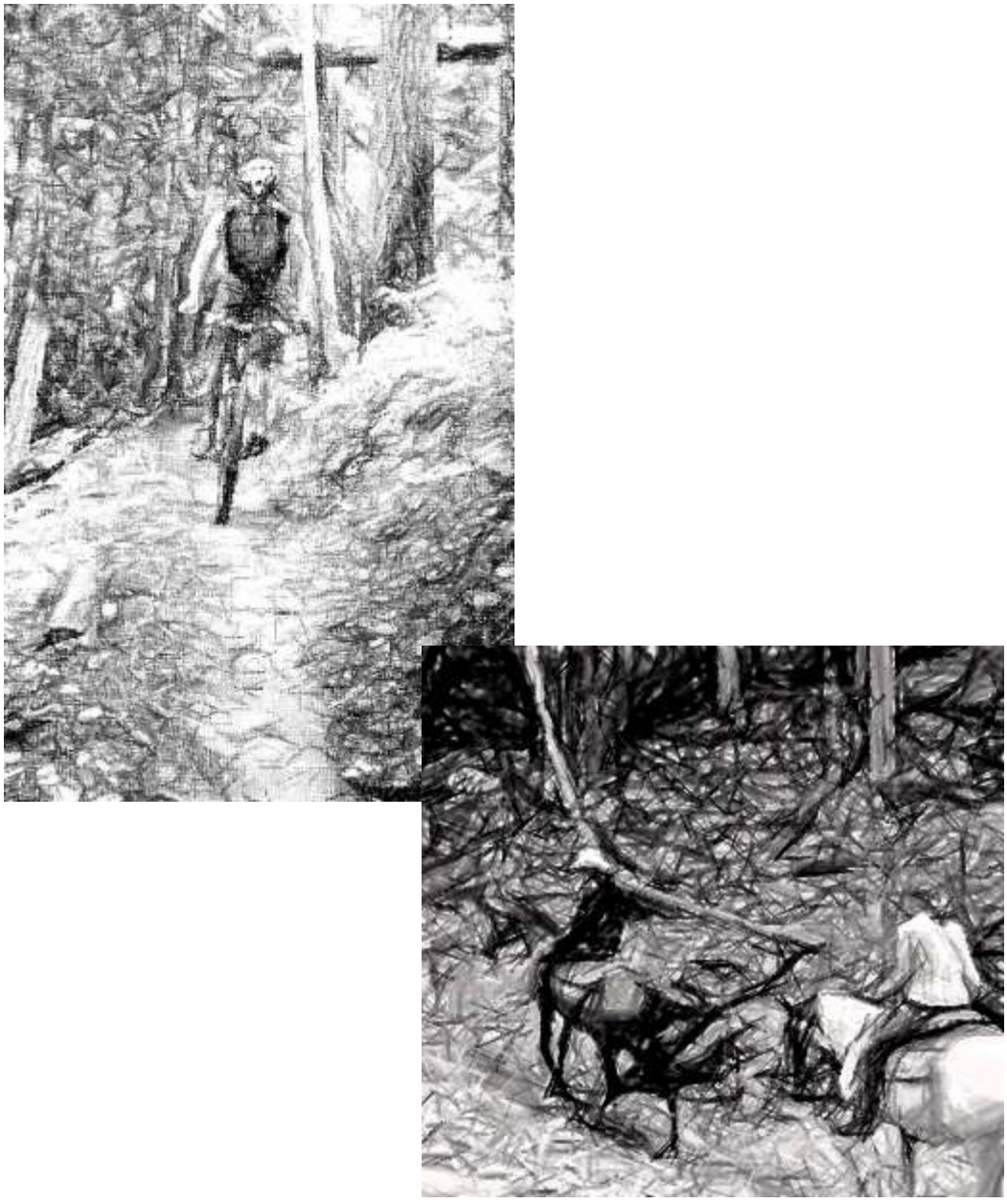
South Canoe Trails

Environmental Screening Report 2011



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Summary of Recommendations: Issues, hotspots, and values

The primary environmental issues to consider when managing the South Canoe trail network is the expansion of unauthorized and possibly non-conforming trails that may threaten sensitive areas. Such trails can encroach on environmentally sensitive areas such as streams and wetlands. Unauthorized trails also often use non sustainable construction practices that can lead to erosion at stream crossings.

Given that several of these trail sections are relatively new and that the popular use of this area by different recreational user groups (including horses) can spread invasive plant seeds, a preliminary inventory for invasive plant species is recommended as baseline information for future monitoring.

Connected with this environmental screening report, adaptive management plans for the South Canoe trail system will include options for corrective actions to avoid these potential impacts:

1. Degradation of water quality due to increased sediment load in streams.
2. The introduction of invasive plant species.
3. Destruction or degradation of habitat for vulnerable and at-risk plant and animal species (provincially red and blue listed species).

Recommendation #1: Control unauthorized trail construction

Continue to meet with all user groups, land tenure holders, relevant businesses, Ministry of the Environment, the City of Salmon Arm and any others interested in the South Canoe trail area. Stress the need to build sustainable trails only with consultation and pre-approval of all concerned parties.

Recommendation #2: Sediment and erosion control at stream crossings

Several stream crossings on the South Canoe trail system are used by both hikers and horses. Where small bridges on abutments control sediment and erosion by hikers, horse traffic will continue to cross streams adjacent to the bridges. Allowing for horse crossings where they are less likely to erode banks, and increase sediment transport into the stream, will help minimize the impact on downstream water quality.

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. Select sites where there is potential for invasive plants to displace native plants such as stream crossings where equestrian use creates alternate crossings or trail junctions where motorized use may act as a vector for seed transmission. Invasive plant species lists and guidelines on inventory methods can be coordinated through the Invasive Plant Council of BC (http://www.invasiveplantcouncilbc.ca/).

Part 1: Development and Use Activities

Background

Historically this area has been the access point into the west Larch Hills area via Metford Forest Service Road (FSR). It is also the access road to Rizzi's gravel pit. To the north side of this area is East Canoe Creek and a closed area to protect Metford Dam and East Canoe Creek Community Watershed, managed by the City of Salmon Arm. The Metford FSR has been gated in recent years to protect the industrial operations of the woodlot and gravel pit. This may have been as a result of the area becoming a bush party area known as Malibu. Trail development and use in this area was historically horseback riding and motorized (ATV and dirtbikes) but during the past 10 years or so the area has rapidly developed into one of Salmon Arm's primary mountain biking area.

In 2011 the City of Salmon Arm approved the use of this trail system for mountain biking, hiking and horse riding. The Shuswap Trail Alliance(STA) and member organizations have undertaken to bring the trails up to sustainable standards. There has also been a Memorandum of Understanding with the woodlot operator for this area.

Grades on the trail systems range from very steep and technical to sweeping switchbacks and rolling terrain. The topography of this area and its proximity to town offers an ideal area for the rapidly growing popularity of mountain biking. During the past few years mountain bike trail development in this area has significantly increased along with an interest in long-term stewardship and sustainable management. The intent of this environmental screening report is to provide the baseline information to meet these objectives.

Tenure and ownership of the South Canoe trail area is complex. Many of the trails of the South Canoe trail system and the parking area are on land belonging to the City of Salmon Arm. Some sections of trails on City of Salmon Arm land will have to be relocated in order to stay out of the community watershed. Other trails are on provincially managed crown land, most of which is an active woodlot under the management of Kurt Olson.

As well as being the trailhead for the South Canoe mountain bike trail system this area is also the Salmon Arm trailhead for the Larch Hills Traverse. Residents and visitors to Salmon Arm are the primary users. The mountain bike trails of South Canoe draw several hundred local and out-of-town users during the summer months. The annual Salty Dog Enduro Mountain Bike Race takes place on the South Canoe trails. This is a large event, well known thoughout BC and Alberta.

While mountain biking is the primary use the trails are also used regularly by hikers and horse riders. With the recent rapid growth of mountain biking on these trails, the amount of motorized traffic (ATVs and dirtbikes) has likely decreased but is not uncommon. There is some non-motorized winter recreation in the area as well with local

snowshoers and skiers accessing the higher elevation trails that are relatively close to town.

Location
The South Canoe trails are located at the end of 10th Ave SE on the southeast side of Salmon Arm. The nearest highway is 97B that runs between Salmon Arm and Enderby.

Activities
Sanctioned or authorized trails have been designed, constructed, upgraded or re-routed following International Mountain Bike Association (IMBA) and provincial standards and best practices for non-motorized recreation. The STA has installed signs and maps throughout the trail system. Ongoing management activities will consist of removal or reconstruction of older and unsustainable or unauthorized trails and structures, clearing blow down and brush on the trail corridors, upgrading signage and monitoring for environmental and trail sustainability.

Trail Stewardship
The establishment of trail stewardship teams to monitor and maintain the trail system is an important initiative for the Shuswap Trail Alliance, especially popular trails such as these where multiple trail activities and land-uses overlap with potential conflicts. Trail stewardship will encourage local users to take responsibility for their trails. Managing existing trails and guiding the creation of new trails for long-term environmentally sustainable use will be the main focus of these teams. For example, trail stewardship teams will encourage the creation of new trails to comply with the 11 step Trail Development Protocol (Appendix A) in order to meet the criteria for approved trails. A stewardship protocol such as this will help ensure that new trail development will follow appropriate consultation with all interested parties and concerned neighbours prior to trail construction. Stewardship planning will also inform trail design and construction so that new trails meet current best practices and protective legislation (e.g., trail stream crossing and the provincial Riparian Areas Regulation of the Water Act).

Part 2: Environment and land-use

Biology-Geology-Climate
The South Canoe trail system is in the Shuswap moist warm Interior Douglas Fir biogeoclimatic subzone variant IDFmw1 (Fig. 1). Because the west slope of the Larch Hills is on the boundary between the IDF and the Interior Cedar Hemlock (ICH) biogeoclimatic zone, all the charts in this report include at-risk species from both zones as it is always possible to encounter species on the edges of their expected boundaries. Determining which biogeoclimatic zone trails are located in is a useful way to classify the ecology of the area and to cross-reference to lists of vulnerable plant and animal species that are likely to exist in a particular ecological zone.

The IDFmw1 zone found across the west slope of the Larch Hills has a shorter growing season and is cooler and dryer than IDFmw2. The IDFmw occurs along the transition between the dry and wet belts of the southern interior. It is separated from other IDF

subzones by the presence of western cedar, white birch, and western larch. The *Guide to Site Identification and Interpretation for the Kamloops Forest Region* (1990) states that ocean-spray and western trumpet honeysuckle are common in IDFmw1 but absent from IDFmw2. The Blind Bay White Lake trail is in the IDFmw2 subzone and has abundant quantities of those species as does this IDFmw1 subzone of the Larch Hills. Because of this contradictory information on subzone flora both subzones will be considered when listing endangered or at risk species.

Dry sites within the IDFmw have moderate to open tree canopies formed by Douglas fir in mature stands. The sparse understory often contains pine grass and red-stemmed feathermoss. Given that many of these South Canoe trails are on dry south or west facing hillsides, fire risk may be high during the summer months. Trail users should be reminded of this and encouraged to take precautions to limit the threat of human-caused fires when fire risk is high.

Ecological Communities

There are 6 ecological communities that may occur within the IDF mw1 and mw2 biogeoclimatic subzone variants (Table 1). Four of these are yellow listed (not at risk), one (western red cedar/douglas fir/red-osier dogwood) is blue listed (of special concern) but common throughout this area and one (black cottonwood/common snowberry/roses) is red listed (extirpated,endangered or threatened). Black cottonwood dominated ecological communities will typically be near riparian areas (streams and wetlands) in the South Canoe area. Avoiding trail development within riparian areas will effectively avoid potential disturbance to these vulnerable ecological communities. Given that the South Canoe area is transitional between IDF and ICH biogeoclimatic zones, we should also consider that ICH ecological communities may occur here. There is one blue listed plant community (western red cedar/western hemlock/common horsetail) that may also occur here.

For more information on how the conservation status and vulnerability of ecological communities are assessed, refer to this pdf document through this web link: http://www.env.gov.bc.ca/cdc/documents/ConsStatusAssessFactors.pdf

Plants

There are 2 red listed and 7 blue listed species in the IDF zone and 2 blue listed species in the ICH zone of the Columbia-Shuswap Regional District and Kamloops Forest District (Table 2). Of these 11 listed species, 6 are less likely to occur in the habitat found along the Larch Hills West trails.

Pink agoseris is a plant of the sub-alpine/alpine. Geyer's onion, porcupine sedge, crested wood-fern, western St. John's-wort and false-pimpernel are all plants associated with moist, wet habitats not found along these trails.

Two red listed species: dark lamb's-quarters and satin flower, and 3 blue listed plants: thyme-leaved spurge, purple-leaved willowherb and white wintergreen are found within the same type of landscape that the South Canoe trail system is in. Appendix B

provides images and detailed descriptions to help identify these at-risk plant species. Special attention will be paid to these plant species during trail monitoring and maintenance and especially to the 2 red listed and 3 blue listed species most likely to be found here.

Wildlife

There are 13 bird and 14 mammal species at risk in the Interior Douglas Fir and Interior Cedar Hemlock biogeoclimatic zones in this area (Tables 3,4). Red listed species that may occur in the South Canoe area include badger, Swainson's hawk, lark Sparrow, western screech-owl, and Lewis's woodpecker. Special attention should be paid to recording observations of these species and avoiding their preferred habitat (Table 5).

A search on the GeoBC data base for Mapped Wildlife Species Point Locations from the provincial wildlife database showed no recorded observations of wildlife in this area.

There are 4 Ungulate Winter Ranges in the area surrounding the South Canoe Trails. Ungulate Winter Ranges are managed by the Ministry of Environment for their high value winter range (providing cover and forage) in this case for mule deer. The establishment of an Ungulate Winter Range implies that there will be higher concentrations of deer in the area, especially during winter months. Higher concentrations of deer in these areas may attract large carnivores such as cougar, bear and wolf. Given that recreational use of these trails is mainly during the summer months, the likelihood of negative impacts to deer are low. Signage and other educational materials however may improve trail user's understand of the ecology of the area and help minimize the risk of dangerous encounters with large carnivores.

Wildlife habitat trees (standing dead and decaying trees) provide important homes for wildlife species at risk (Table 5) and are abundant in this area, especially near riparian areas. Special attention must be given to protecting large wildlife trees, especially in high value areas along streams.

Fish and fish habitat

There are several seasonal or intermittent wetlands and streams in the South Canoe trail system area. Appendix C provides Fisheries and Oceans Canada (DFO) Operational Statement for constructing clear span Bridges. The design and construction practices outlined in this operational statement must be followed at all stream crossings.

- **There are specific provincial and federal regulations that protect fish habitat.**
- **Development within 30 m of a waterbody is regulated through the Riparian Areas Regulation (connected to the provincial Water Act and the federal Fisheries Act).**
- **Any new stream crossings should use the provincial Section 9 Water Act application (see Part 4 Environmental Check List).**

Soil and water degradation

Trails crossing streams, intermittent streams and wetlands are a concern in the South Canoe area. Damage must be avoided by proper design and consultation with regulatory agencies (e.g., Section 9 Notification application). Existing stream crossings may need to be re-routed if erosion and water quality degradation is observed as a consequence of trail use.

Steep trails and clear cut areas raise some soil erosion concerns during periodic heavy rain events. Following current standards and best practices (Whistler Standards, International Mountain Bike Association) for trail construction related to grade and drainage concerns will help to minimize any negative impacts of the trails on surrounding soil and water quality (e.g., rock French drains have been constructed as low-maintenance water control points).

A particular concern with multiple-use trails such as these is that stream crossings may be designed by one user group (e.g., mountain biker) but are not appropriate for another (e.g., horseback riders). A new trail with a small foot/bike bridge may cause serious erosion when horseback riders begin to use the new trail and the only crossing available is adjacent to the bridge. Repeated use by horses will break down the channel banks of the stream and may cause silt-laden water that degrades downstream water quality. This creates a challenging design consideration but these are the things that are best to discuss and consider during trail design and construction phase, especially with a Community Watershed boundary so close to the trails.

Current and historic land use

The entire Larch Hills area is an area of historical interest and claim by the Shuswap First Nation.

Logging interests in this area are held by woodlot owner Kurt Olson. They have been consulted regarding trail routing.

There is a gravel pit on the SW corner of the trail area operated by the Rizzi family.

A check with the BC government Mineral Titles Online does not show any current mineral claims throughout the area of the Larch Hills west trails.

There is no Guide Outfitter operating in this area. Most of the trail is within an existing large trapline license #TR0326T00. The trapline license holder has not been contacted as there has been no evidence of active trapping in the Larch Hills in recent histoy.

Part 3: Mitigation and monitoring: Adaptive Management

The information gathered together for this environmental screening report will be used to develop an Adaptive Management Plan for the South Canoe Trails. The following framework provides the rationale behind the adaptive management approach. Categorizing these components help us to understand and predict what corrective actions may be required in order to achieve environmentally sustainable use of trails in South Canoe.

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. No erosion near riparian areas.
2. No sprawl at viewpoints, juctions or switchbacks.
3. No spread of invasive plant species.
4. Minimal physiological or behavioural disruption of wildlife.
5. No increased threat to wildfire along the private land interface as a result of trail use.

B. Desired Behaviours

1. Use foot bridges where available. Bridges are either designed for multiple use or horses cross creeks beside foot/bike bridges but do not cause soil erosion or bank instability
2. Stay on trails. Do not trample vegetation outside the trail corridor. Do not create alternate trails
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 a baseline inventory.
4. Do not harass wildlife, control pets on leashes when wildlife are encountered, record wildlife encounters on standard forms provided either at trail heads or website (to be determined).
5. No open fires, no trail use during high fire risk periods when backcountry closures are in effect. No smoking.

C. Indicators

1. Bank sloughing, sediment and debris pushed into stream. Downstream sedimentation
2. Trail widths, trail braiding, evidence of trampling and erosion at view points. Change in plant communities to species more resistant to trampling (may include invasive plants)
3. Extent and frequency of invasive species occurrence within 5 m of trails
4. Proportion of wildlife encounters resulting in an alarm response (movement by animals to safer locations)
5. Fire rings/scars, reports of trail use during closed periods.

D. Limits

1. Stable banks on either side of stream crossings, no signs of bank instability caused by foot or horse traffic
2. No increase in trail width, no expansion of viewpoint areas, no more new trail sections near viewpoints
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

- Select monitoring sites at stream crossings where water quality impacts (erosion and sedimentation) and introduction of invasive plants are likely. Use photo documentation and/or follow BC Parks method to measure trends in bank instability, and vegetation damage. Consider monitor sites during the two scheduled maintenance inspections (spring and fall).
- Trail user survey forms should be made available at 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). Create a central repository for this information in conjunction with City of Salmon Arm staff (where will this information be stored, who will be responsible for managing it?)
- Provide a process for people to record and report observations of non-conforming use or construction of new trails (e.g., motorized use in riparian area, poorly designed stream crossings)

F. Corrective Actions

- Possible seasonal trail closures during high water in spring

- Install benches, handrails or fences to control sprawl at viewpoints or horse crossing adjacent to bridges, use signage to keep users on existing trails and avoid trail braiding
- Trail and stream crossing relocation (specific thresholds that would trigger this level of corrective action would require more discussion)
- Signage and educational material to inform users about the ecology, forests, and sensitive riparian areas that they are travelling through have a seasonally high fire risk.

Part 4: Environmental checklist: Compliance legislation, land-use plans, guidelines, and consultation

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

- ✓ Maintain no-disturbance zones alongside streams
- ✓ Notify Ministry of Environment and Fisheries and Oceans Canada (DFO) if work is unavoidable in and about a stream (DFO – Project Review Application Form, MOE -Section 9 Notification application)
- ✓ Follow intent and criteria for no harmful alteration or disruption of fish habitat in DFO's Operational Statements as a result of constructing clear span 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 and Neskonlith Indian Band
Private land holders
B.C. Timber Sales
Woodlot license holders
Local motorized recreation groups
Stream Crossings: Provincial Water Act (Section 9 Application), Federal Fisheries Act (Project Review Application Form)

Web-based Information Sources

Provincial Water Act Regulations (Section 9 Notification Application):
http://www.env.gov.bc.ca/wsd/water_rights/licence_application/section9/

Federal Fisheries Act Regulations (Project Review Application Form):
http://www.pac.dfo-mpo.gc.ca/habitat/steps/praf/index-eng.htm

BC government Land and Resource Data Warehouse. Map-based information extractions through GeoBC Data Distribution Service:
https://apps.gov.bc.ca/pub/geometadata/home.do;jsessionid=140ed63162652a94fee06324bb1bcb751647ab397e37d98811521f64946b84bb.e38QbN8Kbh8NaO0Lch0Tch4PbNeTe6fznA5Pp7ftolbGmkTy

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).

Guide to Site Identification and Interpretation for the Kamloops Forest Region.
http://www.for.gov.bc.ca/hfd/pubs/docs/lmh/Lmh23-1.pdf

Habitat Wizard. BC Ministry of Environment FDIS Fisheries Database:
http://www.env.gov.bc.ca/habwiz/

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: http://www.geog.ubc.ca/biodiversity/eflora/

Mineral Titles on Line BC: www.mton.gov.bc.ca/mtov

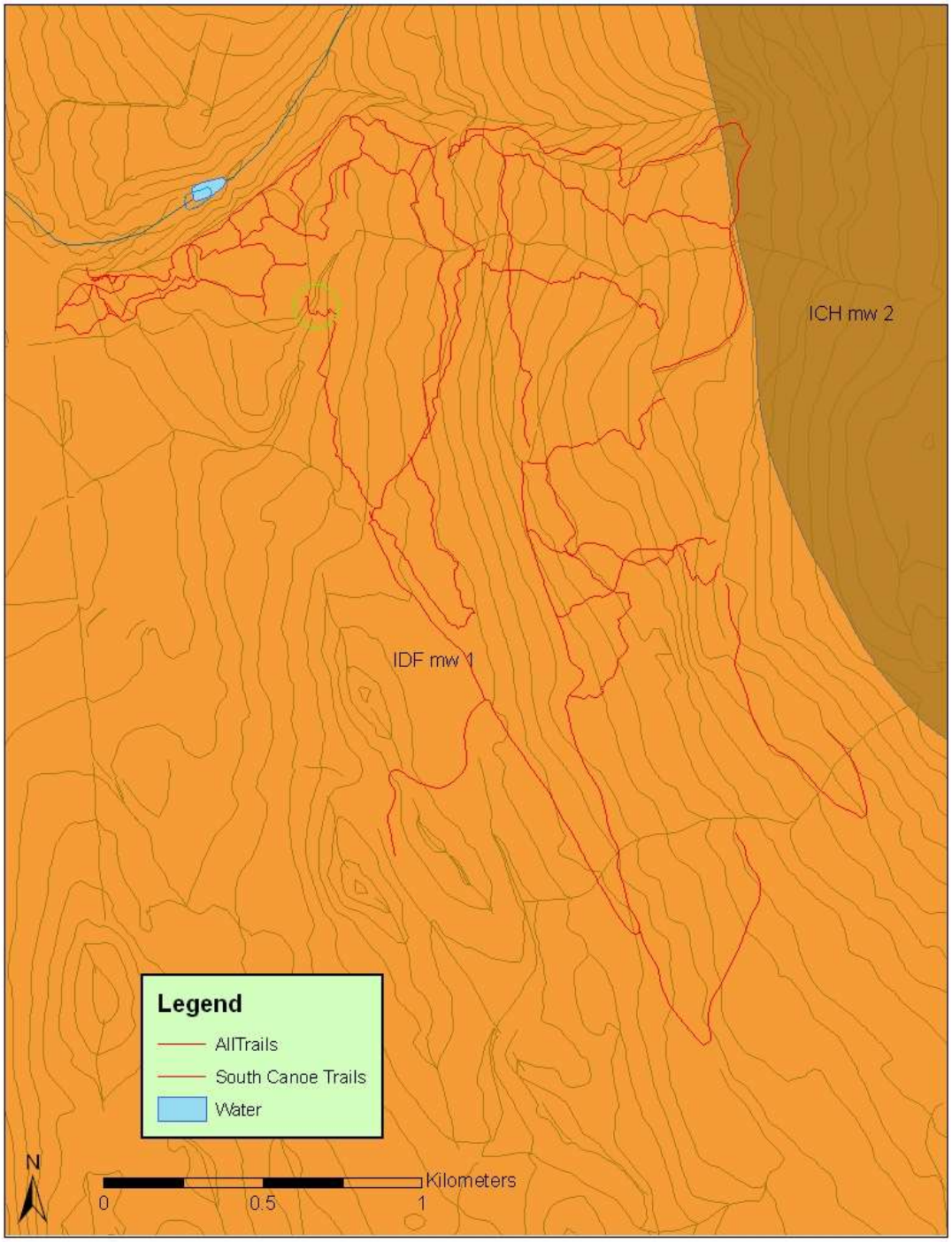


Figure 1 The South Canoe Trail System is almost entirely within the Shuswap moist-warm Interior Douglas Fir ecological land classification system (biogeoclimatic zones). Although not all streams appear on this map, we know that several trails cross riparian areas (e.g., green circle). These crossings are likely the most environmentally sensitive sites within the trail system.

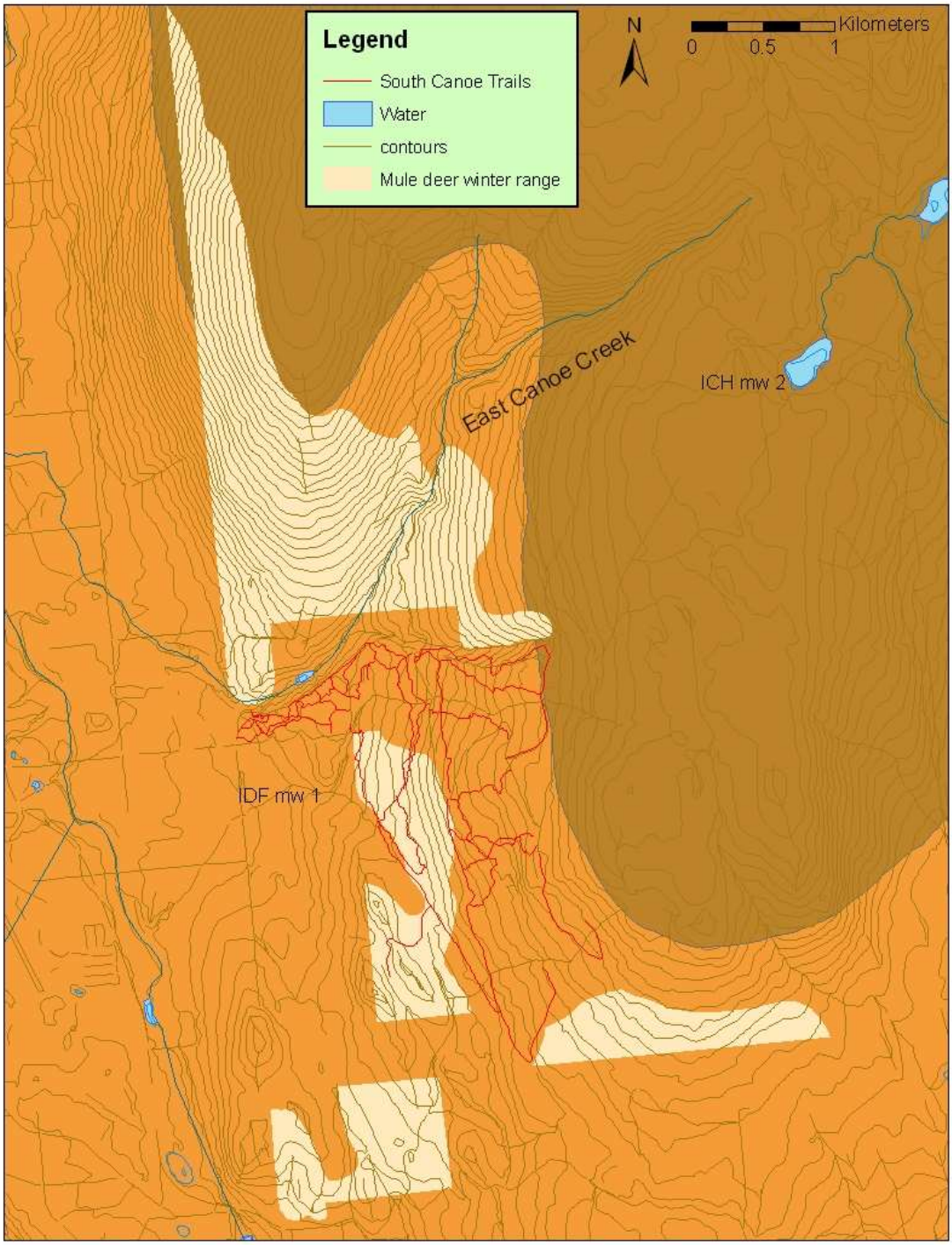


Figure 2. There are 4 Mule deer winter ranges in the area surrounding the South Canoe trails. Ungulate Winter Ranges are managed by the Ministry of Forests Lands and Resource Operations to protect high-value winter cover and forage areas used by ungulate species. The presence of ungulate winter ranges suggests higher concentration of deer and potentially their predators.

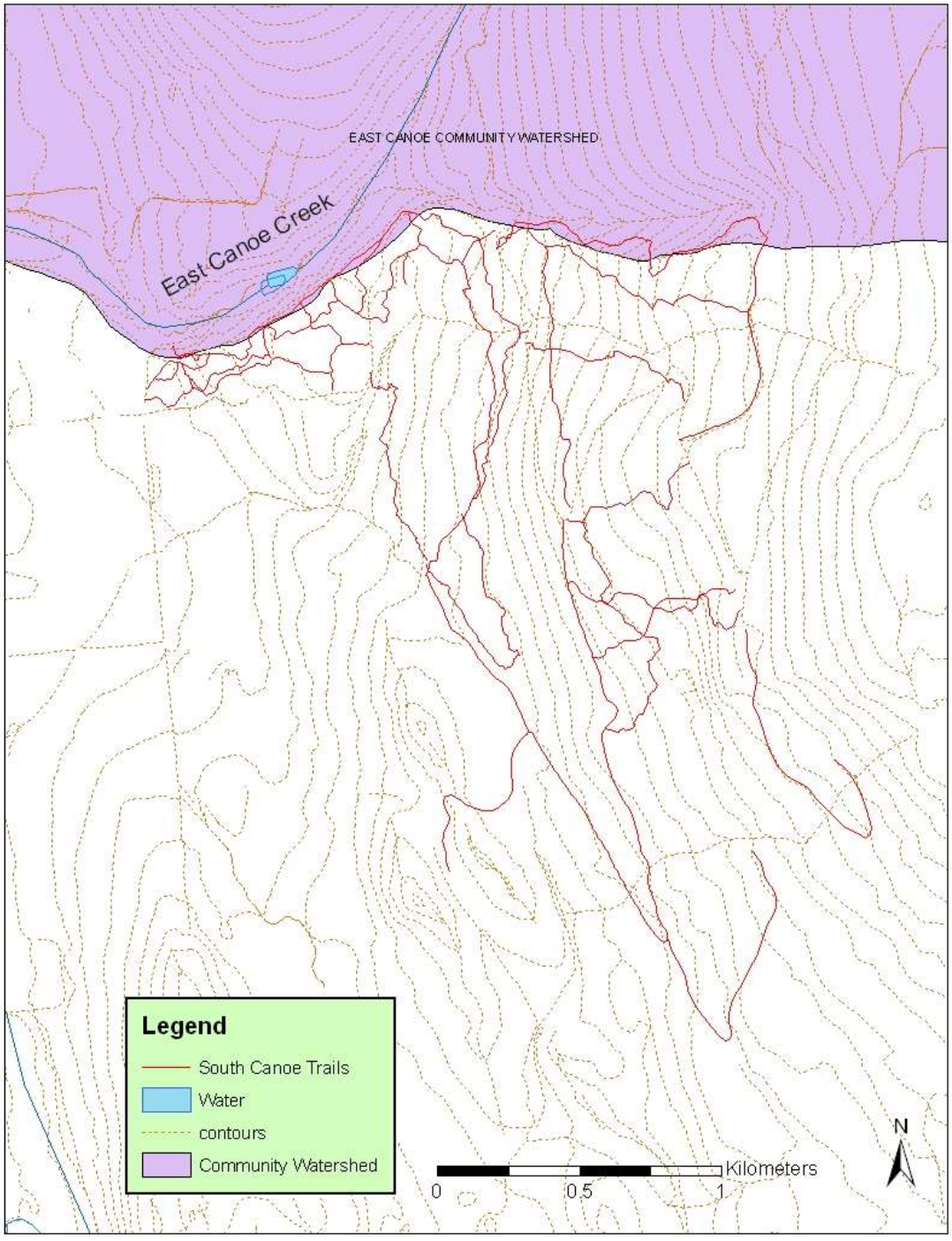


Figure 3. The northern edge of the South Canoe Trails system is adjacent to the East Canoe Community Watershed. Some section of trails fall within the watershed boundary and must be re-routed to avoid encroachment.

Table 1. Ecological communities at risk in the South Canoe area of the Larch Hills .

English Name	BC List	BEC zone	Ecosystem Group
Douglas-fir / pinegrass / red-stemmed feathermoss	Yellow	IDFmwI IDFmw2	Forest, Woodland
Douglas-fir / common snowberry / bluebunch wheatgrass	Yellow	IDFmwI IDFmw2	Woodland, Forest
Douglas-fir - western redcedar / falsebox	Yellow	IDFmwI IDFmw2	Forest
Western red cedar /devil's club/lady fern	yellow	IDFmw1	Forest
Black cottonwood/common snowberry/roses	Red	IDFmw1	Forest
Western red cedar/western hemlock/common horsetail	Blue	ICHmw2	Forest
Western red cedar/Douglas fir/red-osier dogwood	Blue	IDFmw1	Forest

Table 2. Plant species at risk in the Interior Douglas Fir (IDF) and Interior Cedar Hemlock (ICH) biogeoclimatic zones within the Kamloops Forest District and Columbia Shuswap Regional District .If found these plant species should be protected during trail design and construction. Plants in bold are most likely to be seen in this area.

Scientific Name	English Name	BC List	BEC Zone	Name Category
Chenopodium atrovirens	**dark lamb's-quarters**	Red	IDF	Vascular Plant
Olsynium douglasii var. *inflatum*	**satinflower**	Red	IDF	Vascular Plant
Agoseris lackschewitzii	pink agoseris	Blue	IDF	Vascular Plant
Allium geyeri var. *tenerum*	Geyer's onion	Blue	IDF	Vascular Plant
Carex hystericina	porcupine sedge	Blue	IDF	Vascular Plant
Chamaesyce serpyllifolia ssp. *serpyllifolia*	**thyme-leaved spurge**	Blue	IDF	Vascular Plant
Dryopteris cristata	crested wood fern	Blue	IDF/ICH	Vascular Plant
Epilopium ciliatum	**purple-leaved willowherb**	Blue	ICH	
Hypericum scouleri ssp. *nortoniae*	western St. John's-wort	Blue	ICH	Vascular Plant
Lindernia dubia var. *anagallidea*	false-pimpernel	Blue	IDF	Vascular Plant
Pyrola elliptica	**white wintergreen**	Blue	IDF/ICH	Vascular Plant

Table 3. Bird species at risk in the Interior Douglas Fir (IDF) and Interior Cedar Hemlock (ICH) biogeoclimatic zones 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 construction and maintenance.

Scientific Name	English Name	BC List	Identified Wildlife	Breeding Bird
Buteo swainsoni	Swainson's Hawk	Red		Y
Chondestes grammacus	Lark Sparrow	Red		Y
Megascops kennicottii macfarlanei	Western Screech-Owl, *macfarlanei* subspecies	Red	Y (May 2004)	Y
Melanerpes lewis	Lewis's Woodpecker	Red	Y (May 2004)	Y
Ardea herodias herodias	Great Blue Heron, *herodias* subspecies	Blue	Y (Jun 2006)	Y
Asio flammeus	Short-eared Owl	Blue	Y (May 2004)	Y
Catherpes mexicanus	Canyon Wren	Blue		Y
Contopus cooperi	Olive-sided Flycatcher	Blue		Y
Dolichonyx oryzivorus	Bobolink	Blue		Y
Eremophila alpestris merrilli	Horned Lark, *merrilli* subspecies	Blue		Y
Hirundo rustica	Barn Swallow	Blue		Y
Numenius americanus	Long-billed Curlew	Blue	Y (May 2004)	Y
Grus canadensis	Sandhill Crane	Yellow	Y (Jun 2006)	Y

Table 4. Mammal species at risk in the Interior Douglas Fir (IDF) and Interior Cedar Hemlock (ICH) biogeoclimatic zones within the Kamloops Forest District and Columbia Shuswap Regional District .Habitat features (e.g., wildlife trees) used by these species will be avoided where possible during trail design construction and maintenance.

Scientific Name	English Name	BC List	Name Category	BGC
Taxidea taxus	American Badger	Red	Vertebrate Animal	ICH;IDF
Chlosyne whitneyi	Rockslide Checkerspot	Blue	Invertebrate Animal	IDF
Corynorhinus townsendii	Townsend's Big-eared Bat	Blue	Vertebrate Animal	ICH;IDF
Danaus plexippus	Monarch	Blue	Invertebrate Animal	ICH;IDF
Euderma maculatum	Spotted Bat	Blue	Vertebrate Animal	IDF
Gulo gulo luscus	Wolverine, *luscus* subspecies	Blue	Vertebrate Animal	ICH;IDF
Hemphillia camelus	Pale Jumping-slug	Blue	Invertebrate Animal	ICH;IDF
Magnipelta mycophaga	Magnum Mantleslug	Blue	Invertebrate Animal	ICH;IDF
Martes pennanti	Fisher	Blue	Vertebrate Animal	ICH;IDF
Myotis thysanodes	Fringed Myotis	Blue	Vertebrate Animal	ICH;IDF
Ovis canadensis	Bighorn Sheep	Blue	Vertebrate Animal	ICH;IDF
Pholisora catullus	Common Sootywing	Blue	Invertebrate Animal	ICH;IDF
Spea intermontana	Great Basin Spadefoot	Blue	Vertebrate Animal	IDF
Ursus arctos	Grizzly Bear	Blue	Vertebrate Animal	ICH;IDF

Table 5. Important habitats used by vulnerable species that may be found in the South Canoe Trails area (reference: BC Species and Ecosystem Explorer reports).

English Name	Scientific Name	BC Status	Habitat Notes
American Badger	*Taxidea taxus*	Red	Grasslands, deep soil
Rockslide checkerspot	*Chlosyne whitneyi*	Blue	Alpine rockslides, bare rock/talus/scree
Townsend's big-eared bat	*Corynorhinus townsendii*	Blue	Mosaic of wood/grass/shrubland, Cliffs, Caves, Mines
Monarch	*Danaus plexippus*	Blue	Patches of milkweed
Spotted bat	*Euderma maculatum*	Blue	Conifer forests desert to montane, near fields and marshes, roost in caves and cliffs
Wolverine, luscus subspecies	*Gulo gulo luscus*	Blue	Wide ranging, mainly alpine
Pale jumping slug	*Hemphillia camelus*	Blue	Coniferous forests, mossy stumps, rocks, logs, leaf litter
Magnum mantleslug	*Magnipelta mycophaga*	Blue	Cool, moist coniferous forest, logs, bark, depressions, talus rock
Fisher	*Martes pennanti*	Blue	Dense forests, dens in hollow trees and rock crevices
Fringed Myotis	*Myotis thysanodes*	Blue	Roosts in rock crevices
Bighorn sheep	*Ovis canadensis*	Blue	alpine to desert grassland, shrub-steppe with steep "escape" terrain
Common sootywing	*Pholisora catullus*	Blue	disturbed sites, weedy open areas, edges of pastres and gulches
Great Basin spadefoot toad	*Spea intermontana*	Blue	semi-desert shrubland, loose soil, temporary or permanent pools of water
Grizzly bear	*Ursus arctos*	Blue	alpine, sub-alpine forests, require large areaas where food is abundant

APPENDIX A – Shuswap Trail Alliance Trail Building Protocol and Stewardship Information.

Shuswap Trail Protocol

The Shuswap Trail Alliance – Updated: July 25, 2011

Know the Layers

- The Environment/Ecology – Riparian, Wetlands, Watersheds, Critical Habitats, Red/Blue Lists
- Secwepemc (Shuswap) Nation – Sexqueltquin (Adams Lake), Qw7ewt (Little Shuswap), Sk'atsin (Neskonlith), Splatsin
- Provincial/Federal Government – Natural Resources, MoE, DFO, BC Parks, Rec Sites and Trails. . .
- Municipal/Regional Districts – Staff/ Councils, Parks Commissions, Greenway Liaison Committee,
- Land Tenure Holders – Forestry, Range, Mining, Trapping, Harvest, Tourism. . .
- Private Land Owners/Local Residents
- Recreational User Groups – Hiking, Mountain Biking, Equestrian, Nordic Ski, Snowshoe, ATV, Off-road Motorcycle, Snowmobile, Fish & Game, Nature Viewing, Camping, Berry Picking. . .
- Safety – RCMP, Fire Protection, Search & Rescue. . .

"So You Want to Build a Trail" Steps

1. Call the Shuswap Trail Alliance (250-832-0102). . .
2. Do your homework – check with area trail stewards, research the "layers", look at maps/Google Earth/GeoBC Online/Front Counter BC Online, study sustainable design standards, find out about other's plans, talk to people. . .
3. Get permission to explore on the ground
4. Find the Lines (GPS/mapping)
5. Conduct Environmental Screening
6. Write up a draft plan (include design, build, maintenance, and budget)
7. Bring plan to the local Stewardship Advisory or Lead Steward
8. Submit for First Nation (Lakes Division/Little Shuswap), Stewardship Partners, Land Management, and key stakeholder review (see layer contacts). . .
9. Revise lines and plan (as required), and resubmit for review. . .
10. Apply for Authorization – Front Counter BC, Municipal/Regional Government, Private Owner, Department of Fisheries and Oceans, Ministry of Environment. . .
11. Upon authorization – Build, Monitor, Maintain, Adapt. . .

The Shuswap Trail Stewardship Program

1. **Trail Stewardship Advisory Committees** – formed as local advisory groups around specific trail systems (under the umbrella of the Shuswap Trail Alliance) to provide direction to land managers on priorities and needs for trail maintenance, planning, environmental monitoring, user interaction, and adaptive responses – including assistance with volunteer engagement
2. **Lead Trail Stewards** – individuals appointed as the main contact for a specific trail system (under the umbrella of the Shuswap Trail Alliance), assisting with annual trail inventories, inspection of environmental monitor sites, regular walking and register box checks, spring volunteer clean-up days, liaison with land managers through the regional trail stewardship coordinator, and attendance at an annual debrief, planning, and celebration conference of regional trail stewards.

3. **Trail Stewardship Teams** – local individuals who act as the eyes/ears for a specific trail system, assisting the Lead Trail Steward (see tasks above). May also include maintenance support.

4. **Adopt-a-Trail Stewards** – an individual, family, or organization who commit to periodically monitor and provide basic maintenance through the year for a specific section of trail.

5. **The Trail Stewardship "Binder"** – the go-to resource developed for each trail system held by the Lead Trail Steward or Stewardship Advisory Chair that contains the trail management and adaptive plan, schedules, maps, inspection and monitor forms, contact information, and other

Appendix B: Field Identification Information for Potential Plant Species at Risk in the South Canoe Trail System.

Information to assist field identification of the following plants can be found in this appendix:

- dark lamb's-quarters
- satinflower
- pink agoseris
- Geyer's onion
- thyme-leaved spurge
- crested wood fern
- purple -leaved willowherb
- western St. John's-wort
- false-pimpernel
- white wintergreen

Reference: Klinkenberg, Brian (Editor). 2008. E-Flora BC: Atlas of the Plants of British Columbia [www.eflora.bc.ca]. Lab for Advanced Spatial Analysis, Department of Geography, University of British Columbia, Vancouver. Available: http://www.eflora.bc.ca. (Accessed: [*September 28, 2010*]).

Dark lamb's quarters

Chenopodium atrovirens

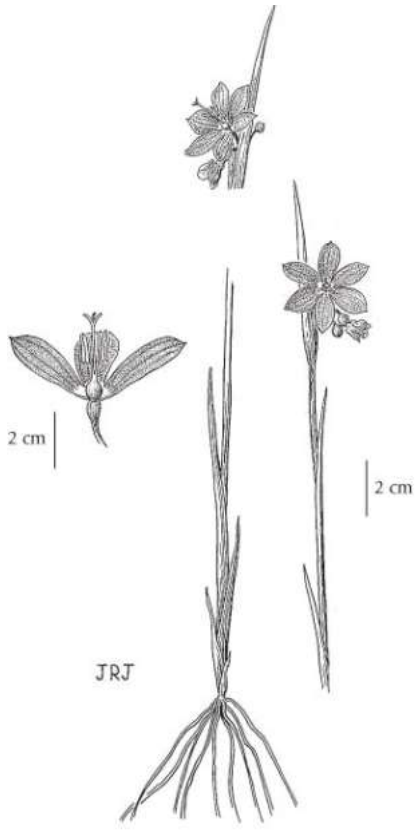
General:
Annual herb from a taproot; stems erect, solitary, simple to branched, 10-50 cm tall.

Leaves:
Stem leaves lanceolate, usually not arrowhead-shaped, greenish on upper surfaces but sparsely mealy below, stalked, 1-4 cm long, rounded to pointed.

Flowers:
Inflorescence of dense clusters in large terminal and smaller lateral spikes, densely mealy, without stalks.

Fruits:
Thin, membranous envelopes, 1 mm wide; seeds obtusely margined, slightly roughened.

Satin flower



Olsynium douglasii var. *inflatum*

General:
Perennial tufted herb from a fibrous root; stems somewhat compressed, simple, 10-30 cm tall.

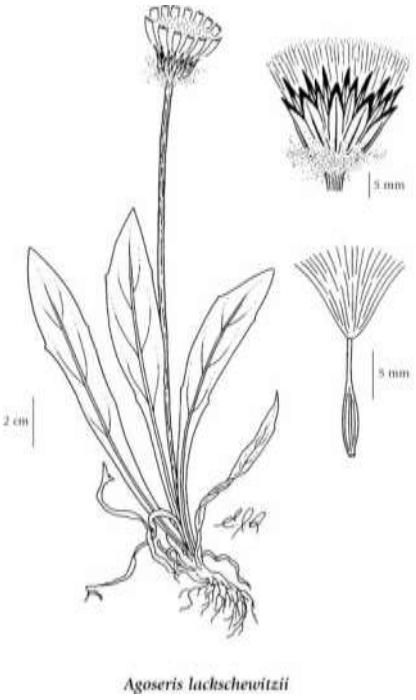
Leaves:
Basal leaves reduced, bractlike, blades lacking or sometimes 1-2 cm long; stem leaves 2 to 4, linear, on the lower 1/2 of stem, sheathing, the blades 10-30 cm long, 1.5-3 mm wide, the tips long-pointed.

Flowers:
Inflorescence of (1) 2 or 3 showy, nodding flowers on slender, flexuous, 3- to 4-cm long stalks; flowers reddish-purple, of 6 distinct oblanceolate to egg-shaped segments, these similar, 1.5-2.5 cm long, 5-nerved, abruptly pointed, the tubes slightly inflated below, 1-2 mm long; bracts 2, unequal, the upper one usually exceeding the flowers; filaments fused about 1/3 to 1/2 their length; anthers 3-7 mm long, yellow.

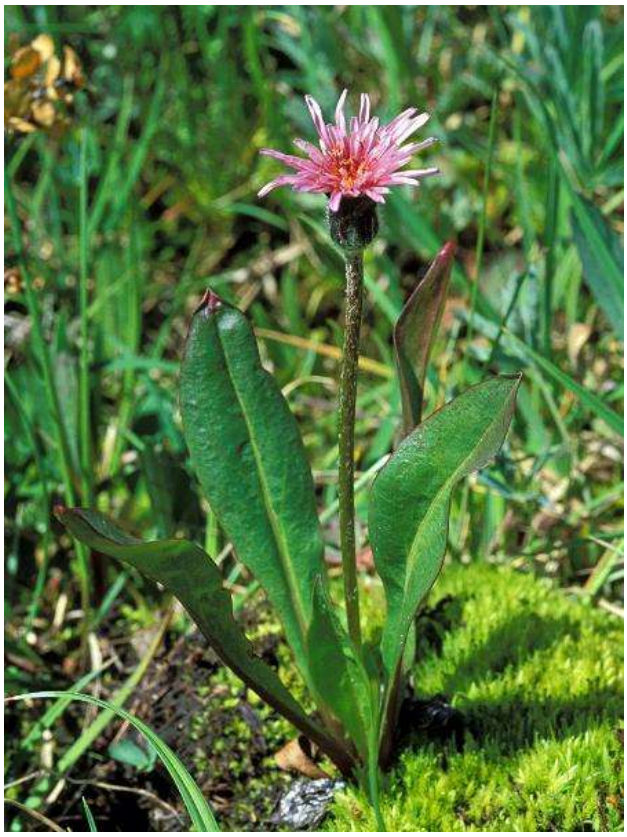
Fruits:
Capsules, 5-9 mm long; seeds numerous, egg-shaped, brown, 1.5-2.5 mm long.

Notes:
Two varieties occur in BC
1. Perianth segments dark red-purple; filament tubes only slightly enlarged above the base; flowers commonly 2 per stem; plants of SW BC .....var. douglasii
1. Perianth segments pale purple; filament tubes with an inflated area just above the base; flowers commonly 3 per stem; plants of SC BC..... var. inflatum (Suksd.) Cholewa & Henderson

Pink agoseris

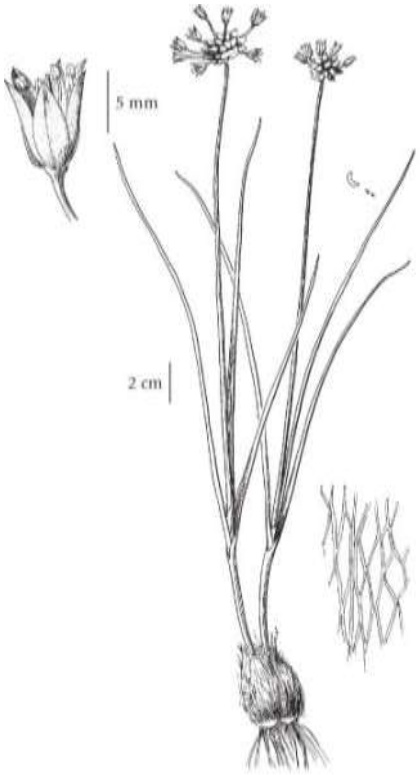


Agoseris lackschewitzii



Scientific Name	*Agoseris lackschewitzii*
English Name	pink agoseris
Plant type	Herbaceous vascular plant
Plant family	Aster
BC List	Blue
IDF and ICH zone	ICHmw
Habitat Type	Wet meadows
Habitat Description	Restricted to perennially wet montane meadows on substrates in which the soil is saturated throughout the growing season in mid-montane to subalpine zones.
Plant Description	Pink Agoseris is a taprooted perennial with milky sap. Glabrous leaves are clustered at the base, and there are 1 to several leafless stems, 10-60 cm tall, arising from the center; leaves taper gradually to a long petiole, are narrowly lance-shaped, 5-25 cm long, and 10-25 cm wide. Flower heads resemble those of the common dandelion; they are solitary at the ends of the stems and composed entirely of deep pink to light purple ray flowers, ca. 15-20 mm long. Involucral bracts are narrowly lance-shaped, 10-15 mm long, villous, with non-glandular hairs, purple-striped, mottled, and obtuse-tipped. Fruits (achenes) have beaks 1/2 to 2/3 the length of their bodies. Fruits also resemble those of the dandelion; they are spindle-shaped, and the top tapers to a slender beak to which numerous, long, white bristles are attached.
Flower Colour	Pink
Flowering period	
E Flora	http://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Agoseris+lackschewitzii

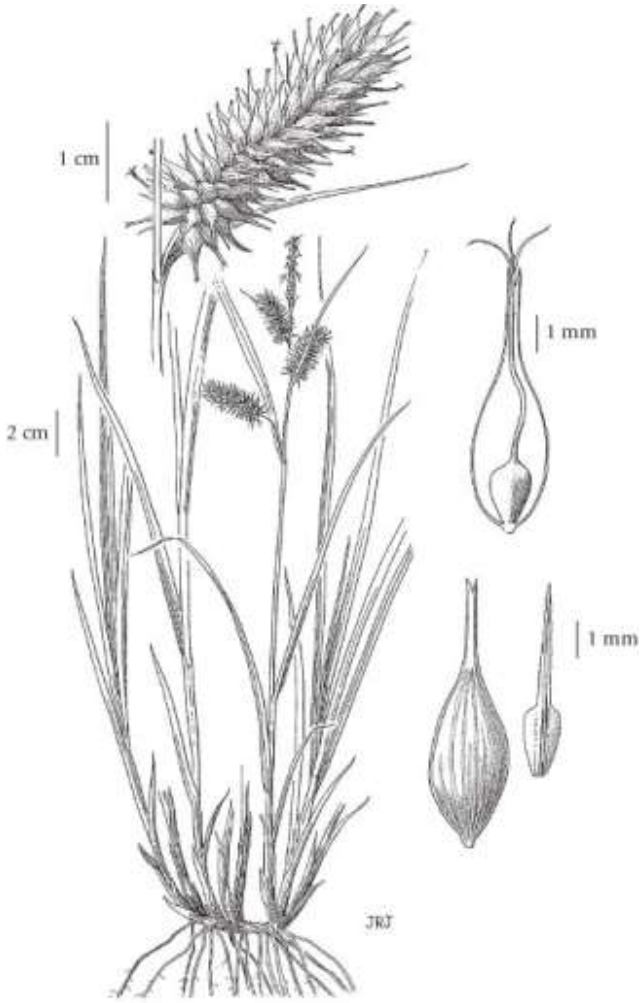
Geyer's onion



Allium geyeri var. *tenerum*

Scientific Name	*Allium geyeri var. tenerum*
English Name	Geyer's onion
Plant type	Herbaceous vascular plant
Plant family	Lily
BC List	Blue
IDF and ICH zone	IDFmw
Habitat Type	Moist meadows and rock outcrops
Habitat Description	Moist meadows and rock outcrops in the lowland, steppe and montane zones
Plant Description	Perennial herb from an egg-shaped, scaly bulb, the bulbs often clustered, the outer scales brownish, fibrous, in a coarse-meshed network, the inner scales whitish; flowering stems erect, 10-50 cm tall, slender, cylindric to somewhat angled, smooth. Basal leaves usually 3 or more, persisting, linear, channeled, shorter than the flowering stem, 2-5 mm wide, smooth, the margins entire; stem leaves lacking. Flowers a terminal umbel of several to many, stalked flowers, above 2 or 3 membranous, egg-shaped to lanceolate bracts, the stalks longer than the flowers. Flowers pink, rarely white, bell-shaped, of 6 distinct tepals, mostly replaced by bulbils; tepals usually 6-8 mm long, egg-shaped to lanceolate, somewhat long-tapering to pointed or blunt tips, sometimes obscurely toothed on the margins, erect, in fruit becoming tough-keeled and enclosing the capsule; stamens 6, usually shorter than the tepals; pistil 1, 3-chambered. Fruits capsules, more or less egg-shaped, 3-lobed, with 6 low, knob-like crests; seeds 6 or fewer, shiny-black.
Flower Colour	
Flowering period	
E Flora	http://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Allium+geyeri var. tenerum

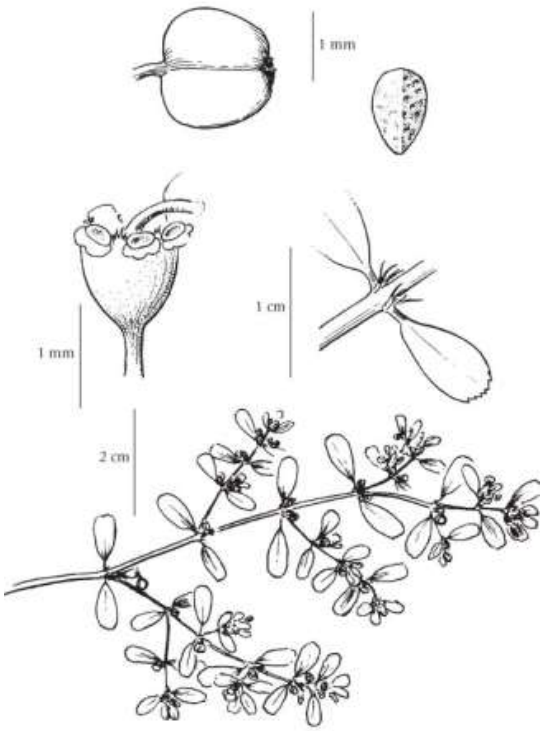
Porcupine sedge



Carex hystricina

Scientific Name	*Carex hystricina*
English Name	porcupine sedge
Plant type	Sedge
Plant family	Sedge
BC List	Blue
IDF and ICH zone	IDFxh
Habitat Type	Swamps, shorelines and wet meadows
Habitat Description	Swamps, shorelines and wet meadows in the steppe and montane zones
Plant Description	Perennial, tufted herb from short, stout rhizomes; stems 15-100 cm tall, as long as or longer than the leaves. Leaves sheaths reddish, the lower ones breaking into threads; blades 3 to 7 per stem, flat, with crosswalls, the margins slightly rolled-under, 2-10 mm wide. Flowers are spikes 2 to 5, the terminal one linear, 2-4 cm long, with male flowers, the lower spikes 1 to 4, cylindrical, with female flowers, the lower long-stalked, reflexed, the upper short-stalked, erect; bracts subtending the female spikes tubular-sheathing, leaflike, the lower bracts much longer than the spikes and their stalks, the upper ones progressively reduced. Fruits perigynia lanceolate to narrowly egg-shaped, 5-7 mm long, 1.5-2 mm wide, usually pale greenish, shiny, inflated, convex, smooth above, (12-) 15- to 20-nerved, numerous, separate or crowded, spreading or directed downward, short-stalked, the beaks about 1/2 as long as the bodies, bidentate; the teeth 0.3-0.9 mm long, straight; female scales lanceolate, translucent, much shorter than the perigynia, the midribs extending into rough, tapered awns, the awns 2-6 mm long; stigmas 3; achenes 3-angled, 1.2-1.6 mm long.
Flower Colour	
Flowering period	
E Flora	http://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Carex+hystricina

Thyme-leaved spurge



Chamaesyce serpyllifolia ssp. *serpyllifolia*

General:
Annual herb from a fibrous root; stems usually prostrate, freely branched with milky juice, 5-30 cm long.

Leaves:
Obliquely oblong to more oblong egg-shaped, toothed near the tip, 5-15 mm long; stipules at the base lanceolate, irregularly margined, 0.5-1.5 mm long.

Flowers:
Inflorescence of small clusters of axillary involucres; involucres 1 mm long, bell-shaped; glands 4, with sunken centres, appendages whitish, lobed or small-toothed.

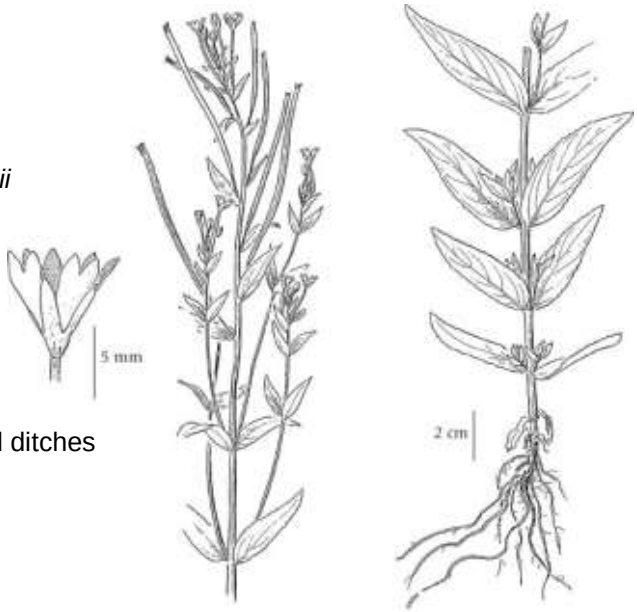
Fruits:
Capsules, 1.5-2 mm long, glabrous; seeds 1.2 mm long, greyish-brown, sticky when wet, pitted to wrinkled or cross-corrugated.

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 m[illegible]
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

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



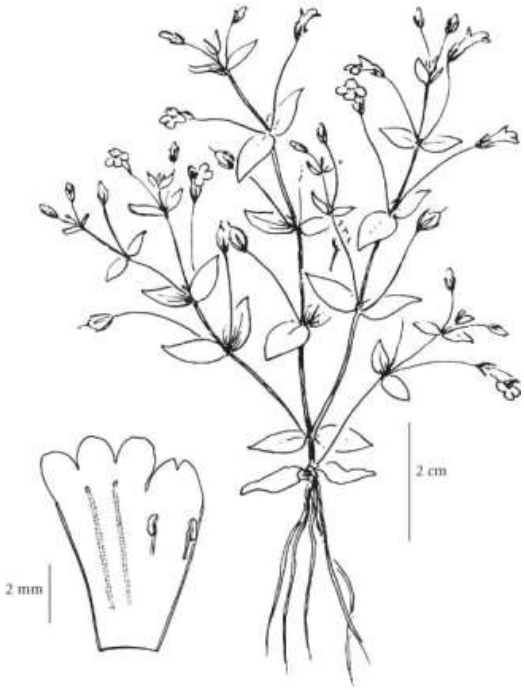
Epilobium ciliatum ssp. *watsonii*

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.
Flower Colour	Two subspecies occur in Bcd: 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

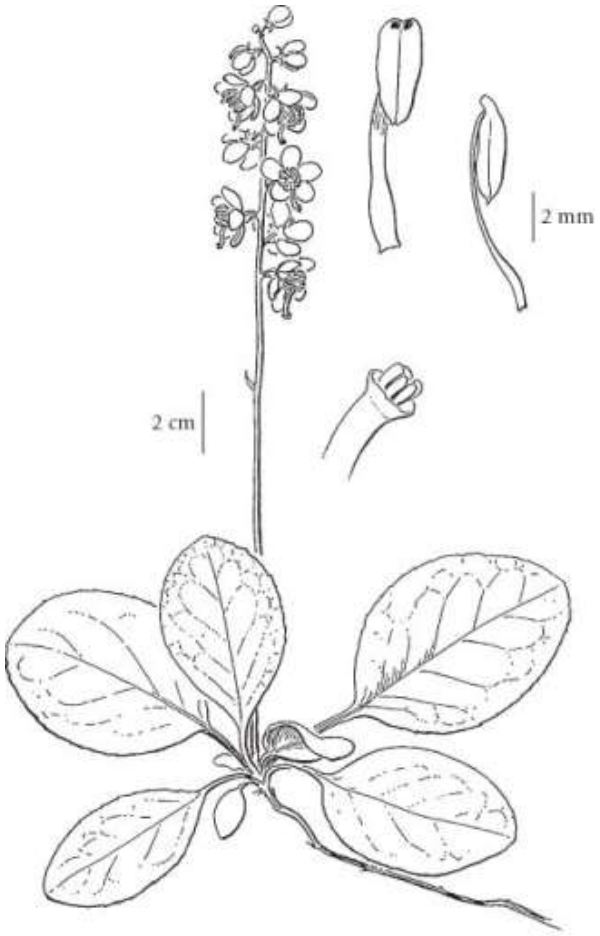
False pimpernel



Lindernia dubia var. *anagallidea*

Scientific Name	*Lindernia dubia var. anagallidea*
English Name	false-pimpernel
Plant type	Herbaceous vascular plant
Plant family	Figwort
BC List	Blue
IDF and ICH zone	IDFxh
Habitat Type	Wet banks or shores
Habitat Description	Wet, sandy or muddy banks and shores in the lowland and steppe zones
Plant Description	Low annual herb from fibrous roots; stems ascending to erect, 5-20 cm tall, slender, branched, smooth. Leaves opposite, unstalked, egg-shaped to elliptic, 0.5-2 cm long, entire to obscurely few-toothed, 3- to 5-veined, smooth. Inflorescence of single stalked flowers in the leaf axils, the thread-like stalks longer than the leaves; corollas blue-violet to whitish, narrowly bell-shaped, 6-9 mm long, 2-lipped, the upper lip with 2 short teeth, the lower lip longer, projecting, 3-lobed, the throat with 2 yellow-hairy ridges; calyces of 5 nearly distinct, equal, linear segments, 3-4 mm long; fertile stamens 2. Fruits capsules, ellipsoid, 4-6 mm long; seeds numerous, yellowish, 0.2-0.4 mm long, smooth to finely net-veined.
Flower Colour	Blue violet to whitish
Flowering period	
E Flora	http://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Lindernia+dubia var. anagallidea

White Wintergreen



Pyrola elliptica

General:
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:
Inflorescence 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.

Appendix C: Fisheries and Oceans Canada (DFO) Operational Statement (Best Practices) for Clear Span Bridge Construction

CLEAR SPAN BRIDGES

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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