Larch Hills Traverse 2010

Environmental Screening Report

Date: February 16, 2010

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Summary of Recommendations

Issues, hotspots, and values

The primary environmental issues to consider when expanding the Larch Hills Traverse trail network are related to those trail sections that are in close proximity to wetlands. While the trail will be routed away from the wetlands there are still three main issues:

1. Destruction or degradation of habitat for wetland species, especially those at risk.
2. Enabling access into the wetlands by motorized traffic.
3. The introduction of invasive species into the wetlands.

These issues are especially sensitive around upper Violet Creek Park. A review of existing biological information has revealed that there are may be several plant species at risk in the type of habitat found near the wetlands. An inventory will help determine whether these sensitive plants are present. Given that the area is also well-used by backcountry horse groups, a preliminary inventory for invasive plant species will also be useful as baseline information for future monitoring.

Recommendation #1: Trail design and construction

Avoid trail layout through riparian areas where possible. If unavoidable, engage a biologist to ensure that the intent of protective legislation (Riparian Areas Regulation, and Section 9 of the Water Act) is followed. Construct all trails using current best practices to avoid erosion and control sediment flow into water bodies. Certified wildlife/danger tree assessors must sign off on any danger trees that require removal during trail construction, especially in riparian areas. This will minimize destruction of important nesting habitat for birds and small mammals.

Recommendation #2: Plant species at risk

Prior to finalizing trial layout, conduct a simple reconnaissance inventory for plant species at risk and the presence of habitat features used by animal species at risk using the field guide provided in Appendix A. The environmental screening process has coordinated species lists that are separated based on vulnerability to impact (e.g., red or blue listing) and habitat type (e.g.,

riparian or forested habitats). These lists are provided in this report along with guidelines on inventory methods.

Recommendation #3: Invasive plant management

A baseline inventory on the presence of invasive plants will also be useful to monitor trends in distribution and abundance. Invasive plant species lists and guidelines on inventory methods can be coordinated through the Invasive Plant Council of BC (http://www.invasiveplantcouncilbc.ca/).

Recommendation #4: Wildlife species at risk

Avoid all habitat features used by wildlife species at risk during trail layout and design. A table of wildlife species at risk and habitat features is provided in this report.

Part 1: Application

Action Description

This environmental screening report encompasses the stage 2 sections of the Larch Hills Traverse. These sections have been proposed in order to route the traverse off existing roads which were used as connections between the ``Rough and Ready`` stage 1 sections. Trail activities and use include hiking, biking, horseback and skiing.

Purpose

Use of the Traverse Trail since trail construction began has been primarily biking, with hiking second. Residents of Salmon Arm and Sicamous have been the primary users.

Location

The Larch Hills Traverse is located on the north side of the Larch Hills between Sicamous and Salmon Arm. This report deals with the section from the old sawmill site east of the end of FSR 110-Branch 070, Kilometre 3 to the top of the Sicamous switchback trail at the end of FSR 112-Branch 600. See the Larch Hills Traverse trail line shown on the attached maps. That line overlaps the already built switchback section up from Sicamous and the proposed section from Salmon Arm, Metford Dam to the end of Branch 070.

Schedule

Trail construction for Stage 1 ``Rough and Ready`` began in 2007. Stage 2 is expected to commence after consultation with the Lakes Division of the Shuswap First Nations, Federated Coop and the BC government.

Activities

Trail construction activities will consist of clearing blowdown and brush on the trail corridor, falling danger trees close to the trail, digging and clearing the trail bed to conform to trail standards

Trail use will be non-motorized hiking, biking and horse riding in the spring, fall and summer with cross country skiing and snows hoeing in the winter and spring.

Part 2: Environmental and land-use

Summary (issues, hotspots, and values)

The Larch Hills Traverse Trail is primarily in the Shuswap moist warm Interior Cedar Hemlock (ICHmw2) biogeoclimatic subzone variant. The sections of the trail covered by this report are entirely in this ICH zone (Fig. 1).

One section of the proposed trail is shown on the map (See Figure 4) as cutting through a corner of the north end of Upper Violet Creek Provincial Park. This line will be re-plotted once the snow has disappeared in the summer of 2010. The trail will be kept out of the park boundaries.

Figure 1 shows 6 wetland areas close to the trail. Trail layout through riparian areas or close to riparian areas will be minimized. All trails will be constructed using current best practices to avoid erosion and sediment control into water bodies. Prior assessments for ecological communities and plant species at risk as well as a cursory inventory on the presence of invasive plants will be useful as baseline information for long term adaptive management planning.

Standing dead and danger trees on the trail will be assessed by a certified wildlife/danger tree assessor before construction begins.

Ecological Communities

There are 9 ecological communities listed on the BC status list. Eight are yellow listed (not at risk). One is blue listed (special concern): western red cedar-western hemlock/common horsetail. The Conservation Framework Summary rates the threat to this community as low. There are no red listed (extirpated/endangered/threatened) communities. (Table 1)

Plants

The Larch Hills Traverse trail that this report is concerned with has only two types of plant habitat: palustrine (wetland) and terrestrial. There are 46 red listed and 80 blue listed species in the ICHmw2 biogeoclimatic zone over those two plant habitats (wetland and terrestrial). Nearly all of the listed species occur in riparian areas such as Mara Meadows Ecological Reserve, well south of the trail site. (See Table 2) Special attention will be paid regarding these plants during trail development, especially near wetlands and at the north end of Upper Violet Creek Park. Violet Creek is the main stream feeding Mara Meadows. As well I would recommend the trail

section skirting Upper Violet Creek Park be carefully surveyed for plant species so that we have baseline information for long term adaptive management. This should be done before any work commences on the trail in that section.

Wildlife

There is a varied range of species in the Larch Hills. There are 91 species at risk in the Interior Cedar Hemlock biogeoclimatic zone (all subzones and variants included) (Table 3). Many of those species are found around the lakes and rivers of the Shuswap but not in the Larch Hills. Red listed species which may occur in the Shuswap ICH subzone include badger, Lewis's woodpecker, northern leopard frog, Rocky Mountain tailed frog, sage thrasher, Swainson's hawk, tiger salamander, western screech-owl, Wiliamson's sapsucker, yellow-breasted chat. Special attention should paid to these species and their habitat if observed. A blue listed species that also needs special observations for possible habitat is the fisher (dens in hollow logs)

A search on the GeoBC data base for Mapped Wildlife Species Point Locations and Species Inventory Telemetry and Species Inventory Wildlife Observations showed a few observations of moose throughout the large hills. There is a hunting season for moose, deer and black bear in Wildlife Management Units 3-26 and 8-26. The Larch Hills Traverse goes through both these units.

There are no mapped Wildlife Management Areas in the Larch Hills.

The Larch Hills Traverse does go through mapped Ungulate Winter Ranges. See Figure 2 showing the Larch Hills Traverse and mule deer winter ranges. These areas are managed by the Ministry of Environment and show areas of high value habitat for mule deer. The section of the trail this report is concerned with touches on the edge one range.

Fish and fish habitat

While there are wetland areas along this portion of the Larch Hills Traverse there are no lakes. The trail will cross north of the headwaters of Canoe and Violet creeks and south of the unnamed creek draining the area north of the height of land above Violet Creek. The stream draining the wetland at the east end of FSR 110-300 is currently crossed by a footbridge (11 U 350703, 5626220).

Soil and water degradation

The sections of the proposed Larch Hills Traverse (Figure 1) concerned with this report are predominately dry. Sections near wetlands have been routed to high ground away from the wetlands. Current standard best practices (Whistler Standards, International Mountain Bike

Association) for trail construction related to grade and drainage concerns will minimize any negative impacts of the trail on surrounding soil and water quality.

Current and historic land use

The Splatsin band of the Shuswap First Nation utilized this area for hunting and gathering. The trail from Sicamous to the end of FSR 112 follows along the north boundary of Indian Reserve 3 of the Splatsin. The whole area of the Larch Hills is an area of historical interest and claim by the Splatsin people.

Logging interests along the proposed trail route are held primarily by Federated Coop and Tolko. Both companies have been consulted regarding built and planned trail proposals. Many trail sections are through recently logged areas as well as areas that will be logged in future. Where possible the trail has been planned through Old Growth Management Areas and Wildlife Tree Patches.

Much of the area of the Larch Hills is a recreation area managed by the Larch Hills Nordic Society through the Ministry of Tourism, Culture and the Arts and the Ministry of Forests. The trail utilizes some of the existing Larch Hills Nordic and Shuswap Outdoors winter ski trails.

There is no Guide Outfitter operating in this area. There is no trapline license. There is a range license south of the trail route. There are mining claims in the Larch Hills. The Larch Hills are within the Salmon Arm unit of the Okanagan Shuswap Land and Resource Management Plan although there are no specific Resource Management Zones mapped in the area.

Part 3: Mitigation and monitoring

This is the framework for long-term adaptive management planning:

A. **Results:** What we are attempting to achieve

B. **Desired Behaviours:** Actions by users that are most likely to achieve results

C. **Indicators:** What to measure to determine if results are being achieved

D. **Limits:** Acceptable bounds of the measured indicator

E. **Monitoring Schedule:** How often the indicators will be measured

F. **Corrective Actions:** Actions triggered if limits are surpassed

A. Results

1. Avoid removal of large standing dead trees.
2. Avoid soil compaction and trail widening near riparian areas.
3. Minimize spread of invasive plant species.
4. Minimize physiological or behavioural disruption of wildlife.
5. Avoid increased threat to wildfire along the private land interface.

B. Desired Behaviours

1. Use certified wildlife/danger tree assessors to evaluate standing snags prior to removal for safety concerns will promote the conservation of wildlife habitat trees. Conduct baseline inventory of large nest trees during trail layout phase. All danger trees that do require removal as a consequence of trail construction should be fallen must be left to decay on the forest floor.
2. No trails through wetlands, and minimal travel through riparian areas (30 m from water bodies). Use existing trails, avoid widening existing trails, avoid heavy use during muddy conditions, obey all trail closures.
3. Learn to identify invasive plants, inspect clothing, equipment, and animals before and after activity, restrict use of areas with invasive plants to times of the year when spread is unlikely, remove invasive plants using appropriate techniques (contact Invasive Plant Council of BC). Conduct baseline inventory.
4. Do not harass wildlife, record wildlife encounters on standard forms provided at trail heads/campground.
5. No open fires except in designated campsites, no trail use during high fire risk periods when backcountry closures are in effect. No smoking.

C. Indicators

1. Number of nest trees (requires baseline inventory), and
2. Trail widths, trail braiding, evidence of erosion within riparian areas (30 m from water course) (option: use Backcountry Recreation Impact Monitoring – BRIM forms)

3. Extent and frequency of invasive species occurrence within 5 m of trails
4. Proportions of wildlife encounters resulting in an alarm response (movement by animals to safer locations), population abundance and distribution trends (check with Min. of Environment for updates on wildlife inventory data)
5. Fire rings/scars, reports of trail use during closed periods.

D. Limits

1. No trees with large open nests removed as a consequence of trail development activities.
2. No increase in trail width, no erosion near waterways
3. No increase in invasive species stem densities, or spatial extent of current infestations
4. No increase in rate of alarm responses over time, no harassment reported, no abandonment of habitats caused by trail activities
5. No increase in fire scars outside of campsites.

E. Monitoring Schedule

- Assessment frequency and application will be tailored to the rate of change that is expected at specific sites (e.g., high use trails near sensitive sites). Current suggestions are for a 3 year monitoring schedule.
- Trail user survey forms should be made available at campsites and trail heads.
- Incorporate assessments and compilation of trail use forms into a trail maintenance plan (e.g., spring trail clearing and trail monitoring, end of season form collection and summary)
- Provide a process for people to record and report observations non-conforming use of the new trail (e.g., motorized use in riparian area, open fires outside of campsites)

F. Corrective Actions

- Increase user education efforts
- Seasonal trail closures (e.g., high water in spring, invasive plant seed dispersal periods)
- Trail relocation (specific thresholds that would trigger this level of corrective action still require more discussion)

Part 4: Pre-screen checklist

Compliance (legislation, land-use plans, guidelines)

Riparian Areas Regulation (BC Water Act, Federal Fisheries Act)

- ✓ Maintain no-disturbance zone in streamside protection and enhancement areas (SPEAs)
- ✓ Notify Ministry of Environment and Fisheries and Oceans Canada (DFO) if work is unavoidable in and about a stream or water body
- ✓ Follow intent and criteria for no harmful alteration or disruption of fish habitat in DFO's Operational Statements for clear span bridges (Appendix X) when constructing foot bridges over streams

Species at Risk Act

- protection to listed species (extirpated, endangered, or threatened)
- federal government has responsibility for federal lands, aquatic species, and migratory birds

Wildlife Act

- protection of nests and nesting birds

Identified wildlife management strategy

- protection of species at risk and regionally important wildlife that the provincial government has designated as requiring special management under the Forest and Range Protection Act (FRPA)

Notification/Consultation

Sexqéltkemc Lakes Division

Private land holders

Federated Co-op

Tolko Industries

Woodlot license holders

Range tenure holders

Local motorized recreation groups

Larch Hills Nordic Society

BC Parks

Checklist of potential impacts:

Avoid disturbance within riparian areas

Plant species at risk inventory prior to final trail location

Invasive plant inventory as baseline information

Avoid direct disturbance to wildlife (harassment by people and dogs)

Avoid soil compaction, sedimentation and erosion near water bodies

Minimize wildlife tree removal

Web-based Information Sources

BC government Land and Resource Data Warehouse. December 2009 extractions through GeoBC Data Distribution Service.

BC Conservation Data Centre 2010, BC Species and Ecosystem Explorer, BC Ministry of Environment, Victoria BC, Available: http://a100.gov.bc.ca/pub/eswp/ (accessed Jan 8, 2010).

Habitat Wizard. BC Ministry of Environment FDIS Fisheries Database.

E-Flora. Electronic atlas of the plants of BC. In: Klinkenberg, Brian. (Editor) 2009. E-Flora BC: Electronic Atlas of the Plants of British Columbia [eflora.bc.ca]. Lab for Advanced Spatial Analysis, Department of Geography, University of British Columbia, Vancouver. January, 2009.

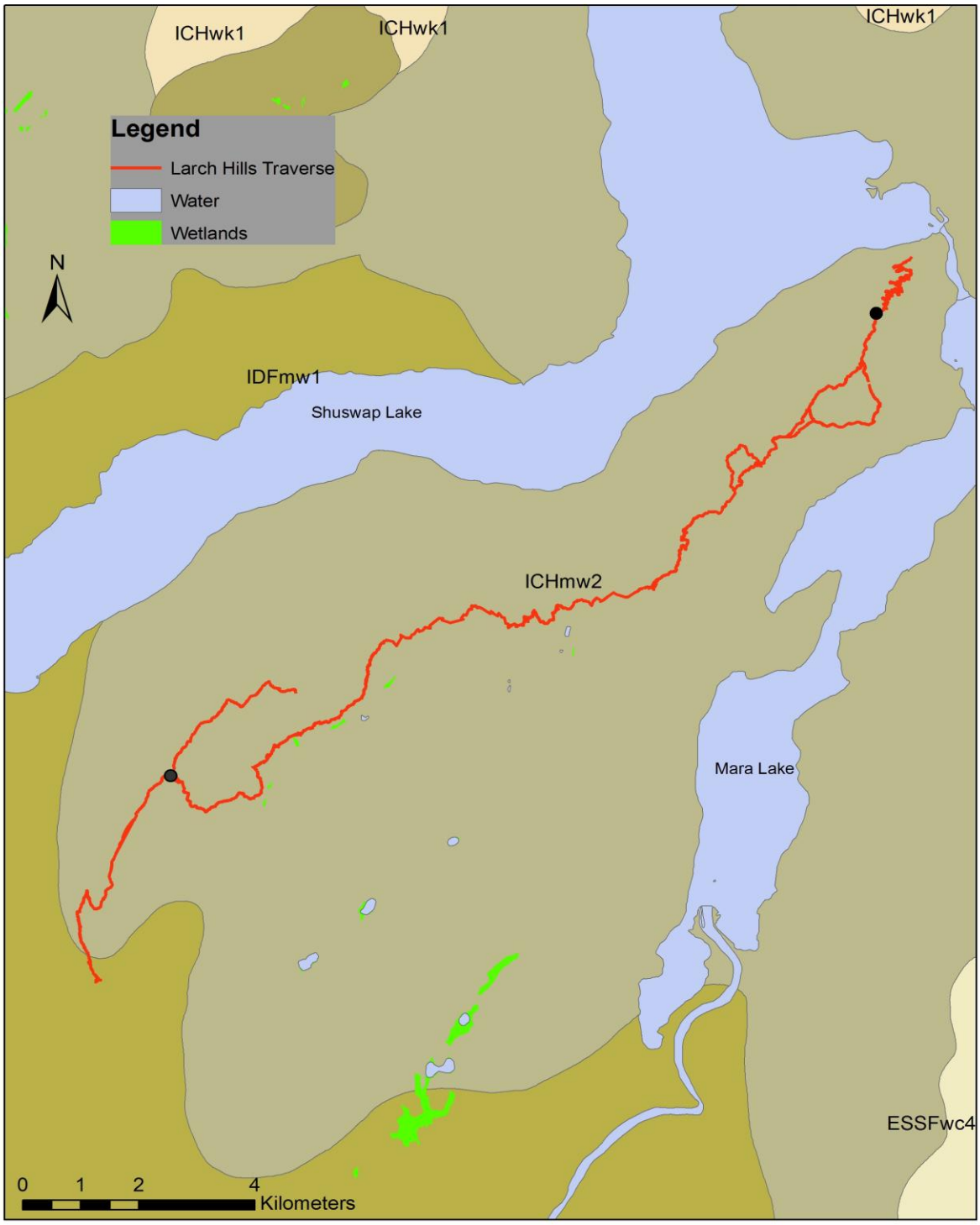


Figure 1 Biogeoclimatic Zones and Wetlands on Larch Hills Traverse. Environmental Review Report covers the area between the points.

Table 1. Ecological communities at risk in the Shuswap moist warm biogeoclimatic zone (ICHmw2) .These vegetation communities will be avoided where possible during trail design and construction on the Larch Hills Traverse.

English Name	BC List	Ecosystem Group
bluejoint reedgrass / glow moss	Yellow	Herbaceous, Wetland
bluejoint reedgrass - sedges	Yellow	Herbaceous, Wetland
Douglas-fir - western redcedar / falsebox	Yellow	Forest
western redcedar / Utah honeysuckle / oak fern	Yellow	Forest
western redcedar / devil's club / lady fern	Yellow	Forest, Riparian
western redcedar - hybrid white spruce / skunk cabbage	Yellow	Wetland, Forest
western redcedar - western hemlock / common horsetail	Blue	Forest, Riparian
western hemlock / falsebox	Yellow	Forest
western hemlock - western redcedar / falsebox / red-stemmed feathermoss	Yellow	Forest

Table 2. Plant species at risk in the interior cedar hemlock biogeoclimatic zone (ICH) within the Kamloops Forest District and Columbia Shuswap Regional District .These plant species will be avoided where possible during trail design and construction on the Larch Hills Traverse. A field guide to these plants can be found at the end of this report (Appendix A). Given the difficulty with field identification of moss species, they have been left out of this guide.

Scientific Name	English Name	Plant type	Plant family	BC List	IDF and ICH zone	Habitat Type	Flower Colour
Dryopteris cristata	crested wood fern	Fern	Fern	Blue	ICHmw;IDFmw; IDFxh	Swamps and wet meadows	
Epilobium ciliatum ssp. watsonii	purple-leaved willowherb	Herbaceous vascular plant	Evening primrose	Blue	ICHmw	Wet disturbed areas, fields and ditches	Rose purple to
Hypnum pratense		Moss	Hypnaceae	Blue	ICH;IDF	n/a	
Hypericum scouleri ssp. nortoniae	Western St. John's-wort	Herbaceous vascular plant	Clusiaceae	Blue	ICHwk	Moist to wet	Yellow
Pyrola elliptica	white wintergreen	Herbaceous vascular plant	Wintergreen	Blue	ICHmw	Dry to moist forests	White
Liparis loeselii	Loesel's Twayblade	Herbaceous vascular plant	Orchid	Red		Wetland	Yellow
Rhizomnium punctatum		Moss	Mniaceae	Red	ICH;IDF	n/a	
Rhynchospora capillacea	brown beak-rush	Sedge	Sedge	Red	ICHmw	Calcareous fens and shorelines	Brown
Salix tweedyi	Tweedy's willow	Shruby vascular plant	Willow	Blue	ICHmw	Moist streambanks and lakeshores	
Solidago gigantea ssp. serotina	smooth goldenrod	Herbaceous vascular plant	Aster	Red	ICHmw;IDFxh	Moist streambanks, meadows, forest openings	Yellow
Sphagnum platyphyllum		Moss	Sphagnaceae	Red	ICH;IDF	n/a	

Table 3. Bird species at risk in the interior cedar hemlock biogeoclimatic zone (ICH) within the Kamloops Forest District and Columbia Shuswap Regional District .Habitat features (e.g., wildlife trees) used by these bird species will be avoided where possible during trail design and construction on the Larch Hills Traverse.

English Name	BC List	Identified Wildlife	Class	Habitat Type
Lark Sparrow	Red		birds	forest/upland
Western Screech-Owl, *macfarlanei* subspecies	Red	Y (May 2004)	birds	wetland; forest/upland
Lewis's Woodpecker	Red	Y (May 2004)	birds	wetland; forest/upland
Swainson's Hawk	Red		birds	wetland; forest/upland
Great Blue heron, *herodias* subspecies	Blue	Y (Jun 2006)	birds	estuaries; lake shore;wetland ;river bank; forest/upland
Short-eared Owl	Blue	Y (May 2004)	birds	estuaries; wetland; forest/upland
Canyon Wren	Blue		birds	forest/upland
Olive-sided Flycatcher	Blue		birds	wetland; forest/upland
Bobolink	Blue		birds	wetland; forest/upland
Horned Lark, *merrilli* subspecies	Blue		birds	forest/upland
Barn Swallow	Blue		birds	estuaries; lake shore; wetland; river bank; forest/upland
Long-billed Curlew	Blue	Y (May 2004)	birds	estuaries; wetland;forest/upland
Boreal Owl	Yellow		birds	
Black Tern	Yellow		birds	
Common Nighthawk	Yellow		birds	
Northern Harrier	Yellow		birds	
Bald Eagle	Yellow		birds	
Sandhill Crane	Yellow	Y (Jun 2006)	birds	lake shore; wetland; river bank; forest/upland
Western Screech-Owl	No Status		birds	

Table 4. Other wildlife species (mammals, insects, amphibians, reptiles, gastropods) at risk in the interior cedar hemlock biogeoclimatic zone (ICH) within the Kamloops Forest District and Columbia Shuswap Regional District .Habitat features used by these species will be avoided where possible during trail design and construction on the Larch Hills Traverse.

English Name	BC List	Identified Wildlife	Class	Habitat Type
American Badger	Red	Y (May 2004)	mammals	forest/upland
Western Painted Turtle - Intermountain - Rocky Mountain Population	Blue		turtles	wetland; river bank
Townsend's Big-eared Bat	Blue		mammals	wetland; forest/upland
Monarch	Blue		insects	wetland; forest/upland
Wolverine, *luscus* subspecies	Blue	Y (May 2004)	mammals	forest/upland
Pale Jumping-slug	Blue		gastropods	forest/upland
Magnum Mantleslug	Blue		gastropods	forest/upland
Fisher	Blue	Y (Jun 2006)	mammals	wetland; forest/upland
Fringed Myotis	Blue	Y (May 2004)	mammals	wetland; forest/upland
Bighorn Sheep	Blue	Y (Jun 2006)	mammals	wetland; forest/upland
Common Sootywing	Blue		insects	wetland; forest/upland
Grizzly Bear	Blue	Y (May 2004)	mammals	wetland; river bank; forest/upland
Columbia Spotted Frog	Yellow		amphibians	
Western Toad	Yellow		amphibians	
Grey Wolf	Yellow		mammals	
Rubber Boa	Yellow		reptiles	
Wolverine	No Status		mammals	
Western Painted Turtle	No Status		turtles	

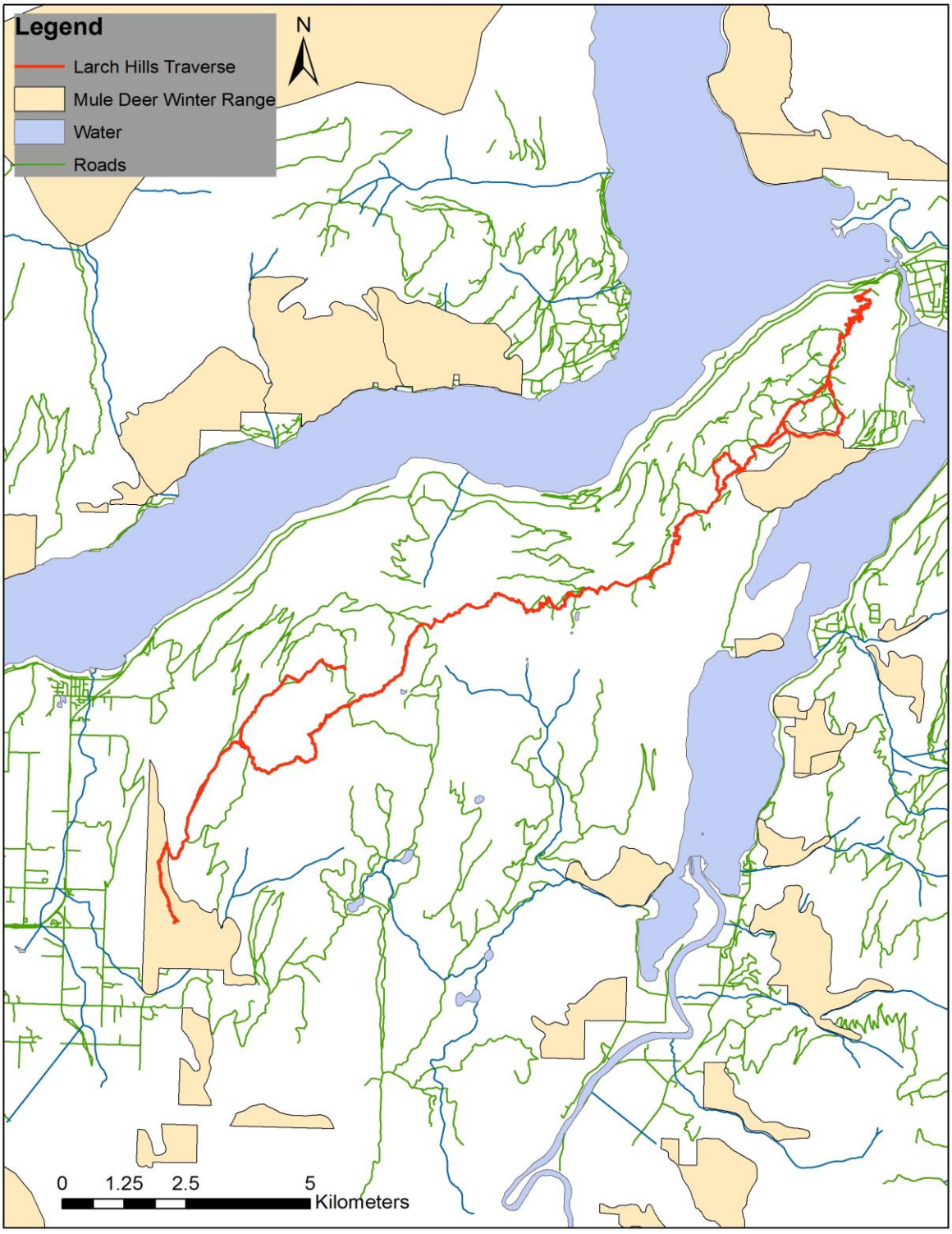


Figure 2. Mule Deer Winter Ranges in the Larch Hills.

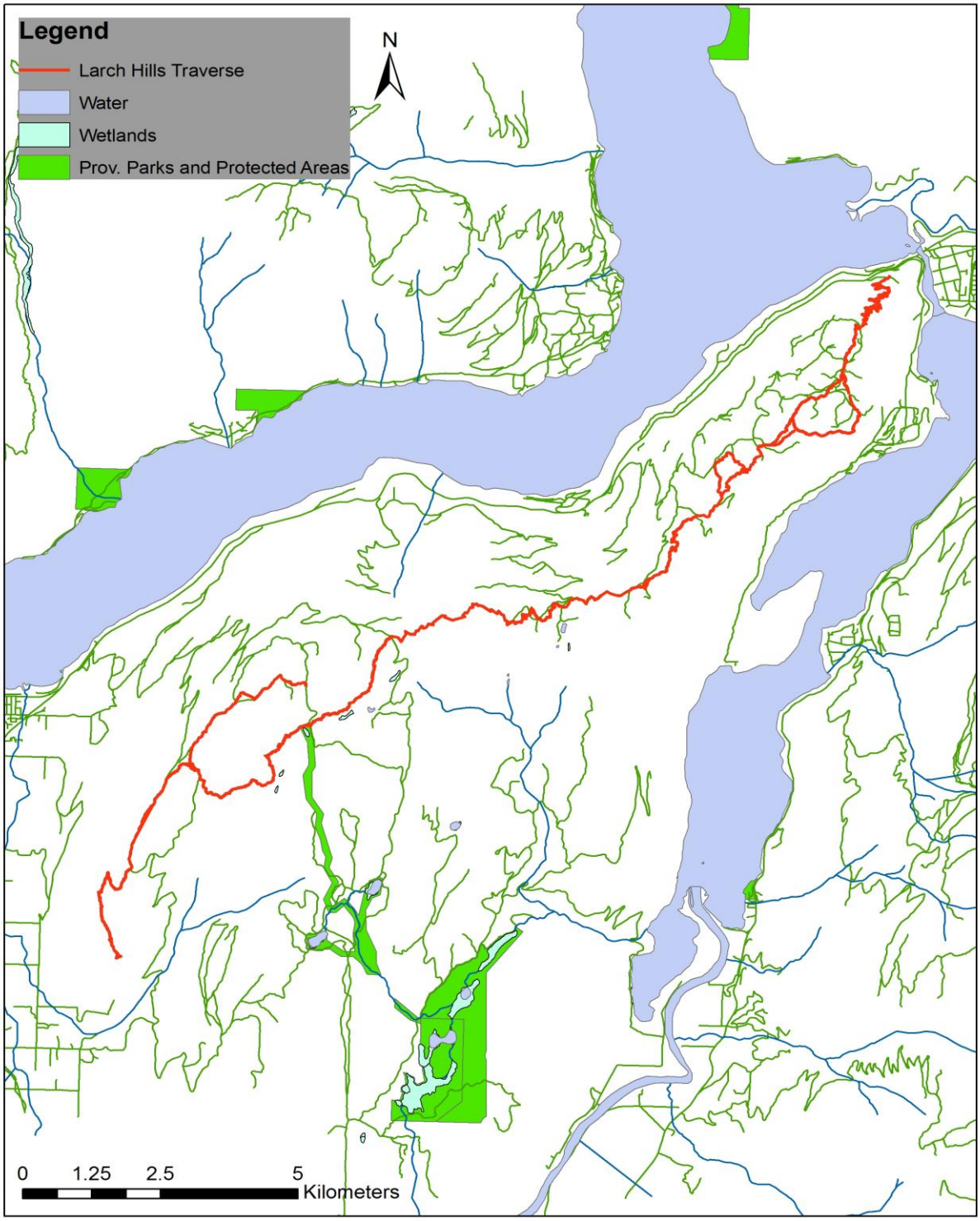


Figure 3. B.C. Parks and Protected Areas and Wetlands in the Larch Hills.

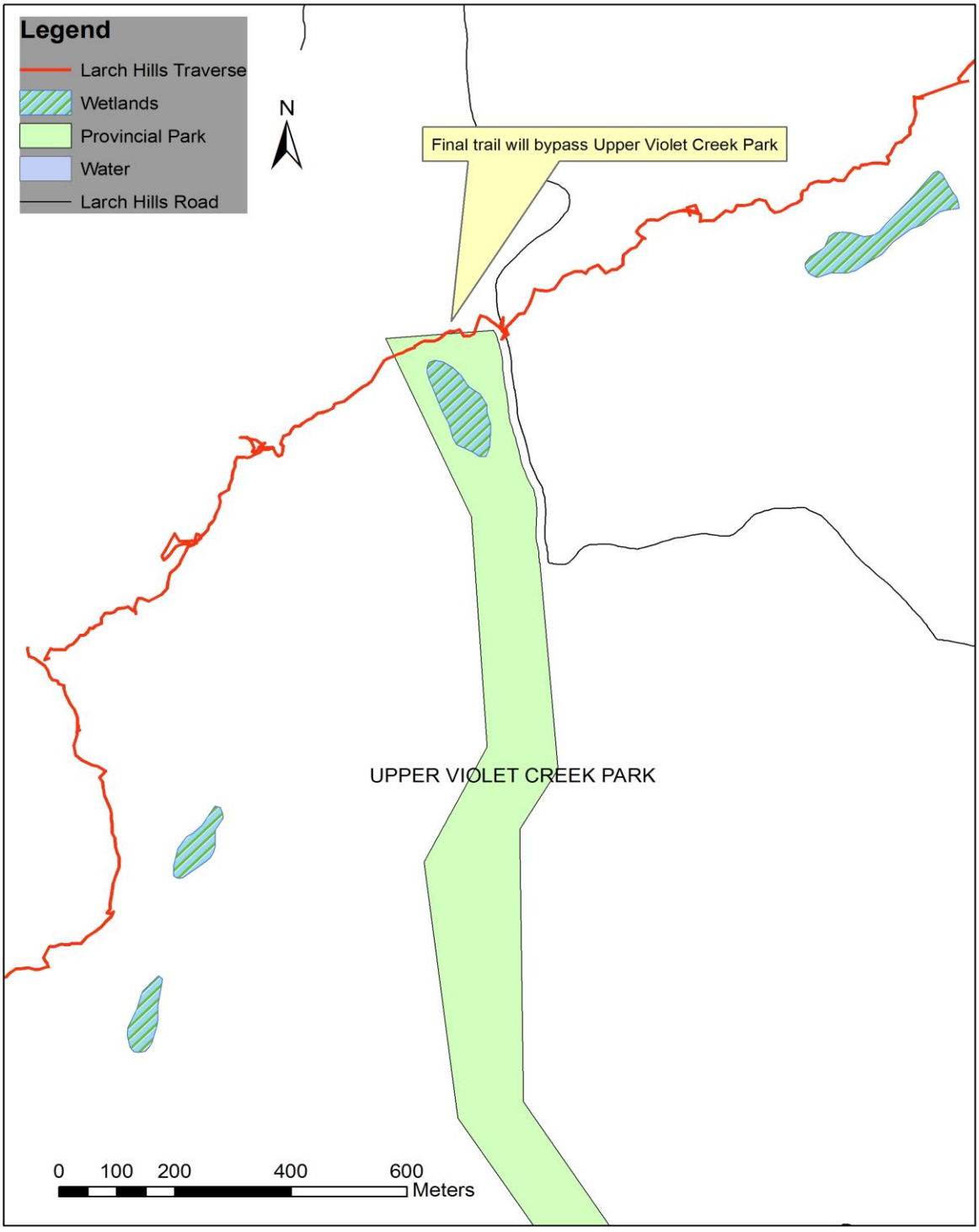


Figure 4. Upper Violet Creek Provincial Park and Larch Hills Traverse trail.

APPENDIX A – Field guide to plant species at risk in the Larch Hills Traverse area.

Larch Hills Traverse

Provincially red and blue listed plant species -

Detailed species descriptions

The following species listings provide detailed descriptions of the red and blue listed plant species in the area of the Larch Hills Traverse.

Provincially red and blue listed species were identified using the BC Ministry of Environment BC Species and Ecosystem Explorer (http://a100.gov.bc.ca/pub/eswp/) using the search criteria of ICHmw biogeoclimatic zone, overlapped with the Columbia-Shuswap, North Okanagan and Thompson-Nicola Regional Districts within the Kamloops Forest District. Information was taken from BC Species and Ecosystems Explorer website, EFlora website, NatureServe website, Rare Native Vascular Plants of BC publication, and BC Species Summary reports from the BC Conservation Data Center. Additional line drawings and information area are available in the publication Rare Native Vascular Plants of BC and in the Species Summary BC Conservation Data Centre.

Moss species are not included in this list because the lack of available descriptive information on habitat and appearance results in difficult field identification.

Crested Wood Fern

Scientific Name	*Dryopteris cristata*
English Name	crested wood fern
Plant type	Fern
Plant family	Fern
BC List	Blue
IDF and ICH zone	ICHmw;IDFmw;IDFxh
Habitat Type	Swamps and wet meadows

Habitat Description

Swamps and wet meadows in the montane zone

Plant Description

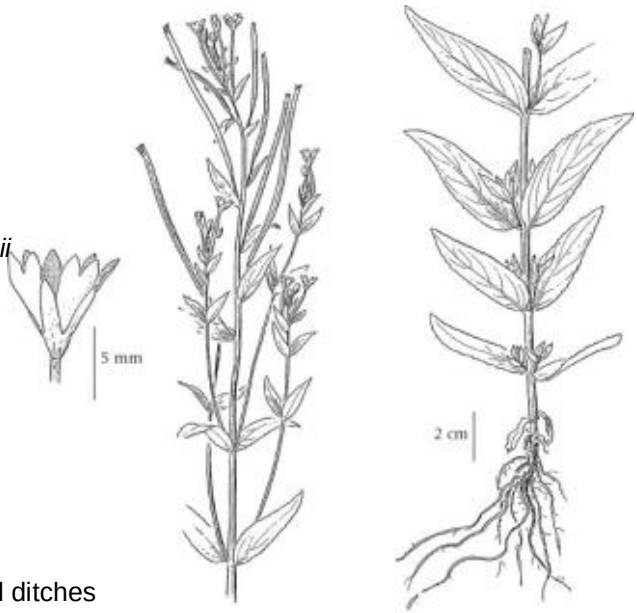
Buckler Fern is an herbaceous perennial with clustered fronds arising from a short rhizome. The stalked fronds have narrowly elliptic blades pinnately divided into numerous pairs of pinnately lobed leaflets, or pinnae. The fertile fronds, 3-6 dm long, are erect and deciduous, while the sterile ones are evergreen, smaller, and more lax. Clusters of spores, or sori are borne along either side of the pinnae midveins on the underside of fertile fronds. Sori are covered by a whitish, broadly horseshoe-shaped membrane, or indusium. The broadly horseshoe-shaped indusium identifies this species as a *Dryopteris*. Other members of the genus in our area have more highly divided leaves and sterile and fertile fronds that are similar to each other.

Flower Colour

Flowering period

E Flora	http://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Dryopteris+cristata

Purple-leaved willowherb



Epilobium ciliatum **ssp.** *watsonii*

Scientific Name	*Epilobium ciliatum ssp. watsonii*
English Name	purple-leaved willowherb
Plant type	Herbaceous vascular plant
Plant family	Evening primrose
BC List	Blue
IDF and ICH zone	ICHmw
Habitat Type	Wet disturbed areas, fields and ditches
Habitat Description	Wet to mesic disturbed areas, roadsides, fields and ditches from the lowland to montane zones
Plant Description	Perennial herb, from basal rosettes or fleshy bulblets, lacking rhizomes; stems 15-150 cm tall, simple or branched, generally finely stiff-hairy in lines or spreading-hairy. Leaves opposite, or alternate above, lance- or lance egg-shaped, 1-15 cm long, finely sharp-toothed to almost entire, veins distinct; stalks 0-8 mm long. Flowers a terminal, leafy-bracted panicle or raceme, finely stiff-hairy, with some spreading and glandular hairs; hypanthium 0.5-2.6 mm long; petals 2-14 mm long, rose-purple to white, notched at tip; sepals 2-7.5 mm long, often reddish; stamens less than or equal to length of pistil; stigmas club- or head-shaped. Fruits capsules, 1.5-10 cm long, hairy; stalks 0-30 mm long; seeds 0.8-1.9 mm long, longitudinally grooved, tuft of hairs white, 2-8 mm long, readily detaching. Note: Three subspecies occur in BC 1. Stem leaves relatively narrow and not crowded around inflorescences; plants usually branched above; petals white to pale pink or purple ssp. ciliatum1. Stem leaves broad and often crowded around inflorescences; plants usually unbranched above; petals dark purple. 2. Underground scales or buds present; inflorescences loose, extended ssp. glandulosum (Lehm.) Hoch & Raven2. Underground scales or buds absent; inflorescences more or less flat-topped ssp. watsonii (Barbey) Hoch & Raven
Flower Colour	Rose purple to white
Flowering period	
E Flora	http://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Epilobium+ciliatum ssp. watsonii

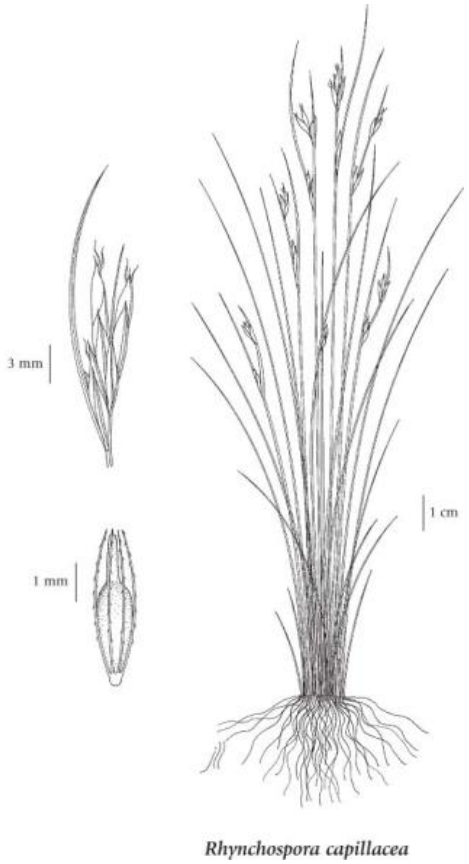
Western St. John's-wort

Scientific Name	*Hypericum scouleri ssp. nortoniae*
English Name	Western St. John's-wort
Plant type	Herbaceous vascular plant
Plant family	Clusiaceae
BC List	Blue
IDF and ICH zone	ICHwk
Habitat Type	Estuaries and wetland edges
Habitat Description	Moist to wet streamsides, estuaries, marshes and open slopes in all zones except alpine and steppe zones.
Plant Description	Perrenial heb from a long stolon and rhizome. Stems erect, branched above, glabrous 5-80 cm tall. Stem leaves oblong to rounded, unstalked, obtuse, 1-3 cm long, 0.5-1.5 cm wide, glabrous with black marginal dots. Inflorescence up to 50+ flowered; petals pale to bright yellow, 7-12 mm long; sepals narrowly egg-shaped to triangular, obtuse, 3-4 mm long; stamens 75-100, united basally into 3 groups; styles 3, 3-5 mm long. Two subspecies occur in Bcd:
Flower Colour	1. Stems few branched in the inflorescence, mostly 5-20 cm tall; leaves rounded; plants infrequent at higher elevations in S BC, most common in SE BC..... ssp. nortoniae (M.E. Jones) J. Gillett 1. Stems branched below the inflorescence, mostly 20-80 cm tall; leaves narrowly egg-shaped; infrequent at lower elevations in S BC, most common in SW BC.....ssp. scouleri
E Flora	http://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Hypericum%20scouleri%20ssp.%20nortoniae&redblue=Both&lifeform=7

Loesel’s Twayblade

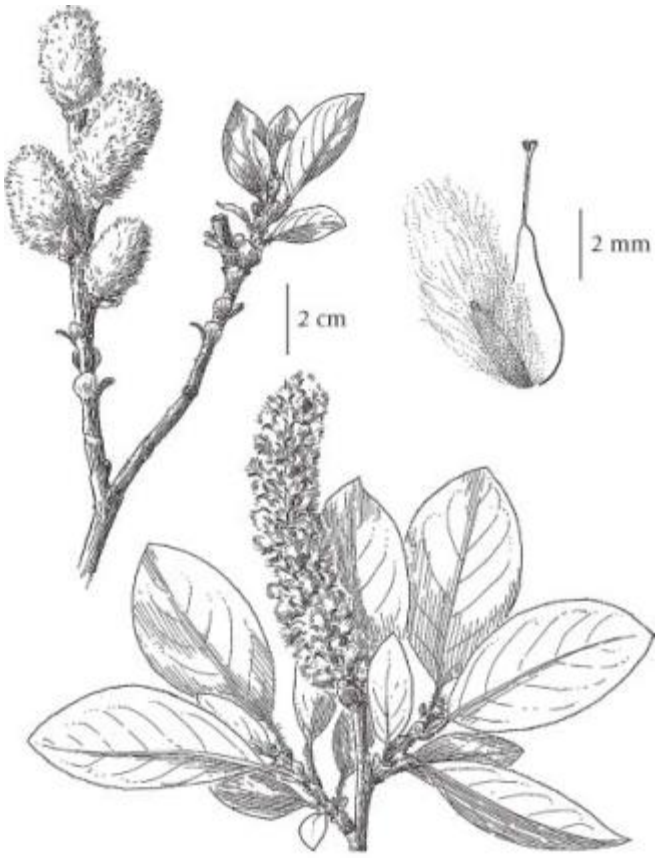
Scientific Name	*Liparis loeselii*
English Name	Loesel’s twayblade
Plant type	Orchid
Plant family	Orchid
BC List	Red
IDF and ICH zone	ICHmw
Habitat Type	Calcareous fens and shorelines (in BC known only in Mara Meadows Ecological Reserve
Habitat Description	Calcareous fens and shorelines in the montane zone
Plant Description	Loesel's Twaydlade is a glabrous, herbaceous perennial with naked stems that are up to 15 cm high arising from a bulb-like base. The two nearly erect, narrowly elliptic basal leaves are 5-15 cm long and have a broad petiole and a thickened midrib. Several flowers are borne on short stalks at the tops of the stem. Each white to greenish flower has 3 narrowly lance-shaped sepals that are 5-7 mm long, 2 nearly linear petals, and a strap-shaped lip petal that is 4-5 mm long and narrowed at the base. The petals and sepals are united together at the top of the curved, club-shaped ovary. The fruit is a narrowly elliptic capsule with numerous dust-like seeds. Diagnostic Characteristics: L. LOESELII might be confused with species of HABENARIA, but flowers of the latter have a tubular spur and lack a short stalk. In addition, HABENARIA species that occur in our fens have leafy stems. Species of LISTERA usually do not occur in fens, and their two leaves are attached to the stem rather than being basal.
Flower Colour	Yellow
Flowering period	
E Flora	N/A

Brown beak-rush



Scientific Name	*Rhynchospora capillacea*
English Name	brown beak-rush
Plant type	Sedge
Plant family	Sedge
BC List	Red
IDF and ICH zone	ICHmw
Habitat Type	Calcareous fens and shorelines
Habitat Description	Calcareous fens and shorelines in the montane zone
Plant Description	Perennial, tufted herb, sometimes forming mats; stems more or less solid, triangular in cross-section, 10-40 cm tall. Leaves sheaths closed; blades in-rolled, threadlike, 0.2-0.4 mm wide. Flowers 1 or 2, compact, axillary or terminal heads, the terminal head egg-shaped, the lateral ones remote, nearly unstalked, each head with 2 to 10, reddish-brown to dark brown, erect or ascending spikes, the axillary heads each with 1 to 4 spikes; involucral bracts longer than inflorescence, 1-2 cm long. Fruits scales translucent on the margins, spirally arranged within the spikes; perianth bristles 6, finely barbed backwards, surpassing the achenes; achenes often obscurely marked with dark horizontal lines, broadest above the middle, conspicuously narrowed towards the bases, 2.5-4.2 mm long, less than 1/2 as wide, capped by tubercles, 1/2 to nearly as long as the achenes.
Flower Colour	Brown
Flowering period	
E Flora	http://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Rhynchospora+capillacea

Tweedy's willow



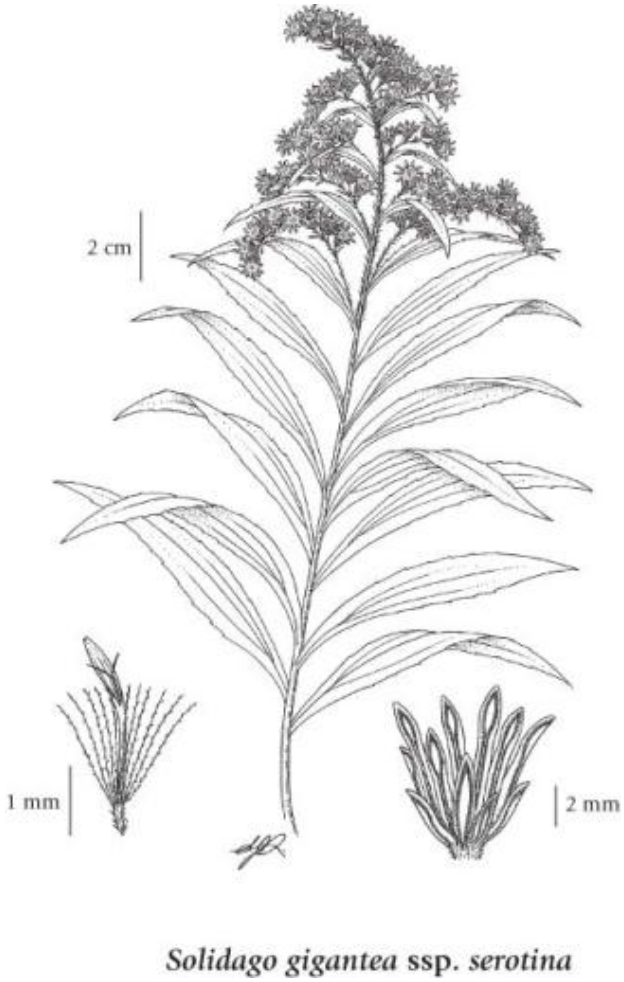
Salix tweedyi

Scientific Name	*Salix tweedyi*
English Name	Tweedy's willow
Plant type	Shruby vascular plant
Plant family	Willow
BC List	Blue
IDF and ICH zone	ICHmw
Habitat Type	Moist streambanks and lakeshores
Habitat Description	Moist streamsides and lakeshores in the montane zone
Plant Description	Dioecious shrubs, 1-3 m tall, not colonial; branches erect, flexible at base; twigs yellow-brown, sparsely to densely hairy. Leaves alternate, simple, elliptic or broadly elliptic, 3.5-10 cm long, 1.7-5 cm wide, lower surface glaucous or not, long soft-hairy, hairs white, upper surface dull, long soft-hairy to nearly smooth, margins toothed with coarse, spreading teeth or nearly entire, bases rounded or heart-shaped, tips pointed; leaf stalks not glandular at top; stipules leaflike, persistent. Flowers unisexual, lacking sepals and petals, borne in catkins which flower before leaves emerge, the catkins stout, unstalked; floral bracts dark, hairs straight or wavy; stamens 2; ovaries 1, smooth; styles 1.1-2.8 mm long. Fruits capsules which split open to release the seeds, each of which is surrounded by a tuft of hairs; stalks 0.4-1.5 mm long.
Flower Colour	
Flowering period	
E Flora	http://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Salix+tweedyi

White wintergreen

Scientific Name	*Pyrola elliptica*
English Name	white wintergreen
Plant type	Herbaceous vascular plant
Plant family	Wintergreen
BC List	Blue
IDF and ICH zone	ICHmw
Habitat Type	Dry to moist forests
Habitat Description	Dry to moist forests in the montane zone
Plant Description	Perennial herb from a spreading, slender rhizome; flowering stems 15-25 cm tall, with many basal leaves. Leaves basal, evergreen, somewhat leathery, the blades broadly elliptic to oblong or egg-shaped, mostly 3.5-7 cm long and about 3/4 as wide, fine-toothed, thin, and dull; stalks rarely as long as blades. Flowers a 2- to 20-flowered terminal, cylindric raceme, the flowers weakly bilaterally symmetric, 10-12 mm wide; flower stalks 3-8 mm long, nearly equaled by the linear-lanceolate bracts; petals white or creamy, rarely pink-tinged, egg-shaped, spreading, 6-8 mm long; sepals longer than wide, triangular to egg-shaped, tips usually sharp-pointed and somewhat bent back; tubes of anthers short, usually somewhat bent back; styles declined, curved, 5-7 mm long, with a distinct collar below the stigma. Fruits capsules, depressed globe-shaped, 4-5 mm wide.
Flower Colour	White
Flowering period	
E Flora	http://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Pyrola+elliptica

Smooth goldenrod



Scientific Name	*Solidago gigantea ssp. serotina*
English Name	smooth goldenrod
Plant type	Herbaceous vascular plant
Plant family	Aster
BC List	Red
IDF and ICH zone	ICHmw;IDFxh
Habitat Type	Moist meadows, streambanks, forest openings
Habitat Description	Moist meadows, streambanks and forest openings in the montane zone
Plant Description	Perennial herb from a fibrous-rooted, creeping rhizome; stems erect, solitary, branched above, the branches recurved and1-sided, glabrous below, glaucous and fine-hairy in the inflorescence, 0.5-2.0 m tall. Basal leaves lacking or, like the lower stem leaves, reduced and soon deciduous; stem leaves lanceolate to elliptic-oblong, 8-15 cm long, 1.3-3.5 cm wide, alternate, simple, sharply saw-toothed or entire, 3-nerved, glabrous. Flowers heads with ray and disk flowers, numerous in a dense pyramidal inflorescence; involucres 2-5 mm tall; involucral bracts lanceolate, often blunt, overlapping, glabrous; ray flowers 9-16, 2-2.5 mm long; disk flowers yellow. Fruits achenes short-hairy; pappus of numerous white hairlike bristles.
Flower Colour	Yellow
Flowering period	
E Flora	http://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Solidago+gigantea ssp. serotina

APPENDIX B : Fisheries and Oceans Canada Operations Statement for Clearspan bridges.

CLEAR SPAN BRIDGES

Fisheries and Oceans Canada
Pacific Region Operational Statement

Version 3.0

This Operational Statement applies to the construction of small-scale bridge structures that completely span a watercourse without altering the stream bed or bank, and that are a maximum of two lanes wide. The bridge structure (including bridge approaches, abutments, footings, and armouring) is built entirely above the **high water mark** (HWM). A clear-span bridge is preferred to a culvert as no structures are placed on the stream bed and therefore there is no alteration of natural channel processes.

Clear-span bridge construction has the potential to negatively affect riparian habitat. Riparian vegetation occurs adjacent to the watercourse and directly contributes to fish habitat by providing shade, cover and areas for spawning and food production. Only the vegetation required to accommodate operational and safety concerns for the crossing structure and approaches, within the right-of-way, should be removed. Stormwater run-off and the use of machinery can introduce deleterious substances to the water body and result in erosion and sedimentation.

Fisheries and Oceans Canada (DFO) is responsible for protecting fish and fish habitat across Canada. Under the *Fisheries Act* no one may carry out a work or undertaking that will cause the harmful alteration, disruption or destruction (HADD) of fish habitat unless it has been authorized by DFO. By following the conditions and measures set out below you will be in compliance with subsection 35(1) of the *Fisheries Act*.

The purpose of this Operational Statement is to describe the conditions under which it is applicable to your project and the measures to incorporate into your project in order to avoid negative impacts to fish habitat and maintain passage of fish. You may proceed with your clear-span bridge project without a DFO review when you meet the following conditions:

- the bridge is placed entirely above the high water mark (**HWM**), (**http://www.pac.dfo-mpo.gc.ca/habitat/Glossary-glossaire-eng.htm#HWM**),
- there is no alteration of the stream bed or banks or infilling of the channel,
- the bridge is no greater than two vehicle lanes in width, does not include sidewalks and biking lanes and does not encroach on the natural channel width by the placement of abutments, footings or rock armouring below the **HWM**,
- the work does not involve the clearing of riparian vegetation – removal of select plants with the road right-of-way can occur to meet operational and/or safety needs,
- your project does not require multiple bridge crossings over the same watercourse, and
- you incorporate the *Measures to Protect Fish and Fish Habitat* when *Constructing Clear-Span Bridges* listed below in this Operational Statement.

If you cannot meet all of the conditions listed above and cannot incorporate all of the measures listed below then your project may result in a violation of subsection 35(1) of the *Fisheries Act* and you could be subject to enforcement action. In this case, you should contact the DFO office in your area if you wish to obtain DFO's opinion on the possible options you should consider to avoid contravention of the *Fisheries Act*.

You are required to comply with all municipal, provincial, territorial and/or federal legislation that applies to the work being carried out in relation to this Operational Statement. In British Columbia, please contact the WaterStewardshipDivision,MinistryofEnvironment (**http://www.env.gov.bc.ca/wsd/water_rights/licence_application/section9/index.html**) for information on the Provincial *Water Regulation* notification requirements when planning to construct clear-span bridges in or around BC waters.

The activities undertaken in this Operational Statement must also comply with the *Species at Risk Act.* For general information on aquatic SARA species visit the following web site: **http://www.dfo-mpo.gc.ca/species-especes/regions/Pac/pacific-index-eng.htm** and/or contact DFO by email at: **SARA@pac.dfo-mpo.gc.ca**

If you have questions regarding this Operational Statement, please refer to the list of **Frequently Asked Questions** (**http://www.pac.dfo-mpo.gc.ca/habitat/os-eo/faq-eng.htm**) or contact DFO Regional Headquarters at 1-866-845-6776.

Please notify DFO 10 working days before starting your work by filling out and sending the Pacific Region Operational Statement **notification form** directly to DFO Regional Headquarters. This information is requested in order to evaluate the effectiveness of the work carried out in relation to this Operational Statement. It is recommended that you keep a copy of the Operational Statement at the work site to demonstrate to Habitat and Fishery Officer staff that the conditions and measures, as outlined in the OS, are being followed.

Area of Application
This Operational Statement applies to the province of British Columbia and Yukon Territory freshwater systems only.

Measures to Protect Fish and Fish Habitat when Constructing Clear-Span Bridges

1. Minimize the riparian area temporarily disturbed by access activities along the adjacent upland property. Use existing trails, roads, or cut lines wherever possible to avoid disturbance to the riparian vegetation.

2. Avoid building on meander bends, braided streams, alluvial fans, active flood plains, or any other area that is inherently unstable and may result in the alteration of natural steam functions or erosion and scouring of the bridge structure.

3. While this Operational Statement does not apply to the clearing of riparian vegetation, the removal of select plants within the road right-of-way (ROW) may be required to meet operational and/or safety concerns for the crossing structure and the approaches. This removal should be kept to a minimum and within the road right-of-way. When practicable, prune or top the vegetation instead of uprooting.

4. Ensure that the clear span bridge is properly designed to address river and channel processes at flows above the ordinary high water mark.

5. Design and construct approaches so that they are perpendicular to the watercourse to minimize loss or disturbance to riparian vegetation.

6. Design the bridge so that stormwater runoff from the bridge deck, side slopes and approaches is directed into a retention pond or vegetated area to remove suspended solids, dissipate velocity and prevent sediment and other deleterious substances from entering the watercourse.

7. Generally there are no restrictions on timing for the construction of clear-span structures as they do not involve in-water work. However, if there are any activities with the potential to disrupt sensitive fish life stages (e.g., crossing of watercourse by machinery), these should adhere to appropriate fisheries **timing windows (http://www.pac.dfo-mpo.gc.ca/habitat/timing-periodes/Index-eng.htm)**.

Machinery fording the watercourse to bring equipment required for construction to the opposite side is limited to a one-time event (over and back) and should occur only if an existing crossing at another location is not available or practical to use. A *Temporary Ford Stream Crossings* Operational Statement is also available.

7.1. To exercise this option, the stream bed at the fording site must be comprised of stable gravel or bedrock and the stream banks must be low and stable.

7.2. If minor rutting is likely to occur, stream bank and bed protection methods (e.g., swamp mats, pads) should be used provided they do not constrict flows or block fish passage.

7.3. Grading of the stream banks for the approaches is not permitted.

7.4. If the stream bed and banks are steep and highly erodible (e.g., dominated by organic materials and silts) and erosion and degradation are likely to occur as a result of equipment fording, then a temporary crossing structure or other practice should be used to protect these areas.

7.5. Time the one-time fording to prevent disruption to sensitive fish life stages by adhering to appropriate fisheries **timing windows**.

7.6. Fording should occur under low flow conditions and not when flows are elevated due to local rain events or seasonal flooding.

8. Install effective sediment and erosion control measures before starting work to prevent the entry of sediment into the watercourse. Inspect them regularly during the course of construction and make all necessary repairs if any damage occurs.

9. Operate machinery on land (above the **HWM**) and in a manner that minimizes disturbance to the banks of the watercourse.

9.1. Machinery is to arrive on site in a clean condition and is to be maintained free of fluid leaks, invasive species and noxious weeds.

9.2. Wash, refuel and service machinery and store fuel and other materials for the machinery away from the water to prevent any deleterious substance from entering the water.

9.3. Keep an emergency spill kit on site in case of fluid leaks or spills from machinery.

9.4. Restore banks to original condition if any disturbance occurs.

10. Use measures to prevent deleterious substances such as new concrete (i.e., it is pre-cast, cured and dried before use near the watercourse), grout, paint, ditch sediment and preservatives from entering the watercourse.

11. No debris to remain within the high-water mark or placed into a stream.

12. Stabilize any waste materials removed from the work site to prevent them from entering the watercourse. This could include covering spoil piles with biodegradable mats or tarps or planting them with preferably native grass or shrubs.

13. Vegetate any disturbed areas by planting and seeding with native trees, shrubs or grasses and cover such areas with mulch to prevent erosion and to help seeds germinate. All seeding and/or planting trees should follow the DFO guidance on **Riparian Revegetation** (**http://www.pac.dfo-mpo.gc.ca/habitat/reveg/index-eng.htm**). If there is insufficient time remaining in the growing season, the site should be stabilized (e.g., cover exposed areas with erosion control blankets to keep the soil in place and prevent erosion) and vegetated the following spring.

13.1. Maintain effective sediment and erosion control measures until re-vegetation of disturbed areas is achieved.

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Aussi disponible en français

http://www.dfo-mpo.gc.ca/oceans-habitat/habitat/modernizing-moderniser/epmp-pmpe/index_f.asp

DFO/2007-1283