DISTRICT OF UCLUELET

HARBOUR AUTHORITY MEETING
Wednesday, June 5, 2019 @ 4:30 PM
George Fraser Room, Ucluelet Community Centre,
500 Matterson Drive, Ucluelet

AGENDA

Page

1. CALL TO ORDER

2. ACKNOWLEDGEMENT OF FIRST NATIONS TERRITORY

   2.1. Council would like to acknowledge the Yuułuʔiłʔatḥ First Nations on whose traditional territories the District of Ucluelet operates.

3. ADDITIONS TO AGENDA

4. APPROVAL OF AGENDA

5. ADOPTION OF MINUTES

   5.1. February 19, 2019 Regular Minutes — 3 - 6
   2019-02-19 Regular Minutes

6. UNFINISHED BUSINESS

7. PUBLIC INPUT, DELEGATIONS & PETITIONS

   7.1. **Public Input**

8. CORRESPONDENCE

   8.1. West Coast Emergency Towing Needs Assessment — 7 - 87
   Canadian Coast Guard
   C-1 Canadian Coast Guard Correspondence

   8.2. BC Salmon Restoration and Innovation Fund — 89 - 93
   Fisheries and Oceans Canada
   C-2 DFO Correspondence

9. INFORMATION ITEMS

   9.1. Action Plan to Address Fraser River Chinook Decline — 95 - 100
   Fisheries and Oceans Canada
   I-1 DFO Correspondence

10. REPORTS

   10.1. Harbour Authority Resolution Tracking — 101 - 102
   Mark Boysen, Chief Administrative Officer
   R-1 Resolution Tracking

   10.2. Proposed Whiskey Dock Float Improvements — 103 - 107

Mark Boysen, Chief Administrative Officer
R-2 Main Street Dock Upgrade Report

10.3. Ucluelet Harbour Report - June 2 — 109 - 110
Kevin Cortes, Harbour Manager
R-3 Small Craft Harbours Report

10.4. Harbour Needs Assessment Update
Department of Fisheries and Oceans Canada / Small Craft Harbours

10.5. Harbour Advisory Commission Update
Harbour Authority

11. OTHER BUSINESS

12. QUESTION PERIOD

13. ADJOURNMENT

DISTRICT OF UCLUELET

MINUTES OF THE HARBOUR AUTHORITY MEETING
HELD IN THE GEORGE FRASER ROOM, 500 MATTERSON DRIVE
Tuesday, February 19, 2019 at 4:30 PM

Present:	**Chair:**	Mayor Noël
	Council:	Councillors Cole, Hoar, Kemps, and McEwen
	Staff:	Mark Boysen, Chief Administrative Officer
		Marlene Lagoa, Manager of Corporate Services
		Kevin Cortes, Harbour Manager
		Darcey Bouvier, Recording Secretary

Regrets:

1 CALL TO ORDER

1.1 Mayor Noël called the meeting to order at 4:30 PM.

2 ACKNOWLEDGEMENT OF FIRST NATIONS TERRITORY

2.1 Council acknowledged the Yuułuʔiłʔatḥ First Nations on whose traditional territories the District of Ucluelet operates.

3 ADDITIONS TO AGENDA

3.1 There were no additions to the agenda.

4 APPROVAL OF AGENDA

4.1 February 19, 2019 Harbour Authority Agenda

HA-001 **It was moved by Councillor McEwen and seconded by Councillor Cole**
THAT Council approve the February 19, 2019 agenda as presented.
CARRIED.

5 ADOPTION OF MINUTES

5.1 November 20, 2018 Regular Minutes

HA-002 **It was moved by Councillor McEwen and seconded by Councillor Cole**
THAT Council approve the November 20, 2018 Regular Minutes as presented.
CARRIED.

6 UNFINISHED BUSINESS

6.1 There was no unfinished business.

7 PUBLIC INPUT AND PRESENTATIONS

7.1 There were no members of the public who wished to speak.

8 CORRESPONDENCE

8.1 2018 Marked the 30th Anniversary of the Harbour Authority Program.
Ministry of Fisheries and Oceans

9 REPORTS FROM COUNCIL OR STAFF

9.1 January 23, 2019 Harbour Advisory Commission Minutes

- CAO Mark Boysen noted he Chaired the last meeting and there are a few actions that are now completed.

9.2 2019 HAABC Seminar Summary

- CAO Mark Boysen advised Kevin's presentation was well-received. Acknowledged the work done by Abby Fortune and her staff in organizing this event. Also noted there is a plaque that was given for hosting the event.
- Councillor McEwen asked about tour. Kevin advised it was a maintenance/harbour tour. About half of the Harbour Masters and Harbour Authority members attended the tour of the Inner and Outer Boat Basin. They discussed similarities and differences between Ucluelet's harbour and other harbours with respect to maintenance, clientele usage, and problem areas.
- Mayor Noël noted some of the Harbour Advisory Commission members went and it was great to have them represented and to have our Harbour Master involved.
- Mayor Noël found the DFO staff to be very knowledgeable and an approachable group that are looking forward to working with us moving forward.
- Mayor Noël suggested that the Kevin's presentation be shared with Tourism Ucluelet. Kevin suggested the presentation can be expanded as he was limited to a certain time.

9.3 Thornton Creek Enhancement Society
Mayco Noël, Mayor

- This is yet another organization that struggles to make money.
- Discussion about rates, fees and structure and how a percentage of that is allocated for the Auxiliary Coast Guard; would like to see this for Thornton Creek Enhancement Society as well.
- Add another line item to include the Hatchery, this may mean rate increases for uses.
- Kevin advised they already allocate 4% of fees to Marine Search & Rescue, which accounts for approximately $12,000/year. If he was to increase that to 8% there may be some push back. Kevin

noted it may work to split the fees if it was increased to 6%, or perhaps even adding a donation box. Kevin noted there are definitely different avenues that can be looked into further.

- Kevin further clarified the 4% is voluntary and if users balk at the fee, he doesn't charge them.
- Kevin advised that all the money collected from the returnables goes to the Hatchery which totals approximately $800 - $1,200/year.
- Council discussed the action of collecting a donation from Small Craft Harbour fees to donate to the Thornton Creek Hatchery.
- Doug Kimoto, is a Director of the Thornton Creek and works in commercial fishery, expressed concern the 2% donation would not be well received by commercial trollers.

HA-003 **It was moved by Councillor Cole and seconded by Councillor Hoar**

THAT Council direct the Harbour Manager to add a 2% voluntary donation for Thornton Creek Enhancement Society to Small Craft Harbour billing and reassess in 12 months.

CARRIED.

9.4 Harbour Authority Resolution Tracking
Mark Boysen, CAO

- Mark met with Spencer Wright from DFO in Vancouver. They discussed the Harbour Master Plan. There was a needs assessment that was done by the previous Council. Mark advised he would like to invite Spencer for the next Harbour meeting in May, and get that process going again.
- Mayor Noël asked about the harbour brochure. Mark advised he met with Nicky Ling and they are in the process of developing a standard brochure template for a more consistent look and branding. Mark advised he is hoping to have a design laid out by mid-March and will send a copy out for comments.

10 NEW BUSINESS

10.1 HAABC Annual Seminar

HA-004 **It was moved by Councillor McEwen and seconded by Councillor Cole**

THAT Council direct Staff to write a thank you letter to the Harbour Authority Association of British Columbia for holding their annual seminar in Ucluelet this year.

CARRIED.

HA-005 **It was moved by Councillor McEwen and seconded by Councillor Hoar**

THAT Council direct Staff to also write a thank you letter to the Harbour Manager and to the Manager of Parks & Recreation for their work on hosting HAABC.

CARRIED.

11 ADJOURNMENT

11.1 Mayor Noël adjourned the meeting at 5:02 PM.

CERTIFIED CORRECT: Minutes of the Harbour Authority Meeting held on Tuesday, February 19, 2019 at 4:30 pm in the George Fraser Room, Ucluelet Community Centre, 500 Matterson Road, Ucluelet, BC.

Mayco Noël
Mayor

Mark Boysen
CAO

Subject: West Coast Towing Needs Assessment
Attachments: West Coast Emergency Towing Needs Assessment (Final) - Mar 31 2019.pdf

From: CCG OPP Towing / GCC PPO Remorquage (DFO/MPO) <DFO.CCG.OPP.Towing-GCC.PPO.Remorquage.MPO@dfo-mpo.gc.ca>
Sent: April 26, 2019 11:31 AM
Subject: West Coast Towing Needs Assessment

(French version below)

Hello,

Since December 2017, the Coast Guard has been working on a *West Coast Emergency Towing Needs Assessment* to better understand existing emergency tow capacity in British Columbia and its capability to manage risks posed by shipping. The Assessment also studies the optimal operating zones for the two newly acquired emergency offshore towing vessels - the *Atlantic Eagle* and *Atlantic Raven*.

The Assessment was informed by an extensive literature review, traffic data analysis and engagement with Indigenous communities and industry stakeholders. We are also in the process of developing two companion emergency towing needs assessments for Central & Arctic and Atlantic Canada. These three assessments will form the foundation for Canada's Strategy on Emergency Towing, co-led by Coast Guard and Transport Canada.

At this point, we wish to share the final draft of the *West Coast Emergency Towing Needs Assessment* to ensure that we have accurately captured your input received to date, and to provide those who have not yet been able to contribute with an opportunity to do so.

Should you wish to discuss the Assessment in detail or require clarification on any of the findings, please contact the Coast Guard (email below) and we will make every effort to have either a Coast Guard or Transport Canada representative available to meet and discuss.

Attached to this email, is the draft *West Coast Towing Needs Assessment* for your review and input. We invite you to send your feedback to: DFO.CCG.OPP.Towing-GCC.PPO.Remorquage.MPO@dfo-mpo.gc.ca by May 31, 2019. Feedback that we receive will be incorporated into a "What We Heard" report, which will take the form of an annex to the *West Coast Towing Needs Assessment* upon its final release.

Thank you,

The Canadian Coast Guard

Bonjour,

Depuis décembre 2017, la Garde côtière a travaillé sur une *Évaluation des besoins en remorquage pour la côte Ouest*, pour mieux comprendre la capacité existante de remorquage d'urgence en Colombie Britannique et sa capacité de gérer les risques posés par la commerce maritime. L'évaluation se penche également les zones d'opération optimales pour les deux navires de remorquage d'urgence nouvellement acquis, l'*Atlantic Eagle et l'Atlantic Raven.*

L'évaluation s'est appuyée sur une analyse documentaire approfondie, une analyse des données sur le trafic ainsi que sur la mobilisation des communautés autochtones et des intervenants de l'industrie maritime. Nous sommes également en train d'élaborer deux évaluations complémentaires portant sur les besoins en remorquage d'urgence pour les régions du centre et de l'arctique, et de l'atlantique du Canada. Ces trois évaluations constitueront la fondation de la Stratégie canadienne sur le remorquage d'urgence, dirigée conjointement par la Garde côtière et Transports Canada.

À ce stade, nous souhaitons partager la version finale de *l'Évaluation des besoins en remorquage d'urgence de la côte Ouest* afin de nous assurer que nous avons bien pris en compte vos commentaires reçus jusqu'à présent, et pour offrir à ceux qui n'ont pas encore eu l'opportunité de commenter une occasion de le faire.

Si vous souhaitez discuter de l'évaluation ou si vous avez besoin de précisions sur une des conclusions, veuillez contacter la Garde côtière (courriel ci-dessous) et nous ferons tout en notre possible pour qu'un représentant de la Garde côtière ou de Transports Canada soit disponible pour vous rencontrer et discuter.

Vous trouverez donc ci-joint l'ébauche de l' *Évaluation des besoins en remorquage de la côte Ouest,* à des fins d'examen et de commentaires. Nous vous invitons à envoyer vos commentaires à: DFO.CCG.OPP.Towing-GCC.PPO.Remorquage.MPO@dfo-mpo.gc.ca d'ici le 31 mai 2019. Les commentaires que nous recevons seront incorporés dans un rapport intitulé «Ce que nous avons entendu», qui sera annexé à *l'Évaluation des besoins en remorquage de la côte Ouest* lors de sa publication finale.

Nous vous remercions,

La Garde côtière canadienne

West Coast Emergency Towing Needs Assessment

Prepared for the Canadian Coast Guard by:

Paul Rudden Consulting

March 2019

EXECUTIVE SUMMARY

This Needs Assessment is the first step in identifying and addressing gaps in emergency towing on the West Coast of Canada. The goals were to understand the existing emergency towing capacity (number of tugs) and capability (principally towing power) to manage the risks posed by shipping, recommend optimal operating zones for the two emergency offshore towing vessels recently leased by the Coast Guard and identify gaps and develop recommendations based on current and future needs.

The work consisted of a review of existing literature, engagement with stakeholders and partners and a high-level data analysis. Below is a summary of the findings. A complete list of findings and the 18 recommendations starts on page 60.

The analysis found gaps in the existing towing capacity and capability on the West Coast. Although there are many tugs in this region their operating areas, and limited towing power relative to the shipping risk does not guarantee a timely and adequate response in some higher risk areas. The capacity and capability gaps will be addressed in the short-term with the addition of the two emergency offshore towing vessels, which have adequate power and characteristics suitable for offshore emergency towing on the West Coast. These two vessels will be best deployed to cover the higher risk areas around Haida Gwaii, the Central Coast and northwest Vancouver Island, but should also be available to respond to incidents anywhere on the coast.

As the leased towing vessel project is planned for a defined period, a more permanent, risk-based solution will be required to ensure future capacity and capability is adequate for the evolving risk. Maritime risk is changing globally, and these impacts are being felt on the West Coast of Canada. Future shipping trends and the resulting emergency towing needs will be affected by many factors from climate change to automation and large-scale shifts in oil and sustainable fuel consumption. These factors are complex, and some have impacts that could raise and reduce risk, simultaneously. For example, the predicted switch to Liquid Natural Gas (LNG) fuels will likely reduce the amount of persistent oil being transported but will introduce new risks to public and responder safety. Another example is the forecast increase in size of container ships, which may require larger more capable tugs, but could also reduce the probability of an incident due to an overall reduction in the number of vessel transits.

This complexity will require the application of a robust risk assessment methodology to understand future likelihoods and impacts and to develop effective and efficient long-term mitigation strategies. Dedicated emergency towing vessels are expensive and are not required in all situations, especially where there are capable tugs which is the case on many areas of the coast. The development of an enhanced emergency towing system that will leverage both existing towing resources and the planned increased tug capacity linked to major projects, such as Trans Mountain in southern British Columbia, and LNG Canada in the north will provide effective and efficient response options for many emergency towing scenarios.

Insights from data analysis, literature review and stakeholder feedback also identified a range of safety-system risk mitigation measures, which could be applied in Canada. In particular, there are a number of initiatives that can increase the time available for a successful response which is one of the most important factors in the probability of success of any emergency towing operation. Some measures applied in other countries and others suggested by stakeholders that could increase available response time include reducing delays in a damaged/disabled vessel reporting to authorities; improving incident

manager's situational awareness of available commercial towing resources; increasing requirements for emergency tow equipment onboard large commercial vessels; and altering, where practical, large commercial vessel routes away from dangers to navigation.

In addition to increasing the probability of success in individual incidents, additional time could also result in significant cost savings as it could result in fewer dedicated resources needed to cover a given area. For example, if measures are put in place that increase the window of response before a vessel drifts ashore from 6 hours to 24 hours, fewer dedicated vessels may be able cover a larger area. Given the relative cost-effectiveness of these measures, and potential impact on success, they should be further assessed and implemented as alternative risk mitigation measures where appropriate.

In summary, emergency towing gaps were found on the West Coast, but the Coast Guard's leased vessels will capably fill those gaps in the short-term. The existing and future commercial tug capacity on the West Coast is capable of handling many emergency towing operations effectively and efficiently and should be leveraged as part of an emergency towing system concept. In the mid- and long-term, a full risk assessment methodology should be applied to fully understand all future risks resulting from complex and substantial changes in commercial shipping. In addition to increased response capacity, a range of mitigation measures to increase available response time, some of which can have a significant impact with relatively low costs, should be considered and implemented, where practical.

TABLE OF CONTENTS

INTRODUCTION

This report summarizes the activities and findings of the emergency towing (ET) assessment on the West Coast of Canada. Although I am the principal author, much of the credit for the report goes to the respective headquarter teams in the Canadian Coast Guard and Transport Canada (TC) who provided valuable input throughout the process. Regional staff in both organizations were also key to arranging and facilitating engagement sessions and providing input without which this report would be incomplete and lacking in depth and focus.

This work also benefitted from the growing capacity within both organizations to effectively apply data analysis to evidence-based decisions. In this case a small team of TC and Coast Guard data specialists conducted an innovative analysis that informed many of the findings and recommendations in this report.

I would also like to thank everyone who took the time and effort to contribute to this work through the engagement process. Participants generously provided documentation and insights that were key to the findings and recommendations. The Oceans Protection Plan (OPP) initiative has made life and work very busy for everyone involved and it is greatly appreciated that people took the time to meet, discuss and complete questionnaires which all have made this work more relevant.

OCEANS PROTECTION PLAN AND EMERGENCY TOWING

On November 7, 2016 the Prime Minister launched the $1.5 billion national Ocean Protection Plan (OPP) which included an ET initiative. ET is considered a key preventative action to manage risks from maritime casualties. Stakeholders and partners have raised concerns about the Government of Canada's (GC) and industry's capacity to protect the British Columbian coast with existing resources. To address this issue, the OPP established a range of ET commitments that includes this assessment, the deployment of new emergency tow kits, the leasing of two emergency offshore towing vessels (EOTV)[1], and development of a long-term national strategy which will be led by TC.

PURPOSE AND SCOPE

The goals of the assessment are to understand the existing ET capacity in western Canadian waters and its capability to manage the risks posed by shipping, identify gaps in capacity and capability and develop recommendations based on current and future needs, and recommend optimal operating zones for the two leased EOTVs.

[1] Emergency Offshore Towing Vessel (EOTV) – The specific Coast Guard designation for the two leased vessels which is synonymous with the more generic emergency towing vessel

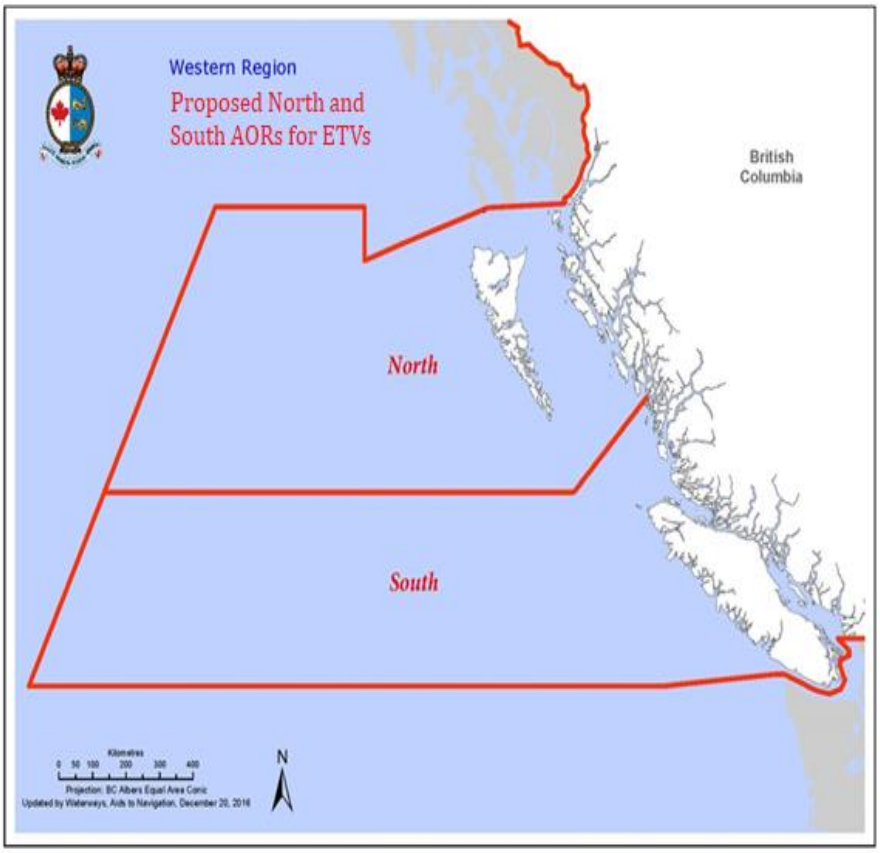


Figure 1 - ETV Areas of Responsibility Source: Coast Guard/TC

Geographically, the work focused on the area of responsibility for the Coast Guard's search and rescue (SAR) service (figure 1) as it best defines where the Coast Guard would respond and manage an incident involving ET. A second geographic consideration was the inshore and offshore zones. The original scope of the project focused on the offshore, but it was agreed early in the process that in order to fully assess ET needs the coastal and inshore areas would also be considered.

ASSESSMENT ACTIVITIES

The assessment involved three principal activities: a literature review; data analysis; and stakeholder and partner engagement.

The literature review included canvassing experts and online searches which produced: Canadian studies, regulations, articles and other documents both national in scope and specific to British Columbia (BC). Additionally, international documentation from states that have implemented an ET service and documents from experts on tugs and ET were reviewed. A bibliography is in Appendix A.

The data analysis relied on the large body of work already done for the area by various stakeholders and partners as well as a wealth of analysis available internationally. Additionally, a small team of Coast Guard and TC data specialists developed new and innovative ways of combining existing datasets that provided insight into gaps in capacity and capability.

Finally, engagement activities were conducted with regional stakeholders and partners including Indigenous Peoples, provincial and municipal government organizations, non-governmental organizations (NGOs), academia, industry in addition to agencies and governments outside of Canada.

REPORT STRUCTURE

This report was primarily written for an informed maritime audience with a level of awareness of shipping, risk and casualty management in western Canadian waters. Additional material has been included to inform a broader audience while keeping the report as concise as possible.

The report starts with an overview of ET internationally and in Canada to provide context, followed by a high-level data analysis of traffic, incidents and existing capacity and capability. The latter section focuses on the gaps and issues with ET capacity and capability and how to fill them. The final section has the findings and recommendations to improve ET and risk on the West Coast.

EMERGENCY TOWING

"Emergency towing" is not a recognised term in international convention and law. It is also not a formal program in the Coast Guard although Coast Guard vessels do occasionally conduct emergency tows of large vessels as an element of the search and rescue (SAR) and environmental response (ER) programs. This required some initial research to clearly define ET within the context of this assessment.

A literature search found no official or standardized definition but uncovered a variety of material referring to salvage, ET, stand-by tugs and rescue towing. The only clearly defined and internationally recognised term among these is salvage, defined by the International Convention on Salvage 1989 as: "…any act or activity undertaken to assist a vessel or any other property in danger in navigable waters or in any other waters whatsoever." ET clearly fits within this definition. However, in the context of this assessment the term "salvage" will mean situations where a ship requires a significant level of commercial, specialised services to recover or remediate a vessel and its cargo after sustaining damage, grounding or sinking. ET will be considered an activity to prevent the need for this larger salvage effort. Based on this, the following definition of ET will be used for this assessment:

Emergency towing - towing to prevent a disabled/damaged vessel from grounding, colliding, alliding[2] or sinking.

In order to further define the scope of work related to ET and its application in Canada, several assumptions were made:

- ET is an activity that can be done by any capable vessel in suitable conditions.
- ET will include all towing activities by any vessel to get a disabled/damaged vessel to a safe place or until it has left the Canadian area of responsibility.
- The GC will manage the ET incident until a disabled/damaged vessel is at a safe place or it has left the Canadian area of responsibility.

Additionally, to fulfill the requirement on recommendations for Coast Guard's leased EOTV operational areas, it was necessary to establish a working definition of their function in line with the Coast Guard's mandate. For the purposes of this assessment, it is assumed that their principal function will be:

To take a distressed or disabled/damaged vessel in tow to minimize risk to life, public safety and the environment.

It is important to note that this statement does not imply that a Coast Guard EOTV will only hold a vessel off the coast until another resource arrives or the situation improves. It is assumed that the Coast Guard

[2] Alliding/allision - a vessel striking a fixed object such as a bridge, pier or navigation aid.

EOTV's will take all actions in accordance with Coast Guard's "Policy on Assistance to Disabled Vessels"[3] including towing a vessel to a safe place when required.

EMERGENCY TOWING HISTORY

Historically as global trade routes expanded, ship's masters, in the absence of organized emergency services, aided each other in remote areas. As shipping practices developed and the value of ships and cargo increased, compensation for assisting another vessel also evolved leading to the emergence of a viable market for specialised salvage services. This resulted in private companies stationing large salvage tugs at strategic locations on global shipping routes forming a network of ET services that responded to vessels in need of assistance.

In the last few decades there have been significant improvements in maritime safety with corresponding reductions in accident rates making the private salvage/ET model economically unsustainable. As a result, few large salvage vessels remain operational globally and none operate on the west coast of Canada[4]. This decline in available resources resulted in many countries facing a lack of towing capacity and capability when it was needed most, sometimes with disastrous consequences. This effectively shifted the burden of response to governments resulting in the implementation of state mandated and funded ET services in many jurisdictions.

Most European maritime countries have some level of ET service using dedicated vessels which provide a range of other emergency response activities beyond ET. Two of the largest fleets, Germany and France, have multiple, dedicated vessels with bollard pulls in the 200-tonne range, capable of towing the largest vessels in extreme conditions. Germany reaffirmed its commitment to ET in 2011 with the commissioning of the custom designed ETV *Nordic* capable of 20 knots (Kts) with 207 tonnes bollard pull (TBP - a measure of towing capability). Other countries operating ETVs include Algeria, Finland, Iceland, the Netherlands, Norway, Poland, South Africa, Spain, Sweden, Turkey and the United Kingdom. Many of these neighbouring countries have also established mutual assistance agreements to maximize the effectiveness of their respective capacity and reduce overall costs to individual states.

In some countries these dedicated vessels are augmented with commercial tugs under some type of service agreement with the government. Australia has adopted a model using a system of levels from Level 1 - dedicated resources to Level 3 - vessels of opportunity. Level 2 is an innovative approach in which the Australian Maritime Safety Agency (AMSA), "contracts suitable towage vessels and their crew to be available in the event of a shipping incident. These harbour tug operators are contracted by AMSA to ensure the availability of their vessels and maintain the training of their crews for emergency towage operations."[5] This type of arrangement has potential in Canada where there is already considerable tug capacity in many locations.

The United States (US) does not have a dedicated, national ET service but, based on the literature review, relies on the capacity of its existing federal fleet supplemented by commercial tugs. Some

[3] http://www.ccg-gcc.gc.ca/Publications/Policy-Assistance-Disabled-Vessels http://www.ccg-gcc.gc.ca/Publications/Policy-Assistance-Disabled-Vessels

[4] New Carissa Review Committee – Report and Recommendations to the Governor of the State of Oregon - page 19/20

[5] AMSA Maritime Casualty Management and Emergency Towage Capability Fact Sheet

States, such as Washington, have established ET services through legislation or other funding mechanisms to address specific risks on their coasts. Additionally, the USCG has developed local ET response plans which rely on cooperation with industry members through tug working groups.[6] The US also has legislation which requires vessels over 400 gross tons in US waters to have a Vessel Response Plan (VRP). The VRP must identify towing vessels with the proper characteristics, horsepower, and bollard pull to tow a vessel in environments where the winds are up to 40 Kts. Response times are also specified for a tow vessel to arrive on scene in 12 hours within 12 nautical miles (NM) and 18 hours within 50 NM of a large port.

DEDICATED EMERGENCY TOWING VESSELS

The dedicated ETV's operated by many countries have common characteristics. Although their size and speed are dependent on the specific operating environment, most existing ETVs are in the range of 60-90 metres in length with a speed of 15-20 Kts and bollard pulls in the 80-200 tonne range. Additional features can include rescue and hospital facilities to enhance their SAR capability, ER equipment to minimize the impact of pollution and fire fighting and salvage equipment to maximize the probability of keeping a vessel afloat so it can be towed to safety.

Figure 2 - Emergency Tow Vessel Nordic Source: Rico Voss - copyright

LIMITATIONS OF EMERGENCY TOWING VESSELS

Although most reviewed studies made a case for dedicated ETVs, many cautioned that they cannot guarantee that an incident will end successfully. The Irish Coast Guard commissioned a study by Marico Marine[7] which best explains their limitations:

"ETVs should be seen as an insurance policy against ship sourced pollution and their costs as a premium paid to provide a reasonable level of cover to the most vulnerable and/or the most hazard strewn stretches of coast. An ETV will not always succeed in rescuing a stricken vessel. It may not be able to

[6] USCG Sector San Francisco Marine Salvage Response Plan
[7] Marico Marine – Irish Coast Guard – Part 1 Study On The Provision For An ETV.

reach it in time; powered groundings can rarely if ever be prevented by an ETV. The weather will be significant factor and may preclude a tow from being connected. Any number of factors such as the capability of the stricken vessel crew may influence against success. Nevertheless, experience has demonstrated that if an ETV is available then the chances of success are greatly increased and pollution on the scale of the *Amoco Cadiz*, *Braer*, and *Exxon Valdez* may be prevented or mitigated."

EMERGENCY TOWING IN CANADA

Towing of disabled vessels in Canada is normally done by four types of vessel depending on the circumstances and availability of resources: Coast Guard vessels; Canadian Coast Guard Auxiliary vessels; commercial tugs; and vessels of opportunity.

The Coast Guard manages the response to most disabled vessels through the authorities and mandates of the SAR and ER programs. When a vessel is in distress or imminent danger all reasonable actions will be taken to mitigate the risk to life, public safety and the environment. Towing is often the best response option as it can be done without a risky evacuation of crew and passengers and mitigates all risks with one action.

The majority of disabled vessels in Canada are under 33 metres in length, in "no immediate danger" and pose a relatively low risk to the environment. The Coast Guard has the capacity and successfully responds to thousands of these minor incidents annually[8], so this category was excluded from further consideration in this assessment.

Incidents involving ships over 33m are rarer with unique needs due to their size and the capabilities required to manage them. Traditionally, when dealing with these larger vessels the Coast Guard's response has been to standby or evacuate the crew and manage the incident while the disabled vessel's owner negotiates a contract with a commercial tug operator. Occasionally, when a commercial tug is unavailable or will not arrive on time, a Coast Guard vessel has attempted a tow of a large vessel to prevent an imminent grounding.

When dealing with these larger vessels, there are three key factors that must be understood as we consider how ET could be managed and delivered in the future:

1. There is a significant increase in risk when towing large vessels especially in heavy weather.
2. The Coast Guard has limited fleet towing capacity and capability to deal with these large vessels and the related risk.
3. Commercial towing operators can receive substantial compensation for towing a large vessel in need of assistance.

IS THERE A NEED TO ENHANCE EMERGENCY TOWING ON THE WEST COAST OF CANADA?

As explained above, Canada has large vessel ET capacity consisting of a mix of public and private resources that is coordinated and responds under federal authorities or under contract to a ship owner. This informal system has resulted in many successful emergency tows on all coasts of Canada. However,

[8] http://www.ccg-gcc.gc.ca/eng/Coast Guard/SAR_Maritime_Sar

there have been incidents which have resulted in questions about the existing system's capacity and capability to manage all of the risk.

Several studies have identified the lack of ET capacity as a critical gap in safety and pollution prevention off the coast of BC. Examples include: the 1990 Brander-Smith Panel's report, the Province's 2013 "West Coast Spill Response Study" and The Living Oceans Society's "Major Marine Vessel Casualty Risk and Response Preparedness in British Columbia". No literature or evidence was found during this assessment that made a case for the status quo or a reduction in ET capacity on West Coast waters.

Indigenous Peoples have also emphasized the need for more ET resources. The Haida Nation hosted a workshop to discuss lessons learned after the disabled vessel *Simushir* came within a few hours of grounding and likely polluting the coast of Haida Gwaii in 2014. The following is a summary of the relevant recommendations from the workshop[9] as presented by Mr. Peter Lantin, President of the Haida Nation:

- Prevention is the Priority - Prevention needs to come first given the remote location and challenges with oil spill response. Additional Coast Guard assets are needed to improve response times.
- Safe Distance Offshore - The recommended distance offshore of 25 NM is inadequate for transiting vessels and needs to be 50 to 100 NM based on past studies.
- Rescue Tugs - There is a need for rescue tugs that are capable of severe weather rescue to be stationed in northern BC including on Haida Gwaii.
- System Oversight - First Nations involvement is essential, particularly in guiding regional investments in accident prevention and preparedness.

Similar concerns have been echoed by Canada's neighbours in Alaska and the State of Washington. Alaska completed a multi-phase risk assessment of maritime transportation in the Bering Sea and the Aleutian Archipelago after the 2004 grounding and subsequent oil and cargo spill from the M/V *Selendang Ayu*[10]. This is the most comprehensive study found in any jurisdiction, spanning five years and conducted by a group of academic, industry and risk experts supported by the United States Coast Guard (USCG). This level of effort was funded by a $3 million (US) award as part of the casualty's legal settlement. It not only found that ET is a key component of an effective safety system but, relative to other response measures such as clean-up, it had a much higher probability of success in the prevalent weather conditions.[11]

On BC's southern border, the State of Washington's government established an ET vessel at Neah Bay on the Strait of Juan de Fuca to manage the risk to its coast from disabled, drifting vessels. This service has proven its value through multiple responses some of which have been in the Canadian area of responsibility.

Although there is no obligation in international law or convention for Canada to establish or provide ET services, there is evidence in recent incidents that the existing ET capacity on the West Coast may be insufficient. Many jurisdictions have already faced this issue and the number and scope of their related

[9] Council of the Haida Nation. (2015). Workshop Summary: Lessons From the Simushir.
[10] AleutianIslandsRiskAssessment.com/background.html
[11] Aleutian Islands Risk Assessment – Recommending an Optimal Response System for the Aleutian Islands: Summary Report February 2015

studies alone is evidence of some need. The case is further strengthened with the existence of large, capable ET vessels throughout the world and the disasters that have been directly linked to their absence.

Two recent incidents, *Simushir* and the containership *MOL Prestige* in 2018, which required the Neah Bay tug's assistance in the Canadian area of responsibility, ended in success but tested the limits of the existing capacity and capability. In the case of the *MOL Prestige*, it raised questions about a gap in Canadian capability and reliance on a foreign resource.

Therefore, it is reasonable to conclude that:

1. **There is a need for an enhanced ET system on the West Coast of Canada.**
2. **There is evidence of gaps in the existing West Coast capacity and capability, which could result in a significant casualty in a likely scenario.**

The remainder of this report will focus on the gaps in the existing system and options, requirements and recommendations to achieve an effective and efficient enhanced system for the West Coast of Canada.

Enhanced Emergency Towing System Concept

There are nearly infinite combinations of variables around maritime casualties and the type and level of response required. On the casualty side of the equation there is the size and type of vessel, location, environmental conditions, number of people involved, pollutant amounts and types, condition of the vessel, capabilities of the casualty's crew and the ship owner's willingness to respond. The response side depends on the location of the casualty relative to the available resources and hazards, the towing vessel's design, size and power, seakeeping[12] capabilities, towing equipment, crew size and capabilities, environmental conditions and location of the casualty relative to sensitive areas and a safe haven. This variability makes it very difficult and prohibitively costly to create a single government or industry funded solution for ET off the extensive Canadian coast.

The addition of two leased EOTVs to Coast Guard's West Coast fleet will add considerable capacity and capability but at a high cost, particularly if this approach is taken to cover all of the ET risk. The federal SAR program faced the same challenges and developed a system approach consisting of primary, secondary, and other resources that does not rely on any single resource and allows flexibility in risk management and response. This model recognizes that the federal government manages all incidents and provides a level of capacity but that it does not fund or provide a response to all incidents off all parts of Canada's coast. Instead, it capitalizes on the available maritime capacity to manage risks in many areas and scenarios. The GC should consider such an enhanced system concept for ET using all available resources to provide flexibility in managing differing levels of risk regionally and nationally.

Although this system approach sounds complex and potentially costly, this is not the case. It is built on existing conventions, laws and traditions and does not require a formal management structure, only a level of coordination which is principally done through existing networks. At the operational level the system is effectively managed through a strong federal coordination and incident management capacity with a high level of situational awareness supplemented by training and exercising programs.

[12] The ability of a vessel to withstand rough conditions at sea

This same concept can be applied to ET as, like Canada's SAR system, many of the parts already exist and can, with a reasonable level of effort, be leveraged into an efficient, responsive system. The following is an outline of the possible structure of such a system:

Incident Management

The federal government would manage all ET incidents using existing powers and authorities in partnership with other levels of government and stakeholders. The Coast Guard's SAR and ER programs and TC's Marine Safety and Security would be the principal incident management leads.

Resources

Primary ET Resources

A primary resource would be a vessel capable and equipped for ET with a trained crew on an established standby posture. The two vessels that Coast Guard is leasing would be primary ETVs in this system. Another possible example could be the offshore oil and gas industry's emergency standby vessels which, by design are capable ETVs. If appropriate arrangements are put in place, similar to the Australian model, specific escort and harbour tugs could also be designated as primary ETVs

Secondary ET Resources

All Coast Guard and other government vessels have an inherent towing capacity dependent on size, structural strength, horsepower, tow arrangements and crew training.

Tugs of Opportunity and Other Vessels

All commercial tugs could be integrated into a system in various roles depending on the circumstances. Any vessel in the Canadian area of responsibility may be ordered to respond to prevent pollution or to assist a vessel in distress using the powers in the *Canada Shipping Act, 2001*.

An important distinction and advantage that an enhanced ET system would have over the SAR system model is the fact that any commercial vessel providing an emergency tow to a ship in need of assistance has rights to compensation under maritime law. When dealing with a large vessel and its cargo this compensation can be substantial, providing a financial incentive for commercial tug participation in an ET system that does not exist in SAR. This financial benefit may also provide opportunities to establish innovative arrangements with tug operators to provide an enhanced level of service in higher risk areas that do not require or justify the level of investment of an EOTV.

EMERGENCY TOWING RISK ON THE WEST COAST OF CANADA

Risk in its simplest form is the probability of something happening multiplied by the severity of the impact if it occurs. In the context of this assessment, we will look at risk as the probability of a vessel becoming a casualty requiring ET assistance and the impact if an emergency tow is unavailable or unsuccessful.

The following is a high-level risk analysis to understand large scale gaps in ET needs. It should not be considered a full ET risk assessment which is beyond the scope of this report. Such an assessment will be required to fully define ET requirements into the future which will be discussed in this report's recommendations.

WEST COAST TRAFFIC

Studies on ship traffic on the West Coast have been conducted since at least 2002 with the most recent being done by the Province of British Columbia in 2013. Additionally, Coast Guard has sources of automated traffic data that has been analysed and presented in maps that provide a visual representation of the traffic patterns inshore and offshore.

West Coast Spill Response Study – BC Ministry of Environment/Nuka Research and Planning Group LLC.

Volume 2 of this study focuses on large commercial ship traffic using multiple data sources from 2011 and 2012. The project's goals were to characterize the existing vessel types and movements along Canada's West Coast, estimate the quantities of petroleum being moved as cargo and fuel oil and forecast potential growth or changes to vessel traffic density and movements over the next 15 years. Although thorough and based on quality-controlled data, there are some limitations that need to be understood.

There is a lack of accurate information on tank barges. Tugs must carry automatic identification system (AIS) tracking equipment but the barges do not, making them difficult to track and determine the amount and types of cargo onboard. Nuka Research did supplementary work to estimate this traffic and volumes of oil and concluded that up to 48 million cubic metres are being transported by barge. This is a large and risky unknown that should be better understood in order to develop adequate mitigation strategies. The study also did not include "innocent passage" vessels which transit Canadian waters but do not call at a BC port and make up a part of the offshore risk that will be managed primarily by the Coast Guard's EOTVs. The final gap is traffic that did not cross any passage line such as much of the BC ferry traffic between Vancouver Island/Haida Gwaii and the mainland and some tug traffic that follows similar routes. These last two traffic patterns will be shown in the graphics in the subsequent section.

The Province's analysis used a system of passage lines to quantify and describe traffic trends:

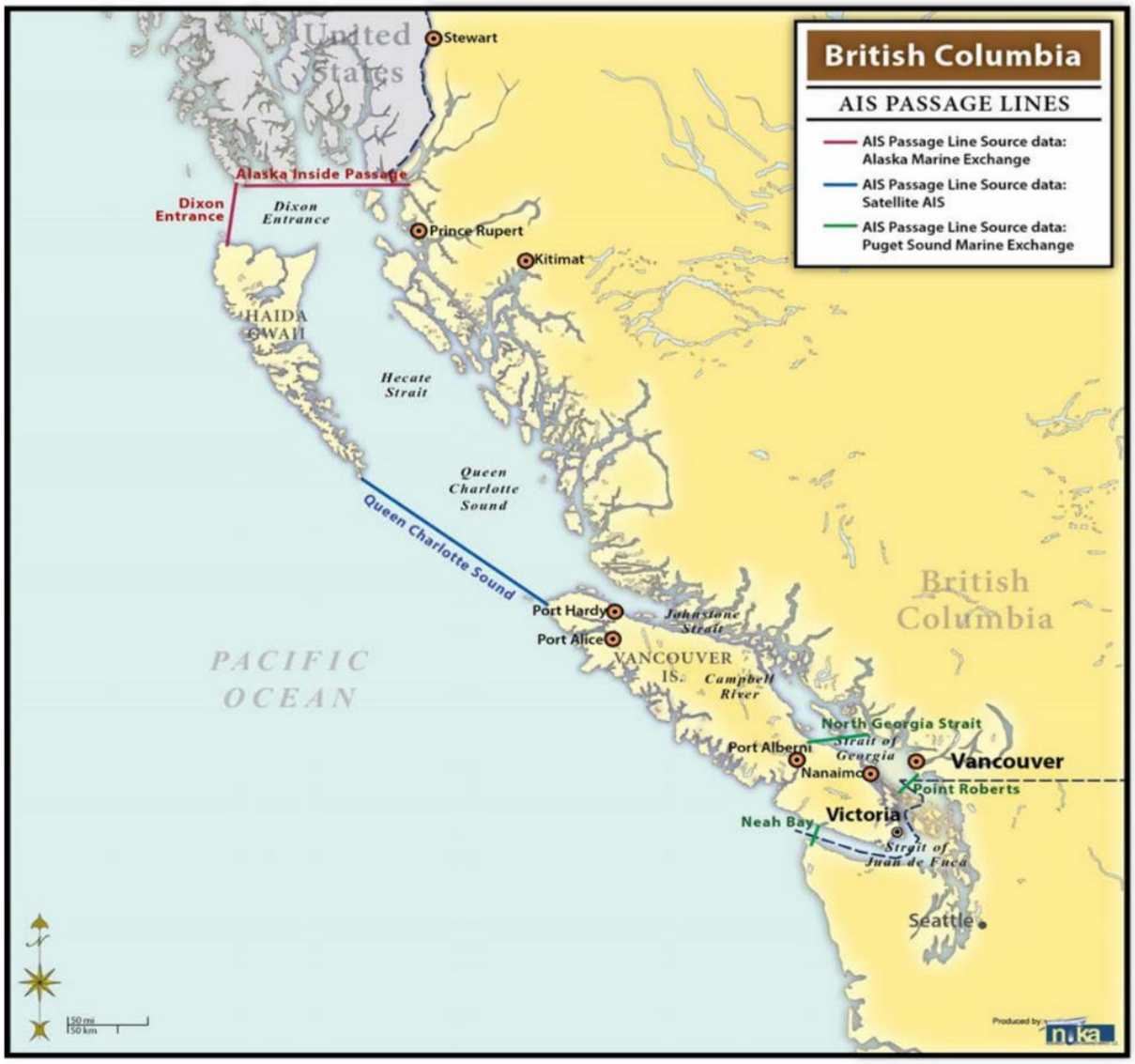


Figure 3 - AIS Passage Lines Source: Province of British Columbia Ministry of Environment/Nuka Research LLC

The authors calculated the number of transits crossing each line by size and type of vessel. The following is a summary of their analysis:

When their transits are combined, cargo ships and container vessels were responsible for 48% of transits across the six passage lines for 2011-2012. Tugs account for the next largest percentage of transits across all lines, with 24%. Passenger vessel transits made up 2% of total traffic in 2011, and 5% in 2012.

Tankers (all types and sizes combined) made up about 6% of overall vessel traffic each year. Small tankers accounted for 57% of total tanker traffic in 2011 and 56% in 2012. The vast majority of all oil and persistent oil cargo moves through the Strait of Juan de Fuca.

The majority of vessel transits (78%) occur in southern BC through the Strait of Juan de Fuca at the Neah Bay and Point Roberts passage lines, each of which sees more than 10,000 transits per year.

Roughly 13% of the vessel transits occurred in central BC through Queen Charlotte Sound or North Georgia Strait. About 1,100 vessels per year moved through Queen Charlotte Sound north to the Gulf of Alaska across the Queen Charlotte Sound passage line. Roughly 2,500 vessels per year transited to/from central BC in the inside waters across the North Georgia Strait passage line. This traffic is composed almost entirely of tugs (78.7%) transiting through the Inside Passage of Canada. Most trade locally, but almost half are transiting through northern BC into the Alaska Inside Passage. Tankers over 40,000 dead weight tonnes (DWT) are prohibited in these waters.

Less than 10% of the total vessel transits occurred at the two northern BC passage lines – Alaska Inside Passage and Dixon Entrance. Traffic in this area consists of some vessels calling at northern BC ports and vessels transiting through the Canadian Inside Passage to and from the Alaska Inside Passage. Almost 2,000 vessels per year transit from BC into the Alaska Inside Passage.

The report went on to describe the sizes and types of vessels and their potential to pollute:

The largest tankers are crude oil carriers up to 193,000 DWT which transit the Strait of Juan de Fuca to US ports. The largest tankers transiting from Vancouver are 123,000 DWT (partially loaded due to draft restrictions) while the largest in northern BC was 51,000 DWT that used Dixon Entrance.

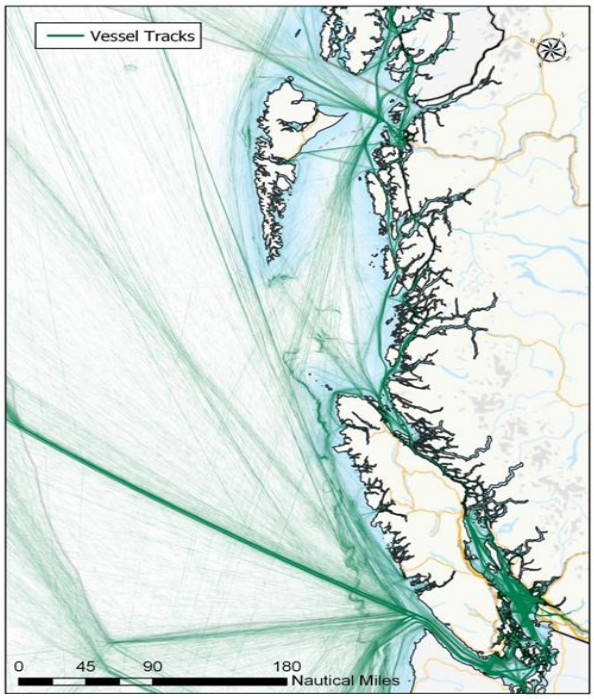
The median size of container vessels ranges from approximately 66,000 to 71,000 DWT. Bulk carriers ranged in median size from 31,000 to 75,000 DWT. The largest general cargo ship was 179,658 DWT while the largest individual cargo vessel was a 388,133 DWT bulk cargo ship, which crossed the Neah Bay passage line in 2011. Bulk cargo ships in excess of 200,000 DWT crossed Dixon Entrance, Neah Bay, and Point Roberts both years.

As a rough estimate, based on the vessel traffic recorded, the overall worst-case spill would be the loss of 210,000 cubic metres (m3) of crude oil from the largest tanker bound for a US port (this represents the known petroleum cargo capacity of that vessel). This size spill could only occur on the outer coast or in the Strait of Juan de Fuca south of Point Roberts as these vessels proceed south to Puget Sound ports before crossing the Point Roberts traffic line. The largest petroleum cargo volume of a vessel recorded in the Georgia Straits near Vancouver was 127,000m3 (persistent oil in a crude tanker), and on the waters of northern and central BC it was 57,000m3 (non-persistent oil in a product tanker). A spill from an articulated tug and barge could exceed 25,000m3 of non-persistent oil. A spill of persistent oil bunkers from a large cargo ship could exceed 12,000m3 in any area of the coast.

In addition to the traffic analysis, the report forecast an increase in shipping activity based on a review of proposed and ongoing projects. With the benefit of hindsight, today's reality highlights the limitations of these forecasts and need for caution in their use to predict future risk. The study listed approximately 28 projects as underway or planned in 2013 but many have since stalled or been cancelled.

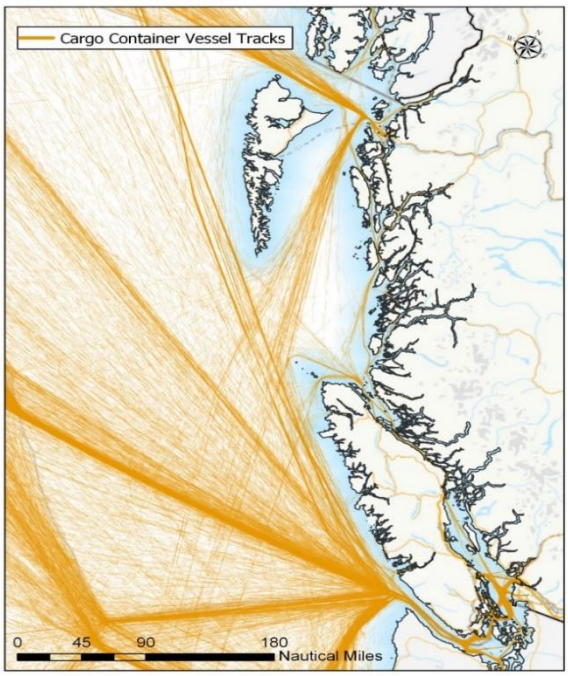
Visual Traffic Patterns

The following graphics, developed by the Coast Guard/TC data team, show traffic patterns using AIS data for 2015. The maps are broken down by type to show trends and behaviours of the larger vessels as they relate to ET. They also fill two missing elements in the Province's study: the extent of offshore innocent passage traffic; and the level of shipping vessel activity between ports which did not cross a passage line.



All vessel tracks including tankers, general cargo, bulker, passenger, fishing, tugs and government vessels. It shows the large-scale patterns and various coastal and trans-Pacific routes of vessels using west coast ports. The principal trans-Pacific great circle routes can be seen in the series of green lines emanating from the major West Coast ports towards Asia.

Figure 4 - All Vessel Traffic Source: Coast Guard/TC



All cargo vessels (general, bulk and container) other than tankers. This shows the presence of these vessels throughout the coast and concentrations at entry points such as Dixon Entrance, Queen Charlotte Sound and the Strait of Juan de Fuca. It also provides clear evidence of the relative volumes and how close to shore many of these vessels pass compared to tanker traffic seen below.

Figure 5 - All Cargo Vessels Source: Coast Guard/TC

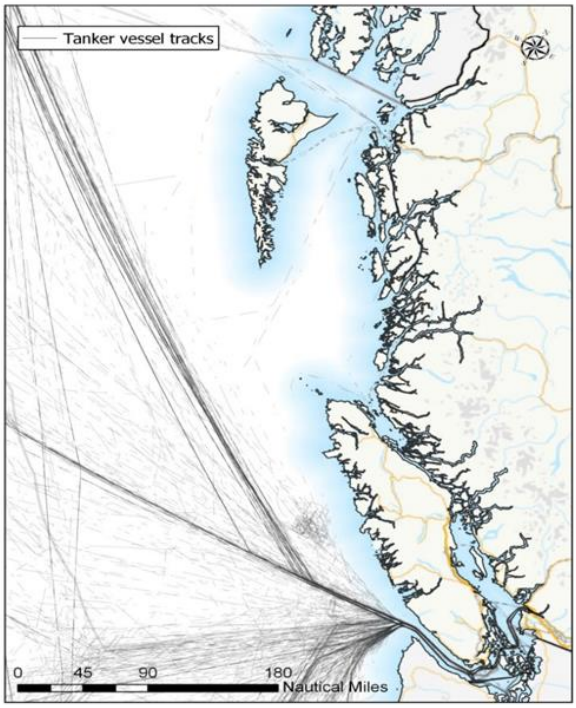


Figure 6 - All Tanker Traffic Source: Coast Guard/TC

All tanker traffic is shown here demonstrating the effectiveness of the voluntary tanker exclusion zone[13], which applies only to laden (southbound) Trans-Alaska tankers. Despite its voluntary and limited scope, it appears to be having a positive impact on the behaviour of most tankers which was confirmed in discussions with Coast Guard Marine Communications and Traffic Services officers at Prince Rupert.

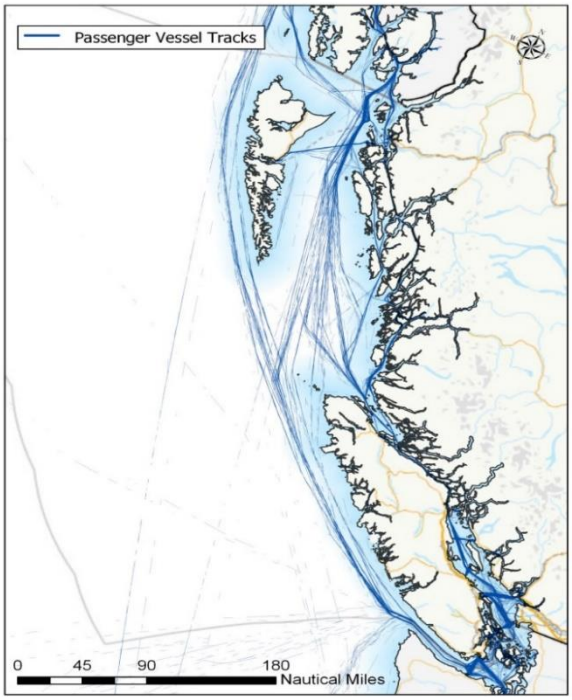
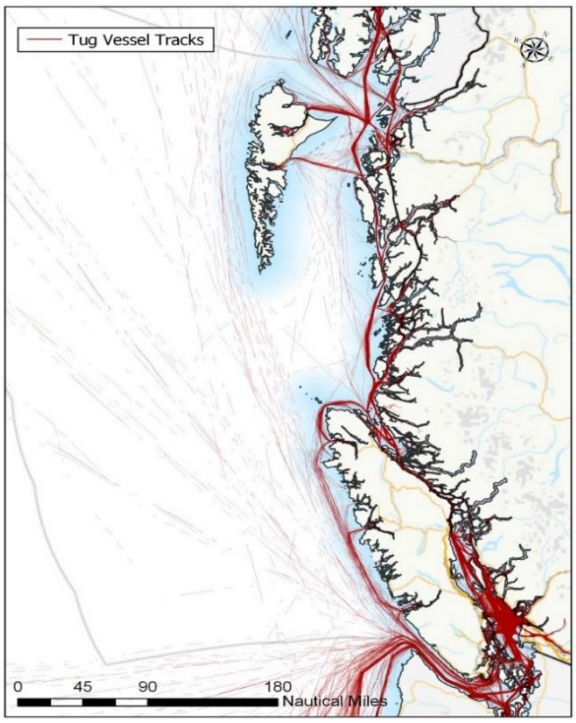


Figure 7 - Passenger Vessel Traffic Source: Coast Guard/TC

Passenger vessel traffic shows two notable behaviours relative to other large vessels. Their frequent use of the Inside Passage and how close they travel to the exposed west coast of Vancouver Island and Haida Gwaii.

[13] https://www.tc.gc.ca/eng/marinesafety/safe-routing-reporting-vessels-4516.html



Tug traffic is clearly concentrated on the Inside Passage, Salish Sea[14] and other sheltered waters where, as will be seen later, it can be an effective risk mitigator. This graphic also shows two good examples of tug traffic that would not have been captured in the Province's study, visible in the two lines going between the mainland and northern Haida Gwaii.

Figure 8 - All Tug Traffic Source: Coast Guard/TC

Traffic Analysis

Large vessel traffic is mostly made up of container ships, bulk carriers, general cargo ships, passenger vessels and tugs while tankers of all types only make up about 6-7% of all traffic. This tanker percentage will increase with the addition of the Trans-Mountain and LNG Canada projects, but they are still unlikely to exceed 10% of the total traffic in the near and mid-term. Liquid Natural Gas (LNG) tankers have been rare on the BC coast but with the recent announcement to proceed with an LNG terminal at Kitimat there will be an increase in the number of these vessels in the future.

Tugs constitute a part of the risk on the coast as they move a large amount of cargo, including petroleum products, along coastal routes and the Inside Passage. Conversely, these vessels also play a large role in risk reduction as they can provide a timely and capable response to many incidents in their operating areas.

The majority of oil movements occur in southern BC through the Strait of Juan de Fuca. This risk is somewhat offset by existing safety systems such as high-level joint US/Canadian vessel traffic management, escort and standby tug requirements, mandatory pilotage and the inherent rescue capacity that can be provided by any vessel in a busy shipping zone.

[14] For the purpose of this report the Salish Sea is defined as the waters between Vancouver Island and the mainland stretching from Campbell River in the north to Puget Sound in the south and the western end of the Strait of Juan de Fuca.

Northern BC has the lowest overall traffic concentrations but lacks many of the safety systems that are present in the south. This area may also see significant growth in large commercial traffic based on the planned projects in the region, some of which include the addition of tug capacity.[15]

EMERGENCY TOWING INCIDENTS

The next step to understanding the risk related to ET is an analysis of incidents beginning with a quantitave assessment done by the Coast Guard/TC data team.

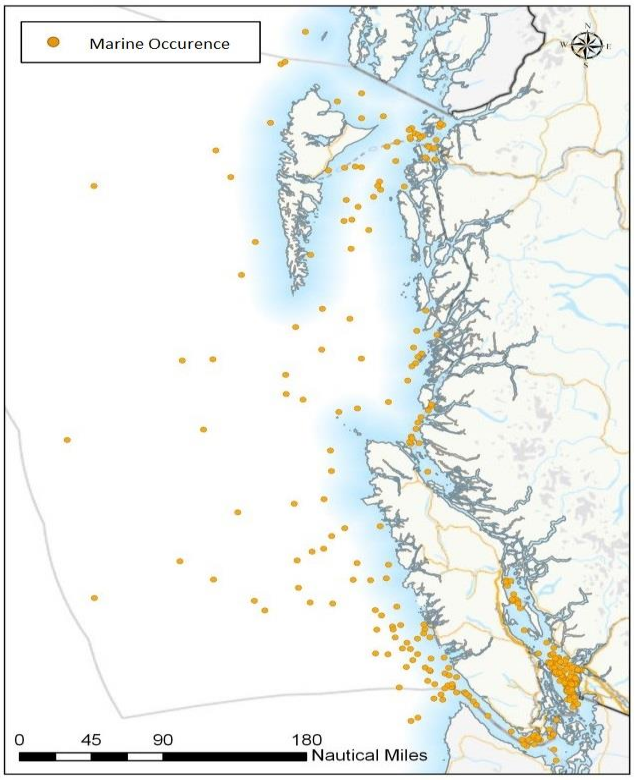


Figure 9 - Incidents from TSB MARSIS database/proxy of risk map
Source: Coast Guard/TC

An examination of available datasets concluded that the Transportation Safety Board's Marine Safety Information System would provide the best data for our purposes. The data from the period 2000-2017 were queried to select occurrence types that could require an emergency tow intervention including: risk of capsizing, collision, grounding, sinking, striking, sustained damage making the vessel unfit for purpose and total failure of any machinery or technical system. This dataset was then filtered to remove any occurrences within 2 NM of the coast due to the low likelihood that a towing vessel would reach and save the vessel prior to grounding[16]. A final filter to remove any vessel below 33 metres was applied to further align the data with the scope of this assessment. The resulting data set is plotted on the map in figure 9 which shows patterns of incident locations and highlights higher risk areas.

Additionally, the literature review found many incidents that provided insight and key factors to consider when assessing ET needs. Select incidents are summarised in the following table which highlights the relevant factors and issues that should be considered in Canada's overall approach to ET. These factors were key drivers for the development of the recommendations in this report. Where available costs were included which show the considerable financial impacts that result when ET is not available or fails to successfully manage a damaged/disabled vessel.

[15] https://www.lngcanada.ca/about-lng-canada/shipping-a-safety-record-to-be-proud-of/
[16] There was debate within the team on this approach as it assumes the vessel could not arrest its drift by anchoring or other means. A consensus was reached that even taking these measures into account, it was most likely that a vessel that starts to drift within 2NM of shore will ground before arrival of an emergency tow in most cases.

Incident Description	Date and Location	Emergency Towing Context	Cost
M/V *Selendang Ayu* Bulk carrier, 225m in length Registration – Malaysia Vessel lost power and grounded after 52 hours adrift and multiple efforts to establish a tow. Resulted in a spill of 336,000 gallons of fuel and diesel with clean up lasting approximately 18 months. Six of the vessel's crew and a USCG helicopter were lost during the incident.	Dec 7th, 2004 Aleutian Islands, Alaska	• The master did not advise USCG of power loss for 15 hours • Three tugs – USCG Cutter *Alex Haley* 80 TBP, *Sidney Foss* 35 TBP and *James Dunlap* 45 TBP were on scene but unable to maintain a tow due to weather and sea conditions • A USCG helicopter was overcome by a wave attempting to rescue the remaining crew members after all efforts to tow were unsuccessful	Approx. $112M[17]
M/T *Braer* Tanker, 241m in length Registration - Bahamas Vessel suffered an engine failure enroute to Quebec from Europe and ran aground despite efforts by local tugs to attach a towline.	Jan 5th, 1993 Shetland Islands, Scotland	• A post incident inquiry recommended establishing a national ET service which was subsequently implemented then reduced in 2011 • Questions were raised around evacuating the tanker's crew too early which may have contributed to the failed attempts to establish a tow	Approx. $172M[18]
M/T *Prestige* Tanker, 243m in length Registration - Bahamas Vessel suffered a hull failure and was taken under tow. Coastal states refused entry to a place of refuge and it broke in two and sank.	Nov 13th, 2002 Off the coast of Portugal and Spain	• Tugs were able to secure a tow line and move the vessel, but states refused entry to a place of refuge and the tanker broke in two and sank on Nov 19th • Oil came ashore in France, Portugal and Spain • The vessel sank in open water due to damage from excessive motion	$1.9 Billion[19]

[17] State of Alaska Press Release – April 27, 2009
[18] House of Commons Transport Committee The Coastguard, Emergency Towing Vessels and the Maritime Incident Response Group Sixth Report of Session 2010–12 Volume I
[19] Maritime-executive.com/article/court-awards-spain-19b-for-prestige-spill

		• This incident was a key driver of the International Maritime Organization's (IMO) subsequent work on places of refuge	
M/V *John 1* Bulk carrier, 183m in length Registration – Panama Vessel suffered a power loss and took on water in ice covered waters Vessel grounded with no significant release of pollutants	Mar 14th, 2014 South Coast of Newfoundland	• The vessel began experiencing problems at 0130 and taking on water around 0320 but did not report to Coast Guard until 0556 • Tug *Ryan Leet* was contracted but took approx. 16 hours to depart • CCGS *Earl Grey* was on scene but could not establish a tow • One towline went into the *Earl Grey's* propeller and was cut • *John 1's* master deferred accepting a tow from *Earl Grey* due to mistaken belief on costs • Vessel grounded and required assistance of 2 tugs and a salvage team to refloat including a Coast Guard ER team on site for the duration of the operation	Unknown
M/V *Simushir* General Cargo/Container, 134m in length Registration – Russia Disabled off BC coast and towed by Coast Guard and contracted tug	Oct 16th, 2014 Haida Gwaii coast of BC	• Marine Communications and Traffic Services officer alerted the Joint Rescue Coordination Centre after noticing the AIS track of the vessel had stopped • CCGS *Gordon Reid* established a tow on the third attempt and was able to hold the vessel until arrival of a tug	Unknown
M/V *New Carissa* Dry bulk cargo, 195m in length Registration – Panama Wreck was dismantled and removed by a salvage team	Feb 4th, 1999 Oregon	• Vessel grounded while anchored and released fuel on the shoreline • Review concluded that a large powerful tug was likely the only capability that could have changed the outcome	Approx. $30M

Mobile Offshore Drilling Unit *Kulluk* Conical Arctic drill rig, 82m in length Registration – Marshall Islands Rig grounded in severe weather after towline parted on Alaska coast	Dec 31st, 2012 Alaska	• The primary towing gear between tug *Aiviq* and *Kulluk* failed • A tow was resumed with secondary equipment and assistance from a second tug, *Alert*, with 150 TBP but the rig grounded in winds up to 55 Kts and seas of more than 6m • The USCG Cutter *Alex Haley* attempted to establish a tow but fouled its prop with the tow line and had to return to port • The probable cause was a failure to adequately assess risk resulting in an inadequate towing plan[20]	Unknown
M/V *Hanjin Elizabeth* Container, 290m in length Registration – Greece Experienced engine failure and drifted for over 33 hours towards Vancouver Island	Feb 11th, 1999 Northwest coast Vancouver Island	• The vessel suffered an engine failure in hurricane force winds and 10m seas • Vessel drifted 100 NM over 33 hours passing the Triangle and Scott chain of islands before a tug arrived • The first tug, *Hunter* from Anacortes, Washington took 20 hours to arrive on scene • The initial tow line parted but the ship was able to get her engines restarted and was escorted by two tugs to Washington	Unknown
M/V *Caria* General cargo ship, unknown length Registration – Liberia Experienced engine failure and drifted for 19 hours passing the northern tip of Vancouver Island	Feb 12th, 1999 Northwest coast Vancouver Island	• The vessel suffered an engine failure in hurricane force winds and 10m seas. • The vessel drifted 41 NM over 19 hours passing 10 NM off the Scott Islands before a tug arrived • The ship was assisted by the Canadian tug *Arctic Hooper*,	Unknown

[20] National Transportation Safety Board Marine Accident Brief Grounding of Mobile Offshore Drilling Unit Kulluk

This incident was concurrent with the *Hanjin Elizabeth* above		which took eight hours to arrive from Tahsis, BC, approximately 80 NM away • It took over 5 hours to secure a towline due to severe sea conditions, allowing only 2 hours to spare before the *Caria* grounded • The vessel was successfully towed to a safe refuge in Hardy Bay, BC	

Table 1 – Incident Summaries

Recent Incidents

Two recent incidents in western Canadian waters highlighted the effectiveness of both the inherent commercial tug capacity and the value of a dedicated ETV.

MOL Prestige

On 31 Jan, 2018 the Joint Rescue Coordination Centre in Victoria received a notification that the container ship *MOL Prestige*, a Singapore registered container ship, had an engine room fire while enroute from Vancouver to Japan. The ship is a 6,350 twenty-foot equivalent unit (TEU), 293m, 72,698 DWT vessel with fuel capacity of approximately 9,000 tonnes. The vessel was in the Canadian area of responsibility, approximately 200 NM southwest of Haida Gwaii with 22 people on board.

SAR aircraft and the CCGS *Sir Wilfred Laurier* were tasked to evacuate the crew and provide lifesaving assistance if required. There were no capable tugs nearby, so the Neah Bay ETV, *Denise Foss*, was contracted by the *MOL Prestige's* owner. The *Denise Foss* was able to establish a tow and both vessels arrived at Seattle on 11th Feb. where the container vessel underwent repairs.

Tug Jake Shearer and Barge

On 26 Nov, 2017, the composite unit tug *Jake Shearer* lost control of its barge loaded with approximately 3,300 tonnes of diesel and gasoline south of Goose Island, Queen Charlotte Sound. A 30 Kt southerly wind and 5 m seas made it impossible for the tug to regain control of the barge but the crew was able to deploy the barge's anchor and hold a position 0.5 NM west of Gosling Rocks.

CCGS *Gordon Reid* and Coast Guard lifeboat *Cape St James* arrived on scene to standby for the safety of the two crew members on the barge. Two US-registered tugs in the area responded, the *Norma H* and *Gulf Cajun,* with the *Norma H* taking the *Gulf Cajun's* barge allowing it to tow the *Jake Shearer's* barge. CCGS *Gordon Reid* and *Jake Shearer* escorted the *Gulf Cajun* and barge safely to Norman Morrison Bay.

Incident Likelihood

The focus of much of the public's concern and some studies specific to BC are centred on a catastrophic release of oil from a large tanker, but all evidence suggests a low and falling probability of this occurring. Tanker incidents have declined globally and are extremely rare in countries, such as Canada, with high

standards and strong regulatory regimes.[21] From an ET perspective, large tankers on the West Coast pose a lower probability of a serious incident compared to other large vessels as they travel on established routes relatively far offshore allowing more time for a response. Nevertheless, the risk of a release from a large tanker will never be zero and it remains higher in areas where tankers approach ports such as the Strait of Juan de Fuca. However, even this higher risk has been somewhat offset for the largest tankers with the use of escort tugs and other safety measures in confined waters.

Conversely, the likelihood of an incident involving other types of vessels, especially cargo ships, is higher simply based on the relative vessel numbers but also because these ships are not subject to the same safety and regulatory regimes that apply to tankers. Therefore, the highest probability of a significant incident on the BC coast is from these general cargo, container and bulk vessels which can carry large amounts of fuel and cargo. Further increasing this risk is the fact that these vessels have no significant restrictions on routing resulting in many sailing relatively close to the coast, decreasing the time available for a towing vessel to successfully intervene before a grounding.

This type of scenario could have a devastating impact on a local area and any nearby coastal community, particularly an Indigenous community that depends on the sea and coast for food, income, quality of life and cultural traditions. The focus on the impact of a large oil spill has also downplayed the pollution that other cargos could cause. For example, a container or bulk ship grounding with hazardous and noxious substances in containerized or bulk forms could have a significant impact on a sensitive or populated area and will be costly and time consuming to remediate. Additionally, the physical properties of these cargos could present challenges to responder and public safety that may not be present when dealing with oil.

Emergency Towing Scenarios

Based on the above analysis, the five likeliest ET scenarios that could occur off the BC coast are:

1. A drifting disabled large cargo or tank vessel at risk of grounding
2. A collision between two large vessels or allision between a vessel and a fixed object in which at least one vessel is disabled
3. A disabled or compromised large vessel in heavy seas in danger of breaking up after a mechanical failure, fire or structural damage
4. A disabled cruise ship or ferry
5. A powered grounding where a vessel drives aground while underway

A capable towing vessel, given enough time, has a reasonable chance of intervening in the first four cases. The disabled cruise ship/ferry is a unique situation as it poses a significant risk to both the environment and large numbers of passengers and crew. An emergency tow is an excellent means of managing both of these risks by precluding a large and dangerous evacuation of thousands of people if the vessel can be safely towed with everyone onboard.

Scenario 5, the powered grounding, is the one type of incident which even a dedicated EOTV cannot prevent. However, in such a case and in all other scenarios, the EOTV can provide a range of other services to mitigate consequences, including rescue and treatment of survivors, remote firefighting, on

[21] A REVIEW OF CANADA'S SHIP-SOURCE OIL SPILL PREPAREDNESS AND RESPONSE REGIME Setting the Course for the Future.

scene/incident command capability and deployment of salvage and pollution counter-measures to reduce impacts on the environment and public safety.

KEY FACTORS TO SUCCESSFUL INCIDENT RESOLUTION

There are key factors that hampered emergency tow efforts in many of the reviewed incidents and studies:

1. Delays in the master notifying authorities of the situation and fully understanding the risks.
2. Delays in identifying available and suitable tugs in the area and dispatching them as soon as possible.
3. Delays in establishing a tow due to issues around costs and authorities.
4. Inability of the responding vessel to establish and maintain a tow due to inadequate towing capability or unsuitable towing arrangements onboard the disabled vessel.
5. Lack of a plan and agreement on a place of refuge.

All of these issues are manageable to a certain degree and the foundation and tools are already in place, in some cases, to make quick progress on interim measures.

Early Awareness of a Potential Casualty

A recurring theme in many incidents is a delay in the master of the disabled vessel notifying authorities resulting in a delayed response and lost opportunity to intervene and affect the outcome. The Aleutian Islands risk study[22] examined sixteen risk reduction options and found that increased satellite and terrestrial AIS tracking of vessels with an alarm system to notify staff of an issue, would be the most effective and efficient option to reduce the severity of incidents. It found that such a system would allow authorities to quickly identify when and where an incident occurs and enable a timelier response.

A good example of the importance of early intervention was seen during the 2014 *Simushir* incident. In this case the Marine Communications and Traffic Services officer at Prince Rupert observed that the vessel's AIS track had stopped and initiated contact with the crew which saved response hours and likely prevented a grounding. It must be noted that this action was not part of the regular duties of the position and would be costly to establish and implement as a job function due to the effort required for continuous, full coastal coverage. This high-level surveillance and alarm function can be done more efficiently and effectively by an automated system as recommended in the Aleutian Islands assessment.

Commercial Tug Situational Awareness

As was seen in several incidents, there is considerable tug capacity on the coast of BC which is capable of preventing or mitigating the impact of a casualty in certain situations. However, Coast Guard incident managers[23] lack full situational awareness of these vessels which is critical for identifying and tasking the nearest suitable tug to provide a timely intervention.

Although Coast Guard situational awareness tools gather and present near-real time information on all AIS-equipped vessels, they presently do not have the capability to present and query enhanced, tug-specific data. Information such as position, course, speed, tug size, bollard pull, and tow status would assist incident managers in identifying the closest and most suitable tug when an incident occurs. The

[22] Aleutian Islands' Risk Reduction Options (RRO) Evaluation Report July 2011.

[23] Incident managers in this context refers to the staff who would normally manage an ET incident specifically a search mission coordinator in a JRCC or a Coast Guard Incident Commander.

existing tracking tools could be enhanced to provide this capability allowing incident managers to quickly identify, assess and task the most effective commercial tugs in near-real time.

Additionally, if collected and stored, this information could be used in future ET risk assessments as it will provide a picture of detailed tug traffic patterns and capability in relation to general ship traffic, EOTV patrol areas and incident locations.

Reaction Times

As with any emergency situation, when a maritime casualty occurs time is critical to a positive outcome. Even the most routine incident can deteriorate quickly with changing weather and other external factors and any disabled vessel is a risk to navigation and collision. Many of the reviewed incidents noted that a quicker response could have resulted in a better outcome and a high state of readiness for ETVs is a key requirement of established services.

There are many factors that influence response times to a vessel in need of an emergency tow. In the best-case scenario a capable towing vessel will be immediately available which, as was seen in the reviewed incidents, is not always the case when relying on tugs of opportunity. This issue is most problematic in open ocean incidents such as the *Simushir*, *Hanjin Elizbeth* and *Caria* when a large, capable tug is required on short notice in a remote location. An established standby posture for ET vessels is one of the best means of ensuring a timely and capable response anywhere on the coast.

WEATHER

Weather has a large influence on probability of an incident and a successful outcome. Weather also plays a role in ET capability as wind, waves and currents affect the forces required to manage a large disabled vessel.

BC's coast has complex and variable weather due to the topography and variations in coastal exposure. Environment and Climate Change Canada's "National Marine Weather Guide – British Columbia Regional Guide", describes the weather conditions that affect large commercial vessels and ET operations, summarized as follows.

Gale force winds are most frequent from October to December. The Inside Passage and inner approaches to Vancouver are sheltered from the extreme winds and high seas that affect the outer coast although, they are subject to outflow and funnelled winds and some of the highest currents in Canada at specific locations.

The outer coast from Neah Bay, Washington to the northern tip of Haida Gwaii and Dixon Entrance is exposed to the full force of the Pacific Ocean and its storms. Most of the Central Coast borders on Hecate Strait which is not exposed to the open Pacific but still is subject to large, wind-driven seas due to the shallow nature and strong currents of the Strait. The highest significant wave height recorded on the West Coast was 14.9 m on southern Hecate Strait and the highest extreme waves were over 30m in this same area.

TOW CAPABILITY AND CAPACITY ON THE WEST COAST

The sections above have provided some understanding of the ET risk that shipping poses on the West Coast. We will now look at the capability and capacity required to manage that risk and quantify the

gaps. Capability refers to a towing vessel's ability to establish and maintain a tow in the prevailing conditions. Capacity, in this context, is defined as the fleet of vessels (mostly tugs) on the West Coast available to provide ET to a large casualty.

TOWING CAPABILITY

There are many factors that determine a tug's suitability for ET such as hull design, endurance, speed, towing equipment and crew competencies, but for the purposes of this assessment we will use bollard pull as the defining parameter. Bollard pull is the measure of a vessel's pulling power, which is key when dealing with the largest vessels in heavy weather and the best measure of an ET capability gap.

To accurately determine the bollard pull required to manage the most likely casualties off the West Coast would require a full technical assessment by a qualified authority which is beyond the scope of this project. However, Clear Seas Centre for Responsible Marine Shipping (Clear Seas) recently completed a study examining the largest ship types and the forces required to manage them in the conditions found on the West Coast of Canada. The assessment, conducted by Vard Marine Inc., was done to provide stakeholders with an understanding of the risks and issues involved in responding to disabled ships. The work focused on the characteristics that make for an effective rescue tug in the environment of Canada's Pacific exclusive economic zone which roughly matches the Coast Guard's planned operating zones for the EOTV's.

Using this methodology, Clear Seas has defined the highest capabilities required to manage the largest vessels which is key in defining any capability gap of the existing tug fleet on the West Coast.

Seven commercial ships, some of which are the largest of their type, were selected for assessment:

Ship Details	Ship #1 Large Container Ship	Ship #2 Very Large Container Ship	Ship #3 LNG Carrier	Ship #4 Vehicle Carrier	Ship #5 Passenger Ship	Ship #6 Bulk Carrier	Ship #7 Aframax Tanker
Type of Ship	Container Ship	Container Ship	LNG Carrier (Q-Max)	Vehicle Carrier	Passenger Ship	Bulk Carrier	Aframax Tanker
Size	14,500 TEU	21,413 TEU	~265,000 m^3	138,000 m^3	~4,000 passengers	221,478 m^3	124,167 m^3
Year Built	2017	2017	2008	2011	2018	2014	2005
Length Overall (m)	366	399.9	345.3	265	329.8	299	249.9
Beam (m)	51	58.8	53.83	32.27	41.5	50	43.9
Gross Tonnage (tonnes)	154,300	210,890	163,922	75,251	167,800	107,054	62,929
Deadweight (tonnes)	153,811	191,422	130,102	41,820	11,700	209,996	115,525
Comment	Largest container ship to call on a Canadian Port (Prince Rupert, Nov 2017).	World's largest container ship, not currently operating in Canadian waters.	Largest LNG carrier identified in "LNG Canada" TERMPOL Review.	MARK V Class is one of the largest vehicle carriers in operation today.	Largest passenger ship to call in Vancouver in 2018.	Currently the largest bulk carrier to call on Canada's Pacific Ports.	Typical of large tankers entering the Port of Vancouver.

Figure 10 - Particulars of ships used in the analysis Source: Clear Seas Centre for Responsible Marine Shipping

Five of these selected vessels currently operate on the West Coast. The exceptions are the two container ships one of which has called at Prince Rupert but the other, the very large container ship, has never traded on the West Coast of Canada. Industry analysts believe that the smaller of the two, the large container ship, will likely become more common on the Trans-Pacific routes in the short to mid-term but it is unlikely that the very large container ships will be present in BC waters in the foreseeable future.[24] With planned expansions at both Roberts Bank (Vancouver area) and Prince Rupert container terminals the capability may exist to receive these very large vessels in the future but this will be subject to variable market forces and shipping company decisions.

The Clear Seas' assessment[25] computed the required bollard pull to manage the seven vessels in five different environmental conditions on the BC coast with the highest, 99th percentile, defined as winds of 33 Kts and seas of 7.8 m. The outcomes can be seen in the following table:

[24] https://www.joc.com/maritime-news/container-lines/13000-teu-ships-be-new-workhorses-asia-us-trades_20170512.html

[25] Emergency Towing Vessel Needs Assessment September 2018 Clear Seas Centre for Responsible Marine Shipping

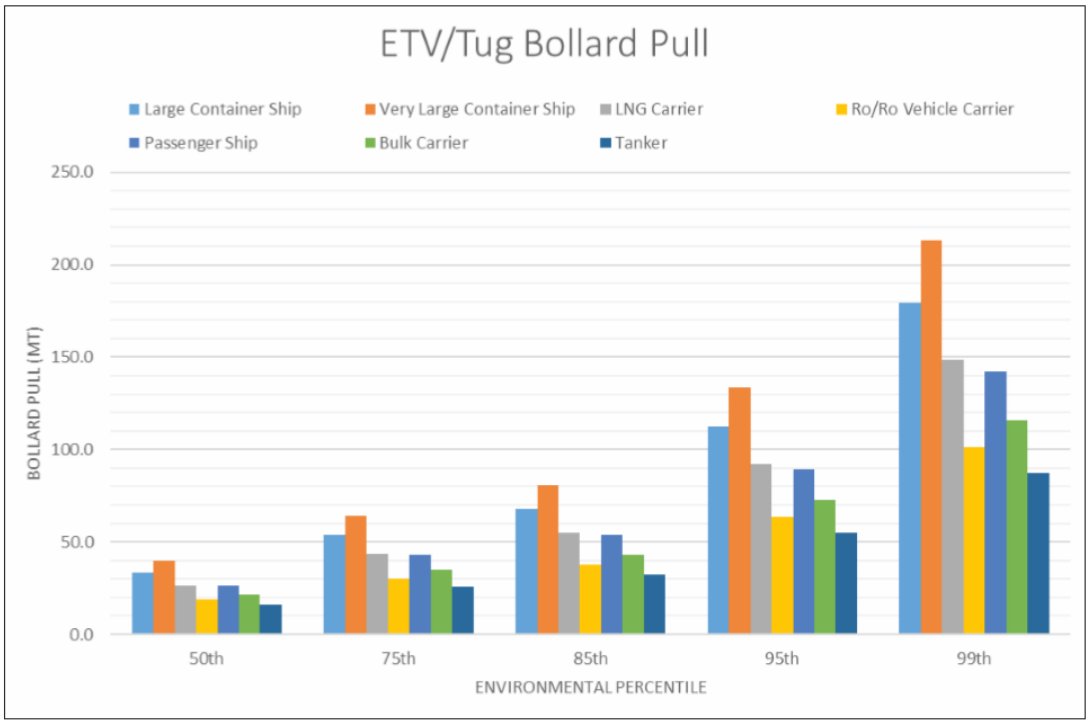


Figure 11 - ETV bollard pull required in response to weather conditions Source: Clear Seas Centre for Responsible Marine Shipping

As can be seen in figure 11, a tug or EOTV with 150 TBP would be capable of managing all present and future vessels to the 95th percentile and all of the vessels presently trading regularly on the coast up to the 99th percentile conditions.

The two largest container ship types, which do not regularly call at BC ports at this time, are the only exceptions and only require over 150 tonnes in the most extreme conditions assessed. In emergency response, it is generally not practical or cost effective to have a single capability for these rare, extreme incidents but instead to have a system and plans to manage them. For example, SAR's worst-case scenario would be the sinking of a large cruise ship requiring the rescue of thousands of people in a short time frame. No single SAR vessel exists that could conduct such an operation; instead, plans are in place to mobilize multiple SAR system resources to manage the extreme demands when these rare incidents occur. It is recommended that a similar approach be taken in the event of an extreme ET incident with plans for the deployment of multiple resources to manage the worst cases. Therefore:

> **150 TBP is the recommended upper bollard pull capability required to manage disabled vessels on the West Coast.**

TOWING CAPACITY

Determining the size of the existing capacity and analysing its distribution and movement patterns will give an indication of the level of coverage available and any capacity gaps. A further assessment of the capabilities of this fleet versus the requirement for up to 150 TBP to manage the most likely large

casualties will allow us to determine if there is a capability gap. Combined, the capacity and capability gaps will allow us to pinpoint areas of highest concern where an EOTV will be most effective.

Canadian Coast Guard

The Coast Guard regularly conducts towing operations during rescue and response incidents as an efficient means of reducing risk to life, property and the environment. Most of these operations involve small fishing and recreational vessels under 33m in the near and mid-shore areas but occasionally there has been a requirement to tow a large commercial vessel with mixed results. The existing Coast Guard fleet will continue to respond and conduct ET where possible, but they are limited by ship design and structure which are not ideally suited to heavy towing operations. Figure 12 shows the general work and traffic patterns of all Coast Guard vessels.

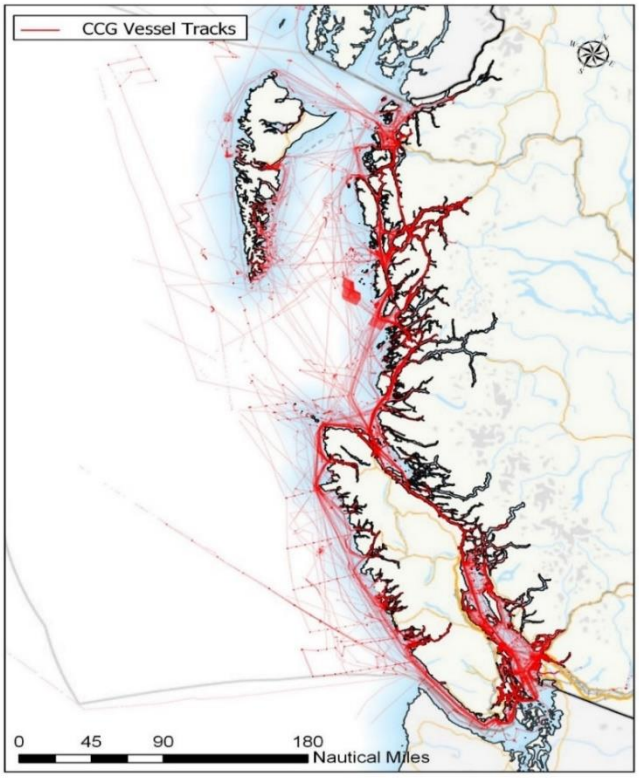


Figure 12 - Coast Guard vessels from Coast Guard coastal AIS, 2015 Source: Coast Guard/TC

Royal Canadian Navy

Royal Canadian Navy (RCN) vessels are capable of ET and regularly respond to emergencies on the Coast, but although larger and more powerful than Coast Guard ships on the West Coast, they are also limited by design and operational demands. The Department of National Defence also has some limited tug capacity in the Esquimalt/Victoria area in support of naval operations. It is expected that both the RCN and its support tugs would continue to respond when required, subject to operational demands.

United States

The State of Washington has established minimum standards for the Neah Bay ETV at the western entrance to the Strait of Juan de Fuca. The present tug, *Diane Foss* which must be underway within 20 minutes of call out, is 40m in length with a speed of 16.8 Kts and 100 TBP.[26] Funding arrangements cover the provision of the "standby service" but vessels in need of assistance must enter into a separate contract for use of the vessel in an ET situation. Despite the lack of a formal agreement, it has and likely will continue to be contracted for incidents in Canadian waters.

[26] https://ecology.wa.gov/Regulations-Permits/Reporting-requirements/Emergency-response-towing-vessel

Commercial Tug Capacity and Capability

As described in several studies and evident in the positive outcome of recent incidents, there is considerable ET tow capacity on the west coast of Canada capable of dealing with large disabled vessels. Although there are no dedicated Canadian resources, commercial towing operators have successfully responded when contracted by owners or ordered[27] under the *Canada Shipping Act, 2001*. Many international studies acknowledge that these tugs can provide an effective response, but they also warn of their limitations to provide a timely and capable response to major incidents.

The Aleutian Islands Risk Assessment project concluded that "that tugs of opportunity alone are not sufficient to reduce the risk of spills from drift groundings."[28] The United Kingdom's North Scotland review[29] also looked at this issue and found that there are no tugs in the North and North West Scotland area that can be relied upon and effectively capable of performing ET operations of the largest vessels visiting the area in open water, gale-force conditions.

There are over 1,200 Canadian and US tugs regularly operating on the BC coast. Some operate in harbours assisting with ship movements and logging operations and others are involved in barge transportation along the coast. Robert Allan Ltd., a Vancouver based company and a world-leading authority on tugs and towing, conducted an evaluation[30] for the Trans Mountain Expansion Project which found that although the number of tugs on the coast is high, there is limited capability for towing large commercial vessels.

A detailed breakdown in Robert Allan Ltd.'s evaluation found that of the approximately 1,200 Canadian tugs in the Pacific Region roughly 1,000 are small, under 15 gross tonnes which would have limited utility when dealing with a large vessel. The next sized group is about 180 tugs between 15 and 150 gross tonnes mostly engaged in coastal towing which we will assume would be capable of providing some level of ET for a casualty in sheltered waters such as the Salish Sea, Inside Passage and adjacent waters where they generally operate. Of the remainder, it concludes there are 32 Canadian tugs over 150 gross tonnes which we will consider capable of assisting a large casualty in an emergency on the more exposed coasts. Additionally, 55 US-based "ocean going" tugs were identified which may be operating in or near Canadian waters and would similarly respond if needed.

Of these more capable tugs, 11 Canadian tugs and 22 US tugs have bollard pulls between 60 and 100 tonnes. Within this group only one Canadian and two US tugs have between 90 and 100 tonnes. Therefore, we will assume that 90 TBP is the highest capability most likely to be available on the West Coast for an ET response. Some of these more capable tugs operate primarily in harbours and a survey indicated that they are based at or regularly operate in Vancouver, Nanaimo, Squamish, Point Roberts and Victoria in the Salish Sea, and Port Alberni, Fraser River, Kitimat and Prince Rupert along the coast. These harbour tugs provide a measure of predictable risk mitigation in and near their homeports. Another segment of this large tug fleet is engaged in barge transportation, principally along established

[27] Canada Shipping Act 2001 Section 180 and CCG DIRECTION PURSUANT TO PARAGRAPH 180.(1)(C) OF THE CANADA SHIPPING ACT, 2001

[28] Estimated Response Times for Tugs of Opportunity in the Aleutians by Nuka Research and Planning Group, LLC.

[29] Assessment of ETV Provision for North and North West Scotland for Maritime and Coastguard Agency 3rd June, 2016

[30] An Evaluation of Local Escort and Rescue Tug Capabilities in Juan de Fuca Strait Project 213-063 Revision 3 November 27, 2013

routes in the Salish Sea, eastern Hecate Strait and Inside Passage. Therefore, it is more likely that a commercial tug would be available to provide timely ET on these more sheltered waters than on the exposed coasts of Queen Charlotte Sound, Haida Gwaii and Dixon Entrance.

CAPABILITY AND CAPACITY GAPS

To identify any gap, we must consider the key need in any ET situation: a capable resource(s) is available to respond, will arrive at a casualty's location and establish a tow within the available time.

Defining the Capability and Capacity Gap

We have established that a towing vessel will require up to 150 TBP to successfully manage the largest vessels in the most likely scenarios on the BC coast. We have also established that the existing commercial capacity on the coast has capability in the 90-tonne range. Therefore:

The capability gap for a single towing vessel is between 90 and 150 TBP.

An argument could be made that a two-tug solution could be used to manage a single large casualty but, as will be seen, many of the largest commercial tugs are based in a port or operate on the more sheltered waters, remote from the offshore areas. This combined with the low numbers of these more capable vessels, unknowns around location and availability and the need for two tugs, means that such a response, relying solely on commercial tugs, is unlikely to be a dependable solution particularly in the exposed coastal and offshore areas. The one possible exception is along the west coast of Vancouver Island where there is a higher concentration of tug traffic and the assistance of the Neah Bay ETV when required. It should also be noted that tandem towing adds complexity especially if the towing vessel crews have limited experience in this type of operation.

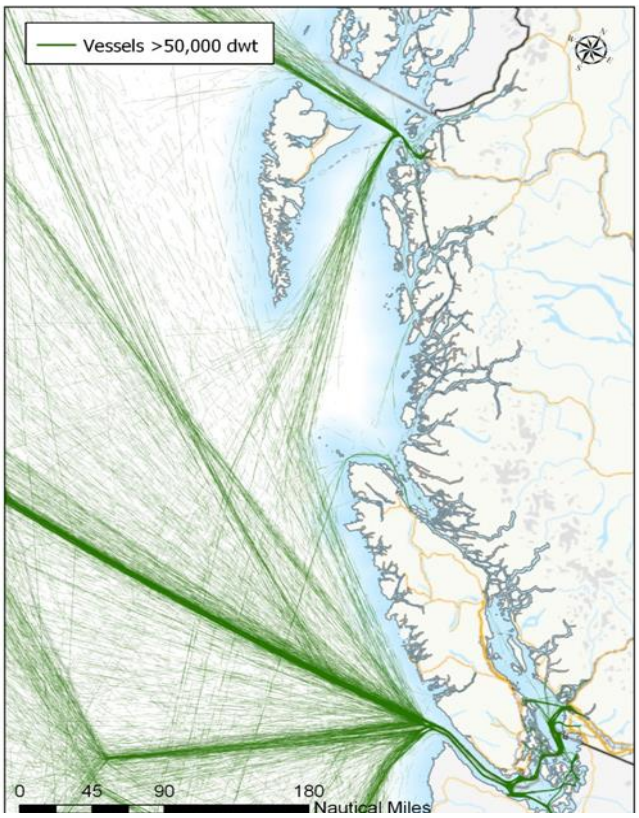


Figure 13 - All vessels over 50,000 DWT Source: Coast Guard/TC

With the quantification of the 90 to 150 TBP capability gap, it is possible to define the most likely areas where a towing vessel with more than 90 TBP could be most effective.

Due to the many variables that affect the forces required to manage a disabled drifting vessel, it is difficult to accurately define the exact size and type of vessel that could exceed 90 TBP. During this review we found no standard formula or simple computation which could provide this type of information. Therefore, an assumption will be made that vessels above 50,000 DWT are the most likely to require a capability greater than 90 TBP. This could be considered a small ship for such forces, which may be the case, but it is prudent to allow a safety factor in the absence of more concrete specifications.

As can be seen in figure 13, this size of vessel is present throughout the exposed coasts of Vancouver Island, Queen Charlotte Sound, Hecate Strait, Dixon Entrance. Therefore, the capability to manage this risk will be required in these areas. Although these vessels are present in the southern Salish Sea it has unique characteristics which will be further discussed in the next section.

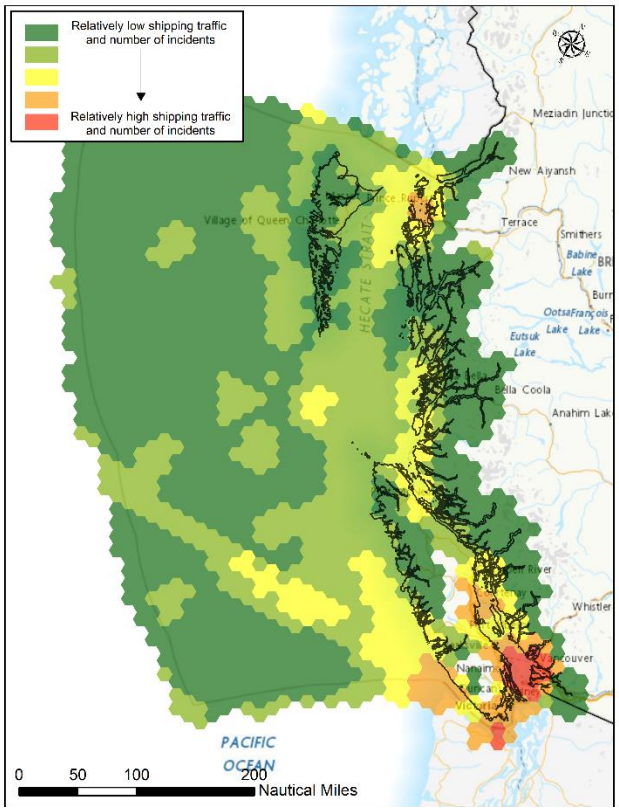


Figure 14 - Incident/traffic heat map Source: Coast Guard/TC

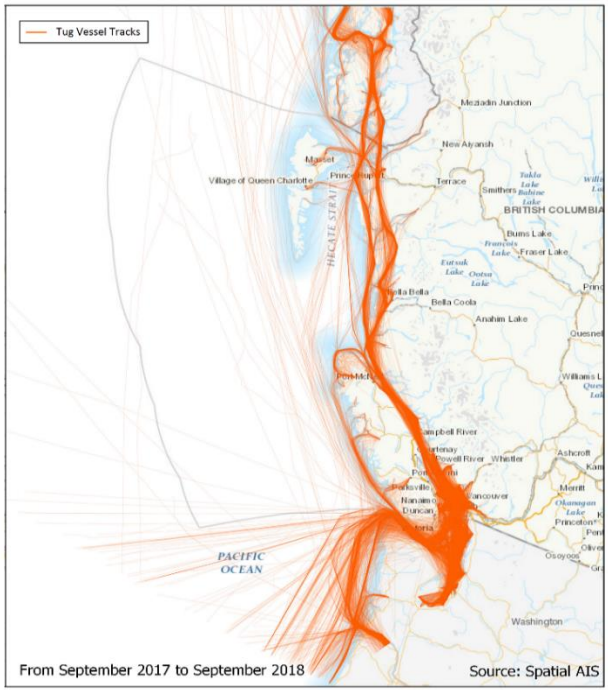


Figure 15 - Major tugs Source: Coast Guard/TC

To further define these higher risk areas and develop recommendations on areas of operation for the leased EOTVs, the Coast Guard/TC data team conducted an analysis[31] comparing traffic and incident data with the existing towing capacity. Their work first analysed and combined commercial traffic with the Transportation Safety Board's incident data (seen earlier in figure 9) and presented them in a heat map in figure 14.

A second map was created (figure 15) showing traffic patterns of the largest Canadian and US tugs identified in Robert Allan Ltd.'s assessment. The two maps were then compared to identify the higher risk areas in relation to the large tug movements.

It is clear in the heat map that the Salish Sea and Prince Rupert are areas of high risk. However, the tug map in figure 15 shows a very high level of large tug activity in those areas which could assist a disabled vessel. There are four additional areas in the heat map that show higher risk; the west coast of Vancouver Island, Queen Charlotte Sound, Hecate Strait and Dixon Entrance. As seen in figure 15, these areas are less well served by major tugs with the exception of the southwest coast of Vancouver Island which also benefits from the presence of the Neah Bay ETV. These four areas

[31] OPP TOWING – DATA ANALYSIS SPATIAL ANALYSIS FOR EMERGENCY TOWING NEEDS ALONG THE WEST COAST OF CANADA

also correspond to the areas of concern identified by many partners and stakeholders in the engagement sessions.

In summary, there is a capability gap between 90 and 150 TBP on much of the coast of BC particularly on the exposed north and central coasts. Although there is a large fleet of tugs that has and will continue to conduct ET, it has limitations. It lacks the bollard pull to manage the largest casualties in heavy weather with only a few of the most capable tugs having bollard pulls in the 90-tonne range, considerably lower than the required 150 tonnes. Additionally, it is difficult to predict and identify where these more capable tugs will be when an incident occurs, and further delays are probable if the tug is already engaged in other towing operations. It is important to note that despite these limitations commercial tugs are still capable of towing even some of the largest vessels in ideal conditions and smaller vessels in most conditions especially in areas where they generally operate. Therefore, it is assumed they will continue to be a key component of any ET system.

CAPACITY AND CAPABILITY GAP ANALYSIS

The Inside Passage is unique from an ET risk perspective as a powered grounding is the most likely scenario. Given that most channels are narrow with steep shores there will be limited opportunity for a crew of a disabled vessel to slow or stop the drift prior to grounding. In these cases, it is questionable whether an EOTV could prevent a grounding unless it was very close and immediately available when the incident occurs. As noted earlier, these channels are also relatively well served by commercial tugs which would likely provide the timeliest response. Therefore, measures recommended later in this report such as enhanced monitoring, stricter requirements for vessels to immediately report a problem and enhanced situational awareness of commercial tug capacity for incident managers will be the best means of lowering the risk on these passages.

The Salish Sea is culturally important to Indigenous People, home of the threatened southern resident killer whales and a large part of the province's population.

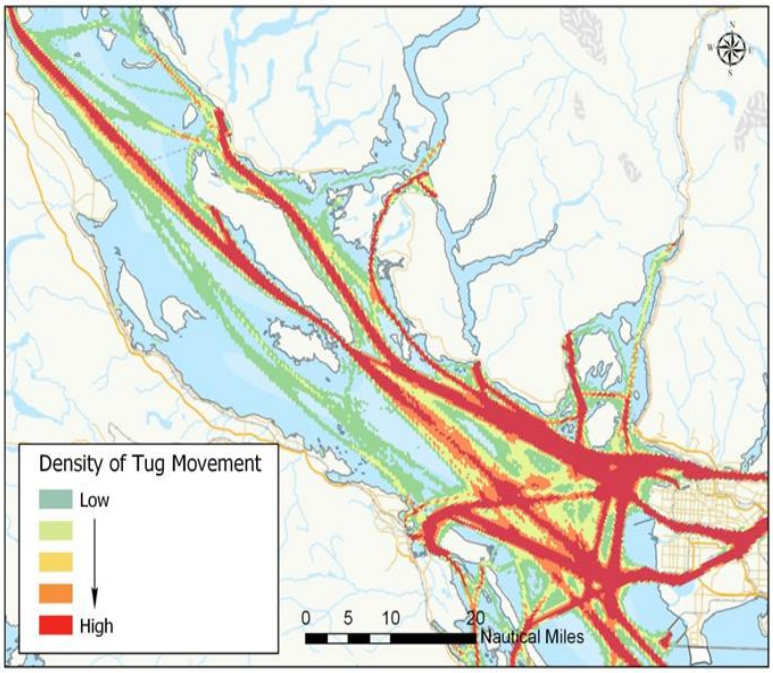


Figure 16 - Tug activity northern Salish Sea Source: Coast Guard/TC

The northern half, which stretches roughly from Vancouver to Campbell River, has a distinctly different traffic and ET risk profile than the southern part. While traffic in the south is mainly large commercial ocean-going vessels going to and from Vancouver and US ports, the northern part is used mainly by tugs and passenger vessels operating locally and, on the north-south trade routes. Although it is a busy strait with considerable risk, it is not as exposed to the extreme environmental conditions seen in the coastal areas and is well served

both in ET capacity and capability. In addition to the 2000+ tug transits per year captured in the traffic studies, there are harbour and escort tugs at Vancouver, Nanaimo and Campbell River that could be called on to respond in an emergency. Fewer large cargo vessels and tankers combined with the shelter from the more severe environmental conditions mean that it will be less likely that a high capability tug will be required in these waters. In exceptional circumstances when this level of capability is needed, a two-tug solution is more likely given the relatively high number of tugs present in the area as can be seen in the figure 16.

The southern portion of the Salish Sea encompasses the Strait of Juan de Fuca to Vancouver corridor which sees about 10,000 large vessel transits per year. Although it has the highest level of large traffic, it does not have the same exposure to the extreme environmental conditions that are likely to generate the higher towing forces more common on the exposed coasts. Additionally, there are strong safety measures in place such as the joint US/Canada vessel traffic management system with full AIS and radar coverage, compulsory pilotage and escort tugs for large tankers and special operating areas at high risk points. However, the level of traffic combined with the navigational challenges and environmental sensitivities have raised concerns among many stakeholders.

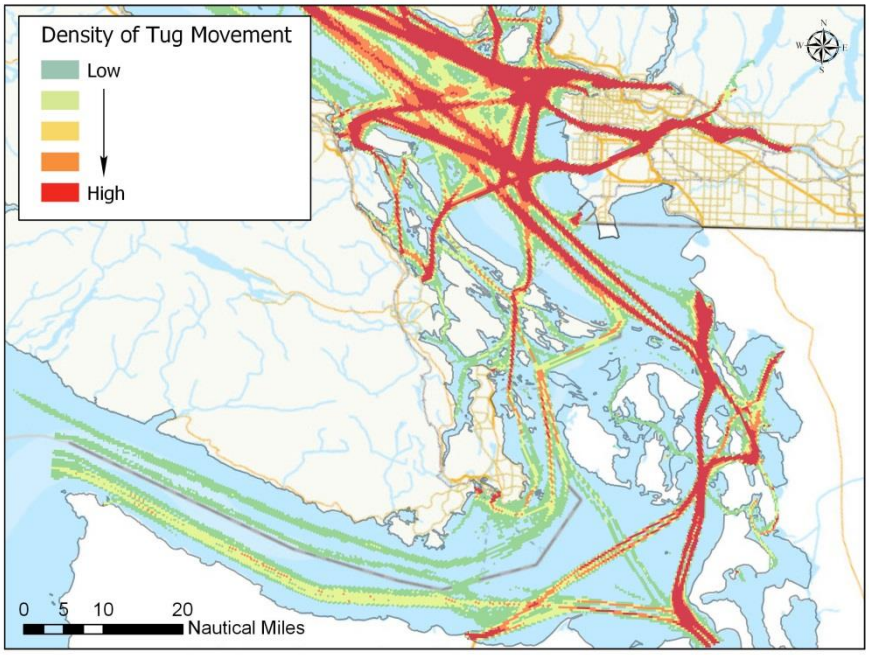


Figure 17 - Tug activity southern Salish Sea Source: Coast Guard/TC

As can be seen in figure 17, this area has in addition to the Neah Bay ETV at the western end, a high level of general tug traffic. It also has the largest harbour and escort tug capacity and capability in the region. These harbour tugs are present in Vancouver, Point Roberts, Nanaimo, Victoria and a number of adjacent US ports.

Within this area, the Boundary Pass/Haro Strait corridor has been identified as especially hazardous for large ships due to the number and size of turns in confined waters, high traffic levels and strong currents. There have been a number of safety and risk studies of this area, one of which recommended stationing an ETV on Haro Strait.

The Pacific Pilotage Authority, using Transport Canada's Pilotage Risk Management Methodology assessed "the Use of Escort Tugs in Haro St and Boundary Pass for Liquid Bulk Vessels, In Product, less than 40,000 SDWT" (summer deadweight tonnage). The final report concluded that a "stand by tug", (another term for an ETV) positioned in the high-risk zone would be an effective risk mitigation solution. Because the original assessment focused on escort tugs and did not fully assess the effectiveness of an ETV in relation to costs and other impacts, a more specific ET risk assessment should be completed before any decision is made. Additionally, further questions were raised around the effectiveness of a

dedicated ETV in this area in the State of Washington's Vessel Traffic Risk Assessment[32]. This study found that "Although a rescue tug stationed in Sidney, BC showed limited effectiveness as modeled in the study, the graphical representations of approximate escort coverage in the report could inform future discussions of rescue tugs."

These assessments show that there is potential for increased ET capacity to reduce risk in this corridor, but a more rigorous and comprehensive assessment will be required to fully understand it. Furthermore, if a risk assessment shows that an ETV is a viable and cost-effective risk reduction measure, there should be a full consideration of all resource options including innovative solutions found in other jurisdictions such as Australia's level 2 arrangements with tug operators. Additionally, the addition of greater towing capacity and capability related to the Trans Mountain project will have an impact on this area as will be explained in a later section.

The Neah Bay tug, which has approximately 100 TBP, will continue to be a key risk mitigator in Canadian waters adjacent to its base at the western entrance of Juan de Fuca Strait. Although its bollard pull is lower than that required to manage the largest vessels, it is still a capable resource that will be able to manage the majority of incidents and at least limit the drift of the largest vessels until the arrival of additional resources. Compared to much of the coast, the availability of additional tugs is more predictable and reliable in the Neah Bay's area with harbour-based tugs in Victoria, Port Alberni and Anacortes, and escort and coastal tugs regularly working in the area. The addition of the Coast Guard EOTVs and the planned capacity related to the Trans Mountain expansion would also provide a measure of redundancy in the Neah Bay ETV's area of operations on both sides of the border.

The remainder of the coast outside of the Salish Sea and Inside Passage encompasses the west coast of Vancouver Island, Queen Charlotte Sound, Hecate Strait, Dixon Entrance and the offshore zone. The combination of large vessel traffic and heavy weather in these areas increases the likelihood of the need for towing capability above the existing commercial tug fleet. These areas also have limited large tug capacity. Therefore, they are the areas in which a large, dedicated EOTV with high bollard pull and seakeeping capability would be most effective.

DEPLOYMENT OF THE COAST GUARD EOTVs

The primary purpose of the Coast Guard's EOTV Project is to charter two vessels to enhance Coast Guard's capacity and capability to assist disabled vessels with the potential to pollute. The two leased vessels, Atlantic Raven and Atlantic Eagle, have bollard pulls in the range of 150 tonnes. Other contractual requirements related to seakeeping, speed, endurance and crewing ensure that the two vessels will be capable of working in extreme oceanic conditions off the coast of BC.

Operational Standby Posture

Although a recommendation on standby posture is not a specific requirement of this assessment, it has been included due to the significance of time in any ET scenario. Coast Guard vessels on primary SAR duty must get underway in 30 minutes or less which is the highest standard for maritime emergency response in Canada. This should be adequate for ET needs and is the recommended posture for the EOTVs to ensure a timely response to all incidents.

[32] 2015 Vessel Traffic Risk Assessment (2015 VTRA) Final Report Summary, Department of Ecology, State of Washington

Recommended Areas of Operation

Coast Guard plans to assign the EOTVs overall areas of responsibility covering roughly the northern and southern halves of the BC coast and offshore areas. To maximize their effectiveness and fill existing gaps, this assessment will define and recommend optimal primary patrol zones within those areas of responsibility.

It is understood that maritime risk is very dynamic and there will be times when another tasking, such as SAR or public safety will take precedence. Therefore, these recommended areas should not be considered directive or limiting in any way but only as references for operational planning and deployment to manage ET risk. Given the limited likelihood that an emergency tow vessel will prevent a grounding on the Inside Passage, the proposed patrol areas will focus on the exposed coastal waters. This does not imply that they should not respond in sheltered waters and in fact it is assumed that an EOTV will be tasked and take all reasonable actions when Coast Guard is alerted to a maritime casualty anywhere on the West Coast of Canada and adjacent waters.

In order to make valid recommendations on EOTV operating areas based on existing resources, it is necessary to make three assumptions:

1. The Neah Bay tug will remain at its present location and continue to respond in Canadian waters.
2. That an agreement will be established to formalize a Canada/US mutual assistance arrangement in each country's adjacent waters. Therefore, the Neah Bay tug will be available to cover the majority of risk in the Strait of Juan de Fuca and approaches supplemented by the Coast Guard EOTVs.
3. That other tow resources such as commercial tugs and Coast Guard vessels will respond when available and safe to do so as part of an ET system.

The recommended patrol areas for the leased EOTVs are within their respective areas of responsibility (figure 1) on the central and northern coasts, specifically:

The southern vessel's patrol zone should cover:

- Queen Charlotte Sound
- North and west coastal areas of Vancouver Island from Port Hardy to Ucluelet.

This will allow the vessel to provide a timely response to traffic in these areas and assist with incidents on the Strait of Juan de Fuca approaches if required.

The northern vessel's patrol zone should cover:

- Dixon Entrance
- Coastal areas of western Haida Gwaii
- Hecate Strait

This will allow the vessel to provide a timely response to large vessel traffic on Dixon Entrance and Hecate Strait and off the west coast of Haida Gwaii.

Both vessels will still be capable of responding to incidents in the offshore zone within their assigned areas of operation. They will also be capable of providing a level of redundancy if one is tasked to a remote location or in the event of an extreme incident requiring capability beyond a single EOTV.

OTHER EMERGENCY TOWING NEEDS AND ISSUES

The focus of concern and recommendations from many of the GC's partners and stakeholders has been to increase emergency tow capacity and capability to manage shipping risk. However, a broader safety management system approach can provide other options to manage some of the risk.

ET ARRANGEMENTS ONBOARD COMMERCIAL VESSELS

Establishing a connection between a towing vessel and a casualty is generally the most difficult and dangerous part of any towing operation. It requires the tow vessel to maneuver in close quarters, usually in rough seas, and exposes crews to danger as they must operate on open decks with heavy equipment in dynamic conditions. The crew onboard the casualty will likely have little or no experience with towing and, in the case of a foreign vessel, language differences may further complicate and lengthen the process.

This issue was recognized and addressed by the IMO resulting in new requirements in the International Convention for the Safety of Life at Sea (SOLAS) for installation of ET arrangements capable of withstanding extreme forces on every tanker of not less than 20,000 DWT. This equipment can be deployed quickly by the casualty's crew to simplify hooking up and maintaining an emergency tow with minimal delay and risk for both crews. Additionally, in the case where a crew must abandon a casualty before the arrival of the towing vessel, this equipment can be easily predeployed to ensure that a towline can be connected and maintained when the towing vessel arrives on scene.

The Aleutian Islands Risk Assessment concluded that expanding the requirement for this type of equipment beyond tankers could be an effective risk mitigation measure, but it is unknown if it was further considered at the federal or international levels. The topic has been discussed at various IMO sessions and it was agreed in 2006 that a procedural solution was preferred over adding this type of equipment for non-tank cargo vessels.[33] Given the increased size and risk from the largest non-tank vessels today and time passed since the IMO decision, the idea of expanding equipment requirements beyond tankers merits further consideration.

LARGE VESSELS AND DISTANCE FROM SHORE

In the traffic analysis maps it was clear that large vessels travel relatively close to shore because it is generally the shortest and most economical route. This practice raises the risk of pollution when a vessel is disabled as there will be less time available to get the vessel under tow before grounding. The following two analyses examined this issue and show how critical distance from shore is to a successful outcome in an ET situation. It also highlights how this issue could have a significant impact on the level of ET resources needed to cover a given area.

[33] IMO SUB-COMMITTEE ON SHIP DESIGN AND EQUIPMENT 49th session Agenda item 20 DE 49/20 8 March 2006 REPORT TO THE MARITIME SAFETY COMMITTEE and IMO GUIDELINES FOR OWNERS/OPERATORS ON PREPARING EMERGENCY TOWING PROCEDURES

Clear Seas Vessel Drift and Response Analysis for Canada's West Coast

This Clear Seas' study presents the risk of a vessel adrift versus response times. It shows that the further a disabled vessel is from shore directly correlates to an increase in likelihood of a successful intervention by an ETV.

The analysis looked at seven scenarios ranging from a single towing vessel at Neah Bay to several with three dedicated ETVs, which represent the conditions when the two Coast Guard leased vessels are operational.[34] The assumptions in the study are generally conservative with vessel reaction times assumed to be up to two hours unless the ETVs are at sea and transit speeds up to 10 Kts. The Neah Bay tug has a 20-minute standard and the Coast Guard EOTVs will likely be 30 minutes.

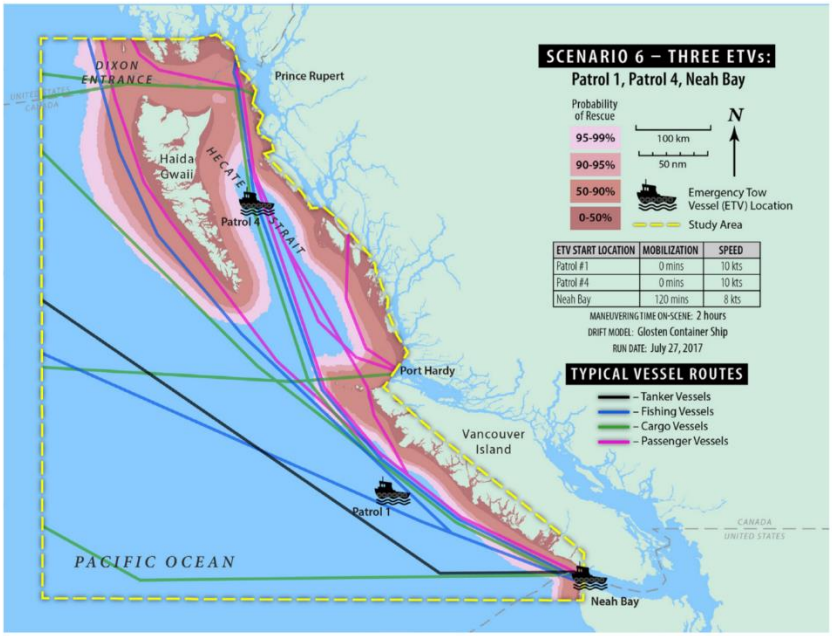


Figure 18 - Emergency tow vessel scenario with typical traffic routes Source: Clear Seas/Nuka Research

Scenario six, in figure 18, shows that three dedicated vessels can mitigate much of the risk. But it also shows when an incident occurs far from the ETV the more likely there will be inadequate time for it to intervene. For example, in this scenario the west coast of Haida Gwaii and Dixon Entrance have relatively large areas of low probability of a rescue (mauve shaded areas) which overlap with existing traffic routes. This is an indication that even in a three ETV scenario the risk may be above a reasonably practical level if traffic patterns remain unchanged.

[34] Vessel Drift and Response Analysis for Canada's Pacific Coast - March 2018 Section 3.1 Scenario Analyses

Coast Guard Drift Predictions

To supplement Clear Seas' work, the Coast Guard's CANSARP program was used to predict a vessel's drift in high risk areas along major shipping routes using near best-case and near worst-case scenarios.

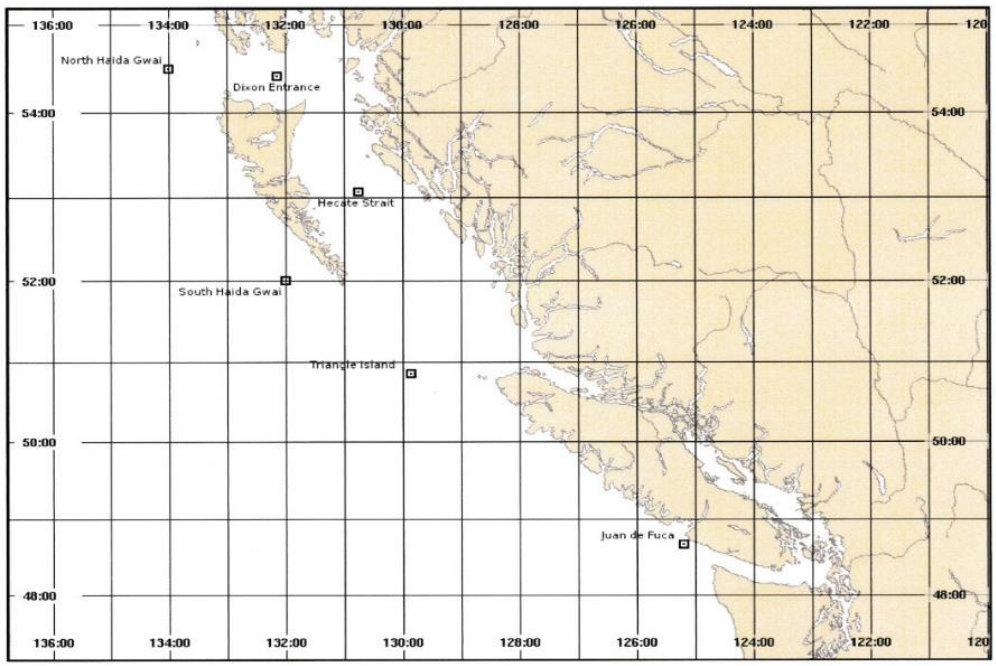
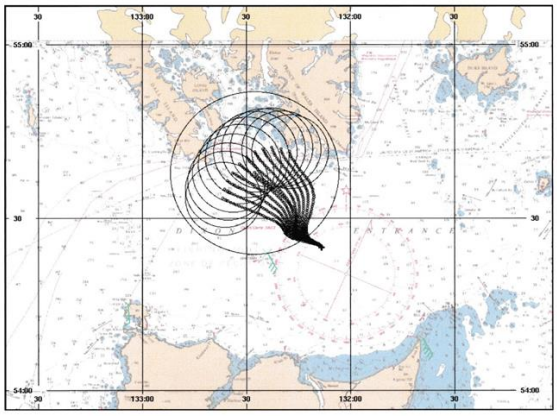


Figure 19 - Cansarp drift locations

CANSARP uses interpolated high-resolution winds downloaded daily from the Canadian Meteorological Centre and applies current models specific to each area. The locations selected for the model drifts are noted on the map in figure 19. Each location has four associated drifts using two drift rates (3% and 9% of wind speed), two of which use actual winds on January 15th, 2018 as a typical winter scenario and two that use a hypothetical wind of 30 Kts blowing directly onshore. This hypothetical wind is an arbitrary input to show a near worst case but, in reality is a low probability. It is also assumed this wind would blow consistently over the duration of the drift period which is unlikely in most cases. Drift times to grounding varied from 1.5 hours in a worst-case scenario at the "Juan de Fuca" location to 72+ hours for a best case at the "Hecate Strait" location.

A sample of the outputs of the four scenarios at the Dixon Entrance location are shown below. The tracks emanating from the single start point (**+**) in the middle of the Entrance are the likely drift tracks of a disabled ship under wind and current influences spread out over the angle of divergence a ship may drift. The series of smaller circles are the areas of highest probability to contain the drifting vessel. The drift time is not an absolute, but an estimate based on the time that the centre of one of the small circles likely reaches shore or shoals assuming that the vessel is likely to be at any point in the small circle.



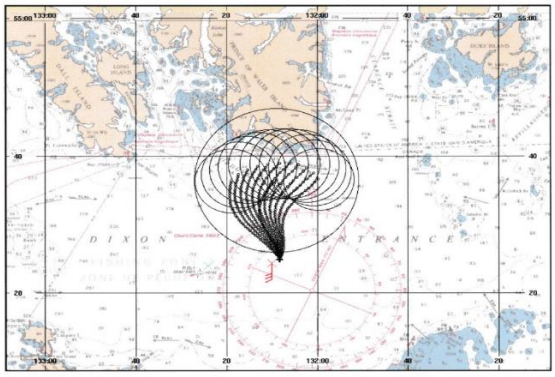
Leeway: 3% of wind speed.

Wind: Actual wind on Jan 15, 2017

Drift time to grounding:

16 hours

Figure 20 – Dixon Entrance Cansarp drift 1



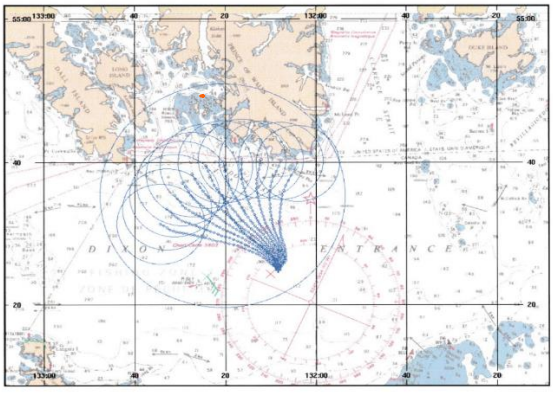
Leeway: 3% of wind speed.

Wind: Artificial - Southerly @ 30 Kts

Drift time to grounding:

8.5 hours

Figure 21 – Dixon Entrance Cansarp drift 2



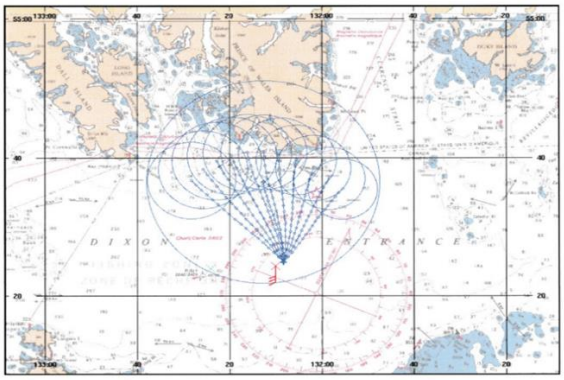
Leeway: 9% of wind speed.

Wind: Actual wind on Jan 15, 2017

Drift time to grounding:

8.5 hours

Figure 22 – Dixon Entrance Cansarp drift 3



Leeway: 9% of wind speed.

Wind: Artificial – Southerly @ 30 Kts

Drift time to grounding:

4.25 hours

Figure 23 – Dixon Entrance Cansarp drift 4

It is clear in both the Clear Seas' and Cansarp drift analyses that a disabled vessel could ground even in some cases when an EOTV is within 8 hours (128 NM at a speed of 16 Kts in good weather and 64 NM at a speed of 8 Kts in heavy seas) of the casualty. Note: 8 hours is used as an example only. It is possible that drift time could be less, and it does not include time to establish the tow. Figure 24 shows an example of these distances (small circles are 64 NM and large circles are 128 NM) from a single point within each of the recommended EOTV patrol areas.

Figure 24 - 128 NM and 64 NM radius from possible ETV locations

Assuming other potential delays such as late reporting of a problem or delayed towing vessel departure are not factors, the only remaining significant and controllable time variable is the disabled vessel's distance from shore. Although moving traffic further from shore and hazards has limited application in narrow channels, there are areas where it may be possible to implement some measures and potentially reduce the risk of a grounding.

The IMO has recognised the value of traffic measures to improve maritime safety[35] and has incorporated them into SOLAS and related regulations, providing states with options that suit their particular requirements. Available measures include two-way routes, recommended tracks, deep water routes, precautionary areas (where ships must navigate with particular caution), and areas to be avoided. These types of measures have been implemented in other jurisdictions such as

[35] http://www.imo.org/en/ourwork/safety/navigation/pages/shipsrouteing.aspx

Australia's east coast and Alaska as a result of the Aleutian Islands Risk Assessment's work[36]. Given this, there is reason for Canada to further investigate their application in certain areas.

Two examples of specific areas where such measures could make a difference can be seen in figures 25 and 26 showing all cargo vessel tracks (orange) and those over 50,000 DWT (green) which pose the largest risk and greatest gap for ET. The first set of maps in figure 25, depicts vessel tracks on the west coast of Haida Gwaii and on Hecate Strait and Queen Charlotte Sound and show that many large vessels take routes, particularly on southern Hecate Strait that pass closer to shore than others. The second pair of maps in figure 26 shows the traffic patterns off the west coast of Vancouver Island and clearly shows similar behaviour with some vessels using routes that pass closer to shore than others on a similar course.

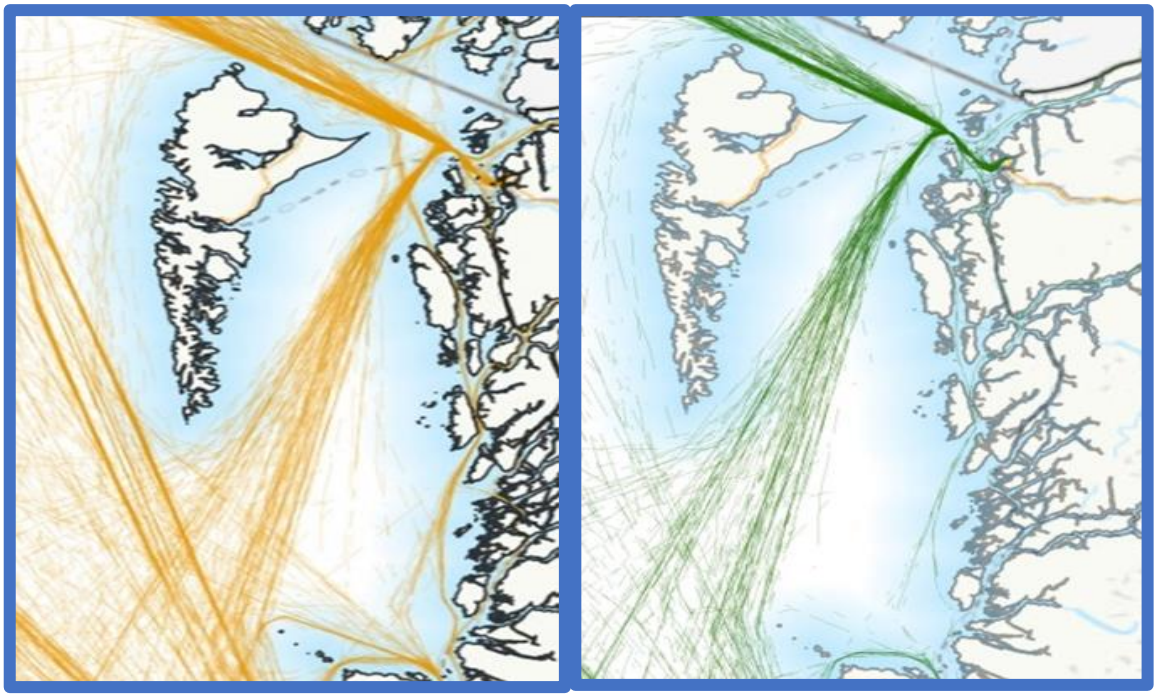


Figure 25 - All cargo vessels and all vessels over 50,000 DWT Dixon Entrance, Haida Gwaii and Hecate Strait Source: Coast Guard/TC

[36] http://www.imo.org/en/MediaCentre/MeetingSummaries/NCSR/Pages/NCSR-2nd-Session.aspx

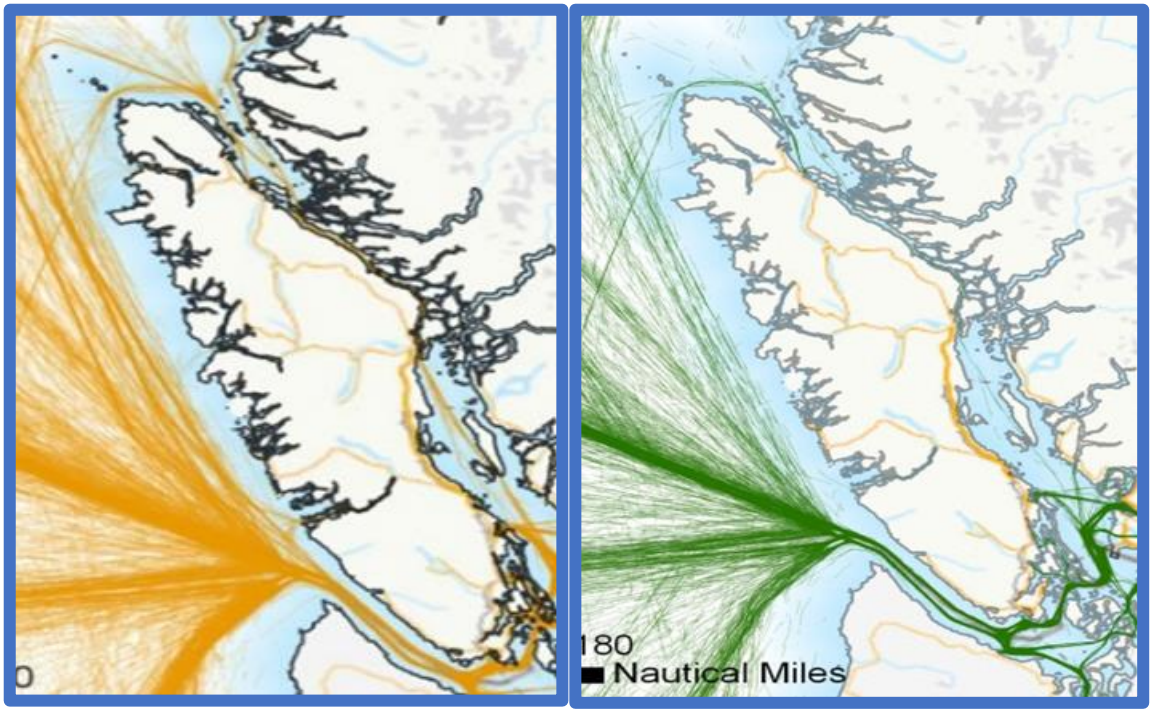


Figure 26 - All cargo vessels and all vessels over 50,000 DWT west coast Vancouver Island Source: Coast Guard/TC

This is a superficial analysis and there may be valid reasons for these vessels to use the apparently higher risk routes. Nevertheless, the observations in both of these zones make a case for further review and determination if measures to alter ship's behaviour are a reasonable means of increasing the available time to prevent a grounding.

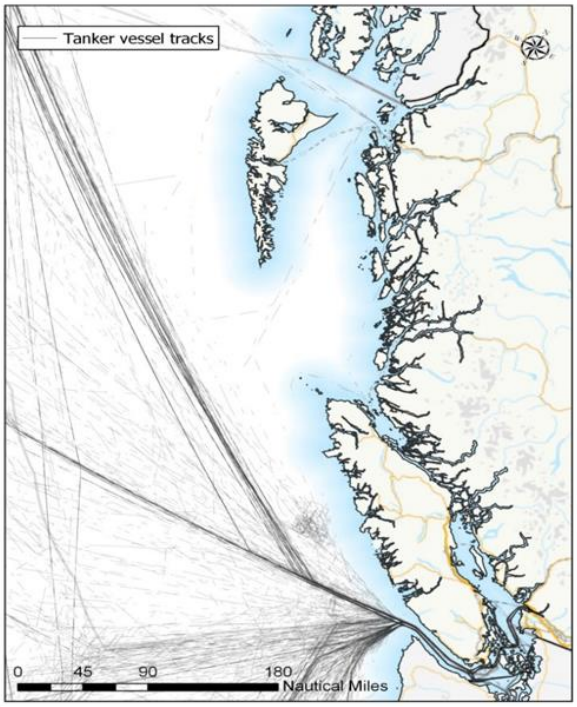


Figure 27 - Tanker traffic Source: Coast Guard/TC

Increasing a vessel's distance from shore could also have an impact on the number of costly, dedicated resources. When large vessels take routes close to shore the higher risk of grounding due to limited drift time is spread along the entire coastline. This results in a requirement for high capability, dedicated resources to cover the entire area to ensure an adequate response will arrive on scene within the limited available time.

To understand this concept, we can look at the effects of the voluntary tanker exclusion zone in figure 27. The exclusion zone keeps tankers far from shore until they approach the Strait of Juan de Fuca. This results in more available time to intervene before a disabled tanker grounds along most of the coast. This effectively reduces the need for dedicated resources to cover the risk. For example,

it is possible that one large dedicated emergency offshore tow vessel could provide a timely response to any tanker incident along most of the coast.

Because there are no similar measures for other large vessels, the higher risk is spread along the entire coast. If all other factors remain unchanged, the result is a requirement to manage unpredictable risk over a larger area which will likely require a higher level of resources. Therefore, the distance that vessels travel from shore has an impact on risk and resources greater than any other factors identified in this assessment. This makes a strong case for further assessment and implementation of traffic management measures.

PLACES OF REFUGE

A place of refuge is defined as a place where a ship in need of assistance can take action to stabilize its condition and reduce the hazards to navigation and protect human life and the environment. A suitable place of refuge is key to resolving a maritime casualty, but it can be a sensitive and complex issue to manage and, balance the interests of the federal government with local stakeholders.

Transport Canada is responsible for the development and implementation of the places of refuge contingency plans and is developing new plans for the West Coast of Canada. As Coast Guard's role in ET grows, the importance of a coordinated approach grows with it and it is imperative that Coast Guard and TC collaborate closely in the development of these plans and their effective application.

The existing plans foster a cooperative approach among stakeholders including Coast Guard when determining a place of refuge. However, Coast Guard's responsibility within them is directly related only to its pollution response mandate with no mention of ET. With the deployment of the leased vessels it will be necessary to review the Places of Refuge Contingency Plans, both nationally and regionally, with TC to ensure the plans reflect operational and jurisdictional realities.

ENGAGEMENT

Engagement with partners and stakeholders was key to understanding the concerns of the people who will be affected by any gaps in ET and their views on risk and mitigation measures. A broad range of groups was engaged including governments, Indigenous Peoples, industry and NGOs. Groups and individuals were given opportunities to provide input through questionnaires and face-to-face sessions. International bodies were also contacted with responses received from Norway, Germany and France.

The engagement was multi-faceted and flexible to fit the needs of stakeholders and ensure that diverse opinions were gathered and considered. In addition to the questionnaires, the team participated in TC OPP Engagement sessions, Canadian Marine Advisory Council meetings and held face-to-face meetings and teleconferences where possible.

Respondents raised many issues that lead to further research and had an impact on the findings and recommendations within this report. Examples include traffic levels and distance from shore, the importance of capable vessels in high risk areas and the opportunities to leverage existing ET capacity. Responses specific to risk and EOTV operating areas informed the data analysis and confirmed the findings which were key in finalizing the recommended patrol zones for the vessels. A full summary of engagement responses from Canadian and foreign partners and stakeholders is in Appendix B.

IDENTIFYING LONG TERM OPTIONS FOR EMERGENCY TOWING IN CANADA

In the past, the West Coast of Canada has relied on an ad hoc and opportunistic approach to ET which was heavily reliant on commercial tugs. This assessment has shown that this approach is no longer adequate to cover the evolving risk, and the GC is taking interim measures to address many of the gaps. Several measures already discussed such as the "ET system concept", if adopted, will lay the groundwork for an effective and efficient long-term strategy.

Transport Canada's ongoing assessment will look at options for longer-term service provision and there are many models worth considering. Some examples were found when reviewing existing services in other jurisdictions and others were raised by partners in engagement sessions.

Industry Funded and Operated Service

As there is no longer a viable market for commercial salvage tugs, the Government would need to apply an incentive for industry to create such a service. The most likely incentive would be a legislative/regulatory one requiring the maritime industry to fund, manage and operate an ET system. An example of this type of model already exists in Canada where the offshore oil and gas industry is required under the Canada Oil and Gas Drilling and Production Regulations to maintain support craft in the field at all times.[37] Another example of a regulatory incentive is the Neah Bay tug that was implemented as a Washington State government funded service in 1999. Later, legislation was introduced that required US vessels over 300 gross tonnes, tankers and tank barges to provide funding to cover the vessel's standby costs. In the event of a casualty, the stricken vessel's owner is responsible for response costs which subsidize the overall vessel operating costs.

Government Funded and Operated Service

In this option, the federal government would most likely establish an ET program as a mandated and resourced activity within the Canadian Coast Guard. The service could be provided using specially designed new Coast Guard vessels or through ongoing charter of existing vessels from industry at least in the near to mid-term.

Hybrid Models

There are other options using combinations of the above. An industry funded/government run model in which regulated industry levies or user fees subsidize a government-based program like the existing marine services fees for icebreaking and navigation services. Another possible mechanism for funding such a public private model is increasing the scope and funding model of the Ship-source Oil Pollution Fund (SOPF) which currently exists "to pay for claims for oil pollution damage or anticipated damage caused by the discharge of oil from all classes of ships on inland or coastal waters, including the exclusive economic zone of Canada".

The opposite of the industry-funded, government-supplied service is a government-funded, industry or community supplied model. This could take the form of grants or contributions to a commercial, non-profit or NGO entity to manage and provide a service under a service level agreement (SLA) with the federal government.

[37] Canada Oil and Gas Drilling and Production Regulations (SOR/2009-315) Part 9

Both of these options will require amendments to legislation and/or regulations that would require further analysis and in-depth consultation with stakeholders if selected for further consideration.

Another hybrid concept worth further examination is the Australian approach, which in addition to one dedicated emergency tow vessel, leverages existing tug capacity with an investment in training and operations to ensure a dependable response when required. Australia has noted that the existing harbour tug capacity generally aligns well with the risk of large commercial vessel traffic patterns due to the fact that the tugs exist in ports used by these vessels. Fiscally, this approach has obvious advantages as the capital, human resource and general operating costs are not borne directly by the taxpayer. Conversely, there are drawbacks to it from an operational perspective. Tug designs are becoming increasingly specialised for specific functions such as escort, ship handling and barge operations resulting in limitations in their versatility. These limitations will be most apparent in the specialised harbour and escort tugs which seem best fitted to this model. In major ports, these vessels generally have the equipment and power to manage the forces generated by a large commercial ship, but other design components such as propulsion systems, hull form and towing configurations could limit their capability to effectively tow a large vessel in open water and heavy weather.

FUTURE WEST COAST TRAFFIC, CAPACITY AND RISK TRENDS

One of the tasks of this assessment is to determine "future needs and gaps for emergency offshore towing capacity on the West Coast of Canada, including the shipping conditions that may trigger a need for additional tow capacity". This section will look at short, mid and long-term factors that could affect ET needs on the West Coast. There are many broad changes underway from regulatory and technological innovation to climate change and shifts in global economies, all of which could have an impact on shipping on the Pacific Ocean and western Canadian waters. Although the requirement was specifically to look at conditions that could require additional tow capacity, there is evidence of pending improvements in technology and fuel trends that could also result in a level of risk reduction in the long term.

Risk Context on the West Coast of Canada

As was seen earlier, traffic is varied and present throughout the coast which at face value could indicate a high probability of a significant incident especially on the busiest routes with large ships. But Canadian and international studies and statistics show that incident rates have been dropping globally and incidents involving tankers, which would have the greatest public safety and environmental impacts, are extremely rare especially in developed countries with strong safety systems such as Canada.

There are many studies by government, academia and international bodies that provide evidence of this trend. The Transport Canada Tanker Safety Panel's "Risk Assessment for Marine Spills in Canadian Waters Phase 1, Oil Spills South of the 60th Parallel" found that the risk of large spills in Canada is so low that it had to use worldwide data, including that from weaker safety jurisdictions to obtain measurable statistics for medium and large spills. Clear Seas Centre for Responsible Marine Shipping's "Commercial Marine Shipping Accidents: Understanding the Risks in Canada" found that the total number of maritime shipping accidents involving solid cargo vessels and tankers has been declining since 1998.

Further context on risk can be found in two international studies[3839] which note that risk concerns generally focus on tankers but cautioned of the higher probability and potential impact from large cargo vessels that carry large amounts of fuel and dangerous cargo. These vessels are also not subject to the same standards in construction, inspection and industry self regulation as tankers, which have been key factors in declining incidents in this sector. This caution around likelihood and impact of an incident involving a non-tank ship was echoed in the Province of BC's 2013 traffic study[40] which found that the largest cargo vessels on the coast can carry up to 12,000m^3 (approx. 10,700 tonnes) of persistent fuel oil.

Planned Canadian Capacity and Capability

There are projects which, if they proceed, will expand or create new shipping terminals on the BC coast. Although much of the focus has been on the increased risk due to increased traffic, two of the most advanced, Trans Mountain in the Vancouver area and LNG Canada in Kitimat, will also increase ET capacity as conditions of their regulatory approval.

The potential impact that these types of projects can have on overall risk can be seen in the tug and escort requirements for the Trans Mountain Expansion Project. The map in figure 28 shows existing tanker escort and pilotage requirements in comparison to the new requirements specified in the National Energy Board's conditions.

[38] Assessment of ETV Provision for North and North West Scotland for Maritime and Coastguard Agency 3rd June, 2016

[39] TOW FORCES FOR EMERGENCY TOWING OF CONTAINERSHIPS, Vladimir Shigunov DNV GL and Thomas E. Schellin DNV GL

[40] West Coast Spill Response Study – Volume 2 Vessel Traffic Study.

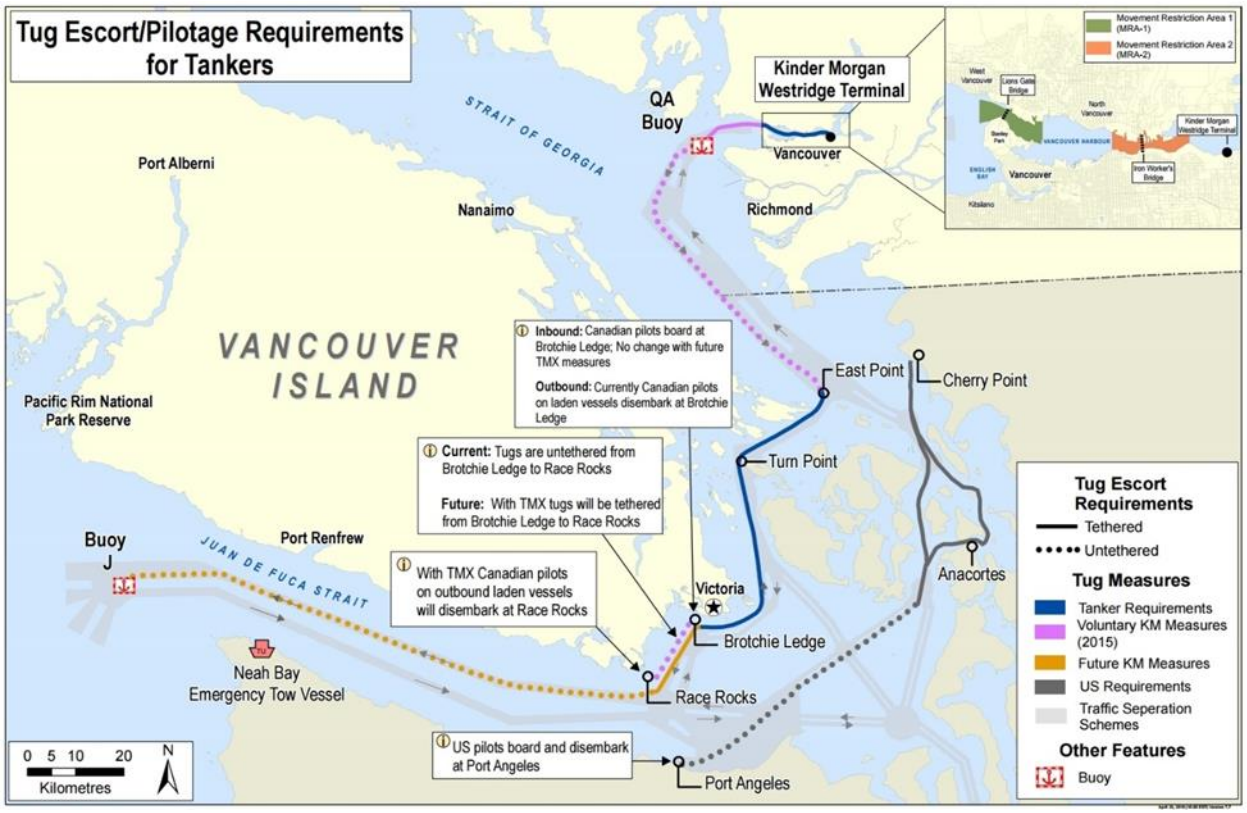


Figure 28 - Tug escort/pilotage requirements for tankers Source: TC

The most significant operational change is the extension of tug escorts for laden tankers from the terminal in Vancouver along the entire transit to Buoy J at the mouth of the Strait of Juan de Fuca. To meet these requirements, the project will likely have three tugs available. At least one of them will be in the 110 TBP range and capable of open ocean rescue in winter conditions at the western approaches to the Strait of Juan de Fuca. The other tugs will likely be more escort specific with a lower bollard pull in the 80-tonne range, which is still in the upper end of existing capability.

Based on the planned daily departure of a loaded Trans Mountain tanker, there will be at least one large, capable tug on the Vancouver – Juan de Fuca transit everyday. This will add valuable capacity and capability on this busy shipping route. When fully implemented, these measures will not only reduce the risk from the tanker traffic, they will also provide a level of safety for all commercial shipping, although with some limitations on the escort tug's availability. To understand their potential impact, we will consider three likely emergency scenarios where they could be called on in their area of operations:

1. All tugs are secured at a base with no tanker commitments – in this case a quick response is probable as these vessels will likely maintain a high state of readiness to support tanker operations
2. A tug is enroute to or from an escort in which case it would likely provide an immediate response

3. A tug is actively escorting a tanker which is the most problematic situation requiring a relative risk assessment in real time. The USCG has examined this type of scenario and developed procedures which could provide a template for a Coast Guard approach[41]

Therefore, there is the potential for these tugs to respond to a disabled vessel in any scenario in the Salish Sea and adjacent waters.

Although not directly related to ET, many of the other NEB conditions and risk mitigation plans for the Trans Mountain project such as navigation practices, traffic deconfliction and pilot training will also have an overall positive impact on ET risk through development and application of best practices across all vessel types and operations.

The tug component of the Trans Mountain project will not only reduce the risk around the increased tanker traffic it will also result in significant risk reduction for all types of shipping in this busy corridor. Given the low probability of a significant tanker incident and the relatively higher likelihood of an incident involving a non-tank vessel, it is reasonable to conclude that the Project will be a net ET risk mitigator for all shipping in the Salish Sea and Juan de Fuca corridor. This is not a new concept. On the East Coast the offshore oil and gas industry has resulted in an increase in large towing vessel capacity that has successfully responded to numerous ET incidents. The most recent was the tow of the disabled container vessel *Yantian Express* by the St John's based *Maersk Mobiliser* in January 2019.

[41] Puget Sound Harbour Safety Committee – Harbour Safety Plan June 2017. Page 105 Section B9

Another Trans Mountain related project is Western Canada Marine Response Corporation's (WCMRC) spill response expansion in southern BC. The planned deployment of this new capacity can be seen in figure 29.

Figure 29 - Planned WCMRC Capacity Source: WCMRC

The larger vessels planned for this project will have tow capability and may be available for ET like any vessel under orders from Coast Guard or TC, although in this case there will need to be consideration of impacts on any concurrent spill response.

The most significant planned addition is a large offshore tug type vessel (likely similar to the Coast Guard leased vessels) which will fulfill WCMRC's operational and regulatory requirements to transport response equipment and store recovered oil. While WCMRC does not intend to use this vessel in a towing role, it will likely have significant tow capability and will be well positioned at its base in Victoria in relation to other resources, such as the Neah Bay ETV and commercial tugs at Point Roberts and Vancouver. Given this vessel's ET potential, location and readiness posture it presents an opportunity for the GC to consider an innovative and potentially efficient arrangement with WCMRC to add ET capacity in this area.

The LNG Canada export terminal at Kitimat in northern BC, which is expected to begin operations by 2025, has a similar risk mitigation approach to Trans Mountain. Their plans include escort tugs with 92 TBP that will accompany vessels along much of the route between Triple Island in the Dixon Entrance area and Kitimat.[42] This project will likely provide the ancillary benefits similar to those of Trans Mountain in an area that is less well served with other ET resources and safety systems.

[42] Termpol Review Process on the LNG Canada Project First Edition 2015

Ship Size

Some reviewed studies raised concerns about increasing commercial vessel size and the capability of ET vessels to manage them. Recent analyses have shown that container ships have seen the greatest growth, and that Vancouver and Prince Rupert are two of the few ports on the west coast of North America capable of receiving the larger vessels. Despite this growth, the recommended 150 TBP specified earlier, combined with the recommended ET system approach should be adequate to manage the largest vessels that could be present on the West Coast for the foreseeable future.

Conversely, any growth in ship sizes could have a more positive effect on risk i.e. an increase in the number of large vessels could result in fewer overall vessel numbers and the likelihood that larger vessels will better withstand extreme weather resulting in a corresponding reduction in likelihood of a casualty. Additionally, if large vessel routes become focused on fewer ports the associated risk would be more spatially concentrated and predictable therefore possibly easier to mitigate with fewer resources.

Ship Emission Regulatory Changes

There is work underway to address the public health concerns related to sulphur oxide emissions from vessel exhaust. These changes are already having an impact on traffic on the west coast and pending regulations could further alter patterns by 2020.

The IMO will implement international standards for low sulphur fuel for all vessels over 400 GT in 2020 which will apply to most non-US, foreign commercial vessels calling at BC ports. Ship owners can comply by selecting one of three available options: convert to low sulphur fuel; install exhaust gas scrubbers or; convert to LNG fuel. The LNG option will likely have limited short-term effects due to high capital costs and limited supply infrastructure. Although adoption rates of the other two options are still unclear, owners must choose and implement one by 2020 which will likely have an impact on traffic patterns on western Canadian waters in the short term.

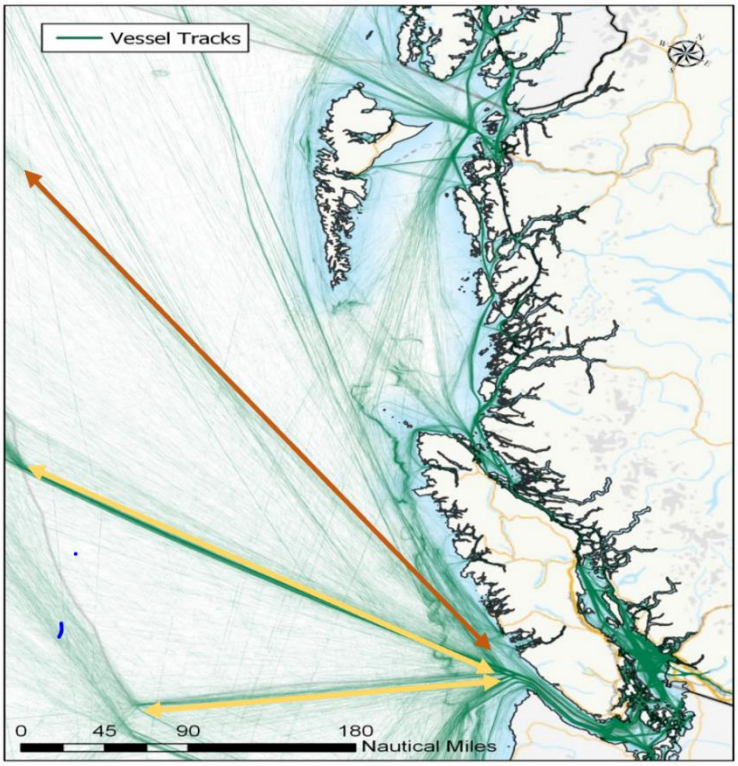


Figure 30 - Great circle routes Source: Coast Guard/TC

Canada and the US enforce a North American Emission Control Area (NAECA) requiring ships to burn a very low sulphur fuel (lower than the pending IMO 2020 standard) when sailing within 200 NM of the coast south of 60N. Prior to NAECA, vessels could take the more economical, direct great circle route (red arrowed line on figure 30), closer to shore, and burn the cheaper fuel for the entire voyage.

NAECA changed this pattern. Many trans-Pacific and Alaska bound vessels from both US and Canadian ports now proceed directly to and from 200 NM (marked with yellow arrows on figure 30), before taking a great circle course, and switching to the lower cost, high sulphur fuel. This behaviour is a good example of an unintended consequence of an environmental measure and acts as an effective ET risk reducer due to most vessels moving directly away from the coast and the risk of grounding. Any vessel that opts to burn the new IMO low sulphur fuel in 2020 will not comply with the higher NAECA standard, and will likely continue to go 200 NM offshore before altering course.

Vessels that install scrubbers will comply with the NAECA standard and likely revert to the more economical (red arrow) route resulting in more ships from both Canadian and US Ports passing closer to the BC coast by 2020. In the longer term, with the forecast expansion of low sulfur LNG there will likely be further increases in this trend and resultant risk.

Technological Change

There are significant technological changes underway that will have impacts on shipping and risk. Two technologies, autonomous ships and alternative fuels, are already operational and it is likely the maritime industry will further adopt them as progress accelerates.

Automated piloting is being implemented across all modes of transportation mainly for two financial reasons: it can reduce risk and corresponding insurance and compensation costs; and it will provide savings in operating expenses with the removal or reduction in the number of crew members and related salaries, travel, accommodation and training costs. The reduction in reliance on crews to pilot vessels should reduce the impact of the largest causal factor in maritime casualties - human error.[43] There are many autonomous ship projects underway. Two of the most advanced include the world's

[43] Human Error and Marine Safety Dr. Anita M. Rothblum U.S. Coast Guard Research & Development Center

first commercial automated ship[44] which is in the design and construction phase and the Port of Rotterdam's autonomous tug project.[45]

The second innovation, alternative fuels, is also being widely implemented including the West Coast of Canada, where BC Ferries is installing LNG propulsion on existing and new builds and researching the use of electricity and other alternative fuels.[46] In addition to LNG, the development of high-efficiency batteries with falling production costs is fostering growth in hybrid and all electric vessels with several already in service on short routes.[47]

Alternative fuels could have a significant impact on maritime risk in several ways. Many alternative energy sources will replace oil-based fuels and reduce the environmental impact from a fuel spill during a maritime casualty. Additionally, if there is a general reduction in the use of oil-based fuels then it is likely that there will be a reduction in the amount of oil that will be transported. The timeline and rate that this will occur is difficult to predict due to complexity of the large-scale variables such as energy market economics, pace of climate change and the related government polices. However, most experts forecast a long-term falling demand for oil which is supported by changes already evident in widely available market analyses and consumption data[48].

Large scale changes like this always have unforeseen and unintended consequences making it even more difficult to predict the impact on shipping and risk. For example, it is possible that alternative systems such as large-scale battery manufacturing or another related emerging sector such as deep-sea mining for rare elements used in new fuels could result in activities and trends that could pose new maritime hazards. Another consideration is the risks related to responder and public safety that some alternative fuels such as LNG introduce. These will have to be monitored and managed in any future safety system.

Climate Change

Climate change is already affecting shipping, particularly in the polar regions, and will have more impacts in the future. The most obvious impact is an increase in severe weather events as forecast by the GC[49], which could increase the likelihood and severity of maritime casualties.

Another less apparent impact is climate induced changes in maritime traffic which may affect the numbers and behaviour of vessels transiting western Canadian waters. The growth of Arctic shipping routes is one change which has the potential to alter global shipping patterns as noted in recent reports:

> "the amount of shipping using the North West and Northern Sea could account for 2% per cent of global traffic by 2030, and 5% percent by 2050."[50]

[44] Automatedshipsltd.com
[45] https://www.maritime-executive.com/article/remote-controlled-fi-fi-tug-makes-debut-at-rotterdam
[46] BC Ferries – Fuel Strategies Update Report June 2016
[47] Oilprice.com – China Launches World's First All-Electric Cargo Ship
[48] MARITIME FORECAST TO 2050 Energy transition outlook 2018 DNV GL
[49] https://www.canada.ca/en/environment-climate-change/services/climate-change/impacts.html
[50] Marine Climate Change Impacts Partnership – Impacts of climate change on ports and shipping

> "Although the expected timelines for a significant increase in traffic is currently unclear and growth should not be overstated, increased marine traffic in the Canadian Arctic is already a reality … over the past 10 years, the Canadian Arctic has seen vessel traffic more than double."[51]

Any change in the Arctic shipping routes at either the Canadian Northwest Passage or Russian Northern Sea Route will likely have an impact on routes, numbers, types and sizes of vessels off the West Coast of Canada. Shorter polar routes are being considered by owners now reliant on the Panama Canal, but it is difficult at this point to understand or forecast how this will affect traffic trends off the BC coast. Therefore, ongoing analysis and risk assessment will be required to understand their impact on ET and implement appropriate mitigation measures.

Global Economic Influences

The Asian economies are growing which has increased shipping to and from North America to provide raw materials to the lower cost Asian manufacturing sector and then return the products to the North American market. However, there are large scale changes underway, particularly in China, which will likely have an impact on shipping patterns. First is the Chinese government's strategy to shift its economy from a reliance on manufacturing for export to a more domestic consumer and service based one. This will likely result in significant changes in export and import patterns and shipping between Asia and North America.

The second and possibly greater impact will be from its "One Belt One Road"[52] initiative which is investing billions of dollars to expand its transportation links with Eurasia and Africa including a new Arctic Northern Sea route. There is no equivalent to increase trans-Pacific trade and it is likely that one of the goals of this strategy is to reduce China's reliance on trade with North America. If this is the case, it is possible that this focus on Asia and Europe will result in a slowing of growth or a reduction in trans-Pacific shipping to and from China and North American ports.

The final factor that could affect trans-Pacific shipping patterns is the expansion of automation in North American manufacturing which could diminish the Asia's low labour cost advantage and result in more manufacturing relocating to North America. If this trend grows it will have an impact on vessel traffic in both directions as fewer raw materials would need to be shipped to Asia and fewer finished products returned.

Managing Complex, Long-Term Uncertainty

In the short term there will likely be changes in traffic patterns off the BC coast that will increase risk due to vessels passing closer to shore and overall increases in traffic due to global economic growth. But it is unlikely that this will require capacity beyond three ETVs (Neah Bay included) and the enhanced ET system described earlier in this report. This capacity can effectively deal with at least three concurrent incidents which is unlikely even if traffic levels increase.

In the mid and long-term, even if there is a significant increase in traffic on the West Coast, there are other changes such as automation and alternative fuels that could offset increases in risk. Therefore, as the pace of climate and technological change and global economics shifts and quickens, a flexible risk management strategy will be required on the part of the GC to understand changing risks and ensure efficient and effective service delivery. The one factor that could require an increase in capability in the

[51] 2018 Pilotage Act Review Pages 95/96
[52] https://www.ft.com/content/0714074a-0334-11e7-aa5b-6bb07f5c8e12

mid-term is the increasing size of vessels which will likely require a review of towing capability within 5 years to ensure it continues to be adequate.

The present strategy of leasing EOTVs to fill an immediate gap allows flexibility in response to unforeseen changes in risk. It also permits Coast Guard to adjust contract parameters to acquire new technologies when they become available such as alternatively fuelled vessels or improved towing equipment technologies. In the unlikely case of a significant risk reduction in the short-term, the nature of the contract also provides the flexibility to cancel or reduce the capacity.

The significant shipping and economic changes underway will likely have wide and deep long-term impacts on maritime risk which will be difficult to understand, assess and mitigate without a systematic approach. Shipping forecasts can be unreliable, the pace and scope of change is increasing, and existing metrics will not be accurate predictors of future risk. This uncertainty could result in ineffective and inefficient use of capital-intensive resources such as dedicated EOTV's, or the application of risk mitigation measures with costly unintended consequences. To avoid this, a strong and comprehensive ET risk assessment and management strategy will be required.

OTHER ISSUES FOR CONSIDERATION

This report has generally focussed on the advantages of an ET service but there are issues with increasing ET capacity and capability that should be considered.

Cost

Any level of dedicated service will be costly, particularly if it is assessed on a "value per incident" basis as there will likely be few incidents requiring a dedicated, large towing vessel. The Aleutian Islands Risk Assessment scrutinized its proposal for an ETV more than any other option for this very reason.

Another cost factor is the level of commitment needed to maintain crew competencies due to the low number of incidents. This will require significant investment in an extensive training program to establish and maintain crew certification and proficiency in a specialised training field not widely available in Canada. Exercising these skills could also be expensive as it will require the hiring of large "casualty" vessels unless agreements can be negotiated with owners to provide a vessel at low or no cost.

Finally, in the absence of national policies and frameworks it will be difficult to determine relevant service standards and effectively measure performance. This will in turn make it difficult to effectively allocate resources and determine accurate costing to deliver an ET service. Additionally, the lack of a formal risk assessment process has potential costing implications as risks may be managed when they become glaringly apparent during an unforeseen disaster scenario and decisions made based on factors other than risk. This is most likely to happen after a large incident when subjective factors and emotion, in the absence of evidence, can heavily influence costly decisions.

Stakeholder Interests and Risk

There are two potential risk issues that should be considered in the implementation of any mandated ET service.

First is the possibility that stakeholders could take greater risks such as sailing in marginal weather, delay reporting a problem or take a riskier route knowing that an EOTV is nearby and available. This is a well documented concept known as risk homeostasis[53].

The second relates to regulatory risk mitigation measures imposed on shipping such as escort tugs and compulsory pilotage which can be costly and provide no immediate return. Stakeholders may attempt to leverage the presence of EOTVs to reduce some of these measures and related costs. Another possibility in this vein is stakeholders advocating for the repositioning of ET resources to manage their specific risk at the expense of overall regional risk mitigation. It is important to note that there was no evidence found of this type of activity during this assessment and the above examples are possibilities only for GC to be aware of. These issues can be identified and managed with awareness and coordination among responders, regulators, policy makers, partners and stakeholders.

CONCLUSION AND RECOMMENDATIONS

This needs assessment was initiated as a first step in identifying and addressing gaps in ET capacity on the West Coast of Canada. The specific objectives were to identify current and future ET requirements, gaps and potential mitigation strategies to inform the way forward. This was principally done through a review of available literature and engagement with stakeholders and partners, supplemented by a high-level data analysis. This work has identified gaps in capacity and capability leading to the development of recommendations to address issues in the short term and inform future work.

Although there is considerable tug capacity on the BC coast capable of ET, this fleet's operating patterns result in ET gaps in specific areas. The central and northern coastal zones including Haida Gwaii, Dixon Entrance, Queen Charlotte Sound and northwest Vancouver Island are the areas most lacking in tug capacity. This gap increases the probability of a disabled vessel grounding or sinking before an emergency tow arrives and therefore the areas where the two leased Coast Guard EOTVs will be most effective.

With respect to capability, there are tugs on the coast with bollard pulls up to 90+ tonnes but studies have shown that the vessel types and sizes trading on the coast will require tugs with bollard pulls up to 150 tonnes. This is a significant gap that will be addressed in the short term with the addition of the leased EOTV's with bollard pulls in the 150 tonne range. This gap will require a more permanent solution in the long term as the factors that affect capability, large ships and bad weather, will be present for the foreseeable future.

Because it is difficult to predict the time and place that an ET incident will occur it will be costly to establish dedicated resources to cover all of the risk. There is considerable existing and planned tow capacity on the coast capable of resolving many incidents. This capacity should be leveraged through the development of an ET system concept and creation of a regional ET working group to identify best practices for leveraging and deploying available resources where practical. The analysis and adoption of best practices from other jurisdictions, such as Australia, could further enhance capacity through the innovative use of commercial tugs as key components of an ET system

Time is one of the most important factors to the success of an ET operation. There are a number of ways of increasing available response time such as: reducing delays in Coast Guard becoming aware of a

[53] https://safetyrisk.net/risk-homeostasis-theorywhy-safety-initiatives-go-wrong/

large vessel in need of assistance; improving situational awareness of towing resources; improving emergency tow equipment onboard large vessels; and altering traffic patterns. These are relatively cost-effective measures when compared to dedicated EOTV's and should be implemented as alternative risk mitigation measures where appropriate.

Future shipping trends and the resulting ET risk will be affected by many factors from global economics and climate change to technology and automation and large-scale shifts in oil and sustainable fuel consumption. These factors are complex and some have impacts that could both raise and reduce risk simultaneously. This complexity will require the application of an appropriate risk assessment methodology to understand the impacts and develop effective and efficient mitigation measures.

The OPP has resulted in significant investment in ET. This level of investment will require clear and measurable service standards and performance measures to ensure effective and efficient service delivery and accountability.

RECOMMENDATIONS

EMERGENCY TOWING CAPACITY AND CAPABILITY

There is a gap in the capability of the existing towing fleet to manage large vessels in the environmental conditions present in the area, especially on the exposed coasts. This capability gap will be addressed in the short term with the addition of the Coast Guard's two leased EOTVs which have adequate bollard pull and other characteristics suitable for ET operations on the exposed coasts of BC. The two vessels will also fill much of the largest capacity gap on the coast, but a full risk assessment will be required to understand the level and type of capacity that will be required to cover all of the future risk throughout the coast.

Dedicated EOTVs are expensive and are not required in all situations especially where there is capable tug capacity. The development of an enhanced ET system that leverages existing and future commercial towing resources will provide effective and efficient mitigation options and responses for many scenarios.

Recommendations

1. The GC develops a long-term risk-based strategy that will provide incident managers with access to sufficiently high capability, high readiness ET capacity on the coast of BC.

2. The GC adopts and develops an ET system concept supported by a regional working group for emergency tow resources using public, private and other emergency tow capable vessels to efficiently manage risk.

3. The GC considers establishing a mutual assistance agreement with the US to ensure there will be joint, dedicated coverage on the Strait of Juan de Fuca and southwest coast of Vancouver Island and adjacent US waters.

4. The GC engages Western Canada Marine Response Corporation and major project proponents on the use of their planned towing resources in an ET role.

5.. The GC enhances situational awareness tools for incident managers to provide near real time tug position and vessel data, such as contact information, bollard pull, speed and tow status, to facilitate locating, assessing and deploying the most suitable commercial tug during an incident.

EMERGENCY OFFSHORE TOW VESSEL PATROL AREAS

As described in the body of the report these recommended areas are not directive but intended to optimize planning and deployment of the dedicated vessels to manage existing risk as part of a larger ET system.

Recommendations

The recommended patrol areas for the leased EOTVs are within their respective areas of responsibility on the central and northern coasts, specifically:

6. The southern vessel's patrol zone should cover:
    - Queen Charlotte Sound
    - North and west coastal areas of Vancouver Island from Port Hardy to Ucluelet.

This will allow the vessel to provide a timely response to traffic in these areas and assist with incidents on the Strait of Juan de Fuca approaches if required.

7. The northern vessel's patrol zone should cover:
    - Dixon Entrance
    - Coastal areas of western Haida Gwaii
    - Hecate Strait

This will allow the vessel to provide a timely response to large vessel traffic on Dixon Entrance and Hecate Strait and off the west coast of Haida Gwaii.

RESPONSE TIME

Due to the length of the BC coast, limited resources and unpredictability of the location and timing of incidents, the Coast Guard needs as much time as possible to recognize, assess and manage a maritime casualty to maximize the probability of success.

Large vessels pass close to the BC coast increasing the likelihood that a disabled vessel will drift aground before an emergency tow vessel can get it under control. There are internationally recognized measures designed to mitigate this risk and there is already evidence of the effectiveness of this form of risk control with the voluntary tanker exclusion zone.

There have been incidents where the master of a vessel in the Canadian area of responsibility has not immediately advised Coast Guard when his vessel is experiencing a problem resulting in lost response time. The reasons for this are beyond the scope of this assessment but could include weak penalties, lax enforcement or simply that the problem has not previously been highlighted and examined. It is an issue that is important enough to merit further study and rectify where possible.

Despite any new reporting requirements there will likely still be cases where a vessel will not immediately report a problem for various reasons sometimes beyond the master's control. Modern technology such as AIS tracking and intelligent algorithms provide an opportunity to limit the impact of these occurrences.

Additional measures, at the operational level, could provide more response time such as procedures that incident managers could provide to a master of a disabled vessel to limit the drift which he may neither be aware of nor consider in an emergency.

Recommendations

8. The GC considers available measures to move transit routes further offshore, or away from hazards where practical, to provide more time for a successful emergency tow intervention and possibly reduce the level of resources required to cover risk.

9. The GC examines the causes of delayed casualty reporting by vessel masters and implements practical and effective measures to eliminate this behaviour.

10. The GC leverages the capability of automated tracking systems such as AIS and develop "intelligent" monitoring tools that recognize when a vessel's behaviour may indicate a problem and alert staff to initiate appropriate action.

11. The GC assesses the practicality and feasibility of the expansion of requirements for ET connection arrangements to vessels other than tankers. If feasible, then work should begin to raise the issue with international partners and at the IMO.

12. The GC develops recommended procedures that incident managers can provide to the master of a disabled vessel to limit drift and reduce the probability of grounding or sinking.

UNDERSTANDING RISK

Risk related to ET is complex and evolving making it difficult to assess and implement appropriate mitigation measures without a formal risk assessment process. The costs of providing a dedicated ET service and potential impacts of an unsuccessful outcome warrant the time and resources needed for such an effort.

Recommendations

13. The GC reviews existing risk assessment methodologies and adopts the most suitable for the requirements of ET.

14. The GC conducts an emergency tow focussed risk assessment including an analysis of all possible mitigation measures for the Boundary Pass/Haro Strait zone in the southern Salish Sea.

15. The GC gathers data on bulk liquid barge traffic on the coast of BC to improve risk modelling and risk management.

Strategic Planning and Accountability

The Coast Guard has likely been implicated in ET operations since its inception in the 1960's because it is an activity required for the delivery of its SAR and ER mandates. As an activity only, it has not required the framework and definition of the SAR and ER programs it serves.

The ET initiative has resulted in considerable investment on par with an established program which is likely to continue for the foreseeable future. With this level of investment come higher expectations and accountability. In the absence of clear policies and frameworks, it will be difficult to effectively determine levels of service and performance standards. This in turn, will make it difficult to determine accurate costing and efficiently allocate ET resources.

Additionally, it is certain that an audit and review of ET will happen at some point in the future, as has been the case in other jurisdictions such as the UK, where a cost-based review resulted in reductions in resource levels. Therefore, to ensure ongoing accountability, alignment with GC priorities, and to prepare for an eventual review, the GC will need a clear framework, service standards and data for ET.

Recommendations

16. The GC develops a position and framework defining how and where ET fits within its program and accountability structure

17. The GC defines service standards and measures of success to facilitate ET performance measurement and alignment with priorities.

18. The GC gathers ET incident and resource data to support performance measurement and reporting.

APPENDIX A - BIBLIOGRAPHY

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APPENDIX B – SUMMARY OF ENGAGEMENT ACTIVITIES

Summary of engagement activities including Transport Canada OPP Sessions and international and domestic questionnaire responses.

TRANSPORT CANADA OPP ENGAGEMENT SESSIONS

Sessions with multiple stakeholders and partners were held in Prince Rupert and Vancouver in March 2018. Participants included Indigenous Peoples, port authorities, the provincial government and a broad range of industry and NGOs. Coast Guard delivered a presentation on the ET initiatives including the leased EOTVs, emergency tow kits, and assessment activities. A selection of the questions specific to ET needs were posed to the attendees and summarised in the two session reports.[54]

A third session was held in Nanaimo in May, 2018 that focused on federal government and southern BC Indigenous Peoples' relations. ET was on the agenda for this session but due to evolving priorities was not fully discussed.

Prince Rupert Session

The following is the ET input as captured in the Prince Rupert report:

- Increase emergency towing capacity for large vessels on the North Coast, paying attention to the following areas at risk of on-water incident: West and North coasts of Haida Gwaii, off Douglas Channel leading to Kitimat, the Area midway between Prince Rupert and Vancouver (Bella Bella, Hartley Bay, Hecate Strait and Gil Island), Chatham Sound, Granville Channel, Portland Canal, Kitsault Arm, and the Northern coast near Alaska.
- Consider mitigating potential risks in other ways, such as: extending the pilotage range, moving traffic further from shore to allow increased response time, improve coordination of vessel traffic, using a floating asset directed to area of highest need (supported by real time risk assessment), building American capacity into emergency towing plans and increasing port state control to ensure compliance with international safety regulations (including smaller vessels).
- Include the following factors in assessing the need and location for new ETVs: quick response time to areas at highest risk, seasonal deployment matched to seasonal traffic patterns, dual purposing vessels, e.g., Western Canada Marine Response Corporation (WCMRC) vessel, Canadian Coast Guard vessels and port capacity to receive very large vessels. Key areas for coverage could include: 1. Dixon entrance, west coast of Haida Gwaii and northern Inside Passage; 1. North of Vancouver Island, covering the west Coast of Vancouver Island, Queen Charlotte Sound, Hecate Strait and the Central Coast.
- Consider a shared approach to providing and funding EOTVs where authority lies with government and funding is covered by industry; working together under a private/public partnership, industry could pay into a system that has a government regulatory and operational

[54] OCEANS PROTECTION PLAN PACIFIC REGION DIALOGUE FORUMS SUMMARY REPORT North Coast Dialogue Forum (Prince Rupert) March 8-9, 2018 and OCEANS PROTECTION PLAN PACIFIC REGION DIALOGUE FORUMS SUMMARY REPORT South Coast Dialogue Forum (Vancouver) March 20-21, 2018

oversight. Key concerns are ensuring government accountability for fast, effective response while ensuring financial responsibility of industry rather than taxpayers.

Vancouver Session

The following is the ET input as captured in the Vancouver Report:

- Pay attention to the following areas at risk of on-water incident in identifying where to increase emergency towing capacity along the BC Coast: Southern coast, lower Salish Sea, North Cowichan Bay, Turn Point, Haro Strait, Juan de Fuca Strait, areas with high catastrophic loss (Fraser and Cowichan rivers; entrance of Strait of Juan de Fuca), West and North Coast of Vancouver Island; outside of Vancouver Island, the Inside Passage (Seymour passage; North of Port Hardy), Discovery Channel, Central Coast (Bella Bella, Calvert Island), Haida Gwaii (Western areas; on the outside), Off Douglas Channel, the Dixon entrance.
- Ensure a thorough analysis has been conducted in assessing emergency towing capacity need and the location of new EOTVs. Analysis should clarify the factors that have led to the decision to lease two new EOTVs, include a review historical AIS data on vessel traffic patterns (high traffic areas; tug proximity) and current plans and/or requirements for industry to provide emergency towing capacity.
- Consider mitigating potential risks in other ways, such as: re-designating transit lanes to require vessels to transit further off shore to allow for increased response time; improving marine safety by focusing on the causes that increase risk of pollution from an oil spill, such as human error, ship mechanical issues, inattention to weather and local conditions, increased vessel congestion; strengthening local and off-shore emergency response capacity; and using multi-tasking patrol vessels (dual purpose Naval or Canadian Coast Guard vessels).
- Communicate with US counterparts to determine if any support could be available for emergency towing, e.g., US tugs at Neah Bay and/or consider the approach of an International Tug of Opportunity.
- Explore the idea of roving ETVs (one stationed in the South and one stationed in the North); vessels could be positioned based on real time risk assessment, e.g., based on availability of other towing resources in the vicinity, concentration of vessels; weather conditions, seasonal factors, etc.
- Include the following factors in assessing the need and location for new ETVs: high traffic areas, weather and natural conditions that increase risk of incident, availability of response to near shore or offshore traffic, e.g., remote areas; high response time, high ecological cost of oil spill/risk of catastrophic loss (areas used by First Nations or others for food gathering; cultural importance; environmentally sensitive areas), proximity to highly populated areas, high economic costs to businesses.
- Key areas that could be considered for location of new ETVs included: the west coast of Vancouver Island, Port Hardy (could respond to both the west and east coasts of Vancouver Island), Quatsino Sound and Estevan Point on the northwest and west coast of Vancouver Island respectively; the Juan de Fuca Strait to Vancouver traffic route (although some felt that capacity was sufficient in this area), and the area from Georgia Strait to Queen Charlotte Strait between North Vancouver Island and the mainland.

- Establish a system where industry has clear responsibility for covering the costs of emergency towing in keeping with the polluter pay principle and where government regulates and has oversight. Consider an industry levy that pays into a government response fund or add emergency towing as an extension of the Western Canada Marine Response Corporation capacity (Noted that WCMRC currently has no emergency towing capacity), which is funded by industry (mostly oil producers).

All of this input has proven valuable in many ways: it has directed the team to look at specific areas of high risk; provided evidence and documentation that would likely have been missed; and presented options for ET service provision and funding that otherwise may not have been identified and considered.

QUESTIONNAIRE RESPONSES

Below is a summary of responses to the questions distributed to Canadian and foreign stakeholders.

Canadian Questions and Responses

1. **In your opinion, is there presently sufficient emergency towing capacity off the coast of BC to manage the risks of pollution from casualties?**

The majority of respondents said there is not sufficient capacity. Two respondents felt that there could be enough capacity if the existing commercial fleet was better utilized.

The Neah Bay tug was cited as adequate for the area it covers but noted that Canadian shipping companies do not contribute to its funding but benefit from its presence.

2. **Do you believe that in the future there will be sufficient emergency towing capacity off the coast of BC to manage the risks of pollution from marine casualties?**

The responses to this question were more divided with a majority stating no and some saying yes but contingent on: implementation of OPP initiatives; greater use of existing commercial tugs; and the implementation of Coast Guard's leased EOTVs.

One ETV operator noted the difficulty in maintaining a service without government subsidies due to the lack of incidents which could fund a commercial service. A number of responses felt that the addition of the two Coast Guard EOTVs will mitigate much of the risk but may not be enough to cover all of the coast and future traffic levels. Two positive responses specified moving traffic further from shore as an additional measure to reduce risk even with any increase in emergency tow capacity.

3. **If your answer to either question 1 or 2 above is <u>yes</u>, please explain why.**

Several respondents stated yes but contingent on additional measures such as the addition of emergency tow resources.

4. **If your answer to either question 1 or 2 above is <u>no</u>:**
    a. **Please explain why.**

Many responses expressed concerns with the present capacity and capability to respond to incidents involving large casualties throughout the coast and provided examples of recent incidents as validation for their concerns. With respect to the future, some felt that industry alone will not increase capacity to

an adequate level and some concerns were raised around ongoing federal funding for a sustainable emergency tow system. Crew training was also raised as a concern, specifically the skills required to conduct an emergency tow are not present in the existing tug fleet.

A lack of traffic data and unknowns about future increases in traffic were identified along with the belief that vessels will continue to travel too close to shore which will not allow adequate time to respond.

b. What do you think would be an acceptable level of towing capacity?

Some responses stated that at least two vessels with high bollard pulls capable of handling a large tanker and large container ship with one each stationed in the north and south would suffice. Others focused on the need to better understand traffic and response times as part of a risk assessment process before a decision is made on the required capacity.

An increase in capacity on interior waters of the Salish Sea, Inside Passage and particularly Haro Strait and Boundary Pass was also recommended.

In addition to more tow capacity, other risk mitigation measures were suggested by several respondents including the tanker moratorium and increased vessel surveillance. Additionally, the distance that vessels travel from shore was raised, once again, as a key factor with one respondent providing a detailed analysis recommending that vessels should be kept 70 NM from shore even with the addition of ETVs.

5. Are there any specific areas where you feel that the risk of an on-water incident is greatest?

All respondents except one, stated “yes”. The “no” respondent further explained that distance from shore is the key factor in risk related to any disabled vessel.

a. If your answer is <u>yes</u>:

i. Please identify the specific area(s) using geographic descriptions such as latitude and longitude, common landmark names or other identifiable territorial limits.

Respondents identified areas throughout the coast. The south coast areas included exposed coastal areas such as the entrance to the Strait of Juan de Fuca and the west coast of Vancouver Island including Estevan Point. Interior waters on the south coast included Seymour Narrows, Race Passage, Current Passage and Blackney Passage at the northeast end of Vancouver Island. The southern Salish Sea including the Port of Vancouver and particularly Haro Strait and Boundary Pass were specified by a number of respondents as high risk due to traffic levels, challenging navigation and environmental conditions.

The Central Coast included the narrow channels on the Inside Passage and the shipping route to Vancouver and US ports in the south via Queen Charlotte Sound and Hecate Strait. The risk in the Gitga’at territory was specifically identified in one response due to confined and complex waters and conditions.

Much of the north coast was identified as high risk in many responses. The entire Haida Gwaii coast was a common concern with its west coast specifically raised due to traffic and a lack of tow resources. Other areas of concern included Dixon Entrance, northern Hecate Strait, the route from Kitimat to Prince Rupert and the route to Stewart north of Prince Rupert.

ii. Why do you feel that the risk is higher in this area?

Responses varied widely but all provided explanations. Some focused on probability factors including traffic density, remoteness, lack of suitable anchorages, extreme weather, currents and narrow passages. On the impact side, references were made to the pristine environments specifically Haida Gwaii and Pacific Rim National Park and the importance of fragile ecosystems to Indigenous people.

A lack of existing capacity was noted by several respondents. One respondent noted that although the Haro Strait/Boundary Pass area has high risk the addition of Trans Mountain tugs could provide an opportunity to reduce this risk.

iii. Can you provide any information that you may wish to support your views?

High traffic levels, size of vessels and recent incidents were reasons provided in many responses. One respondent provided evidence of traffic levels versus available towing capacity specifically in the Prince Rupert and Juan de Fuca areas.

Recent casualties that were given as evidence of higher risk included the *Queen of the North, Simushir* and *Nathan Stewart*. Some respondents specified their considerable experience and expertise as validation for their conclusions and recommendations.

One private ETV operator stated that its Alaska based vessel has responded to incidents adjacent to Canadian waters.

6. In your opinion, are there <u>other options</u> available (instead of increasing emergency towing capacity) to mitigate the potential risk of pollution from vessels transiting off the coast of BC?

There was a mix of responses with a majority stating yes there are other options.

If your answer is <u>yes</u> please describe the alternative option(s).

Alternative options included:

- Additional safety measures, such as: two people on the bridge; master on the bridge in certain confined waters; and a “deadman” switch to reduce powered groundings.
- The need for regulators to impose more restrictions on impaired vessels to reduce risk such as ordering a vessel further from shore before attempting repairs and requiring tug escorts for vessels that are restricted in manoeuverability or have experienced problems enroute to a BC port.
- The distance vessels transit from shore was raised by more than one person as the most important measure even if emergency tow vessels are available.
- Reducing the number of high-risk vessels such as tankers was specified in one response.
- An industry funded full emergency response service such as that present in other countries was recommended for consideration.
- An MOU between Canada and the US to provide seamless salvage and marine firefighting services off the west coast.
- Escort tugs for tankers combined with tanker convoying measures in confined waters.
- More pilotage for high risk vessels such as tugs and barges moving oil products.

7. **If you feel that emergency towing capacity should be increased, please provide further information such as:**

Responses ranged from general statements such as “purpose built for towing large vessels” to very detailed recommendations on the specifications for emergency tow vessels. The general consensus was that ocean-going tugs specifically built and equipped to tow large vessels are required for offshore areas. One respondent noted that smaller escort/berthing type tugs would suffice on the more protected but high-risk areas on the Juan de Fuca/Vancouver corridor.

Bollard pull recommendations ranged from 50 TBP for a tug in Haro Strait’s sheltered waters to 180 TBP for open ocean areas, with a speed of 15 Kts and firefighting and oil recovery capability.

The Neah Bay tug was referred to as a good example of the type of vessel required with one respondent adding that Canada needs access to its services. Conversely another respondent questioned the capability of this vessel.

   a. **The number of vessels required.**

The majority quoted two vessels as a minimum in the offshore zones, but estimates went as high as five or six depending on response times and the possibility that more than one vessel may have to respond to an incident or cover when another tug is out of service.

One respondent noted that the Haro Strait/Boundary Pass zone may have specific requirements which should be further studied “to determine what is best considering the feasibility, time, distance, waterway management, weather, and other factors”.

   b. **The best location(s) for basing/operating these vessels.**

Most responses split the coast into north, central and south and recommended a vessel in each zone with Juan de Fuca/Vancouver, Port Hardy/Tofino/Port Alberni, Hartley Bay and Haida Gwaii/Prince Rupert named as optimal areas for basing and operating the EOTVs.

Once again Haro Strait/Boundary Pass was raised as a potential area for an EOTV.

   c. **Please provide other information you may wish to share that supports your suggestion(s).**

Proximity to high risk areas was the most common theme to justify having emergency tow vessels on the south, central and north coasts.

8. **If you feel that emergency towing capacity should be increased, who should be responsible for providing and funding emergency towing services (e.g. private industry, federal government, other organizations)?**

   a. **Please explain your choice.**

There was a mix of opinions on this topic. Many respondents felt that the federal government/Coast Guard should be the service provider but consensus on the source of funding for the service was less clear. A number of options were proposed from full federal funding to an industry funded service and some more nuanced options such as the federal government funding but recovering costs from industry. Some felt that the shipping industry and the shippers who use their service and provincial governments who collect revenue should be responsible for funding.

b. Please provide any other information you may wish to share that supports your suggestion(s).

Reasons provided to support the various funding arguments include:

- The federal government is responsible for safety and should fund the service. Another variant of this was the federal and provincial governments allow these vessels to transit BC waters and should pay to manage the risk.
- The shipping industry should pay which could nudge them to increase their safety practices.
- The Neah Bay tug is an example of a successful industry funded model.
- An industry funded and provided service will be more efficient and has the capacity and expertise to provide the service.
- Government funding supported by cost recovery is the generally accepted practice worldwide.

9. Is there anything else you would like to add to your responses that will contribute to the towing needs assessment?

The requirement for crew training in ET in collaboration with experts in the field was raised along with the requirement for defined response times and concerns about the capacity of Coast Guard vessels to conduct towing operations. Port Alberni noted the advantages of basing an emergency tow vessel at its facilities and the increased risk in its region due to forecast traffic growth.

The State of Washington Department of Ecology pointed to a workshop report[55] that recommended establishing a multi-mission emergency response towing vessel in the Boundary Pass/Haro Strait area as number 3 out of the 9 top mitigation measures voted on by participants.

10. Do you have other specific questions or concerns on towing you would like to add?

One respondent expressed an interest in what other countries are doing. Another felt that the public will expect any ET service to continue beyond the three-year term of Coast Guard's leased vessels, while another stated that it will take years to have an effective system in place, so work has to start immediately and progress quickly to reduce the risk.

A warning was given about the complete reliance on a tug of opportunity system as the tugs are not capable to respond in heavy weather and may not be in the vicinity of the casualty. A private company already providing ET and salvage services expressed an interest in partnering with government to extend its services into Canada as part of a seamless response to vessels on the great circle route between North America and Asia.

One respondent noted the difficulty responding to a pollution incident in remote areas and ineffective measures in exposed waters as a good reason to focus on the prevention of such an incident through ET.

[55] 2016 Salish Sea Oil Spill Risk Mitigation Workshop Summary Report December 2016 Publication no. 17-08-005, Department of Ecology, State of Washington

International Questions and Responses

A questionnaire specific to foreign states that have assessed or implemented ET elicited responses from Norway, France and Germany which are summarised below.

1. **Has your organisation assessed the demand for an emergency towing service for the salvage of large merchant vessels? If so did you complete a risk assessment and was the emergency towing service established as a result of the risk assessment?**

   Germany – Yes. An ET strategy has been in place since 2001 and was recently reviewed and updated due to evolving requirements such as increasing vessel sizes. The present report and recommendations are being prepared for approval and implementation by the German Bundestag.

   France – Yes. An ET service has been in place since 1978 due to issues with response to maritime disasters off the French coast. A risk assessment was completed in 2016 which validated the investment in the service and found that for every single euro invested there is savings of two hundred euros in avoided costs.

   Norway – Yes. A state tow system was established off the coast of northern Norway in 2003 in response to risk from transportation of oil from Russian ports along the Norwegian coast. Further assessments were done between 2005 and 2009 resulting in the reduction of vessels from three to two in the north and the addition of capacity in the south and west coasts.

2. **Does your organisation maintain an emergency towing service?**

   a. **If the answer is yes, please describe the service, e.g. number of vessels, types of vessels and operating areas.**

      Germany – Yes. There is a total of eight vessels, four state-owned and four chartered, based on the Baltic and North Sea coasts. These vessels have bollard pulls ranging from 40 to 200 tonnes with the North Sea vessels capable of reaching a disabled vessel in 2 hours in storm conditions.

      France – Yes. There is a total of four vessels with three on the Atlantic Coast and one on the Mediterranean. The vessels have bollard pulls ranging from 160 to 210 tonnes. The vessels are contracted from a commercial company but under control of the Navy.

      Norway – Yes. There is a total of four vessels with two in the north and one each on the south and west coasts.

   b. **How is the emergency towing service funded?**

Germany - The ET strategy is exclusively funded from tax revenues.

France – the service is federally funded.

Norway – the service is federally funded but costs are recovered from the disabled vessel when an emergency tow is required.

c. Have you ever assessed the demand for this emergency towing service?

Germany – Yes, referenced in question 1 (copy provided).

France – Yes, refenced in question 1 (copy provided) and the service is subject to a quality assurance process.

Norway – Yes (copy provided). From 2020 the Coast Guard will take over the operation of the ET service using six vessels and no longer rely on chartered civilian vessels.

3. Have you analysed or introduced possible alternatives for an emergency towing service in order to reduce the risks caused by large vessels?

Germany – Yes. they were included in the recent review and report being prepared for the Bundestag.

France – Yes. Vessels such as pollution response vessels and commercial tugs are used to provide a service when the larger and more powerful ETVs are not required.

Norway - Yes. We have contributed to the development of and acquired two "ShipArrestors". [56]

[56] http://www.mikomarine.com/norway-commits-to-the-shiparrestor/

APPENDIX C

Reference map showing specific locations in the Report.

GLOSSARY

Allision – a vessel striking a fixed object such as a bridge, pier or navigation aid.

Automatic Identification System (AIS) - a vessel tracking system that automatically provides updates on a vessel's position and other relevant ship voyage data to a vessel traffic operator and other vessels in the area.

Bollard pull - Bollard pull is the zero-speed pulling capability of a towing vessel. It is a measure of the usefulness of limiting the drift of and towing a disabled vessel.

Canada Shipping Act 2001 - the principal legislation governing safety of marine transportation and recreational boating, as well as protection of the marine environment.

Dead weight tonnage (DWT) – Deadweight tonnage is a measure of how much weight a ship can carry including cargo, fuel, fresh water, ballast water, provisions, passengers, and crew. It is normally expressed in metric tonnes.

Deadman switch – Any safety system which requires an active response within a period of time; if the response does not occur, or is incorrect, then it initiates some kind of emergency response e.g. setting off an alarm.

Gross tonnage (GT) – a measure of a ship's overall internal volume.

Innocent passage – a concept in the law of the sea that allows for a vessel to pass through the territorial waters of another state, subject to certain restrictions. Passage is innocent so long as it is not prejudicial to the peace, good order or security of the coastal State.

Inside Passage - a coastal route for ocean-going vessels along a network of passages that weave through the islands on the Pacific coast.

International Convention for the Safety of Life at Sea (SOLAS) - an international maritime treaty which sets minimum safety standards in the construction, equipment and operation of merchant ships. Signatory countries must ensure that ships registered by them comply with these minimum standards.

International Maritime Organization (IMO) - the United Nations specialized agency with responsibility for the safety and security of shipping and the prevention of marine and atmospheric pollution by ships.

Knot (Kts) – a unit of speed equal to one nautical mile per hour.

Leeway - the motion of an object induced by wind and waves.

Nautical mile (NM) - a unit of distance used chiefly in navigation, equal to 6080 feet or 1853 meters.

Place of refuge - 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.

Voluntary Tanker Exclusion Zone – A Tanker Exclusion Zone along the BC coast to limit the risk of potential oil spills. The size of the area was based on calculating the worst possible drift of a disabled tanker with a cargo, versus the time required for help to arrive. Loaded oil tankers servicing the Trans-Alaska Pipeline System between Valdez, Alaska and Puget Sound, Washington must travel west of the zone. The exclusion zone does not apply to tankers travelling to or from Canadian ports.

Tandem tow – a towing operation involving two or more tugs connected to a single towed object.

Twenty-foot equivalent unit (TEU) – A unit used to express the capacity of a container ship in a uniform manner, the number of containers that the ship can load is converted into a number of containers of the smallest size, which are twenty feet in length.

Subject: Message regarding launch of DFO's BC Salmon Restoration and Innovation Fund

From: Wong, Cindy
Sent: March 28, 2019 11:22 AM
Subject: Message regarding launch of DFO's BC Salmon Restoration and Innovation Fund

Dear Harbour Authorities,

Please find below information on the Department's newly announced BC Salmon Restoration and Innovation Fund (BCSRIF) that was officially launched on March 15, 2019.

The BCSRIF represents a federal-provincial investment of up to $142.85 million over the next five years. It's goal is to help ensure that BC fisheries are environmentally and economically sustainable for the long-term and resilient to the challenges of climate change and evolving economic conditions. The Fund will also help to protect and restore priority wild BC fish stocks, including Pacific salmon.

This Fund is focused around several key pillars, including Innovation (to encourage new products and technologies), Infrastructure (to encourage capital investments in new products, processes or technologies) and Science Partnerships between industry, academia, and other research institutions. Funding will be available to British Columbia-based commercial and non-commercial organizations, including Indigenous groups, commercial enterprises, universities and academics, and stewardship organizations. Through these collaborations, we will leverage opportunities to ensure the sustainability of BC's fish and seafood sector and support efforts to restore and protect salmon species and other priority fish stocks.

Further information can be found in the News Release or by visiting the website at http://bcsrif.ca
If you have any questions, please feel free to contact the BCSRIF team at DFO.BCSRIF-FRISCB.MPO@dfo-mpo.gc.ca or call 1-833-615-2379.

Thank you,
Cindy

Cindy Wong
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Government of Canada / Gouvernement du Canada

Home > Fisheries and Oceans Canada

Governments of Canada and British Columbia now accepting proposals to help restore Pacific salmon and boost the province's fish and seafood sector

From: Fisheries and Oceans Canada

News release

March 15, 2019

Victoria, BC - Wild Pacific salmon is integral to the economic and social fabric of coastal communities, and is fundamental to Indigenous communities across British Columbia. The need to act now to protect habitat and restore our wild fish stocks is clear and indeed vital to the environmental and economic sustainability of the province.

Today, the Minister of Fisheries, Oceans and the Canadian Coast Guard, the Honourable Jonathan Wilkinson and BC Premier, the Honourable John Horgan, officially launched the British Columbia Salmon Restoration and Innovation Fund in Victoria. This fund is a federal-provincial collaboration that will help restore the habitat of our wild fish stocks in communities across British Columbia, and the protection of our vulnerable wild Pacific salmon species. The Government of Canada is investing $100 million over five years, and the Government of British Columbia is investing $42.85 million over five years.

It will also support fisheries innovation, science and infrastructure so that BC fish stocks can be harvested sustainably into the future. These investments support the protection of BC's wild fisheries and enhance sustainability in the aquaculture industry.

The fund is now open to proposals from Indigenous groups, conservation groups, commercial organizations in the wild fisheries and industry sectors, recreational fisheries, as well as non-commercial organizations such as universities and academia, industry associations and research institutions. The fund will support projects that leverage local knowledge such as local Indigenous monitoring and guardianship programs and community-led habitat restoration, among other innovative projects aimed at protecting and restoring wild fish stocks.

To be eligible, projects must focus on one or more of the following three areas:

- Innovation – to encourage the development of new technologies to increase productivity and help meet conservation and sustainability

objectives, including the protection and restoration of wild BC stocks, including Pacific salmon;
- Infrastructure – to encourage capital investments in new products, processes or technologies to support the advancement of sustainable fishing practices and to support the protection and restoration of wild BC stocks, including Pacific salmon;
- Science partnerships – to support collaborations with academia and other research institutions to improve our knowledge and understanding of impacts to wild stocks and to develop sustainable fishing practices.

The investments from the British Columbia Salmon Restoration and Innovation Fund will ensure BC's wild fisheries are environmentally and economically sustainable for the long-term and that jobs in the fishery are resilient to the challenges of climate change and evolving economic conditions. The fund will help protect and restore priority wild BC fish stocks, including Pacific salmon. Consumers will also benefit from high-quality, sustainably sourced, Canadian fish and seafood products.

To find out more about eligibility, project criteria and how to apply, visit the British Columbia Salmon Restoration and Innovation Fund web page: bcsrif.ca.

Quotes

> "The Government of Canada believes that environmental sustainability and economic growth go together. The new BC Salmon Innovation and Restoration Fund will restore and protect our wild Pacific salmon, while creating more economic opportunities and jobs for the people of British Columbia. I am extremely pleased with the very positive partnership we have developed with the Government of BC in this important area. By working together with the provincial government, conservation groups, scientists and industry we are confident that we can enhance our fisheries and protect our wild fish stocks."
>
> The Honourable Jonathan Wilkinson, Minister of Fisheries, Oceans and the Canadian Coast Guard

> "Wild salmon are a part of who we are in this province. Over the past 20 months, our government has been working with First Nations, communities, commercial and recreational fisheries, environmental organizations, and other experts to develop a path forward, towards a sustainable BC fishery that supports wild salmon. By dedicating resources to habitat restoration and salmon runs, this fund will build on that work to make sure wild salmon stocks thrive in BC."
>
> The Honourable John Horgan, Premier of British Columbia

> "The BC Salmon Restoration and Innovation Fund demonstrates that the province is taking significant action to support wild salmon stocks and fisheries. We are working in partnership with Fisheries and Oceans Canada to protect the health of wild salmon, and support the First Nations, communities and industries that rely on them."
>
> The Honourable Lana Popham, Minister of Agriculture

Quick facts

- The British Columbia Salmon Restoration and Innovation Fund is a 70% federal, 30% provincial cost-shared program.
- The Government of Canada is investing $100 million over five years for the British Columbia Salmon Restoration and Innovation Fund and will also provide a one-time contribution of $5 million to the Pacific Salmon Endowment Fund.
- The Government of British Columbia is investing $42.85 million over five years.
- Salmon are a part of intricate food webs in both their freshwater and marine environments, affecting everything from tiny zooplankton to large mammals like whales, bears and birds of prey.
- Culturally, Chinook is an important species for many BC First Nations. It is also part of the province's long tradition of recreational and sport fishing, which is connected to BC's tourism industry. Commercial fishing also plays a large role in BC's economy.

Associated links

- Wild Pacific Salmon get a boost with new Salmon Restoration and Innovation Fund for the province of British Columbia
- Canada's fisheries funds
- Pacific Salmon Endowment Fund Society

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Stay connected

- Follow the Department of Fisheries and Oceans Canada on Twitter, Facebook, Instagram and YouTube.
- Follow the Canadian Coast Guard on Twitter, Facebook, Instagram and YouTube.
- Subscribe to receive our news releases and more via RSS feeds. For more information or to subscribe, visit http://www.dfo-mpo.gc.ca/media/rss-eng.htm.

Search for related information by keyword: NE Nature and Environment | Fisheries and Oceans Canada | Canadian Coast Guard | British Columbia | Environment and natural resources | Business and industry | general public | news releases | Hon. Jonathan Wilkinson

Date modified:
2019-03-15

From: Hughson, Lam
Subject: Chinook Conservation Measures
Date: April 29, 2019 3:24:38 PM

Dear Harbour Authority:

For information purposes only, please find attached a link to a news release regarding Government of Canada's action plan to address Fraser River Chinook decline.

Thank you

https://www.canada.ca/en/fisheries-oceans/news/2019/04/government-of-canada-takes-action-to-address-fraser-river-chinook-decline.html

Lam Hughson, on behalf of Katie Rattan, A/Regional Manager, Client Services
A/Harbour Development Officer/ A/Agent De Développement Portuaire
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Government of Canada takes action to address Fraser River Chinook decline

From: Fisheries and Oceans Canada

News release

April 16, 2019

Vancouver, BC - Over the past 50 years, the world's wildlife populations have declined by 60%. In Canada, 521 species have been identified as being at risk under the Species at Risk Act and the list is growing. Recent assessments by the Committee on the Status of Endangered Wildlife in Canada for Chinook salmon from the Fraser River system have found Chinook are also in danger of disappearing from Canada.

Chinook salmon populations have been in decline for years as a result of a number of factors including habitat destruction, harvest, and the effects of climate change. Of the thirteen wild Fraser River Chinook salmon populations assessed, only one is not at risk. The science is clear. The loss of these Chinook populations would be disastrous not just for wildlife that depend on them as a food source, but also for the many BC communities whose jobs and ways of life depend on Chinook salmon. That's why the Government of Canada has taken, and is taking, urgent and concrete actions to ensure that at-risk Chinook salmon are protected for future generations.

However, the challenges facing at risk Fraser River Chinook salmon stocks are multi-faceted. The road to recovery requires a long-term view and the collaboration of all interested parties. To this end, DFO is announcing today that it will engage with First Nations, the Province of BC and stakeholders over the next several weeks to explore establishing a process to address a broad range of issues that are impacting Chinook stocks. These issues include:

- conservation issues, including land and water use issues,
- fish habitat issues,
- the role of hatcheries to support rebuilding and the potential for marked fisheries,
- how seals and sea lions may be affecting Chinook salmon, and
- other relevant topics.

Establishing a process to have these important discussions will play a vital role in determining how best to steward this resource going forward and what

options may exist to further address the social, cultural and economic importance of these Chinook stocks.

Fisheries management measures for 2019 will support the recovery of at risk Fraser River Chinook populations and protecting the jobs and communities that depend on Chinook survival. These measures were developed following consultation with Indigenous communities, recreational and commercial fishing organizations and environmental organizations. These measures are one component of a larger strategy intended to place at risk Pacific salmon populations on a path towards sustainability.

Fisheries management measures for the 2019 fishing season will include:

- Commercial fishing: Commercial troll fisheries for Chinook will be closed until August 20 in Northern BC, and August 1 on the West Coast of Vancouver Island to avoid impacting Fraser Chinook stocks and to support conservation priorities.

- Recreational fishing: The 2019 management measures for recreational fisheries where at risk Chinook stocks may be encountered are designed to maximize returns of these at risk Chinook to their spawning grounds. Opportunities to harvest Chinook will be provided later in the season to support the long-term viability of the recreational industry. The 2019 measures include:
- Non-retention of Chinook in, Johnstone Strait and Northern Strait of Georgia until July 14; a daily limit of one (1) Chinook per person per day from July 15 until August 29, and two (2) per person per day from August 30 until December 31.
- Non-retention of Chinook in the Strait Juan de Fuca and Southern Strait of Georgia until July 31; retention of one (1) Chinook per person per day as of August 1 until August 29, and two (2) per person per day from August 30 until December 31.
- West Coast Vancouver Island offshore areas will have non-retention of Chinook until July 14 followed by a limit of two (2) Chinook per day from July 15 to December 31. West Coast Vancouver Island inshore waters will remain at two (2) Chinook per day for the season once at-risk Chinook stocks have passed through, to support the long term viability of the salmon and of the recreational fishery.
- Fraser River recreational fisheries will remain closed to salmon fishing until at least August 23, and opportunities will be informed by any other conservation issues (coho, steelhead, etc).
- Retention of two (2) Chinook per day continues to be permitted in Northern BC and inshore areas of the West Coast of Vancouver Island. Other opportunities may be identified and announced in season where abundance permits.

- An overall reduction in the total annual limit for Chinook that can be retained per person in a season from 30 fish to 10. Recreational fisheries for other species will continue. Please see the Department's web-site for local regulations.

- First Nations food, social and ceremonial fisheries: these fisheries, which have a constitutionally protected priority, will not commence until July 15 – concurrent with the opening of the recreational retention fishery.

These new measures are difficult, but they are necessary to address Fraser River Chinook decline. A continued decline would irrevocably harm species that depend on the survival of Chinook salmon, such as the Southern Resident killer whale. In addition, it would permanently affect the culture, heritage and livelihoods of Indigenous communities and permanently eliminate many jobs in the recreational and commercial fishing industries.

These measures are part of a comprehensive approach to restoring the health of wild salmon stocks. Other key elements of this comprehensive approach include:

- Habitat protection – the proposed Fisheries Act, - if passed would restore lost protections to our waterways and specifically to fish habitat.
- Habitat restoration – we, in collaboration with the Government of BC, recently announced the establishment of the $142M British Columbia Salmon Restoration and Innovation Fund. As well, the Canada Nature Fund for Aquatic Species at Risk, provides $55 million fund over five years to support projects that help recover aquatic species at risk; the Fraser Watershed is one area identified for priority action.
- Science – the Government of Canada is making significant investments in science to enhance fish stock assessments and to adapt to the impacts of climate change. This includes an additional $107 million to support the implementation of the Fish Stocks provisions of the proposed Fisheries Act. These resources, committed in the Fall Economic Statement, will increase scientific capacity for stock assessment of Canada's fish stocks, including Pacific salmon stock assessments.
- Predation – DFO, in partnership with research partners in Canada and the U.S., is convening a forum to discuss and assess scientific evidence relating to population dynamics of seals and sea lions, their diet and their impacts.

The Government of Canada is taking significant action to ensure that our Chinook salmon survive for future generations. The measures announced today highlight the government's commitment to working collaboratively to ensure the sustainability of Chinook stocks as a means by which to ensure the health of our ecosystems and the long term prosperity of Indigenous and coastal communities.

Quotes

> “The science is clear: Pacific Chinook salmon are in a critical state. Without immediate action, this species could be lost forever. As the Minister responsible for the health and sustainability of our oceans, I want to ensure that we do not knowingly put these stocks on a path to extinction. The measures I am announcing today, as part of a comprehensive plan to protect wild Pacific salmon, are significant, necessary and difficult. They are critical to the future of Chinook stocks and to the futures of Indigenous and coastal communities who rely on them for sustenance, jobs and economic prosperity.”
>
> The Honourable Jonathan Wilkinson, Minister of Fisheries, Oceans and the Canadian Coast Guard

Quick facts

- In November 2018, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assessed 16 southern BC Chinook salmon stocks, 13 of those originating in the Fraser River. Seven of the Fraser Chinook populations were assessed as endangered, four as threatened and one as a population of special concern. Only one stock was deemed not at risk. Insufficient data was available to assess the two remaining stocks.
- In 2018, a WWF Living Planet Report showed that around the world, wildlife populations have declined 60% over the past 50 years. The 2017 report by the same group indicated that half of all species in Canada were in decline. In Canada there are 521 plant and animal species at risk that are listed under SARA.

Related products

- Backgrounder: Action to protect Fraser River Chinook salmon

Associated links

- Fisheries Management Measures: Fraser River Chinook
- Pacific Salmon
- Living Planet Report 2018, World Wildlife Fund
- Living Planet Report 2017, World Wildlife Fund

Contacts

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Date modified:
2019-04-17

DISTRICT OF UCLUELET

RESOLUTION TRACKING

Habour Authority

Meeting	Agenda Item #	Meeting Item Description	Resolution Text	Description	Staff Responsible	Follow-Up Status
05-May-18	9.1.	Signage	THAT the Habour Authority direct staff to install signage and lifejackets for children.	Outer Basin and Whiskey Dock	Kevin Cortes	In Progress - *to be installed by June.*
05-May-18	9.3.	Signage	THAT the Harbour Authority direct Staff to explore options for Seaplane Base moorage within our facilities.	Examination of seaplane moorage options under review by Harbour Master	Kevin Cortes	Complete
04-Sep-18	6.1.	Harbour Authority Resolution Tracking		Staff to work with the Coast Guard Auxiliary on signage.	Kevin Cortes	Assigned
04-Sep-18	6.2.	Harbour Advisory Commission Update	THAT Council direct Staff to work collectively with the Harbour Authority, Royal Canadian Marine Search & Rescue and the Harbour Manager to create and publicize a media release highlighting current activities, acknowledging the volunteers and promoting a membership drive.	To work collectively with the HA, HAC, RCMSAR and Harbour Manager to create a media release/membership drive.	Mark Boysen	Assigned
04-Sep-18	7.3.	Councillor Noel	THAT Council direct Staff to provide design options of universal signage for the Main Street Dock, Inner and Outer Boat Basin, and to include input from the Harbour Advisory Commission for the next Harbour Authority meeting on November 20th.	Work with Harbour Manager to create design options for signage and to run it past the HAC members.	Mark Boysen	Complete
Harbour Authority - 20 Nov 2018	4.2.	Small Craft Harbour Brochure Re-print Kevin Cortes, Harbour Manager		Work on brochure for 2019 season. Designer drafting document.	Mark Boysen	In Progress

RESOLUTION TRACKING
Habour Authority

Meeting	Agenda Item #	Meeting Item Description	Resolution Text	Description	Staff Responsible	Follow-Up Status
Harbour Authority - 19 Feb 2019	5.1.	November 20, 2018 Regular Minutes	THAT Council approve the November 20, 2018 Regular Minutes as presented.	Print, sign, scan, file.	Darcey Bouvier	Assigned
Harbour Authority - 19 Feb 2019	9.3.	Thornton Creek Enhancement Society Mayco Noël, Mayor	THAT Council direct the Harbour Manager to add a 2% voluntary donation for Thornton Creek Enhancement Society to Small Craft Harbour billing and reassess in 12 months.	THAT the Harbour Authority reassess the 2% voluntary donation to Thornton Creek in early 2020.	Kevin Cortes	Assigned - *reassess in early 2020*
Harbour Authority - 19 Feb 2019	9.3.	Thornton Creek Enhancement Society Mayco Noël, Mayor	THAT Council direct the Harbour Manager to add a 2% voluntary donation for Thornton Creek Enhancement Society to Small Craft Harbour billing and reassess in 12 months.	Update billing for SCH and begin collecting 2% fee.	Kevin Cortes	Complete
Harbour Authority - 19 Feb 2019	9.4.	Harbour Authority Resolution Tracking Mark Boysen, CAO	***Refer to the Minutes***	Invite Spencer Wright to attend May 21 HA meeting.	Mark Boysen	Complete
Harbour Authority - 19 Feb 2019	10.1.	HAABC Annual Seminar	THAT Council direct Staff to also write a thank you letter to the Harbour Manager and to the Manager of Parks & Recreation for their work on hosting HAABC.	Write both thank you letters.	Darcey Bouvier	Complete
Harbour Authority - 19 Feb 2019	10.1.	HAABC Annual Seminar	THAT Council direct Staff to write a thank you letter to the HAABC for holding their annual seminar in Ucluelet this year.	Write the thank you letter.	Darcey Bouvier	Complete

STAFF REPORT TO COUNCIL

Council Meeting: JUNE 5, 2019

500 Matterson Drive, Ucluelet, BC V0R 3A0

FROM: MARK BOYSEN, CHIEF ADMINISTRATIVE OFFICER **FILE NO:** 8700-03

SUBJECT: PROPOSED WHISKEY DOCK FLOAT IMPROVEMENTS **REPORT NO:** 19-70

ATTACHMENT(S): APPENDIX A - PRELIMINARY REVISION TO THE WHISKEY DOCK FLOAT (HAROLD ENGINEERING)

RECOMMENDATION(S):

1. **THAT** the Harbour Authority direct Staff to provide a detailed proposal for float improvements to the Main Street (Whiskey) Dock at the September 17, 2019 Harbour Authority meeting.

PURPOSE:

The purpose of this report is to provide background information on initial discussions to make improvements to the floating dock at the Main Street dock.

BACKGROUND:

The Main Street Dock (Whiskey Dock) includes a straight-line floating dock that is used by local boats and companies on a contract basis. Float planes moor at this location from time to time.

DISCUSSION:

Staff have identified the potential for improvements to the Whiskey dock, including an expansion of the existing floats to include improved float plane service. While replacement of the dock in its current orientation is an option, there is an opportunity to support increased economic development through better use the space and to consider the specific needs of float planes.

The District's Habour Manager, Kevin Cortes, was given permission to initiate conversations with Herold Engineering (the Consultant) regarding potential redesigns for the dock. Using feedback from the Harbour Manager and Staff, the Consultant has produced an initial concept plan for consideration (see Appendix A). Staff have initially reviewed the plan and would like to receive feedback from the Harbour Authority before proceeding further with the project.

Harbour Air initiated service to Tofino in 2017 and staff have held conversations with Harbour Air regarding the future potential for expansion to Ucluelet. Currently, Harbour Air considers using the Ucluelet Harbour during fog-delays in Tofino.

FINANCIAL:

Preliminary cost estimates provided by the Consultant including contingency is $319,200. These can be considered "Class D" estimates and require a more detailed analysis. Staff recommend that additional consulting costs should be expected. The Ucluelet Harbour Reserve Fund is a potential source of funds to consider for this project which currently holds approximately $311,000.

OPTIONS REVIEW:

1. **THAT** the Harbour Authority direct Staff to provide a detailed proposal for float improvements to the Main Street (Whiskey) Dock at the September 17, 2019 Harbour Authority meeting. **(Recommended)**

2. **THAT** the Harbour Authority provide alternative direction to staff.

Respectfully submitted: Mark Boysen, Chief Administrative Officer

HEROLD ENGINEERING

April 26, 2019 1040-009

Via email: Email Address of Client

District of Ucluelet
200 Main Street
Ucluelet, BC
PO Box 99
V0R 3A0

Attn: Kevin Cortes, Harbour Master

Re: Preliminary Revision to Whiskey Dock Float

Dear Dear Kevin:

Herold Engineering Limited (Herold) completed a preliminary design for changes to the Whiskey Dock float basin. The changes are as generally discussed during our meeting and completed with the intent of providing additional float moorage and access suitable for Seaplanes. The following is brief design summary of the arrangement presented on the attached reference sketch SK1.

As stated, the design is preliminary with several items requiring confirmation prior to moving forward to detailed design. We took soundings at isolated points within the basin to determine the approximate 0.0 metre water line and -1.0 metre water line (tide and chart datum) shown on the plan. We also approximated the water lot boundary location based on information provided by the District. These two items will need to be confirmed as they may further limit the orientation of the proposed arrangement.

The arrangement generally includes adding 2 new lengths of float and reconfiguring the existing floats. All new floats are proposed to be DFO style, heavy duty, treated timber floats.

A new 90 foot long by 9 foot wide timber float is proposed in line with the existing wharf face, essentially doubling the current continuous moorage used by larger commercial vessels. The float will be moored by steel pipe piles, using internal pile wells so that the inside of the float can provide an additional 90 feet of continuous moorage for appropriately sized vessels.

The new 90 foot long by 9 feet wide seaplane float is located on the inside of the basin and will be moored via chain and anchor system and will have controlled access provided by a security gate at the north end of the float.

The connection between the two new floats will be provided by modifying the existing 80 feet long float into two pieces as shown in the sketch. Further, the existing gangway landing float (40 feet by 12 feet) will be relocated south to connect the modified walkway floats. The modified walkway floats can be moored to the existing wharf piles.

The existing steel gangway is 37 feet long and is very steep at lower tide levels. With increased seaplane passenger and cargo use, we recommend replacing the existing gangway

#7 1920 Lyche Road, Ucluelet, BC V0R 3A0 Telephone: 250-534-9145 email: mail@heroldengineering.com

with an aluminum gangway, suitable for increased use and more accessible for users at lower tide levels. Our sketch shows a 60 feet long by 4 feet wide aluminum truss gangway.

We have prepared the below opinion of probable cost based on recent projects of similar scope that Herold has been responsible for. The provided contingency is generally representative of the preliminary stage of design and intended to be suitable for budgeting purposes.

	Unit	Quantity	Rate	Estimate
Mobilization/Demobilization	Lump sum	1	$30,000	$30,000
Supply/Install 90'x9' Timber Floats	Each	2	$65,000	$130,000
Supply and Drive Steel Pile (18" Dia. Assumed)	Each	6	$7,000	$42,000
Supply and Install Anchors and Chain	Each Pair	3	$2,000	$6,000
Security Gate	Each	1	$2,200	$2,200
Modify and Relocate Existing Timber Floats	Lump sum	1	$12,000	$12,000
Supply and Install New 60' Aluminum Gangway	each	1	$21,000	$21,000
	Subtotal			$243,200
	Contingency (20%)			$60,800
	Detailed Design Estimate			$15,200
	Project Estimate			$319,200

Please contact the undersigned with any questions you may have about the proposed work or for assistance in implementing the recommendations.

Yours truly,

HEROLD ENGINEERING LIMITED

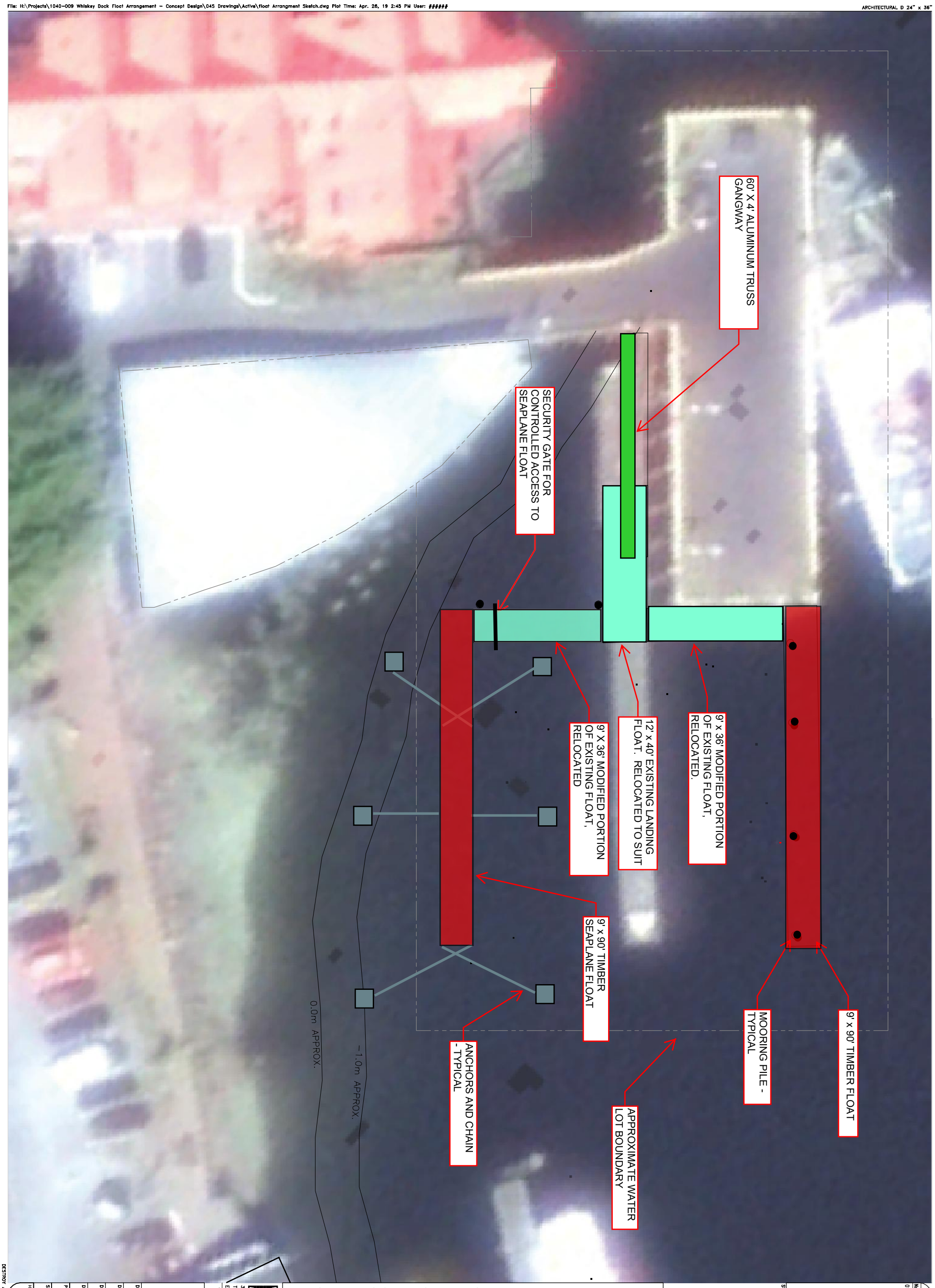
Jeff Duncan, P. Eng.
Associate

Enclosure

#7 1920 Lyche Road Ucluelet, BC V0R 3A0
mail@heroldengineering.com
(250)534-9145

File: H:\Projects\1040-009 Whiskey Dock Float Arrangement - Concept Design\04S Drawings\Active\float Arrangment Sketch.dwg Plot Time: Apr. 26, 19 2:45 PM User: ######

ARCHITECTURAL D 24" x 36"



ISSUES		
No.	DATE mm.dd.yy	ISSUED FOR
01	2019.04.26	CLIENT CONSIDERATION

SUB CONSULTANT

WHISKEY DOCK FLOAT BASIN
SEAPLANE FLOATS

DISTRICT OF UCLUELET, 200 MAIN ST. UCLUELET, BC

PO BOX 999, V0R 3A0

HEROLD ENGINEERING

3701 Shenton Rd, Nanaimo, BC V9T 2H1
Tel: 250-751-8558 Fax: 250-751-8559
Email: mail@heroldengineering.com

CONCEPTUAL
GENERAL
ARRANGEMENT

DESIGNED	ENGINEER'S SEAL
JDD	
DESIGN REVIEW	
DRAFTED	
JDD	
DRAFTING REVIEW	
PROJECT No. 1040-009	CLIENT DRAWING No. n/a
SCALE AS SHOWN	PERMIT No. n/a
HEL DRAWING No. SK1	REVISION 00

DESTROY ALL DRAWINGS SHOWING PREVIOUS REVISION

Ucluelet Harbour Report June 2019

Updates

The DFO announced their fisheries management plan. Area G Trollers will be closed until August. The recreational fishers will be able to retain Chinook Salmon from the surfline in through Barkley Sound until July 15th then in all other areas as well.

The Trawl fishery is going strong mostly fishing for hake delivering to UHS, Ukee Fish and Neptune

We have 8 dive boats working throughout April and May delivering Geoducks off the Whiskey dock as well as 3 crab boats calling Ucluelet home.

May has brought us 14 charter boats working off our docks as well as additional 4 whale watching boats

JUNE 4, 2019

Kasslyn Contracting

PROJECTS

We have been sprucing up the harbour. We have repainted the parking lot at the inner basin.

Dock repairs at the Whiskey Dock both upper and lower docks including the addition of new chain and anchors on the airplane float.

New signage at the Outer Basin and Boat launch.

Future Projects

Replace The rotten bullraills around the upper dock on Whiskey dock. Estimated cost $10,000.