Wallace Bay 3: Supplemental Information

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Prepared for:

Canadian Wildlife Service

Environment and Climate Change Canada

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Nature of Project and Method

Restoration

The main component of the restoration project will be a managed dyke removal. To reintroduce tidal influence to this impoundment, partial or complete dyke removal will allow reconnection of the tidal regime. Free flow of tidal water will provide conditions for salt marsh restoration to occur. Three attributes are critical to restoration success in a macro-tidal environment: reconnection of tidal channels, adequate sediment supply and suitable marsh elevation. Presence of a halophytic vegetation seedbank is also important to begin marsh colonization.

All work will occur outside of the sensitive wildlife lifecycle period. Before any earthworks will commence, the site will be drawn down to remove as much water as possible.

There are several factors considered in planning dyke breaches including: geospatial extent, geomorphology, tidal frame, hydrology, tidal channels, water velocity and current, sediment accretion rates, and subsidence rates. Breaches will allow reconnection of tidal hydrodynamics. Breaches will be designed with capacity to minimize excessive erosion and optimise sediment flocculation to increase sediment accretion rates.

Reconnection of tidal channels is also important to re-establish dynamic equilibrium and increase soil solidification rates on the marsh. The water control structure that regulates water levels on the project will be removed and the tidal channel left open. All infrastructure will be loaded on a truck, removed from the site and disposed of appropriately.

Monitoring Program

Ecological and hydro geomorphological monitoring will occur on both the restoration site and the reference site, located across the river, about 750 m north of WB3 (E 456634, N 5076156). Monitoring will follow Global Programme of Action Coalition (GPAC) protocol. The reference site, WB3-R, exhibits similar geomorphologic conditions to WB3. The area is located at the upper reach of a tidal tributary of Wallace Bay. The feature has two small watercourse inputs, resembling hydrology at WB3. WB3-R has one secondary tidal channel at the southern extent. The study area at WB3-R is 20 ha.

The monitoring protocol will use a suite of various tidal wetland indicators to gauge the ecosystem response to the restoration. Indicators include geospatial attributes, hydrology, soils, sediment accretion and vegetation, consistent with other tidal wetland restoration projects conducted to date.

DUC has existing relations with a number of local qualified research labs that specialize in coastal restoration projects. Our science staff works with specialists and students in all of the Maritime Provinces to produce applicable publications that inform future projects.

To conduct baseline monitoring, specific tools and instruments will need to be used. The most intensive being the installation of a Feldspar marker horizon. A Materials Safety Data Sheet is available for G200 HP feldspar product. It is determined to have no ecological adverse affects because it is made from a naturally occurring innocuous mineral. However, this technique will only be conducted if required for baseline data. No geological or biological collections will be required.

Post-restoration monitoring will require routine visits to the site in subsequent years. However, this can be timed to understand the vegetation establishment, while avoiding sensitive bird breeding and other critical timing issues related to wildlife.

Follow-ups

Monitoring efforts will be ongoing post-restoration to ensure the project is responding as anticipated. Once the schedule of monitoring visits is finalized, this information will be provided to Environment and Climate Change Canada.

Environmental Impact Mitigation

Applicable Acts and regulations

All earthwork will occur outside biologically sensitive times (Aug 15-March 30). The following Acts and regulations apply to the planned work:

- Environment & Climate Change Canada: Fish and fish habitat protection prohibitions under the *Fisheries Act*. Work will occur within the fish window and the NWA regulations with respect to migratory bird breeding (Aug. 15- Sept. 30), unless a variance or extension is requested.
- Environment & Climate Change Canada: *Canada Wildlife Act*
- Environment & Climate Change Canada: Environment Canada: *Migratory Birds Convention Act*
- *Species at Risk Act*
- The Federal Policy on Wetland Conservation, *Canadian Environmental Assessment Act*
- NS Wetland Conservation Policy, *Environment Act*
- NS Environment, Watercourse Alterations Standard
- *Impact Assessment Act*

All successful earthworks contractors are required to work under Environmental Protection Guidelines outlined in the contract. This includes, but not limited to, site commissioning and decommissioning, a sediment and erosion control plan, hazardous materials management, work adjacent to watercourses and site drainage.

Project duration and frequency of visits

DUC anticipates this project will span over 3-4 months. Non-invasive work, such as baseline monitoring data collection, field topographic surveys and other planning activities will likely take place within 1-2 weeks. The anticipated timeline for earthworks is likely to occur within 1-2 weeks. Frequency of visits will depend on worker schedules, but will likely be clumped by task (i.e. monitoring, surveys etc.). Earthworks will be focused on specific days to complete the job quickly in attempt to minimize the time heavy machinery is on site.

Earthworks

A 20 ton or larger excavator will be employed to remove dyke material and the water control structures. A tandem truck may also be used to transport dyke material and debris offsite as required. Machinery will work on the existing dyke footprint only.

Stakeholder consultation

Stakeholders holding marine shellfish leases in proximity to the project will be notified of project scope and its potential minimal impact to the shellfish lease.

Table 1. Wallace Bay 3 salt marsh restoration monitoring program. (Annual application indicated by B – both sites, AP – Wallace Bay 3, R – Wallace Bay 3 Reference Site)

Indicator	Parameters	Sampling Method	Monitoring Year				
			Post				
			Pre (2019)	1	2	3	5
Geospatial	Marsh surface elevation	Digital Elevation Model (DEM)	B				B
Hydrology	Tidal signal	Automated water level logger	WB			WB	WB
	Suspended sediment concentration	Bottle sample	WB	WB		WB	WB
Sediment	Sediment accretion	Marker horizons*	B	B	B	B	B
Vegetation	Composition	Point Intercept method (1 m^2 plots)	B	B	B	B	B
	Abundance/distribution						
	Height						
	Habitat map	Aerial photography	B	WB	WB		WB

*This parameter will be collected and analysed if required by regulators.

Appendix

Photos

Photo 1. Wallace Bay 3 aerial perspective east-northeast.

Photo 2. Wallace Bay 3 segment 1 perspective southeast.

Photo 3. Condition of Wallace Bay 3 outer dyke (northeast).

Photo 4. Wallace Bay 3 Segment 2 perspective southeast from the cross-dyke.

Photo 5. Water control structure regulating water in Wallace Bay 3 Segment 1.