PREDICTED EFFECTS OF THE ROBERTS BANK TERMINAL 2 (RBT2) DEVELOPMENT ON WESTERN SANDPIPERS

Environment and Climate Change Canada (ECCC) has predicted that the RBT2 Project will remove the salinity trigger for high fatty acid production by diatoms in biofilm on Roberts Bank in the Fraser River Estuary and have species-level consequences for Western Sandpipers. Although these effects are deemed to be permanent, irreversible, continuous and unmitigable the Project has been approved.

Background:

Roberts Bank in the Fraser River Estuary and delta is internationally recognized as an important link in the chain of stopover sites along the Pacific Flyway used by Western Sandpipers to fly from their overwintering grounds as far south as Peru to their breeding areas in Alaska. Each spring, the entire species of Western Sandpipers migrate thousands of kilometers north to their breeding grounds in Alaska and an estimated 42 to 64% rely on Roberts Bank to refuel. The probability is that almost all Western Sandpipers will use Roberts Bank at least once in their approximate 8-year lifespan.

Western Sandpipers are specialist feeders on intertidal biofilm, a thin “slime” on the mud surface produced predominantly by microscopic plants called diatoms. Biofilm accounts for approximately 50% of the energy budget for migrating Western Sandpipers on Roberts Bank. Even more critically, long-chained polyunsaturated fatty acids (MUFA and PUFA) generated by the diatoms provide essential nutrients for successful migration that cannot be obtained from any other available food.

The man made island for RBT2 will restrain outflow from the Fraser River and reduce the salinity of water over the intertidal mudflats of Roberts Bank during the spring migration period. These salinity changes will impact both the quantity and quality (especially fatty acid production) of biofilm which will, in turn, negatively affect the migration success, reproduction and survival of Western Sandpipers.

Western Sandpiper Abundance:

Numbers of migrating Western Sandpipers stopping at Roberts Bank are assumed to mirror population-level trends for the entire species. Their abundance at Roberts Bank has fallen by approximately 23% between 2009 and 2019 (2.3% per year) as part of a longer-term decline (54% over 29 years or 0.9% per year). This rate of decline is concerning but has not reached the threshold rate that would trigger a COSEWIC Threatened status for the species* (Canham et al. 2021).

The decrease in salinity resulting from RBT2 is predicted to markedly accelerate the current rate of Western Sandpiper decline by compromising their access to biofilm and essential nutrients. The change would result in the decline exceeding the COSEWIC threshold for Threatened Status (A Wildlife Species that is likely to become listed as

endangered if nothing is done to reverse the factors leading to its extirpation or extinction) within approximately 10 years (30% decline). As there are no equivalent large intertidal mudflats in the Fraser River Estuary and delta that can be created to compensate for Roberts Bank, the loss of Roberts Bank in the chain of migratory stopover sites would effectively "hemorrhage" the entire species; the birds would need to fly at least an additional approximate 300 km from the nearest southerly stopover, a more minor site at Grays Harbor, Washington State, USA, directly to the Stikine River Estuary, Alaska, a distance of over 1,250 km, with a commensurate reduction in overall migration and breeding success.

Furthermore while the Vancouver Fraser Port Authority claims it will recreate biofilm that is lost and the mitigation measures in the Decision Statement allow for biofilm habitat creation or enhancement, ECCC scientists have stated categorically that:
1) There is not an equivalent muddy intertidal area available in the Fraser River estuary and delta that could compensate for the loss of the biofilm on Roberts Bank (i.e. Quantity)- plus,
2) regardless, any area(s) would need to be subject to a similar salinity "trigger" occurring on Roberts Bank during the April/May period such that fatty acid production would peak during the breeding migration of sandpipers (i.e. Quality and Availability). ECCC scientists are on public record with this statement during the assessment process for RBT2. ** (Kuwae, T et al 2021)

Conclusion:

The even more important story is that the effects from RBT2 are not just about Western Sandpipers – these shorebirds are the window into the ecological functioning of the Fraser River Estuary and reveal that the ecological integrity of the last remaining natural large intertidal bank will be compromised. Curtailing fatty acid production from intertidal biofilm on Roberts Bank will have cascading negative effects up the food web, impacting commercial fisheries, including salmon and crab, and apex predators such as Orca.

Reference

* Canham, R., S.A. Flemming, D.D. Hope and M.C. Drever. 2021. Sandpipers go with the flow: Correlations between estuarine conditions and shorebird abundance at an important stopover on the Pacific Flyway. Ecology and Evolution 11: 2828-2841.

** Kuwae, T., Elner, R.W., Amano, T., & Drever, M. C. (2021). Seven ecological and technical attributes for biofilm-based recovery of shorebird populations in intertidal flat ecosystems. Ecological Solutions and Evidence, 2, e12114. https://doi.org/10.1002/2688-8319.12114