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To: Krista Englund, Regional Manager of Environmental Services for SCR, Ministry of Transportation and Infrastructure

Subject: **Trout Lake Creek (Site DF4) Pacific Water Shrew Habitat Evaluation**

1.0 INTRODUCTION

Damage to the Trout Lake Creek crossing of Hick's Lake Road (referred to as Site DF4) occurred as a result of flooding associated with the November 2021 atmospheric river. Site DF4 is located at the southern extent of Hick's Lake Road (just north of the intersection with Rockwell Drive) where the Ministry of Transportation and Infrastructure (MOTI) right-of-way bisects Sasquatch Provincial Park at the southeast extent of Harrison Lake near Harrison Hot Springs (Figure 1).

The 2021 flood resulted in channel embankment erosion and caused Trout Lake Creek to top its banks and wash out a temporary railcar bridge (installed following a previous flood event in 2020). Emergency works included the removal of flood debris and the washed-out bridge, installation of four 1,500 mm diameter High-Density Polyethylene (HDPE) culverts under the reconstructed Hick's Lake Road, and associated riprap erosion protection. MOTI intends to replace the culverts with a new clear-span bridge as the permanent crossing which will include a temporary detour crossing.

MOTI retained Hatfield Consultants (Hatfield) to conduct a Pacific water shrew (*Sorex bendirii*; hereafter referred to as PWS) habitat assessment to evaluate the need for a PWS salvage prior to construction activities.

This memorandum outlines the results of the habitat assessment for PWS and provides recommendations to mitigate impacts to PWS associated with construction activities.

Figure 1 Project location map.



2.0 REGULATORY CONTEXT

PWS has been listed as Endangered on Schedule 1 of the federal *Species at Risk Act* (2002, c. 29) (SARA) since 2007. As per section 37 of SARA a recovery strategy for PWS is required. In 2014, under section 44 of SARA, the provincial Recovery Strategy for Pacific Water Shrew in British Columbia¹ was adopted by the Government of Canada². Site DF4 does not overlap with federal critical habitat for PWS. The closest delineated critical habitat polygon is Miami Slough (ID# 141_10) located in Harrison Hot Springs, about 4.7 km southwest of Site DF4.

The *Wildlife Act* (RSBC 1996, c. 488) provides for the conservation and management of wildlife and wildlife habitats in BC. PWS are provincially Red-listed³ meaning they are at risk of being lost (i.e., extirpated, endangered, or threatened)

Best Management Practices (BMPs) were created for the Pacific Water Shrew Recovery Team with the intention of maintaining and incurring no further loss of current PWS populations and restoring the historical range of PWS where suitable/connecting habitat exists or can be restored⁴. The BMPs provide guidance for environmental assessments and for development activities within PWS habitat.

3.0 METHODS

The PWS habitat evaluation included an assessment of the ecosystem classification, soil, vegetation, and species-specific habitat features with consideration of the guidance and methods provided in:

- Standard for Terrestrial Ecosystem Mapping in BC⁵;
- British Columbia Wildlife Habitat Rating Standards⁶;
- Best Management Practice Guidelines for Pacific Water Shrew in Urban and Rural Areas⁴;
- Field Manual for Describing Terrestrial Ecosystems⁷; and
- A Field Guide for Site Identification and Interpretation for the Vancouver Forest Region⁸.

¹ Pacific Water Shrew Recovery Team. 2009. Recovery Strategy for the Pacific Water Shrew (*Sorex bendirii*) in British Columbia. Prepared for the B.C. Ministry of Environment, Victoria, BC. 27 pp.

² Environment Canada. 2014. Recovery Strategy for the Pacific Water Shrew (*Sorex bendirii*) in Canada. Species at Risk Act Recovery Strategy Series. Environment Canada, Ottawa. 35 pp. + Appendix.

³ B.C. Conservation Data Centre. 2023. BC Species and Ecosystems Explorer. B.C. Government, Victoria B.C. Available: <http://a100.gov.bc.ca/pub/eswp/>. October 16, 2023.

⁴ Craig, V.J., R.G. Vennesland and K.E. Welstead. 2010. Best Management Practices for Pacific Water Shrew in Urban and Rural Areas. Version May 2010. Prepared for the Pacific Water Shrew Recovery Team. Pp. 41

⁵ Resource Inventory Standards Committee. 1998. Standards for Terrestrial Ecosystem Mapping in British Columbia. Prepared by the Ecosystem Working Group, Terrestrial Ecosystem Task Force. Pp 100.

⁶ Resource Inventory Standards Committee. 1999. British Columbia Wildlife Habitat Rating Standards. Prepared by the Ministry of Environment, Lands, and Parks, Resource Inventory Branch. Pp 97.

⁷ BC Ministry of Forests and Rance and BC Ministry of Environment. 2010. Field Manual for Describing Terrestrial Ecosystems, 2nd ed. Land Management Handbook Number 25. Crown Publications, Victoria, BC. Pp 33 + Appendix.

⁸ Green, R. N., and K. Klinka. 1994. A Field Guide to Site Identification and Interpretation for the Vancouver Forest Region. Land Management Handbook Number 28. Crown Publications, Victoria, BC. Pp 249 + Appendix.

The site series and structural stage of the area is needed to use the provincial PWS habitat suitability model⁹. The model considers habitat within 100 m of water when assigning a rating to a given site series and structural stage. The study area in which the assessment took place is defined by the forested landscape within 100 m of Trout Lake Creek, 30 m upstream and downstream of Hick's Lake Road. The construction footprint of Site DF4 is defined by the clearing and grubbing limits within the study area.

4.0 RESULTS

Results of the field assessment are provided for both the study area, and the proposed construction footprint which is located within the study area.

4.1 STUDY AREA

The study area is characterized by a mixed forest dominated by western redcedar (*Thuja plicata*), western hemlock (*Tsuga heterophylla*), and bigleaf maple (*Acer macrophyllum*) (Figure 2). On average, trees range from approximately 35 to 50 cm diameter at breast height and canopy closure is approximately 40-60%. The understory is open with little herbaceous cover aside from sword fern (*Polystichum munitum*). Additional understory species include vine maple (*Acer circinatum*) and beaked hazelnut (*Corylus cornuta*). Coarse woody debris of varying sizes and decay classes are present but not abundant. Forests on the east and west sides of Hick's Lake Road displayed similar habitat characteristics and species presence; however, the forest on the east side of the road had fewer deciduous trees in the canopy resulting in little leaf litter on the forest floor. This forest on the east side of the road did, however, have slightly more understory diversity and abundant moss coverage compared to the forest on the west side of the road.

The study area contains forest in structural stage 5 (i.e., Young Forest) and biogeoclimatic site series characteristics of the Coastal Western hemlock dry maritime Douglas-fir – sword fern (CWHdm/04) and coastal western hemlock dry maritime Western red-cedar – sword fern (CWHdm/05), with moderately dry to slightly dry soil moisture and rich to very rich soil nutrients. These site series are Red-listed³ in forest ecosystems in the Mature Forest and Old Forest structural stages.

The PWS habitat suitability model⁹ rates CWHdm/04 and CWHdm/05 as nil (i.e., no habitat provided), but states that sites within 100 m of water should receive a minimum rating of low. Accordingly, the habitat suitability rating for PWS in the study area is low. PWS are associated with riparian habitats with abundant coarse woody debris and soft-bodied invertebrates². Additional important habitat features are diverse understory, heavy shrub cover, moist connecting habitat, and a functioning riparian ecosystem². The study area's lack of these important features supports the low suitability rating.

⁹ Craig VJ. 2007a. Species account and preliminary habitat ratings for Pacific water shrew (*Sorex bendirii*) using TEM Data v. 2. Draft. Surrey (BC): Ministry of Environment.

Figure 2 Photographs of the study area (October 13, 2023).



Photo 1 Forested habitat in the study area west of Hick's Lake Road.

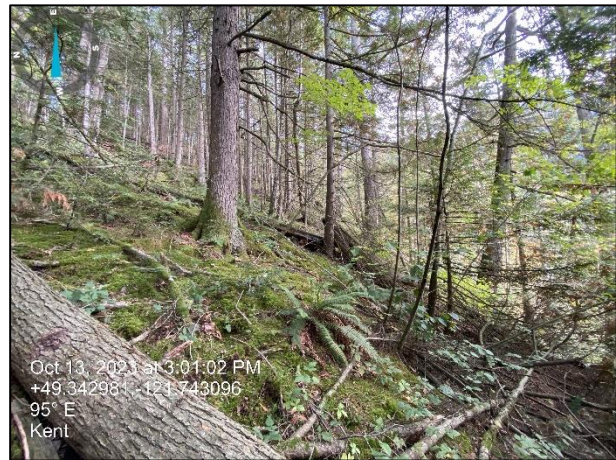


Photo 2 Forested habitat in the study area east of Hick's Lake Road.

4.2 CONSTRUCTION FOOTPRINT

As the construction footprint falls within the study area, the same site series apply. The construction footprint is primarily comprised of riprap, roadside cut and fill slopes, and a roadside maintenance corridor but does also extend into forested areas adjacent to Trout Lake Creek (Figure 3). There is little transition between aquatic and forested habitat and the riparian area is characterized primarily by riprap scour protection which almost immediately transitions to forest, cut/fill slopes, or Hick's Lake Road. Forested portions of the construction footprint are functionally the same as what is described for the study area (see Photos 1 and 2 in Figure 3).

The structural stage of the disturbed landscape (i.e., riprap and roadside) is low shrub influenced by anthropogenic modifications (see Photos 2 and 3 Figure 3). Vegetation growth here is less than 2 m tall and is comprised of typical pioneer species including red alder (*Alnus rubra*), black cottonwood, thimbleberry (*Rubus parviflorus*), and herbaceous weedy species (e.g., dandelion, clovers, grasses, and plantain). Non-native species such as Himalayan blackberry (*Rubus armeniacus*), bitter dock (*Rumex obtusifolius*), butterfly bush (*Buddleja davidii*), and wall lettuce (*Mycelis muralis*) were observed in the disturbed areas. There is no crown closure over the disturbed landscape. Minimal coarse woody debris is present and is mostly contained in areas directly adjacent to the creek.

While Trout Lake Creek may sustain aquatic invertebrates that PWS rely on for foraging, the hardened banks, road and associated maintenance corridor, and limited cover do not provide the appropriate habitat necessary for PWS to carry out their basic life requirements. As with the study area, habitat suitability for PWS is considered low (not nil) because of the proximity of water.

Figure 3 Photographs of the construction footprint (October 13, 2023).



Photo 1 Example of forested area east of Hick’s Lake Road within the construction footprint.



Photo 2 Example of roadside and forested area west of Hick’s Lake road within the construction footprint.



Photo 3 Trout Lake Creek and riparian area in the construction footprint east of Hick’s Lake Road.



Photo 4 Trout Lake Creek and riparian area in the construction footprint west of Hick’s Lake Road.

5.0 RECOMMENDATIONS

There is a low likelihood of PWS being present given the lack of suitable habitat at Site DF4; therefore, a PWS salvage is not recommended. The provincial BMPs⁴ recommend sampling for the presence of PWS in habitat with a low rating; however, it is not feasible to conduct a PWS survey/salvage at Site DF4 according to the BMPs which instructs the installation of pitfall traps within 5 m of water. The riprap armoring along the banks and within 5 m of Trout Lake Creek would make this impractical. The intact forest adjacent to the construction footprint can provide incidental wildlife refuge during construction.

6.0 CLOSURE

A PWS habitat evaluation was conducted at Site DF4 and found low suitability for PWS. A PWS salvage is not recommended.

If you have any questions, please do not hesitate to contact the undersigned.

Sincerely,



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