MADDISON CONSULTANTS LTD
SOUND SCIENCE FOR FUTURE GROWTH

February 8, 2021

Gambier Island Conservancy
1005 West Bay Road
Gambier Island, B.C.
V0N 1V0

Subject: Preliminary Sensitive Species Assessment for Cutblock 39 at the Headwaters of Whispering Creek, Gambier Island, British Columbia (BC).

Dear Members of the Gambier Island Conservancy,

Maddison Consultants Ltd. (Maddison Consultants) is pleased to provide this preliminary assessment of sensitive species for Cutblock #39 at the headwaters of Whispering Creek, Gambier Island, British Columbia (BC).

Methods

Literature Review and Records Search

A literature review was conducted to identify the presence, or potential occurrence, of species of management concern (*e.g.,* plant and animal species) in the vicinity of, or within, the study area. The resources used to compile the list, along with a table depicting the identified species of management concern, are included in Attachment A.

Field Surveys

Micaele Florendo, R.P. Bio., of Maddison Consultants conducted a biological reconnaissance survey on February 2, 2021. The survey was conducted on foot from 10:00 a.m. until 12:30 p.m. The survey was conducted to characterize the biological resources and to ascertain the potential presence or absence of Conservation Data Centre (CDC) or *Species at Risk Act* (SARA) Schedule 1 listed wildlife species within the study area. A 400 square metre (m^2) plot to describe the vegetation was conducted during the survey in accordance with the "Field manual for describing terrestrial ecosystems, 2nd edition" (BC Ministry of Forests and Range and BC Ministry of Environment, 2010).

Photographs were taken at various locations throughout the survey area to document the existing conditions, and are attached in Attachment B. A resume for Micaele Florendo is attached in Attachment C.

Weather conditions during the survey were overcast. Rocks, cobble, and woody debris were overturned throughout the study area in an attempt to detect amphibians, reptiles, slugs and snails. All wildlife and plant species observed directly or otherwise, were noted. Vascular plants were identified in the field according to Pojar and Mackinnon (1994); and, voucher specimens were collected for identification according to eFlora (1998 - 2002). Animal species observed within the study area were identified according to Sibley (2003) and National Geographic (1987). A list of the observed plant and animal species is attached as Attachment D.

Existing Conditions

The study area is within the Coastal Western Hemlock (CWH) biogeoclimatic zone which occurs predominantly west of the coastal mountains along the entire coast of BC, and at low to middle elevations from sea level to 900 m on windward slopes along the south and mid-coast (1050 m on leeward slopes), and up to 300 m in elevation along the north coast (Ministry of Forests, 1991).

This zone is on average the rainiest biogeoclimatic zone in BC with a cool mesothermal climate consistent with cool summers and mild winters (Ministry of Forests, 1991). The mean annual temperature is about 8 degrees Celsius (°C) (Ministry of Forests, 1991). At least three CWH subzones have established on Gambier Island and each are considered genetically distinct forest variants and provide different ecological conditions (Madrone 2009; Chourmouzis et al. 2009). These include CWH xm1 (Very Dry Maritime), CWHvm2 (Very Wet Maritime), and CWHdm (Dry Maritime). Currently, none of these forest variants are sufficiently protected in BC to sustain the unique genetic diversity associated with these forest communities into the future (Meidinger and Pojar 1991; Mackenzie and Meidinger 2017). The study area appears to include both Dry Maritime (CWHdm) and Very Wet Maritime (CWHvm2) subzones.

Western hemlock (*Tsuga heterophylla*) is usually the most common tree species in the forest cover. It regenerates under a canopy of mature stands on zonal sites and elsewhere, where sufficient acid raw hummus or decaying wood has accumulated on the forest floor (Ministry of Forests, 1991). Red alder (*Alnus rubra)*, a pioneer species, is widespread on logged-over and otherwise disturbed sites (Ministry of Forests, 1991).

Characteristic floristic features of zonal ecosystems in the CWH zone include: (a) the prominence of western hemlock, (b) the sparse herb layer, and, (c) the predominance of several moss species, particularly step moss (*Hylocomium splendens)* and lanky moss (*Rhytidiadelphus loreus).*

Characteristic soil processes include the accumulation of acid organic matter on the forest floor (Mor formation), leaching, eluviations, illuviation, and gleying (Ministry of Forests, 1991). Many soils derived from the acidic parent materials, such as granodiorites are low in clay minerals and poor in nutrients (Ministry of Forests, 1991).

The habitat on site is predominantly mature forest dominated by western hemlock and Douglas fir. In areas where stumps were observed, springboard notches were observed on various stumps; therefore, providing evidence that portions of the forest had previously been logged. Also present on the stumps were fire scars indicating that the area burned after it had been logged. Two drainages were documented within the cutblock; both are approximately a metre in width, with a channel of fines and gravel, and a cascade pool morphology. There is one area on the south side of the drainage where no stumps were observed and some large douglas fir trees occur. This portion of the cutblock appears to be old growth forest.

Vegetation

Vegetation surveyed within the 400 m^2 plot included trees, shrubs, herbs, and bryophytes and lichens. The dominant tree species include western hemlock, with some western red cedar, and douglas fir; there were a few red alder trunks as large woody debris on the forest floor. The shrub layer species includes sword fern (*Polystichum munitum*), red huckleberry (*Vaccinium parvifolium*) and with some scattered occurrences of wood fern (*Dryopteris expansa*), deer fern (*Blechnum spicant*), and licorice fern (*Polypodium glycyrrhiza*). The bryophytes and lichens within the plot include juniper haircap moss (*Polytrichum juniperinum*), red stemmed feathermoss *(Pleurozium schreberi*), and step moss *(Hylocomium splendens)*, among others. Although not present within the plot, there are several snags with woodpecker holes throughout the study area, these would be considered wildlife trees.

Animals

The wildlife trees may be utilized by birds, small mammals, and other animals for nests, nurseries, storage areas, foraging, roosting, and perching. Live trees with snag-like features, such as hollow trunks, excavated cavities, and dead branches can provide similar value.

No amphibians or reptiles were detected during the assessment. Amphibian species that are likely to occur within, and adjacent to the study area include the Pacific tree frog (*Hyla regilla*), wandering Salamander (*Aneides vagrans*), the rough-skinned newt (*Taricha granulosa*), northwestern salamander (*Ambystoma gracile*), long-toed salamander (*Ambystoma macrodactyum*) and the red-legged frog (*Rana aurora*). Reptiles that are likely to occur within, and adjacent to the study area include the western terrestrial garter snake (*Thamnophis elegans*) and the northern alligator lizard (*Elgaria coerulea*).

Three bird species were observed during the field survey and included the dark-eyed junco (*Junco hyemalis*), the common raven (*Corvus corax*), and the American robin (*Turdus migratorius*). Bird biodiversity is expected to increase within, and adjacent to the study area during the migratory and nesting seasons.

No mammals were observed in the study area. Mammals expected to occur within, and adjacent to the study area include the black-tailed deer (*Odocoileus hemionus hemionus*),

the wolf (*Canis lupus columbianus*), the cougar (*Puma concolor*), as well as several species of shrews, mice, the Douglas squirrel (*Tamiasciurus douglasii*), and the northern flying squirrel (*Glaucomys sabrinus*). Both the ermine (*Mustela erminea*) and Pacific marten (*Martes caurina*) are frequently observed by local residents (M Stamford pers. com.).

Aquatic Resources

Two drainages were observed flowing through the cutblock during the survey. The drainages, which are headwater tributaries to Whispering Creek are both approximately 1 metre (m) in width, with numerous steps and pools formed by a stable bed of boulders and cobble with gravel and some fines deposited in low gradient sections. Both tributaries drain higher gradient (~5%) western slopes of Mt. Killam before their confluence, then Whispering Creek flows to the southwest. Abundant moss in the stream channel indicate substrate stability afforded by the extensive old forest in the riparian area. Despite recent heavy rains, water was flowing clear throughout the drainages during the field survey.

Identified Wildlife Species

The field surveys conducted for this assessment determined that there is a moderate to high potential of six plant and fourteen animal species of management concern to occur within the study area. Plant species of management concern with a moderate to high probability of occurrence include: Roell's brotherella moss (*Brotherella roellii*), banded cord moss (*Entosthodon fascicularis*), silvery hair moss (*Fabronia heterophylla*), seaside bone (*Hypogymnia heterophylla*), cryptic paw (*Nephroma occultum*), and giant chain fern (*Woodwardia fimbriata*). Animal species of management concern with a moderate to high probability of occurrence include: threaded vertigo (*Nearctula* sp.), evening fieldslug (*Deroceras hesperium*), Oregon forestsnail (*Allogona townsendiana*), Puget Oregonian snail (*Cryptomastix devia*), rubber boa (*Charina bottae*), coastal tailed frog (*Ascaphus truei*), red-legged frog (*Rana aurora*), wandering salamander (*Aneides vagrans*), coastal giant salamander (*Dicamptodon tenebrosus*), northern goshawk (*Accipiter gentiles* ssp. *laingi*), marbled murrelet (*Brachycamphus marmoratus*), band-tailed pigeon (*Columbia fasciata*), western screech-owl (*Megascops kennicottii kennicottii*), common nighthawk (C*hordeiles minor*). In addition, the coastal cutthroat trout (*Oncorhynchus clarki clarki)* is known to be present in downstream reaches of Whispering Creek and their presence within the study area is unknown. Resident populations of coastal cutthroat trout are common in small (<4m bankfull width) headwater streams throughout their range (Rosenfeld et al. 2002), including adjacent streams on Gambier Island (e.g. McDonald Creek, Mannion Creek; M. Stamford pers. com.).

Recommendations

Focused surveys for bryophytes should be conducted by a qualified professional prior to clearing to determine the presence of Roell's brotherella moss, banded cord moss, silvery hair moss, seaside bone, cryptic paw, and giant chain fern within the area proposed for clearing.

A qualified professional should conduct focussed surveys for threaded vertigo, evening field slug, Oregon forestsnail, and Puget Oregonian snail within the area proposed for clearing.

A qualified professional should conduct surveys for the rubber boa and the wandering salamander within the area proposed for clearing.

A professional shall be considered qualified to conduct focussed sensitive species surveys if they are registered and in good standing with the College of Applied biology with a minimum of five years experience conducting surveys for the specific sensitive species for which they will be conducting surveys for or if they are a professional with a minimum of five years of published research related to the specific sensitive species for which they will be conducting surveys for.

Environmental DNA (eDNA) sampling should be conducted to evaluate the presence (tadpoles observed downstream, M. Stamford pers. com.) and distribution of the coastal tailed frog in Whispering Creek. The species is on the yellow-list provincially (Apparently Secure) due to their wide distribution, but remain a Schedule 1 species of Special Concern under the federal Species at Risk Act (BC Conservation Data Center 2020). A unique taxonomic nature with a metamorphic life history and heavy reliance on particular types of aquatic and terrestrial habitats in headwater streams make them vulnerable to disturbances (Environment Canada and Climate Change 2016). As logging in Whispering Creek headwaters may result in the removal of the riparian vegetation and sedimentation within the creek, as well as the potential release of hydrocarbons in the creek, logging activities can be a serious threat to coastal tailed frog populations if they occur in this section of Whispering creek as well as the known population downstream. Sampling with eDNA provides a more robust estimate than visual assessments for evaluate the distribution of tailed frogs and is the most robust method to monitor a potential decline in Whispering Creek (e.g. Hobbs 2017). The presence of other species in the watershed (e.g. red-legged frog, coastal giant salamander) can potentially also be assessed using the same eDNA samples once laboratory analyses are optimized.

Marbled Murrelets are unique among North American seabirds in that they nest on large boughs high in old-growth conifers. The Marbled Murrelet is listed as threatened in Canada by COSEWIC (Committee on the Status of Endangered Wildlife in Canada; Hull 1999), is designated as Red-listed in British Columbia (BC Species and Ecosystem Explorer 2006, MMRT 2003), and is an "identified wildlife" species pursuant to the Forest and Range Practices Act (BCMWLAP 2004). One of the primary threats to this species is the loss of nesting habitat through logging of old-growth forests. As there is suitable nesting habitat for this species and there is designated critical habitat for the marbled murrelet proposed in the vicinity of the cutblock, focused surveys for this species should be conducted to determine if they utilize the cutblock for nesting prior to harvesting. Survey methodology should follow the Resources Inventory Committee Guidelines, including those for the qualifications of the personnel conducting the survey.

Although bird species of management concern may utilize the study area if they occur in the vicinity, outside of the nesting season they are expected to flush from the study area while vegetation clearing is underway. Therefore, all clearing activities should occur outside of the nesting season for migratory birds (March 15 to August 30).

Two drainages occur within the area proposed for clearing. These drainages may be subject to the *Water Sustainability Act*, and the *Fisheries Act*; therefore, clearing activities have the potential to directly, and indirectly, impact these drainages and their riparian area. Any work in the vicinity of this drainage should be designed to avoid impacts, either direct or indirect, to this drainage and its riparian habitat, as described in the Standards and Best Practices for Instream Works (Ministry of Water, Land and Air Protection, 2004), and the Measures to Protect Fish and Fish Habitat (Fisheries and Oceans Canada [DFO], 2019). In addition, any works in and about a stream must comply with these provincial and federal regulations.

We trust that this letter meets your needs and expectations. If Maddison Consultants can be of further assistance, or if you have any questions concerning this proposal, please contact us by phone, on (604) 838-2321, or by e-mail, at Micaele@maddison-consultants.com.

Sincerely,

Maddison Consultants Ltd.

Micaele Florendo

COLLEGE OF APPLIED BIOLOGY
Micaele J.W. Florendo
FEB 8, 2021
R.P. Bio #1423
CAB

Micaele Florendo, P.Biol., R.P.Bio.
Principal Biologist

Attachment A: Sensitive species table.
Attachment B: Site photographs
Attachment C: Resume
Attachment D: Plant and Animal list

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ATTACHMENT A

Sensitive Species Table

SPECIES	HABITAT AND DISTRIBUTION	ACTIVITY/BLOOMING PERIOD	STATUS DESIGNATION	PROBABILITY OF OCCURRENCE
NON-VASCULAR PLANTS				
Roell's brotherella moss *Brotherella roellii*	Occurs in cool, humid mixed deciduous and conifer, second-growth forests on stream terraces, swampy floodplains, and occasionally in ravines with creeks. Many of the current locations occur within city parks. The primary substratums include: alder, big leaf maple, dogwood trees, rotten logs and stumps. Roell's Brotherella Moss is known from only 26 current and 4 historical records, isolated locations within the Lower Mainland of the Fraser River and Howe Sound area.		CDC: red COSEWIC: EN SARA: EN	**High**
Banded cord moss *Entosthodon fascicularis*	Banded cord-moss grows on soil over rock, often amongst other mosses, plant litter, and bases of vascular plants, in open to semi-shaded habitats, usually in or adjacent to seasonally moist sites. Fourteen populations are found in nationally threatened Garry oak (Quercus garryana) and associated ecosystems. Of the remaining five populations, four are found in dry coastal Douglas-fir (Pseudotsuga menziesii) ecosystems on the coast, and one is in a dry pine/fir forest in the Kootenay region. Banded cord-moss is found in western North America and western Eurasia with a disjunct distribution. It is relatively rare in North America, found only in British Columbia, Washington, Idaho, Oregon, California, and Arizona. It is widespread in Europe. In Canada, banded cord-moss is mainly restricted to Vancouver Island and the adjacent Gulf Islands of British Columbia. A single collection has been made in the Kootenay area in the southeast part of the province.		CDC: blue COSEWIC: SC SARA: SC	**Moderate - high**
Silvery hair moss *Fabronia pusilla*	tiny, creeping moss that grows in thin, flat mats over rock surfaces. It has been found in western North America, Mexico, Europe, and North Africa. In North America, it has been reported from southern British Columbia, Washington, Idaho, Oregon, Colorado, New Mexico, Arizona, and California. This species is restricted to southern British Columbia where it has been found at two locations: below McKee Peak at the west end of Sumas Mountain east of Abbotsford, and in the Arrow Lakes area in the southwestern part of the province, where it has probably been extirpated.		CDC: red COSEWIC: EN SARA: EN	**Moderate - high**
seaside bone *Hypogymnia heterophylla*	Coastal conifers, especially shore pine (*Pinus contorta*) in open coastal localities from BC to northern California.		CDC: red COSEWIC: TH SARA: TH	

Cryptic paw *Nephroma occultum*	Cryptic paw is confined to moist forested regions at elevations below 1200 m. In B.C., all populations occur where the mean annual temperature is between 4 and 10°C, with an annual mean temperature range of about 15–26°C in the Coastal Western Hemlock zone and the Interior Cedar–Hemlock zone of the British Columbia biogeoclimatic ecosystem classification system. Cryptic paw occurs on trees of all age classes in old-growth forests characterized by high humidity and stable environmental conditions. Old-growth forests provide protection from summer drought, one of the distribution constraints of this species. Cryptic paw most often grows on living branches, usually near the branch tips among the conifer needles. It is less common or absent over large branches or on the trunks of trees. It is an acidophytic species that colonizes a broad range of trees. Cryptic paw is a North American endemic known from Alaska, Oregon, Washington, and British Columbia. In 2004, 6 populations had been documented from Alaska, 182 from Oregon, 8 from Washington, and 45 (43 extant, 2 extirpated) from British Columbia.		CDC: blue COSEWIC: TH SARA: SC	**Low – moderate**.
VASCULAR PLANTS				
DICOTYLEDONS				
Gymnosperm				
Blechnaceae				
giant chain fern *Woodwardia fimbriata*	Wet forests and seepy, coastal cliffs in the lowland zone. 0 – 2300 metres. Infrequent in SW BC (SE Vancouver Island, Lasqueti and Texada Islands); S to CA, disjunct to AZ and NV.	Year round	CDC: blue COSEWIC: - SARA: -	**Moderate.**
Dryopteridaceae				
Coastal wood fern *Dryopteris arguta*	Occurs in fairly specialized habitats of coastal wooded slopes, cliffs, and rocky outcrops (Jamison and Douglas 1998). Exposures are always southwest, southeast, or south, and slopes are usually moderately steep (Jamison and Douglas 1998). D. arguta habitats are often strongly associated with the red-listed Garry oak ecosystems of the Coastal Douglas-fir biogeoclimatic zone, which are very rare and fragmented in B.C.	Year round	CDC: blue COSEWIC: SC SARA: SC	**Low.** Although habitat on site is suitable, not suitable ecosystem.
Asteraceae				
Vancouver Island beggarticks *Bidens amplissima*	On silty, alluvial soils in moist to wet ditches, streambanks and pond edges in the lowland zone. Tends to occur in areas where annual and seasonal water level fluctuations are the norm and in tidal zones where it is inundated twice a day, and dries out between tides. Pacific Northwest of North America. In BC, in the lower mainland and on Vancouver Island.	July - September	CDC: blue COSEWIC: SC SARA: SC	**Absent.** No suitable habitat on site.

Fabaceae				
Macrae's clover *Triflorum dichotomum*	Mesic to dry slate cliffs or talus, sandstone shale, and open, grassy sites in the lowland zone; rare on SE Vancouver Island and adjacent Gulf Islands; S to C CA	April - May	CDC: blue COSEWIC: - SARA: -	**Absent.** No suitable habitat on site.
Limnanthaceae				
Macoun's meadow-foam *Limnanthes macounii*	Wet depressions, vernal pools and seepage sites. Occur from 0 – 200 metres elevation. Southern Vancouver Island and adjacent Gulf Islands; one disjunct population in California assumed to be an undescribed species.	March - April	CDC: red COSEWIC: TH SARA: TH	**Low.** Although suitable habitat for this species is present, the elevation is outside the known elevation range for this species.
Nyctaginaceae				
yellow sand verbena *Abronia latifolia*	Moist coastal beaches and sand dunes in the lowland zone. To 850 metres in elevation. Infrequent on the Queen Charlotte Islands, Vancouver Island and the Gulf Islands; S to CA.	June - August	CDC: blue COSEWIC: - SARA: -	**Absent.** Not suitable habitat on site.
MOLLUSCS				
threaded vertigo *Nearctula* sp.	Lives in moist leaf litter in rich sites in deciduous and mixed forests. Southwestern BC to Monterey County, California.	Year round	CDC: blue COSEWIC: SC SARA: SC	**Moderate.** Suitable habitat present on site.
evening fieldslug *Deroceras hesperium*	Low-elevation, mixed forests. Comox, Vancouver Island south to Oregon; west of the Cascade Mountains.	Year round	CDC: red COSEWIC: - SARA: -	**Moderate.**
dromedary jumping-slug *Hemphillia dromedarius*	Old-growth and older second-growth coniferous forests. Shelters under logs, rocks, and vegetation. Southern Vancouver Island to the Cascade Range and Olympic Peninsula, Washington; in BC, restricted to Vancouver Island.	Year round	CDC: red COSEWIC: TH SARA: TH	**Low.** Suitable habitat on site, outside known range of species.
warty jumping-slug *Hemphillia glandulosa*	Coniferous, deciduous, and mixed-wood forests under logs, ferns, and other vegetation. Southern Vancouver Island to northwest Oregon. In BC, this species has only been found on Vancouver Island.	Year round	CDC: red COSEWIC: SC SARA: SC	**Low.** Suitable habitat on site, outside known range of species.
Oregon forestsnail *Allogona townsendiana*	Moist, lowland deciduous woods with dense undergrowth, often in patches of stinging nettle. Southwestern BC to northwestern Oregon. In BC, occurs along the Chilliwack and Fraser River valleys from hope to Mission and Langley. Few records from southern Vancouver Island.	Year round; most active late spring to early summer	CDC: red COSEWIC: EN SARA: EN	**Low – moderate.** Although suitable habitat present on site, stinging nettle was not detected during the biological reconnaissance.
broadwhorl tightcoil *Pristiloma johnsoni*	Found in leaf litter of old growth and older second growth deciduous, coniferous and mixed-wood forests to an elevation of over 1300 m in the subalpine. Vancouver Island, south along the coast and the Fraser Valley.	Year round	CDC: blue COSEWIC: - SARA: -	**Low.** Suitable habitat on site, outside known range of species.

Puget Oregonian snail *Cryptomastix devia*	The geographic range of the Puget Oregonian snail extends south from southwestern British Columbia through western Washington State to the Oregon side of the Columbia Gorge in the United States. In Canada, the species is known from only three old (1850–1905) records from Vancouver Island and southwestern mainland of British Columbia. This snail is a mature forest specialist and inhabits moist old-growth and late successional forests and riparian areas at low and middle elevations. Essential habitat attributes for the species are thought to include shade provided by forest canopy, which conserves moisture and ameliorates fluctuations in temperature and moisture conditions on the forest floor; coarse woody debris and leaf litter for escape cover and oviposition sites; and mycorhizae and associated fungi for food.	Most common late spring	CDC: red COSEWIC: ET SARA: ET	**High.**
BUTTERFLIES AND MOTHS				
dun skipper *Euphyes vestris*	Open, moist areas that have it's larval host plants, which are sedges (*Carex* sp.) and *Cyperus esculentus;* also in disturbed areas such as road edges, railroad right-of-ways, powerline right-of-ways, and roadside ditches. May be found in fairly dry conditions where spring floods or permanent springs provide moist conditions for the larval foodplant. From BC southward along the Cascade, Sierra Nevada, and Coast Mountains to Central California. In BC, this species occurs on Vancouver Island from Courtenay south to Thetis Lake Park, but is absent from the Saanich Peninsula. It is known from one location in Powell River, one location in Pemberton, Mission and five localities in the Fraser Canyon associated with small, moist areas at permanent springs, including Hope, Boston Bar, Lytton, North Lytton and Lillooet.	late June - mid-August	CDC: blue COSEWIC: TH SARA: TH	**Low.** no larval plants detected during biological reconnaissance.
Indra swallowtail *Papilio indra*	Dry rocky slopes, as well as, hilltops. Feeds on the carrot family, especially *Lomatium.* When hilltopping, this species occurs just below the tops of the hills and usually lands flat on the ground, not on vegetation.	June - July	CDC: red COSEWIC: - SARA: -	**Low.** habitat on site too wet; no larval plants detected during biological reconnaissance.
common woodnymph *Cercyonis pegala incana*	Grassy forest openings, clearcuts, roadsides, meadows and streambanks. Larval food source is grass, can feed on sedges. Adults feed on willow and poplar sap. Southern BC south to central California and Arizona and across the continent to the Atlantic. Subspecies *incana* only occurs from Vancouver island south to Willamette Valley, Oregon.	July - September	CDC: red COSEWIC: - SARA: -	**Low.** Although suitable habitat occurs adjacent to the site, no suitable habitat on site.

Hoffman's checkerspot *Charidryas hoffmanii*	Openings, such as meadows, associated with mountain coniferous forest from 1,250 to 1,900 meters in elevation and feeds on asters. Known only from the Cascade Mountains in Manning Provincial Park, but should occur east to Keremeos.	late June - late July	CDC: red COSEWIC: - SARA: -	**Absent.** Site is outside known elevation range for this species.
common ringlet *Coenonympha tullia insulana*	Occur in meadows and grasslands at all elevations that are damp enough to maintain green grass throughout the driest part of summer and do not flood excessively in winter. Occur from Northwest Territories, south to California, east to northeastern US and Newfoundland. This subspecies occurs on Vancouver Island and coastal mainland BC	May to October	CDC: red COSEWIC: - SARA: -	**Absent.** No suitable habitat on site.
FISH				
cutthroat trout *Oncorhynchus clarki clarki*	Small, low gradient, coastal streams and estuarine habitats that are well shaded with water temperatures optimally below 18 degrees Celsius, spawns in streams on clean, small gravel substrates. After emerging, fry move into larger rivers (or lakes). Young feed mostly on aquatic and drift insects, microcrustaceans, and occasionally smaller fish. Adults eat insects, crustaceans, and other fish. Occurs in small coastal streams from the Eel River in Humboldt County, California northward to the Prince William Sound area of Alaska, including numerous islands with suitable habitat off the coast of BC and southern Alaska. However, this species does not typically occur farther inland than 150km.	Year round	CDC: blue COSEWIC: - SARA: -	**Moderate.** Present in downstream reaches of Whispering Creek, presence upstream of falls needs better evaluation (Michael Stamford, personal communication).
REPTILES				
painted turtle *Chrysemys picta*	Lakes, ponds, slow moving streams with basking sites and aquatic vegetation. East of the Cascade Mountains in the Columbia drainage, eastern Washington, the north-central and northeastern portions of Oregon, interior southern BC, extreme northern Idaho and western Montana. Small scattered populations in the Puget Sound area.	Year round; breeding in late May	CDC: blue COSEWIC: - SARA: -	**Absent.** No suitable habitat on site.
sharp-tailed snake *Contia tenuis*	Under rocks, decaying wood and debris in oak woodlands, also open pine forests, dense coniferous forests, brushy chaparral, and grassy savannas. Valley floors to mountainous terrain from just above sea level to 4000 ft elevation. Feed on slugs, snail eggs and earthworms. Occurs from northern California to southern Vancouver Island and some Gulf Islands.	late February – June; late September - October	CDC: red COSEWIC: EN SARA: EN	**Low.** Although suitable habitat occurs on site, this species is not known to occur on Gambier Island.

rubber boa *Charina bottae*	Mixed-wood and deciduous forests, typically dominated by Bigleaf maple (*Acer macrophyllum*) and with dense herbaceous cover, such as stinging nettle (*Urtica dioica*) with coarse woody debris, copious amounts of leaf litter, and both living and senescent vegetation. Western Cascades, Puget Trough, and eastern lowlands of the Olympic Peninsula in the United States north into the southwestern region of British Columbia. In BC, most records are from the Fraser Valley in the Mission/Abbottsford/Chilliwack area and from the lower portion of the Chilliwack Valley, below 360 meters in elevation. Two outlying localities, in Langley and southern Vancouver Island.	Year round; adults best located in late spring	CDC: yellow COSEWIC: SC SARA: SC	**Moderate.** Unconfirmed sightings of this species on Gambier Island (Michael Stamford, pers. comm.).
AMBHIBIANS				
tailed frog *Ascaphus truei*	Steep, cold mountain streams, with boulders or cobbles, approximately 0.5 to 15 meters in width in old-growth forests as breeding habitat, along with damp litter on the forest floor to survive as metamorphosed adults. Absent from creeks with either low or excessively steep gradients. Ice free in winter. They winter under rocks or at the stream surface. Eggs are attached to the underside of a boulder or large rock in the stream. Tadpoles feed on diatoms, and the adults consume a variety of items, including spiders, ticks, mites, collembolans (snow fleas), snails and various insects. Sensitive to stream disturbance such as siltation or algal growth. Adults are closely associated with their breeding creek throughout their lives, typically not moving more than 20 meters as adults need to stay moist as they are much less able to withstand drying than other frogs. Coastal mountain ranges in British Columbia, Washington, Oregon, Idaho, northwestern Montana and California from sea level to the timberline. In BC, this species occurs from Penticton north to the Portland Canal (north of Prince Rupert). It does not occur on Vancouver Island or the Queen Charlotte Islands.	Year round	CDC: yellow COSEWIC: SC SARA: SC	**High.** Known to occur (observed) in Whispering Creek (Michael Stamford, personal communication, 2021.)
red-legged frog *Rana aurora*	Streams, ponds, and marshes with slow-moving water and adjacent terrestrial environments; moist forest conditions far from open water characterized by mature vegetation, leaf litter, and large woody debris. Restricted to low elevations. Breeding in late winter/early spring in shallow water of permanent ponds or lakes, slow-moving streams, marshes, bogs, and swamps. During the summer, hatchlings typically occur within vegetation along streams, in moist sedge or brush, on shaded pond edges, and/or under logs or debris. Due to predation and competition with introduced bullfrogs (*Rana catesbeiana*),	March – October; hibernates from November until late February	CDC: blue COSEWIC: SC SARA: SC	**High.** Although no suitable breeding habitat on site, this species is known to migrate away from water. In addition, this species is known to occur on Gambier Island.

	the red-legged frog does not occur where this species is present. Occurs along the west coast of North America from Baja California to Canada and reaches the northern extent of its range in extreme southwestern BC. In BC, it occurs on Vancouver Island, the Gulf Islands, the mainland adjacent to the Straight of Georgia, and through the Fraser valley to Hope.			
wandering salamander *Aneides vagrans*	An entirely terrestrial salamander inhabiting low-elevation coastal Douglas-fir and Western Hemlock forests of various ages; usually under rotting logs or loose bark and moss. This species depends upon cutaneous respiration and therefore is restricted to moist microhabitats. Wandering Salamander is found only on Vancouver Island, adjacent small islands and one location on the Sunshine Coast.	Year round	CDC: blue COSEWIC: SC SARA: SC	**High.** This species has been observed and collected on Gambier Island (Michael Stamford, personal communication, 2021).
coastal giant salamander *Dicamptodon tenebrosus*	Dry, open woods to coastal rainforest at various elevations; many types of aquatic habitats, including mountain streams, large rivers, lakes and ponds in clear, cool, fast flowing and well-oxygenated streams with step pool morphology and sufficient hiding cover. The larvae of this species predominantly use pocket pools. This species is sensitive to competition and predation from introduced game fish. The aquatic larvae feed nocturnally on invertebrates, tadpoles, small fish, and occasionally each other. The metamorphosed adult forages in the forest, using the damp litter on the forest floor to survive: in moist forested areas with ample hiding cover an in close proximity to streams (within ten meters of the stream). Can move up to several hundred metres in wet neights and often move 1500 metres on successive nights. Adults consume land snails, slugs, beetles, shrews and other amphibians. Western coast of North America and from northwestern California to southwestern BC. In BC, this salamander occurs in just one drainage basin, the Chilliwack River valley; in small tributaries of the Fraser River near the Chilliwack River Valley. Their range in this vicinity appears to be continuous, extending from the west side of Vedder Mountain to the slopes east of Chilliwack Lake.	Year round	CDC: blue COSEWIC: TH SARA: TH	**High.**
BIRDS				
western grebe *Aechmophorus occidentalis*	Coastal, river backwater, and large slough areas. Breeds in western North America, very abundant to very common in southern coastal BC. On the coast, occurs in sheltered salt- and brackish water areas; small numbers are frequently found on slow-moving coastal rivers, large	Year round	CDC: red COSEWIC: SC SARA: SC	**Absent.** No suitable habitat for this species.

	sloughs, lakes, and in the open ocean. Occurs throughout North America. Historically, breeding locations are in the interior of British Columbia; eggs are deposited in late May/early June.			
great blue heron *Ardea herodias herodias*	Salt, brackish, and freshwater environments including marshes, swamps, shores, and tidal flats. The diet of great blue herons is highly variable and adaptable and includes fish, frogs, salamanders, turtles, snakes, rodents, and birds. This species is very common in southern BC and is frequently observed. The Fraser River delta is the primary wintering area for the great blue heron in BC. Breeding colonies are typically associated with island or mainland sites adjacent to tidal mud flats and eelgrass meadows. Nesting colonies can be located adjacent to high-traffic areas, such as Stanley Park, Vancouver. The nest is in trees approximately 5 to 30 metres above the ground or water. Widely distributed along the coast including Vancouver Island and the Queen Charlotte Island and throughout the interior south of the 52 latitude.	Year round	CDC: blue COSEWIC: - SARA: -	**Low.** Biological reconnaissance occurred during the early portion of the known nesting season. This species was not detected on site; no platform nests observed.
northern goshawk *Accipiter gentiles* ssp. *laingi*	Hunt inside the forest or along edge. Occur in coniferous or mixed forests and are restricted to wooded areas, may occur in open woods. Feed on birds and small mammals. In the Fraser basin, occurs near wooded sloughs, hedgerows, and woodlands along river banks with tall shrubs, and over cattail marsh. Nests in trees in major crotch of trunk. Throughout North America; range appears to be expanding. Breeds in the temperate and boreal regions of the northern hemisphere. Some confusion in the literature regarding the range of the subspecies: the American Ornithologists Union restrict this subspecies to the Queen Charlotte Islands and Vancouver Island, while Jewett *et al.* (1953) consider all coastal birds south to Oregon to be the *laingi* subspecies.	Year round	CDC: red COSEWIC: TH SARA: TH	**High.**
peregrine falcon *Falco peregrinus anatum*	Habitat requirements can be divided into three components, including the nest site, the nesting territory and the home range. The nest site is a scrape made on cliff ledges on steep cliffs, typically near wetlands. The nesting territory is the area defended around the nest, which is related to food availability. The home range is the non-defended area in which peregrines forage for food. This area can extend up to 27 kilometers from the nest. Peregrines often prefer open habitats such as wetlands, tundra, savanna, sea coasts, and open mountain meadows, but will hunt over open forest, can also occur near beaches, tidal flats, reefs, island, marshes, estuaries, lagoons, flooded farmland, airports,	Year round	CDC: red COSEWIC: NAR SARA: SC	**Low.** This species may forage in the vicinity if present.

	parks, golf courses, railway yards, and bridges. The main prey item for the peregrine falcon is birds; associated with habitats where there is an abundance of small-to-medium sized birds, including airports, bridges, and parks. Three subspecies of the peregrine falcon (*Falco peregrinus*) have distinct geographic distributions. The a*natum* subspecies, also known as the American peregrine, breeds south of the treeline in Alaska and Canada, throughout most of the United States of America, and from central to south Mexico.			
marbled murrelet *Brachyramphus marmoratus*	Coastal areas, mainly in salt water within 2 km of shore, including bays and sounds; not uncommon up to 5 km offshore; occasionally also on rivers and lakes usually within 20 km of ocean (but up to 75 km), especially during breeding season. Nests often are in mature/old growth coniferous forest near the coast: on large mossy horizontal branch, mistletoe infection, witches broom, or other structure providing a platform high in mature conifer (e.g., Douglas-fir, mountain hemlock). Most nesting occurs in large stands of old growth. Nest sites generally have good overhead protection. Nesting or probable nesting has been recorded up to 56 km inland in California (USFWS 1994). On the British Columbia coast, nesting birds flew 12-102 kilometers (mean 39 kilometers) inland from foraging sites on the water. In British Columbia, adult diet during the breeding season is mostly fishes.	Year round; breeding from late March to late September	CDC: blue COSEWIC: TH SARA: TH	**High.** Modelled critical habitat polygons for this species includes this area. Suitable nesting habitat occurs on site. (see: BC Government ongoing Cumulative Effects Project)
band-tailed pigeon *Columba fasciata*	Variety of habitats ranging from open wooded areas including mixed coniferous/deciduous trees with edges, city yards, parks, wooded groves, open bushland, mineral springs, and intertidal flats. Breeds in coniferous trees and deciduous trees. Forage for ripening fruits and grains in wooded areas; frequent rail lines, grain storage areas, and residential properties where grain is transferred and/or stored. Broadly distributed from southern Alaska to Central and South America. In North America, it is distributed along the coastal areas from about southern Alaska into Baja California; interior region from Colorado, where they extend mostly along the continental divide into South America. While present year-round in some	Year round	CDC: blue COSEWIC: SC SARA: SC	**Moderate.** Limited foraging opportunities on site.

	northern urban areas where it is attracted to feeders and holly orchards, the species is described as a partial migrant where most from the northern pacific coast breeding range migrate to south of the upper third of California (Sonoma-Nevada Counties) and most from the interior region migrate beyond the U. S. and Mexico border.			
short-eared owl *Asio flammeus*	Open areas such as marshes, swamps, sloughs, estuaries, lakeshores, spits, marine foreshores, beaches, lagoons, grasslands, sedge-hardhack associates, rangelands, airports, golf courses, dykes, agricultural fields and grassy fields; active during daylight, especially in the evening. Breeds in open country with shore vegetation, including grasslands, rangelands, near-dry marshes, farmlands, low-arctic tundra, brushy fields, and forest clearings. Nests are shallow scrapes on dry ground, on a raised hummock or ridge, and sparsely lined. Foraging and roosting occurs in abandoned pastures, fields, hay meadows, grain stubble, airports, golf courses, young conifer plantations, and marshes. Primarily consume microtine rodents. Scattered occurrences in winter in northern Mexico and summer residents as far north as Alaska. In North America, it breeds from Alaska across the southern arctic Canada to northern Quebec and Newfoundland south locally to Central California, Utah, Kansas, Ohio, and New Jersey; also South America and Eurasia, and Hawaii. The Fraser River delta is the main wintering area in BC. Here they roost in tall-grass areas along the lee side of dykes.	uncommon spring and autumn migrant throughout BC; year round on the extreme southwest coast	CDC: blue COSEWIC: SC SARA: SC	**Low.**
western screech-owl (*kennicottii* subspecies) *Megascops kennicotti kennicottiii*	Mixed deciduous/coniferous forests on the edges of clearings, wooded canyons, riparian thickets, deserts, orchards, at low elevations often associated with riparian areas. May roost in either coniferous or deciduous tree cavities, patches of thick vegetation, nest boxes, buildings, trees, vines, and crevices in cliffs. Nesting habitats of this owl include large, natural cavities (e.g. in trees), abandoned pileated woodpecker (*Dryocopus pileatus)* and northern flicker holes, as well as, cavities in poles, and old magpie (*Pica pica)* nests. May occur in wooded suburban areas and city parks, if they are disturbed minimally by humans and their associated activities.	Year round	CDC: blue COSEWIC: TH SARA: TH	**High.** Several wildlife trees throughout site have cavities suitable for nesting. Limited human disturbance.

	Western screech-owl is nocturnal and becomes active at dusk feeding on small mammals, birds, reptiles, small fish, and insects, with large insects being primary source of food (Alsop, 2001). This species is sedentary in that it often stays in the same home range throughout the year. Western portion of the North American continent from southern Alaska to central Mexico (COSEWIC, 2002). It is generally common and widely distributed throughout its range. In BC, this subspecies is known along the coast, including Vancouver Island, but excluding the Queen Charlotte Islands, relatively common in the lower mainland.			
Spotted owl *Strix occidentalis*	Preferentially selects old coniferous forests for foraging, roosting and nesting, with large overstorey trees (>75 cm dbh), multilayered canopy, large decaying fallen trees and large diameter standing dead trees; these stands are typically dominated by trees >200 years. Nest in tree cavities, deformities of large trees (e.g., depressions in the top of broken-topped trees, or platforms constructed by other birds or by natural accumulations of debris) located below the overhead canopy, thereby providing overhead cover and seclusion to the nest. Small mammals predominate in diet; also eats various birds and sometimes large insects. Sometimes stores food for future use. RESIDENT: southwestern British Columbia south through western Washington and western Oregon to southern California and northern Baja California (probably); in Rocky Mountain region from southern Utah and central Colorado south through the mountains of Arizona, New Mexico, extreme western Texas (Guadalupe Mountains), northern Sonora, Chihuahua, and Nuevo Leon to Jalisco, Michoacan, and Guanajato.	Year round; nocturnal	CDC: red COSEWIC: EN SARA: EN	**Low.** Suitable habitat on site, no surveys completed to detect presence on island.
northern pygmy-owl *Glaucidium gnoma swarthi*	Endemic to Vancouver Island. Generally found in mature forest or open woodlands; frequents meadows while foraging; nests in woodpecker holes. An opportunistic predator with a wide trophic niche; feeds primarily on small birds, small mammals, insects, and reptiles. British Columbia south through western U.S., interior Mexico, and Guatemala to central Honduras, east to Colorado, central New Mexico, and western Texas; also in Cape district of Baja California Sur, Mexico.	Year round; breeding from early April to mid-June;	CDC: blue COSEWIC: - SARA: -	**Low.**
olive-sided flycatcher *Contopus cooperi*	Abundant in early postfire landscapes that have burned at high severity. Breeds in coniferous woods across Canada, Alaska, and the northeastern and western United States, and other types of wooded areas in California. Migrate to Central America and the Andes region of South America.	Spring and summer	CDC: blue COSEWIC: SC SARA: TH	**Low.**

Barn swallow *Hirundo rustica*	Open situations, less frequently in partly open habitats, frequently near water. Nests in barns or other buildings, under bridges, in caves or cliff crevices, usually on vertical surface close to ceiling. Commonly reuses old nests. Usually returns to same nesting area in successive years; yearlings often return to within 30 km or closer to natal site. Flies over open land and water and forages on a wide variety of flying insects; rarely eats berries. South-coastal and southeastern Alaska, across much of Canada south through much of U.S. to central Mexico; also eastern Buenos Aires province, Argentina, in early 1980s (Ridgely and Tudor 1989); across Eurasia to Mediterranean region, northern Africa, China, Japan.	Late April through August	CDC: blue COSEWIC: TH SARA: TH	**Low.**
Common nighthawk *Chordeiles minor*	In British Columbia, Common Nighthawks can be found roosting and nesting in a variety of habitats including: beaches, farm fields, sagebrush and grassland habitat, open Ponderosa pine forests, rock outcrops, logged and slash-burned forest areas, coastal island meadows and urban areas. Ground substrates at nesting sites included gravel, sand, bare rock, wood chips, needles, leaves, and occasional living vegetation: lichen, dandelion and moss. Common Nighthawks are known from throughout the province, with the exception of west of the Coast Mountains north of Vancouver (where they are very rare) and the Queen Charlotte Islands (where they are accidental). They have been found breeding from sea level to elevations of 1250m.	Mid-march through August	CDC: yellow COSEWIC: SC SARA: TH	**High.** Suitable nesting habitat on site, adjacent lakes and ocean provide suitable foraging habitat. Observed every summer foraging above the forest canopy on site (Micael Stamford pers. comm.)
MAMMALS				
Townsend's big-eared bat *Corynorhinus townsendii*	Wide variety of habitats, its distribution strongly correlates with the availability of caves or cave-like roosts. Diet consists of small moths, lacewings, beetles, flies, and sawflies. Relatively sedentary and move only up to 10-65 km from the winter roost to the summer roost. Current range of this species is from Mexico into BC, along the western United States. In addition, there are a few isolated populations in the central and eastern United States.	Year round; nocturnal	CDC: blue COSEWIC: - SARA: -	**Low.** No caves within 100 m of site.

Legend

CDC

red candidates for legal designation as Threatened (TH) or Endangered (EN).

blue considered to be vulnerable or sensitive to human activities or natural events, and could become candidates for the red-list.

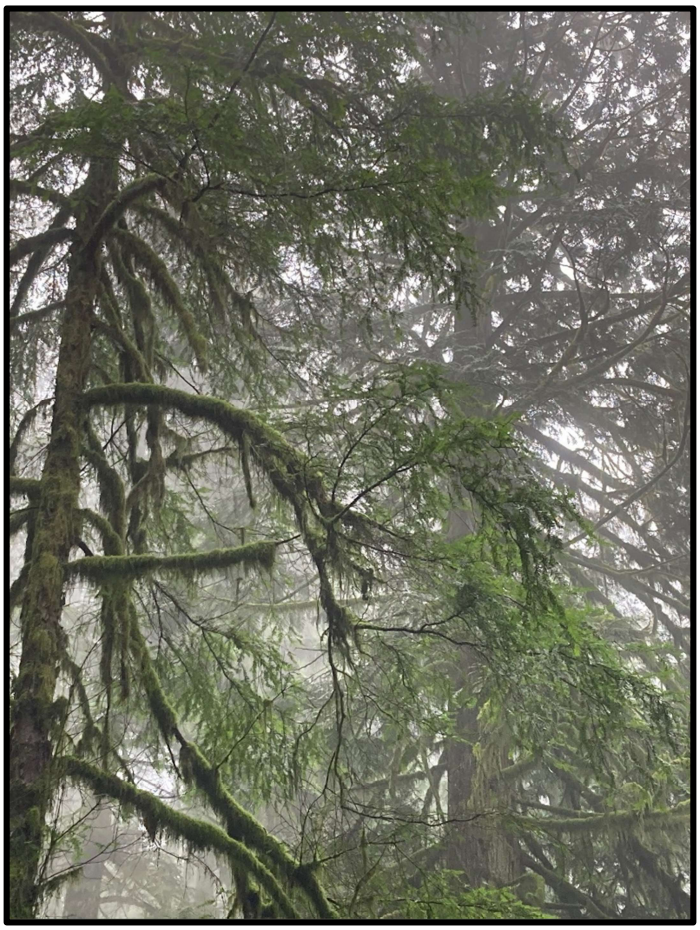
yellow indigenous and are not at risk in BC and include uncommon, declining, and increasing species.

SARA/COSEWIC

X	Extinct	a species that no longer exists
ET	Extirpated	a species that no longer exists in the wild in Canada, but occurs elsewhere
EN	Endangered	a species facing imminent extirpation or extinction
TH	Threatened	a species likely to become endangered if limiting factors are not reversed
SC	Special Concern	a species with characteristics that make it particularly sensitive to human activities or natural events
NAR	Not At Risk	have not been given status because populations are not in any peril; and,
DD	Data Deficient	a species for which there is insufficient scientific information to support status designation.
-	Not addressed	Not addressed by the COSEWIC or the SARA

ATTACHMENT B

Site Photographs



ATTACHMENT C

Resume

MADDISON CONSULTANTS LTD
SOUND SCIENCE FOR FUTURE GROWTH

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MICAELE J.W. FLORENDO, B.Sc., P.Biol., R.P.Bio.

Principal Biologist, 26 years experience

Micaele has worked both in Canada and the United States of America (U.S.A.), during the past twenty-six years on residential, commercial, industrial development projects. She has expertise in biophysical and wetland classification assessments. In addition, her experience covers biological reconnaissance surveys, botanical inventory surveys, ornithological surveys, amphibian call surveys, habitat mapping, environmental assessments, ecological assessments, biological impacts analysis, habitat restoration, construction monitoring, design and implementation of avoidance and minimization measures, design and implementation of mitigation measures, permit applications, and watershed assessment.

Micaele's career began in British Columbia working on a variety of contracts in both fisheries and botany. Subsequently, she moved to Southern California to work as a biologist specializing in botanical resources with some experience in ornithological surveys and wetland assessments for a mid-sized environmental consulting company. In 2005, Micaele partnered with her father, David Maddison, to provide biological resource services for Maddison Consultants Ltd. Micaele has been the sole proprietor since her father's retirement in 2008. In 2009, Micaele moved to Alberta where she has completed over a dozen biophysical assessments, amphibian surveys, ornithological surveys, botanical surveys and wetland classification assessments, as well as associated permit applications. Micaele is currently located on Bowen Island, British Columbia. She continues to provide services in both British Columbia and Alberta from initial studies through to construction phases.

SELECTED PROJECTS:

Micaele conducted nocturnal amphibian call surveys, botanical surveys, and an updated wetland delineation for a proposed development in Lloydminster, Alberta (AB). (2020).

Micaele conducted biological constraints analysis for a proposed residential project on Bowen Island, BC. This project included construction monitoring. (2018-2020).

Micaele conducted a botanical inventory for the Highway 91 and Highway 17 interchange project in Delta, BC. (2019).

PROFESSIONAL DEVELOPMENT:

Vancouver Island University. Riparian Areas Protection Regulation Methods. July, 2020.

Water Act Approvals – Alberta Environment and Parks Environmental approvals system OneStop webinar, 2020.

Updates to the Provincial Riparian Areas Regulation webinar, 2019.

Professional Governance Act overview webinar, 2018.

Wetland practice standards webinar, 2016.

Regulatory compliance for biologists in the oil and gas industry webinar, 2016.

Alberta Wetland Policy: As the rubber hits the road webinar, 2014.

De*mist*ifying Wetlands in Alberta, 2012

Botany of Calgary and Environs, 2011

Environmental and Operational Engineering Standards, 2006

Flora of the Eastern Mojave Desert, 2003

Flora of Camp San Luis Obispo,2003

Birding By Ear, 2002 & 2003

Introductory Birding, 2002

Identification of Raptors, 2001

Fairy Shrimp – Tadpole Shrimp Identification, 2001

Flora of San Diego County, 2001

Flora of San Luis Obispo, 2000

Southwestern Willow Flycatcher (*Empidonax trailli extrimus*) workshop, 2000

Fish Habitat Assessment and Rehabilitation Prescriptions, 1996

Introduction to the Forest Practices Code, 1995

PROFESSIONAL AFFILIATIONS:

Alberta Society of Professional Biologists, number 2066

College of Applied Biology/Association of Professional Biologists of BC, number 1423

EDUCATION:

University of Victoria, Bachelors of Science (Biology), 1994

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SELECTED PROJECTS CONTINUED:

Micaele conducted vegetation surveys for a Range Plant Community and Range Health Assessment for three proposed solar power projects in southern Alberta. (2018).

Micaele collected baseline data for sensitive plant species, botanical inventory, Ecological Land Classification, and invasive species as well as a wetland inventory for an Environmental Assessment under the federal Canadian Environmental Assessment Act (CEAA) in Bragg Creek, Alberta. (2017).

Micaele completed a Phase II Ecological Network Report for a proposed Industrial Development in Edmonton, AB. Assessments included biological reconnaissance, sensitive botanical species surveys, wetland classification assessment using the Alberta Wetland Classification System (AWCS), as well as completing the Alberta Wetland Rapid Evaluation Tool-Actual (ABWRET-A) form and shapefile for a determination of relative wetland value to initiate coordination of anticipated compensation for proposed impacts to wetlands.

Micaele conducted a biophysical assessment of a proposed seismic program within the Manitou Sandhills Area, Saskatchewan. (*2015*).

Micaele conducted a biophysical assessment within Beaumont, Alberta. The assessments included botanical and ornithological surveys, a wetland classification assessment accompanied with recommendations of avoidance and minimization measures. In addition, Micaele obtained the required wetland approvals and compensation packages to offset project impacts to wetlands. This project was completed efficiently and on budget while meeting the new Water Act Policy deadlines. (*2015*).

Micaele completed a biophysical constraints analysis of a proposed industrial development within Alexander First Nations Reserve Number 134. This assessment included botanical and ornithological surveys, constraints analysis, and recommendation of avoidance and minimization measures. Subsequently, Micaele prepared the Detailed Environmental Review (DER) based on the Aboriginal Affairs and Northern Development Canada (AANDC) terms of reference. (2012-*2013).*

Micaele compiled a sensitive botanical species list and then conducted botanical surveys for sensitive botanical resources within the revised project boundary for the South Fraser Perimeter Road (SFPR) project of the Gateway Program, Lower Mainland, British Columbia. Subsequently, she designed and coordinated the implementation of the mitigation plan for the rare botanical species observed within the project boundaries. *(2008-2010).*

WORK HISTORY PRIOR TO MADDISON CONSULTANTS:

ECL-Envirowest Consultants Ltd. Burnaby, B.C., 2005

LSA Associates, Inc. Irvine, California, 1999 – 2005

BC Conservation Foundation, Surrey, B.C., 1998 – 1999J.O. Thomas and Associates, Vancouver, B.C., 1998

EVS Environment Consultants, North Vancouver, B.C., 1997 – 1998

Andrew A. Bryant Services, Nanaimo, B.C., 1997

Malaspina University-College, Nanaimo, B.C., 1996

Coastal Geoscience Research Corporation, Victoria, B.C., 1994 – 1996

Pacific Forestry Centre, Victoria, B.C., 1992 - 1993

SELECTED PROJECT EXPERIENCE PRIOR TO MADDISON CONSULTANTS LTD.:

Micaele conducted surveys for song birds, raptors, and nesting birds for the development of the Richmond Oval site, Richmond, British Columbia. *(2005).*

Micaele conducted focused surveys for burrowing owl *(Athene cunicularia hypugea)* within the Eastvale area of Riverside County, California. *(2004).*

Micaele completed monthly bird surveys at the Bolsa Chica Mesa, Orange County, California. *(2003-2004).*

Micaele conducted the background literature review, botanical surveys, general ornithological surveys, delineation of jurisdictional waters, oak tree surveys, and impact assessment for a variety of projects throughout southern and central California. In addition, Micaele designed the avoidance and minimization measures to offset impacts associated with proposed development. Furthermore, she obtained the required environmental approvals from the various regulatory agencies *(2003-2005).*

ATTACHMENT D

Plant and Animal List

PLANT SPECIES OBSERVED

The following plant species were observed in the assessment area by biologist Micaele Florendo during the site survey.

* Introduced, nonnative species

BRYOPHYTES

Blechnum spicant	deer fern
Climacium dendroides	treemoss
Dryopteris expansa	spiny wood fern
Hylocomium splendens	step moss
Pleurozium schreberi	red stemmed feathermoss
Polypodium glycyrrhiza	licorice fern
Polystichum munitum	sword fern
Polytrichum juniperinum	juniper haircap moss
Polytrichum communis	common haircap moss
Pseudotsuga menziesii	Douglas fir
Pteridium acquilinum	bracken fern
Ptilium crista-castrensis	knight's plume moss
Selaginella wallacei	Wallace's selaginella
Thuja plicata	western redcedar
Tsuga heterophylla	western hemlock

ANGIOSPERMAE: DICOTYLEDONAE DICOT FLOWERING PLANTS

	Acer macrophyllum	bigleaf maple
	Alnus rubra	red alder
	Digitalis purpurea	common foxglove
*	*Geranium robertianum*	Robert's geranium
	Rubus ursinus	California blackberry
	Tiarella trifoliata	three-leaved foam flower
	Vaccinium parvifolium	red huckleberry

ANGIOSPERMAE:MONOCOTYLEDONAE MONOCOT FLOWERING PLANTS

Goodyera oblongifolia	rattlesnake plantain
Juncus effuses	common rush

Taxonomy and nomenclature are based on the following:

Klinkenberg, Brian. (Editor) 2020. *E-Flora BC: Electronic Atlas of the Flora of British Columbia* [eflora.bc.ca]. Lab for Advanced Spatial Analysis, Department of Geography, University of British Columbia, Vancouver.

ANIMAL SPECIES OBSERVED

This is a list of animals noted in the study area. Presence may be noted if a species is seen, or heard, or identified by the presence of tracks, scat or other signs.

* Introduced species

AVES	**BIRDS**
Corvidae	**Jays, crows and their allies**
Corvus corax	common raven
Turdidae	**Thrushes**
Turdus migratorius	American robin
Emberizidae	**Emberizids**
Junco hyemalis	dark-eyed junco

Taxonomy and nomenclature are based on the following:

American Ornithologists' Union. 1998. The A.O.U. Checklist of North American Birds, 7th Ed. American Ornithologists' Union, Washington D.C.; 1998.

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_____2004. Forty-fifth Supplement to the American Ornithologists' Union Checklist of North American Birds. Auk 121: 985-995; 2004.

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_____2006. Forty-seventh Supplement to the American Ornithologists' Union Checklist of North American Birds. Auk 123: 926-936; 2006.

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_____2008. Forty-ninth Supplement to the American Ornithologists' Union Checklist of North American Birds. Auk 125: 758-768; 2008.

_____2009. Fiftieth Supplement to the American Ornithologists' Union Checklist of North American Birds. Auk 126: 705-714; 2009.

_____2010. Fifty-first Supplement to the American Ornithologists' Union Checklist of North American Birds. Auk 127: 726 - 744; 2010.

_____2011. Fifty-second Supplement to the American Ornithologists' Union Checklist of North American Birds. Auk 128: 600 - 613; 2011.

_____2012. Fifty-third Supplement to the American Ornithologists' Union Checklist of North American Birds. Auk 129(3):573 – 588, 2012.

_____2013. Fifty-fourth Supplement to the American Ornithologists' Union Checklist of North American Birds. Auk 130:558 – 571, 2013.

_____2014. Fifty-fifth Supplement to the American Ornithologists' Union Checklist of North American Birds. Auk 131:CSi - CSSxv.

_____2015. Fifty-sixth Supplement to the American Ornithologists' Union Checklist of North American Birds. Auk 132:748 – 764, 2015.

_____2016. Fifty-seventh Supplement to the American Ornithologists' Union Checklist of North American Birds. Auk 133: 544 – 560, 2016.

_____2017. Fifty-eighth Supplement to the American Ornithologists' Union Checklist of North American Birds. Auk 134: 751 - 773, 2017.

_____2018. Fifty-ninth Supplement to the American Ornithologists' Union Checklist of North American Birds. Auk 135: 798-813, 2018.

_____2019. Sixtieth Supplement to the American Ornithologists' Union Checklist of North American Birds. Auk 136: 1-23, 2019.

_____2020. Sixty-first Supplement to the American Ornithologists' Union Checklist of North American Birds. Auk 137. https://doi.org/10.1093/auk/ukaa030 2020.