SCIENCE RESPONSE TO INFORMATION REQUESTS SUBMITTED TO THE ENBRIDGE NORTHERN GATEWAY PROJECT ENVIRONMENTAL IMPACT ASSESSMENT HEARINGS RESPECTING SHIP STRIKE RISK AND ACOUSTIC DISTURBANCE FROM SHIPPING TO WHALES

Context

Fisheries and Oceans Canada's (DFO) Environmental Assessment and Major Projects Division (EAMP), Pacific Region, requested that DFO Science, Pacific Region, on May 15, 2012, provide information regarding specific Information Requests (IRs) submitted to the Enbridge Review Panel that DFO Science has the expertise to evaluate. As the IRs for which Science advice was requested cover a range of issues and scientific disciplines, separate Science Responses have been developed for each category of IRs, and in some cases specific IRs. In addition to science related questions, some IRs included elements that were questions pertaining to DFO policy, management or legal information.

This Science Response addresses the questions about ship strike risk and ship strike risk mitigation and acoustic disturbance to whales. These questions can be categorized as:

- questions concerning the adequacy of the mitigation measures proposed by Enbridge Northern Gateway to reduce the risk of ship strikes causing injury or mortality to whales particularly Fin Whales, Humpback Whales and Grey Whales;
- questions concerning the adequacy of the ship strike risk analysis proposed for the region defined as the Confined Coastal Assessment Area (CCAA) and Enbridge Northern Gateway's proposed timing for its completion in relation to the timing of the completion of the Environmental Review and similarly the ship strike analysis for the Open Water Assessment Area (OWAA);
- questions concerning the extent of DFO studies of the spatial and seasonal distribution of marine mammals in the CCAA and the OWAA;
- questions concerning the adequacy of the assessment of noise levels and impacts to cetaceans and adequacy of the proposed mitigation regarding noise levels.

This Science Response report is from the Fisheries and Oceans Canada, Canadian Science Advisory Secretariat, Regional Science Special Response Process (SSRP) of May 29th, 2012 on the Science advice in response to information requests submitted by Intervenors to the Enbridge Northern Gateway pipeline project environmental assessment Panel Review Process. Additional publications from this process will be posted as they become available on the Fisheries and Oceans Canada Science Advisory Schedule at www.dfo-mpo.gc.ca/csas-sccs/index-eng.htm.

Background

The Enbridge Northern Gateway Project proposes to ship dilute bitumen from Kitimat, British Columbia to markets in China and California with tankers of the class Very Large Crude Carriers (VLCC) (Vol. 1, B1-2, Enbridge Northern Gateway Project Section 52 Application). The tanker route from Kitimat through confined waterways in British Columbia and then into open waters of Hecate Strait, Dixon Entrance and Queen Charlotte Sound in British Columbia are illustrated in Figure 1. For assessment purposes Enbridge Northern Gateway defines two areas, the Confined Channel Assessment Area (CCAA) (Figure 2) and the Open Water Assessment Area (OWAA) which is BC waters to the territorial sea limit (Figure 1). Incoming ships will deliver cargoes of condensate. Enbridge Northern Gateway estimate 71 condensate and 149 oil tankers will call in at the Kitimat terminal for a total of 440 transits per year (Vol. 8C, B3-37, Enbridge Northern Gateway Project Section 52 Application). A marine terminal will be constructed near Kitimat with two tanker berths and one utility berth (Vol. 1, B1-2, Enbridge Northern Gateway Project Section 52 Application).

Two IR submissions were made to the Joint Review Panel (JRP) by DFO. Enbridge Northern Gateway provided responses to requests for information in the IRs. Since then Intervenor review of the Environmental Assessment documents prepared by the proponent (Enbridge Northern Gateway) and of the IRs and the responses by the proponent has resulted in a series of further questions to DFO by Intervenors. This document addresses the Intervenor questions to DFO regarding ship strike risk and acoustic disturbance from tanker traffic resulting from the proposed Enbridge Northern Gateway Project.

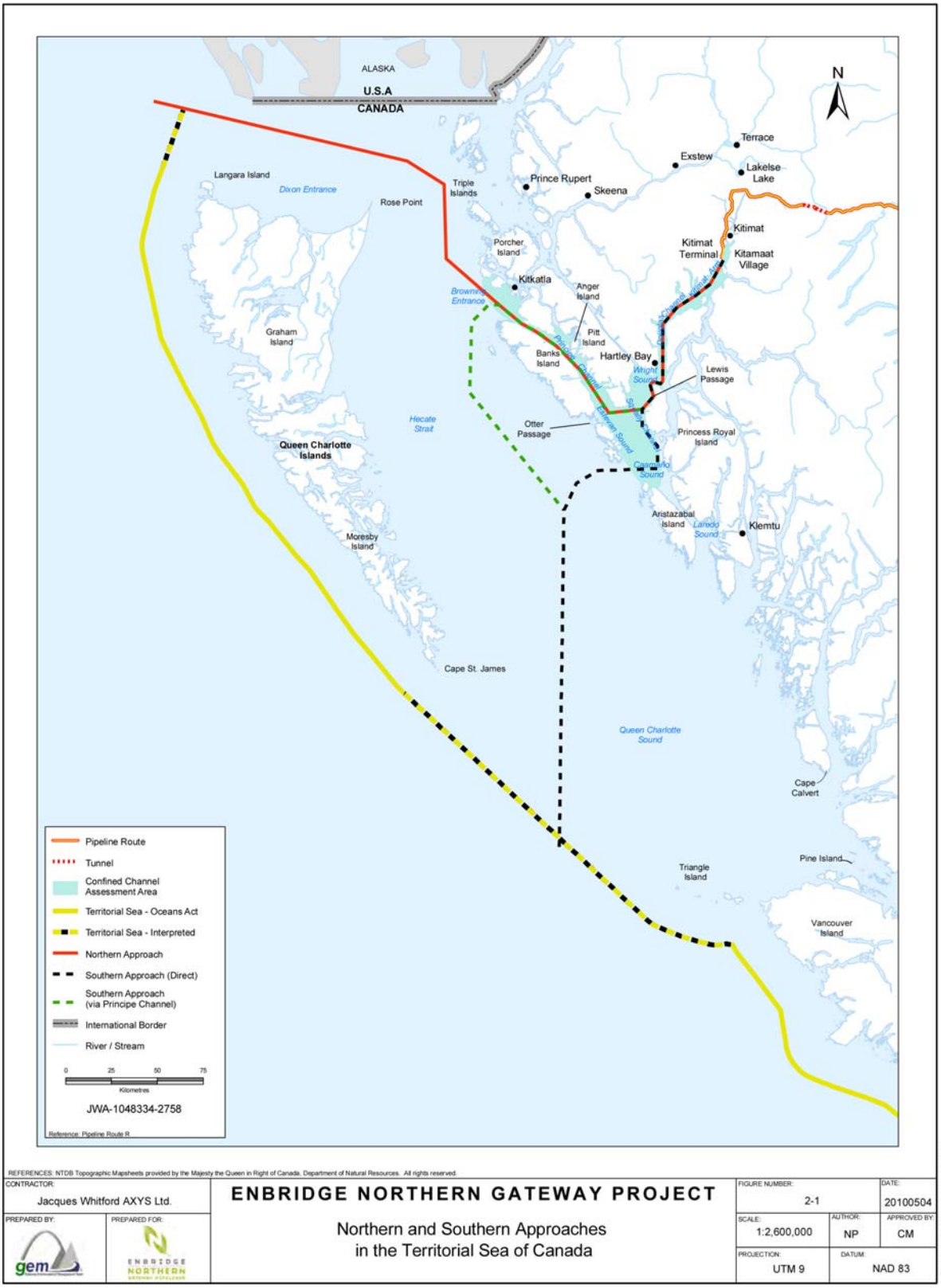

Figure 1. Map illustrating the proposed tanker routes through the Confined Channel and Open Water Assessment Areas (CCAA and OWAA). The OWAA extends to the territorial sea boundary (from Volume B9-42 Enbridge Northern Gateway Project).

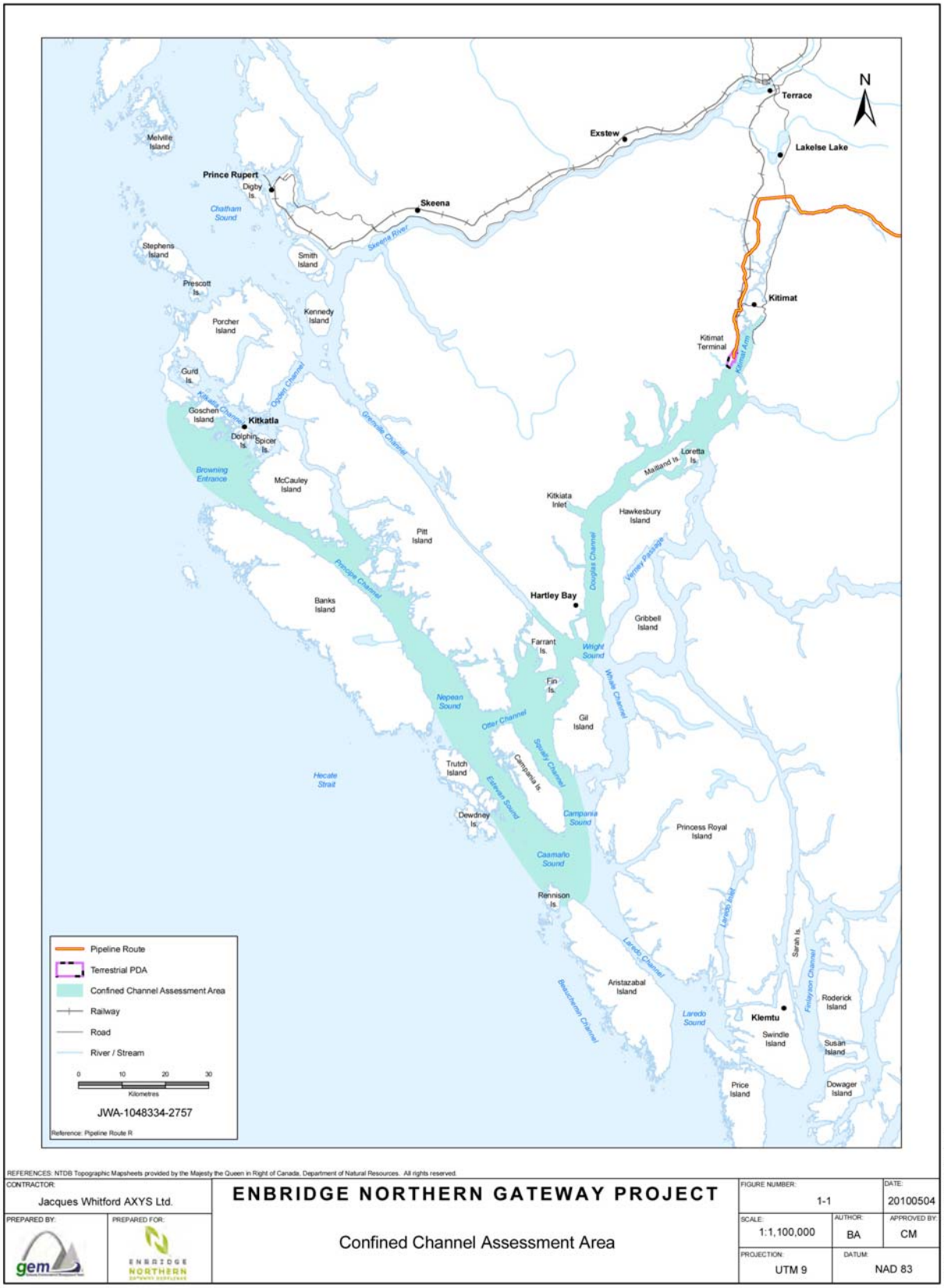

Figure 2. Map illustrating the location and extent of the Confined Channel Assessment Area (CCAA) (from Volume 8B Enbridge Northern Gateway Project Section 52 Application).

Analysis and Responses

The questions posed to DFO Science are presented as bullets. In some cases, several questions could be grouped together to be addressed with one comprehensive answer. The response is provided below the bulleted questions.

Ship Strike Risk to Fin Whales and Humpback Whales

- In light of the statement that Fin Whales and Humpback Whales occurring in the CCAA are more likely to be involved in collisions, please indicate how effective the proposed mitigation of reducing speed to 10 knots will be in preventing collisions.
- Please identify the range of mitigation options that DFO considers would be effective in reducing the risk of collisions for SARA listed species, such as the Fin and Humpback Whales.
- Please explain whether or not, and why, DFO is satisfied, with NGP's refusal to provide the information requested by DFO to assess potential impacts of ship strikes on Whales until after the JRP has concluded its business (NGP's response to IR 2.23). If DFO is not satisfied with NGP's response, please explain why it has not filed a Notice of Motion with the JRP to compel NGP to provide the necessary information?

The Proponent's mitigation plan for potential vessel strikes with marine mammals causing serious injury or death of marine mammals includes reducing vessel speed in the CCAA to 10-12 knots generally, and 8-10 knots in the 'Humpback Whale core area' during May to November, *"unless otherwise required for safe navigation"* (p. 10-89 and elsewhere, Vol. 8B, Enbridge Northern Gateway Project Section 52 Application). It is also stated that if Whales are located in the path of a tanker transiting the CCAA (p. 10-10, Vol. 8B, Enbridge Northern Gateway Project Section 52 Application), the *"tanker will be requested to reduce speed to the minimum safe level of navigation through the specific area*". This speed reduction would presumably be less than the routine 8-10 knots speed in the CCAA.

In a report of the International Whaling Commission's (IWC) Vessel Strikes Working Group, it is reported that about 23% of all confirmed vessel strikes causing death or serious injury to Whales took place at speeds of 10 knots or less (Van Waerebeek and Leaper 2008). That report also shows that two baleen Whale species—the Fin Whale and Humpback Whale—are by far are the most frequently involved in ship strikes globally. These are SARA-listed species and they occur regularly within the CCAA (Nichol and Ford 2012, Ford et al. 2010c).

Reduction in vessel speed and avoidance of whales through vessel's course alteration are the two primary methods of reducing the probability of vessel strikes taking place. However, as the IWC report indicates, tanker speed reduction to 8-10 knots may not fully mitigate the risk of ship strikes. The following questions were presented by DFO in IR 2 with respect to the details of the proposed mitigation strategy.

1. What are the anticipated maximum speeds of the tanker when speed reduction is requested due to the presence of Whales in its path in the CCAA?
2. What speeds would be required for safe navigation of the tankers?
3. What navigational conditions would require these speeds, and how often would they be expected to occur?
4. Are there specific areas along the planned route within the CCAA where safe navigation would routinely require speeds in excess of 10 knots during May to November?

5. Are there sections of the planned route through the CCAA where course alteration to avoid Whales would not be possible due to navigational constraints? If so, please identify these sections.

The effectiveness of the two primary mitigation measures (speed reduction and course alteration) will depend on the extent to which these measures can be applied (the maximum speed required for safe navigation), and the consistency with which these measures can be applied (are there sections of the route or sea and weather conditions where course alteration would not be possible or where speed reductions are not possible?). The proponent stated in the IR 2.23 submission that speed reductions and course alterations would be made when safe to do so. They note that speeds of 8-12 knots are required for safe navigation of the tankers. Speeds of greater than 10knots would be required outside of the Humpback Whale core area (which is approximately the same area as the candidate critical habitat area for Humpback Whales, Figure 3) and also greater than 10 knots in the Humpback Whale core area outside of the season May through October. Regarding alterations of the ship's course, the proponent states that this could only occur at the safety discretion of the BC coast pilot and tanker master. As such the proponent is not able to specify the details of the implementation of their proposed mitigation strategy. It is thus not possible for DFO science to assess the effectiveness of these measures for reducing the risk of injury or mortality to Fin and Humpback Whales.

The potential effectiveness of these mitigation measures is also limited by lack of a quantitative analysis of the seasonal and spatial densities of whales in the CCAA, based on systematic line transect survey data. A quantitative analysis is required to estimate ship strike risk and identify areas of greatest risk based on spatial and seasonal distribution of Whales. No such survey or analysis has yet been undertaken by the proponent or by DFO in the CCAA area. The proponent has indicated that field surveys and a quantitative ship strike analysis would be completed prior to start up of the project but not before completion of the environmental review (IR 2.23). At this time there is no analysis or assessment for DFO to review.

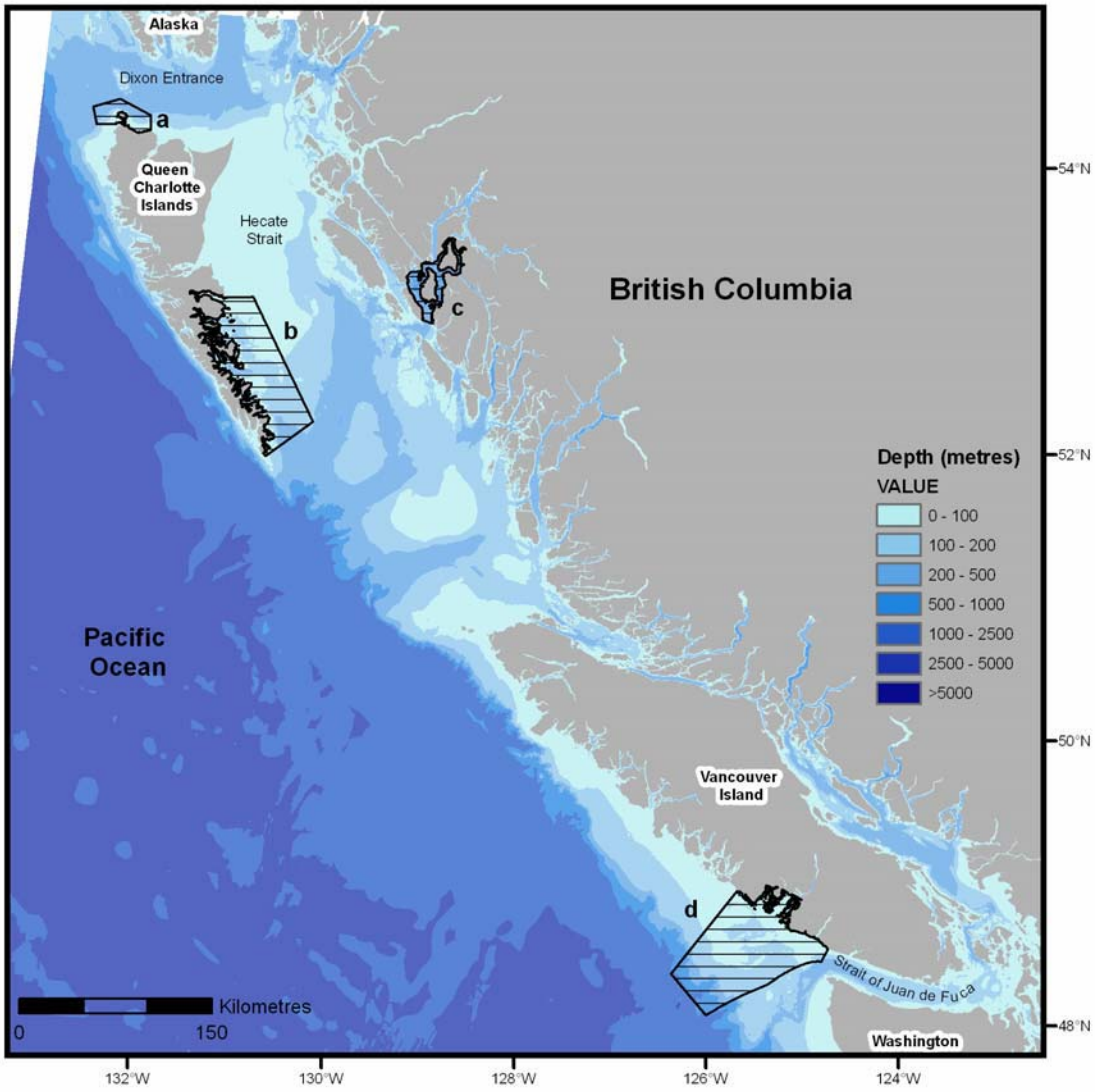

Figure 3. Location and extent of Gil Island identified potential critical habitat (marked as "c") for Humpback Whales in the Camaano Sound area (from Nichol et al. 2010).

Ship Strike Risk to Grey Whales

- Please indicate whether the risk assessment of ship strikes in the OWAA for Grey Whales during their spring migration recommended by DFO is required during the EA. If it is not, please explain how DFO is able to assess the effectiveness of the proposed mitigation and the significance of the effects on Whales and whether the absence of this information will allow for an assessment of impacts in the OWAA given DFO's statement that information in the CCAA is inadequate to assess the risk of serious injury or mortality to Humpback Whales and Fin Whales from ship strikes.
- Is DFO conducting or involved in studies of Grey Whale migration patterns in the CCAA and the Project Development Area ("PDA") to address these issues? If yes, will those studies also include studies of Grey Whale migration patterns in the OWAA? If not, why not?

- Is DFO conducting or involved in studies assessing the risks of ship strikes in the OWAA? If not, why not?
- If DFO is conducting or involved in studies assessing the risks of ship strikes in the OWAA and/or studies of Grey Whale migration patterns, are those data being incorporated into the effects assessment of the Northern Gateway Project on marine mammals. If not, why not?

In the EA documents, the proponents correctly described the existing knowledge as of 2010 regarding the migration corridor of Grey Whales in the CCAA and OWAA, taken primarily from DFO's Management Plan for Pacific Grey Whales (2010). However, since that Management Plan was prepared, new information has become available as part of DFO Science research on the migration route of northeastern Pacific Grey Whales. A recent publication, (Ford et al. 2012), by DFO Science provides new and important insight into the northward migration route taken by Grey Whales in the northeastern Pacific. The study demonstrates that Grey Whales migrate through Queen Charlotte Sound, Hecate Strait and Dixon Entrance rather than along the outer coast of Haida Gwaii as was originally thought. From Baja California to western Alaska, Grey Whales generally migrate within a few kilometres of shore over most of their migration corridor, and this transit of the relatively open waters of Hecate Strait and Dixon Entrance is unusual. Most of the proposed approaches to the CCAA in Hecate Strait as well as the tanker route through Dixon Entrance overlap substantially with this migration corridor. During the migration the entire northeastern Pacific population (except for the Pacific Coast Feeding Aggregation) passes through these waters in March and April of each year. The southward migration route in winter remains uncertain.

DFO is not currently involved in ship strike risk analysis for Grey Whales; however the recent report provides significant and important information highlighting the potential vulnerability of the northeastern Pacific Grey Whale population to ship strikes in the OWAA during their northward migration. Grey Whales are known to be vulnerable to ship strikes (Douglas et al. 2008). The proponent stated in IR2.23 that they would complete a ship strike risk analysis for Grey Whales and revise the mitigation actions they have proposed to consider this species. The proponent has indicated that field surveys and a quantitative ship strike analysis would be completed prior to start up of the project but not before completion of the environmental review (IR 2.23). Therefore it is not possible at this time for DFO Science to assess the effectiveness of the mitigation plan for Grey Whales.

Impacts to SARA-listed cetaceans

- Please explain whether or not, and why, DFO is satisfied that NGP's response to its IR 2.19 that NGP provide "additional information on SARA-listed species at the individual level" to assist DFO in understanding potential impacts. If DFO is not satisfied with NGP's response, please explain why it has not filed a Notice of Motion with the JRP to compel NGP to provide the necessary information?

The proponent indicates in IR 2.19 that they will develop a Marine Mammal Protection Plan (MMPP) in consultation with DFO to be implemented in the CCAA and adhere to the plan during the life of the project. The proponent state that they will implement the plan to the extent practical; however they point out that they are not legally obligated to provide this plan nor are they required to have a SARA permit to operate a vessel in Canadian waters. Furthermore, they observe that four other industries operating vessels in the same area have not been scrutinized in this way. Since the details of the MMPP are unknown and since there may be no legal requirement for the plan or its implementation, DFO Science can not determine the effectiveness of the plan.

Cetacean Research Studies by DFO

- Is Fisheries and Oceans Canada engaged in any studies to assess the spatial and seasonal occurrence and densities of marine mammals in the CCAA?
- If so, will the studies include an adequate assessment of the risk of serious injury or mortality to Humpback and Fin Whales from ship strikes associated with the Northern Gateway project?

DFO conducts studies to determine the distribution and seasonal occurrence, population structure and population abundance of Blue, Fin, Sei, North Pacific Right, and Humpback Whales in Canadian Pacific waters (Ford et al. 2010b, 2010c, Ford et al. 2009, Nichol et al. 2010, Nichol and Ford 2012). DFO is also engaged in studies of life history, abundance, ecology and habitat use for Northern Resident, Southern Resident, Transient and Offshore Killer Whales (e.g., Ford et al. 2010a, Ellis et al. 2011). Research techniques include visual surveys, photo-identification, acoustic monitoring, genetics, and prey sampling. Field studies take place throughout BC coastal waters, including the CCAA. As part of DFO Species at Risk program, DFO Science has thus far provided advice regarding critical habitat for the Humpback Whale and for Northern Resident Killer Whales. Candidate areas that overlap the CCAA for both of these species have been identified (Figure 3, Figure 4) (Ford 2006; Nichol et al. 2010). The region of Camaano Sound also appears to provide important habitat for Fin Whales and historically Fin Whales and Humpback Whales have occupied this area (Nichol et al. 2002; Nichol and Ford 2012).

No analysis of the risk of serious injury or mortality has been made. A ship strike risk analysis would require a quantitative analysis of the seasonal and spatial densities of Whales in the CCAA, based on data from intensive systematic line transect surveys. Such surveys have not yet been undertaken by the proponent or by DFO in the CCAA area.

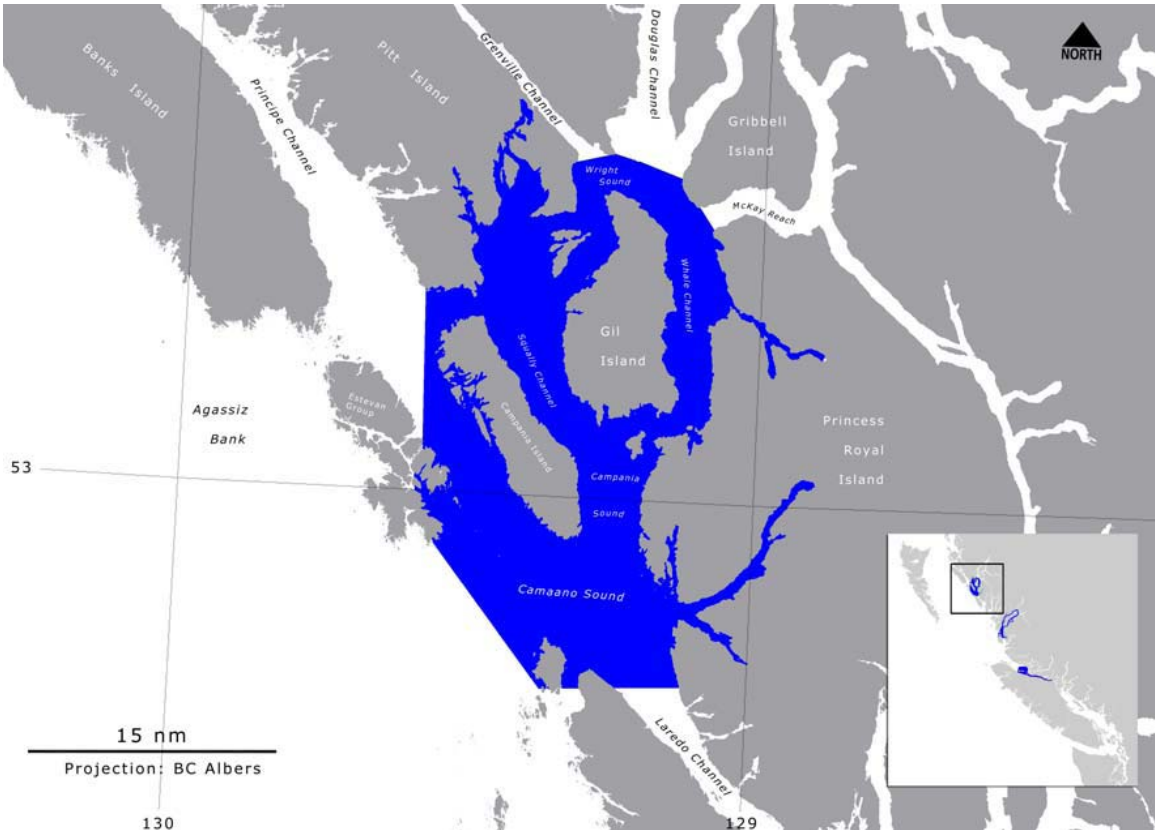

Figure 4. Location and extent of identified potential critical habitat for Northern Resident Killer Whales in the Camaano Sound area (from Ford 2006).

Assessment of Shipping Noise in the CCAA

- Please explain whether or not, and why, DFO is satisfied that NGP's response to its IR 2.24 that NGP provide maps of noise levels at a range of acoustical frequencies all along the shipping channel in order for DFO to "understand possible bottlenecks and assess the possibility of excessive noise" and "to help DFO understand and evaluate measures intended to reduce or eliminate the effects of the project, including possible effects on SARA-listed species?" If DFO is not satisfied with NGP's response, please explain why it has not filed a Notice of Motion with the JRP to compel NGP to provide the necessary information?
- How is the information requested by DFO on the range of acoustic frequencies present in the shipping channel relevant to the assessment of potential risks associated with the Project? [NGP Response to Federal Government IR No.2, number 2.24; Volume 2, Part 1, section 2.2.1)
- Please explain whether or not, and why, DFO is satisfied that NGP's response to its IR 2.25 that NGP provide an audiogram analysis for Fin Whales and vessel traffic to help DFO understand and evaluate measures intended to reduce or eliminate the effects of the project, including possible effects on SARA-listed species? If DFO is not satisfied with NGP's response, please explain why it has not filed a Notice of Motion with the JRP to compel NGP to provide the necessary information?

The proponent has not provided additional information about noise levels at a range of frequencies along the shipping channels. They have indicated in IR 2.24 that they did do some

modelling already presented in the EA but that they may do more as part of other studies they propose to undertake with regards to cetaceans prior to operations. The proponent suggested in their response IR 2.24 that the ambient noise levels will be high even without any industrial activity, implying that the acoustic impact from tanker traffic may not be significant. While this may be true for the open ocean where distant storms and shipping keep the noise level relatively high, this is unlikely to be the case in the constricted channels of the proposed shipping channel. Further modeling and in-field noise measurements may indicate that noise generation needs to be reduced in certain areas along the shipping channel to avoid impacts to SARA listed species. It is not possible at this time for DFO Science to determine acceptable noise thresholds in the CCAA in the absence of additional modelling and in-field measurements.

Conclusions

It is not possible to assess the effectiveness of the proposed ship strike mitigation measures at this time.

A Marine Mammal Protection Plan has not yet been developed and therefore can not be assessed. Further, it is not clear if the proponent will be legally obligated to abide by such a plan.

It is not possible at this time to assess ship strike risk to Fin Whales and Humpback Whales and Grey Whales, not because the occurrence of whales in the CCAA and OWAA is unknown, but because the specific intensive line transect survey data representative of the area have not been collected.

Candidate critical habitat areas for Humpback Whales and Northern Resident Killer Whales have previously been identified and overlap the CCAA.

It is not possible at this time for DFO Science to determine acceptable noise thresholds in the CCAA in the absence of additional modelling and in-field measurements.

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