Department of Justice Canada

Prairie Region
301 - 310 Broadway
Winnipeg MB R3C 0S6

Ministère de la Justice Canada

Région des Prairies
310, Broadway, bureau 301
Winnipeg MB R3C 0S6

Security Classification/ *Classification de sécurité :* **PROTECTED A**

Telephone/*Téléphone:* (204) 984-6961
Facsimile/*Télécopieur:* (204)984-6488
Email/*Courriel:* Dayna.Anderson@justice.gc.ca

Board File OF-Fac-Oil-T260-2013-03 59

December 10, 2018

VIA E-FILING, TO BE FOLLOWED BY REGULAR MAIL

National Energy Board
Suite 210, 517 10 Ave SW
Calgary, AB T2R 0A8

Attention: Ms. Sheri Young, Secretary of the Board

Re: Hearing Order MH-052-2018
Trans Mountain Expansion Project – National Energy Board Reconsideration
Response to Board Information Request No. 1 to Federal Departments and Agencies

Attached for filing please find the responses of Fisheries and Oceans Canada and Canadian Coast Guard, Environment and Climate Change Canada, Natural Resources Canada, Parks Canada and Transport Canada to the National Energy Board's Information Request No. 1 to the Federal Departments and Agencies (questions 1.1 through 1.56).

Please note that responses to questions 1.57 through 1.65 are being filed separately by Vancouver Fraser Port Authority and Pacific Pilotage Authority, as those Authorities are not represented by the Department of Justice Canada.

Yours truly,

Dayna S. Anderson
Senior Counsel
Prairie Region
Department of Justice Canada

cc All Parties to MH-052-2018 Proceedings

Canada

Hearing Order MH-052-2018

Board File OF-Fac-Oil-T260-2013-03-59

Responses of:

Environment and Climate Change Canada
Fisheries and Oceans Canada and Canadian Coast Guard
Natural Resources Canada
Parks Canada Agency
Transport Canada

to

National Energy Board
Information Request No. 1
to the Federal Departments and Agencies

Trans Mountain Expansion Project

Reconsideration

December 10, 2018

Glossary of Terms

AIS - Automatic Identification System

AMARS - Autonomous Multichannel Hydrophone Recorders

AP – Action Plan

APAHs - alkylated congeners

ARMs - alternative response measures

AWB – Access West Blend

BCEAO - British Columbia Environmental Assessment Office

Bill C-86 – "A second Act to implement certain provisions of the budget tabled in Parliament on February 27, 2018 and other measures"

Butler Report - Independent Review of the M/V Marathassa Fuel Oil Spill Environmental Response Operation

CAR - Joint Federal/Provincial Consultation and Accommodation Report for the Trans Mountain Expansion Project, dated November 2016

CCG – Canadian Coast Guard

CEAA 2012 - *Canadian Environmental Assessment Act, 2012*, SC 2012, c 19

CEO – chief executive officer

CEPA – *Canadian Environmental Protection Act*

CFA – Canadian Ferry Association

CHO – Critical Habitat Order

CHS - Canadian Hydrographic Service

CLB - Cold Lake blend

CMAC - Canadian Marine Advisory Council

CMP – Chemical Management Plan

CNPA - *Canada National Parks Act*

COOGER - Centre for Offshore Oil, Gas and Energy Research

COSEWIC – Committee on the Status of Endangered Wildlife in Canada

CORI - Coastal Ocean Research Institute

CRF – Coastal Restoration Fund

CSA – Canadian Standards Assocation

CSA 2001 - *Canada Shipping Act*, 2001

CSAP – Collaborative Situational Awareness Portal

CSAS - Canadian Science Advisory Secretariat

CVTS - Cooperative Vessel Traffic Services

CWS – Canadian Wildlife Service

DFO - Department of Fisheries and Oceans

dB - decibel

DBDPE - decabromodiphenyl ethane

DP - dechlorane plus

DWT – deadweight tonnage

EA - Environmental Assessment

EAO - British Columbia Environmental Assessment Office

ECCC - Environment and Climate Change Canada

ECHO – Enhancing Cetacean Habitat and Observation Program

EEDI - Energy Efficiency Design Index

ESTS - Emergencies Science and Technology Section

EEM - excitation/emission matrix

EEZ - exclusive economic zone

EREM/MICE - Environmental Response Equipment Modernization / Mobile Incident Command Equipment

FCSAP – Federal Contaminated Sites Action Plan

GHG – greenhouse gas

GINPR - Gulf Islands National Park Reserve

HBCD - hexabromocyclododecane

HC - Health Canada

Hearing Order - Hearing Order MH-052-2018, issued by the National Energy Board on October 12, 2018 **IAMC** - Indigenous Advisory Monitoring Committee

ICCT - International Council on Clean Transportation

ICS - Incident Command System

IMO - International Maritime Organization

ISTOP – Integrated Satellite Tracking of Polluters

IPO-West - Indigenous Partnerships Office – West

LC-PFCAs - long-chain perfluorocarboxylic acids

LiDAR – Light Detection and Ranging

LLMC - International Convention on Limitation of Liability for Maritime Claims

MARPOL Annex VI - Convention to Prevent Air Pollution from Ships

MCTS - Marine Communications and Traffic Services

MMRP - Marine Mammal Response Program

MMRs – Marine Mammal Regulations

MCTS - marine communications and traffic services

MEIT – Marine Emissions Inventory Tool

MEPC - Marine Environment Protection Committee

MDFA - Maa-nulth Domestic Fishing Area

MP – management plan

MPA – Marine Protected Area

MPMO - Major Projects Management Office

NAFCs - naphthenic acid fraction components

NAs - Naphthenic acids

NASP - National Aerial Surveillance Program

NEB - National Energy Board

NEBA - net environmental benefit analysis

NEMES – Noise Exposure to Marine Ecosystems from Ships

NMCA - National Marine Conservation Areas

NOAA - United States National Oceanic and Atmospheric Administration **NRCan** - Natural Resources Canada

NSR - Navigation Safety Regulations

OPA - oil-particulate aggregates

OpNet – Operational Network

OPP – Oceans Protection Plan

OSRS - Oil Spill Response Science Program

PAHs - polycyclic aromatic hydrocarbons

PANHs - polycyclic aromatic nitrogen heterocycles

PAME – Protection of the Arctic Marine Environment

PARAFAC - parallel factor analysis

PBDEs - polybrominated diphenyl ethers

PBOM – Physiologically Based Oiling Model

PCA - Parks Canada Agency

PCBs - polychlorinated biphenyls

PFOA - perfluorooctanoic acid

PFOS - perfluorooctane sulfonate

PFP - Participant Funding Program

PMRA – Pesticide Management Regulatory Agency

PPA – Pacific Pilotage Authority

PR – progress report

PRISMM - Pacific Region International Marine Megafauna

PRMM – Pilotage Risk Management Methodology

PRNPR - Pacific Rim National Park Reserve

Project - Trans Mountain Expansion Project

RAMSARD – Risk-based Analysis of Maritime Search and Rescue Delivery

RCAs - Rockfish Conservation Areas

RKW – Resident Killer Whale

RS – recovery strategy

RSA - Marine Regional Study Area

SARA - *Species at Risk Act*, SC 2002, c. 29

SEEMP - Ship Energy Efficiency Management Plan

SCAT - Shoreline Cleanup Assessment Techniques

SLCPs - short-lived climate pollutants

SPE - solid phase extraction

SPI-WCE - Strategic Partnerships Initiative – West Coast Energy

SRKW - Southern Resident Killer Whale

SSG NMCAR - Southern Strait of Georgia National Marine Conservation Area Reserve

SWA - surface washing agent

TC - Transport Canada

TERMPOL – Technical Review Process of Marine Terminal Systems and Transhipment

Sites **TM** - Trans Mountain Pipeline ULC; Trans Mountain Pipeline L.P.

TMX - Trans Mountain Pipeline Expansion Project

TPH - total petroleum hydrocarbons

TSS - Traffic Separation Scheme

UBC – University of British Columbia

UNMP - Underwater Noise Management Plan

ULS - Underwater Listening Station

URN - underwater radiated noise

VFPA – Vancouver Fraser Port Authority

VTS - Vessel Traffic Service

WCEI - West Coast Energy Infrastructure Initiative

WI – Whales Initiative

WMT - Westridge Marine Terminal

Wreck Removal Convention - Nairobi International Convention on the Removal of Wrecks, 2007 **WSER** - Wastewater System Effluent Regulations

WSR – Whale Science Review

Question #	1.1 Government of Canada commitments
Reference:	A95292-2, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 1.
Preamble:	Throughout the reference, the Government of Canada has made a number of commitments with respect to goals, objectives, activities, and outcomes that are either in progress or are proposed to be commenced by various federal departments, agencies, and organizations. These involved Project-related marine shipping commitments, as well as commitments intended to mitigate potential effects associated with Project-related marine shipping. Some of these commitments will not be completed by 22 February 2019. The Board would like to receive a consolidated list of the Government of Canada's commitments in order to make it easier for all Parties and the Board to access and reference them, as they may be completed at a future date.
Request:	a) Provide a commitments tracking table that contains all relevant commitments made by the Government of Canada in the reference, and which are Project-related marine shipping commitments, as well as commitments intended to mitigate potential effects associated with Project-related marine shipping. As appropriate, organize commitments by high-level topic (or subject area). For each commitment, include: i) individual commitment number; ii) group responsible for implementing the commitment (e.g., which federal department, agency, or organization); iii) a description of the commitment; iv) document or source reference(s) (e.g., exhibit number and page reference); v) commitment status (e.g., fulfilled, in-progress, outstanding); vi) Project Stage for Implementation of Commitment (Use Project Stage Identifiers used in the OH-001-2014 proceeding commitment tracking table filed by Trans Mountain [A71392]; and vii) any other relevant comments that the Government of Canada wishes to provide. b) Provide a commitment to submit an updated table prior to the close of the evidentiary portion of the MH-052-2018 Reconsideration hearing.
Response:	The Government of Canada has developed a Commitments tracking table (attached as: 1.01-1) outlining, for each commitment, the seven points listed in Information Request 1.1(a) including: commitment number, responsible Federal Department and/or Agency, description of the commitment, document or source reference, commitment status, project stage for implementation of commitment, and other comments as noted above. Commitments in the table reflect those made in the Evidence package filed with the Board on October 31, 2018, by the Department of Justice on behalf of Natural Resources Canada, Transport Canada, Department of Fisheries and Oceans, Canadian Coast Guard, Environment and Climate Change Canada, Health Canada, and Parks Canada Agency.

	"Commitments", for the purpose of this Table, means activities and initiatives that are: a. new Commitments set out in the Oceans Protection Plan and/or the Whales Initiative; or b. ongoing Commitments that are Project specific and are outside of the regulatory framework. Government activities that are outlined in the regulatory framework are general responsibilities to be properly discharged by law. These activities are not considered specific commitments in response to the Project, and as such are not included in the attached Commitment Table. An updated table will be submitted prior to the close of the evidentiary portion of the MH-052-2018 Reconsideration hearing.
Responding FA:	Natural Resources Canada, Transport Canada, Department of Fisheries and Oceans, Canadian Coast Guard, Health Canada, Parks Canada Agency, and Environment and Climate Change Canada.

UPDATED COMMITMENTS TRACKING TABLE

GOVERNMENT OF CANADA

Version 1 - December 10, 2018

Project Stage for Implementation Column Identifiers

" Prior to Construction" - To be completed prior to Construction of specific facility or relevant section of pipeline

" During construction" - To be completed during Construction of Specific facility or relevant section of pipeline

" Prior to Operation" - To be completed prior to commencing operations

"Operations" - To be completed after operations have commenced *NOTE: Projected Operation Date unknown*

"project Lifecycle" - Ongoing commitment

Status Column Identifiers

"Scoping" - work has not commenced

"In Progress" - work has commenced or is partially complete

"Superseded by Condition" - Commitement has been superseded by NEB condition

"Complete" - Commitment has been met

Topic Identifiers

Topic 1: Greenhouse gas (GHG)

Topic 2: SARA-listed species

Topic 3: SRKW

Topic 4: Marine birds

Topic 5: Marine oil spills

Topic 6: Marine safety, navigation, and disturbance

Topic 7: National parks and/or national marine conservation areas

Topic 8: Mitigation and monitoring measures for human health effects

Topic 9: Mitigation, accommodation, and monitoring measures proposed by Indigenous groups

Note: To the extent to which the response to IR 1.1 (the IR 1.1 Table) constitutes a tabulation of evidence presented in the Federal Interveners' Evidence Submission A95292-2 (the Federal Submission) in summary form, the evidence set out in the Federal Submission takes precedence

Commitment #	Topic	Responsible Department (s)	Description	Document Reference(s) Source(s) of Commitment	Commitment status	Project Stage for Implementation of Commitment	Additional Comments
Gov01	5	Canadian Coast Guard, Fisheries and Oceans Canada, Transport Canada, and Environment and Climate Change Canada	OPP Regional Response Planning initiative	A95292-2 2.B.12 PDF pp 36-37	In Progress	Project Lifecycle	
Gov02	5 & 6	Canadian Coast Guard, Transport Canada	OPP Increased Emergency Towing Capacity initiative	A95292-2 2.B.17 PDF pp 44-45	In Progress	Project Lifecycle	

Commitment #	Topic	Responsible Department (s)	Description	Document Reference(s) Source(s) of Commitment	Commitment status	Project Stage for Implementation of Commitment	Additional Comments
Gov03	5	Environment and Climate Change Canada, Department of Fisheries and Oceans, Natural Resources Canada	OPP Investments in oil spill research	A95292-2 2.E PDF pp 64-68, 140	In progress	project Lifecycle	
Gov04	5 & 6	Transport Canada, Canadian Coast Guard	OPP Comprehensive Strategy for Vessels of Concern Program	A95292-2 2.C.7 PDF pp 57-58	In Progress	Project Lifecycle	
Gov05	5 & 6	Transport Canada, Canadian Coast Guard	OPP Building Meaningful Partnerships with Indigenous Communities in Marine Safety	A95292-2 2.D.1 PDF pp 59-62	In Progress	Project Lifecycle	
Gov06	5 & 6	Transport Canada, Canadian Coast Guard,	OPP Increased On-Scene Environmental Response Capacity initiative	A95292-2 2.B.16 PDF pp 41-44	In Progress	Project Lifecycle	
Gov07	5	Transport Canada, Canadian Coast Guard, Environment and Climate Change Canada	OPP Emergency Response Capacity to Effectively Manage Marine Incidents Initiative	A95292-2 2.B.14 PDF pp 38-39	Complete	Project Lifecycle	

Commitment #	Topic	Responsible Department (s)	Description	Document Reference(s) Source(s) of Commitment	Commitment status	Project Stage for Implementation of Commitment	Additional Comments
Gov08	5 & 6	Transport Canada, Canadian Coast Guard, Environment and Climate Change Canada	OPP Legislative Amendments to Key Legislation inititaive	A95292-2 2.B.18 PDF pp 45-47	In Progress	Project Lifecycle	
CCG01	5	Canadian Coast Guard	Initiative & Sub-Initiative: Regional Response Planning (RRP) Project Name: N/A	A95292-2: 2.B.12 PDF pp 36-37	In Progress	End Date March 2019	*Initiative that relates to marine shipping generally, but could apply to Project-related marine shipping activities.* RRP is a two year project that ends on March 31, 2019. RRP is piloting a holistic, risk-based approach to environmental response planning. The RRP pilot project is being untaken within British Columbia's Northern Shelf Bio-region. The pilot project is intended to contribute to a strengthened marine safety system through enhanced coordination and more effective response to marine pollution incidents.
CCG02	5&6	Canadian Coast Guard	Initiative: National Vessel Tracking and Monitoring System Sub-Initiative & Project Name: Operational Network (OpNet)	A95292-2: 2.B.2 PDF p 29	In Progress	End Date March 2022	*Initiative that relates to marine shipping generally, but could apply to Project-related marine shipping activities.* Modernization of 50% of MCTS sites has been achieved. The project will continue its modernization efforts with the remaining sites.
CCG03	5&6	Canadian Coast Guard	Initiative: National Vessel Tracking and Monitoring System Sub-Initiative: Additional Radar Sites Project Name: Strengthen the National MCTS Radar Network	A95292-2: 2.B.4 PDF p 30	In Progress	End Date March 2022	*Initiative that relates to marine shipping generally, but could apply to Project-related marine shipping activities.* Radar installations are on track for completion by March 2022. Civil works for all sites are progressing according to plan.
CCG04	5&6	Canadian Coast Guard	Initiative: Federal Oversight of Incident Management Sub-Initiative & Project Name: MCTS Staffing Factor	A95292-2: 2.B.5 PDF p 30	In Progress	End Date March 2022	*Initiative that relates to marine shipping generally, but could apply to Project-related marine shipping activities.* Coast Guard Western Region's six personnel have been added: four in Victoria and two in Prince Rupert.
CCG05	5&6	Canadian Coast Guard	Initiative, Sub-Initiative & Project Name: National Implementation of the Risk-Based Analysis of Maritime Search and Rescue Delivery Methodology (RAMSARD)	A95292-2: 2.B.13 PDF pp 37-38	In Progress	End Date March 2022	*Initiative that relates to marine shipping generally, but could apply to Project-related marine shipping activities.* The new RAMSARD methodology is being implemented nationally. One area in Northern BC will be completed by March 2019.

Commitment #	Topic	Responsible Department (s)	Description	Document Reference(s) Source(s) of Commitment	Commitment status	Project Stage for Implementation of Commitment	Additional Comments
CCG06	5&6	Canadian Coast Guard	Initiative: Federal Oversight of Incident Management Sub-Initiative: 24/7 Emergency Response Capacity to Effectively Manage Marine Incidents Project Name: 24/7 Regional Operations Centres (ROCs) & National Command Centre (NCC)	A95292-2: 2.B.16 PDF pp 41-44	In Progress	End Date March 2022	*Initiative that relates to marine shipping generally, but could apply to Project-related marine shipping activities.* Interviews conducted to fill remaining positions.
CCG07	5&6	Canadian Coast Guard	Initiative: On-Water Presence and Response Capacity Sub-Initiative: New Staffed Logistic Depot Near Port Hardy in BC Project Name: Port Hardy Depot	A95292-2: 2.B.16 PDF p 44	In Progress	End Date March 2022	*Initiative that relates to marine shipping generally, but could apply to Project-related marine shipping activities.* An engineering options analysis report has been prepared to inform the decision on a suitable location. As an interim solution, warehouse space was leased in order to house new environmental response equipment.
CCG08	5&6	Canadian Coast Guard	Initiative: On-Water Presence and Response Capacity Sub-Initiative: Six New SAR Lifeboats and In-Shore Rescue Boat Project Name: New CCG Lifeboats (SAR)	A95292-2: 2.B.16 PDF p 44	Scoping	Start Date April 2020 End Date March 2026	*Initiative that relates to marine shipping generally, but could apply to Project-related marine shipping activities.* Four new lifeboat stations in BC will increase Coast Guard's on-water response capacity and enable quicker and more efficient responses.
CCG09	5&6	Canadian Coast Guard	Initiative & Sub-Initiative: Increased Emergency Tow Capacity Project Names - 8J110: Installation and Operationalization of Tow Capacity, 8J130: Leasing Towing Vessels, 8J140: Emergency Towing Needs Analysis	A95292-2: 2.B.17 PDF pp 44-45	In Progress	End Date March 2022	*Initiative that relates to marine shipping generally, but could apply to Project-related marine shipping activities.* The project is on schedule to deliver 30 tow kits by the middle of December 2018. The current awarded contract has a plan to deliver a total of 135 tow kits by March, 2022. Both Emergency Offshore Towing Vessels have arrived in Victoria.
CCG10	5&6	Canadian Coast Guard	Initiative: Conserve or Restore Marine Ecosystems Sub-Initiative: A Comprehensive Strategy for Vessels of Concern Project Name (8R300): Risk-Based Strategy to Address Vessels of Concern	A95292-2: 2.C.7 PDF pp 57-58	In Progress	End Date March 2022	*Initia"Initiative that relates to marine shipping generally, but could apply to Project-related marine shipping activities.* A comprehensive national strategy to address hazards posed by abandoned, dilapidated and wrecked vessels. The strategy is focussed on preventing the occurrence of new vessels of concern while also addressing the vessels already in Canadian waters. Bill C-64 (The Wrecked, Abandoned or Hazardous Vessels Act) has received all-party support in the House of Commons and is making its way through the Parliamentary process. It is currently being studied by the Senate Standing Committee on Transport and Communications."

Commitment #	Topic	Responsible Department (s)	Description	Document Reference(s) Source(s) of Commitment	Commitment status	Project Stage for Implementation of Commitment	Additional Comments
CCG11	5&6	Canadian Coast Guard	Initiative: Enhanced Indigenous and Community Capacity in the Design and Delivery of the Marine Safety and Environmental Protection Measures Sub-Initiative: Coast Guard Auxiliary Chapter in British Columbia Project Name: Coast Guard Auxiliary - Indigenous Branch	A95292-2: 2.D.2 PDF p 62	In Progress	End Date March 2022	*Initiative that relates to marine shipping generally, but could apply to Project-related marine shipping activities.* Coastal Nations Coast Guard Auxiliary has been established. Training initiatives and outfitting vessels with required equipment are underway.
CCG12	5&6	Canadian Coast Guard	Initiative: Enhanced Indigenous and Community Capacity in the Design and Delivery of the Marine Safety and Environmental Protection Measures Sub-Initiative & Project Name: Leverage CCGA for Environmental Response	A95292-2: 2.D.2 PDF p 62	In Progress	End Date March 2022	*Initiative that relates to marine shipping generally, but could apply to Project-related marine shipping activities.* Four Coastal Nation Search and Rescue courses to First Nations have been completed in Bamfield BC. One more course is scheduled to take place in February, 2019. In addition, two Search and Rescue pods/exercises have and continue to take place on a monthly basis.
CCG13	5&6	Canadian Coast Guard	Initiative: Enhanced Indigenous and Community Capacity in the Design and Delivery of the Marine Safety and Environmental Protection Measures Sub-Initiative: Indigenous Community Response Teams Project Name: Indigenous Community Response Training	A95292-2: 2.D.2 PDF pp 62-63	In Progress	End Date March 2022	*Initiative that relates to marine shipping generally, but could apply to Project-related marine shipping activities.* The second Coastal Nations Search and Rescue course of this fiscale year was held in Bamfield from October 24-30, the project has now trained 32 members from 18 different First Nations.
CCG14	5&6	Canadian Coast Guard	Initiative: Enhanced Indigenous and Community Capacity in the Design and Delivery of the Marine Safety and Environmental Protection Measures Sub-Initiative: Indigenous Community Response Teams Project Name: Collaborative Situational Awareness Portal (CSAP)	A95292-2: 2.D.2 PDF pp 62-64	In Progress	End Date March 2022	*Initiative that relates to marine shipping generally, but could apply to Project-related marine shipping activities.* Developing a Collaborative Situational Awareness Portal Prototype. Held Engagements with various Indigenous Communities and Marine Stakeholders. The Project Team will continue with further engagements in order to gather feedback and additional requirements of all user groups. New versions of portal will be released regularly as input is collected.
CCG15	5&6	Canadian Coast Guard	Initiative: Enhanced Indigenous and Community Capacity in the Design and Delivery of the Marine Safety and Environmental Protection Measures Sub-Initiative: Coast Guard Auxiliary Chapter in British Columbia Project Name: Indigenous Community-Boat Volunteer Program	A95292: 2.D.2 PDF p 62	In Progress	End Date: 2020-2021	*Initiative that relates to marine shipping generally, but could apply to Project-related marine shipping activities.* Four-year pilot project to provide funding to Indigenous communities to purchase life-saving equipment and bolster on-water response capacity.

Commitment #	Topic	Responsible Department (s)	Description	Document Reference(s) Source(s) of Commitment	Commitment status	Project Stage for Implementation of Commitment	Additional Comments
CCG16	5&6	Canadian Coast Guard	Initiative: On-Water Presence and Response Capacity Sub-Initiative: Increased On-Scene Environmental Response Capacity Project Name: Primary Emergency Response Teams	A95292-2: 2.B.16 PDF p 42	In Planning		*Initiative that relates to marine shipping generally, but could apply to Project-related marine shipping activities.* Dedicated on-water personnel available to respond to reports of marine spills.
CCG17	5&6	Canadian Coast Guard	Initiative: On-Water Presence and Response Capacity Sub-Initiative: Increased On-Scene Environmental Response Capacity Project Name: Increasing Training and Exercising	A95292-2: 2.B.16 PDF pp 42-43	In Progress	End Date March 2022	*Initiative that relates to marine shipping generally, but could apply to Project-related marine shipping activities.* New Instructors are being hired to develop and deliver the new ER Training Program.
CCG18	5&6	Canadian Coast Guard	Initiative: On-Water Presence and Response Capacity Sub-Initiative: Sub-Initiative: Modernize CCG Environmental Emergency Response Equipment Project Name: Environmental Response Equipment Modernization	A95292-2: 2.B.16 PDF pp 43-44	In Progress	End Date March 2022	*Initiative that relates to marine shipping generally, but could apply to Project-related marine shipping activities.* A procurement plan for new environmental response equipment is in place and has delivered equipment such as skimmers and curtain booms.
DFO01	3	Fisheries and Oceans Canada	Initiative & Sub-Initiative: Develop a Coastal Environmental Baseline Monitoring Program to Assess the Cumulative Impacts of Marine Shipping Project Name: N/A	A95292-2: 2.C.2 PDF pp 50-51	In Progress	2021-22 (commitment completion date)	*Initiative that relates to marine shipping generally, but could apply to Project-related marine shipping activities.* Through the Coastal Environmental Baseline Program, Fisheries and Oceans Canada committed to work with Indigenous and local communities and others to collect ecological data at the Port of Vancouver and to make this data available to the public. Projects within areas surrounding the Port of Vancouver are expected to generate data related to physical and biogeochemical oceanography and priority marine contaminants; functional coastal sedimentary habitat, including mapping eelgrass meadows and kelp beds; species distribution and abundance of intertidal clams; eulachon; juvenile salmon; nearshore cetaceans; and underwater noise. The data from these projects will assist Fisheries and Oceans Canada to detect changes in these ecosystems and may also be used to inform a cumulative effects framework for marine shipping as well as other environmental assessments and decision-making processes.

Commitment #	Topic	Responsible Department (s)	Description	Document Reference(s) Source(s) of Commitment	Commitment status	Project Stage for Implementation of Commitment	Additional Comments
DFO02	3	Fisheries and Oceans Canada	Initiative: Mitigating the Risk of Marine Shipping on the Environment, including Impacts of Underwater Noise from Ships Sub-Initiative: Reducing the Threat of Vessel Traffic on Whales and Other Marine Mammals through Detection and Avoidance Project Name: N/A	A95292-2: 2.C.3 PDF p 51	In Progress	2021-22 (commitment completion date)	*Initiative that relates to marine shipping generally, but could apply to Project-related marine shipping activities.* Evaluate and test technologies that are able to detect the presence of SRKW in near-real time which could help reduce the risk of strikes between vessels and whales.
DFO03	3	Fisheries and Oceans Canada	Initiative: Mitigating the Risk of Marine Shipping on the Environment, including Impacts of Underwater Noise from Ships Sub-Initiative: Establishing Marine Environmental Quality Regulatory and Non-Regulatory Measures Project Names: N/A	A95292-2: 2.C.4 PDF pp 51-54	In Progress	2021-22 (commitment completion date)	*I nitiative that relates to marine shipping generally, but could apply to Project-related marine shipping activities.* 1) Implement a 5-year science research program to better understand the impact of underwater shipping-related noise on SRKW. 2) Deploy acoustic recorders in SRKW critical habitat and other areas of interest to: a. Help establish ambient underwater noise levels in SRKW critical habitat; b. Help determine SRKW distribution and habitat use over the annual cycle; and c. Help inform and evaluate the effectiveness of mitigation measures aimed at reducing underwater noise levels potentially received by SRKW. 3) Provide financial support to external organizations to undertake research that will complement DFO's research program to better understand the impact of underwater shipping-related noise on SRKW, including: a. University of British Columbia: Examine how changes in the food web affect the abundance and quality of Chinook salmon in critical habitat areas of SRKW. b. Ocean Wise Conservation Association: Conduct a comprehensive health assessment of Northern and Southern Resident Killer Whale populations to better understand the impact of environmental stressors, particularly noise and prey limitation. c. University of Victoria: Studies are looking at how underwater noise impacts the whales' ability to use their echolocation to communicate and detect prey. Researchers are also examining how noise impacts Chinook salmon, their primary prey. Work will also focus on understanding the contribution of small vessels to the overall soundscape of Southern Resident Killer Whales. d. Dalhousie University: Development of an ocean noise model capable of predicting the ambient or "natural" underwater noise levels in waters inhabited by whales. Combining the natural underwater noise level with noise generated from human activities will increase our understanding of the total sound pressure levels experienced by whales and their impact on their ability to forage for food and communicate with one another.

Commitment #	Topic	Responsible Department (s)	Description	Document Reference(s) Source(s) of Commitment	Commitment status	Project Stage for Implementation of Commitment	Additional Comments
DFO04	3	Fisheries and Oceans Canada	Initiative: Conserve or Restore Marine Ecosystems Sub-Initiative: Coastal Restoration Fund Project Name: N/A	A95292-2: 2.C.5 PDF pp 54-57	In Progress	End Date 2022	*This initiative relates to reducing threats (prey) to SRKW.* Following the initial call for proposals the program received 163 expressions of interest requesting over $310 M in funding. Of these, 39 projects have been funded worth over $55M, with 10 British Columbia projects located in areas impacted by the TMX project. The program's second call for proposals was launched November 1, 2018.
DFO05	3	Fisheries and Oceans Canada	Initiative: Conserve or Restore Marine Ecosystems Sub-Initiative: Marine Mammal Response and Marine Protected Areas Surveillance and Enforcement Program Project Name: N/A	A95292-2: 2.C.6 PDF p 57	In Progress	Project Lifecycle	*This initiative relates to reducing threats to SRKW.* Increase the capacity of the Conservation and Protection Program within Fisheries and Oceans Canada to better respond to marine mammal incidents such as collisions, entaglements and strandings.
DFO06	3	Fisheries and Oceans Canada	Initiative & Sub-Initiative: Increased Capacity for Prey Availability Research Project Name: N/A	A95292-2: 3.C.1 PDF p 88	In Progress	Project Lifecycle	*This initiative relates to better understanding of the one of the three primary threats (prey) to the Southern Resident Killer Whale.* Staffing an additional Senior Biologist position focusing on increasing our understanding of the issues surrounding prey availability and SRKW foraging success in key foraging areas in their critical habitat.
DFO07	3	Fisheries and Oceans Canada	Initiative & Sub-Initiative: Whale Contaminant Research Program Project Name: N/A	A95292-2: 3.C.2 PDF p 88	In Progress	Project Lifecycle	*This initiative relates to better understanding of one of the three primary threats (contaminants) to the Southern Resident Killer Whale.* Activities will concentrate on contaminant levels and their trends in SRKW prey (main route of entry of contaminants into whales is through their prey) and, where possible, also assess the direct effects of contaminants on SRKW .

Commitment #	Topic	Responsible Department (s)	Description	Document Reference(s) Source(s) of Commitment	Commitment status	Project Stage for Implementation of Commitment	Additional Comments
DFO08	3	Fisheries and Oceans Canada	Initiative & Sub-Initiative: Fisheries Management Measures Project Name: N/A	A95292-2: 3.C.3 PDF pp 88-89	Complete (2018 Measures) In Progress (2019 Measures)	Prior to Operation	*This initiative relates to better understanding of two of the three primary threats (prey, noise and physical disturbance) to the Southern Resident Killer Whale.* Introduced fishery management measures in 2018 aimed at reducing the total harvest for Chinook salmon by 25-35 percent in areas of critical habitat along with monitoring to assess the effectiveness of these measures. Fisheries and Oceans Canada is currently consulting on new and/or additional measures for the 2019 fishing season. Fisheries management measures are meant to respond to the threat of reduced prey availability for SRKW in key foraging areas in SRKW critical habitat by reducing competition between fishers and whales.
DFO09	3	Fisheries and Oceans Canada	Initiative & Sub-Initiative: Enhancing Compliance and Enforcement Project Name: N/A	A95292-2: 3.C.4 PDF p 89	In Progress	Prior to Operation	*This initiative directly responds to a threat to the survival and recovery of the SRKW.* Addition of four new fishery officers and a dedicated patrol vessel. Additional capacity for Fisheries and Oceans Canada's Compliance and Protection Program is anticipated to be in place by spring 2019, ahead of the salmon fishing season.
DFO10	3	Fisheries and Oceans Canada	Initiative & Sub-Initiative: Pacific Marine Mammal Response Program (MMRP) Project Name: N/A	A95292-2: 3.C.5 PDF p 89	In Progress	Prior to Operation	*This initiative directly responds to a threat to the survival and recovery of the SRKW.* Implementation of a Fisheries and Oceans Canada Pacific Region whale hub to improve the ability of Fisheries and Oceans Canada and partners to support implementation of recovery measures and actions to minimize threats to SRKW survival and recovery.

Commitment #	Topic	Responsible Department (s)	Description	Document Reference(s) Source(s) of Commitment	Commitment status	Project Stage for Implementation of Commitment	Additional Comments
DFO11	3	Fisheries and Oceans Canada	Initiative & Sub-Initiative: Building Partnerships for Additional Action Project Name: N/A	A95292-2: 3.C.6 PDF p 90	In Progress	Prior to Operation	*These initiatives inform mitigation actions for the three primary threats to the SRKW.* Working with Indigenous Peoples, environmental organizations, members of the Enhancing Cetacean Habitat and Observation (ECHO) Program, fishing organizations and the marine industry, as well as other governments to support the recovery of the SRKW Fisheries and Oceans Canada is undertaking a Whale Innovation Challenge initiative (https://whalechallenge.org, see Annex 3.F.11) in partnership with Nesta's Challenge Prize Centre to develop solutions towards real-time detection and location of whales. The initiative aims to mobilize the technology development community in Canada and globally to develop and innovate solutions to better track whales in real-time. Whale Science for Tomorrow (http://www.nserc-crsng.gc.ca/Professors-Professeurs/RPP-PP/Whale-Baleines_eng.asp), a joint initiative between Fisheries and Oceans Canada and the Natural Sciences and Engineering Research Council of Canada was launched in summer 2018 with the objective of providing funding ($3M over 5 years) to Canadian universities for research on endangered whales, including Southern Resident Killer Whale. Funding under this program will focus on understanding threats affecting whales, as well as measuring the effectiveness of efforts currently in place to mitigate threats An SRKW Indigenous and Multi-Stakeholder Advisory Group has also been established to facilitate communication and coordination of activities working towards SRKW recovery.
DFO12	3	Fisheries and Oceans Canada	Initiative: Additional Protection Measures Sub-Initiative: Critical Habitat Project Name: N/A	A95292-2: 3.C.6 PDF p 90	Complete	Prior to Operation	*This initiative directly responds to a threat to the survival and recovery of the SRKW.* Identifying additional critical habitat for SRKW encompassing waters on the continental shelf off of southwestern Vancouver Island, including Swiftsure and La Pérouse Banks

Commitment #	Topic	Responsible Department (s)	Description	Document Reference(s) Source(s) of Commitment	Commitment status	Project Stage for Implementation of Commitment	Additional Comments
DFO13	3	Fisheries and Oceans Canada	Initiative: Additional Protection Measures Sub-Initiative: Prey Project Name: N/A	A95292-2: 3.C.7 PDF p 91	In Progress	Prior to Operation	*This initiative directly responds to a threat to the survival and recovery of the SRKW.* Subject to the outcomes of consultation with Indigenous groups and stakeholders, consider expanding the duration, geographic scope and/or application of fisheries closures in SRKW critical habitat (building on closures implemented in 2018), potentially via a variation order under the Fisheries Act, to increase prey availability and foraging opportunities. Increase hatchery production at facilities which enhance Chinook stocks while minimizing potential effects of hatchery origin fish on naturally spawning populations.
DFO14	3	Fisheries and Oceans Canada	Initiative: Additional Protection Measure Sub-Initiative: Disturbance Project Name: SRKW Sanctuary	A95292-2: 3.C.7 PDF p 91	In Progress	Prior to Operation	*This initiative directly responds to a threat to the survival and recovery of the SRKW.* Advance feasibility work on establishing SRKW sanctuaries within sub-areas of critical habitat.
DFO15	3	Fisheries and Oceans Canada	Initiative: Additional Protection Measure Sub-Initiative: Disturbance Project Name: Reduced Vessel Disturbance	A95292-2: 3.C.7 PDF p 92	Complete	Prior to Operation	*This initiative directly responds to a threat to the survival and recovery of the SRKW.* Establish new minimum approach distances for vessels through amendments to the Marine Mammal Regulations, including the amendment to establish a 200 metre minimum approach distance for SRKW.

Commitment #	Topic	Responsible Department (s)	Description	Document Reference(s) Source(s) of Commitment	Commitment status	Project Stage for Implementation of Commitment	Additional Comments
DFO16	3	Fisheries and Oceans Canada	Initiative: Additional Protection Measure Sub-Initiative: Implementation Project Name: Scientific Monitoring & Compliance and Enforcement	A95292-2: 3.C.7 PDF p 92	In Progress	Prior to Operation	*This initiative relates to better understanding the overall threats to the Southern Resident Killer Whale.* Increased scientific monitoring and analysis within SRKW foraging areas (e.g., changes in Chinook abundance, SRKW foraging success, and changes in the acoustic environment) to assess effectiveness of Chinook salmon management measures from a SRKW perspective. Continue to implement compliance and enforcement measures related to protections under the SARA (e.g., prohibitions against the killing, harming, and harassing an individual of a wildlife species listed as extirpated, threatened or endangered; prohibitions against destroying any part of the critical habitat of a listed endangered or threatened species, or of a listed extirpated species if a recovery strategy has recommended its reintroduction into the wild in Canada); the Marine Mammal Regulations (prohibitions against disturbance and minimum approach distances for vessels); Fisheries Act (fisheries closures and other measures); and the Oceans Act (marine sanctuary).

Commitment #	Topic	Responsible Department (s)	Description	Document Reference(s) Source(s) of Commitment	Commitment status	Project Stage for Implementation of Commitment	Additional Comments
DFO17	5	Fisheries and Oceans Canada	Initiative: Strengthening Our Understanding of How Oil Products Behave in Water Sub-Initiative: Expand Research on Fate, Behaviour and Biological Impact Project Name: N/A	A95292-2: 2.E: PDF pp 64-67	In Progress	2021-22 (commitment completion date)	*I nitiative that relates to marine shipping generally, but could apply to Project-related marine shipping activities.* 1) University of Guelph: Effects and Biomarkers of Diluted Bitumen Exposure Relevant to Seawater Transition in Atlantic Salmon. Duration: 2017 – 2020 (3 years) 2) University of Victoria: Enabling Rapid Evaluation of Biological Effects of Oil Spills on Juvenile Pacific Salmon in Coastal Habitats. Duration: 2017 – 2020 (3 years) 3) University of Saskatchewan: Evaluating Effects of the Husky Energy Pipeline Spill on Fishes in the North Saskatchewan River. Duration: 2017 – 2020 (3 years) 4) L'Institut national de la recherche scientifique (INRS): Examination of the Toxicity of Diluted Bitumen on Freshwater Fish. Duration: 2017 – 2020 (3 years) 5) International Institute for Sustainable Development (Experimental Lakes Area): Responses of Wild Fish to a Controlled Spill of Diluted Bitumen in Enclosures Deployed in a Boreal Lake at the International Institute for Sustainable Development-Experimental Lake Area (IISD-ELA), Northwestern Ontario. Duration: 2017 – 2021 (4 years) 6) New Jersey Institute of Technology: The Generation of Water Accommodated Fraction (WAF) and Chemically Enhanced Water Accommodated Fraction (CEWAF) (Development of a revised standard method for evaluating the toxicity of heavy oils and other petroleum products for aquatic species). Duration: 2018 – 2019 (1 year) Internal research efforts include laboratory studies that focus on the fate, behaviour and treatment of diluted bitumen and refined products and treatment methods under various environmental and oceanographic conditions. Areas of focus include: - Investigating the behaviour of different types of petroleum products ranging from light and refined fuels to heavy crude oil and bitumen under realistic oceanographic and environment conditions (e.g. ranges of temperature, salinities and wave energies) to better understand and predict the impact of oil spills on the marine environment; and - Examining the effectiveness of spill treating agents under variable conditions to aid in decisions that support their use.
DFO18	5	Fisheries and Oceans Canada	Initiative: Strengthening Our Understanding of How Oil Products Behave in Water Sub-Initiative: Improving Drift Prediction and Near-Shore Modelling Project Name: N/A	A95292-2: 2.E: PDF p 67	In Progress	2021-22 (commitment completion date)	*Initiative that relates to marine shipping generally, but could apply to Project-related marine shipping activities.* Develop enhanced hydrodynamic models (e.g., models providing currents, temperature, salinity) for six high-priority ports, including the Port of Vancouver, in support of improved emergency responses related to environmental incidents, such as oil spills, and the production of hydrographic electronic navigation products.

Commitment #	Topic	Responsible Department (s)	Description	Document Reference(s) Source(s) of Commitment	Commitment status	Project Stage for Implementation of Commitment	Additional Comments
DFO19	5	Fisheries and Oceans Canada	Initiative: Strengthening Our Understanding of How Oil Products Behave in Water Sub-Initiative: Establish a Multi-Partner Oil Spill Response Technology Research for Spill Clean-up Project Name: N/A	A95292-2: 2.E.1 PDF p 67	In Progress	2021-2022 (commitment completion date)	Multi-Partner Research Initiative for Marine Oil Spill is a research network that brings together the best scientific expertise in oil spill research, both nationally and internationally, and is guided by an Advisory Committee. The Multi-Partner Research Initiative will provide funding to external to government researchers to help advance scientific knowledge in oil spill response and remediation strategies, with a focus on five priority areas aligned with the alternative response measures: Spill treating agents, in situ burning, oil translocation, decanting and oily waste disposal, and natural attenuation/ bioremediation.
DFO20	5&6	Fisheries and Oceans Canada, Canadian Hydrographic Service	Initiative: Navigational Information Sub-Initiative: Modern Hydrography and Charting in Key Areas Project Name: N/A	A95292-2: 2.B.6 PDF pp 30-31	In Progress	2021-22 (commitment completion date)	*Initiative that relates to marine shipping generally, but could apply to Project-related marine shipping activities.* Providing updated Electronic Navigation Charts, through modern hydrographic and charting activities, for 13 high priority ports in southern BC by 2021-22.
DFO21	3	Fisheries and Oceans Canada, Transport Canada	OPP Coastal Environmental Baseline program	A95292-2 PDF pp 50-51	In Progress	Project Lifecycle	
ECCC01	4	Environment and Climate Change Canada	Marine bird research and monitoring programs	A95292-2 PDF pp 131, 139	In progress	Project Lifecycle	
ECCC02	5	Environment and Climate Change Canada	Noise Exposure to Marine Ecosystems from Ships	A95292-2 PDF p 138	In progress	Project Lifecycle	
ECCC03	5	Environment and Climate Change Canada	Trajectory modelling of oil spills	A95292-2 PDF p 138	In progress	Project Lifecycle	
ECCC04	5	Environment and Climate Change Canada	The Physiologically Based Oiling Model	A95292-2 PDF p 138	In progress	Project Lifecycle	

Commitment #	Topic	Responsible Department (s)	Description	Document Reference(s) Source(s) of Commitment	Commitment status	Project Stage for Implementation of Commitment	Additional Comments
NRCAN01	9	Natural Resources Canada	The Strategic Partnerships Initiative – West Coast Energy (SPI-WCE) contribution program was launched in 2014, to facilitate Indigenous participation in west coast energy infrastructure development. Although not linked directly to specific projects like TMEP, the program funded Indigenous - led projects and workshops, including some related to the marine environment.	A95292-2 Section 4.B.3 PDF pp 107-109	Complete	End Date March 2019	Information on workshops and projects funded relating to the marine environment are outlined in Section 4B of Government of Canada Evidence, pages 86-88. The Program ends March 2019.
NRCAN02	9	Natural Resources Canada	Implement the Indigenous Advisory and Monitoring Committee on the Trans-Mountain Expansion Project, including with respect to the performance of the Project, the braoder NEB-regulated pipeline corridor, the marine terminal and associated marine shipping over the lifecycle of the project.	A95292-2 Section 4.B.2 PDF pp 101-107	In Progress	Project Lifecycle	Federal commitment detailed on page 80. Additional information, including progress to date may be found on pp. 80-86.
PCA01	3	Parks Canada Agency	Parks Canada Agency has no specific commitments regarding Project-related marine shipping. Park Wardens will notify fenderal partner agencies including Transport Canada and Canadian Coast Guard should they observe any infractions while carrying out their ordinary duties. Parks Canada warden capacity will not change as a result of potential project approval.	A95292-2 PDF p 240	In Progress	Project Lifecycle	
PCA02	3	Parks Canada Agency	Park Canada Agency is a member of the OPP. This commitment is unrelated to project-related marien shipping and it's membership in the OPP will not change as a result of potential project approval.	A95292-2 PDF p 241	In Progress	Project Lifecycle	
TC01	3	Transport Canada	Whales initiative, Legislative Initiatives	A95292-2 3.B.1 PDF p 71	Ongoing	Project Lifecycle	
TC02	3	Transport Canada	Whales Initiative, Research and Development (R&D)	A95292-2 3.B.2 PDF pp 71-76	In Progress	Project Lifecycle	While the Government's evidence submission had stated this hydrophone would be deployed spring of 2019 (page 54), delays in the contracting process have delayed the deployment. The hydrophone is now expected to be in place by October 2019 and will be deployed for a period of 4 years.
TC03	3	Transport Canada	Whales Initiative, Underwater Noise Management Plans	A95292-2 3.B.3 PDF pp76-77	In Progress	Prior to Operation	Stakeholder engagement is to begin in January 2019.
TC04	3	Transport Canada	Whales Initiative, Vessel Traffic Management Measures for Underwater Noise Mitigation	A95292-2 3.B.4 PDF pp 78-79	In Progress	Project Lifecycle	Transport Canada is working with ECHO and other stakeholders to inform appropriate measures for the 2019 season.
TC05	3	Transport Canada	Whales Initiative, Supporting Enforcement and Monitoring, National Aerial Surveillance Program (NASP) and Hydrophone Deployment	A95292-2 3.B.5 PDF pp 80-81	In Progress	Project Lifecycle	As noted for #17 above (line30), the Boundary Pass hydrophone is expected to be in place by October 2019.

Commitment #	Topic	Responsible Department (s)	Description	Document Reference(s) Source(s) of Commitment	Commitment status	Project Stage for Implementation of Commitment	Additional Comments
TC06	3	Transport Canada	Whales Initiative, International Collaboration to Reduce the Adverse Impacts of Underwater Noise from Commercial Ships	A95292-2: 3.B.6 PDF pp 81-83	In Progress	Project Lifecycle	
TC07	3	Transport Canada	Whales Initiative, Expanded Slowdown Zone	A95292-2: 3.B.7 PDF pp 83-84, 123	Scoping	Prior to Operation	
TC08	3	Transport Canada	Whales Initiative, Conservation Agreements with Key Industry Stakeholders	A95292-2 3.B.8 PDF p 85	In Progress	Prior to Operation	
TC09	3	Transport Canada	Whales Initiative, Proposal to expand requirements for Automatic Identification Systems (AIS) to smaller commercial vessels	A95292-2 3.B.9 PDF p 86	In Progress	Prior to Operation	
TC10	3	Transport Canada	Whales Initiative, Support for WhaleReport Alert System	A95292-2:3.B.10 PDF pp 86-87	In Progress	Project Lifecycle	
TC11	5	Transport Canada	OPP Incident Command System initiative	A95292-2:2.B.15 PDF pp 39-41	In Progress	Project Lifecycle	
TC12	6	Transport Canada	OPP Enhanced Maritime Situational Awareness initiative	A95292-2: 2.B.1 PDF pp 27-29	Scoping	Project Lifecycle	
TC13	6	Transport Canada	OPP Anchorages initiative	A95292-2: 2.B.8 PDF p 32	In Progress	Project Lifecycle	
TC14	6	Transport Canada	OPP Proactive Vessel Management initiative	A95292-2: 2.B.9 PDF pp 32-34	In Progress	Project Lifecycle	
TC15	6	Transport Canada	OPP Pilotage Act Review initiative	A95292-2:2.B.10 PDF pp 34-35	In Progress	Project Lifecycle	
TC16	3 & 6	Transport Canada	OPP Cumulative Effects of Marine Shipping inititaive	A95292-2 : 2.C.1 PSF pp 48-50	In Progress	Project Lifecycle	
TC17	5 & 6	Transport Canada	OPP Places of Refuge initiative	A95292-2: 2.B.11 PDF pp 35-36	In Progress	Operations	

Question #	**1.2 Indigenous Coast Guard Auxiliary**
Reference:	A95292-2, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 1, PDF page 62 of 242.
Preamble:	The reference notes that the CCG is working in partnership with Indigenous groups to create a dedicated funding agreement specifically to support Indigenous communities to participate in marine emergency response activities within their communities as Auxiliary volunteers. An Indigenous Coast Guard Auxiliary (Auxiliary) has been incorporated with one active unit established. This initiative will initially target Indigenous communities in British Columbia, but could be expanded nationally.
Request:	Provide more information regarding the Auxiliary, including: a) where the active unit has been established; b) which Indigenous communities have expressed interest in participating in the Auxiliary; c) how CCG is measuring the success of the Auxiliary overall, and the active unit specifically, including the criteria CCG will use to determine whether or not the Auxiliary will be expanded elsewhere in British Columbia; and d) if CCG determines that more units will be established in British Columbia, a description of when the expansion may take place and how many units CCG anticipates will be created in the province.
Response:	**Provide more information regarding the Auxiliary, including:** **a) where the active unit has been established;** The Canadian Coast Guard Auxiliary is a national program with a history spanning more than four decades. Funded by Coast Guard, Auxiliary organizations are federally incorporated not-for-profit entities that actively support Coast Guard's marine emergency response capacity in Newfoundland and Labrador, Maritimes, Québec, Ontario and in British Columbia. The Oceans Protection Plan provides contribution funding to expand the Auxiliary by increasing the participation of coastal Indigenous communities in the Arctic and in British Columbia. In British Columbia, this was realized through the creation of an Indigenous Auxiliary, the Coastal Nations Coast Guard Auxiliary (CNCGA), in July 2018. This new organization enhances the already established Auxiliary capacity in British Columbia. The CNCGA currently has two units and is operational in the Ahousaht and Gitxaala nations. Each community represents an Auxiliary unit with vessels and crews that are trained and ready to respond to marine emergencies/Coast Guard taskings. **b) which Indigenous communities have expressed interest in participating in the Auxiliary**; In addition to Ahousaht and Gitxaala, other nations that have expressed interest in becoming a CNCGA unit include the Heiltsuk, Haida, Gitga'at, Nisga'a and Lax Kw'alaams. **c) how CCG is measuring the success of the Auxiliary overall, and the active unit specifically, including the criteria CCG will use to determine whether or not the Auxiliary will be expanded elsewhere in British Columbia; and**

	The objective of the Auxiliary nationally is to respond to 20% of marine search and rescue (SAR) incidents in Canadian waters under federal jurisdiction. Each Auxiliary organization is required to train its members to national competency standards, and to ensure that vessels are in a state of readiness around the clock, and upon accepting a tasking, an Auxiliary vessel is expected to be deployed within 30 minutes. With regards to criteria to determine expanding the Auxiliary elsewhere in British Columbia, CNCGA funding supports limited coordinated strategic expansion. Coast Guard will work collaboratively with CNCGA to identify areas of highest priority for search and rescue coverage. **d) if CCG determines that more units will be established in British Columbia, a description of when the expansion may take place and how many units CCG anticipates will be created in the province.** For the CNCGA, a unit is defined as a member nation. Determining the need for more units will be evidence-based using a risk-based analysis of the maritime search and rescue needs in a given area. The number of units added over time will be determined in large part by SAR needs and availability of resources. CNCGA expansion (increasing the number of CNCGA member nations/units) is a goal of both the organization and the Coast Guard. The CNCGA is in the nascent stages and as it becomes more established will be better positioned to engage interested Coastal nations to expand its reach.
Responding FA:	Canadian Coast Guard

Question #	1.3 Public health and emergency management
Reference:	i) A95292-2, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 1, PDF page 203 of 242 ii) A95299-25, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 2, Annex 8.E.1 – Guidance for the Environmental Public Health Management of Crude Oil Incidents – A Guide Intended for Public Health and Emergency Management Practitioners.
Preamble:	Reference i) indicates that the CCG is the on-water federal lead agency for marine pollution response. The CCG provides oversight of every marine incident and is responsible for ensuring the clean-up of ship-source and mystery-source spills of oil and other pollutants into Canadian waters. Reference ii) was published in August 2018 by Health Canada and provides guidance for the environmental public health management of crude oil incidents, including Section 3: Public Health Risk Management.
Request:	Provide CCG's views on the above-referenced Health Canada report and discuss its application to emergency response planning for Project-related marine shipping.
Response:	The Canadian Coast Guard undertakes emergency response planning for marine spills within its mandate, which includes potential spills from Project-related marine shipping. The approach and principles described in the Canadian Coast Guard's response plans are consistent with those described in the Health Canada report. Both Health Canada and Canadian Coast Guard prioritize the health and safety of first responders and the public during the spill response. This is reflected in the Canadian Coast Guard's emergency response plans as well as in its response methodology. The Health Canada report recommends using the Incident Command System to integrate facilities, equipment, personnel, procedures and communications to allow for a multi-disciplinary and multi-sectoral approach during spill response. Consistent with this, the Canadian Coast Guard's response plans outline the approach to incident management using the Incident Command System (ICS). As the lead agency for the federal government in response to ship-source marine pollution, the Canadian Coast Guard acts as the Incident Commander for responses within Canadian Coast Guard's mandate, or as an Incident Commander within a Unified Command structure that integrates key parties, including the polluter, Indigenous communities and provincial and territorial governments when appropriate and required. ICS is designed to facilitate integration of appropriate expertise based on the nature of the incident. Accordingly, where appropriate, the Canadian Coast Guard uses the ICS structure to integrate organizations responsible for public health risk management, including federal and provincial/territorial organizations. As noted in the Health Canada report, the standard ICS structure includes a Safety Officer. The Safety Officer is responsible for developing and recommending measures to ensure personnel safety and occupational health of not only response workers, but also the public, and to anticipate, recognize, assess, and control hazards and unsafe conditions or situations. On smaller incidents, when a dedicated Safety Officer is not

	appointed, these responsibilities are carried out by the Incident Commander or Unified Command. At a local level, the Greater Vancouver Integrated Response plan for Marine Pollution integrates public health management during both preparedness and response. It is designed to serve as the guide for multi-agency on-water response to serious oil pollution events in the area of English Bay and Burrard Inlet. It is the product of a significant cooperative effort by federal departments, First Nations, provincial ministries, municipalities, the port authority, industry (including the Western Canada Marine Response Corporation), and non-governmental organizations such as the Vancouver Aquarium. This plan focuses on ship source and mystery source spills of liquid petroleum in the marine environment as covered under the *Canada Shipping Act*, 2001. At the federal, provincial and local levels, the plan includes those responsible for public health considerations.
Responding FA:	Canadian Coast Guard

Question #	**1.4 Use of Indigenous traditional knowledge in the Action Plan for the Southern resident killer whale (SRKW)**
Reference:	A95299-19, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 2, Annex 7.G.2: i) Action Plan for the Northern and Southern Resident Whale, PDF page 429 of 898 ii) Southern resident killer whale – A science based review of recovery actions for three at-risk whale populations, PDF page 572 of 898 iii) A95292-2, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 1, PDF page 178 of 242.
Preamble:	Aboriginal traditional knowledge on the behavior and distribution of resident killer whales and their prey into measures for the recovery of the species. The reference indicates that the timeline for this measure is annual and ongoing. In Reference ii), it is noted that the above measure has not yet started. Reference iii) notes that there has been no new update to Recovery Measure #20 since the science-based review of recovery actions for SRKW (Reference ii]).
Request:	Provide an update on the status of Recovery Measure #20, including: a) an explanation as to why this measure has not yet begun, given that other efforts to determine the behavior and distribution of SRKW and their prey are underway; b) which Indigenous communities will be providing Indigenous traditional knowledge; c) how this information will be collected on an annual and ongoing basis; and d) which other efforts to determine the behavior and distribution of SKRW could benefit from the collection of Indigenous traditional knowledge.
Response:	**Provide an update on the status of Recovery Measure #20, including:** **a) an explanation as to why this measure has not yet begun, given that other efforts to determine the behavior and distribution of SRKW and their prey are underway;** The *Species at Risk Act* recognizes that Aboriginal Traditional Knowledge (ATK) should be considered in developing and implementing recovery measures. The DFO Species at Risk program has engaged Indigenous groups on the development of recovery documents since the formation of the program in 2003, to participate in the recovery of species at risk including through the provision of ATK. This engagement includes the development of the Recovery Strategy for Northern and Southern Resident Killer Whale (*Orcinus orca*) in Canada, the Action Plan for the Northern and Southern Resident Killer Whale (*Orcinus orca*) in Canada (NEB Document No. A95299-19, Page 413 of 896) and the amended Recovery Strategy for Northern and Southern Resident Killer Whale (*Orcinus orca*) in Canada (NEB Document No. A95299-19, Page 650 of 896), which includes new areas of critical habitat and further clarifies the functions, features, and attributes of all critical habitat for Resident Killer Whales. To the extent possible, opportunities for and consultation, which includes the invitation to provide ATK, where available, were provided to all Indigenous groups considered to

	be directly affected by the recovery strategy and action plan as per the *Species at Risk Act*. While actions to recover SRKW have been ongoing over the years, the Action Plan provides the Department and others with specific recovery measures for research, education and outreach, and management, the successful implementation of which involves continued engagement, including with Indigenous groups, to identify specific projects and activities to implement the recovery measures. As collaborative implementation increases, Indigenous groups are being engaged (e.g. through governance bodies such as the SRKW Indigenous and Multi-stakeholder Advisory Group, and the DFO-led SRKW prey availability working group) with the invitation to provide traditional knowledge on the behavior and distribution of RKW and their prey, where available, such that it may be incorporated into the implementation of recovery measures. The SRKW Indigenous and Multi-stakeholder Advisory Group has been initiated to assist with sharing of information across sectors and facilitating coordination of an integrated approach to the implementation of recovery measures, and the DFO-led SRKW prey availability working group has been developed to advise on implementation of salmon fisheries management measures to address lack of prey availability. DFO is of the view that Recovery Measure #20 has been initiated through recent engagement of Indigenous groups in implementation governance processes for implementation of Action Plan recovery measures in 2019. ATK provided through this process on SRKW behaviour, distribution and their prey is considered and incorporated where provided. **b) which Indigenous communities will be providing Indigenous traditional knowledge;** Fisheries and Oceans Canada (DFO) has discussed the status of Recovery Measure #20 above [see Response to 1.4a)]. The department welcomes ATK from all Indigenous groups, however, the provision of ATK is at the discretion of each Indigenous group that chooses to participate in engagement efforts undertaken by DFO. Therefore, DFO cannot provide a list of Indigenous communities that intend to provide ATK. **c) how this information will be collected on an annual and ongoing basis; and** Engagement with Indigenous groups is considered and sought throughout the implementation process for recovery measures to the extent possible. The provision of ATK is at the discretion of each Indigenous group engaged in SRKW recovery. This information may be sought and collected through existing or future processes such bilateral meetings with Indigenous groups, the SRKW Indigenous and Multi-stakeholder Advisory Group, and consultation on Integrated Fisheries Management Plans. ATK may also be collected if made available through studies funded by the Aboriginal Fund for Species at Risk (AFSAR) which supports the development of Indigenous capacity to participate actively in the implementation of the Species at Risk Act. In addition, the Habitat Stewardship Program (HSP), which provides funding for projects submitted by Canadians that contribute directly to the recovery objectives and population goals of species at risk. **d) Provide an update on the status of Recovery Measure #20, including which other efforts to determine the behavior and distribution of SKRW could benefit from the collection of Indigenous traditional knowledge.**

	Fisheries and Oceans Canada uses the best available information in all aspects of decision-making, which includes scientific studies, ATK, and any other available information.
Responding FA:	Fisheries and Oceans Canada

Question #	1.5 SRKW Imminent Threat Assessment – Consultation
Reference:	i) A95292-2, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 1, PDF page 69 of 242 ii) A95299-19, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 2, Annex 7.G.2, Southern Resident Killer Whale Imminent Threat Assessment, PDF page 871 of 898
Preamble:	Reference i) states that the late-2016 launch of the Oceans Protection Plan initiated the Government of Canada conducting science-based whale reviews on the effectiveness of recovery measures to that date for three whales, including SRKW, and subsequent public engagement. This resulted in the development of the "What We Heard Reports," the SRKW Symposium, and, ultimately, the Whales Initiative funding. It provided a basis for the way forward on what is needed to promote the recovery of the species. Reference ii) states that Indigenous consultation was not specifically done to support the SRKW Imminent Threat Assessment. However, from 10-12 October 2017, DFO held a SRKW Symposium in Vancouver. The reference notes that Indigenous groups participated in the symposium and provided a review of the linkages between threats, and expressed that the complexity and importance of killer whales and their relationship to First Nations is fundamental to cultural traditions and teachings.
Request:	Provide more details regarding the information provided by Indigenous communities at the symposium, including: a) how the information provided by Indigenous communities was used in support of the Whales Initiative, including the specific measures that have been launched as part of the Whales Initiative that incorporate the information provided; b) whether this information was used for any other Government of Canada initiatives or measures related to marine shipping; and c) whether the Government of Canada has sought the input of Indigenous communities on SRKW specifically, and other whales on the west coast more generally, in any other ways and, if so, how this information has been incorporated into the Oceans Protection Plan, the Whales Initiative, and any other relevant initiatives related to marine shipping.
Response:	**Provide more details regarding the information provided by Indigenous communities at the symposium, including:** **a) how the information provided by Indigenous communities was used in support of the Whales Initiative, including the specific measures that have been launched as part of the Whales Initiative that incorporate the information provided;** The SRKW Symposium included presentations by four Indigenous participants, under the discussion topic "First Nations review of linkages between threats": Dr. Teresa Ryan, Tsimshian Nation; Tim Kulchyski, Cowichan Tribes; Carleen Thomas, Tsleil-Waututh Nation; Ray Harris, Stz'uminus First Nation. These talks highlighted the prominence of SRKW in First Nations' history and culture, including their prominence in many stories and art. Indigenous participants highlighted the importance of SRKW (and species at risk more broadly) to Indigenous peoples; the

	importance of Chinook salmon stocks to their communities and SRKW (including a particular focus on Fraser River Chinook, which are of particular importance to SRKW); the importance of considering SRKW recovery in the ecosystem context; and the desire of Indigenous peoples to participate directly in the protection and recovery of SRKW. These perspectives helped inform several elements of the Whales Initiative, particularly program elements aimed at increasing research on key threats to SRKW in the marine ecosystem – the availability of their prey species (Chinook), and the impacts of contaminants on SRKW and their prey species; fisheries management measures aimed at increasing prey availability; and including Indigenous participation in an advisory committee convened by DFO to recommend fishery management measures to support SRKW recovery for the 2018 fishing season; and delivering Marine Mammal Response Program training to Indigenous groups to respond to live stranded and entangled SRKW as well as minimize risk of oil spill exposure through the use of acoustic deterrents. **b) whether this information was used for any other Government of Canada initiatives or measures related to marine shipping;** Indigenous feedback from the symposium also informed the convening of an Indigenous and Multi-stakeholder Advisory Committee in August, 2018 to more directly involve Indigenous groups and others in SRKW recovery planning, and to facilitate a more holistic dialogue about integrating work on recovery across all three major threats (prey availability, physical and acoustic disturbance [including that from marine shipping], and contaminants). Throughout the development of the Recovery Strategy for Northern and Southern Resident Killer Whale (*Orcinus orca*) in Canada (A95299-19, Page 650 of 896) and the Action Plan for the Northern and Southern Resident Killer Whale (*Orcinus orca*) in Canada (A95299-19, Page 413 of 896), opportunities for consultation were provided for all Indigenous groups considered to be directly affected by the Recovery Strategy and Action Plan as per the *Species at Risk Act* and as a result of obligations stemming from Section 35 of the Constitution. Implementation of recovery measures for SRKW depends on the commitment and cooperation of many different groups, including Indigenous groups. Measures to be taken collaboratively are identified in the Action Plan and engagement with Indigenous groups is considered and sought throughout the implementation of relevant recovery measures. **c) whether the Government of Canada has sought the input of Indigenous communities on SRKW specifically, and other whales on the west coast more generally, in any other ways and, if so, how this information has been incorporated into the Oceans Protection Plan, the Whales Initiative, and any other relevant initiatives related to marine shipping.** The Government of Canada has consulted extensively with Indigenous communities regarding SRKW, and on whales more broadly, through a variety of forums, initiatives and processes. In particular, the Oceans Protection Plan (OPP) included several components aimed specifically at engagement, partnership and capacity-building with Indigenous communities. The *Species at Risk Act* (SARA) recognizes that the roles of the Aboriginal peoples of Canada and of Wildlife Management Boards are essential and that the traditional knowledge of Aboriginal peoples of Canada should be considered in the assessment of

	which species may be at risk and in developing and implementing recovery measures. Since the SARA came into force, the Fisheries and Oceans Canada Species at Risk (SAR) Program in the Pacific Region has sought the input of Indigenous communities with respect to the protection of aquatic species at risk in the Canadian waters of the Pacific Ocean, including SRKW and other at-risk whales (Transient Killer Whales, Offshore Killer Whales, Blue, Fin and Sei Whales, North Pacific Right Whale, Grey Whale, and Humpback Whale). Under SARA, the preparation of recovery documents, including recovery strategies, action plans and management plans, must be carried out in cooperation and consultation with specific potentially affected groups and individuals. There are also consultation obligations that stem from Section 35 of the Constitution. As such, those Indigenous groups which are identified to be potentially affected by a listing, strategy, or plan have been engaged and consulted to the extent possible. For SRKW, this includes input from potentially affected Indigenous groups on the development and implementation of the Recovery Strategy for Northern and Southern Resident Killer Whale (*Orcinus orca*) in Canada, the Action Plan for the Northern and Southern Resident Killer Whale (*Orcinus orca*) in Canada (A95299-19, Page 413 of 896), and the proposed amended Recovery Strategy (A95299-19, Page 650 of 896) which identifies two new areas for consideration as critical habitat for Resident Killer Whales. Implementation of recovery measures for SRKW also depends on the commitment and cooperation of many different groups, including Indigenous groups. Measures to be taken collaboratively are identified in the Action Plan and engagement with Indigenous groups is considered and sought throughout the implementation of relevant recovery measures. The Recovery Strategy and Action Plan for Resident Killer Whales provide a foundation and direction for the Oceans Protection Plan and the Whales Initiative for Resident Killer Whale survival and recovery.
Responding FA:	Fisheries and Oceans Canada

Question #	**1.6 Baseline studies, and cumulative and regional assessments (same as or similar to IR 1.27 directed at TC)**
Reference:	A95292-2, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 1: i) PDF pages 48 to 50 of 242 ii) PDF pages 50 and 51 of 242 iii) PDF page 178 of 242.
Preamble:	In Reference i), the Federal Authorities state that, as part of the Oceans Protection Plan, TC is working collaboratively on a Cumulative Effects of Marine Shipping Initiative at six pilot sites (including one in South Coast British Columbia), and that results will include: • collection and amalgamation of existing data such as marine vessel movements; • development of the National Cumulative Effects Assessment Framework; and • identification of potential tools and strategies that can be applied to mitigate the effects of existing and future vessel movements. The Federal Authorities state that the data, framework, and tools developed will support evidence-based decisions that will guide economic growth while preserving marine ecosystems; that the initiative will improve the understanding of cumulative effects from marine shipping at each pilot site; and that the final phases of work (in 2020-2021) will include conducting a regional cumulative effects assessment in each pilot site and identifying potential options for mitigation. After this, results will be evaluated to identify and develop regional tools that can be applied to existing vessel movements as well as future project developments. In Reference ii), Federal Authorities state that DFO and TC are working collaboratively on a Coastal Environmental Baseline Program to collect coastal environmental baseline data at six pilot sites over the next four years, including in the Port of Vancouver, which can be used to inform ecosystem assessments, including the cumulative effects of marine shipping, and to help DFO detect changes in the local ecosystem. In Reference iii), DFO states that Recovery Measure #11 from the Resident Killer Whale (RKW) Action Plan, regarding the assessment of cumulative effects of potential anthropogenic impacts on RKW using an appropriate impact assessment framework for aquatic species, is now underway and the anticipated date for peer review through the Canadian Science Advisory Secretariat is May 2019.
Request:	Provide more details on each of the following initiatives, assessments, and programs, including how they might be relevant to assessing, mitigating, and monitoring the effects of Project-related marine shipping (including cumulative effects and effects of any accidents and malfunctions), and when the results of each of these initiatives, assessments and programs expected. a) Cumulative Effects of Marine Shipping Initiative b) Regional cumulative effects assessment

	c) Coastal Environmental Baseline Program d) Assessment of cumulative effects of potential anthropogenic impacts on RKW In each case, provide a rationale, taking into account: • the Board's responsibilities under the *Canadian Environmental Assessment Act, 2012* and the *Species at Risk Act* (SARA), such as having to consider cumulative effects, mitigation, and follow-up measures in relation to Project-related marine shipping, • the purposes and anticipated results of each of the initiatives, assessments, and programs as referenced in the preamble; and • when mitigation and monitoring could be put in place for Project-related marine shipping.
Response:	**a) Cumulative Effects of Marine Shipping Initiative** The National Energy Board (NEB) posed Information Request (IR) 1.6a to Fisheries and Oceans Canada (DFO) on November 27, 2018. After reviewing the request, DFO has determined that this IR falls outside the scope of its mandate. DFO therefore refers the NEB to Transport Canada's response to IR 1.27a. **b) Regional cumulative effects assessment** Regional cumulative effects assessments are a phase of the Cumulative Effects of Marine Shipping Initiative. Thus, how the regional cumulative effects assessments are relevant to assessing, mitigating, and monitoring the effects of Project-related marine shipping, and when the results of those assessments are expected are questions best addressed by Transport Canada in its response to IR 1.27. **c) Coastal Environmental Baseline Program** Through the "Coastal Environmental Baseline Program", Fisheries and Oceans Canada is engaging partners in coastal environmental baseline data collection at six pilot sites across Canada including the Port of Vancouver. This program aims to collect a breadth of baseline information at the pilot sites over the course of several years that can help characterize ecosystems. Data collection is commencing 2018/19 and will continue through to 2021/22 and collected data will be accessible via open portals. The environmental data to be collected is being determined in partnership with Indigenous and coastal communities, and includes data related to physical and biogeochemical oceanography; functional coastal sedimentary habitat, including mapping eelgrass meadows and kelp beds; species distribution and abundance of intertidal clams; juvenile salmon; nearshore cetaceans; and underwater noise. The data from these projects will assist the detection of changes in these ecosystems with time and may also be used to inform impacts of marine shipping as well as other environmental assessments and decision-making processes. Baseline data may also be relevant for assessments of specific components and features of these ecosystems required for other science and/or management purposes. For example, baseline data that may be relevant for monitoring of changes in the status of ecosystem components before and/or after the commencement of project-related marine shipping and/or after mitigation measures are in place.

	d) Assessment of cumulative effects of potential anthropogenic impacts on RKW. In Fall 2017, Fisheries and Oceans Canada's (DFO) Species at Risk Program in Pacific Region requested science advice through the Canadian Science Advisory Secretariat on the cumulative effects of anthropogenic impacts to Resident Killer Whales. A Canadian Science Advisory Secretariat Regional Peer Review of *Cumulative Effects Assessment for Northern and Southern Resident Killer Whale Populations in the Northeast Pacific* is planned for Spring 2019 (DFO 2018). This cumulative effects assessment is required in order to address Recovery Measure 11 in the *Species at Risk Act* (SARA) Action Plan for these populations (DFO 2017). This recovery measure states "Assess cumulative effects of potential anthropogenic impacts on Resident Killer Whales using an appropriate impact assessment framework for aquatic species". The three primary anthropogenic threats to Southern Resident Killer Whale (SRKW) that will be considered as contributors to cumulative effects in this assessment are those previously identified by DFO (2017): reduced prey availability; acoustic and physical disturbance (including disturbance by both commercial and recreational vessels); and environmental contaminants. Cumulative effects assessments allow for comparisons among multiple threats and their combined impact on long-term population viability. *References:* Fisheries and Oceans Canada (DFO). 2017. Action Plan for the Northern and Southern Resident Killer Whale (*Orcinus orca*) in Canada. Species at Risk Act Action Plan Series. Fisheries and Oceans Canada, Ottawa. v + 33 pp. Fisheries and Oceans Canada (DFO). 2018. Cumulative Effects Assessment for Northern and Southern Resident Killer Whale Populations in the Northeast Pacific. Terms of Reference. Regional Peer Review Process – Pacific Region. March 12-14, 2019, Nanaimo, British Columbia. http://www.dfo-mpo.gc.ca/csas-sccs/Schedule-Horraire/2019/03_12-14-eng.html
Responding FA:	Fisheries and Oceans Canada

Question #	1.7 SARA-listed marine fish, invertebrate, turtle, and mammal species
Reference:	i) A95292-2, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 1, PDF pages 196 and 197 of 242 ii) A95299-18, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 2, Annex 7.G.1, 2011 Recovery Strategy for Basking Shark, PDF pages 826 to 860 of 1133 iii) A95299-19, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 2, Annex 7.G.2, Report on the Progress of Recovery Strategy Implementation for Basking Shark, PDF pages 849 to 868 of 898 iv) A95292-2, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 1, PDF pages 117 to 123, 174 to 190, and 200 and 201 of 242
Preamble:	In Reference i), DFO lists 23 aquatic SARA-listed species that may be affected by Project-related marine shipping. DFO also provides a number of recovery documents concerning these species. For example, DFO provides the recovery strategy for Basking Shark (Pacific Population) and a Report on the Progress of Recovery Strategy Implementation for this species – see References ii) and iii). The Board notes that these documents include information that could be relevant to Project-related marine shipping in terms of effects and potential mitigation and monitoring measures. For example, they list collision with vessels as a threat and there are recommended recovery approaches corresponding to this threat, such as creating a Basking Shark Sightings Network, developing potential foraging habitat maps, and creating codes of conduct to promote responsible boating and fishing practices. In Reference iv), DFO and TC highlight, for SRKW and Northern resident killer whale (NRKW), sections of certain recovery documents relevant to Project-related marine shipping. They provide a discussion of the potential effectiveness and feasibility of various mitigation and monitoring measures related to marine shipping and cumulative effects, and update the implementation of recovery measures in relation to threats from marine shipping/vessel traffic. For other species, it is less clear to the Board which recovery documents contain information pertinent to Project-related marine shipping.
Request:	For each SARA-listed marine fish, invertebrate, turtle, and mammal species potentially affected by Project-related marine shipping (except for SRKW and NRKW), provide the following. a) *With regard to effects in new and updated evidence since the date of the Board's OH-001-2014 Recommendation Report (May 2016):* Identify and discuss (including links and page numbers) any information within new and updated Recovery Strategies, Action Plans, Management Plans, Progress Reports, Threat Assessments, or other related documents that concerns potential threats or effects relevant to Project-related cumulative effects).

	b) *With regard to mitigation and monitoring in any relevant evidence:* Identify and discuss (with links and page numbers) any information within any Recovery Strategies, Action Plans, Management Plans, Progress Reports, Threat Assessments, or other related documents, that considers mitigation and monitoring measures that could be relevant to Project-related marine shipping, and comment on the safety, technical, and economic feasibility of each such measure with regard to Project-related marine shipping.
Response:	Information pertaining to NEB Request 1.7(a) and (b) is provided in Table 1.7-1 below. This table identifies and discusses information from SARA recovery documents concerning potential threats or effects relevant to project-related marine shipping (including malfunctions, accidents, or cumulative effects). The information in this table was consolidated from Recovery Strategies, Action Plans and Management Plans. Progress Reports were not cited in Table 1 as these reports do not identify new threats to species. Progress Reports provide an update on the progress of implementation of recovery measures and relevant measures are summarized in Table 1.7-2. The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) Threat Assessments were outside the scope of this assessment but threats to species identified in COSEWIC documents and Recovery Potential Assessments for at-risk aquatic species have been prioritized and reported in recovery documents. This IR response should be considered along with the Government of Canada's (GoC) response to NEB Topic 2: *Species at Risk Act (SARA)* listed species (Exhibit A95292-2, Section 7.B). The GoC submission is referenced in the tables below where no new information has been identified. The information in Table 1.7-1 on threats and recovery measures has been summarized from recovery documents due to the breadth of information identified in these documents. Please refer to the original SARA documents referenced in the tables below for more detailed information. Please note that the NEB request pertained to both monitoring and mitigation measures. Measures, particularly for monitoring (e.g. boat/ aerial surveys) may be repeated for various species. In addition, broad scale mitigation actions such as emergency response planning or marine spatial planning may also be duplicated. *References for NEB Request 1.7.a. and 1.7.b. (cited in Tables 1.7-1 and 1.7-2)*: *Organized by species* **Offshore Killer Whale** COSEWIC. 2008. COSEWIC assessment and update status report on the Killer Whale *Orcinus orca*, Southern Resident population, Northern Resident population, West Coast Transient population, Offshore population and Northwest Atlantic / Eastern Arctic population, in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. viii + 65 pp. Fisheries and Oceans Canada (DFO). 2007. Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment [accessed January 2013]. Available at: http://www.dfo-mpo.gc.ca/oceans/publications/seismic-sismique/index-eng.html

	Department of Defense (DND). 2008. Maritime Command Order: Marine Mammal Mitigation Procedures [MARCORD]. Unpublished. 46-13 (3A). 10 pp. Ford, J.K.B., and G.M. Ellis. 2014. You are what you eat: ecological specializations and their influence on the social organization and behaviour of killer whales. Pp. 75-98, in Yamagiwa, J., and L. Karczmarski (eds.). Primates and Cetaceans: Field Research and Conservation of Complex Mammalian Societies, Springer, New York. **Harbour Porpoise** Ford, J.K.B., R.M. Abernethy, A.V. Phillips, J. Calambokidis, G.M. Ellis and L.M. Nichol. 2010. Distribution and Relative Abundance of Cetaceans in Western Canadian Waters From Ship Surveys, 2002 - 2008. Canadian Technical Report of Fisheries and Aquatic Sciences 2913: v + 51 pp. DFO. 2018. Report on the Progress of Management Plan Implementation for the Pacific Harbour Porpoise (*Phocoena phocoena vomerina*) in Canada for the Period 2010-2015. Species at Risk Act Management Plan Report Series. Fisheries and Oceans Canada, Ottawa. iv+ 34 pp. **Blue Whale** DFO. 2013. Report on the Progress of Recovery Strategy Implementation for Blue, Fin and Sei Whales (*Balaenoptera musculus*, *B. physalus* and *B. borealis*) in Pacific Canadian Waters for the Period 2006-2011. Species at Risk Act Recovery Strategy Report Series. Fisheries and Oceans Canada, Ottawa. v + 10 pp. Ford, J.K.B., R.M. Abernethy, A.V. Phillips, J. Calambokidis, G.M. Ellis, and L.M. Nichol. 2010. Distribution and relative abundance of cetaceans in western Canadian waters from ship surveys, 2002-2008. Canadian Technical Report of Fisheries and Aquatic Sciences 2913: v + 51 pp. Erbe *et al*. 2014, Identifying Modeled Ship Noise Hotspots for Marine Mammals of Canada's Pacific Region. PLoS ONE 9(3): e89820. **Fin Whale** DFO. 2017. Identification of Habitat of Special Importance to Fin Whales (*Balaenoptera physalus*) in Canadian Pacific Waters. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2017/039. Pilkington, J.F., Stredulinsky, E.H., Abernethy, R.M., and Ford, J.K.B. 2018. Patterns of Fin whale (*Balaenoptera physalus*) Seasonality and Relative Distribution in Canadian Pacific Waters Inferred from Passive Acoustic Monitoring. DFO Can. Sci. Advis. Sec. Res. Doc. 2018/032. vi + 26 pp. Nichol, L.M., Wright, B.M., O'Hara, P., and Ford, J.K.B. 2017. Assessing the risk of lethal ship strikes to humpback (*Megaptera novaeangliae*) and fin (*Balaenoptera physalus*) whales off the west coast of Vancouver Island, Canada. DFO Can. Sci. Advis. Sec. Res. Doc. 2017/007. vii + 33 pp. Nichol, LM & Wright, Brianna & O'Hara, Patrick & Ford, JKB. (2017). Risk of lethal vessel strikes to humpback and fin whales off the west coast of Vancouver Island, Canada. Endangered Species Research. 32. 10.3354/esr00813. Ford, J.K.B, E.H. Stredulinsky, J.R. Towers and G.M. Ellis. 2013. Information in Support of the Identification of Critical Habitat for Transient Killer Whales (Orcinus

orca) off the West Coast of Canada. DFO Can. Sci. Advis. Sec. Res. Doc. 2012/155. iv + 46 pp.

Transient Killer Whale

DFO. 2013. Information in Support of the Identification of Critical Habitat for Transient Killer Whales (*Orcinus orca*) off the West Coast of Canada. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2013/025.

Organized alphabetically

COSEWIC. 2008. COSEWIC assessment and update status report on the Killer Whale *Orcinus orca*, Southern Resident population, Northern Resident population, West Coast Transient population, Offshore population and Northwest Atlantic / Eastern Arctic population, in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. viii + 65 pp.

Department of Defense (DND). 2008. Maritime Command Order: Marine Mammal Mitigation Procedures [MARCORD]. Unpublished. 46-13 (3A). 10 pp.

DFO. 2013. Information in Support of the Identification of Critical Habitat for Transient Killer Whales (*Orcinus orca*) off the West Coast of Canada. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2013/025.

Erbe *et al*. 2014, Identifying Modeled Ship Noise Hotspots for Marine Mammals of Canada's Pacific Region. PLoS ONE 9(3): e89820.

Fisheries and Oceans Canada. 2018. Report on the Progress of Management Plan Implementation for the Pacific Harbour Porpoise (*Phocoena phocoena vomerina*) in Canada for the Period 2010-2015. Species at Risk Act Management Plan Report Series. Fisheries and Oceans Canada, Ottawa. iv+ 34 pp.

Fisheries and Oceans Canada. 2017. Identification of Habitat of Special Importance to Fin Whales (*Balaenoptera physalus*) in Canadian Pacific Waters. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2017/039.

Fisheries and Oceans Canada. 2013. Report on the Progress of Recovery Strategy Implementation for Blue, Fin and Sei Whales (*Balaenoptera musculus*, *B. physalus* and *B. borealis*) in Pacific Canadian Waters for the Period 2006-2011. Species at Risk Act Recovery Strategy Report Series. Fisheries and Oceans Canada, Ottawa. v + 10 pp.

Fisheries and Oceans Canada. 2007. Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment [accessed January 2013]. Available at: http://www.dfo-mpo.gc.ca/oceans/publications/seismic-sismique/index-eng.html

Ford, J.K.B., and G.M. Ellis. 2014. You are what you eat: ecological specializations and their influence on the social organization and behaviour of killer whales. Pp. 75-98, in Yamagiwa, J., and L. Karczmarski (eds.). Primates and Cetaceans: Field Research and Conservation of Complex Mammalian Societies, Springer, New York.

Ford, J.K.B, E.H. Stredulinsky, J.R. Towers and G.M. Ellis. 2013. Information in Support of the Identification of Critical Habitat for Transient Killer Whales (Orcinus orca) off the West Coast of Canada. DFO Can. Sci. Advis. Sec. Res. Doc. 2012/155. iv + 46 pp.

	Ford, J.K.B., R.M. Abernethy, A.V. Phillips, J. Calambokidis, G.M. Ellis, and L.M. Nichol. 2010. Distribution and relative abundance of cetaceans in western Canadian waters from ship surveys, 2002-2008. Canadian Technical Report of Fisheries and Aquatic Sciences 2913: v + 51 pp. Nichol, L.M., Wright, B.M., O'Hara, P., and Ford, J.K.B. 2017. Assessing the risk of lethal ship strikes to humpback (*Megaptera novaeangliae*) and fin (*Balaenoptera physalus*) whales off the west coast of Vancouver Island, Canada. DFO Can. Sci. Advis. Sec. Res. Doc. 2017/007. vii + 33 pp. Nichol, LM & Wright, Brianna & O'Hara, Patrick & Ford, JKB. (2017). Risk of lethal vessel strikes to humpback and fin whales off the west coast of Vancouver Island, Canada. Endangered Species Research. 32. 10.3354/esr00813. Pilkington, J.F., Stredulinsky, E.H., Abernethy, R.M., and Ford, J.K.B. 2018. Patterns of Fin whale (*Balaenoptera physalus*) Seasonality and Relative Distribution in Canadian Pacific Waters Inferred from Passive Acoustic Monitoring. DFO Can. Sci. Advis. Sec. Res. Doc. 2018/032. vi + 26 pp.
Responding FA:	Fisheries and Oceans Canada

TABLE 1.7-1 (Note: Page numbers below refer to Recovery Documents as filed in the Appendices to the Government of Canada's opening statement and direct evidence; see 3rd column of each row).							
SPECIES INFORMATION & RECOVERY DOCUMENT* REFERENCES			**DFO RESPONSE TO NEB REQUEST 1.7.a.**	**DFO RESPONSE TO NEB REQUEST 1.7.b.**			**SUPPLEMENTARY INFORMATION**
Species & SARA Status	**Published SARA Recovery Document(s)**	**NEB Reference (page numbers refers to numbers in red at the bottom of each page)**	**Potential threats or effects relevant to Project-related marine shipping (including from malfunctions, accidents, or cumulative effects)**	**Monitoring/ Mitigation Measures which may be relevant to Project-related marine shipping**	**Status of Recovery Measure**	**Safety, technical, and economic feasibility of each such measure with regard to Project-related marine shipping**	**Additional Notes**
Northern Abalone (Endangered)	Recovery Strategy (2007)	A95299-18: Page 350 of 1131	Page 368 - Works and developments on, in, and under the water (e.g., marinas, loading facilities, aquaculture farms) may have negative impacts on northern abalone habitat and numbers in localized areas, and will need to continue to be monitored and regulated in order to maintain habitat in which the northern abalone can be recovered and to prevent losses to important spawning aggregations.	Table 2, Page 374 - Recovery Planning table states "Use Protocols for authorizing works or developments on, in and under water". This recovery activity can be applied to project-related marine shipping activities and any potential accidents or malfunctions. [Note these protocols can be found on page 1069 of the document referenced in the row below (i.e., the Action Plan)].	Ongoing	Assessment of the safety, technical, and economic feasibility of each recovery measure has not been assessed.	
	Action Plan (2012)	A95299-18: Page 1013 of 1131	Page 1031 - Preliminary results from joint research by Parks Canada Agency and Fisheries and Oceans Canada indicate that significant mortality events may occur upon settling of larvae, which also contributes to overall low recruitment (Parks Canada Agency and DFO unpublished); habitat loss and degradation resulting from underwater works and development (e.g., marinas, loading facilities, aquaculture farms).	Table 4, page 1049 - Review Works and Development Proposals in Abalone habitat and critical habitat	Ongoing	Assessment of the safety, technical, and economic feasibility of each recovery measure has not been assessed.	The Impact Assessment Protocol for Works and Developments Potentially Affecting Abalone and Their Habitat was developed in 2007 to enable assessment and monitoring of works and developments around abalone and their habitat.
Basking Shark (Endangered)	Recovery Strategy (2011)	A95299-18: Page 824 of 1131	Page 830 - Collision with vessels, harassment from marine based activities, and prey availability are potential threats or effects identified in the Recovery Strategy that are relevant to project-related marine shipping. Pages 6-7 of the Recovery Strategy provide further description of these threats.	Table 3, Page 847 - Implement a Code of Conduct (guidelines for marine users to minimize negative interactions and collisions, i.e., proper boating practices for commercial fisheries, recreational fisheries, and ecotourism)	Completed	Assessment of the safety, technical, and economic feasibility of each recovery measure has not been assessed.	See Basking Shark Code of Conduct: http://dfo-mpo.gc.ca/species-especes/publications/sharks/coc/coc-basking/index-eng.html
Killer Whale – Offshore (Threatened)	Recovery Strategy (2018)	A95299-19: Page 744 of 896	Page 750 - Notable threats to the Offshore Killer Whale population and its habitat are "high levels of contaminants, acoustical and physical disturbance, and potential oil spills". See Page 760 for further information on threats.	Table 2, Pages 778–781 - A summary of relevant measures is included below. Broad strategy 1, Approach 1 - Generally describes the research approaches to increase our understanding and knowledge of Offshores, their prey and the threats they face via ongoing multi-species ship-based surveys and photo-identification efforts. Broad strategy 3, Approach 2 - Generally describes research approaches to identify Offshore foraging ecology, prey, and potential impacts of shifting prey dynamics (e.g. due to climate change effects). Broad strategy 3, Approach 3 - Determination of noise profiles, short- and long-term effects of chronic and immediate acoustic and physical disturbance on Offshores. Develop and implement measures to reduce or eliminate disturbance on Offshores. Broad strategy 3, Approach 1, 4 - Though not specific to Offshore Killer Whales, regulations and guidelines	Broad strategy 1, Approach 1 - Ongoing Broad strategy 3, Approach 1 - In progress. Regulations and guidelines including the amendments to the Marine Mammal Regulations and the Be Whale Wise guidelines apply to all marine mammals. Broad strategy 3, Approach 2 - In progress however, the majority of efforts to date have been focused in inshore waters so have limited applicability to Offshore Killer Whales. Broad strategy 3, Approach 3 - Not started (but in progress for other killer whale populations) Broad strategy 3, Approach 4 - In progress Broad strategy 3, Approach 5 - Not started (but in progress for other killer whale populations)	Assessment of the safety, technical, and economic feasibility of each recovery measure has not been assessed.	Page 750 - Through appropriate regulation and management of substances harmful to the marine environment, and the transport of these anthropogenic inputs to the marine environment, including safety measures and timely and thorough spill response, the detrimental effect of contaminants and oil spills on the Offshore Killer Whale population and their prey may be mitigated within Canadian waters. With implementation and enforcement of the *Fisheries Act*, its associated regulations, and the application of best practices (e.g. DFO 2007b for seismic sound; DND 2008 for sonar use), as well as additional stewardship guidelines currently in place, acute noise and vessel disturbance may be mitigated. It is presently unknown whether chronic noise disturbance could be mitigated throughout the range of the Offshore Killer Whale population, and there are currently no chronic noise mitigation measures in effect in Canadian Pacific waters. Though Offshore

TABLE 1.7-1 (Note: Page numbers below refer to Recovery Documents as filed in the Appendices to the Government of Canada's opening statement and direct evidence; see 3rd column of each row).							
SPECIES INFORMATION & RECOVERY DOCUMENT* REFERENCES			**DFO RESPONSE TO NEB REQUEST 1.7.a.**	**DFO RESPONSE TO NEB REQUEST 1.7.b.**			**SUPPLEMENTARY INFORMATION**
Species & SARA Status	**Published SARA Recovery Document(s)**	**NEB Reference (page numbers refers to numbers in red at the bottom of each page)**	**Potential threats or effects relevant to Project-related marine shipping (including from malfunctions, accidents, or cumulative effects)**	**Monitoring/ Mitigation Measures which may be relevant to Project-related marine shipping**	**Status of Recovery Measure**	**Safety, technical, and economic feasibility of each such measure with regard to Project-related marine shipping**	**Additional Notes**
				including the amendments to the *Marine Mammal Regulations* and the Be Whale Wise guidelines apply to all marine mammals. Broad strategy 3, Approach 5- relates to the identification and protection of critical habitat (currently not identified for Offshores) Page 782 - The schedule of studies being undertaken to help identify seasonal distribution of the species, and subsequently critical habitat, and may be relevant to Project-related shipping. Ongoing studies include photo-identification, prey fragment and fecal collection, biopsy sampling and acoustic recording.			Killer Whales are not listed under the United States of America's (US) Endangered Species Act, they are protected by US federal Marine Mammal Regulations and associated threat mitigation measures that are comparable to the protections offered by Canada's Marine Mammal Regulations. Monitoring likely occurs at an acceptable level throughout their range, though some threats are better monitored than others and mitigation is variable. As anything beyond natural mortality could jeopardize the recovery of the Offshore Killer Whale population (i.e. potential biological removal is calculated to be less than one individual) (Ford et al. 2014), continued monitoring and improved mitigation of threats across their range is imperative.
	Management Plan (2009)	A95299-18: Page 518 of 1131	There is no additional information further to the information provided in the Government of Canada's Opening Statement filed with the National Energy Board on October 31, 2018 (NEB Document No. A95292-2, Section 7.B).	There is no additional information further to the information provided in the Government of Canada's Opening Statement filed with the National Energy Board on October 31, 2018 (NEB Document No. A95292-2, Section 7.B).	N/A	Assessment of the safety, technical, and economic feasibility of each recovery measure has not been assessed.	

TABLE 1.7-1 (Note: Page numbers below refer to Recovery Documents as filed in the Appendices to the Government of Canada's opening statement and direct evidence; see 3rd column of each row).							
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Steller Sea Lion (Special Concern)	Management Plan (2011)	A95299-18: Page 744 of 1131	Page 773 - 782 - Exposure to persistent environmental contaminants is a principal threat to Steller Sea Lions identified in the Management Plan. These chemicals can magnify with increasing position in food webs, thereby predisposing many marine mammals to be highly contaminated. Acute or chronic acoustic disturbance may disrupt foraging behaviour and displace animal from feeding areas. Chronic noise at important foraging areas or near rookeries could have long term negative effects on the species. Toxic spills, entanglement in marine debris and disease are other threats to Steller Sea Lion which could be associated to effects relevant to Project-related marine shipping. Page 783 - Individual or combined effects of threats and limiting factors are not prominent enough to force population decline, or to limit population growth. Nevertheless, with a population growth rate of less than 5% per annum, a relatively small increase in human induced mortality could become an important factor if conditions for Steller Sea Lions deteriorate, or if combined with other threats.	Table 3, Page 795-799: A summary of relevant actions is provided below. Action 4 - Review proposals with potential for disturbance at haul-outs and rookeries and provide advice Action 5 – Manage and reduce input of chemical toxins, reduce toxic loading Action 8 – Determine risk associated with lifting of moratorium on offshore fossil fuel extraction Action 9 – Data collection of tissue samples, brand re-sighting and photographs of branded animals Action 10a – Contribute, support, foster research on important foraging areas, seasonal distribution Action 10c – Maintenance of brand re-sight database Action 11 - Assess sustainability of total human-caused mortality Action 18 – Support, contribute to coordination of range-wide surveys every four years Action 19 – Consider biennial rookery surveys Action 20 – Foster improved communication networks	Action 4 - underway, ongoing. Action 5 - underway. Action 8 - underway, ongoing. Action 9 - underway, ongoing. Action 10a - underway. Action 10c - completed. Action 11 - underway. Action 18 - underway, ongoing. Action 19 - not started. Action 20 - in progress and completed.	Assessment of the safety, technical, and economic feasibility of each recovery measure has not been assessed.	
Pacific Harbour Porpoise (Special Concern)	Management Plan (2009)	A95299-18: Page 617 of 1131	Page 622 - Habitat degradation, toxic spills, chemical contamination and acoustic disturbance are identified as significant or principal anthropogenic threats to Harbour Porpoise in the Management Plan. These can be potential threats or effects relevant to project-related marine shipping. Pages 12-17 further describe these threats. Page 632 - For populations, such as Pacific Harbour Porpoise, which may occur over small ranges or exist in restricted habitats, the cumulative effect of any combination of threats may result in more deleterious consequences than any single threat alone.	Table 4; pages 657 - 662. Threats are summarized below. Action 2a and 2b – Amendments to the Marine Mammal Regulation and Enforcement of Marine Mammal Regulations and education regarding guidelines for marine wildlife viewing. Action 5a and b – Develop marine mammal-specific measures for inclusion into catastrophic spill response programs. Review and routinely monitor point-source contamination in known Harbour Porpoise habitat in B.C. in the development of regulations for new emerging PBTs such as PBDEs. Action 6 – Permits for non-DFO research, monitoring, and assessments continue to be issued by DFO as applications are reviewed. Action 7 – Support Marine Mammal Response Network (e.g. incident data collection, necropsies) Action 10a and b – Share Harbour Porpoise Data from	Action 2a. Recently completed. Amendments to the Marine Mammal Regulations came into force in July 2018. Action 2b. Ongoing Action 5ai and ii. In progress Action 6. In progress Action 7. Ongoing Action 8. In progress Action 10a-b. In progress Action 14. Ongoing Action 15a-b. Ongoing	Assessment of the safety, technical, and economic feasibility of each recovery measure has not been assessed.	For DFO spill response planning, aquatic SARA listed species will receive elevated priority when considering response and protection measures during a spill scenario.

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				reconnaissance surveys and remote acoustic packages. Results of cetacean surveys conducted by DFO from 2002-2008, including number of sightings and distribution of Pacific Harbour Porpoise in B.C., were made publicly available in 2010 (Ford et al. 2010). Hydrophones capable of detecting Harbour Porpoise acoustically are maintained by DFO and by ENGOs. Additionally, data collected during the 2018 Pacific Region International Survey of Marine Megafauna (PRISMM) survey will allow for an updated population estimate for Harbour Porpoise in BC waters, expected to be completed in fall 2019. Table 4; actions 13 and 14 – To support the collection of sightings information to better understand species distribution, occurrence and threats. Table 4; action 15a and b – Conduct assessments of vulnerability to identified threats			
Yelloweye Rockfish (type I and type II) (Special Concern)	Management plan is expected to be developed in 2018-19.		N/A	N/A	N/A	N/A	N/A
Longspine Thornyhead (Special Concern)	Management Plan (2012)	A95299-19: Page 1 of 896	Table 1, Page 26 lists pollution as a threat (petroleum spills from tankers; petroleum leaks from sunken vessels; waste from oceangoing vessels, toxins, localized chemical imbalances, anaerobic conditions. Page 31-32 - A plausible threat to these rockfish species is the temporal and spatial expansion of low-productivity regimes caused by climate change, which could influence prey availability and juvenile survival. However, the full impacts of this threat are unknown and further research will be required.	There are no recovery measures included in the management plan that target monitoring or mitigation of these threats.	N/A	N/A	Pages 31 and 32 further describe the identified threats. Page 32 further describes the threat of pollution in greater detail including information on how synthetic and non-biodegradable pollutants can compromise the species and the low effectiveness of measures to prevent and mitigate effects of oil spills.

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Bluntnose Sixgill Shark (Special Concern)	Management Plan (2012)	A95299-18: Page 1087 of 1131	Page 1093 - The primary threats identified for these species are entanglement and bycatch. Other threats, identified in the Management Plan, which may be relevant to Project-related marine shipping include: pollution, habitat loss or degradation, climate and oceanographic change, and harassment.	Table 6, Page 1121, Actions 2-3 - Permitting and the completion of scientific research, monitoring and assessment to address key knowledge gaps and clarify identified threats for Bluntnose Sixgill Shark and Tope Shark in Canadian Pacific waters. Research to better understand the species biology, ecology (habitat/ diet requirements) as well as threats to the species is identified in the Management Plan. Table 6, Page 1122, Action 11 - Collaborate with academic community, industry, environmental non-governmental organizations (ENGOs), and other government agencies on regional, national, and international efforts of research, monitoring, management and enforcement activities for the Bluntnose Sixgill Shark and Tope Shark.	Action 2-3 - Ongoing for some factors; however, further research on threats has not been completed (no permits have been requested to clarify identified threats to the species). Action 11 - Ongoing. While progress has been made on some of these components, there is no monitoring plan in place that could address the effects of project-related marine shipping.	Assessment of the safety, technical, and economic feasibility of each recovery measure has not been assessed.	Pages 1112 - 1113 - Pollution due to petroleum spills from oil tankers, drill rigs, or ocean-going vessels; waste from ocean-going vessels; or biological contaminants via sewage outflow or industry discharge. Page 19 Coastal development such as docks, tanker ports, other similar installations may exclude juvenile Bluntnose Sixgill Shark from their preferred shallower water habitats. Localized water quality issues and physical degradation of habitat may compromise prey availability, displace juvenile Bluntnose Sixgill Shark, affect their potential to feed, or affect reproductive success. Page 1121-1122 - Climate change could influence prey availability and juvenile survival; however, the full impacts of this threat are unknown and further research will be required. More detail on threats can be found on pages 1112-1113. As per SARA s.72, the Report on the Progress of the Management Plan Implementation from 2012 – 2017 is currently under development. This report will report on the status of implementation of the management actions identified in the Management Plan.
Tope Shark (Special Concern)	Management Plan (2012)	A95299-18: Page 1087 of 1131	Page 1093 - The primary threats identified for these species are entanglement and bycatch. Other threats, identified in the Management Plan, which may be relevant to Project-related marine shipping include: pollution, habitat loss or degradation, climate and oceanographic change, and harassment.	Table 6, Page 1121, Actions 2-3 - Permitting and the completion of scientific research, monitoring and assessment to address key knowledge gaps and clarify identified threats for Bluntnose Sixgill Shark and Tope Shark in Canadian Pacific waters. Research to better understand the species biology, ecology (habitat/ diet requirements) as well as threats to the species is identified in the Management Plan. Table 6, Page 1122, Action 11 - Collaborate with academic community, industry, environmental non-governmental organizations (ENGOs), and other government agencies on regional, national, and international efforts of research, monitoring, management and enforcement activities for the Bluntnose Sixgill Shark and Tope Shark.	Action 2-3 - Ongoing for some factors; however, further research on threats has not been completed (no permits have been requested to clarify identified threats to the species). Action 11 - Ongoing. While progress has been made on some of these components, there is no monitoring plan in place that could address the effects of project-related marine shipping.	Assessment of the safety, technical, and economic feasibility of each recovery measure has not been assessed.	Pages 1112 - 1113 - The threat of pollution to the Bluntnose Sixgill Shark and Tope Shark could originate from petroleum spills from oil tankers, drill rigs, or ocean-going vessels; waste from ocean-going vessels; or biological contaminants via sewage outflow or industry discharge. Page 19 - Climate and oceanographic change would impact prey availability, distribution patterns, growth, spawning or parturition areas and nursery grounds. More detail on threats can be found on pages 1112 - 1113. As per SARA s.72, the Report on the Progress of the Management Plan Implementation from 2012 – 2017 is currently under development. This report will report on the status of implementation of the management actions identified in the Management Plan.

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Species & SARA Status	**Published SARA Recovery Document(s)**	**NEB Reference (page numbers refers to numbers in red at the bottom of each page)**	**Potential threats or effects relevant to Project-related marine shipping (including from malfunctions, accidents, or cumulative effects)**	**Monitoring/ Mitigation Measures which may be relevant to Project-related marine shipping**	**Status of Recovery Measure**	**Safety, technical, and economic feasibility of each such measure with regard to Project-related marine shipping**	**Additional Notes**
Green Sturgeon (Special Concern)	Management Plan (2017)	A95299-19: Page 497 of 896	Page 520 - Persistent Bio-accumulative Toxins- High contaminant loads in individual fish could cause a continuous impairment of their behaviour and physiological processes throughout their range, affecting feeding, growth and reproductive success Page 511 - The widespread ecosystem impairment from climate change would be expected to impact the feeding, growth, and survival of higher trophic level fish foraging on benthic invertebrates and fish Page 510 to 513; 520 - Habitat loss or degradation and pollution- These threats may affect behaviour, physiology, fecundity, immune response, habitat use, and result in direct or indirect mortality. Individual and population level impacts to the species may arise from the effect of any combination of the above threats, in conjunction with limiting factors (Section 3.3.3). The consequence of these interactions may be more serious than those of a single threat acting upon the population in isolation.	Page 527 - Improve estimation of all sources and magnitude of human-induced mortality; Investigate habitat and diet requirements. No recovery measures were identified that could target monitoring or mitigation of the threat of climate change.	Not started	Assessment of the safety, technical, and economic feasibility of each recovery measure has not been assessed.	A Report on the Progress of the Management Plan Implementation from 2017 – 2021 will be initiated in 2021. This report will report out on the status of implementation of the management actions identified in the Management Plan.
Rougheye Rockfish (type I and type II) (Special Concern)	Management Plan (2012)	A95299-19: Page 1 of 896	Table 1, Page 26 - Lists pollution as a threat (Petroleum spills from tankers; petroleum leaks from sunken vessels; waste from oceangoing vessels Page 31-32 - Climate change is identified as a plausible threat to this species (further described in threats to Longspine Thornyhead).	No recovery measures were identified that could target monitoring or mitigation of these threats.	N/A	N/A	Section 1.7.2, Page 32 further describes the threat of pollution in greater detail including information on how synthetic and non-biodegradable pollutants can compromise the species and the low effectiveness of measures to prevent and mitigate effects of oil spills.
Olympia Oyster (Special Concern)	Management Plan (2009)	A95299-19: Page 540 of 896	Page 547 - Disruption or alteration of habitat is a current concern for management.	Page 550 – (1) Where possible, develop and undertake protection measures by identifying Olympia oysters in coast wide mapping initiatives and land/marine-use planning processes, such as the Quatsino Sound Coastal Plan, in order for the relevant authorities to take into account the presence of Olympia oysters. (2) Continue to regulate through the habitat referral process, activities that may disrupt or alter Olympia oyster habitat, particularly nearshore developments where populations of Olympia oysters are known to occur. For nearshore development projects, avoid impacts to Olympia oyster beds through project relocation or design mitigation if possible. If impacts are unavoidable, adhere to like-for-like principles when designing and constructing compensatory habitat.	1. Not started 2. In progress	Assessment of the safety, technical, and economic feasibility of each recovery measure has not been assessed.	

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Blue Whale (Endangered)	Recovery Strategy (2006)	A95299-18: Page 236 of 1131	Ship strikes, underwater noise, pollution (including oil spills), and habitat displacement due to changes in ocean climate or trophic structure are threats identified in the Recovery Strategy (p. 264-270) which are relevant to project-related marine shipping.	Pages 278 – 280 - Strategies and approaches to address threats and contribute to recovery of Blue, Fin, and Sei Whales are outlined in the Recovery Strategy. The approaches that relate to Project-related marine shipping are: include research to estimate population abundance, extent of migration, population identities, and seasonal distribution of these species; as well as the following threat mitigation approaches: a) Determine the spatial distribution of commercial shipping traffic and relate to the critical habitat of Blue, Fin, and Sei Whales c) Determine source locations and background noise levels from anthropogenic sources and relate to critical habitat of Blue, Fin, and Sei Whales d) With information gathered in a) and c) above, develop options to protect critical habitat and implement as necessary e) Investigate methods to obtain information on frequency of ship strikes and, if necessary, develop options to reduce their occurrence f) Include the presence of balaenopterids in oil spill response plan(s) to prevent individuals from being oiled in the event of an oil spill g) Confirm that there is little threat to balaenopterids in Pacific Canadian waters from chronic and acute sources of pollution i) Promote marine mammal viewing guidelines and enforce compliance with regulations against disturbance	The status of the recommended approaches to meet recovery objectives and the schedule of studies to identify critical habitat from 2006-2011 were reported on in the Progress Report (2013). Current status of activities underway to support research objectives are reported below for Action Plan measures 1a - d, 3, and 4. Current status of threat mitigation approaches: a) See measure 7 for Action Plan. Note that critical habitat has not been identified for Blue Whales, due to insufficient data, so progress made toward approaches a and c does not relate directly to Blue Whale critical habitat, but to Blue Whale habitat in general. c) See measures 24 and 25 for Action Plan d) Not started e) See measures 5a-d, 7 and 8 for Action Plan f) See measure 17 for Action Plan g) Not started i) See measure 18 for Action Plan	Assessment of the safety, technical, and economic feasibility of each recovery measure has not been assessed.	

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	Action Plan (2017)	A95299-19: Page 351 of 896	Vessel strikes and physical disturbance due to vessel presence; acute and chronic anthropogenic noise; pollution; and changes in foraging habitat due to changes in ocean climate or trophic structure are threats described in the Action Plan (p. 359) which are relevant to project-related marine shipping.	Table 1 (pages 364-368): Measures 1, 3-9, 15-18 and Table 2 (pages 369-371): Measures 19, 23-27, 29 are recovery measures relevant to monitoring/mitigation of project-related marine shipping. Table 1: Measure 1: Use systematic ship-based or aerial line-transect surveys to advance the following efforts: a) determine abundance, site fidelity, and movement patterns using photo ID b) assess distribution and movement patterns using satellite telemetry c) determine population identities using DNA analysis d) determine distribution and densities of prey species Measure 3: Collaborate on the development of a trained core of observers to provide reliable sightings information from offshore platforms of opportunity, and continue to support the British Columbia Cetacean Sightings Network. Measure 4: Record and analyse data from passive acoustic monitoring devices to further investigate extent of occurrence, and advance the determination of population identities; collaborate with other projects Measure 5: Use Pacific Marine Mammal Response Program (MMRP) to: a) continue to solicit and collect data on incidents (e.g. live strandings; dead, sick or injured animals; and vessel strikes) b) continue to develop, train, and equip response teams to attend to Blue, Fin, Sei and North Pacific Right Whales found in distress c) continue to determine the cause of death of whales via necropsy, incident investigation and gear recovery, when possible d) continue to analyse Pacific MMRP data and identify the sources and locations of human-caused injury or mortality when possible Measure 6: Photograph whales during surveys conducted in conjunction with Measure #1, and examine photographs for evidence of vessel strike Measure 7: Identify areas of high risk of interactions through the continued development of spatial analysis of potential whale distribution with respect to ship traffic data Measure 8: After review of mitigation measures that have been effective in other jurisdictions, engage in discussions with other agencies about techniques to reduce the occurrence of vessel strikes	Current status of the relevant recovery measures are below. 1a-d: Ongoing (e.g. annual multi-species ship-surveys; aerial surveys conducted between 2012-2015) 3: Ongoing (e.g. BC Cetacean Sightings Network supported through Habitat Stewardship Program funding) 4: Ongoing; see e.g. Ford et al. 2010 5a-d: Ongoing 6: Ongoing through multi-species ship surveys, and dedicated and opportunistic effort 7: Not started 8: Not started for Blue Whales. Some measures underway for other species (e.g. RKW) could have some benefit to Fin Whales, though there is limited overlap in habitat use 9: Ongoing through DFO Fisheries Protection Program 15: Sample collection occurs when possible during surveys; however, samples have not been analyzed for contaminants 16: Ongoing through DFO Fisheries Protection Program 17: In progress. Regional emergency response plans are under development in collaboration with partners as part of the Government of Canada's national Ocean Protection Plan launched in November 2016. 18: Ongoing by DFO, and by ENGOs and FN partners supported by HSP and AFSAR funding programs 19: Ongoing (e.g. by ENGOs and Academia) 23: Ongoing (e.g. by ENGO and FN partners, some of which are supported by HSP and AFSAR funding programs) 24: In progress, e.g. Erbe et al. 2014. 25: In progress in parts of the coast through hydrophone networks	Assessment of the safety, technical, and economic feasibility of each recovery measure has not been assessed.	

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				Measure 9: Continue to review applications for projects that involve production of noise and provide activity-specific requirements for monitoring and mitigation Measure 15: Monitor and analyse the indicators of stress and animal health. Analyse biopsy and fecal samples for identity and sources of contaminants and biological pollutants. Measure 16: Review proposals and recommend mitigation measures in the context of risk to Blue, Fin, Sei and North Pacific Right Whales to pollution exposure Measure 17: Collaborate on the development and implementation of pollution response plans for marine mammals Measure 18: Promote and distribute marine mammal viewing guidelines and enforce Marine Mammal Regulations against disturbance Table 2: Measure 19: Supplement DFO's efforts by contributing systematic surveys and advancing the effort 1a to 1c above Measure 23: Support DFO's MMRP to contribute to measures 5a to 5d Measure 24: Use area- and time-specific acoustic propagation models to better determine levels of sound exposure, in relation to current and potential whale distribution Measure 25: Use passive acoustic monitoring data to better characterize the underwater soundscape, and noise trends over time, in whale habitat Measure 26: Assess the potential impacts of new and emerging acoustic technologies on these whales, and develop mitigation measures as necessary Measure 27: Develop techniques to mitigate exposure to anthropogenic noise. Measure 29: Develop and implement prevention and mitigation measures to reduce the impacts of pollution on Blue, Fin, Sei and North Pacific Right Whales.	26-27: In progress, e.g. through ECHO (projects generally not developed for large whales specifically, but some may have limited applicability to large whales 29: Ongoing		

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Fin Whale (Threatened)	Recovery Strategy (2006)	A95299-18: Page 236 of 1131	Ship strikes, underwater noise, pollution (including oil spills), and habitat displacement due to changes in ocean climate or trophic structure are threats identified in the Recovery Strategy (p. 264-270) which are relevant to project-related marine shipping.	Strategies and approaches to address threats and contribute to recovery of Blue, Fin, and Sei Whales are outlined in the Recovery Strategy (Page 278 – 280). The approaches that relate to project-related marine shipping are include research to estimate population abundance, extent of migration, population identities, and seasonal distribution of these species; as well as the following threat mitigation approaches: a) Determine the spatial distribution of commercial shipping traffic and relate to the critical habitat of Blue, Fin, and Sei Whales c) Determine source locations and background noise levels from anthropogenic sources and relate to critical habitat of Blue, Fin, and Sei Whales d) With information gathered in a) and c) above, develop options to protect critical habitat and implement as necessary e) Investigate methods to obtain information on frequency of ship strikes and, if necessary, develop options to reduce their occurrence f) Include the presence of balaenopterids in oil spill response plan(s) to prevent individuals from being oiled in the event of an oil spill g) Confirm that there is little threat to balaenopterids in Pacific Canadian waters from chronic and acute sources of pollution i) Promote marine mammal viewing guidelines and enforce compliance with regulations against disturbance	The status of the recommended approaches to meet recovery objectives and the schedule of studies to identify critical habitat from 2006-2011 were reported on in the progress report (2013). Current status of activities underway to support research objectives are reported below for Action Plan measures 1a - d, 3, and 4. Current status of threat mitigation approaches: a) Critical habitat has not been identified for Fin Whales; however, partial "Habitat of special importance" to Fin Whales in Canadian Pacific waters is identified in DFO 2017. This is habitat considered necessary for the survival or recovery of Fin Whales, and is under consideration as critical habitat. See measure 7 for Action Plan, but note that southwestern Vancouver Island is outside the identified habitat of special importance for Fin Whales. c) See measures 24 and 25 for Action Plan, though note that measures relates to Fin Whale habitat in general, not critical habitat d) Not started e) See measures 5a-d, 7 and 8 for Action Plan f) See measure 17 for Action Plan g) Not started i) See measure 18 for Action Plan	Assessment of the safety, technical, and economic feasibility of each recovery measure has not been assessed.	

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SPECIES INFORMATION & RECOVERY DOCUMENT* REFERENCES			**DFO RESPONSE TO NEB REQUEST 1.7.a.**	**DFO RESPONSE TO NEB REQUEST 1.7.b.**			**SUPPLEMENTARY INFORMATION**
Species & SARA Status	**Published SARA Recovery Document(s)**	**NEB Reference (page numbers refers to numbers in red at the bottom of each page)**	**Potential threats or effects relevant to Project-related marine shipping (including from malfunctions, accidents, or cumulative effects)**	**Monitoring/ Mitigation Measures which may be relevant to Project-related marine shipping**	**Status of Recovery Measure**	**Safety, technical, and economic feasibility of each such measure with regard to Project-related marine shipping**	**Additional Notes**
	Action Plan (2017)	A95299-19: Page 351 of 896	Vessel strikes and physical disturbance due to vessel presence; acute and chronic anthropogenic noise; pollution; and changes in foraging habitat due to changes in ocean climate or trophic structure are threats described in the Action Plan (p. 359) which are relevant to project-related marine shipping.	Table 1 (pages 364-368): Measures 1, 3-9, 15-18 and Table 2 (pages 369-371): Measures 19, 23-27, 29 are recovery measures relevant to monitoring/mitigation of project-related marine shipping. Table 1: Measure 1: Use systematic ship-based or aerial line-transect surveys to advance the following efforts: a) determine abundance, site fidelity, and movement patterns using photo ID b) assess distribution and movement patterns using satellite telemetry c) determine population identities using DNA analysis d) determine distribution and densities of prey species Measure 3: Collaborate on the development of a trained core of observers to provide reliable sightings information from offshore platforms of opportunity, and continue to support the British Columbia Cetacean Sightings Network. Measure 4: Record and analyse data from passive acoustic monitoring devices to further investigate extent of occurrence, and advance the determination of population identities; collaborate with other projects Measure 5: Use Pacific Marine Mammal Response Program (MMRP) to: a) continue to solicit and collect data on incidents (e.g. live strandings; dead, sick or injured animals; and vessel strikes) b) continue to develop, train, and equip response teams to attend to Blue, Fin, Sei and North Pacific Right Whales found in distress c) continue to determine the cause of death of whales via necropsy, incident investigation and gear recovery, when possible d) continue to analyse Pacific MMRP data and identify the sources and locations of human-caused injury or mortality when possible Measure 6: Photograph whales during surveys conducted in conjunction with Measure #1, and examine photographs for evidence of vessel strike Measure 7: Identify areas of high risk of interactions through the continued development of spatial analysis of potential whale distribution with respect to ship traffic data Measure 8: After review of mitigation measures that have been effective in other jurisdictions, engage in discussions with other agencies about techniques to reduce the occurrence of vessel strikes	Current status of the relevant recovery measures are below. 1a-d: Ongoing (e.g. annual multi-species ship-surveys; aerial surveys conducted between 2012-2015) 3: Ongoing (e.g. BC Cetacean Sightings Network supported through Habitat Stewardship Program funding) 4: Ongoing; see e.g. Pilkington et al. 2018 5a-d: Ongoing 6: Ongoing through multi-species ship surveys, and dedicated and opportunistic effort 7: Ongoing. Analysis of ship strike risk to FW completed for southwestern Vancouver Island: (Nichol et al. 2017a and Nichol et al. 2017b) 8: Not started for Fin Whales. Some measures underway for other species (e.g. RKW) could have some benefit to Fin Whales, though there is limited overlap in habitat use 9: Ongoing through DFO Fisheries Protection Program 15: Sample collection occurs when possible during surveys; however, samples have not been analyzed for contaminants 16: Ongoing through DFO Fisheries Protection Program 17: In progress. Regional emergency response plans are under development in collaboration with partners as part of the Government of Canada's national Ocean Protection Plan launched in November 2016. 18: Ongoing by DFO, and by ENGOs and FN partners supported by HSP and AFSAR funding programs 19: Ongoing (e.g. by ENGOs and Academia) 23: Ongoing (e.g. by ENGO and FN partners, some of which are supported by HSP and AFSAR funding programs) 24: In progress, e.g. Erbe et al. 2014	Assessment of the safety, technical, and economic feasibility of each recovery measure has not been assessed.	

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				Measure 9: Continue to review applications for projects that involve production of noise and provide activity-specific requirements for monitoring and mitigation Measure 15: Monitor and analyse the indicators of stress and animal health. Analyse biopsy and fecal samples for identity and sources of contaminants and biological pollutants. Measure 16: Review proposals and recommend mitigation measures in the context of risk to Blue, Fin, Sei and North Pacific Right Whales to pollution exposure Measure 17: Collaborate on the development and implementation of pollution response plans for marine mammals Measure 18: Promote and distribute marine mammal viewing guidelines and enforce Marine Mammal Regulations against disturbance Table 2: Measure 19: Supplement DFO's efforts by contributing systematic surveys and advancing the effort 1a to 1c above Measure 23: Support DFO's MMRP to contribute to measures 5a to 5d Measure 24: Use area- and time-specific acoustic propagation models to better determine levels of sound exposure, in relation to current and potential whale distribution Measure 25: Use passive acoustic monitoring data to better characterize the underwater soundscape, and noise trends over time, in whale habitat Measure 26: Assess the potential impacts of new and emerging acoustic technologies on these whales, and develop mitigation measures as necessary Measure 27: Develop techniques to mitigate exposure to anthropogenic noise. Measure 29: Develop and implement prevention and mitigation measures to reduce the impacts of pollution on Blue, Fin, Sei and North Pacific Right Whales.	25: In progress in parts of the coast through hydrophone networks 26-27: In progress, e.g. through ECHO (projects generally not developed for large whales specifically, but some may have limited applicability to large whales 29: Ongoing		

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Species & SARA Status	**Published SARA Recovery Document(s)**	**NEB Reference (page numbers refers to numbers in red at the bottom of each page)**	**Potential threats or effects relevant to Project-related marine shipping (including from malfunctions, accidents, or cumulative effects)**	**Monitoring/ Mitigation Measures which may be relevant to Project-related marine shipping**	**Status of Recovery Measure**	**Safety, technical, and economic feasibility of each such measure with regard to Project-related marine shipping**	**Additional Notes**
Sei Whale (Endangered)	Recovery Strategy (2006)	A95299-18: Page 236 of 1131	Ship strikes, underwater noise, pollution (including oil spills), and habitat displacement due to changes in ocean climate or trophic structure are threats identified in the Recovery Strategy (p. 264-270) which are relevant to project-related marine shipping.	Strategies and approaches to address threats and contribute to recovery of Blue, Fin, and Sei Whales are outlined in the Recovery Strategy (Page 278 – 280). The approaches that relate to project-related marine shipping are include research to confirm the presence of Sei Whales in Canadian Pacific waters, estimate population abundance, extent of migration, population identities, and seasonal distribution of these species; as well as the following threat mitigation approaches: a) Determine the spatial distribution of commercial shipping traffic and relate to the critical habitat of Blue, Fin, and Sei Whales c) Determine source locations and background noise levels from anthropogenic sources and relate to critical habitat of Blue, Fin, and Sei Whales d) With information gathered in a) and c) above, develop options to protect critical habitat and implement as necessary e) Investigate methods to obtain information on frequency of ship strikes and, if necessary, develop options to reduce their occurrence f) Include the presence of balaenopterids in oil spill response plan(s) to prevent individuals from being oiled in the event of an oil spill g) Confirm that there is little threat to balaenopterids in Pacific Canadian waters from chronic and acute sources of pollution i) Promote marine mammal viewing guidelines and enforce compliance with regulations against disturbance	The status of the recommended approaches to meet recovery objectives and the schedule of studies to identify critical habitat from 2006-2011 were reported on in the progress report (2013). Sei Whale presence has been confirmed in Canadian Pacific waters. Current status of activities underway to support research objectives are reported below for Action Plan measures 1a - d, 3, and 4. Current status of threat mitigation approaches: a) See measure 7 for Action Plan. Note that critical habitat has not been identified for Sei Whales, due to insufficient data, so progress made toward approaches a and c does not relate directly to Sei Whale critical habitat, but to Sei Whale habitat in general. c) See measures 24 and 25 for Action Plan d) Not started e) See measures 5a-d, 7 and 8 for Action Plan f) See measure 17 for Action Plan g) Not started i) See measure 18 for Action Plan	Assessment of the safety, technical, and economic feasibility of each recovery measure has not been assessed.	

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	Action Plan (2017)	A95299-19: Page 351 of 896	Vessel strikes and physical disturbance due to vessel presence; acute and chronic anthropogenic noise; pollution; and changes in foraging habitat due to changes in ocean climate or trophic structure are threats described in the Action Plan (p. 359) which are relevant to project-related marine shipping	Table 1 (pages 364-368): Measures 1, 3-9, 15-18 and Table 2 (pages 369-371): Measures 19, 23-27, 29 are recovery measures relevant to monitoring/mitigation of project-related marine shipping. Table 1: Measure 1: Use systematic ship-based or aerial line-transect surveys to advance efforts in understanding...species biology (e.g. abundance), distribution, movement patterns, and prey distribution and densities. Measure 3: Collaborate on the development of a trained core of observers to provide reliable sightings information from offshore platforms of opportunity, and continue to support the British Columbia Cetacean Sightings Network (BC Cetacean Sightings Network is supported through DFO Habitat Stewardship Program funding) Measure 5: Use Pacific Marine Mammal Response Program (MMRP) to: a) solicit and collect data on incidents (e.g. live strandings; dead, sick or injured animals; vessel strikes) b) continue to develop, train, and equip response teams to attend to Sei Whales found in distress c) continue to determine the cause of death of whales via necropsy, incident investigation and gear recovery, when possible d) continue to analyse Pacific MMRP data and identify the sources and locations of human-caused injury or mortality when possible Measure 6: Photograph whales during surveys conducted in conjunction with Measure #1, and examine photographs for evidence of vessel strike Measure 7: Identify areas of high risk of interactions through the continued development of spatial analysis of potential whale distribution with respect to ship traffic data Measure 8: After review of mitigation measures that have been effective in other jurisdictions, engage in discussions with other agencies about techniques to reduce the occurrence of vessel strikes Measure 9: Continue to review applications for projects that involve production of noise and provide activity-specific requirements for monitoring and mitigation Measure 15: Monitor and analyse the indicators of stress and animal health. Analyse biopsy and fecal samples for identity and sources of contaminants and biological pollutants.	Current status of the relevant recovery measures are below. 1a-d: Ongoing effort; however, limited data collection to date due to scarcity of Sei Whale sightings 3-5a-d: Ongoing 6: Ongoing effort to find and photograph Sei Whales through multi-species ship surveys, and dedicated and opportunistic effort; though very little data exists due to scarcity of sightings 7: Not started 8: Not started for Sei Whales. Some measures underway for other species (e.g. RKW) could have some benefit to large whales, though there is limited overlap in habitat use 9, 16: Ongoing through DFO Fisheries Protection Program 15: Not started due to scarcity of sightings 17: In progress. 18, 19. 23, 29: Ongoing 24: Not started for Sei Whales, in progress for other baleen whales/large whales 25: In progress in parts of the coast through hydrophone networks 26-27: In progress e.g. through ECHO (projects generally not developed for large whales specifically, but some may have limited applicability to large whales	Assessment of the safety, technical, and economic feasibility of each recovery measure has not been assessed.	Page 8-12 very limited photo identification and acoustic data, and no satellite tag or genetic data is available for Sei Whales Regional emergency response plans are under development in collaboration with partners as part of the Government of Canada's national Ocean Protection Plan launched in November 2016. Measures 18 and 23 are listed as Ongoing efforts by DFO as well as by ENGO and FN partners, some of which are supported by HSP and AFSAR funding programs)

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				Measure 16: Review proposals and recommend mitigation measures in the context of risk to Blue, Fin, Sei and North Pacific Right Whales to pollution exposure Measure 17: Collaborate on the development and implementation of pollution response plans for marine mammals Measure 18: Promote and distribute marine mammal viewing guidelines and enforce Marine Mammal Regulations against disturbance Table 2: Measure 19 and 23: Supplement DFO's efforts by contributing systematic surveys and advancing the effort 1a to 1c above; support MMRP to contribute to measures 5a to 5d Measures 4, 24-27 (related to acoustic disturbance): Record and analyse data from passive acoustic monitoring devices to further investigate extent of occurrence, and advance the determination of population identities; collaborate with other projects, Use area- and time-specific acoustic propagation models to better determine levels of sound exposure, in relation to current and potential whale distribution, Use passive acoustic monitoring data to better characterize the underwater soundscape, and noise trends over time, in whale habitat; assess the potential impacts of new and emerging acoustic technologies on these whales, and develop mitigation measures as necessary; develop techniques to mitigate exposure to anthropogenic noise Measure 29: Develop and implement prevention and mitigation measures to reduce the impacts of pollution on Blue, Fin, Sei and North Pacific Right Whales			

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Grey Whale Eastern North Pacific Population (Special Concern)	Management Plan (2011)	A95299-18: Page 675 of 1131	Page 681 - The primary threats affecting the eastern population of Grey Whales are disturbance by human activities within their breeding, feeding and migratory areas, corridor, and decreased benthic and pelagic productivity on feeding grounds. Other direct threats also of concern are acute noise and toxic spills.	Table 3 Pages 723 - 727. Measures 2, 4, and 7-13 may be relevant to project-related shipping. These measures are summarized below. Please refer to the Management Plan for further information. Measure 2 relates to completion and enforcement of the Marine Mammal Regulations Measure 4 relates to the development of comprehensive toxic spill response to mitigate impacts including e.g. developing an emergency response plan, and operational manual. Measure 7 relates to research on Grey Whale biology e.g. satellite tracking, habitat use studies, photo-id and genetic studies etc. Measure 8-9 photographic analysis to assess scarring rates for individuals, ongoing vulnerability assessments via multiple efforts (e.g. tissue sampling, necropsies, and investigation into the potential for increased risk of seismic noise stress, catastrophic spills and vessel disturbance to the population and to the PCFA) Measure 10-12 details monitoring and assessment for Grey Whales e.g. sightings collection, annual population estimates, capture-recapture-photo identification programs, body condition measurements Measure 13 describes outreach and communication efforts to increase awareness of Grey Whales such as the development of communication networks during catastrophic oil spills, ongoing communication and promotion of Be Whale Wise Guidelines and the Marine Mammal Regulations, and support and contribution to transboundary and inter-jurisdictional collaboration on research and management initiatives to ensure a coordinated response for conservation.	There is no additional information further to the information provided in the Government of Canada's Opening Statement filed with the National Energy Board on October 31, 2018 (NEB Document No. A95292-2, Section 7.B).	Assessment of the safety, technical, and economic feasibility of each recovery measure has not been assessed.	NOTE: In fall 2017, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) reassessed the Eastern Pacific Grey Whale population as three Designatable Units: (1) the Pacific Coast Feeding Group population (endangered); (2) the Western Pacific population (endangered); and (3) the Northern Pacific Migratory population (not at risk). These Designatable Units are currently under consideration for listing under SARA.
Leatherback Sea Turtle (Endangered)	Recovery Strategy (2006)	A95299-18: Page 300 of 1131	Page 306 - Marine debris ingestion, physical injury or death due to collisions with boats, oil spill related threats, environmental contaminants e.g. heavy metals or PCBs.	There are no recovery measures included in the recovery strategy that target monitoring or mitigation of the threats of climate change, environmental contamination, debris ingestion or injury/ death due to boat collisions. 1. Page 331 - Synthesize existing data on activities that potentially harm leatherbacks that frequent Pacific Canadian waters	1. Not started	Assessment of the safety, technical, and economic feasibility of each recovery measure has not been assessed.	Page 323 - Turtles can be injured or killed if struck by boats and propellers. Leatherbacks may be particularly at risk because of their habit of swimming just beneath the surface. Perhaps the largest concern in Pacific Canada arises from transiting vessels. Given the slow swimming of leatherbacks and the often high speeds of vessels, these types of impact could cause mortality. Page 324 - Environmental contamination – Bio-concentration of chemical pollutants in the prey of leatherbacks has not been studied and their impact is not known.

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							Accumulation of heavy metals and PCBs has been demonstrated in leatherback turtles The Recovery Strategy notes that because of the lack of information on leatherbacks in Pacific Canadian waters, recovery of this species will initially follow a staged and adaptive approach. Mitigation, for example, will have to be tailored to our emerging understanding of threats. Hence it is unrealistic at the outset to expect all recovery objectives to have measurable outputs; instead, these will emerge as research proceeds. As research proceeds it may assist in developing, or determining success of, survival and recovery actions. Page 340 - Critical and important habitat in Pacific Canada identified. Status- in progress. Science advice for Leatherback Sea Turtle critical habitat has been developed. The paucity of sightings data and minimal information on foraging behaviour in Pacific Canadian waters has limited the precision of critical habitat identification. Work is underway to refine this habitat identification.
	Action Plan [Proposed] (2017)	A95299-19: Page 385 of 896	Page 392 - identifies climate change as a serious threat to the species.	There are no recovery measures included in the recovery strategy that target monitoring or mitigation of climate change. Pages 398 - 402 - Relevant measures are summarized below (15, 18, 19-24, 27-28, 30, 41, 45, 46). Measure 15 - Identify the threats in the inter-nesting habitat of the Pacific Leatherback Sea Turtle population (i.e., accidental entanglements and incidental catch) Measure 18 - Develop and distribute material to increase awareness of Leatherback Sea Turtles in Pacific waters and to encourage timely reporting of sightings Measure 19-21 - Develop tissue collection protocol, support necropsies, and obtain Passive Integrated Tag scanner for Leatherback Sea Turtle strandings (to understand threats, life histories) Measure 22 - Encourage communities to undertake regular patrols in areas identified as having a higher probability of strandings Measure 23 - Consider Leatherback Sea Turtles and their prey in environmental assessments of projects and developments in Canadian Pacific waters Measure 24 - Develop educational material directed to stakeholders and fishers detailing the impact of derelict gear, ocean debris on Leatherback Sea Turtles, and	Measure 19 – Year 1 Measure 20, 28 - In progress Measure 23 - Unknown status Measure 15, 18, 21, 22, 24, 27, 30, 41, 45, 46- Not started	Assessment of the safety, technical, and economic feasibility of each recovery measure has not been assessed.	

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				mitigation measures for fishery interactions Measure 27 - Identify the effects of contaminants and dispersants on Leatherback Sea Turtles Measure 28 - Ensure Leatherback Sea Turtles and their prey are considered in existing and upcoming spill response plans, including effects of dispersants Measure 30 - Support actions to decrease threats to Leatherback Sea Turtles during migration and foraging (e.g., development and use of mitigation measures for incidental catch, entanglement) Measure 41 - Refine understanding of Western Pacific Leatherback Sea Turtle hatchling dispersal, juvenile and adult distribution in order to identify site-specific threats throughout their range Measure 45 - Identify factors that could potentially affect jellyfish abundance in Canadian Pacific waters Measure 46 - Utilize drift models in order to guide monitoring effort and recovery of Leatherback Sea Turtle carcasses			
Sea Otter (Special Concern)	Recovery Strategy (2007)	A95299-18: Page 392 of 1131	Please see information included under Sea Otter Management Plan below	Please see information included under Sea Otter Management Plan below	Please see information included under Sea Otter Management Plan below	Assessment of the safety, technical, and economic feasibility of each recovery measure has not been assessed.	
	Management Plan (2014)	A95299-19: Page 162 of 896	Pages 178 - 191 - Oil spills, vessel strikes, and human disturbance are threats described in the Management Plan which are relevant to project-related marine shipping.	Table 3, Pages 200 – 202: Relevant measures are described below. Broad Strategy 1 – Management – generally describes management and protection measures that may be undertaken to ensure the continued success of Sea Otter repopulation and range growth. Broad Strategy 2 - Research and Monitoring – describes research and monitoring activities that may be undertaken to clarify the significance of threats to Sea Otters and their habitat. Broad Strategy 3 - Communication and Outreach – communication to the public and others is important to promote understanding and support and for the need to protect Sea Otters.	Broad Strategy 1 – Management - ongoing and in progress. Broad Strategy 2 - Research and Monitoring - ongoing, in progress. Broad Strategy 3 - Communication and Outreach Strategies - In progress.	Assessment of the safety, technical, and economic feasibility of each recovery measure has not been assessed.	

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Killer Whale - Transient (Threatened)	Recovery Strategy (2007)	A95299-18: Page 460 of 1131	Pages 483 - 489 - Acoustic disturbance (acute and chronic noise), physical disturbance, collision with vessels, toxic spills, and changes in prey availability are threats identified in the Recovery Strategy which are relevant to project-related marine shipping. Primary prey of TKW includes Steller Sea Lions (SC) and Harbour Porpoises (SC), and oil spills are listed as a threat in the Management Plans for each of these populations	Pages 498 – 499 (Table 2) - The recommended approaches to meet recovery objectives that are relevant to monitoring/mitigation of project-related marine shipping are included in the October submission (no new information) and were recommended in the Recovery Strategy, Table 2. Additionally, the following activities, identified in the Schedule of Studies to identify critical habitat are relevant to monitoring and mitigating impacts of project-related marine shipping- spatial analysis of existing sighting data; spatial analysis of existing data with respect to the distribution of TKW prey; spatial analysis of TKW kill locations with respect to ambient noise environment, year-round surveys to determine range and seasonal movement of TKW; year-round surveys to determine the spatial and temporal distribution and abundance of small cetaceans; and formal and informal sighting networks for TKW and small cetaceans		Assessment of the safety, technical, and economic feasibility of each recovery measure has not been assessed.	Partial habitats of special importance have been identified for Transient Killer Whales in the CSAS Science Advisory Report 2013/025 (DFO 2013). An amendment to the Recovery Strategy to incorporate this proposed critical habitat is in development. An Action Plan is under development.
North Pacific Right Whale (Endangered)	Recovery Strategy (2011)	A95299-18: Page 859 of 1131	Due to the lack of data on occurrence, distribution, habitat use, reproduction and genetics of the Right Whale in Pacific Canadian waters at the time of Recovery Strategy development, current threats could not be directly determined. However, it is important to consider all possible threats that may affect the survival of Right Whales occurring in Pacific Canadian waters and their habitat. The following potential threats were described in the Recovery Strategy (p. 883-886) and are relevant to project-related marine shipping: ship strikes and marine traffic; noise; and pollution.	There is no additional information further to the information provided in the Government of Canada's Opening Statement filed with the National Energy Board on October 31, 2018 (NEB Document No. A95292-2, Section 7.B). The schedule of studies to identify critical habitat may be relevant to monitoring/mitigation of project-related shipping and can be found in the Recovery Strategy, Table 5 (p. 899)	There is no additional information further to the information provided in the Government of Canada's Opening Statement filed with the National Energy Board on October 31, 2018 (NEB Document No. A95292-2, Section 7.B) with the exception that the BC Cetacean Sighting Network's Whale Report Alert System; described in the 6th shipping-related action from the Recovery Strategy, was launched in October 2018	Assessment of the safety, technical, and economic feasibility of each recovery measure has not been assessed.	

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SPECIES INFORMATION & RECOVERY DOCUMENT* REFERENCES			**DFO RESPONSE TO NEB REQUEST 1.7.a.**	**DFO RESPONSE TO NEB REQUEST 1.7.b.**			**SUPPLEMENTARY INFORMATION**
Species & SARA Status	**Published SARA Recovery Document(s)**	**NEB Reference (page numbers refers to numbers in red at the bottom of each page)**	**Potential threats or effects relevant to Project-related marine shipping (including from malfunctions, accidents, or cumulative effects)**	**Monitoring/ Mitigation Measures which may be relevant to Project-related marine shipping**	**Status of Recovery Measure**	**Safety, technical, and economic feasibility of each such measure with regard to Project-related marine shipping**	**Additional Notes**
	Action Plan (2017)	A95299-19: Page 351 of 896	Vessel strikes and physical disturbance due to vessel presence; acute and chronic anthropogenic noise; pollution; and changes in foraging habitat due to changes in ocean climate or trophic structure are threats described in the Action Plan (p. 359) which are relevant to project-related marine shipping	Table 1 (pages 364-368): Measures 1, 3-9, 15-18 and Table 2 (pages 369-371): Measures 19, 23-27, 29 are recovery measures relevant to monitoring/mitigation of project-related marine shipping. Table 1: Measure 1: Use systematic ship-based or aerial line-transect surveys to advance the following efforts: a) determine abundance, site fidelity, and movement patterns using photo ID. b) assess distribution and movement patterns using satellite telemetry c) determine population identities using DNA analysis d) determine distribution and densities of prey species Measure 3: Collaborate on the development of a trained core of observers to provide reliable sightings information from offshore platforms of opportunity, and continue to support the British Columbia Cetacean Sightings Network. Measure 4: Record and analyse data from passive acoustic monitoring devices to further investigate extent of occurrence, and advance the determination of population identities; collaborate with other projects Measure 5: Use Pacific Marine Mammal Response Program (MMRP) to: a) continue to solicit and collect data on incidents (e.g. live strandings; dead, sick or injured animals; vessel strikes) b) continue to develop, train, and equip response teams to attend to Blue, Fin, Sei and North Pacific Right Whales found in distress c) continue to determine the cause of death of whales via necropsy, incident investigation and gear recovery, when possible d) continue to analyse Pacific MMRP data and identify the sources and locations of human-caused injury or mortality when possible Measure 6: Photograph whales during surveys conducted in conjunction with Measure #1, and examine photographs for evidence of vessel strike Measure 7: Identify areas of high risk of interactions through the continued development of spatial analysis of potential whale distribution with respect to ship traffic data Measure 8: After review of mitigation measures that have been effective in other jurisdictions, engage in discussions with other agencies about techniques to reduce the occurrence of vessel strikes	Current status of the relevant recovery measures are below. Please also refer to the information provided in the Government of Canada's Opening Statement filed with the National Energy Board on October 31, 2018 (NEB Document No. A95292-2, Section 7.B). 1a-d: Ongoing effort conducted through multi-species ship-based and previous aerial surveys; however, very limited photo identification and acoustic data, and no satellite tag or genetic data, have been collected from NPRW due to extreme scarcity of sightings 3: Ongoing (e.g. BC Cetacean Sightings Network supported through Habitat Stewardship Program funding) 4: Ongoing efforts in potential habitat for North Pacific Right Whales 5a-d: Ongoing 6: Ongoing effort to find and photograph North Pacific Right Whales through multi-species ship surveys, and dedicated and opportunistic effort; though very little data exists due to scarcity of sightings 7: Not started 8: Not started for NPRW. Some measures underway for other species (e.g. RKW) could have some benefit to large whales, though there is limited overlap in habitat use 9: Ongoing through DFO Fisheries Protection Program 15: Not started due to scarcity of sightings 16: Ongoing through DFO Fisheries Protection Program 17: In progress. Regional emergency response plans are under development in collaboration with partners as part of the Government of Canada's national Ocean Protection Plan launched in November 2016. 18: Ongoing by DFO, and by ENGOs and FN partners supported by HSP and AFSAR funding programs 19: Ongoing efforts conducted (e.g. by ENGOs and Academia), though very little data collected due to	Assessment of the safety, technical, and economic feasibility of each recovery measure has not been assessed.	

TABLE 1.7-1 (Note: Page numbers below refer to Recovery Documents as filed in the Appendices to the Government of Canada's opening statement and direct evidence; see 3rd column of each row).							
SPECIES INFORMATION & RECOVERY DOCUMENT* REFERENCES			**DFO RESPONSE TO NEB REQUEST 1.7.a.**	**DFO RESPONSE TO NEB REQUEST 1.7.b.**			**SUPPLEMENTARY INFORMATION**
Species & SARA Status	**Published SARA Recovery Document(s)**	**NEB Reference (page numbers refers to numbers in red at the bottom of each page)**	**Potential threats or effects relevant to Project-related marine shipping (including from malfunctions, accidents, or cumulative effects)**	**Monitoring/ Mitigation Measures which may be relevant to Project-related marine shipping**	**Status of Recovery Measure**	**Safety, technical, and economic feasibility of each such measure with regard to Project-related marine shipping**	**Additional Notes**
				Measure 9: Continue to review applications for projects that involve production of noise and provide activity-specific requirements for monitoring and mitigation Measure 15: Monitor and analyse the indicators of stress and animal health. Analyse biopsy and fecal samples for identity and sources of contaminants and biological pollutants. Measure 16: Review proposals and recommend mitigation measures in the context of risk to Blue, Fin, Sei and North Pacific Right Whales to pollution exposure Measure 17: Collaborate on the development and implementation of pollution response plans for marine mammals Measure 18: Promote and distribute marine mammal viewing guidelines and enforce Marine Mammal Regulations against disturbance Table 2: Measure 19: Supplement DFO's efforts by contributing systematic surveys and advancing the effort 1a to 1c above Measure 23: Support DFO's MMRP to contribute to measures 5a to 5d Measure 24: Use area and time-specific acoustic propagation models to better determine levels of sound exposure, in relation to current and potential whale distribution Measure 25: Use passive acoustic monitoring data to better characterize the underwater soundscape, and noise trends over time, in whale habitat Measure 26: Assess the potential impacts of new and emerging acoustic technologies on these whales, and develop mitigation measures as necessary Measure 27: Develop techniques to mitigate exposure to anthropogenic noise. Measure 29: Develop and implement prevention and mitigation measures to reduce the impacts of pollution on Blue, Fin, Sei and North Pacific Right Whales.	scarcity of sightings 23: Ongoing (e.g. by ENGO and FN partners, some of which are supported by HSP and AFSAR funding programs) 24: In progress for other baleen whales/large whales 25: In progress in parts of the coast through hydrophone networks 26-27: In progress, e.g. through ECHO (projects generally not developed for large whales specifically, but some may have limited applicability to large whales 29: Ongoing		

TABLE 1.7-1 (Note: Page numbers below refer to Recovery Documents as filed in the Appendices to the Government of Canada's opening statement and direct evidence; see 3rd column of each row).							
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Species & SARA Status	**Published SARA Recovery Document(s)**	**NEB Reference (page numbers refers to numbers in red at the bottom of each page)**	**Potential threats or effects relevant to Project-related marine shipping (including from malfunctions, accidents, or cumulative effects)**	**Monitoring/ Mitigation Measures which may be relevant to Project-related marine shipping**	**Status of Recovery Measure**	**Safety, technical, and economic feasibility of each such measure with regard to Project-related marine shipping**	**Additional Notes**
Humpback Whale (Special Concern)	Recovery Strategy (2013)	A95299-19: Page 68 of 896	Vessel strikes, toxic spills, and acoustic disturbance, and the cumulative effects of these threats are relevant to project-related marine shipping and identified and described in the Recovery Strategy (p. 92 - 99).	Table 2 Page 106: Relevant recovery measures are described below. Broad Strategy 1: Threat Monitoring – recommended approaches would include threat assessment for humpback whales that considers cumulative effects and models spatial and temporal risk from potential threats. Broad Strategy 2: Management Strategies – lists various management approaches that are recommended to meet the population and distribution objective. Broad Strategy 4: Monitoring and Inventory – continue to support sightings network and outreach and communications. Broad Strategy 5: Legal Protection & Enforcement – continue to enforce protection measures for marine mammals and complete amendments to the *Fisheries Act.*	Broad Strategy 1: Threat Monitoring - in progress. Broad Strategy 2: Management Strategies - ongoing, not started, and no longer applicable. Broad Strategy 3: Monitoring and Inventory - ongoing. Broad Strategy 4: Legal Protection & Enforcement - ongoing and completed.	Assessment of the safety, technical, and economic feasibility of each recovery measure has not been assessed.	Critical habitat was identified for Humpback Whales in their Recovery Strategy, but is no longer protected as Humpback Whales are now listed as Special Concern.

TABLE 1.7-2				
This table includes further information on monitoring and mitigation measures which may be relevant to project-related marine shipping (1.7.b.) from Progress Reports. Progress Reports do not typically identify new potential threats to species (1.7.a.) and thus this column has been excluded. *Note: Page numbers below refer to Progress Report documents as filed in the Appendices to the Government of Canada's opening statement and direct evidence; see 3rd column of each row).*				
#	**Species & SARA Status**	**Published SARA Recovery Document(s)**	**NEB Reference (page number refers to numbers in red at the bottom of each page)**	**Further Information on Progress towards Goals and Objectives set out in Recovery Documents**
1	Harbour Porpoise	Progress Report 2010 - 2015 (2018)	A95299-19: Page 803 of 896	Page 806 - The Progress Report summarizes progress made towards achieving the goal and objectives set out in the management plan, including: - ongoing research focused on abundance and distribution of Pacific Harbour Porpoise through ship-based multi-species surveys, land-based observation sites, sightings networks, and passive acoustic monitoring - improved understanding of the population structure of Pacific Harbour Porpoise in southern B.C. waters through genetic analysis - identification of the first potential breeding sites for Pacific Harbour Porpoise in B.C. waters - a study focused on the prey species and seasonal diet of Pacific Harbour Porpoise - coast-wide expansion of the B.C. Marine Mammal Response Network (MMRN) responsible for responding to all injured, distressed and dead marine mammals including Pacific Harbour Porpoise - outreach programs promoting responsible marine mammal viewing guidelines and raising awareness about anthropogenic threats to marine mammals have reached hundreds of thousands of citizens coast-wide
2	Sei Whale	Progress Report 2006 - 2011 (2013)	A95299-19: Page 146 of 896	The status of the recommended approaches to meet recovery objectives and the schedule of studies to identify critical habitat from 2006-2011 were reported on in the progress report (2013). For the current status of these approaches, please refer to the Action Plan
3	Fin Whale	Progress Report 2006 - 2011 (2013)	A95299-19: Page 146 of 896	The status of the recommended approaches to meet recovery objectives and the schedule of studies to identify critical habitat from 2006-2011 were reported on in the progress report (2013). For the current status of these approaches, please refer to the Action Plan.
4	Basking Shark	Progress Report 2011	A95299-19: Page 847 of 896	There is no additional information further to the information provided in the Government of Canada's Opening Statement filed with the National Energy

TABLE 1.7-2				
This table includes further information on monitoring and mitigation measures which may be relevant to project-related marine shipping (1.7.b.) from Progress Reports. Progress Reports do not typically identify new potential threats to species (1.7.a.) and thus this column has been excluded. *Note: Page numbers below refer to Progress Report documents as filed in the Appendices to the Government of Canada's opening statement and direct evidence; see 3rd column of each row).*				
#	**Species & SARA Status**	**Published SARA Recovery Document(s)**	**NEB Reference (page number refers to numbers in red at the bottom of each page)**	**Further Information on Progress towards Goals and Objectives set out in Recovery Documents**
		- 2016 (2018)		Board on October 31, 2018 (NEB Document No. A95292-2, Section 7.B).
5	Northern Abalone	Progress Report 2007 - 2012 (2015) Progress Report 2012 - 2017 under development	A95299-19: Page 218 of 896	There is no additional information further to the information provided in the Government of Canada's Opening Statement filed with the National Energy Board on October 31, 2018 (NEB Document No. A95292-2, Section 7.B).
6	Olympia Oyster	Progress Report 2009 - 2015 (2017)	A95299-19: Page 540 of 896	There is no additional information further to the information provided in the Government of Canada's Opening Statement filed with the National Energy Board on October 31, 2018 (NEB Document No. A95292-2, Section 7.B).
7	Blue Whale	Progress Report 2006 - 2011 (2013)	A95299-19: Page 146 of 896	The status of the recommended approaches to meet recovery objectives from 2006-2011 were reported on in the progress report (2013). The current status of mitigation and monitoring approaches which may be relevant to Project-related shipping are reported in the Action Plan.
8	Leatherback Sea Turtle	Progress Report 2007 - 2012 (2015)	A95299-19: Page 278 of 896	There is no additional information further to the information provided in the Government of Canada's Opening Statement filed with the National Energy Board on October 31, 2018 (NEB Document No. A95292-2, Section 7.B).
9	Transient Killer Whale	Progress Report 2007 - 2012 (2015)	A95299-19: Page 253 of 896	The status of the recommended approaches to meet recovery objectives from 2007-2012 were reported on in the progress report (2015). The current status of these approaches were reported on in the information provided in the Government of Canada's Opening Statement filed with the National Energy Board on October 31, 2018 (NEB Document No. A95292-2, Section 7.B).
10	Grey Whale	Progress Report currently under development	N/A	There is no additional information further to the information provided in the Government of Canada's Opening Statement filed with the National Energy Board on October 31, 2018 (NEB Document No. A95292-2, Section 7.B).

Question #	1.8 Follow-up to SRKW Imminent Threat Assessment
Reference:	A95299-19, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 2, Annex 7.G.2, SRKW Imminent Threat Assessment: i) PDF page 870 of 898 ii) PDF page 893 of 898 iii) A95292-2, Department of Justice (on behalf of various Federal Departments and Agencies), Part 1, PDF page 69 of 242 iv) A95296-2, VFPA, Written evidence, PDF pages 2-4 of 20 v) A95292-2, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 1, PDF pages 88 and 89, 178, and 206 of 242
Preamble:	In Reference i), the SRKW Imminent Threat Assessment states that the aim of the assessment was to inform an opinion as to whether or not this species faces imminent threats to its survival or recovery in Canada, as per section 80 of the SARA. It states that, under that section, an emergency protection order must be recommended to the Governor in Council if the competent Minister is of the opinion that a listed wildlife species is facing imminent threats to its survival or recovery. In Reference ii), the Imminent Threat Assessment concluded with recommendations that it is considered that SRKW are likely facing imminent threat to survival and to recovery. In Reference iii), the Federal Authorities state that the competent ministers under SARA determined in May 2018 that SRKW are likely facing imminent threat to survival and to recovery. References iii), iv), and v) note that the Whales Initiative, the 2018 Haro Strait voluntary vessel slowdown trial, and the 2018 fishery management measures related to SRKW were, at least in part, in response to the imminent threat determination.
Request:	Fully describe what actions and plans have followed as a result of the competent Minister's determination that SRKW are facing an imminent threat to their survival and recovery, and the rationale for the chosen steps taken or to be taken.
Response:	Prior to the release of the SRKW Imminent Threat Assessment, the Government of Canada had already made investments in supporting the recovery of SRKW through the Whales initiative announced as part of Budget 2018. The *Marine Mammal Regulations* (MMRs) made under the *Fisheries Act* were amended in June 2018 to prohibit vehicles (except aircraft in flight) from approaching within 200 metres of a killer whale in Canadian fisheries waters in British Columbia and the Pacific Ocean. The approach distances prescribed in the MMRs do not apply to a vessel that is in transit. Vessels that are actively engaged in whale watching or that divert their course to follow or interact with a whale are not considered in transit for the purposes of this exemption. Contravention of the Regulations is an offence under the *Fisheries Act*. Work to finalize these proposed amendments was expedited based, in

	part, on the imminent threat assessment and the need to respond to unique threats faced by the SRKW. The release of the SRKW Imminent Threat Assessment helped further focus efforts and actions being undertaken under the Whales Initiative (NEB Document No. A95292-2, Chapter 3), and on October 31, 2018, the Government announced a range of additional measures, building on the Whales Initiative (NEB Document No. A95292-2, Section 3.C.7), designed to further address the imminent threats to the survival and recovery of SRKW. These key threats include lack of prey availability, acoustic and physical disturbance, and bio-accumulation of contaminants. The actions and efforts being undertaken as a part of the Whales Initiative and the October 31 additional measures were informed by the findings of the SRKW Imminent Threat Assessment (Government of Canada direct evidence Annex 7.G.2, PDF page 867 of 896) and the Whales Science-based Review (Government of Canada direct evidence Annex 7.G.2, PDF page 562 of 896). In response to the finding of imminent threats to survival and recovery for SRKW, the Species at Risk Program in Pacific Region expedited the timelines and compressed the process to amend Section 7 (Critical Habitat) in the amended Recovery Strategy for Northern and Southern Resident Killer Whale (*Orcinus orca*) in Canada to incorporate two additional areas of special importance to be identified as Resident Killer Whale critical habitat and provide clarification of the functions, features and attributes for all Resident Killer Whale critical habitat. While the amendment process was compressed with respect to internal departmental work, efforts to engage online and in person were increased significantly during that time period. The Recovery Strategy was finalized in December 2018 and is available at: https://www.registrelep-sararegistry.gc.ca/virtual_sara/files/plans/Rs-ResidentKillerWhale-v00-2018dec-Eng.pdf
Responding FA:	Fisheries and Oceans Canada

Question #	**1.9 Washington State Orca Task Force (same as or similar to IR 1.29 directed at TC)**
Reference:	i) A95280-22, Trans Mountain, Opening statement and direct evidence, Attachment 6.0.3, Southern Resident Orca Task Force Draft Report and Recommendations ii) A95280-23, Trans Mountain, Opening statement and direct evidence, Attachment 6.0.4, October 24 Draft Orca Task Force Recommendations iii) A95280-2, Trans Mountain, Opening statement and direct evidence, PDF page 38 of 73
Preamble:	Trans Mountain filed Reference i) and, as it described in Reference iii), the "associated, updated" Reference ii) as part of its written evidence. References i) and ii) resulted from the establishment of a Southern Resident Killer Whale Task Force by order of the Governor of Washington State. In Reference iii), Trans Mountain states that many of the mitigation measures explored in depth in these (and other referenced) reports require multi-party and transboundary cooperation, including within government, between governments, and between government and the maritime community.
Request:	a) Discuss which of the recommendations in Reference ii) – appropriately modified to apply in Canada where possible – could be relevant to mitigating the effects of Project-related marine shipping or its associated cumulative effects. b) For each potentially relevant measure, discuss its safety, technical, and economic feasibility. If already addressed in materials previously filed in this MH-052-2018 hearing or in the OH-001-2014 hearing, provide references (with links and page numbers) together with an explanation of how that previous material addressed the measure.
Response:	**Environment and Climate Change Canada** **a) Discuss which of the recommendations in Reference ii) – appropriately modified to apply in Canada where possible – could be relevant to mitigating the effects of Project-related marine shipping or its associated cumulative effects** for recommendations 29-33 of Table 1: • Recommendation 29: Accelerate the implementation of the ban on PCBs in state purchased products and make information available online for other purchasers. • Recommendation 30: Identify, prioritize and take action on chemicals that impact orcas and their prey. • Recommendation 31: Reduce stormwater threats and accelerate clean-up of toxics that are harmful to orcas. • Recommendation 32: Improve effectiveness, implementation and enforcement of National Pollutant Discharge Elimination System (NPDES) permits to address direct threats to Southern Resident orcas and their prey.

	• Recommendation 33: Increase monitoring of toxic substances in marine waters; create and deploy adaptive management strategies to reduce threats to orcas and their prey. The recommendations are relevant to recovery of SRKW in Canada; however, ECCC is of the opinion that recommendations 29-33 would not be relevant mitigation measures for the effects of Project-related marine shipping or its associated cumulative effects. **b) For each potentially relevant measure, discuss its safety, technical, and economic feasibility.** Not applicable, based on departmental responses to a) above. **Fisheries and Oceans Canada, Canadian Coast Guard response for Recommendation 24** Recommendations from the Washington State Orca Task Force report that directly or indirectly support increasing Chinook salmon abundance coast-wide, increasing availability of salmon in key southern resident killer whale (SRKW) foraging areas, and increase SRKW access to Chinook salmon by limiting interference from vessel disturbances could be relevant to mitigating the effects of Project-related marine shipping. Recommendations below that have the potential to increase productivity of Chinook (i.e., increase abundance), their availability (e.g., by reducing underwater vessel noise masking echolocation) and access, could theoretically help offset the effects of marine shipping, as noted in DFO's chapter of the direct evidence filed by the Government of Canada (A95299-20, Annex 7.G.3, Page 24 of 361). Fisheries and Oceans Canada (DFO) is of the view that many of the report's recommendations align with existing, planned, or recommended measures and activities implemented, or to be implemented, in Canada to support recovery of SRKW. Where relevant, DFO has provided additional information below that may address aspects of IR 1.9a and 1.9b. For each recommendation, where DFO has indicated that is has initiated a measure, DFO has also concluded that implementing the recommendation is safe and is technically and economically feasible. **Recommendation 1: Significantly increase investment in restoration and acquisition of habitat in areas where Chinook stocks most benefit Southern Resident orcas.** DFO made recent investments in restoration of fish habitat under the Coastal Restoration Fund. These investments were outlined in Section 2.C.5 of the Government of Canada's direct evidence submission (NEB Document No. A6J6L9). **Recommendation 2: Immediately fund acquisition and restoration of nearshore habitat to increase the abundance of forage fish for salmon sustenance.** DFO made recent investments in restoration of fish habitat under the Coastal Restoration Fund. These investments were outlined in Section 2.C.5 of the Government of Canada's direct evidence submission (NEB Document No. A6J6L9). **Recommendation 3: Enforce laws that protect habitat.** DFO currently implements and enforces provisions of the *Fisheries Act*, the *Species at Risk Act*, and the *Oceans Act* that relate to the protection of aquatic habitat.

	Recommendation 4: Immediately strengthen protection of Chinook and forage fish habitat through legislation that amends existing statutes, agency rulemaking, and/or agency policy. The Government of Canada has proposed amendments to the *Fisheries Act* that would strengthen the protection of fish habitat, including that for Chinook and forage fish. DFO has engaged with Indigenous groups, provinces, territories, and stakeholders on the proposed changes to the *Fisheries Act* and will continue to provide updates to the public as the parliamentary process to amend the Act progresses. **Recommendation 5: Develop voluntary incentives to encourage voluntary actions to protect fish habitat.** DFO currently supports conservation and enhancement of fish habitat (including for Chinook and forage fish species) through funding programs including the Coastal Restoration Fund, the Recreational Fisheries Conservation Partnerships Program and the West Coast Energy Fund. These funding programs support projects undertaken by angling/fishing groups, conservation organizations, and Indigenous groups to rebuild and rehabilitate fish habitat in Canada. In addition to funding programs, DFO has actively been engaging communities on fish and fish habitat conservation and enhancement across BC and the Yukon for over 40 years through the Salmonid Enhancement Program (SEP). SEP, sustains salmon populations and provides harvest opportunities in commercial, recreational and Aboriginal fisheries. It produces Pacific salmon by operating salmon hatcheries and spawning channels; by restoring habitat in rivers, streams and wetlands; and by supporting citizen involvement in activities to enhance salmon, restore habitat and improve watershed stewardship. A key function of SEP is educating the public on the importance of protecting fish habitat through community engagement (e.g., salmon releases), and by providing educational material to teach students about the value of the salmon resource. **Recommendation 6: Increase hatchery production and programs to benefit Southern Resident orcas consistent with sustainable fisheries and stock management, available habitat, recovery plans, and the Endangered Species Act. Hatchery increases should be done in concert with increased habitat protection and restoration measures.** DFO is considering options to increase Chinook enhancement, including Chilliwack River Hatchery for Fraser Fall Chinook. All new production will be vetted and reviewed through an integrated production planning process with DFO's Salmonid Enhancement Program, Science Stock Assessment, and Fisheries Management. **Recommendation 7: Prepare an implementation strategy to re-establish salmon runs above existing dams, increasing prey availability for Southern Resident orcas.** Most dams in the area of interest are owned by BC Hydro, and DFO has worked with BC Hydro to establish Water Use Plans, with the goal of ensuring that operations at those facilities are meeting objectives for fisheries interests. Footprint effects from those dams are also managed by BC Hydro through their Fish and Wildlife Compensation Program, and DFO guides those projects through participation in the Steering Committees.

	Recommendation 8: Increase spill to benefit Chinook for Southern Residents by adjusting Total Dissolved Gas allowances at the Snake and Columbia River dams. This recommendation does not apply to Canada. **Recommendation 9: Determine whether removal of Lower Snake River Dams would provide benefits to Southern Resident orcas commensurate with the associated costs, and implementation considerations.** This recommendation does not apply to Canada. **Recommendation 10: Support full implementation and funding of the 2019-2028 Pacific Salmon Treaty.** Canada and the U.S. have agreed to a new 10-year conservation and harvest sharing arrangement under the Pacific Salmon Treaty. Subject to formal ratification by the Parties, the new management regimes (including Chapter 3: Chinook Salmon) will be implemented beginning January 1, 2019. **Recommendation 11: Reduce Chinook bycatch in west coast commercial fisheries.** DFO has focused efforts on directly reducing harvest, rather than bycatch. For the 2018 fishing season, DFO implemented an overall reduction in Chinook harvest of 25-35 percent. For the salmon fishing season (June 1 to September 30), DFO also implemented full closures for recreational finfish and commercial salmon fisheries in portions of the Strait of Juan de Fuca and Gulf Islands, and Partial closures in the mouth of the Fraser River, with monitoring to assess the effectiveness of the closures. **Recommendation 12: Direct the appropriate agencies to work with tribes and NOAA to determine if pinniped predation is a limiting factor for Chinook in Puget Sound and along Washington's outer coast and evaluate potential management actions.** Work is being carried out by DFO Science Branch to update pinniped population assessments and to collect further data on pinniped diet, to inform potential for competition for SRKW prey. **Recommendation 13: Support authorization to more effectively manage pinniped predation of salmon in the Columbia River.** Work is being carried out by DFO Science Branch to update pinniped population assessments and to collect further data on pinniped diet, to inform potential for competition for SRKW prey. **Recommendation 14: Reduce populations of non-native predatory fish species that prey upon or compete with Chinook.** Management of freshwater invasive species in Canada is primarily administered by the provinces. DFO is currently taking action to reduce the threat of marine invasive species, including some that may affect Chinook. For example, DFO is currently involved in development of a Salish Sea transboundary action plan for European green crab, an invasive species that affects estuarine and eelgrass habitat and consumes the invertebrate prey of Chinook. For more information concerning DFO's role and actions in invasive species management, see the website of the Aquatic Invasive Species program.

	Recommendation 15: Monitor forage fish populations to inform decisions on harvest and management actions that provide for sufficient feedstocks to support increased abundance of Chinook. DFO has a range of monitoring, stock assessment and fisheries management processes in place for forage species that support protection and rebuilding of Chinook salmon, including Pacific herring. **Recommendation 16: Support the Puget Sound zooplankton sampling program as a Chinook and forage fish management tool.** DFO Science Branch conducts annual zooplankton surveys in the Strait of Georgia between June and September. **Recommendation 17: Establish a statewide "Go-slow" bubble for small vessels and commercial whale watching vessels within half a nautical mile of orcas.** DFO refers the Board to Transport Canada's response to IR 1.29 for comment relating to Recommendation 17. **Recommendation 18: Establish a limited-entry whale-watching permit system for commercial whale-watching vessels and commercial kayak groups in the inland waters of Washington State to increase acoustic refuge opportunities for the orcas.** All marine mammals (including SRKW) are subject to the provisions of the *Marine Mammal Regulations* (MMR) made under the *Fisheries Act*. Among other things, the MMR prohibit disturbing marine mammals. The Government of Canada recently amended the *Marine Mammal Regulations* to provide greater protection for marine mammals including Canada's at-risk whales (NEB Document No. A6J6L9, Section 3.C.4, PDF page 89). Among other things, as a result of the amendments, in the case of killer whales in Canadian fisheries waters in the Pacific Ocean and BC, an approach of less than 200 metres is considered a disturbance. This approach distance applies to all vehicles (except aircraft in flight), which would include whale watching vessels and commercial kayaks. The approach distance does not apply to vessels in transit. There is currently no permitting scheme for whale watching or commercial kayak vessels. **Recommendation 19: Require an annual "Be Whale Wise" certification for all recreational boaters on the inland marine waters and ensure that all boaters are educated on how to limit boating impacts to orcas.** DFO has not contemplated a formalized requirement for a "Be Whale Wise" certification, which would require consultation and engagement with affected stakeholders. DFO currently promotes awareness of recreational boaters and supports the Be Whale Wise Guidelines. Additional information to increase awareness of boaters is provided on DFO's website at the following link: http://www.dfo-mpo.gc.ca/species-especes/mammals-mammiferes/watching-observation/index-eng.html **Recommendation 20: Increase enforcement capacity and fully enforce regulations on small vessels to provide protection to Southern Residents.** DFO made recent investments in increased compliance and enforcement capacity in the Pacific region. These investments were outlined in Section 3.C.4 of the Government of Canada's direct evidence submission (NEB Document No. A6J6L9).

	Recommendation 21 to 23 DFO refers the Board to Transport Canada's response to IR 1.29 for comment relating to Recommendation 21 to 23. **Recommendation 24: Reduce the threat of oil spills in Puget Sound to the survival of Southern Residents.** DFO provided information relating to enhancement of marine oil spill prevention, emergency preparedness, and emergency response measures as outlined in Section 7.D.2 of the Government of Canada's direct evidence submission (NEB Document No. A6J6L9). As described in Section 2.B.17 of the Government of Canada's direct evidence submission, the Canadian Coast Guard is actively involved in increasing its towing and emergency capacity to in order to assist disabled vessels to safety. This includes, but is not limited to, increasing towing capacity through the lease of two large vessels, equipping large Canadian Coast Guard vessels with emergency tow kits, and developing a long-term national strategy for emergency towing. The Canadian Coast Guard will continue to monitor the work of the Washington State Orca Task Force and work with partners, particularly Transport Canada, to ensure that it has sufficient emergency towing capacity and appropriate oil spill responses in place along its coastal waters, including the West Coast of Canada. **Recommendation 25: Coordinate with the Navy in 2019 to discuss reduction of noise and disturbance affecting Southern Resident orcas from military exercises and Navy aircraft.** Where proposed projects may result in noise levels causing disturbance or harm to marine mammals (e.g., seismic surveying, pile driving, military exercises, naval aircraft, etc.), permits may be required pursuant to subsection 38(1) of the *Marine Mammals Regulations*. Such a permit can only be issued if the activity is considered to be one of those mentioned in that subsection. Subsection 38(2) lists the conditions which may be attached to such a permit, which include the manner in which the marine mammals may be disturbed and the measures that are required to mitigate or minimize the negative effects of disturbing them. Additionally, a permit could also be required under section 73 of the *Species at Risk Act* (SARA). Such a permit can only be issued if the purpose and preconditions of section 73 of SARA are met, including among other things, that the competent minister is of the opinion that the activity will not jeopardize the survival or recovery of the species. **Recommendation 26: Revise RCW 77.15.740 to increase the buffer to 400 yards [366 metres] behind the orcas.** The *Marine Mammal Regulations* (MMRs) made under the *Fisheries Act* were amended in June 2018 to prohibit vehicles (except aircraft in flight) from approaching within 200 metres of a killer whale in Canadian fisheries waters in British Columbia and the Pacific Ocean (Section 3.C.4, PDF page 89 of the Government of Canada's written evidence). The approach distances prescribed in the MMRs do not apply to a vessel that is in transit. Vessels that are actively engaged in whale watching or that divert their course to follow or interact with a whale are not considered in transit for the purposes of this exemption.

	Recommendation 27: Determine how permit applications in Washington state that could increase traffic and vessel impacts could be required to explicitly address potential impacts to orcas. Environmental assessments (EAs) in Canada can consider the impacts a project, or associated vessel traffic, might have on SRKW. In order to be considered in the EA process, SRKW (including any potential traffic or vessel impacts) would need to be identified in the selection of valued components or at other stages of EA scoping. **Recommendation 28: Establish a whale protection zone to reduce disturbance to foraging orcas.** Please see the response to IR 1.16. **Recommendation 29 to 33** DFO notes that Environment and Climate Change Canada (ECCC) is responsible for administering Section 36 of the *Fisheries Act*, which governs the deposit of deleterious substances in water frequented by fish for all purposes and subject matters, except as the provision related to aquaculture, aquatic invasive species or species that constitute a pest to the fisheries. As such, DFO refers the Board to ECCC's response to IR 1.9 for comment relating to Recommendations 29 to 33. **Recommendation 34 to 36** Funding, research, and monitoring are key aspects to the successful implementation of all recommendations described above. The Government of Canada funds investments in research and monitoring through ongoing program delivery, in addition to the Oceans Protection Plan and the Whales Initiative.
Responding FA:	Environment and Climate Change Canada, Fisheries and Oceans Canada, Canadian Coast Guard response for Recommendation 24

Question #	**1.10 Noisiest versus quiet vessels (same as or similar to IR 1.30 directed at TC, and IR 1.59 directed at VFPA)**
Reference:	i) A95299-19, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 2, Annex 7.G.2, Probability of Effectiveness of Mitigation of Noise, PDF pages 455 and 456 of 898 ii) A95292-7, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 1, Annex 3.F.2, JASCO Report, PDF page 10 of 359 iii) A95299-19, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 2, Annex 7.G.2, SRKW Review of Recovery Actions, PDF page 616 of 898 iv) A95299-20, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 2, Annex 7.G.3, Technical review of effectiveness of mitigation, PDF page 33 of 361 v) A95292-7, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 1, Annex 3.F.2, JASCO Report, PDF page 11 of 359 vi) A95296-8, VFPA, Written evidence, Appendix 4, PDF pages 1 and 2 of 38 vii) A95299-19, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 2, Annex 7.G.2, SRKW Imminent Threat Assessment, PDF page 889 of 898
Preamble:	In Reference i), DFO Science states that a small proportion of ships produce a disproportionately large amount of the total noise. In Reference ii), JASCO states that it modelled replacing the 10 per cent of noisiest vessels with the corresponding 10 per cent quietest and found that perceived loudness was reduced, and that, if the 10 per cent loudest could be identified (e.g., with systems such as the ECHO listening station), they could be subject to mitigation such as targeted slowing. In Reference iii), DFO's suggested priority recovery measures included implementing incentive programs and regulations that result in reduced acoustic footprints of the vessels habitually travelling in and near important SRKW habitat (e.g., through changes in vessel maintenance, application of quieting technologies) and the elimination of the noisiest vessels. In Reference iv), DFO Science Branch states that the ECHO Program found that regular propeller cleaning and repair, as well as regular cleaning of the hull, lead to significant noise reduction effectiveness, with keeping the propeller clean and in good shape to be the overall best approach to minimize the noise level for any individual vessel. In Reference v), JASCO states that ship design changes, vessel retrofitting, and regular ship maintenance would result in a long-lasting change in underwater noise levels everywhere these vessels operate, that such decisions are the responsibility of vessel owners and will be driven largely by financial decisions, and so incentives such as the

	Port of Vancouver's discount for certified quiet vessels could be used to encourage implementation. In Reference vi), VFPA states that, through its EcoAction Program, it currently offers discounted harbour dues and recognition to vessels that meet certain environmental performance criteria: quiet notations from ship classification societies Bureau Veritas, DNV-GL, and RINA are eligible for a gold level (highest) discount in harbour dues, while three propeller technologies shown to reduce propeller-generated noise are eligible for a bronze level discount. In Reference vii), Federal Authorities state that, under the Whales Initiative, there may be a recommendation to develop guidelines for quiet design and retrofits, that requirements could be made mandatory through regulation, and it is noted this is a long-term action since design criteria and/or standards will need to be developed.
Request:	a) With regard to References i) through iv), discuss the potential efficacy of identifying and mitigating the noisiest vessels in the Salish Sea in order to offset the additional noise from Project-related marine shipping or to reduce associated cumulative effects, including: a.1) how such vessels could be identified and who would undertake that; a.2) whether it is reasonable and effective to first focus on vessels habitually travelling in or through the area; a.3) what the current level of understanding is regarding which are the noisiest types of vessels, and of the noisiest individual vessels in the area; a.4) what mitigations could be practical and effective in the short and long term with regard to the noisiest vessels (for example, could the noisiest vessels be identified and speed restrictions imposed on them, as suggested in Reference ii]); and a.5) what incentives or requirements could be put in place to encourage or require implementation of such mitigations. b) With regard to References v) through vi), discuss what the experience has been with the Port's incentive program, and what the plans are for its future, including: b.1) whether there has been an evaluation of the effectiveness of the Port's incentive program (for example, is it known if the incentive program is actually affecting vessel owner and operators' decision-making to quieten their vessels?); b.2) how the level of financial gain provided by the incentive program compares to the cost of maintenance and retrofits for existing vessels, and design changes for quieter new vessels; and b.3) what the expected level of effectiveness of the incentive is going forward. c) With regard to Reference vii), discuss whether there is a plan for guidelines, regulations, or other measures to encourage or require quieter vessels via maintenance and retrofits for existing vessels, and design changes for quieter new vessels.
Response:	a) With regard to References i) through iv), discuss the potential efficacy of identifying and mitigating the noisiest vessels in the Salish Sea in order to offset the additional noise from Project-related marine shipping or to reduce associated cumulative effects, including:

	a.1) how such vessels could be identified and who would undertake that; The noise emitted from vessels can be recorded using calibrated, bottom mounted, underwater acoustic recorders. When a ship passes over the acoustic recorders, the recorded noise can be matched in time and space to the specific ship using Automatic Identification System (AIS) to get a unique ship signature noise at that specific location and time. Multiple passes of the same vessel under different conditions, both environmental (sea state, tide, temperature, etc) and vessel specific (speed, load, etc), are required to provide an accurate measure of the vessel generated noise at that location. After multiple vessels pass the listening station, it is possible to get a relative ranking of the noise generated from the vessels (taking into account the variables described above that affect noise propagation) and identify the noisiest vessels. While Fisheries and Oceans Canada (DFO) Science does collect acoustic data using underwater acoustic recorders, it does not process or analyze such data for the purposes of identifying unique ship signatures. Such analyses are undertaken are undertaken by Jasco Applied Science and results maintained by the Vancouver Fraser Port Authority (VFPA) (Matthews et al. 2018). *References:* Matthews, M.-N. R., Z. Alavizadeh, D.E. Hannay, L. Horwich, and H. Frouin-Mouy. 2018. *Assessment of Vessel Noise within the Southern Resident Killer Whale Critical Habitat: Final Report*. Document number 01618, Version 2.1. Technical report by JASCO Applied Sciences for the Innovation Centre, Transport Canada/Government of Canada. a.2) whether it is reasonable and effective to first focus on vessels habitually travelling in or through the area; As mentioned above, Fisheries and Oceans Canada (DFO) Science has not undertaken an analysis comparing the noise generated by different vessels or the frequency/duration of their presence in the Project area. Thus, DFO cannot comment on the effectiveness of approaches to target vessels for noise reduction measures. a.3) what the current level of understanding is regarding which are the noisiest types of vessels, and of the noisiest individual vessels in the area; The information regarding the noise output of individual vessels is held by the Vancouver Fraser Port Authority (VFPA). Fisheries and Oceans Canada (DFO) therefore refers the National Energy Board to VFPA's response to IR 1.59a)iii). a.4) what mitigations could be practical and effective in the short and long term with regard to the noisiest vessels (for example, could the noisiest vessels be identified and speed restrictions imposed on them, as suggested in Reference ii]); and

	Fisheries and Oceans Canada (DFO) provided analysis and discussion of mitigation measures in Annex 7.G.3, PDF page 29 to 34 of 361. This science advice also identifies considerations for the effectiveness for these measures. a.5) what incentives or requirements could be put in place to encourage or require implementation of such mitigations. Fisheries and Oceans Canada (DFO) refers the National Energy Board to Transport Canada's response to IR 1.30a)v) and the Vancouver Fraser Port Authority's response to IR 1.59a)v). b) With regard to References v) through vi), discuss what the experience has been with the Port's incentive program, and what the plans are for its future. The National Energy Board (NEB) posed Information Request (IR) 1.10b to Fisheries and Oceans Canada (DFO) on November 27, 2018. After reviewing the request, DFO has determined that this IR falls outside the scope of its mandate. DFO therefore refers the NEB to the Vancouver Fraser Port Authority's response to IR 1.59b. c) With regard to Reference vii), discuss whether there is a plan for guidelines, regulations, or other measures to encourage or require quieter vessels via maintenance and retrofits for existing vessels, and design changes for quieter new vessels. The National Energy Board (NEB) posed Information Request (IR) 1.10c to Fisheries and Oceans Canada (DFO) on November 27, 2018. After reviewing the request, DFO has determined that this IR falls outside the scope of its mandate. DFO therefore refers the NEB to Transport Canada's response to IR 1.30c and the Vancouver Fraser Port Authority's response to IR 1.59c.
Responding FA:	Fisheries and Oceans Canada

Question #	**1.11 Haro Strait slowdown trials (same as or similar to IR 1.31 directed at TC, and IR 1.60 directed at VFPA)**
Reference:	i) A95292-2, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 1, PDF pages 70 and 71, and 83 and 84 of 242 ii) A95299-20, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 2, Annex 7.G.3, Technical review of effectiveness of mitigation, PDF page 32 of 361 iii) A95292-2, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 1, PDF pages 76 and 77 of 242 A95296-4, VFPA, Written evidence, Appendix 2.1: iv) PDF pages 20 and 21, and 42 and 43 of 131 v) PDF pages 9, 11, and 14 of 131 vi) A95296-2, VFPA, Written evidence, PDF pages 2 to 4 of 20 vii) A95299-20, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 2, Annex 7.G.3, Technical review of effectiveness of mitigation, PDF page 35 of 361 viii)A95280-2, Trans Mountain, Opening statement and direct evidence, PDF page 43 of 73 ix) A95296-4, VFPA, Written evidence, Appendix 2.1, PDF pages 2 and 3, and 30 and 31 of 131 A95292-2, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 1: x) PDF page 85 of 242 xi) PDF page 71 of 242
Preamble:	In Reference i), the Federal Authorities state that: • the vessel noise modelling work by JASCO, combined with analysis of noise reduction achieved during the summer of 2017, and the assessment of risks, have determined that vessel slowdowns are not only effective at reducing underwater noise, but also pose a low risk to navigational safety; • analysis of the 2018 noise reduction measures will be completed by early 2019 and will inform future work so that mitigations can be in place well in advance of any additional Project-related tanker traffic; • an expansion of vessel slowdowns will be explored to increase the amount of SRKW critical habitat transited at lower speeds, thereby increasing the impact of this noise reduction measure; and • the next step is collaborative planning of the slowdown for 2019 with industry and other stakeholders. In Reference ii), DFO Science Branch states that area-based vessel speed limitations may need to account for potential vessel accelerations in other locations to maintain the

	shipping schedule, resulting in an increase in sound exposure and ship strike risk along other areas of the vessel route. In Reference iii), TC states that assessments of measures to mitigate underwater vessel noise must consider not only the effectiveness at mitigating noise, but also navigational safety, economic, and business impacts; unintended environmental consequences; and Canada-United States and international considerations. In Reference iv), VFPA states that, if all vessels participated in the 2017 Haro Strait slowdown trial, the estimated aggregate industry cost (accounting for pilotage costs, ship time, fuel consumption) was estimated to be $522,720 and that, due to the trial's short duration and the option to not participate if the sailing schedule would be significantly impacted, the trial was not expected to have a material effect on potential indirect economic impacts such as customer service, international trade traffic, or overall competitiveness of the Port of Vancouver. However, a more permanent and mandatory vessel slowdown, particularly if applied only to Canadian-bound vessels, could potentially have an adverse impact on these elements, creating competitive disadvantage for the Port of Vancouver. In Reference v), VFPA states that, for the 2017 trial, a speed through water of 11 knots was proposed to achieve maximum potential benefit to underwater noise reduction without compromising navigational safety. In Reference vi), VFPA states that vessel speeds of 15 knots (for faster vessels) and 12.5 knots (for slower vessels) were proposed for the 2018 slowdown trial to both maximize vessel participation and benefit the whales. In Reference vii), DFO Science Branch states that vessel speed has been found to be an important factor contributing to both the likelihood and the severity of a strike, and that the probability of a lethal injury to a whale when struck increases significantly above 9 knots and almost certainty results in whale death above 15 knots. In Reference viii), Trans Mountain states that it is commonly recognized by marine professionals that general slowing down of all vessels to a common reduced speed could lead to bunching and congestion of ships in transit, which could pose new navigational safety issues. In Reference ix), VFPA states that small and recreational boat traffic was not targeted in the 2017 Haro Strait slowdown trial, but was noted to significantly affect noise levels measured at Lime Kiln. In Reference x), Federal Authorities state that TC is promoting Conservation Agreements with key stakeholder groups, such as with VFPA, shipping, cruise line, and pilotage groups to formalize the existing voluntary slowdown. In Reference xi), Federal Authorities state that TC has proposed legislated changes to the Canada Shipping Act, 2001 (Bill C-86) to give government clear and enhanced authority to mandate speed reductions and other measures to protect the marine environment, including endangered whales.
Request:	Discuss the path forward to having in place an effective and enduring speed limit mitigation in Haro Strait and/or in other parts of the Salish Sea in order to offset the additional noise from Project-related marine shipping, or to reduce associated cumulative effects, including the following: a) For the mitigations noted in Reference i), discuss:

	a.1) the type of mitigations envisioned with regard to speed restrictions (for example, is this mitigation to be stable and mandatory, or year-to-year and voluntary?); a.2) what still needs to be tested or determined so that such mitigations can be in place well in advance of any additional Project-related tanker traffic (for example, what further trials are envisioned and for how long?); a.3) whether speed limit mitigation is being considered as a permanent measure, or as a temporary measure until other mitigations are in place, taking into account the operational life of the Project; and a.4) what the potential is for expansion of speed limit mitigation beyond Haro Strait, what other areas are under consideration, what studies have been done, and what remains to be determined prior to such expansion, including what a realistic timeline is for doing so. b) With regard to References ii) through iv), discuss what technical, navigational safety, economic, business, unintended environmental consequences, Canada-United States, international, and other challenges remain to be resolved before effective and enduring speed limit mitigation can be put in place in Haro Strait and/or in other parts of the Salish Sea, including what a realistic timeline is for doing so. c) With regard to References v) through viii), discuss what the competing pressures are, and the pros and cons between slower and faster speed limits in general, and what the reasons were for increasing the speed limits from 2017 to 2018 and for introducing different limits for different types of vessels. d) With regard to Reference ix), discuss whether the inclusion of other vessels (such as small crafts and ferries) is under consideration for speed limit mitigation, what the pros and cons are of doing so, and how effective it would be expected to be. e) With regard to References x) through xi), discuss what legal or non-legal means are being considered for speed limit mitigation in the future, and what the pros and cons are of each. In this discussion, explain what "formalize" a voluntary measure means.
Response:	**Discuss the path forward to having in place an effective and enduring speed limit mitigation in Haro Strait and/or in other parts of the Salish Sea in order to offset the additional noise from Project-related marine shipping, or to reduce associated cumulative effects, including the following:** **a) For the mitigations noted in Reference i), discuss:** **a.1) the type of mitigations envisioned with regard to speed restrictions (for example, is this mitigation to be stable and mandatory, or year-to-year and voluntary?);** Fisheries and Oceans Canada (DFO) Science has provided advice on how speed restrictions could reduce potential adverse effects such as underwater noise or the potential for ship strikes in Annex 7.G.3, PDF page 31 to 33 of 361. DFO refers the National Energy Board to Transport Canada's response to IR 1.31a.1 and the Vancouver Fraser Port Authority's response to IR 1.60a.1 for further comment. **a.2) what still needs to be tested or determined so that such mitigations can be in place well in advance of any additional Project-related tanker traffic (for example, what further trials are envisioned and for how long?);**

	a.3) whether speed limit mitigation is being considered as a permanent measure, or as a temporary measure until other mitigations are in place, taking into account the operational life of the Project; and Fisheries and Oceans Canada (DFO) refers the National Energy Board to Transport Canada's response to IR 1.31 a.2 and 1.31 a.3 and the Vancouver Fraser Port Authority's response to IR 1.60 a.2 and 1.60 a.3. **a.4) what the potential is for expansion of speed limit mitigation beyond Haro Strait, what other areas are under consideration, what studies have been done, and what remains to be determined prior to such expansion, including what a realistic timeline is for doing so.** Fisheries and Oceans Canada notes that the same considerations described in Annex 7.G.3, PDF pages 31 to 33 of 361 would be relevant beyond Haro Strait. DFO has deployed and will be deploying additional hydrophones in areas beyond Haro Strait to develop an acoustic baseline of the current and proposed critical habitat for SRKWs. The data collected can be used by federal agencies, if appropriate, to inform the feasibility of speed limit mitigation beyond Haro Strait. **b) With regard to References ii) through iv), discuss what technical, navigational safety, economic, business, unintended environmental consequences, Canada-United States, international, and other challenges remain to be resolved before effective and enduring speed limit mitigation can be put in place in Haro Strait and/or in other parts of the Salish Sea, including what a realistic timeline is for doing so.** With respect to technical and unintended environmental consequences, Fisheries and Oceans Canada (DFO) provided advice in Annex 7.G.3, PDF pages 24 to 46 of 361, on the effectiveness of a speed reduction mitigation measure that recognizes trade-offs need to be considered including the (i) local fleet characteristic, (ii) local noise propagation characteristics, and (iii) whether the potential decrease in sound energy levels is a net improvement for SRKWs over the resulting longer term exposure to sound and possible increased noise exposure in other areas. **c) With regard to References v) through viii), discuss what the competing pressures are, and the pros and cons between slower and faster speed limits in general, and what the reasons were for increasing the speed limits from 2017 to 2018 and for introducing different limits for different types of vessels.** The relationship between reduction in speed of a vessel and reduction in associated noise and noise exposure is complex. Whereas vessel speed reduction generally reduces sound source levels it increases the overall travel time of the vessel through an area, and as a consequence sound exposure time increases. This increased exposure needs to be integrated into the assessment of source level reduction at any given location. For example, in their study, McKenna et al. (2013) found a container ship that reduced its speed from 20 to 10 knots showed a 5 dB source level reduction but also doubled the exposure time. When the doubled exposure time is included in the calculation of the maximum source level, the overall exposure reduction is only 2 dB. Further a speed reduction below 7.7 knots would not result in any additional decrease in sound source levels but, in fact, was found to actually increase the sound source level exposure because of the increased exposure time (McKenna et al. 2013). Additionally, because different vessel designs are associated with different vessel types and different design can produce different spectral source levels, the noise reduction associated with speed reduction differs among vessel types (McKenna et al. 2012).

	Ship type, however, is not the only factor that affects variation in sound source levels. Measured source spectral levels exhibited large variability, with variability sometimes exceeding 30 dB, even when aggregated by ship types or length classes (Simard et al. 2016). As well, some ships may actually show an increase in noise with reduced speed, depending on propeller type and propulsion system (Spence and Fischer 2017). Furthermore, loading levels influence the draft of vessels, which in turn changes the depth of the propeller in the water and the sound source levels (McKenna et al. 2013). On the other hand, noise output of slow moving vessels, such as tugs may not change at all with a fixed amount vessel speed reduction . In summary, a vessel type alone may not be a sufficient indicator for determining noise reduction as a result of speed restriction, while a fixed speed restriction will not achieve reducing noise output for all vessels. *References:* McKenna, M.F., Ross, D., Wiggins, S.M. and Hildebrand, J.A., 2012. Underwater radiated noise from modern commercial ships. The Journal of the Acoustical Society of America, 131(1), pp.92-103. McKenna, M.F., Wiggins, S.M. and Hildebrand, J.A., 2013. Relationship between container ship underwater noise levels and ship design, operational and oceanographic conditions. Scientific reports, 3, p.1760. Simard, Y., N. Roy, C. Gervaise and S. Giard, 2016. Analysis and modelling of 255 source levels of merchant ships from an acoustic observatory along St. Lawrence Seaway. J. Acoust. Soc. Am. 140(3), 2002-2018. Spence, J.H. and Fischer, R.W., 2017. Requirements for Reducing Underwater Noise From Ships. IEEE Journal of Oceanic Engineering, 42(2), pp.388-398. **d) With regard to Reference ix), discuss whether the inclusion of other vessels (such as small crafts and ferries) is under consideration for speed limit mitigation, what the pros and cons are of doing so, and how effective it would be expected to be.** Discussion of how effective speed regulation mitigation options might be in reducing sound source levels, should include the considerations identified above in the response to 1.11c. **e) With regard to References x) through xi), discuss what legal or non-legal means are being considered for speed limit mitigation in the future, and what the pros and cons are of each. In this discussion, explain what "formalize" a voluntary measure means.** The National Energy Board (NEB) posed Information Request (IR) 1.11e to Fisheries and Oceans Canada (DFO) on November 27, 2018. After reviewing the request, DFO has determined that this IR falls outside the scope of its mandate. DFO therefore refers the NEB to Transport Canada's response to IR 1.31e and the Vancouver Fraser Port Authority's response to IR 1.60e.
Responding FA:	Fisheries and Oceans Canada

Question #	**1.12 Whale presence notification system (same as or similar to IR 1.32 directed at TC)**
Reference:	i) A95299-20, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 2, Annex 7.G.3, Technical review of effectiveness of mitigation, PDF page 42 of 361 ii) A95292-2, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 1, PDF pages 86 and 87 of 242 iii) A95299-20, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 2, Annex 7.G.3, Technical review of effectiveness of mitigation, PDF pages 35 and 36 of 361 iv) A95292-7, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 1, Annex 3.F.2, JASCO Report, PDF page 11 of 359 v) A95292-2, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 1, PDF page 90 of 242 A95299-20, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 2, Annex 7.G.3, Technical review of effectiveness of mitigation: vi) PDF pages 35 and 36 of 361 vii) PDF pages 35 and 36 of 361 viii) A95299-19, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 2, Annex 7.G.2, Probability of Effectiveness of Mitigation of Noise, PDF pages 468 and 473 of 898 ix) A95299-20, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 2, Annex 7.G.3, Technical review of effectiveness of mitigation, PDF pages 35 and 36 of 361
Preamble:	In Reference i), DFO Science Branch states that implementing real-time notification of whale presence could lead to earlier initiation of other mitigation procedures, such as vessel-slow down, but only if real-time detection were reliable year-round and notification can reach vessels in due time. In Reference ii), Federal Authorities state that Ocean Wise has completed an initial pilot of its Whale Report Alert system to assist in alerting mariners to the presence of whales in a given area, is looking to expand the application of the system and the network of trained observers, and that, going forward, TC will provide funding to support Ocean Wise to further develop and deploy the system. In Reference iii), DFO Science Branch states that there is an effort within the Federal Government's Ocean Protection Plan Ship collision avoidance program to evaluate methods and technology that could be useful for real-time ship alerts of whale presence, such as acoustic monitoring networks in areas of high collision risk, infrared automated detection in narrow waterways, and automated delivery of sightings via mariner sightings networks, among other approaches.

	In Reference iv), a JASCO report prepared for TC noted that SRKW are known to vocalize frequently, and so a network of hydrophone stations at locations where vessel traffic lanes intersect with key locations in the SRKW habitat could be highly effective. In Reference v), Federal Authorities state that DFO is undertaking a Whale Innovation Challenge initiative to develop solutions towards real-time detection and location of whales. In Reference vi), DFO Science Branch states that technologies to detect marine mammals under low visibility conditions (such as night vision systems, radar, active sonar, forward-looking infrared cameras, and infrared binoculars) have undergone limited testing and have generally been found to perform poorly. Except for detecting large cetaceans at distances of several kilometres in calm sea states, onboard passive acoustic monitoring is not a viable option as most acoustic monitoring equipment that can be operated on a moving vessel would not provide reliable detections of marine mammals located in front of the vessel. Moreover, many cetaceans, including SRKW, vocalize intermittently and are often silent for periods of time. In Reference vii), DFO Science Branch states that posting trained marine mammal observers (MMOs) or video monitoring systems on the bows of ships is likely to be useful only when sighting conditions are good, and when there is sufficient time for the vessel to safely react and avoid striking a marine mammal. In critical habitat areas, the Project tankers are too large and moving at speeds too great to allow for much maneuverability should an animal be detected ahead of the ship. Within the narrower waterways, from Haro Strait to Burrard Inlet, the ability to maneuver the ship away from SRKW is limited and likely poses a safety risk; however, there may be utility with this approach near the Project facility, and thus it is recommended that MMOs coordinate with existing whale sighting networks to receive advance warning of SRKWs to facilitate mitigation, such as reducing speed. In Reference viii), DFO states that ships changing speed or direction could confuse the whales, resulting in a potential increase in strike risk due to lack of predictability of ship movement. In Reference ix), DFO Science Branch states that bottom-mounted acoustic arrays have been deployed to monitor calling baleen whales, specifically North Atlantic Right Whales, but also Fin Whales and Humpback Whales. In the northeastern United States, this information is provided to vessel operators in real-time, allowing for an agreed-upon response such as reducing vessel speed when a calling whale is detected in or near the shipping lane within a 24-hour period.
Request:	Describe the path forward for investigating and implementing a whale detection notification system with regard to SRKW and other whales in the areas transited by Project-related marine shipping, including the following: a) With regard to References i) through vi), discuss what is/are currently considered the most promising methods and technologies, and why. b) With regard to References vii) through viii), discuss what are considered the most effective and practical responses by vessels when notified of whale presence in the area, and why. For example, is a general slowdown through an area in which whales are known to be present (or known to have been present in the past 24 or 48 hours) considered more effective and practical than real-time speed or route adjustments?

	c) With regard to Reference vii), describe what is meant by "there may be utility with this approach near the Project facility." d) With regard to the United States' system noted in Reference ix), discuss what the experience has been of that system, whether there are analyzed results, and what lessons can be carried over to the area of concern in this hearing.
Response:	Describe the path forward for investigating and implementing a whale detection notification system with regard to SRKW and other whales in the areas transited by Project-related marine shipping, including the following: a) With regard to References i) through vi), discuss what is/are currently considered the most promising methods and technologies, and why. There are several technologies with potential to form the basis of a whale tracking and notification system, including those mentioned above (acoustic monitoring networks in areas of high collision risk, infrared automated detection in narrow waterways, and automated delivery of sightings via mariner sightings networks). Fisheries and Oceans Canada (DFO) notes in Annex 7.G.3, PDF pages 24 to 46 of 361 and describes in Section 2.C.3, PDF page 51 of 242 of the Government of Canada's direct evidence submission, that DFO is currently working with its partners to test and evaluate methods and technologies capable of detecting whales, including SRKW, in near-real time. Given that the program is only in year two of five and that the evaluation and analysis of the whale detection methods and technologies are still underway, there are no conclusive peer reviewed results at this point in time to indicate which methods or technologies are likely to be considered the most promising. That said, real-time (or near real-time) notification of whale presence could help mitigate potential risks related to both physical (including vessel strikes) and acoustic disturbance. b) With regard to References vii) through viii), discuss what are considered the most effective and practical responses by vessels when notified of whale presence in the area, and why. For example, is a general slowdown through an area in which whales are known to be present (or known to have been present in the past 24 or 48 hours) considered more effective and practical than real-time speed or route adjustments? An evaluation of vessel response options under different whale presence circumstances has not been undertaken by Fisheries and Oceans Canada (DFO) for the Project area. However, a more proactive approach, such as a general slowdown in areas where SRKW are known to have been present or areas they frequent is likely to be more effective than real time (or near real time) speed or route adjustments in mitigating he potential risk of vessel strikes, given the limited maneuverability of large vessels. c) With regard to Reference vii), describe what is meant by "there may be utility with this approach near the Project facility." Near the loading facility, project vessels are expected to move very slowly and/or are likely to be maneuvered with the assistance of tugs. Using Marine Mammal Observers on vessels near the loading facility to alert vessel operators about the presence of whales may allow vessel operators to manoeuver the ship to mitigate any ship strike risk. However, it is recognised that due to the reduced speed at which vessels would be travelling near the Project facility, the risk of ship strike would be low.

	d) With regard to the United States' system noted in Reference ix), discuss what the experience has been of that system, whether there are analyzed results, and what lessons can be carried over to the area of concern in this hearing. The near real-time system in the northeastern United States was installed in January 2008. It is a network of 13 "auto-detection buoys" (with estimated listening radii of five nautical miles) that continually listen for calling whales in the traffic separation scheme on the approach to Boston Harbor. Software installed on the buoys allows for the automatic detection of right whale calls. Detections are relayed in real-time via cell or satellite to an analyst at the Cornell Lab of Ornithology for verification. Verified detections are subsequently included in warnings sent to nearby ships, with a delay of as little as 20 minutes. This system is briefly described by Van Parijs et. al. 2009 (https://www.int-res.com/articles/theme/m395p021.pdf – see figures 6 & 7). DFO has had no direct experience with this near real-time system being operated in the Boston shipping lanes and is not aware of any specific analysis of the data collected by this system or its performance. Results from this system would not be directly transferable to the area of concern in this hearing due to a number of factors: calls from killer whales are higher in frequency than right whales and will not be detectable over the same distances; the auto-detection software is designed for the sounds produced by right whales, not killer whales; and the Salish Sea has a very spatially complex topography and bathymetry relative to the Massachusetts Bay which results in a more complex sound propagation landscape.
Responding FA:	Fisheries and Oceans Canada

Question #	**1.13 Lateral displacement trial in the Strait of Juan de Fuca (same as or similar to IR 1.33 directed at TC, and IR 1.61 directed at VFPA)**
Reference:	i) A95296-2, VFPA, Written evidence, PDF pages 4 to 6 of 20 ii) A95299-20, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 2, Annex 7.G.3, Technical review of effectiveness of mitigation, PDF page 31 of 361 A95292-2, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 1: iii) PDF page 79 of 242 iv) PDF page 121 of 242 v) PDF page 70 of 242 vi) PDF pages 76 and 77 of 242 vii) PDF page 121 of 242 viii) PDF page 85 of 242
Preamble:	In Reference i), VFPA states that the ECHO Program and TC conducted a voluntary trial from August to October 2018 to study how laterally displacing vessels away from identified SRKW feeding areas along the northern side of the Strait of Juan de Fuca affects the underwater noise levels in those foraging areas. When it is safe and operationally feasible to do so, all deep-sea vessels transiting outbound are requested to navigate as far south as possible within the outbound lane of the traffic separation scheme, and all vessels transiting the inshore zone are requested to navigate as far south from Vancouver Island as possible without entering the traffic separation scheme. The ECHO Program will work with project partners to collate results and report out on the lateral displacement trial, with a final report anticipated for the second quarter of 2019. In Reference ii), DFO Science provides a map showing (from North to South) the SRKW foraging area, the inshore traffic lateral displacement trial zone, the deep-sea traffic lateral displacement trial zone, and the traffic separation scheme. In Reference iii), the Federal Authorities state that non-participation in the trial has been principally due to operational and safety considerations. In Reference iv), TC states that modelling in the July 2018 JASCO report indicates that, while shifting commercial shipping towards the centre of the shipping lane has little effect, a commensurate shifting of offshore smaller vessel traffic (including tugs) towards the centre of the Strait produces important noise savings. In Reference v), the Federal Authorities state that there is early evidence that the first steps taken to mitigate vessel noise, including the voluntary lateral displacement in the Strait of Juan de Fuca, are generating positive results. In Reference vi), TC states that assessments of measures to mitigate underwater vessel noise must consider not only the effectiveness at mitigating noise, but also navigational safety, economic and business impacts, unintended environmental consequences, and Canada-United States and international considerations.

	In Reference vii), TC states that the PRMM (i.e., the Greenwood Risk Assessment) determined that the action of shifting vessel traffic away from foraging areas, or laterally displacing such vessels, was a "low risk." In Reference viii), Federal Authorities state that TC is promoting Conservation Agreements with key stakeholder groups, such as with VFPA, shipping, cruise line, and pilotage groups to formalize the existing voluntary lateral displacement measures.
Request:	Discuss the current understanding of the effectiveness and challenges of lateral displacement within the Strait of Juan de Fuca, and what the plan is going forward, including the following: a) With regard to Reference iii), describe the operational and safety considerations that have been raised. b) With regard to References iv) though v), discuss whether it is known or expected if the primary benefits will be gained by moving the smaller vessel traffic further from the foraging areas, rather than moving the commercial shipping within the shipping lane. Discuss whether the monitoring undertaken during the trial has been (or will be) able to determine this. If this is found to be the primary benefit, discuss whether it is expected that consideration of moving the shipping lanes is unlikely to be necessary. c) With regard to References vi) through vii), discuss what costs and challenges are anticipated if it is decided to continue with this lateral displacement. d) With regard to Reference viii), describe what it means to formalize a voluntary measure. Discuss whether further trials are envisioned. Discuss whether any consideration has been given to whether such lateral displacements could become permanent, or whether it is too early for such considerations.
Response:	**Discuss the current understanding of the effectiveness and challenges of lateral displacement within the Strait of Juan de Fuca, and what the plan is going forward.** a), c), and d) The National Energy Board (NEB) posed Information Request (IR) 1.13 to Fisheries and Oceans Canada (DFO) on November 27, 2018. After reviewing the request, DFO has determined that IR 1.13a, 1.13c, and 1.13d fall outside the scope of its mandate. DFO therefore refers the NEB to Transport Canada's response to IR 1.33 and the Vancouver Fraser Port Authority's response to IR 1.61. **b) With regard to References iv) through v), discuss whether it is known or expected if the primary benefits will be gained by moving the smaller vessel traffic further from the foraging areas, rather than moving the commercial shipping within the shipping lane. Discuss whether the monitoring undertaken during the trial has been (or will be) able to determine this. If this is found to be the primary benefit, discuss whether it is expected that consideration of moving the shipping lanes is unlikely to be necessary.** The Enhancing Cetacean Habitat Observation (ECHO) 2018 lateral displacement trial ran from August 20, 2018 through to October 31, 2018. Over the first 7 weeks of the trial, review of automatic identification system (AIS) vessel tracking found that participation rates for deep-sea vessels were in the order of 82% when combining full and partial participation. The cumulative participation by the inshore tug-and-tow traffic

over this same time period was 79% (ECHO, 2018). All commercial, AIS equipped, vessels heading out the Strait between longitudes 124° and 124°40' West, over a distance of approximately 34 nautical miles were requested to navigate as far south from Vancouver Island as possible without entering the traffic separation scheme (Fig. 1.13-1). The study did not capture detailed information on smaller vessels that are not AIS equipped. Similar to tugs, small vessels generate more high frequency and less low frequency sound than big vessels.

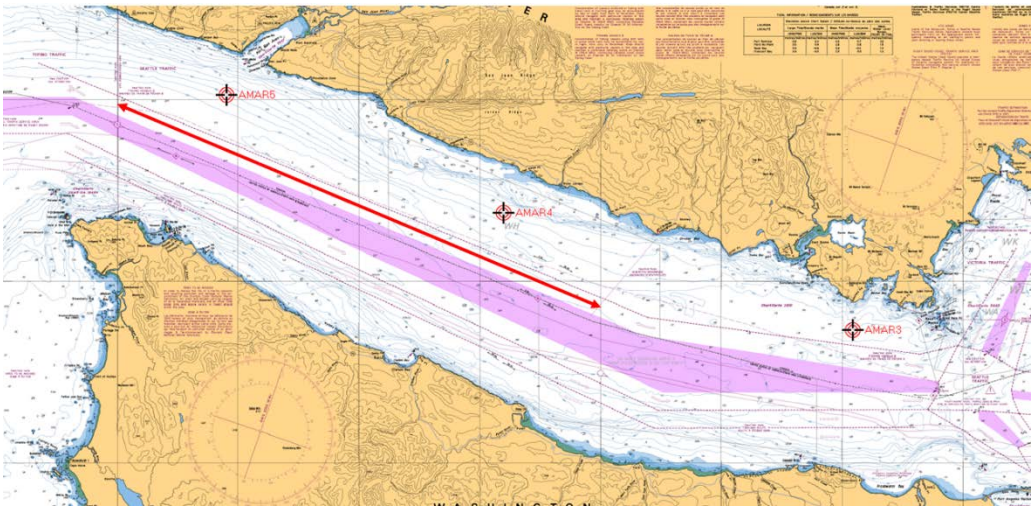

Figure 1.13-1. Strait of Juan de Fuca showing shipping lanes with the 34 nm track between 124°W and 124° 14'W (red arrow) where outgoing vessels were requested to navigate as far south from Vancouver Island as possible. Also shown are the three Fisheries and Oceans Canada (DFO) hydrophone stations (shown as AMAR3, 4, and 5).

Since February 2018, Fisheries and Oceans Canada (DFO) has deployed three broadband (10-128,000 Hz), continuously recording autonomous hydrophone systems at locations from Sooke to Port Renfrew in the Strait of Juan de Fuca (Fig. 1.13-1) as part of the Ocean Protection Plan, Marine Environmental Quality (MEQ) program. These recorder locations were chosen to coincide with areas of critical habitats for SRKW, therefore places where they spend significant time and forage. The study aims to evaluate the potential reductions in underwater ambient noise in these three foraging areas as a result of the lateral displacement trial by analysing data collected from these recorders between April 15th and August 20th, 2018 and between November 1st and November 30th (baseline – before and after the lateral displacement trial) and between August 20th and October 31st 2018 (during the lateral displacement trial). Data analysis is ongoing and conclusions are not yet available. If the lateral displacement is effective, a difference should be detected in the noise levels between the trial period and the two baseline periods.

The two hydrophone systems along the lateral displacement route (AMAR 4 and 5) are located approximately 4 km north of the outgoing shipping lane at depths of between 120 and 160 m. Any noise reduction as a result of lateral displacement will depend on the propagation characteristics of the environment between the vessels and the foraging areas (i.e., bathymetry, bottom type, sound-speed profiles and sea state – all which affect noise propagation). It will also depend on the noise source level, the spectral

	composition of the noise signature of the vessels displaced, and the actual displacement distances involved. Because low frequency sound propagates further than high frequency sound, it is expected that moving vessels that generate relatively more higher frequency sound further south in the shipping lane will have greater effect than moving vessels that generate relatively more low-frequency sounds. Because the deep-sea vessels generate more low-frequency noise than the tugs, there may be a greater noise reduction as a result of the lateral displacement of the tugs than from that observed when deep-sea vessels are displaced the same distance (Veirs et al. 2016). *References:* ECHO. 2018. https://www.portvancouver.com/environment/water-land-wildlife/echo-program/2018-underwater-vessel-noise-reduction-initiatives/
Responding FA:	Fisheries and Oceans Canada responding to b; Canadian Coast Guard responding to a, c, and d.

Question #	**1.14 Potential routing changes in Haro Strait (same as or similar to IR 1.34 directed at TC, and IR 1.62 directed at VFPA)**
Reference:	i) A95292-7, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 1, Annex 3.F.2, JASCO Report, PDF pages 8 and 57 of 359 ii) A95292-9, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 1, Annex 3.F.4, Greenwood Report, PDF page 21 of 53 iii) A95292-2, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 1, PDF page 121 of 242
Preamble:	In Reference i), JASCO modelled a westward shift of the existing inbound and outbound shipping lanes in Haro Strait away from the important SRKW foraging areas on the west side of San Juan Island, and found that it reduced the audiogram-weighted noise levels at receiver sites. JASCO noted that this routing change was not vetted by CCG or PPA, but warrants further consideration. In References ii) and iii), it is noted that the Greenwood Risk Assessment found the whale protection zone in east Haro Strait, and the small craft route up the west side of Haro Strait, to be acceptable.
Request:	Describe the potential routing changes in Haro Strait that might mitigate adverse effects on SRKW, including moving the shipping lanes and/or moving smaller craft routes, and explain with rationales whether such changes have been considered for trials or for further consideration.
Response:	The National Energy Board (NEB) posed Information Request (IR) 1.14 to Fisheries and Oceans Canada (DFO) on November 27, 2018. After reviewing the request, DFO has determined that this IR falls outside the scope of its mandate. DFO therefore refers the NEB to Transport Canada's response to IR 1.34 and the Vancouver Fraser Port Authority's response to IR 1.62.
Responding FA:	Canadian Coast Guard

Question #	**1.15 Special routing proposed by Trans Mountain (same as or similar to IR 1.35 directed at TC)**
Reference:	i) A95280-2, Trans Mountain, Opening statement and direct evidence, PDF page 50 of 73 ii) A95292-2, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 1, PDF page 155 of 242
Preamble:	In Reference i), Trans Mountain states that it is aware that the continental shelf off southwestern Vancouver Island (SWVI) (largely outside the 12 nautical-mile limit), including Swiftsure and La Pérouse Banks, has recently been proposed as NRKW and SRKW critical habitat. In light of this – and subject to receiving support from the responsible authority, TC, and confirmation from DFO concerning potential environmental benefits – Trans Mountain would be prepared to request that arriving and departing Project-related vessels include a specified Deviation Point as part of the vessels' passage plan and proceed at not more than 12 knots between the Deviation Point and Buoy J (safe navigation permitting and if feasible to do so, given pilot and berthing arrangement for arriving vessels). In Reference ii), the Federal Authorities state that the area of proposed critical habitat off SWVI is of importance in this review process as it overlaps with a small portion of the marine shipping lanes (at the western end of the Juan de Fuca Strait).
Request:	Discuss whether DFO has any comments or views on Trans Mountain's proposal at this time, including: a) whether any discussions have been held already; b) whether it appears to be beneficial to SRKW and NRKW; c) whether the routing proposal would affect any United States identified critical habitat; d) what the process would be for considering this proposal; and e) what a realistic timeline would be for doing so.
Response:	Discuss whether DFO has any comments or views on Trans Mountain's proposal at this time, including: a) whether any discussions have been held already. Fisheries and Oceans Canada is not aware of any conversations that have been held to discuss Trans Mountain's proposed Deviation Point. b) whether it appears to be beneficial to SRKW and NRKW. For information regarding effectiveness of mitigation measures, please see Annex 7.G.3, PDF pages 24 to 46 of 361 of the October 31 Direct Written Evidence of the Federal Authorities. No formal peer-reviewed evaluation of Trans Mountain's special routing instructions has been undertaken by Fisheries and Oceans Canada at this time regarding the benefits to SRKW and NRKW. c) whether the routing proposal would affect any United States identified critical habitat.

	Please note that the response to question 1.15c is based on the assumption that "United States critical habitat" is referring to Resident Killer Whale critical habitat only. Existing critical habitat for SRKW in United States (U.S.) waters does not extend offshore of Cape Flattery, so would not be impacted by vessel course deviations that occur outside of Juan de Fuca Strait. However, DFO understands that a petition to revise the U.S. SRKW critical habitat designation to include the region between Cape Flattery, WA (48° N, 124° W) and Point Reyes, CA (37° N, 123° W), extending from the coast to a distance of approximately 76 km offshore was received by the National Oceanic and Atmospheric Administration (NOAA) in 2014. After reviewing the petition, public comments, and the best available information, DFO understands that NOAA is proceeding with a revision to critical habitat reflecting the additional area described in the petition. The northern extent of this proposed critical habitat is the Canada-U.S. border; therefore, it is contiguous with proposed SRKW and NRKW critical habitat in Canadian waters off of southwest Vancouver Island. If SRKW critical habitat in U.S. waters is revised, then any deviations south of the Canada-U.S. border west of Juan de Fuca Strait to 76 km offshore would likely affect this critical habitat. Note that the proposal only considers the proposed critical habitat for SRKW and NRKW off southwestern Vancouver Island; the shipping lanes also overlap with existing critical habitat for SRKW in Juan de Fuca Strait. Existing critical habitat for SRKW in Juan de Fuca Strait is contiguous between Canadian and U.S. waters, so any deviation outside of Canadian waters in Juan de Fuca Strait would affect U.S. critical habitat for SRKW. d) what the process would be for considering this proposal; and e) what a realistic timeline would be for doing so. The National Energy Board (NEB) posed Information Request (IR) 1.15d and 1.15e to Fisheries and Oceans Canada (DFO) on November 27, 2018. After reviewing the request, DFO has determined that IR 1.15d and 1.15e fall outside the scope of its mandate. DFO therefore refers the NEB to Transport Canada's response to IR 1.35.
Responding FA:	Fisheries and Oceans Canada

Question #	**1.16 Acoustic / feeding refuges (same as or similar to IR 1.36 directed at TC)**
Reference:	i) A95299-19, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 2, Annex 7.G.2, SRKW Review of Recovery Actions, PDF page 616 of 898 ii) A95299-20, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 2, Annex 7.G.3, Technical review of effectiveness of mitigation, PDF page 38 of 361 iii) A95292-2, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 1, PDF page 91 of 242 iv) A95299-19, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 2, Annex 7.G.2, SRKW Imminent Threat Assessment, PDF page 889 of 898 v) A95292-2, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 1, PDF pages 88 and 89, 178, and 206 of 242 vi) A95299-20, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 2, Annex 7.G.3, Technical review of effectiveness of mitigation, PDF 37 of 361 vii) A95299-19, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 2, Annex 7.G.2, SRKW Review of Recovery Actions, PDF page 612 of 898
Preamble:	In Reference i), DFO's suggested priority recovery measures include: identify candidate acoustic refuge areas within foraging and other key areas of SRKW habitat, and undertake actions for their creation. In Reference ii), DFO Science Branch states that year-round or seasonal quiet or "no-go" zones in certain critical habitats (e.g., known SRKW feeding areas) would result in significant noise level reductions in the areas affected, but would result in increased noise levels in other areas and would likely require dynamic management to respond to SRKW behaviour, foraging needs, and prey availability. In Reference iii), Federal Authorities state that DFO plans to advance feasibility work on establishing SRKW sanctuaries within sub-areas of critical habitat; that a sanctuary could be established as a Marine Protected Area under the Oceans Act and prohibit activities that are contrary to the conservation objectives established; and that activities such as all fishing and commercial carrier vessels, ferries, whale watching vessels, and recreational boating could be restricted or prohibited in order to provide for conditions conducive to effective communication and feeding when SRKW are present. In Reference iv), the Imminent Threat Assessment states that DFO has identified the need for discussions with other sectors, including whale watching, to understand activity levels within key foraging areas and what potential additional voluntary measures may be taken to minimize physical and acoustic disturbance in identified killer whale foraging areas to the extent possible. It also states that discussion of potential voluntary measures that align with any implemented fishery area closures in key foraging areas through engagement, communications, and stewardship is anticipated. At present, it is unclear whether and if the appropriate federal regulatory tools exist to exclude non-

	fishing vessel-based activities from feeding areas, or whether authorities exist under provincial jurisdiction. As well, vessel exclusion zones can be difficult to enforce, especially for small recreational crafts. In Reference v), DFO states that, after the competent Ministers under the SARA determined that the SRKW is facing an imminent threat to both its survival and recovery, fishery management measures were introduced for the 2018 salmon fishing season, including full fishery closures for recreational finfish and commercial salmon fisheries in portions of the Strait of Juan de Fuca and the Gulf Islands, as well as partial closures at the mouth of the Fraser River, with the aim of protecting key foraging areas for SRKW by reducing competition between fishers and whales. DFO states that a post-season review of the effectiveness of the closures is underway, and consultations for the 2019 fishing season surrounding Chinook and SRKW management will start in January 2019. In Reference vi), DFO Science Branch states that four key locations of SRKW foraging habitat have been identified: Juan de Fuca Strait, the west side of Pender Island, the south side of Saturna Island, and the mouth of the Fraser River. In Reference vii), DFO states that, in 2017, the US National Oceanic and Atmospheric Administration (NOAA) was considering a petition to establish a Whale Protection Zone that would extend 1.2 km offshore of the west side of San Juan Island, and that the proposed protected area would encompass approximately 26 to 31 km2 and is an area in which SRKW are estimated to be three times more likely to be engaged in foraging than elsewhere. It states that efforts to create areas of reduced acoustic and physical disturbance as well as reduced competition should also be a priority in Canadian waters.
Request:	Describe the state of consideration of potential acoustic or feeding refuge areas or exclusion zones for SRKW in the Salish Sea, including the following: a) What are the anticipated primary challenges with such an approach? Is the dynamic management referred to in Reference ii) likely to be a challenge, or are some key SRKW habitat/feeding areas sufficiently stable? b) Are particular candidate areas under consideration? Are the areas subject to fishery closures in 2018 noted in Reference v) under consideration for longer term measures? Are the other areas noted in Reference vi) under consideration? c) What studies, trials, and consultations would need to be conducted to move this approach forward, are there plans to undertake them, and what is a realistic timeline for doing so? What other sectors (e.g., whale watching, fishing, recreation, ferries) would need to be considered and how might such considerations limit the ability to create such areas or zones? d) What are the primary activities that would be expected to be prohibited or limited in such an area or zone? For example, might a fishery closure be the primary measure, or a prohibition on whale watching craft, or would a combination of measures typically be necessary? e) How could such an area or zone be implemented, including mandatory or voluntary measures? With regard to References iii) and iv), would legislative change be required for mandatory measures? f) With regard to Reference vii), what is the status of the proposed Whale Protection Zone off the west side of San Juan Island?

Response:	**General status update:** Fisheries and Oceans Canada (DFO) is acting on the noted priority recovery measure identified in the resident killer whale action plan and in Reference i), to assess the feasibility of potential acoustic or feeding refuge areas and, if appropriate, identify candidate acoustic refuge areas within foraging and other key areas of SRKW habitat, and undertake actions for their creation. Work is being initiated by DFO to pursue the concept of a SRKW refuge or exclusion zone[1] to reduce physical and acoustic disturbance, one of the main threats to SRKW recovery, with a particular focus on foraging areas. Work is in very early stages, with a focus on the development a multi-sectoral Technical Working Group on Identification and Development of Proposed SRKW Sanctuaries (hereafter the Sanctuary TWG), and exploring regulatory and non-regulatory options for implementation. Other technical working groups (TWGs) are also being proposed to address all the main threats to SRKW. The working groups will include policy, technical and scientific experts from the federal government, Indigenous Peoples/First Nations, environmental groups, industry, and other areas. TWGs will be charged with providing proposals and advice on specific actions to address imminent threats to the SRKW and facilitate recovery. The Sanctuary TWG is expected to have an inaugural meeting in mid-December to: • Develop a workplan for immediate actions (by spring 2019) • Identify potential long-term work items(by June 2019) The current draft focus envisioned for the Sanctuary TWG is to "advance feasibility work on one or more SRKW sanctuaries, including consideration of potential boundaries and permitted or restricted activities, within sub-areas of critical habitat". [1]Note that for this response, the term "refuge", "sanctuary", and "exclusion zone" are used to describe the general concept of a spatial area under some form of protection aimed at reducing acoustic or physical disturbance to foraging and / or other key areas of SRKW habitat and supporting SRKW recovery. This terminology is expected to become more consistent once more in-depth work to evaluate options and tools for implementation is advanced. **Describe the state of consideration of potential acoustic or feeding refuge areas or exclusion zones for SRKW in the Salish Sea, including the following:** **a) What are the anticipated primary challenges with such an approach? Is the dynamic management referred to in Reference ii) likely to be a challenge, or are some key SRKW habitat/feeding areas sufficiently stable?** The primary challenges to this approach have not been fully scoped, but are expected to include: • defining areas and boundaries with incomplete science on the spatial and temporal distribution of SRKW foraging area; • incomplete science on the spatial and temporal distribution of other sensitive SRKW life stages; • variation and uncertainty in future spatial and temporal distribution of SRKW foraging and other sensitive life stages; • lack of public consensus on the objectives for a SRKW sanctuary;

- lack of public consensus on the required management measures within a sanctuary area and likely stakeholder concerns related to minimizing socio-economic impacts; and
- length of time required to implement regulatory measures.

DFO has not undertaken a spatial analysis to determine if there is stability in SRKW foraging areas within the Project area. However the temporal aspect of SRKW movement is known to vary by season, by year, and by pod (Cominelli et al. 2018). In Annex 7.G.3, PDF pages 24 to 46 of 361, DFO identifies that this management measure would have limited application in constrained areas like the Gulf Islands and would be challenging to design and effectively manage given the spatial and temporal variance of SRKW.

Reference:

Cominelli, S., Devillers, R., Yurk, H., MacGillivray, A., McWhinnie, L. and Canessa, R., 2018. Noise exposure from commercial shipping for the southern resident killer whale population. Marine Pollution Bulletin, 136, pp.177-200.

b) Are particular candidate areas under consideration? Are the areas subject to fishery closures in 2018 noted in Reference v) under consideration for longer term measures? Are the other areas noted in Reference vi) under consideration?

Specific candidate areas have not yet been identified though, subject to feasibility assessment, it is expected that sanctuary areas would be a sub-set of the SRKW critical habitat area, and will build upon measures taken in 2018 to reduce disturbance (i.e., fisheries closures). Fisheries closures in 2018 were informed by past data (i.e., visual observations) of areas with high frequencies of SRKW foraging activities. At this time Fisheries and Oceans Canada (DFO) has not made any determinations about the status of these areas for longer term measures. Candidate area discussions will also be linked to discussions on potential future fisheries closures through the SRKW Prey Availability and Accessibility TWG and other multi-stakeholder advisory processes. DFO has not conducted a detailed review of the areas referred to in Reference vi) and therefore does not have additional information to provide at this time.

c) What studies, trials, and consultations would need to be conducted to move this approach forward, are there plans to undertake them, and what is a realistic timeline for doing so? What other sectors (e.g., whale watching, fishing, recreation, ferries) would need to be considered and how might such considerations limit the ability to create such areas or zones?

In the context of potential acoustic or feeding refuge areas or exclusion zones for SRKW studies, trials and consultations required to move such an initiative forward have not yet been determined, but will be considered as part of the feasibility analysis and workplan that is under development. The Sanctuary TWG may also identify what studies or trials may be required to inform implementation. For a potential acoustic or feeding sanctuary area(s) for SRKW, the list of sectors to be considered would be dependent on the conservation objective(s) established for the sanctuary(s) and the management measures contemplated, but would be expected to include the sectors listed in the Information Request (whale watching, fishing, recreation, ferries) and potentially marine transportation more generally. Engagement and consultation with these sectors and

First Nations will be conducted through the TWG and other to-be-determined opportunities.

d) What are the primary activities that would be expected to be prohibited or limited in such an area or zone? For example, might a fishery closure be the primary measure, or a prohibition on whale watching craft, or would a combination of measures typically be necessary?

The primary activities that would be prohibited or limited in such an area or zones have not yet been defined, and would be dependent on the conservation objective(s) and management measures established for the sanctuary(s). From an initial perspective, activities that contribute to physical or acoustic disturbance would be candidates for prohibition or limitation, however, consultation and detailed assessment of the costs-benefits of any restriction would need to precede actions to restrict that activity. Implementation of different measures could be phased in over time based on the degree of regulatory or operational complexity associated with their implementation.

e) How could such an area or zone be implemented, including mandatory or voluntary measures? With regard to References iii) and iv), would legislative change be required for mandatory measures?

No decision has been made with respect to the specific regulatory or non-regulatory tool(s) that would be applied in advancing a refuge or exclusion zone. DFO expects that options will be discussed and considered by the Sanctuary TWG. Potential regulatory tools available to the federal government to establish spatially defined sanctuaries or to put in place restrictions and prohibitions on given activities in these areas include:

Species at Risk Act:

- Subsections 80(1) and (4) - Emergency Order
- Sections 53, 59, 71 Regulations
- Section 56 - Guidelines and Codes of practice

Fisheries Act

- S.35(3) or 43(1)(i.1) - Regulations made for purposes of para. 35(2)(a)
- Para. 43(1)(b) - Regulations "respecting conservation and protection of fish"
- S. 37(1.1)-(3) – Ecologically Significant Areas

Canada Shipping Act, 2001 regulations (s.190) alone or in conjunction with regulations made under the *Fisheries Act.* See also Transport Canada's response to IR 1.16e).

Oceans Act

- Para. 35(3) – Regulations designating Marine Protected Areas
- Paras. 32(q), 52.1(a) – Marine environmental quality guidelines and regulations

Non-regulatory tools could include:

- Voluntary measures (e.g., area restrictions or boat speed reductions, 400m buffer around killer whales, etc.)
- Various forms of negotiated agreements with resource users and / or sectoral groups having impacts in the area
- Voluntary Marine environmental quality measures (e.g. noise or other threshold triggering various voluntary measures once exceeded)

	The suitability of the above listed tools will depend on the nature of the candidate area(s) selected for protection, the conservation objective(s) defined for the area(s), the specific activities that require regulation or control and the input of those engaged and consulted in the design of the refuge. **f) With regard to Reference vii), what is the status of the proposed Whale Protection Zone off the west side of San Juan Island?.** On November 10, 2016, National Marine Fisheries Service (NMFS) received a petition pursuant to the Administrative Procedure Act (APA) from the Orca Relief Citizen's Alliance, Center for Biological Diversity, and Project Seawolf requesting that they utilize their authorities under the Endangered Species Act (ESA) and Marine Mammal Protection Act (MMPA) to establish a whale protection zone to reduce noise and disturbance of SRKW. The petitioners identify threats to the whales, discuss alleged insufficiencies with existing protections, and describe NMFS' authority under the ESA and MMPA to establish a whale protection zone with regulations. The petition describes the features of a whale protection zone and cites information evaluating the benefits of a protected area. The area proposed for a protection zone is similar to, but wider and longer than the zone originally considered by NMFS in 2009 (74 FR 37674; July 29, 2009). NOAA requested public comments on the petition and has stated it will consider all comments and available information when determining whether to accept the petition and proceed with the suggested rulemaking. For further information on the petition, a media release, and the notice requesting comments is posted at: https://www.westcoast.fisheries.noaa.gov/protected_species/marine_mammals/killer_whale/vessel_regulations.html
Responding FA:	Fisheries and Oceans Canada

Question #	**1.17 Quiet periods (same as or similar to IR 1.37 directed at TC)**
Reference:	A95292-7, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 1, Annex 3.F.2, JASCO Report, PDF page 10 of 359
Preamble:	In the reference, JASCO modelled restricting commercial vessel traffic in Haro Strait from midnight to 4:00 am, which it states greatly decreased SRKW-weighted noise during the restricted period (given commercial vessels contribute most to the night-time noise), but increased daytime noise levels. It states that the benefit of this approach depends on how marine fauna use their habitat during the night (e.g., does SRKW forage substantially at night?), and that this approach warrants further consideration.
Request:	Discuss whether the potential for night-time quiet periods in parts of the Salish Sea are being further considered and studied. If so, describe what is being done. If not, explain why.
Response:	The night time behaviour of SRKW foraging is not well understood. To inform the potential for night-time quiet periods, DFO Science is conducting concurrent research with National Oceanic and Atmospheric Administration (NOAA) to enhance our knowledge. These studies will use developed methods to identify sub-surface behavior, including foraging events, from acoustic and kinematic data obtained by suction cup-attached tags. The data will be analyzed to estimate and compare relative foraging rates and received noise levels between NRKW and SRKW individuals, in order to improve understanding of any night time patterns and differences in fitness-relevant foraging behaviors of the two listed populations. This project aims to enable broader assessments of trans-boundary populations to assess whether differences in foraging behavior, which are likely affected by differing levels of vessel disturbance, can explain differences in recovery rates between the two populations. These concurrent five year studies (NRKW – DFO and SRKW – NOAA) are expected to yield results in years four and five and will support the development of science advice on the question of night time acoustic impacts and potential role of night-time quiet periods.
Responding FA:	Fisheries and Oceans Canada

Question #	**1.18 Offsetting Project-related noise with other noise reductions (same as or similar to IR 1.38 directed at TC)**
Reference:	i) A95299-19, Department of Justice (on behalf of various Federal Departments and Agencies) Opening statement and direct evidence, Part 2, Annex 7.G.2, Probability of Effectiveness of Mitigation of Noise, PDF page 460 of 898 ii) A95292-7, Department of Justice (on behalf of various Federal Departments and Agencies) Opening statement and direct evidence, Part 1, Annex 3.F.2, JASCO Report, PDF page 7 of 359 iii) A77045-1, National Energy Board OH-001-2014 Recommendation Report for the Trans Mountain Expansion Report (May 2016), PDF pages 183 and 184 of 553
Preamble:	In Reference i), DFO states that JASCO provided a presentation on preliminary modelling results for the projected mean increase in noise associated with Project-related marine shipping at two different geographic scales (Salish Sea: 0.19 dB; Haro Strait: 0.23 dB), and for the changes in noise (averaged over these areas) that would be expected to occur after applying certain mitigation measures. It was found that, with the addition of Project-related marine shipping and replacement of 10 per cent of the noisiest vessels by the quietest 10 per cent of vessels in the Salish Sea, a mean reduction of 0.80 dB or 0.68 dB resulted (depending on whether ferries were included in the mitigation). With the addition of Project-related marine shipping and vessel slow-down to 11 knots in Haro Strait, a mean reduction of 0.02 dB resulted. In Reference ii), JASCO states that a speed limit much higher than 11 knots in Haro Strait would likely be insufficient to balance the additional noise produced by Project-related traffic. In Reference iii), the Board referred to a number of general principles for offsetting.
Request:	Discuss the potential for noise reduction mitigations that apply to other vessels in the Salish Sea to offset the additional noise produced by Project-related marine vessels, including the following: a) Can net-zero or net-benefit be achieved with such offsetting? What would be a reasonable scenario for each, taking into account an appropriate offset ratio? b) With regard to Reference i), to what extent is averaging the modelled sound over an area and over time necessary to demonstrate a net-zero or net benefit in overall noise reduction via offsetting, and what area and time is appropriate? With such averaging, would noise still be higher as a result of Project-related marine vessels in more local areas and over shorter time periods, and would this undermine the concept of offsetting? c) To what extent would the particular frequencies of noise radiated from Project-related marine shipping need to be taken into account when determining offset measures? d) How would each of the general principles for offsets in Reference iii) apply? For example, with regard to additionality, would additional offset measures have to be put in place above and beyond what Federal Authorities have already committed to, and, with regard to duration, would there be confidence that the offset measures would be in place for the lifetime of the Project?

	e) What form of follow-up would be appropriate, and by whom, to demonstrate if the offsetting is achieving its goals? f) How might such offsets need to change over the lifetime of the Project (e.g., to reflect quieter new-built tankers or new research insights), and what would be an appropriate process to re-evaluate the offsets over time? g) Could such offsetting also offset any other effects, such as increased strike risk for SRKW and other marine mammals? If not, explain why. If so, discuss how net-zero or net-benefit could be demonstrated for these other effects.
Response:	**Discuss the potential for noise reduction mitigations that apply to other vessels in the Salish Sea to offset the additional noise produced by Project-related marine vessels, including the following:** **a) Can net-zero or net-benefit be achieved with such offsetting? What would be a reasonable scenario for each, taking into account an appropriate offset ratio?** Fisheries and Oceans Canada (DFO) has not undertaken an internal peer review of Matthews et al. (2018) or conducted independent modelling or other evaluations to determine the impact of offsetting by non-Project vessels in the Project area. *Reference:* Matthews, M.-N. R., Z. Alavizadeh, D.E. Hannay, L. Horwich, and H. Frouin-Mouy. 2018. *Assessment of Vessel Noise within the Southern Resident Killer Whale Critical Habitat: Final Report*. Document number 01618, Version 2.1. Technical report by JASCO Applied Sciences for the Innovation Centre, Transport Canada/Government of Canada. **b) With regard to Reference i), to what extent is averaging the modelled sound over an area and over time necessary to demonstrate a net-zero or net benefit in overall noise reduction via offsetting, and what area and time is appropriate? With such averaging, would noise still be higher as a result of Project-related marine vessels in more local areas and over shorter time periods, and would this undermine the concept of offsetting?** The specific pages noted in Reference i) refer to preliminary modeling results that were presented at that time and that have now become the more comprehensive Reference ii) report. Fisheries and Oceans Canada has not undertaken an internal peer review of this report and therefore cannot comment specifically on its findings. **c) To what extent would the particular frequencies of noise radiated from Project-related marine shipping need to be taken into account when determining offset measures?** The amplitude and the frequency of noise radiating from Project-related marine shipping should be fully considered with respect to impacts on SRKW, or any marine mammal species. Indeed, it is important to consider the acoustic energy both in the environment as a whole and in terms of the frequencies used by a particular species, in order to understand the effects on their habitat (Southall et al. 2007). While much of the noise radiating from transiting ships is below 1 kHz, a significant part of shipping noise also extends to high frequencies used by SRKWs for social calls and echolocation clicks (10 to 96kHz). For instance, in the core of SRKW critical habitat, received levels

	of ship noise are elevated above background levels not only at low frequencies but also at high frequencies (10 to 40 kHz, Veirs et al. 2015). The use of audiogram-weighted received levels to assess the impact of ship noise on SRKW shows that such shipping noise can mask killer whale communications and interfere with their echolocation signals (Williams et al. 2014). In addition, there is evidence in other species that even noise at frequencies outside of the hearing range can have physiological impacts that contribute to hearing loss (Kugler et al. 2014). DFO Science has not undertaken specific analysis to assess how the impacts of Project-related marine shipping could be taken into account in determining offsetting measures. *References:* Kugler K., Wiegrebe L., Grothe B., Kössl M., Gürkov R., Krause E., Drexl M. 2014. Low-frequency sound affects active micromechanics in the human inner ear. Royal Society open science 1(2):140166. Southall, B.L., Bowles, A.E., Ellison, W.T., Finneran, J.J., Gentry Jr., R.L., G, C.R., Tyack, P.L., 2007. Marine mammal noise exposure criteria: initial scientific recommendations. Aquat. Mamm. 33 (4), 411–521. https://doi.org/10.1578/AM.33.4.2007.411. Veirs, S., Veirs, V. and Wood, J.D. 2015. Ship noise in an urban estuary extends to frequencies used for echolocation by endangered killer whales. PeerJ 4:e1657. Williams, R., Clark, C.W., Ponirakis, D., Ashe, E., 2014. Acoustic quality of critical habitats for three threatened whale populations. Anim. Conserv. 17 (2), 174–185. **d) How would each of the general principles for offsets in Reference iii) apply? For example, with regard to additionality, would additional offset measures have to be put in place above and beyond what Federal Authorities have already committed to, and, with regard to duration, would there be confidence that the offset measures would be in place for the lifetime of the Project?** Fisheries and Oceans Canada has not considered how the principles in Reference iii) would apply. **e) What form of follow-up would be appropriate, and by whom, to demonstrate if the offsetting is achieving its goals?** Offsetting goals or objectives have not been defined spatially or temporally. As such Fisheries and Oceans Canada cannot provide advice on appropriate measures to determine their effectiveness. The acoustic portion of the Marine Environmental Quality initiative of the Ocean Protection Program has established permanent hydro-acoustic listening stations that are continuously collecting acoustic information. This information is being collected to measure the before and after acoustic signature in the Project area. **f) How might such offsets need to change over the lifetime of the Project (e.g., to reflect quieter new-built tankers or new research insights), and what would be an appropriate process to re-evaluate the offsets over time?** Fisheries and Oceans Canada (DFO) cannot predict the changes to the ecosystem or the changes to anthropogenic activities over the lifetime of the Project. Also, specific goals of offsetting have not been defined and as a result DFO cannot comment on what

	offsetting measures would be needed over the lifetime of the project. Pending the development of scenarios for offsetting, modelling could be undertaken to estimate their efficacy. With ongoing collection of acoustic information via passive acoustic monitors, empirical data could be used in the future to determine the efficacy of offsetting measures pertaining to noise reduction. **g) Could such offsetting also offset any other effects, such as increased strike risk for SRKW and other marine mammals? If not, explain why. If so, discuss how net-zero or net-benefit could be demonstrated for these other effects**. As noted above, goals for offsetting have not been defined and as a result Fisheries and Oceans Canada cannot comment on what offsetting could be implemented over the lifetime of the project or its ancillary benefits.
Responding FA:	Fisheries and Oceans Canada

Question #	**1.19 DFO Important Areas**
Reference:	A95299-20, Department of Justice (on behalf of various Federal Departments and Agencies) Opening statement and direct evidence, Part 2, Annex 7.G.3, Technical review of effectiveness of mitigation, PDF page 28 of 361
Preamble:	The reference shows a map produced for Trans Mountain in 2013 showing that Project-related marine shipping passes adjacent to or through DFO Important Areas for Harbour Seal and for Harbour Porpoise.
Request:	a) Discuss whether there have been any updates to DFO Important Areas, including the creation of any new Important Areas, in the vicinity of the Project-related marine shipping routes since the date of the Board's OH-001-2014 Recommendation Report (May 2016). b) Discuss whether there is any recommended or required mitigation in relation to the Important Areas shown in the reference, or to new such areas, that would be relevant to Project-related marine shipping.
Response:	**a) Discuss whether there have been any updates to DFO Important Areas, including the creation of any new Important Areas, in the vicinity of the Project-related marine shipping routes since the date of the Board's OH-001-2014 Recommendation Report (May 2016).** Fisheries and Oceans Canada (DFO) does not have any updates to the Important Areas for harbour seal or harbour porpoise in the vicinity of the Project-related marine shipping routes. **b) Discuss whether there is any recommended or required mitigation in relation to the Important Areas shown in the reference, or to new such areas, that would be relevant to Project-related marine shipping.** Important Areas have been defined to help inform the development of Ecologically and Biologically Significant Areas (EBSA) (Levesque and Jamieson 2015). The identification of an Important Area does not impart legal designation or regulatory requirement. They are used to inform marine planning initiatives. Fisheries and Oceans Canada is not aware of any proposed or required mitigations associated with the Important Areas within the Project Area. *Reference:* Levesque, C and Jamieson, G.S. 2015. Identification of Ecologically and Biologically Significant Areas in the Strait of Georgia and off the West Coast of Vancouver Island: Phase I - Identification of Important Areas. DFO Can. Sci. Advis. Sec. Res. Doc. 2014/100. viii + 68 p.
Responding FA:	Fisheries and Oceans Canada

Question #	1.20 Relative contribution to overall impacts on SRKW
Reference:	i) A95299-19, Department of Justice (on behalf of various Federal Departments and Agencies) Opening statement and direct evidence, Part 2, Annex 7.G.2, SRKW Review of Recovery Actions, PDF pages 569, and 594 and 595 of 898 ii) A95299-20, Department of Justice (on behalf of various Federal Departments and Agencies) Opening statement and direct evidence, Part 2, Annex 7.G.3, Technical review of effectiveness of mitigation, PDF page 36 of 361 iii) A95299-19, Department of Justice (on behalf of various Federal Departments and Agencies) Opening statement and direct evidence, Part 2, Annex 7.G.2, 2018 Proposed Recovery Strategy for Northern and Southern Resident Killer Whales, PDF page 670 of 898 iv) A95299-20, Department of Justice (on behalf of various Federal Departments and Agencies) Opening statement and direct evidence, Part 2, Annex 7.G.3, Technical review of effectiveness of mitigation, PDF pages 39, 40, and 43 of 361 v) A95292-8, Department of Justice (on behalf of various Federal Departments and Agencies) Opening statement and direct evidence, Part 1, Annex 3.F.3, CORI, PDF page 7 of 31 vi) A95299-19, Department of Justice (on behalf of various Federal Departments and Agencies) Opening statement and direct evidence, Part 2, Annex 7.G.2, SRKW Review of Recovery Actions, PDF page 615 of 898 vii) A95292-12, Department of Justice (on behalf of various Federal Departments and Agencies) Opening statement and direct evidence, Part 1, Annex 3.F.7, Canada to IMO, PDF page 3 of 13 viii) A95292-9, Department of Justice (on behalf of various Federal Departments and Agencies) Opening statement and direct evidence, Part 1, Annex 3.F.4, Greenwood, PDF page 5 of 53 ix) A95292-6, Department of Justice (on behalf of various Federal Departments and Agencies) Opening statement and direct evidence, Part 1, Annex 3.F.1, Green Marine, PDF pages 43 and 46 of 107 x) A95292-2, Department of Justice (on behalf of various Federal Departments and Agencies) Opening statement and direct evidence, Part 1, PDF pages 74 and 119 of 242 xi) A95234-1, PPA, Written evidence, PDF page 7 of 22 xii) A95299-19, Department of Justice (on behalf of various Federal Departments and Agencies) Opening statement and direct evidence, Part 2, Annex 7.G.2, SRKW Review of Recovery Actions, PDF pages 599 to 601 of 898 xiii) A95299-19, Department of Justice (on behalf of various Federal Departments and Agencies) Opening statement and direct evidence, Part 2, Annex 7.G.2, SRKW Imminent Threat Assessment, PDF pages 869 to 898 of 898 xiv) A95299-19, Department of Justice (on behalf of various Federal Departments and Agencies) Opening statement and direct evidence, Part 2, Annex 7.G.2, SRKW Review of Recovery Actions, PDF pages 599 to 601 of 898

	xv) A95292-2, Department of Justice (on behalf of various Federal Departments and Agencies) Opening statement and direct evidence, Part 1, PDF page 175 of 242 xvi) A95299-19, Department of Justice (on behalf of various Federal Departments and Agencies) Opening statement and direct evidence, Part 1, Annex 7.G.2, SRKW Review of Recovery Actions, PDF page 609 of 898 xvii) A95299-19, Department of Justice (on behalf of various Federal Departments and Agencies) Opening statement and direct evidence, Part 1, Annex 7.G.2, 2018 Proposed Recovery Strategy for Northern and Southern Resident Killer Whales, PDF page 669 of 898
Preamble:	In Reference i), DFO states that each of reduced prey availability, physical and acoustic disturbance, and environmental contaminants are at a high level of concern. In Reference ii), DFO states that research on the cumulative effects of the multiple threats to SRKW suggests that, although prey limitation is likely the most important factor affecting population growth, both reductions in acoustic disturbance and increases in prey abundance are needed to achieve population growth. In Reference iii), the proposed recovery strategy states that population viability analysis (PVA) models predicted that prey limitation had the greatest potential to impact population growth, but that either higher levels of noise and disturbance or higher levels of PCB contamination would also be sufficient to shift population trajectories from slow positive growth into decline. In Reference iv), DFO states that, according to a cumulative effects model by Lacy et al. (2017), a reduction in noise relative to baseline levels would be required to maintain the SRKW at current population levels, unless improvements in prey abundance and/or reduced contaminant levels are also implemented. For example, a 30 per cent increase in prey abundance (while leaving other environmental conditions such as noise at baseline) was predicted to lead to a SRKW annual population growth rate of 2.5 per cent, while decreasing noise to zero (while leaving other environmental conditions such as prey abundance at baseline) was predicted to lead to a growth rate of 1.7 per cent. In Reference v), Coastal Ocean Research Institute (CORI) states that participants at a workshop in May 2017 determined that motorized vessels are the most significant sources of impactful, chronic noise in the SRKW's critical habitat area. In Reference vi), DFO states that underwater noise from shipping in SRKW habitat in the Salish Sea is already causing a reduction in foraging opportunities for SRKW and there are expected impacts of this noise on SRKW communication space and on other life processes. Further reductions to foraging opportunities are anticipated with future increases in shipping. In Reference vii) – a letter to the Marine Environment Protection Committee (MEPC) of the International Maritime Organization (IMO) – Canada states that the largest contributor of anthropogenic noise to the marine environment is conclusively commercial shipping, particularly in the low frequency range. In Reference viii), the Greenwood Risk Assessment report noted a 2017 study by JASCO Applied Sciences Ltd. which concluded that, while small vessel traffic could not be quantified reliably, the major source of noise in Haro Strait was largely attributable to deep-sea shipping traffic.

	In Reference ix), Green Marine states that approximate sound levels (dB re 1 µPa @ 1m) for tankers are 174 ± 4, for tugs are 170 ± 5, and for whale-watching boats 115 to 127. In Reference x), DFO states that, while tankers and escort tugs are not as loud as other vessel classes, they are louder than most in high frequencies of critical importance to the SRKW. In Reference xi), PPA states that pilotage assignments (vessel movements) within the waters of the west coast of Canada have been declining steadily from over 14,000 assignments in the late 1990s to just over 11,000 following the global economic meltdown of 2008-2009. At present, PPA's annual assignments are approximately 12,500. In Reference xii), DFO states that, within the Salish Sea, commercial shipping is the dominant source of overall sound energy, but smaller craft (recreational, fishing, whale watching boats) are a substantive contribution in certain sub-areas. In Puget Sound, commercial vessel traffic accounted for more than 90 per cent of the sound energy budget, with container ships as the greatest contributor. Commercial whale watching in the Canadian and United States' portions of the Salish Sea increased from a few boats in the 1970s to about 80 boats in 2003 and, in 2016, to 100 boats. SRKW were observed to be within 400 m of a vessel most of the time during daylight hours from May through September, largely as a result of whale-watching oriented vessels approaching and following them. In Reference xiii), Canada states that numerous studies since 2002 have demonstrated behavioural response and changes in acoustic signaling by SRKW living and foraging in the Salish Sea that strongly suggest an energetic cost and potential stress to SRKW associated with the increased noise levels. In Reference xiv), DFO states that studies of SRKW behaviour in the vicinity of whale-watching oriented vessels in the Salish Sea showed that SRKW were significantly less likely to be foraging and significantly more likely to be traveling when boats were around and were displaced short distances by the presence of vessels. Time lost from foraging across all vessel types is estimated at 20-23 per cent of each whale day. Two-thirds of this lost time is considered to be due to behavioural responses which are caused predominantly by large ships (generally vessels of 500 tons or more), although whale watching boats (small vessels) are predominantly responsible for the remaining high sound frequency click masking noise. In Reference xv), DFO notes that its 2017 Whale Science Review identified ship strikes as an additional threat to the three main threats noted in the Recovery Strategy for SRKW. In Reference xvi), DFO states that a threat that could remove one animal will have significant consequences. Reference xvii) provides a graph showing the population size and trends for SRKW from 1976 to 2017.
Request:	Provide further discussion on the relative contribution of the threats to SRKW, including each of the following: a) What is the relative contribution of each of the threats (including decreased prey abundance, underwater noise, contamination, and vessel strikes) to the overall threat to SRKW in the Salish Sea, including:

	a.1) the potential for quantitative comparison of the contribution from individual threats, including appropriate methods and measures for comparing them; a.2) challenges or limitations in comparing them; a.3) past and anticipated future trends in these relative contributions; a.4) the confidence in any conclusions drawn; a.5) any thresholds relevant to each threat that would permit a comparison of their relative contributions; a.6) the extent to which PVA models, or a model such as reported in Lacy et al. (2017), could provide quantitative comparisons of the relative contribution of different threats to SRKW, and with what level of confidence; and a.7) any conclusions as to where mitigation efforts should be focused based on relative contributions? b) What is the relative contribution of vessels to underwater noise, compared to other sources of anthropogenic noise? c) What is the relative contribution of different types of vessels, including oil tankers and whale watching boats, to each of the threats on SRKW in the Salish Sea, including: c.1) the potential for quantitative comparison, including appropriate methods and measures for comparing them; c.2) challenges or limitations in comparing them; c.3) past and anticipated future trends in these relative contributions; c.4) the confidence in any conclusions drawn; and c.5) any conclusions as to where mitigation efforts should be focused based on relative contributions? d) How many whale watching boat trips are there per day that seek SRKW, how does this vary from season to season, and are there any limitations on such numbers? e) What evidence is there that underwater noise or other disturbance from vessels leads to decreased foraging effectiveness or decreased time for foraging; how has the time that SRKW lose to foraging because of disturbance from vessels been estimated; what is the contribution of different types of vessels, including oil tankers and whale watching boats, to that lost time; and what is the confidence in such estimates? f) What data is there on the number of SRKW-vessel strikes in the Salish Sea or elsewhere, the types of vessels involved, and the reasons for such strikes?

	g) What are the primary knowledge gaps concerning the relative contribution of threats to SRKW, and of the contribution of different types of vessels to these threats, and what studies are underway or planned to resolve them? h) Provide graphs, over the same time scale as the graph shown in Reference xvii), showing (as best as can be estimated and for the most relevant area to SRKW): (1) the population size of Chinook salmon, (2) the estimated underwater noise levels, and (3) the estimated contaminant levels (for one or more key contaminants). For each graph, describe how it was estimated, any uncertainties or assumptions, the utility in comparing any trends it shows to the trends in the graph in Reference xvii), and whether it provides any insights into the relative contribution of different threats to SRKW.
Response:	**Provide further discussion on the relative contribution of the threats to SRKW, including each of the following:** **a) What is the relative contribution of each of the threats (including decreased prey abundance, underwater noise, contamination, and vessel strikes) to the overall threat to SRKW in the Salish Sea, including:** **a.1) the potential for quantitative comparison of the contribution from individual threats, including appropriate methods and measures for comparing them;** To date, the only published study comparing the relative contribution of individual anthropogenic threats (decreased prey availability, underwater noise, contamination, and vessel strikes) on SRKW is the cumulative effects analysis of Lacy et al. (2017). The Lacy et al. (2017) study used a Population Viability Analysis (PVA) model, which is an appropriate method for comparing the contribution of threats to viability of a wildlife population. PVA models allow for the expression of single or multiple anthropogenic effects on a species in terms of changes in vital rates such as birth rates, mortality rates, inbreeding, etc. that determine population growth rate. The population growth rate that results from the combination of these rates is considered an appropriate measure of population viability. Expressing each threat effect (or the interactions among threats) in terms of a change in one or more vital rates allows the threat effects to be converted into a common currency and compared. DFO considers PVA to be the best modelling approach available for the purpose of comparing the contribution of individual threats as well as evaluating their cumulative effects and has previously used PVA for assessment of the St. Lawrence River beluga whale population (Williams et al. 2017). Lacy et al. (2017) were the first to use this method to examine cumulative effects of anthropogenic stressors on SRKW. The Lacy et al. (2017) model predictions have not been tested. **a.2) challenges or limitations in comparing them;** Comparing the contribution of individual threats by means of a PVA model, considered the best available method for SRKW, requires confidence in both the model structure and the data used. Modelling the SRKW population is limited by the lack of experimental data on the reaction of SRKWs to individual threats (such as vessel noise) and the lack of knowledge on the mechanisms of interactions between stressors (e.g.,

	the effects of noise when prey availability is low may be different from those when prey availability is high). Experimental data cannot be obtained without directly interacting with the SRKW, which could further jeopardize the population. Observational data, such as killer whale behaviour in the presence and absence of vessels, has been used to represent the impacts of vessels on SRKW (Williams et al 2006). Other data used in models of SRKW come from other populations of killer whales, such as Northern Resident Killer Whale. For some threats, in particular for PCB contaminants, limited data for cetaceans exist and effects are inferred from other mammalian models (e.g. mink Kihlstrom et al. 1992; Desforges et al. 2018). In an ecosystem where multiple threats are co-occurring, it can be difficult to assess the contribution of individual threats, both because the threats may not exhibit similar variability in time and space and because threats may interact with one another to produce unpredictable results (Crain et al 2008). **a.3) past and anticipated future trends in these relative contributions;** A correlative analysis by Ward et al. (2009) examined the effect of multiple threats on the fecundity (calf production) of SRKW over time but did not address all the threats presently under consideration. Ward et al. (2009) looked at changes in multiple Chinook salmon indices, environmental variables, tourism, whale watching, and urban population density between 1979 and 2006 and the ability of these variables to predict calving in resident killer whales. Contaminants and noise were not included in the analysis because of a lack of time series data. The analysis determined that fecundity was apparently determined by prey abundance and killer whale population age structure. Factors affecting other vital rates that help to determine population growth rate, such as mortality rate, were not investigated. Lacy et al (2017) constructed alternate PVA models to examine the effects of changes in acoustic disturbance, ship strikes, contaminants, and prey availability, individually or in combination with the other threats, on the predicted SRKW population. The results were tabulated in DFO (2018: Table 1, page 16). **a.4) the confidence in any conclusions drawn;** At this time, the only completed PVA model examining the cumulative effects of threats on SRKW population viability is that of Lacy et al. (2017). However, the predictions of the model have not been tested. **a.5) any thresholds relevant to each threat that would permit a comparison of their relative contributions;** To our knowledge, no methods exist to use thresholds to compare relative contributions of threats. Additionally, thresholds have not been identified for all the threats. **a.6) the extent to which PVA models, or a model such as reported in Lacy et al. (2017), could provide quantitative comparisons of the relative contribution of different threats to SRKW, and with what level of confidence; and** See response to IR 20 a.iv. **a.7) any conclusions as to where mitigation efforts should be focused based on relative contributions?** The outcomes of the Lacy et al. (2017) PVA model suggest that there are several configurations of threat reduction (e.g., increase in prey availability combined with reduction in noise) that could lead to increased population growth of SRKW, but do not

provide clear guidance for the best mitigation actions. The Lacy et al. (2017) PVA model does not examine Project-specific effects.

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b) What is the relative contribution of vessels to underwater noise, compared to other sources of anthropogenic noise?

At global scales the largest contributor to the anthropogenic underwater noise budget is commercial shipping (Ocean Studies Board and National Research Council 2003). However, there have not been any studies that have specifically identified and quantified all sources of anthropogenic noise in the Salish Sea. That said, in a one year study of nearby Admiralty Inlet, in Puget Sound, Bassett et al. (2012) found that commercial vessel traffic accounted for more than 90% of the sound energy budget, with container vessels being the largest contributor.

Beyond the work by Basset et al (2012) in Puget Sound, there is no other available evidence for the Salish Sea from the Strait of Georgia to the mouth of Juan de Fuca to further comment on the relative contribution of vessels or other sources of anthropogenic noise.

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Bassett, C., Polagye, B., Holt, M.M., and Thomson, J. 2012. A vessel noise budget for Admiralty Inlet, Puget Sound, Washington (USA). Journal of the Acoustical Society of America 132:3706–3719.

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c) What is the relative contribution of different types of vessels, including oil tankers and whale watching boats, to each of the threats on SRKW in the Salish Sea, including:

The impact of anthropogenic noise on SRKW will depend on both the overall noise level (the sound energy integrated across all frequencies relevant to SRKW) and the distribution of the noise across this frequency range. Heise et al. (2017) identified three frequency bands (10 – 100,000 Hz; 500 – 15,000 Hz; and 15,000 – 100,000 Hz) in which noise can impact different life functions of the whales. The first, 10 – 100,000 Hz, is the broadband noise levels integrated across all frequencies. Measurements of this broadband noise has been agreed upon as a good indicator for (a) the risk of behavioural disturbance, (b) potential of physiological responses (e.g. stress), (c) disruption of important activities such as resting and foraging, and (d) possible temporal hearing sensitivity threshold shifts (TTS) when noise exposure is very long. This band will be dominated by anthropogenic noise at frequencies below 200 Hz because sound at low frequencies propagates further in the ocean and thus the sound spectrum in the ocean is dominated by these low frequencies. Noise energy in the second band, 500 to 15,000 Hz (the middle frequency subset of the first band), has the potential to interfere with SRKW communication signals and therefore may impact group cohesion and coordination and may interrupt important social behaviours. The third band, 15,000 – 100,000 Hz, is the high frequency subset of the first band. The noise concentrated in this range may cause echolocation masking. Resident killer whales use echolocation clicks to find fish, to navigate and orient themselves to avoid hazards. Noise in this high frequency band may thereby interfere with all of these life functions.

Actual observations of the relative contribution of different vessel types to the overall noise budget has only been established for one area of the Salish Sea; for AIS equipped vessels entering and leaving Admiralty Inlet, in Puget Sound over a 12 month period (Bassett et al. 2012). The relative contributions from different vessel classes in this study are summarized in Table 1.20-1. As described above these results are dominated by the low frequencies (below 200 Hz).

Table 1.20-1: Measured contribution to anthropogenic noise budget from various sources in Admiralty Inlet, Puget Sound (Basset et al. 2012)

Source	Percentage of noise budget
Container vessels	57%
Bulk carriers	16%

Tugs	9%
Ferries	5%
Vehicle Carriers	4%
Cruise ships	4%
Tankers	2%
General cargo vessels	2%
All other vessel categories (including whale watching boats)	1%

The overall noise budget and the relative contribution of different vessel types are expected to be highly location and time-span dependent.

Noise from different vessel categories will have different spectral characteristics (noise intensity varies across different sound frequencies) (Veirs et al. 2016). Therefore the impact of noise on the life functions of SRKW may differ among vessel categories. All vessel categories have similar median sound levels at frequencies above 20,000 Hz and therefore will have similar impact on echolocation masking. However, high-frequency noise more rapidly attenuates with distance from the source than low frequency noise (e.g., 3 dB/km at 20,000 Hz and 30 dB/km at 100,000 Hz) (Fisher and Simmons, 1977). As a result, echolocation masking due to noise from larger vessels that tend to travel further away from the animals and produce less energy at higher sound frequencies is of lower impact compared to noise sources travelling closer to the animals and producing more sound energy at these higher frequencies. Exceptions are narrow channels like Haro Strait and Boundary Pass where SRKW and large vessels are often less than 1 km apart (Veirs et al. 2016).

At lower frequencies the noise spectrum levels diverge between the different vessel categories. At frequencies below 200 Hz the vessel categories separate into high and low-power groups (Veirs et al. 2016). The high-power group consists of container ships, vehicle carriers, cargo ships, bulk carriers and tankers. All other vessel categories fall into the low-power group. The high-power group has peak power of 153–159 dB near 50 Hz while the low-power group has peak power of 134–141 dB near 50 Hz. This low frequency noise travels long distances and has the potential to cause behavioural disturbance and elevates the risk of physiological responses in SRKW over very large areas in the Salish Sea.

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c.1) the potential for quantitative comparison, including appropriate methods and measures for comparing them;

All commercial maritime vessels exceeding 300 gross tons, tugs and tow, and passenger vessels are mandated to use Automatic Identification System (AIS) transponders in the Salish Sea. It is therefore relatively straight forward to determine the relative contribution of these vessels to the overall noise budget in a given area by combining AIS records with broadband hydrophone recordings from autonomous or

	cabled recording systems. A noise budget for a given area of interest can also be modeled using AIS records combined with information about individual vessel source levels, sound speed profiles, and bottom type (e.g. Simard et al. 2016). **c.2) challenges or limitations in comparing them;** Assessing the possible impacts of all the smaller vessels not mandated to use AIS, including all the whale watching vessels, is a challenge. A major challenge is to determine the actual impact that noise at different frequencies has on the life functions of SRKW. A number of research projects are presently underway to try to determine this. Until this research is completed it is difficult to quantify the relative impact of increased low frequency noise from large vessels compared to the more local high frequency noise from non AIS vessels, including whale watching boats. For the physical modelling the biggest uncertainties are the effect of bottom type on sound propagation and the effect of spatial and temporal variability of the sound speed profiles on the sound propagation. **c.3) past and anticipated future trends in these relative contributions;** DFO Science does not undertake this type of monitoring. **c.4) the confidence in any conclusions drawn; and** The largest contributor of low-frequency anthropogenic noise to the marine environment is commercial shipping. This noise is primarily generated from propeller action, equipment used in the propulsion of the ship and the flow of water over the hull (Spence and Fischer 2017). At frequencies below about 1000 Hz the sound waves travel far, making commercial ship noise an important factor in the noise budget everywhere in the region and thus there is a high potential to interfere with biological systems. Using AIS data combined with observations of individual and vessel class acoustic signatures do allow for reliable estimates of noise budgets and estimating relative contributions to these noise budgets. The main uncertainties in relative contributions to the noise budget are associated with vessels without AIS, including whale watching boats. These vessels generate noise at the higher end of the frequency range and tend to travel much closer to the SRKW than the larger commercial vessels. Studies are presently underway to try to determine the impact of these vessels on SRKW communication and echolocation, and thereby their relative contribution to the overall noise budget. **c.5) any conclusions as to where mitigation efforts should be focused based on relative contributions?** DFO Science does not have any conclusions about where mitigation efforts should be focused. *References:* Bassett, C., Polagye, B., Holt, M.M., and Thomson, J. 2012. A vessel noise budget for Admiralty Inlet, Puget Sound, Washington (USA). Journal of the Acoustical Society of America 132:3706–3719.

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	speed was a significant factor in determining the amount of noise generated. Slowing speed, which results in less noise, masked signals at 1 km from the boat. However, there are typically many boats in the vicinity of SRKWs, so modelled noise levels associated with a number of boats around the whales were found to be close to the critical noise threshold assumed to cause a permanent hearing loss over prolonged exposure. Since 2002, a number of studies have demonstrated behavioural response and changes in acoustic signaling by SRKWs in the Salish Sea that strongly suggest an energetic cost and potential stress to SRKWs associated with the increased noise levels. Specifically, SRKWs significantly increased the duration of their calls when boats were present and increased the amplitude of their calls as background noise level increased as a result of the number of vessels nearby (Foote et al. 2004; Holt et al. 2009; 2011). SRKWs were observed to be within 400 m of a vessel most of the time during daylight hours from May through September, largely as a result of whale-watching oriented vessels approaching and following them. Studies of SRKW behaviour in the vicinity of whale-watching oriented vessels in the Salish Sea showed that SRKWs were significantly less likely to be foraging and significantly more likely to be traveling when boats were around and that SRKWs were displaced short distances by the presence of vessels (Lusseau et al. 2009). Behavioural responses to close approaches of boats include an increase in surface active behaviour which may have increased energetic costs (Noren et al. 2009). In 2016, Veirs et al published a report detailing the sound pressure levels in SRKW habitat and identifying the masking potential of the frequencies emitted from ships. In addition to Erbe's 2002 model, a dose response model of SRKW acoustic impacts was developed (SMRU 2015), and in 2017, these dose-response estimates were put into a SRKW noise-exposure model framework that included inputs of SRKW habitat use; commercial vessel noise; and the presence, proximity, and noise level of whale watching boats (see SMRU 2015 methodology p.4; SMRU 2017 Methods p.6). DFO Science is not aware of any analysis that tries to determine the contribution of the different vessel types to lost foraging time by SRKWs as a result of noise and/or disturbance. The OPP-MEQ initiative is collecting data on foraging and other behaviours relative to other covariates, including vessel type, distance, ambient noise, sea state and bathymetry. Concerns regarding the possibility of underestimating impacts through the use of the dose response curve and noise exposure model are outlined in a previous CEAA IR. Page 15, IR 9 (https://www.ceaa-acee.gc.ca/050/documents/p80054/119390E.pdf). A recent workshop identifying metrics for assessing and managing underwater noise was undertaken and various limitations were outlined (Heise et al, 2017). *References:* Au, W.W.L., J.K.B. Ford, and K.A. Newman Allman. 2004. Echolocation signals of free-ranging Killer Whales (Orcinus orca) and modeling of foraging for chinook salmon Oncorhynchus tshawytscha). Journal of the Acoustical Society of America 221: 559-564 Barrett-Lennard, L.G., J.K.B. Ford and K. Heise. 1996. The mixed blessing of echolocation: Differences in sonar use by fish-eating and mammal-eating Killer Whales. Animal Behaviour 51: 553-565.

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	Williams, R., C. Erbe, E. Ashe, A. Beerman, and J. Smith. 2014. Severity of killer whale behavioral responses to ship noise: A dose–response study. Marine Pollution Bulletin 79: 254–260. Williams, R., D. Lusseau, and P.S. Hammond. 2006. Estimating relative energetic costs of human disturbance to Killer Whales (Orcinus orca). Biological Conservation 133: 301-311. **f) What data is there on the number of SRKW-vessel strikes in the Salish Sea or elsewhere, the types of vessels involved, and the reasons for such strikes?** Fisheries and Oceans Canada (DFO) information on vessel strikes involving marine mammals is based on third-party reporting. The recently amended Marine Mammal Regulations, which came into force on July 9, 2018, include requirements for mandatory reporting on all accidental contact between a vehicle or fishing gear and a marine mammal. Reporting must include the date, time and location of the incident; the species of marine mammal involved in the incident; the circumstances of the incident; the size and type of vehicle and, if applicable, the type of fishing gear involved in the incident; the weather and sea conditions at the time of the incident; the observed state of the marine mammal after the incident; and the direction of travel of the marine mammal after the incident, to the extent that it can be determined. This will provide a more comprehensive data set regarding vessel strikes going forward. Over the past several years, information related to marine mammal vessel strikes has increased due to enhanced reporting mechanisms such as the 24-hour Observe Record Report (ORR) hotline and the British Columbia Marine Mammal Response Network (BCMMRN) which were both established in 2008. **g) What are the primary knowledge gaps concerning the relative contribution of threats to SRKW, and of the contribution of different types of vessels to these threats, and what studies are underway or planned to resolve them?** See response to (IR 20 a.2). Ongoing studies on noise impacts from different types of vessels (e.g., see responses to IR 20 b, c) may improve the ability to assess relative contribution of threats by vessel type. As noted in (IR 20 a.1) and (IR 20 a.4), DFO is in process of developing a PVA model that is expected to better assess the relative contribution of threats to SRKW. **h) Provide graphs, over the same time scale as the graph shown in Reference xvii), showing (as best as can be estimated and for the most relevant area to SRKW): (1) the population size of Chinook salmon, (2) the estimated underwater noise levels, and (3) the estimated contaminant levels (for one or more key contaminants).** Reduced prey abundance and availability, underwater noise resulting in acoustic disturbance and interference with normal life processes including foraging, as well as the bioaccumulation of contaminants in the tissues of SRKW, are all recognized as major threats to SRKW (DFO 2011; DFO 2017a). However, the relationship between SRKW annual population size and each of these threats (and the likely interactions amongst these threats) is complex and the subject of cumulative effects analyses. As highlighted below, several indices exist for each of these three stressors. Selecting the most relevant one, at the most relevant spatial and temporal scales, to build a comparison plot is not trivial and should be the result of a thorough analytical process.

	(1) Analysis of SRKW diets has demonstrated a preference for Chinook Salmon that migrate through the SRKW range as returning adults (Ford *et al.* 2009; Hanson *et al.* 2010). Many of the populations of Chinook Salmon that migrate through the habitat of the SRKWs have been assessed under the Wild Salmon Policy and categorized as stocks of conservation concern (DFO 2016). Further, many of these same stocks of Chinook Salmon were the subject of targeted fisheries reductions in 2018, further underscoring the significant conservation concerns (DFO 2018). There are three main measures of Chinook abundance that are available and likely relevant to SRKW: Chinook Technical Committee (CTC) Terminal Run estimates, Coded wire tag (CWT) Terminal Run Reconstruction estimates, and Ocean Abundance (OA) estimates. All three indices, and subsets, have been shown to correlate to resident killer whale feeding behaviour and population dynamics (OA & CWT: Stredulinsky 2016; Velez-Espino et al. 2015; CTC: Foster et al. 2012, Brent et al. 2015, Ford et al. 2010, Ellis et al. 2017; Ward et al. 2009). The different indices each have their own strengths and weaknesses, and represent different aspects of salmon life-cycle and migration. Therefore, choosing the most appropriate depends on the specific aim and scale of the research questions. (2) Underwater noise from vessels is recognized as increasing in the world's oceans (NRC 2003; DFO 2017b) and particularly where ships become compressed in space as they approach coastal areas and ports, and for SRKW, where their habitat overlaps these coastal areas. Currently in the Salish Sea one large ship transits the area, on average, every hour of every day of every year, with three transits per hour observed at the busiest times (Erbe *et al.* 2012 Williams *et al.* 2014). DFO is currently developing program to facilitate ongoing monitoring and measurement of noise in the Salish Sea. Plotting a single metric of ocean noise raises issues of the spatial domain to consider (e.g., all of the Project relevant area, all of SRKW range, or areas of special importance that overlap with Project area) and of the time scale (annual vs. seasonal, in the context of SRKW use of the area). Moreover, there are several metrics of ocean noise, some of which represent acoustic energy in the environment as a whole while others focus on frequencies that relate to particular species. (3) Numerous environmental contaminants exist, including those that bio-accumulate and may cause endocrine disruption, which are of higher concern (e.g. Mongillo *et al.* 2012; Desforges *et al.* 2018). Choosing a single metric of the contaminant levels in the environment raises questions of spatial domain, especially since most contaminants are global rather than produced locally, while the relevant aspect is the exposure of SRKW within their yearly range. The other issue is that historical or current levels of a particular set of contaminants may not reflect bioaccumulation processes that have occurred over the lifetime of individuals (in interaction with life history events such as reproduction) and thus do not necessarily relate directly to current levels measured in SRKW. Other issues limit the utility of producing these graphs and the insights that can be derived from comparing these indices visually. There can be temporal lags between the changes in stressor levels and SRKW numbers, for instance due to delays in how food supply can influence population dynamics or to bioaccumulation of contaminants over time. A detailed analysis is needed to detect the appropriate time-lags and to tease apart the effects of the different stressors. There is also the problem that even a strong visual correlation (or lack thereof) does not necessarily imply a true causal relationship.

	For all these reasons, a visual assessment of four graphs to inform a discussion about relative contributions of the different stressors would not be a scientifically valid approach. The detailed analysis required is thus beyond the scope of this IR. *References:* Desforges, J.P., Hall, A., McConnell, B., Rosing-Asvid, A., Barber, J.L., Brownlow, A., De Guise, S., Eulaers, I., Jepson, P.D., Letcher, R.J., Levin, M. 2018. Predicting global killer whale population collapse from PCB pollution. Science. 361(6409):1373-6. DFO. 2018 Science information to support consultations on BC Chinook Salmon fishery management measures in 2018. DFO Can. Sci. Advis. Sec. Sci. Resp. 2018/035. DFO 2017a. Southern Resident Killer Whale: A science based review of recovery actions for three at-risk whale populations DFO 2017b. Evaluation of the Scientific Evidence to Inform the Probability of Effectiveness of Mitigation Measures in Reducing Shipping-Related Noise Levels Received by Southern Resident Killer Whales. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2017/041 DFO 2016. Integrated Biological Status of Southern British Columbia Chinook Salmon (*Oncorhynchus tshawytscha*) Under the Wild Salmon Policy. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2016/042 DFO. 2011. Recovery Strategy for the Northern and Southern Resident Killer Whales (*Orcinus orca*) in Canada. *Species at Risk Act* Recovery Strategy Series, Fisheries & Oceans Canada, Ottawa, ix + 80 pp. Erbe, C., MacGillivray, A., and Williams, R. 2012. Mapping cumulative noise from shipping to inform marine spatial planning. The Journal of the Acoustical Society of America 132:EL423. Ford, J.K.B., B.M. Wright, G.M. Ellis, and J.R. Candy. 2009. Chinook salmon predation by Killer Whales: seasonal and regional selectivity, stock identity of prey, and consumption rates. DFO Can. Sci. Advis. Sec. Res. Doc. 2009/101. Hanson, M.B., Baird, R.W., Ford, J.K.B., Hempelmann-Halos, J., Van Doornik, D.M., Candy J.R., Emmons C.K., Schorr G.S., Gisborne B., Ayres K.L., Wasser S.K., Balcomb K.C., Sneva J.G., and Ford M.J. 2010b. Species and stock identification of prey consumed by endangered Southern resident killer whales in their summer range. Endangered Species Research 11:69–82. Mongillo, T. M., E.E. Holmes, D.P. Noren, G.R. VanBlaricom, A.E. Punt, S.M. O'Neill, G.M. Ylitalo, M.B. Hanson, and P.S. Ross. 2012. Predicted polybrominated diphenyl ether (PBDE) and polychlorinated biphenyl (PCB) accumulation in southern resident killer whales. Marine Ecology Progress Series 453:263–277. NRC (National Research Council). 2003. Ocean Noise and Marine Mammals. National Research Council, National Academies Press, Washington, D.C. Williams, R., Clark, C.W., Ponirakis, D., Ashe, E. 2014. Acoustic quality of critical habitats for three threatened whale populations. Animal Conservation. 17(2):174-85.

Responding FA:	Fisheries and Oceans Canada

Question #	**1.21 Mitigation measures and monitoring – Marine birds (same as or similar to IR 1.41 directed at TC, and IR 1.46 directed at ECCC)**
Reference:	i) A95280-18, Trans Mountain, Opening statement and direct evidence, Attachment 5.5.2, PDF page 3 of 3 A95280-2, Trans Mountain, Opening statement and direct evidence: ii) PDF page 56 of 73 iii) PDF pages 57 and 58 of 73
Preamble:	In Reference i), Trans Mountain lists possible regional mitigation measures for certain marine bird species at risk requiring government and/or industry leadership with support/participation from Trans Mountain, if adopted. Trans Mountain includes vessel speed restrictions, vessel-based marine bird mortality monitors, and sensory disturbance monitors as possible regional mitigation measures. It identifies ECCC as the primary responsible party for vessel-based marine bird mortality monitors, and sensory disturbance monitors, and TC as the primary responsible party for vessel speed restrictions. In Reference ii), Trans Mountain states that it would be more practical to obtain information on mortality events from systematic and repeatable surveys, as ad hoc records of incidental collisions provide little insight into the scale of the issue and of the factors contributing to collision events. It also states that, for such a program to be meaningful both at Project and cumulative scales, a government-led program supported by industry could be tenable. It states that to coordinate and finance a mortality monitoring program (with industry support), and to oversee its technical and scientific merit, the government agencies likely to be involved would be TC, ECCC, and the CCG. In Reference iii), Trans Mountain identifies two potential monitoring programs related to sensory disturbance that could provide insight into the effects of marine transportation on marine birds: • onboard marine bird monitoring during vessel transit along the shipping lanes; and • use of satellite (i.e., GPS) or radio (i.e., Motus Wildlife Tracking System) transmitters to track real-time movements of individual birds in relation to the positions of vessels. In Reference iii), Trans Mountain states that to coordinate and finance a tracking program (with industry support), and to oversee its technical and scientific merit, the government agencies likely to be involved would be TC, ECCC, and the CCG.
Request:	a) Discuss the technical and economic feasibility of measures and monitoring outlined by Trans Mountain in References i), ii), and iii) for marine birds. b) Discuss how the measures referred to in a) are consistent with any applicable recovery strategies and action plans for marine bird species at risk. c) Describe CCG's potential role in establishing or supporting such monitoring. d) Discuss how, specifically, Trans Mountain could support or participate in such initiatives.
Response:	The National Energy Board (NEB) posed Information Request (IR) 1.21 to Fisheries and Oceans Canada (DFO) on November 27, 2018. After reviewing the request, DFO

	has determined that this IR falls outside the scope of its mandate. DFO therefore refers the NEB to Transport Canada's response to IR 1.41 and Environment and Climate Change Canada's response to IR 1.46.
Responding FA:	Canadian Coast Guard

Question #	**1.22 Timing of Oceans Protection Plan, Pillar 1 initiatives**
Reference:	A95292-2, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 1, Chapter 2 – Oceans Protection Plan: i) 2.B.2 – National Vessel Tracking and Monitoring System and Strengthening Marine Communications and Traffic Services, PDF page 29 of 242 ii) 2.B.3 – Operational Network (OpNet), PDF page 29 of 242 iii) 2.B.4 – Additional Radar Sites, PDF page 30 of 242 iv) 2.B.6 – Modern Hydrography and Charting in Key Areas, PDF pages 30 and 31 of 242 v) 2.B.8 – Anchorages, PDF page 32 of 242
Preamble:	References i) to v) describe several initiatives being undertaken under Pillar 1 (A World-Leading Marine Safety System that Protects Canada's Coasts) of the Oceans Protection Plan. The references explain that the initiatives are to enhance sharing of marine traffic information with local communities and provide safer navigation in Canada's waters through better information being delivered to marine users.
Request:	For each of the five referenced initiatives, provide key timelines and the anticipated completion dates for all ongoing and future activities.
Response:	**<u>Transport Canada</u>** The referenced Oceans Protection Plan initiatives i-iii are led by the Canadian Coast Guard and iv led jointly by Fisheries and Oceans Canada and the Canadian Hydrographic Service. Fisheries and Oceans Canada will respond to this Information Request for the following initiatives: i) 2.B.2 – National Vessel Tracking and Monitoring System and Strengthening Marine Communications and Traffic Services, PDF page 29 of 242 ii) 2.B.3 – Operational Network (OpNet), PDF page 29 of 242 iii) 2.B.4 – Additional Radar Sites, PDF page 30 of 242 iv) 2.B.6 – Modern Hydrography and Charting in Key Areas, PDF pages 30 and 31 of 242 v) 2.B.8 – Anchorages, PDF page 32 of 242 The Oceans Protection Plan's Anchorages initiative continues to engage with stakeholders and Indigenous groups to identify shared issues and develop solutions. This initiative is meant to be collaborative in nature and these activities are ongoing. As such, planned timelines for the completion of specific activities and results are not definite and timelines will be influenced by the collaborative process. The approach to collaborative framework development is meant to support the establishment of meaningful relationships and the provision of input by all interested parties throughout the process and changes will be developed and implemented over the duration of the Oceans Protection Plan.

Canada Coast Guard

i) National Vessel Tracking and Monitoring System – Timelines

There are no specific milestones for the National Vessel Tracking and Monitoring System.

ii) Operational Network Initiative - Timelines

Target Fiscal Year	Description of Key Output
2017/18	15% of MCTS remote sites modernized and backup link procured and installed. **COMPLETED.**
2018/19	50% of MCTS remote sites modernized and backup link procured and installed. **IN PROGRESS.**
2019/20	75% of MCTS remote sites modernized and backup link procured and installed. **IN PROGRESS.** Total of three (3) MCTS centre business continuity plans completed. **IN PROGRESS.**
2020/21	90% of MCTS remote sites modernized and backup link procured and installed. **IN PROGRESS.** Total of six (6) MCTS centre business continuity plans completed.
2021/22	100% of MCTS remote sites modernized and backup link procured and installed. **IN PROGRESS.** Total of twelve (12) MCTS centre business continuity plans completed.

Note: MCTS is the acronym for Marine Communications and Traffic Services

iii) Additional Radar Sites – Timelines

Target Fiscal Year	Description of Key Output
2017/18	Define priority radar coverage areas. **COMPLETED.**
2017-21	Site tenure arranged. **ONGOING.**
2018-21	New tower construction at all coverage areas. **ONGOING.**
2018-22	New coverage areas infrastructure (shelters, services). **ONGOING.**
2019-22	New radar installations completed at all coverage areas.
2020-22	Operational capability enhancements achieved.

	v) Anchorages Canadian Coast Guard refers the National Energy Board to Transport Canada's response to IR 1.22. **<u>Fisheries and Oceans Canada</u>** iv) Modern Hydrography and Charting in Key Areas - Timelines For the Modern Hydrography and Charting in Key Areas (PDF pages 30 and 31 of 242), the two key timeline milestones are the completion of the surveying activities in 2020, and the completion of the chart production activities in 2022. The anticipated completion date for this initiatives activities, as identified under the Ocean Protection Plan, is April 1, 2022.
Responding FA:	Transport Canada, Canada Coast Guard, Fisheries and Oceans Canada

Question #	**1.23 Socio-economic analysis of voluntary measures**
Reference:	A95292-2, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 1, PDF page 123 of 242
Preamble:	In the reference, TC states that an analysis of the socio-economic impacts of the voluntary measures involving the slowdown in the Haro Strait and the lateral displacement in the Strait of Juan de Fuca is currently underway and expected to be completed by April 2019.
Request:	a) Describe the scope of the socio-economic analysis of the voluntary measures referenced above, including: a.1) the key impacts and indicators considered and the rationale for selecting these; a.2) the process and methods used; and a.3) the level and type of community and Indigenous participation; and b) Discuss how the socio-economic analysis will guide decisions about future regional management measures, including the continuance of any voluntary measures and/or legislative changes involving both commercial and recreational vessels.
Response:	a) The socio-economic analysis referenced on PDF page 123 of the Canada's evidence submission (A95292-2) will be initiated in January 2019 and conducted through three contracts: • A cost-benefit evaluation of voluntary measures; • An economic impact analysis of voluntary measures; and • Local community/supply chain participant perspectives on voluntary measures o At a minimum, the **cost-benefit analysis** will examine • the costs of compliance by the marine transport industry, including government administrative costs, and any other costs resulting from the measures; • actual or estimated compliance cost for major industry stakeholder groups by sector, supply chain function and province; • the incremental benefits of improvement to the affected whale populations from the mitigation measures. o For the **economic impact analysis**, the direct, indirect and total impacts will be distributed by province and region using a regional input-output model. o The **local community and supply chain analysis** methodology will be developed by the contractor in consultation with Transport Canada. In carrying out the analysis, perspectives from Indigenous groups and communities as well as industry representatives will be sought through a series of interviews and targeted engagement. b) The results of the analysis will be used to inform decisions on future management measures, including the need to modify existing measures.
Responding FA:	Transport Canada

Question #	**1.24 Greenhouse gas (GHG) emissions – Continuous monitoring of fuel consumption**
Reference:	i) A95280-17, Trans Mountain, Opening statement and direct evidence, Attachment 5.4.2, PDF pages 11 and 16 of 21 ii) A95292-2, Department of Justice (on behalf of various Federal Departments and Agencies), Opening statement and direct evidence, Part 1, PDF page 113 of 242
Preamble:	Reference i) states that, in 2017, the International Maritime Organization (IMO) agreed on a time frame for developing a comprehensive strategy for reducing GHG emissions from ships. It further states that the IMO has targeted a reduction of 50 per cent for maritime GHG emissions by year 2050 relative to the year 2008. The reference states that the data collection system on fuel oil consumption of ships over 5,000 gross tons, which begins on 1 January 2019, will feed into a process towards adoption of a revised strategy in 2023. This monitoring will provide a better understanding of actual GHG emissions for large maritime vessels to better track the intended reduction of GHG emissions via direct measurement. The reference further states that, as a member of the IMO, it is expected that Canada will be part of all initiatives on global shipping and would undertake fuel consumption monitoring. Reference i) also states that, as a member of the IMO, Canada exercises its responsibility for promulgating and ensuring all requirements under the IMO Conventions are met through TC. Canada's commitment to the IMO on the data collection system for fuel oil consumption of ships may be delegated by TC to the vessel Class Societies. Reference ii) states that Canada has been working with the IMO, of which Canada is a Member State, to address GHG emissions in the international maritime sector.
Request:	a) Describe how TC, as a member of the IMO, will exercise its responsibility under the IMO Conventions to undertake data collection for fuel consumption of ships over 5,000 gross tons. b) Provide the reporting mechanism, including who will report, and to whom, and the frequency of reporting on fuel consumption of Project-related marine shipping.
Response:	a) Transport Canada will delegate to Classification Societies the collection of fuel oil consumption data for Canadian vessels that operate internationally and are over 5000 GT, to collect the fuel oil consumption data required for the IMO data collection system. The Classification Societies are to verify the accuracy of the data and forward the aggregate data to a specific Transport Canada website. This data will then be submitted to the IMO Ship Fuel Oil Consumption Database through the IMO reporting system. The collection and reporting of the fuel oil consumption data will be done once a year as per the requirements of Regulation 22A, Annex VI of the International Convention for the Prevention of Pollution from Ships (MARPOL). b) Project-related vessels will report to the responsible Flag State (country of vessel registration), which will then report to IMO as per the requirements of Regulation 22A, Annex VI MARPOL.
Responding FA:	Transport Canada

Question #	**1.25 GHG emissions – Carbon taxation and pricing (same as or similar to IR 1.43 directed at ECCC)**
Reference:	i) A95280-17, Trans Mountain, Opening statement and direct evidence, Attachment 5.4.2, PDF pages 9 and 16 of 21 ii) A95280-2, Trans Mountain, Opening statement and direct evidence, PDF page 35 of 73
Preamble:	Reference i) states that the IMO, with its pledge to reduce GHG emissions by 50 per cent by year 2050 relative to the year 2008 level, sought to have a dialogue about the possibility of a maritime carbon tax as a key element of a GHG mitigation strategy for international maritime transport. The reference states that the International Monetary Fund (IMF) is assisting IMO with economic modelling that includes incentives such as carbon pricing to reduce GHG emissions. Reference ii) states that market-based mechanisms are also being investigated by the IMO, and that the IMF serves to provide a fiscal incentive for the maritime industry to invest in more energy efficient manner and for offsetting growing ship emissions.
Request:	a) Explain whether or not British Columbia's carbon tax (or any other carbon pricing or carbon regulation within Canada) is applicable to a shipper when it fuels its tankers that visit the Westridge Marine Terminal. b) Describe any policies or programs related to carbon pricing or CO2 reduction at international, federal, and provincial levels that may apply to Project-related marine shipping. c) Explain how the maritime carbon tax noted in the preamble would account for carbon pricing or other CO2 reduction mechanisms at the state level? d) Discuss whether it would be reasonable to expect oil tankers visiting the Westridge Marine Terminal to offset their GHG emissions and, if so, for how much of their voyage, and who would be responsible to ensure such offsets are put in place and monitored? e) Provide details of any fiscal incentives available at the international or state level for the maritime industry to invest in more energy efficient manner and for offsetting ship emissions.
Response:	a) British Columbia's carbon tax applies to marine fuel that is used by a shipper in a vessel movement between two points, or the same point, within British Columbia. This includes fuel purchased in B.C., brought into B.C. in the supply tank or supplemental supply tank of a vessel, or purchased outside of B.C. and transferred into the receptacle of a ship within B.C. Based on B.C. tax guidance, the fuel that is used to power the tankers that visit the Westridge Marine Terminal may, upon registration of the owner or operator as a registered marine service, be exempted from the B.C. carbon tax as the fuel is used in a voyage between a location in British Columbia and a location in another jurisdiction. For reference and further details on the application of British Columbia's carbon tax to marine fuel and shippers, please see the B.C. Ministry of Finance Tax Bulletin CT 005, revised April 2018, attached as Annex 1.25-1.

	b) There are no international, federal or provincial carbon pricing policies that would apply to Project-related marine shipping at this time, with the exception of the Energy Efficiency Design Index (EEDI) and the Ship Energy Efficiency Management Plan (SEEMP), both of which are IMO requirements that have been implemented in Canada through the *Regulations Amending the Vessel Pollution and Dangerous Chemicals Regulations*. Details on these initiatives were provided in section 5.C.1 of Canada's evidence submission (A95292-2, PDF Page 113). As noted in response (a) the B.C. carbon tax does not apply to fuel used in inter-jurisdictional voyages. The federal backstop carbon pricing system will not apply in B.C. given the B.C. policy meets federal benchmark carbon pricing criteria. Market-based measures are identified under the initial IMO strategy as potential measures to reduce emissions from international marine shipping. British Columbia has in place a low carbon fuel standard, which establishes life-cycle greenhouse gas emissions intensity reduction requirements for fossil fuel suppliers in B.C. The policy is intended to reduce the overall carbon intensity of transportation fuels used in the province, including through greater use of lower-carbon renewable fuels. The standard may or may not implicate fuel consumed by Project-related marine vessels. In addition, a federal clean fuel standard is under development, led by Environment and Climate Change Canada, and more details are provided in response to question 1.43. c) As noted in section 5.C.1 of Canada's evidence (A95292-2, PDF Page 114), a number of potential short-, mid- and long-term measures were agreed to be included by IMO Member States in the initial strategy on the reduction of GHG emissions from vessels agreed to by the IMO in 2018. The list is non-exhaustive and is without prejudice to measures the Organization may further consider and adopt. IMO Member States have agreed to start work on the timelines for identifying and prioritizing measures in an effort to develop and implement short-term measures to achieve reductions of GHG emissions from international shipping in advance of 2023, when a revised strategy will be adopted by the IMO. Market-based measures were identified in the initial IMO strategy as possible candidate mid-term measures to incentivize GHG emission reductions from ships. As such, it is premature to assess how a maritime carbon tax that could be considered by the IMO member states in the context of the initial IMO strategy would account for carbon pricing or other CO_2 reduction mechanisms at the state level. It would be important for there to be mechanisms in place to ensure that shippers are not charged twice for the same unit of fuel or emissions and that such a system provide a level playing field for international shippers. d) Tankers visiting the Westridge Marine Terminal would typically be international ocean-going vessels whose emissions would fall under the responsibility of the IMO. Canada has been working with the IMO, of which Canada is a Member State, to address GHG emissions in the international maritime sector, and continues to work with the IMO on the next steps outlined in the initial strategy described in section 5.C.1 of Canada's evidence submission (A95292-2, PDF Page 113), including work on the timelines for identifying and prioritizing measures in an effort to develop and implement short-term measures to achieve reductions of GHG emissions from international shipping in advance of 2023. IMO measures are typically aimed at the sector as a whole given the importance of consistency across the international shipping industry and maintaining a level playing field and would therefore not target only

	vessels visiting Westridge Marine Terminal. If a relevant measure such as an offset system for the sector was agreed to, Canada would need to develop and introduce regulations under an appropriate domestic legislation in line with the IMO regulation. e) There are no known government fiscal incentives available at the international or state level for the Canadian maritime industry to invest in more energy efficient vessels or offset ship emissions. A January 2018 report by the Natural Resources Defence Council (NRDC), an international nonprofit environmental organization, entitled "Incentive Schemes for Promoting Green Shipping" provides a comprehensive summary of the various industry-developed environmental rating programs, as well as details of some examples of ports which have adopted these rating programs in order to administer their port-specific fiscal incentives. The NRDC report also profiles the incentive programs at Port of Vancouver and Port of Prince Rupert. The NRDC report is attached as Annex 1.25-2.
Responding FA:	Transport Canada

Ministry of Finance
Tax Bulletin

ISSUED: September 2011 REVISED: April 2018 Bulletin CT 005

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Commercial Air or Marine Services

Carbon Tax Act

Latest Revision: *The revision bar (|) identifies changes to the previous version of this bulletin dated June 2017. For a summary of the changes, see Latest Revision at the end of this document.*

This bulletin explains the requirements and responsibilities of a registered air service or a registered marine service under the *Carbon Tax Act*. This bulletin also explains the requirements for self-assessing or claiming a refund of carbon tax for non-registered commercial air services and non-registered commercial marine services.

This bulletin does not apply to commercial air services that do not have flights between two points in BC. These businesses may apply to become a registered consumer. For information on becoming a registered consumer, see **Bulletin MFT-CT 004**, *Registered Consumers*. This bulletin also does not apply to interjurisdictional cruise ships that have scheduled ports of call outside BC or other ships prohibited from coasting trade under the *Coasting Trade Act* (Canada). Fuel used in the operation of these ships is exempt from carbon tax.

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Overview

Carbon tax applies to the purchase or use of fuels, such as gasoline, diesel, natural gas, heating oil, propane and coal, unless a specific exemption applies (for information on specific exemptions, see our **exemptions** page). The use of fuels includes all uses, even if the fuel is not combusted. Carbon tax also applies to combustibles, such as peat and tires, when used to produce heat or energy. For a complete list of the fuels and combustibles subject to carbon tax and their tax rates, see **Bulletin MFT-CT 005**, *Tax Rates on Fuels*.

A registered air service or a registered marine service is authorized to purchase specific types of fuel without paying carbon tax at the time of purchase in BC. For example, a registered air service can purchase aviation or jet fuel without paying carbon tax at the time of purchase, and a registered marine service can purchase light fuel oil or heavy fuel oil without paying carbon tax at the time of purchase. However, they are required to self-assess (pay directly to us) carbon tax on all fuel they use for a non-exempt purpose in BC.

Commercial air services and commercial marine services that are not registered are required to pay carbon tax on fuel at the time of purchase in BC and on fuel brought into BC that they use for a non-exempt purpose. They may be eligible for a refund of carbon tax paid on fuel used for an exempt purpose.

Registered Air or Marine Services

Qualifying for Registration as a Registered Air Service

You may apply to us for registration as a registered air service if:

- you own or operate a commercial air service that:
  - provides interprovincial or international air transportation of passengers and/or goods to members of the public for a fee, or
  - provides interprovincial or international air services other than the transportation of passengers and/or goods (e.g. aerial surveying or spraying) to members of the public for a fee,
- at least 50% of the fuel you use in all flights beginning or ending in the province is for flights that do not connect two locations in the province, and
- you hold a licence issued by the Canadian Transportation Agency and, if required by Transport Canada, an operating certificate issued by Transport Canada for each type of aircraft owned and operated by you.

Qualifying for Registration as a Registered Marine Service

You may apply to us for registration as a registered marine service if:

- you own or operate a commercial marine service that:
  - provides marine transportation of passengers and/or goods to members of the public for a fee on ships owned or operated by you, and
  - at least 50% of all the marine trips of all your ships that begin or end in BC are trips that do not include a segment of a marine trip that begins at a port or other similar place in BC and ends at the same location or another port or similar place in BC.

OR

- you own or operate a commercial marine service that:
  - provides marine services other than the marine transportation of passengers and/or goods to members of the public for a fee on ships owned or operated by you, and
  - at least 50% of all the marine trips of all your ships that begin or end at a port or other similar place in BC, begin or end at a port or other similar place that is outside of BC with no intervening stops.

How to Apply

To apply for registration as a registered air service, you need to complete and send in an *Application for Registration as a Registered Air Service* (**FIN 123**).

To apply for registration as a registered marine service, you need to complete and send in an *Application for Registration as a Registered Marine Service* (**FIN 155**).

Before being registered as either a registered air service or registered marine service, you must enter into an agreement with us that sets out the duties and conditions of your registration. You may also be required to provide an unconditional letter of credit from a recognized Canadian financial institution.

If you are conditionally approved for registration, we will send you two copies of an agreement. If you agree with the duties and conditions, you must sign and return both copies to us. The director will then sign both copies of the agreement and return one copy to you.

If you are approved for registration, we will also send you a *Registered Air Service Certificate* or a *Registered Marine Service Certificate*, which will include your name, address, registration number and the type of fuel(s) you may purchase tax exempt.

If you are not approved for registration, we will send you a letter explaining why your application was refused and how to appeal the decision if you disagree. If your application is refused, you must pay carbon tax at the time of purchasing fuel in the province, and you must self-assess carbon tax on fuel you transfer or bring into the province in a supply tank or otherwise import and use in BC. You may apply for a refund of tax on the portion of the fuel you used for an exempt purpose. For more information on refunds of carbon tax, see Non-Registered Air or Marine Services below.

Responsibilities

Purchasing Fuel

As a registered air service or registered marine service, you may purchase the type(s) of fuel indicated on your certificate without paying carbon tax at the time of purchase by providing your supplier with a copy of your certificate, or your certificate number and the fuel type.

Self-Assessing Carbon Tax

As a registered air service or registered marine service, you must self-assess carbon tax when you use the type(s) of fuel indicated on your certificate for a non-exempt purpose (e.g. fuel used in a flight connecting two points within BC). This includes fuel you:

- Purchase in BC
- Bring into BC in the supply tank or supplemental supply tank of an aircraft or vessel
- Purchase outside of BC and transfer into the receptacle of an aircraft or ship within BC

You must also self-assess carbon tax on the amount of fuel you determine will not be used (e.g. due to spillage).

If you use any type of fuel in BC that is not indicated on your *Registered Air Service Certificate* or *Registered Marine Service Certificate* (e.g. you import another type of fuel or combustible you use for a non-exempt purpose), you must self-assess carbon tax on that fuel or combustible. For more information, see **Bulletin MFT-CT 006**, *Self-Assessing Motor Fuel and Carbon Tax*.

Reporting Periods

Reporting periods are monthly or quarterly and are established when you become a registered air service or a registered marine service. Your reporting period is based on the annual amount of carbon tax you are required to self-assess:

- Less than $120,000 – quarterly reporting (January 1 – March 31, April 1 – June 30, July 1 – September 30, October 1 - December 31)
- $120,000 or more – monthly reporting

Once your reporting period is assigned, you will receive a reminder in the mail prior to each remittance due date. If you have an **eTaxBC** account, you will receive your reminder by email.

Tax Returns and Payments
You use the *Registered Air Service or Marine Service Carbon Tax Return* to self-assess the carbon tax due.

If you identify an error in a tax return from a previous reporting period, you must submit an amended return for that reporting period as soon as possible.

How to File and Pay
You can file your tax return and pay the carbon tax due:

- Online using **eTaxBC**
- By mail or courier using the *Registered Air Service or Marine Service Carbon Tax Return* (**FIN 105**) available on our website

Credit Transfers
If you have a credit balance on your motor fuel or carbon tax account and want to transfer this credit to another reporting period or to another of your motor fuel or carbon tax accounts where there is an amount owing, you must provide us with written instructions that include:

- The credit amount you want to transfer
- The account the credit is being transferred from
- The account the credit is being transferred to (include the reporting period if applicable)

You can send us these instructions:

- Online using eTaxBC - log on to your eTaxBC account and click on Contact the Ministry to send us a message
- By email to **CarbonTax@gov.bc.ca**
- By mail - attach a note or letter to your return

Do not enter the credit amount as a tax adjustment on your return or your return may be processed incorrectly.

Your transfer request must be received on or before the tax return due date (see Due Date below) to avoid penalty and interest charges. Penalty and interest may also apply on any unpaid amount if we find that the amount of credit available at the time of transfer was incorrect.

Due Date
You must file a return and pay any carbon tax due to us by the **15th day** of the month following the reporting period in which you used the fuel in the province. If the due date for the tax return and payment falls on a weekend or a BC statutory holiday, the due date is the next business day.

If you file and pay online using **eTaxBC**, your tax return and payment are considered on time if they are posted to eTaxBC by 11:59 pm (Pacific Time) on the due date.

If you send in your tax return and payment by mail, it is considered on time if the envelope is postmarked by Canada Post (or a national equivalent if outside Canada) on or before the due date. A business postage meter mark is not sufficient. If you mail your tax return and payment on or near the due date, ask Canada Post to postmark the envelope immediately.

If you send your tax return and payment by courier, it must be received by us by the close of business (4:30 pm) on the due date to be considered on time.

Payments must be negotiable on or before the due date to be considered on time (e.g. if your payment is submitted on time but is post-dated after the due date, it will be considered late). If you are paying by cheque, it must be payable in Canadian funds to the Minister of Finance.

If you are filing a nil tax return (i.e. no tax is owing), you may fax it but it must be received by us by 11:59 pm on the due date.

If your return and payment are not received on time, penalties and interest may be applied. Nil tax returns and amended tax returns are treated the same as other late tax returns in evaluating filing history.

Record Keeping
The *Carbon Tax Act* requires that you keep all your records and documents in BC for **five** years.

Suspension and Cancellation of Registered Air or Marine Service Registrations
Your certificate as a registered air service or a registered marine service may be suspended or cancelled for not complying with the *Carbon Tax Act* or regulations or for not meeting the duties and conditions set out in your agreement.

If your certificate is suspended or cancelled, you must pay carbon tax at the time you purchase fuel in the province. You also must continue self-assessing carbon tax on fuel you transfer or bring into the province in a supply tank or otherwise import and use for a non-exempt purpose in BC. You may apply for a refund of carbon tax paid on the

portion of fuel purchased in BC that you use on trips or flights that begin or end outside of the province. For more information on self-assessing or refunds of carbon tax, see Non-Registered Air or Marine Services below.

Non-Registered Air or Marine Services

Businesses that provide commercial air or commercial marine services but do not have a registered air service or marine service certificate (or have had their certificate suspended or cancelled) are considered non-registered air services or marine services. Non-registered businesses still have certain responsibilities and refund opportunities under the Act.

Responsibilities

Paying Carbon Tax – Commercial Air Services

If you are not registered as a commercial air service, you must pay carbon tax at the time you purchase fuel from your supplier in BC. You must self-assess carbon tax if you did not pay carbon tax on the fuel at the time of purchase. This includes fuel you:

- brought into BC in the supply tank or supplemental supply tank of an aircraft, or
- purchased outside of the province and transferred into the receptacle of an aircraft within BC.

However, you are not required to self-assess carbon tax if the fuel was for use in a flight that:

- transported passengers and/or goods,
- was for members of the public for a fee,
- began or ended outside of BC, and
- was authorized by the Canadian Transportation Agency and if required by Transport Canada, was issued an operating certificate by Transport Canada for the type of aircraft used for the flight.

OR

- provided an air service other than the transportation of passengers and/or goods,
- was for members of the public for a fee,
- began or ended outside of BC, as long as that beginning or ending outside BC was integral to the provision of the air service, and
- was authorized by the Canadian Transportation Agency and if required by Transport Canada, was issued an operating certificate by Transport Canada for the type of aircraft used for the flight.

Paying Carbon Tax – Commercial Marine Services

If you are not registered as a commercial marine service, you must pay carbon tax at the time you purchase fuel from your supplier in BC. You must self-assess carbon tax if you did not pay carbon tax on the fuel at the time of purchase. This includes fuel you:

- Brought into BC in the supply tank or supplemental supply tank of a ship
- Purchased outside the province and transferred into the receptacle of a ship within BC

How to Pay Carbon Tax

Tax Returns and Payments

If you owe carbon tax, you must file the *Non-Registered Air or Marine Carbon Tax Refund Application/Return* (**FIN 171**) and pay the tax due to us. This form acts as both a refund application and a return. If the net amount you report on the form shows that tax is due, the form is considered a return. If the net amount you report on the form shows you overpaid tax, the form is considered an application for refund (see Refunds below).

Reporting Periods

Reporting periods are monthly or quarterly and are established by us after you have filed your first tax return. Your reporting period is based on the annual amount of carbon tax you are expected to self-assess as follows:

- Less than $120,000 – quarterly reporting (January 1 – March 31, April 1 – June 30, July 1 – September 30, October 1 - December 31)
- $120,000 or more – monthly reporting

Due Date

You must file your return and pay any carbon tax due to us by the **28th day** of the month following the reporting period in which you use the fuel. If the due date for the tax return and payment falls on a weekend or a BC statutory holiday, the due date is the next business day.

If you send in your tax return and payment by mail, it is considered on time if the envelope is postmarked by Canada Post (or a national equivalent if outside Canada) on or before the due date. A business postage meter mark is not sufficient. If you mail your tax return and payment on or near the due date, ask Canada Post to postmark the envelope immediately.

If you send your tax return and payment by courier, it must be received by us by the close of business (4:30 pm) on the due date to be considered on time.

Payments must be negotiable on or before the due date to be considered on time (e.g. if your payment is submitted on time but is post-dated after the due date, it will be

considered late). If you are paying by cheque, it must be payable in Canadian funds to the Minister of Finance.

If your tax return and payment are not received on time, penalties and interest may be applied.

Refunds

Applying for a Refund of Carbon Tax – Commercial Air Service

If you purchase fuel within BC for a commercial air service, you may apply for a refund of the carbon tax you paid on fuel used in a flight that:

- transported passengers and/or goods,
- was for members of the public for a fee,
- began or ended outside of BC, and
- was authorized by the Canadian Transportation Agency and if required by Transport Canada, was issued an operating certificate by Transport Canada for the type of aircraft used for the flight.

OR

- provided an air service other than the transportation of passengers and/or goods,
- was for members of the public for a fee,
- began or ended outside of BC, as long as that beginning or ending outside BC was integral to the provision of the air service, and
- was authorized by the Canadian Transportation Agency and if required by Transport Canada, was issued an operating certificate by Transport Canada for the type of aircraft used for the flight.

Applying for a Refund of Carbon Tax – Commercial Marine Service

If you purchase fuel for a commercial marine service in BC, you may apply for a refund of carbon tax you paid on fuel used in a ship on a marine trip, or a segment of a marine trip, that:

- Was for members of the public for a fee, transported passengers and/or goods, and did not include a segment of a marine trip that began at a port or other similar place in BC and ended at the same location or at another port or similar place in BC
- Provided marine services other than the marine transport of passengers and/or goods to members of the public for a fee and began or ended at a port or other similar place in BC, as long as that marine trip began or ended at a port or other similar place that is outside BC with no intervening stops and that segment of the marine trip was integral to the provision of the marine service

Refund Application/Return
To apply for a refund of carbon tax, you use the *Non-Registered Air or Marine Carbon Tax Refund Application/Return* (**FIN 171**).

If the net amount you report on the form shows that tax is due, the form is considered a return.

If the net amount you report on the form shows that you overpaid tax, the form is considered an application for a refund.

Your refund claim must be received by us within four years of the date you paid the tax (i.e. the fuel purchase date). Claims for amounts of less than $10 **are not** eligible for a refund.

For more information on how to submit the form and the detailed information required to support your refund or return, see the instructions and documentation requirements attached to the *Non-Registered Air or Marine Carbon Tax Refund Application/Return* (**FIN 171**).

Need more info?

Online: **gov.bc.ca/salestaxes**
Toll-free: 1 877 388-4440
Email: **CTBTaxQuestions@gov.bc.ca**

Subscribe to our **What's New** page to receive email updates when information changes.

The information in this bulletin is for your convenience and guidance and is not a replacement for the legislation.

Latest Revision
April 2018

- Removed annual filing as a possible reporting period. Available reporting periods are now monthly or quarterly, depending on the amount of carbon tax you are required to self-assess. The change in reporting period may be reviewed at a later date, subject to the regulations being amended to establish a reporting period from April 1 to March 31.
