuel is typically heavy fuel oils (Bunker C or IFO 380) with lesser amounts of marine diesel oil. The latter “refined” fuel is mainly use when the vessel is entering and in port, due to being more reliable and having less harmful air emissions than a heavy fuel oil.

The vessel’s outer hull typically serves as part of the fuel tank and susceptible to rupture on collision or grounding - referred to as “wing-tanks”. Recognizing the vulnerability of these fuel tanks to rupture, the International Maritime Organization adopted in March 2006 a regulation (Reg. 12A under MARPOL Annex 1) requiring that by 2010 all new ships with an oil fuel capacity of 600 cubic meters (m^3) or more must have their fuel tanks deeper inside the ship and behind two walls. That rule affects most large commercial ships. The regulation also puts a maximum capacity limit of 2,500 m^3 *per* fuel tank. It does not phase out wing-tanks - as such vessels with single-hull protected fuel tanks will be around for decades.

The full range of general cargo vessels frequent coastal waters of British Columbia. The Port of Vancouver has three “breakbulk” terminals. More than fifteen of the world's top general cargo carriers regularly call on the Port of Vancouver.

Container Vessel

Container vessel carry all of their load in truck or railcar-size containers, in a technique called containerization. They form a common means of commercial intermodal freight transport.



Container ships capacity is measured in Twenty-foot Equivalent Units (TEU), the number of standard 20-foot containers measuring 6 x 2.6 x 2.6 meters a vessel can carry. This not withstanding, most containers used today measure 40 ft (12 m) in length.

Economies of scale have dictated an upward trend in sizes of container ships in order to reduce costs. One limit on ship size is the "Suezmax" standard, or the largest theoretical ship capable of passing through the Suez Canal, which is about a 137,000 DWT container vessel capable of carrying 14,000 TEU.

Beyond Suezmax lies the "Malaccamax" (for Straits of Malacca) ship of of 300,000 DWT capable of 18,000 TEU (470 meters long, 60 meters wide, 16 meters of draft).

Emma Mærsk was the largest container ship ever built, and as of 2007 the longest ship in use. Officially, *Emma Mærsk* is able to carry around 15,212 TEU. See vessel -size comparison chart - blue vessel is the *Emma Mærsk*.

The containers and the cargo they contain make up the vast majority of the total weight of a cargo ship. Consequently, the loading and unloading is a delicate balancing act as, it directly affects the centre of mass for the ship. A poorly loaded ship can capsized - which has happened. In open sea, storms can cause loss of containers that pose a floating collision hazard to other vessels. If a container vessel grounds, the recovery of lost of containers and removal of the containers that remain aboard are very problematic. The lost containers and the products therein are a significant form of marine pollution. The flotsam (marine debris) can be spread far and wide and far by currents and pollute beaches. Containers often contain dangerous goods such as paints, pesticides, manufacturing products. For example, the *MSC Napoli* that ran aground in the English Channel on January 18, 2007 demonstrates the environmental impact of a container vessel grounding. Of the 41,773 metric tons of cargo on board, 1,684 metric tons were of products classified as dangerous. Some 103 containers fell into the sea. As with other cargo vessels, several of its fuel wing tanks were also ruptured and released heavy fuel oil.

There are container terminals in the Ports of Vancouver and Prince Rupert. Expansion in both in volume and size of container vessels is projected to grow significantly over the next few years.

Cruise ship

A **cruise ship** is a passenger vessel used for pleasure voyages, where the voyage itself and the ship's amenities are part of the experience.

By convention and long usage, the size of passenger or cruise ship vessel is measured by gross tonnage, which is a measure of enclosed volume. Typical cruise ships that ply BC's Inside Passage on the Alaska cruise range from 50,000 GT to 93,500 GT. They can carry from 700 to over 3,000 passengers.

Cruise ships represent a small — although highly visible — portion of the international shipping industry. Their current environmental profile is public and agency focus on their waste streams that can result in discharges to the marine environment, including sewage, grey water, hazardous wastes, oily bilge water, ballast water, and solid waste. These wastes, if not properly treated and disposed of, can have the potential to threaten human health and cause damage to aquatic life.

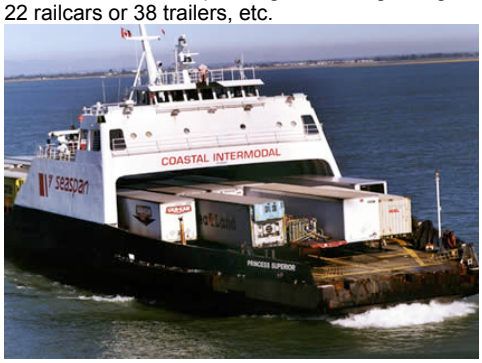
From a vessel casualty standpoint, cruise ships carry a lot of fuel - both Heavy Fuel Oil such as Bunker C (a residual fuel), IFO 380 & 180 (Intermediate fuels) and marine grade diesel (a distillate fuel). The industry is moving more to the latter to meet stringent air quality requirements at ports. A small 13,600 GT to a large 115,800 GT cruise ship can have approximately 927 to 4,316 metric tons of persistent intermediate fuel oil (IFO), respectively. Other pollutants include the solvents, cleaners and chemicals similar to a typical town of 2,000 to 3,000 people. The large structure of cruise ships makes salvage, wreck removal, or lightering of oil left in tanks very difficult.

Incidents on cruise vessels in British Columbia do not happen often. A notable "close call", however, was an engine circuit-board fire on the *Statendam* (Holland America Line) that occurred in the Strait of Georgia in August 2002. This incident was investigated by the Transportation Safety Board of Canada (MIR M02W0135)

Barges

Barges are not self-propelled and need to be moved by tugboats or towboats - either by pushing or pulling. Barges come in a variety and sizes as shown by the following list of *Seaspan International's* barge categories:• Bulk Carriers •Chip Barges • Combination Chemical / Covered Barges • Covered Barges • Flatdeck Barges • General Cargo Vessels •Hopper / Conveyor Barges • Log Barges • Railcar Barges •Ro/Ro Ferries•Tanker Barges. Tugs are not included in these descriptions.

Barge sizes are described in what they are capable of carrying, such as: for oil barges - 12 to 32 thousand barrels of oil; for chip barges - 1,700 to 3,000 short ton of chips; for general cargo barges - 22 railcars or 38 trailers, etc.



It is generally what barges carry that pose the environmental risk, not the barge itself. Large oil barges can carry over 3,911 metric tons (30,000 barrels) of petroleum - either as refined or crude. Oil barges supply refined fuels to island communities and heavy oils for industries such as pulpmills. Alaska tug and tow companies such as *Alaska Marine Lines* (AML) regularly schedule trips of barges with containers, vehicles and other cargo to supply the industry and residents of the State of Alaska. The containers often have dangerous goods - paints, solvents, industrial chemicals, biocides, etc. Similar environmentally hazardous materials are carried in RO-RO barges that routinely travel between the Lower Mainland and Vancouver Island.

As with any vessel, barges have accidents such as the AML Freight Barge - the *Baranof Provider* - caught fire in Chatham Strait near Fredrick Sound in November 2006. (SITREP). Other barges have lost their entire cargo such as the Ted LeRoy Trucking Ltd's equipment barge in *Robson Bight (Michael-Biggs) Ecological Reserve* in Johnstone Strait in August 2007.

1.1 Vessel Traffic in British Columbia - Current and Future

1.1.1. Overview

The following graphic and table represent a generalized picture of traffic volumes and routes in Canada's coastal and territorial waters (Figure 2 and Table 1).[11]

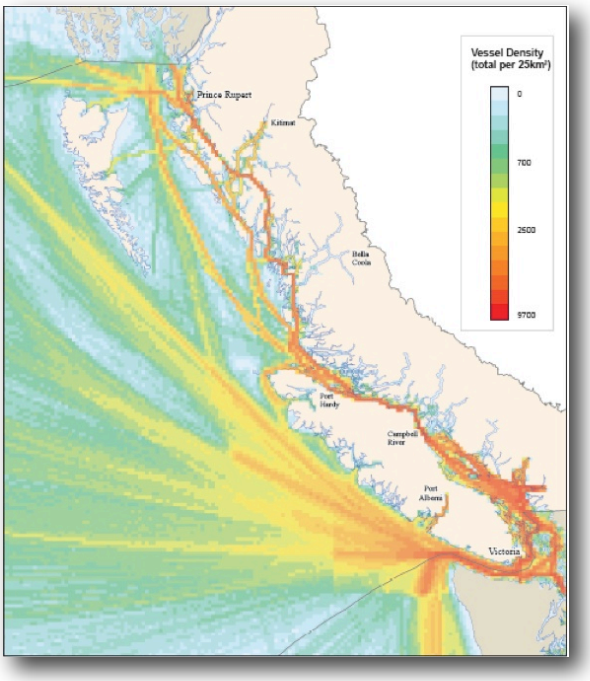


Figure 2: Marine Traffic Vessel Density (*per* 25 km^2)
(Source MCTS Canadian Coast Guard 2003)

Vessel Type	Vessel Description	Average Number of Vessels/Year	Percentage of Total
Tankers	Carrying liquid oil in bulk	2,739	<1
Chemical	Carrying liquid chemicals in bulk	1,278	<1
Cargo	Bulk cargos such a cars, grain, ore	29,253	7
Tugs	Towing or propelling barges	117,319	29
Fishing	Catching, processing,or transporting fish	11,078	3
Passenger	Ferries and cruise ships	229,095	56
Other	Vessel not categorized above	19,541	5
	TOTAL:	**410,303**	100

Table 1: Annual Vessel Movements by Vessel Type from 1996/97 to 2003/04 for the Coast of British Columbia (Source MCTS Canadian Coast Guard)

[11] Primary source of information is from *Marine Communications and Traffic Services* (MCTS) of the Canadian Coast Guard (CCG) and obtained from the BC Ministry of Environment's report: *British Columbia Coastal Environment 2006: Alive and Inseparable.*

Shipping in British Columbia (*i.e.*, number and type of vessel) seasonally varies along some routes. Overall shipping traffic is greater in summer than in winter. The distribution of bulk carrier, cargo, and tanker traffic does not change much seasonally. Fishing vessel traffic is seasonal because of fishery openings. Cruise ship traffic is also seasonal, with the heaviest traffic during the Alaska cruise ship tourism period in summer.

There are essentially three traffic patterns for major vessels along coastal and territorial waters: *Port Access*, *Inside Passage*, and *Great Circle*. The following provides an overview of the current and future vessel traffic volumes and their types along these routes. The future shipping patterns and volumes relate to several pending industrial projects such as oil pipelines, terminal expansions, and LNG re-gasification plants. These industries could either increase the existing frequency of vessels or require new vessels to import or export their goods.

1.1.2. Port Access Vessel Routes

There are four deep-sea port locations in British Columbia connected to Canada's continental highways and railways: 1) Lower mainland, 2) Prince Rupert, 3) Kitimat, and 4) Stewart.

Strait of Georgia and Juan de Fuca Strait have the highest port access traffic volumes. These traffic patterns represent access and egress to major ports, such as the Port of Vancouver and those within the US Puget Sound area. All types of major vessels use these port access routes.

Since 1993, the Washington Department of Ecology's Spill Program has kept a yearly record of major vessel traffic through their State waters - which includes the shared-US/Canada waters of the Juan de Fuca Strait. The data is provided in their *Vessel Entry and Transit (VEAT)* counts for Washington Waters. For Washington Department of Ecology's VEAT 2006, vessel traffic to southern Canadian ports amounted to 1,935 individual major cargo and passenger vessels and 3,997 entering transits by them (Note: trips back to sea are not counted). Tanker traffic is examined separately below.

Major vessel traffic can be expected to increase within the Strait of Georgia, Haro Strait and Juan de Fuca Strait. The total Port of Vancouver throughput is expected to grow 2.3% *per* year from throughput of 73.57 million metric tons in 2004 to 106.4 million metric tons of total goods transported by vessels by 2020 (Table 2 and Figure 3).[12]

Sector	2004 Volume in millions of tonnes	2020 Projected Volume in millions of tonnes	Annual Growth Rate
Containers	14.06 (1.66 million TEUs)	38.56 (4.6 million TEUs)	6.5%
Liquid Bulk	6.88	12.28	3.7%
Dry Bulk	49.32	51.42	0.3%
Break Bulk	3.30	4.18	1.5%
Total Cargo	**73.57**	**106.4**	**2.3%**
Cruise	929,976 revenue passengers	1,340,000 revenue passengers	2.3%

TEU is defined as a twenty-foot equivalent unit. TEU is the common measure of containerized cargo.

Table 2: Port of Vancouver Vessel Volume (metric tons) Throughput Increases: from 2004 to Projected 2020

[12] *Source:* *2005 PORTplan: land use plan for the Port of Vancouver,* Vancouver Port Authority

Detailed vessel traffic projections can also be found in the 2005 *British Columbia Ports Strategy* prepared by the Ministry of Small Business and Economic Development / Ministry of Transportation; the *2005 PORTplan: land use plan for the Port of Vancouver* prepared by the *Vancouver Port Authority* and the 2006 *Pacific Gateway Strategy Action Plan* prepared by government and industry.

Container Vessel and Bulk Carrier Terminal Expansion Projects:

Extensive vessel cargo terminal infrastructure expansions are underway and proposed for British Columbia. They are designed to cope with the large projected increase in Trans-Pacific Trade. These projects are part of a $13 billion federal and provincial government, shipping industry, port and railway *Asia-Pacific Gateway Project* to make intermodal container and bulk cargo management larger and more efficient. While increased traffic is projected across all cargo types handled at the Port of Vancouver, the largest increase will be the container vessel sector. [13]

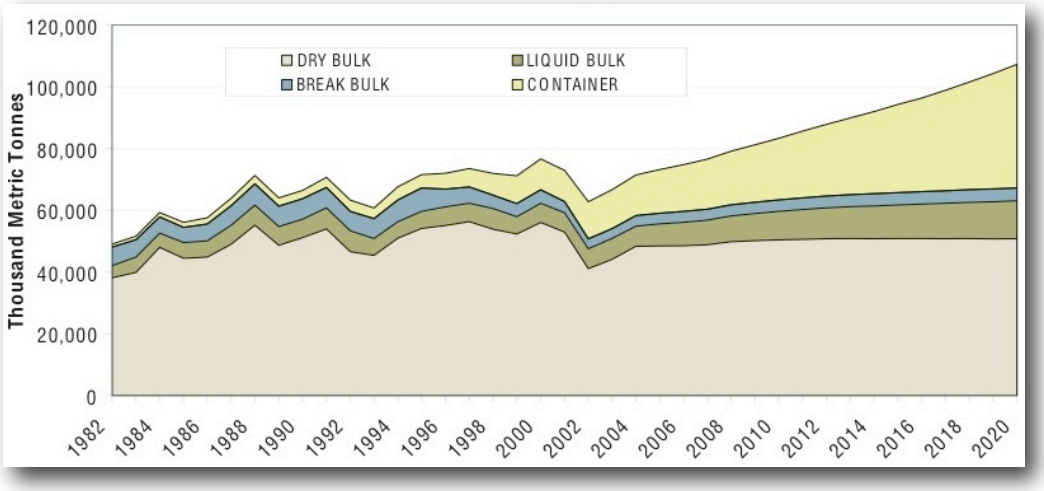


Figure 3: Port of Vancouver Vessel Volumes (metric tons) Throughput from 1993 to projected 2020

The following coastal industrial projects are examined under "Port Access Routes":

1. Vancouver Port Authority's Delta Container Terminal - Delta
2. Prince Rupert Port Authority's Container Terminal Expansion - Prince Rupert
3. Stewart Bulk Terminal's Ltd's Terminal Expansion - Stewart
4. Northern Development's General Cargo Terminal Proposal - Kitimat
5. Kinder Morgan Canada's Trans Mountain Pipeline System Expansion - Vancouver
6. EnCana/Methanex's Condensate Tanker Imports - Kitimat
7. Pembina Pipeline's Summit Lake Condensate Pipeline - Kitimat
8. Enbridge Corporation's Gateway Project - Kitimat
9. WestPac LNG Corporation's LNG Terminal & Re-gasification Plant - Texada Island
10. Kitimat*LNG's* LNG Terminal - Kitimat
11. Pacific Trail Pipelines Limited Partnership's LNG Pipeline Looping - Kitimat

[13] There are three container terminals in the Port of Vancouver: Centerm and Vanterm located in Burrard Inlet and Deltaport located at Roberts Bank

Project Description 1: *Vancouver Port Authority's* Delta Container Terminal Third Berth Project - Delta

The Vancouver Port Authority's *Deltaport Container Terminal Third Berth Project* is anticipated to increase their current 3.1 ship movements *per* day to 5.3 ship movements *per* day when both the new berth and a second terminal are in operation by 2021.[14] [15] The first phase of the project would expand the current capacity of 900,000 TEUs to a capacity of 3.2 million TEUs.

The size of the container vessels will also increase from current 1,600/6,300 TEUs to as large as 12,000 TEUs.[16]

The Port of Vancouver's container terminal expansions by 2020 will increase combined capacity from 2.0 million to 5.9 TEUs. This volume includes expansion to the Fraser Surrey Docks.

Deltaport Container Terminal Project

Prince Rupert Container Terminal

Project Description 2: *Prince Rupert Port Authority's* Container Terminal Expansion - Prince Rupert

Central and north coasts of British Columbia are also experiencing similar vessel traffic growth, with the Port of Prince Rupert shipment volumes surpassing 10 million metric tons in 2007 for the first time in a decade. The 2007 total volume cargo of 10.6 million metric tons is a 36.8% increase over 2006.[17]

Part of this growth is due to the recently completed (2007) Prince Rupert Container Terminal as well as an 80% increase in cargo through Ridley Terminals. It is the first dedicated intermodal (ship-to-rail) container terminal in North America, with the design capacity to move 500,000 TEUs *per* year.

A *Prince Rupert Port Authority's* initiative is to further expand its Terminal to quadruple the capacity of the facility to 2 million TEUs by 2012 to meet the demands of continued growth in Asia-Pacific traffic trade. This expansion could make it Canada's second largest container vessel terminal and capable of handling the largest container vessels in the world.

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[14] Source: *2006 Deltaport Third Berth Expansion Project: Comprehensive Study Report* prepared by Fisheries and Oceans Canada and Environment Canada. One of several reports in the Canadian Environmental Assessment Registry.

[15] The terminal 2 phase was withdrawn in February 2006 from the provincial environmental assessment process by the proponent due to need for greater stakeholder consultation. Source: February 2, 2006 correspondence from Vancouver Port Authority to the *BC Environmental Assessment Office*.

[16] TEU: Twenty-foot Equivalent Units- an international standard size description for intermodal containers

[17] Source: Prince Rupert Port Authority press release January 2008.

Project Description 3: *Stewart Bulk Terminal's Ltd's* Terminal Expansion- Stewart

The *Stewart Bulk Cargo and Container Project* in Stewart could increase vessel traffic in the Portland Inlet/Channel from 30 to 100 vessels *per* year.[18] Stewart Bulk Terminal is Canada's most northernly ice free deep-sea terminal.

Stewart Bulk Terminal

Project Description 4: Northern Development's General Cargo Terminal Proposal - Kitimat

Kitimat's Chamber of Commerce is seeking to establish a general (breakbulk) cargo vessel terminal. The importance of this initiative was recognized by the provincial government recently when it announced offering $200,000 towards a $774,000 study intended to look at the benefits and feasibility of establishing a break-bulk facility in Kitimat. In addition, the Northern Development Initiative also committed $200,000 to the study.[19] The main cargos would be wood and ore.

Current Oil Tanker Traffic and Volumes:

Additional to current and potential increase in major bulk cargo and container vessels, there is also a similar picture for tankers for the west coast.[20] In British Columbia, there are essentially three tanker sectors using Port Access routes:

1. Oil tankers as part of the Trans-Alaska Pipeline System (TAPS) that comprise of US flagged and owned oil tankers transporting crude oil from Valdez Alaska to refineries in Puget Sound *via* Juan de Fuca Strait;[21]

2. Canadian-chartered tankers from the Port of Vancouver (Burrard Inlet) exporting both crude and refined oil products, as well as tankers importing chemicals. Port access is *via* Strait of Georgia, Haro Strait and Juan de Fuca Strait [22] and,

3. Canadian-chartered tankers importing condensates to the Methanex Marine Terminal in Kitimat *via* Douglas Channel and Camano Sound.

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[18] Source: *Application for Project Approval Certificate for a Proposed Wharf at Stewart Bulk Terminals,Stewart B.C.*, A Report Prepared for the B.C. Environmental Assessment Office, Victoria, by Stewart Bulk Terminals Ltd (proponent),

[19] The Northern Development Initiative is a corporation dedicated to the stimulation and creation of economic growth and job creation

[20] "Tanker" refers to a self-propelled tank vessel engaged in the transport of bulk crude oil, refined petroleum products, or chemicals.

[21] In Juan de Fuca, there is a US /Canada traffic separation arrangement where by incoming major vessel arrive on the US side of the strait and leave on the Canadian side.

[22] Five terminals handle petroleum: Shellburn (Shell), Stanovan (Chevron), Westridge Marine Terminal (Kinder-Morgan), PetroCanada, Imperial Oil (IOCO) Terminal. Edible oils are handled at Neptune Bulk Terminals, Vancouver Wharves and West Coast Reduction. Three terminals handle petrochemical cargoes: Dow Chemical, Pacific Coast Terminals and CANEXUS Chemicals.

The US Alaska oil tanker (TAPS) trade has result in an oil tanker entering the Juan de Fuca Strait everyday since 1976. Those tankers entering Juan de Fuca Strait are less than 125,000 DWT.[23] [24]

About Trans-Alaska Pipeline System (TAPS) Oil Tankers

The TAPS tanker traffic commenced in 1977 with the loading of the ARCO Juneau on August 1. On March 24, 1989 their first and only major oil spill occurred when the *Exxon Valdez* ran aground on Bligh Reef in Prince William Sound. On July 10, 1989 a Ship Escort Response System was introduced. By 2001, 17,000 tankers had been loaded.

The Washington Department of Ecology's Spill Program tracks the number of tankers on the TAPS route and whether they are double-hulled or not. This initiative is part of the Pacific States/BC Oil Spill Task Force Prevention Project titled: *TAPS Trade Tankers Present and Future.* Of the 15 oil tankers on the route, only one is still single hulled: the *Seariver Long Beach* owned by *SeaRiver Maritime Inc.* It was built in 1987 - no conversion is planned, but expected to be retired from service by January 2010. This is the mandatory date for double hulls under the US Federal *Oil Pollution Act of 1990* (OPA '90). As of April 2008, the average age of the 15 tankers currently participating in the TAPS trade is 9.9 years.

Of particular note, the oil tanker built after 2000 for *Polar Tanker Inc.*,*Alaska Tanker Company* and *BP Oil Shipping Company* are not only double-hulled, but exceed international standards by having dual (segregated) engine and steering systems. See tanker descriptions below.

Alaska Frontier

BP Oil Tankers - Alaska Class vessels - are designed for maximum flexibility in the transport of crude oil from Valdez, Alaska, to oil refineries located on the US West Coast. 124,999 DWT with cargo capacity (98%) of: 1,300,000 bbls. They are all double-hulled with dual/ segregated engine and steering systems. Source: BP Tanker Fact Sheet: 2008 NASSCO/General Dynamics Corporation

Polar Adventure

Polar Tankers, Inc., a wholly owned subsidiary of ConocoPhillips operates Endeavour Class vessels that have double hulls, two independent engine rooms, redundant propulsion and twin steering systems, and a bow thruster. The Polar Adventure is 124,999 DWT. The entire fleet is employed in the Alaska crude trade.

On the west coast, the United States largely imports oil with US-flagged and owned vessels (TAPS tankers). There are internationally chartered ones as well. Canada's oil industry mostly exports oil with international-chartered oil tankers. The Washington Department of Ecology's VEAT 2006 recorded 62 individual tankers and 94 entering transits to southern Canadian Ports. This data represents all products being transported in bulk by tankers.

[23] 125,000 DWT is the maximum size of oil tanker allowed in State of Washington water pursuant to state regulation (rule)

[24] DWT = Dead -weight Ton: A vessel's cargo-carrying capacity measured in tons

The Port of Vancouver handles fuel oil and gasoline imports and exports through five terminals: Shellburn (Shell), Stanovan (Chevron), Westridge Marine Terminal (Kinder-Morgan), PetroCanada, and Imperial Oil (IOCO) Terminal. In 2006, these terminals shipped 1.7 million metric tons of gasoline and 1.4 million metric tons of fuel oil - mostly by barges to and from points on Vancouver Island and into the State of Washington.

The major oil handling terminal in British Columbia is the Kinder Morgan Canada's Westridge Marine Terminal in Burnaby (Burrard Inlet). The terminal off-loads crude to oil tankers, and imports refined oil products from barges.

Crude oil shipments through Westridge Marine Terminal have grown in the past three years - to 1.3 million metric tons in 2006 from 461,000 metric tons in 2004. Most of oil tanker shipments are to California and a few "spot-markets". Canadian crude oil shipments to China topped $150-million in the first seven months of 2007, opening up a potential market for Canadian crude. Statscan reported that increased trade was a result of China and Canada testing the "logistics of shipping Alberta oil through the Port of Vancouver." [25] Thirty-four crude oil tankers oil tankers were loaded in 2007, compared to last year's twenty-eight. This volume contributes to all the shipments of crude oil from the Port of Vancouver.

The current capacity for the Westridge Marine Terminal enables three or four tankers a month to be loaded, depending on their size. Maximum rated capacity of the terminal is for berthing a 100,000 DWT (Aframax size tanker) - but limited to smaller tankers by harbour and berth draft restrictions. The typical range of oil tanker chartered is within 65,000 DWT to 85,000 DWT. The tanker size also reflects harbour limitations in California. Tanker traffic could increase with current and planned pipeline expansions by Kinder-Morgan Canada.

Oil Tanker Compliance and Safety Screening by Kinder-Morgan Canada

The customer orders the tankers (e.g. Chevron, ESSO), but Kinder Morgan Canada who operates the Westridge Marine Terminal screens them for safety compliance and suitability (*pers. comm.* Reynold Hinger: Director of Shipping Services, Kinder-Morgan Canada). Both the individual oil tanker and the fleet owner/operator are screened for compliance to international and regional conventions and laws and for accident history.

If carrying crude oil, all out-going, loaded tankers are double-hulled and provided harbour and escort tug services. Pilots are onboard for all oil tankers transiting between Victoria and English Bay - Vancouver Harbour. All oil tankers entering Vancouver Harbour *via* First and Second Narrows are boarded by a contracted, experience tanker captain for entry inspections and transit and loading briefings. The Kinder-Morgan representative stays on-board during the transits and loading operations. (*per.comm*. Captain John Swann, Swann and Associates).

The Port of Vancouver's Harbour Manual provides detail requirements of oil tankers entering the harbour and first and second narrows.

[25] Source: Statistics Canada "Spotlight" Canada-China Trade, Nov 26, 2007

Oil Pipeline Projects:

Oil pipeline project proposals in British Columbia are primarily driven by Alberta's current and forecasted oil sands production (Figure 4). This crude oil requires a means of export to Asian-Pacific markets, as well as to import condensate petroleum back to Alberta.[26] Condensates are used thin (dilute) the thick oil sands to enable pipeline transport. Part of this global transport system includes oil tankers - more and bigger.

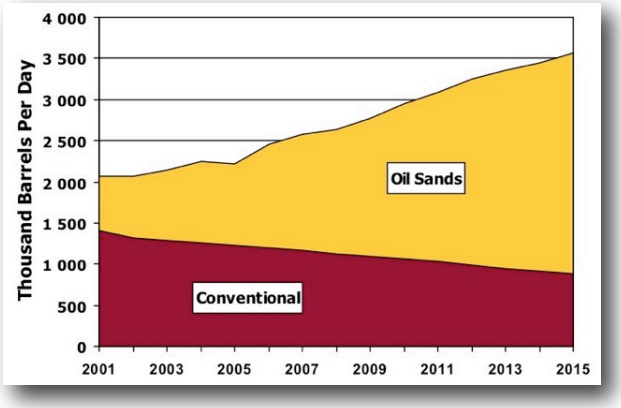

Figure 4: Current and Future Conventional *versus* Oil Sand Production for Western Canada

Source: May 2006. *Canadian Crude Oil Production and Supply Forecast 2006 - 2020.* Canadian Association of Petroleum Producers

Project Description 5: *Kinder Morgan Canada's* Trans Mountain Pipeline System Expansion - Vancouver

Kinder Morgan Canada has began work on several pipeline expansion projects to significantly increase its Trans-Mountain Pipeline system capacity (TMX 2008 overview brochure). The first project was the Trans Mountain Pump Station Expansion (TMPSE) that added 10 new pump stations along the existing pipeline to increase capacity by 30,000 barrels *per* day (bpd) for a total of 260,000 bpd. The Anchor Loop project is underway. It involves twinning (or looping) a 158-kilometer section of the existing pipeline between Hinton, Alberta and Jackman, British Columbia. The expansion also adds two new pump stations. Completion is expected by November, 2008. The Anchor Loop will increase pipeline capacity from 260,000 bpd to 300,000 bpd.

The TMX-2 Project is the second major expansion phase of Kinder Morgan Canada's pipeline expansion plan. The $1.3 billion TMX-2 project would add 100,000 bpd of incremental capacity to its pipeline system; bring total capacity to 380,000 bpd by 2012 or later.[27] The last phase - TMX-3 Project - would bring capacity up to 700,000 bpd (unspecified completion date).

Kinder-Morgan Canada is also considering a Northern Option Project that entails a new 400,000 bpd pipeline from Rearguard *via* Prince George to Kitimat. This project could compete with Enbridge Gateway Project (see below). The project is subject to having a steady and viable Asian market. This project enables Kinder-Morgan the option to use VLCC oil tankers that can carry over 2 million barrels of product. (*pers. com.* Norm Rinne, Kinder-Morgan Marine Services)

As Kinder-Morgan Canada completes its projects there could be significantly more tankers exporting oil. The *Westridge Marine Terminal* would be dredged to allow 100,000 DWT Aframax-sized tankers to be used - they carry approximately 800,000 barrels of oil. The terminal can be expanded with a second terminal to enable up to 300,000 bpd throughput. A portion of oil received at their facility will be exported by a spur-pipeline to BP America's Cherry Point Refinery in Puget Sound in the United States.

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[26] May 2006. *Canadian Crude Oil Production and Supply Forecast 2006 - 2020.* Canadian Association of Petroleum Producters (CAPP)

[27] Kinder Morgan Canada initiated its public consultation process in the summer of 2006, has halted its consultation and regulatory activities for the project until Kinder Morgan Canada and its shippers have reached a commercial agreement to pursue this expansion phase of TMX

Project Description 6: EnCana/Methanex's Condensate Tanker Imports - Kitimat

In the central-coast, there are also tankers using Port Access routes. As of April 2006 to April 2008, *EnCana Corporation* has imported 666,701 MT (6,818,601 barrels) of "Peruvian" condensate to the *Methanex Corporation's* marine terminal in Kitimat in double-hull oil tankers.[28] The condensate is then transported by *Canadian National Railway* to Alberta.[29] The tanker traffic is currently between 7 to 9 loaded in-bound 35,000 DWT condensate tankers each year. This traffic volume is lower than the expected 32 vessels *per* year due to the lack of interim storage tank capacity at the terminal . In 2004 and 2005, there were 113 and 98 visits (respectively) of chemical tankers, general cargo, bulk carriers to Methanex, Eurocan and Alcan terminals in Kitimat.[30] (See Text Box on Port Access to Kitimat)

Project Description 7: *Pembina Pipeline Corp.'s* Summit Lake Condensate Pipeline - Kitimat

Kitimat has a large potential for tankers to import much more condensate pending two pipeline projects proposed by *Pembina Pipeline Corporation* and by *Enbridge Corporation*. These pipelines could replace the current transport of condensate by railcar and could increase overall volume of condensate imported by tankers.

The *Pembina Pipeline Corporation's Prince George (Summit Lake) to Kitimat Condensate Pipeline Project* is a proposal for a new 465 kilometer condensate pipeline (40 cm /16") between Prince George and Kitimat. The project utilizes existing Pembina facilities from Prince George to Edmonton to move product to service the Alberta's oil sands projects. Pipeline capacity would be 100,000 bpd. All of this product would be imported by tanker. The project is currently on-hold, at the "pre-application" stage with the *BC Environmental Assessment Office*.

Project Description 8: *Enbridge Corporation's* Gateway Project - Kitimat

By far the largest pipeline proposal that, if approved, would result in significant oil tanker movement in the central coast is the *Enbridge Corporation's* Enbridge Gateway Project.[31] This is a $4 billion dollar, 1,150 kilometer pipeline to transport crude oil across the province from Strathcona County (NE of Edmonton) to Kitimat for export by oil tankers to Asian (China) and US southern markets (California). Pipeline design capacity is for 400,000 bpd of heavy oil by a 0.7 meter (30 inch) pipeline. The project also includes a smaller 0.50 meter (20 inch) pipeline to carry imported condensate (diluent). The condensate pipeline design capacity is 150,000 bpd. Anticipated completion date is between 2012 and 2014.

Oil tanker traffic would be 6 to 7 out-bound oil tankers each month of Very Large Crude Carriers (VLCC) of up to 320,000 DWT and 4 to 6 in-bound condensate tankers each month using Suezmax tanker vessels up to 160,000 DWT.[32]

To initiate the federal environmental assessment process, *Kinder-Morgan Canada* filed a *Preliminary Information Package* to both the *National Energy Board* and the *Canadian Environmental Assessment Agency* in October 2005. The project was on hold until First Nations

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[28] Methanex's methanol production plant closed in 2005 due to high natural gas costs. The company shipped products since 1982, where in 1996 peak ship movements was 96 *per* year. The maximum size of vessel berthing at the terminal is 50,000 DWT, with future up-grade to handle 75,000 DWT vessels.

[29] Condensate is a by-product of natural gas production and is used as a diluent added to oil sands bitumen to assist in pipeline transportation. It is a non-persistent petroleum product that rapidly evaporates if spilled.

[30] Source: 2006. *METHANEX CORPORATION TERMINAL KITIMAT MARINE TERMINAL MODIFICATIONS, TERMPOL No. 3.2 Origin, Destination & Marine Traffic Volume Survey*, Prepared by Moffatt & Nichol Consultants, Vancouver, BC

[31] The report titled: Timothy Van Hinte, 2005. *Managing Impacts of Major Projects: An Analysis of the Enbridge Gateway Proposal*. Rept 374, Simon Fraser University provides a comprehensive analysis of this project.

[32] Source; Gateway Newsletter February 28th, 2006.

consultations are complete and more certain export contracts with China are established, but resumed in June 18, 2008 under the National Energy Board.

Port Access Approaches to Kitimat

There are essentially two port access approaches for major vessels arriving to or from Kitimat - a northern and a southern. The open-waters of Hecate Strait and the sound are hazardous areas for all types of vessels. For example, Camano Sound is subject to severe currents, winds, seas and swells during and after winter cyclonic storms. Often the sound can only be navigable during fair-weather summertime conditions. A TERMPOL study of current vessel traffic volumes and patterns to assess tanker routing to Kitimat stated:(1)

The north coast of BC is a well established commercial and recreational marine network of coastal and inland waterways. However, tankers transiting to and from Methanex's Kitimat Terminal will encounter locations where close-quarter situations with other marine traffic may occur, including pilot boarding stations, narrow channels, channel bends, and areas where marine traffic crosses. In addition to marine vessel traffic, visiting tankers need to be aware of other regional activities that may present navigational hazards including military operations, exploratory work, seaplane activities, commercial fisheries, and environmentally and socio-economically sensitive shoreline features.(2)

1) "TERMPOL Review Process (TRP)" refers to the *Technical Review Process of Marine Terminal Systems and Transshipment Sites*" and focuses on a dedicated design ship's selected route in waters under Canadian jurisdiction to its berth at a proposed marine terminal or transshipment site and, specifically, to the process of cargo handling between vessels, or off-loading from ship to shore

2) Source:2006. METHANEX CORPORATION TERMINAL KITIMAT MARINE TERMINAL MODIFICATIONS, TERMPOL No. 3.2 Origin, Destination & Marine Traffic Volume Survey. Prepared by Moffatt and Nichol Consultants, Vancouver, B.C.

Liquid Natural Gas (LNG) Projects:

British Columbia may soon experience a new type of tanker in its coastal waters - liquefied natural gas (LNG). LNG terminal proposals are rapidly occurring along the Pacific West Coast. Thirteen LNG terminal projects are tracked by the California Energy Commission, two of which are proposed in British Columbia.

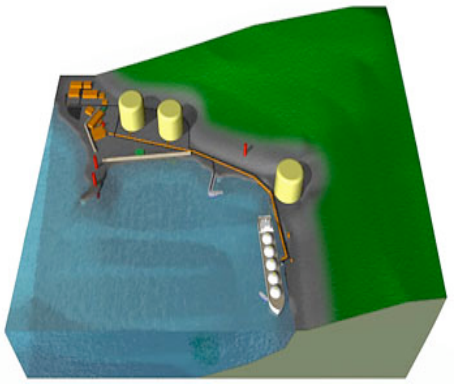
LNG Tanker

Project Description 9: *WestPac LNG Corporation's,* LNG Terminal & Re-gasification Plant - Texada Island

WestPac Terminal Inc. of Calgary initially proposed to build and operate a liquefied natural gas (LNG) receiving terminal on Ridley Island near Prince Rupert, but moved its project to Kiddie Point near the northern tip of Texada Island. *WestPac LNG Corporation's,* $200 million Texada LNG Terminal project would comprise LNG storage tanks, dock facilities and related re-gasification and trans-shipment facilities. Offshore, there will be two full-containment LNG storage tanks, each with a gross volume of 165,000m3 capacity. About thirty-six LNG carriers a year would arrive at its facility, or one about every ten days. WestPac plans to put off filing its project description until the company has a better sense of new greenhouse gas regulations that may come into effect. When ready, WestPac would then file a Project Description with the BC Environmental Assessment Office and the Canadian Environmental Assessment Agency to formally begin the regulatory review and environmental assessment process.

Project Description 10: *KitimatLNG's* LNG Terminal - Kitimat

KitimatLNG Inc. has been given *BC Environmental Assessment Certificate for Construction and Operations* of a liquefied natural gas (LNG) import terminal at Bish Cove about 14 kilometers from Kitimat (June 6, 2006). KitmatLNG is a subsidiary of Galveston LNG Inc.



Kitimat LNG Terminal Proposal

The product would be imported by LNG tankers to a terminal then transported by a 18 km pipeline to Pacific Northern Gas pipeline. Expected shipments are a loaded in-bound LNG tanker every 4 to 5 days (70-90 vessels/ yr). These LNG tankers will range in capacity from 160,000 m^3 (current size) to 250,000 m^3 (ultimately). Anticipated operation date is November 2008.

Project Description 11: *Pacific Trail Pipelines Limited Partnership's* Kitimat to Summit Lake LNG Pipeline Looping - Kitimat

The proposed Kitimat to Summit Lake LNG Pipeline Looping Project would significantly increase the capacity to transport LNG overland from the Kitimat LNG Terminal to the Duke Energy pipeline system at Summit Lake.[33] The proposed 470 kilometers pipeline loop will increase the capacity of the system from 610 million to 1 billion cubic feet *per* day. As such, this project would further increase LNG tanker traffic through Douglas Channel. The project is under review by the *BC Environmental Assessment Office*.

[33] The project proponent is the *Pacific Trail Pipelines Limited Partnership* - a partnership with *Pacific Northern Gas Ltd*. and *Kitimat LNG*

Projected Vessel Traffic Summary

The following table provides a coarse (snap-shot) picture of increased vessel traffic pending west coast industrial project approvals and final operations (Table 3). Almost all the terminals in the Port of Vancouver are undertaking some form of expansion. Some projects may compete with each other - especially the southern and central oil (crude and condensate) pipelines. Some may never come to fruition.

Table 3: Summary of Projected Major Vessel Traffic Volumes based on West Coast Industrial Projects

Project	Vessel	Current Size	Current Traffic Volume	Potential Traffic Volume	Comments
Delta Port Container Terminal Expansion	Container	Current: range of 1,600 to 6,300 TEU	3.1 vessels/ day (1,131 vessels/year)	5.3 vessels/day (1,934 vessels/ year)	Container vessels will also increase in size - up to 12,000 TEU
Prince Rupert Container Terminal Expansion	Container	Up to a 5,020 TEU capacity vessel	167,000 TEU total volume for 2007	Up to 5 million TEU annually by 2020	Container vessels will increase up to 12,000 TEU or greater
Stewart Bulk Cargo and Container Terminal Project	Bulk	variable	30 vessels/ year of mostly bulk & some bagged ore	100 vessels/year of both bulk & container	
Kitimat General (Breakbulk) Terminal	General Cargo	unknown	unknown	unknown	Proposal in feasibility stage
Kitimat LNG Terminal Project	LNG Tanker	n/a	n/a	70 to 90 LNG tankers /year	Size range from 160,000 to eventually 260,000 cubic meters LNG tankers
Kitimat to Summit Lake LNG Pipeline Looping Project	LNG Tanker	n/a	n/a	Increase LNG tanker traffic	The pipeline project would significantly increase the capacity to overland transport LNG from the Kitimat LNG Terminal.
Texada LNG Terminal Project	LNG Tanker	n/a	n/a	36 LNG tankers / year	
Kinder Morgan Canada pipeline projects and marine terminal expansion in Vancouver.	Oil Tanker	65,000 to 85,000 DWT range	34 out-bound tankers for 2007	Up to one loaded tanker per day.	Tanker size will increase to 100,000 DWT. Tanker traffic based on all projects completed to maximum oil volume of 700,000 bpd. An assumption is all product is exported by tanker, whereas some may be exported by pipeline to US.

Project	Vessel	Current Size	Current Traffic Volume	Potential Traffic Volume	Comments
EnCana / Methanex condensate import	Oil Tanker	35,000 DWT	7 to 9 in-bound tankers/year	32 in-bound tankers/year	Condensate is currently transported overland by rail car (30 to 40 cars/day). Imports are limited by a shortage of temporary storage capacity at the terminal, which is in progress of being increased.
Pembina Pipeline Corporation's Prince George (Summit Lake) to Kitimat Condensate Pipeline Project	Oil Tanker	n/a	n/a	One inbound tanker every ten days assuming an Aframax size	Pipeline design capacity is 100,000 barrels per day. Could replace current condensates imports by EnCana being moved overland by railcar.
Enbridge Corporation's Gateway Project - condensate import pipeline	Oil Tanker	n/a	n/a	4 to 6 in-bound tankers/month of Aframax size	Pipeline design capacity is 150,000 bpd. May compete with condensates imports by Pembina's PG to Summit Lake to Kitimat Pipeline
Enbridge Corporation's Gateway Project - crude oil export pipeline	Oil Tanker	n/a	n/a	6 to 7 out-bound VLCC size (320,000 DWT) tankers/month	Pipeline design capacity is 400,000 bpd of crude oil.

1.1.3. Inside Passage Vessel Routes

Georgia Strait (north), Johnstone Strait and Hecate Strait and the many smaller mainland passages represent the "Inside Passage" route used primarily by cruise ships, tugs, and fishing vessels for either scenic travel, sheltered passage, or both. There is almost constant vessel traffic in the Inside Passage. Between 1,200 and 1,500 vessels each month use all or part of the passage in summer, compared to between 800 and 1,000 vessels each month in winter.[34] The Inside Passage route is a well established commercial and recreational marine network of coastal and inland waterways.

The route has challenging waters for major vessels to navigate due to currents and confined passages. There are numerous locations with close-quarter situations with other marine traffic. These risky areas include pilot boarding stations, in narrow channels, along channel bends, and where marine traffic crosses.

There are three classes of marine traffic that use the Inside Passage:

- *Piloted / MCTS Reporting Traffic* - Foreign registered ships over 350 gross registered tons (GRT) and Canadian registered ships over 10,000 GRT, are required to carry a local marine pilot and to comply with the CCG's Marine Communication and Traffic Services (MCTS) reporting requirements.
- *Non-Piloted Reporting Traffic* – Foreign registered and Canadian registered ships that are not required to carry a pilot, but are in excess of certain size restrictions for their type are also required to comply with MCTS reporting requirements.
- *Non-Reporting Traffic* – Vessels under specific size restrictions are not required to make any reports to VTS. These include: crafts under 30 m in length; tug and tow, where combined length is less than 45 m, or where the object towed or pushed is less than 20 m; fishing vessels in transit that are under 24 m in length and less than 150 GRT; and, fishing vessels when engaged in fishing activities (Source: Methanex TERMPOL No. 3.2. rpt).

Figure 5 shows average annual vessel traffic in the Inside Passage at Wright Sound for 5,522 vessel transits. [34]

Large Alaska-bound cruise ships frequent the Inside Passage on a seasonal basis - mainly summer months. Tug and barge traffic moves goods to Alaska, oil to coastal communities, and logs to BC mills. Tug and barge traffic is very extensive in the Inside Passage as it offers sheltered waters most of the way. The most common small vessels are commercial fishing boats.

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[34] 2006. METHANEX CORPORATION TERMINAL KITIMAT MARINE TERMINAL MODIFICATIONS, TERMPOL No. 3.2 Origin, Destination & Marine Traffic Volume Survey. Prepared by Moffatt and Nichol Consultants, Vancouver, B.C.

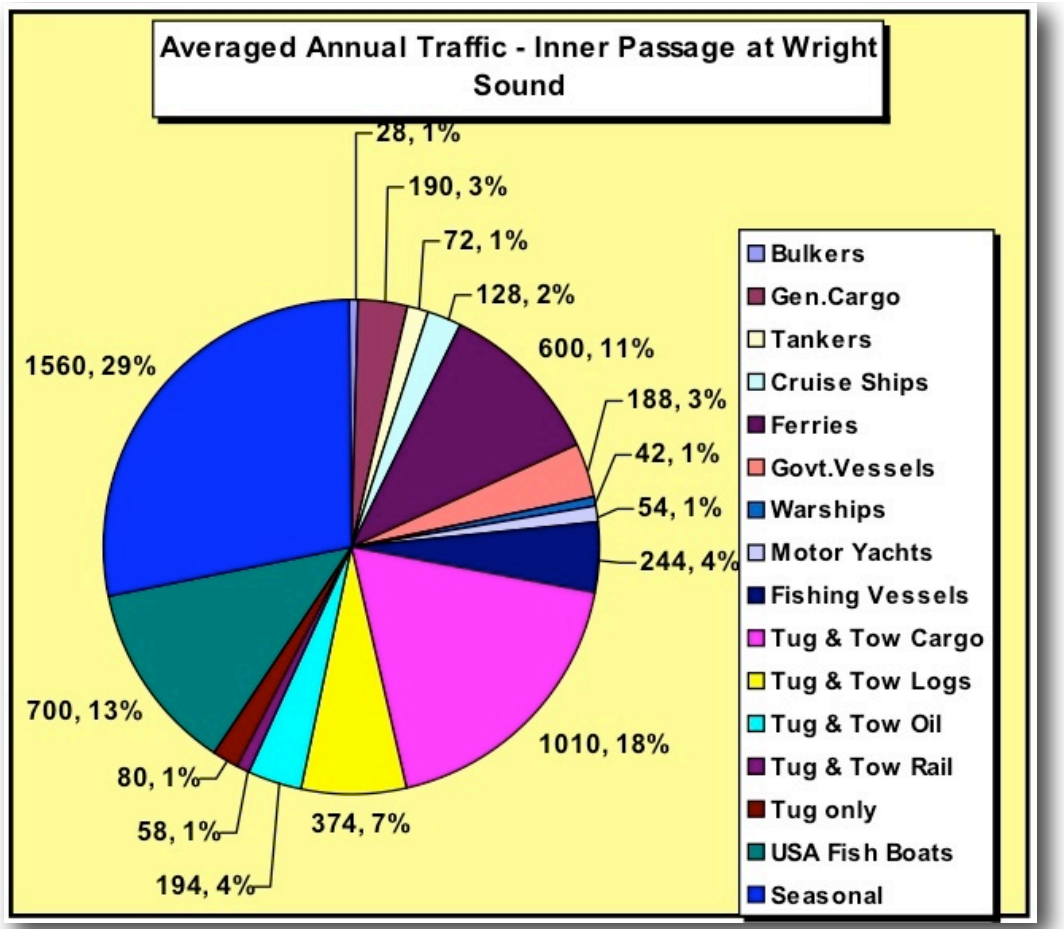

Figure 5: Average Annual Vessel Traffic in the Inside Passage at Wright Sound (5,522 vessels)

Annually from May to September, more than 960,000 million passengers on some 275 sailings, pass through the Port of Vancouver's two cruise terminals, Canada Place and Ballantyne.[35] This traffic volume is up by 9% from 2006. The majority of these cruise ships (128) travel the inside passage (see Figure 5).

The medium to large Alaska cruise ship (50,000 to 90,000 gross tonnage GT) companies are: Royal Caribbean, Celebrity Cruises, Regent Seven Seas Cruises, Carnival, Princess Cruises, Holland America Line, and Norwegian Cruise Line. (Figure 6)

[35] Source: *Vancouver Port Authority: Statistics Overview 2007.*

Figure 6: Typical Alaska Cruise Ships

	*Celebrity Infinity* Celebrity Cruises	Occupancy: 2046 GT: 91,000
	*Radiance of the Seas* Royal Caribbean International	Occupancy: 2,501 GT: 90,090
	*Seven Seas Mariner* Regent Seven Seas Cruises	Occupancy: 700 GT: 50,000
	*Carnival Spirit* Carnival	Occupancy: 2,124 GT: 88,500
	*Caribbean Princes* Princess Cruises.	Occupancy: 3,100
	*Amsterdam* Holland American Line	Occupancy: 1,380 GT: 61,000
	*Norwegian Pearl* Norwegian Cruise Lines	Occupancy: 2,394 GT: 93,530

As for tug and barge traffic, there are two sectors: *Alaska Transit*, and *Domestic Services*. Alaska transit are barges that supply goods to the State of Alaska. Domestic services are those Canadian tug and barge companies that provide most oil transport services to British Columbia's coastal communities and industries (Figure 7).

Alaska Marine Lines (AML) is an example of a US company that under takes scheduled towing of goods between the States of Alaska and Washington *via* the Inside Passage (Table 4).[36]

AML Barge loaded in Seattle - destined for Alaska

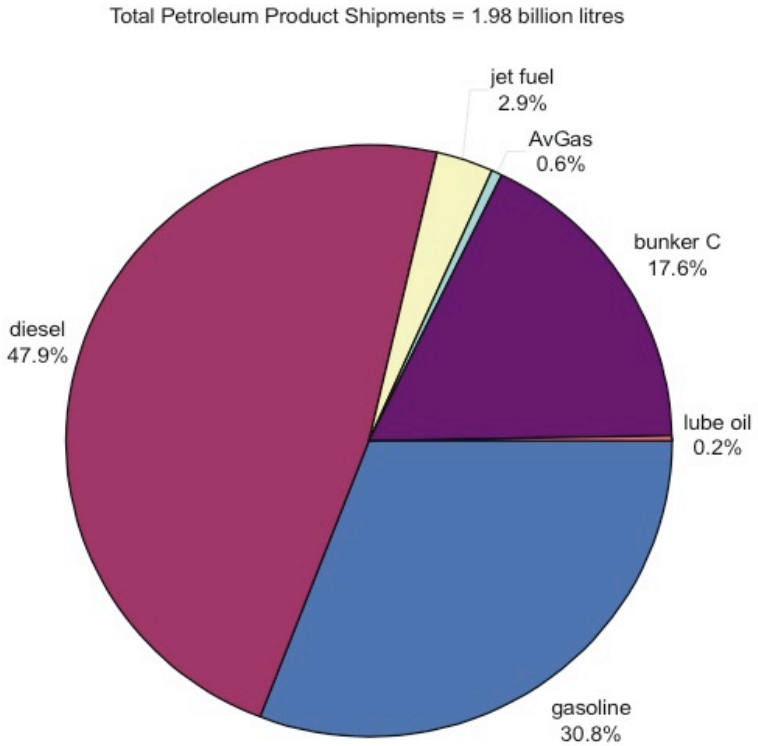

Figure 7: Marine Transport of Petroleum Products in BC primarily by Tug and Barge.

[36] Alaska Marine Lines (AML) is a marine transportation company and has offices throughout Alaska as well as in Seattle.

Table 4 shows the other US tug and barge companies that transport a wide-variety of goods to Alaska.

Company	Trips	Frequency*	Cargo
Sirius Maritime Company (Seattle, WA)	Seattle↔Alaska	1 trip/season	Oil Products
Crowley Maritime Corp. (Seattle, WA)	Seattle↔Alaska	4 to 8 trips/ month	General Cargo, Petroleum Products
Foss Maritime Company (Seattle, WA)	Seattle↔Alaska Prince Rupert ↔Alaska	2 trips/month & 3 trips/month	General Cargo
Alaska Marine Lines Inc (Seattle, WA)	Seattle↔Alaska	8 to 12 trips/ month	All Types of Cargo
Brusco Tug and Barge Inc (Longview, WA)	Seattle↔Alaska	1 to 4 trips/ month	Bulk and Log Cargo
Northland Services (Seattle, WA)	Seattle↔Alaska	8 to 16 trips/ month	All Types of Cargo
Sause Bros (Coos Bay, OR)	Seattle↔Oregon	No planned trips in 2006. Did a total of 5 trips in 2005	Oil Products

* Lower trip number represent winter travel.
* Source: *2006. METHANEX CORPORATION TERMINAL KITIMAT MARINE TERMINAL MODIFICATIONS, TERMPOL No. 3.2 Origin, Destination & Marine Traffic Volume Survey.* Prepared by Moffatt and Nichol Consultants, Vancouver, B.C.

Table 4: US-flagged Tug and Barge Companies that Use the Inside Passage.

Canadian domestic tug and tow companies include Union Tug & Barge, West Coast Tug and Barge, Island Tug & Barge. and SMIT Marine Canada.[37] Seaspan International - a member of the Washington Marine Group - is the largest coastal barge services for British Columbia. There are over one hundred towing business in the BC's Marine Sector, but most are small.[38]

Island Tug & Barge is the largest supplier of oil transport in British Columbia with a fleet of vessels including nine tugboats and fourteen barges with more in construction. Island Tug and Barge dominates the waterborne barge shipment of petroleum products in BC with a 75% market share by volume. The remaining 25% is extensively from similar operators who have a fleet of certified oil barges; such as North Arm Transportation, Inlet Navigation, Wainwright Marine Services, Marine Petrobulk, ICS Petroleum, and Seaspan International.[39]

[37] In 2000, SMIT International acquired Rivtow Marine Ltd., the second-ranked tugboat company in British Columbia. The acquisition included Tiger Tugz Inc., Rivtow's wholly owned subsidiary, and Rivtow's interest in Westminster Tug Boats Inc

[38] Source: Fisheries and Oceans Canada: Oceans Industries" Statistical Services (Marine Towing)

[39] 2002, *Report: Risk Assessment Study of Oil Transportation on the BC Coast.* Prepared for: Transport Canada Ottawa, Prepared by: Robert Allan Ltd. Naval Architects and Marine Engineers Vancouver, BC

Island Tug & Barge plans to have a full fleet of double-hulled barges by 2010, in advance of regulation.[40][41] It services most of the Inside Passage communities and industries on a regular schedule of deliveries.

A small marine sector is domestic intermodal that moves freight products, consumer goods and regulated commodities in trucks and trailers. In British Columbia, this is largely provided by Seaspan Coastal Intermodal which services Vancouver Island. It has regularly scheduled sailings between its Tilbury Terminal(Delta) and Nanaimo Terminal (Nanaimo) and Swartz Bay Terminal (Sidney). The company uses both RO-RO barges and vessels.

Seaspan Coastal Intermodal - RO-RO vessel above and barge below.

Brief History of Coastal Tankers in British Columbia's Inside Passage - leading to Current Tug and Oil Barge Traffic

The tanker traffic began 97 years ago when a cargo of crude oil was delivered to the ill-fated B.C. Oil Refinery in Port Moody. The plant experienced a number of problems which led to its closure in 1913. The second phase in tanker traffic began when the Imperial Oil Co. began to import oil from San Pedro, California in their own fleet of coastal tankers from 1915 to 1953. In 1947, Imperial Oil Co. discovered oil in Leduc, Alberta, resulting in the construction of a Ioco Refinery, which opened in 1953, after completion of the Trans Mountain Pipeline. From that date on, there was no need to import American crude oil into Canada.

From 1917 to 1995, Imperial Oil operated nine tankers dedicated to hauling refined products like kerosene, heating oil, lubricants and eventually motor gasolines, diesel fuel and aviation jet fuels up and down the west coast - mainly by the Inside Passage. The first tanker to carry kerosene and lubricants to Vancouver Island and as far north as Prince Rupert was the "Imperial". Over the following years, a series of Imperial coastal tankers were built, the last one in 1970 being the Imperial Skeena (See picture)"

Oil tanker spotting along BC's Inside Passage ended in 1995 with the last sailing of the Imperial Skeena from the Ioco Refinery. Coastal oil tanker traffic traveling north and south within British Columbia's inside waters have extensively being replaced by BC tug and oil barge companies.

Source: Extracted from the Fall, 2005 (Vol. 8 No 3) edition of the Focus newsletter by Al Sholund, Freedom of the City recipient and local historian Oil Tankers in Burrard Inlet. Port Moody Historical archives.

[40] Island Tug and Barge Ltd. of Vancouver, BC is the first Canadian tug and barge company to be awarded the Exceptional Compliance Program Award (ECOPRO) from Washington State Department of Ecology for excellence in marine safety and environmental stewardship.

[41] Canada's phasing out single-hulled oil barges is mandated under the *Canada Shipping Act* and requirements stipulated in the Oil Barge Standard. Part VII Double Hull Requirements: sets the time frame for all oil barges of less than or equal to 5,000 GRT to be of double hull design as of January 1, 2015. Barges over 5,000 GRT must comply with the time frame for oil tankers as *per* Canada's: Oil Tanker Double Hull Construction Standards. by 2010.

1.1.4. Great Circle Vessel Route

The outer west coasts of Vancouver Island and the Queen Charlotte Islands represents the "Great Circle Route."

This ocean route is the shortest distance for major vessels to travel to the Asian Pacific Rim Countries (Japan, Korea, China, Russia). It is a route shared by both Canadian vessels, as well as international vessels from the United States and from countries using the Panama Canal.

Figure 8: The Great Circle Shipping Route

Typical vessels are container vessels, oil tankers, bulk carrier, RO-RO, and general cargo vessels.

In 2002, the *Pacific States/BC Oil Spill Task Force* undertook a study of the vessel traffic patterns of this route from California to Alaska.[42] The study was titled: *West Coast Offshore Vessel Traffic Risk Management Project* (WCOVTRM). It was initiated in response to concerns that both tank and non-tank vessels transiting the Pacific Coast could pose a risk to sensitive coastal resources from oil or hazardous cargo spills caused by collisions or drift groundings. The study noted:

> *There are no significant sections of shoreline of the West Coast which do not involve sensitive bird, plant, estuarine, or mammal habitat, or beaches and towns dependent upon tourism, or port entry areas economically sensitive to the need to keep maritime traffic moving.*

For British Columbia, the study also noted:

> *Within the West Coast Vessel Traffic Risk Study Area, the primary British Columbia shorelines of high environmental sensitivity to oiling due to potential for long-term oil retention are the protected bays, sounds and archipelagos along the outer coast. There are species along the entire coast which are designated as threatened or endangered by Canadian authorities. Two national parks include: the Pacific Rim National Park (Broken Islands/Long Beach, West Coast Trail and the Gwaii Haana) and an International Biosphere, as well as numerous provincial parks (Brooks Peninsula, Cape Scott, Nuchatlitz.) Tourism (beach recreation, camping, kayaking, hiking) and eco-tourism (e.g., marine mammal watching) are major economic opportunities along the West Coast for coastal communities.*

The study collected data on vessels transiting the Pacific North American coastline from San Diego, California to Cook Inlet, Alaska for a one year period - July 1, 1998 to June 30, 1999. This

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[42] The *Pacific States/British Columbia Oil Spill Task Force* was authorized by a *Memorandum of Cooperation* signed in 1989 by the Governors of Alaska, Washington, Oregon, and California and the Premier of British Columbia following the *Nestucca* and *Exxon Valdez* oil spills. These events highlighted their common concerns regarding oil spill risks and the need for cooperation across shared borders. In June 2001, a revised Memorandum of Cooperation was adopted to include the State of Hawaii and expand focus to spill preparedness and prevention needs of the 21st century.

provided a "snapshot in time" to estimate volume of coastal traffic. To avoid duplication, the focus was only on arrivals in each port and to each vessel's last port of call.[43]

The study estimated over 19,000 vessel transits from Alaska to California during the year. The majority of vessels are large commercial vessels such as container ships and bulk carriers. Eighty-nine percent were arrivals at the major ports of Prince William Sound, the Juan de Fuca region, the Columbia River, San Francisco Bay, and Los Angeles/Long Beach. Approximately 31% of these vessel arrivals were Trans-Pacific from Hawaii, Asia, Oceania, Europe, or the Middle East utilizing the Great Circle Route.

After deducting unknown "last port of call" vessels, 12,646 vessel arrivals in Pacific west coast ports were considered coastwise transits. The fishing vessels often travel as close as 3 nautical miles (nm) offshore. Container, bulk carriers, general cargo vessels may be anywhere in between these distances. Navigation of these vessels is based on the captain's discretion. Oil tankers voluntarily travel 50 or more nautical miles offshore in the United States, and further in Canada due to its Tanker Exclusion Zone. (Source: WCOVTRM Final Rpt.

For British Columbia, "coast transits, where a vessel is going to a Canadian Port or just passing by ranges from 2,000 to 4,000 vessels each year. The break-down of Last Port of Call is shown in the chart for "arrivals" (Source: WCOVTRM: Appendix D).

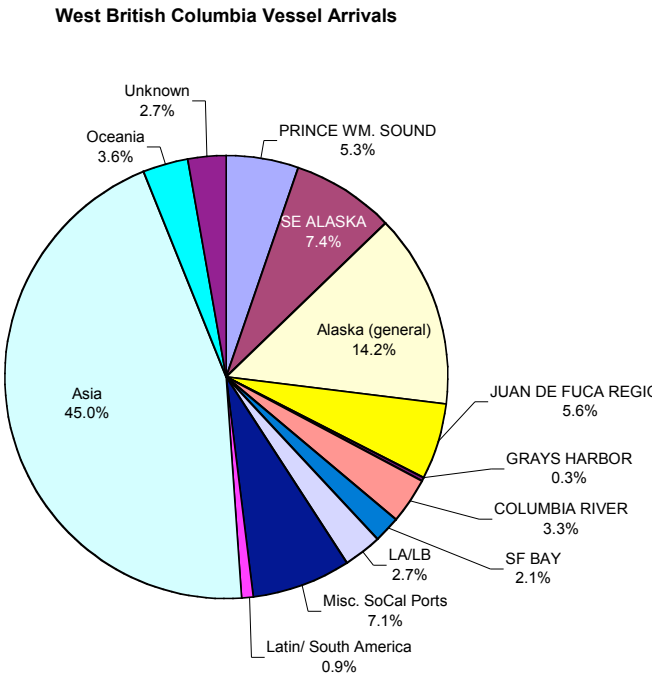


Figure 9: Vessel Arrivals to British Columbia

One other characteristic of Canada's outer west coast is its Tanker Exclusion Zone (TEZ). The Notices to Shipping (NOTSHIP) issued for the west coast of Canada (Vessel Traffic Services Part 3) states:

> *In order to reduce the likelihood of grounding on the BC Coast, in the event of propulsion or steering gear breakdown, loaded tankers operating from Valdez Alaska to U. S. West Coast ports should refrain from operating in the Tanker Exclusion Zone.The Tanker Exclusion Zone is defined as follows: A Line From 54 00N 136 17W to 51 05N 132 30W to 48 32N 126 30W to 48 32N 125 09W*

The purpose of the TEZ is to protect the environment in the event of a tanker becoming disabled while in transit and beginning to drift towards shore.

[43] In some cases. this information was not available without extensive research. In other cases, the data had not been recorded. The final numbers include 964 arrivals for which no "Last Port of Call "(LPOC) data could be determined, representing 5% of the total.

The following factors were considered when defining the zone boundary:

- The requirement to reduce as much as is reasonably practical the possibility of a disabled tanker grounding on the B.C. Coast.
- Concern for the safety of fishing activity off the west coast of Vancouver Island; in particular, reducing the risk of collision with tankers.
- The expressed desire by the *American Institute of Merchant Shipping* to keep the boundary as close to the shoreline as reasonably possible for economic reasons.
- The position at time of breakdown of the simulated tankers which were predicted to run aground before the arrival of a rescue tug.

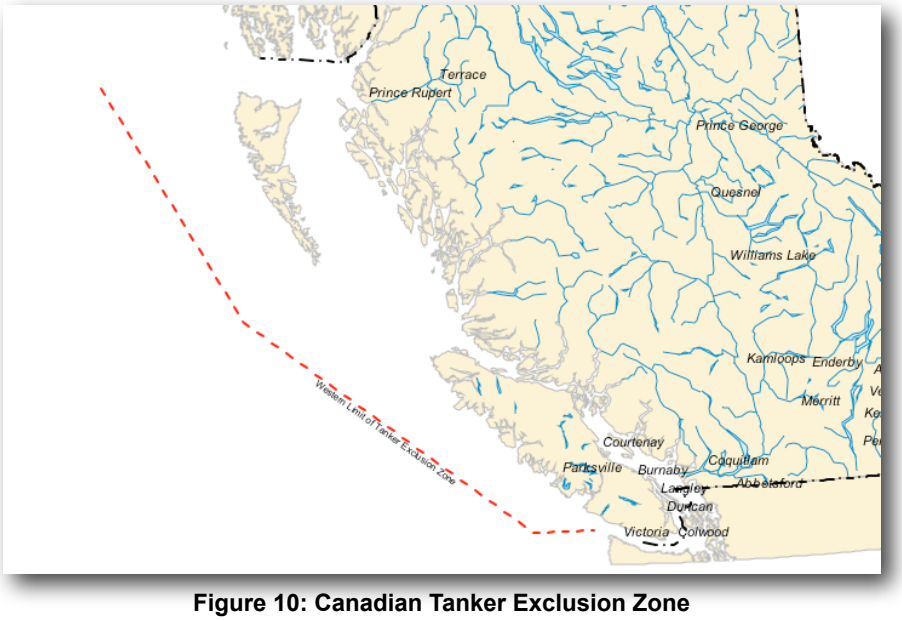


Figure 10: Canadian Tanker Exclusion Zone

The TEZ is specifically targeted at Alaska (TAPS) crude oil tankers. Other tankers are requested to abide by this routing. (2008 Annual Notice to Mariners: Part 10: Routing of Ships, Section 2.5 Tanker Exclusion Zone - Pacific Coast). No International Maritime Organization (IMO) approval was requested for the TEZ, since it is voluntary.

The Canadian Coast Guard at Tofino asks the TAPS tankers to leave their Automatic Information System (AIS) activated to track them beyond the traffic separation scheme in/out of the Straits. There is no CCG radar in the Prince Rupert area, so tankers are tracked by VHF radio from the north end of Vancouver Island. Laden tankers are requested to radio in at both the northern and southern boundaries. In addition, the CCG's pollution surveillance flights can spot tankers which are not in compliance. Laden tankers found landward of the zone are questioned by the Canadian Coast Guard regarding their intent.[44] Oil barges and other non-oil carrying tankers such LNG or chemical ones do not need to abide by the TEZ.

[44] Source: Interim Report to the States/British Columbia Oil Spill Task Force Members Regarding the West Coast Offshore Vessel Risk Management Project July, 1999

History of Establishing the Tanker Exclusion Zone

In the 1970s, the Trans Alaska Pipeline System (TAPS) was completed from Prudhoe Bay to Valdez, Alaska. Since that time, tankers varying in size from 50,000 to 250,000 DWT have been transporting crude oil from Valdez to U.S. west coast ports. Every day two or three loaded tankers with Alaska North Slope (ANS) crude depart Valdez terminal, of which one dog-legs and enters the Juan de Fuca Strait. Conversely, a tanker in ballast exits the strait heading back to Alaska for another load.

Environmental concerns resulted in the establishment of a routing system for these TAPS tankers in 1977. These routes were designed to keep tankers in excess of 100 nautical miles (nm) west of the Queen Charlotte Islands. The southern portion of the routes was approximately 85 nm from Cape Scott, 35 nm from Estevan Point and 25 nm from Amphitrite Point, Vancouver Island. However, in March, 1982, the U.S. Coast Guard cancelled the TAPS routes. They were unpopular with the tanker industry and there was concern by the U.S. Government that the northern portion of the routes was not surveyed. On June 15th 1985, revised TAPS routes similar to the 1977 routes were established; but again not favoured by the industry. The cost of conforming to the new routes was objected to by the American Institute of Merchant Shipping (AIMS) - now the Chamber of Shipping of America. They felt the routes were too confining and added considerably to the operating expenses of the tankers. Additionally, the shipping industry felt tankers should be able to plan their trips with consideration given to weather and other environmental factors.

During December 1985 members of the Canadian and U.S. Coast Guards met with members of AIMS in Seattle to discuss tanker routing, It was agreed that a temporary Tanker Exclusion Zone be established off the Canadian West Coast as an interim measure. This zone has since held tankers 77 nm to the west of Cape St. James, 60 nm from Triangle Island, 40 nm from Estevan Point. In the meantime, the Canadian Coast Guard conducted a Tanker Drift Study. The results were published in January, 1988.

On January 26th, 1988, members of the Canadian Coast Guard and U.S. Coast Guard met with representatives of the American Institute of Merchant Shipping in Seattle to discuss the Tanker Drift Study and the recommended Tanker Exclusion Zone. All three parties accepted the results of the Study.

The current Tanker Exclusion Zone defines an area off Canada's West Coast where a disabled tanker would likely drift ashore prior to the arrival of salvage tugs in unfavourable weather conditions. This outcome represented an optimum compromise for marine safety, user economics, and environmental considerations of all the agencies involved.

Source: Vessel Traffic Services: Canadian Coast Guard, Transport Canada (Revised: Information Brochure: 29/09/93)

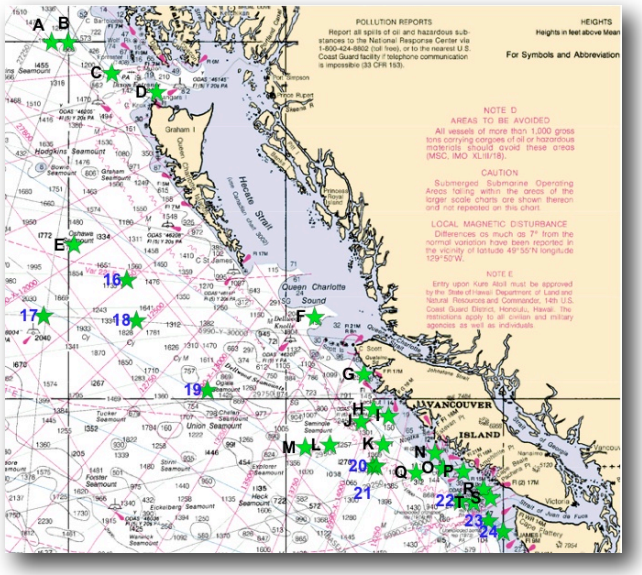
Part 2: Marine Vessel Casualty Risk and Incident Scenarios

The further away from one emergency, the closer you are to the next one

2.0 Vessel Casualties

Casualty data collected for the *West Coast Offshore Vessel Traffic Risk Management* report indicate that there were over 800 marine casualties involving vessels 300 gross tons or larger reported along the outer west coast of North America between 1992 to 1999, but only 96 of these casualties fell within the scope of a potential for a 1,000 gallon (24 barrels) or more oil spill. These casualties ranged from mechanical failures to collisions or groundings. The following chart and table shows major reported marine vessel casualties in Canadian outer territorial waters.[45]

Figure 11 Historic outer West Coast Major Vessel Casualties in Canadian Territorial Waters: 1992-1999 (Source: WCOVTRM Appendix G)



[45] US and Canadian flag ships are required to report casualties outside of their own territorial waters. There may have actually been more loss-of-power or steering casualties which occurred within the US and Canadian Economic Exclusion Zone (EEZ) affecting foreign flag vessels that were not reported.

Vsl/Flag		Casualty Type	Main Vsl Type	Specific Vsl Type	Incident Causes	Date	Incident Position
S	RS	DISABLED	Fishing Vessel	FISHING VESSEL	UNKNOWN	3-Feb-99	20 nm west of Juan de Fuca
T	RS	DISABLED	Fishing Vessel	FISHING VESSEL	UNKNOWN	19-Feb-99	10 nm southwest of Cape Flatterly
K	US	MECH/EQUIP FAILURE	Fishing Vessel	FISHING VESSEL	DISABLED	10-Oct-97	50 nm West of Estevan
P	US	MECH/EQUIP FAILURE	Fishing Vessel	FISHING VESSEL	DISABLED	12-Apr-96	NW Amphitrite
O	US	MECH/EQUIP FAILURE	Fishing Vessel	FISHING VESSEL	DISABLED	22-Aug-98	33 nm west Amphitrite Point
Q	NO	MECH/EQUIP FAILURE	Freight Ship/ Misc.	BULK CARRIER	DISABLED	2-Jul-99	30 nm off Estevan Point
M	GR	MECH/EQUIP FAILURE	Freight Ship/Misc	BULK CARRIER	DISABLED	11-Feb-99	100 nm west of Vancouver Island
G	BF	MECH/EQUIP FAILURE	Freight Ship/Misc	BULK CARRIER	DISABLED	13-Nov-99	7.5 nm West of Kains Island
J	PN	MECH/EQUIP FAILURE	Freight Ship/Misc	BULK CARRIER	DISABLED	15-Feb-99	35 nm fm Vancouver Island
I	PN	MECH/EQUIP FAILURE	Freight Ship/Misc	BULK CARRIER	DISABLED	16-May-96	17 nm SW of Lookout Island
C	AC	MECH/EQUIP FAILURE	Freight Ship/Misc	BULK CARRIER	DISABLED	19-Dec-94	40 nm NW Langara Island
R	BF	MECH/EQUIP FAILURE	Freight Ship/Misc	BULK CARRIER	DISABLED	20-Aug-97	10 nm SE of Cape Beale
H	LI	MECH/EQUIP FAILURE	Freight Ship/Misc	CARGO SHIP	DISABLED	12-Feb-99	15 nm SW of Brooks Peninsula
24	DA	MECH/EQUIP FAILURE	Freight Ship/Misc	FREIGHT SHIP	Engine had clogged fuel injector	28-Sep-93	Strait of Juan de Fuca; 12 nm offshore
23	US	STRUCT FAIL	Tank Ship	TANK SHIP	Fractures found in cargo tank	31-Jan-92	30 nm from entrance to Juan de Fuca
16	US	STRUCT FAIL	Tank Ship	TANK SHIP	Crack in cargo tank	30-Jan-94	90 nm W of Queen Charlotte
19	US	STRUCT FAIL	Tank Ship	TANK SHIP	Cracks found in vicinity of tanks	27-Feb-95	Vancouver, BC; 150 nm offshore
N	US	MECH/EQUIP FAILURE	Freight Ship/Misc	RORO/ CONTAINER	DISABLED	1-Feb-98	10.2 nm off Estevan
B	US	MECH/EQUIP FAILURE	Freight Ship/Misc	RORO/ CONTAINER	DISABLED	4-Aug-99	80 nm west of Langara
L	PN	MECH/EQUIP FAILURE	Freight Ship/Misc	RORO/ CONTAINER	DISABLED	14-Feb-98	74 nm fm Vancouver Isl.
21	US	MECH/EQUIP FAILURE	Tank Ship	TANK SHIP	Loss of power to all bridge equipment	28-Jan-92	Vancouver, BC; 65 nm offshore
18	US	MECH/EQUIP FAILURE	Tank Ship	TANK SHIP	Electrical power failure caused loss of control	20-Dec-92	South Graham Island, Canada
E	US	MECH/EQUIP FAILURE	Tank Ship	TANK SHIP	DISABLED	24-Feb-95	150 nm NW Cape St. James
D	BF	ON FIRE	Freight Ship/Misc	BULK CARRIER	UNKNOWN	21-Feb-95	5 nm N. of Langara Island

Table 5: Historic Outer West Coast Major Vessel Casualties in Canadian Territorial Waters: 1992-1999
(Source: *West Coast Offshore Vessel Traffic Risk Management Project* Appendix G)

Table 6 provides an overview of some of the notable vessel incidents along the Pacific west coast.

Table 6: Descriptions of Notable Major Vessel Incidents along the Pacific West Coast

On January 25th, 1973, the freighter *Irish Stardust* ran aground near Alert Bay, British Columbia and ruptures its fuel tanks spilling 480 metric tons of Bunker C fuel. A 160 km slick and oiled shores resulted. This incident raised debate in Parliament about oil spill preparedness in BC and the risk of oil tankers transiting the Inside Passage. The latter is based on US proposal to introduce the Alaska (TAPS) oil tankers. See: January 26th 1973 Legislative 2nd Session of 30th Parliament, Hansards

December 23rd 1988, the tug *Ocean Services* rammed and holed its tow - the oil barge *Nestucca* - about 3 km off Gray's Harbour, Washington. An estimated 875 metric tons (5,500 barrels) of Bunker C oil was spilled. The prevailing winter winds drifted the spilled oil along the west coast of Vancouver Island from near Victoria in the southeast to near Cape Scott in the north. Reports indicated that as many as 56,000 seabirds were killed. Many shores were oiled. The incident initiated the States/BC Oil Spill Task Force between the State of Washington and Province of British Columbia.

On March 24th, 1989, the oil tanker *Exxon Valdez* grounded on Bligh reef in Prince William Sound, Alaska. The tanker carried 53 million gallons of Prudhoe Bay crude oil of which 10.8 million gallons (44,000 metric tons) spilled into the sea. It eventually covered 11,000 square miles (28,000 km²) of ocean and 1,900 km of shores. The incident resulting in the *US Oil Pollution Act of 1990* (OPA90) and expanded the member states of the Pacific States/BC Oil Spill Task Force to include Alaska, Washington, Oregon and California.

On November 27th, 1997, the Panama Flag *Kuroshima* (4160 GT) reefer seafood ship while anchored in Summer Bay on the Aleutian Island of Unalaska, Alaska drifted aground in storm conditions. The vessel had 743 metric tons (5,700 barrels) Bunker C on board, and 89 metric tons (680 barrels) lube oil. Approx 145 metric tons (28 barrels) of Bunker C oil spilled in this accident contaminating about 10 kilometers of shoreline.

On February 4th, 1999, the *New Carissa* - A Japanese-owned, but Panamanian-flagged bulk carrier - on its way to Coos Bay, Oregon (US) lost anchor during storm conditions and grounded outside of Coos Harbor. It held 1,490 metric tons (11,429 barrels) of Bunker fuel, spilling 268 metric tons (2,005 barrels) when it broke in half. Wreck removal became the major cost of the incident.

On February 11th 1998, the engines failed on the Greek-registered, container vessel *Hanjin Elizabeth* (62,723 DWT). The vessel began drifting about 80 nautical miles from Brooks Peninsula on Vancouver Island towards Cape Scott Islands. The maximum fuel capacity of the *Hanjin Elizabeth* is approximately 4,000 metric tons (30,600 barrels). It is reported to have over 1,915 metric tons (19,585 barrels) of bunker fuel. The vessel has a capacity for 4,000 (TEU) containers. A tow was briefly attached before breaking. The short stabilization of the vessel enabled enough time for ship crew to safely fix and restore engine function.

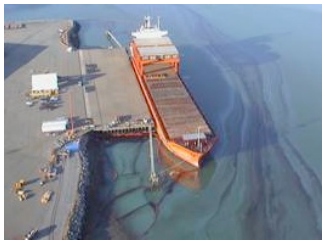
Table 6: Descriptions of Notable Major Vessel Incidents along the Pacific West Coast

On December 8th, 2004, the Malaysian freighter *Selendang Ayu* went aground and broke in half at Skan Bay off Unalaska Island in the Aleutian chain. The accident spilled 1,000 metric tons (7,670 barrels) of Intermediate Fuel Oil and 66,000 metric tons of soybeans into the water and onto the shores of the island.

On June 30th, 2005, the *Queen of Oak Bay* lost power four minutes before it was to dock at the Horseshoe Bay terminal (British Columbia). The vessel became adrift unable to change speed, but able to steer, and slowly ran into the nearby marina. It destroyed or damaged 28 pleasure craft and subsequently went aground a short distance from the shore. No casualties or injuries were reported and no oil spilled from the ferry.

On July 23rd, 2006, the *Cougar Ace*, a 200 meter (654-ft) car carrier homeport in Singapore, listed 80 degrees and took on water in Alaska waters. Estimates for the amount of fuel onboard was 428 metric tons (3,385 barrels) of Intermediate Fuel Oil 380 and 103 metric tons (814 barrels) of Marine Diesel Oil. No spill resulted, but many cars were damaged.

On March 22nd, 2006, the *Queen of the North* ferry sank after running aground on Gil Island in Wright Sound, 135 kilometres (70 nautical miles) south of Prince Rupert, British Columbia. The vessel was a RORO ferry operated by BC Ferries, that travelled the scenic route of the Inside Passage. Two passengers died. The ship had approximately 180 metric tons (1,384 barrels) of marine diesel fuel on board and 2 metric tons (14 barrels) of lubricating oil. The ferry was also carrying 16 vehicles. The grounding and sinking created an oil slick that spread throughout the sound. The marine diesel oil, quickly evaporated in the choppy seas and warm weather.



On August 5th, 2006, the general cargo (42,252 DWT) *Westwood Anette* punctured its "day-tank" when it drifted back into a pylon during high wind conditions - releasing 31 metric tons (243 barrels) of IFO 380 fuel oil (Bunker C fuel oil cut with less than 5% gas oil) into Howe Sound and the adjacent Squamish Estuary (British Columbia). The estuary marsh is an important fisheries and wildlife area. Response to the oiling of the marsh attempted to balance wildlife protection, a strong local desire to removal all oil in the marsh, and the need to avoid the use of cleanup techniques that would do more harm than good.

On November 7th, 2007, the container vessel *Cosco Busan* collided into a pier of the San Francisco-Oakland Bay Bridge resulting in the breach of two wing-tanks used for fuel. The total amount spilled was 166 metric tons (1,275 bbls) of heavy fuel oil (IFO 380). The San Francisco Bay area public quickly converged to volunteer for oil spill cleanup which resulted in problems in response management due to lack of pre-planning/preparation for a workforce of this nature.

Photo sources:
Transportation Safety Board of Canada iincident photo gallery
Alaska Department of Environment and Conservation, Spill Prevention and Response Program incident photo gallery.
Countryman & McDaniel - The Logistics - Customs Broker Attorneys photo gallery of major vessel and other transportation incidents.
US National Oceans and Atmospheric Administration (NOAA) incident photo gallery.
Wikipedia photo gallery

There are three facets of a major vessel casualty that can have significant environmental impacts:

1. The discharge of the vessel's cargo;
2. The release of the vessel's engine / system fuel(s), and
3. The ship wreck itself.

For the first item, the public mostly worry of a major tanker losing its cargo of oil and the environmental consequences - which are well known, documented, and valid. This has galvanized government policy for the last two decades. What is not fully comprehended is that other cargos - particularly containers - have significant environmental and public safety consequences. Imagine a hundred or more containers as marine debris (flotsam) from a container ship overturning. Of these floating and/or beached containers, imagine them breaking open to spread their contents causing more marine pollution.

Broken, beached containers from the *Napoli* (UK)

The second item often missed by the public and government is that all major vessels - including tankers - can carry a lot of heavy fuel oil (HFO) to run their engines and ship-systems - referred to as "bunker fuel". The following table 7 shows the typical HFO capacity of different vessels. World-wide, bunker fuel spills - particularly from general cargo, bulk carriers, and container vessels - surpass the frequency of bulk cargo oil released by oil tankers. Consequently, the *International Maritime Organization* is establishing new requirements to mitigate bunker fuel tank rupture.

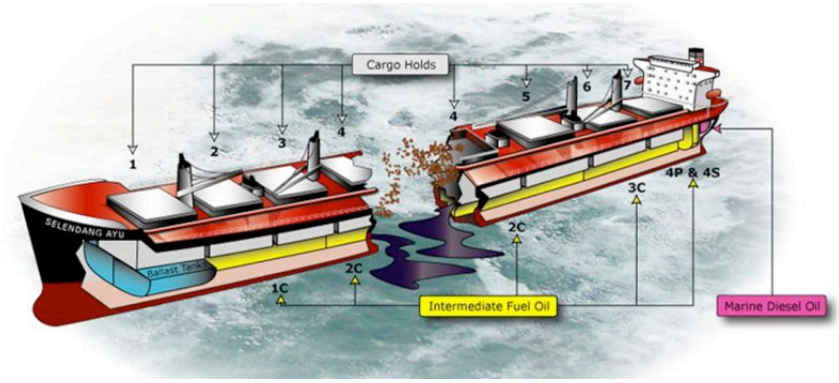
As for a ship wreck due to grounding or sinking, a salient issue is whether it is economical (reasonable cost) to salvage the vessel for further use or to leave it as a wreck. It is the latter that raises the environmental debate as a ship wreck can be a public safety issue, a blight on the environment, navigational risk, a source of chronic pollution as it degrades, or any combination thereof. Wreck removal can be expensive. Just to remove the stern portion of the *New Carissa* (Oregon) is expected to cost $18 million US. The complete cost of cleaning up the environmental damage and wreckage of the *Selendang Ayu* (Alaska) could be more than $200 million - of which ship wreck removal will be a major cost.

The 911 Word Trade-Towers incident has created a new government/industry focus on LNG tankers related to accidental or purposeful tank rupture that can potentially result in a catastrophic explosion. This is a public safety issue.

Table 7: Typical bunker fuel capacities for Heavy Fuel Oil (HFO) and Diesel Oil (DO) to operate major vessels

Tankers (oil, LNG, chemical)					
	Panamax 50,000 DWT	Aframax 90,000 DWT	Suezmax 150,000 DWT	VLCC 285,000 DWT	Tankers: The HFO tanks are usually arranged in one or two pairs of wing tanks to avoid passing piping through ballast and cargo tanks.
HFO (m^3) DO (m^3)	1,700 220	2,900 320	3,800 370	7,500 400	

Container					
	750 TEU 9,000 DWT	1500 TEU 20,000 DWT	Panamax 45,000 DWT	Post-Pmax 75,000 DWT	Containers: Majority of HFO is allocated to wing tanks outboard of the cargo holds. Tanks are distributed longitudinally through the midship region, such that bunkering or consuming fuel oil does not significantly alter trim or stability
HFO (m^3) DO (m^3)	700 130	2,000 200	5,600 330	7,600 430	
Bulk Carriers					
	Handysize 30,000 DWT	Panamax 70,000 DWT	CapeSize 160,000 DWT	Bulk Carriers: Capesize bulk carriers usually carry their fuel oil in engine room's wing tanks similar to tankers. For the smaller Handysize or Panamax ships, HFO is most commonly allocated to center double bottom tanks. Alternatively, bulk carriers may have HFO in the outboard double bottom/wing tanks, or arranged in deep tanks forward together with engine room tanks	
HFO (m^3) DO (m^3)	1,300 130	2,200 270	4,000 300		



Example fuel tank arrangement for a general cargo, bulk carrier, or container vessel

Example when fuel tanks are ruptured: 80,000 gallons of fuel oil were spilled in July 1995 when the vessels *Alexia* and *Enif* collided 70 miles south of New Orleans. The bunker oil is only from the smaller vessel.

Source: Bunker data and collision image- Presentation to Protection of Bunker Tanks *The 24th International Bunker Conference, Rotterdam, 9th May 2003* by Dragos Rauta, INTERTANKO
Graphics: Alaska Department of Environment and Conservation (*Selendang Ayu*).
Note: Intermediate Fuel Oil (IFO) is a type of Heavy Fuel Oil (HFO).

2.1 About Environmental Risk Assessment

From a shipping and coastal protection perspective, environmental risk assessment involves examining natural events (extreme weather), technology (electronic navigation), practices (deep sea ballast exchange), processes (bridge management), products (ship wreck, containers), agents (oil, chemicals) and other factors that may pose threats to ecosystems (shores, fisheries) and to the animals and people that rely on them (First Nations, tourism, fishers). It is predominantly a scientific activity and involves a critical review of available data for the purpose of identifying and possibly quantifying the risks associated with a potential threat. Environmental risk assessment goes well beyond the simple view that risk is just a function of *probability* (likelihood) and *consequences* (impacts).

Identification of an emerging issue - or priority for further action - can result in a demand for an environmental risk assessment to determine whether the initial indication of a problem is valid or not. For example, an environmental risk assessment may be warranted with the advent of new, larger or more tankers in a region - such as LNG or oil tankers.

The assessment provides the basis for most legislative and regulatory programs, as well as for international agreements to address identified threats. Approaches vary significantly from one situation to another and from one jurisdiction to another. There are some efforts to bring some commonality to the approaches used, such as by the *Canadian Standard Association*.

If a threat to the environment is identified through a risk assessment process, then both risk *communication* and *management* are undertaken to consider the need to impose measures to control or mitigate the risk. One needs to understand the problem first in order to design a solution. Then both need to be communicated.

While science remains an important factor, other key factors must also be considered in designing risk mitigation measures such as: market economics, availability of alternative technology, traditional and evolving practices, and new processes. International, national and regional stakeholders from all sectors, cultures and economic-standing will have a say about the appropriateness of risk and the need for risk reduction measures. In many ways, this stage is the most complex. The extensive effort to spend time, money and working together with stakeholders (those affected) to mitigate a known risk is problematic for government and industry. The lack of progress and results often lead to the public stating after a major marine vessel casualty: “if you knew the risk, why didn’t you do something about it?”

Environmental risk assessment for the marine sector can be used in a number of ways.

- *Prioritization of Risks* — used when faced with a number of potential environmental risks in order to establish their relative importance, and thus provide a basis for prioritizing which risks should be dealt with first (*e.g.,* which type of vessel poses the greatest risk in a particular region and why?).

- *Site-specific Risk Evaluation* — used to determine the risks associated with locating facilities or industrial proposals (*e.g.,* environmental site assessment for an oil tanker terminal).

- *Comparative Risk Assessment* — used to compare the relative risks of more than one course of action (*e.g.,* what is the comparative risk of using more frequent and smaller ”Aframax” oil tankers for exporting crude from the Port of Vancouver compared to moving the same amount of oil with fewer shipments with Very Large Crude Containers from a Kitimat Terminal?).

➡ *Quantification of Risks* — used to quantify effectiveness of mitigation measures (*e.g.* what are the acceptable concentrations of the harmful tribulytin leachate from anti-fouling agents used on major marine vessels?).

2.1.1. Risk Assessment in British Columbia and Adjacent US States

Marine vessel risk studies have been few and far between in British Columbia. Most studies have been undertaken in southern British Columbia (See: Text Box). Few studies have taken a "route-based" approach to determine relative risk.[46] The intent of these studies is generally to guide marine transport decisions on accident prevention. For a particular coastal locale (harbour, strait, *etc*), marine safety decisions may pertain to vessel traffic separation routes, an area to be avoided, navigational aids, notice to mariners of risks and operational instructions, tug requirements, *etc*.

For this report, the risk studies examined below are to show some problem areas pertaining to vessel marine casualty and the reasons why. This recognizes that: 1) marine accidents happen, 2) they can occur anywhere, and 3) for any reason.

Historical Marine Vessel Risk Assessments Studies Undertaken in British Columbia

1972,*"The West Coast Oil Threat In Perspective",* Environment Canada prepared by Howard Paish and Associates

McAllister, *et al*. 1978. *Potential Pacific Coast Oil Ports: A Comparative Environmental Risk Analysis*, A Report by Fisheries and Environment Canada, Working Group on West Coast Deep water Oil Ports. Vancouver, BC.

W.H. Wolferstan, 1980. *Oil Tanker Traffic: Assessing the Risks to Southern Coast of British Columbia*, APD Bulletin 9, BC Ministry of Environment. (Vol 1 and 2)

D.F. Dickens, *et al*. 1990. *Marine Oil Transportation Systems: Evaluation of Environmental Risk & Alternatives for Risk Reduction*. Vol II. Prepared for the States/British Columbia Oil Spill Task Force.

1991. *Risk Analysis of Tanker Traffic Movements within the Port of Vancouver.* Prepared for the Vancouver Port Corporation (Vancouver) by Sandwell and subconsultant Bennett Environmental Consultants Ltd. and Seaconsult Marine Research Ltd.

1992. *Canadian Coast Guard: Canadian Oil Spill Risk Criteria Definition and Application of Comparison of High Risk Locations.* Prepared for Canadian Coast Guard, Marine Emergencies by AECL Research (Chalk River) in association with D.F. Dickins Associate (Vancouver)

R. Allan and D.F Dickens, 1995. *A Review of Escort, Rescue and Salvage Towing Capability in Canadian Waters*. Prepared for the Canadian Council of Ministers of the Environment.

2.1.2. West Coast Offshore Vessel Traffic Risk Management Project

In 2002, the *Pacific States/BC Oil Spill Task Force* undertook a study of the vessel traffic patterns from California to Alaska. The *West Coast Offshore Vessel Traffic Risk Management Project* (WCOVTRM) only looked at vessels transiting the outer Pacific West Coast and the relative risk of marine casualty and the relative environmental sensitivities between California and Alaska. Major marine vessel scenarios were developed for each jurisdiction. These scenarios were based on casualty records. The risk factors were:

- ➡ Volume of Oil/Vessel Design
- ➡ Drift
- ➡ Higher Collision Hazard
- ➡ Distance Offshore
- ➡ Weather/Seasonal
- ➡ Tug Availability
- ➡ Coastal Route/Density
- ➡ Historical Casualty Factor Environmental Sensitivity
- ➡ Environmental Sensitivity

[46] The Pacific States/BC Oil Spill Task Force , 2002 *West Coast Offshore Vessel Traffic Risk Management Project*

For each category of vessel (tanker, barge, cargo/passenger, fishing) a numerical rank was given to each risk factor and added up. Measures that reduce risk such as tug escort and double-hulls were given numerical scores credited against a vessel's risk (Source: Appendix K - WCOVTRM). From these risk factors, the Pacific west coast was provided with a relative risk ranking for each marine vessel casualty scenario used (Table 8).

Degree of Risk	Score
Less/Lower Risk	Less than or equal to 36 points total
Average/Medium Risk	Between 37 ~ 52 points total
More/Higher Risk	Greater than or equal to 53 points total

Table 8: Relative Risk Ranking Scheme

British Columbia looked at 10 different marine vessels examined over 3 seasons - 30 different scenarios. Table 9 shows the relative risks compared to other jurisdictions. The comparative results show that the British Columbia has its share of high risk marine casualty situations.

Region	**Number of Scenarios**	**Higher Risk Scenarios**	**Average Risk Scenarios**	**Lower Risk Scenarios**
Alaska	33	5	26	2
British Columbia	30	10	14	6
Washington and Oregon	48	36	11	1
California	45	15	26	4
Total	**156**	**66**	**77**	**13**

Table 9: Relative Risk Results for Pacific West Coast Scenarios

The next two pages outline ten selected scenarios for British Columbia's outer coast and their relative risk findings(*West Coast Offshore Vessel Traffic Risk Management Project*). There were nine risk factors considered.

BC Scenario 1

Vessel	Location	Season	Risk Factors	Pts	Pts Total	Comments
Chemical Tanker; loaded methanol; single hulled; 32,758 DWT; 178.96 LOA	In transit fm Vancouver to LA; 11 nm WSW Cape Flattery; 48-22N, 125-00W		1) Vol Oil/Vessel Design	10		* engine failure; drifting
			2) Drift	2		
			3) Higher Collision Hazard	3		
			4) Distance Offshore	8		
		Winter	5) Weather/Seasonal	10		6) Tug fm Port Angles = 7 hrs
			6) Tug Availability	2		
			7) Coastal Route Density	2		
			8) Historical Casualty	6		9) Inside Olympic Coast Sanctuary
			9) Environmental Sensitivity	10	53	
		Spring/Autumn		8	51	
		Summer		4	47	

BC Scenario 2

Vessel	Location	Season	Risk Factors	Pts	Pts Total	Comments
Tug & Barge, loaded Black Oil	In transit fm Port Angels to Port Alice, BC; 20 nm south of Brooks Peninsula; 49-45N, 128-00W		1) Vol Oil/Vessel Design	9		* broken tow; unable to recover due to weather
			2) Drift	2		
			3) Higher Collision Hazard	0		
			4) Distance Offshore	8		
		Winter	5) Weather/Seasonal	10		6) Tug fm Port Angeles = approx. 21 hrs
			6) Tug Availability	6		
			7) Coastal Route Density	2		
			8) Historical Casualty	5		
			9) Environmental Sensitivity	6	48	
		Spring/Autumn		8	46	
		Summer		4	42	

BC Scenario 3

Vessel	Location	Season	Risk Factors	Pts	Pts Total	Comments
Crude Carrier; double hull; loaded 46K tonsANSCO	Transit fm Valdez to Anacortes; 110nm west of Cape St. James; 52-03.3N, 134-05.5W		1) Vol Oil/Vessel Design	3		* Engine room fire; complete engine failure
			2) Drift	2		
			3) Higher Collision Hazard	0		
			4) Distance Offshore	1		
		Winter	5) Weather/Seasonal	10		6) Tug fm Port Angeles = 48 hrs+
			6) Tug Availability	10		
			7) Coastal Route Density	2		
			8) Historical Casualty	6		9) Bowie Seamount 90 nm to NW
			9) Environmental Sensitivity	2	36	
		Spring/Autumn		8	34	
		Summer		4	30	

BC Scenario 4

Vessel	Location	Season	Risk Factors	Pts	Pts Total	Comments
LPG Tanker (15,530 DWT - 12,880 CRT) loaded methanol	In transit fm Kitmat, BC to San Francisco; 42 nm ENE of Cape St. James; 52-05N, 130-00W		1) Vol Oil/Vessel Design	10		6) Tug fm Port Angeles = 38 hrs
			2) Drift	2		
			3) Higher Collision Hazard	0		
			4) Distance Offshore	4		
		Winter	5) Weather/Seasonal	10		
			6) Tug Availability	10		
			7) Coastal Route Density	2		
			8) Historical Casualty	6		
			9) Environmental Sensitivity	8	52	
		Spring/Autumn		8	50	
		Summer		4	46	

BC Scenario 5

Vessel	Location	Season	Risk Factors	Pts	Pts Total	Comments
Foreign Fish Factory Trawler (2,209 DWT), engaged in fishing	19 nm SW Cape Beale, Vancouver Island; 48-30.7N, 125-17.7W		1) Vol Oil/Vessel Design	6		* True event in 1992 where the F/V collided w/ a container ship
			2) Drift	6		
			3) Higher Collision Hazard	10		
			4) Distance Offshore	8		
		Winter	5) Weather/Seasonal	10		6) Tug fm Neah Bay = 3 hrs
			6) Tug Availability	1		
			7) Coastal Route Density	2		
			8) Historical Casualty	10		9) Olympic Coast Sanctuary = 3nm to SE; ATBA = 18nm
			9) Environmental Sensitivity	10	63	
		Spring/Autumn		8	61	
		Summer		4	57	

BC Scenarios continued....

BC Scenario 6

Vessel	Location	Season	Risk Factors	Pts	Pts Total	Comments
Foreign Bulk Carrier	In transit fm China to Prince Rupert; 36 nm NW of Langara Pt., Queen Charlotte Is.		1) Vol Oil/Vessel Design	7		* Real case; Lost all engine - drifted in 40ft seas, 7kt winds
			2) Drift	10		
			3) Higher Collision Hazard	9		
			4) Distance Offshore	5		
		Winter	5) Weather/Seasonal	10		6) no recorded time on how long it actually took for rescue vsl to arrive.
			6) Tug Availability	10		
			7) Coastal Route Density	2		
			8) Historical Casualty	4		
			9) Environmental Sensitivity	6	63	If from Port Angles = more than 2 days
		Spring/Autumn		8	61	
		Summer		4	57	

BC Scenario 7

Vessel	Location	Season	Risk Factors	Pts	Pts Total	Comments
Crude carrying tanker; double hull; 124,751 DWT -- loaded ANSCO	In transit fm Valdez to Port Angles, WA; 60 nm SW of Estevan Pt; 48-28N, 127-00W		1) Vol Oil/Vessel Design	3		* lost all engine power
			2) Drift	2		
			3) Higher Collision Hazard	0		
			4) Distance Offshore	0		
		Winter	5) Weather/Seasonal	10		6) Tug fm Port Angles = 15 hrs
			6) Tug Availability	4		
			7) Coastal Route Density	2		
			8) Historical Casualty	6		
			9) Environmental Sensitivity	2	29	
		Spring/Autumn		8	27	
		Summer		4	23	

BC Scenario 8

Vessel	Location	Season	Risk Factors	Pts	Pts Total	Comments
US Tug & Barge w/ refined oil	In transit fm Cherry Pt., WA to LA; 27 nm SW Cape Alava, WA; 48-02.6N, 125-23.6W		1) Vol Oil/Vessel Design	9		* lost all engine power
			2) Drift	2		
			3) Higher Collision Hazard	3		
			4) Distance Offshore	4		
		Winter	5) Weather/Seasonal	9		
			6) Tug Availability	2		6) Tug fm Port Angeles = 10 hrs
			7) Coastal Route Density	10		
			8) Historical Casualty	5		
			9) Environmental Sensitivity	10	54	9) Inside Olympic Coast Sanctuary (ATBA = 10nm)
		Spring/Autumn		7	52	
		Summer		2	47	

BC Scenario 9

Vessel	Location	Season	Risk Factors	Pts	Pts Total	Comments
Cruise Ship; double hull	Transit fm Vancouver to San Francisco; 6.5 nm NE of Cape Flattery; 48-29N, 124-40W		1) Vol Oil/Vessel Design	2		* Engine rm fire; lost power & drifting
			2) Drift	10		
			3) Higher Collision Hazard	9		
			4) Distance Offshore	8		
		Winter	5) Weather/Seasonal	10		6) Tug fm Port Angles = < 6 hrs.
			6) Tug Availability	1		
			7) Coastal Route Density	2		
			8) Historical Casualty	1		9) Olympic coast Sanctuary (ATBA = 4 nm to south)
			9) Environmental Sensitivity	10	53	
		Spring/Autumn		8	51	
		Summer		4	47	

BC Scenario 10

Vessel	Location	Season	Risk Factors	Pts	Pts Total	Comments
U.S. Factory Trawler	In transit fm Seattle to Ketchikan; 5.5 nm S of Pachena Pt., Vancouver Isl.; 48-38N, 125-07W		1) Vol Oil/Vessel Design	6		
			2) Drift	6		
			3) Higher Collision Hazard	0		
			4) Distance Offshore	8		
		Winter	5) Weather/Seasonal	10		6) Tug fm Port Angles = 2.5 hrs
			6) Tug Availability	1		
			7) Coastal Route Density	2		
			8) Historical Casualty	10		
			9) Environmental Sensitivity	10	53	9) Olympic Coast Sanctuary 8nm S; ATBA = 18nm to SE
		Spring/Autumn		8	51	
		Summer		4	47	

The findings of the “relative” vessel casualty risk for British Columbia’s outer coast are that winter is the riskiest season for vessel travel, and its those major vessels that transit the closest to shore that are the highest environmental threat, such as bulk carriers, large fishing vessels, cargo vessels, and oil barges.

The two risk "drivers" are:

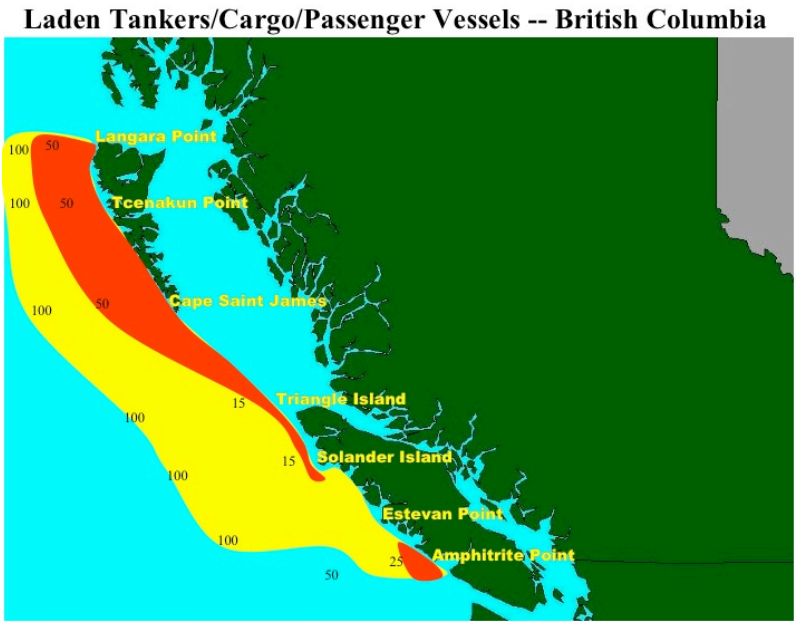
1. Major vessels carry a lot of heavy fuel oil for their engines; and,
2. If a major vessel should lose engine power or steering, there is little or no tug capability to ensure a timely rescue before grounding.

Oil tankers that stay beyond the Tanker Exclusion Zone (TEZ) do not pose the same level of risk, which was the intent of the TEZ in the first place.

The message to the shipping community from this study is that captains of major vessels need to transit further offshore from Vancouver and Queen Charlotte Islands to ensure sufficient time for a rescue tug to be dispatched, to arrive on-scene, and to secure a tow. The risk assessment also reinforces the message to use extra caution within vessel convergence areas, such as the entrance to the Juan de Fuca Strait.

The following maps (Figure 12) provide a graphical representation of the relative casualty risk by vessel category and the reason for this risk (Appendix L - WCOVTRM)

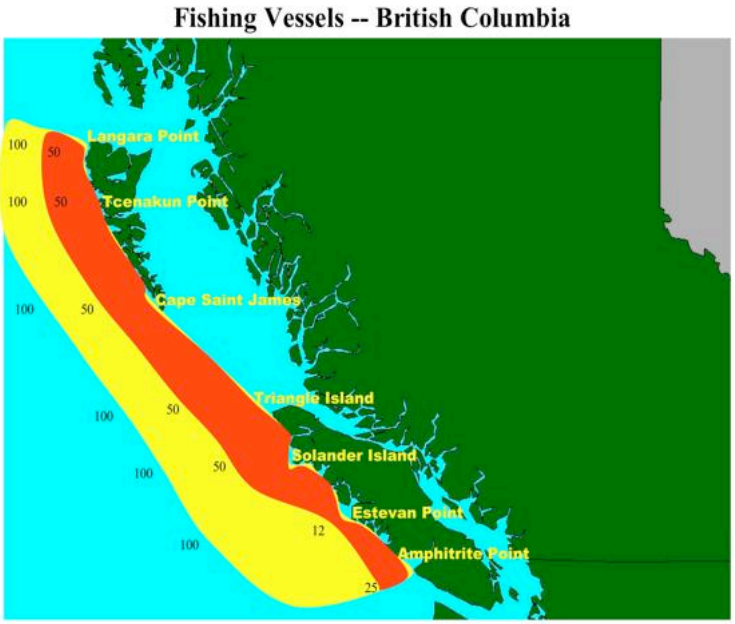
Figure 12: Relative Risk of Vessel Casualty along British Columbia's West Coast



In British Columbia the Higher risk for these vessel types runs from a few to 50 nautical miles offshore. Off of Amphitrite Point (shown in red), the risk is mainly because the area is a high transition/intersection zone for the entrance of the Strait of Juan de Fuca, contributing to a higher collision hazard. From Solander Island and further north, the risk is mainly due to the distance from a designated rescue tug.

Figure 12: Relative Risk of Vessel Casualty along British Columbia's West Coast

In British Columbia, the higher risk areas for laden tank barges were limited to approximately 15 nm off of Amphitrite Point and to 12 to 15 nm off of Graham Island (Cape St. James to Langara Point). The higher risk off of Amphitrite Point is due to higher collision risk factors. Off of Graham Island, the risk is due to lack of rescue tug availability.



In British Columbia, fishing vessels were at higher risk approximately 50 nm off the entire coast, narrowing to 12 to 25 nm in the southern region of Vancouver Island. Contributing factors were fishing vessels' higher casualty rates and tug response times for remote areas.

2.1.3. Collision Risk at the Approaches to the Strait of Juan de Fuca

A paper prepared by Brad Judson (Judson Research, Vancouver Canada) for the 7th International VTS Symposium in Vancouver (June 1992) illustrates the nature of a localized vessel risk area - the entrance to the Strait of Juan de Fuca. The title of the paper is: *Collision Risk Circumstances and Traffic Routeing in the Approaches to the Strait of Juan de Fuca*. The collision of the factory vessel *Tenyo Maru* and the freighter *Tuo Hai* in the approaches to the Strait in July 1991 shows that accidents can happen in this area and that oil can be spilled, vessels

sink, and people can be killed (Figure 13).[47] This assessment is an example of a "quantitative" risk analysis where complex mathematical formulas are used.

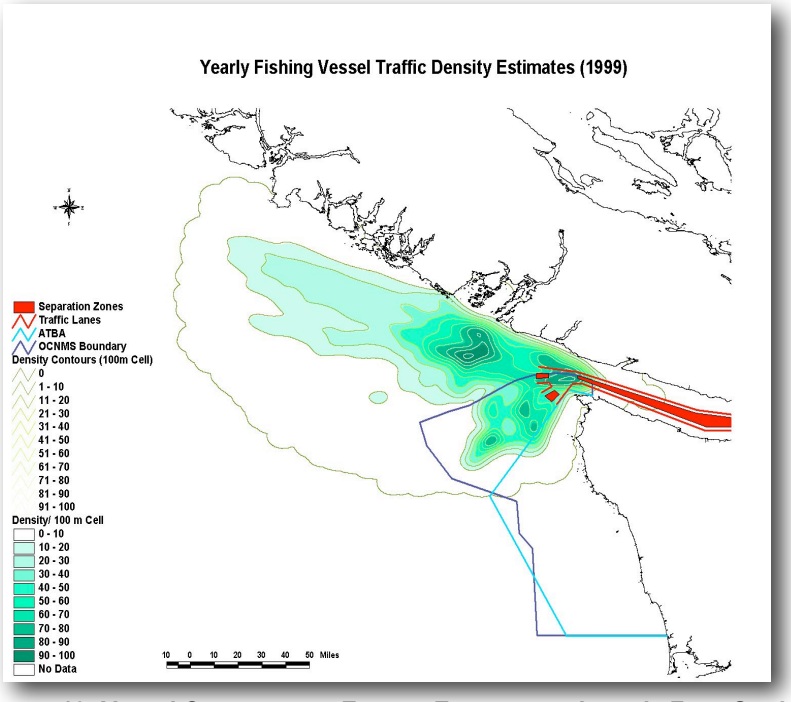


Figure 13: Vessel Convergence Zone at Entrance to Juan de Fuca Strait

The area demarcated by the fishing vessel density is also the convergence zone for both incoming and out-going tankers, bulk carriers, and general cargo vessels. The freedom of movement for major vessels is also constrained by a military exercise area and season fishing fleets. From an oil tanker safety standpoint, this convergence area was identified by both federal and provincial public enquiries after the 1988 *Nestucca* oil barge and 1989 *Exxon Valdez* oil tanker spill incidents, as follows:

- Federal Brander-Smith report stated: "As a priority, the Canadian Coast Guard examine existing traffic routing schemes with a view to reducing the risk of collision due to traffic concentration at the entrance to Juan de Fuca Strait";[48]
- Provincial David Anderson report stated: "Consideration be given to extending the routing system more miles to seaward of the entrance to the Strait of Juan de Fuca, so as to increase the separation and to move the Far Eastern traffic more to the west".[49]

What is interesting about this location recommendation is that - despite the high-level public enquiry recommendations - the Brad Judson analysis (1992) reveals the level of risk still exists primarily due to uncontrolled vessel speeds. The Judson study also noted that "by routing major vessel traffic clear of the fishing banks, the probability of collision during the peak traffic month of July was reduced by 68 percent and the annual collision risk by 40 percent."

This small independent study was a pre-curser to a much more detailed 1997 study done by the US *Volpe National Transportation Systems Center*. The center conducted a broader assessment of the probabilities and consequences of marine accidents including Puget Sound, the Strait of

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[47] For images of spill response for this incident see NOAA photo gallery

[48] Federal Brander-Smith 1990. *Public Review Panel on Tanker Safety and Marine Spills Response Capability*

[49] Provincial David Anderson 1989. *Report to the Premier on Oil Transportation and Oil Spills*

Juan de Fuca, passages around and through the San Juan Islands, and the offshore waters of the *Olympic Coast National Marine Sanctuary*.

This assessment, formally titled *"Scoping Risk Assessment Protection Against Oil Spills in the Marine Waters of Northwest Washington State,"* but commonly called the *"Volpe Study"* recommended several vessel routing measures for further study, including changes to the offshore approaches to the Strait of Juan de Fuca.[50] This study has stimulated policy debate in the United States regarding the implementation of risk reduction measures, but much less so in Canada.

The initial *Volpe Study*, subsequent panel debates and recommendations are of particular importance to Canada, as the risk mitigation measures (or lack of measures) affect Canadian interests as these waters are shared by major vessels, and spilled oil and drifting ships do not respect borders.

2.1.4. Alaska Aleutian Island Risk Assessment

Currently, the Alaska Department of Environmental Conservation and US Coast Guard are working on a multi-stage risk assessment of maritime transportation in the Bering Sea and the Aleutian Archipelago by vessels that use the Great Circle route. This effort is a result of the December 8, 2004 grounding and subsequent oil spill from the *Selendang Ayu* - along with other marine casualties in the region. The multi-facet study is called: *Aleutian Island Risk Assessment*. The first report is the *Vessel Traffic in the Aleutians Subarea* (Sept. 20, 2006).

The findings of this assessment also have particular relevance to British Columbia, because both areas generally share the same type and frequency of vessel traffic using the Great Circle route. As well, the vessels travel in proximity to shore and in similar marine environments. Alaska, however, has a much greater spill response and rescue tug capability than British Columbia.

Summary of Findings of the Aleutian Island Risk Assessment

Based on automated tracking data collected from October 2005 through June 2006, about 3,100 ships each year (8-9 vessels each day) pass through the Aleutians (primarily westbound) on trans- Pacific voyages, including:

- Approximately 1,200 container ships (39% of total) per year with a median fuel capacity of 1.6 million gallons of persistent fuel oil;
- As many as 1,300 bulk and general freight ships (41% of total) per year with a median fuel capacity of approximately 470,000 gallons of mostly persistent fuel oil,
- About 265 motor vehicle carriers per year (8.5% of total) per year with an estimated average fuel capacity of 500,000 gallons of persistent fuel oil;
- About 110 reefer (refrigerated) cargo ships (3.5% of total) per year with a median fuel oil capacity of 317,000 gallons of mostly persistent fuel oil.
- 22 tankers per year (0.7%), transporting about 400 million gallons of refined oil.
- The remaining 7.3% of the total is comprised of other vessel types with a variety of persistent and non-persistent fuel.

Source: Vessel Traffic in the Aleutians Subarea (Sept. 20, 2006), Alaska Department of Environmental Conservation

[50] In September, 2000, the North Puget Sound Long-Term Oil Spill Risk Management Panel, or "Oil Spill Risk Panel" presented their final report and recommendations to the Navigation Safety Advisory (NAVSAC) Council for their consideration.

2.1.5. Citizen Oversight of Risk and Risk Measures

The overview of past and present marine risk assessments demonstrates that vessels accidents happen, risks have been determined, and prevention and response measures proposed. To examine all recommendations and their variations for the multitude of marine sectors is a major undertaking. To ensure that they are being acted on in a timely manner - and with the expected intent - requires a great deal of monitoring and promoting (oversight) by the public and other concerned stakeholders.

In British Columbia, the *Citizens Advisory Committee on Oil Spills* was established soon after the David Anderson (1989) *Report to the Premier on Oil Transportation and Oil Spills* was released by the Provincial government. The committee was tasked with monitoring the implementation of recommended measures directed to oil spill prevention and response preparedness. Representation included environmental non-government organizations, First Nations and government. The committee was disbanded in 1993 following significant reduction in response planning and preparedness staffing and budget of the BC Ministry of Environment's Environmental Emergency Program Headquarters.[51]

When the Canadian regime for oil spill response was established in 1993, the federal government established six *Regional Advisory Council on Oil Spill Response* (RAC) across Canada. These councils are established by the Minister of Transport under the *Canada Shipping Act*. Their initial mandate was only to ensure that Response Organizations were charging their clients fair and transparent fees for their services. They still exist, but have recently expanded their terms-of-reference to include issues related to oil spill response readiness. This transition took over a decade to happen. The RACs report to the Assistant Deputy Minister of Safety and Security, Transport Canada and may make recommendations related to marine oil spill preparedness. They can not make directives. The RAC can also report to the Minister of Transport Canada or the federal House of Commons Standing Committees on either Transportation or the Environment. In accordance with amendments to the *Canada Shipping Act*, these Councils are to be representative of the communities and the interests likely to be affected by an oil spill. The RACs generally do not have full local community, environmental NGOs or First Nation's representation.

The RACs effectiveness is only as good as their committee representation, participant dedication, and a receptive ADM or Minister. For Pacific Region RAC, the representation and dedication is good, but the reception and timely feed-back of RAC findings by Transport Canada has been marginal.[52]

The *Canadian Marine Advisory Council* (CMAC) is Transport Canada's national consultative body for marine matters. Meetings are normally held twice a year in the spring and fall, both nationally in Ottawa and in each region. Members include representatives of individuals and parties that have a recognized interest in boating and shipping concerning safety, recreational matters, navigation, marine pollution and response, and marine security. The CMAC has very specific terms-of-reference. Their areas of interest include:

- ➡ Development and acceptance of international conventions, regulations, codes, standards, and recommendations;
- ➡ Development and implementation of national statutes, regulations, codes, standards, recommendations and procedures; operations and services; and,

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[51] Ministry Emergency Program Headquarters (Victoria) staffing level declined from 11 full-time employees (FTE) in 1990 to 4 FTEs in 1993, and then to 2 FTEs in 1997 with a ten year period in between when there was only 1 FTE position actually filled. As of 2007, there are now 3 FTEs in the Headquarters portion of the program for emergency planning and preparedness for oil and hazardous material spills.

[52] Source: *pers. comm.* Noel Boston, RAC vice president.

➡ Matters related to marine safety, marine services, marine pollution prevention and response, and marine security.

CMAC has Standing Committees such as on the environment. The Environment committee provides a forum for consultation and information sharing on pollution prevention, compensation and liabilities and oil spill response. There are regional CMACs such as for the Pacific Region. The CMAC has a strong industry presence, but almost no environmental non-government organization input or influence. The CMAC has a stronger political influence than the RAC.

In the United States, there are several strong oversight groups with dedicated funding and mandates to ensure the marine vessel risk studies are done, recommendations made, and implemented. Most notably groups on the Pacific west coast are located in Alaska as a result of the 1989 *Exxon Valdez* oil tanker spill. These *Alaska Regional Citizens Advisory Councils* (RCAC) are the *Cook Inlet Regional Citizens Advisory Council* and the *Prince William Sound Regional Citizens Advisory Council*.

The interest groups represented in these councils include: tribal organizations, state chamber of commerce (tourism), environmental groups, recreational groups, commercial fishing groups, and aquaculture associations. In addition, the councils often include ex-officio members (non-voting) such as: U.S. Coast Guard, Alaska Department of Environmental Conservation, Alaska Division of Emergency Services, Environmental Protection Agency, U.S. Forest Service, Bureau of Land Management, Minerals Management Service (MMS), Alaska Department of Natural Resources, and National Oceanic and Atmospheric Administration (NOAA).

The *Alaska Regional Citizens Advisory Councils* have dedicated funding to monitor and undertake special oil spill and vessel casualty risk mitigation studies - often with industry.

Establishment of the RCACs in Alaska

In the aftermath of the 1989 *Exxon Valdez* oil spill, the US Congress crafted a comprehensive oil spill prevention bill. The Oil Pollution Act of 1990 (OPA 90) is the result of public hearings around the state where citizens and local government leaders demanded public involvement in the oversight of oil transportation.

Many people felt that government and industry representatives had become too comfortable in their positions and that complacency was a contributing factor in the *Exxon Valdez* spill. The 1990 Alaska Oil Spill Commission Report, while discussing the Exxon spill, states, "success bred complacency; complacency bred neglect; neglect increased the risk until the right combination of errors led to disaster."

Congress wanted to insure that the sense of complacency that led to the spill in Prince William Sound would not be repeated in the future. Under OPA90, two regional citizen advisory councils were created - one for the Prince William Sound area and one for Cook Inlet. Congress envisioned the councils as a mechanism to foster long-term partnerships between industry, government, and the coastal communities of Alaska - which they have achieved.

In British Columbia, the monitoring and promoting (oversight) of vessel casualty risk and response preparedness are weak. Transport Canada's *Regional Advisory Council* (RAC) is made up of a few dedicated people with essentially no budget and no power. The federal government response to RAC recommendations are generally slow coming, with no promises and little action. The *Canadian Marine Advisory Council* (CMAC) and their regional groups are essentially representatives of the shipping industry.

2.2 Marine Casualty Incident Scenarios

The following fictional scenarios provide a basis to explore the nature of various types of marine vessel accidents that could happen on the west coast. The scenarios provide an opportunity to explore the response dynamics and issues that may result. Part 3 of the report provides analyses of these issues which are often institutional or technical in nature.

Scenario #1: Cargo vessel grounds on Race Rocks and releases bunker fuel into Juan de Fuca Strait

Vessel:	Bulk Grain Cargo Vessel
Registration:	Foreign-flagged (Liberian)
Owner:	China shipping company
Amount Oil Released:	2,000 metric tons of Bunker C
Location:	Semi-exposed coastal environment

A 60,000 DWT grain carrier grounds on Race Rock in Juan de Fuca Strait releasing 2,000 metric tons (12,579 barrels) heavy bunker C fuel oil from its forward wing-tanks and day tank. Spill site is a semi-sheltered environment with moderate to high ocean currents and a mixture of shoreline types nearby. Location is Race Rocks near Victoria and Esquimalt. Race Rocks is a marine protected area.

Context: This scenario is probable as:

- The vessel is of typical size leaving from the Port of Vancouver's terminals carrying coal, grain, sulphur and potash and other bulk goods. The largest cargo vessels are bulk ore carriers that can be 150,000 DWT to over 200,000 DWT.
- Bunker C is a common fuel for operating large sea-going vessels and held in "wing-tanks" that have only a single hull between the fuel and the sea.
- Vessels have been recorded to have lost power in the Juan de Fuca Strait and gone adrift such as in December 4th, 2003 when the container vessel *"ZOIS"* lost engine power while *en route* to Seattle via Canadian waters and drifted for to within approximately 400 meters of Trial Island near Victoria before regaining propulsion
- Most of these vessels are foreign-flagged and operated and chartered for their services.

Potential Issues: For scenario #1, the funds for spill response, damage compensation, and penalties will be from the ship-owner's *Protection and Indemnity Insurance* (P&I Club) that all international vessels must have if carrying more the 2,000 metric tons of oil either in bulk or as fuel for the vessel. The fund amount is calculated on the size of the vessel (approximately $40 million). The money serves to pay for spill response, damage compensations and penalties. As such, the Responsible Party (RP) may hold a portion of the money aside for compensation and penalty costs, thereby reducing funds for response.

As the vessel is owned by a foreign company, the person serving as the RP's Incident Commander is generally the P&I Club representative. Once the RP's limit of responsibility has been reached, the RP can legally under the federal *Marine Liability Act* Part 6 (54) relinquish its spill response and impact mitigation responsibility to government *via* "transfer of command". There is a high likelihood that such transfer of responsibility will occur before shoreline cleanup is finished, let alone wreck salvage or removal.

Spill response in this scenario is problematic in that the product is persistent oil, currents will impede on-water containment/collection, and a mix of shorelines will be contaminated. Opportunities for natural cleanup will be marginal as it's a semi-protected coastal environment (moderate to low wave energy). There is also the potential for both birds and seals to be oiled. The proximity to an urban setting will demand a level of cleanup standard for shores, birds and mammals. There is also increase exposures to private damages to boats, marinas, tourism, etc. that determines the amount of private damage compensation set-aside.

Footnotes: [53] [54]

[53] International vessel P&I club insurance that applies to all vessels over 300 GRT and calculated on the size of vessel

[54] Transfer of command pertains to when incident management is transferred from the Responsible Party (ship owner) to government (federal and/or provincial), and that includes all further costs and consequences of the incident.

Scenario #2: Container vessel drifts ashore on Nootka Island - losing containers and discharging bunker oil

Vessel:	Container Carrier Vessel 67,000 DWT
Registration:	Foreign-flagged (Panama)
Owner:	Japan shipping company
Amount Oil Released:	1,500 metric tons intermediate fuel oil /800 mt of marine diesel
Other Pollutants:	500 containers released overside, with 4500 still on-board
Location:	Exposed coastal environment in a remote area.

A 67,000 DWT container vessel loses engine power and runs grounds near Nootka Island during a severe storm. Tug rescue efforts failed. The vessel released 1,500 metric tons (11,500 barrels) heavy Bunker C fuel oil and 800 metric tons (6,100 barrels) of marine diesel. In addition, 500 containers with unknown goods inside fell into the sea; the remaining 4,500 remained on-board. The incident site is a remote, expose coast with high wave energy. Shorelines are primarily bedrock and cobble sediment.

Context: Daily there are major vessels that pass close to Vancouver Island *en route* to either Pacific West Coast ports (coast transits) or to international ports *via* the Great Circle route. The latter is the shortest distance around the globe. Container vessels often travel within about 20 to 30 nautical miles off shore. There is little rescue tug capability off of British Columbia's west coast. There is no guarantee that the tug would actually be able to fix a line and hold the vessel at a steady state (at station) in a severe storm.

Potential Issues: For scenario #2, the funds for spill response, damage compensation, and penalties will be from the ship *owner*'s *Protection and Indemnity Insurance* (P&I Club) (see comments for Scenario #1). The cost of salvage, container removal, compensation for lost goods is all from the same insurance fund – leaving less money for spill response. The ship owner had an arrangement with Burrard Clean Operations (BCO) to address the oil response consequence. The location is not in BCO's *primary* or *enhanced* areas of response, but the Response Organization does have some staged equipment on the west coast of Vancouver Island. Burrard Clean Operations has neither the mandate nor capability to respond to hazardous materials, the containers, nor the ship salvage or wreck removal - just the oil spill.

Spill response in this area is problematic, in that persistent oil is spilled in a remote environment that is difficult for cleanup crews to attend. Though opportunities for natural cleanup will be good for exposed outer coast area, there are a lot of semi-protected coastal (moderate to low wave energy) environments created by small islands and reefs. There are potential effects on both birds and mammals that are species at risk.- such a Marble Murletts and Sea Otters. Wildlife response planning and preparedness is not well developed in British Columbia. Provincial marine parks are in the area and there are high First Nations interests.

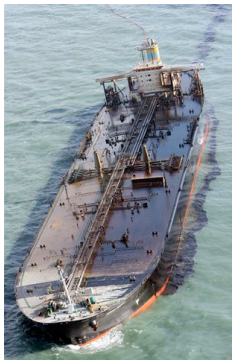
The containers that fall overboard are themselves a pollution and navigation hazard. Several can expect to have hazardous material products inside. There is no salvage plan for British Columbia on how to track and remove floating and/or stranded containers - let alone any cargo materials released from any damaged containers. For responding to any hazardous materials on-board or as flotsam, BC has a *Marine Chemical Emergency Response* regime framework, but it has not been adopted or tested by industry or the federal government. The remaining containers on board will be an impediment to vessel salvage and for fuel removal. .

Footnotes: [55]

I. [55] Container vessels can carry a large variety of hazardous materials - both explosive and toxic. British Columbia's Pacific region has been a leader in Canada in addressing the issue of emergency response for hazardous materials on vessels via their *Marine Chemical Emergency Response* regime development (MCER). Transport Canada is the lead federal agency to address Hazardous and Noxious Substance (HNS) response on vessels.

Scenario #3: Oil tanker collides with cargo vessel in Haro Strait releasing crude oil

Vessel:	Panamax-size oil tanker 70,000 DWT
Registration:	Foreign-flagged (Korean)
Owner:	Greek shipping company
Amount Oil Released:	6,355 metric tons (65,000 barrels) crude oil
Location:	Protected coastal archipelago environment - semi-remote



A fully loaded and out-bound 70,000 DWT double-hulled oil tanker collided with a general cargo vessel when the tanker was making its turn at "Turn Point" in Haro Strait. There were maximum flood currents at that time - 3.2 knots and high winds. Structural damage to the cargo vessel was minor, but the searing collision ruptured several of the oil tanker's holds releasing about a third of its crude oil. Spill release potential was mitigated by the oil tanker's double-hull construction. The tanker lost steerage due to rudder damage. The two escorting tugs were not able to keep it "at station" due to high currents and winds. The tanker found its natural place of refuge grounded in Boundary Bay.

Context: Panamax-size tankers range in size from 55,000 to 80,000 DWT - average cargo carrying capacity of 0.5 million barrels. They are a common type of oil tanker leaving Port of Vancouver (Westridge Marine terminals) exporting petroleum products ranging from crude oil to refined fuel. All are of doubled-hulled construction. Haro Strait is a vessel high-collision risk area identified in by the *North Puget Long-term Oil Spill Risk Management Panel* (2000).

Generally oil tankers that collide and/or ground do not release their entire cargo - 6,500 metric tons (64,000 barrels) represent less than an 1/8 of the tanker's load. Escort tugs are required to accompany laden crude oil tankers from Roberts Bank to Victoria. However, the Canadian tanker escort protocol is over a decade old and not monitored for efficacy, such as the escort tugs used in the States of Alaska and Washington

Potential Issues: For scenario #3, the funds for spill response, damage compensation, and penalties will be from the ship-owner's *Protection and Indemnity Insurance* (P&I Club) as well as from International oil pollution compensation (IOPC) funds and CLC Fund. The incident is within Burrard Cleans Operations (Canada's Westcoast Response Organization) *enhanced response area* and below their mandated 10,000 tonne spill planning and preparedness requirement. As per *Canada Shipping Act* regulation, the tanker owner had an arrangement with BCO to be their spill response contractor.

Spill response in this area is problematic in that the product is persistent oil that is spilled in a semi-rural environment. Opportunities for natural cleanup will be poor as there are a lot of protected coastal environments (low wave energy) created by both the Canadian Gulf Islands and US San Juan Islands. The spill will be a very significant trans-border event calling for invoking the CANUSPAC annex plan of the US and Canadian *Joint Marine Contingency Plan*. Currents will spread the product throughout these islands as well as the Strait of Georgia and Boundary Bay. On-water booming and skimming will be difficult due to currents and most of the oil will be on-shore within 24 to 72 hours. The use of dispersants and/or in-situ burning will come in to play, particularly by US agencies. British Columbia and Canada do not have a decision-making process for these potentially effective response tools - hence Canada has no response capability in dispersants/in-situ burning.

Gulf Islands National Park Reserve is nearby. There are high First Nations interests. Resources at risk include wintering and resident birds. Haro Strait is also the primary route for resident pods of Orca. The Strait is used for major vessels accessing the Port of Vancouver. There will be significantly disruption to shipping while the oil or ship remains in the incident area. Compensation for economic impacts to tourism and recreational activities in the area will be high. A 2004 Tug Escort Study for the State of Washington estimate the socio-economic cost for this size spill to be over $1 billion dollars. After the incident, the United States will address natural resource damage assessment (NRDA) awards (compensation) for impacts to their coastal resources. Canada and British Columbia do not have a NRDA policy or process. As such, compensation reciprocity between the US and Canada will be difficult.

Scenario #4: Cruise Ship on fire and sinks in Blackney Passage - Johnstone & Blackfish Sounds

Vessel:	Cruise Ship 88,500 GRT / 2000 passengers and crew
Registration:	Foreign-flagged (Bahamas)
Owner:	Dutch Company
Amount Oil Released:	Sheen Only
Location:	Protected coastal archipelago environment - remote

A cruise ship traveling the Inside Passage from Vancouver to Juneau (Alaska cruise route) suddenly has an engine fire and becomes disabled in Blackney Passage. The passage joins Johnstone with Blackfish Sounds. Within eight hours, the vessel sinks. All passengers and crew are evacuated safely. The vessel's navigational tree showing above water marks the ship's location. A small sheen of unrecoverable diesel was visible for only a few hours.

Context: The cruise ship is of the typical size that routinely transits Blackney Passage on the Alaska tourist route. Accidents have happen here before. The bulk carrier *Raven Arrow* in 1997 ran aground in Boat Bay after missing the entrance to Blackney Passage in the fog. Passenger vessels fires are uncommon - but do happen. In 2002, the Alaska cruise ship *Statendam*, in the Strait of Georgia had a significant engine room fire.

Potential Issues: For scenario #4, the funds for initial response, salvage, passenger compensation, and penalties will be from a ship owner's *Protection and Indemnity Insurance* (P&I Club). The limit of liability for both passenger claims and environmental damage is near the upper threshold required under the *Marine Liability Act* for a convention vessel.

Under federal policy, the Canadian Coast Guard is the lead federal agency for emergency response to marine search & rescue, and ship-source pollution. The lead provincial agency would be the *Provincial Emergency Program* (PEP) under the *Emergency Program Act* and its Environmental Program Management Regulation (See: Schedule 1). As such, emergency response would be multiagency, invoking: the Canadian Coast Guard's Joint Rescue Co-ordination Centre (JRCC) located in Victoria, the PEP Emergency Coordination Centre (Victoria), and the local government's (Emergency Operations Centre (Port McNeil). The company (Responsible Party - RP) would coordinate their involvement through their ship's agency (Vancouver). A possible consequence is an immediate "convergence" of small and large vessels at the incident site to deal with the evacuation of passengers and crew. This often results when each agency and the RP is functioning in isolation of each other - working from their respective emergency operations centers.

A single Incident Command Post being established with all representative agencies and the RP present and undertaking tactical response under a single *Incident Action Plan* is required to ensure a coordinated response. However, establishing a Command Post with a single integrated govt/RP response team is not universally understood or applied in Canada. Unlike the United States, this approach done under the *Incident Command System* (ICS) is standard practice - and has proven its worth. In BC, the ICS is required and used for site (Command Post) and field (tactical) levels of emergency response by provincial agencies. However, PEP does not have Command Post (site) and tactical (field) "response teams". Only BC Ministry of Environment and Ministry of Forests have such teams for inland and marine oil spills, and hazardous material incidents (Environment) and for forest fires (Forests). The Ministry of Environment fully uses the ICS in their response plans and the team integration protocols there in. The CCG uses a modified ICS for marine emergencies and does not endorse team integration with the RP or another jurisdiction. As such, there is a potential "silo" approach to managing this incident which could likely transcend to addressing the environmental consequences of the vessel itself.

The main environmental implications of this scenario relate to the final disposition of the vessel - to salvage it or not. There is no federal guideline that provides a framework of what is "reasonable" from environmental and cost perspectives. Given the ecological sensitivity and tourist value - and possible navigation hazard - of Blackney Passage, this matter might become a heated debate. A debate that may be somewhat clouded by how well the response to fire control and the crew and passenger rescue went. As a final note, Burrard Clean Operations - the ships contracted Response Organization - would have a marginal "standby" role in case of more fuel release. It is not equipped nor required to undertake fuel removal from a vessel, or any other salvage activity.

Scenario #5: Oil tanker carrying condensate collides with a tug in Wright Sound (Inside Passage)

Vessel:	Oil Tanker "handysize" 35,000 DWT
Registration:	Foreign-flagged (Marshall Islands)
Owner:	United Kingdom Company
Amount Product Released:	23,000 barrels of condensate
Location:	Protected coastal archipelago environment - remote

An in-bound 35,000 DWT oil tanker with 36,500 metric tons (280,000 barrels) of condensate collides with a north-bound tug. The tanker was *en route* to Kitimat. The tanker sustained damage to two of its five starboard tanks resulting in a steady discharge of product at 130 metric tons (1,000 barrels) an hour. Maximum discharge based on two ruptured tanks is an estimated 3,000 metric tons (23,000 barrels). The tanker was not disabled, but stayed "on-station" until a place of refuge could be determined and approved by Transport Canada. The tug and its crew were okay.

Context: The handysize tanker is one of the most common size and type of vessel to transport condensates. EnCana Corp is currently importing condensate in these size tankers to be offloaded on to railcars at the Methanex marine terminal in Kitimat.

Collisions and grounding rarely result in a catastrophic loss of cargo from a tanker unless there is a fire or sinking involved.

Crossing Wright Channel has a relatively higher risk than transiting down Douglas Channel due to higher number of vessels using the sheltered and scenic Inside Passage.

Potential Issues: For scenario #5, the funds for response, compensation, and penalties will be only from the ship-owner's *Protection and Indemnity Insurance* (P&I Club), but not from International oil pollution compensation (IOPC) funds or the CLC Fund. This is because condensate is not classified as a "persistent oil", hence not eligible for approximately $200 million if it was a tanker of the same size carrying a persistent oil - such as crude. The limit of liability for environmental damage is near the upper threshold required under the federal *Marine Liability Act* for a convention vessel.

Condensates are liquid hydrocarbon mixtures recovered from natural gas reservoirs. They are composed of C_4 (butane etc) and higher carbon number hydrocarbons and have an API between 50° and 85°. As such, they are volatile and potentially explosive. This risk, including inhalation of vapours, poses a safety and health hazards to responders. The product is non-recoverable, hence the rationale for not been covered by the IOPC and CLC fund regime. The response strategy is to let it evaporate and reduce exposures to humans and structures (buildings).

Its impact in the marine environment is short - measured in hours to a few days - but harsh. Marine mammals (whales, seals, otter, etc) and birds will suffer the same inhalation impacts as would people if exposed to high ambient air concentrations. Plankton are readily killed by any exposure to dissolved condensate in the marine water column. However, the impact to the planktonic population is short-term due to high recruitment potential. Condensates that contaminate coastal marsh vegetation, shellfish beds, or shore-based organisms can suffer immediate acute impacts. Recruitment (replenishment/growth) of heavily contaminated areas could be years.

Canada and British Columbia do not have a Natural Resource Damage Assessment (NRDA) process, such as in the United States (also see US NOAA). The Canadian domestic spill compensation regime - the *Ship-source Oil Pollution Fund* (SOPF) - does not accept claims for natural resource damages as a legitimate criterion.

A decision regarding where to locate a tanker with condensates into a place of refuge to undertake damage control is problematic. The level of coastal resource information, decision-making process, and community understanding to make such a decision is not well established.

Scenario #6: Chemical tanker loses engine power during a severe storm and runs aground on Queen Charlotte Islands.

Vessel:	Chemical Tanker 35,000 DWT
Registration:	Foreign-flagged (Marshall Islands)
Owner:	South Korean Company
Amount Product Released:	1,000 metric tons (7,670 bls) Bunker C / 80 metric tons (613 bls) diesel.
Location:	Remote outer west coast

National Maritime Museum, London

A 35,000 DWT chemical tanker while *en route* to the Port of Vancouver from South Korea lost engine use during gale to hurricane sea conditions. The tanker was 60 nautical miles west of the Queen Charlotte Islands when it began drifting. There were no tugs-of-opportunity within the area capable of a high-seas rescue. Two large ocean-going tugs were dispatched from Vancouver and Port Angeles. The chemical tanker grounded before these tugs arrived. The location was a remote, rock cliff cove with shallow reef. The tanker carried 1,000 metric tons (7,670 barrels) of bunker fuel and 80 metric tons (613 barrels) of marine diesel oil. Though a lot of hull damage incurred - with total loss of bunker fuels - there was no rupture of chemical tanks. The oil was not recoverable due to sea conditions. The tanks carried a mixed load of several different hazardous chemicals - acids, caustics and phenols. The tanker remains stranded in the cove on a rocky reef. Although pre-arrangement was established by the ship owner with Burrard Clean Operations (a Transport Canada, certified Response Organization), the Responsible Party chose not to hire them.

Context: Chemical tankers use the Great Circle route to trade with Asian-Pacific and Pacific west coast ports. They generally travel between 30 and 100 nautical miles off-shore. Chemical tankers do not have to abide by the Canadian Tanker Exclusion Zone. Severe storms are common in this area. Drift rates for high profile vessels, such as chemical and LNG tankers, vehicle RO-RO vessels and container vessels can reach 3.6 knots per hour. There is little to no rescue tug capability in the Queen Charlotte region, unless there happens to be a Canadian or US tug-of-opportunity nearby.

Potential Issues: For scenario #6, the funds for response, compensation, and penalties will be only from the ship owner's *Protection and Indemnity Insurance* (P&I Club), but not from International oil pollution compensation (IOPC) funds or the CLC Fund. This is because the cargo is not a "persistent oil".

It is well documented and debated in British Columbia and in the State of Washington the need for a dedicated - or much improved system of - rescue tug capability on British Columbia's/Washington's outer west coast and major straits (Juan de Fuca, Hecate).

Chemical tankers generally carry a mixed load of goods. From a public/worker safety standpoint, they range from benign to very hazardous. Their compartments are strongly constructed (double hulled). As such, the situation where the vessel's hull is damaged, but not the tanks is quite probable. Nevertheless, the tanker can't remain exposed to high sea conditions for long without releasing its cargo. Transport Canada is the lead federal agency to address Hazardous and Noxious Substance (HNS) response on vessels. BC Ministry of Environment is the lead provincial agency for hazardous material spills.

British Columbia's Pacific region has been a leader in Canada in addressing the issue of emergency response for hazardous materials on vessels *via* their *Marine Chemical Emergency Response* (MCER) initiative. Nevertheless, Canada's response capability to manage a ship-based incident involving hazardous materials is weak. The access and removal of the chemicals from the tanker will be extremely dangerous to responders. There is no planning or preparedness on how this could be accomplished.

Burrard Clean Operations (BCO) was not hired for this incident, though the ship owner (Responsible Party) had a legal, contractual arrangement with this Response Organization. Companies/vessels operating in Canada that fall under the *Canada Shipping Act* must have an "arrangement" with a Response Organization to manage any oil spill from their vessel. They are not, however, legally required to employ the RO in the event of an incident. However, this is a moot point as the oil was not recoverable and BCO is neither mandated nor capable of handling hazardous materials on a vessel.

Part 3: Marine Vessel Casualty Response Preparedness

Impediments to Emergency Preparedness - complacency & thinking someone else will do the job

3.0 Introduction

Part 1 (Vessel Traffic) and Part 2 (Vessel Casualty Risk) sets the framework to examine British Columbia's - and Canada's - response preparedness for a major marine vessel casualty. Part 3 analysis needs to be viewed with the understanding that the vessels that frequent coastal waters of British Columbia are generally well managed. Major vessel casualties have been few. The shipping system works well under *International Maritime Organization's* convention regime and Canada's shipping laws. The low number of vessel accidents also attests to *due diligence* of the vessel's owners, their agents, and their charterers. BC's west coast's vessel traffic management and navigational systems are also effective. Nevertheless, there is always room for improvement and a need for oversight by the public, government and industry to ensure continued enhancement on all areas that reduce vessel casualty risk. It doesn't serve industry nor coastal communities well to let complacency slip in.

The marine risk in British Columbia is increasing as vessel traffic volume and ship sizes grow to meet current and pending industrial projects. A major vessel accident can happen anytime, any place, and for any reason. The fictional scenarios in Part 2 offer some vessel risk insights and show that there are institutional and technical gaps in emergency preparedness and response to a vessel casualty. The scenarios also indicate there are more environmental consequences than just spilled oil. Part 3 explores what gaps exist and why, and provides some suggested policy direction for improvements. Subject areas examined are:

➡ Limitations to Canada's Oil Spill Response Organization Regime related to:

- Wildlife Response;
- Managing an Oil Spill Workforce;
- Oily Waste Disposal;
- In-situ Oil burning and Dispersant use;
- Response to condensates, biofuels and canola oil, and
- Financial Assurances

- ➡ Financial Risk and Vulnerability
- ➡ Divergent Response Paradigms between Federal and Provincial Governments
- ➡ Geographic Response Plans to Guide Local Preparedness
- ➡ Rescue Tug Capability
- ➡ Oil Tanker Escort
- ➡ Salvage Operations
- ➡ Places-of-Refuge Decision Making
- ➡ Natural Resource Damage Assessment
- ➡ Building Emergency Planning and Preparedness Capability

3.1 Canada's Oil Spill Response Regime

The design and operation of major vessels are primarily determined by *International Maritime Organization* conventions for ensuring crew and passenger safety, preventing vessels accidents, making arrangement for compensation, and preventing pollution. These conventions come in effect when a majority of nations (states) accede to them - such as Canada under the *Canada Shipping Act* and its regulations.[56] However, the design, arrangement, and level of emergency preparedness for a vessel casualty are left to the individual nation to determine.

As a result of the 1988 *Nestucca* tug and barge collision and the 1989 *Exxon Valdez* oil tanker grounding, marine emergency preparedness and response mechanism became ensconced into the *Canada Shipping Act* and its regulations - at least for the oil spill consequence (See Text Box on next page). The regulation that followed these events was the: 1993 Response Organizations and Oil Handling Facilities Regulation. This regulation establishes an entity called a "Response Organization." Owners of ships and coastal oil handing facilities identified by the regulation are required to have an arrangement with a Response Organization to handle an oil spill that they are responsible for (See Text Box).[57]

Vessels and Oil Handling Facilities required to have an "arrangement" with a certified Response Organization

In 1993, the *Canada Shipping Act* was amended to include regulations and standards to protect all navigable waters by placing requirements on tankers/barges carrying oil in bulk of 150 tonne and greater, on ships 400 tonne and greater, and on oil handling facilities that receive deliveries from vessels included above to have an "arrangement" with a Transport Canada certified Response Organization to manage any spill for which they are the Responsible Party.

A Response Organization has to meet specific spill response planning and preparedness standards to be federally certified. These are the "*Response Organizations Standards*" set out in Transport Canada' s 1995 TP 12401 E document. Once certified, a Response Organization can collect retainer fees from vessel and oil handling facility owners to buy response equipment (vessels, booms, skimmers), to hire staff, and to undertake spill preparedness planning. These fees do not pay for response. Furthermore, having an arrangement with a Response Organization does not guarantee the vessel owner will employ them if there is an oil spill. Employing a Response Organization's services is not a legal requirement of a member client - just paying the fees is required. (See Scenario #6)

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[56] IMO conventions are referenced throughout the *Canada Shipping Act's* regulations, such as the Regulation for the Prevention of Pollution from Ships and for Dangerous Chemicals.

[57] An example of the terms and conditions of an "arrangement with a Response Organization can be found at *Burrard Clean Operations* web-site . Refer to "site menu" and "full membership agreement form".

In Canada, there are four Response Organizations below the 60th parallel: *Burrard Clean Operations*, *Eastern Canada Response Corporation*, *Point Tupper Marine Services*, and *Atlantic Emergency Response Team* (Figure 14). Canada's oil spill regime is essentially the "bench mark" from which to begin assessing marine vessel casualty preparedness in Canada, as oil spill preparedness and response is the only consequence mandated to be funded by the shipping industry.

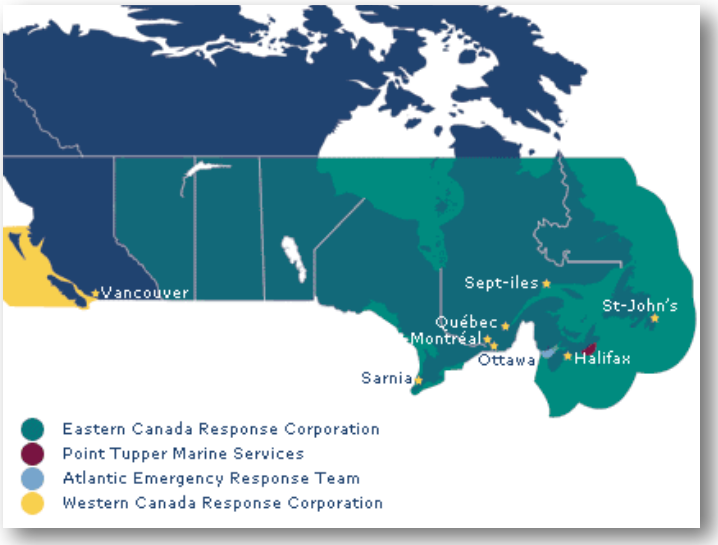

Figure 14: Response Organizations in Canada

The History and Current Mandate of Canada's Response Organizations

The report of the *Public Review Panel on Tanker Safety and Marine Spills* (the Brander-Smith Report), released in 1990, together with internal reviews by the Government of Canada and a number of independent studies, made it clear that Canada's ability to respond to oil spills of significant size was deficient. With this in mind, the panel recommended that Canada increase its response capacity at a regional level to the point where it could address spills of up to 10,000 metric tons. This target preparedness volume is about 1/4 of the amount of oil spilled from the 1989 *Exxon Valdez* oil tanker (44,000 metric tons) - which in turn was about 1/5 of its total load.

In 1990, the *Canadian Petroleum Products Institute* (CPPI) responded to and endorsed a number of the recommendations of the Public Review Panel. Non-members industries of CPPI involved in oil related activities also came on-board - such as private oil companies and shippers. One of the key commitments was an agreement to develop and implement, through a partnership with government, a national program to protect the marine environment. This would include all sectors and industries which might spill oil in the course of their activities.

There were two strategic directions that industry/government could have taken to meet this intent:

1) re-instate the *Ship-source Oil Pollution Fund* and establish a central, government funded response agency paid with industry money, or
2) establish a separate private-sector response organization that is industry funded and managed.

The second approach was chosen. The primary reason for **not** opening up the SOPF (item 1)as a funding mechanism is that the oil handling and shipping industry have paid into the fund only a small levy of 15 cents *per* tonne imported/transfered oil, and for only a short period from 1972 to 1976. This was when Canada's oil fund was the *Maritime Pollution Claims Fund*. No levy has been imposed since 1976. Interest paid by the federal government (a.k.a. "tax payer") that has accumulated on the original $34,866,459.88 now amounts to $363,782,610.94. In-addition, the oil shipping industry's annual contribution to the *International IOPC Funds* is paid directly from the SOPF. The IOPC has received approximately $42 million out of the fund since 1989. As it is now, it is too good of a deal for industry to change this arrangement back in 1993.

A second issue negotiated between government and industry was that the focus would be only the oil spill consequences of a marine vessel casualty - not other consequences such as salvage, rescue tug role, other marine pollutants such as cargo. Since 1995, Canada now has a marine oil spill response regime whereby:

- Vessels and designated oil handling facilities are required to prepare *Oil Pollution Emergency Plans* (OPEPs) detailing arrangements for responding to oil spills;
- Spill response preparedness (resources, planning, etc) be funded by the private sector that pose the spill risks; and
- The federal government oversees private sector spill response efforts, and assumes direct operational control only if the situation warrants it.

Burrard Clean Operation's (BCO) geographic area of response includes all of BC's coastal waters and connected common navigable and tidal inland waters. They are Transport Canada certified as a 10,000 metric tons Response Organization.

Oil handling facility's *bulk oil cargo fees* and ship owner's *annual membership fees* fund BCO's oil spill preparedness.[58] It is with these revenue sources that Response Organizations establish their oil spill response capability. For BCO, this revenue is used to prepare for the four tier levels and corresponding spill amounts and equipment deployment times (Table 10).

Tier	Maximum Quantity of Oil Spilled	Response Deployment Time (hours)
Tier 1 - a designated port *	Response planning capability 150 metric tons	**6**
Tier 2 - a designated port	Response planning capability 1,000 metric tons	**12**
Tier 3 - a primary area of response*** or an enhanced response area**	Response planning capability 2,500 metric tons	**18**
Tier 4 - a primary area of response or an enhanced response area	Response planning 10,000 metric tons	**72**

* Only designated port in BC is Vancouver Harbour: (Boundary Bay; the waters bounded by a line drawn from a point on shore originating at the Canada-United States border on Point Roberts due west along the international border to a point 123°19.3'W, then north to a point 49°14'N, 123°19.3'W, then to a point 49°15.5'N, 123°17'W; the waters of Burrard Inlet east of a line drawn between Point Atkinson Light and Point Grey.)
** Only **enhanced response area** in BC is Juan de Fuca Strait (All the Canadian waters between the western boundary of a line drawn from Carmanah Point on Vancouver Island to Cape Flattery, Washington State, and the eastern boundary consisting of a line running along the 48°25'N parallel from Victoria, eastward, to the Canada-United States border.)
*** **Primary area of response** is essentially the remainder of coastal Canadian waters. (All the Canadian waters between the northern boundary of a line drawn from the point 49°46.5'N, 124°20.5'W on the mainland, through Texada Island, to the point 49°22.5'N, 124°32.4'W on the shore of Vancouver Island and the southern boundary consisting of a line running along the 48°25'N parallel from Victoria, eastward, to the Canada-United States border.)

Table 10: Tier Levels for Marine Oil Spill Preparedness by a Response Organization

How a Response Organization Serves their Client

When a Response Organization (RO) is called out, the Responsible Party (RP) provides the Incident Commander responsible for the overall management of the response including the approval of action plans and making financial commitments on behalf of the company. If the RP has an incident management team – such as a major oil or shipping company – then RO personnel integrates within. If only a single representative of the RP – such as P&I Club insurance representative for a foreign-flag vessel – then the RO provides most of the organizational elements other than a "command" role. The RO will assist in providing incident organization to facilitate the management of spill activities related only to on-water response and shoreline cleanup of oil – according to Transport Canada's, RO Planning Standard, TP 12401 E.

In BC, the emergency management system used by Burrard Clean Operations (an RO) is the Incident Command System (ICS). The ICS is extensively used by international oil and shipping industries. It is the foundation of the provincial "all-hazard" BC Emergency Response Management System (BCERMS), and the US National Incident Management System (NIMS) The ICS is designed for command post (site) level management to guide tactical field operations. The Canadian federal government agencies have not universally adopted the ICS

[58] Bulk oil cargo fees are based on amounts and types of product transferred at coastal oil terminals and provide the largest proportion of BCO's revenue which can be several thousands a dollars a year, whereas, annual membership for each ship owner is only $450.00 *per* year. BCO's 2006 spill preparedness budget was about $4.2 million and their expenses were about $3.8 million. Response Organizations are not-for-profit organizations. Source: Burrard Clean Operation's revenues and expenditures are posted on their web-site under financial information.

As previously noted, the services of a Canadian Response Organization are pursuant to the *Response Organizations Standards* set out in Transport Canada' s TP 12401 E. These services are limited to four planning and preparedness activities related to an oil spill from a vessel or oil handling facility, of specified sizes, and for up to 10,000 metric tons. These actions are to plan to prepare:

- To deploy response equipment within time standards of 6 to 72 hours after notification depending on location of spill (e.g. "designate port" "primary" or "enhanced" area);
- To remove oil from water with 10 days, once operational;
- To treat a minimum of 500 meters of oiled shorelines *per* day and,
- To hold oily wastes for 24 hours.

These services reflect a private-sector regime for Canada that focuses on the "spill" component of the vessel or oil handling facility accident – not on the casualty itself. As such, a Response Organization does not undertake the following consequences of a vessel casualty:

- Salvage (emergency repair),
- Firefighting,
- Lightering (removal of cargo and fuels);
- Cleanup of non-oil pollutants such as hazardous materials, containers or bulk goods;
- Response to oils not stipulated under CSA (biofuels, condensates, canola).[59]

If a vessel casualty requires any of the above services, but there is no oil spill or threat, a Response Organization is not required to attend (See: Scenario #6). The entire incident management and tactical operations then becomes the responsibility of the ship-owner. The owner could just be a foreign agent with a small regional office in Canada, with its headquarters located anywhere in the world. If the ship-owner is unable or unwilling to respond, then incident management can become the responsibility of government. This has both operational and political consequences (examined later).

The long list of vessel casualty activities also competes with limited response funds. They also need to be incorporated into the overall incident management organization, response objectives and strategies. As such, each of the above response activities must be prepared and planned for to determine their efficacy and to ensure that they are "reasonable" measures and expenditures.[60] As with an oil spill, there is high industry and government accountability to ensure these other response actions will protect coastal environments and be undertaken in a timely and effective manner.

As stated in the "issue" section of this report, the fundamental reason why these services were not addressed after the *Nestucca* and *Exxon Valdez* marine casualties is that industry and government focussed on only the spilled oil. Consequently, there is little government or industry response preparedness to mitigate environmental impacts from the vessel and its cargo. These issues are examined more fully in this report.

Since Canada's Response Organization oil spill regime is essentially the "bench mark" from which to begin assessing marine vessel casualty preparedness, it is worthwhile to examine whether the mandated standards are adequate.

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[59] *2001 Canada Shipping Act:* PART 8 - POLLUTION PREVENTION AND RESPONSE - DEPARTMENT OF FISHERIES AND OCEANS definition "oil" means petroleum in any form, including crude oil, fuel oil, sludge, oil refuse and refined products

[60] The test of reasonable cost is tightly tied to government policy -both federal (Transport Canada TP 6217 Costing Principles and Standards and *Marine Liability Act*) and BC Ministry of Environment's emergency programs principles and approaches. However, the "test" is very subjective and is not defined in legislation, and therefore reasonable measures and cost are often defined by standard, proven response practices used world-wide.

3.2 Improvements in Marine Oil Spill Preparedness

The following looks at oil spill response planning and preparedness activities as established by the current legislative framework of Canada's oil spill response organization regime. Discussion will show that there are still substantive improvements required to meet public and political expectations with respect to coastal protection during a major marine oil spill.

Transport Canada is currently under taking a *CSA 2001 Regulatory Reform Project* for all the regulations under the act - including its emergency response regulations (See Text Box). The improvements noted below fall within the terms-of-reference of amending these regulations.

***Canada Shipping Act* - Regulatory Reform**

On July 1, 2007, the *Canada Shipping Act, 2001* (CSA 2001) replaced the *Canada Shipping Act* as the principal legislation governing safety in marine transportation and recreational boating, as well as protection of the marine environment. It applies to Canadian vessels operating in all waters and to all vessels operating in Canadian waters. The CSA 2001 promotes the sustainable growth of the marine shipping industry without compromising safety.

The original *Canada Shipping Act* was one of Canada's oldest pieces of legislation, and was based on the *British Merchant Shipping Act* of 1894. It had been amended many times over the years and had become difficult to use and in need of reform. The reform of the *Canada Shipping Act* was initiated in 1997 and evolved on two tracks. The first track resulted in Bill C-15, which received Royal Assent in June 2001 and revised provisions dealing with ship ownership, registration, and mortgages. It also added a preamble to clarify the Act's objectives and interpretation. The second track resulted in Bill C-14, which received Royal Assent on November 1, 2001 as the *Canada Shipping Act, 2001*.

Following Royal Assent of the CSA 2001, a regulatory reform initiative was launched to develop the supporting regulations required to bring the new Act into force. The process involved consultations with a wide range of marine stakeholders. Source: CSA regulatory home page.

Within Canada's oil spill response regime, there is room for improvement. The *Canada Shipping Act's* regulation and referenced *Response Organizations Standards* are so narrowly defined that a Response Organization might not achieve the full scope of response activities to effectively address a 10,000 tonne oil spill or larger. The areas requiring enhanced planning and response capacity by a Response Organization are:

- Wildlife rescue and rehabilitation;
- Managing a large oil spill workforce;
- Final oily waste disposal;
- Alternative response methods such as in-situ oil burning and dispersant use, and
- Response to Oil Products not Defined Under the *Canada Shipping Act*..

To achieve new and enhanced emergency preparedness for oil spills, a Response Organization will require increases in funding by their member clients. During a response, the Response Organization, as well as other contracted services, require better financial assurances that they will be paid by their client. These latter issues are also explored more fully in this report.

3.2.1. Oiled Wildlife Response

The key objective of wildlife response is to minimize animal suffering. Prompt initiation of professional oiled wildlife response personnel that can quickly assess natural resource impacts, collect harmed animals, and provide either a means for humane rehabilitation or euthanasia will minimize wildlife suffering.

Experience has shown that the amount of wildlife contamination is not the primary determinant of survivability, but how long the animal has been exposed and/or remaining in the field. A highly oiled bird that has been captured and appropriately cared for within a few hours of being contaminated has a greater chance of survival – and less suffering - than a lightly oiled one left in the wild for days.

Other objectives for wildlife response are to ensure it is an organized, efficient, transparent, stakeholder inclusive, and fair process. A professionally managed wildlife response – in look, feel and delivery - founded on established incident management and wildlife care practices fosters public confidence.

Experience has also shown involvement of local wildlife rescue organizations, environmental groups and the general public is critical to the success of many oiled wildlife responses. Providing care to oiled wildlife demonstrates the Responsible Party's commitment of make a coastal community whole again.

Protester - 2002 *Prestige* oil tanker spill (Galicia - Spain)

If no organized response is present, pictures of heavily oiled or dead animals in the media will often stimulate people to help the animals themselves, potentially putting themselves and the animals at even greater risk. Conversely, an organized oiled wildlife response that is part of the wider incident management effort provides opportunities for skilled wildlife responders and the public to contribute safely to the response effort. (See: Text Box)

About Public Expectations during a Major Oil Spill

Two oil spill activities that have the highest pubic performance expectation - hence political and corporate accountability - are caring for oiled wildlife and cleaning oiled shores. These impacts foster the greatest public outcry from an oil spill, not the offshore oil slick *per se*. Of the 57 largest oil spills in the world, only a handful have invoked intense global public and media attention, such as the following oil tanker incidents:

- 1967 *Torrey Canyon*, U.K.
- 1978 *Amoco Cadiz*, France,
- 1989 *Exxon Valdez*, Alaska,
- 1996 *Sea Empress*, U.K.,
- 2002 *Prestige*, Spain.
- 2007 *Hebei Spirit*, South Korea.

The public outcry was not directly related to the amount of oil spilled from these events, but to the fact that they all significantly oiled shores and/or wildlife. This reaction is because public perspective and concern regarding the level of response effort towards onshore contamination is far more heightened than that of offshore activities such as oil booming and skimming. It is far easier to establish an isolation zone between the public and offshore response operations as compared to on shore and wildlife response operations. The general public cannot readily see offshore oil effects on the environment. Similarly, the public cannot readily draw opinions on the effectiveness of offshore recovery operations. For example, the recognition that even under good conditions mechanical recovery of oil (booms & skimmers) rarely exceeds 10 to 15 percent of the released oil does not appear to be a public issue. What is important is that there "appears" to be boom and boat equipment deployed. The Responsible Party - often with support of government - will deploy booms even though they are ineffective - termed as "media props". Examples of "media props" used were during the Queen of the North Ferry sinking and Dalco Passage oil tanker waste discharge events. These incidents had unrecoverable oil because the slicks were oil sheens - too thin to boom or skim.

In contrast, once a persistent oil (crude, bunker) reaches the shorelines its impacts are quite evident to people. This raises public concerns and in turn expectations of responders. Not establishing a well managed shore clean up or wildlife response workforce will be very contentious to the public. They can see and often directly experience these endeavours. Keeping oil off shores and wildlife has both political and ecological benefits, as well as being prepared if it does.

Oiled wildlife response is partially ensconced into Canada's oil spill Response Organization regime to include only the hazing (scaring away) birds to prevent them from descending on oiled

waters or shores. This level of service would not necessarily meet the public expectations stated above, let alone guarantee adequate protection of wildlife resources.

The fundamental problem is that oiled wildlife response is not treated with the same urgency, application of resources and organization as other spill response actions such as shoreline cleanup. The latter has well established procedures for determining which shores require treatment, how, and to what level.[61] To seek the same direction for oiled wildlife - such as determining which wildlife species to be cared for - can result in a heated debate between the Responsible Party and government agencies. This lack of preparedness and debate were evident during the *Andre* bunker spill in Burrard Inlet, British Columbia on July 4th, 2006 (See: Text Box).

Bird Capture and Rehabilitation during the *Andre* Bunker Oil Spill (2006)

The bulk carrier *Andre* spilled over 7,500 litres (63 barrels) of oil into Vancouver Harbour in July 2006 while the vessel was bunkering at anchor. The Responsible Party (vessel owner) - as represented by its Protection & Indemnity (P&I) insurance representative - agreed to pay to capture, assess and stabilize affected birds. These actions where undertaken by Focus Wildlife - a professional (fee-for-service) contractor. For these initial activities, Focus Wildlife was retained under the auspices of Burrard Clean Operations - a Transport Canada certified Response Organization (RO). Hiring sub-contractors is the standard practice for RO's to deliver services, such as shoreline cleanup.

Forty-six oiled Canada Goose affected by the spill were considered candidates for further rehabilitation as determined by the contractor and a provincial veterinarian. Two cormorants were euthanized due to heavy oiling. The RP refused to undertake further care (rehabilitation) of these birds because they are a common species and the cost *per* bird would be high. The RP viewed further treatment as unreasonable measures and cost. The federally regulated Canada Goose is not a species at risk nor would their loss adversely affect populations in the area. Nevertheless, the Canadian Wildlife Service (CWS) directed the RP to rehabilitate these birds. The RP stood their grounds and refused to provide operational funds beyond consumable supplies (i.*e.* but no more fees for services).

At this juncture, CWS assumed responsibility for the care of these birds, but also did not provided additional operational funds to Focus Wildlife to complete bird rehabilitation and release. Furthermore, CWS directed them not to euthanize them. As well, BCO revoked the contractor arrangements with Focus Wildlife so as not to incur the financial risk for a facet of spill response not mandated for an RO. RO's do not have a "response budget"; it is strictly pay-as-you-go. Furthermore, a RO can not seek reimbursement for a monetary loss under the federal *Marine Liability Act*. Releasing Focus Wildlife from working as a sub-contractor to BCO was essentially a "business" decision.

The outcome was Focus Wildlife - a private contractor - was left with 48 oiled Canada Geese in boxes to care for. They established a temporary wildlife care facility and rehabilitated and released the birds at their own expense - approximately cost of $60,000. The delay incurred in determining the final disposition of the birds had doubled the cost of wildlife care. This incident drew public attention - particularly from the non-government wildlife rehabilitation organizations. The NGO's made it very clear to the shipping industry and government "free" wildlife care service will not longer be provided to a spiller.

Transport Canada under the Canada Shipping Act successfully fined the vessel owner a $5,000 financial penalty and ordered them to pay $75,000 toward research, conservation and protection of migratory bird habitat in the Georgia Basin. The latter funds went to Canadian Wildlife Service. Focus Wildlife has yet to be paid for caring for birds under federal jurisdiction.

As with any facet of emergency response, there has to be an operational guideline that ensures that all parties - industry and government - agree to what are reasonable measures and hence reasonable costs. "Reasonable cost" does not mean setting a monetary ceiling, but instead provide clear criteria and rationale for mitigative measures, and ensure that these actions are:

- ➡ Proven and practical in-the-field
- ➡ Implemented according to established protocols

[61] The process for determining shorelines for cleanup, treatment options, and end-points is referred to as *Shoreline Cleanup Assessment Technology (Team)* - SCAT. The process was established by Environment Canada in late 1980's and has been since adopted world-wide.

- Based on technical assessments and ecological criteria
- Linked to mutually agreed upon response objectives and strategies by the Responsible Party and lead government agencies
- Effectively delivered under the Incident Command System
- Managed by a professional contracted services, and
- Delivered by a paid, trained and supervised workforce.

The matter of what are deemed reasonable actions/costs can potentially "trump" government legislation, such as the *Canada Shipping Act*, *Fisheries Act*,or *Migratory Bird Act*. Reasonable cost criteria can also trump political and public expectations. The reason is that reasonable cost is referenced in legislation and policy, but not well defined. Any person can seek a legal opinion and resolution from a higher court. Judges tend to be sympathetic to individuals - including companies - who consider that a law was delivered in a draconian, unreasonable way.

Historically, the cost of wildlife response in British Columbia has been borne by non-government "volunteer" animal welfare organizations such as the *Society for the Prevention of Cruelty to Animals* (SPCA). This is essentially a free service to the Responsible Party (spiller) and to the government trustees of the wildlife resources affected. Though very dedicated and hard working, volunteers cannot meet the rigorous demands of an emergency. Voluntary oiled wildlife groups lack the necessary emergency management skills and extensive resources (time, staff, and equipment) to commit to the response effort. As individuals, wildlife rescue and rehabilitation personnel are collectively a great resource for oiled wildlife response, in so far as they are managed by qualified and professional emergency personnel knowledgeable in this specialized area. Lastly, wildlife response planning, direction and operations have largely been outside the incident management system for spills.[62]

As a result, of this arms-length and free service there has been little work on defining reasonable measures and hence cost for oiled wildlife response. The exception is by the BC Ministry of Environment's Environmental Emergency Program that has drafted an *Operational Guideline on Oiled Wildlife Response* to support delivery of its *Marine Oil Spill Response Plan*. This is in keeping with the provincial policy direction on oiled wildlife rescue and rehabilitation:

> *To clarify the Provincial position regarding wildlife treatment, the Ministry will adopt guidelines for the rehabilitation of birds and animals, including endangered species.*
> Source: BC Marine Oil Spill Prevention and Preparedness Strategy

This operational guideline has not been finalized as it does not fully harmonize with the federal and provincial policies on oiled wildlife response.[63] Nevertheless, the document does set the stage for progress in this area. The draft guidelines identified eight response measures as being reasonable:

1. To assess initial and projected wildlife impacts
2. To ramp up and prepare for wildlife response
3. To capture all oiled wildlife

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[62] S Reid, C. Battaglia and C. Doucette 2007. *A Review of Factors that Influence Reasonable Cost and Actions with-in Oiled Wildlife Response*, Prepared for the *9th International Effects of Oil on Wildlife Conference*. Monterey, California 25–29 June, 2007

[63] The Government of Canada's wildlife response is guided by their January 2000 *National Policy on Oiled Birds and Oiled Species at Risk*. The Canadian Wildlife Service (CWS) of Environment Canada is the agency for implementation of this policy. CWS is charged with the administration of the *Migratory Birds Convention Act*. There will be an additional responsibility under federal endangered species legislation for all listed species at risk under its jurisdiction. The Marine Mammal Regulations of the *Fisheries Act* specifies prohibitions and legal authorities respecting marine mammals in Canada. The *Fisheries Act* prohibits any person from disturbing marine mammals, except when the individual or organization is authorized to do so by a licence or aboriginal authority. This Act and regulation is administrated by Fisheries and Oceans Canada.

4. To assess, stabilize and document all oiled wildlife
5. To establish a temporary oiled wildlife care facility
6. To rehabilitate oiled wildlife according to their recovery potential and *for those species directed by government*
7. To release wildlife back to the environment, and
8. To clean, re-inventory and re-supply equipment used.

The stumbling block in moving forward in oiled wildlife response preparedness is where a government decision has to be made on which species of bird or animal that has a good chance of recovery should be rehabilitated (See: Item 6 italic highlighted caveat) Rehabilitation (stabilization, cleaning, feeding, de-oiling, and release) is often the most costly component of the overall wildlife response process - especially if there are only a few animals assessed as candidates for continued care. The unit cost *per* animal can be high, and hence viewed by the Responsible Party as "unreasonable." If the RP refuses to rehabilitate a particular species of oiled wildlife, it is up to the government to advise them to do so based on "reasonable" criteria, or to rehabilitate the animals themselves at their cost. Alternatively, they can instruct the RP to euthanize a particular species of wildlife.

The debate on reasonable actions (costs) rests on whether the criteria for rehabilitation should be on "philosophical" grounds where the polluter has injured the animal and therefore is morally obligated to save them all OR on "ecological" grounds where only selected wildlife species that are designated as either: *Endangered*, *Threatened* or *of Special Concern* under the *Species at Risk Act* (SARA) are required to be rehabilitated.[64] [65] [66] Neither grounds preclude a Responsible Party from treating all oiled wildlife for corporate image or other reasons. The issue mainly arises when there is:

1. only limited funds for spill response and choices have to be made - clean beaches or treat birds;

2. a bottleneck in wildlife response that causes undue stress to captured animals that then need to be euthanized.

The issue will also arise if government assumes responsibility for the spill (e.g. mystery spill) and has to abide by the criteria they had established for reasonableness for the private-sector.

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[64] Canada has pledged to protect these species and overall ecological diversity in accordance with *United Nations Convention on Biological Diversity* (1992), and under the *National Accord for the Protection of Species at Risk* (1996). As such, government conservation programs use species ranks as criteria when they set conservation priorities. These rankings can also be used to set priorities for both wildlife protection and treatment during an oil spill.

[65] In comparison to oiled wildlife decision-making, the decision-making process for oiled shores has matured over the last decade. The *Shoreline Cleanup Assessment Technique* (SCAT) process is no longer based on "every" shore will be treated regardless of cost, but decisions are now largely based ecological and physical criteria to achieve a net environmental benefit. The contentious issue is usually agreeing on when is a treated shore clean.

[66] The federal government's *National Policy on Oiled Birds and Oiled Species at Risk* policy guiding response priorities has an ecological basis, stating:

> *In comparing the seriousness of damage to different components of an ecosystem and in setting priorities for response, CWS uses the criterion of 'time to recovery'. Species which are abundant and have short generation times are likely to re-establish population levels more rapidly after a spill, and are thus of lesser concern than species such as pelagic seabirds. Those birds have long generation times, and with a clutch of only one egg, have a restricted reproductive potential. Species at risk are those which may already have much reduced populations and a negative population trajectory, or occupy limited geographical areas at different times of the year. These make large proportions of the population vulnerable to oil spill events and are thus unlikely to recover naturally following a population reduction.*

SUGGESTED POLICY DIRECTION OILED WILDLIFE RESPONSE	
Canada's oil spill Response Organization (RO) regime should expand their wildlife response capability and capacity to include hazing, capture, assessment, rehabilitation and release of oiled birds and mammals. Within 24 hours of a spill, a RO should have capability to mobilize personnel and equipment to haze, capture and transport oiled wildlife. There should be at least two mobile (vehicle or trailer) facilities for a Tier 3 response capability and four for a Tier 4. Within 72 hours of a spill, a RO should have capability to establish a fully operational temporary Wildlife Care (Rehabilitation) Centre for the continued assessment, stabilization, and treatment of oiled wildlife. The capacity of the centre should be able to handle a minimum of 200 birds, 10 sea otters, and 10 seals for a Tier 4 response capability. These mobile and fixed facilities are deployed, constructed and operated under established oiled wildlife care protocols. Management of oiled response is provided by a professional (fee-for-service) contractor. Oiled wildlife tactical response is delivered by a paid, trained, supervised and qualified workforce primarily from the local wildlife rehabilitators groups. These oiled wildlife response measures should be stipulated in the Response Organizations and Oil Handling Facilities Regulation and guiding *Response Organization Standards* as part of Transport Canada's *CSA 2001 Regulatory Reform Project*. Government agencies with trustee (stewardship) mandates for coastal marine wildlife protection need to develop an operational guideline that reflects "reasonable actions/costs", best oiled wildlife care practices, and oiled wildlife response implementation under the Incident Command System for emergency response. Recognizing that captured wildlife must be cared for until a decision has been made to either euthanize or rehabilitate, a Response Organization and/or their sub-contracted services require financial indemnification if there is no – or a protracted – government decision on their final disposition.	
POLICY DELIVERY	
Temporary Wildlife Care (Rehabilitation) Centre and supporting Mobile Wildlife Response Vehicles/Trailers	Mobile Response facilities are vehicles or trailers that can arrive at the "beach-head" to deploy wildlife rescue personnel and in turn receive captured oiled wildlife, undertake initial care for their transportation to a temporary Wildlife (Rehabilitation) Centre. A Wildlife Care (Rehabilitation) Centre requires having: ➡ siting and facility criteria; ➡ a design and layout of the facilities specific for birds and for mammals; ➡ an organizational structure for wildlife response within these facilities with reporting relationships and duties (including administration); ➡ equipment drawings and specifications for pens, pools, water systems as *per* species specific rescue/rehab requirements to facilitate construction; ➡ preliminary pre-built pens and pools for immediate use; ➡ capture, stabilization and transport equipment and supplies for immediate use; ➡ a tagging and storage system for mortalities; ➡ an operational guideline and supporting documentations and tracking systems ➡ management by qualified professional oiled wildlife response organization under fee-for-service principle. ➡ a "Wildlife Branch" under Operations Section within the Incident Command Post, and a dedicated technical specialists in the Environmental Unit to prepare an Oiled Wildlife Response Plan.

3.2.2. Managing a Large Oil Spill Workforce

The *Response Organizations Standards* set out in the Transport Canada' s TP 12401 E required *"A minimum of 500 m of shoreline is to be treated each day".* This standard is a planning and preparedness guideline for a Response Organization to meet and to demonstrate in order be certified by Transport Canada. This rate of shoreline cleanup would not necessarily require a large cleanup workforce.[67]

Shoreline Cleanup Workers - *Prestige* oil tanker incident- Spain

British Columbia does not have a capability to establish and manage a large oil spill workforce for a major oil spill. Two reasons for this are: first, the planning/preparedness standard for a RO is very low, and second, oil spill exercises have focused only on initial on-water response phase of a marine oil spill. On-water response exercises typically end before oil has reached the shore. In British Columbia, there is rarely (if ever) marine oil spill exercises that have begun with an oiled shoreline. The gathering, registering, screening, training, supervising, deploying a workforce can be much more challenging than that of an on-water oil recovery.

Shoreline Cleanup Workers - *Hebei Spirit* oil tanker rupture - South Korea

As mentioned for wildlife response, the lack of good management of a workforce for cleaning oiled shores can have adverse political and corporate ramifications.

When the *Prestige* oil tanker sank near Galicia (Spain) in November 2002, there was over 10,000 people cleaning oiled shores. The tanker was an 18,000 DWT Aframax oil tanker - single hulled and old. It lost about 80% of its 77,000 metric tons of heavy fuel oil. The shore workers included contractors, military, and public volunteers. This resulted in adversarial group dynamics and difficulty in properly matching equipment with people. It also resulted in large fluctuations of people on the beach at any given time where: contractors stayed, volunteers worked weekends, and military worked weekdays (Figure 15).

The size of the *Prestige* shoreline cleanup workforce doesn't even compare with that of the 2007, *Hebei Spirit* oil tanker incident in South Korea. This tanker was carrying 260,000 metric tons of crude oil when struck by a crane on a barge that ruptured its hull - spilling an estimated 10,800 metric tons of cargo. This volume is just over Canada's Response Organization Tier 4 planning/ preparedness standard of 10,000 metric tons. *The Hebei Spirit* accident resulted in a much larger and more diverse workforce of over a million people.

[67] It has been generally understood by industry, BCO and government that "volunteers" will not be used to rescue and treat oil birds, to clean oiled shores, or to remove oily wastes. Instead, a paid "workforce" will be used instead. Public can volunteer to register with this workforce, but after that they are essentially employees. This workforce arrangement was established by the BC Ministry of Environment in the early 1990's.

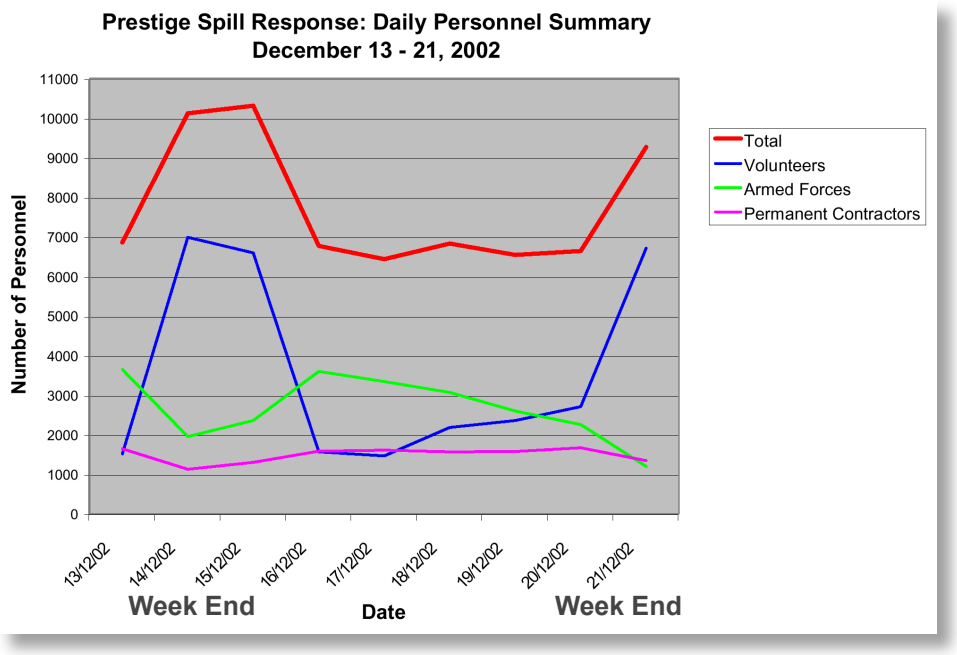


Figure 15: Graph of Shoreline Workforce Attendance for One Week (*Prestige* Oil Spill)

On November 7th, 2007, the container vessel *Cosco Busan* collided into a pier of the San Francisco-Oakland Bay Bridge resulting in the breach of two wing-tanks used for fuel. The total amount spilled was 53,569 gallons (1,275 bbls) of heavy fuel oil (IFO 380). The San Francisco Bay area public quickly converged to volunteer for oil spill cleanup. There were less than 1,000 volunteers. Nevertheless, the Incident Commanders were taken by surprise with this outpouring of convergent volunteers willing to help pick up oil off of beaches. However, with no volunteer training protocols or materials in place, agencies were forced to pull together training materials and protocols during the spill response itself, taking time away from other duties. This resulted in long and frustrating delays that negatively affected overall response management. US federal regulations require minimum training before responders can enter the oil spill collection areas to avoid exposure to hazards. Furthermore, their *Area Contingency Plan* discourages the use of convergent volunteers for cleaning up oil. As such, screening, hiring, and training is required to create a safe and qualified workforce. This effort takes significant planning, time, and effort.

An *Incident Specific Preparedness Review* for the response to this marine casualty was convened the U.S. Coast Guard and provides more detail on this issue, as well as other issues that can be expected in British Columbia for a similar type of event.[68] As well, new US guidelines on convergent volunteer management were drafted

[68] Source: 2008, Incident Specific Preparedness Review (ISPR) *M/V Cosco Busan* Oil Spill in San Francisco Bay :REPORT ON INITIAL RESPONSE PHASE

SUGGESTED POLICY DIRECTION MANAGING A LARGE OIL SPILL WORKFORCE	
The Response Organizations and Oil Handling Facilities Regulation and guiding *Response Organization Standard* should focus on oil spill workforce capacity, not on the minimum length of shoreline treated *per* day. The regulation should make it explicit that unpaid convergent volunteers for shore cleanup and wildlife response are not allowed to be used by a Response Organization for oil spill response. Public interested in or canvassed to work on spill response must be managed as a registered, trained, equipped, supervised and paid "workforce". For tier 4 response planning, the workforce capacity should be a minimum of 1,000 workforce members that are readily expandable to 5,000 members within 48 hours and 72 hours respectively. Timelines should begin after areas of shore are no longer subject to "re-oiling" and the Shoreline Cleanup Assessment Technique (Team) process has fully begun. For oiled wildlife response, timelines should begin 24 hours before oiled wildlife are expected to be found.	
POLICY DELIVERY	
Large Oil Spill Workforce	Response Organization should have the following structures and systems in place at tier 2 and above response preparedness levels: ➡ A registration system to evaluate, assign, and record personnel assigned; ➡ Code of conduct for workforce members; ➡ Pay schedule based on work assigned; ➡ Identification card to verify assignments; ➡ A workforce training program on basic oil spill safety and function specific tasks (e.g. shoreline cleanup, oily waste management); ➡ A workforce supervisor training program; ➡ A mechanism to match cleanup resources with workforce members and their tasks. At least every third major exercise for RO re-certification should focus on shoreline cleanup/workforce management.

3.2.3. Oily Waste Disposal

A large workforce is required to collect and move oily wastes from shores to a temporary storage area at a beach head. Oily waste storage is also required for on-water response. A lack of temporary oil storage capacity is often a major impediment to both on-water and on shore cleanup.

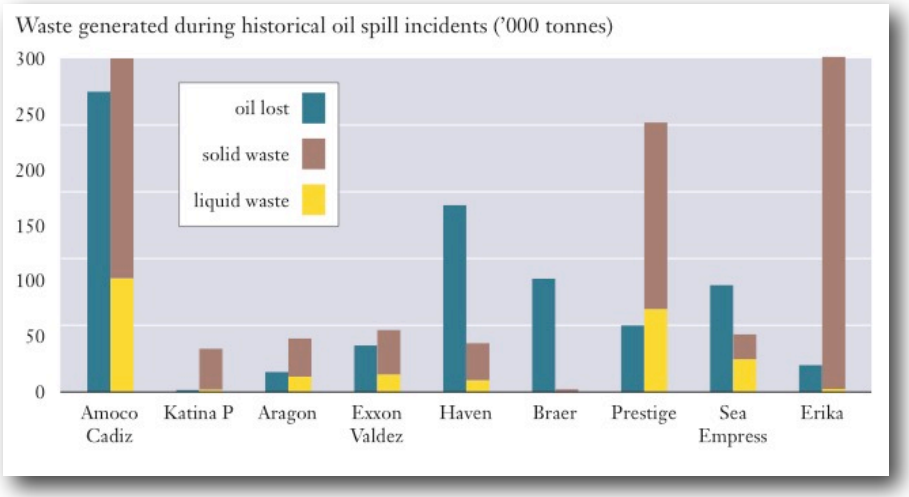
The Response Organization Standard requires a Response Organization to have custody of an oily waste for a 24 hour period or less. After that period, it is up to the Responsible Party and government - mainly the Province - to come up with both additional temporary storage capability and final disposal solutions.

The *Response Organizations Standards* set out in the Transport Canada' s TP12401E states the following requirements for oily waste management:

The equipment for use with respect to an oil spill in a geographical area includes oil recovery units necessary for the operational requirements in that geographical area in addition to:

> (a) a sufficient primary temporary storage capacity to maintain recovery operations of oil or oily-water waste continuously during a 24-hour period and a sufficient secondary temporary storage capacity to store at least twice the total quantity of oil or oily-water waste collected by the response organization's oil recovery units that are used in a 24-hour period; or
>
> (b) a primary temporary storage capacity and a secondary temporary storage capacity that are less than those referred to in paragraph (a), where the efficiency of the oil recovery devices or the capability to decant water reduces the volume of storage required, or alternative temporary storage or disposal locations are available within the geographical area.

A marine oil spill produces large amounts and variety of oily wastes that need to have both temporary and final storage solutions. In many cases, the volume of oily waste can greatly exceed the initial volume of oil spilled. (Figure 16)



Source: International Petroleum Industry Environmental Conservation Association, REPORT SERIES ,Vol. 12 GUIDELINES FOR OIL SPILL WASTE MINIMIZATION AND MANAGEMENT

Figure 16: Waste Generated by Large Marine Oil Spills

The 2002 *Prestige* oil tanker that sank near Galicia (Spain) spilled 63,000 metric tons of heavy fuel oil and demonstrated the problems encountered when temporary oily waste storage was not ready to handle the vast amounts of on-water and on-shore recovered oil, as well as other oiled debris and response equipment (booms, buckets, shovels, bags). Some of the consequences were further contamination of the land-base and infrastructures (backshores, sidewalks, roads, piers) and the mixing of waste-streams (fresh oil, plastics, pails, sorbents, ropes). This lack of a plan, equipment, and monitoring significantly elevated the cost of both the response and of the final oily waste disposal solution. The following photographic collage depicts the situation

Establishing temporary oily waste storage is in the purview of the Response Organization, whereas the final disposal is guided by the Province. Both activities are expected to be paid for by the Responsible Party. Conversely, the Responsible Party will expect that the measures will be reasonable, in that the oily waste management solutions are both practicable and cost-effective.

The expense of final disposal of oily waste from a major vessel casualty can be very high - up to a third of the overall response cost. This cost also competes with the expense of removal of a ship wreck and other pollutants - such as the ship's cargo.

A Newfoundland and Labrador Environmental Industry Association (NEIA) workshop in St Johns NFLD on November 20, 2003 recognized the issues and challenges of final oily waste disposal. This workshop was initiated after the problems encountered by the 2002 *Prestige* and 1999 *Erika* oil tanker incidents.[69] No solutions or commitments to solving final oily waste disposal from a major marine oil spill came out of this workshop.

In Canada, British Columbia has probably made the greatest in-roads to addressing oily waste management during a major marine oil spill. However, these in-roads are still marginal and were initiated over 15 years ago with no further action. In 1993, the BC Ministry of Environment wrote an oily waste management manual to guide the process of managing oily waste streams – fresh oil, oiled shoreline debris, contaminated equipment, etc. In the same year, there was an effort to inventory potential sites for final disposal/ storage of oily waste. A strategic plan for the collection and disposal of oily wastes from a

Management of Oily Waste During an Emergency

All waste disposal (temporary or permanent) must be pursuant to the Environmental Management Act and its hazardous waste regulation.

Spilled oil is a "waste" under this Act as the product is no longer suitable for its original purpose. "Waste oil" is further defined under the Hazardous Material Regulation which provides legal specifications on treatment and disposal. Part 2 of the Act prohibits introduction of wastes into the environment unless it is authorized under specified provisions. However, Section 19 of the Act provides the ability for the Ministry to make variances to the legislation to provide some "regulatory" relief during an emergency.

[69] The oil tanker *Erika* sank spilling approximately 20,000 metric tons of heavy fuel oil. More than 4,000 people were involved in shoreline clean-up generating large volumes of waste very quickly. From 20,000 metric tons of oil spilled, more than 250,000 metric tons of oily waste was produced.

marine oil spill was also written.[70] This study and reports were a joint Ministry and Burrard Clean Operations initiative.

The study examined the constraints and capabilities in British Columbia regarding storage and disposal of oily wastes in landfills, land farms, incinerators, pulp mills, dry-land log sorts, cement plants, and asphalt plants. The findings revealed two types of impediments: either *technical* or *institutional*. Technical impediments are when a facility could not take the oily wastes for final disposal because it would disrupt or jeopardize their operations or cause environmental risk. Institutional impediments are those when facilities could technically handle the oily wastes, but provincial regulations or local bylaws would not allow them to receive them. For example, most landfills are not permitted to take large amounts of liquid oily waste (an institutional impediment), whereas pulp mills can burn waste oil, but do not want to risk contaminating their boilers (a technical impediment). The conclusion of the study was that there are very few options for handling large amounts of oily waste in an emergency.

The solutions cannot be readily pulled-from-a-hat (see Text box). For oil collected by skimmers and sorbents or gathered on the beach, there are essentially only four options for disposal: 1) oil/water separation for recycling, 2) bioremediation, 3) incineration, and 4) land filling. The selection of a method of waste disposal will be highly dependent on other logistics and cost factors such as amounts of materials that need to be transported, proximity and availability of disposal facilities. As such, there will often be trade offs between what is most "environmentally preferred" and what is "practicable" (Figure 17). There needs to be creative and proactive solutions examined by both government and industry that go well beyond normal business practices for oily waste disposal - emergency response is not normal business practice.

Oily Waste Planning During an Emergency

In the event of a marine oil spill, a Waste Management Plan must be prepared by Incident Management Team's technical specialists that work with the team's Planning Section. This plan needs to address:

- field survey of wastes for amounts and categories;
- selection of temporary and final disposal alternatives;
- identification of hired or contracted resources;
- formulation of field crews and supervisor;
- on-site compliance monitoring;
- health and safety of works;
- environmental risks, and
- regulatory requirements.

Any delay in developing this plan, getting endorsement from Incident Commander(s), approvals from government agencies, or stakeholder acceptance can result in all field operations coming to a halt. The more the delay in the decision on final disposition of the oily wastes, the longer the use of temporary solutions.

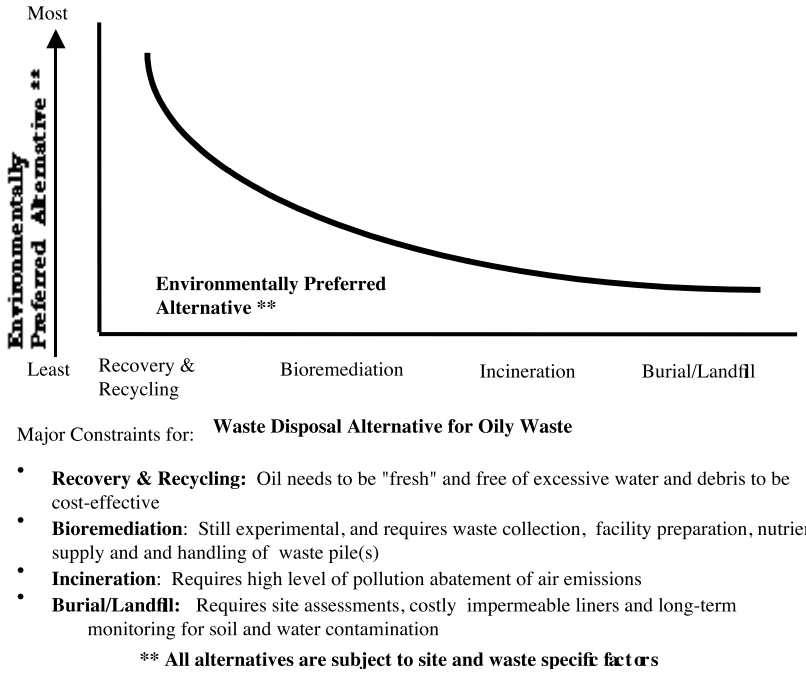
In the absence of an oily waste disposal plan and meaningful capacity, the application of waste minimizing response strategies such as in-situ oil burning and dispersant use become very important. These on-water response options are examined later in the report.

There are also other oily waste minimizing opportunities related to shoreline cleanup that includes:

- The use of Shoreline Cleanup Assessment Techniques (SCAT) in a manner that ensures only shores that need to be cleaned are worked on (*i.e.,* many coastal high wave energy shores have a natural cleaning capability that is gentler on the environment than aggressive cleaning to remove oil);
- To adopt shore treatment completion standards (end-points) that relate to the oily waste disposal challenges (*i.e.,* the cleaner a beach, the more oily waste generated);
- To undertake in-situ (in place) beach disposal of large oily debris such as logs;

[70] Source:1993 *Inventory of Potential Sites for Disposal/storage of Oily Waste*, and 1993 *A Strategic Plan for the Collection and Disposal of Oily Wastes from a Marine Oil Spill*, prepared for the BC Ministry of Environment, and Burrard Clean Operations.

- To carefully manage and monitor shoreline workforce activities (*i.e.,* ensure that responders are removing only the oiled sediment, and not the beach itself);
- To undertake shoreline treatment methods that utilize natural cleaning of oiled sediments, and
- To minimize the use of sorbents (fibre booms and cloths, peat-moss) for shoreline protection and clean-up that become an additional oily waste.



Source: 2003, *Operational Guideline on Oily Waste Disposal*, BC Ministry of Environment, Victoria

Figure 17: Waste Disposal Alternatives for Final Oily Waste Disposal and their Environmental Merits

Figure 18: Final Oily Waste Disposal Solution for the *Prestige* Spill Oil Waste - a landfill

SUGGESTED POLICY DIRECTION OILY WASTE MANAGEMENT	
The Response Organizations and Oil Handling Facilities Regulation and guiding *Response Organization Standard* should not be based on a time-frame for holding temporary oily wastes, but specify holding capacities that are in the range of 4 to 5 times the tier level oil spill preparedness - e.g., tier 4 would be 40,000 to 50,000 metric tons of oily wastes. Furthermore, the standards should specify a need for a "systematic approach" to oily waste management as *per* the BC Ministry of Environment's 1993 *Waste Management Guideline during a Marine Oil Spill*, the International Petroleum Industry Environmental Conservation Association (IPIECA), Rpt. Series ,Vol. 12 *Guidelines for Oil Spill Waste Minimization and Management*, or combinations thereof.	
POLICY DELIVERY	
Oily Waste Management	The Response Organizations should have: ➡ plans and arrangements for the timely disposal of all oily wastes that are recyclable; ➡ a waste management plan supported by an on-site monitoring system (e.g. pre-scripted signage and trained supervisors) that ensures that all oily wastes are segregated into waste streams; ➡ a training strategy to minimize oily waste generations that includes - but not limited to - the application of *Shoreline Cleanup Assessment Techniques* (SCAT), non-waste generation shoreline treatments (e.g. sediment tilling), and workforce monitoring to minimize excessive non-oiled sediment being put into the waste stream; ➡ plans and equipment for in-situ (at or near site) oily waste treatment that includes, but not limited to, environmentally-sound and practical oiled woody-debris burning, oiled debris/sediment land-farming, and portable incineration. Response Organizations should investigate suitable and available storage system that can be used, or adapted for, temporary oily wastes storage. The organization should be prepared to buy or construct various sizes and strengths of disposal liners that can fit commercial totes, garbage bins, and trucks to minimize storage and transport spillage. Response Organizations should investigate, design, and have the equipment to establish portable "forced-air" burning systems for eliminating combustible oily organic debris to be burned on-site near the source(s) of collection. Both Burrard Clean Operations and fed/prov government should investigate the use of large barges for near-site oily waste treatment, as well as for transport to land-based waste facilities (see below). Both Burrard Clean Operations and government should identify "technical specialists" in oily waste management and provide the appropriate incident management training. The Ministry of Environment needs to establish engineered and environmentally approved siting criteria/design for an oily waste disposal facility. This would facilitate location selection and construction, when required. The design level should be a minimum of 50,000 metric tons of oily wastes. The facility design should include a combination of land-farming (bioremediation) and incineration, with the last option being land-filling. The BC Ministry of Environment and the oil industry should examine the efficacy of large-scale, but mobile, bioremediation (land-farming) of oil wastes that can be used near an oil spill area. Strategically located "crown-land" should be set-aside for multiple oily waste facilities to be located - with community pre-acceptance. Locations should be based on logistical requirements to transport oily waste both by sea and land methods. These areas would only be used when needed. Permit conditions should be pre-established.

3.2.4. In-Situ Oil Burning and Dispersant Use

As stated previously, keeping oil off shores is both a political and an ecological imperative. It is generally understood that oil harms shore-dependent organisms. However, stranded oil also has significant potential health consequences to a cleanup workforce. More than 11,000 workers helped clean up the 1989 *Exxon Valdez* oil. There is currently a debate in Alaska about whether many of these worker's health problems were attributed to their spill response efforts. Lastly, the province and industry have no meaningful solution for the disposal of large quantities of oily waste collected on-water and from on-shore.

Keeping oil off shorelines is difficult to achieve when on-water oil recovery with conventional booms, and skimmers can only remove 10 to 15 percent of the floating oil. However, *in-situ* oil burning and dispersant use have both proven to be orders of magnitude more effective response tools. This is when they are used at the right time, place, and conditions. There are only a few nations that do not use these non-mechanical alternatives. Canada is one.

In recognition of achieving an overall net environmental benefit, the promoters for use of *in-situ* oil burning and dispersant use are most of the environmental and ecology departments along the Pacific west Coast. In 1995, the Pacific States/BC Oil Spill Task Force produced a report on the issues surrounding the use of dispersants and *in situ* burning. The report discussed environmental trade offs and related concerns, and described the status of dispersant-use and *in-situ* burn policies for the Task Force's member jurisdictions.[71]

The main recommendation was for Task Force members to develop decision-making guidelines on appropriate use of these non-mechanical alternatives so that they can be part of the "tool box" of response measures. This approach recognizes that industry, such as Response Organizations, will not capitalize on dispersant application or *in-situ* oil burning boom equipment unless there is some assurance that government can make a decision to use them. These decisions are made when safe to do so for responders and the public, and when a net environmental benefit can be assured.

Canadian agencies have difficulty in making approval decisions - even with the knowledge that these non-mechanical alternatives can minimize shoreline cleanup, protect workforce health, reduce oily waste generation, and mitigate harm to on-water wildlife (birds, whales, seals, and otters) and on-shore organisms (invertebrates, algae).

About Dispersants:

For the past two decades, dispersants have been the tool of choice in many countries such as England, Norway, New Zealand, and Africa. In the United States, a large dispersant stockpile and delivery capability exists. It is the primary tool for some States such as Hawaii. The efficacy of using dispersants with minimal disruption to the environment has been enhanced with new environmentally-safer dispersant formulations, improved application devices

Dispersant Application

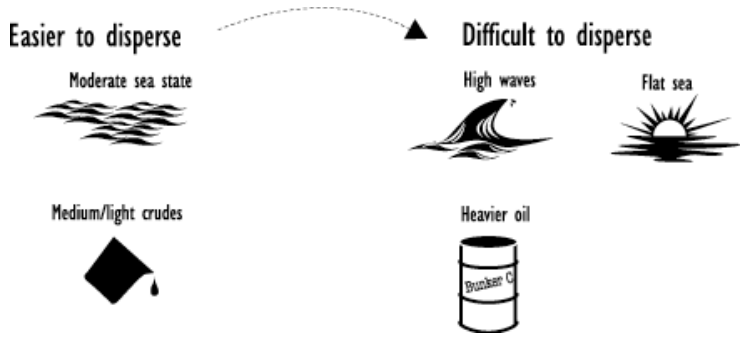
[71] In 1995, the member agencies of the Pacific States/BC Oil Spill Task Force were the States of Alaska, Washington, Oregon and California, and the Province of British Columbia.

and methods, and monitoring protocols. [72]

Opponents to dispersants view that their use is an industry-based scheme because it is inexpensive. Furthermore, the prevailing view is that the methods are just a means of transferring the environmental impact to the water column. Yes, these methods are less expensive than on-water booming and skimming, and there are impacts to organisms in the water column. Nevertheless a "net environmental benefit" can be achieved (See: A Primer in Dispersants, Figure 19). There is expansive literature on where and how to use dispersants and in-situ oil burning effectively, such as from the *US National Oceans and Atmospheric Administration* (NOAA).

Figure 19: A Primer on Dispersants
Primary source (US National Oceans and Atmospheric Association (NOAA)

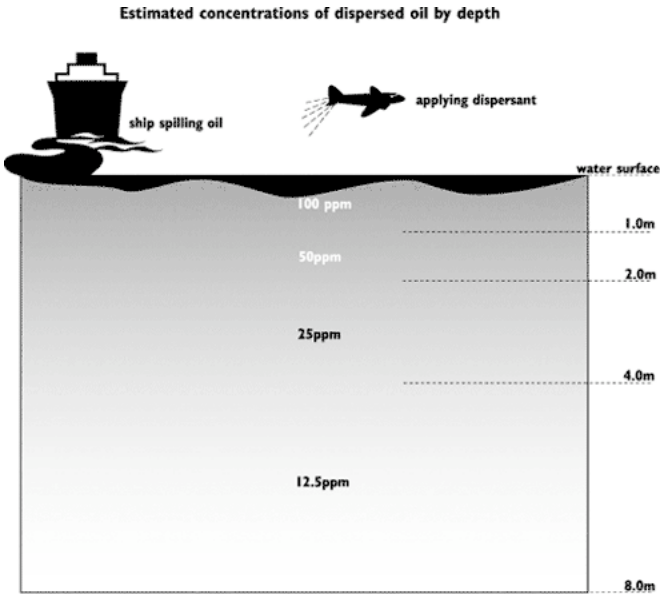
Dispersants have a very high encounter (contact) rate with a large oil slick when applied by aircraft and/or vessel – 10 to 40 times higher than mechanical booming and skimming. Therefore, a greater area of the slick is being addressed, as opposed to mechanical means which is only in contact with the leading edges of a slick



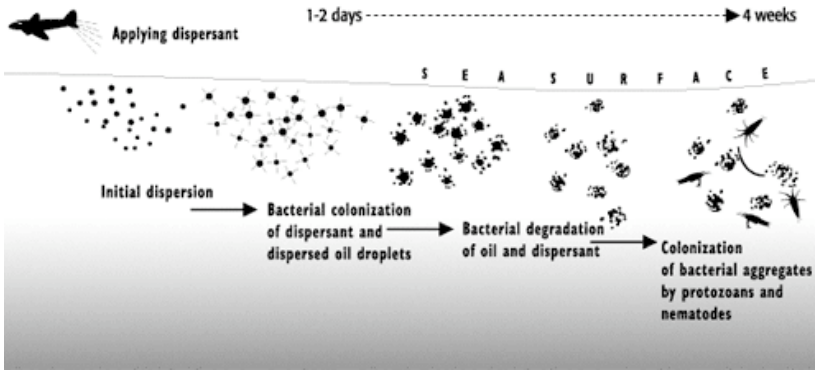
The effectiveness of a given dispersant depends on the type of oil spilled (it is easier to disperse lighter oils), weather conditions, and how quickly dispersants can be applied once oil has spilled. Dispersants must mix with the oil and water, so some energy is required for effective dispersion. But too much wind and wave energy may result in conditions that are dangerous for flying aircraft and that make it difficult to target the oil and properly apply the right amount of dispersant. Heavier oils or highly emulsified oils (oils that have mixed with water to form a heavy froth) are less amenable to successful dispersion, although research on new types of dispersants is attempting to address this problem. The graphic above contrasts the kinds of conditions under which dispersants are likely to be more effective (shown on the left) with the kinds of conditions under which it's harder to disperse oil (shown on the right).

[72] The following have stated their strategic position or level of interest in use of dispersants:
- *US National Research Council*: "The Overall Ecological Impact of Oil Will Likely be Reduced by Dispersion"
- *International Petroleum Industry Environmental Conservation Association (IPIECA):* "In Most Regions it is Likely That the Dispersant Option Will Offer a Net Environmental Benefit for Some Oil Spill Scenarios"
- *American Society for Testing and Materials (ASTM)*: "The Trade-Off That Must be Evaluated is Between the Impact of the Relatively Long Residence Time of Spilled Oil Which Strands on Shorelines Versus the Short-Term Impact of Dispersed Oil in the Water Column"
- *IMO/ITOPF/Commission of the European Communities:* "On Occasions, the Potential Benefit Gained by Using Dispersants to Protect Coastal Amenities, Sea Birds and Intertidal Marine Life May Far Outweigh Any Potential Disadvantages, As the Temporary Tainting of Commercial Shellfish"
- *IMO/United Nations Environment Program:* "The Possible Detrimental Effects of the Use of Dispersants Might be Offset by the Gains That Result From Keeping Other Parts of the Environment Clear of Oil".

Figure 19: A Primer on Dispersants
Primary source (US National Oceans and Atmospheric Association (NOAA)



Initially, dispersed oil moves down into the water column to depths ranging from 1 to 10 meters (about 3 to 30 feet). To avoid contaminating the sea floor, most dispersant use are restricted to waters deeper than 10 meters (about 30 feet). The diagram above shows concentrations of dispersed oil at different depths (estimated from field studies), during the first few hours after dispersants have been applied. These concentrations drop within hours as currents and waves disperse the oil further.



Eventually, dispersed oil droplets degrade into naturally occurring substances. There is evidence that dispersed oil degrades more quickly than oil that has not been dispersed. The diagram above illustrates how the oil may be processed in the marine ecosystem. First, the droplets of oil and dispersant are colonized by bacteria that then begin to degrade them. Next, protozoans and nematodes (small worms) join the colonies. Eventually, the oil will further broken down and incorporated into the food web.

Figure 19: A Primer on Dispersants
Primary source (US National Oceans and Atmospheric Association (NOAA)

A Net Environmental Benefit can be achieved with dispersants in that its use has potential benefits of:

- Garnering a higher level of protection to mobile marine animals such as birds, sea otters, seals and whales that are less pre-disposed to avoiding an oil slick on the surface
- Reducing the impact on shorelines and sensitive coastal habitats
- Offsetting the formation of oil/water emulsions that impede mechanical recovery and results in higher oily wastes being generated, and
- Making oil less adhesive to shore substrates (rocks and vegetation) to assist shoreline cleanup efficacy.

In any particular situation, the decision to use dispersants involves balancing the potential advantages of dispersant use--removing oil from the water surface and avoiding some shoreline impacts--with the potential disadvantages, such as impacts to plankton or other water column organisms.

The decision to use dispersants rests with the federal government, particularly Fisheries and Oceans Canada and Environment Canada. Dispersants are viewed by Fisheries and Oceans Canada as just another deleterious substance in the environment. Conversely, Environment Canada views them as a potentially effective response tool.

Environment Canada has a pre-approved list of dispersants suitable use for Canadian waters. Canada was also the first country to write a guide on this topic: Environment Canada's 1973 *Guidelines on the Use and Acceptability of Oil Spill Dispersants* (Rpt. EPS 1_EE-73-1) and wrote a 2nd addition in 1984. This is one of many dispersant guidelines worldwide.

In February 2004, a workshop on dispersant use was held in St. John's, Newfoundland that examined Canada's dispersant approval process.[73] The workshop revealed the above mentioned conundrum in which, "no dispersant planning [by industry] without approval; no approval [by government] without planning" [emphasis added]. In essence, there are two dead-locks in moving dispersants use in Canada forward:

1. Internally, between Environment Canada that sees a benefit, and Fisheries and Oceans Canada that can only sees a fisheries threat - a cost.

2. Externally, between industry and government on what should come first a commitment (by industry) or a decision (by government).

As in Eastern Canada, there is no dispersant capability in British Columbia - even after 24 years of debate. However, there is substantive dispersant capability in the United States that is available for Canada, if requested. This assumes a timely decision can be made, the appropriate oil type, and suitable sea conditions. If a catastrophic oil spill occurred in the Strait of Juan de Fuca, there will be some deep soul searching in Canada if the US deploys their dispersant systems, and Canadians just watching on as the oil rolls on to northern shores.

About *In-situ* Oil Burning:

Environment Canada has been a world-leader in the research and design of how to burn spilled oil on water that is controlled with fire booms, and to ensure both public and responder safety.[74] However, the decision-guidelines for *in-situ* burning in British Columbia rests primarily with the BC Ministry of Environment, as there are air quality and public health concerns.

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[73] *Workshop on Dispersant Use in Eastern Canada*. St. John's, Newfoundland, February 4 and 5, 2004, by Ken Trudel S.L. Ross Environmental Research Limited, Ottawa, Environmental Studies Research Funds, Report No. 149

[74] The 1993 *Newfoundland Offshore Burn Experiment* (NOBE) addressed many of the operational, air quality and marine impact concerns – with favourable results. NOBE put Canada at the international forefront on the scientific understanding of this technology.

In keeping with the Pacific States/BC Oil Spill Task Force call for decision-guidelines for non-mechanical response methods, the BC Ministry of Environment wrote in 1995: The *British Columbia/Canada In-situ Oil Burning Policy and Decision Guidelines* (See: Text box). The intent of the guideline was to have Fisheries and Oceans, Environment Canada and the BC Ministry of Environment sign-off on how and when to make a decision to undertake an *in-situ* oil burn. This has yet to happen; the report is still a draft 13 years later. The primary obstacle is that the Ministry of Environment's Air Quality program is not convinced that public health is fully protected, despite millions of dollars of research stating that there are ample marine conditions and locales for *in-situ* oil burning to occur and health safety measures (monitoring, fire control, *etc*.) that ensures public health is protected. The entire focus of the draft guideline is on ensuring that public health is protected (Figure 20).

Draft BC/Canada In-situ Oil Burning Policy and Decision Guidelines (Preface)

The burning of oil on water (in-situ) during a major marine oil spill is a viable means to mitigate the impact of spilled oil on people and the environment. This action will be under special circumstances, such as a major offshore spill of petroleum from an oil tanker, and undertaken in conjunction with other spill recovery efforts such as booming and skimming. The *British Columbia/Canada In-situ Oil Burning Policy and Decision Guidelines* provides the regional direction and procedures to expedite in-situ burn decisions and to ensure public safety and maximize environmental protection.

The interest in burning oil as a response technique is largely driven by the environmental and ecology agencies along the Pacific west coast as there is a high likelihood of a net environmental benefit from its application if correctly timed and appropriately implemented. There is a need to move from the research phase to the policy and procedural stages. In-situ burning capitalization and application by the oil industry and its response organizations will only occur if government environmental agencies take a lead in the in-situ burn decision-making process.

The development of this document is the result of years of work, millions of dollars in research, and practical experience. The document is dynamic and will be periodically reviewed by the BC Marine Spill Coordination Committee to incorporate any new information that becomes available.

Figure 20: Primer on In-situ Oil Burning

History of In-situ Oil Burning

A burn efficiency of 98 percent was obtained during a test burn of Alaska North Slope crude oil conducted on the second day of the *Exxon Valdez* spill (March, 1989). The oil was collected by fire-resistant boom towed in a U-configuration behind two fishing boats. Within 1 hour and 15 minutes after ignition, approximately 57,000 to 114,000 liters (357 to 714 barrels) was burned with about 1,136 liters (7 barrels) of burn residue remaining.

The *Newfoundland Offshore Burn Experiment* (NOBE) conducted in August 1993 by Environment Canada had similar efficiencies. During sea trials, a 213 meter (770 ft.) fire boom held about 48 cubic meters (302 barrels) of oil which was almost completely burned (99 %) in an hour and half.

All US states along the Pacific west coast have developed in-situ oil burning policies and guidelines. The *BC Citizen's Advisory Committee on Oil Spill Prevention and Response* in their 1995 annual report acknowledged this work and stated "In-situ burning has the potential to achieve remarkable results in certain definable spill cases." The committee recommended that British Columbia examine the appropriateness of the alternative technology to mechanical oil removal

Potential Effectiveness of In-situ Burning

For oil burning to be effective, it must be employed early on in the spill before the spilled oil weathers and loses its flammable constituents. The window of opportunity is generally less than 72 hours. Optimally, the decision to burn should be made within 6 to 8 hours after the spill. Most oil types will burn on water, as long as the boomed oil is thick enough. Oils that are conducive to in-situ oil burning include crude, bunker and blended oils, jet fuels, and diesel.

Figure 20: Primer on In-situ Oil Burning

Environmental Trade Offs and the Protection of Public Health

Response to an accidental release of large quantities of oil often results in environmental trade off. In-situ oil burning is no exception. The trade-off for choosing to burn is to allow short-term, managed air pollution compared to long-term, difficult to manage on-water oiling and on-shore contamination. Controlled offshore burning of contained oil may have no measurable impact to marine and coastal ecology, whereas oil on water and shores can have devastating and long-term effects. Environment and ecology agencies recognize this fact and concur that in-situ burning is a viable tool in spill management. As such, the assessment of the trade off of air pollution *versus* oiled waters and shores is not a major decision factor in determining whether to burn.

What is not, however, a trade-off is causing human health effects. Protection of human health is the major issue and the focus of the of in-situ oil burning decision guidelines. Extensive, multi-million dollar studies on in-situ oil burning have helped define when, where and how to achieve the primary response priority of protecting people, yet obtain the environmental protection advantage of in-situ burning.

SUGGESTED POLICY DIRECTION
IN-SITU OIL BURNING AND DISPERSANT USE

The Response Organizations and Oil Handling Facilities Regulation and guiding *Response Organization Standard* should require Response Organizations to have both in-situ oil burning and dispersant use equipment to augment mechanical-based response for a tier 4 (10,000 tonne) preparedness level. When the conditions are deemed suitable, fire-boom and monitoring equipment should be fully deployed within 10 hours of a spill - subject to daily-light limitations. This capability also includes operational guidelines, training, and air monitoring equipment. Industry needs to build public and agency confidence in their ability to successfully conduct in-situ oil burning and dispersant operations.

Environment Canada should revise the existing national dispersant use decision-making guideline with written endorsement by Fisheries and Oceans Canada. The draft *BC/Canada In-situ Oil Burning Decision Guideline* should be completed by the Ministry of Environment and endorsed by Environment Canada, Fisheries and Oceans Canada, and Transport Canada. Government "approving" agencies needs to build public and industry confidence in their ability to make a timely and definitive decision to use these tools when appropriate.

POLICY DELIVERY

In-situ oil burning and dispersant use	Response Organization should have multiple systems for in-situ oil burning and dispersant application, which are regional located, as well as national or international sources. Both government and industry should: ➡ Establish technical specialists in both the areas of decision-making and tactical operations for in-situ oil burning and dispersant use; ➡ Employ the international operational and monitoring guidelines (e.g. NOAA SMART guides) to the fullest extent to ensure efficacy of use, achieve a net environmental benefit, and to protect public health; ➡ Provide presentations and courses to regional health authorities on public health safety measures incorporated within in-situ oil burning decisions and operations and ➡ Undertake coastal consultations/workshops on the use of dispersants and in-situ oil burning to achieve a net environmental benefit and to protect public health. These should also include waste minimization strategies as well. At least every third major exercise for RO re-certification should focus on dispersant use and in-situ burning.

3.2.5. Oil Products not Defined Under the Canada Shipping Act

The Response Organizations and Oil Handling Facilities Regulations define the type of "oil" the same as in the *Canada Shipping Act*. PART 8 of the Act pertaining to pollution prevention and response defines "oil" as meaning: "petroleum in any form, including crude oil, fuel oil, sludge, oil refuse and refined products". Response Organizations are not required to plan, prepare and respond to condensates, biofuels and canola or any other type of oil that does not fall within this definition. The noted products are often carried in bulk in vessels and transferred at facilities in British Columbia. An example is the tanker import of condensates (a non-refined petroleum, but not a crude oil) by EnCana to the Methanex terminal in Kitimat. If there is a rupture and spill of this product, a Response Organization is neither equipped nor required to respond. Condensates are a significant danger to responders due to its high volatility that poses a fire/exposion threat. Condensates fall very closely into the "hazardous materials" category. BC has essentially no hazardous material response capability for a vessel-based incident.

There have been spills of some of these noted products that fall outside the *Canada Shipping Act's* definition of oil. An example is when the *Cape Benat,* a Liberian-registered chemical tanker, spilled canola oil in Vancouver Harbour when it was loading at Vanterm, (November 23 and 24, 1999). This is one of several canola oil spills in that harbour that have resulted in the mortality of hundreds of birds.

Such spills also occur elsewhere in the world, such as when the *Allegra* spilled 900 metric tons of palm nut oil into the English Channel (October, 1st, 1997)

These types of oil not defined under the *Canada Shipping Act* can also pose a significant risk to people, property and the environment. The Environmental Response Regulations should be inclusive of these products.

SUGGESTED POLICY DIRECTION RESPONSE TO OILS NOT DEFINED UNDER THE *CANADA SHIPPING ACT*.	
The Response Organizations and Oil Handling Facilities Regulation and guiding *Response Organization Standard* should broaden the definition of "oil" to include other types that pose an environmental risk if spilled. Certain products should be explicitly referenced such as condensates, biofuels and canola. A Response Organization should be required to prepare and respond to these types of products carried by vessels and/or off-loaded at facilities. Government should examine whether Response Organizations should expand their response mandates to include hazardous materials carried on vessels - either in bulk or packaged.	
POLICY DELIVERY	
Oils not specified under the *Canada Shipping Act*.	Response Organization should plan and be equipped for biofuels and canola spills. Both government and industry should: ➡ Establish technical specialists on biodiesel and canola oil spills pertaining to on-water recovery, shoreline cleanup, and oiled wildlife care; ➡ Establish a response strategy for condensates that minimizes the.danger to responders and impacts to environment; ➡ Investigate other types of oil-like products that are transported in bulk by vessels that pose a risk to the environment if spilled.

3.2.6. Financial Assurances for the Response Organizations

Response Organizations in Canada function and behave as a not-for-profit "businesses." For a major spill, hundreds-of-thousands to millions of dollars can be spent daily. Response Organizations do not have an “operational’ bank-account. They are not allowed too. They are strictly reliant on the Responsible Party paying them for their services. As a result, a Response Organization often tallies their invoices from their client daily. It is a case of “no pay, no stay.

There is little recourse for a Response Organization if their business incurs a financial loss. The *Marine Liability Act* closes any options for a Response Organization to be compensated for financial losses from the *Ship-source Oil Pollution Fund*. The Act states:

> **Claims filed with Administrator**
>
> 85 (1) In addition to any right against the Ship-source Oil Pollution Fund under section 84, a person who has suffered loss or damage or incurred costs or expenses referred to in subsection 51(1) in respect of actual or anticipated oil pollution damage may file a claim with the Administrator for the loss, damage, costs or expenses.
>
> **Exception**
> (3) Subsection (1) does not apply to a response organization referred to in subsection 51(1)

If in doubt about being paid, a Response Organization may seek for a surety bond from the Responsible Party before proceeding with response activities. This approach is neither timely nor certain. As such, there needs to be a legal means for “financial assurance” that indemnifies a Response Organization if a client fails to fully pay for services provided.

There is also a requirement for some legally “binding” language that ensures a Response Organization is not subjected to renegotiating pre-determined (scheduled) contracted service fees by a client during an event. When an owner of a ship (or associate member such as a government agency) agrees to the “arrangement” with a Response Organization, they also agree to their charge-out-rates for response. Any reduction in charge-out expenses for services during an incident should be viewed as a cost to the Response Organization, and also be eligible for indemnification.

There should be some legal language that ensures that other businesses whose services that are contracted to a Responsible Party, but not under a Response Organization arrangement, are also protected from financial losses. This is particularly relevant for the work (expenses) of a major vessel casualty related to wildlife response, salvage, cargo removal, and lightering of oil. Contractors should not be left to fend-for-themselves, as emergencies are not a normal business environment.

The current level of membership fees to have an arrangement with a Response Organization appear to bear little resemblance to the client’s risk to the environment, or the consequences of a spill.[75] The level of membership fees for a Response Organization should also reflect:

- ➡ The sector spill frequency and risk.
- ➡ Current and additional services being provided.
- ➡ Financial assurance/ indemnification.

If this report’s suggested policy directions and delivery ideas are to be adopted, higher membership fees will be required for these services to pay for a Response Organization’s additional planning, equipment capitalization, staffing, and exercising.

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[75] The issue of “risk-based” fees schedules was raised by agency and public comment on the *1996 Report on Canada Oil Spill Response Capability and Investigation of the Proposed Fee Regime* (Referred to as the "Gold Panel's Report").

SUGGESTED POLICY DIRECTION FINANCIAL ASSURANCES FOR A RESPONSE ORGANIZATION	
The Response Organizations and Oil Handling Facilities Regulation and/or the *Marine Liability Act* should provide financial assurances to both Response Organizations and other contractors should they incur a financial loss due to a client not fully paying for emergency services provided. Considerations should be given to Response Organizations and other contractors having access to the *Ship-source Oil Pollution Fund* for business losses. A mechanism should be in place to address reasonable charge-out-rates for a Response Organization and other contracted services, so that when applied during a spill response these rates cannot be disputed by the client. The membership fees should reflect the particular sectors spill risk and consequences, and reflect any new services provided under an amended *Response Organizations and Oil Handling Facilities Regulation* and its standard.	
POLICY DELIVERY	
Financial Assurances for a Response Organization	Response Organization client groups, along with Transport Canada, should address means for ensuring equitable charge-out-rates and ensuring that business losses are compensated for.

3.3 Marine Vessel Casualty Response Beyond Just Oil Spills

The following examines the challenge of responding to consequences of a major vessel casualty that are not specifically related to an oil spill or its threat. These challenges include:

- Tug rescue of a disabled vessel along the west coast
- Tug escort of laden oil tankers after leaving a harbour
- Salvage operations for removal of cargo and fuel oil, as well as, for ship protection or wreck removal, and
- Places of refuge decision-making for a vessel needing assistance and/or to reduce environmental impact risk.

However, these challenges also share with oil spill preparedness and response, the following consequences:

- Financial risk and vulnerability to government
- Divergent response paradigms of the Federal and Provincial governments
- Natural resource damage assessment policy and process, and
- Building emergency response planning and response preparedness capacity.

3.3.1. Financial Risk and Vulnerability from a Major Vessel Casualty

The foundation of Canada's environmental emergency response regime is based on the "polluter-pay-principle". This principle is applied in two fundamental ways: 1) pay to be prepared, and 2) pay to respond. For example, preparedness for marine oil spills is the collective effort of the shipping industry through their membership fees to a Response Organization. Response is the responsibility of the spiller (the Responsible Party). Operational delivery is by the ships owner's Response Organization, but under the direction and funding of the Responsible Party.

In the event of a vessel casualty, there are various funding arrangements used by a ship owner to pay for:

- Legal fees
- Penalties
- Response management (both government and Response Organization participation)

- Impact mitigation (tactical booming, skimming, oily waste management, salvage, *etc*).
- Impact assessments
- Monitoring
- Private/public damage compensation, and
- Natural resource damage assessment and compensation.

The amount of funding available and how it can be used is highly variable depending on the type and size of a vessel, and what cargo it is carrying. There are also legally defined limit to the amount of money that a ship owner only has to pay (referred to as "limit of financial liability"). Once they reach their limit of financial liability, the ship owner is no longer a "Responsible Party." They can transfer the responsibility to government. In some situations, this transfer can happen a lot sooner than government or the public would expect, and/or before there is closure to the incident. This questions whether the "polluter-pay-principle" can be truly attained with certainty - at all times and under any situation. The following examines this government financial risk and vulnerability.

Over the last decade, there have been significant changes nationally and internationally regarding the levels of financial insurance (guarantees) that ship owners are required to have under various response funding and compensation regimes. To what degree these arrangements alleviate financial risk is uncertain. Financial risk pertains to a Responsible Party defaulting on response commitments or exceeding their limit of financial responsibility for the incident. Both outcomes result in the Responsible Party passing the remaining incident management for the vessel casualty on to government. This "transfer-of-command" has financial, operational, and political consequences.

Governments can be vulnerable to incurring the response cost before incident closure. In 1995, a study on financial preparedness for a major marine oil spill in British Columbia was prepared for the BC Ministry of Environment to examine the financial arrangements of both the shipping industry and government (federal/provincial) to manage a major marine oil spill.[76] This report concluded there is a "real likelihood that federal and provincial agencies will have to pay for responding to an oil spill without full cost recovery from the spiller." Additionally, there is further risk that government will incur the cost of actions of removing a vessel's cargo (including remaining bunker fuels), recovering lost cargo (*e.g.* containers), and dealing with the ship wreck itself.

There are many factors that make this issue very complicated and uncertain. They include, but are not limited to:

1. The type of vessel (bulk oil carrier *versus* general vessel) as well as the type of oil spilled (persistent *versus* non-persistent) determines what compensation regime is invoked;
2. The size of vessel determines the amount of funds available for response and compensation;
3. The ship owner determines the Responsible Party (RP) that authorizes expenditures and assumes incident command;
4. The corporate nature of the Responsible Party (national company *versus* foreign company) influences how funds will be allocated;
5. The spill location (open ocean *versus* inside passage) determines anticipated and actual cost of response and pollution damages;
6. The rate of response expenditures determines when the limit of financial responsibility is reached and what amount of impact mitigation has been achieved;
7. The role of the *Protection & Indemnity Club* (P&I Club) representative, the *International Oil Pollution Convention Fund* (IOPC) or *International Tanker Owners Pollution*

[76] Aengus R.M. Fogarty, 1995, *Financial Preparedness for a Major Marine Spill in British Columbia.* Prepared for the BC Ministry of Environment, Lands and Parks, Victoria, B.C..

Federation (ITOPF) technical advisors, and lawyers of the RP influence operational expenditures; and

8. The US/Canada oil spill funding regimes creates potential disparities in response efforts and damage compensation for a cross-border incident.

There should be clear understanding of:

- ➡ The current funding levels and arrangements for various vessel types that pose a marine oil spill risk
- ➡ The types of expenditures and activities that are considered recoverable costs
- ➡ Time-lines and the stage of vessel casualty response when (or if) funds will be exhausted
- ➡ Measures to minimize financial risk. and
- ➡ The arrangements and expectations of funding a cross-border marine oil spill.

For each one of the six vessel casualty scenarios in Part 3, there would be different outcomes on: 1) the amounts of money available for spill response and damage compensation, 2) the impact mitigation accomplished, and 3) the amount and types of damage compensated. There may be even situations where a "transfer of command" has occurred between the Response Party and government before incident closure. Table 11 illustrates these issues based on three tiers of funding sources for oil spills.

Table 11: Response Funding, Incident Completion and Damage Award Matrix

SCENARIO #	Tier 1 – P&I Club Insurance [1] CLC Fund	Tier 2 – IOPC Funds [2]	Tier 3 – SOP Fund [3]	Total Amount Available [4]
Limits of Financial Responsibility	$$$	$$$	$$$	$$$
Amount of fund set aside for future legal fees penalties, & compensation	$$$	$$$	$$$	$$$
Amount remaining for immediate spill management and response	$$$	$$$	$$$	$$$
Spill Cost Per Day	$$$	$$$	$$$	$$$
Level of Impact Mitigation Reached	Completed: ☐ On water response ☐ Shore Booming ☐ Shore Clean-up ☐ Salvage	Completed: ☐ On water response ☐ Shore Booming ☐ Shore Clean-up ☐ Salvage	Completed: ☐ On water response ☐ Shore Booming ☐ Shore Clean-up ☐ Salvage	Completed: ☐ On water response ☐ Shore Booming ☐ Shore Clean-up ☐ Salvage
Level of Compensation Reached	☐ Private/Public Damages ☐ Natural Resource Damages [6]	☐ Private/Public Damages ☐ Natural Resource Damages	☐ Private/Public Damages ☐ Natural Resource Damages	☐ Private/Public Damages ☐ Natural Resource Damages
Transfer of Command (Days) [5]	???	???	???	???

[1] International merchant vessel *Protection and Indemnity Club* (P&I Club) insurance that applies to vessels over 300 GRT. Funds amounts are vessel specific. Maximum amount is $400 million for one occurrence. Covers more than just oil pollution costs and damages.

[2] 1992 *Civil Liability Convention* (CLC) & 1992 *International Oil Pollution Compensation* (IOPC) funds that apply to vessels (e.g. barges and tankers) that carry more than 2,000 metric tons of persistent oil in bulk as cargo. Calculated on vessel size to a maximum threshold 0f $355 million (2007).

[3] Canadian domestic *Ship-source Oil Pollution* (SOP) fund that applies to all vessels that cause oil pollution impacts to a maximum limit for one occurrence of just over $149.5 million (2007).

[4] Combined funds available for spill response, damage (private and natural resource) compensation, legal costs, and penalties.
[5] Transfer of command pertains to when incident management is transferred from the Responsible Party (ship owner) to government (federal and/or provincial) that includes all further costs and consequences.
[6] Compensation for natural resources damages is not well-defined in Canada, especially not under shipping laws.

It is beyond the scope of this report to complete the above table for one scenario, let alone six, given the complexity of this issue. The matrix raises the questions that need answers to guide response efforts and to measure financial risk.

Canada's international and domestic funding regimes are examined below as they relate to the 3 tiers of response funding and damage compensation available for a vessel casualty. These funding tiers are:

- Tier 1: Protection and Indemnity Club (P&I Club)
- Tier 2: International Oil Pollution Funds (CLC/IOPC)
- Tier 3: Canada's domestic Ship-source Oil Pollution Fund (SOPF)

The federal *Marine Liability Act*, creates the legal liability on the ship owner for oil pollution damage, the costs of clean up of a pollution incident and, if the environment is impaired from oil pollution damage, for the costs of reasonable measures of reinstatement actually undertaken or to be undertaken. [77] There are essentially two components to the Act:

1.DIVISION 1: Relates to establishing strict liability of owner, with only certain defenses, for oil pollution by a "seagoing" vessels carrying, in bulk as cargo, crude oil, fuel oil, heavy diesel oil, lubricating oil or any other persistent hydrocarbon mineral oil. This section also establishes a financial limit to this liability.

2. DIVISION 2: Relates to additional response funding and damage compensation for oil pollution of "sea going" vessels that are carrying more than 2,000 metric tons of persistent oil in bulk as cargo through *International Oil Pollution Compensation Fund* - such as

About the Marine Liability Act

On August 8, 2001, the *Marine Liability Act*, S.C. 2001, c. 6 came into force. The purpose of the Act is:

•To adopt a new regime of Shipowner's liability to passengers and a new regime for apportioning liability.
•To consolidate existing marine liability regimes to one comprehensive piece of legislation; and
•To validate certain bylaws and regulations made under Canada *Ports Corporation Act* and the *Pilotage Act*.

The *Act* consists of six parts covering the following matters:

1. Personal Injuries and Fatalities;
2. Apportionment of Liability;
3. Limitation of Liability for Maritime Claims;
4. Liability for Carriage of Passengers by Water;
5. Liability for Carriage of Goods by Water;
6. Liability and Compensation for Pollution;

Some of the Act is new and there are some significant changes to maritime law. Much of the Act is simply taken from existing legislation such as the *Canada Shipping Act*. For example, there are no substantive changes to the law in Canada respecting the general provisions relating to the limitation of liability for maritime claims, or the provisions relating to liability and compensation for pollution.

[77] The use of provincial legislation for spill cost recovery has not been tested in Canada and could raise a constitutional challenge regarding whether provincial government can jointly or singularly "occupy" marine oil spill response with the federal government. In Canada the "lead federal agency is Canadian Coast Guard by policy and convention. In British Columbia, the "lead provincial agency" is the BC Ministry of Environment by mandate and law (*BC Emergency Management Act* and its Emergency Management Regulation). It is beyond the scope of this analysis to determine the constitutionality of spill cost recovery from a province. *Lead Agency* refers to the government department, ministry or organization that have jurisdictional (federal, provincial, local governments, and First Nations) or functional (Fire, Police, Ambulance) command roles in managing the incident. The designation of the lead agency may be based on legislation, an interagency agreement, a Cabinet decision and/or custom or precedent. Under the Incident Command System, there can be more than one lead agency represented under a unified command, as well as the Responsible Party for spills,

oil tankers and barges. This division also includes the legal foundation for Canada's domestic *Ship-source Oil Pollution Fund* (Tier 3)

Regarding the civil liability for pollution by ship-owners, Section 51(1) of the *Marine Liability Act* essentially sets the stage for funding response and damage and cost compensation as follows:

Owners of Ships

Liability for pollution and related costs

51. (1) Subject to the other provisions of this Part, the owner of a ship is liable

(*a*) for oil pollution damage from the ship;

(*b*) for costs and expenses incurred by

(i) the Minister of Fisheries and Oceans,

(ii) a response organization within the meaning of section 654 of the *Canada Shipping Act*,

(iii) any other person in Canada, or

(iv) any person in a state, other than Canada, that is a party to the Civil Liability Convention,

Liability for environmental damage

(2) If oil pollution damage from a ship results in impairment to the environment, the owner of the ship is liable for the costs of reasonable measures of reinstatement actually undertaken or to be undertaken.

Note: *Marine Liability Act*: Section 51(3) provides that the owner's liability is strict. It does not depend on proof of fault or negligence.

The *Marine Liability Act* also sets limitations of liability on the ship owner for any single oil pollution occurrence. This applies to container, general cargo, RO-RO, ferry, bulk carrier, as well as tankers such as those carrying LNG and chemicals. It also includes oil tankers, as they house persistent, heavy fuel oil (Bunker C; IFO 380) to operate their engines. The matter of tankers carrying persistent oil as "cargo" and the additional levels of international funding is examined later. As a benchmark for all seagoing "convention" vessels the limits of liability are as follows under the *Marine Liability Act*:

Limitation of liability — Convention ships

54. (1) The maximum liability under section 51 of an owner of a Convention ship in respect of an occurrence is

(*a*) if the ship has a tonnage of not more than 5,000 tons, 4,510,000 units of account; and

(*b*) if the ship has a tonnage of more than 5,000 tons, 4,510,000 units of account for the first 5,000 tons and 631 units of account for each additional ton, not exceeding 89,770,000 units of account in the aggregate.

Note: "Unit" equals the Special Drawing Right of the *International Monetary Fund* are used to calculate amounts in a country's currency. Example: For May 2, 2008: Can.$1.65/Unit * 89,770,000 units = $148,120,500 (Can) is the maximum limit of financial responsibility for a convention vessel carrying persistent oil in bulk as cargo or fuel, unless the vessel carries more than 2,000 metric tons of a persistent oil as its cargo - then additional funds are available through the *International Oil Pollution Compensation Fund*. Smaller convention vessels will have lower limit of financial responsibility.

The Act also states:

Shipowner's fund

58. (1) The owner of a Convention ship is not entitled to limitation of liability under subsection 54(1) unless the owner constitutes a fund, in this section referred to as the "ship owner's fund", in an amount equal to the limit of the owner's liability under that subsection.

Section 58 requires the ship owner to have a fund arrangement, such as with a *Protection and Indemnity Club* (P&I Club) or as in the case of oil tankers and barges carrying persistent oil as cargo, then with the *International Oil Pollution Compensation Fund*.[78]

Ship owner contract arrangement with a *Protection and Indemnity Club* (P&I Club) fulfills legal requirement for first level (Tier 1) of a seagoing (convention) vessel's financial assurances - generally vessels over 300 GRT. P&I Clubs insure a wider range of claims other than just oil pollution.

The *Marine Liability Act* has a special clause for vessels carrying persistent oil in bulk as cargo to provide additional funding for response and damage compensation. This next level (Tier 2) of funding is essentially targeted to a specific shipping sector - oil tankers and barges. The *Marine Liability Act* does not specify vessel types, *per se*. Tier 2 oil pollution funds (CLC/IOPC) do not necessarily provide money available for other consequences of a marine vessel casualty - such as salvage and cargo lightering -unless they can be linked to mitigating or preventing further oil pollution. For example, the removal of bunker oil from within a damaged vessel can be viewed as an oil pollution prevention measure and subject to these funding arrangements, whereas, removal of the ship wreck itself may not. The latter has to be initially paid from P&I Club insurance (Tier 1).

Section 60 of the *Marine Liability Act* requires that all "convention" ships in Canadian waters that are carrying more than 2,000 metric tons of oil in bulk as cargo have a certificate of financial responsibility issued under Article VII of the Civil Liability Convention. The section states:

60. (1) A Convention ship carrying, in bulk as cargo, more than 2,000 metric tons of crude oil, fuel oil, heavy diesel oil, lubricating oil or any other persistent hydrocarbon mineral oil shall not

(*a*) enter or leave a port in Canadian waters or in the exclusive economic zone of Canada or arrive at or leave an offshore terminal in Canadian waters or in the exclusive economic zone of Canada, or

(*b*) if the ship is registered in Canada, enter or leave a port in any other state, whether or not the state is a party to the Civil Liability Convention, or arrive at or leave an offshore terminal

(i) in the territorial sea or internal waters of any such state, or

(ii) in the exclusive economic zone of any such state or, if the state has not established an exclusive economic zone, in an area beyond and adjacent to the territorial sea of the state, and extending not more than 200 nautical miles from the baselines from which the breadth of its territorial sea is measured

unless a certificate described in Article VII of the Civil Liability Convention and subsection 61(1) has been issued in respect of the ship, showing that a contract of insurance or other security satisfying the requirements of that Article is in force in respect of the ship.

There are three important clauses to take note of: first, the oil is bulk (not packaged), second, the oil is primarily "cargo" (bunker fuel is inclusive of this requirement for oil tankers), and third, the oil is persistent (e.g. not gasoline, condensates, diesel). As such, Section 60 relates primarily to oil tankers and barges carrying persistent oil as primarily cargo.

Protection and Indemnity Club (P&I Club) provides the "ship owner's fund" arrangement under the *1992 Civil Liability Convention* (See Text Box next page). The amount of funds available depends on the size of the vessel. The limit is approximately $7.89 million for a ship not exceeding 5,000 units of gross tonnage, increasing on a linear scale to approximately $157.14 million for ships of 140,000 units of tonnage or over. The *Marine Liability Act's* Division 2: Compensation for Marine Oil Spills provides the legal application of this fund and others.

[78] P&I Clubs also handle the "ship-owners fund" requirements of the first tier of oil spill funding and compensation under the 1992 *Civil Liability Convention*.

About the Civil Liability Convention

The 1969 and 1992 CLC govern liability of oil tanker owners for oil pollution damage. The shipowner is normally entitled to limit his liability to an amount that is linked to the tonnage of his ship. The source of compensation money comes from insurance (P&I Clubs). Under the 1969 CLC, the shipowner is deprived of the right to limit his liability if the incident occurred as a result of the owner's actual fault or privity. Jurisprudence provides reasonable prospects for breaking the ship owner's right to limit liability under this test.

Under the 1992 CLC, claims for pollution damage can be made only against the registered owner of the tanker or his insurer. The shipowner is deprived of his right to limit his liability only if it is proved that the pollution damage resulted from the ship owner's personal act or omission, committed with the intent to cause such damage, or recklessly and with knowledge that such damage would probably result. This new test makes it practically impossible to break the shipowner's right to limit liability. The shipowner's limit of liability is higher than in the 1969 CLC. Source: Ship-source Oil Pollution Fund: The Administrator's Annual Report 2006-2007

About Protection and Indemnity Clubs

Protection and Indemnity Associations commonly called "P&I Clubs" insure 90% of the world's merchant fleet against the inevitable risks a ship faces when it carries petroleum. ore, freight, cars, passengers, or containers. The P&I Clubs were established by the ship owners, themselves, upon the principle of mutuality, which has been defined as the "joint, shared or reciprocal protection against losses." By collectively bearing the risks of inevitable maritime losses, they would be in less danger of individual business catastrophe. "Protection" risks insured against are the liability for death, personal injury, collision, dock damage and the removal of wrecks. "Indemnity" risks refers to the liability for loss or damage to cargo, and fines.

A protection and indemnity association is not a traditional insurance company. It differs from ordinary insurers in two ways:

1. A P&I Club is a "mutual association" - that is a group of ship owners who have agreed to insure one another's vessels for the mutual benefit of all. For a ship owner to obtain coverage, he must become and remain a member of the Club.
2. The coverage they provide is only for indemnity. It is not standard liability insurance. The Clubs will not indemnify their members for covered losses unless and until the member has actually paid out a claim, judgement or settlement. This provision is generally known as the "pay to be paid" clause.

P&I Clubs do not issue insurance policies. The "contract" for protection and indemnity insurance is evidenced and created by a "Certificate of Entry" between the Club and the ship owner.

Following the grounding of the Torrey Canyon in 1967, coverage for the liabilities, costs and expenses arising from oil spills became an increasingly important aspect of P&I insurance. As such, a P&I Club also offers "limited" coverage for oil pollution claims. The liability under P&I coverage is capped at $400 million each vessel, for any one accident or occurrence. An individual Club does not bear this $400 million risk of loss by itself. It is only responsible for the first $1.2 million. After that, "the Pool," which is made up of the 16 Clubs in the "International Group" (see list below) collectively covers claims up to $12 million, on any one occurrence of any one vessel. The Group's excess re-insurers are liable for the balance of the $400 million. The "International Group" is comprised of the larger P&I Clubs:

- Assuranceforeningen Gard
- Assuranceforeningen Skuld
- The Britannia Steam Ship Insurance Association Limited
- Liverpool and London Steamship Protection and Indemnity Association Limited
- The London Steam Ship Owners' Mutual Insurance Association
- The North of England Protection and Indemnity Association Limited
- The Standard Steamship Owners' Protection and Indemnity Association Limited
- The Standard Steamship Owners' Protection & Indemnity Association (Bermuda) Limited
- The Steamship Mutual Underwriting Association (Bermuda) Limited
- Sveriges Angfartygs Assurans Forening (The Swedish Club)
- The United Kingdom Mutual Steam Ship Assurance Association (Bermuda) Limited
- The West of England Ship Owners Mutual Insurance Association (Luxembourg)
- The Japan Ship Owners' Mutual Protection and Indemnity Association, and
- The American Steamship Owners Mutual Protection & Indemnity Association, Inc.

If that amount available by a P&I Club member does not cover all the admissible claims (Tier 1). Further compensation is available from a series of *International Oil Pollution Compensation Funds* (IOPC Funds) of the *International Maritime Organization's* (IMO) (Tier 2). Assuming the damage occurs in a country which is a member of that IOPC Funds, such as Canada. .

There are three *International Oil Pollution Compensation Funds*: the *1971 Fund*, the *1992 Fund* and the *Supplementary Fund*. These three funds have different maximum amounts of compensation, different criteria for access and use, and different member countries. Canada is a member of the 1*992 Fund* (which includes the *1971 Fund*). It is not a member of the *Supplementary Fund.*

The *1992 Fund* is essentially the second tier of funding for spill response and compensation for persistent oil released from vessels designed to carrying such products in bulk – such as oil tankers and barges. Canadian modifications to the conventions extend the principles to a wider range of oil. The maximum amount payable for any one incident is 203 million Special Drawing Right (SDR) which is approximately $355 million. These amounts are based on the SDR of the *International Monetary Fund* million as of April 1, 2007.

Defining Persistent Oil

The *International Maritime Organization* pollution convention's concept of persistent and non-persistent oils is related to the likelihood of the material dissipating naturally at sea and whether cleanup would be required. However, a precise definition of persistent oil is not provided and interpretation has historically relied on the examples given in the Conventions such as crude oil, fuel oil, heavy diesel oil and lubricating oil. The lack of a precise definition led the *International Oil Pollution Compensation (IOPC) Fund* to seek to clarify the definition and to develop a working model for practical implementation. As a result, a distinction has been made between persistent and non-persistent oils based on the distillation characteristics of the oil shipped.

Non-persistent oils are those that are generally of a volatile nature and are composed of lighter hydrocarbon fractions, which tend to dissipate rapidly through evaporation. In contrast, persistent oils generally contain a considerable proportion of heavy fractions or high-boiling material. In the technical definition adopted by the IOPC Fund, persistent oils are defined by describing what is meant by what are considered non-persistent oil, as follows:

> "non-persistent oil is oil which, at the time of shipment, consists of hydrocarbon fractions:
>
> a) at least 50% of which, by volume, distils at a temperature of 340°C (645°F)and
> b) at least 95% of which, by volume, distils at a temperature of 370°C (700°F);
>
> when tested by the ASTM Method D86/78 or any subsequent revision thereof".

The boundary set by this definition is somewhat arbitrary particularly given the continuous spectrum of oil types with varying degrees of persistence. The definition may also give rise to other difficulties as the definition cannot be applied to non-mineral oils (despite the physical persistence of some of these oils) because they cannot tolerate the distillation process. On the other hand, whilst the 1969 CLC applies to any type of persistent oil (including non-mineral oils such as whale oil, canola oil), the definition of oil was revised in the 1971 Fund Convention and in the subsequent '92 CLC and FC to apply only to 'persistent hydrocarbon mineral oils'.

The P&I Clubs have adopted the IOPC Fund definitions as a standard by which to apply an additional premium on persistent oil cargoes deemed to represent a greater risk of financial exposure in the event of oil pollution.

The source of money (fees) for these international funds are from levies on oil receiving companies operating in member countries around the world. Canada is, however, the exception to this practice. All Canadian oil receiving industries have their annual contribution paid from Canada's Ship-source Oil Pollution Fund (SOPF) - a fund of last resort (examined later).[79] The SOPF also funds other IOPC Fund costs invoiced to Canada on behalf of the oil receiving industry. These costs include the IOPC Funds general operating expenses and anticipated compensation payments in major incidents. Since 1989, the IOPC Funds have received

[79] Oil receiving industries include: oil companies, power generating authorities, pulp and paper manufacturers, chemical plants and other heavy industries.

approximately $42 million out of the SOPF.[80] This is a good deal for the oil industry. Their initial investment for this arrangement with the SOPF was only about $34.8 million when a levy was imposed on imported oil into Canada between 1972 and 1976.[81]

The *International Maritime Organization*'s Protocol 2003 *Supplementary Fund* is an additional level of international money for oil spill response and compensation. Membership of the *Supplementary Fund* is optional and any country which is a member of the *1992 Fund* may join. Canada has not currently subscribed to this third fund. With the *Supplementary Fund* Canada would have $1.3 billion for a major marine oil spill instead of the current maximum amount of $355 million. The *Supplementary Fund* would put Canada *on par* with the United States' *Oil Pollution Act of 1990*.[82] [83].

Another IMO convention that Canada could adopt to ensure adequate financial assurances from bunker fuels from non-tank vessels, such as cargo, container, and ferry vessels, is the *International Convention on Civil Liability for Bunker Oil Pollution Damage*, 2001 that entered into force in November 2008. It is designed to ensure that adequate, prompt, and effective compensation is available to persons who suffer damage caused by spills of oil, when carried as fuel in ships' bunkers. The bunkers convention provides a free-standing instrument covering pollution damage. A key provision is direct action that allows a claim for compensation for pollution damage to be brought directly against an insurer (*e.g.* P&I Club). The Bunker Convention requires ships over 1,000 gross tonnage to maintain insurance or other financial security to cover the liability of the registered owner for pollution damage in an amount equal to the limits of liability under the applicable national or international limitation regime, but in all cases, not exceeding an amount calculated in accordance with the *Convention on Limitation of Liability for Maritime Claims*, 1976, as amended. Canada has examined, but not adopted the Bunker Convention - refer to Transport Canada's *Maritime Law Reform Discussion Paper*, May 2005, TP1430E.

The last option (Tier 3) for a claimant for oil spill response costs and damage compensation is to apply to Canada's domestic *Ship-source Oil Pollution Fund* (SOPF). The SOPF has the potential to "top-up" the international regimes with additional funds, but only as a last resort. The SOPF provides $149,567,763.80 for all claims from one oil spill. The classes of claims for which the SOPF may be liable include the following:

- Claims for oil pollution damage;
- Claims for costs and expenses of oil spill clean-up including the cost of preventative measures; and
- Claims for oil pollution damage and clean-up costs where the identity of the ship that caused the discharge cannot be established (mystery spills).

Claims for oil pollution damage can be made directly against the fund in the circumstances prescribed in the *Marine Liabilities Act's* sections 84. The administrator or the SOPF will determine whether the costs are "reasonable" and may rely on the Canadian Coast Guard to provide their evaluations.

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[80] Source: Ship-source Oil Pollution Fund: The Administrator's Annual Report 2006-2007

[81] As at March 31, 2007, the balance in the SOPF was $ 363,782,610.94. The maximum liability of the SOPF for all claims from one oil spill is $ 149,567,763.80. During the new fiscal year, the Minister of Transport has the statutory power to impose a levy for the SOPF of 44.85 cents *per* metric ton of "contributing oil" imported into or shipped from a place in Canada in bulk as cargo on a ship. No such levy has been imposed since 1976.

[82] For Transport Canada discussion on marine policy related to marine liability, refer to their *MARITIME LAW REFORM. Discussion Paper. International Marine Policy*, TRANSPORT CANADA, May 2005, TP 14370E

[83] The aggregate maximum amount of compensation available for a spill of persistent oil from a large oil tanker is 750 Million SDR per incident

Liability of Ship-source Oil Pollution Fund

84. Subject to the other provisions of this Part, the Ship-source Oil Pollution Fund is liable for the matters referred to in subsection 51(1) in relation to oil, if

(*a*) all reasonable steps have been taken to recover payment of compensation from the owner of the ship and, in the case of a Convention ship, from the International Fund and have been unsuccessful;

(*b*) the owner is not liable by reason of any of the defences described in subsection 51(3) and the International Fund is not liable either;

(*c*) the claim exceeds

(i) in the case of a Convention ship, the owner's maximum liability under this Part to the extent that the excess is not recoverable from the International Fund, and

(ii) in the case of a ship other than a Convention ship, the owner's maximum liability under Part 3;

(*d*) the owner is financially incapable of meeting the owner's legal obligations under subsection 51(1), to the extent that the obligation is not recoverable from the International Fund;

(*e*) the cause of the oil pollution damage is unknown and the Administrator has been unable to establish that the occurrence that gave rise to the damage was not caused by a ship; or

(*f*) the Administrator is a party to a settlement under section 90.

As stated, the SOPF was established with an industry levy between 1972 and 1976. Their initial investment of $34.8 million has now grown from interest paid from the federal government's General Revenue to its current 2007 amount of $363,782,610.94. [84] This amount does not include the SOPF previously paid out for damage claims, administration, and oil industry's annual fees to the IOPC fund.

The following Figure 21 shows the current limits of liability and compensation available for an oil spill:

- **(Tier 1):** the *1992 Civil Liability Convention* (CLC) and **(Tier 2)** the 1992 *International Oil Pollution Compensation* (IOPC) Fund required by all major vessels with 2,000 metric tons or over of persistent bulk oil as cargo (*e.g.,* oil tankers/barges). Tier 1 is handled by the ship owner's P&I Club. For Tier 2, Canada subscribes and pays industry's annual contribution from Canada's *Ship-source Oil Pollution Fund* (SOPF). The IOPC funds are paid out by the international regime in accordance with their claims manuals.
- **(Tier 3):** the *Ship-source Oil Pollution Fund* (SOPF) for oil spills from all vessels in Canada (both convention and non-conventions ships) was established from industry monetary contributions between 1972 and 1976. The fund's current amount is from annual interested paid by the federal government on the initial contribution.

[84] The SOPF came into force on April 24, 1989, by amendments to the CSA. The SOPF succeeded the *Maritime Pollution Claims Fund* (MPCF) which existed in 1973.

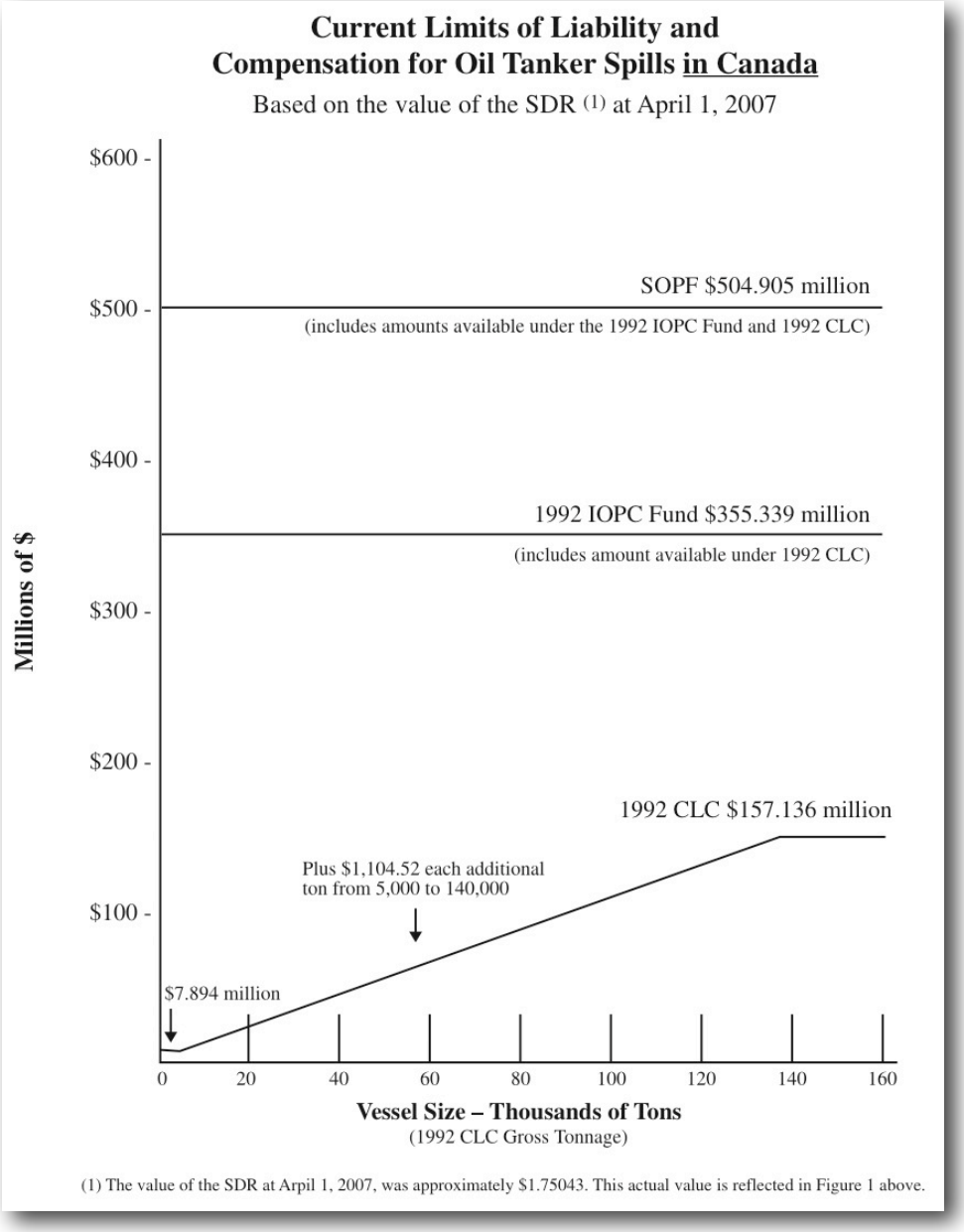


Figure 21: Limits of Liability and Compensation for Oil Spills in Canada

United States and Canada - A Comparative Analysis

The United States has a different arrangement than Canada for required financial arrangement for oil spill response and damage compensation. Vessels operating in US coastal (state) and territorial waters (federal) are required to have limits of financial responsibility under both state and federal legislation. In Canada, it is only a federal requirement. The Pacific States/BC Oil Spill Task Force has prepared a table that describes current Certificate of Financial Responsibility requirements for vessels, tank barges, and facilities as set by the Task Force member agencies.

The *US Oil Pollution Act of 1990* (OPA 90) places the primary burden of liability and the costs of oil spills on the vessel owner and operator who were responsible for the spill (See Text Box). OPA 90 applies to oil discharged from vessels or facilities into navigable waters of the United States and adjoining shorelines. OPA 90 also covers substantial threats of discharge, even if an actual discharge does not occur. When Responsible Parties' costs exceed their limit of liability and the limit is upheld - because there was no gross negligence or violations of federal regulations by the vessel owner or operator - the Responsible Party is entitled to file a claim on the US *Oil Spill Liability Trust Fund.* This fund can be used for reimbursement of costs in excess of the Responsible Party's limit. The National Pollution Funds Center (NPFC) within the U.S. Coast Guard reviews the claim to determine which costs are OPA 90 compensable, and the Responsible Party is then reimbursed from the Fund.

About the US *Oil Pollution Act of 1990*

The framework for addressing and paying for maritime oil spills is identified in the *Oil Pollution Act of 1990* (OPA 90), which was enacted after the 1989 *Exxon Valdez* spill. OPA 90 created a "polluter pays" system that places the primary burden of liability and the costs of oil spills on the vessel owner or operator who was responsible for the spill—that is, the Responsible Party. However, there are financial limitations on that liability. Under this system, the responsible party assumes, up to a specified limit, the burden of paying for spill costs—which can include both removal costs (cleaning up the spill) and damage claims (restoring the environment and payment of compensation to parties that were economically harmed by the spill). Above the specified limit, the Responsible Party is no longer financially liable.

To pay costs above the limit of liability, as well as to pay costs when a Responsible Party does not pay or cannot be identified, OPA 90 authorized the *Oil Spill Liability Trust Fund* (Fund), which is financed primarily from a *per*-barrel tax on petroleum products either produced in the United States or imported from other countries. The Fund is administered by the *National Pollution Funds Center* (NPFC) within the U.S. Coast Guard. The balance in the Fund— about $600 million at the end of fiscal year 2006—is well below its peak of $1.2 billion in 2000. The decline in the Fund's balance primarily reflects an expiration of the barrel tax on petroleum in 1994. The tax was not reinstated until 2005.

OPA 90 also defines the costs for which responsible parties are liable and for which the Fund is made available for compensation in the event that the responsible party does not pay or is not identified. These costs, or "OPA 90 compensable" costs, are of two main types:

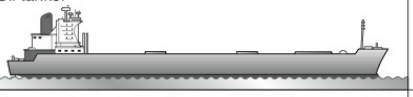
- *Removal costs*: Removal costs are incurred by the federal government or any other entity taking approved action to respond to, contain, and clean up the spill. For example, removal costs include the equipment used in the response—skimmers to pull oil from the water, booms to contain the oil, planes for aerial observation—as well as salaries and travel and lodging costs for responders.

- *Damages caused by the oil spill*: OPA 90 compensable damages cover a wide range of both actual and potential adverse impacts from an oil spill, for which a claim may be made to either the Responsible Party or the fund itself. Claims include natural resource damage claims filed by trustees, claims for uncompensated removal costs and third-party damage claims for lost or damaged property and lost profits.

Source: 2007 MARITIME TRANSPORTATION :Major Oil Spills Occur Infrequently, but Risks Remain, Testimony Before the Subcommittee on Oceans, Atmosphere, Fisheries, and Coast Guard, Committee on Commerce, Science and Transportation, U.S. Senate, United States Government Accountability Office (GAO)

The *Coast Guard and Maritime Transportation Act* of 2006 increased the limits of liability from the limits set by OPA in 1990. Both laws base the liability on a specified amount *per* gross ton of vessel volume, with different amounts for vessels that transport oil commodities (tankers and tank barges) than for vessels that carry oil as a fuel (cargo vessels, fishing vessels, and passenger ships). The 2006 Act raised both the *per*-ton and the required minimum amounts, differentiating between vessels with a double hull, which helps prevent oil spills resulting from collision or grounding, and vessels without a double hull (Table 12).

Table 12: Limits of Liability for Vessels in the United States

Vessel type	Description	Limit of liability
Oil tanker 	An *oil tanker* is a ship designed to carry oil in large tanks.	*Single hull:* • *Vessels greater than 3,000 gross tons* the greater of $3,000 per gross ton or $22 million. • *Vessels less than or equal to 3,000 gross tons* the greater of $3,000 per gross ton or $6 million. *Double hull:* • *Vessels greater than 3,000 gross tons* the greater of $1,900 per gross ton or $16 million. • *Vessels less than or equal to 3,000 gross tons* the greater of $1,900 per gross ton or $4 million.
Tank barge 	A *tank barge* is a non-self propelled vessel that carries liquid, solid, or gaseous cargos in bulk in tanks primarily through rivers and inland waterways.	
Cargo/freight 	A *cargo ship* or *freighter* is a vessel that transports non-oil goods and materials.	The greater of $950 per gross ton or $800,000.
Fishing vessel 	A *fishing vessel* is a ship that is used to catch fish for commercial use.	

Source: 2007 MARITIME TRANSPORTATION :Major Oil Spills Occur Infrequently, but Risks Remain, Testimony Before the Subcommittee on Oceans, Atmosphere, Fisheries, and Coast Guard, Committee on Commerce, Science and Transportation, U.S. Senate, United States Government Accountability Office (GAO)

As in Canada, the pollution liability coverage for large vessels in the US is often underwritten by not-for-profit mutual insurance organizations. These organizations act as a collective of ship owners who insure themselves at-cost. The primary insurers of commercial vessels in U.S. waters are the *Water Quality Insurance Syndicate*, an organization providing pollution liability insurance to over 40,000 vessels, and the *International Group* of *Protection & Indemnity Club* (P&I Club) that provide insurance primarily to foreign- flagged large vessels

Differences in Canada compared to the United States:

- Canadian shipping or oil handing industries do not pay for a *per*-barrel levy for oil imported or exported into Canada. The last time they did this was between 1972 and 1976 under the *Maritime Pollution Claims Fund* - now Canada's *Ship-source Oil Pollution Fund*.
- The financial health of Canada SOPF is (2007) $363.7 million compared to OPA 90's *Oil Spill Liability Fund* of $600 million (2006) - with a peak amount 1.2 billion in 2002. The US is concerned about this low level of financial preparedness, whereas Canada is not.
- The Canadian *Ship-source Oil Pollution Fund* can make a single payment of one occurrence of $149.5 million, whereas the US *Oil Spill Liability Fund* is authorized to expend $1.0 billion (1,000 million).
- Whereas the US relies on their *Oil Spill Liability Trust Fund,* Canada relies on the international oil spill response and compensation funds such as the CLC and IOPC funds. The maximum available funds for a major oil tanker incident in Canadian waters from these international regimes about $355 million.

- Based on the combined domestic (SOPF) and international (CLC & ICPC) funds, Canada has about 1/2 the amount of financial resources to manage a large oil spill compared to the United States.
- Ship-owners are the Responsible Party in Canada, whereas both the ship-owner and operator can be in the United States.
- The Canadian ship owners as the Responsible Party do not have access to Canada *Ship-source Oil Pollution Fund* once they reach their limit of financial responsibility. Instead, they no longer have to assume the role as the RP. In the United States, a Responsible Party can make a claim on the OPA 90's *Oil Spill Liability Fund* to continue their role as RP - subject to US Coast Guard approval.
- The Canadian oil receiving industry's annual contribution to IMO international funds is paid out of Canada's *Ship-source Oil Pollution Fund*. In the US, the oil industry does not subscribe to the IMO funds, but employ their own domestic regime under OPA 90 - the *Oil Spill Liability Fund,* that is funded by a levy on each barrel of oil imported into the United States.
- The US OPA 90 explicitly states that funds can be used for compensating resource trustees (State and Federal government ecology departments, Tribal Bands) for natural resource damages due to an oil spill (*e.g.,* remaining unmitigated impacts after cleanup and lost of non-economic opportunities). In Canada, natural resource damage process and ability to claim is poorly defined. The *International Oil Pollution Compensation Funds* and Canada's *Ship-source Oil Pollution Fund* claims guidelines explicitly do not accept claims for natural resource damages.

Table 13: Spill Cost Summary of Selected US Incidents, 1984 - 2000 (1997 US$ equivalents)

Vessel or Facility Name	Vessel Type	Date		Oil Type	Total Spill Vol. (gal)	Response Cost ($ per gal. spilled)	Natural Resource Damages ($ per gal. spilled)	Economic Claims ($ per gal. spilled)	TOTAL SPILL COST millions	TOTAL COST/GAL ($ per gal. spilled)
Arco Anchorage	Tanker	31-Dec-85	WA,	Crude	189000	143	3		27.2	143
Apex Houston	Barge	28-Jan-86	CA	Crude	25000	2	481		12.11	484
Glacier Bay	Tanker	2-Jul-87	AK	Crude	60000	68		1416	89.18	1486
Nestucca	Barge	23-Dec-88	WA	Fuel Oil	231000	56	57	4	27.68	119
Exxon Valdez	Tanker	24-Mar-89	AK	Crude	11000000	306	140	665	12262.95	1114
American Trader	Tanker	7-Feb-90	CA	Crude	417000	36	29	54	59.52	142
Sammi Superstars/ Maui	Freighter	8-Jan-91	CA	Fuel Oil	32064	620			20	623
Texaco Anacortes	Refinery	22-Feb-91	WA	Crude	27300				11	402
Tenyo Maru	Fishing Vessel	22-Jul-91	WA/BC	Fuel oil,Diesel	173000	88	65		28.33	163
***Union* Oil**	Pipeline	3-Aug-92	CA	Crude	14700	1006	108		16.7	1136
Morris J.	Barge	7-Jan-94	Puerto	Fuel Oil	789000	111	9	7	182.14	230
Berman			Rico							
Barge 101	Barge	31-Dec-94	WA	Diesel	26900					
Kure	Freighter	5-Nov-97	CA	Fuel oil	4500	2222				
Kuroshima	Freighter	26-Nov-97	AK	Fuel oil	47000	159			11.5	244
Command	Tanker	28-Sep-98	CA	Fuel Oil	51450	23			9.4	182
New Carissa	Freighter	4-Feb-99	OR	Fuel oil	70000	328			36.5	521
US Averages					**822370**	**369**	**112**	**429**	**914**	**499**

Source: Pacific States/BC Oil Spill Task Force

The ship owner is the Responsible Party in Canada, not the client (*e.g.,* cargo owner) or operators (charterers). Ship owners are strictly liable for oil pollution with little defense. They will have to pay for the response and damages incurred to the environment and the people that rely on it. They also have to demonstrate they have the financial arrangement through a third party such as a P&I Club, or for oil tankers and barges carrying persistent oil, the *International Oil Pollution Compensation Fund*. Their vessels are not adequate collateral.

The Concerns:

There are very definitive criteria on how and what funds will be spent on that are written in law, policy and fund claim guidelines. Reasonable measures or cost requirements are poorly defined. There will be numerous technical and legal "advisors" of the Responsible Party that will influence how and how-much money will be spent. Most debate and advise will be given on what are the reasonable measures,which detracts from responding to the incident.

A Responsible Party generally holds a significant portion of available money to one side as a contingency for legal fees, penalties and future compensation claims for private damages. They do not get reimbursed by their P&I Club insurers until they have paid out of their own funds (*i.e.,* "pay to be paid" clause). As such, not all money is allocated to impact mitigation, meaning active spill or vessel casualty response may end sooner than the public and politicians expected. There is also the problem that the Responsible Party is not required to report their expenditures costs it incurs while responding. This lack of information makes it difficult to estimate when their limit of financial responsibility will be reached, as well as to estimate what amount of response will be achieved.

There is a defined limit to a Responsible Party's financial responsibilities. Marine casualty and oil spill response is very expensive. Once this limit is reached, the ship-owner is no longer the Responsible Party. It is very difficult to "break limitations" and to seek more response funding. The RP is essentially no longer "willing" nor "able" to continue to manage the response efforts, and a transfer-of-command to government results. This transfer of command is not guaranteed to be smooth in British Columbia due to divergent response policies and philosophies between the provincial and federal government (examined in the next section).

Under some situations, reaching the limit of financial responsibility can occur well before incident closure. There could still be floating oil on the water, let alone the need to complete shoreline cleanup, remove other pollutants (containers, cargo), and address wreck removal. It is only the Tier 1 level of financial assurances from ship owner's P&I Club that pays for non-oil pollution environmental impacts of a vessel casualty. As such there is a financial risk to government leading to political consequences. The later reflects strong public expectation around the "polluter-pay" principle and the responsibility to make the environment and their community whole again.

To the lay-person, there is little understanding of this very complex subject area of oil spill response funding arrangements, let alone how the other consequences of a major marine vessel casualty will be funded. Each scenario in Part 3 will have a different story and outcome pertaining how - and how much - funds will be spent and the final outcomes. For example, oil tankers are not all treated the same. It depends on what they are carrying. For Scenario #5, the tanker carrying condensate is not eligible for funding arrangements with IMO's *International Oil Pollution Compensation Funds* that could provide up to $355 million towards spill response and damage compensation. The condensate being carried as cargo is not a "persistent" oil. It is only the Heavy Fuel Oil (Bunker or IFO 380) used to operate the tanker's engines that requires the ship owner to have a financial arrangement under the *Marine Liability Act* for oil pollution. The

tanker owner's P&I Club is their only guarantor for the oil spill consequences (both bunker and condensate) and any additional impacts the tanker itself inflicts on the environment.

For Scenario #3, where a Panamax oil tanker collides with another vessel and releases over 6 metric tons of crude oil, it meets the *Marine Liability Act* requirement to have an arrangement with the IOPC Funds. The Responsible Party will not have access to the maximum amount of funds because of the tanker's small size. A very expensive cleanup will ensue as Haro Strait and the surrounding island are low-energy environments. There probably be sufficient amount of funds to mitigate impact to the environment and compensate for private damages, but not for natural resource damages. There will certainly be debate between the US and Canadian government - with State and Province overtures - about natural resource damage compensation. The US takes such compensation as a matter of course, whereas in Canada this is not the case. The question of reciprocity between nations will certainly be tested, based on this issue and divergent response funding/compensation regimes of US and Canada,.

Modifying the International Maritime Organization's convention arrangement for seagoing vessels is difficult to undertake due to the global nature of the shipping business and need to ensure consistency and certainty as vessels travel from one port to another. Nevertheless, government and the shipping/oil industries still need to examine opportunities to enhance both Canada's domestic and international regimes to meet current economic realities that: 1) spills are getting more expensive, 2) coastal economic values are getting higher, and 3) the likelihood of a major vessel casualty is increasing with current and pending west coast developments.

There should be much more clarity and communication on the nature of funding and compensating for environmental damages from a vessel casualty, and not just for oil pollution. There should be no surprises for the public, affected stakeholders, and government agencies. There needs to be creative means to minimize financial risk, that is to get the most environmental protection out of the money that is available to the Responsible Party.

SUGGESTED POLICY DIRECTION
FINANCIAL RISK AND VULNERABILITY

Financial risk pertains to a Responsible Party defaulting on response commitments or exceeding their limit of financial responsibility for the incident management of a major vessel casualty. This is for all environmental and socio-economic consequences - not just an oil spill. Both outcomes result in the Responsible Party passing the remaining incident management for the vessel casualty on to government. Financial vulnerability pertains to the likelihood of this happening with adverse operational and political consequences. The public and coastal communities are entitled to have a clear understanding provided by both government and the shipping industry of this risk and vulnerability. Opportunities and mechanisms to reduce financial risk and vulnerability should be fully explored.

The likelihood of changing the current response funding and damage compensation regime for seagoing and other major vessels is remote. Nevertheless, there are two under-utilized opportunities that should be explored:

1. Canada adopts the International Maritime Organization's Protocol 2003 that establishes *Supplementary Fund* which provides additional funds for spill response and compensation.

2.Minister of Transport responsible for Canada's domestic *Ship-Source Oil Pollution Fund* re-instates a levy of 44.85 cents *per* metric ton of "contributing oil" imported into or shipped from a place in Canada in bulk as cargo on a ship.

Transport Canada should also undertake a study to determine whether the *Ship-source Oil Pollution Fund* is the best value for Canadians, compared to industry establishing their own fund, investing its own contributions, administrating the fund themselves, and paying their own annual contribution to the *International Oil Compensation Fund*. (IOCP Fund). As well, consideration should be given to expand the fund mandate to be inclusive of all environmental consequences of a major vessel casualty - not just oil pollution. As such, contributors to the fund should include both convention and non-convention vessels that pose an environmental and socio-economic risk to Canada's coastal marine waters and communities.

There should be a legislative requirement for a party responsible for a marine casualty to report the allocation of funds during the course of the incident to assess what amount is being held-back as a contingency compared to the amount allocated to impact mitigation. The legal requirement should also require the Responsible Party to provide a detailed post-incident report (audit) on all response costs.

The federal government should undertake a comprehensive comparison of the US and Canadian regimes for both oil spill and vessel casualty response to ensure fair and equitable reciprocity. Where there are gaps, such as in natural resource damage assessment and compensation, they need to be adequately addressed.

POLICY DELIVERY	
Financial Risk and Vulnerability	The 1995, *Financial Preparedness for a Major Marine Spill in British Columbia* prepared for the BC Ministry of Environment, Lands and Parks, Victoria, B.C (Now Ministry of Environment) should be re-visited and up-dated. Particular attention should be given to addressing the US/Canada reciprocity issues raised by the report. A scenario-based financial risk and vulnerability assessment for vessel casualties should be done for British Columbia that examines the levels of impact mitigation and damage compensation that can be achieved for the various tiers of funds available to a Responsible Party. The analysis should examine all consequences of a vessel casualty, not just oil pollution. A government/industry task force should be established to determine whether Canadians are getting the best value for their money with the continued payment of interest on the *Ship-source Oil Pollution Fund*, whether a more equitable approach is warranted, and how the fund's mandate can be expanded to include all major vessels and impact consequences.

3.3.2. Divergent Response Paradigms of Government

The cornerstones for effective response to an emergency are: *people*, *organization* and *relationship*. The following examines the divergent response paradigms of the federal and provincial agencies that have mandates for involvement in a marine vessel casualty incident. These agencies are the Canadian Coast Guard of Fisheries and Oceans Canada and the BC Ministry of Environment.

The Ministry of Environment is the lead provincial agency for oil and hazardous material spills under the *Emergency Program Act* and its Emergency Management Regulation. [85] The Canadian Coast Guard is the lead federal agency for marine oil spills from vessels under the *Canada Shipping Act*.[86]

These two agencies are not on the "same playing field" pertaining to the three emergency cornerstones. This has been evident since the 1973 *Irish Stardust* grounding in Alert Bay and the 1981 *Nestucca* oil spill off the west coast of Vancouver Island. This divergence could be the-most salient factor to undermine effective response to a vessel casualty. Public, political and stakeholder expectations might not be met unless remedied.

There needs to be an arrangement that is more respectful and inclusive of each others jurisdictional responsibilities (See: Text Box).

About Jurisdiction and Emergency Response

Canada is a confederation of provinces, with jurisdiction over various areas divided between the federal and provincial governments. These areas of jurisdiction are enumerated in the *1867 Constitution Act* (also referred to as the *British North America Act*). Areas such as defense, navigation, shipping, fisheries and criminal law are examples of federal jurisdiction. Matters dealing with property and civil rights are provincial. Pollution was not a pressing priority in 1867. As such, environmental protection does not fall clearly into any one jurisdiction exclusively.

As with pollution, emergency response is also more a collective of responsibilities, with some falling under federal jurisdiction and others provincial. The responsibilities are often integrally linked. For example, fish, birds, vessels, and trains are entities that migrate or travel internationally, and therefore are managed under the *Fisheries Act*, *Migratory Birds Convention Act*, *Canada Shipping Act* and *Railway Act,* respectively. However, these entities travel in, on, or over the coastal waters and lands of British Columbia - areas that also have a vested interest to be protected by First Nations, Local government and the Province. Another example is that constitutionally the water-bodies within the "jaws of land" (bays, fjords, passages), the seabed, and what is attached (eel-grass, algae, rocks) are mostly owned by the Province. But the fisheries habitat (*e.g.,* herring habitat) that is collectively created by these coastal features is a federal fisheries responsibility. Essentially, the federal and provincial resource agencies are "joined at the hip".

In the event of an oil spill from a vessel casualty, it is questionable that the federal government has sole jurisdiction with overarching authority for the singular reason the vessel is regulated under the *Canada Shipping Act*. First, the accident was not the normal operation of the vessel, second, the product has escaped onto several other jurisdictions, and lastly, more than one jurisdiction have powers to direct or seek mitigation of the impacts during different stages of the emergency response to the incident.

Under cooperative incident management, an expectation is that each jurisdiction is expected not to abrogate their legal, mandated responsibilities. Instead, they are expected to use their respective authorities in a cooperative manner to maximize the success of the emergency response. An example is to reduce the regulatory burden on the Responsible Party - as most laws are designed for normal business operations. Laws should not be used to "trump" each other legitimate roles.

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[85] "Lead Agency" refers to the government department, ministry or organization that have jurisdictional (federal, provincial, local governments, and First Nations) or functional (Fire, Police, Ambulance) command roles in managing an emergency. The designation of the lead agency may be based on legislation, an interagency agreement, a Cabinet decision or precedent. There can be more than one lead agency represented under a unified command, as well as the Responsible Party for spills and a marine casualty. A lead agency representative - an Incident Commander - represents their government at the Command Post (site) and operational (field) levels of emergency response.

86 The provincial *Emergency Management Act* and its regulation specifically identifies the BC Ministry of Environment as a "key" (lead) agency responsible for the provincial government's overall actions and performance during a spill. The *Canada Shipping Act* does not identify the Canadian Coast Guard as a "lead agency" *per se*, but provides them the authority and mandate to act as one. This role is reinforced by policy and precedence.

Background to Different Paths to Incident Management:

An agreement called: *An Understanding between Canada and British Columbia Concerning Federal and Provincial Responsibilities in Oil and Hazardous Material Spills* was signed in 1981 by both the provincial and federal government (commonly referred to as the *1981 Spill Agreement*). This arrangement appeared suitable until tested by the 1988 *Nestucca* spill that oiled the west coast shores of Vancouver Island. Despite following the *1981 Spill Agreement*, problems arose. Neither governments were prepared for a large marine oil spill. The provincial government was not strategically situated to meet its interests; the federal government didn't have incident organization or response capacity. The arrangements pursuant to the *1981 Spill Agreement* for inter-agency government response proved to be flawed. The next year, the *Exxon Valdez* oil spill in Alaska drove home the need for industry and government to improve cooperation and integration during a major marine oil spill. The incident management paradigm shift was from "who is in charge" of a spill, to "how do we do this together." However, Canada's federal government focus is on the former, whereas the latter is the provincial government's focus.[87] These divergent perspectives were rooted in the *Nestucca* and *Exxon Valdez* public enquires and their recommendations.

The provincial *Report to the Premier on Oil Transportation and Oil Spill* prepared by David Anderson in 1989 discussed the management and organization deficiencies during both the *Exxon Valdez* and *Nestucca* oil spills. David Anderson noted that:

> *"A major spill inevitably involves a large number of interests and organizations, each with its own legitimate concerns, and each determined to have concerns given a full hearing. Only then does the discussion get down to determining priorities for action. The answer lies not in more power to a single individual or government department, but in having an organization which will permit such interest and values to be discussed and taken into account in spill response planning, before a spill occurs."*

The federal *Public Review Panel's Report on Tanker Safety and Marine Spills Response Capability* prepared by Brander-Smith in 1990 also recognized the need for organizational structure. The report states: "The Coast Guard must remain the lead agency responsible for marine spill response and this role must be clearly defined and reinforced." Regarding the national response model, the Panel recommended the following:

> *"The Coast Guard at all times has overall responsibility for oil spill response at all levels. It must be ready to assume response management from the outset, at the local and regional levels, and to always be in command at the national level."*

The Brander-Smith'd recommendation is diametrically opposite of David Anderson's

The provincial approach was that recommended by David Anderson. It is highlighted in a guiding principle of the Provincial Marine Oil Spill Preparedness and Response Strategy written in 1990 by the Ministry of Environment which states that oil spill response is a "joint effort between provincial and federal agencies." Furthermore, the provincial strategy called for greater clarification of roles and responsibilities of industry and government, and called on reviewing and initiating a new agreement on environmental interaction (examined later). This recognizes that both the Province and Canada have separate "lead" role designations based on each other's interests, accountabilities, and legislations. As such, governments (jurisdictions) must work jointly

[87] In the United States, the federal, State and Tribal governments adopted the use of a unified (shared) command structure under the Incident Command System. The US Coast Guard generally had the major share in the response decisions, but all parties - including the Responsible Party (ship owner/operator) are present at the command table to develop joint response objectives and Incident Action Plan to manage the emergency.

at a strategic (*e.g.,* Command-level) to ensure their legislated mandates fully address public, political and stakeholder interests and expectations. First Nations and Local Government involvement needs must also be considered in this manner.

The Ministry of Environment advocates this approach in all their spill response plans and emergency program principles and approaches.[88] On each spill response plan cover has the Ministry's Environmental Emergency Program's mission statement as follows:

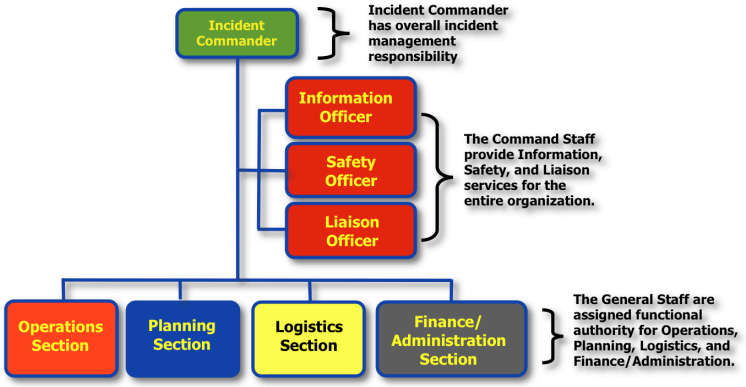
Exemplary Environmental Emergency Management through Leadership, Organization, Team Work, and Shared Responsibility.

The provincial mechanism to ensure a "strategic" and "functional" placement of all responding jurisdictions during an environmental emergency is through the common use of the Incident Command System (ICS) and the unified command protocol therein (See Text Box).

The Essence of the Incident Command System for Emergency Response

The Incident Command System (ICS) is a common, proven organizational structure employed by many companies and government agencies throughout Canada, United States, and world-wide to manage emergencies of all types and scales: such as a spill, vehicle accident, flood, severe storm. The use of the ICS and preparation of response plans addresses the "timeless tactical truth": Effective emergency response needs effective organization.

An Incident Management Team (IMT) employs the ICS, principally at an Incident Command Post (ICP). The ICP/IMT is characterized by three fundamental elements: 1) first direct-line of supervision to field personnel that have the "hands-on" work (e.g. beach cleanup, waste handling, wildlife rescue, field reconnaissance, equipment staging, etc), 2) where the response strategy and tactical (operational) decisions and plans are formulated, and 3) where unified (shared) command is established with other jurisdictions.



The objective of the ICS is to maximize team efficiency by defining lines of communications, delegating responsibilities, expanding with new people and duties to ensure no one exceeds their capabilities - mentally or physically.

The ICS organization builds from the ground up, with the management of all major functions initially being the responsibility of just a few people. Functional units are designed to handle the most important incident activities, and as the incident grows, additional individuals are assigned. Effective responders foster a team identity, rather than that of their originating agency or company. That is a primary alliance to the team and its mission - public safety and environmental protection - galvanizes actions. The ICS promotes such a focus as it is "function" based (i.e. coordinate, operate, plan, acquire, *etc.*). It is important for an Incident Management Team - whether government or industry - to understand that they are not alone, but have the entire resources (equipment, personnel, expertise, etc.) of their government, or industry associations at their disposal. The ICS ensures that such resources are received by an organization capable of handling and deploying them. It also ensures, when government agencies and the Responsible Party are working together in a unified/integrated manner, that limited resources are pooled. The ICS brings both capability and capacity to emergency preparedness and response.

[88] The provincial-level spill response plans written by the BC Ministry of Environment includes: *BC Marine Oil Spill Response Plan*, *BC Inland Oil Spill Response Plan*, *BC Hazardous Material Response Plan*. These are supported by 28 operational guidelines that provides technical and organizational guidance on plan delivery.

This unified or shared responsibility arrangement entails:

- Each affected jurisdiction - federal, provincial, local government, and First Nations - as well as and the Responsible Party (spiller) has representation at a "command level" to jointly develop overall response objectives, strategies, and tactics, and
- Each representative jurisdiction in command has response personnel integrated into one Incident Management Team that is co-located at a single Incident Command Post. These people provide technical information on response priorities, tactical delivery, as well as occupy ICS positions such as in command, operations, planning, logistics, and finance/administration sections.

This approach builds capacity, but is successful only if all responders work according to the "rules of engagement" under the ICS, have exercised together, and have fostered positive working relationship.

The Canadian federal government adopted the Brander-Smith approach to ensure the Canadian Coast Guard (CCG) will at all times have overall responsibility for oil spill. This policy is entrenched in the CCG's *Environmental Response National Plan*, Response Management System (RMS), their exercises, and the very core of their culture. Should the CCG assume control of a spill as an On-Scene Commander, there is no strategic place for either the Provincial and Local Government, or First Nations.[89] [90] This is because the CCG's *Environmental Response National Plan's* guiding principle pertaining to a lead agency role, states:

> f) there can be only one lead agency with the authority and mandate to ensure overall management and responsibility for the monitoring of and management of a response to a pollution incident.

Under the federal government model for marine oil spill response, other stakeholders regardless their of standing (senior agency representative or a junior biologist) are not part of the CCG's Incident Management Team, but instead accommodated by another separate team - the federal *Regional Environmental Emergency Team* (REET). The REET is essentially an "arms-length" committee co-chaired by Environment Canada and the BC Ministry of Environment.[91] It has only an advisory role to the CCG, when asked. The REET members are physically kept separate from CCG's Incident Management personnel - generally in another room. The REET has a 35 year history in marine oil spill response (See: Text Box).

The REET is a collective of people, often with a wide variety of skills, interests, representation, and divergent ways of doing work. The REET members are primarily tasked with establishing environmental response priorities and to provide expert advice to the CCG's federal Monitoring Officer or On-Scene Commander. The REET can also provide advise to the Responsible Party's Incident Commander and other jurisdictions functioning under Unified Command. This advise may be vetted by the CCG's Federal Monitoring Officer. The REET does not provide other response services such as tactical or logistical personnel and equipment to augment response efforts.

Essentially, the federal government brings two teams to one incident - the CCG's Incident Management (or Monitoring) Team and Environment Canada's *Regional Environmental*

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[89] As long as a competent Responsible Party (spiller) - with its Incident Commander and response team - is effectively managing a spill, the CCG assume a *Federal Monitoring Officer* (FMO) role. As a FMO, they cannot by national policy participate in unified command with the RP or the Province, but takes an "arms-length" monitoring function.

[90] *On-scene Commander* (CCG), *Incident Commander* (Province/Industry) are the same command role.

[91] For the BC Ministry to Environment to assign one its Incident Management Team members as a co-chair to the REET it is conditional on the province having an Incident Commander represented in unified command. See Section 3.11 government/industry interface in the *BC Marine Oil Spill Response Plan*.

Emergency Team. Neither of them integrate very well with each other, nor with the Responsible Party. This is the current situation for British Columbia.

Lastly, most of the functions of the REET are essentially done and delivered by an Environment Unit (EU) within the ICS's Planning Section of an integrated Responsible Party/Government Incident Management Team. Often during spill exercises, the EU and REET are the same people trying to be in two places at the same time, but with different masters, processes and agendas.[92]

History of the Regional Environmental Emergency Team (REET)

The *Regional Environmental Emergency Response Team's* (REET) origin is in eastern Canada. As such, the REET is strongly routed in the emergency approach to spills in Ontario and the Atlantic provinces.

In 1970, the tanker "ARROW" ran aground in Chedabucto Bay, Nova Scotia, spilling its cargo of heavy fuel oil. A lesson learned was to have the most up-to-date information and expert advice on environmental matters made more readily available during pollution emergencies. In 1973, Environment Canada set up national and regional committees to give advice on how to prevent, plan for and respond to environmental emergencies. These committees, or "teams", are made up of representatives from federal and provincial government agencies responsible for environmental protection, and from private industry. Each regional committee is referred to as the *Regional Environmental Emergency Team* (REET).

In its response role, REET operates as a team of experts, advising the On-Scene-Commander whether the Canadian Coast Guard or the Responsible Party. The REET also advises the CCG when they are taking the Federal Monitoring Office (FMO) role during a spill (e.g. when an RP has overall incident management responsibility)

Similar Incident Command System - but two different flavours

By 1998, both the Ministry of Environment and the Canadian Coast Guard had adopted an emergency response management system. Both are founded on the Incident Command System (ICS) for incident management structure and approach. However, the emergency response management system of the CCG's is different in many technical details.[93]

At the site (Incident Command Post) level of emergency management, the BC Ministry of Environment's response plans are internationally consistent with the United States - both state and federal. This reflects the ICS origins, which are United States based, as well as the provincial participation in the *Pacific States/BC Oil Spill Task Force*. The task force strives for international consistency in marine oil spill prevention, preparedness and response for the Pacific west Coast. The Provincial response plans are also fully consistent with plans of major oil and shipping industries that operate in both Canada and the United States - such as Imperial Oil, Shell Oil, Petro-Canada, Kinder-Morgan, Teekay Shipping, *etc*. The Provincial and industry plans are also consistent with *Burrard Clean Operation's* response plans, which are also ICS based.

The provincial and industrial approach reflects the benefits of a common incident management organization, terminology, forms, and protocols. This commonality builds both emergency response capability and capacity. It allows for sourcing responders from multiple organizations (local, provincial, national and international) and institutions (government, industry, consultant) and to integrate them as one Incident Management Team working together.

The Ministry of Environment has two Incident Management Teams to deliver the province's-spill response plans. Like a major company, these teams comprise of regular ministry staff

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[92] The Environmental Unit (EU) is one of several units under the ICS Planning Section of an Incident Management Team using ICS. US federal/state, BC provincial, and Burrard Clean Operations spill response plans all have an EU. Members of the EU are "technical specialists," all of which have accountability to their Incident Commander in unified command.

[93] Since 1991, the Ministry of Environment adopted Incident Command System (ICS) in its plans, training, exercises, and unified command for integration with the Responsible Party and other jurisdictions. In 1995, the Province of British Columbia adopted the ICS and unified command protocol therein as a requirement for all Ministry and Crown Agency response planning and preparedness. The provincial system includes all levels from policy, support, site management, to field - called the *BC Emergency Response Management System*. ICS is the foundation throughout.

(managers, technicians, administrators) that fulfill both ICS positions (Command, Operations, Planning, Logistics, and Finance/Administration) and technical specialist functions (waste management, wildlife rescue, air quality, shoreline assessment).

For a major spill, the provincial team members are tasked with being at the right place and time to establish (or to build on) incident management at a Command Post with other responding jurisdictions - including the Responsible Party.[94]

The Canadian Coast Guard's *Response Management System* (RMS) - though based on ICS - uses a modified organization, different forms, and varied terminology (Table 14). As mentioned, their national plan and RMS does not endorse the use of unified command and the agency/ industry integration this entails. A significant portion of CCG's 2006 RMS User Guide focuses on having a team of *Federal Monitoring Officers* (FMO) "shadow" the Responsible Party's response team members to assess their performance. The FMOs do not contribute to the response efforts by providing tactical or logistical resources such as equipment, people, *etc*. (See: Text Box)

Table 14: Comparison of International ICS and Canadian Coast Guard RMS

	International/Provincial Incident Command System (ICS)	Canadian Coast Guard's Response Management System (RMS)
Organizational/ Terminology	Staff that report to Commander are called "command staff" and referred to as "officers"	RMS uses "Advisory Staff" and are not referred to as "officers".The RMS uses several different names such as "Communications" instead of "Information Officer"
	ICS uses sections, branches, units, divisions and groups with a defined names.	RMS uses the five functional aspects of ICS command, operations, planning logistics, and finance, but does not use the ICS hierarchy or nomenclature thereunder.
Response Management Integration	Integration is via unified command with other jurisdictions and the Responsible Party, as well as integrating positions within a single industry/ govt ncident Management Team	"Advisory Staff" & "Monitoring Staff" do not integrate *per se* with a RP managed team, but shadow and record performance. Other stakeholders - including juridictions - are accommmodated by the REET.
	ICS uses "divisions" to demarcate operational areas	RMS uses "zones"
	ICS uses "strike teams" and "task forces" to define operational working relationships.	RMS does not use strike teams/task forces to manage tactical resources
	ICS uses specific colour coding for functions that are internationally recognized - such a green vest for Incident Commander, blue for planning section personnel.	RMS uses a different vest colours than used by those agencies/companies that employ the ICS.
Information Management	ICS uses specific forms for documentation that are internationally consistent	RMS has their own forms for documentation of priorities, assignments, resource tracking etc.
	ICS has a specific initial response phase that lead to an operational period. Each has specific meeting requirements, agendas and deliverables	RMS operational period and meeting schedules are not consistent with ICS
	ICS has a Incident Action Plan with specific components	RMS has a "mission form" with a different process than ICS

[94] The Government of British Columbia has only two Ministries that have "overhead" Incident Management Teams for the site (Command Post) level of emergency response: BC Environment for oil and hazardous material spills, and BC Forests for forest fires. Nevertheless, there are several hundred provincial employees trained in ICS to be available for a large scale emergency. There are also others listed on the *Provincial Emergency Program's* (PEP) *Temporary Emergency Assignment Management System* (referred to as "T.E.A.M.S.") to provide support these incident management teams.

A consequence of deviating from the international ICS is that the CCG cannot readily tap into other provincial, national or international responders without having to orient arriving outside people to their response system's differences. During an emergency is not the time to educate or train. The CCG is essentially on their own, when taking over incident management as the "On-Scene Commander" (OSC) on behalf of the federal government. This transition from an FMO to an OSC would occur during an "ship-source" mystery oil spill where there is no Responsible Party, or the Responsible Party is unable or unwilling to assume incident management. The latter can happen when a ship-owner reaches its limit of financial responsibility.

The Federal Monitoring Officer's Dilemma

According to Canadian Coast Guard's *Environmental Response National Plan*, responsibilities of the Federal Monitoring Officer (FMO) include:

- ascertaining the polluter's intentions with respect to measures taken to repair, remedy, minimize or prevent pollution damage;
- assessing the public interest priorities, considering any circumstances and advice deemed necessary;
- ensuring that the polluter addresses public interest priorities such as:
  - ◊ health and safety of crews, response personnel and the public;
  - ◊ reduction of the threat of further pollution; and
  - ◊ reduction of the threat to, and amelioration of damage to the environment, particularly in sensitive areas.
- assessing the nature and the scope of measures taken;
- ensuring and coordinating resources necessary to monitor and evaluate the response;
- acting as the federal spokesperson, when required;
- providing advice and support to the polluter's On-scene Commander;
- deciding to assume the role of On-scene Commander, if required; and,
- ensuring the collection of all documentation necessary to initiate cost recovery in accordance with the *Ship-source Oil Pollution Clean-up Costing Principles and Documentation Standards (TP 6217).*

The FMO role is largely "monitoring" (ascertain, ensure, assess) and not a "responding" role *per se*. The Canadian Coast Guard's FMO "support" to a Responsible Party does not generally include people, equipment and other tactical or logistics services to augment the overall response efforts. The main CCG supporting resources (people, aircraft, boats) are those directed to establishing environmental priorities and monitoring spill performance. This "rule-of-engagement" puts political pressure on the FMO as there is public expectation that CCG skimmers, booms, field staff, *etc* would be deployed to help recover oil on water and on shores. This type of support was not what was brokered with industry in establishing the Canada's Oil Spill Response Regime - under the polluter-pay principle for both preparedness and response.

This inability to add tactical response resources to a major marine oil spill is compounded by the RP knowing that any government equipment used will be subject to cost recovery. As such, a competent Incident Commander for the Responsible Party would ensure that all equipment and people are reflected in a joint Incident Action Plan (IAP) with the company/government agreed on response objectives, strategies, and tactics therein. If equipment is used outside the IAP and without RP knowledge or consent, the likelihood of full cost recovery by the agency deploying these resources is questionable - if argued in court by the RP's lawyers.

Alternatively, Provincial, Local Government and First Nations that are represented in unified command with the RP (which the FMO is not party to) have a much better ability to augment any aspect of the spill response efforts as long as they agreed to the IAP and are participating with the understanding they are there to make the RP's efforts "successful." There is a much higher certainty of both response success and cost-recovery under this arrangement of working within, rather than at arms length.

The FMO role does not appear to be the vision that Brander-Smith had in his 1990 *Public Review of Tanker Safety and Marine Spill Response Capability*, as it seems antithetical to strong federal leadership during a marine oil spill.

The Transfer-of-Command:

If there is a "transfer-of-command" to government from a Responsible Party - according to CCG policy of only one "lead agency" in command, - the Provincial, Local Government, and First Nations Incident commanders (or representatives in Command) will most likely be directed to joint the federal *Regional Environment Emergency Team* (REET). This move also affects all of their respective responders that have been fully integrated into a single Incident Management Team

prior to the transfer-of-command, including personnel assisting in safety, public information, logistics, planning, operations, and finance/administration.

A transfer-of-command has never been tested in British Columbia. All exercises on marine oil spills annually undertaken by *Burrard Clean Operations* have been with a Responsible Party taking the command role. [95] The provincial Incident Commander has always established unified command with the Responsible Party and integrated the provincial team within their team (and contractor) within a single Incident Command Post - as *per* ICS protocol and process.

The federal government's national response plan, their response management system, nor their "one lead agency" policy precludes the province from establishing unified command with a Responsible Party. This also applies to any other jurisdictions such as First Nations and Local Government from doing the same. Unified Command is the case so long as the CCG is in a *Federal Monitoring Officer* role. The political and operational dynamics of "transfer-of-command" will only arise when CCG assumes an "On-scene Commander" role and tries to invoke the "one lead agency" federal policy.

The BC Ministry of Environment and the CCG Incident Management Teams have never exercised together or participated in an oil spill incident where the CCG has assumed the role of an On-scene Commander. The CCG has always assumed the *Federal Monitoring Officer* (FMO) role for recent spill events in British Columbia. These incidents include the *Queen of the North* ferry sinking (March 2006), *Westwood* (August 2006) and *Andre* (July 2006) freighters bunker spills, and the *Ted Leroy Trucking* barge incident (August 2007). Even these incidents had their problems with provincial, First Nations, Local government integration.

Shipping Industry Perspectives:

The Incident Command System and the unified command with industry and government calls for a single Incident Action Plan with agreed-on response objectives, strategies and tactics, and team integration within an Incident Command Post. The perspective of the shipping and oil industry on this approach varies.

As stated, companies that operate within both the United States and Canada are generally fully supportive of the ICS. Nevertheless, not all shipping industry representatives understand or share the use of ICS and unified command, which is typically the case where the ship owner's representative is just a "ship agent" or their *Protection and Indemnity Club* representative. These people would be required to take a "command role," but often have little or no understanding of ICS or local/regional dynamics.[96] As such, they are very reliant on the CCG's FMO for direction and advice. The CCG becomes a "go-between" to the RP by vetting the interests of other jurisdictions. When this happens, it can cause frustration and angst with other Incident Commanders representing the province, First Nations and/or Local government.[97]

A third group that may interfere with establishing unified command are the RP's maritime lawyers and technical advisors, an example being the International Oil Tankers Pollution Federation (IOTPF). ITOPF is a not-for-profit organization established on behalf of the world's ship owners to promote an effective response to marine spills. It provides technical advice - particularly to shipping companies that have oil tankers - on all aspects of pollution response and the effects of spills on the marine environment. IOTPF personnel are very influential advisors to an RP's

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[95] *Burrard Clean Operations* cannot take a command role, so invites a member client to participate to be the Incident Commander and to integrate their company's response team. Refer to BCO web-site on" About Us: Canada's Approach" and Integration & Cooperation"

[96] Also referred to as a "qualified individual" which is tantamount to a one person Incident Commander totally reliant on the Response Organization to deliver incident management and tactical operations.

[97] Under unified command, problems and disagreements are resolved either amenably or "hammered-out" privately in the "Command Room". If there is an unresolved, significant issue, then the matter is elevated to each Incident Commander's executive (CEO, Deputy Minister, Regional Director). This allows the response to move forward. Disagreements rarely occur when Incident Commanders respect each others role and authorities during different stages of an emergency.

Incident Commander, and may not encourage the use of unified command and industry/ government team integration. As for lawyers, their interests are for their clients, not necessarily for the better good.

Harmonization Efforts:

The lack of federal and provincial harmonization has been raised by the Province since the early 1990s. There have been numerous efforts by BC Ministry of Environment's executive addressing the above issues. For example, the following Deputy Minister's public comments on the Department of Fisheries and Ocean's *Discussion Paper on Proposed Adjustments to the Governance of Canada's Marine Oil Spill Preparedness and Response Regime* (1999) captured the issue:[98]

> *On reading the discussion paper, I have concluded that the critical issue related to governance of Canada's marine oil spill preparedness and response regime is not the transparency of Response Organization fees for its services, the enhancement of wildlife protection, the scope of committee/council mandates, or the payment mechanisms for costs incurred by CCG during a spill. The main governance issue in British Columbia is how provincial and federal governments and industry will be strategically and operationally situated during a major marine oil spill incident in order to meet their legal and mandated requirements. This issue is directly related to the federal Policies for the Federal Monitoring Officer and On-Scene Commander written in 1995. This national policy is integral to Canada's marine spill response regime and governance, but functions as doctrine within the discussion paper. This policy could significantly undermine goals stated in your letter: an integrated approach to the management of both public and private responses; greater public accountability; and a strong national system for spill preparedness and response.*
>
> *The Province of British Columbia has sought changes to the national policy and CCG response plans, since 1992. We promote the concept and organization of industry and government responders in the Incident Command System, working according to Unified Command, and striving for a single, integrated incident management team. Since 1992, this issue has been communicated in technical comments on draft CCG Plans, and by the Minister of Environment, Lands and Parks in correspondence pertaining to the Standards on Response Organizations and the national policy being addressed here, without resolution. The national policy is a significant impediment to emergency harmonization between federal and provincial agencies with emergency mandates in British Columbia.*
>
> *This ministry has attempted to resolve the matter since 1991 through a Memorandum of Understanding on Environmental Emergency Interactions between Canada and British Columbia but has been stalled as a result of this policy.*

A framework for harmonization was initiated by the BC Ministry of Environment when it began in 1990 to write a *Memorandum of Understanding on Environmental Emergency Interactions between Canada and British Columbia* to replace the *1981 Spill Agreement*.[99] This initiative was part of implementing the Ministry's *Strategic Policy for Federal and International Agreements* as provided in the *1990 BC Marine Oil Spill Prevention and Preparedness Strategy*.

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[98] February 18, 1999 Letter posted on DFO web-site on public comment to their 1999 "Gold's Panel Report" from Cassie J. Doyle, Deputy Minister of BC Ministry of Environment, Lands and Parks to Wayne G. Wouters, Deputy Minister, Department of Fisheries and Oceans

[99] The *1981 An Understanding between Canada and British Columbia Concerning Federal and Provincial Responsibilities in Oil and Hazardous Material Spills* (Spill Agreement) has not been rescinded. It is still referenced by in Environment Canada's National Environmental Emergencies Contingency Plan Appendix A: Environmental Emergencies Agreements and Memoranda of Understanding

The policy states:

> I*n order, to clarify the roles and responsibilities of the Province in oil spill response with respect to other jurisdictions, BC Ministry of Environment will initiate the review and amendment of federal and international agreements and initiate new agreements as necessary.*
>
> *The 1981 Federal/Provincial Memorandum-of-Understanding concerning oil and hazardous material spills will be rescinded and a new memorandum of understanding on environmental interactions be written to more clearly establish roles and responsibilities concerning oil spills and to enhance cooperation for maximum public benefit. Federal and provincial cooperation will be enhanced through joint exercises, coordination of plans and studies, and sharing of resource technologies.*

The intent of the MoU is to guide provincial and federal response agencies in concert with local government and the spiller in order to expedite a cohesive and coordinated emergency response to an incident that involves a release of a polluting substance. The MoU applies the principles of the Incident Command System that employs unified command and an integrated government/ industry response.

Eighteen years have now passed since this initiative, without being any closer to harmonization. The issue will be resolved one-way or another during a major marine casualty when a transfer of command occurs or if there is a mystery oil spill.

SUGGESTED POLICY DIRECTION HARMONIZING THE RESPONSE PARADIGMS OF FEDERAL AND PROVINCIAL GOVERNMENTS	
The 1981 *An Understanding between Canada and British Columbia Concerning Federal and Provincial Responsibilities in Oil and Hazardous Material Spills* (*1981 Spill Agreement*) needs to be rescinded, as it does not serve the interests of either the province, First Nations, Local Government or industry who seek an integrated response to a marine vessel casualty, whether the incident results in a spill or not. The process of achieving a federal and provincial agreement on the draft *Memorandum of Understanding between Canada/British Columbia on Environmental Emergency Interaction* needs to be initiated again. As the Province has historically and consistently taken the initiative to resolve the divergent response paradigms, the resolution of the problem should be a specific initiative of the BC Minister of Environment and undertaken by the Minister himself.	
POLICY DELIVERY	
Harmonizing Response Paradigms	The BC Minister of Environment has potentially three combined approaches that could help address the issue above. As well, Provincial leadership could also foster emergency harmonization throughout Canada that builds national emergency response capability and capacity. The BC Minister of Environment should: 1) Advocate the use of the Incident Command System: its organizational structures, unified command protocol, team integration, etc, to the *Canadian Council of Ministers of the Environment* to achieve the CANADA-WIDE ACCORD ON ENVIRONMENTAL HARMONIZATION and the CCME's vision that: "Governments working in partnership to achieve the highest level of environmental quality for all Canadians". 2) Approach the federal Minister of *Public Safety Canada* that has an overarching federal government mandate for establishing a *National Emergency Response System* (NERS) under the *Emergency Management Act.* to have federal departments employ the Incident Command System for site (Command Post) level of response to all emergencies. Other federal departments with lead federal agency roles - such as the National Energy Board for trans-border pipelines, Transport Canada for railways, Agriculture Canada for foreign animal disease - have not adopted the Incident Command System at this level of response. 3) Approach the Minister of Transport Canada to specifically address the issue of marine vessel casualty and oil spill response harmonization and the lack of progress over the last 18 years.

3.3.3. Geographic Response Plans to Guide Local Preparedness

Preparing Geographic Response Plans (GRPs) for oil spill response or for major vessel casualty response has not been done in British Columbia, though well established in the United States on the Pacific west coast.[100] [101] GRPs are used as a guide to protecting natural and cultural resources during response to oil spills in a geographical area. They can also serve to expedite a "place of refuge decision" pertaining to a major vessel requiring a safe haven for repairs, to reduce the risk of environmental damage, or both (examined later).

GRPs provide recommended spill response strategies that responders can use. The strategies can be very specific about locating booms, staging areas for equipment, finding temporary storage areas for oily wastes, locating a command post, accessing places for response equipment for sea deployment, finding a facility for a temporary Wildlife Care (Rehabilitation) Centre, and more. A GRP can incorporate spill risk ranking trajectory modeling that predicts where and how long it will take for the oil to affect sensitive resources. Also modeling can be used to determine the likelihood of a vessel requiring a place of refuge using vessel traffic patterns and drift analysis. Places of refuge for major vessels can include consideration of anchorage suitability, as well as associated environmental risk.

An essential benefit of GRPs is not just the document, but the process of preparing it. GPRs, though labour intensive, are developed in partnership with all levels of government, First Nations, and industry, such as a Response Organization. For example, GRPs can include contact numbers of local emergency coordinators, First Nations, and others that need rapid notification of a spill or place of refuge decision. If these people are party to the GRPs development for their local area, responders will have a much better understanding of expectations and have a resource base to work from.

For British Columbia, the closest product to a GRP is its *Coastal Resource Information System* (CRIS). This product is a computer-based Geographic Information System (GIS) inventory of coastal resources that covers the entire 29,000 kilometers of BC's coast. The information resides with GeoBC.[102]. This system also has an oil shore sensitivity mapping application.

British Columbia's CRIS is one of the most detailed and comprehensive coastal mapping initiatives in the world. Its origin was from provincial oil spill planning preparedness in the early 1990's (See Text Box). David Anderson's *Report to the Premier on Oil Transportation and Oil Spills* (1989), prepared after the *Nestucca* barge oil spill (1988) and the *Exxon Valdez* tanker oil spill (1989), gave special attention to this issue. The report stated:

> *"If this [coastal resource and oil sensitivity mapping and planning] is done effectively before a spill takes place, residents, industry, and government agencies will have a common understanding of objectives, and much of the initial confusion present in both the Nestucca spill and the Exxon Valdez spill will be avoided." (Section 4.02). [emphasis added]*

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[100] Examples of GRPs for the Pacific west coast can be found for the Region 10 Regional Response Team and the Northwest Area Committee. Examples in proximity to British Columbia's waters are the GRPs for the Strait of Juan de Fuca, North Central Puget Sound, North Puget Sound / San Juan Islands. They are coordinated by the Washington Department of Ecology (Refer to Web site: Marine Geographic Response Plans).

[101] The BC Ministry of Environment, in cooperation with Burrard Clean Operations, has initiated in 2008 a "pilot" Geographic Response Plan project for the Kitimat Area to define format and resource needs. (*pers. com*. Mike Drumm. BC Ministry of Environment, Smithers, BC)

[102] *GeoBC* provides a window to data and information sources from various ministries and agencies from the Natural Resource Sector within the British Columbia Provincial Government. The *Integrated Land Management Bureau* is responsible for *GeoBC* and has developed this site as a first step towards making information accessible to clients without having to go to many different sites to find the resource.

However, the coastal resource mapping, as extensive and important as it is, has been largely undertaken in isolation of coastal community participation. The system's information and process does not fully meet the intent of David Anderson's recommendation.

There are also gaps in both coastal and oil spill response data and information. Only the southern coastal areas (Strait of Georgia, Juan de Fuca Strait) and Vancouver Island has specific information related to oil spill logistics, such as booming. This information is out of date, but in the process of being revised. In addition, emergency contact numbers are not included. There is little integration of information between what is on the coast, what is sensitive to oil or a vessel casualty, who to contact, and what to do about it. The GRP process is a form of response information integration and garners local stakeholder acceptance of difficult decisions that may have to be made.

About British Columbia's Coastal Resource and Oil Spill Information Systems

In 1992, the BC Ministry of Environment developed a computer-based *Marine Oil Spill Response Information System* for oil spill preparedness and response. This system was the pre-curser to what is now the British Columbia Coastal Resource Information System (CRIS) which can be accessed through GeoBC.

The *Coastal Resource Information System* includes multiple data-types such as satellite images, digital maps (topographical/bathometry), and geographically referenced information. The information relates to more than 50 coastal resources, including the physical character of the shorelines and the biological species that interact with the shoreline, such as fish, birds, and marine mammals. The database also includes human activities that occur in the coastal zone, such as sport and commercial fisheries, aquaculture, native harvesting, tourism, recreation, and commercial enterprises. Special status areas, such as archaeological and heritage sites (password protected), and ecological reserves and parks, are also included. Coastal inventory and human uses are linked independently to a uniquely defined shoreline unit. Each shoreline unit is based on its geomorphology: sandy beach, rock platform, cobble, rock cliff, etc.

The original *Marine Oil Spill Response Information System* (OSRIS) is now a specialized application that uses the above core data of CRIS. It is a sophisticated computer modeling program that determines the sensitivity of each shoreline unit to oil pollution. The modeling program considers such aspects as: oil residency, coastal resources present, species rating, seasonality, human-use rankings, and more. Identification of the most important and vulnerable coastal areas enables priorities to be decided shoreline protection from oil pollution. Based on this sensitivity determination, the system also identifies countermeasures strategies, such as protection booming.

During a spill event, a spill trajectory model can simulate the spread of oil on water depending on wind direction, time and current/tidal regimes. Where shoreline oiling occurs, the system assists in determining the most environmentally sound cleanup strategies. The benefits of both the *Coastal Resource Information System* and its *Marine Oil Spill Response Information System* is that they improve pre-spill determination of sensitive shorelines that would require protection or cleanup, and help to decide equipment deployment and cleanup logistics.

There are two obstacles in preparing the Geographic Response Plans for British Columbia. They are:

1. No structure or framework in BC on what a GRP should look like, contain, or present and
2. Little emergency planning and preparedness capacity in both government and industry.

SUGGESTED POLICY DIRECTION GEOGRAPHIC RESPONSE PLANS TO GUIDE AND TO ENGAGE LOCAL RESPONSE PREPAREDNESS	
Geographic Response Plans should be developed for British Columbia's coastal zones that utilize the full capability of the provincial coastal resource and oil sensitivity mapping capabilities, the expert knowledge of the oil response community (industry and government), and local knowledge of coastal communities and First Nations. The process of preparing these plans should foster agency understanding and relationships with the BC coastal communities.	
POLICY DELIVERY	
Geographic Response Plans	Geographic Response Plans should be jointly prepared by government (local, provincial, federal), First Nations, the private sector and other local stakeholders that have vested interests (*e.g.,* environmental NGOs). A pilot project should be established to determine GRP management, content, structure and dissemination. Some considerations on GRP design include: •internet-based to allow access and up-dating for planning purposes •structured content to serve as a database of information, rather than just text (pdf) documents. •searchable information that is down-loadable (e.g. maps, contacts) to be both operational and to support internet-based situation reporting. • guidance documents (e.g. Operational Guidelines, Response Plans). GeoBC should evaluate the GIS platform currently used by Washington Department of Ecology for GRP information dissemination. Funding should be provided by both government and industry, whereas the former focusses on coastal mapping and oil sensitivity information, and industry focuses on marine casualty response (logistics, booms, facilities, staging areas). The local community focus provides regional knowledge and determines stakeholder applicability, relevance, and acceptance. The GRP should also facilitate places of refuge decision-making by including anchorage and access needs of vessels needing a safe haven for repairs and/or environmental protection.

3.3.4. West Coast Rescue Tug Capability

British Columbia has marginal tug capability to rescue (assist) a seagoing vessel under distress on the west coast.[103] The current situation is based on a commercial tug being in the locale of a stricken vessel to be of emergency service - referred to as a "tug-of-opportunity." This arrangement also assumes that the tug has a place to harbour its tow (logs, barge), and that the environmental conditions for rescue do not put the crew in danger. Lastly, the tug-of-opportunity relies on the captain and crew to have the training, skills, and equipment to "snag" a vessel and to keep it "at station" until additional assistance arrives or a place of refuge decision can be made on where to tow the vessel.

This issue of establishing a rescue (assist) tug capability, going beyond the current regime of using tugs-of-opportunity, has been raised since oil port evaluation studies for the west coast were conducted in 1978.[104] In 1990, a Brander-Smith recommendation (6-4) stated:

> *Powerful tugs able to tow large disabled tankers to safety, be available on standby for incidents occurring both within and outside Juan de Fuca Strait, and mandatory emergency towing arrangements should be established*.

In 1995, the *Canadian Council of Ministers of the Environment* (CCME) undertook a review of escort, rescue, and salvage towing capability in Canadian waters (See: Text box of tug descriptions).[105] A cost-benefit analysis for establishing a dedicated rescue/salvage tug to serve Canada's southern west coast was also undertaken. These studies are two of several CCME studies that were requested by the BC Minister of Environment (then Honourable Moe Sihota) to improve oil spill prevention from vessel casualties.[106] Since 1995, Canada's west coast has only had a few near misses from drifting vessels, as a result the public and political pressure in British Columbia quickly waned (See: Text Box).

Harbour, Escort, Rescue and Salvage Tugs

Harbour tugs are confined to ports to accompany and maneuver a vessel to its moorings or dock. Escort tugs are specifically design to accompany a vessel - particularly an oil tanker - along coastal routes of difficult navigation. Also called "tractor" tugs. A rescue tug is any tug that is either available "on opportunity" or specifically stationed at a "ready-state" to assist a major vessel that needs assisted towing because of foundering or drifting. A salvage tug contains specialized equipment and trained crews to undertake emergency vessel repairs to prevent sinking and/or release of cargo and fuels. They may also have fire-fighting equipment.

Harbour

Escort/Tractor

Rescue

Salvage

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[103] "assist " or "rescue" refers to "a tug or other vessel capable of attaching to and stabilizing a drifting disabled vessel, to arrest the drift until a suitable salvage/towing vessel can arrive on scene to provide necessary assistance.

[104] *1978. Potential Pacific Coast Oil Ports: A Comparative Environmental Risk Analysis, (Vol. 1):* A report by Fisheries and Environment Canada (Vancouver)

[105] 1995. *A Review of Escort, Rescue and Salvage Towing Capability in Canadian Waters*, Prepared for the Canadian Council of Ministers of the Environment, by Robert Allan Ltd, and D.F. Dickens Associates Ltd.

[106] The Minister of Environment's 1995 Spill Prevention had four initiatives: 1) expediting the phasing out of single hulled oil tankers, 2) requiring major vessel to have a Marine Pollution Prevention Plan, 3) establishing a dedicated rescue tug on the West Coast, 4) creating incentives and funding for enhanced marine pollution prevention.

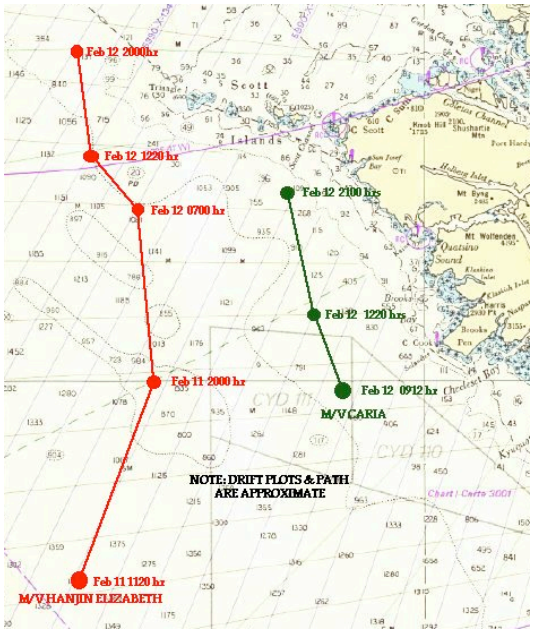
High Seas Rescue off of Canada's the West Coast

The Incident

On February 11th 1998, the engines failed on the Greek-registered, container vessel *Hanjin Elizabeth* (approx. 37,000 DWT). The vessel began drifting about 80 nautical miles from Brooks Peninsula on Vancouver Island towards Scott Islands located at the most northerly end of the island. A crew of 24 are on board. On February 12th at around 0200 hours, the engines also failed of the Liberian-registered, general cargo vessel *Caria* (approx. 26,000 DWT). It began drifting 17 nautical miles from Brooks Peninsula towards Cape Scott at the northern end of Vancouver Island. There were 20 crew members on board. Severe storm to hurricane force winds and 10 meter sea prevailed in the area. Ocean-going rescue tugs from the United States and Canada were dispatched by the Canadian Coast Guard's Rescue Co-ordination Center in Victoria. CCG also dispatched two of its own vessels. At the onset of both vessel disablings, it was anticipated that they would run aground before the tugs arrived to secure a tow. The Cape Scott/Scott Island group is a highly significant ecological area with vulnerable populations of seabirds and seals. Cape Scott Provincial Park is at the north end of the island. This park is noted for its wilderness hiking and historical setting.

Outcome

The *Hanjin Elizabeth* drifted "not under command" for about 100 nautical miles to the north over a 33 hour time period before regaining engine functions. The initial rescue tug on-scene - the U.S. "Hunter" - failed to sustain towing. It took only about an hour to fix a towline, but within an hour the towline broke due to storm force winds and seas. Fortunately, when the *Hanjin Elizabeth* was in tow, it was stabilized long enough to enable the crew to safely repair its engine. Within a couple of hours the vessel was operating under its own power. The US "Hunter" took approximately 20 hours to arrive from its home port of Anacortes, Washington State. It travelled over 360 nautical miles *via* the "Inside Passage" between Vancouver Island and the mainland and around Cape Scott to avoid in storm conditions. The second. and larger US tug, the "Sea Victory" from Seattle took 29 hours to arrive on scene. It also took the same inside passage route - traveling about 400 nautical miles. The third tug on-scene was the Canadian "Seaspan" from Port Hardy. It took 7 hours to arrive (90 nautical miles). The *Hanjin Elizabeth* engines regained functions by the time the U.S. "Sea Victory" arrived. The CCG vessel - the "John P. Tully" - could only be on standby for potential crew rescue. The *Hanjin Elizabeth* had drifted past and just west of the Triangle and Scott chain of islands before the first tug arrived. These islands extend 28 nautical miles from Cape Scott. The *Hanjin Elizabeth* reached its intended destination of Seattle under its own power, but escorted by the two tugs. There was no loss of life, cargo, or oil.



The *Caria* began drifting from a position much closer to Vancouver Island than the *Hanjin Elizabeth*. The *Caria* drifted 41 nautical miles over a 19 hour period. It came within 10 nautical miles of both Vancouver Island and Scott Islands before a towline was secured by the Canadian tug "Arctic Hooper". It took the Arctic Hooper eight hours to arrive from Tahsis, approximately 80 nautical miles away. At the time of the tug's arrival, the *Caria* was rigging its anchor to drop and drag to help avoid grounding. The CCG vessel "Narwhal" was on standby for potential crew rescue. There was difficulties in securing a towline due to severe sea conditions - a very dangerous task for vessel and tug crews. It took over 5 hours to secure a line. Based on drift rate, there was about 2 hours to spare before the *Caria* would have grounded. The vessel was successfully towed through Scott Channel to a safe refuge in Hardy Bay (Port Hardy - Johnstone Strait) for repairs. There was no loss of life, cargo, or oil.

The total number of tugs dispatched were six, of which only one managed to secure a towline. The rescue tugs were- US *"Sea Victory"*, US *"Commander"*, the US *"Barbara Foss"*, Canadian *"Arctic Hooper"* and Canadian "*Seaspan Queen*". The two CCG vessels - the *"Narwhal"* and *"John P. Tully"* could only standby for crew rescue and response monitoring functions. Incident closure was February 13th at 0800 hours when the *Hanjin Elizabeth* was under command *en route* to Seattle, and the *Caria* reached Hardy Bay under tow and moored for repairs.

Washington Department of Ecology's Spill Program and State governors pressured for several years to establish a large ocean-going tug at Neah Bay (Juan de Fuca Strait) to be a dedicated rescue tug to protect the State's coastal waters. After several years of debate amongst the shipping industry, coast guard, environment NGOs, and the state agency, they successfully established a dedicated tug in 1999.

Stationing this tug is a statement that a private sector tug-of-opportunity regime established in 1997 was not satisfactory to protect Washington's coastal waters from a marine casualty (See: Text Box)

Rescue Tug at Neah Bay, Washington

The Private-sector' s International, Tug of Opportunity System

In 1995 there was strong BC Provincial and Washington State pressure to establish a dedicated rescue tug, such as at Neah Bay, to be on full-time standby to assist a disabled vessel before grounding or in need of a tow to a safe refuge. The US and Canadian shipping industry proposed an international, private-sector tug of opportunity system as an alternative solution (referred to as "the ITOS Plan"). In 1996, a self-initiated marine industry group formed to address a US President's Directive to examine private-sector efforts to improve vessel safety (see note below). The group consisted of representatives from the United States and Canadian shipping industry. The goal was to develop a tug of opportunity system with existing marine resources located in the US Puget Sound and Canadian Strait of Georgia areas. The ITOS Plan identified the needed for communicating with and tracking of tugs of opportunity, improving current practices used to respond to disabled vessels, and creating a central data base of potential commercial tugs. However, the ITOS Plan was deficient in defining:

- procedures to assign tugs to the ITOS,
- the areas for ITOS coverage,
- coverage requirements relating to tug capability and response time,
- training and special equipment requirements for crews, and
- system performance criteria.

Nevertheless, both the US and Canadian Coast Guard accepted the industry's ITOS Plan.

Currently, major seagoing tugs have electronic tracking devices (Automatic Identification System - AIS) to allow them to be located in real-time on computer charts. This information is provided to US and Canadian Marine Vessel Traffic Services to reference if there is an emergency request for tug assistance . Essentially, this electronic tracking system is the extent of the ITOS Plan's delivery. A phone call to the three major tug companies would achieve the same functionality. None of the short-comings, such as crew training and special emergency tow equipment, have been done. Essentially, the ITOS Plan was a means to diffuse the Provincial and State pressure in 1995 to improve rescue (assist) tug capability along their coasts.

Note: In 1995, the *Alaska Power Administration Asset Sale and Termination Act*, P.L. 104-58, was signed by the US President on November 28, 1995. Title IV of the Act requires the US Coast Guard to submit a plan to Congress on the most cost-effective means of implementing such an international, private-sector tug of opportunity system (ITOS) for vessels in distress operating within the Olympic Coast National Marine Sanctuary and the Strait of Juan de Fuca. The Canadian Coast Guard participated in this process.

Source: Report to Congress, International, Private-Sector Tug-of-Opportunity System for the Waters of the Olympic Coast National Marine Sanctuary and the Strait of Juan de Fuca and 1999 Regulatory Assessment Use of Tugs to Protect Against Oil Spills in the Puget Sound Area Prepared for the United States Coast Guard Report No. 9522-002

In 2002, a *West Coast Offshore Vessel Traffic Risk Management* (WCOVTRM) project was initiated by the *Pacific States/British Columbia Oil Spill Task Force* in response to concerns that both tank and non-tank vessels transiting the Pacific Coast could pose a risk to sensitive coastal resources from oil or hazardous cargo spills caused by collisions or drift groundings. A major part of this study was to evaluate rescue tug capability from Alaska to California. The rescue tug study entailed:

- Classifying suitable tugs-of-opportunity along the coast that could rescue a vessel;
- Determining where they are stationed
- Calculating how long it would take them to reach any given point along the coast, and
- Assessing the drift rates of various types of major vessels.

From this information, the study was able to determine from what distances offshore would a dispatched rescue tug make it on time to secure a tow on a drifting vessel and hold it at station. An intersection line ("point of no return") was determine for a "worst case" and "average" case situation, as defined by a vessel drift rates of 3.6 and 1.1 knots, respectively.

Pacific West Coast Vessel Drift Study

When its propulsion or steering fails, a ship will drift due to the combined effects of the wind, waves, current, trim and ballast. NOAA's Hazardous Materials Response Division was requested by the States/British Columbia Oil Spill Task Force to analyze ship drift rates for the West Coast from Alaska to southern California to determine the risk of a disabled vessel coming ashore and grounding.

Onshore drift speeds were based upon 10 to 15 years of wind records from five different locations along the West Coast. These onshore drift speeds were based on windages (a ship's draft rate based upon vessel surfaces which function as "sail" areas) for various types of vessel, which range from 2 percent to 10 percent. For example a laden (or in ballast) oil tanker has a much lower windage (sail area), than a container vessel or LNG tanker.

There were two categories of vessel sizes: *Smaller* vessels were considered less than 200,000 tons summer dead weight (SDWT). *Larger* vessels or very large carrying capacity (VLCC) are greater than 200,000 SDWT. The vessels were considered fully loaded or carrying ballast.

The analysis did not use computer model simulations. It was not practicable to predict exactly where and when a drifting ship would come ashore for the entire West Coast and under every possible condition

For drift results see Appendix F of the *West Coast Offshore Vessel Traffic Risk Management*

British Columbia has only a few large ocean-going tugs that can handle a "severe" weather rescue (assist) of a disabled vessel, but more tugs that could handle an "average" weather rescue. In total there are twenty-two tugs have at least "average" weather capability. These "tugs-of-opportunity" are generally stationed in Vancouver/Delta area when not engaged in their commercial work. Other rescue tugs could be sourced from the States of Washington or Alaska.[107]

Under such an arrangement in the worse case scenario, any stricken vessel would have to be 50 nautical miles off-shore of Vancouver Island or 216 nautical miles off of the Queen Charlotte Island to have some confidence that a tug could arrive on time to secure a tow and keep it "at station" (Figure 22). Other assumptions are that the vessels have either a towing package or a

[107] For an inventory of west coast tugs that meet a rescue (assist) design and power criteria: see Appendix H of the West Coast Offshore Vessel Traffic Risk Management

mechanism to secure a tow, and that the tug and vessel crew are trained in securing an emergency line.[108].

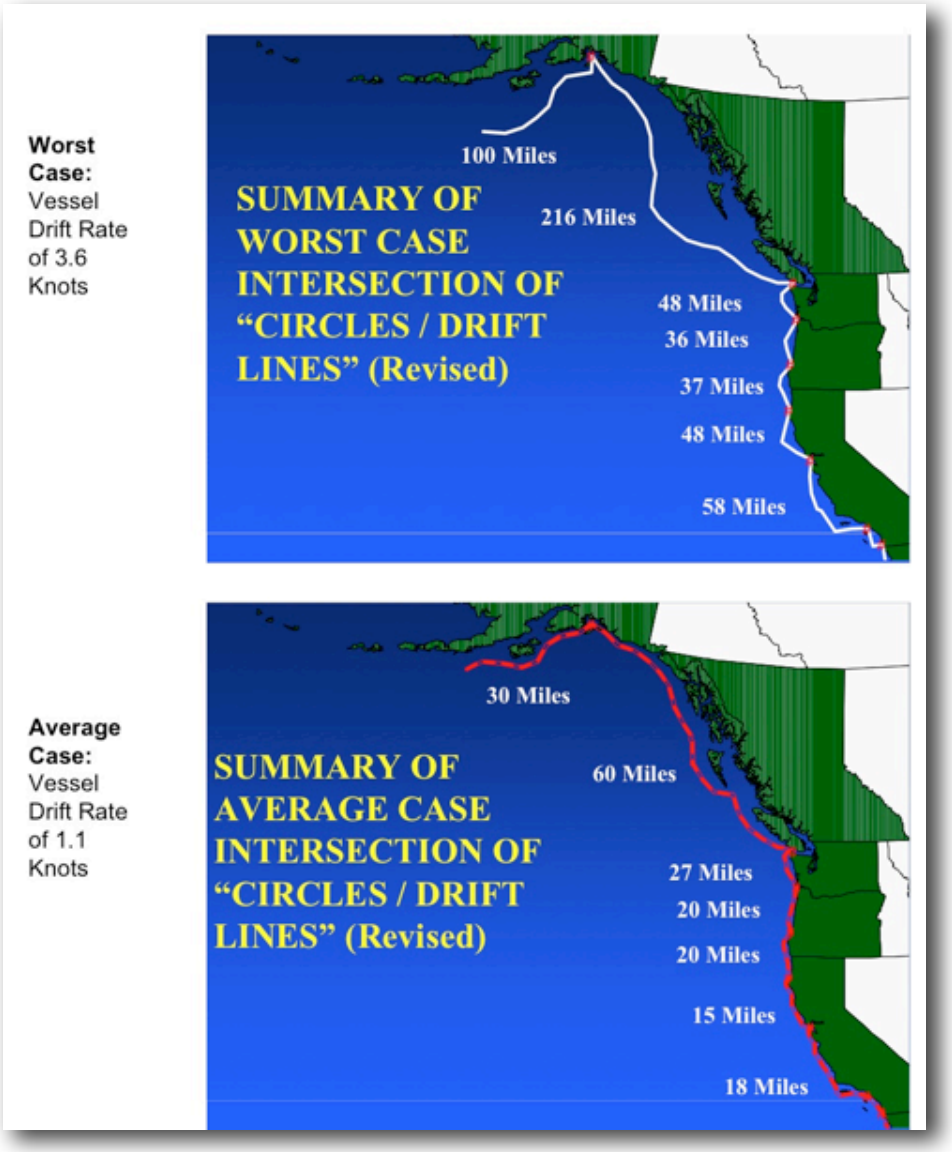


Figure 22: Worst and Average Case Tug Rescue Interception Distances in British Columbia

What is interesting to note, is that "worst case" drift is beyond Canada's Tanker Exclusion Zone (TEZ). The TEZ distance was largely established on tanker drift analysis and tug availability in the early 1980's. The main mitigating factor today is that most of the US TAPS oil tankers from Alaska have dual systems: two engines, two screws and two rudders. The likelihood of both systems becoming disabled is remote. However, other non-Alaska oil tankers that are chartered by US or Canadian companies have only one engine system and therefore do not have this risk reduction feature.

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[108] The IMO's *International Convention for Safety of Life at Sea* (SOLAS) Chapter 5, Regulation 15.1 requires all tankers of 20,000 deadweight tons and above and built after January 1996 to be fitted with emergency towing arrangements at both ends of the ship. Tankers built before that date must be fitted with emergency towing arrangements not later than 1 January 1999. Cargo and passenger vessels, including fishing vessels, are not required under international or federal law to maintain emergency towing equipment on board.

Major non-tanker vessel's (bulkers, container, cargo, chemical, RORO, etc) traveling the "great circle route" all have only one engine system. These vessels commonly travel within the 60 nm intersection (average case) line. Many of these vessels have high windage and hence high drift rates.

SUGGESTED POLICY DIRECTION WEST COAST RESCUE TUG CAPABILITY	
Transport Canada (Marine Safety) should undertake an oil tanker drift and rescue tug analysis to reevaluate the efficacy of the Tanker Exclusion Zone. Transport Canada should ensure the recommendations of the Pacific States/BC Oil Spill Task Force are fully considered to mitigate groundings of a major vessel, such as issuing a notice to mariners of the lack of tug rescue (assist) along the west coast. A dedicated rescue (assist) tug should be considered for the central coast of British Columbia to remedy current deficiencies for both oil tankers and other major vessels. This tug's size, specifications, equipment and training should include salvage, cargo and bunker lightering, fire-fighting and other response capabilities. The Canadian shipping industry should share in the funding of the Neah Bay (Washington State) dedicated tug as it confers a direct benefit to the industry and to British Columbia's south coast protection. Federal government and shipping industry should consider dedicated rescue tug to be part of an integrated major marine vessel casualty response regime for British Columbia and funded under the same model as for Canada's oil spill response regime.	
POLICY DELIVERY	
West Coast Rescue Tug Capability	Transport Canada reviews the 2008 five year status of the recommendations provided by the Pacific States/BC Oil Spill Task Force's *West Coast Offshore Vessel Traffic Risk Management* to ensure Canada is meeting the expectations of this report to mitigate major vessel grounding on the Pacific West Coast. Major vessel drift studies should be undertaken that incorporate the data and findings of the Pacific States/BC Oil Spill Task Force's *West Coast Offshore Vessel Traffic Risk Management* project. As well, specific modeling and drift card studies should be undertaken to obtain a higher level of resolution on where major vessel grounding might occur. Transport Canada should undertake a study to determine if major vessels that visit BC's ports are aware of rescue tug limitations on the West Coast, and if they: • have incorporated emergency towing as part of their ISM-approved Safety Management System: • have dedicated "emergency towing" equipment for a high-seas rescue such as a towing bridle, Smit-Bracket system, extra chain, etc. Transport Canada should undertake as study of tugs-of-opportunity that could provide rescue (assist) under both severe and average conditions on the west coast to determine if: • crew and captain are willing to undertake rescue services under adverse conditions; • specialized training has been provided and reflected in their company's safety plans, and • tugs have been equipped with specialized towing resources, such as floating buoys, bridle lines, hooks, etc (refer to: *Peril at Sea and Salvage – A Guide for Masters* by the International Chamber of Shipping (OCIMF). Transport Canada should examine the efficacy of other dedicated tugs used in the United States, France, South Africa and the United Kingdom. Federal and provincial governments (lead agencies) should develop guidelines and protocols on invoking contingency measures if a vessel in distress needs a place of refuge and/or rescue tug services. These contingency measures could include putting resources on standby such as incident management teams, the risk assessment team, rescue tugs, and other supporting personnel in case rescue fails and grounding is certain.

3.3.5. Oil Tanker Tug Escort

Both the States of Alaska and Washington have well-defined requirements for laden oil tankers to have escort tugs alongside when transiting through the narrow passages of their coastal waters. - In some places, these tugs have to be tethered with the tanker. Prince William Sound has a world-class tanker escort system for their Alaskan oil tankers that consists of-powerful "tractor" tugs accompanying each laden tanker through the Sound. These tugs are available under Alyeska Pipeline Service Company's *Ship Escort Response Vessel System* (SERVS). (See fact sheet on SERVS tugs) The tug specifications, escort protocols and emergency procedures are well established.[109] These spill mitigation measures are based on tug escort studies (modeling and field trials) and expert consultation. [110] Furthermore, the requirements are revisited when there is a change in tanker design/operations. This is the case now that new US-Flagged Alaskan tankers have double hull construction, as well as dual operating systems for engines, screws, and steering.[111]

Currently, British Columbia requires escort tugs for out-bound crude oil tankers from the Port of Vancouver. A laden crude oil tanker of 40,000 DWT or more is required to have two tug escorts to accompany it through Haro Passage to Victoria.[112] This requirement was based on guidelines developed in the early 90's by Transport Canada Marine Safety (CCG), B.C. Pilotage Authority, B.C. Pilots, Vancouver Port Authority and the Oil Industry titled: *Canadian Escort Tug Standard for Haro Strait and Boundary Pass.* The standards were based on the largest tug available at the time. However, there have been major enhancements worldwide to determine more tested escort tug design, size and operational criteria.[113]

Seaspan International Ltd provides this escort services with tugs stationed at Robert's Bank (Delta).[114] The company is currently obtaining more powerful tractor tugs, but it is unclear whether they are being deployed for escort.[115] Nevertheless, the fifteen-year old guidelines for this important vessel casualty and spill risk mitigation should be revisited to ensure they reflect "best practices" for oil tanker escort. This need is particularly pressing due to the increased frequency of out-bound oil tanker traffic using Haro Strait. Consideration should also be given to tankers that are carrying lesser amounts of persistent oil. A spill in this area would have significant ecological and political consequences.

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[109] Escort tugs pro-actively operate in proximity to tankers traveling in confined or sensitive water ways where the disabling of the tanker might pose a threat to other vessel traffic, the environment, or both.

[110] Example of a field study is the Jagannathan, S., Laible, D. *San Francisco Bay Tanker Escort Study*, The Glosten Associates. Undertaken for Chevron Shipping Company, and Arco Marine.

[111] Refer to: 2004. *Study of Tug Escorts in Puget Sound,* Prepared for State of Washington: Department of Ecology Lacey, Washington File No. 04075, by The Glosten Associates.

[112] Haro Strait is recognized in various studies as a high navigational risk area due to its narrow confines, strong currents, and high vessel traffic volumes. Refer to: A Port and Waterway Safety Assessment (PAWSA) Workshop for Haro Strait / Boundary Pass on February 25 - 26, 2002 in Richmond for an overview of navigational risk in this area,

[113] Source: *Report: Risk Assessment Study of Oil Transportation on the BC Coast*, Project 201-143, Prepared for Transport Canada, Ottawa, by Robert Allan Ltd, Vancouver

[114] Due to its location, *Seaspan International Ltd* has placed tugs on site at Roberts Bank and provides oil tanker escort services.

[115] Seaspan International Ltd does not provide information about their tug escort services (*pers. comm.* Doug Towill, Seaspan International)

SUGGESTED POLICY DIRECTION TUG ESCORT FOR OIL TANKERS	
Transport Canada (Marine Safety) needs to reassess the *Canadian Escort Tug Standard for Haro Strait and Boundary Pass* and be prepared to write a new standard that is founded on world wide "best practices" for tug escort of laden oil tankers. Consideration should be given to ensure that these standards are consistent with tug escort requirements for oil tankers transiting the State of Washington's waters and requirements under the *US Oil Pollution Act of 1990,* as well. Transport Canada should ensure current tug escort services for laden oil tankers is fully transparent to other agencies and the public regarding such matters of frequency of tug escort, what tugs are used (with specifications), escort positioning/emergency protocols, crew training (nature and frequency), exercises and field tests, near misses and other information that fosters confidence pertaining to the efficacy of this coastal protection measure. Transport Canada should undertake a study to determine a maximum tanker size allowed through Haro Strait given its narrow confines, difficult currents, and high traffic volumes, and the limitations on tug escort to mitigate a collision or grounding.	
POLICY DELIVERY	
Tug Escort	Transport Canada (Marine Services) should undertake a joint industry/government evaluation on oil tanker escort requirements and standards based on best-practices world-wide for both current tanker movements, and future proposals. Transport Canada needs to prepare an annual report on tug escort services for laden oil tankers transiting Boundary Bay, Haro Strait and the Juan de Fuca Strait to address all matters of "standard of care" such as frequency of crew training, lists of tugs deployed, problems encountered, etc

3.3.6. Salvage Capability in British Columbia

Salvage pertains to a vessel that provides assistance to a disabled ship to proactively prevent sinking or release of polluting substances (oil, cargo, containers). In the case of a sunken vessel, salvage operations can include ship recovery, removal of fuel oils, or both. A salvage vessel can also have deep-sea diving, remote operation vehicle (ROV) capabilities, or both for underseas operations. Salvage vessels tend to be large, seagoing vessels of high engine power range (>8000 BHP) with towing capabilities.

Salvage operations are a very specialized field that includes stability analysis of a damaged vessel, use of specialized hull patches, operation of large water and fuel removing pumps, and more (See Text Box).[116] A salvage vessel may have fire fighting services as well.

[116] For detailed information and analysis of salvage operations, refer to: 1994 A REASSESSMENT OF THE MARINE SALVAGE POSTURE OF THE UNITED STATES COMMITTEE ON MARINE SALVAGE ISSUES, MARINE BOARD, COMMISSION ON ENGINEERING AND TECHNICAL SYSTEMS, NATIONAL RESEARCH COUNCIL, National Academy Press, Washington, D.C.

About Salvage Operations

Salvage operations can help prevent pollution by providing assistance to a damaged or stressed vessel. For example, salvors can transfer fuel from a damaged vessel to a sound one (a procedure known as lightering), thereby reducing the threat of a spill. They can tow a damaged vessel to a safe harbour for repairs, or perhaps even repair the damaged vessel on site. Salvors can also remove cargo, such as containers, to minimize environmental damages.

The international marine salvage industry has undergone significant changes in the past two decades. Of most concern are the dwindling numbers of trained salvors and the decline in dedicated salvage resources worldwide. The general approach to salvage is in a state of flux. Historically the salvor directed the salvage response effort; management of vessel salvage response now is a joint effort between the Responsible Party (ship owner) and responding government agencies.

The vessel owner is assuming a more active role in salvage response management, including, in some instances, contracting directly for specialized needs rather than relying on a single salvage company for all salvage services. The salvor often is relegated to a consulting position, without direct input into the decision-making process. Consequently, operational guidelines on how a salvor is expected to provide their services in each country or region are becoming more important.

The traditional principles of salvage law were modified in the *International Salvage Convention of 1989* to recognize the salvor's duty to protect the environment and to authorize a special compensation award to promote that duty.

The incidence of maritime casualties and therefore the need for salvage services has declined over many years. This trend is favourable for safety and environmental protection, but it has a negative effect on business conditions in the marine salvage industry. Consequently, the level of salvage activity both in Canada and the United States continues to be insufficient to support traditional salvage practices. Salvage has become a secondary business for salvors and other marine contractors.

The motivation for maintaining a salvage capability has shifted from a private concern - protecting the vessel and its cargo - to a more public or societal interest in protecting the environment and economy from impacts of a vessel casualty. If salvage capability is deemed important for British Columbia there will have to be strong public and political pressure to ensure adequate salvage capability is established. This capability can be achieved ***domestically***, by promoting a salvor industry in British Columbia, ***internationally*** by ensuring there is an arrangement with a global provider of these services, or combination thereof.

There requires an operational guideline to determine how the salvage is incorporated into overall incident management for a vessel casualty in British Columbia. The role(s) of other responding government agencies need to be addressed. The objectives of an operational guideline are to foster effective response and define reasonable actions and costs within BC's west coast setting. This information and framework are essential to salvage operations because the salvor no longer is in charge of the decision-making process employed in responding to a marine casualty, particularly one involving pollution or the threat of it. Instead, the salvor's role is to assist and provide direction to an Unified Command involving the federal government, provincial government(s), and the responsible party (vessel or cargo owner or designate).

Currently, salvage operations are not part of Canada's oil spill response regime. Essentially, British Columbia has no salvage operations capability. A ship owner's representative (ship agent, P&I Club representative) requires a salvage plan that not only addresses their type of vessel, but also the damage done and the resources requiring protection. A fundamental, but critical

question, will be who will establish the incident management organization when there is only a single ship owner representative?[117]

Vessel casualty scenarios #1, 2, 4 and 6 would have high levels of salvage operational components to them.

Photographs of Salvage Situations and Activities

Source: TITAN, a Crowley company. A worldwide marine salvage and ship wreck removal company operating from main bases in the USA, UK and Southeast Asia. The also do marine firefighting, vessel/ship lightering, underwater fuel removal, damage stability and other rapid marine emergency response services for the maritime industry. Other large international salvage companies include: Svitzer, SMIT, Donjon,Gililinus, and Mammoet.

Transport Canada should pay particular attention to a recent IMO 2007 convention on the removal of wrecks. This new convention provides a legal basis for coastal countries to remove, or have removed, from their coastlines, wrecks which pose a hazard to the safety of navigation or to the marine and coastal environments, or both. It will make shipowners financially liable and require them to take out insurance or provide other financial security to cover the costs of wreck removal. It will also provide a country with a right of direct action against insurers. Articles in the

[117] There are a few options that a ship-owner representative could consider to establish "incident management" for a major salvage operation: 1) contract Burrard Clean Operations to provide only the incident management structure, 2) hire abroad an emergency response consulting/contracting firm from the United States or elsewhere; 3) rely on the CCG to provide the organization (though against their policy for a RP lead response - at least for oil spills) 4) rely on the Provincial Incident Management Team of the BC Ministry of Environment.

Convention cover: reporting and locating ships and wrecks; warnings to mariners about the wreck; and action by a country to locate the ship or wreck; criteria for determining the hazard posed by wrecks to both shipping and the environment, measures to facilitate the removal of wrecks, liability of the owner for the costs of locating, marking and removing ships and wrecks, compulsory insurance or other financial security to cover liability under the convention, and settlement of disputes.

SUGGESTED POLICY DIRECTION VESSEL SALVAGE OPERATIONS	
Transport Canada (Marine Safety) and the industry should establish a domestic or internationally arranged vessel salvage capability for the west coast of BC and integrate this capability with response preparedness for other consequences of a marine vessel casualty, such as tug rescue, fire-fighting, and spill response.	
POLICY DELIVERY	
Salvage Operations	Transport Canada (Marine Services) undertake a joint industry/government workshop on vessel salvage operations and wreck removal based on best-practices. This workshop could be the basis to determine: • the strategic direction to establish salvage operations capability on the west coast - such as domestic, international, or combinations thereof. •whether specialized salvage equipment needs to be stationed in British Columbia; •the nature of an operational guideline to show where salvage fits within Incident Management and the roles of other government agencies, and •the training of "technical specialists" that can be used to assist salvor requirements. Transport Canada should sponsor a vessel casualty exercise that will require salvage operations.

3.3.7. Places of Refuge Decision-Making

A ship requiring assistance due to loss of propulsion or steerage, actual or imminent structural failure (hull breach) or fire damage may require a place of refuge. A place of refuge is:

> "… *a place where a ship in need of assistance can take action to enable it to stabilize its condition and reduce the hazards to navigation, and to protect human life and the environment."* [118] [119]

This refuge must have adequate water depth for lightering (remove cargo or fuels) or repairs to protect the marine environment. It may entail a ship entering a harbour, anchoring in protected water (a cove or bay) or beaching in order to make ship repairs, to reduce the threat of pollution (oil, containers, bulk cargo, breakbulk), or both.

The decision to allow a place of refuge and the determination of the location is a critical strategic response action as the outcome – whether denied or approved – can markedly affect the coastal community's welfare, the environment, and the response cost. This decision needs to be expeditiously made whilst ensuring that the choice is both pragmatic to the ship master and equitable to those coastal stakeholders that benefit from the decision or may incur an impact.

There is no single place of refuge for all ships and all situations. Decisions relating to places of refuge encompass a wide range of environmental, social, economic, and operational issues that

[118] Definition is from Transport Canada's draft *National Places of Refuge Contingency Plan* (PORCP)

[119] The terms "Harbours of Safe Refuge" and "Safe Havens" are synonymous with "Places of Refuge."

vary according to each situation and location. The decision to allow a ship to seek a place of refuge, as well as the decisions and actions implementing that decision, are inherently based upon an assessment of the risk factors and fairness that involves sound and transparent judgment and discretion. Final selection of a place of refuge needs to be made on a case-by-case basis.

In 2005, Transport Canada drafted a *National Places of Refuge Contingency Plan* (*PORCP)* to guide in the above decision-making challenges.[120] This draft plan is one of many developed, and all are essentially modeled after the International Maritime Organization (IMO) adopted Resolution A.949 (23), *Guidelines on Places of Refuge for Ships in Need of Assistance* in December 2003 (See: Text Box).

Places of Refuge Guidelines

There are several guidelines written at international to provincial levels to facilitate decision-making on a place of refuge for a major vessel under distress. They are:

- International Maritime Organization's (IMO) *Guideline on Places of Refuge for Ships in Need of Assistance* – international
- Pacific States/BC Oil Spill Task Force's *Places of Refuge Annex* – Pacific west coast (from Alaska to California, including Hawaii)
- Canada's draft *National Places of Refuge Contingency Plan* – national, and
- Ministry of Environment's *Operational Guideline on Places of Refuge Decision-making* – provincial

All of these guidelines are framed around the IMO guideline. As such, there are similarities in their objectives, approaches and essential information needs.

Guidelines on Places of Refuge for Ships In Need of Assistance - International Maritime Organization:

The International Maritime Organization (IMO) adopted Resolution A.949 (23),*Guid elines on Places of Refuge for Ships in Need of Assistance* in December 2003. IMO favoured pre-designated sites when they first addressed this issue after the *T/V Castor* incident in 2000, but this approach changed after the *T/V Prestige* spill off Spain in 2002. The emphasis in the IMO guidelines is now on the authority of the coastal state – such as Canada - to make the final decision, considering all necessary information and expert guidance. The IMO guidelines are voluntary and are only a tool for decision-making.

Draft *National Places of Refuge Contingency Plan* – Transport Canada:

In Canada, Transport Canada (Marine Services) serves as the "Maritime Assistance Service" - as envisioned in the IMO guidelines. Transport Canada is tasked with the development of Canada's guidelines or plan under the IMO framework. In October 25, 2005, Transport Canada released its first draft draft for consultation, titled: *National Places of Refuge Contingency Plan*. The plan states: *"... Transport Canada is responsible for ensuring the IMO Guidelines are taken into account and implemented to the extent possible*"

Place of Refuge Annex – Pacific States/BC Oil Spill Task Force:

The Pacific States/BC Oil Spill Task Force (Province of British Columbia and States of Alaska, Washington, Oregon, California and Hawaii) recognized the possibility of a place of refuge incident could happen on the US/Canada West Coast. A Task Force workgroup convened in February, 2004 and a year later developed a Places of Refuge "annex" based on the IMO guideline. The intent of this annex was to make the IMO guidelines more operational and relevant to the Pacific west coast. The annex is available to be used by other state, provincial, and/or federal agencies, or shipping industry companies to frame their own decision-guidelines.

Operational Guideline on Places of Refuge - BC Ministry of Environment:

The BC Ministry of Environment prepared an operational guideline on places of refuge that provides the "context" of the decision-making requirements, the basic steps in making such a decision, the expected arrangement with the federal government to make a joint decision, and lists resource information needs. This is one of some 28 operational guidelines that supports provincial-level spill response plans prepared by the Ministry.

[120] A second 2007 edition of the *National Places of Refuge Contingency Plan* (TP14707E) and be found on Transport Canada's web-site.

Though there is a "National Plan," it is Transport Canada Marine Safety's "regional" procedures for places of refuge decisions that are important to British Columbians. The national plan states that Transport Canada's regional:

> *Procedures and arrangements should take into account and, where appropriate, build upon existing procedures and plans. Consideration should be given to identifying any specific needs, issues and concerns of stakeholders that would need to be taken into account in decisions related to a place of refuge.*
>
> *Each TC Marine Safety region should bring the PORCP to the attention of the various port, local, regional authorities so that existing contingency plans and emergency procedures can be reviewed and updated as needed.*
>
> *Contingency plans should take into account foreseeable accident scenarios that might result from the granting of a place of refuge and what measures might be taken to reduce the consequences*.

The plan defines a "*stakeholder"* in a place of refuge decision as:

> *"… any individual, group, or organization to affect, be affected by, or believe it might be affected by a decision or activity."*

This is an ambitious goal for Transport Canada's regional staff. It requires proactive outreach to government agencies such as the province, First Nations, and coastal communities to explain the nature of a place of refuge decision and how they may become involved. An avenue for such outreach is for Transport Canada to participate in preparing Geographic Response Plans in concert with stakeholders. This recognizes that local acceptance to the decision-making process is as important (if not more important) than the information required to make a decision (See Text Box).[121]

There are five challenges facing a places of refuge decisions in British Columbia. The lack of:

1. Rescue tug capability on the West Coast;
2. Plans to document anchorage suitability and environmental sensitivity information;
3. An effective mechanism to undertake local notifications to First Nations and Local Community representatives that have a mandate, the authority, and the knowledge to assist in the decision-making;
4. Local coastal community understanding and acceptance of how and why a place of refuge decision is made, and
5. Discipline by Canada Coast Guard and Transport Canada Officers to actually undertake a stakeholder based and structured approach to a place of refuge decision.

[121] In Canada, Transport Canada serves as the "Maritime Assistance Service" - as envisioned in the IMO Guidelines. However, other jurisdictions such as provincial and local governments, and First Nations - via their Incident Commander, (or representative) would have a pivotal role in formulating and supporting any places of refuge decision (if time allows).

Places of Refuge Decision - Making Process

The decision-making process for determining a safe and appropriate place of refuge for a stricken vessel involves:

1. Weighing the options of a ship remaining in the same position, continuing its voyage, being towed further out to sea, being intentionally scuttled, or being directed to a place of refuge; and then
2. Weighing which place of refuge would be best based on achieving a net-environmental-benefit, most cost-effective, and the most equitable to those that benefit from the decision and those that may incur an impact.

Pursuant to these two phases, there are essentially elements required for making an expedient, pragmatic, and equitable decision for a place of refuge for a major ship, as follows:

- **A process that describes the initial incident information** that a ship master would provide when initiating the request for refuge.
- **An incident management system** where affected jurisdictions, technical specialists, and operations can be invoked such as the international Incident Command System with Unified Command.
- **A listing of categories of decision factors** (human health and safety; the environment; the ship's status and risks; response and salvage resources; and "other command and management factors") which would be used to evaluate the options of a ship remaining in the same position, continuing its voyage, being towed further out to sea, being intentionally scuttled, or being directed to a place of refuge.
- **Detailed evaluation checklists and/or decision-tree** to assess which place of refuge would be best.

A starting point for Transport Canada and other agencies to engage coastal community stakeholders is to examine the model used in Alaska, such as for Prince William Sound by the Department of Environmental Conservation's Division of Spill Prevention and Response. They have established a multi-stakeholder Place of Refuge (POR) working group that recognizes that each vessel incident presents unique circumstances that must be addressed. The working group's goal is to undertake pre-planning to expedite safe repair or salvage for a damaged vessel while avoiding or minimizing impacts to local resources. The working group recognizes that before bringing a vessel into an anchoring or mooring location, the following factors need to be considered and weighed:

- Status of the vessel
- Public safety
- Environmental resources at risk
- Strategies to protect sensitive areas
- Prevailing winds
- Navigational approach to the mooring site
- Anchoring ground
- Vessel traffic
- Available dock and support facilities
- Available skilled and spill response labour
- Economic concerns and potential impacts

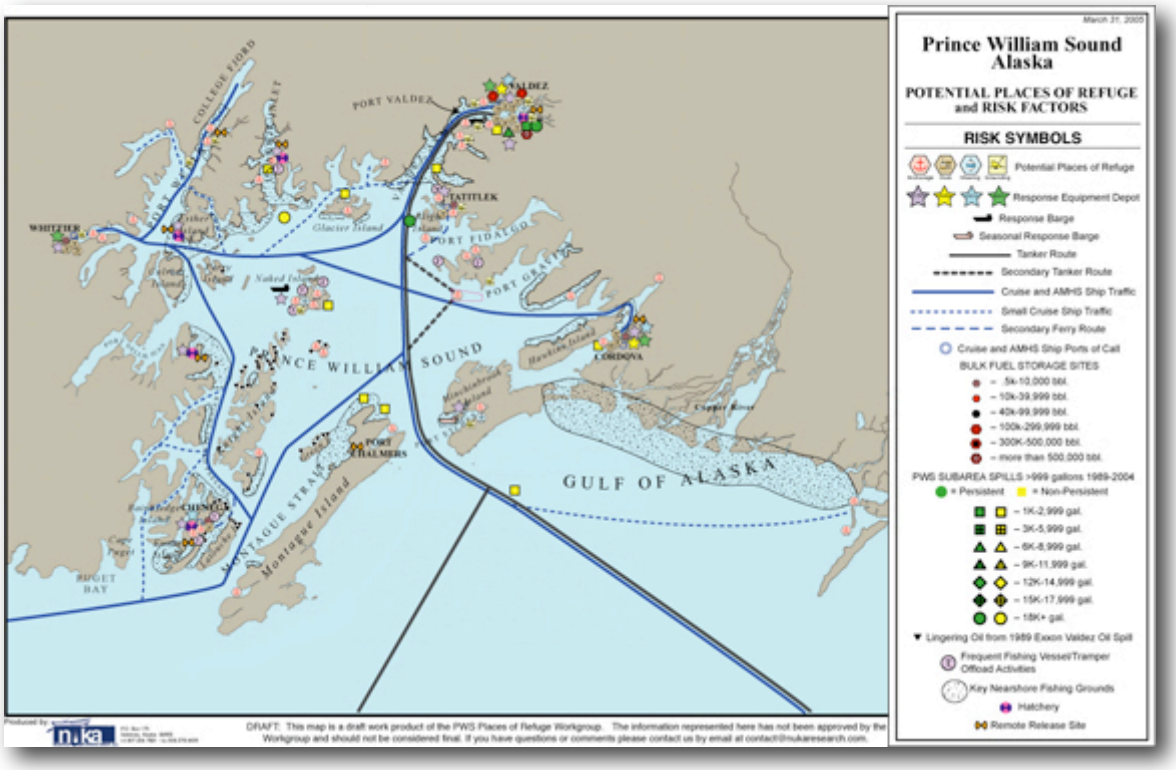

Figure 23: Example of a Place of Refuge Decision-Making Resource Map.
Source: Alaska DEC

A fundamental matter to understand is that there may not be sufficient time to garner "multi-stakeholder" input and consensus on a place of refuge decision. A vessel may find is own natural place of refuge or require immediate assistance in a matter of hours. Pre-planning and pre-consultations are largely to facilitate a practicable and equitable solution where and when there is time. If not sufficient time, the decision made by Transport Canada would be less contentious if there had been extensive community outreach before hand. There is also the need to recognize that there should be a "balance" between having a unilateral decision by a federal representative or by a group of government "bureaucrats" that do not have a vested interest in the coastal communities potentially affected. As stated by *Maritime and Coast Guard Agency* for the United Kingdom:

> *The "agony of the moment" choice of a place of refuge will be more robust if it can be demonstrated that the decision is supported by a system of formal assessment.* (See: Text Box)

The Saga and Challenges of the *MSC Napoli* Place of Refuge Decision

The chain of events began on the morning of 18 January. During severe weather conditions, the MSC Napoli, a UK registered vessel, experienced difficulties on the French side of the English Channel, 40 miles off Cornwall. The MSC Napoli's master made the decision that the danger was sufficient that the crew should abandon the ship. Despite the heavy seas, all of the crew were successfully rescued by helicopter.

In accordance with the Anglo-French Joint Maritime Contingency Plan, the initial assistance to the ship was a French-led operation (conducted in close liaison with the UK Secretary of State's Representative for Maritime Salvage and Intervention - SOSREP). An on-scene assessment of the condition of the MSC Napoli was made, and the conclusion of this assessment was that the least environmentally risky option was to tow the vessel to a place of refuge in UK waters.

The need for a place of refuge and its location are always driven by the circumstances of an incident, including such event-specific data as the weather, the geographical whereabouts of the incident and the type of threat posed by the vessel and its cargo. On this occasion, the south coast of England provided better options for a place of refuge than the French coast. On the French coast, there were no suitable places of refuge within reasonable distance. Accordingly, Portland Harbour was selected as the destination for the MSC Napoli, owing to the extent of its port facilities. A tow was attached on the evening of 18 January. However, in the early hours of 20 January, the MSC Napoli's condition began to worsen significantly due to continuing severe weather and it became clear that it would not be possible to reach Portland. Priority was given to giving the vessel shelter and keep it in one piece, as there was real concern the vessel might start to break up. The decision was made to turn the vessel towards an identified beaching site in the sheltered waters of Lyme Bay. Environmental groups and local authorities were consulted, and it was on this basis that the decision was taken to beach the ship just to the east of Sidmouth.

On the evening of 20 January, tugs attempted to pull the MSC Napoli harder aground. At this time there was some leakage of oils into the water and a boom was deployed around the vessel to contain it. The oil leaking from the MSC Napoli created an eight kilometer wide sheen.

The MSC Napoli was carrying approximately 2300 containers, of which 157 were believed to contain hazardous materials, including perfume, pesticides and batteries. One hundred and three containers were lost overboard, and some have washed ashore. Seventy six of the containers have been found, many of which have been identified and have had their contents verified. The contents and positions of all but 27 containers have now been identified.

Source: UK Department of Transport

SUGGESTED POLICY DIRECTION PLACES OF REFUGE DECISION-MAKING	
Transport Canada (Marine Safety) needs to establish an extensive local coastal community out-reach program on the nature and challenges of places of refuge decision-making. Special attention should be given to identify local community representatives that have the mandate, authority and expertise to facilitate a decision. Places of Refuge decision making process and information should be incorporated into Geographic Response Plans for coastal communities.	
POLICY DELIVERY	
Places of Refuge	Transport Canada (Marine Services) needs to provide operational "regional" solutions and approaches to addressing places of refuge in consultation with the province, local community governments and coastal reliant resource industries (tourism, fishing), First Nations, and the shipping industry. This can be initiated through workshops to further define: • Who are "stakeholders" and their expectations • Scenario development • Community outreach program • Application of Geographic Response Plans Transport Canada should fully consider borrowing from the Places of Refuge program by the Alaska Department of Environmental Conservation.

3.3.8. Natural Resource Damage Assessment

In the United States, a natural resource damage assessment is undertaken after an oil spill to determine "residual" damages to natural resources after cleanup is completed. These natural resources (shores, animals and habitats) are often jointly managed by state, federal and Tribal (First Nations) trustees. The damage is essentially an "unmitigated" loss of use and enjoyment of the resources by the people and communities these trustees represent. It is a matter of course in the United States that compensation - a monetary transfer payment - is sought from the Responsible Party (RP) causing the damage. The concept and application of the principles of mitigation and compensation for natural resources losses are well established in the United States.

The organization that spearheads the Natural Resource Damage Assessment (NRDA) process is the US National Oceans and Atmospheric Association and Administration (NOAA).[122] There is also close "State-level" involvement such as from the Washington Department of Ecology's Spill Program (See: Damage Assessment References) and the Alaska Department of Environmental Conservation's Division of Spill Preparedness and Response (See: NRDA Information Sheet).[123]

This level of NRDA process development is not the case for Canada or for the Province of British Columbia. Essentially, all that the federal and the provincial governments have are separate "bank-accounts" to receive compensatory awards based on court settlements under "creative sentencing" clauses found within their respective laws. Environment Canada has established the "Environmental Damage Fund" whereas the Province has the "Habitat Conservation Trust

[122] The Natural Resource Damage Assessment (NRDA) provisions in the United States are legislated under the *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) and the *Oil Pollution Act of 1990*. These acts provide a mechanism for restoring natural resources that have been adversely affected, or "injured," by releases of oil or hazardous substances. In enacting this legislation, the US Congress believed that these resources provide valuable services to society. The NRDA process is an attempt to make the public "whole" for the loss of those ecological services stemming from exposure to oil or hazardous substances, before, during and after cleanup efforts.

[123] A Natural Resource Damage Assessment (NRDA) Roundtable was sponsored by the Pacific States/British Columbia Oil Spill Task Force, in February of 2002 that provides industry and government perspectives on this issue.

Foundation".[124] [125] The jurisdiction that lays the charges, gets the compensation. There has been little or no consideration that jurisdictional interests overlap - such that a "ship" or "pipeline" may be federally regulated, but the spill affects provincial natural resources. There is no evidence that the Provincial Government was ever consulted by Environment Canada when it established their fund.

To date, the compensation awards for spills have been pursuant to federal laws and assigned to the Environmental Damages Fund. The awards have been too few and too small for the province to have taken notice. This could change if the damage fund was large. It could also change if First Nations and Local Coastal Community governments were directly affected by a spill or vessel casualty and not party to the compensation negotiation and how or where the money is allocated.

About Environment Canada's Environmental Damages Fund	About the Provincial Habitat Conservation Trust Foundation
Prior to 1995, any judgments obtained from a court or monies obtained from settlements reached between parties involving the Canadian government had to be paid into the Consolidated Revenue by virtue of the *Financial Administration Act*. Consequently, those monies could not be used to assist in environmental restoration projects. To remedy this, the Treasury Board of Canada in 1995 authorized the creation of a special holding account (Environmental Damages Fund) for allocating court awards and settlements, as well as voluntary payments and international funds compensation, towards environmental restoration projects. The object of the Environmental Damages Fund (the Fund) is to assist in the rehabilitation of injured or damaged environmental or natural resources and to ensure that proposed projects to help rehabilitate the environment are cost effective and technically feasible. If the Crown successfully prosecutes a polluter and a fine is imposed, or where the federal government commences civil litigation and either negotiates a judgment from a court in relation to restoration of environmental damages, the court, the Crown and the defense can recommend that the monies obtained be placed into the Fund. Cleanup costs, actual response costs and legal costs are specifically excluded from the Fund. Environment Canada administers the fund, and accounts for each award separately, so that the money can then be used to fund projects in the same community in which the pollution has occurred. The money in the fund is allocated to local organizations, who often use it as seed money to find partners who contribute additional money and resources. Groups who receive funding must carry out their projects in a technically feasible, scientifically sound and cost-effective way.	The Habitat Conservation Trust Foundation (Fund) or HCTF came into existence in 1981 because its major contributors (hunters, anglers, trappers, and guide-outfitters) were willing to pay for conservation work above and beyond that required by government for basic management of wildlife and fish resources. Unlike license fees that cover basic management costs, conservation investments funded by HCTF surcharges benefit contributors by enhancing their opportunities to use and enjoy wildlife and fish resources. To date, the HCTF has channeled more than $80 million into fish and wildlife enhancement projects at over 1,000 different sites across the province and another $12 million into important acquisitions of key pieces of habitat. HCTF funds have been used to receive compensation awards from major projects - that though approved - resulted in unmitigated resource losses such a wildlife habitat. Examples include hydro-electric dams. It was also used as the "bank-account" for the $12 million damage award from Sause Brothers Ltd. for their Nestucca barge oil spill in 1989. This money was jointly administered by the Province and Environment Canada. HCTC funds are also available for any compensatory award for pollution obtained from "creative sentencing" under provincial pollution laws.

To which one of the two competing funds a compensatory payment from a ship-source spill or marine casualty is used - federal or provincial - may be a moot point. There is a high likelihood that there will not be enough money left for natural resource damage compensation after the Responsible Party pays for its legal fees, penalties, response, and private damages. Under both domestic and international compensation regimes, the ability to "break" financial limitations is very difficult.

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[124] Environment Canada's *Environmental Damage Fund* is a 1995 federal initiative of Eastern Canada stemming from vessel-related fugitive oil spills killing sea birds. The BC Ministry of Environments *Habitat Conservation Trust Fund* has been established for decades and uses compensation from major project developments, such as hydro-electric developments.

[125] The Habitat Conservation Trust Foundation was previously the Habitat Conservation Trust Fund (1981 to 1996)

There are also policy impediments in making claims under compensation funds. For oil spills that are funded from the IMO's International Oil Pollution Compensation Funds, the fund administrator explicitly states:

> *Compensation for environmental damage (other than economic loss resulting from impairment of the environment) is restricted to costs for reasonable measures to reinstate the contaminated environment. Claims for damage to the ecosystem are not admissible. (See: IOPCF's FAQs)*

For a major marine casualty that does not necessarily involve an oil spill, but incurs substantial costs for removal of cargo, salvage, and possibly wreck removal, the amount of funds available from their *Protection and Indemnity Club* insurers might not be enough for compensation for natural resource damages.

In Canada, natural resource damage awards will continue to be limited to small vessel incidents only. Should there be a potential for a large claim, neither Canada or the Province have a natural resource damage assessment process (e.g.. a means to measure and evaluate natural resource damages and assign a monetary value to the loss), that would facilitate a claim from a ship owner.

Definitions and Principles of Mitigation and Compensation.

Mitigation is an aspect of the management of impacts whereby a developer assumes some of the costs to make its project or activity more environmentally and socially acceptable. It refers to measures taken in the planning, design, construction, operation or other activities of a project with the specific objective of preventing, reducing or offsetting adverse environmental impacts.

Compensation is a monetary payment by a developer that has an equal surrogate value of the resource(s) foregone, despite mitigation, to those people or agencies that experience the loss. Thus, compensation is the transfer of funds "from" the developer (proponent) of the project causing an adverse impact "to" those people or agencies that bear the impact. This payment enables those bearing the impact to pursue measures to redress any remaining resource losses in ways they deem desirable, regardless of the initial efforts of the developer to alleviate impacts.The underlying principles of mitigation for environmental protection include:

- A universal understanding by industry, developers, government, environmental groups and the public of the principles of mitigation and compensation would help alleviate the continuous decline in biological productivity and diversity and promote sustainable environmental development.
- Compensation - as an incentive to reduce environmental loss/damage - is more aligned to performance measures and reducing regulatory burden on industry and government, than the traditional model of fines and subsidies.
- By assessing projects and pollution according to the principles of mitigation and compensation, an overall improvement in social and economic welfare can be realized. As well, sustainable development is fostered since compensation encourages mitigation and accounts for residual losses of natural resource values.

The concepts of mitigation and compensation are founded on performance measure and market-based drivers to achieve sustainable development. There are three economic tools to influence public and industry activities:

- ***Fines*** *– penalize for doing wrong*
- ***Subsidies*** *– encourage appropriate activities*
- ***Compensation*** *– pay more for poor performance & pay less for good performance*

Subsidies are loosing favour, fines are draconian, and compensation awards are rarely sought. The latter approach requires a the strategic shift in government policy. There is opportunity to put more responsibility for environmental management in the hands of proponents, but with the important *proviso* that - if performance is poor and results in residual, unmitigated losses of natural resources - then compensation will be pending. This compensation would be a transfer payment equal to the value of the resources lost.

To date, government resource agencies have little – or very restrictive – ability to seek compensation (a monetary award) for unmitigated damages from both approved and unapproved activities – e.g. loss of riparian habitats, in-stream works, spills, etc. Laws generally seek compensation award, but only if a charge is laid and a conviction results - few have provisions for pro-active mitigation and compensation.

Source: S.Reid: 2002 *Principles of Mitigation and Compensation for Crown Resource Losses*, Discussion Paper,

In 1995, the BC Ministry of Environment undertook a study of Canada's financial preparedness for a major marine spill in British Columbia.[126] One of the key findings was the lack of reciprocity with the United States on both response funding and compensation for a cross-border marine oil spill. A significant deficiency pertained to Natural Resource Damage Assessment (NRDA) and compensation awards. A ship owner operating and spilling oil in the United States expects to pay NRDA damages; their resource trustee agencies (Ecology, Natural Resources, First Nations) expect to receive this award. This is not the case in Canada. Consequently if there is cross border spill incident originating in Canadian water, US residents and resource agencies will expect both private and natural resource damage compensation from Canada. (See Scenario #3 - Oil Tanker Incident in Haro Strait). Conversely, if a spill originates in the United States, Canada may expect such funds. Neither citizens or agencies will receive compensation due to the lack of reciprocity, even if the money was available.

SUGGESTED POLICY DIRECTION NATURAL RESOURCE DAMAGE ASSESSMENT	
Environment Canada and the BC Ministry of Environment should prepare a Natural Resource Damage Assessment harmonization agreement that is inclusive of each other as well as First Nations and local coastal governments such as the establishment of a "NRDA Trustee Committee" Transport Canada (Marine Services) needs to examine with their US counterparts the full scope of marine vessel casualty funding and damage award (private and natural resource) arrangements to foster cross-border financial reciprocity. Where financial reciprocity does not exist, or is uncertain, Transport Canada should make a public account of them.	
POLICY DELIVERY	
Natural Resource Damage Assessment	Environment Canada and BC Ministry of Environment should undertake a project to determine economic values of coastal resources that could be subject to natural resource damage compensation (habitats, shores, etc, but not commercial or private economic uses which are already covered by compensation regimes). The BC Coastal Resource Information System and internet could be used for questionnaire delivery could be used for this economic evaluation. The results can be used to model both tangible and intangible economic losses from an oil spill. Environment Canada and the BC Ministry of Environment should hold a multi-stakeholder workshop on natural resource damage assessment and compensation in Canada to harmonize approaches.

3.3.9. Building Emergency Response Preparedness Capacity

In order to respond to a major vessel casualty, one needs money, organization, people and equipment - and a lot of them. All these resources and activities need to be founded on a positive relationship between jurisdictions and with affected stakeholders. There also needs to be a plan for every major tactical activity - shore cleanup, oily waste management, salvage operations, wildlife rescue, cargo removal, *etc*. Otherwise, the Responsible Party will question what are the "reasonable measures" and hence costs. Then emergency response just becomes a continuous debate. There needs to be a multitude of "technical specialists" as part of the incident management team that know how to deliver on these very specific facets of managing a vessel casualty. These specialists also need to know how to work within the dynamics of an emergency setting (*e.g.,* trained and exercised in the Incident Command System).

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[126] Aengus R.M. Fogarty, 1995, *Financial Preparedness for a Major Marine Spill in British Columbia*. Prepared for the BC Ministry of Environment, Lands and Parks, Victoria, B.C..

However, to prepare for an emergency requires planning and preparedness capacity provided by people and budgets. The list of suggested policy directions and delivery suggestions in this report would command time and effort. These suggestions are not necessarily new. A thorough examination of the plethora of recommendations from public enquires, post-incident reports, risk assessments, and studies will reveal that they have been raised before - often several times.

For about the last 13 years, there has been a marked decline in emergency planners that address marine vessel casualty risk, prevention and response preparedness. There was focused government and industry energy soon after the 1988 *Nestucca* barge and 1989 *Exxon Valdez* tanker oil spills, but it declined quickly. For example, the BC Ministry of Environment's emergency program began in earnest in 1990 with eleven dedicated full-time employees within their headquarters. By 1995, the staff was down to five and by 1998 to one. There are now three full-time emergency planners. Environment Canada's and Canadian Coast Guard's regional headquarters always had a low staffing level of three or four emergency planners. Even staffing at organizations like Burrard Clean Operations is lean. Of eleven personnel, only a few are planners; the remaining are administrators or they look after response equipment. This fundamental problem of marginal emergency planning capacity - particularly in government - is further eroded as these personnel have other responsibilities as well. Both federal and provincial planners deal with railway, pipeline, vehicle and industrial risks as well as spill situations. If one combined all the time allotted to emergency preparedness and planning directed to oil spills and marine vessel casualties with the federal and provincial governments, one would be stretching it to say there were more the 3 or 4 full-time equivalents. This is simply not enough capacity.

Coast-wide, there is very little understanding of emergency management in general, let alone specifically regarding a major vessel casualty response. In Canada, emergency management is at the stage where industrial "health and safety'" standards and culture were twenty years ago.[127] British Columbia adopted the Incident Command System formally in 1995 and it is now adopted by Alberta after the 2005 CNR train derailment at Lake Wabamum.[128] The ICS has not been adopted by federal departments in Canada. The major benefit of ICS is that it builds emergency capacity. The process also has benefits in fostering positive relationships within the response community. There is still a lack of capacity in numbers of personnel that know how to manage a major environmental emergency. Within this community of emergency responders, there is still plenty of room to build relationships and preparedness capacity (See: Text Box).

This situation can partly be blamed on the lack of an effective mechanism to provide public oversight on emergency preparedness. Nobody is essentially watching the store - at least not the whole building. Organizations such as the Burrard Clean Operation's User Group, the BC Marine Spill Coordination Committee, the Regional Canadian Marine Advisory Council, and the Regional Advisory Council all have narrowly defined terms-of-reference. None are strategically structured to broadly look at marine vessel casualty risk, prevention, and response preparedness. None have true representation of all jurisdictions (federal, provincial, local governments, First Nations), or of other interested stakeholders such as in coastal communities and Environmental NGOs. As such, each committee only works on one piece of the puzzle at a time. There are a lot of dedicated and talented people in these organizations; there needs to be a better means to optimize their efforts.

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[127] Environmental emergency management pertains to where there is a team of people functioning under a common system - such as the Incident Command System - at an Incident Command Post (site-level), not the tactical (operational) field level *per se*.

[128] The ICS has been used in the United States since 1976, and adopted in Australia, New Zealand, United Kingdom. The United Nations recommend it as the international standard for emergency management.

The challenges to build emergency planning and response capacity in British Columbia can be summarized as: overcoming complacency, avoiding faith-based preparedness, thinking someone else will do the job, applying authority properly, and building relationships. (See: Text Box).

Fundamental institutional impediments in Canada to emergency preparedness

There are several institutional impediments in Canada to emergency preparedness that marginalizes planning and response capacity building. There is a basic misunderstanding of the benefits of emergency preparedness. This applies to both agencies and companies that have mandates to be prepared. Executives know it is important to be prepared for an emergency (spill, industrial accident, earthquake, etc) for either due diligence or governance reasons. Nevertheless, there is an underlying hope that an incident doesn't happen on their watch. As such, the level of emergency staffing and budgeting is largely "faith" based. The prevailing view is that an "event" is a future occurrence and that there are other competing current demands on staff and the organization that take precedence. What is often ignored is the understanding that the "process" of emergency preparedness can have immediate benefits to an agency or company. For example, the process of establishing of an Incident Management Team brings an organization's staff together for a common goal, breaks down internal barriers (silos) between departments (sales, engineering, administration) and between staff positions (managers, technicians, administrators, etc). The initiative demonstrates commitment to the environmental to the organization's employees, as well as to other stakeholders. These benefits alone can justify the cost of a robust emergency preparedness program.

Another institutional impediment to emergency preparedness is when an agency or company thinks someone else is prepared (or mandated) to do the job on their behalf. There is the perception (hope) that some other agency or company has a particular capability - such as to register and supervise a thousand shoreline workforce personnel for an oil spill, patch a ruptured oil barge, or provide incident management. A reality check is rarely pro-actively done. Gaps and deficiencies are generally discovered and disclosed during and after an incident. If there was oversight with broad multi-stakeholder representation, these misperceptions would not happen as easily. If there was more and wider public and government oversight, it would be readily evident to the public and government agencies that Canada has a marine response regime that is not capable of addressing all of the consequences of a vessel casualty.

Finally, there is a tendency in emergency preparedness to think that somehow "authority" equates to "capability". Laws should be applied by responding jurisdictions to foster synergies, not to "trump" one and another. The Responsible Party needs all the help they can get. Removing regulatory burden is one way. Emergency response capacity is built on relationships that are founded on trust and respect.

Other capacity building considerations are to undertake more coastal community outreach with local fishers, businesses, citizens, and First Nations to foster emergency preparedness. The primary focus should be on training a local community how to manage an emergency at the "command post" level that involves the Incident Command System and use of Incident Management Teams. This will ensure that local government and First Nations are both "strategically" and "operationally" prepared to integrate with other government and company responders. It is of little value to train local community people how to cleanup a beach or rescue an oiled bird, if there is no knowledge on how they are to represent their interests during an emergency. Capacity building starts with organization and relationships. The BC Ministry of Environment and Burrard Clean Operations started this out reach in 2007 for First Nations engagement (See: Text Box).

Going the Right Direction on Building Coastal Emergency Capacity with First Nations

A workshop was held March 14, 2007 in Duncan to begin the process of building First Nations emergency preparedness capacity for marine oil spills. The workshop was sponsored by the BC Ministry of Environment and Burrard Clean Operations. Following this workshop, the sponsors initiated a series of follow-up community information sessions focusing on the current provincial spill response regime that include the use of the Incident Command System and Unified Command. One topic was how First Nations can integrate within that structure. Also discussed were training opportunities such as on Shoreline Cleanup Assessment Team (SCAT). SCAT is a process to assess shores for oiling and cleanup options. Also discussed was First Nation's participation in exercises such as those by Burrard Clean Operations. Presentations by Gitga'at First Nation (Queen of the North), and Namgis (Robson Bight) were also part of the sessions to highlight First Nations involvement in and experience with recent incidents.

Funding is marginal for this initiative, at about $50,000 to support community meetings, staff travel, and to support Northwest Community College's Coastal Guardian diploma program. The program has an environmental emergency component. The initiative has been very well received for relationship-building, and in practical terms, opportunities to better integrate coastal First Nations during environmental emergencies involving government and industry.

Source: *per. comm*: Kenneth Howes: Manager, First Nations Consultation and Negotiation, Regional Operations, BC Ministry of Environment, Victoria

Within the context of just Canada's oil spill Response Organization regime, the suggested policy directions and delivery options to enhance and expand spill operations will take significantly more funding. To build marine vessel casualty response capability, the level of funding to ensure adequate rescue tug and salvage operations could exceed current industry and government funding for oil spill response preparedness. There may be benefits of merging them as one overall "marine emergency response regime" under one funding arrangement.

SUGGESTED POLICY DIRECTION BUILDING EMERGENCY PLANNING AND PREPAREDNESS CAPACITY	
Transport Canada, Environment Canada, Fisheries and Oceans Canada, BC Ministry of Environment, and the BC Chamber of Shipping should establish a marine vessel casualty task force with full representation of all jurisdictions (provincial, federal, local governments, and First Nations) and other organizations with coastal protection interests. The task force's mandate should be to examine all consequences of a major vessel casualty. The task force's mission is to demonstrate leadership in addressing marine vessel casualty risk factors, implementing risk mitigation and response preparedness recommendations, remedying institutional, financial, and technical gaps in emergency response, and breaking down barriers (silos) between industry and environmental sectors. The task force's focus should be on "best-practices" for incident management and operational response measures that builds emergency preparedness capacity in British Columbia.	
POLICY DELIVERY	
Building Emergency Planning Capacity	The task force are executive members of the above agencies and shipping association (provincial: Assistant Deputy Minister, federal: Regional Director General, industry: Executive Director). In addition, a senior First Nations representative and a member from the Union of BC Municipalities (coastal representative) are required. There should be one Environmental NGO to provide "citizen" oversight and inputs. The working group of the task force could be selected participants from the Regional Advisory Council, Regional Canada Marine Advisory Council, Burrard Clean Operations User Group, BC Marine Spill Coordination Committee. The objective is to build synergy and coordination amongst these committees and councils, and to minimize duplication. Work group members can also be from First Nations, Local Government, and Environmental NGOs as recommended by the task force members. The task force should have a budget to pay for: an Executive Coordinator and an administration position, an "honorarium" for member participation as well as their travel and lodging. The budget should also include paying for the cost of the design and delivery of issue specific workshops, preparation or completion of operational guidelines, inter-agency/industry cooperative agreements, and undertaking special studies. The task force should be prepared to identify where significant emergency operational readiness funds should be directed based on consultations (workshops) and guidance documents (operational guidelines) - such as on salvage operations, in-situ oil burning, wildlife rescue, etc. The task force should be prepared to monitor exercises related to major vessel casualty response.