Appendix G
Marine Resources

Appendix G.1
Marine Resources
Information Request #1, 2 and 3

Pacific NorthWest LNG

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Catherine Ponsford
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Dear Ms. Ponsford:

Reference: Marine Resources Information Request # 1, # 2 and # 3

This letter responds to the request for Outstanding Information received from the Canadian Environmental Assessment (CEA) Agency on August 14, 2014.

Information Request #1

Government of Canada – Outstanding Information

DFO: *Location specific information on species utilization and dependency (species present, abundance, timing/seasonal variability, and their lifecycle dependency) on the areas indicated has been assumed, not verified. Verification of species utilization and dependency is needed to determine the significance of adverse environmental effects. Please provide this information.*

Information Request #2

Government of Canada – Outstanding Information

DFO: *For many species utilization of the Project Development Area has been assumed, not verified. Verification of species utilization of the Project Development Area is needed to determine the significance of adverse environmental effects. Please provide this information.*

Information Request #3

Government of Canada – Outstanding Information

DFO: *Species specific inventory at various life stages within the Marine Berth Dredge Area has not been conducted. Therefore assumptions of utilization have been made. The accuracy of these assumptions are unknown and therefore limits the ability to identify species important to First Nation groups. Provide verification of species specific inventory at various life stages within the Marine Berth Dredge Area and describe species important to Aboriginal groups.*

Pacific NorthWest PNW Limited Partnership (PNW LNG) – Response:

Effects of the Pacific NorthWest LNG Project (the Project) on marine resources were assessed in Section 13 of the Environmental Impact Statement (EIS). During the EIS review, Fisheries and Oceans Canada (DFO) requested additional information regarding species abundance, timing of key lifecycle stages, and species use and dependence on habitats potentially affected by the Project. The main area of concern raised by stakeholders, First Nation groups and DFO was attributed to the marine terminal dredge program, and the uncertainty associated with species presence and time of use in habitats potentially affected by the dredging and construction activities.

In order to provide DFO with additional supportive information, a comprehensive literature review of species dependencies within the project development area (PDA) was conducted and the results summarized in the technical memo "Species Use of Marine Habitats in the Local Assessment Area, 2014". This memo compiled field data with information from available literature to infer the relative abundance and species dependency on habitats within five primary areas: the marine terminal (including breakwaters and offsetting locations near Flora Bank), the materials off-loading facility (MOF), the pioneer dock, the access bridge, and the Brown Passage disposal at sea site.

Through continued discussions with stakeholders, First Nation groups and regulatory agencies, concerns remained regarding the marine terminal dredge program and potential risk to the fisheries resource associated with Flora and Agnew Banks. The marine terminal was subsequently redesigned and berths relocated (as discussed in Addendum #1), including elimination of the marine terminal dredge program. Based on this marine terminal design mitigation, there are large reductions in interactions between the Project and marine resources and habitats.

This response provides: (1) an update on the recent marine terminal design mitigation applicable to effects on marine habitats and species; (2) a schedule for initial baseline fisheries and habitats surveys within the project area; (3) a review of additional historic survey data obtained for the Lelu Island, Flora Bank and Kitson Island areas, and (4) an outline of an approach to ensure serious harm is adequately offset and the productivity of the fisheries resource within the PDA is maintained and/or improved.

Revised Project Marine Terminal Designs

Design mitigations to the marine trestle siting and layout have reduced the overall project area in the marine environment. With the new design, only construction of the MOF is expected to result in serious harm to commercial, recreational and Aboriginal (CRA) fisheries. The number of piles used in the marine terminal and project infrastructure has been reduced to 464 from 546; pile installation (vibratory construction technique for pile installation into soft sediments and bedrock) and potential scour and accretion around piles is expected to result in habitat effects around piles in soft sediment areas and will be addressed through construction mitigation measures and habitat offsetting to to address serious harm to CRA fish and forage fish species. Marine terminal effects on Agnew and Flora Bank sediments and habitats have been modelled as noted in response to Marine Resources IR #36 and #37. Monitoring of potential project related effects on habitats will be a component of the commitments of the Project and will be part of a long-term follow-up program.

PNW LNG has asked for, and received, guidance from DFO to clarify the recent changes and policy updates under the 2013 *Fisheries Act*. DFO has clarified that a project related *Fisheries Act* authorization and offsetting will be required for permanent serious harm to fish habitat used for dependent life processes by fish that are part of CRA fisheries and forage fish that support these fisheries. Based on the siting of the marine infrastructure and recent discussions with DFO, the predicted project related habitat impacts (permanent alteration or destruction) being considered as serious harm to marine fish habitat and requiring habitat offsetting include:

- Approximately 1,830 m^2 of intertidal eelgrass areas used as nursery and foraging habitats by juvenile salmonids, herring, surf smelt, sandlance and crab within the dredge area planned for the MOF.
- Approximately 6,800 m^2 of intertidal and subtidal hard bottom substrate with brown algae, used as nursery and foraging habitat by juvenile salmonids, herring, surf smelt, sandlance and crab within the dredge area planned for the MOF.
- Approximately 2,384 m^2 of open water / soft substrate area used as benthic habitat by Dungeness crab and local flatfish species around the southwest tower platform (infrastructure and scour armouring) for the marine terminal suspension bridge.

- Approximately 5,730 m^2 of open water / soft substrate area used as benthic habitat by Dungeness crab and local flatfish species around the southwest anchor block platform (infrastructure and scour armouring) for the marine terminal suspension bridge.
- Approximately 6,282 m^2 of open water / soft substrate areas used as benthic habitat by Dungeness crab, coonstripe shrimp and local flatfish species around individual and grouped piles (pile infrastructure and scour armouring) for the marine terminal jetty and berth.

A preliminary habitat offsetting plan has been developed and discussed with DFO, First Nations and stakeholders. Through appropriate offsetting, the overall fish productivity within the PDA will be maintained and no significant adverse effects associated with the Project are expected.

Fisheries and Habitat Survey Program

It is recognized that further fish and fish habitat data collected in the PDA will support development of mitigation strategies and measures during permitting. A work plan for a field monitoring program has been completed and has been implemented in November-December 2014. Two winter fisheries and habitat surveys are planned and will be expanded with input from DFO and First Nations. An additional work plan and surveys are planned during 2015 for spring, growing season, late summer and fall periods. Surveys will include crab and shrimp trapping, seining in intertidal and subtidal areas, and hydroacoustic and trawl surveys throughout the project area, including north and west of Lelu and Kitson Islands, Horsey Bank and Inverness Passage. Results of the fisheries surveys will be used to define construction mitigation measures and environmental management approaches prior to construction. Pre-construction surveys will be used as pre-condition assessment references as a component of follow-up monitoring through the Environmental Assessment Certificate and regulatory permitting. Reports will be provided to regulatory agencies and First Nations groups throughout the survey program.

Fish and Fish Habitat Use and Life History Dependence

Recent observations of habitat types and fish distribution are consistent with past studies conducted at Flora Bank and Lelu Island (Higgins and Schouwenburg 1973, Anderson 1986, Community Fisheries Development Center 2001, Gottesfeld et al. 2008, Faggetter 2009, Carr-Harris and Moore 2013, Faggetter 2013). Past studies observed small benthic fish species (sculpins, flatfish) and low numbers of juvenile crab and shrimp in soft sediment habitats outside areas of eelgrass on the northern edge of Flora Bank and outside the tidal current channel immediately adjacent to Lelu Island. Juvenile salmonids were observed during May – June smolt migrations in sites on Horsey Bank and in low-water channels with strong tidal currents, immediately adjacent to Lelu Island and outer Kitson Island. Salmonids were observed in greater numbers in more complex nearshore habitats of Chatham Sound islands, particularly in habitats with pronounced channels, tidal current and complex habitats (Higgins and Schouwenburg 1973, Anderson 1986, Community Fisheries Development Center 2001, Gottesfeld et al. 2008, Carr-Harris and Moore 2013). Plankton feeding sockeye (*Oncorhynchus nerka*) and pink (*O. gorbuscha*) salmon were observed in large schools outside Lelu Island and Flora Bank in areas of pronounced currents in offshore migratory pathways within the water column (Manzer 1969, Gottesfeld et al. 2008). Sockeye and pink salmon were noted to have limited abundance throughout the year with the exception of smolt migrations occurring over a two to three week period in the spring consistent with observations of smolt migrations and habitat use in the Fraser River (Johannes et al. 2012). Salmonids were not observed in soft sediment shallow depth areas of Agnew Bank and along the northern edge of Flora Bank (Anderson 1987). Chinook (*O. tshawytscha*), coho (*O. kisutch*) and chum salmon (*O. keta*) were observed at low density in catches within complex habitats in bays and eelgrass beds throughout Chatham Sound (Higgins and Schouwenburg 1973, Anderson 1986, Community Fisheries Development Center 2001, Carr-Harris and Moore 2013). Juvenile coho salmon often resided in areas of higher amphipod density throughout the growing season.

Based on existing and past fish and habitat surveys and fish, crab and shrimp distribution along the marine terminal and trestle alignment, there is little expectation of overlap or effects from the marine terminal with existing eelgrass habitats and populations of salmonids, crab, shrimp, flatfish and forage fish species. Past

survey observations of salmonids, shrimp and juvenile crab along Lelu Island and outside the immediate area of the trestle and marine terminal ranged in density from 0 to 2 individuals/m^2 (Higgins and Schouwenburg 1973, Anderson 1986, Community Fisheries Development Center 2001, Carr-Harris and Moore 2013, Appendix M Technical Data Report – Marine Resources). There is little or no expectation that project infrastructure and construction activities will overlap and have effects at the population level on salmonids, herring, eulachon, crab, shrimp or forage fish in soft sediment habitat areas.

Maintenance and Improvement of Fisheries Resources Productivity

Habitat offsetting concepts have been revised based on the new footprint for the redesigned marine terminal and relocated berths. The habitat offset measures are identified to counterbalance the loss of specific habitat types (eelgrass and hard substrate algae/kelp habitats) with similar enhanced habitats, where practical, and avoid and limit potential destruction of existing habitats associated with construction of offset habitats. Offset habitats will be carefully sited and fully designed with input from DFO and First Nation groups to maintain productivity of local fisheries. The offset plans will be presented in a detailed Request for Authorization under Section 35(2) of the *Fisheries Act* and will incorporate preferred offset plans refined for location, size, design feasibility, effectiveness and follow-up monitoring. The Project preference will be to create offset habitats in advance or parallel to project construction works, where possible.

The current potential habitat offsets include approximately 24,080 m^2 of constructed eelgrass and algae habitats comprising five sites constructed as benched raised beds, and sloping intertidal reefs both planted using donor stock (eelgrass and algae) including stock salvaged from the MOF intertidal dredge area if possible. Habitat offsets are conceptually sited at existing rocky intertidal bays south and west of the MOF. Planned eelgrass/algae beds will be planted on constructed benched and sloping shoreline areas using appropriate sediment types and texture as a growth medium for eelgrass and algae.

As discussed with DFO, the offset habitat sites selected on Lelu Island presently comprise widely distributed rocky subtidal and intertidal shorelines with some areas of soft sand substrate. The highest high water (HHW) intertidal area is comprised of silt-clay soft sediments. These habitats have been previously surveyed, and will be fully surveyed in early 2015 to develop detailed habitat construction designs. Present baseline resource survey results indicate the sites selected for offsetting have little or no complex habitats and have limited or no habitat use by crab, salmon and forage fish species. One of the five sites selected has abandoned vessels and debris in the intertidal area. This debris will be removed and the area restored to its natural function. The five conceptual sites selected will be refined through further field investigations to maximize success of the constructed offset habitats and maintain habitat productivity. No life process dependent habitats have been observed in these offset sites.

Summary

The concerns identified by regulatory agencies, First Nation groups and stakeholders regarding the marine terminal design and sediment dredge program have been addressed by the marine terminal design mitigation. Project changes (related to the marine infrastructure) are expected to result in a reduction of the project development area from 1,250,200 m2 (originally presented in the EIS) to 70,000 m2. Detailed fisheries and habitat surveys are planned from November 2014 through to 2015. Surveys will include crab and shrimp trapping, beach seining in intertidal and subtidal areas, and hydroacoustic and trawl surveys throughout the project area, including north and west of Lelu and Kitson Islands, Horsey Bank and Inverness Passage.

Of the overall project area, impacts to fish habitats potentially resulting in serious harm are considered localized to the MOF area and the southwest bridge tower and southwest bridge anchor areas. The habitats present within the MOF and at the bridge tower and anchor sites are considered common within the PDA, not used for specific CRA species as life process dependent habitats, and the work areas will be isolated during construction from habitats on Flora Bank.

Through the *Fisheries Act* Authorization permitting process, a detailed habitat offsetting plan will be developed and implemented to maintain the productivity of the fisheries resource in the PDA. The Project will therefore not result in a significant adverse effect to fish and fish habitat.

Closure

This letter provides the Outstanding Information requested by the Government of Canada. If you have any questions, please contact PNW LNG.

References

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