Dear Ms. Beaudet:

Re: Environment and Climate Change Canada's Response to the Review Panel's Information Request ECCC IR-08 for the Roberts Bank Terminal 2 Project

Thank you for your letter of October 12, 2017 in which the Review Panel requested additional information from Environment and Climate Change Canada (ECCC). ECCC's response to the Review Panel's information request (ECCC IR-08) is provided in the attached Annex.

I trust our response is helpful to the Review Panel and the environmental assessment of the Project. Please do not hesitate to contact me if you have any questions or concerns.

Yours sincerely,

Mary Taylor
A/Director General,
Environmental Protection Operations Directorate
Environment and Climate Change Canada’s Response to Panel Information Request 08 for the Roberts Bank Terminal 2 Project

Panel Information Request ECCC IR-08: Marine Vegetation: Wetland Assessment

Context:

In the context of the completeness review for the EIS and Marine Shipping Addendum for the proposed Project, the Canadian Environmental Assessment Agency required the following additional information from the Proponent regarding wetlands (CEAR Doc#271):

- #22 – provide a consolidated description of the location, size, type, species composition, and ecological functions of wetlands potentially affected by the Project; and
- #23 – provide a discussion of the implications of the Federal Policy on Wetland Conservation to the Project.

In its response to information requirements #22 and #23 (CEAR Doc#314), the Proponent stated that intertidal marsh is the only habitat type that meets the definition of a wetland under the Canadian Wetland Classification System within the local assessment area. Based on the assessment of effects on intertidal marsh as a marine vegetation sub-component in Section 11 of the EIS, the Proponent concluded that there was no residual adverse effect to intertidal marsh due to the small footprint of direct loss and the predicted increase in productivity with the Project. The Proponent also concluded that there were no adverse effects to the hydrological, biogeochemical, and habitat functions of intertidal marsh within the local assessment area. This conclusion was further substantiated by the Proponent on the basis of its offsetting framework outlined in Section 17 of the EIS.

In its sufficiency review of the Project, Environment and Climate Change Canada provided the Federal Policy on Wetland Conservation – Guidance for Application and Implementation in Environmental Assessment (CEAR Doc#581). The guidance outlined several considerations for the assessment of wetland functions, which include but are not limited to:

- the importance of wetland habitat types on a regional basis including, for example, at-risk communities and eelgrass beds;
- the need to account for temporary losses, of duration equal to or less than five years, as well as longer term losses; and
- the need to develop mitigation measures that are commensurate with the type of loss of function as well as with the time lag between the occurrence of the loss and potential recovery.

There were discrepancies between the information provided by the Proponent and the guidance provided by Environment and Climate Change Canada. For example, Environment and Climate Change Canada mentioned eelgrass beds, which were not included as a habitat type by the Proponent. Also, using predicted gains in productivity to justify that there will be no residual adverse effects on intertidal marsh did not account for temporary losses or for the time delay
between loss and recovery. It is also unclear how the Proponent’s offsetting plans would be commensurate with potential loss of wetlands since the Proponent did not develop offsets for marine vegetation sub-components other than macroalgae.

Information Request:

Provide advice on the adequacy of the Proponent’s effects assessment on wetlands, as presented in the response to information requirement #22 from the Canadian Environmental Assessment Agency (CEAR Doc#314).

Specifically:

- clarify which wetland habitat types within the local assessment area are subject to the Federal Policy on Wetland Conservation;
- advise on the adequacy of using predicted gains in productivity to justify the absence of residual effects on wetlands and wetland functions; and
- advise on the adequacy of the proposed offset plans to mitigate potential loss of wetlands and wetland functions.

Provide advice on the specific additional information requirements that are necessary to complete the assessment of effects from the proposed Project on wetlands and wetland functions.

Environment and Climate Change Canada’s (ECCC) Response

Provide advice on the adequacy of the Proponent’s effects assessment on wetlands, as presented in the response to information requirement #22 from the Canadian Environmental Assessment Agency (CEAR Doc#314).

It is ECCC’s view that the information provided in the Proponent’s effects assessment for the Roberts Bank Terminal 2 Project is not adequate. The following sections provide ECCC’s analysis, including recommendations for additional information that would help clarify the effects assessment.

- **Clarify which wetland habitat types within the local assessment area are subject to the Federal Policy on Wetland Conservation**

The Federal Policy on Wetland Conservation (FPWC) commits the Government of Canada to the goal of no net loss of wetland function on federal lands and waters or when an activity that may impact wetlands is subject to approvals under federal legislation. RBT2 is proposed on federal land and would be subject to approvals under federal legislation and as such would be subject to the FPWC.

It is ECCC’s view that the FPWC applies to all wetlands types within the Local Assessment Area (LAA). The Project is located in a geographic area where the documented continuing loss of

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1 ECCC’s Sufficiency Review of the RBT2 EIS, Appendix V, Federal Policy on Wetland Conservation, Guidance for Application and Implementation in Environmental Assessment.
wetlands has reached critical levels. Further, wetlands in the region of the Project have been designated as ecologically important and are therefore also subject to the FPWC.

ECCC partially relies on the Canadian Wetland Classification System (CWCS) to identify and classify wetlands across Canada (National Wetlands Working Group, 1997), including those for this Project. While the CWCS is a comprehensive document and uses ecological principles, it does not reflect wetland science advances in the twenty years since its publication. Thus, the department also uses primary literature and expert opinion to complement the CWCS’ wetlands identification and classification scheme.

The specific wetland habitat types within the LAA subject to the FFPWC are:
- Intertidal marsh, and
- Intertidal and shallow subtidal (to a depth of 2 meter) sand and mudflats.

Intertidal sand and mud flats are defined as wetlands using CWCS as follows:
- **Wetland Class:** *Shallow Water* (see page 55 of the CWCS for background information)
- **Wetland Form:**
  - *Estuarine Bay Water:* these wetlands are similar to tidal bay water wetlands but are situated in estuaries, or;
  - *Estuarine Delta Water:* these wetlands are associated with deltas and alluvial plains in estuaries
- **Wetland Type:** *Aquatic and Non-vegetated*

The above CWCS classification scheme does not explicitly include benthic microalgae. Therefore, the intertidal mud- and sand- flats of Roberts Bank would be classified as unvegetated in areas that support benthic microalgae (biofilm) and mats of cyanobacteria (biomat). Scientific understanding of mudflats as highly productive ecosystems is evolving, and classification systems, such as the CWCS, may not reflect the most recent science. In particular, mudflats are now widely understood to be highly productive wetland ecosystems (Passarelli, C et al., 2014, Underwood, GJC and J Kromkamp, 1999, Thornton, D et al. 2002, Burger, J. et al., 1984, Seitz, R.D. et al., 2014). Thus, ECCC considers biofilm and biomat areas as wetlands.

The Proponent, in section 11 of their Environmental Impact Statement (EIS), defines Marine Vegetation by five sub-components: eelgrass, intertidal marsh, macroalgae, biomat, and biofilm. Each sub-component is represented by specific species assemblages. The Roberts Bank Terminal 2 (RBT2) EIS identifies intertidal marsh as the one wetland type in the LAA; it does not include intertidal and shallow subtidal sand- and mud- flats in its wetlands assessment.

Further to the general information provided above on the CWCS, ECCC further identifies the following in relation to the LAA:
- The presence of macroalgae and eelgrass on the mud- and sandflats is indicative of Aquatic type tidal flat wetlands; and,

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2 ECCC’s Sufficiency Review of the RBT2 EIS, Appendix V, Federal Policy on Wetland Conservation, Guidance for Application and Implementation in Environmental Assessment (CEAR#581).
- The presence of biomat and biofilm on the mud- and sandflats is indicative of Non-vegetated type tidal flat wetlands.

As such, ECCC does not support the Proponent’s exclusion of tidal flats as wetlands in their wetlands assessment and is of the view that the Proponent’s effect assessment on wetlands is not adequate.

• **Advise on the adequacy of using predicted gains in productivity to justify the absence of residual effects on wetlands and wetland functions**

ECCC is of the view that it is not adequate, for this Project, to use predicted gains in productivity to justify the absence of residual effects on wetlands and wetland functions.

ECCC’s interpretation of the CWCS is that tidal flats constitute wetlands, and that the Marine Vegetation sub-components / species associated with these habitats are germane to the Panel’s question. More specifically, ECCC considers eelgrass (native and non-native) and macroalgae (Ulva, Rockweed, and Kelp) to be associated with Aquatic type intertidal flats; and Biofilm (marine and freshwater) and Biomat to be associated with Unvegetated type intertidal flats. Predicted changes in productive potential can be expected to vary depending on the sub-component/representative species.

For the Marine Vegetation valued component, the Proponent’s Ecosystem with Ecopath (EwE) model (an ecosystem and coastal geomorphic model used to characterize Project-related effects), predicts that net productivity of overall marine vegetation would slightly increase in the future with the Project, with specific increases or decreases differing among sub-components and species representatives.

As previously noted, the RBT2 EIS identifies intertidal marsh as the one wetland type in the LAA, and an overall increase in production potential is predicted for this sub-component. Other than for biofilm, there are instances where the Proponent’s lines of evidence regarding changes in productivity do not align with each other. These appear to reflect the differences in short-term versus long-term sub-component responses to the Project. For example, for intertidal marsh, productivity would decrease in the short-term due to direct mortality associated with the Project footprint; in the long-term, it is anticipated that marsh productivity would increase due to changes in salinity and sedimentation processes.

In relation to biofilm, the RBT2 EIS’s predicted productivity gains and losses vary across lines of evidence (e.g., positive in the EwE model, negative in the Shorebird Foraging Opportunity Model).

In relation to Coastal Birds Productivity, Table 15-11 indicates that residual effects were identified for diving birds only, with minor decreases or negligible changes in productivity for the

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3 RBT2 EIS, Section 11.0 – Marine Vegetation Assessment, 11.6.3.6 Summary of Marine Vegetation Productivity Changes
remaining sub-components. These were not carried for further characterization. The EwE model predicts increases in productivity for other Waterfowl, Western Sandpiper, Dunlin, and Peregrine Falcon, and decreases for the remaining sub-components and species representatives. It is unclear to ECC how these predicted productivity changes were weighted relative to other lines of evidence. For example, the EwE model predicts a 13% increase Western Sandpiper productivity, whereas the conclusion drawn for overall changes in productivity are ‘Minor Decrease’ (during construction) and ‘Negligible’ (during operation). Further, and in relation to shorebirds, ECC does not agree with RBT2 EIS’s characterization of residual effects for the reasons described in ECC’s Sufficiency Review of the Sufficiency Review of the Roberts Bank Terminal 2 Project Environmental Impact Statement and Marine Shipping Addendum (CEAR# 581).

A key consideration in the the RBT2 EIS is reconciling predicted productivity gains against concomitant habitat losses. The conclusion that predicted gains may offset habitat losses carries two risks. Firstly, there is a risk that modelled future wetland habitats may not perform as predicted. Roberts Bank is an ecologically complex system such that modelled future productive states need to be treated with caution. Secondly, despite any realized productivity gains, an absolute loss in habitat would contribute to the historical, on-going, and likely future cumulative loss of wetland habitat of the Fraser River Estuary. This loss may be beyond the Proponent’s control to remedy, and places added pressure on remaining habitats to support bird populations at existing levels into the future. For example, urban and industrial development pressures in the Regional Assessment Area suggest that opportunities for staging and wintering birds to access agricultural fields may decrease in the future. As such, contrary to the conclusion drawn in the RBT2 EIS regarding decreases in productivity in American Wigeon, loss of habitat may not be offset by agricultural fields in the future if the time horizons used for the EwE model are considered.

The incorporation of a model-based, ecosystem-level productivity approach to assess effects on migratory birds and associated habitats is a relatively new approach to federal environmental assessment, where estimating habitat loss has typically focused on an area of extent of valued ecosystems. The modelling of future productivity potential of the Roberts Bank ecosystem provides useful insights and offers an alternate approach for considering effects and mitigation options. Professional judgement has been used to arrive at conclusions where lines of evidence do not align.

Notwithstanding, ECC previously advised that there is a potentially high risk to shorebirds because the assessment did not account for lipid production by diatomaceous biofilm. If adverse impacts were to occur, they would be irreversible as no known mitigation exists to address the predicted changes in salinity. This has been identified as a critical factor influencing the distribution and abundance of specific lipid-rich diatom species in the LAA.

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4 Note that ECC also provided a perspective on cumulative wetland losses in its response to ECC IR-07 (CEAR# 1091)
5 RBT2 EIS, Section 15 – Coastal Bird Assessment, Table 15-11 Coastal Birds Productivity Summary (Prior to Mitigation) Based on Weight of Evidence
Advise on the adequacy of the proposed offset plans to mitigate potential loss of wetlands and wetland functions

ECCC advises that the proposed offset plans to mitigate loss of wetlands and wetland functions are not adequate.

The RBT2 EIS predicts that the Project would result in a direct, permanent loss of 55.6 ha of intertidal and 113.0 ha of subtidal habitat. An additional 17.4 ha of subtidal habitat would also be lost due to dredging or densification. The effects of changes in water quality, sedimentation and coastal processes, and biotic interactions were considered.

Onsite habitat offsetting is proposed to address predicted habitat losses. Conceptually, the offsetting measures would be to create intertidal marsh (15 ha), sandy gravel beach (4.5 ha), mudflat (4.5 ha), subtidal rock reef (2 ha), and eelgrass (3 ha). These measures are proposed for valued components where negative changes in predicted future productivity are measured as greater than 5% and described as a ‘Minor Decrease’. In relation to Marine Vegetation and Coastal Birds sub-components and representative species, offsetting is proposed to address such described effects for Rockweed, American Wigeon, Other Waterfowl, Brant, Western Grebe, and Surf Scoter.

Offsetting research suggests that offset or replacement wetland habitats have decreased biological structure (driven mostly by plant assemblages), and biogeochemical functioning (driven primarily by the storage of carbon in wetland soils), than in reference sites (Moreno-Mateos et al 2012, Turner et al 2001). These challenges have been documented in regulatory wetland regimes (see NRC 2001). A recent study assessing the status of marsh and riparian habitat compensation projects in the Fraser River Estuary found that the objective of no-net-loss of wetland functions was not achieved (Lievesley et al, 2016). Regarding offsetting implemented for the Deltaport Third Berth Project, the five year monitoring program indicates that challenges remain in achieving specific compensation objectives. For example, vegetation associated with the constructed marshes is poorly established in some areas and invasive plant colonization has been observed. Further, to address uncertainty in achieving habitat equivalency, and to address the time lags incurred before offsetting objectives are achieved, compensation ratios are typically recommended (Clark and Bradford 2014).

The RBT2 EIS has employed a productivity-based approach that does not reconcile with the general offsetting approach described in ECCC’s FPWC implementation guidance. In

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6 RBT2 EIS, Section 15.0 – Coastal Birds Assessment
7 RBT2 EIS, Section 17.0 – Mitigation for Marine Biophysical Valued Components; Appendix 17-A; and, Appendix 17-C
8 RBT2 EIS, Section 17.0 – Mitigation for Marine Biophysical Valued Components
9 Note that the sub-components and species representatives listed reflect those for which ECCC has a mandated interest. Refer to Section 17.0 – Mitigation for Marine Biophysical Valued Components, Table 17.3 Marine Biophysical Valued Components – Summary of Potential Project-related Changes in Productivity, for the complete list
particular, ECCC typically recommends compensation ratios to address losses in habitat area
because the use of habitat area as a metric aims to safeguard against incremental habitat loss.
It is also an explicit recognition of the technical limitations associated with replacing habitats,
both in terms of habitat morphology and functioning.

In its offsetting framework, the Proponent proposes that time lags were considered. ECCC
advises the following:
- As acknowledged in the RBT2 EIS, mitigation or offsetting measures are not available to
  avoid Project impacts to biofilm due to predicted changes in salinity.
- There is large uncertainty around whether mudflat habitat could be created that would
  support the lipid-rich biofilm important for shorebirds.
- While sandflat is less productive than other habitat types in the LAA, its use as a
  substrate to promote more productive habitats does suggest that some functions would
  be exchanged for others, notwithstanding that sandflat productivity was accounted for in
  the offsetting calculations.
- Proposed offsetting concepts do not address impacts to subtidal sandflat (to -2m)
  wetland habitat.

(2.) Provide advice on the specific additional information requirements that are necessary to
complete the assessment of effects from the proposed Project on wetlands and wetland
functions.

ECCC recommends the following information requirements in relation to the Proponent’s
wetland and wetland functions assessment:

- Include intertidal and shallow subtidal sand- and mudflats in the wetland and wetland
  functions assessment for the Project in order to ensure the impact assessment adequately
  characterizes wetlands and wetland functions.

- Explain how each line of evidence is weighted in drawing conclusions on changes in
  productivity to Coastal Bird sub-components in order to understand how these conclusions
  regarding changes in productivity were determined since they were used by the Proponent
  to determine offsetting measures for specific marine vegetation and coastal birds.

- Explain how productivity predictions were used to determine or guide the on-site habitat
  offsetting in terms of area. As described in ECCC guidance\(^\text{11}\), a ratio of 2:1 is generally
  recommended, with higher ratios reflecting site-specific conditions. Given the ecological
  context of the LAA, a minimum compensation ratio of greater than 2:1 should be considered.
  Given the productivity-based assessment, it is not clear how compensation ratios, as
  defined by area, was reached.

\(^{11}\) ECCC’s Sufficiency Review of the RBT2 EIS (CEAR#581)
Explain whether the offsetting framework aims to achieve a no-net-loss in productivity for each sub-group and species representatives. Based on Table 17-C2 of Appendix 17-C, it appears that this goal would not be achieved. This request seeks to understand the rationales where reductions in productivity for specific functional groups would occur due to proposed offsetting.

Explain how future productivity gains would help address the time lag issue (potentially upwards of ~50 years). It is ECCC’s view that time lags would remain despite the proposed consideration of implementing offsetting as soon as possible after Project construction. As reflected in ECCC’s guidance, a consideration of time lag issues should be included in the offsetting plan.

Explain whether there are areas available in the LAA such that offsetting would avoid potential negative habitat and functional trade-offs. As reflected in ECCC’s guidance, geographic proximity should be included in the offsetting plan.

Include a step-wise description of how the gains and losses of each functional group were calculated in section 17.0 – Mitigation for Marine Biophysical Valued Components. For example, based on Table 17-C2 of Appendix 17-C, it is not clear why the Project with on-site offsetting would result in a loss in productivity for American Wigeon when offsetting would in theory result in creation of habitats that have positive values for this species (mudflat bench, tidal marsh, sandy gravel beach, eelgrass) at the cost of habitat that have 0 value for this species (rocky intertidal, sandflats). This information is needed to determine how offsetting could be achieved as ECCC was unable to determine, based on the information provided, how offsetting gains and losses were calculated.

In addition to these aforementioned recommendations for additional information requirements, ECCC has identified an apparent error in the EIS that should be rectified:

Correct the error in Appendix 10-D – Habitat Productivity Assessment, 5.0 Summary, in relation to bird preference to habitats Table D-9. Specifically, the statement that birds are most abundant on mudflat benches does not appear to reflect the data reflected in Table D-9.

Information Sources for Response to ECCC IR-08:

- Environmental Impact Statement (EIS) Volume 3: Section 11, 17, Appendix 17-A, 17-B
- Additional Information Requirements of July 31, 2015 (CEAR Doc#271) and Proponent Response (CEAR Doc#314): IR22, IR23
References


