



# **APPENDIX A**

## **Project Meeting Summaries**

**SOURCE TO TAP WATERSHED ASSESSMENTS FOR  
PEACHLAND CREEK AND TREPANIER CREEK**

**Summary Notes of the First Technical Committee Meeting**

Held September 9, 2009 (9:00 to 11:20 am)

at District of Peachland Public Works Office, 5379 Princeton Avenue

1. Introduction of Attendees:

Mirjam Glass	District of Peachland (mglass@peachland.ca)
Robert Birtles	Interior Health Authority (Robert.Birtles@interiorhealth.ca)
Solvej Patschke	Ministry of Environment (Solvej.Patschke@gov.bc.ca)
Rob Dinwoodie	Ministry of Forest and Range (MOFR) (rob.dinwoodie@gov.bc.ca)
Clay Bradley	Ministry of Forest and Range (Clayton.Bradley@gov.bc.ca)
Robert Annand	Ministry of Forest and Range (robert.annand@gov.bc.ca)
Ralph Backer	Ministry of Forest and Range (ralph.backer@gov.bc.ca)
Charles Oduro	Ministry of Forest and Range
Margaret Bakelaar	Central Okanagan Regional District (margaret.bakelaar@cord.bc.ca)
Zee Marcolin	Golder Associates Ltd. (zmarcolin@golder.com)

2. Project Overview:

The District of Peachland has retained Golder Associates Ltd. to conduct Watershed Assessments for source protection for Peachland Creek and Trepanier Creek, which supply the majority of the District of Peachland's domestic water. The Watershed Assessment will complete Modules 1, 2, 7 and 8 of the Comprehensive Drinking Water Source to Tap Guideline. Module 2 will include an update the last IWAP completed in the late 1990's.

3. Discussion Topics:

**Cattle Issues:**

- R. Dinwoodie requested that impact areas of cattle be prioritized and specific impacts be described, helpful to MOFR to develop range mitigation plans and address high priority issues first.
- If a location of cattle impact is identified, assess if a larger area is an issue and include on map (i.e., identify one cattle impacted site but the site is part of a larger area surrounding the creek that is grassed and flat and can provide access all along the reach)



- Identify water use schedules of sources if applicable and critical time periods (i.e., are different intakes or reservoirs used at different times).
- Identify if there is a safe time or area for cattle to access creek or reservoir and not impact water quality (i.e., in Duteau – cattle can access one area of the reservoir with minimal impacts).
- Identify dry sections of streams that may have flow at other times, i.e., cattle accessing dry creek bed in summer, the stream flows with fall rains and re-introduces feces into the stream.
- Identify good off-watering sites if possible.
- MOFR does not have jurisdiction over private land – cattle issues on private land need to be worked out with land owner. M. Bakelaar indicated that there may funding sources available to assist private land owners. Maybe Ministry of Agriculture can assist.
- MOFR is currently developing Best Management Practices (BMPs) for grazing cattle in community watersheds. Hope to have soon so that what has been proven effective is used consistently in all areas.
- Off site watering – the purveyor must transfer a small portion of their water licence to the MOFR for off-site watering. The range tender holder does not get the water license, so if he loses the range tender, the off-site watering station can be used by the next range tender holder through MOFR. Is a slow process, so get application in as soon as possible.
- All watershed needs to be looked at for cattle impacts, not just lower creek reaches.

**IWAP Update:**

- Golder's methodology was to update the IWAP from the ones previously done by assessing any changes in the watershed based on an aerial photo comparison and completing the field reconnaissance work with a focus on water quality, quantity and fish habitat, but the detailed inventory work within the IWAP was not included in our work plan.
- S. Patschke stressed the importance of completing the sediment source survey, including on non-status roads to look for chronic sediment sources. Used example in Duteau Creek that many non-status roads are chronic sediment sources. Z. Marcolin explained that the work plan includes a sediment source survey with examination of roads, but the field work will focus on water quality issues and not on completing a detailed inventory all road attributes.
- Discussion on Community Forest Agreement and allowable Equivalent Clearcut Area (ECA) – current legislation allows QP to recommend ECAs, generally if ECAs > 30% in Community Watersheds, requires more investigation before allowable.

**Source to Tap Watershed Assessments:**

- R. Birtles explained that the District of Peachland is required to complete Modules 1, 2, 7 and 8 of the Comprehensive Drinking Water Source to Tap Assessment Guidelines as a condition on their operating permit.
- The guideline is a multi barrier approach that is fairly standardized in Canada and the US, BC is a little behind, however there is some liberty in conducting the assessments.
- S. Patschke likes including the IWAP approach as it also includes the sediment source survey and the hydrology impacts in the watershed. This allows assessing the physical effects on water quantity and quality.
- R. Annand said he's okay with using a modified IWAP, but should explain in the report where and why variance from the IWAP procedure.
- Discussion on treatment and how treatment plants are designed for water quality parameters and large differences can cause a treatment plant to fail, requiring a boil water advisory for the community.

- One objective of source protection is to provide the best water quality possible for treatment, as consistently as possible (could also reduce treatment costs).
- R. Birtles explained about Interior Health policy that purveyors must use filtration; unless they can provide evidence they don't need to and then must apply for a filtration deferral. Peachland would not be able to apply for a filtration deferral due to fluctuations in turbidity and fecal counts.
- Filtration is to remove turbidity and microbial contamination, it does not protect against chemical contamination of water.
- Wildfire increases treatment costs due to increase nitrogen and phosphorus.

#### **Peachland Water Source:**

- Population 5,000, new development could double population.
- Master Water Plan calls for Peachland Creek as main water source in the future. Trepanier and the Peachland wells will eventually not be used. Trepanier Creek does not have storage capacity due to and risk from Brenda mines.
- S. Patschke indicated that Peachland, and other water purveyors, need to do drought planning as this could be an issue in the near future.
- M. Glass indicated the Peachland reservoir did not fill this year until August; usually they need to spill water during freshet.

#### **CORD and Planning in Watershed Areas:**

- Area outside of District of Peachland boundaries is within CORD.
- CORD is currently completing Fringe Planning in area. Peachland and Trepanier Creek Areas only have zoning but are currently in the process of completing an Official Community Plan (OCP), therefore the watershed assessment is good timing for CORD.
- There was a subdivision application in the Trepanier Creek area but it was deferred until the OCP is complete.
- SHIM mapping completed in Peachland and Trepanier Creek riparian areas.
- Crystal mountain plans include summer & winter activities with development population of 5,000. May not be in assessment area but could impact Jack Creek.

#### **Reporting:**

- Suggestion that reporting process break down issues and risk assessment by resource use, that way responsible parties can focus on their area.
- Need to provide solutions, not just indicate a problem, which is where the technical committee comes in. Language in report, especially impacts and recommendation, needs to be realistic and specific. If a site is unacceptable, then it needs to be identified as such, which can make access to funding easier.
- "Easy wins" should be identified, even if not high priority.
- Some discussion about having each section reviewed by the technical committee before proceeding to the next section. Z. Marcolin indicated the approach in the workscope was to provide a table of contents and risk assessment matrices at the progress meeting in October to get approved and thought it would be difficult to do one section at a time before doing the next as they were tied together, but we could revisit this at the progress meeting as we would have a better idea of the report approach by then.



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**Mountain Pine Beetle (MPB)**

- Impacts of MPB will impact water quality and quantity, need to be looked at in assessment.
- R. Annand indicated that there is a high degree of MPB in both watersheds and the expectation is 80% of mature pines will be lost.
- Discussion on the merits and differing opinions on whether to harvest and replant immediately and have quicker recovery or whether to allow natural die off and recovery, with impacts prolonged but potentially for a longer period of time.
- S. Patschke is waiting on Granger report that deals with hydrologic impacts of MPB, has a differing view on impacts which indicates recovery from natural die-off depends on understory. Will forward once she receives it. Suggests reviewing MOF Extension Notes 88 for MPB impacts.

**Land Uses Specific to Trepanier and Peachland Creeks:**

- ATV groups use – commercial tours within Peachland Creek watershed (FERPA indicates can't knowingly cause damage to the environment).
- Quarter section on Greata Creek with beaver dam.
- Brenda Mines – has an application in for expanding their mining activities.
- Several gravel pit applications currently submitted, which are next to the creek.
- Common for motorcycles to ride down the exposed slope of Peachland Creek Road, have plugged ditch line which may cause road failure and increased erosion.
- Cars have been dropped into creek.
- Highway diversion in Trepanier Creek.

**Action Items**

- R. Birtles to forward the MOU to all ministry representatives.
- Z. Marcolin to forward map of Watershed Assessment Areas and meeting summary notes to Technical Committee.
- Technical Committee members to forward to Z. Marcolin contact information for stakeholders within the Watershed Assessment Areas.
- M. Glass to book room for Stakeholder meeting.

Minutes completed by: Zee Marcolin, P.Eng. Golder Associates Ltd.

Reviewed by: Russ Wong, P.Geo. Golder Associates Ltd.

**SOURCE TO TAP WATERSHED ASSESSMENTS FOR  
PEACHLAND CREEK AND TREPANIER CREEK**

**Summary Notes for the Stakeholder Meeting**

Held October 15, 2009 (3:00 to 5:00 pm)  
at the Peachland Community Center, Council Chambers Office, 4450 6th Street, Peachland

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**Attendees:**

Mirjam Glass – District of Peachland (mglass@peachland.ca)  
Doug Allin – District of Peachland (dallin@peachland.ca)  
Solvej Patschke – Ministry of Environment (Solvej.Patschke@gov.bc.ca)  
Rob Dinwoodie – Ministry of Forest and Range (rob.dinwoodie@gov.bc.ca)  
Clay Bradley – Ministry of Forest and Range (Clayton.Bradley@gov.bc.ca)  
Ralph Backer – Ministry of Forest and Range (ralph.backer@gov.bc.ca)  
Margaret Bakelaar – Central Okanagan Regional District (margaret.bakelaar@cord.bc.ca)  
Zee Marcolin – Golder Associates Ltd. (zmarcolin@golder.com)  
Bryn Lord – Interior Health Authority (Bryn.Lord@interiorhealth.ca)  
Grant A. Thompson - Heartland Economics LP. Westbank First Nation (grant.thompson@wfndc.ca)  
Mike Jobke - Kamloops Woodlot Education Society & BCTS (mike.jobke@gov.bc.ca)  
Ted Chudyk - Silver lake Forestry Camp, lease and water licence holder on Silver Lake (info@silverlakekidscamp.com)  
Harold Waters - Tolko Industries Ltd. (harold.waters@tolko.com)  
Al Springer - Peachland Sportsmen Association  
Georges Guilleminot - Brenda Mines (gguilleminot@xstratacopper.ca)  
Jessica + Joe Klein - The Homestead Certified Organic Farm (jjhomestead@telus.net)  
Cliff Stowell - License holder on Lacoma Lake (homeandweb@shaw.ca)  
Genevieve Dunbar - Okanagan Basin Water Board (genevieve.dunbar@obwb.ca)  
Keith Fielding – Mayor District of Peachland (mayor@peachland.ca)  
Lloyd Hooper - Trepanier Ditch Water Community (hoopershomestead@shaw.ca)



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## **Agenda**

1. Introductions
2. Project background - project overview and objectives
3. Drinking water legislation background and policy direction of Interior Health (Bryn Lord, Interior Health)
4. Current and previous activities identified and risks to water quality
5. Input from stakeholders regarding:
  - a. watershed activities, current and historical,
  - b. natural, biological, physical and chemical hazards,
  - c. concerns and issues of stakeholders in relation to the watershed as a water source, and
  - d. identify changes in land use and forestry operations.

## **Project Background:**

The District of Peachland has retained Golder Associates Ltd. to conduct Watershed Assessments for source protection for Peachland Creek and Trepanier Creek, which supply the majority of the District of Peachland's domestic water requirements. The District is required to complete this assessment as part of their operating permit, issued by the Interior Health Authority.

The Watershed Assessment will complete **Modules 1, 2, 7 and 8** of the Comprehensive Drinking Water Source to Tap Guideline. The following provides an overview of each module within the Guideline:

- Module 1. Delineate and characterize drinking water source(s)
- Module 2. Conduct contaminant source inventory
- Module 3. Assess water system components
- Module 4. Evaluate water system management, operation, and maintenance practices
- Module 5. Audit finished water quality and quantity
- Module 6. Review financial capacity and governance of the water service agency
- Module 7. Characterize drinking water risks from source to tap
- Module 8. Propose a drinking water risk management strategy

The Comprehensive Drinking Water Source to Tap Guideline gives water purveyors a tool in which to assess all risks and threats to their water source and incorporate a multi-barrier approach to the protection of the water supply for both quantity and quality. The basis of this approach is to understand all aspects of delivering a clean, safe and reliable water supply from the source to the consumer's tap. The multi-barrier approach examines risks and threats to the water supply at the source, distribution system, management structure, operator training and the overall maintenance of the system. By understanding the risks, problems can be fixed, preventative measures can be incorporated into policy and long-term planning, effective water treatment methods identified and installed and emergency planning completed.

The project initiates this process and starts with identification of risks to water quantity and water quality in the watershed source areas. These include natural and human impacts. After the risks are identified, they are prioritized by a risk assessment process and then the development of strategies to reduce risk is initiated in consultation with a technical committee and stakeholders in the watersheds.

## **Meeting Purpose:**

Peachland Creek and Trepanier Creek are multi-use watersheds and provide a wide variety of values to many different user groups. These include (but not limited to) drinking water, industrial resources, private land and recreational values. The purpose of the stakeholder meeting is to identify potential risks to water quality, water quantity and fish habitat and to initiate a discussion with the stakeholders to safeguard the drinking water supply, either from protection of the source or improvements in areas impacting the source.

The focus on this project is drinking water for Peachland, so the study focus is the watershed areas above the District of Peachland intakes, however, this will also benefit down gradient water users. At this stage of the study we are trying to benchmark where we are now so we can identify areas that need improvement either through mitigation or developing strategies of risk reduction.

### **Discussion Topics:**

#### **Local Water Licensees, Trepanier Ditch Water Users and Residents:**

- Expressed concern with water quantity issues on Trepanier Creek and frustrated by requirement to build dam or potentially lose water license allotment.
- Replaced weir in 2006.
- Identified amount of projected and rate of development as a concern for local residents, Trepanier Creek is over licensed as is and increased development will reduce amount of water available to local residents.
- Peachland indicated that development is outside the scope of this study, but Peachland is undertaking a number of studies to examine water use and once meters are installed, Peachland will be able to categorize water uses and identify excesses. This information can be used to better manage the water supply and form policies as required. Currently in BC, domestic irrigation typically doubles water use rates in summer months.
- Pollution reduction in the watersheds is very important.
- Comments that local residents and water users are not consulted sufficiently on watershed activities and development, suggestion to have notification registry for those that want to be notified. CORD commented that there is no standard process for notification and there are also many different ministries that deal with different applications depending on application type and land type, but commented was noted and a good idea.
- Noted some private properties that may be a concern to the water resource (abandoned vehicles, old septic systems, etc.) but concerns that these cannot be accessed and there is nothing that can be done. Also noted that residents offered to assist in identifying these risks years ago but were never contacted. Some discussion on tools available to local governments to compel private property owners to reduce risks to drinking water. Noted that many notification process requirements are to advertise and do not require direct notification – comment that this is inadequate as many times local residents may not see the ad.
- Hikers and fishers are not a problem and help to police area. Explained that as part of the watershed assessment procedure, all risks are identified and then a risk assessment prioritized risks, usually fishers and hikers are not identified as a high priority risk.
- Comment about dogs in the creeks along the Greenway initiative and smokers dropping their cigarette butts along the paths.
- Dead animals in the creek, was a dead deer in Trepanier Creek and no one would take responsibility.

#### **Forestry**

- Tenure holders – 95% of Trepanier is in community forest managed by Westbank First Nation (WFN) and Peachland watershed forestry tenure includes Tolko, Woodlot (Kamloops Woodlot Education Society) and BC Timber Sales (BCTS).
- Pesticides not used in community forests for at least 10 years (need to check with Ministry of Highways and Hydro.) Interior watersheds do not have a brush problem like on the coast that use round-up to brush, not that much brush problems in the interior forests. Tolko utilizes manual brushing in community watersheds.
- WFN and Tolko have both completed retention and salvage plans for mountain pine beetle (MPB) and hydrologic assessments of the potential impacts (Tolko is waiting for their report).

- Retention and salvage plans – driver is to salvage MPB impacted wood before it loses its market value. It takes into account where stands are, LRMP, terrain, wildlife and fish habitat, biodiversity, old growth areas, short term recovery impacts, etc. Tolko commented that they leave stream buffers even if trees are highly infested.
- Comment that there was a large clear-cut in Peachland – Tolko explained that the salvage plan does include large cutblocks due to the nature of pine stands, but generally recovery is quick (about eight years for greening an area) and Lodgepole pine is vigorous and comes back quickly in natural areas.
- Comment that forestry needs to work with cattle interests to include natural barriers to stream areas as large cutblocks can provide easy access to streams to cattle.
- WFN commented that urban pressures and increased population has impact their forestry operations.

### Wildfire

- Gorman's had a foot or more of soot on-site after the Glenrosa Fire; soot loading to creeks after first large rainfall is a concern to drinking water.
- Discussion around treatment of organic loadings in creeks after a fire and potential impact to treatment plant. With the fires in community watersheds in the past few years, studies are being conducted to examine organic and chemical impacts on water quality and strategies are being developed to assist purveyors to deal with fires in their water source areas.
- Suggestion of completing retention planning to include fire breaks for the protection of property and protection of drinking water resources.
- WFN is in process of completing a Fuel Management Plan for Trepanier Creek, looking at 6,000 to 8,000 hectares, with open house in November. Looking at reducing fire risk and asked consultant to examine all possible solutions, i.e., species, tree density, deciduous trees, access, crowing of trees, etc. Interested in concept of tying in the protection of drinking water sources and fire protection planning into retention and salvage planning
- Comment on stream channels & canyons creating “fire wicks” where fires run of these areas and access higher elevation stands. There is balance between salvage logging for protection of streams (i.e., keeping stream buffers in canyons) and creating fire breaks to reduce fire wicking

### Cattle:

- Ministry of Forest and Range (MOFR) is currently developing Best Management Practices (BMPs) for grazing cattle in community watersheds. Hope to have soon so that what has been proven effective is used consistently in all areas.
- Wants project to highlight stream and drainage courses – not all range tenures follow watershed boundaries. Commented on different approaches being done in different watershed areas because different consultants are employed – noted that this may be better dealt with between government agencies.
- MOFR does not have jurisdiction over private land – cattle issues on private land need to be worked out with land owner.
- Natural barriers to creeks are very important to cattle range and creek access points.
- The watershed assessment reports provide MOFR the framework to initiate range use plans in each watershed area. Would be nice if the reports identified funding sources. Range plans also monitor effectiveness.
- MOFR has some sites identified, will send maps to Golder.
- Shorelines on reservoirs can be a problem area for cattle, especially during low water. Need to identify outflow areas.

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- Landowners must understand legislation – it is their responsibility to keep cattle off their property, not the responsibility of cattle ranchers. If they buy a quarter section, it is their responsibility to fence the property.
  - Studies have shown that although cattle do contribute fecal material to the creeks, wildlife and birds also have significant contribution.

#### **Tussock Moth**

- Infestations within the Peachland and Trepanier watersheds - attacks Douglas-Fir, can cause allergies.
- Forestry commented that stands generally have approximately 25% survival from Tussock.

#### **MacDonald Creek**

- Identified as potential sediment area.
- Landslide in late 90's, Peachland sportsman's club completed some remediation with funding from Brenda Mines.

#### **Brenda Mines**

- Water from mine site is high in molybdenum, but all water is treated before being released.
- A newsletter is produced that provides water quality information.

#### **Okanagan Basin Water Board (OBWB)**

- OBWB has provided funding to Peachland and other municipalities to complete source to tap watershed assessments, these projects are high priority for OBWB.
- OBWB is mandated to work with local municipalities to identify water concerns in the Okanagan Basin and provide tools and assist in developing strategies to local governments to deal with concerns identified. As OBWB is funded by taxes from local governments, funding is provided back to local governments to complete projects.
- OBWB does not have a mandate to oversee regulation.

#### **Source to Tap Watershed Assessments:**

- Interior Health indicated that District of Peachland is required to complete Modules 1, 2, 7 and 8 of the Comprehensive Drinking Water Source to Tap Assessment Guidelines as a condition on their operating permit.
- The guideline is a multi barrier approach that is fairly standardized in Canada and the US and BC is a little behind.
- Health policy that purveyors must have dual treatment including filtration unless can provide evidence filtration is not needed and then must apply for a filtration deferral.
- Peachland and local water users would not be able to apply for a filtration deferral due to fluctuations in turbidity and fecal counts. Completing this assessment will not eliminate the boil water advisory for local water users as water from BC streams generally has fluctuating turbidity and microbial counts which are especially influenced by high spring runoff flows.

Minutes completed by: Zee Marcolin

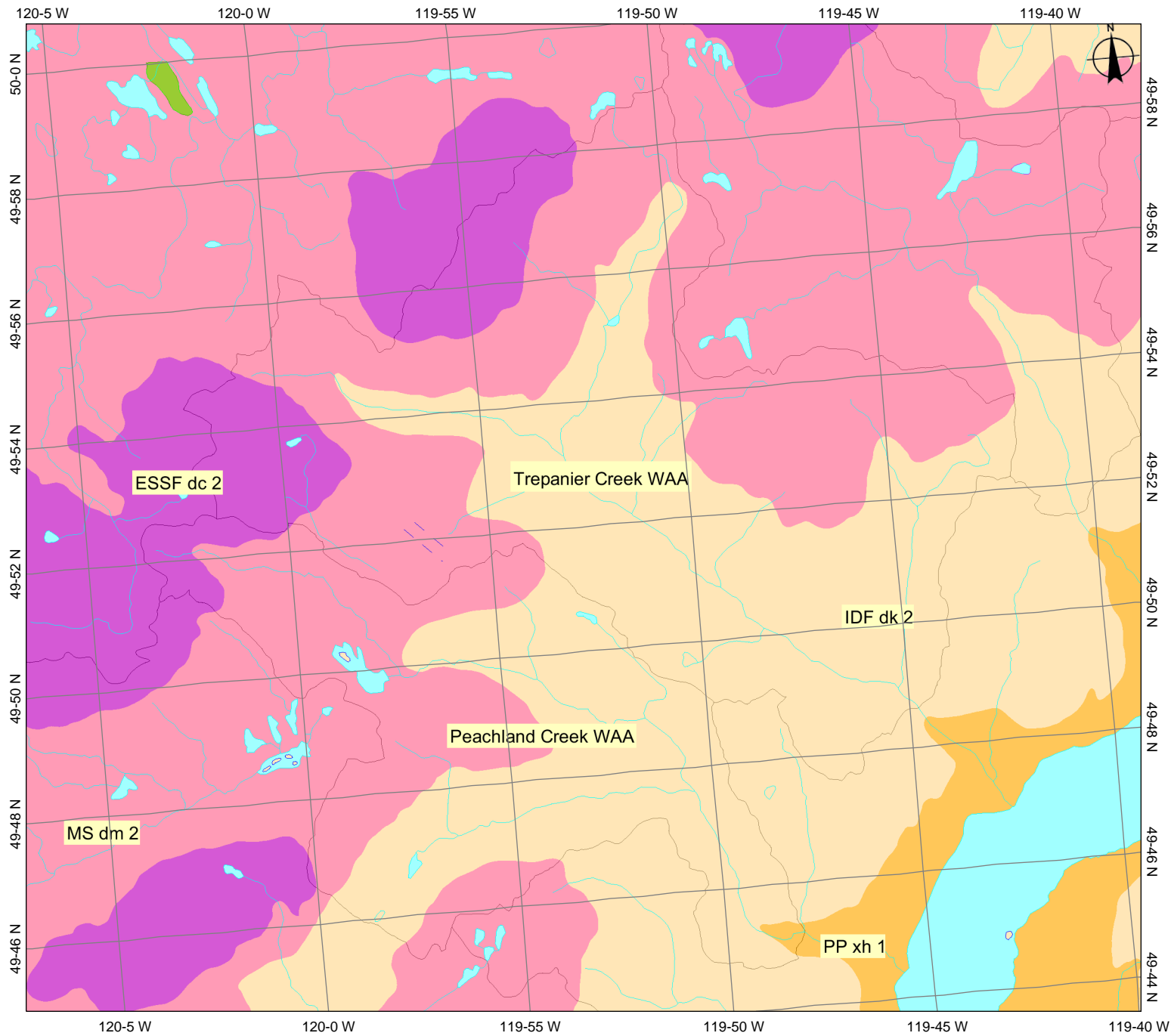
Reviewed by: Russ Wong



# **APPENDIX B**

## **Biogeoclimatic Zone Information**





### Biogeoclimatic Zones

#### Legend

- Community Watersheds - Outlined (1:250,000)
- Water - Coastal Islands - Outlined (1:250,000)
- Coastal Island - Definite
- Water - Lakes, Large Rivers, etc. - Colour Themed (1:250,000)
- River or Stream - Definite
- Lake - Definite
- Lake - Indefinite
- Lake - Intermittent
- Lake - Marshy
- Quarry (Water-filled)
- Reservoir - Definite
- Flooded Land - Inundated Indefinite
- Lake - Marshy Indefinite
- Marsh
- Island - Definite
- Water - Lakes, Large Rivers, etc. - Outlined (1:250,000)
- River or Stream - Definite
- Lake - Definite
- Lake - Indefinite
- Lake - Intermittent
- Lake - Marshy
- Quarry (Water-filled)
- Reservoir - Definite
- Flooded Land - Inundated Indefinite
- Lake - Marshy Indefinite
- Island - Definite

0 2.4 4.8 km.

Scale: 1:250,000  
Biogeoclimatic Zones - Colour Themed

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Datum/Projection: NAD83, Albers Equal Area Conic

#### Key Map of British Columbia





## **ESSF - Engelmann-Spruce-Subalpine fir Zone**

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**By: Derek Marcoux R.P.Bio., Selkirk College**

### **Introduction**



The Engelmann Spruce Subalpine fir zone (ESSF) occupies high elevation subalpine habitat throughout the province. In the south, it occurs above the Interior Cedar Hemlock zone and the Montane Spruce zone. In central BC, the ESSF occurs above the Subboreal Spruce. In northern B.C., the ESSF is gradually replaced by the Spruce-Willow-Birch zone. The Mountain Hemlock zone is the equivalent subalpine zone on the coast. The elevational ranges for the ESSF are between 1200-2100m in the southwest, 1500-2300m in the southeast and 900-1700m in the north (Meidinger and Pojar 1991).

The ESSF is typified by long cold winters and deep snowpacks. In the wetter regions of the interior, snowfall accumulation can be as much as several meters. The drier ESSF zones have annual precipitation between 400-500mm and the wetter regions have as much as 2200mm of which 50-70% falls as snow (Meidinger and Pojar 1991). Mean annual temperatures range between  $-1^{\circ}\text{C}$ - $+2^{\circ}\text{C}$ .

Meidinger and Pojar (1991) recognize 15 subzones in the ESSF zone. This zone occurs over a widely different climate belts ranging from the very wet southern interior to the dry, cold regions of the central interior. Four dry subzones (ESSFxc, ESSFdc, ESSFdk, ESSFdv) are found to occur above the Montane Spruce. Three moist subzones (ESSFmv, ESSFmc, ESSFmm) occur along the leeward side of the Coast Mountains in the same elevational band as the Mountain Hemlock zone. Six wet subzones (ESSFwm, ESSFwk, ESSFwc, ESSFvc, ESSFvv) are found in southeastern and northwestern regions of the province above the Interior Cedar Hemlock zone. With increasing elevation, the ESSF gradually opens into the ESSF parkland zone. The parkland is transitional to the true Alpine Tundra.

Podzolic soil development is common in the ESSF zone along with thick Mor humus forms. Brunisols occur in areas with less annual rainfall.

### **Ecosystems**

In the drier subzone regions, Grouseberry (*Vaccinium scoparium*) can be the dominant understory shrub and can often form pure cover under a mixed canopy of Subalpine fir, Engelmann Spruce and Lodgepole pine. Additional understory species may include *Cladonia* spp. Lichen, black huckleberry (*Vaccinium membranaceum*) and Soopollalie (*Shepherdia canadensis*) are also common species. In these areas, pure stands of lodgepole pine are common due to a widespread fire history. Many of these stands have existed for over 200 years (Steen and Coupe 1997).

In the moist and wet regions, grouseberry is restricted to dry sites and zonal vegetation includes dense covers of black huckleberry, white-flowered rhododendron, false azalea (*Menziesia ferruginnea*), Oak fern (*Gymnocarpium dryopteris*) and Sitka Valerian (*Valeriana sitchensis*). Moss cover can include knight's plume moss and leafy liverworts.



Avalanche chutes are common in the steep regions of the ESSF. In the dry subzones such as along the Rocky Mountains, avalanche chutes can consist of mostly low-growing herbaceous vegetation. In the wetter regions, the chutes are often a very dense combinations of alder (*Alnus* spp.), Indian hellebore (*Viratrum viride*), cow-parsnip (*Heracleum maximum*) and ladyfern (*Athyrium filix-femina*).

Lloyd et. al. (1990) recognizes two high elevation grasslands in the ESSFxc subzone. Vegetation is dominated by bluebunch wheatgrass (*Pseudoroegneria spicata*), western pasqueflower (*Anenome occidentalis*), Junegrass (*Koeleria macrantha*), and Pinegrass (*Calamagrostis rubescens*).

## Resources

Although forestry is common in the ESSF, accessibility is the main limitation in some of the steep, mountainous terrain. Regeneration in the upper elevations of the ESSF is often hindered by a short growing season. In areas where harvesting occurs, Engelmann Spruce and Lodgepole pine are the most common tree species for regeneration.

The forested and parkland zones are common hiking destinations during the summer months for people to access the high elevation lakes or alpine meadows. During the winter, the ESSF is widely used for alpine skiing, cross-country skiing and snowmobiling.



The ESSF is an important area for water production in the province. Together with the Alpine Tundra zone, the area provides late season snowmelt to refill watersheds. Clearcutting within this zone can shorten the length of time it takes for this water to melt. The shorter period can lead to a greater risk of flooding water during spring runoff and also water deficit later in the growing season. However, clearcuts also accumulate more snow on the ground, which can lead to less loss of the snowpack through evaporation from the forest canopy and greater amount available for recharge to the water supply

## References

Lloyd, D., K. Angove, G. Hope, and C. Thompson. 1990. A guide to site identification and interpretation for the Kamloops Forest Region. B.C. Min. For., Res. Br., Victoria, B.C., Land Management. Handbook. No. 23. <http://www.for.gov.bc.ca/hfd/pubs/docs/lmh/lmh23.htm>

Meidinger, D. and Pojar, J. 1991. Ecosystems of British Columbia. British Columbia Ministry of Forests. 330 pp. <http://www.for.gov.bc.ca/hfd/pubs/Docs/Srs/SRseries.htm>

Steen, O.A., and R.A. Coupé. 1997. A field guide to forest site identification and interpretation for the Cariboo Forest Region. B.C. Min. For., Res. Br., Victoria, B.C., Land Management. Handbook. No. 39. <http://www.for.gov.bc.ca/hfd/pubs/docs/lmh/lmh39.htm>

Images © Derek Marcoux

## **IDF - Interior Douglas-fir Zone**

**By: Derek Marcoux R.P.Bio., Selkirk College**

### **Introduction**



The Interior Douglas-fir Zone (IDF) occupies mid to low elevations throughout the southern and central interior of British Columbia. Elevations range between 300m-1450m. The IDF occupies sites that range from wet coast/interior transition to the interior wetbelt. Generally, this zone occurs above the Ponderosa Pine zone and below the Montane Spruce zone. In the coast transition, the IDF can occur below the Coastal Western Hemlock zone and in the north it can occur below the Sub Boreal-Pine –Spruce zone and Sub Boreal-Spruce zone.

The IDF typically dominates an area that is in the rainshadow of the major mountain ranges of BC. In the west, it is the rainshadow of the Coast Mountains and toward the eastern end of the range, it is the rainshadow of the Columbia and Purcell Mountains. Annual precipitation ranges from 295-750mm and mean annual temperatures range between 1.6-9.5°C (Meidinger and Pojar 1991).

Meidinger and Pojar (1991) recognize seven subzones in the IDF. They range from the very dry, hot (IDF<sub>xh</sub>) to the wet, warm (IDF<sub>fw</sub>). The location of the various subzones varies due to subtle changes in local climate.

Soils range from Chernozems to gray luvisols and eutric brunisols. Humus forms will likely range between mulls and moders. Mors humus forms occur in wetter sites and on north facing slopes. Morainal, colluvial, glaciofluvial, glaciolacustrine and fluvial parent material occur most frequently.

### **Ecosystems**



The IDF is comprised of open to closed forests of Douglas-fir, Ponderosa pine, Lodgepole pine (absent from drier regions) and hybrid white spruce. Open grasslands are common in the drier regions. In some situations, these are classified as phases of biogeoclimatic variants (eg IDF<sub>dk1a</sub>) (Lloyd et. al. 1990). Ponderosa pine occurs on dry sites in the southern part of the range and western redcedar is sometimes found in moist draws in the drier parts of the zone and on zonal sites in the transitional areas with the interior wetbelt. Lodgepole pine and Trembling aspen (*Populus tremuloides*) occur commonly as seral species in all regions except where it is dry. Pinegrass (*Calamagrostis rubescens*) is a common understory species throughout all of the subzones.

Very dry subzones have an understory consisting of pinegrass (*Calamagrostis rubescens*), Birch-leaved spirea (*Spiraea betulifolia*), bluebunch wheatgrass (*Pseudoroegneria spicata*), stonecrop species (*Sedum* spp.) and red-stemmed feathermoss (*Pleurozium schreberi*) and Peltigera lichens (*Peltigera* spp.).

Dry subzones are typified by the occurrence of lodgepole pine and western larch in the overstory and twinflower (*Linnaea borealis*), falsebox (*Paxistima myrsinites*) in the understory.

The moist and wet subzones typically have understory species such as thimbleberry (*Rubus parviflorus*), Douglas-maple (*Acer glabrum*), Hooker's Fairybells (*Prosartes hookeri*), beaked hazelnut (*Corylus cornuta*) and black huckleberry (*Vaccinium membranaceum*).

Grasslands within this zone are typified by communities of bluebunch wheatgrass, Idaho fescue (*Festuca idahoensis*), Spreading needle grass (*Acnatherum richardsonii*), Rough fescue (*Festuca campestris*), Junegrass (*Koeleria macrantha*) and Pasture sage (*Artemisia frigida*). Degraded sites (usually from overgrazing) are dominated by Cheatgrass (*Bromus tectorum*), Knapweed (*Centaurea* spp.) and Oyster plant (*Tragopogon* spp.)

## **Resources**

Forestry is an important use of the resources in the IDF. Silvicultural options are wide ranging on these sites and are often well-suited to uneven aged management and various forms of shelterwood cutting. This is largely due to the moderate shade tolerance of Douglas-fir which makes it suitable for regeneration under its own canopy. Interior Douglas-fir is a prized species for sawlog production due to the slow growing rate which provides strong wood with tight annual ring growths.

Cattle grazing is common and extensive areas are under grazing leases. Pinegrass is the dominant species for forage throughout the zone.

Recreation opportunities include many popular sports such as hunting, fishing hiking, biking and cross-country skiing.

## **References**

Lloyd, D., K. Angove, G. Hope, and C. Thompson. 1990. A guide to site identification and interpretation for the Kamloops Forest Region. B.C. Min. For., Res. Br., Victoria, B.C., Land Manage. Handb. No. 23. <http://www.for.gov.bc.ca/hfd/pubs/docs/lmh/lmh23.htm>

Braumandl, T.F. and M.P. Curran. 1992. A field guide for site identification and interpretation for the Nelson Forest Region. B.C. Min. For., Res. Br., Victoria, B.C., Land Manage. Handb. No. 20. <http://www.for.gov.bc.ca/hfd/pubs/docs/lmh/lmh20.htm>

Images © Derek Marcoux and Evan MacKenzie

## MS - Montane Spruce Zone

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By: Derek Marcoux, R.P.Bio., Selkirk College

### Introduction



The Montane Spruce (MS) occurs in mid-elevation sites in south-central British Columbia. It is a transitional zone between the dry Interior Douglas-fir and the wetter, colder ESSF. It extends from the Fraser Plateau west of Williams Lake south to the US border. It occurs in the lee side of the Coast/Cascade Mountains, Okanagan highlands, Fraser Plateau, and southern Rocky Mountain Trench. Elevations range between 1100-1500m in the wetter regions and 1250-1700m in the drier regions (Meidinger and Pojar 1991).

The MS is typified by short, warm summers and long cold winters. Annual precipitation is between 380-900mm and the mean annual temperature is between 0.5-4.7°C (Meidinger and Pojar 1991).

Meidinger and Pojar (1991) classify five subzones of the MS in the province. In the lee side of the Coast Mountains and the Chilcotin and Thompson plateaus, four subzones occur (MSxv, MSxk, MSdc and MSdm). In the southern Rocky Mountain Trench, midslopes are dominated by the MSdk subzone.

Soils are typically Brunisols or Luvisols. In the wetter regions, podzolic soil development may occur.

### Ecosystems



The MS zone is characterized by a widespread fire history that has left extensive regions of seral plant communities dominated by lodgepole pine. Hybrid white spruce is a common canopy species but rarely reaches dominance in the overstory to slow growing conditions. Subalpine fir is more prevalent in the cooler regions of the MS.

Very dry subzones are characterized by common juniper (*Juniperus communis*), soopolallie (*Shepherdia canadensis*), crowberry (*Empetrum nigrum*), grouseberry (*Vaccinium scoparium*), pinegrass (*Calamagrostis rubescens*), twinflower (*Linnaea borealis*) and Cladina (*Cladina* spp.) lichens. Dry subzones are characterized by additional species in the understory such as black twinberry (*Lonicera involucrata*), arctic lupine (*Lupinus arcticus*), western meadowrue (*Thalictrum occidentale*) and mountain sweet-cicely (*Osmorhiza chilensis*).

Typically zonal plant communities consist of Grouseberry (*Vaccinium scoparium*), Utah honeysuckle (*Lonicera utahensis*), twinflower (*Linnaea borealis*) and Pinegrass (*Calamagrostis rubescens*). Douglas-fir (*Pseudotsuga menziesii*), Big Sage (*Artemesia tridentata*) and common juniper (*Juniperus communis*) occupy dry sites in the drier regions of the MS. Wet sites typically have associations of hybrid white spruce, horsetail (*Equisetum* spp), black gooseberry (*Ribes lacustre*) and Trapper's tea (*Ledum glandulosum*).

## Resources

Forestry is a common resource use in the MS zone. Extensive stands of lodgepole pine are subject to Mountain Pine beetle epidemics periodically. Much of this is a result of fire suppression that has left many forest stands overcrowded and stressed which allow the beetles to quickly take hold.

Cattle grazing is very common in this zone due to the abundance of native pinegrass in the understory. In addition, many areas have been grass seeded with desirable forage species to enhance grazing along forest roads and cutblocks.

Recreational activities include hunting, fishing, horseback riding, snowmobiling and cross-country skiing.

## References

Braumandl, T.F. and M.P. Curran. 1992. A field guide for site identification and interpretation for the Nelson Forest Region. B.C. Min. For., Res. Br., Victoria, B.C., Land Manage. Handb. No. 20. <http://www.for.gov.bc.ca/hfd/pubs/docs/lmh/lmh20.htm>

Meidinger, D. and Pojar, J. 1991. Ecosystems of British Columbia. British Columbia Ministry of Forests. 330 pp. <http://www.for.gov.bc.ca/hfd/pubs/Docs/Srs/SRseries.htm>

Lloyd, D., K. Angove, G. Hope, and C. Thompson. 1990. A guide to site identification and interpretation for the Kamloops Forest Region. B.C. Min. For., Res. Br., Victoria, B.C., Land Manage. Handb. No. 23. <http://www.for.gov.bc.ca/hfd/pubs/docs/lmh/lmh23.htm>

Steen, O.A., and R.A. Coupé. 1997. A field guide to forest site identification and interpretation for the Cariboo Forest Region. B.C. Min. For., Res. Br., Victoria, B.C., Land Manage. Handb. No. 39. <http://www.for.gov.bc.ca/hfd/pubs/docs/lmh/lmh39.htm>

Images © Selkirk College



## PP - Ponderosa Pine Zone

By Derek Marcoux R.P.Bio., Selkirk College

### Introduction



The Ponderosa Pine (PP) zone occurs in valley bottoms above the BG zone (where present) to approximately 900m and is situated beneath the IDF zone. This is the driest forested zone in the province (Meidinger and Pojar 1991). Lloyd et. al. (1990) reports that the mean annual precipitation ranges between 250-400mm and the mean annual temperature ranges between 5.4 and 9.0°C.

There are two subzones recognized in the PP zone. The very dry, hot subzone (PPxh) occupies valley bottom between Lytton, Lilloet, Nicola and Thompson rivers and the Okanagan Valley. The dry, hot subzone (PPdh) is found along the Kettle River near Grand Forks, drier portions of the East Kootenay Trench near Cranbrook and the Kootenay River along the Kooacanusa reservoir (Meidinger and Pojar 1991).

Soils are typically Chernozemic or Brunisolic with thin mull humus forms. Parent material are often glaciofluvial, fluvial, glaciolacustrine, morainal, colluvial or eolian.

### Ecosystems



The following ecosystem information is summarized from Braumandl and Curran (1992), Lloyd et. al. (1990), Meidinger and Pojar (1991) and Steen and Coupé (1997).

Zonal ecosystems in the PPxh subzone consist of Ponderosa pine, Bluebunch wheatgrass (*Pseudoroegneria spicata*), and Idaho fescue (*Festuca idahoensis*). Dry sites consist of Ponderosa pine, Big sage (*Artemisia tridentata*) and Bluebunch wheatgrass. Douglas-fir (*Pseudotsuga menziesii*) and Trembling aspen are more common on wetter sites or cool aspects. Understory species on these sites includes Snowberry (*Symphoricarpos albus*), Pinegrass (*Calamagrostis rubescens*) and Birch-leaved spirea (*Spiraea betulifolia*).

In the PPdh, zonal sites are occupied by ponderosa pine, Bluebunch wheatgrass and junegrass (*Koeleria macrantha*). Dry sites are typified by compact selaginella (*Selaginella densa*), Bluebunch wheatgrass and blue-eyed Mary (*Collinsia parviflora*). Isolated pockets of dense forest occur in wet sites near riparian areas and depressions. These sites have vegetation such as trembling aspen, black cottonwood, snowberry (*Symphoricarpos albus*) and horsetail (*Equisetum* spp.).

Very dry sites commonly have association of arrow-leaved balsamroot (*Balsamorhiza sagittata*) and prickly pear cactus (*Opuntia fragilis*).

## Resources

This zone is used extensively for cattle grazing in the spring and provides ideal ungulate winter range habitat. Additional agricultural crops include a variety of fruits from orchards, wine production from vineyards in the southern end of the range and ginseng.

Due to the population density and rolling topography, urban development is common and widespread in some areas particularly the Okanagan valley.

Forestry activities are often limited due to poor productivity and sparse coverage of commercial trees.

Recreational activities include hiking, mountain biking, hunting and fishing. Water sports are common near large water bodies such as Okanagan Lake.

## References

Braumandl, T.F. and M.P. Curran. 1992. A field guide for site identification and interpretation for the Nelson Forest Region. B.C. Min. For., Res. Br., Victoria, B.C., Land Manage. Handb. No. 20. <http://www.for.gov.bc.ca/hfd/pubs/docs/lmh/lmh20.htm>

Lloyd, D., K. Angove, G. Hope, and C. Thompson. 1990. A guide to site identification and interpretation for the Kamloops Forest Region. B.C. Min. For., Res. Br., Victoria, B.C., Land Manage. Handb. No. 23. <http://www.for.gov.bc.ca/hfd/pubs/docs/lmh/lmh23.htm>

Meidinger, D. and Pojar, J. 1991. Ecosystems of British Columbia. British Columbia Ministry of Forests. 330 pp. <http://www.for.gov.bc.ca/hfd/pubs/Docs/Srs/SRseries.htm>

Steen, O.A., and R.A. Coupé. 1997. A field guide to forest site identification and interpretation for the Cariboo Forest Region. B.C. Min. For., Res. Br., Victoria, B.C., Land Manage. Handb. No. 39. <http://www.for.gov.bc.ca/hfd/pubs/docs/lmh/lmh39.htm>

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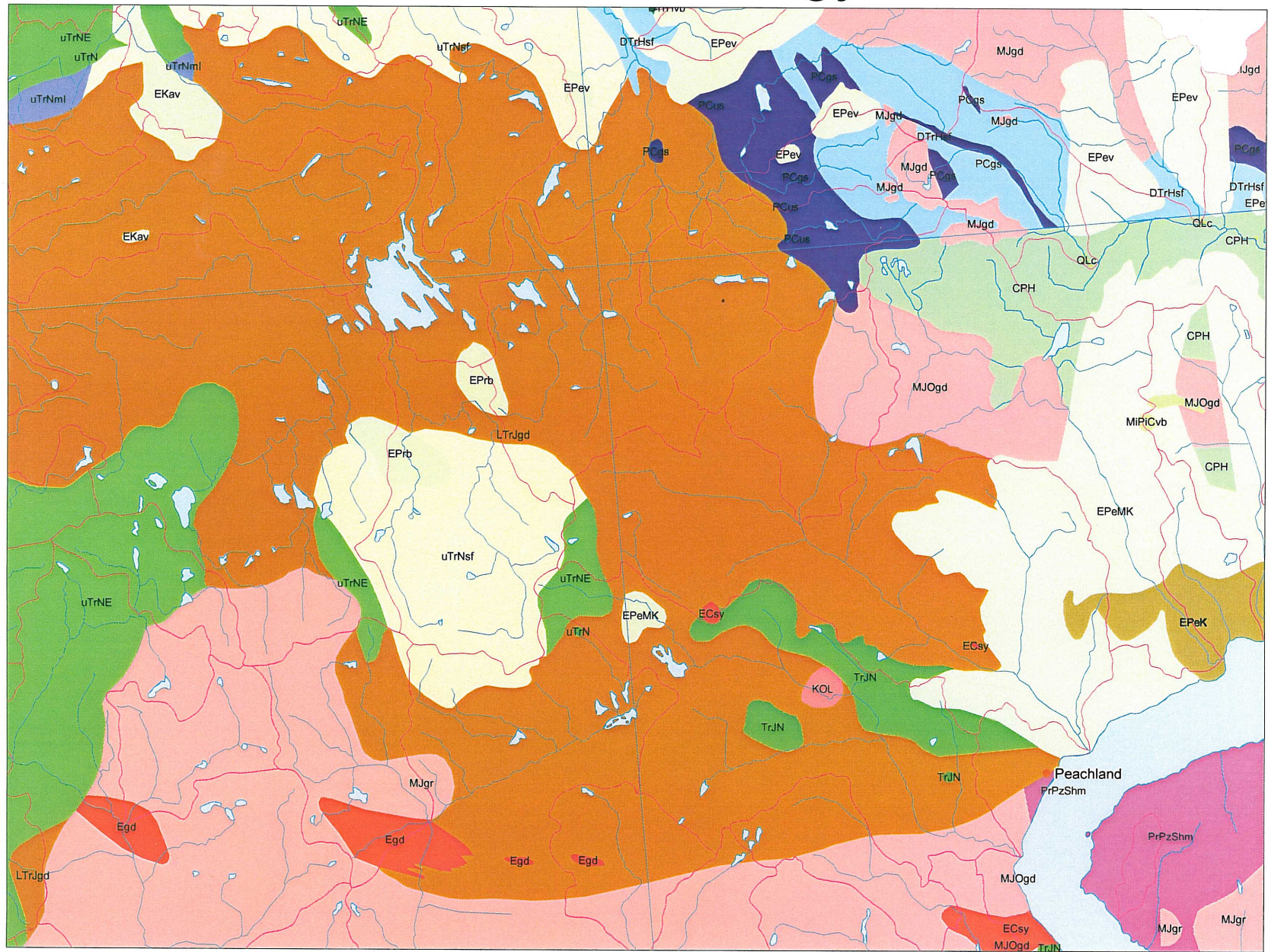




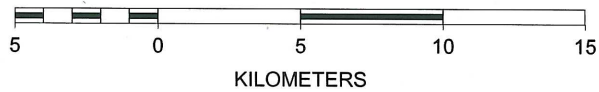
# **APPENDIX C**

## **Bedrock Geology and Longitudinal Creek Profiles**

# Bedrock Geology



SCALE 1 : 265,906



N



# Geology Legend

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## Triassic to Jurassic

### *Nicola Group*

TrJN calc-alkaline volcanic rocks

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*British Columbia Ministry of Energy, Mines and Petroleum Resources*  
*Geological Survey Branch*

# Geology Legend

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## Late Triassic to Early Jurassic

LTrJgd granodioritic intrusive rocks

---

---

*British Columbia Ministry of Energy, Mines and Petroleum Resources*  
*Geological Survey Branch*

# Geology Legend

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## **Eocene**

### *Penticton Group*

**EPeMK** Marron, Kettle River, Springbrook, Marama and Skaha Formations:  
undivided volcanic rocks

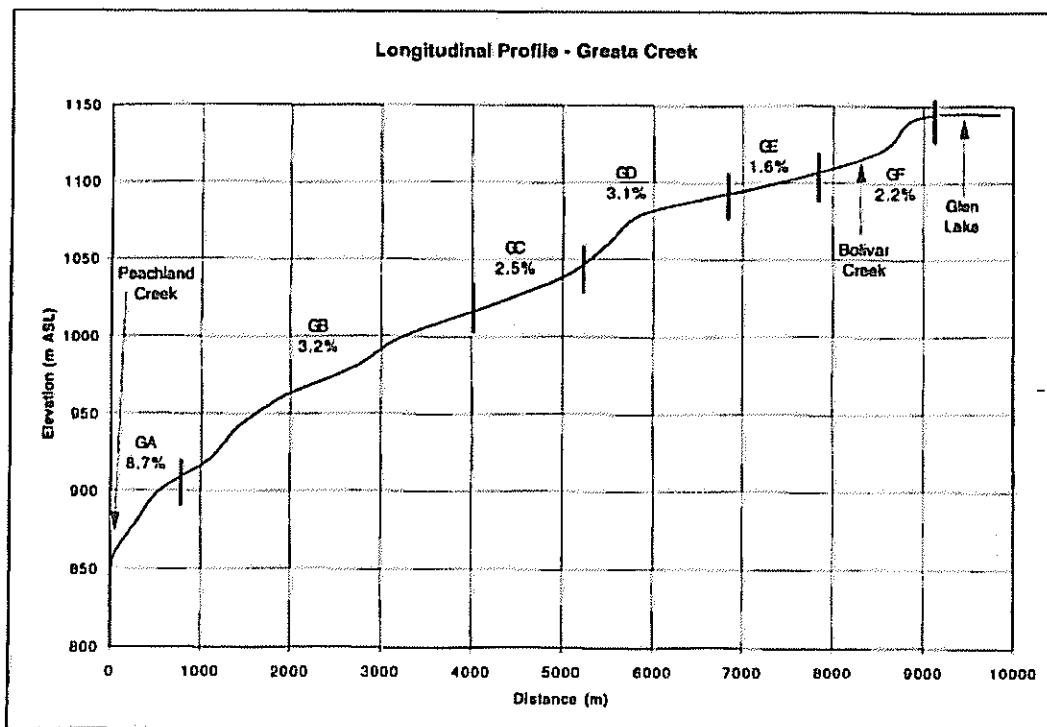
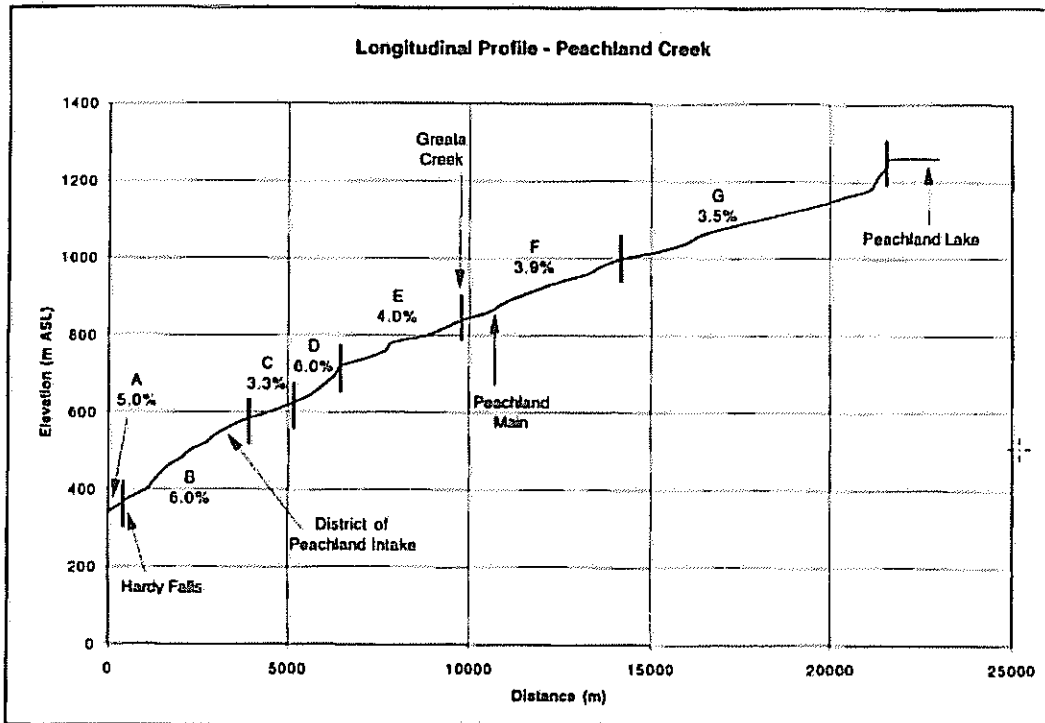
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*British Columbia Ministry of Energy, Mines and Petroleum Resources*  
*Geological Survey Branch*

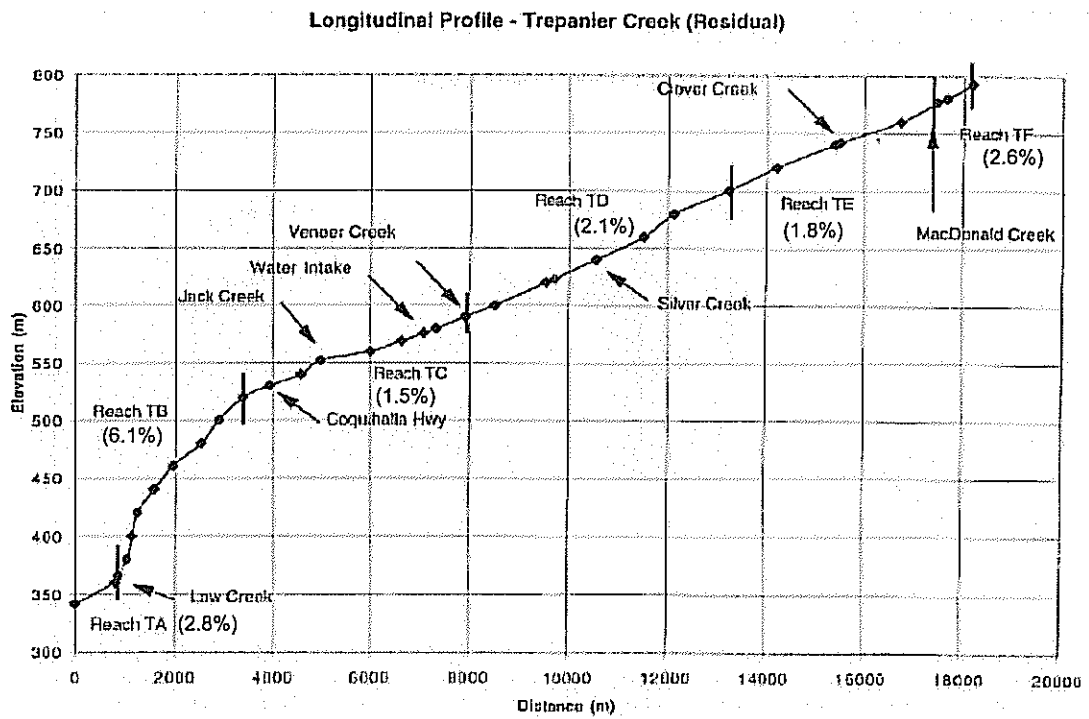
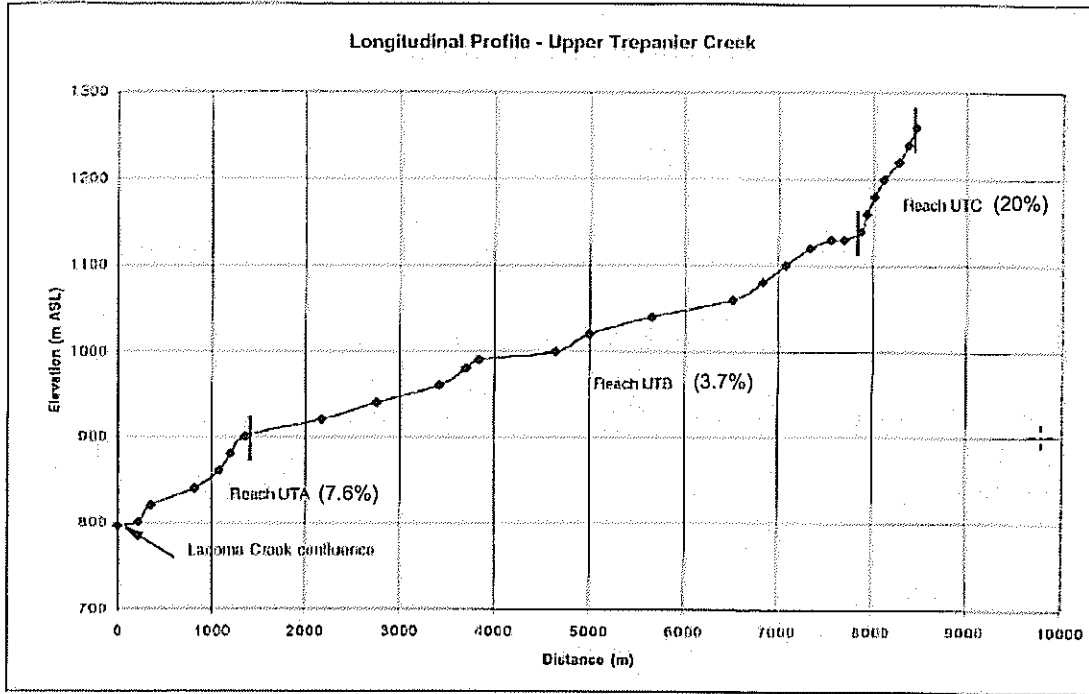


## Longitudinal Profile of Peachland Creek and Greata Creek

From: Watershed Assessment Report for the Peachland Creek Watershed, September 1999. Completed by Dobson Engineering Ltd. for Riverside Forest Products Limited.

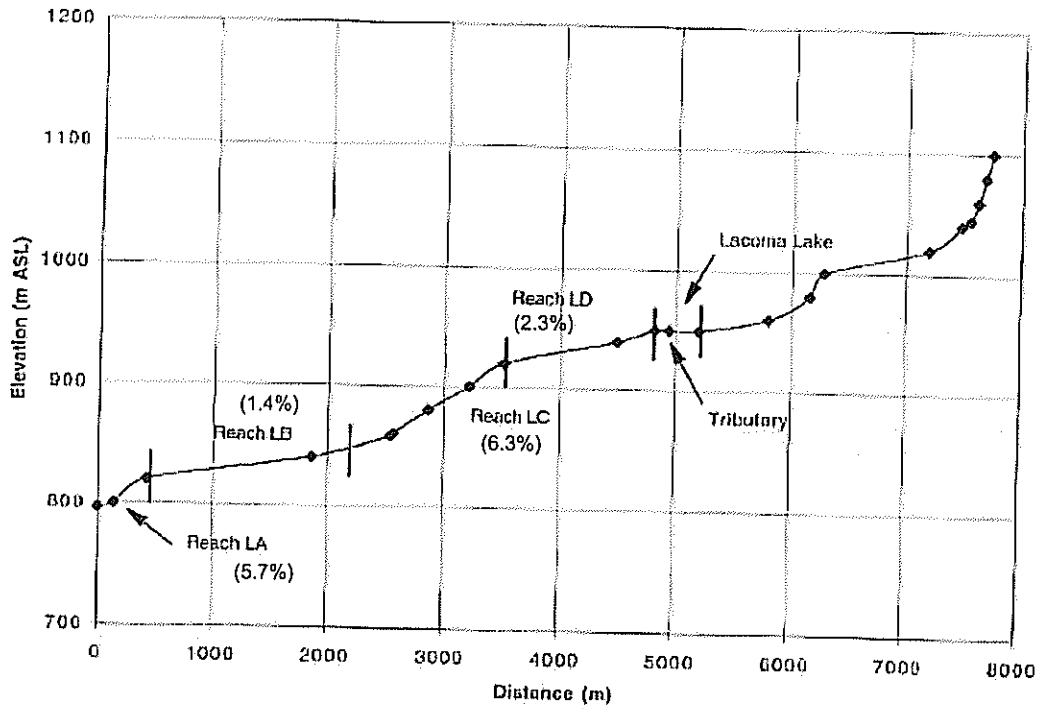


**Longitudinal Profile of Trepanier Creek, Lacombe Creek and MacDonald Creek**  
 From: Watershed Assessment Report for the Trepanier Creek Watershed, November 1998. Completed by Dobson Engineering Ltd. for Gorman Bros. Lumber Ltd.

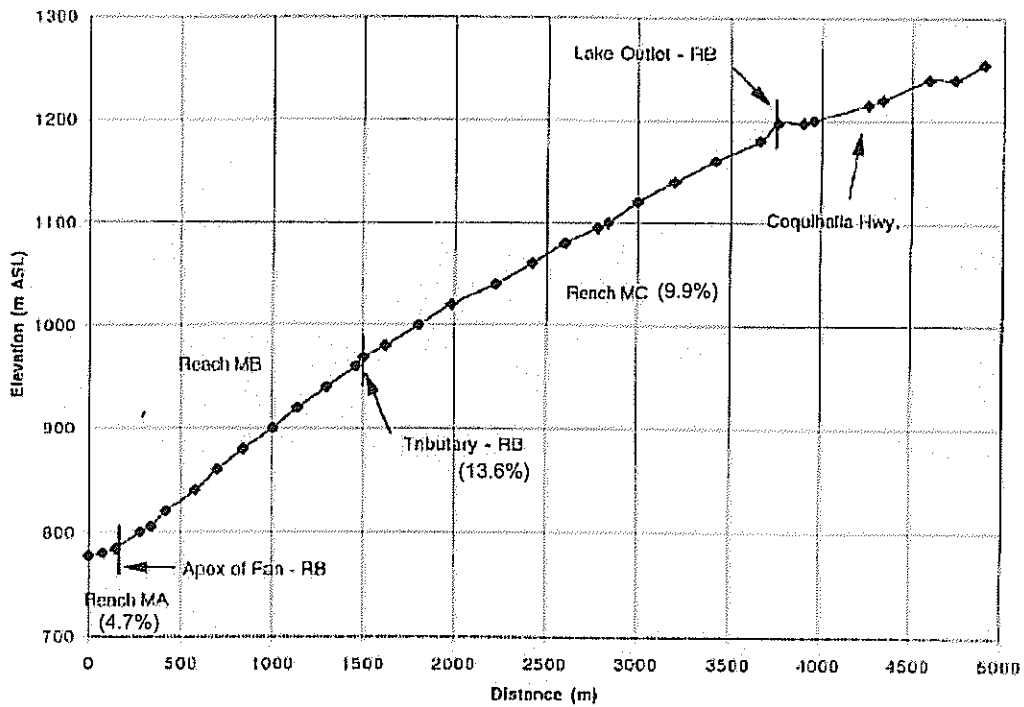


-(2.8%)

### Longitudinal Profile - Lacoma Creek



### Longitudinal Profile - MacDonald Creek







# **APPENDIX D**

## **Photographs**



Photo 1 – Peachland Creek Intake Facility



Photo 2 – Peachland Creek Intake weir, looking upstream

REVISION DATE: BY: FILE:

PROJECT						<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---				
DESIGN	ZM	24NOV09	SCALE	NTS	REV.			
CADD	--					<b>Photos 1 and 2</b>		
CHECK								
REVIEW								







Photo 3 – Peachland Intake ponds, looking east from intake weir



Photo 4 – Slope Peachland Creek –downstream—flow control-- weir

REVISION DATE: BY: FILE:

PROJECT		<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>			
PROJECT No. 09-1493-5018		FILE No. ---			
DESIGN	ZM	24NOV09	SCALE	NTS	REV.
CADD	--		<b>Photos 3 and 4</b>		
CHECK					
REVIEW					








**Photo 5 – Outlet of intake weir into the settling pond**



**Photo 6 – Peachland Creek downstream of Intake weir**

REVISION DATE: BY: FILE:

PROJECT					<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---			
DESIGN	ZM	24NOV09	SCALE	NTS	REV.		
CADD	--		<b>Photos 5 and 6</b>				
CHECK							
REVIEW							
							





**Photo 7 – Sedimentation in Peachland Creek between the Intake weir and the flow control weir**



**Photo 8 – Sloughing slope on Peachland Creek beside the flow control weir**

REVISION DATE: BY: FILE:

PROJECT					<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---			
DESIGN	ZM	24NOV09	SCALE	NTS	REV.		
CADD	--		<b>Photos 7 and 8</b>				
CHECK							
REVIEW							








**Photo 9– Sloughing slope on Peachland Creek beside the flow control weir**



**Photo 10 – Sedimentation and animal prints by Peachland Creek Intake weir**

REVISION DATE: BY: FILE:

PROJECT						<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---				
DESIGN	ZM	24NOV09	SCALE	NTS	REV.			
CADD	--					<b>Photo 9 and 10</b>		
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REVIEW								
								



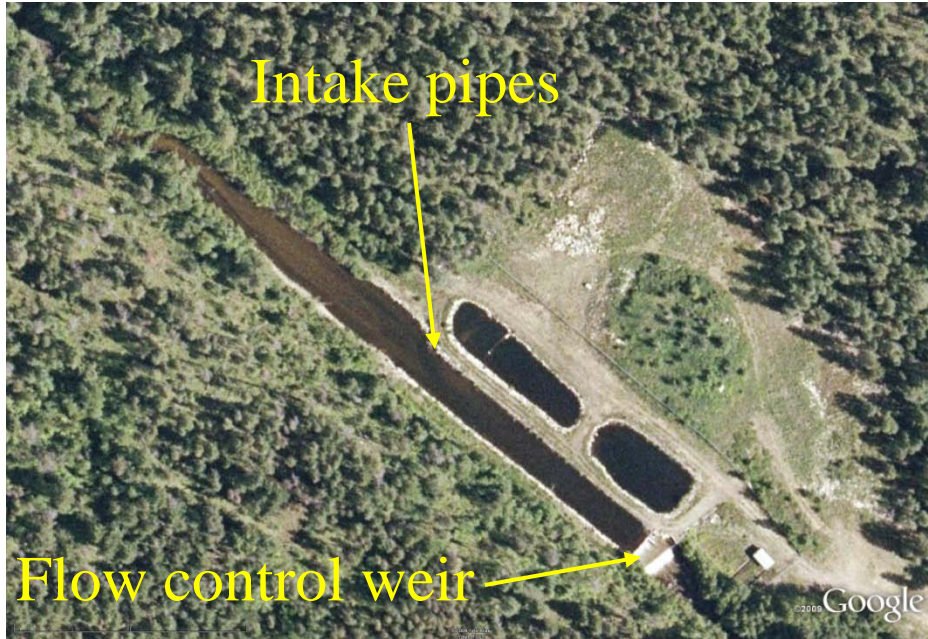


Photo 11 – Trepanier Creek Intake Facility



Photo 12 – Trepanier Creek intake pipes in Trepanier Creek

REVISION DATE: BY: FILE:

PROJECT						<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---				
DESIGN	ZM	24NOV09	SCALE	NTS	REV.			
CADD	--					<b>Photos 11 and 12</b>		
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REVIEW								








**Photo 13 – Settling Ponds at Trepanier Creek intake facility, looking downstream (southeast)**



**Photo 14 – Flow control weir on Trepanier Creek**

REVISION DATE: BY: FILE:

PROJECT					<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---			
DESIGN	ZM	24NOV09	SCALE	NTS	REV.		
CADD	--		<b>Photos 13 and 14</b>				
CHECK							
REVIEW							
							






**Photo 15 – Trepanier Creek at intake pipes, looking upstream (northwest)**



**Photo 16 – Trepanier Creek at intake pipes, looking downstream (southeast)**

REVISION DATE: BY: FILE:

PROJECT					<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---			
DESIGN	ZM	24NOV09	SCALE	NTS	REV.		
CADD	--		<b>Photos 15 and 16</b>				
CHECK							
REVIEW							
							





**Photo 17 – Creek Crossing, Monroe Forest Road over Peachland Creek (P-2)**



**Photo 18 – Evidence of cattle at Monroe Forest Road crossing over Peachland Creek (P-2)**

REVISION DATE: BY: FILE:

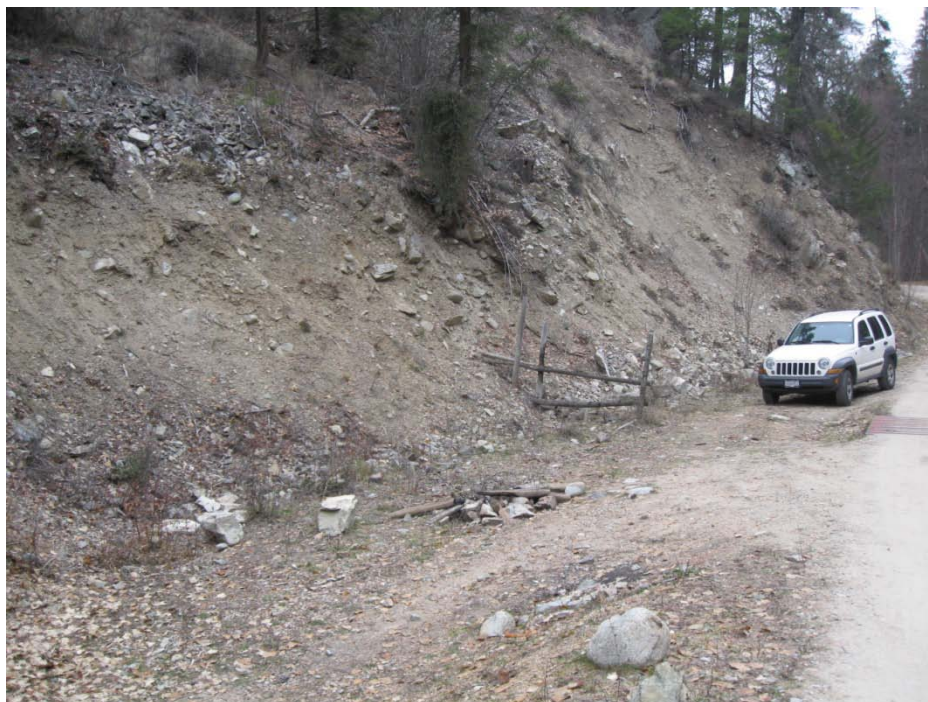
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DESIGN	ZM	24NOV09	SCALE NTS	REV.
CADD	--		<b>Photos 17 and 18</b>	
CHECK				
REVIEW				








**Photo 19 – Access to creek from both sides of Monroe Forest Road bridge over Peachland Creek (P-2)**



**Photo 20 – Exposed and eroding cutslope immediately upgradient of Monroe Forest Road bridge over Peachland Creek (P-2)**

REVISION DATE: BY: FILE:

PROJECT					<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---			
DESIGN	ZM	24NOV09	SCALE	NTS	REV.		
CADD	--		<b>Photos 19 and 20</b>				
CHECK							
REVIEW							
							





**Photo 21 – Surface condition of Monroe Forest Road – drainage directed across road surface causing erosion (P-3)**



**Photo 22 – Motorcycle trail onto Monroe Forest Road (P-4)**

REVISION DATE: BY: FILE:

PROJECT						<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---				
DESIGN	ZM	24NOV09	SCALE	NTS	REV.	<b>Photos 21 and 22</b>		
CADD	--							
CHECK								
REVIEW								







**Photo 23 – Motorcycle trail onto Monroe Forest Road (P-4)**



**Photo 24 – Erosion at switchback on Monroe Forest Road – note creek (P-5)**

REVISION DATE: BY: FILE:


PROJECT					<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---			
DESIGN	ZM	24NOV09	SCALE	NTS	REV.		
CADD	--		<b>Photos 23 and 24</b>				
CHECK							
REVIEW							
							





Photo 25 – Impromptu motorbike trail along Monroe Forest Road (P-6)



Photo 26 – Impromptu motorbike trail along Monroe Forest Road

REVISION DATE: BY: FILE:

PROJECT					<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---			
DESIGN	ZM	24NOV09	SCALE	NTS	REV.		
CADD	--		<b>Photos 25 and 26</b>				
CHECK							
REVIEW							








**Photo 27 – Start of an impromptu motorbike trail along Monroe Forest Road**



**Photo 28 – Impromptu motorbike trail on steep slope along Monroe Forest Road (Some attempts to stop use by blocking trail)**

REVISION DATE: BY: FILE:

PROJECT					<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---			
DESIGN	ZM	24NOV09	SCALE	NTS	REV.		
CADD	--		<b>Photos 27 and 28</b>				
CHECK							
REVIEW							
							





**Photo 29 – Eroding cutbank at second switchback on Monroe Forest Road (P-7)**



**Photo 30 – Eroding cutbank at second switchback on Monroe Forest Road (P-7)**

REVISION DATE: BY: FILE:


PROJECT					<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---			
DESIGN	ZM	24NOV09	SCALE	NTS	REV.		
CADD	--		<b>Photos 29 and 30</b>				
CHECK							
REVIEW							
							





Photo 31 – Example trail off of staging area (P-8)



Photo 32 – Example trail off of staging area (P-8)

REVISION DATE: BY: FILE:


PROJECT					<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---			
DESIGN	ZM	24NOV09	SCALE	NTS	REV.		
CADD	--		<b>Photos 31 and 32</b>				
CHECK							
REVIEW							
							





Photo 33 – Outhouse in staging area (P-8)



Note slump on other side of creek

Photo 34 – Eroding cutbank at second switchback on Monroe Forest Road (P-7)

REVISION DATE: BY: FILE:

PROJECT					<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018			FILE No. ---				
DESIGN	ZM	24NOV09	SCALE	NTS	REV.		
CADD	--		<b>Photos 33 and 34</b>				
CHECK							
REVIEW							







Photo 35 – Gravel pit on Princeton Ave. (P-11)



Photo 36 – Steep slopes on Princeton Ave. vulnerable to erosion and slides (P-12)

REVISION DATE: BY: FILE:

PROJECT						<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---				
DESIGN	ZM	24NOV09	SCALE	NTS	REV.			
CADD	--					<b>Photos 35 and 36</b>		
CHECK								
REVIEW								







**Photo 37 – Steep slopes on Princeton Ave. vulnerable to erosion and slides (P-12)**

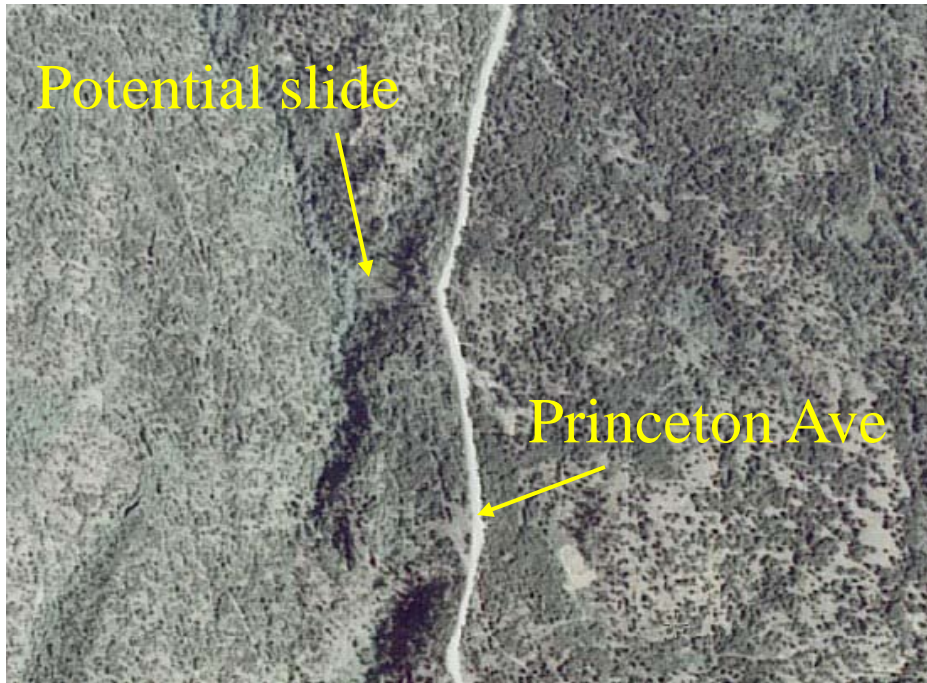


**Photo 38 – Example of cutbanks on Princeton Ave. (P-13)**

REVISION DATE: BY: FILE:

PROJECT						<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---				
DESIGN	ZM	24NOV09	SCALE	NTS	REV.			
CADD	--					<b>Photos 37 and 38</b>		
CHECK								
REVIEW								





**Photo 39 – Potential slide below Princeton Ave. (P-14)**  
 (Aerial photo BCD07031 #99 courtesy of MOFR)



**Photo 40 – Gravel Pit on Princeton Ave. (P-15)**

REVISION DATE: BY: FILE:

PROJECT						<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018					FILE No. ---			
DESIGN	ZM	24NOV09	SCALE	NTS	REV.			
CADD	--				<b>Photos 39 and 40</b>			
CHECK								
REVIEW								







**Photo 41 – Lagoon – unknown purpose and drainage pattern (P-19)**



**Photo 42 – Potential slide on Peachland Creek (P-20)  
(Aerial photo BCD07030 #185 courtesy of MOFR)**

REVISION DATE: BY: FILE:

PROJECT						<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---				
DESIGN	ZM	24NOV09	SCALE	NTS	REV.			
CADD	--					<b>Photos 41 and 42</b>		
CHECK								
REVIEW								








**Photo 43 – Potential slide on Peachland Creek (P-22)  
(Aerial photo BCD07030 #185 courtesy of MOFR)**



**Photo 44 – Slope Peachland Creek –downstream—flow control-- weir**

REVISION DATE: BY: FILE:

PROJECT						<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---				
DESIGN	ZM	24NOV09	SCALE	NTS	REV.			
CADD	--					<b>Photos 43 and 44</b>		
CHECK								
REVIEW								
								




**Photo 45 – Pond upstream of creek crossing on Brenda Lake Road (P-24)**



**Photo 46 – Creek crossing, pond with cattle and wildlife access (P-25)**

REVISION DATE: BY: FILE:

PROJECT					<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---			
DESIGN	ZM	24NOV09	SCALE	NTS	REV.		
CADD	--		<b>Photos 45 and 46</b>				
CHECK							
REVIEW							
							






**Photo 47 – Partially blocked culvert on Brenda Mine Road. (P26)**



**Photo 48 – Brenda Mines tailings pond and spillway (P-27)**

REVISION DATE: BY: FILE:

PROJECT					<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---			
DESIGN	ZM	24NOV09	SCALE	NTS	REV.		
CADD	--		<b>Photos 47 and 48</b>				
CHECK							
REVIEW							
							




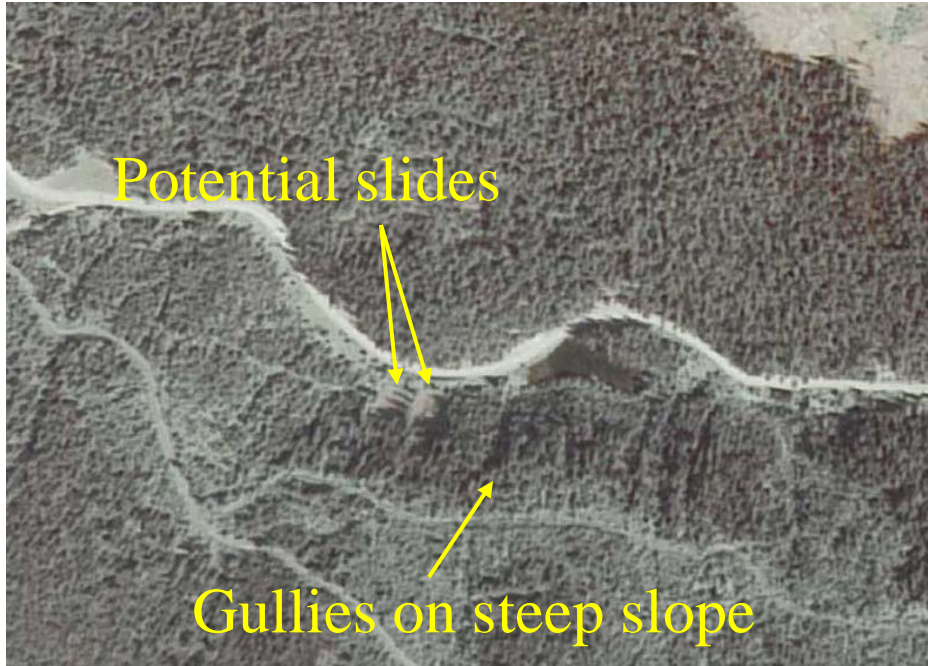
**Photo 49 – Road crossing spillway (P-28)**



**Photo 50 Exposed cuts in Peachland Lake spillway (P-28)**

REVISION DATE: BY: FILE:

PROJECT					<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---			
DESIGN	ZM	24NOV09	SCALE	NTS	REV.		
CADD	--		<b>Photo 49 and 50</b>				
CHECK							
REVIEW							
							



**Photo 51 – Potential slides and gullies to Bolingbroke Creek (P-31)  
(Aerial photo BCD07030 #193 courtesy of MOFR)**



**Photo 52 – Culvert on Peachland Forest Service Road (P-31)**

REVISION DATE: BY: FILE:

PROJECT						<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---				
DESIGN	ZM	24NOV09	SCALE	NTS	REV.			
CADD	--					<b>Photos 51 and 52</b>		
CHECK								
REVIEW								








**Photo 53 – Switchback at Glen Lake Road, road surface erosion and potential cattle access (P-32)**



**Photo 54 – Switchback at Peachland Forest Road, steep slopes with exposed soil (P-34)**

REVISION DATE: BY: FILE:

PROJECT					<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---			
DESIGN	ZM	24NOV09	SCALE	NTS	REV.		
CADD	--		<b>Photos 53 and 54</b>				
CHECK							
REVIEW							
							






**Photo 55 – Switchback at Peachland Forest Road, cars at bottom (P-34)**



**Photo 56 – Switchback at Peachland Forest Road, cars at bottom (P-34)  
Courtesy of Doug Allin, District of Peachland**

REVISION DATE: BY: FILE:

PROJECT					<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---			
DESIGN	ZM	24NOV09	SCALE	NTS	REV.		
CADD	--		<b>Photos 55 and 56</b>				
CHECK							
REVIEW							
							





**Photo 57 – Hydrometric station #08NM041 on Trepanier Creek (T-1)**



**Photo 58 – Camping site with garbage about (T-2)**

REVISION DATE: BY: FILE:

PROJECT						<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---				
DESIGN	ZM	24NOV09	SCALE	NTS	REV.	<b>Photos 57 and 58</b>		
CADD	--							
CHECK								
REVIEW								







**Photo 59 – Abandoned vehicle at camping site (T-2)**



**Photo 60 – Exposed and eroding cutslope on road to gravel pit (T-3)**

REVISION DATE: BY: FILE:

PROJECT						<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---				
DESIGN	ZM	24NOV09	SCALE	NTS	REV.			
CADD	--					<b>Photos 59 and 60</b>		
CHECK								
REVIEW								







**Photo 61 – Gravel pit (T-4)**



**Photo 62 – Trepanier Creek Bridge Crossing (T-5)**

REVISION DATE: BY: FILE:

PROJECT						<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---				
DESIGN	ZM	24NOV09	SCALE	NTS	REV.			
CADD	--					<b>Photos 61 and 62</b>		
CHECK								
REVIEW								







**Photo 63 – Trepanier Creek Crossing – old ford, camping, sediment on bridge (T-5)**



**Photo 64 – Trepanier Creek Crossing – recent ditches draining directly to creek (T-5)**

REVISION DATE: BY: FILE:

PROJECT						<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---				
DESIGN	ZM	24NOV09	SCALE	NTS	REV.			
CADD	--					<b>Photos 63 and 64</b>		
CHECK								
REVIEW								







**Photo 65 – Large extraction site beside Trepanier Creek (T-6)**



**Photo 66 - Large extraction site beside Trepanier Creek, note chemical containers and stockpiles beside creek. (T-6)**

REVISION DATE: BY: FILE:


PROJECT					<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---			
DESIGN	ZM	24NOV09	SCALE	NTS	REV.		
CADD	--		<b>Photos 65 and 66</b>				
CHECK							
REVIEW							
							




Photo 67 – Camper trailer at excavation site (T-6)



Photo 68 – Eroding cutbanks on newly created road to gravel pit (T-7)

REVISION DATE: BY: FILE:

PROJECT					<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---			
DESIGN	ZM	24NOV09	SCALE	NTS	REV.		
CADD	--		<b>Photos 67 and 68</b>				
CHECK							
REVIEW							
							





**Photo 69 – Eroding cutbanks on newly created road to gravel pit (T-7)**



**Photo 70 – Eroding cutbanks on newly created road to gravel pit (T-7)**

REVISION DATE: BY: FILE:


PROJECT					<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---			
DESIGN	ZM	24NOV09	SCALE	NTS	REV.		
CADD	--		<b>Photos 69 and 70</b>				
CHECK							
REVIEW							
							





Photo 71 – Gravel Pit (T-8)



Photo 72 – Road to Trepanier Park – example of ponding on road (T-9)

REVISION DATE: BY: FILE:


PROJECT					<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---			
DESIGN	ZM	24NOV09	SCALE	NTS	REV.		
CADD	--		<b>Photos 71 and 72</b>				
CHECK							
REVIEW							
							






Photo 73 – Old creek crossing, bridge removed (T-10)



Photo 74 – Some erosion on apparent ephemeral stream (T-11)

REVISION DATE: BY: FILE:

PROJECT					<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---			
DESIGN	ZM	24NOV09	SCALE	NTS	REV.		
CADD	--		<b>Photos 73 and 74</b>				
CHECK							
REVIEW							
							





**Photo 75 – Evidence of wildlife (T-11)**



**Photo 76 – End of road to Trepanier Park, bridge removed (T-12)**

REVISION DATE: BY: FILE:

PROJECT						<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018						FILE No. ---		
DESIGN	ZM	24NOV09	SCALE	NTS	REV.	<b>Photos 75 and 76</b>		
CADD	--							
CHECK								
REVIEW								







Photo 77 – Bridge removed at end of road to Trepanier Park (T-12)



Photo 78 – Logging through drainage area. (T-14)

REVISION DATE: BY: FILE:

PROJECT					<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---			
DESIGN	ZM	24NOV09	SCALE	NTS	REV.		
CADD	--		<b>Photos 77 and 78</b>				
CHECK							
REVIEW							







**Photo 79 – Culvert in Upper Clover Creek Bench – Access to wildlife and cattle**



**Photo 80 – Culvert in Upper Trepanier Bench – Access to wildlife and cattle (T-20)**

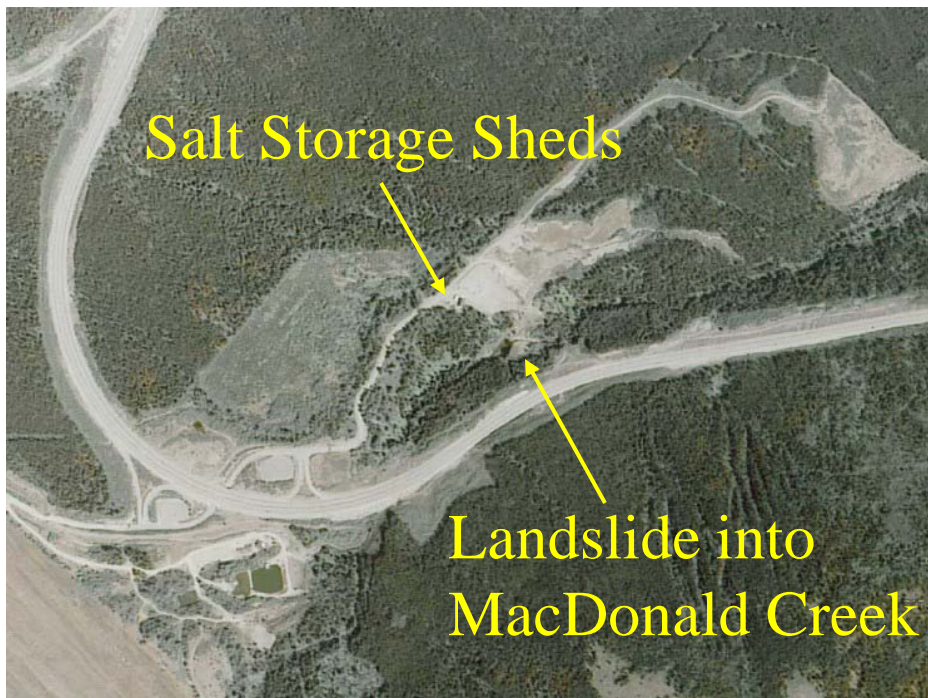
REVISION DATE: BY: FILE:

PROJECT						<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---				
DESIGN	ZM	24NOV09	SCALE	NTS	REV.			
CADD	--					<b>Photos 79 and 80</b>		
CHECK								
REVIEW								





**Photo 81 – General winter road condition of Highway 97C – sand and salt application to surface (T-23)**



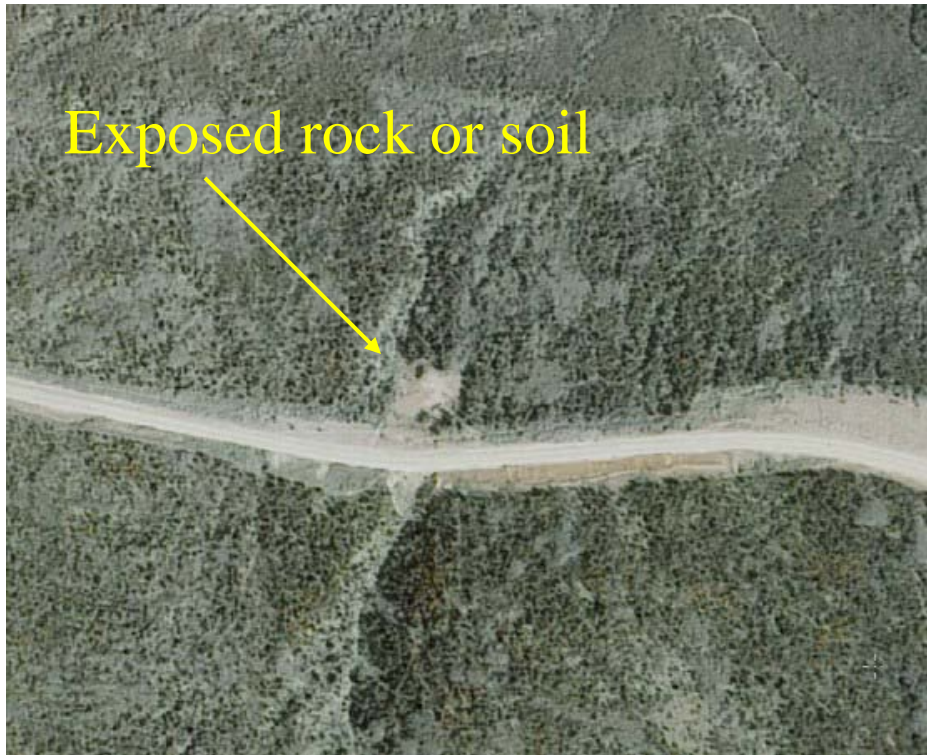
**Photo 82 – Salt storage sheds (T-24) and landslide into MacDonald Creek (T-25) (Aerial photo BCD07030 #036 courtesy of MOFR)**

REVISION DATE: BY: FILE:

PROJECT		<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>			
PROJECT No. 09-1493-5018		FILE No. ---			
DESIGN	ZM	24NOV09	SCALE	NTS	REV.
CADD	--		<b>Photos 81 and 82</b>		
CHECK					
REVIEW					







Exposed rock or soil


Photo 83 – Exposed rock or soil at creek crossing on Highway 97C (T-26)  
(Aerial photo BCD07030 #038 courtesy of MOFR)



Cut on Highway

Photo 84 – Large exposed cuts Highway 97C as seen from Trepanier Park (T-27)

REVISION DATE: BY: FILE:

PROJECT						DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT		
PROJECT No. 09-1493-5018				FILE No. ---				
DESIGN	ZM	24NOV09	SCALE	NTS	REV.			
CADD	--					<b>Photos 83 and 84</b>		
CHECK								
REVIEW								
								



**Photo 85 – Large exposed cuts on Highway 97C (T-32)**



**Photo 86 – Large exposed cuts on Highway 97C (T-34)**

REVISION DATE: BY: FILE:

PROJECT						<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018						FILE No. ---		
DESIGN	ZM	24NOV09	SCALE	NTS	REV.	<b>Photos 85and 86</b>		
CADD	--							
CHECK								
REVIEW								







Photo 87 – Sign of “Electric Motors Only” for boats on Silver Lake (T-34)



Photo 88 – Culvert at creek crossing upgradient of Silver Lake, cattle and wildlife access (T-35)

REVISION DATE: BY: FILE:

PROJECT		<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>			
PROJECT No. 09-1493-5018		FILE No. ---			
DESIGN	ZM	24NOV09	SCALE	NTS	REV.
CADD	--		<b>Photos 87 and 88</b>		
CHECK					
REVIEW					





**Photo 89 – Road example in Silver Lake area, cattle and wildlife access to water in ditches (T-36)**



**Photo 90 – Silver Lake Recreation camping site (T-37)**

REVISION DATE: BY: FILE:

PROJECT						<b>DISTRICT OF PEACHLAND PEACHLAND CREEK AND TREPANIER CREEK WATERSHED ASSESSMENT</b>		
PROJECT No. 09-1493-5018				FILE No. ---				
DESIGN	ZM	24NOV09	SCALE	NTS	REV.			
CADD	--					<b>Photo 89 and 90</b>		
CHECK								
REVIEW								







# **APPENDIX E**

## **2009 Tussock Moth Outbreak Map within the Central Okanagan Regional District**



Agenda No: 4.1

Mtg Date: Sept. 10, 2009

# Governance & Services Committee Report

**TO:** Governance & Services Committee

**FROM:** Cathy MacKenzie, RPF - Parks Operator 3

**DATE:** August 25, 2009

**SUBJECT:** Douglas Fir Tussock Moth Update - Forested Crown & Private Lands in the Central Okanagan

---

## RECOMMENDATION

For Information Only – No Recommendation Provided.

## ORIGIN

Governance and Services Committee Meeting, August 13, 2009:

#GS64/09 THAT staff be directed to report back to the Governance and Services Committee if there is a role for local government working with the Ministry of Forests on local infestation of the Douglas-Fir Tussock moth; as well as whether there is an issue with regional properties that needs to be addressed in the future.

## BACKGROUND

Dr. Lorraine Maclauchlan, the forest entomologist for the Ministry of Forests and Range (MOFR) addressed the August 13<sup>th</sup>, 2009 meeting of the Governance and Services Committee to provide information on a new growing forest health problem, the infestation by the Douglas Fir Tussock Moth.

This pest is of particular concern as it not only kills trees very quickly but it also can cause a human health problem called Tussockosis. Approximately one in three humans have allergic type symptoms ranging from general itchiness, watery eyes, and skin rashes to full anaphylaxis. Horses and dogs may also be affected.

The MOFR is responsible for forest pest management on Crown lands. They complete aerial surveys for the entire province every year to look for new outbreaks and the severity of the damage. From this information, they determine the extent of their aerial spray control program. Ministry of Forests and Range staff is currently mapping the extent of the outbreak within the Regional District of Central Okanagan. Preliminary data shows new severe outbreaks in the Trepanier, Ellison and Glenmore areas. Additionally, residents of the Joe Rich area have noticed defoliation, however MOFR mapping has not yet been completed and the severity level is currently unknown.

Regional and electoral area Park properties within the affected zones include Coldham, Trepanier Greenway, Star, Stephens Coyote, Mill Creek, and likely Three Forks, Philpott Trail



and Daves Creek Corridor. The severity level in most of these parks has not yet been determined with the exception of Coldham Regional Park. Coldham is within close proximity of the epicentre of the Trepanier infestation. Moderate to severe defoliation was noted in this park in July.

As stated by Dr. MacLachlan, the MOFR offers the opportunity to collaborate with their Crown land spray program to ensure greater coverage throughout the region. They will consider spraying Regional and large Municipal Parks as well as large rural parcels of private land that are close to or adjacent to Crown Land. They have offered the opportunity of cost sharing to private landowners in the past. They will not spray in the urban areas. Depending on the choice of spray and the number of applications, the all inclusive cost is approximately \$100 per ha.

### **ANALYSIS**

MOFR staff offers the planning and spraying expertise for this program including ground assessments of any areas of concern to confirm the need for or effectiveness of spraying. They hope for local government help in the communication and information dissemination portions of the program.

RDCO staff anticipate seeking RDCO Board approval to partner with MOFR in any future MOFR sponsored aerial spraying application for the Trepanier Valley and specifically Coldham Regional Park. Based upon the results of further ground surveys Parks Services staff also anticipate proposing appropriate funds in the 2010 Regional Parks Services budget to complete this task in affected parks.

Respectfully submitted,



Approved for inclusion,




Murray Kopp  
Manager – Parks Services

Attachment: Map – Douglas fir Tussock Moth 2009 Outbreak Areas

## Regional District of Central Okanagan


### Douglas-fir Tussock Moth 2009 Outbreak Areas

**CORD Outline**




**2009 tussock moth defoliation**

- Light
- Moderate
- Severe
- Tree Farm License
- Wood Lot Licence
- Community Forest
- Indian Reserve
- Parks and Protected Areas
- Municipalities

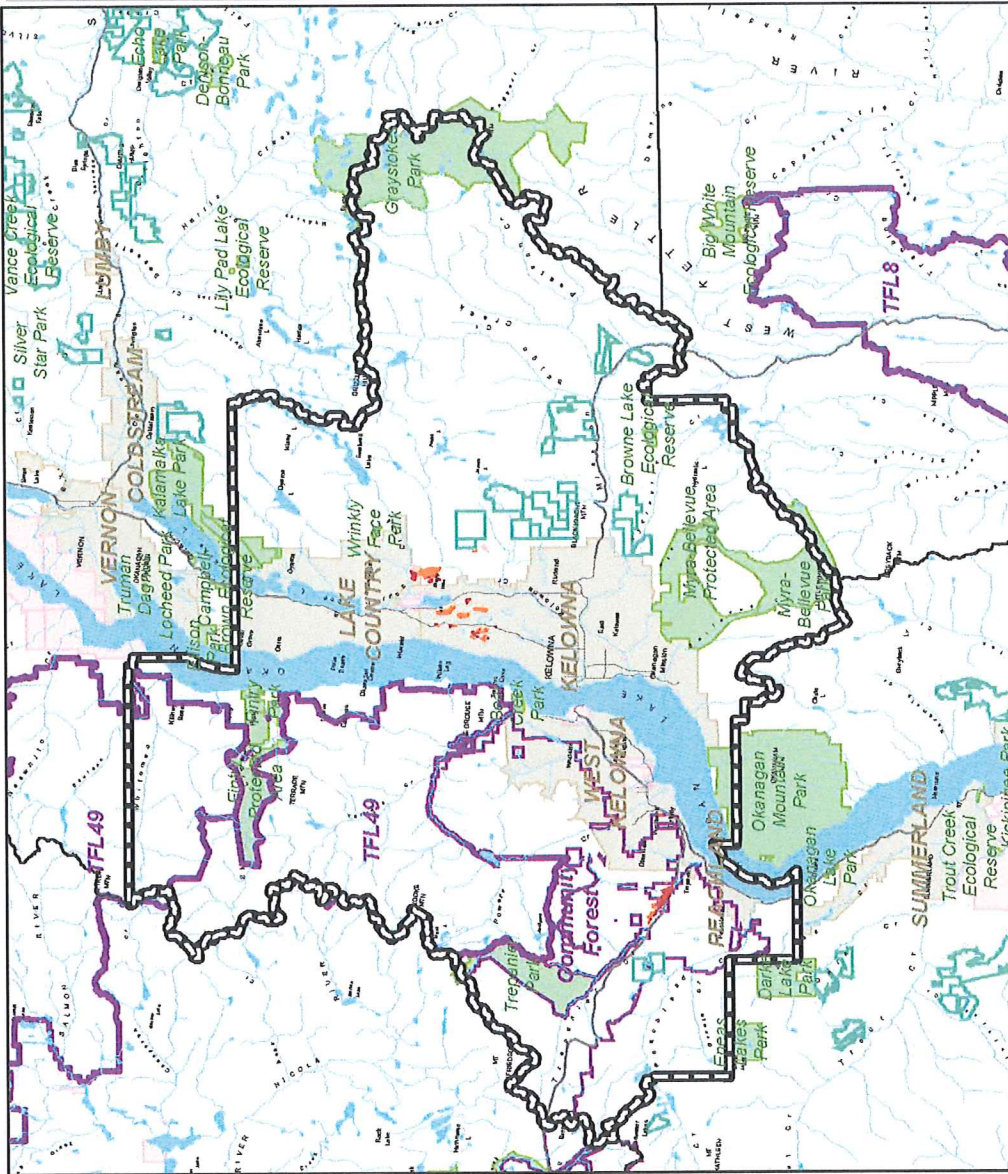


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Map produced by:  
Ministry of Forests and Range,  
Southern Interior Forest Region



Map date: August 25, 2009







# **APPENDIX F**

## **Wildlife Information for the Central Okanagan Regional District**

## BC Species and Ecosystems Explorer Search Results

Scientific Name	English Name	RISC Code	Provincial	Status			CF Priority
				BC List	COSEWIC	Global	
<i>Acrocheilus alutaceus</i>	Chiselmouth	F-ACAL	S3S4 (2004)	Blue	NAR (2003)	G5 (1996)	2
<i>Ardea herodias herodias</i>	Great Blue heron, <i>herodias</i> subspecies	B-GBHE-HE	S3B,S4N (2009)	Blue		G5T5 (2000)	2
<i>Argia emma</i>	Emma's Dancer	IO-ARGEMM	S3S4 (2004)	Blue		G5 (1990)	4
<i>Asio flammeus</i>	Short-eared Owl	B-SEOW	S3B,S2N (2009)	Blue	SC (2008)	G5 (2008)	2
<i>Botaurus lentiginosus</i>	American Bittern	B-AMBI	S3B (2005)	Blue		G4 (1996)	2
<i>Collophrys affinis</i>	Immaculate Green Hairstreak	IL-CALAFF	S3 (2006)	Blue		G5 (1998)	2
<i>Catherpes mexicanus</i>	Canyon Wren	B-CAWR	S3 (2005)	Blue	NAR (1992)	G5 (1996)	4
<i>Chrysemys picta pop. 2</i>	Western Painted Turtle - Intermountain - Rocky Mountain Population	R-CHPI-02	S2S3 (2007)	Blue	SC (2006)	G5TNR	2
<i>Cicindela pugetana</i>	Sagebrush Tiger Beetle	IC-CICPUG	S3 (2008)	Blue		G4 (2008)	2
<i>Coluber constrictor</i>	Racer	R-COCO	S3 (2007)	Blue	SC (2004)	G5 (2006)	2
<i>Contopus cooperi</i>	Olive-sided Flycatcher	B-OSFL	S3S4B (2009)	Blue	T (2007)	G4 (2008)	2
<i>Corynorhinus townsendii</i>	Townsend's Big-eared Bat	M-COTO	S3 (2006)	Blue		G4 (1996)	2
<i>Cottus hubbsi</i>	Columbia Sculpin	F-COBA-HU	S3 (2004)	Blue	SC (2000)	G4Q (2001)	2
<i>Crotalus oreganus</i>	Western Rattlesnake	R-CROR	S3 (2007)	Blue	T (2004)	G5 (2006)	2
<i>Danaus plexippus</i>	Monarch	IL-DANPLE	S3B (2006)	Blue	SC (2001)	G5 (2003)	2
<i>Euderma maculatum</i>	Spotted Bat	M-EUMA	S3S4 (2006)	Blue	SC (2004)	G4 (1998)	2
<i>Eumeces skiltonianus</i>	Western Skink	R-EUSK	S3 (2007)	Blue	SC (2002)	G5 (2005)	1
<i>Euphagus carolinus</i>	Rusty Blackbird	B-RUBL	S3S4B (2005)	Blue	SC (2006)	G4 (2008)	2
<i>Gomphus graslinellus</i>	Pronghorn Clubtail	IO-GOMGRA	S2S3 (2004)	Blue		G5 (1985)	2
<i>Gulo gulo luscus</i>	Wolverine, <i>luscus</i> subspecies	M-GUGU-LU	S3 (2006)	Blue	SC (2003)	G4T4 (1996)	2
<i>Hemphillia camelus</i>	Pale Jumping-slug	IM-HEMCAAM	S3 (2008)	Blue		G4 (2006)	4
<i>Hesperia nevada</i>	Nevada Skipper	IL-HESNEV	S3S4 (2006)	Blue		G5 (2006)	2
<i>Hirundo rustica</i>	Barn Swallow	B-BASW	S3S4B (2009)	Blue		G5 (1996)	2



<i>Larus californicus</i>	California Gull	B-CAGU	S3B (2005)	Blue		G5 (1996)	4
<i>Libellula pulchella</i>	Twelve-spotted Skimmer	IO-LIBPUL	S3 (2004)	Blue		G5 (1985)	4
<i>Lycaena nivalis</i>	Lilac-bordered Copper	IL-LYCNIV	S3 (2006)	Blue		G5 (1998)	4
<i>Macromia magnifica</i>	Western River Cruiser	IO-MACMAG	S3 (2004)	Blue		G5 (2004)	2
<i>Magnipelta mycophaga</i>	Magnum Mantleslug	IM-MAGMYC	S2S3 (2008)	Blue		G3 (2006)	3
<i>Martes pennanti</i>	Fisher	M-MAPE	S2S3 (2006)	Blue		G5 (2005)	2
<i>Myotis ciliolabrum</i>	Western Small-footed Myotis	M-MYCI	S2S3 (2006)	Blue		G5 (1998)	3
<i>Myotis thysanodes</i>	Fringed Myotis	M-MYTH	S2S3 (2006)	Blue	DD (2004)	G4G5 (1998)	3
<i>Otus flammeolus</i>	Flammulated Owl	B-FLOW	S3S4B (2005)	Blue	SC (2001)	G4 (2000)	2
<i>Ovis canadensis</i>	Bighorn Sheep	M-OVCA	S2S3 (2006)	Blue		G4 (2008)	3
<i>Pholisora catullus</i>	Common Sootywing	IL-PHOCAT	S3 (2006)	Blue		G5 (1998)	4
<i>Pituophis catenifer deserticola</i>	Gopher Snake, <i>deserticola</i> subspecies	R-PICA-DE	S2S3 (2007)	Blue	T (2002)	G5T5 (1996)	2
<i>Pristiloma arcticum</i>	Northern Tightcoil	IM-PRIARC	S3S4 (2008)	Blue		G3G4 (2004)	4
<i>Promenetus umbilicatellus</i>	Umbilicate Sprite	IM-PROUMB	S3S4 (2008)	Blue		G4 (2000)	4
<i>Reithrodontomys megalotis</i>	Western Harvest Mouse	M-REME	S2S3 (2006)	Blue	SC (2007)	G5 (2003)	2
<i>Spea intermontana</i>	Great Basin Spadefoot	A-SPIN	S3 (2007)	Blue	T (2007)	G5 (2002)	1
<i>Stagnicola apicina</i>	Abbreviate Pondsnaail	IM-STAAPI	S2S3 (2008)	Blue		G5 (2003)	3
<i>Sylvilagus nuttallii</i>	Nuttall's Cottontail	M-SYNU	S3 (2006)	Blue	SC (2006)	G5 (1996)	2
<i>Synaptomys borealis artemisiae</i>	Northern Bog Lemming, <i>artemisiae</i> subspecies	M-SYBO-AR	S2S3 (2006)	Blue		G4T2T3 (1999)	1
<i>Ursus arctos</i>	Grizzly Bear	M-URAR	S3 (2006)	Blue	SC (2002)	G4 (2000)	2
<i>Vallonia cyclophorella</i>	Silky Vallonia	IM-VALCYC	S3 (2008)	Blue		G5 (2004)	4
<i>Zonitoides nitidus</i>	Black Gloss	IM-ZONNIT	S3S4 (2008)	Blue		G5 (2003)	4
<i>Chrysemys picta</i>	Western Painted Turtle	R-CHPI	S3 (2007)	No Status	E/SC (2006)	G5 (2005)	2
<i>Aeshna constricta</i>	Lance-tipped Darner	IO-AESCON	S2 (2004)	Red		G5 (1985)	2
<i>Argia vivida</i>	Vivid Dancer	IO-ARGVIV	S2 (2004)	Red		G5 (1990)	2
<i>Buteo swainsoni</i>	Swainson's Hawk	B-SWHA	S2B (2009)	Red		G5	2

						(1996)	
<i>Chondestes grammacus</i>	Lark Sparrow	B-LASP	S2B (2005)	Red		G5 (2009)	2
<i>Cicindela decemnotata</i>	Badlands Tiger Beetle	IC-CICDEC	S1S3 (2008)	Red		G4 (2008)	2
<i>Cicindela parowana</i>	Dark Saltflat Tiger Beetle	IC-CICPAR	S1 (2008)	Red	E (2009)	G4 (2008)	1
<i>Gonidea angulata</i>	Rocky Mountain Ridged Mussel	IM-GONANG	S1 (2008)	Red	SC (2003)	G3 (2007)	1
<i>Icteria virens</i>	Yellow-breasted Chat	B-YBCH	S1S2 (2005)	Red	E (2000)	G5 (1996)	1
<i>Megascops kennicottii macfarlanei</i>	Western Screech-Owl, <i>macfarlanei</i> subspecies	B-WSOW-MA	S2 (2009)	Red	E (2002)	G5T4 (2000)	1
<i>Melanerpes lewis</i>	Lewis's Woodpecker	B-LEWO	S2B (2009)	Red	SC (2001)	G4 (2001)	2
<i>Perognathus parvus</i>	Great Basin Pocket Mouse	M-PEPA	S2 (2006)	Red		G5 (1996)	2
<i>Rangifer tarandus</i> pop. 1	Caribou (southern population)	M-RATA-01	S1 (2006)	Red	T (2000)	G5T2Q (2002)	2
<i>Recurvirostra americana</i>	American Avocet	B-AMAV	S2B (2005)	Red		G5 (1996)	2
<i>Sorex merriami</i>	Merriam's Shrew	M-SOME	S1 (2006)	Red		G5 (1996)	1
<i>Sorex preblei</i>	Preble's Shrew	M-SOPR	S1S2 (2006)	Red		G4 (1996)	1
<i>Taxidea taxus</i>	Badger	M-TATA	S1 (2006)	Red	E (2000)	G5 (2005)	1
<i>Aegolius funereus</i>	Boreal Owl	B-BOOW	S4 (2009)	Yellow	NAR (1995)	G5 (1996)	3
<i>Bufo boreas</i>	Western Toad	A-BUBO	S4 (2007)	Yellow	SC (2002)	G4 (2008)	2
<i>Canis lupus</i>	Grey Wolf	M-CALU	S4 (2006)	Yellow	NAR (1999)	G4 (2006)	3
<i>Charina bottae</i>	Rubber Boa	R-CHBO	S4 (2007)	Yellow	SC (2003)	G5 (2006)	3
<i>Chlidonias niger</i>	Black Tern	B-BLTE	S4B (2009)	Yellow	NAR (1996)	G4 (1996)	3
<i>Chordeiles minor</i>	Common Nighthawk	B-CONI	S4B (2005)	Yellow	T (2007)	G5 (2009)	2
<i>Circus cyaneus</i>	Northern Harrier	B-NOHA	S4B (2009)	Yellow	NAR (1993)	G5 (2008)	2
<i>Elgaria coerulea</i>	Northern Alligator Lizard	R-ELCO	S4S5 (2007)	Yellow	NAR (2002)	G5 (2005)	3
<i>Haliaeetus leucocephalus</i>	Bald Eagle	B-BAEA	S5B,S5N (2009)	Yellow	NAR (1984)	G5 (2005)	6
<i>Rana luteiventris</i>	Columbia Spotted Frog	A-RALU	S4 (2007)	Yellow	NAR (2000)	G4 (2008)	2

## Search Summary

**Time Performed** Thu Dec 10 14:58:11 PST 2009



**Results** 72 records.

**Search Criteria** Species Group:Animal  
AND Regional Districts:Central Okanagan (RDCO) ( Restricted to Red, Blue, and Legally designated species )  
Sort Order:BC List Ascending

**Notes**

1. Citation: B.C. Conservation Data Centre. 2009. BC Species and Ecosystems Explorer. B.C. Minist. of Environ. Victoria, B.C. Available: <http://a100.gov.bc.ca/pub/eswp/> (accessed Dec 10, 2009).
2. Forest District, MoE Region, Regional District and habitat lists are restricted to species that breed in the Forest District, MoE Region, Regional District or habitat (i.e., species will not be placed on lists where they occur only as migrants).

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