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Sent via email

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File No: 512

Dear Ms. Myles:

Re: Roberts Bank Terminal 2 Assessment - Completeness Review

We write on behalf of Western Canada Wilderness Committee, Raincoast Conservation Foundation, David Suzuki Foundation and the Georgia Strait Alliance regarding the completeness of the addendum to the Roberts Bank Terminal 2 Project Environmental Impact Statement on shipping impacts (the "Shipping Addendum"). These comments are in addition to those submitted on behalf of our clients in June regarding the completeness of the Environmental Impact Statement (the "EIS"). In our June 2015 comments on completion we stated that the EIS was insufficient in its consideration of certain issues, including potential impacts on marine species at risk and the cumulative effects of the project on the marine environment and marine species at risk. While the Shipping Addendum does provide further information and consideration of these impacts, as set out in the attached comments, the Shipping Addendum, even in combination with the EIS, is still incomplete on some issues.

We understand that the purpose of the completeness review is to ensure there is enough information available on the impacts of the proposed terminal expansion to begin a meaningful technical review. Our clients offer the attached comments on completeness with this in mind.

Our clients are concerned about the impacts of the proposed terminal expansion on the marine environment and in particular on endangered marine species such as the Southern Resident Killer Whale. We have asked the experts retained by our clients to evaluate the completeness of the Shipping Addendum's consideration of those impacts. There may be other parts of the Shipping Addendum which are also incomplete. Our focus on the Shipping Addendum's consideration of certain issues should not be interpreted to mean that we think it is otherwise complete.

We attach three sets of comments from experts identifying places where, in their opinion, the Shipping Addendum is incomplete. The attached comments consider the completeness of the consideration in the Shipping Addendum of the following issues and impacts: salmon; prey availability for Southern Resident Killer Whale; marine pollution; pollution impacts on Southern

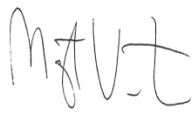
Resident Killer Whale; underwater noise; underwater noise impacts on cetaceans; and cumulative effects particularly on Southern Resident Killer Whale. As you will see the experts have identified places where, in their opinion, information or analysis is missing from the Shipping Addendum.

We recognize that there is not always a bright line between sufficiency and substance – however our experts have concluded that the nature of the missing information and analysis is such that it is not possible to meaningfully proceed to a technical review of the proposed project.

As you know a technical review of a proposal that lacks the necessary information or evidentiary base will be of limited utility in meeting the government's legal obligation to carefully consider the impacts of the proposed project. Further, starting with limited information on impacts places significant burden on interveners to effectively do the work of the proponent, conducting not just a review of an assessment, but the assessment itself. We therefore respectfully request that you ask the Port to address these deficiencies – in particular those areas where the experts identify data, information or evidentiary deficiencies - before proceeding to the technical review.

Thank you for this opportunity to participate.

Sincerely,



Morgan Blakley and Margot Venton
Barristers and Solicitors

Encl: Comments of Dr. Scott Veirs, marine biologist
Comments of Dr. Chris Kennedy, aquatic toxicologist
Comments of David Scott, fisheries biologist

cc.

Honourable Hunter Tootoo, Minister of Fisheries and Oceans, min@dfo-mpo.gc.ca

Honourable Catherine McKenna, Minister of the Environment, Minister@ec.gc.ca

Roberts Bank Terminal 2 Project
Environmental Impact Statement Marine Shipping Addendum – Comments on Completeness
November 12 – December 16, 2015

I am Dr. Scott Veirs a marine biologist and oceanographer, with expertise in underwater acoustics including the impact of ocean noise on marine mammals. I have been retained on behalf of Georgia Strait Alliance, Western Canada Wilderness Committee, David Suzuki Foundation and Raincoast Conservation foundation to assist them in the Terminal 2 review.

The assessments of acoustic and cumulative impacts on Southern Resident Killer Whales (SRKWs) depend on accurate measurement and modelling of the source spectra of underwater noise from container ships associated with the Project. We advise that the following data gaps and insufficiencies be addressed in the characterization of current and projected vessel traffic conditions so that the updated EIS guidelines are met and a technical review of the impacts on SRKW is possible. We also advise additional consideration of the Project's potential effects on both transient (Bigg's) killer whales, their prey, and humpback whales.

Comments on Completeness of Information in the EIS

Issue *(if possible, please include reference to the relevant section of the EIS Guidelines)*	**Reference to EIS Addendum**	**Requested Completeness Information**	**Rationale**
17.3.2	4.2.1.1	Table 4-3 or a new table should present current vessel size distributions (e.g. 2012 data) in addition to the projected distributions for 2025 and 2030.	Section 17.3.2 requires "description of the types and sizes of vessels currently operating in the region." The size distribution of the shipping traffic (at least the container ships) currently associated with PMV terminals is important for referencing potential increased effects of the Project. Without this information it is impossible to correlate vessel size with potential effects (e.g. due to underwater noise, wakes, and oil spill risks).

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Issue *(if possible, please include reference to the relevant section of the EIS Guidelines)*	**Reference to EIS Addendum**	**Requested Completeness Information**	**Rationale**
17.2.2	4.1.1	Table 4-2 should include any 2012 movement data for segment F (through Rosario) for all vessel classes. The number of container ships movements through Segment B (Haro Strait) in 2012 should be broken down for each PMV terminal by: (a) inbound for a PMV terminal directly from the Pacific, (b) bound for a PMV terminal from Puget Sound, (c) bound for Puget Sound from a PMV terminal, (d) outbound from a PMV terminal directly to the Pacific.	Section 4.1.1 mentions the historic routing of container traffic between Vancouver and Puget Sound via Rosario Strait. The requested information would be required to inform whether Haro Strait traffic and associated effects could be mitigated by re-activating Rosario Strait transits. Section 17.2.2 specifically calls for "alternatives considered, such as different routing, frequency and vessel types." The relevance of such information is implied in Addendum section 4.2.1.6 for projected RBT2 traffic (but not current traffic): "almost **100%** of the ship calls will also visit one of the PNW U.S. ports of Seattle or Tacoma as part of their voyage. This accounts for one additional movement through Segment C for each such voyage with a total of 780 movements through Segment C and 520 non-Project associated movements through Segment G."
17.4.1	7.6.5.1	Provide statistics that summarize acoustic environment at shorter (e.g. 1-minute) time scales, not only monthly or seasonal averages of SPL (which are not relevant to many potential effects on marine organisms). When assessing the change due to 1.5 additional container ships per day, summary statistics should include daily metrics like those quantified in the main EIS Appendix 14-B: e.g. % reduction in daily "quiet" time.	The relevant time scale for assessing behavioral change due to a change in average SPL should be similar to the duration of an organism's exposure to the ship's noise – e.g minutes for a typical passing ship, not days or months. This has recently been articulated in draft guidance from NOAA: "Overall dB rms levels should be based on short enough time windows to capture temporal variation in sound levels."

Issue *(if possible, please include reference to the relevant section of the EIS Guidelines)*	**Reference to EIS Addendum**	**Requested Completeness Information**	**Rationale**
17.4.1	7.6.7.1	Include recent peer-reviewed literature when justify estimation of Triple E-Class source levels. Use existing data to assess whether scaling container ship noise by vessel length works for existing source level measurements of different sized container ships (e.g. McKenna, 2013).	McKenna, 2013, reports that ship length is the 2nd most predictive covariate of broadband and octave-band source level and her Fig. 4 suggests slope is about 0.015 dB/m of LOA (for broadband levels between 20 and 1,000 Hz). In opposition to this, the Addendum states that there is no relationship between merchant ship length and source level, citing the much older study by Scrimger and Heitmeyer (1991).
17.4.1	7.6.2.2	Use published, peer-reviewed data to verify the assumption that adding 1.67 dB will accurately adjust spectrum levels from the measured representative ship (338m) to a Triple-E class (367m) ship.	In reference to Triple-E class contain ships the Addendum (Section 7.6.7.1) states erroneously that there is an "absence of source level measurements for this class of vessel." Figure 7 of McKenna et al., 2013 indicates that they have source spectra for at least 3 container ships that are 350-400m long.
17.4.1	7.6.2.2	The Addendum should include a clear characterization of the distribution of container ship source spectra. The derivation of the "conservative" source level estimates for model and representative ships is not clear in section 7.6.2.2. or the references it makes (to Section 7.6.3.1 and Appendix 7.6-A).	Container ship source levels have a wide range of values distributed about the mean. McKenna (2013) reports a range of +/-15 dB. Therefore, the louder ships likely to be in the distribution should be used to evaluate the likely most severe impacts (e.g. on SRKWs). A ship that is 15 dB louder than the average ship produces about 30 times the acoustic power underwater.
17.4.1	7.6.4.1	Re-assess sound pressure level statistics, particularly at low-frequency (<200Hz). Consider re-acquiring ambient noise recordings using a mooring design that eliminates pseudo-noise associated with tidal currents.	The acknowledged contamination of at least some of the acoustic records by pseudo-noise should shift analysis away from annual or monthly means and towards assessing ship and background levels only during low-velocity tidal periods, e.g. via the methods of Bassett et al, 2012.

Issue *(if possible, please include reference to the relevant section of the EIS Guidelines)*	**Reference to EIS Addendum**	**Requested Completeness Information**	**Rationale**
17.4.1	7.6.7.1	The acknowledged gaps in the VTOSS data should be filled with gap-free ship track data (e.g archived AIS data from 2012, possibly supplemented with data from more recent years).	While VTOSS data errors may average out over months, they could cause assessments of SPL averages over shorter time scales to be inaccurate.
17.1.1	8.2.6.1	Effects of ship noise (and wakes) on prey and foraging efficiency of threatened inner-coast transient (Bigg's) killer whales should be considered.	DFO has proposed critical habitat within ~5.5km of shore which much of the shipping lanes in the modeled areas. Table 8.2-3 lists the Northeast Pacific Transient (Bigg's) Population as within the LAA. On page 8.2-19 the Addendum suggests that "Marine mammals considered in this assessment either feed exclusively on fish (i.e., SRKW) or a combination of fish and invertebrates (i.e., humpback whale, Steller sea lion)." This suggests that including the transient killer whales in the SRKW marine mammal group fails to fully assess the potential effects of the Project on transient killer whales and their (marine mammal) prey. Detrimental effect on transients could occur if ship noise causes: behavioral change in marine mammal prey of transients that reduces availability (e.g. hauling out more frequently; reducing effectiveness of male harbor seal vocalizations); or masking of signals used by foraging transients (passive listening or echolocation). This is also important to consider because foraging efficiency of SRKWs and transient KWs could be linked ecologically (since pinnipeds and SRKW both prey on salmonids).

Issue *(if possible, please include reference to the relevant section of the EIS Guidelines)*	**Reference to EIS Addendum**	**Requested Completeness Information**	**Rationale**
	8.2.6.2	Assess masking potential of ship noise for echolocation used by North Pacific Humpback Whales.	Counter to the assertion in the footnote on Addendum page 8.2-29 ("...baleen whales, such as the North Pacific humpback whale, do not use echolocation to location their prey..."), broadband clicks are associated with nighttime foraging in humpback whales (Stimpert et al., 2007).
	8.2.6.2	Assess masking potential of ship noise for communication and foraging signals used by North Pacific Humpback Whales.	Humpback calls have been recorded in ER by Ford/Neptune; calls have also been recorded in Haro Strait by Salish Sea Hydrophone Network.
17.4.1	7.6.5.1	Clarify how the additional 260 RBT2 ships were distributed temporally in each Addendum model.	Worst case models should assume that additional ships are distributed at extremes: either evenly spaced between or coincident with current and projected non-RBT2 traffic. For example, assume that 1.5 additional ships per day will cause 3 new ship wakes to impact shorelines in two extreme ways: (a) wakes arriving at the shoreline in the middle of periods which would otherwise have been calm; and (b) wakes arriving simultaneous to existing or projected non-RBT2 wakes, thereby increasing their impact.

Roberts Bank Terminal 2 Project
Environmental Impact Statement Marine Shipping Addendum – Comments on Completeness
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I am David Scott a fisheries biologist, with particular expertise in salmon. I have been retained on behalf of Georgia Strait Alliance, Western Canada Wilderness Committee, David Suzuki Foundation and Raincoast Conservation foundation to assist them in the Terminal 2 review. There are several issues noted below for which the information provided is insufficient to allow a technical review of the EIS and Addendum.

Comments on Completeness of Information in the EIS

Issue *(if possible, please include reference to the relevant section of the EIS Guidelines)*	**Reference to EIS Addendum**	**Requested Completeness Information**	**Rationale**
EISG – Section 3.3.1, *Section 17.1.1* Choices of value components (VCs) for Chinook salmon are inappropriate.	*Section 8.1.5.5*	Chinook salmon should have VCs at the Conservation Unit level due to their economic, cultural and ecological importance along with their importance as prey for the Southern Resident Killer Whales.	Chinook populations in the Fraser have been assigned into Conservation Units (CUs) by Fisheries and Oceans Canada to preserve the locally adapted diversity of salmon populations, and are composed of one or more populations based on their unique ecology, life history and genetics (Holtby and Ciruna 2007; DFO 2013). These Chinook CUs vary considerably in their life history including their reliance on the estuary as juveniles and run timing as adults. The proponent should provide information at this level to be consistent with fisheries managers and ensure the panel can adequately asses the risk to the various CUs of Fraser River Chinook.
EISG – Section 3.3.1 *Section 17.1.1* VC's missing	*Section 8.1.5.5*	Steelhead should be included as a VC.	Steelhead (*Oncorhynchus mykiss*) are a culturally important fish harvested by First Nations and recreational anglers, and are a potentially important prey item for Southern Resident Killer Whales (Hanson et al. 2010). Due to their cultural importance, use of the LAA and current depleted status of some Fraser populations (MELP and DFO 1998), they should be included as a VC.
EISG – Section 3.3.1 *Section 17.1.1* VC's missing	*Section 8.1.5.5*	Pink salmon should be included as a VC.	Pink salmon are economically and ecologically important in the Lower Fraser, are extremely abundant in odd-years (second greatest after sockeye), and have been repeatedly demonstrated to use near shore areas in Roberts Bank as juveniles (Levy and Northcote 1982; Levings 1985; Archipelago 2014).

Issue *(if possible, please include reference to the relevant section of the EIS Guidelines)*	**Reference to EIS Addendum**	**Requested Completeness Information**	**Rationale**
Section 9.1.5. Inadequate description of baseline conditions for Pacific salmon, lack of reference to Cohen Commission findings	*Section 8.1*	The proponent should further incorporate the findings of the Cohen Commission into the description of baseline conditions for Pacific salmon VCs.	The proponent was instructed to pay particular attention to the findings of the Cohen Commission yet it is not referenced in the addendum.
EISG – section 4.4.3 Incomplete list of other projects which are likely to occur.	*Section 4.3 Table 4-7*	Inclusion of other projects in the area which may result in increased vessel traffic.	The proponent has used a review done by Trans Mountain in 2013 for their expansion project to predict future vessel traffic in the area. (Expansion Project Volume 8A Table 4.4.1.1 for projected growth, Table 4.4.1.2 for projected movements (TMX 2013)). The proponent should provide an up to date evaluation of potential other projects and associated vessel traffic in the LAA in order to evaluate potential cumulative effects.
EISG – section 4.4.3 Inadequate consideration of effects of larger container ships.	*Section 4.2.2.1*	The proponent should provide an evaluation of the potential effects of larger container ships (>10,000 TEU).	The proponent notes that the terminal is designed for ultra large ships yet they predict the effects of marine shipping based on the 8-10,000 TEU size range. As they note the percentage of ships in the >10,000 TEU range will increase from 19% to 29% from 2025 to 2030 and continue increasing in the future, therefore it seems likely this will make up the majority of vessel traffic in the future. As such there current evaluation is inadequate to assess the risk to Pacific salmon VCs
EISG – Section 17.4 Section 10.1.2 No consideration of potential effects of lighting and shading on Pacific salmon VCs	*Section 8.1*	The proponent should provide further information on the potential effects of light disturbance and shading associated with marine shipping on Pacific salmon VCs.	Research in the Pacific Northwest has demonstrated an effect of anthropogenic lights and over-water structures on juvenile Pacific salmon behaviour. The proponent should identify whether marine shipping will lead to increased anthropogenic lighting and shading and whether this will result in negative effects on Pacific salmon VCs.
EISG – Section 17.4 Section 10.1.2 Insufficient information to assess potential behavioural effects associated with underwater noise	*Section 8.1.6.1*	Further studies on potential behavioural effects of underwater noise on Pacific salmon VCs or further emphasis on the uncertainty in the state of science regarding underwater noise.	The proponent bases their conclusion that underwater noise associated with Marine Shipping will have negligible effects on Pacific salmon as “modelled noise will not exceed the 90 dBht (species) behavioural threshold for salmon”. This is in reference to a study conducted in a laboratory setting with only two salmon, both adult Atlantic salmon (Nedwell et al. 2007). This provides very little certainty that it is possible to predict the effects of underwater noise on juvenile Pacific salmon behaviour, therefore

Issue *(if possible, please include reference to the relevant section of the EIS Guidelines)*	**Reference to EIS Addendum**	**Requested Completeness Information**	**Rationale**
			further research should be provided or the proponent should evaluate the potential for cumulative effects of underwater marine noise on juvenile Pacific salmon.
EISG – Section 17.4 Section 12.1.2. Lack of consideration of cumulative effects on Pacific salmon VCs	*Section 8.1.9.*	Based on the uncertainty around the effects of underwater noise and other aspects of marine shipping and the project, and past activities in the Regional Assessment Area which have already cumulatively affected salmon populations, the proponent should consider the potential for cumulative effects on Pacific salmon VCs.	The evidence provided by Port Metro does not allow the panel to adequately assess the potential cumulative effects of marine shipping on Pacific salmon VCs, particularly for juvenile Chinook. As noted by the proponent in Section 8.1.6.1. "Future increases in commercial vessel traffic are expected to make a relatively small contribution to overall underwater noise levels in the LAA due to the high density of existing commercial vessel traffic". As noted in the EIS Guidelines Section 12.1.2. "The EIS will describe the analysis of the total cumulative effect on a VC over the life of the project, including the incremental contribution of all current and proposed physical activities, in addition to that of the project." Therefore as the project will lead to an incremental increase relative to current activities cumulative effects must be considered.
Please use as many pages as necessary.			

References:

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DFO. 2013. Review and update of southern BC Chinook conservation unit assignments. DFO Can. Sci. Advis. Sec. Sci. Resp. 2013/022.

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Roberts Bank Terminal 2 Project
Environmental Impact Statement Marine Shipping Addendum – Comments on Completeness
November 12 – December 16, 2015

I am Dr. Chris Kennedy, an aquatic toxicologist and professor at the Simon Fraser University in British Columbia. I have been retained on behalf of Georgia Strait Alliance, Western Canada Wilderness Committee, David Suzuki Foundation and Raincoast Conservation foundation to assist them in the Terminal 2 review.

Comments on Completeness of Information in the EIS

Issue *(if possible, please include reference to the relevant section of the EIS Guidelines)*	**Reference to EIS Addendum**	**Requested Completeness Information**	**Rationale**
Indicators (EIS Guidelines; 10.1, Environmental Effects and 17.2.2 Description of Activity)	*Addendum, Section 8.2.2 Indicators* *p. 8.2-3, Table 8.2-1*	Include or provide justification for absence of water and sediment quality as an indicator in Table 8.2-1.	The description of indicators in Section 8.2.2 of the Addendum states that the indicators selected for this assessmet are the same as those used in the RBT2 EIS. However those in the RBT2 EIS include 'Water and Sediment Quality' (p. 14-4)
Indicators EIS Guidelines; 10.1, Environmental Effects and 17.2.2 Description of Activity	*Addendum, Section 8.2.2 Indicators*	Provide a description of ballast water release as a source of contamination in the LAA and rationale for it absence as a potential to cause adverse health effects in SRKW. Provide a detailed description of ballast water treatment and release activities.	Ships outlined for use in the completed project use large amounts of ballast water, which is often taken on in the coastal waters in one region after ships discharge wastewater or unload cargo, and discharged at the next port of call, wherever more cargo is loaded. Ballast water discharge typically contains a variety of biological materials which may affect SRKW.
Indicators (EIS Guidelines; 10.1, Environmental Effects and 17.2.2	*Addendum, Section 8.2.2 Indicators*	Provide a description of bilge water release as a source of contamination in the LAA and rationale for it absence as a potential to cause adverse health effects in SRKW.	Leaks and engine maintenance activities release oil and gasoline and along with the degredation products of petroleum, will contaminate water in the bilge. Bilge water also may contain solid wastes and other contaminants, as well as high biological oxygen demand which may affect SRKW.

Issue *(if possible, please include reference to the relevant section of the EIS Guidelines)*	**Reference to EIS Addendum**	**Requested Completeness Information**	**Rationale**
Description of Activity)		Provide a detailed description of bilge water treatment and release activities.	
Indicators (EIS Guidelines; 10.1, Environmental Effects and 17.2.2 Description of Activity)	*Addendum, Section 8.2.2 Indicators*	Provide a description of sewage (grey or blackwater) release as a source of contamination in the LAA and rationale for it absence as a potential to cause adverse health effects in SRKW. Provide a detailed description of grey and blackwater treatment and release activities.	Ships can release large amounts of greywater into the oceans. Sewage can contain bacteria, pathogens, viruses, parasites, nutrients, detergents, oil and grease, organic compounds, metals and other contaminants which may affect SRKW.
Indicators (EIS Guidelines; 10.1, Environmental Effects and 17.2.2 Description of Activity)	*Addendum, Section 8.2.2 indicators*	Provide a list of chemicals of potential concern (COPCs) in each of grey/blackwater, bilge water, and ballast water as potential contaminants releaseed into the LAA and rationale for their absence as a potential to cause adverse health effects in SRKW.	The EIS Guidelines in Section 17 state that the proponent is expected to employ the standard ecological risk assessment framework as presented in section 10 of the EIS Guidleines. A risk assessment framework includes a description of COPCs entering the environment with the potential for causing adverse effects on the receiving environment. This begins the assessment for predicting/evaluating the likely effects on identified valued components outlined in Section 10 under 'Impact Matrix'.
Baseline Conditions (EIS Guidelines; 17.3.1, Existing Marine Environment)	*Addendum, Section 8.2.5.2 Species of Conservation Concern, Table 8.2-3, p. 8.2-8*	For SRKW, provide more detailed information on the yearly time spent in the LAA.	Table 8.2-3 lists all 33 species of marine mammals found in BC with time spent in the LAA as Predicted Occurrence and Use in LAA. This terminology and 'quantification' does not allow for any determination of total time (and when) spent in the LAA which is necessary for determining exposure risk to COPCs.

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Issue *(if possible, please include reference to the relevant section of the EIS Guidelines)*	**Reference to EIS Addendum**	**Requested Completeness Information**	**Rationale**
Baseline Conditions (EIS Guidelines; 17.3.1, Existing Marine Environment)	*Addendum, Section 8.2.5.2 Species of Conservation Concern, Table 8.2-3, p. 8.2-8*	For SRKW, provide more detailed information on the overlap between the LAA and the critical habitat of the SRKW.	Table 8.2-3 lists all 33 species of marine mammals found in BC with time spent in the LAA as Predicted Occurrence and Use in LAA. For data for the SRKW, it is stated that the LAA overlaps the majority of the identified critical habitat. A map or percentage overlap would be useful in determing exposure risk to SRKW and/or ciritical habitat.
Baseline Conditions (EIS Guidelines; 17.3.1, Existing Marine Environment)	*EIS, p. 14-32*	Provide existing data for concentrations of COPCs identified from ballast water, bilge water, grey/black water, and petroleum-derived hydrocarbons in the LAA.	In the current threats list for for DFOs Recovery Strategies for SRKW, 'Environmental contaminants (i.e. persistent bioaccumulating toxins, oil spills and other toxic spills)' are noted. In order to determine exposure risks and potential effects to SRKW, background on these COPCs are needed. Some information on PCBs is outlined in the EIS (p. 14-32), however, PCBs have not been identified as a COPC in the EIA, and no others have been listed or discussed.
Baseline Conditions (EIS Guidelines; 17.3.1, Existing Marine Environment)	*Addendum, Section 8.2.5.3 Southern Resident Killer Whale, p. 8.2-15*	Provide as of 2015, age demographics of SRKWs.	SRKW age demographics can aid in determining risk from exposure to some contaminants. For example, it has been shown that young lactating whales (being at the apex of the food chain) may be more susceptible to biomagnification of contaminants than non-lactating whales resulting in higher accumulations of contaminant body burdens and potential effects.
Effects Assessment (EIS Guidelines; 17.4.1, Effects on the Marine Environment)	*Addendum, Section 8.2.6 Potential Interactions and Effects, p. 8.2-17*	*Provide justification for excluding water and sediment quality (i.e. contaminants other than oil spill related) from the list of potential interactions and effects.*	The interactions and potential effects of marine shipping on marine mammals is limited to acoustic and physical interactions with vessels. Contaminants may also play a role in affecting marine mammals, but have not been addresses at all, nor given a negligible rating.

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Issue *(if possible, please include reference to the relevant section of the EIS Guidelines)*	**Reference to EIS Addendum**	**Requested Completeness Information**	**Rationale**
Effects Assessment (EIS Guidelines; 17.4.1, Effects on the Marine Environment)	*Addendum, Section 8.2.6 Potential Interactions and Effects, p. 8.2-17*	*Provide a rationale (qualitative or quantitative method) for determining when an interaction is negligible.*	The interactions and potential effects of marine shipping on marine mammals have been rated and some have been given a 'classification' of negligible. It is unclear how this categorization (qualitative or quantitive) was achieved.
Effects Assessment (EIS Guidelines; 17.4.1, Effects on the Marine Environment)	*Addendum, Section 8.2.6 Potential Interactions and Effects, p. 8.2-18, Table 8.2-5*	*Provide a rationale (qualitative or quantitative method) for determining the rating (low to high) for a potential effect.*	The interactions and potential effects of marine shipping on marine mammals have been rated low to high. It is unclear how this rating (qualitative or quantitive) was achieved.
Effects Assessment (EIS Guidelines; 17.4.1, Effects on the Marine Environment)	*Addendum, Section 8.2.6 Potential Interactions and Effects, p. 8.2-21*	*Provide established ambient air quality objectives or standards for humans for comparison to marine mammal data. Provide literature data to support a negligible potential effect of direct fume inhalation from shipping or similar exhaust.*	The lack of ambient air quality objectives or standards for marine mammals does not preclude negative impacts on marine mammal health. In order to be fully informed on the potential impacts of air pollution from shipping on SRKW, data from other mammalian species may be useful as direct fume inhalation from bunker oil and diesel fuelled ships are likely to cause some adverse effects.
Effects Assessment (EIS Guidelines; 17.4.1, Effects on the Marine Environment)	*Addendum, Section 8.2.6 Potential Interactions and Effects, p. 8.2-21*	*Provide information on the implementation in 2015 of the North American Emission Control Area.*	The lack of effects on marine mammals with respect to increased shipping is based on an actual reduction in marine vessel emissions (even with increases in shipping) due to implementation of the ECA in 2015. If this has not been implemented, the proponents modelling exercise should be revisited.

Issue *(if possible, please include reference to the relevant section of the EIS Guidelines)*	**Reference to EIS Addendum**	**Requested Completeness Information**	**Rationale**
Effects Assessment (EIS Guidelines; 17.4.1, Effects on the Marine Environment)	*Addendum, Section 10.3.3.1 Plausible Accident or Malfunction #1: Hard Grounding Resulting in a Spill, p. 10-10*	*Provide a hypothetical spill scenario with light fuel oil.*	The rationale behind choosing heavy fuel oil as an example for effects occurring from an oil spill accident are understood, however, the potential effects to SRKW exposed to petroleum under this scenario does not model risk for all fuel types as noted. Light fuel oil, while being less persistent and likely to spread less than a more persistent heavy oil is much more acutely toxic. The components of light oil can contain much higher proportions of compounds such as benzene, toluene, xylene and ethyl benzene and lower molecular weight polycyclic aromatic hydrocarbons such as the naphthalenes. Exposure scenarios and toxicity from this oil mixture are vastly different, but could potentially cause more impact through short-term effects.
Effects Assessment (EIS Guidelines; 17.4.1, Effects on the Marine Environment)	*Addendum, Section 10.3.3.1 Plausible Accident or Malfunction #1: Hard Grounding Resulting in a Spill, p. 10-12*	*Modelling efforts towards spill scenario should use worst case parameters to determine the maximum spread and impact of oil on critical SRKW habitat. This should include a modelling of lighter fuel oils.*	The modelling for the heavy fuel oil spill does not necessarily use all worst case scenario parameters. These should be outlined (e.g. during winter conditions of low ambient temperature and maximum wind/wave) and used to determine the maximum spread of oil.
Effects Assessment (EIS Guidelines; 17.4.1, Effects on the Marine Environment)	*Addendum, Section 10.3.3.1 Plausible Accident or Malfunction #1: Hard Grounding Resulting in a Spill, p. 10-14*	*Provide evidence that the majority of spilled heavy oil that reached the shore would be recovered.*	The duration of exposure of SRKW to contaminated food and a contaminated environment (water and sediments) is based on the environmental persistence and the recovery efforts for spilled oil. The Exxon Valdez example indicates that oil may last for decades following a spill, even following recovery and cleanup efforts.

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Effects Assessment (EIS Guidelines; 17.4.1, Effects on the Marine Environment)	*Addendum, Section 10.3.3.1 Plausible Accident or Malfunction #1: Hard Grounding Resulting in a Spill, p. 10-14*	*Provide information that assesses the use of chemical dispersants for spilled oil (e.g. COREXIT) and its potential effects on SRKW.*	Oil spill cleanup efforts often utilize chemical dispersants such as COREXIT (e.g. Deep Water Horizon). These dispersants are known to have toxicity to a wide variety of marine organisms. The proponents mitigation proposal should address the potential for its use and subsequent exposure and potential toxicity to SRKW.
Effects Assessment (EIS Guidelines; 17.4.1, Effects on the Marine Environment)	*Addendum, Section 10.5.7.2 Potential Interactions and Effects, p. 10-60*	*Provide Potential Effects for Exposure to Light Fuel Oil due to an Accident or Malfunction.*	The list of effects of oil spills on marine mammals exposed to a heavy fuel oil spill include a number of health effects that can include those that would occur with short term exposure to petroleum hydrocarbons found more commonly and in higher concentrations in light fuel oil. However, compounds found in higher concentrations in light fuel oils (e.g. BTEX) may cause other effects not listed here.
Effects Assessment (EIS Guidelines; 17.4.1, Effects on the Marine Environment)	*Addendum, Section 10.5.7.2 Potential Interactions and Effects, p. 10-60*	*Provide Potential Effects for Exposure to Heavy Fuel Oil due to an Accident or Malfunction that are more chronic in nature.*	Many chemicals in fuel oils have other effects in animals that are not listed such as carcinogenicity, teratogenicity, and potential endocrine disruption and reproductive effects found with chronic exposure. These should be assessed and listed as well.
Effects Assessment (EIS Guidelines; 17.4.1, Effects on the Marine Environment)	*Addendum, Section 10.5.7.2 Potential Interactions and Effects, p. 10-62*	*Provide an assessment of the routes of exposure of chemicals that are contained in fuel oils.*	The routes of exposure to SRKW are well known and include the lungs, skin, gastrointestinal tract. Compounds in fuel oil can be absorbed from the air, food, and water.

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Effects Assessment (EIS Guidelines; 17.4.1, Effects on the Marine Environment)	*Addendum, Section 10.5.7.2 Potential Interactions and Effects, p. 10-63*	*Provide information showing that all oil impacted salmon populations will rebound after an oil spill and that reductions in SRKW salmon food supply during recovery years will not affect the health of SRKW.*	The conclusions that salmon populations will rebound due to natural recruitment and immigration processes and will return salmon populations to pre-spill numbers without any adverse effects on SRKW during low abundance must be supported with scientific evidence.
Effects Assessment (EIS Guidelines; 17.4.1, Effects on the Marine Environment)	*Addendum, Section 10.5.7.2 Potential Interactions and Effects, p. 10-63*	*Provide evidence that contamination endpoints or biological communities can return to pre-spill conditions.*	It is unlikely that contamination endpoints in areas of significant oil spills have returned to baseline values. Additionally, ecological data suggest that impacted ecologies by oil spills do not return to pre-spill conditions, but are altered permanently.
Please use as many pages as necessary.			