


## Appendix I

[By Email]

March 4, 2016



Catherine Ponsford  
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Dear Catherine:

**Re: Pacific Northwest LNG Project: Harbour Porpoise Significant Adverse Effect Determination**

### ***Introduction***

Pacific NorthWest LNG (PNW) has had an opportunity to review the draft Canadian Environmental Assessment Agency (the Agency) Environmental Assessment Report received February 10, 2016. PNW is providing a number of comments on that draft report under separate cover.

In this letter, PNW is providing comment on a particular matter, the draft determination that the Pacific Northwest LNG Designated Project is likely to result in a significant adverse effect to harbour porpoise (*Phocoena phocoena*).

PNW notes that the draft determination was influenced by the advice the Agency received in a letter from Fisheries and Oceans Canada (DFO) dated January 15, 2016. That advice was, in turn, based on information from the Marine Mammal Program Interim Report, dated June 30, 2015 and submitted to the Agency in July 2015 in accordance with the request for further information made by the Agency in Annex III of its letter dated to PNW dated June 2, 2015. As the title indicates, that report was delivered on an interim basis. PNW can now advise that the final Marine Mammal Program Final Report (Final Report) prepared by Stantec Consulting Ltd., is to be transmitted to DFO on March 4, 2016.

Sections 6.7.3 and 7.3.4 of the Agency's draft Environmental Assessment Report set out and explain the draft determination that the Designated Project is likely to result in a significant adverse effect to Harbour Porpoise. In particular, the draft significance determination is based, at least in part, on what is stated to be an absence of information about the availability of alternative habitat for the Harbour Porpoise. The Final Report provides information to support PNW's conclusion that alternative habitat is available based on analysis of the data collected and habitat suitability modelling. Further, recently published research on Harbour Porpoise (Best et al. [2015]) also demonstrates that alternative habitat is available.

In PNW's view, this information bears directly on the advice to the Agency from DFO and on the draft determination of significance. In particular, it demonstrates that alternative habitat is

available and, consequently, that the Project is not likely to result in a significant adverse effect to harbour porpoise.

Accordingly, PNW is writing to advise the Agency of this information so that it can be taken into account when finalizing the Environmental Assessment Report and the Agency's conclusions with respect to the significance of the potential significant adverse effects of the Designated Project to harbour porpoise.

For convenience, a more detailed discussion of the information about harbour porpoise habitat is provided below.

## ***Discussion***

### *Contents of this Letter*

This letter describes the study methods, explains harbour porpoise density data, and discusses significance thresholds. It is PNW's view that this information demonstrates that the Project is not likely to cause significant adverse environmental effects to harbour porpoise, and that cumulative effects to harbour porpoise are also not likely to be significant.

More specifically, this letter provides:

- A summary of final harbour porpoise data analysis, including predicted harbour porpoise distribution and relative abundance in the study area based on a full year of line transect, vessel-based, survey data, from January to December, 2015.
- A discussion of available suitable habitat for harbour porpoise based on Stantec Consulting Ltd.'s model predictions and recent work by Best et al. (2015).
- A discussion of the determination of significance, including:
  - A discussion of DFO's initial comparison of preliminary (or interim) marine mammal observations in Chatham Sound Survey Areas A and B. This comparison used the partial dataset presented in the Interim Report, which does not account for differences in survey effort between the two sites. The surveys were designed to provide data across the entire local study area (Survey Area A) and finer resolution data closer to the Project (Survey Area B) to support monthly marine mammal density modelling that factors in the effort used to generate density estimates of harbour porpoise that cover both study areas.
  - An overview of PNW's environmental management/mitigation commitments to reduce the potential effects from pile driving activities (reference to PNW LNG letter submitted to DFO and copied to the CEA Agency on August 19, 2015).
  - Predicted harbour porpoise distribution and densities in relation to the 160 dB re 1  $\mu$ Pa rms SPL modelled safety radii for impact pile driving with mitigation, from Appendix N of the EIS (PNWLNG EIS Appendix N: JASCO Applied Sciences, *Modelling of Underwater Noise for Pacific Northwest LNG – Marine Construction and Shipping Scenarios Report*, POO1224, Document 00669, February 18, 2014).

### **Summary of Final Marine Mammal Data Analysis**

Marine mammal sightings from line transect, vessel based survey from November 2014 to June 2015 were summarized in the Marine Mammal Program Interim Report (June 30, 2015). PNW's

consultant, Stantec Consulting Ltd., has since developed the Marine Mammal Program Final Report (Final Report), February 2016, compiling line transect, vessel-based survey data collected from January to December 2015.

Harbour porpoise sighting numbers from the November 2014 and February 2015 surveys were too low to model density and weather in December 2014 was too rough for surveys to be completed. The Final Report uses distance sampling methods (Buckland et al. 2001) and density surface modelling (Miller et al. 2013), to predict the relative abundance and distribution of marine mammals observed during the surveys. These statistical methods factor in the increased survey effort in Study Area B (relative to Study Area A), and produce figures predicting the mean density of individual marine mammals that could be observed across the whole Chatham Sound study area (A and B combined).

The survey design was developed to satisfy the Agency's requirements for a marine mammal monitoring and protection plan and aimed to provide a better understanding of the Chatham Sound area, which considers both the Project's immediate area of marine construction (Area B) and, eventually, operations (both Area A and B) effects. It was not intended to provide a comparison of relative abundance information between the two study areas.

Please refer to the attached figures. Figures 1 to 11 show the modelled harbour porpoise hot spots (i.e., areas that are predicted to have higher densities of harbour porpoise) in Chatham Sound across the 2015 study year.

- Hot spots were predicted in the south of Digby Island, around Ridley Island, around Lelu Island and northeast of Stephens Island. The higher densities observed at these four locations indicate that these areas are preferred suitable habitat for harbour porpoise, which PNW's data shows is used at various times throughout the year.
- Hot spots similar to these predictions could likely be found outside of the study area, though the modelling predictions are limited within this area of assessment. Best et al. (2015) show that high summer densities of harbour porpoise are located in the coastal waters of Porcher Island (< 5 km) as well as east of Haida Gwaii (within approximately 100 km).
- The estimated harbour porpoise relative mean abundance in Chatham Sound was predicted (with lower and upper 95% confidence intervals) to be 265 individuals (110 to 641) in July (highest mean predicted value in the year; Figure 6).
- Months with predicted low to moderate density values (i.e., August through to October) show similar distributions, where harbour porpoises are using the same areas, albeit with lower predicted density values.

PNW's analysis shows that harbour porpoises can be expected to be found in these four locations year-round. Thus, alternative suitable habitat for harbour porpoises which may be displaced by the project's temporary in-water construction is available within the study area south of Digby Island, around Ridley Island, around Lelu Island (away from in-water works) and northeast of Stephens Island.

Based on modelling by Best et al. (2015), additional alternative suitable habitat for harbour porpoises is also available around Porcher Island and east of Haida Gwaii.

## Discussion of Determination of Significance

### DFO comparison of preliminary marine mammal observations

DFO's January 2016 letter of advice to the CEA Agency, in PNW's view, may have been based on incomplete information. DFO only had access to the Proponent's preliminary marine mammal observations (i.e., raw data) in Chatham Sound Survey Areas A and B. It is PNW's view that some of the interpretations from this incomplete information may not be accurate.

For example, the comments provided by DFO to CEA Agency, appear to be an outcome of comparing two figures from the Interim Report: Figure 12 (Chatham Sound Survey Area A Marine Mammal Sightings: All Surveys) and Figure 13 (Chatham Sound Survey Area B Marine Mammal Sightings: All Surveys).

The two regions displayed on these figures (Figure 12 and 13 - attached) were subject to different survey effort, and the sightings presented were preliminary observational information that was not corrected for survey effort and had not had any statistical analysis applied. As such, and particularly in consideration of the notable difference in observer effort between Areas A and B, it is PNW's view that conclusions concerning an "elevated abundance" from these preliminary tallies may not be accurate.

PNW acknowledges that the full year of field data and results of this modelling was not made available for DFO to consider when formulating their conclusions (i.e., the baseline data was being collected at the time of their review). As referred to in the sections above, the final results of harbour porpoise modelling show that in addition to the coastal waters around Lelu Island, suitable habitat is predicted to be available for harbour porpoise in the study area in the coastal waters south of Digby Island, around Ridley Island, and northeast of Stephens Island.

### PNW LNG Mitigations and Monitoring

Throughout the environmental assessment process PNW has worked with DFO to develop mitigations to avoid and mitigate potential adverse effects of marine resources. This was compiled into a summary of PNW LNG's proposed mitigation and offsetting commitments for fish, fish habitat, and marine mammals, in a letter submitted on August 19, 2015. Mitigation measures referenced in this summary letter were developed with an understanding of sections 7 and 8 of the Marine Mammal Regulations under the *Fisheries Act*. The measures that are anticipated to reduce adverse underwater noise effects from construction activities (i.e., pile driving) to harbour porpoise will include:

- Using a temporary coffer dam to isolate the tower block and anchor block marine work areas from surrounding waters.
- Preferentially using low noise pile installation techniques (i.e., vibratory installation methods) in softer sediments when feasible.
- Establishing a 500 m to 1,000 m safety radius for impact pile driving activities. The distance is based on modelling and will be refined through in-situ acoustic monitoring using a 160 dB re 1 $\mu$ Pa rms sound pressure level threshold for marine mammals, as required under CEA Agency's Potential Conditions (6.12.1 and 6.12.2).
- Implementing a marine mammal observation program during impact pile driving as required under CEA Agency's Draft Conditions (6.12.3).
- Using bubble curtains or bubble containment casing to reduce underwater sound pressure levels during impact pile driving.

- Employing additional mitigations measures should noise monitoring suggest that the use of bubble curtains is not sufficient mitigation during pile installation.

Impact pile driving and vibratory pile driving using a bubble curtain were modelled and shown in the JASCO Underwater Noise Modelling Report (Appendix N of the EIS; Figure 19 and Table 12, and Figure 41 and Table 34, respectively) and identified the maximum radii of predicted underwater noise level effects.

In accordance to the Agency's potential conditions, the 160 dB re 1  $\mu$ Pa rms SPL behavioral threshold will be applied during impact piling using a bubble curtain. This sound contour level was predicted to extend a maximum distance of 840 m (REA) or 1 km (R95%). Marine mammal observers will be present during pile installation activities to observe (and potentially shut-down or delay activities) for harbour porpoise (and other marine mammals) detected over this distance.

Although abundance and population trends of harbour porpoise in the area are unknown, estimates by Best et al. (2015) indicate that there are approximately 3,704 (1,518 – 9,040) in the Queen Charlotte Basin in summer, with high densities found around Porcher Island, Prince Rupert and east of Haida Gwaii.

In light of the results from the 2015 data collected by PNW LNG, this suggests that, under the worst case scenario (i.e., where all individuals are affected), 7.15% of the local population (265 individuals of 3,704 within the Queen Charlotte Basin) might be affected. Further, if harbour porpoise are displaced from the habitat around Lelu Island for the 3 years of in-water work during construction, other suitable habitat appears to be available. Therefore, potential changes in harbour porpoise behaviour (i.e., avoidance behavior) attributed to project construction are not expected to affect the viability of the local population.

The availability of suitable alternative habitat means that changes in behavior are not expected to affect population viability, and certainty regarding availability of alternate habitat is increased by PNW's recent results, and the modelling presented by Best et al. (2015). Thus, our confidence that the Project is not likely to cause significant adverse environmental effects for harbour porpoise is also increased.

### **Conclusion**

The summary results of more complete statistical analyses for harbour porpoise that account for survey effort are provided in this memo.

Density surface predictions show high harbour porpoise density areas in the south of Digby Island, around Ridley Island, around Lelu Island and northeast of Stephens Island. The higher densities predicted at these four locations indicate that these areas are likely suitable habitat for harbour porpoise. Best et al. (2015) show that high summer densities (i.e., hotspots) of harbour porpoise are located in the coastal waters of Porcher Island (< 5 km) as well as east of Haida Gwaii (within approximately 100 km). Both studies suggest that potential suitable habitat is available to harbour porpoise.

Based on acoustic modelling using threshold levels (160 dB re 1  $\mu$ Pa rms SPL), availability of suitable alternative habitat and the Project's mitigation measures, underwater noise is not expected to affect the viability of the harbour porpoise population. PNWLNG is confident that the Project is not likely to cause significant adverse environmental effects to harbour porpoise.

Other projects considered in the cumulative effects assessment may affect some of the areas identified as suitable alternative habitat in the Prince Rupert area. However, the timing of the other projects is uncertain and the number and distribution of potential sites means that potential changes in harbour porpoise behavior are not expected to affect the viability of the population. Therefore, we remain confident that cumulative effects on harbour porpoise are also not likely to be significant.

Respectfully,  
<Original signed by>

Mike Lambert  
Head, Environmental and Regulatory Affairs  
Pacific NorthWest LNG

Attachments: Figures 1 – 11 Predicted Chatham Sound Harbour Porpoise Density  
Figure 12 Chatham Sound Survey Area A Marine Mammal Sightings  
Figure 13 Chatham Sound Survey Area B Marine Mammal Sightings

Cc: Al Magnan, DFO, Nanaimo