

## Memorandum

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**Attention** Molly Clarkson, Resource Conservation Manager, Gulf Islands National Park Reserve  
**CC** Sibylla Helms (Parks Canada) and Ministry of Transportation and Infrastructure: Chad Bengert (McElhaney), Leigh Holt (WSP)

**From** Charlie Palmer, P.Biol., R.P.Bio., Ausenco (for Ministry of Transportation and Infrastructure)  
**Subject** Canal Road (MoTI ref 18102) – February-March 2023 Site Survey Results  
**Date** 12 May 2023  
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**Document Ref:** 103041-07

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### Project Background

Following extreme rainfall events in November 2021 a section of Canal Road on South Pender Island experienced significant damage and is subject to potential landslide or slope failure. The current roadway is unstable and was not built for long-term sustainable use or current traffic volumes. Before the BC Ministry of Transportation and Infrastructure (MOTI) can realign a portion of Canal Road to provide a safe and stable roadway and to minimize the possibility of future failures occurring, planning and approvals are necessary to manage the impacts of the Project on habitat, including land in Gulf Islands National Park Reserve.

### Regulatory Situation

Approvals for activities associated with the Project have been issued by Parks Canada, with Conditions requiring management or mitigation actions:

- Parks Canada Decision Record (Parks Canada Basic Impact (BIA) Assessment Determination per s.82 of the *Impact Assessment Act*), 15 March 2023.
- Parks Canada *Species at Risk Act* s.73 Permit Decision Tool approval 15 March 2023.
- Parks Canada Research and Collections Permit GINP-2022-44623 15 March 2023
- Ministry of Water Land and Resource Stewardship Fish and Wildlife permit under the *Wildlife Act* (SU23-788728),

### Purpose

This memorandum (including the attached figure and JHEC memorandum) addresses requirements for biological studies to better understand and or to manage potential Project impacts on:

**Sharp-tailed Snake (*Contia tenuis*)** – salvage and relocation of individuals ahead of tree-clearing. This memorandum meets a mitigation requirement as per the Decision Record, and reporting per the requirement of the *Species at Risk Act* Permit Decision Tool.

**Western Screech Owl (*Megascops kenicottii*)** – studies to understand presence as per requirements of the Decision Record (i.e., commitments in 10.11 in the BIA application)

**Bats, specifically little brown myotis (*Myotis lucifugus*)** – studies to understand presence as per requirements in the Decision Record (i.e., commitments in 10.11 in the BIA application)

## Sharp-tailed Snake

Sharp-tailed snake are a *Species at Risk Act* listed species. Potential Project-related impacts suggested the need for salvage ahead of tree clearing (initially planned for early April 2023) and relocation into unaffected nearby habitat. Salvage and relocation were required by the Decision Record, and permitted by the *Species at Risk Act* Permit Decision Tool (federal land)<sup>1</sup> and *Wildlife Act* Permit (provincial land)<sup>2</sup>.

A Parks Canada issued Research and Collection Permit<sup>3</sup> guides and permitted the survey and collection methods within the work zone (**Figure 1**). Survey and collection were conducted by trained and experienced biologists, as described in the attached memorandum (Hobbs 2023), and centered around inspection of rotting stumps / nurse logs as per mitigation in section 10.11.14 in the BIA. The timing of sharp-tailed snake salvages was determined after biologists verified snake emergence from brumation at a nearby private land site of known occupation. Observation records relative to date and temperature recorded by the landowner at this nearby site confirm that the timing of salvage was within the optimum date and temperature ranges when most sharp-tailed snake detections have occurred (94 detections between 2015 and 2023).

No sharp-tailed snake activity was observed at the site. The lack of observations is likely explained by the absence of prey items.

The method employed for this work was predicated on tree clearing being conducted in early April 2023. A delay in the construction schedule has forced the timing for tree clearing to August. With respect to the Parks Canada Decision Record mitigation requirements (as per the BIA) for sharp-tailed snake, the change in timing and the results of survey and salvage work suggest the following mitigation is necessary to manage project impacts with sharp-tailed snake and to achieve no significant adverse impacts:

- a repeat, one-day-long survey and salvage of the work zone (per the approved methods) is recommended one week ahead of August 2023 tree clearing. Such mitigation would be consistent with the existing approvals to re-survey the work zone after any substantive period of non-activity (i.e., as was to be done between tree felling and yarding / grubbing).
- exclusion fencing to prevent re-establishment by snakes from outside the exclusion area into the work zone will be unnecessary if the pre-tree clearing survey results continue to show no snakes. Absence of snakes, low habitat suitability within and around the work zone and low motility of snakes would be the rationale for this recommendation, as it was for the previously approved request to vary this requirement in (30 April 2023 approval from Parks Canada). Therefore, we request permission from Parks Canada to not install exclusion fences when tree clearing activity is initiated in August 2023 (precise timing still to be confirmed) if no snakes are observed during the survey.

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<sup>1</sup> GINPR23-01 SARA Permit Decision Tool 15 March 2023

<sup>2</sup> *Wildlife Act* permit application tracking number 100405556

<sup>3</sup> GINP-2022-44623 Research and Collection Permit

## Western Screech Owl

Western screech owl call-play-back surveys were conducted in the work zone (**Figure 1**) as per recommended methods for British Columbia (Resource Inventory Standards Committee). See the attached memorandum (Hobbs 2023) for details on methods. No screech owls were observed (i.e., heard), and with consideration for the nesting period for this species, which will be complete before tree clearing and construction occurs (Campbell et.al. 1990<sup>4</sup>), no further surveys are considered necessary.

The requirements of the Decision Record / BIA for this species are considered complete.

## Bats, Especially Little Brown Myotis

Protection of individuals of little brown myotis and other bats is provided, with mitigation as listed in the Parks Canada Decision Record / BIA (section 10.11.3-4, 10, 11). Mitigation is centered around avoidance of high intensity work within key periods for bats, specifically the maternity period May to late-August (MoE 2016<sup>5</sup>). Mitigation for any high intensity activities (e.g., blasting and tree clearing) that are conducted in this period is also provided, specifically, surveys to identify the presence of habitat features that might host bats in this period and limits on blasting.

Project construction, including high-intensity activities, was initially anticipated for early April. Surveys were conducted with this timing assumption, focussing on the potential for roosting and to monitor winter bat activity levels and gain insight into potential hibernation locations. Construction is now anticipated to start in August. This timing aims to avoid potential impacts on maternity roosts (if present), because after mid-August there are low chances of maternity activity. August to June is outside the core maternity period for most of BC's resident bat species, including little brown myotis. Information from the surveys, described below, provides information to inform, interpret and manage risks.

Bat maternity roosts are habitat features used by pregnant and nursing adult female bats and pre-volant (non-flying) juvenile bats. A suitable maternity roost site has high stable temperatures (30-55°) and humidity, which generally for little brown myotis is confined to cavities in trees, or to artificial human structures (attics, disused buildings, bat "houses"). Habitat surveys in the project area did not identify any features that possessed key biophysical attributes typical of little brown myotis maternity roosts. Suitable anthropogenic structures are absent at the site, and the tree habitat features present at the site do not have sufficient solar insulation (energy supply) and thermal momentum (energy retention) to provide the necessary thermal conditions for maternity use by little brown myotis. Bats were present, as confirmed by nocturnal acoustic (remote sensing) surveys. Timing of the observations suggest that such activity was not associated with hibernation use, instead this activity is most likely attributed to transient or feeding activity by bats.

Extrapolation of these results to maternity roosting potential, particularly the habitat assessment, informs the BIA requirements. Two factors in combination suggest that risk of impact from high-intensity activities such as rock blasting on little brown myotis maternity roosting will be avoided:

- (i) Tree clearing will not occur during the sensitive maternity roosting period.
- (ii) There is low potential for maternity habitat features within the Project area

Given the above interpretation, there is limited value in developing a noise and vibration monitoring program for blasting activities per the BIA (section 10.11.10, 11). Trees within the potentially affected area were found to be unsuitable for maternity roost use, with no features identified at which such monitoring would

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<sup>4</sup> Campbell et.al. 1990. Birds of British Columbia Vol II, page 359, August is outside / end of the core breeding period.

<sup>5</sup> B.C. Ministry of Environment. 2016. Best Management Practices for Bats in British Columbia, Chapter 1: Introduction to the Bats of British Columbia. B.C. Ministry of Environment, Victoria, BC. 108 pp

be useful, and construction timing outside of the most sensitive period for maternity use further suggests limited utility in a noise and vibration monitoring program.

Mitigation (compensation) for potential tree roosting bat habitat loss includes the installation of a vertical habitat feature (a relocated danger tree).

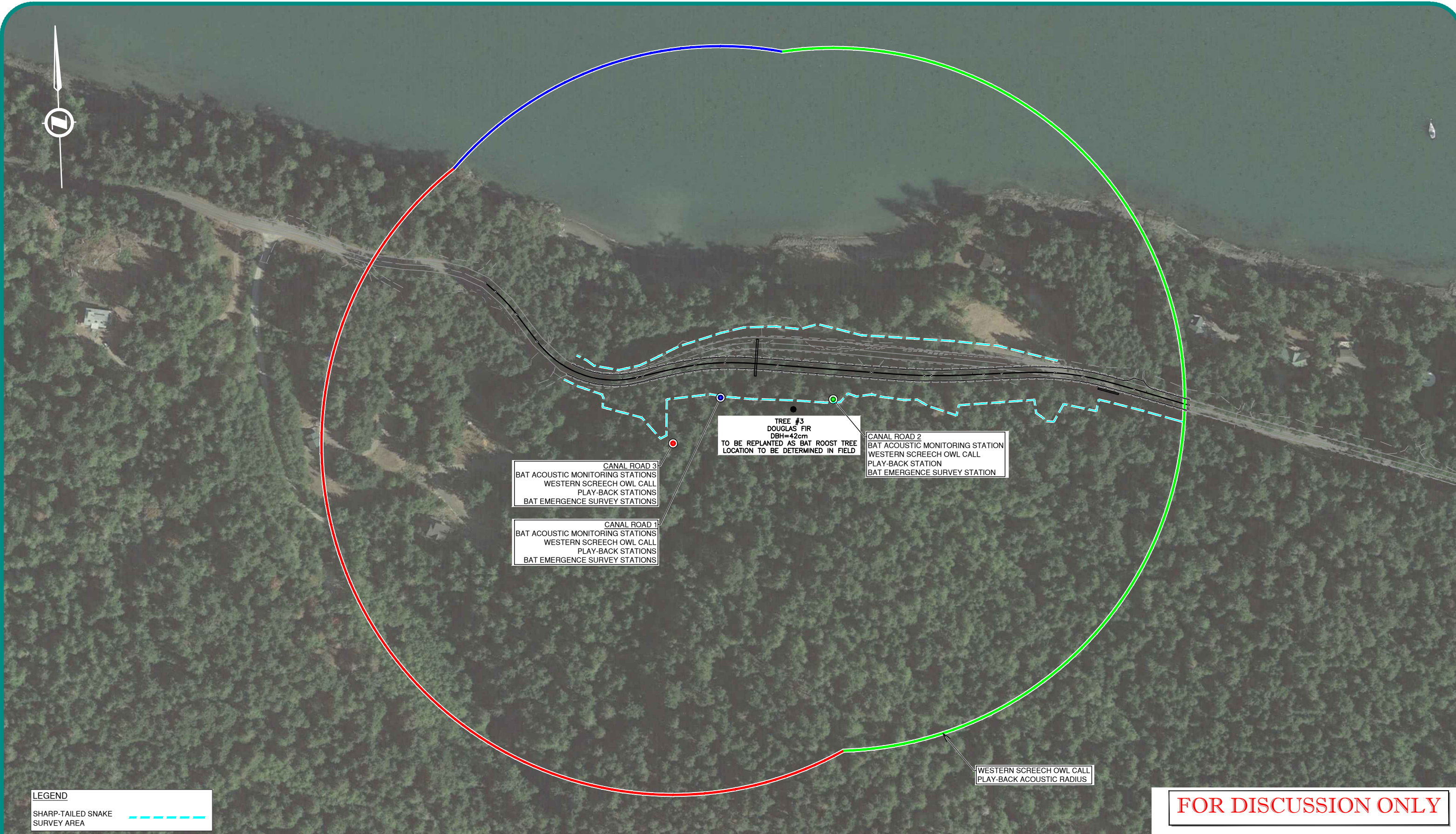
### **Other Biota**

During the conduct of survey work for western screech owl the potential for cavity nests, particularly for pileated woodpecker (*Dryocopus pileatus*), was evaluated in the work zone. No suitable nest cavities with sufficient depth were observed (see attached Hobbs 2023 memorandum attached). Evidence of foraging was noted (**Figure 1**).

Immediately prior to tree-clearing, and as per the requirements of the Decision Record / BIA, surveys will be conducted; for compliance with the BC *Wildlife Act* (s.37), the *Migratory Birds Convention Act*, and the Migratory Bird Regulations 2022 (schedule 1). Variously these requirements provide protection for actively used nests, and for certain species, nests that are protected year-round whether active or not. The pre-tree clearing surveys will be conducted according to a protocol that will be the subject of a future Parks Canada review and approval.



Plot DATE: 2023/05/10 X:\2121\2121-00865-09 Mot1 - Canal Road Remediation\10.0 DRAWINGS\10.3 Engineering\CanalRoad\DrawingProduction\3300\_SARAssessment.dwg (LAST SAVED: Gharoon)



CANAL ROAD 3  
BAT ACOUSTIC MONITORING STATIONS  
WESTERN SCREECH OWL CALL  
PLAY-BACK STATIONS  
BAT EMERGENCE SURVEY STATIONS

CANAL ROAD 1  
BAT ACOUSTIC MONITORING STATIONS  
WESTERN SCREECH OWL CALL  
PLAY-BACK STATIONS  
BAT EMERGENCE SURVEY STATIONS

TREE #3  
DOUGLAS FIR  
DBH=42cm  
TO BE REPLANTED AS BAT ROOST TREE  
LOCATION TO BE DETERMINED IN FIELD

CANAL ROAD 2  
BAT ACOUSTIC MONITORING STATION  
WESTERN SCREECH OWL CALL  
PLAY-BACK STATION  
BAT EMERGENCE SURVEY STATION

WESTERN SCREECH OWL CALL  
PLAY-BACK ACOUSTIC RADIUS

**LEGEND**  
SHARP-TAILED SNAKE  
SURVEY AREA

**FOR DISCUSSION ONLY**

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### CANAL ROAD DIP SLIDE - SOUTH PENDER ISLAND SAR ASSESSMENTS

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AND INFRASTRUCTURE  
SOUTH COAST REGION  
HIGHWAY ENGINEERING AND GEOMATICS



SCALE: 0 10 1:1000 50m

PROJECT NUMBER: 18102-000 DATE: 2023-05-05  
DRAWING NUMBER: SK-SARASSESSMENT REV:



# MEMORANDUM

<b>Date:</b>	March 31, 2023
<b>To:</b>	<b>Charlie Palmer (Ausenco)</b>
<b>From:</b>	Jared Hobbs, M.Sc., R.P.Bio.
<b>File:</b>	JHEC-2023-9
<b>Re:</b>	<b>Bat activity assessment and roosting potential at the Canal Road Dip Slide Project, Pender Island, BC.</b>

J Hobbs Ecological Consulting Ltd. (JHEC) is submitting this memorandum (memo) to Charlie Palmer, National Director Environmental Planning and Management, Ausenco. In completion of this work JHEC provided site assessment with respect to bat roosting potential and bat activity at the Canal Road Slide Project, Pender Island, BC (the “Site”).

This Work was completed by J Hobbs Ecological Consulting Ltd. (“JHEC”) acting under contract to Ausenco (the “Client”), as a deliverable for project number JHEC-2023-9. This memo has been prepared by JHEC, based on information provided by the Client, and for the sole benefit and use by the Client. In performing this Work, JHEC has relied in good faith on information provided by others and has assumed that the information provided by those individuals is both complete and accurate. The findings presented herein should be considered within the context of the scope of work and project terms of reference; further, the findings are time sensitive and are considered valid only at the time the memo was produced. The conclusions or recommendations contained in this memo are based upon the applicable guidelines, regulations, and legislation existing at the time the memo was produced; any changes in the regulatory regime may alter the conclusions or recommendations herein.

## BACKGROUND

This memo covers three focal taxa identified by Parks Canada Agency (PCA) to be of concern, and with potential to occur at the Site, including: Western Screech-owl (*Megascops kennicottii kennicottii*), Sharp-tailed snake (*Contia tenuis*) and several species of bats (i.e., Chiropterans). The objectives, methods of assessment and results are provided separately for each focal taxon.

The Site occurs in the Coastal Douglas Fir moist maritime (CDFmm) Biogeoclimatic (BEC) zone on South Pender Island. The Site includes an area of anticipated impact (from proposed road improvements) and is situated on a north aspect steeply sloped coniferous forested area on the north face of Mount Norman. The forested habitat at the site is described in the 2018 Vegetation Resource Inventory (VRI) database as a maturing Age Class 6 (projected age of 108 years) western redcedar (*Thuja plicata*) forest. There are no natural forest openings, low vertical complexity (i.e., even aged stand), very few (legacy) mature trees, dense crown closure (55%), and virtually no understory layer. There is a dense herbaceous layer along the road edge that is comprised primarily of Salal (*Gaultheria shallon*) and Sword Fern (*Polystichum munitum*). As is typical of coniferous forests in this age class, and in this BEC zone, the understory is suppressed by a dominant, dense, single-layered canopy with few openings and diminished biodiversity (fauna and flora).

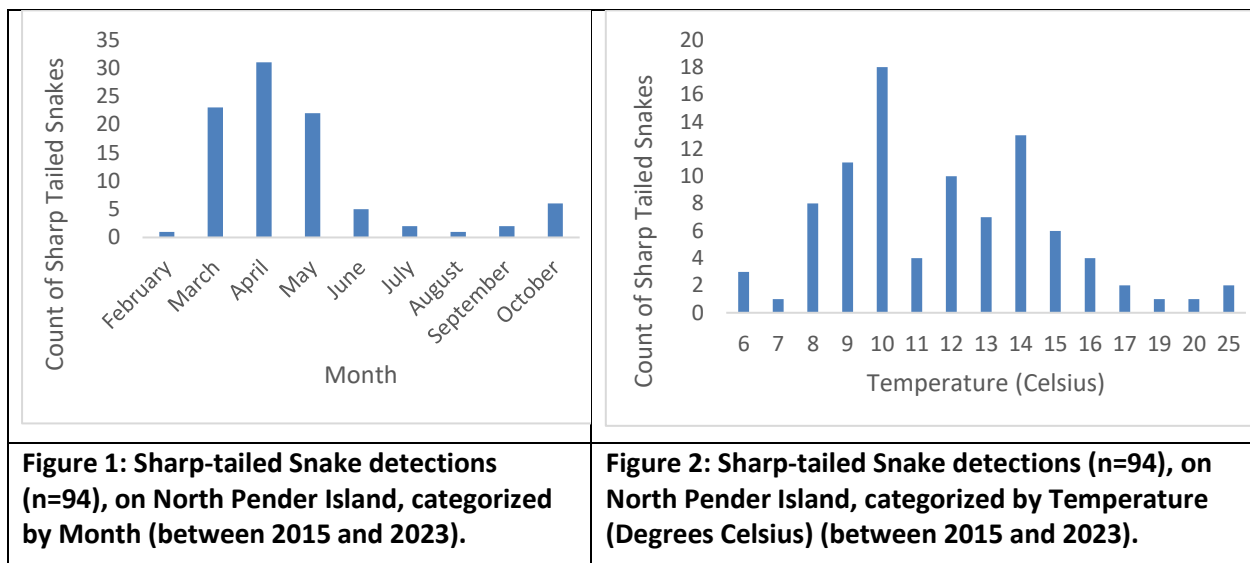
## SHARP-TAILED SNAKE

Objectives of the Sharp-tailed Snake habitat and occupancy assessment at the Site included:

1. To complete an expert-based habitat suitability assessment, based on familiarity with the species in BC, including familiarity with all documented Sharp-tailed Snake occurrence locations on North and South Pender Island.
2. To search for Sharp-tailed Snake in the area demarcated for clearing and grubbing (i.e., Sharp-tailed Snake salvage activities).
3. To relocate any Sharp-tailed Snake detected, during salvage (Note: translocation of any other herptiles and gastropods encountered, during Sharp-tailed Snake salvage operations, would also be undertaken as authorized under permit).

### Methods

Prior to and during salvage (or survey) for Sharp-tailed Snake a known occurrence location was checked on March 25<sup>th</sup>, March 28<sup>th</sup> and March 29<sup>th</sup> to ensure sample conditions were appropriate, and that Sharp-tailed Snake were active and visible under shallow cover objects. To ensure appropriate timing a total of 94 Sharp-tailed Snake observations, as documented on a private residence on North Pender Island between 2015 and 2023, were analyzed to quantify detection rates by temperature and by date (**Figure 1** and **Figure 2**) (**Appendix 1**). Salvage operations were completed over three successive days from March 28<sup>th</sup> through to March 30<sup>th</sup>, 2023.



Temperatures during salvage operations were documented as:

- March 28, 2023: high of 15°C and low of 2°C
- March 29, 2023: high of 15°C and low of 5°C
- March 30, 2023: high of 12°C and low of 3°C

Comparison with temperature and observation dates from 94 observations documented between 2015-2023 (on N. Pender Island) suggest sampling conditions were optimal during salvage operations completed at the site between March 28<sup>th</sup> through March 30<sup>th</sup>, 2023.

Salvage methods followed those described in MFLNRO (2016). In short, surveyors searched, on hand-and-knees, combing through the forest floor and displacing potential cover objects (as physically possible), in search of Sharp-tailed Snake. Targeted physical searches were conducted by lifting and

searching beneath overturned rocks and coarse wood debris, and by overturning and searching beneath leaf litter (Note: leaf-litter was sparse on site as broadleaf deciduous tree species were absent). Where present, mats of moss (primarily step (or feather) moss (*Hylocomium splendens*)) were also displaced and searched (beneath) for Sharp-tailed Snakes.

### Habitat Assessment Results

In general, habitat was deemed to have low potential for use by Sharp-tailed Snake based on consideration of prey abundance (i.e., gastropods) (see **Results**) and habitat suitability. Although Sharp-tailed Snake has been documented nearby on Canal Road (CDC element occurrence record: single dead (road-killed) adult Sharp-tailed Snake reported by the author with voucher specimen submitted to the Royal BC Museum) most observation records in BC have been reported from warm-aspect slopes in more open sparsely forested habitats (ECCC 2020, MOE 2015, Pers. Obs.).

MOE (2015) describes suitable Sharp-tailed Snake habitat to be in open woodlands (i.e., within forest openings) in micro-sites with abundant security habitat (including talus, coarse woody debris, and/or fissures in rock (COSEWIC 2009 as cited in MOE 2015)). Habitats at known sites are characterized by warm aspects (with the above noted exception found on S. Pender Island by the author), relatively shallow soils, low levels of litter cover, and high abundance of rock cover (MOE 2015).

Although site attributes (see **Background** information for the site) are not representative of preferred habitats for this federally endangered (*Species at Risk Act* (SARA) Schedule 1) listed species the Site merited survey in consideration of the above-noted documented occurrence in similar habitat, and in proximity, further south along Canal Road.

### Results

Searches for sharp-tailed snake were conducted during the day on March 28<sup>th</sup>, 29<sup>th</sup> and 30<sup>th</sup>, 2023. Searches (i.e., salvage) was led by J. Hobbs (Director and Senior Technical Expert - JHEC) and assisted by Jay Brogan (Senior Biologist - Ausenco). A total of 36 person-hours of search effort was undertaken. No snakes, amphibians, or (live) snails were found during the salvage efforts despite a thorough search effort.

Remains of snails (i.e., shells) including Robust Lancetooth (*Haplotrema vancouverense*) (N=14), Pacific Sideband Snail (*Monadenia fidelis*) (n=4) and Northwestern Hesperian (n=2) were encountered but surveys likely preceded the active period for snail species on this cool north-aspect slope). Two dormant banana slugs (*Ariolimax columbianus*) were also detected and relocated upslope of the zone demarcated for clearing and grubbing.



## BATS

Objectives of the bat habitat and occupancy assessment at the Site included:

1. To identify potential bat hibernacula (rock or tree cavity) or night-roosting features within the Site.
2. To document acoustic bat activity as evidence of use by roosting (and potentially hibernating) bats within features located at the Site.

### Methods

Bat acoustic activity assessments were conducted between February 1<sup>st</sup>, 2023 and March 30<sup>th</sup>, 2023 by S. Dulc (Senior Biologist and subject-matter expert - JHEC). The assessments included:

- Ground-based visual assessment of tree and rock features at the Site to identify potential for use by roosting (or hibernating) bats.
- Deployment of passive acoustic monitoring equipment (Anabat Swift).
- Emergence (visual) surveys of bats during the typical emergence period (commencing at civil sunset and continuing for one-hour post-sunset during the active period) using infra-red camera equipment (Seek Compact Pro Thermal Camera).
- Active acoustic monitoring, for bats, during visual surveys (commencing at civil sunset and continuing for one-hour post-sunset during the active period) using a Wildlife Acoustics Echometer Touch microphone and iPad tablet software.

### Habitat Assessment

Several features that could potentially be used by roosting bats were documented on Site, including:

- Tree stumps.
- Flaking bark and cavities on large trees.
- Rock crevices.

Many of the features were not accessible (i.e., too high or deep) to visually inspect. No guano or other evidence of use of any inspected features was observed during any of the site visits (see **Results**).

### Visual Survey Results

Three visual (emergence) surveys were conducted at the Site (March 6<sup>th</sup>, March 21<sup>st</sup> and March 27<sup>th</sup>, 2023), commencing at civil sunset and ending one hour after civil sunset, resulting in a total person-survey time of 180 minutes. For each survey, a single observer used a Seek Compact Pro thermal camera to record any bat activity at, or in the vicinity of, the feature of interest. All visual surveys for bats were conducted during nights with no precipitation, little or no wind and temperatures above 5°C. No bats were observed emerging from, or flying within the vicinity of, the features being surveyed during any of the three visual surveys.

### Active Acoustic Survey Results

Active acoustic recording methods (i.e., human monitored recording equipment) were also used for the duration of each emergence survey (March 6<sup>th</sup>, March 21<sup>st</sup> and March 27<sup>th</sup>, 2023) to detect bats flying within a 20-to-50-meter radius of the recorder. Active acoustic survey was conducted using a Wildlife Acoustics Echometer Touch (ET) handheld detector. No bats were recorded using the ET during any of three nights (total 180 minutes) of active acoustic emergence surveys.

## Passive Acoustic Survey Results

In addition to visual (emergence) and active acoustic surveys, passive acoustic methods were also used to detect any bats within the Site between February 1<sup>st</sup>, 2023 and March 30<sup>th</sup>, 2023. A single Anabat Swift (Titley Scientific) bat detector (i.e., a passive detector) was deployed to record any proximal (i.e., within ~50 m) bat echolocation calls. The detector was installed to record nightly acoustic activity, commencing 60 minutes prior to civil sunset and continuing for 60 minutes after civil sunrise, at three locations on Site to maximize the area (and potential roost features) covered.

- A passive bat detector was deployed at a site identified as Canal Rd 1 from February 1<sup>st</sup>, 2023 to March 21<sup>st</sup>, 2023; a total of 42 detector-nights of recordings were obtained at Canal Rd 1.
- The detector was moved on March 21<sup>st</sup>, 2023 to Canal Rd 2 where it recorded until March 27<sup>th</sup>, 2023; a total of six detector-nights of recordings were obtained at Canal Rd 2.
- The detector was moved to Canal Rd 3 on March 27<sup>th</sup>, 2023 where it recorded until March 30<sup>th</sup>, 2023: a total of three detector-nights of recordings were obtained at Canal Rd 3.
- Battery failure resulted in no recordings between February 28<sup>th</sup> and March 6<sup>th</sup> at Canal Rd 1. The total acoustic monitoring period at all detector locations (not including days with equipment failure) was 51 days.
- Acoustic files were analyzed using Anabat Insight (Version 2.0.6-3) and then manually vetted to ensure no bat files were missed.
- Files were then manually identified to one of eight phonic groups were used to accommodate the inherent difficulty in accurate identification, to species level, by acoustics alone (for most bat species (Lausen et al. 2022)). See list below for a count of echolocation calls within each of the eight groups.

In total, 11,106 acoustic files were recorded during the 51-days of passive acoustic recording. The vast majority (99.4%,  $n=11041$ ) were noise files (i.e., non-bat). The remaining 62 (0.006%) of recorded acoustic files were identified as bat echolocation calls. The number of files identified to each of the phonic groups, during the 53-day acoustic survey period, is as follows:

1. 30k = Three files. This group includes Western Evotis (*Myotis evotis*) and Townsend's Big-eared Bat (*Corynorhinus townsendii*); however, identification to a specific species in this frequency range is challenging when recording quality is poor (see Lausen et al. 2022) so this is left as a 'group' to represent potential inclusion of other species that may overlap with this frequency range. One of these 30k calls had what appeared to be a song sequence following a low amplitude pulse (call recorded on February 23, 2023 at 00:23 h).
2. 40k = Three files. This group includes at least four species including Long-legged Myotis (*M. Volans*), Little Brown Myotis (*M. lucifugus*) (listed on SARA Schedule 1) and two species that are very unlikely to occur on Pender Island (Eastern Red Bat (*Lasiurus borealis*) and Dark-nosed Small-footed Myotis (*M. melanoryhinus*)).
3. 50k = 13 files. This group includes Californian Myotis (*M. californium*) and Yuma Myotis (*M. yumanensis*). Both species are likely common on Pender Island.
4. EPFULANO = 12 files. This group includes Big Brown Bat (*Eptesicus fuscus*), and Silver-haired bat (*Lasionycteris noctivagans*). Both species are confirmed to occur on Pender Island.
5. LANO song = Four files. This is a species-specific group that includes only Silver-haired Bat.

6. COTO = 14 files. This is a species-specific group that includes only Townsend's Big-eared Bat as evidenced by a split harmonic pattern on the call sonogram.
7. LowF = 11 files. Bat files that that could not be assigned to a specific frequency group, due to very poor recording quality, were classified as either LowF (low frequency) or HiF (high frequency).
8. HiF = Two files. Bat files that that could not be assigned to a specific frequency group, due to very poor recording quality, were classified as either LowF (low frequency) or HiF (high frequency).

The number of bat calls recorded on a nightly basis varied from zero calls (for 32 nights; or 62% of the survey period) to 14 calls (as recorded on March 28<sup>th</sup>, 2023) during the 51-day passive acoustic survey period. Bat calls were recorded on a total of 19 detector-nights (38%) during the 51-day survey period. When bat calls were recorded, the mean count was 1.5 bat calls/detector-night, and the median count of recorded bat calls was two bat calls/detector-night.

The timing of recorded bat calls also varied on a nightly basis; time of first bat recorded varied from 17:33 hours (h) to 03:00 h over the survey period. On nights when bat calls were recorded, 22 bat calls (i.e., 35%) were recorded during the emergence period (taken to be from sunset to one-hour post-sunset); within the emergence period, variation in timing of recorded calls was sunset  $\pm$  49 minutes. Within bats recorded during the emergence period a total of seven acoustic files were recorded within  $\pm$  10 minutes of sunset (February 18<sup>th</sup> – one file; March 15<sup>th</sup> – one file; March 18<sup>th</sup> – one file; March 28<sup>th</sup> – four files) suggesting emergence from a location very close to the recording equipment.

### Discussion of Bat Results

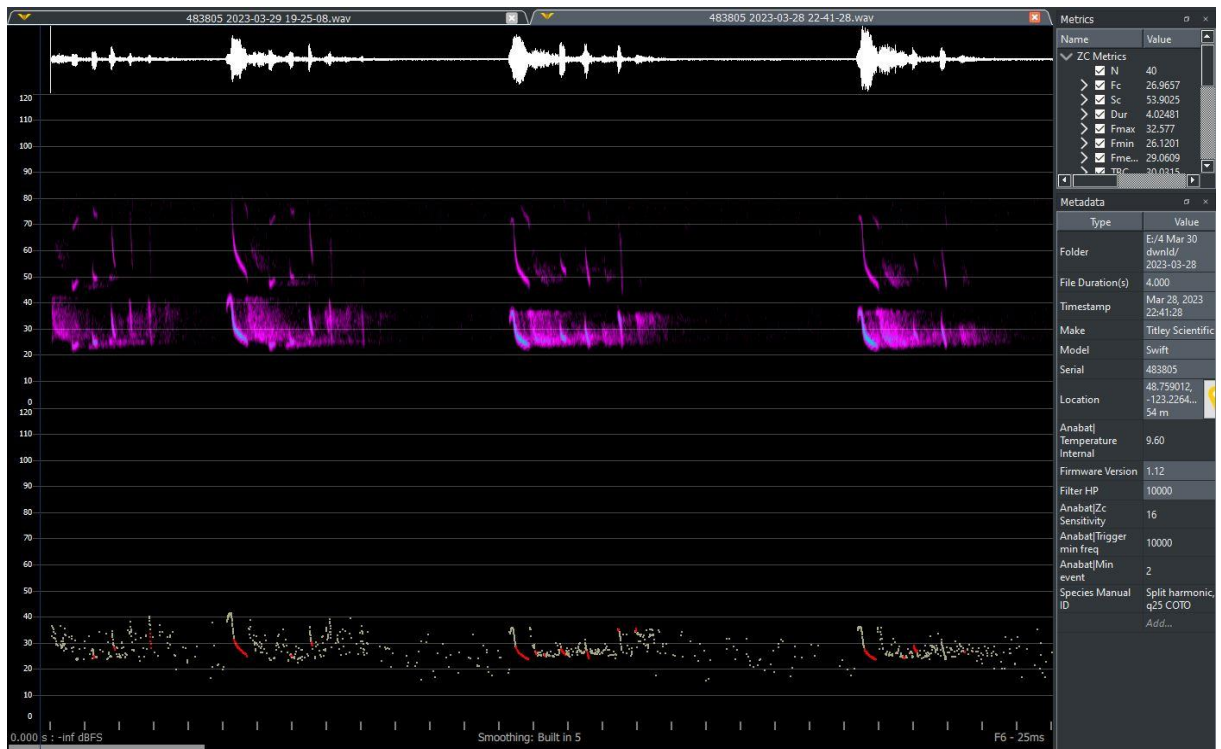
The results from the habitat assessment indicate there are multiple features on the Site that have roosting potential for bats including Silver-haired bat, Townsend's Big-eared Bat (as confirmed acoustically) and other species (e.g., Little Brown Myotis (as suspected within the 40k phonic clade)); however, no features were positively identified as bat roosts or hibernacula.

Results from passive and active acoustic surveys and from visual emergence surveys (as conducted during appropriate weather conditions) demonstrate that bats (multiple species) are frequenting the Site. Bat acoustic calls (n=62) (recorded at any time of evening) were recorded on 38% of nights during the two-month passive acoustic monitoring survey period confirming some use of the Site, by bats (see **Results** for breakdown by phonic group). The following specific points merit consideration:

- While the lack of bat detections (n=0) during the three evening emergence surveys is somewhat suggestive that the features being surveyed are unlikely to be hibernacula, this cannot be stated unequivocally as winter bat activity is limited (particularly for Little Brown Myotis; see point below) and dependent on temperature, wind speed and/or barometric pressure changes (Klüg-Baerwald et al. 2016). It is likely that active acoustic (and visual) emergence surveys did not coincide with optimal conditions for winter bat activity (for any species) by coincidence alone.
- Furthermore, in other studies, winter activity for the federally Endangered (SARA-Schedule 1 listed) Little Brown Myotis has only been observed within the hibernacula (i.e., no winter flight outside the hibernacula has been documented) and the earliest acoustic detection of this species (on nearby Salt Spring Island) is March 30<sup>th</sup> (as reported in Lausen et al. 2022). The timing of

passive and active acoustic and visual surveys at the Site (February 1<sup>st</sup> through March 30<sup>th</sup>, 2023) is unlikely to be coincident with cessation of hibernation (for Little Brown Myotis), so it remains enigmatic whether any of the rock features surveyed in February and March 2023 were being used as hibernacula by Little Brown Myotis.

- It should also be noted that while Townsend's Big-eared Bats (as detected during passive acoustic monitoring – see **Figure 3**) are known to arouse from hibernation approximately every three weeks during the annual hibernation period (Lausen et al. 2022) this species typically emerges later in the evening than other bat species. Thus, it is unlikely to be detected during one-hour active surveys conducted during the standard bat emergence time (within  $\pm 10$  minutes of civil sunset) despite detection (in the area) from passive acoustic detectors deployed overnight.



**Figure 3: Sonogram from acoustic recording of a Townsend's Big-eared Bat recorded at the Site on March 28<sup>th</sup>, 2023 at 22:41.**

Over the 51-day survey period 35% (n=22) of all bat vocalizations were recorded during the emergence period (i.e., within  $\pm 10$  minutes of civil sunset); any detection (acoustic or visual) of bats within the emergence period suggest that roosting is occurring at or near the detector location. These results provide suggestive evidence that at least some bats may be roosting at the site (i.e., near the detector stations). Conversely, 65% of all recorded bat vocalizations were detected well after the daily emergence period; these recordings were likely made by bats roosting outside, or simply transiting through, the Site. This data suggests the Site does not appear to support a high number of roosting or hibernating bats but more precise quantitation of bats using the site, and the specific location of hibernating sites (if any) within the area anticipated for clearing, remains enigmatic.



## WESTERN SCREECH-OWL (MEGASCOPS KENNICOTTII KENNICOTTII)

Objectives of the Western Screech-owl habitat and occupancy assessment at the Site included:

1. To complete an expert-based habitat suitability assessment, based on familiarity with the species in BC, including familiarity with all documented Western Screech-owl occurrence locations on South Pender Island (n=4).
2. To conduct acoustic lure surveys (for Western Screech-owl) on three separate nights during the spring breeding period (i.e., March) to identify potential Western Screech-owl occupancy at the Site.
3. To search for, and identify, any potential Western Screech-owl nesting features at the Site.

### Methods

Three nocturnal call-playback (CPB) surveys were conducted for Western Screech-owl, concomitant with bat emergence surveys, on three nights in March (see **Results**). During CPB, one survey station was assessed per night, and each survey station was monitored for at least 60 minutes. As the total area being assessed was very small (~2 hectares (ha)) any owl that vocalized, in response to CPB, would be easily detected. Surveys were not conducted in adverse weather conditions such as steady or heavy rain or wind speeds > 20km/hr (Beaufort 4) (as per RISC Standard protocol).

During the CPB survey an adult male territorial Western Screech-owl “bouncing-ball” call was broadcast intermittently using a FoxPro NX4 megaphone. CPB surveys followed Resource Inventory Standards Committee (RISC 2006) protocols that included a minimum duration of fifteen minutes at each survey station. After the standard 15-minute station was completed observers continued to listen (and intermittently broadcast an adult male territorial Western-Screech owl call every 10-15 minutes) for the remainder of the 60 minute survey period.

### Habitat Assessment Results

No potential nest trees were detected during the habitat assessment. There was only one tree with evident cavities within the survey area; these cavities were all excavated by Pileated Woodpecker during foraging and the depth was insufficient to facilitate nesting by Western Screech-owl.

Habitat suitability, for Western Screech-owl was estimated to be low based on a lack of suitable forest openings, a lack of potential nest structures (i.e., mature trees with natural or excavated cavities) and low (likely) estimated prey abundance. The Western Screech-owls are generally associated with more gently sloped mature forested habitat with natural openings and, typically, nearby riparian habitats that generally affords increased prey abundance (WSOW-RT 2008, Hobbs 2023). Mature mixed-wood forests with presence of mature Cottonwood (*Populus trichocarpa*), a dense understory and (soft) edge habitat (forested habitats with natural openings) are generally regarded as high-quality Western Screech-owl habitat (Hobbs 2023, Pers. Obs.). These attributes were all lacking at the Site.

### Active Acoustic Survey Results

A total of three surveys, 180-minutes total duration, for WSOW were conducted on March 6<sup>th</sup>, March 21<sup>st</sup>, and March 27<sup>th</sup>, 2023. No western-screech owls were detected during CPB surveys. Western Screech-owl is unlikely to be frequenting the site on a regular basis, or nesting within the area anticipated for clearing.

## CLOSURE

It is hoped that the results, and discussion, from surveys completed in February through March (2023), at least partially address concerns for interaction, during Project development activities, with ecological values at the Site.



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Authorized Signatory and QEP: J. Hobbs - Director

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**APPENDIX 1: SHARP-TAILED SNAKE OBSERVATION DATA BETWEEN 2015-2023 SUBMITTED SEPARATELY.**