

COLUMBIA RIVER WETLANDS INVENTORY REPORT



Prepared for:

**Columbia Rivers Greenways Alliance
Invermere, British Columbia**



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COLUMBIA RIVER INVENTORY

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1.0 INTRODUCTION

1.1 Project Background

The Columbia River Greenways Alliance (CRGA), a non-profit organization formed in 2000 through the collaboration of local citizens has, as its stated mission the development of “*a network of linear corridors of open natural spaces that maintain the wildlife habitat and recreational legacy of the region and enhance the ecological, economic and community well-being of the Upper Columbia Valley*” Over the last four years the combined direction and effort of the founding partners has resulted in the completion of several community projects which serve as successful examples of ecosystem restoration and educational opportunity for the people visiting or living in the area. Two recent projects nearing completion are the Dragonfly Boardwalk located adjacent to James Chabot Provincial Park in Invermere and the continued development of the Sinclair Creek trail in Radium Hot Springs.

This project, the Columbia River Inventory (CRI), is intended to support the planning and development of future projects within the CRGA mandate. It is an information gathering exercise intended to document many of the published and available data sources about the Columbia River Wetlands from Invermere to Donald, British Columbia. Using funding provided by the Mark Kingsbury Foundation, the CRI was started in early 2004 to:

- Research and obtain currently available ecological, jurisdictional, and cultural information related to the study area;
- Identify options for possible Greenways routes and sites for development consideration; and
- Support the site plan mapping and design of interpretive strategies for four additional projects with which the CRGA could proceed.

This report presents a summary of the inventories reviewed, a listing of the potential routes or projects that were identified and finally, the four potential Greenways projects selected by the CRGA for further development.

1.2 Project Scope

Entitled the Columbia River Inventory, this project is more accurately described as an “inventory of inventories”, with data sources collected to support the task of Greenways route or node selection as well as providing the appropriate interpretive focus. Two examples of applicable inventories would be that ecological information relevant to interpretive programs and the jurisdictional ownership information which may affect public access. While there are limits to compiling the complete and definitive list of inventories on the Columbia River, this report provides a selection

of mapped and written resources together with additional listings of possible information sources. Each inventory is presented with the source organization details and a contact or web site for those interested in obtaining additional information. In addition, several sources for similar types of information are provided as applicable. Although effort has been made to ensure that contact information is correct at the time of this report, there are often changes to web site addresses and organization contact information.

Due to the number and variety of the inventories presented, it should also be noted that the terminology, presentation and written summaries of this collected information are intended only as a guide to existing inventories and organizations. Interested users of any specific inventory are advised always to follow up with the original source contacts for complete details on their specific area of interest.

1.3 Geographic Area Description

The study area for the Columbia River Inventory includes that length of the Columbia River, its wetlands and adjacent uplands lying between Invermere in the south and Donald in the north.

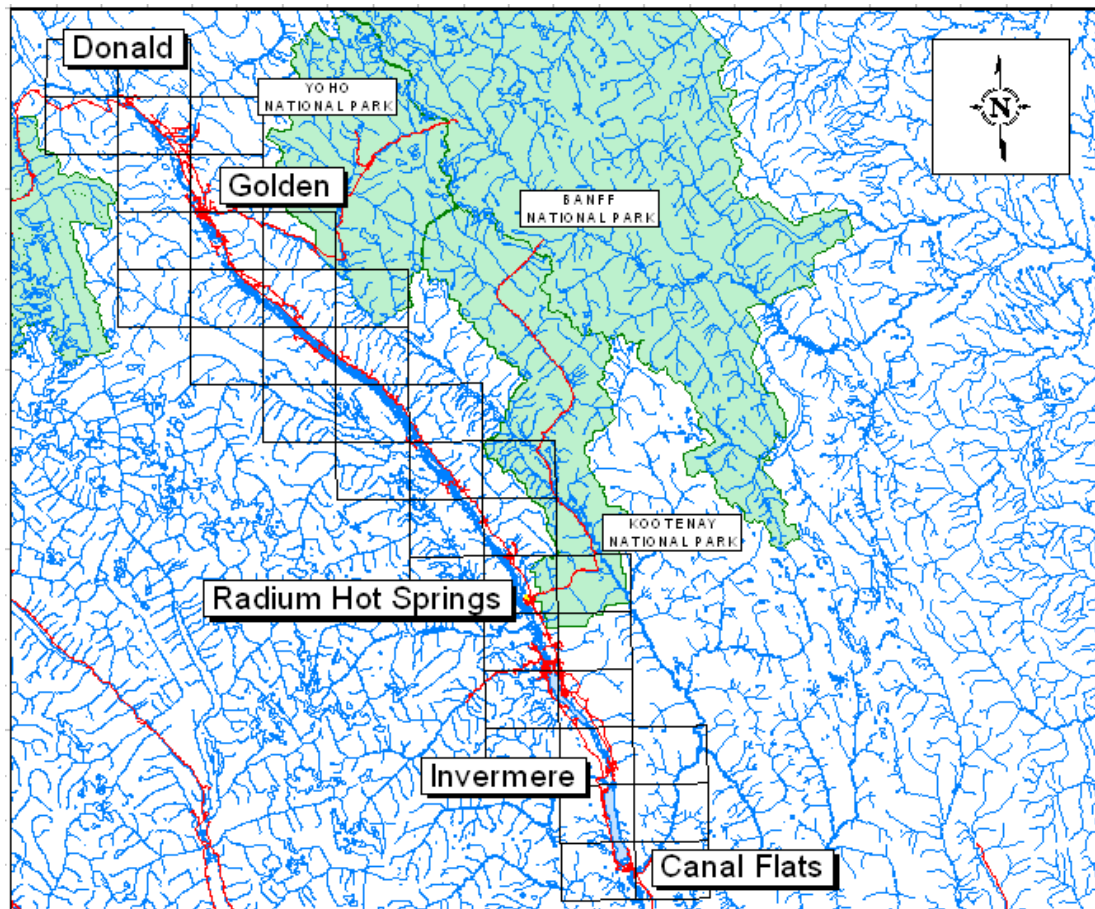


Figure 1. Columbia River Inventory Study Area

It should be noted that as the work of the Columbia River Greenways Alliance progresses in the future, it is appropriate to include the upper Columbia River system extending south from Invermere to Canal Flats within the collected inventory area. Although not specifically addressed in this report, many of the information sources described already cover this area or have similar information sources currently available.

1.4 Inventory Definitions

The outline for the Columbia River Inventory project identified four broad categories for review: ecological, jurisdictional, cultural and recreational. This presented a challenge in organizing the information due to the range of disciplines involved and the format and purpose that each study might take. For example, inventories may range from general written characteristics about bird habitat not specifically located through to high resolution georeferenced data such as surveyed lot lines. Cultural and recreational inventories include the anecdotal stories of current day *river float travelers* (italics mine) to the well documented history of First Nations and early

settler activities found in local museums. This report presents a range of inventories relating to the Columbia River and wetlands complete with a brief description, some sample maps and information on how to access additional or related information:

Base Mapping and Imagery

A selection of digital map and image inventories which show natural topographic features and/or planimetric linework. This data provides the base map layers used for orienting the user to location and scale.

Ecological Inventories:

This section of the report includes those classified and mapped natural features relating to existing geology, flora and fauna present in the upper Columbia River Valley

Cultural and Recreational Inventories

The Cultural and Recreation references are primarily associated with, or relating to human development and impact. Included are resource mapping derived from interpreting other data sources, such as the mapping of flooding and erosion risk to buildings near alluvial fan locations.

Jurisdictional Inventories

Information sources having either legal or management implications to Columbia River wetland activities. These include inventories such as land ownership or current management documents which require review and referral prior to proceeding with projects.

1.5 Notes on Inventories and Digital Data

The following notes are offered as a general guide to understanding several issues and limitations present when dealing with mapped inventories.

Large Scale versus Small Scale?

Large Scale (i.e. 1: 5000) = (generally) more detail. Maps show a smaller area.

Small Scale (i.e. 1:250,000) = Larger area covered and (generally), less detail.

How Accurate is the inventory?

In digital mapping, inventory features can appear to be mapped very precisely; however the question of how suitable an inventory is for any particular use rests with the original accuracy and resolution of the source documents. If the inventory can not (or does not) distinguish boundaries definitively at larger scales, then at smaller scales the mapped resolution of those features may actually only be accurate or reliable to within hundreds of metres.

Is the data current? Does it matter?

Collecting and maintaining inventories can be expensive. Inventory information can easily become misleading if it is not maintained to reflect current conditions.

However, inventories captured twenty years ago may still be applicable for those features that don't change much (i.e. Contour lines) while more recent mapping of dynamic features such as subdivision developments may be suspect for certain uses (i.e. Fire Interface Hazard Mapping). This may be the case even if the date of the inventory appears to be more recent.

Where does one obtain a specific inventory?

Data is often stored in more than one location and it may sometimes be difficult to identify who is responsible for either the source or maintenance of a particular inventory. Over time these inventories will be found in many different organizations and although still traced back to the original source, there is a chance that the latest information or update has not been re-acquired. **Every attempt has been made to identify the official distribution point for inventories discussed in this report, however on occasion data may be obtained from an alternate source.** To avoid misinterpretation or misuse, users are advised to check with the proper source to confirm the version and availability of the data they need.

How many inventories do you need?

This is probably the most important question to answer when looking for information. The sheer volume of data available, whether free or not, can quickly overwhelm and limit project success, if even simply by the effort expended trying to organize the mapping and understand the inter-relationships between information. To avoid this, keep the project objectives clear and approach inventory issues in a step-

by-step manner rather than by designing large and complex mapping or analysis applications.

1.6 Project Methodology

The Columbia River Inventory Project is the result of a series of separate information gathering efforts completed from January to March of 2004. The following outline describes each phase and provides a brief summary of the results and nature of the work performed.

Identification and Acquisition of Base Inventories – The purpose of this first activity was to acquire a series of available inventories for use as base mapping layers. Depending on map scale, these files show various levels of detail onto which other inventories could be presented. Access and copyright issues on some data was handled through initial contact with the appropriate agencies and follow-up letters sent to formalize agreements to use the data.

Satellite Images and Planning Maps – This work involved locating two more recent Landsat 7 images from Natural Resources Canada's free image database and then contracting some digital "fixes" to the files. The result was a single image file covering the upper Columbia River from the Kinbasket pondage south to Canal Flats. This information was combined with the base data mentioned above to create a series of planning maps for use in private and public meetings conducted during the project.

Private Meetings – A contact list of residents knowledgeable in the variety of inventory fields was prepared and follow-up calls made by e-mail, phone call or personal meeting. These meetings provided input into known activities and issues concerning the Columbia River and Wetlands and led in many cases to additional information and contacts.

Public Meetings - Over a period of two weeks in February, two separate public meetings were conducted in Golden. The intent of these sessions was to ask local residents for their input on possible Greenways project ideas while at the same time introducing the CRGA organization and objectives to the local newspaper and others in attendance. Most of the possible project ideas for the north end of the study area originated in these meetings.

Field Review and Discussions – On several occasions, groups of involved members visited proposed sites to discuss issues and opportunities relating to the project. With

the substantial snow cover present last winter, a proper assessment of some sites was not possible until later in the spring.

Presentation of Project Options and Selection of Initial Nodes – Referencing the combined list of inventory information and potential sites, the CRGA project committee met to review and select four possible Greenways node locations for further review and study. A separate report prepared by the Interpretive Strategy and Design Consultants presents the details of the final four nodes selected.

1.7 Data Agreements and Links to other Agencies

This section addresses two issues related to the ability of the CRGA to effectively use the Columbia River Inventory in the delivery of their mandate:

1. The original data acquisition process; and
2. The future day-to-day use of those inventories by the CRGA.

As noted earlier, the Columbia River Inventory is not a comprehensive listing but rather an introduction to the range and nature of information available. Much of this data is available for download at no cost; however there are core inventories which are not. These “pay-for-use” base map inventories are captured at high resolution using the latest technologies and information available and are therefore expensive to quality control and maintain. As such, there is currently a cost-recovery program in place to assist in the continued funding of these programs.

The solution to this issue is some form of *Data Use or Data Exchange Agreement* with the appropriate government Ministries, permitting access and use of the base mapping layers in exchange for providing information on activities mapped by the CRGA. Under a Data Exchange Agreement, there is an expectation that data related to changes on the landscape (i.e. road construction) would be captured to a set standard and provided back to the mapping section(s) of those Ministries responsible. Another option to assure access and use of this critical data is through a *Data Use Agreement*, made between the government and an end user doing work for *either for the government directly or for a project funded through a government initiative such as the Columbia Basin Fish and Wildlife Compensation Program*.

At the time of preparing this report there are ongoing discussions with the various Ministries to set up these types of agreements in order that a current set of planimetric data remains available to support CRGA activities in the future.

The second issue is one of storage and continued access to the information collected by this project. Except for those with specialized mapping knowledge and skills, much of the data collected becomes unavailable to the average layperson and this again is a challenge. The solutions proposed are to work with the government ministries and the Columbia Basin Fish & Wildlife Compensation Program (CBFWCP) office in Castlegar, B.C., both of which have the capabilities to “serve” up information over the Web in a manner that is both users friendly and consistent. These organizations have the skill sets and infrastructure to provide access to routine mapping services through the web with minimal impact on resources. Additionally, as they are also partners with others in organizations like the CRGA and East Kootenay Conservation Program (EKCP), the program managers may often provide this service as their “in-kind” assistance to the organizations. **Further coordination in this area is required.**

1.8 Acknowledgements

Collecting this amount of information in a relatively short time would not have been possible without the cooperation and help of virtually everyone contacted in the course of the project. The various municipal, regional and provincial agency staff were more than willing to share their knowledge and in many cases, assisted in the retrieval and interpretation of particular inventories.

Additionally, the author wishes to thank the numerous private individuals who gave their time and input to the project, either in individual meetings or as participants in the several field sessions attended. These thanks most definitely include the interested citizens living in and around the Town of Golden, who participated in the inventory meetings with admirable enthusiasm and interest.

Recognition should be also be given to the members of the CRGA Board of Directors for their ongoing involvement with this project, and to consultants Meredith Hamstead, Marla Oliver, and Aina Cernenoks for their valued input and continued support.

Finally, a word of thanks is directed towards the Mark Kingsbury Foundation for funding the work and for the assistance and feedback on the project.

There are easily many other names which might be mentioned here; however a more complete list of those contacted is found in Appendix B at the end of this report.

2.0 COLUMBIA RIVER INVENTORIES

2.1 Base Mapping and Imagery

A selection of digital map and image inventories which show natural topographic features and/or planimetric linework. This data provides the base map layers used for orienting the user to location and scale.

2.1.1 Provincial Map Grids

Most of the inventory datasets discussed in this **Base Map and Imagery** section are produced and distributed by map tile. According to their source, resolution and subject matter, map tiles may be provided in Provincial, Regional, NTS or BCGS mapsheet coverages. For the Columbia River Wetland Area(s), the following mapgrid references are used to identify a particular area of inventory interest:

National Topographic System: 1: 250,000 scale coverage by letter block.

BC Geographic System: 1: 20,000 scale mapsheet grids. There are 100 maps within each NTS letter block, starting from “001” in the Southwest corner and increasing incrementally in number horizontally to mapsheet “100” in the Northeast corner. Both TRIM and NTS map inventories are ordered by either the complete letter block or as specific 1:20000 BCGS maps.

Contact: Mapgrid datasets are available from the Ministry of Sustainable Resource Management (MSRM) GIS data ftp site under the **Mapsheet Grids** directory at:

Web link: <http://srmwww.gov.bc.ca/gis/arcftp.html>

Note: There is currently no fee associated with downloading this data.

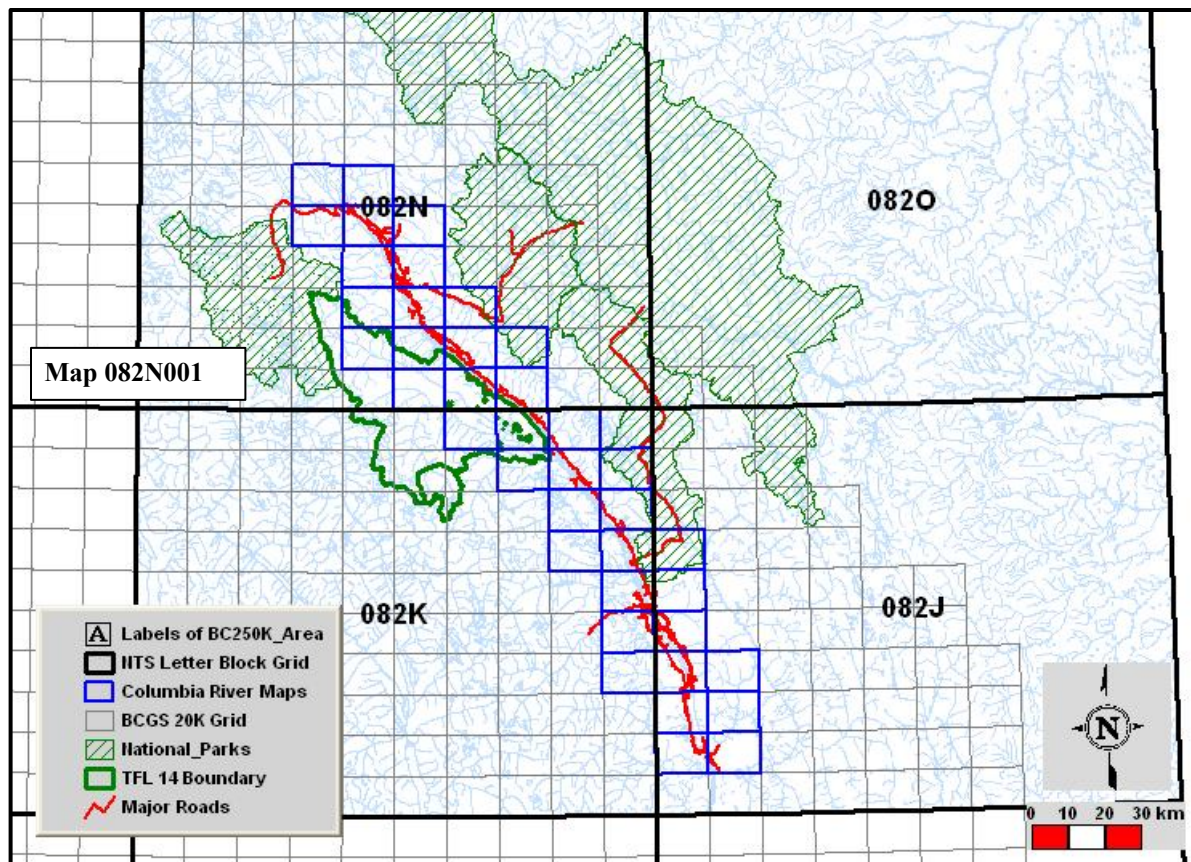


Figure 2. Provincial Map Grids

Related topics: N/A

2.1.2 National Topographic System Mapping

The NTS Map base is a small scale 1: 250K map layer suitable for overviews of larger areas. Provided in National Topographic System letter block datasets, the files contain major water courses, highways, towns and other planimetric information

NTS Map inventories are available to order from the Base Mapping and Geomatics Branch (BMGS) of MSRM on their Provincial Digital Atlas site at:

Contact: BC Ministry of Sustainable Resources Management

Web link: <http://srmwww.gov.bc.ca/bmgs/catalog/digatlas.htm>

Note: For organizations having either a specifically approved Data Use Agreement or a Data Exchange Agreement with BMGS, files may be made available at reduced or no cost. There is currently an effort being made to arrange for these agreement(s) to be in place for the reference and use of the Columbia River Greenways Alliance as a partner under the East Kootenay Conservation Program.

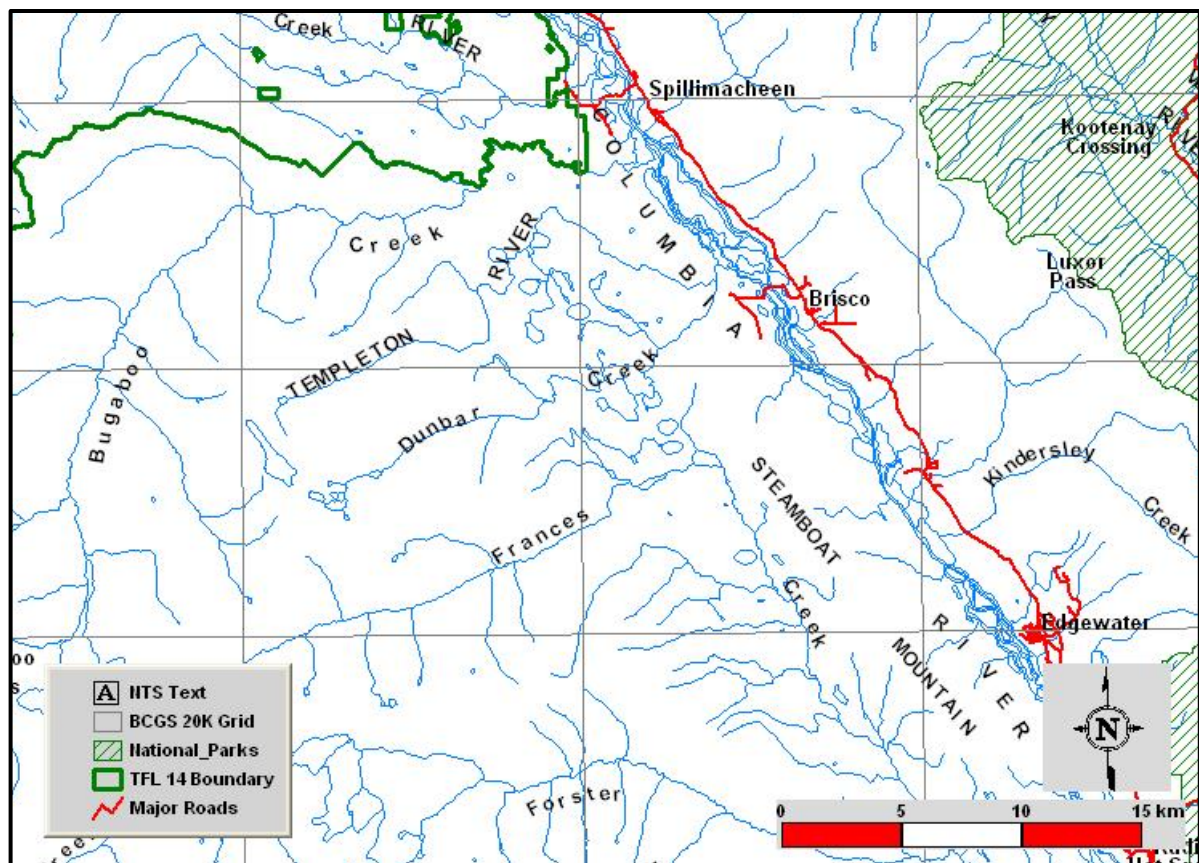


Figure 3. National Topographic System Mapping.

Related Topics and Contacts:

For additional base mapping, refer to Terrain Resource Information Management (TRIM) mapping elsewhere in this report.

2.1.3 Hillshade Images

A complete provincial set of hillshade images were created from a high resolution gridded Digital Elevation Model (DEM) product from the 1:20000 TRIM bases.

Description: Hillshade Image Catalogue, with a sun angle of NW & SW (Azimuth 225 & 315)

Purpose: Often used to show general topography and elevation relief.

Time Period: September 1999, with DEM originating from March 1998

Accuracy: 25 meters

Contact: These hillshade images are provided in JPEG format and include a georeferenced “world file” which allows for accurate placement in relation to other data. They are available on the MSRM GIS data ftp site under the **Hillshade Images** link at:

Web link: <http://srmwww.gov.bc.ca/gis/arcftp.html>

Note: Currently free for download.

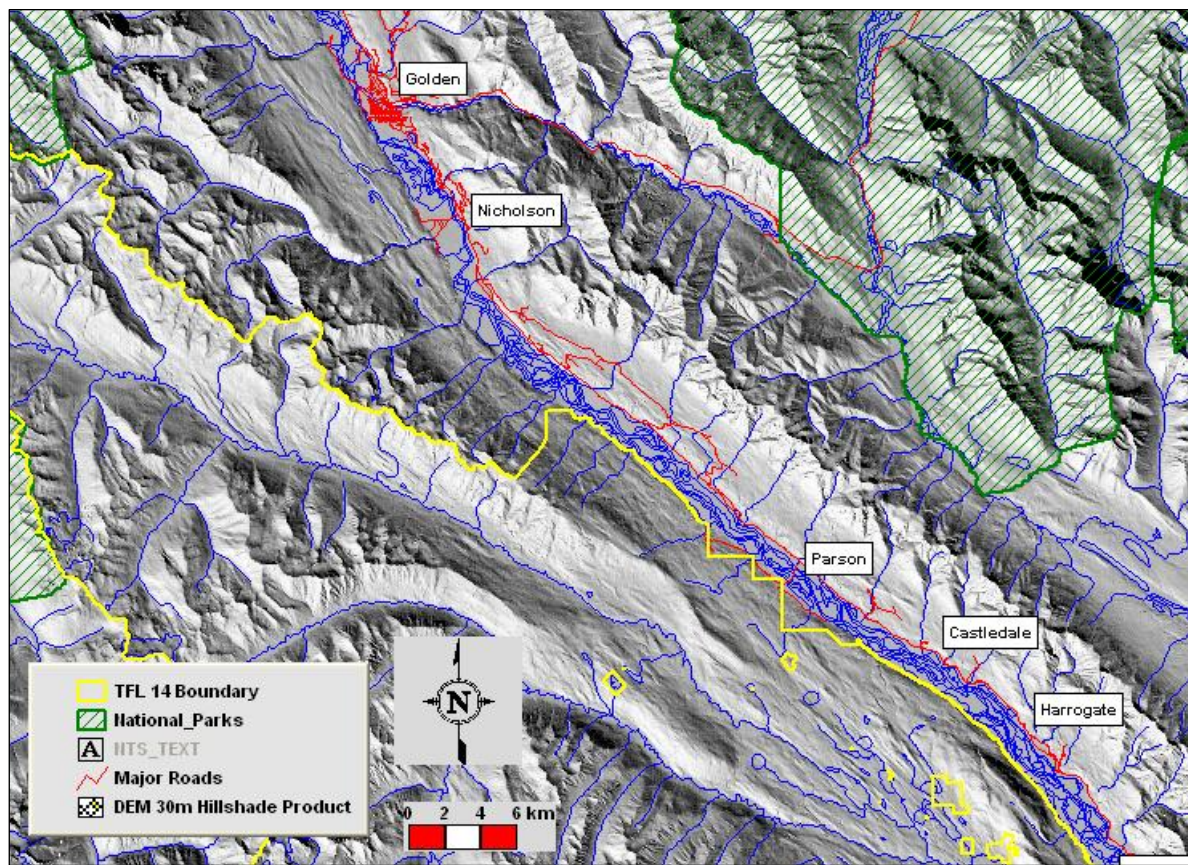


Figure 4. Hillshades

Related Topics and Contacts:

For source digital elevation models (DEM) and products , refer to Terrain Resource Information Management (TRIM) mapping elsewhere in this report.

2.1.4 Landsat 7 Satellite Imagery

Relatively coarse resolution (15 metres B&W / 30 m Colour) satellite imagery data obtained through Natural Resources Canada at no charge. These images are useful for more current (2001) information as well as for overview imagery for large areas.

This type of Landsat image is the source for the classification and mapping of the **Baseline Thematic Mapping** (BTM) inventory described later in this report.

Images are available in a variety of formats, projections and date of satellite acquisition. Files can be ordered at no cost for download after setting up an account on the following web site:

Contact: Natural Resources Canada – Canadian Geospatial Data Infrastructure

Web link: <http://geogratis.cgdi.gc.ca/clf/en>

Note: The Columbia River Greenways Alliance has acquired and processed two separate images into one fused file suitable for overviews covering the upper Columbia River and wetlands. It may be accessed through the EKCP office in Invermere.

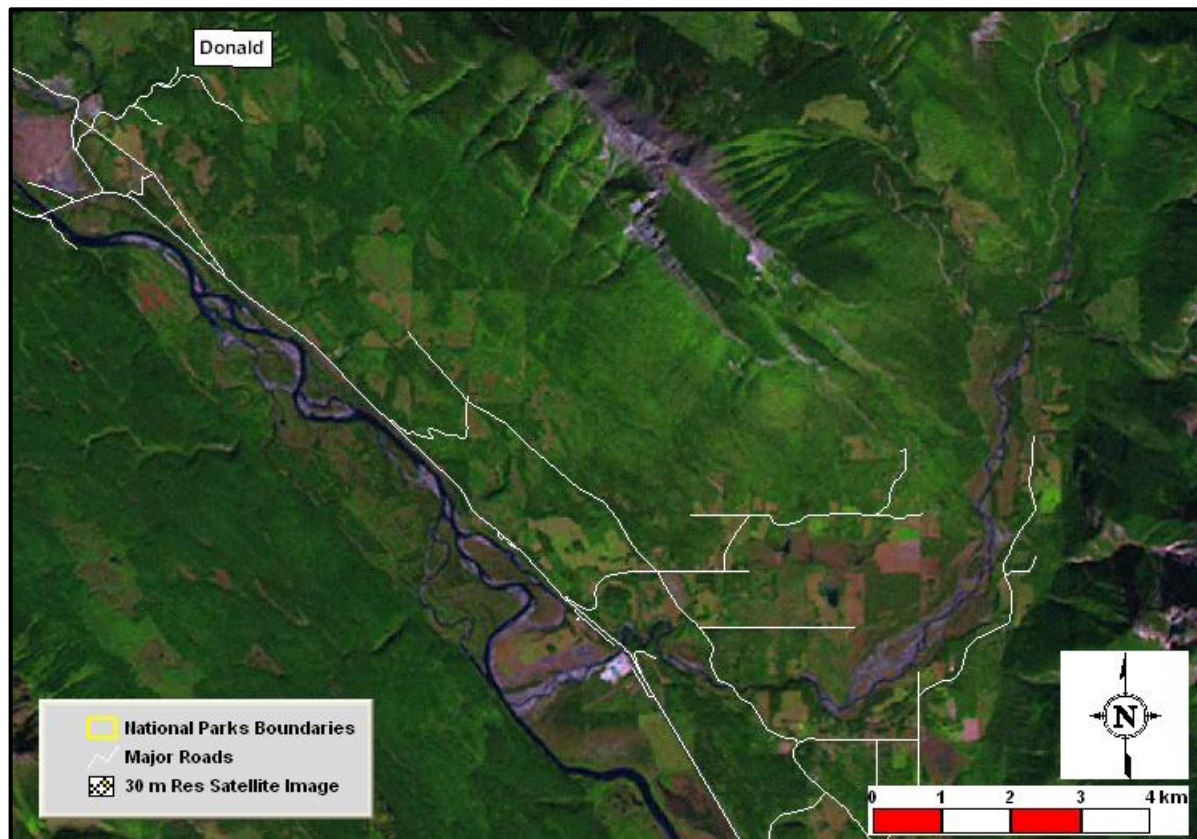


Figure 5. Landsat 7 Satellite Imagery – Ortho-corrected.

Related Topics and Contacts:

Satellite and related imagery: [McElhanney Consulting Services](#)

Optional contacts for ortho services:

Terra Remote at: <http://www.terraremove.com>

2.1.5 TRIM Mapping

1: 20K TRIM Mapping – Digital Elevation Model (DEM) and Contours

The Terrain Resource Information Management (TRIM) program continues to support digital baseline mapping in the province. The DEM and contour components of this inventory are used for illustrating topographic detail and terrain modeling. Contours are marked at 20 metre intervals with index contour features every 100 m.

1: 20K TRIM Mapping – Planimetry

This is the standard map base for the province and shows roads, water courses, urban and rural development features, as well as broad vegetation boundaries. Note that although the maps are intended for periodic update, more recently built roads and other developments may not yet be present in the file(s).

Trim maps are available through:

Contact: BC MSRM – Base Mapping and Geomatics Services (BMGS)

Web link: <http://srmwww.gov.bc.ca/bmgs/catalog/digatlas.htm>

Note: There are associated purchase costs for the digital data unless organizations have an approved Data Use Agreement or a Data Exchange Agreement with BMGS, in which case files are made available at reduced or no cost.

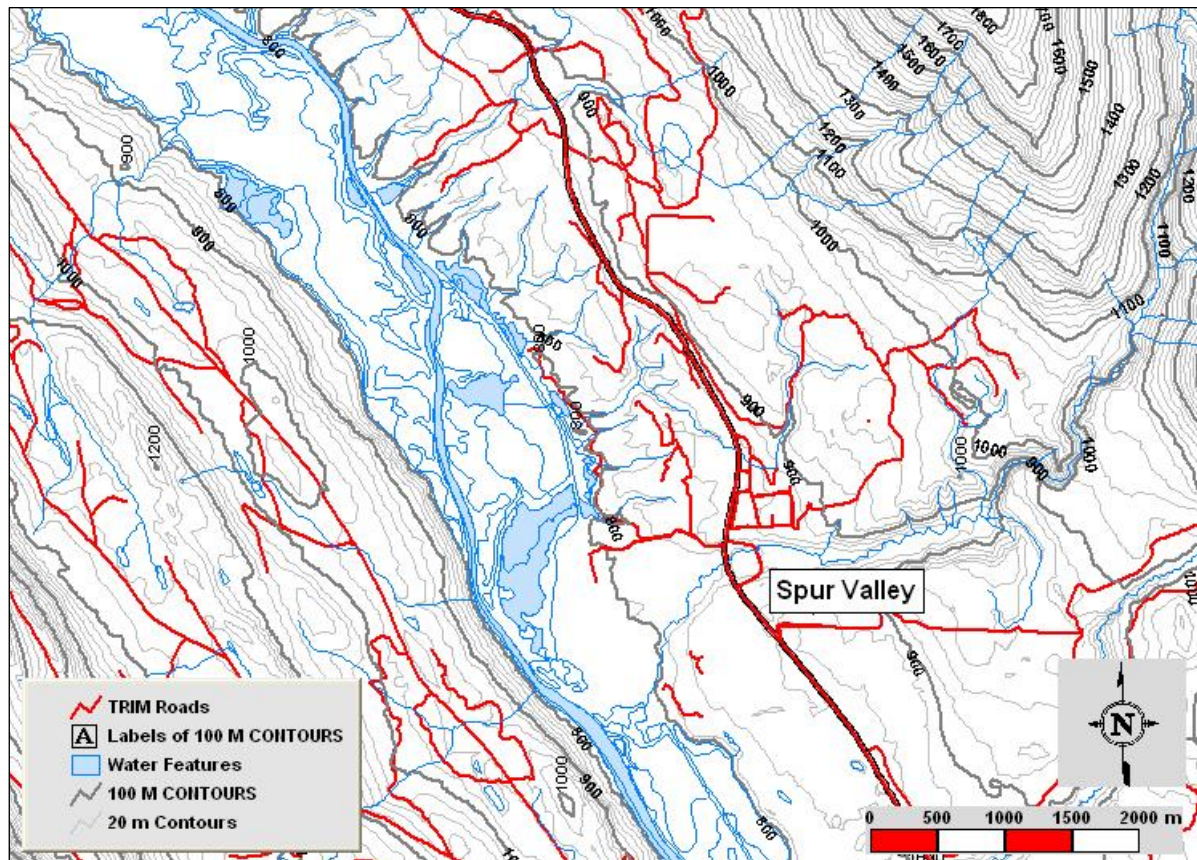


Figure 6. TRIM Mapping.

2.1.6 Orthophotography

There are two vintages of ortho-photos covering the study area: photos detailing areas within the Rocky Mountain Forest District (approx. Carbonate Ck and south) were created from 1995 aerial photography, whereas more recent 2001 photo source was used for areas within the Columbia Forest District (approx. Nicholson and north)

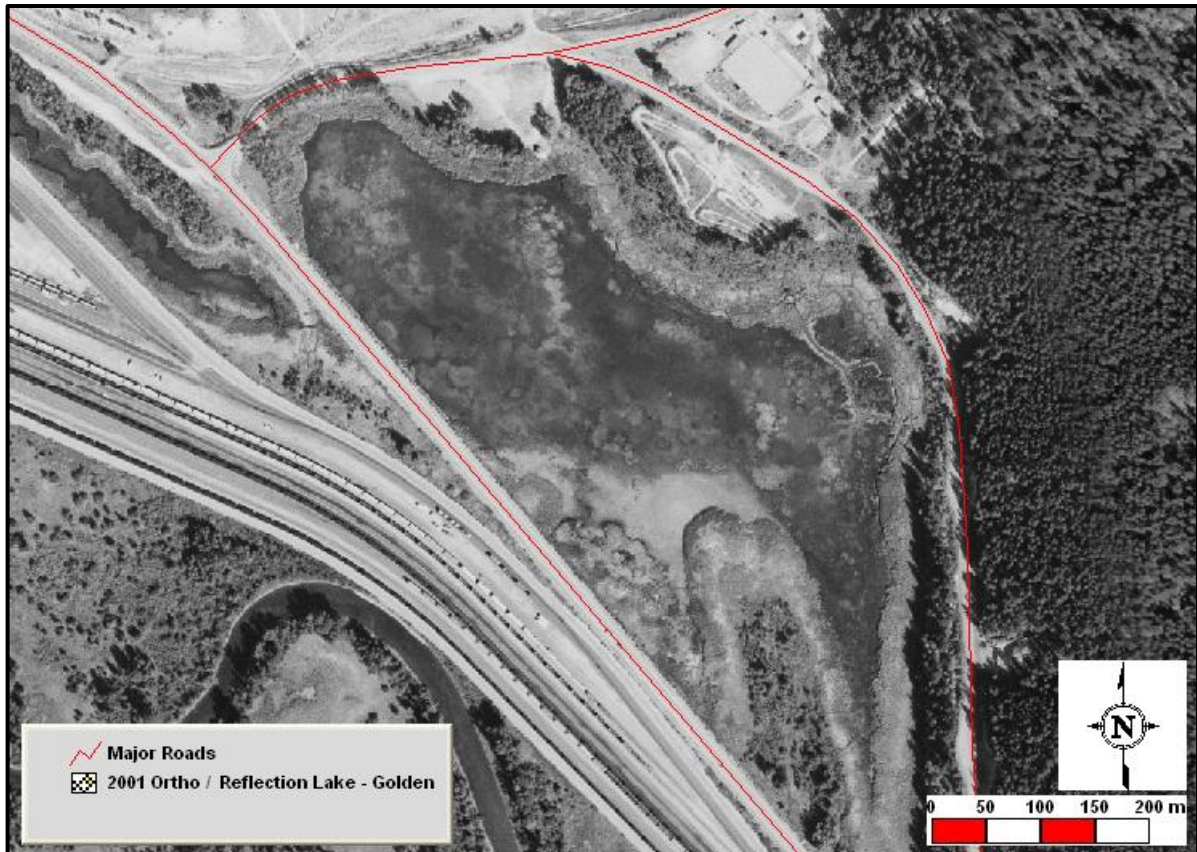


Figure 7. Digital B/W Orthophoto (Reflection lake near Golden).

An arrangement has been made between the BC Government and [McElhanney Consulting Services](http://www.mcelhanney.com) to distribute orthophotos that are created as one of the deliverables from the TRIM II mapping program. Orthophotos are created from new aerial photography by scanning, geo-referencing and resampling of the data.

Contact: McElhanney Consulting Services - Vancouver, B.C.

Web links: <http://srmwww.gov.bc.ca/bmgs/catalog/digatlas.htm> or www.mcelhanney.com

2.2 Ecological Inventories

This section of the report includes those classified and mapped natural features relating to existing geology, flora and fauna present in the upper Columbia River Valley.

2.2.1 Forest and Vegetation Cover

The primary source for Forest and Vegetation Mapping for the province is managed by the BC Ministry of Sustainable Resource Management (MSRM). A recent change to the structure of these inventories has seen a conversion from the traditional “Forest Cover” mapping (shown below) to a Vegetation Resource Inventory (VRI) file. Besides other changes, the new structure allows for more detailed classifications of those non-timbered vegetation types which have grown in importance over the years. Detailed descriptions of the current Vegetation Resource Inventory can be found by contacting either:

Contact: BC Ministry of Sustainable Resource Management
Kootenay Contact Centre – Nelson, B.C.

Web: <http://srmwww.gov.bc.ca/tib/vri/index.html>

Note: There are associated purchase costs for the digital data unless organizations have an approved Data Use Agreement or a Date Exchange Agreement with BMGS, in which case files are made available at reduced or no cost.

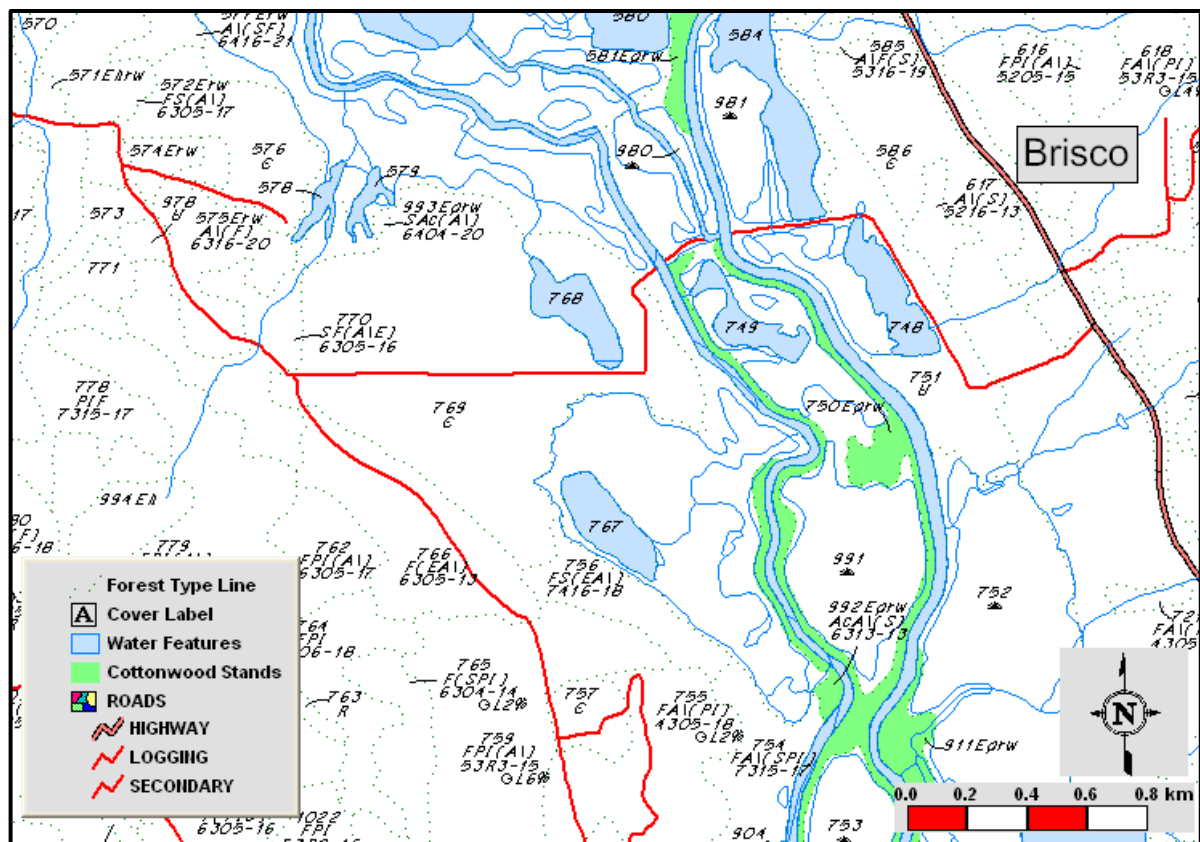


Figure 8. Provincial Forest Cover map.

Additional sources for Forest and vegetation cover information may be found at:

- **Ministry of Forests District Offices** (hard copy viewing only)
- **Logging Company offices** such as Canfor, Tembec and Louisiana Pacific.

2.2.2 Biogeoclimatic Zone / Subzone

Biogeoclimatic Ecosystem Classification (BEC) mapping provides the basis for describing areas of similar ecology based on elevation and aspect combinations combined with moisture regimes (i.e. regions of similar climate influences). In the upper Columbia River valley, a relatively dry area compared to the rest of the province, the primary Zone is described as “IDF” (Interior Douglas Fir) with two Subzone, a Dry Mild (dm2) class to the north with the southern portion of the valley being “undifferentiated” (“un”). These classifications assist forest and land managers in prescribing ecologically sound activities (i.e. such as restocking plans after timber harvesting) and play a dominant role in determining vegetation and habitat capabilities and objectives across the landscape.

Contact: BC Ministry of Forests - Research Branch, Victoria, B.C.

Web: www.for.gov.bc.ca/hre/becweb/subsite-map/provdigital-01.htm

Note:

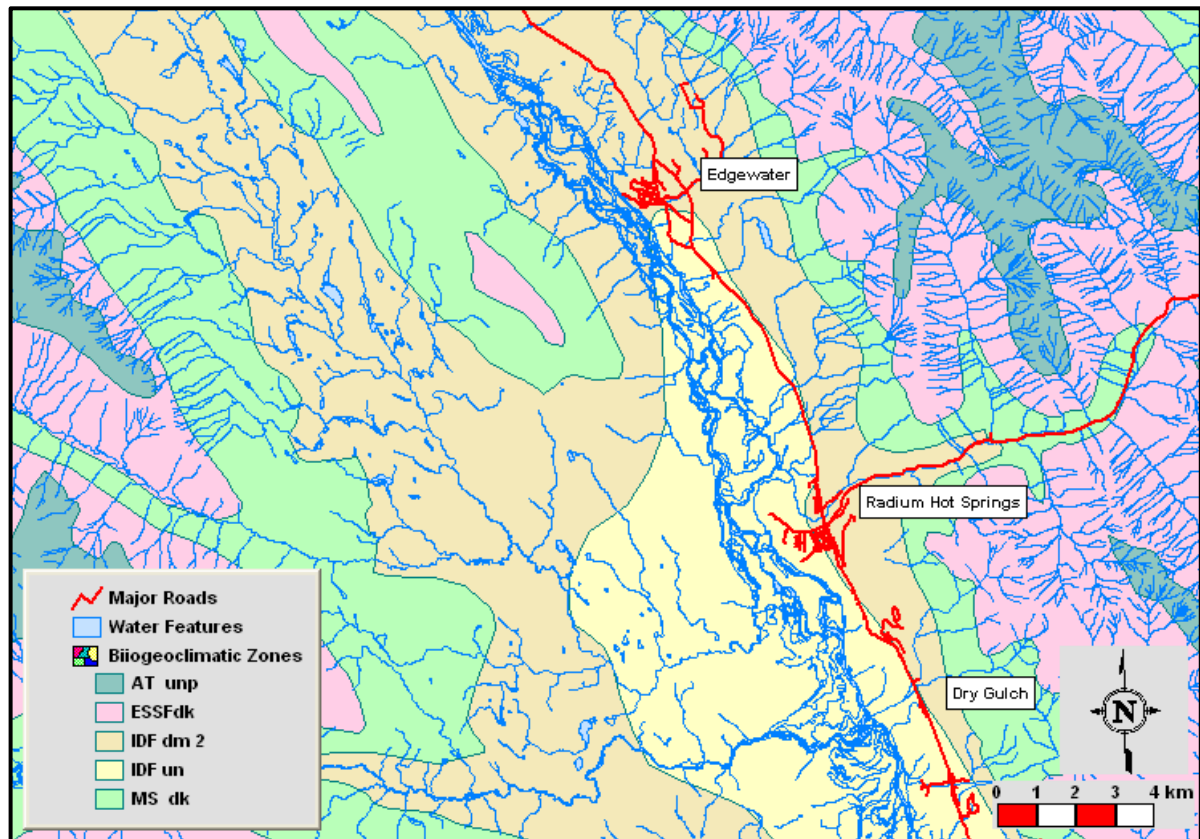


Figure 9. Biogeoclimatic map.

An additional source of ecosystem map inventories and area descriptions has recently been completed by the Canadian Rocky Mountains Ecoregional Team with the production of the four-volume *Canadian Rocky Mountains Ecoregional Assessment* report in May of 2004. A

copy of this report is found in the CRGA Reference Library and for further information, users should contact:

- **Nature Conservancy Canada, Canadian Rocky Mountains Office**

2.2.3 Grasslands

The Grasslands Council of Canada maintains an inventory of grassland-related map layers. Included in the available datasets are grassland habitats and plant communities, wetland and other habitats lost due to natural changes and development impacts.

Contact: Grasslands Conservation Council of B.C.

Web: <http://www.bcgrasslands.org/>

Note: Maps for most areas of BC are freely available for viewing and download in PDF format from this site.

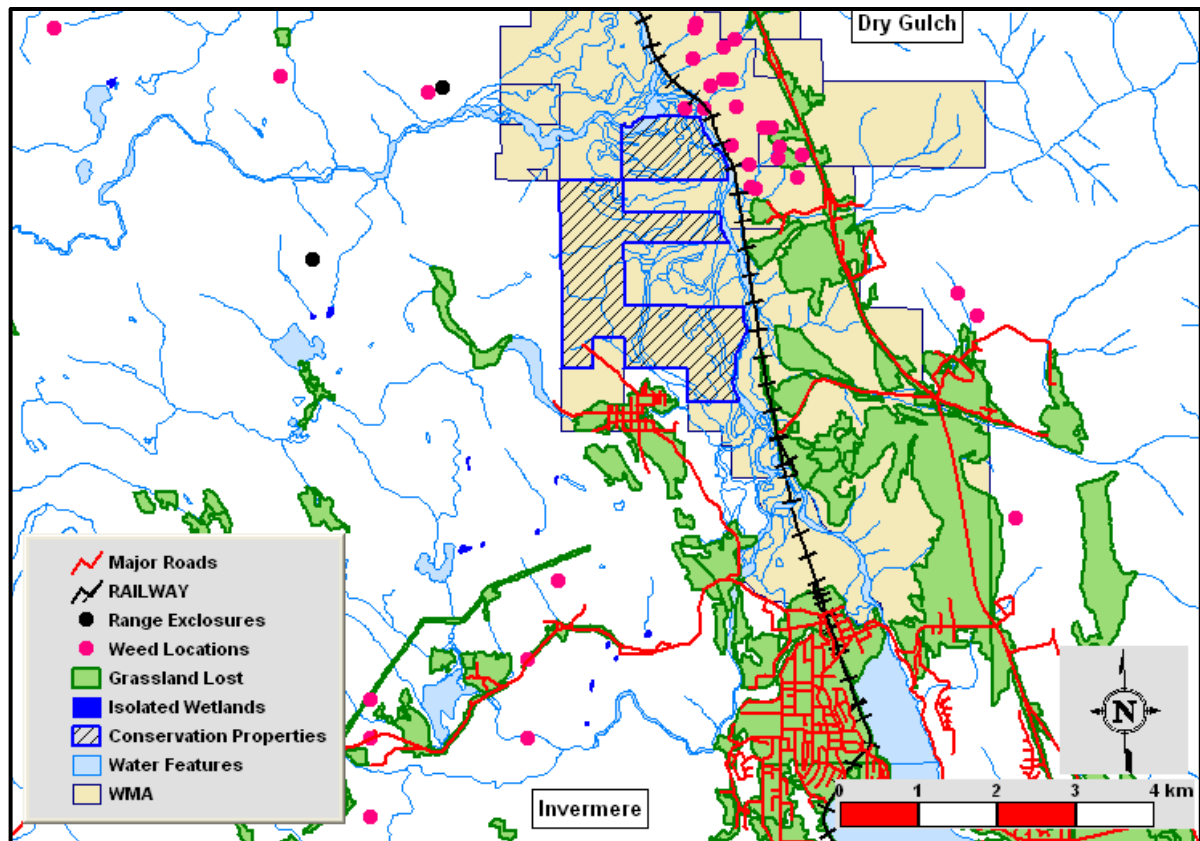


Figure 10. Grassland mapping.

Additional sources for information relating to grasslands may be found at:

- **Canadian Parks and Wilderness Society**
- **Living Landscapes**
- **Habitat Conservation Trust Fund**
- **Friends of Ecological Reserves**
- **The Nature Conservancy**
- **BC Institute of Agrologists**

2.2.4 Surficial Geology

Surficial geology is concerned with the description of the types and distributions of unconsolidated sediments across the landscape. This information is collected and maintained primarily in maps and databases. It is useful to those engaged in mineral exploration, sand and gravel production, hazard assessment, and land use planning.

Contact: BC Government Ministry of Energy and Mines

Web: <http://www.em.gov.bc.ca/Mining/Geolsurv/Surficial/default.htm>

Note: The Digital Terrain Map Library on this site references terrain and slope stability related maps in digital format. The digital maps may be viewed on-line or downloaded for use in a GIS or Desktop Mapping package.

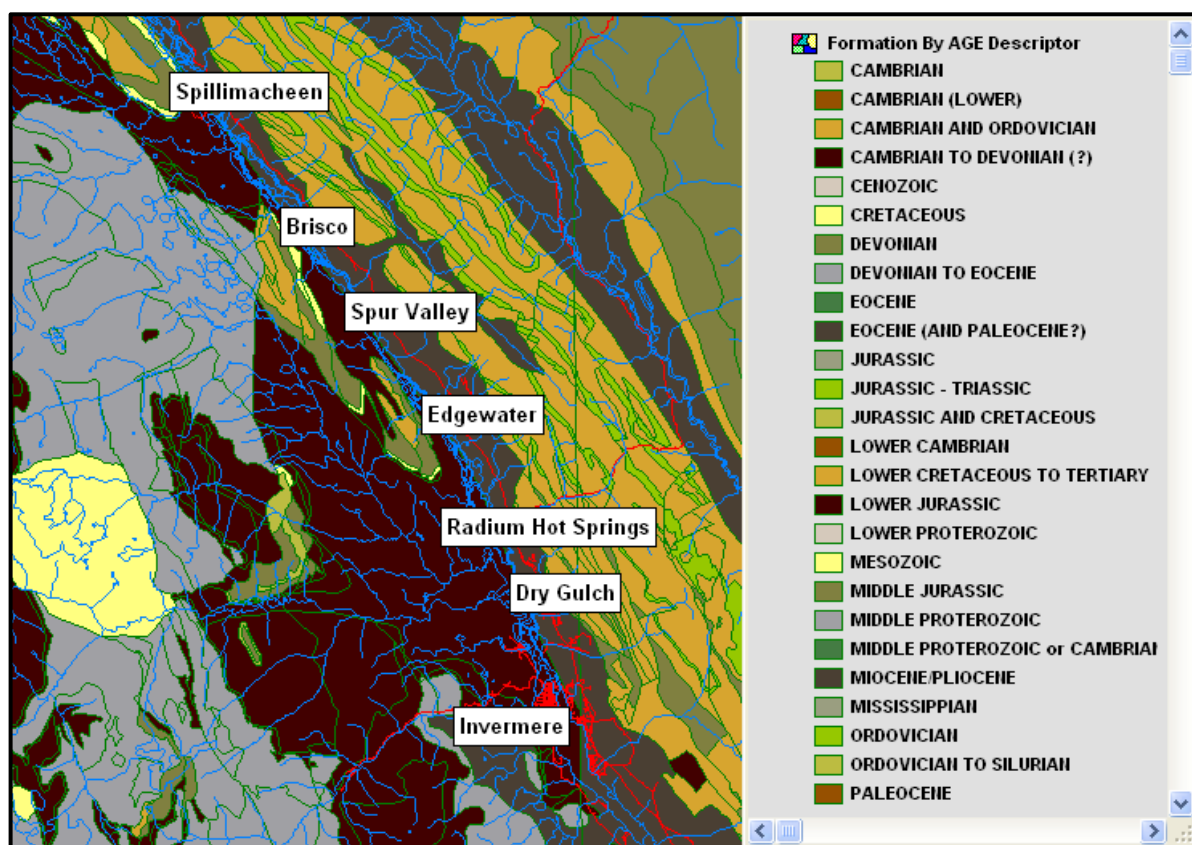


Figure 11. Surficial Geology.

Additional sources for information relating to Mining, Soils and Terrain information may be found at:

- The Mining Association of British Columbia (MABC)
- BC Institute of Agrologists
- Canadian Geomorphology Research Group
- BC Government Ministry of Energy and Mines
- BC Government Ministry of Water, Land and Air Protection

2.2.5 Biophysical Habitat Capability

In the East Kootenays, the Biophysical Habitat Capability inventory has improved upon on the earlier **Canadian Land Inventory** (CLI) with mapping of the location, quality and quantity of ungulate habitat across the landscape. This higher resolution mapping (1: 50000) shows generalized areas of habitat classes based on soils, topography (aspect and elevation), climate and vegetation cover. In addition to the habitat capability concept of the CLI, a habitat suitability rating was added based on the current carrying capacity for a particular species at the present stage of forest cover species, age and stand characteristics.

Even more recently, this biophysical mapping is being replaced (where available) by a new inventory initiative called Terrestrial Ecosystem Mapping (TEM) or Predictive Ecosystem Mapping (PEM). Ecosystem mapping is the stratification of a landscape into map units, using a combination of ecological features, primarily climate, physiography, surficial material, bedrock geology, soil, and vegetation. This mapping provides sufficient enough detail to interpret habitat capability and suitability for a broader range of wildlife species.

Biophysical Mapping Contact: B.C. Government - Ministry of Water, Land and Air
Protection. Kootenay Region Office in Nelson

Web: <http://srmwww.gov.bc.ca/kor/gis/gisdata.htm>

Note: Datasets available through WLAP and/or MSRM Regional GIS Coordinator.

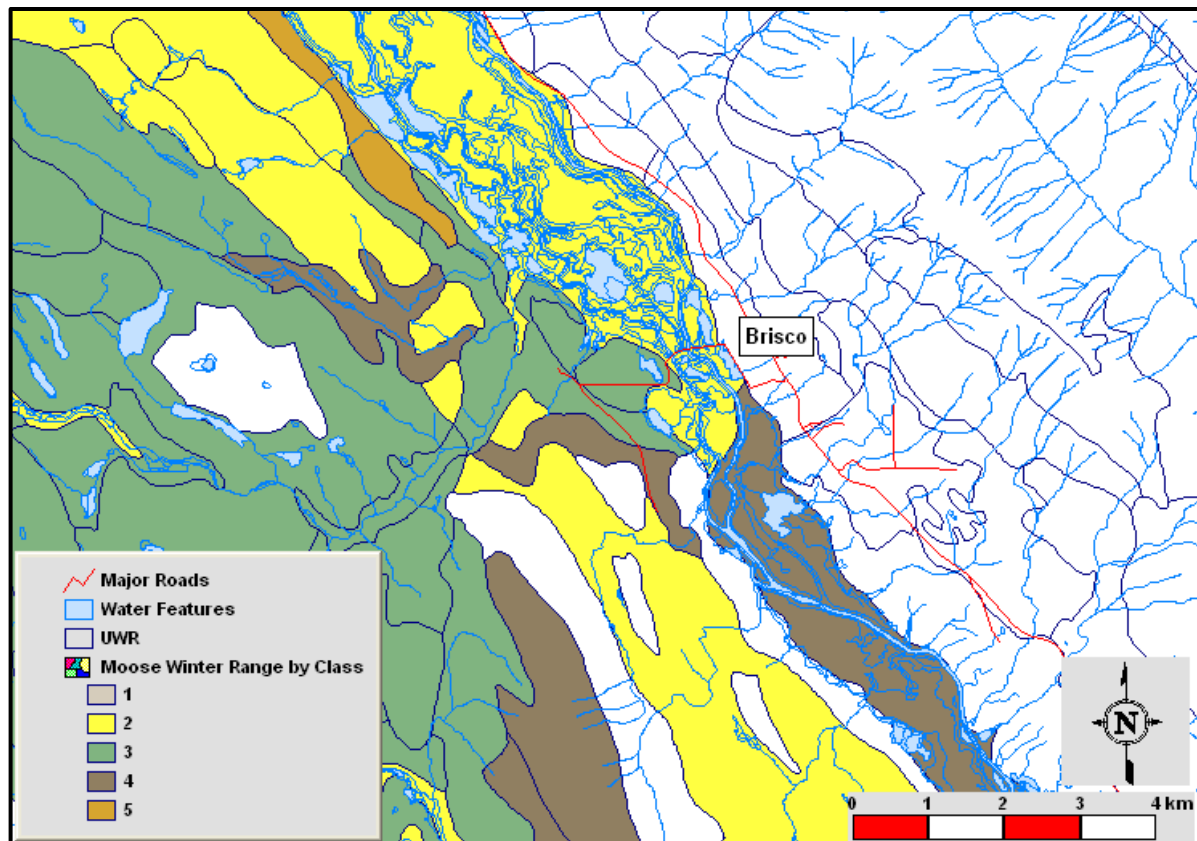


Figure 12. Biophysical Habitat Capability

TEM Contact: B.C. Government - Ministry of Sustainable Resource Management

Web: <http://srmwww.gov.bc.ca/ecology/tem/>

Note: There is currently limited coverage of TEM mapping over the Columbia River Wetlands area.

Other sources for ecosystem mapping:

- **Canadian Land Inventory:** Natural Resources Canada – Geogratis data link
- **Nature Conservancy of Canada**

2.2.6 Alluvial Fans and Floodplains

Alluvial Fans have been defined as “a sedimentary deposit located at a topographic break, such as the base of a mountain front, escarpment or valley side, that is composed of stream flow and/or debris flow sediments and has the shape of a fully or partially extended fan.” (FEMA, 2003). Although largely unnoticed adjacent to the wetlands from Invermere to Golden, they are a common feature of the landscape and a part of the natural ecosystem of the valley, affecting water courses, debris flows and soil characteristics. Due to the potential for flooding, destructive debris flows and potential soils loss, many of these fans are now mapped for further analysis in these areas, such as the flood hazard mapping discussed elsewhere in this report.

Contact: BC Ministry of Sustainable Resource Management, Kootenay Contact Centre
Web: <http://srmwww.gov.bc.ca/kor/gis/gisdata.htm> under the “water” directory.
Note: The alluvial fan inventory is used as a base layer for the flood hazard mapping and is listed by specific creek name locations.

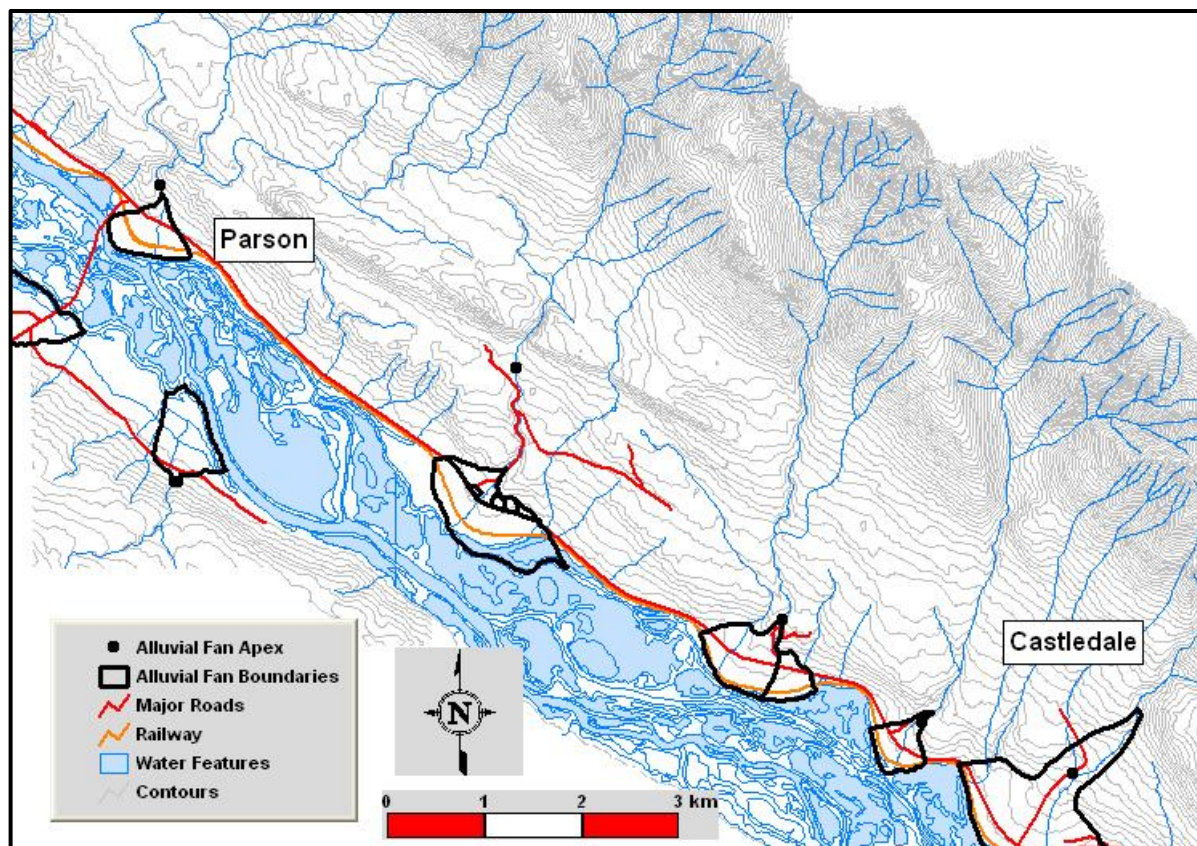


Figure 13. Alluvial Fans and Floodplains map.

Additional information regarding alluvial fan mapping background may be located at:

- **BC Government Ministry of Energy and Mines**

- U.S. Federal Emergency Management Agency (FEMA) http://www.fema.gov/fhm/ft_alfan.shtm

2.2.7 Wetland Classification Mapping

Baseline inventories of land types within the Columbia River wetlands are important in order to gauge both natural and human related changes which are occurring in and adjacent to the area. In 1983, Pedology Consultants and other consultants completed a baseline inventory through an intensive classification and mapping report of the Columbia River wetlands between Donald and Skookumchuck. The resulting hard copy maps delineate habitat and landform types across the area, examples of which are marshes, pond depth, shrub types and areas of anthropogenic influence. A sample map is shown below.

Contact: BC Government Ministry of Water, Land and Air Protection (WLAP)
Web: N/A
Note: Reference report: “Opportunities for Conservation and Recreation Development in the Columbia River Wetlands”, available for viewing at the local WLAP office. The maps are available in hard-copy format only



Figure 14. Wetland Classification Mapping.

Additional information regarding wetland classification and mapping may be found at:

- **BC Government Ministry of Sustainable Resource Management** under the Terrestrial and Predictive Ecosystem Mapping initiative (TEM and PEM).
- **Environment Canada** - The Wetland Classification system

2.2.8 Breeding Bird Surveys

There is currently an ongoing and formal breeding bird survey conducted yearly within the Columbia River Wetlands area as part of the North American Breeding Bird Survey (BBS). The BBS is a volunteer-based survey coordinated in Canada by the Canadian Wildlife Service National Wildlife Research Centre, and is designed to collect long-term data on the population status and trends of breeding birds throughout North America.

Each year, a series of 17 locations are visited between late May and early July to record the total number of individual bird species heard or seen within 0.4 km of each stop during a three-minute observation. Records and overview route maps may be found at:

Contact: Canadian Wildlife Service National Wildlife Research Centre

Web: http://www.cws-scf.ec.gc.ca/nwrc-cnrf/migb/01_1_2_e.cfm

Note: Route maps available as PDF files for viewing

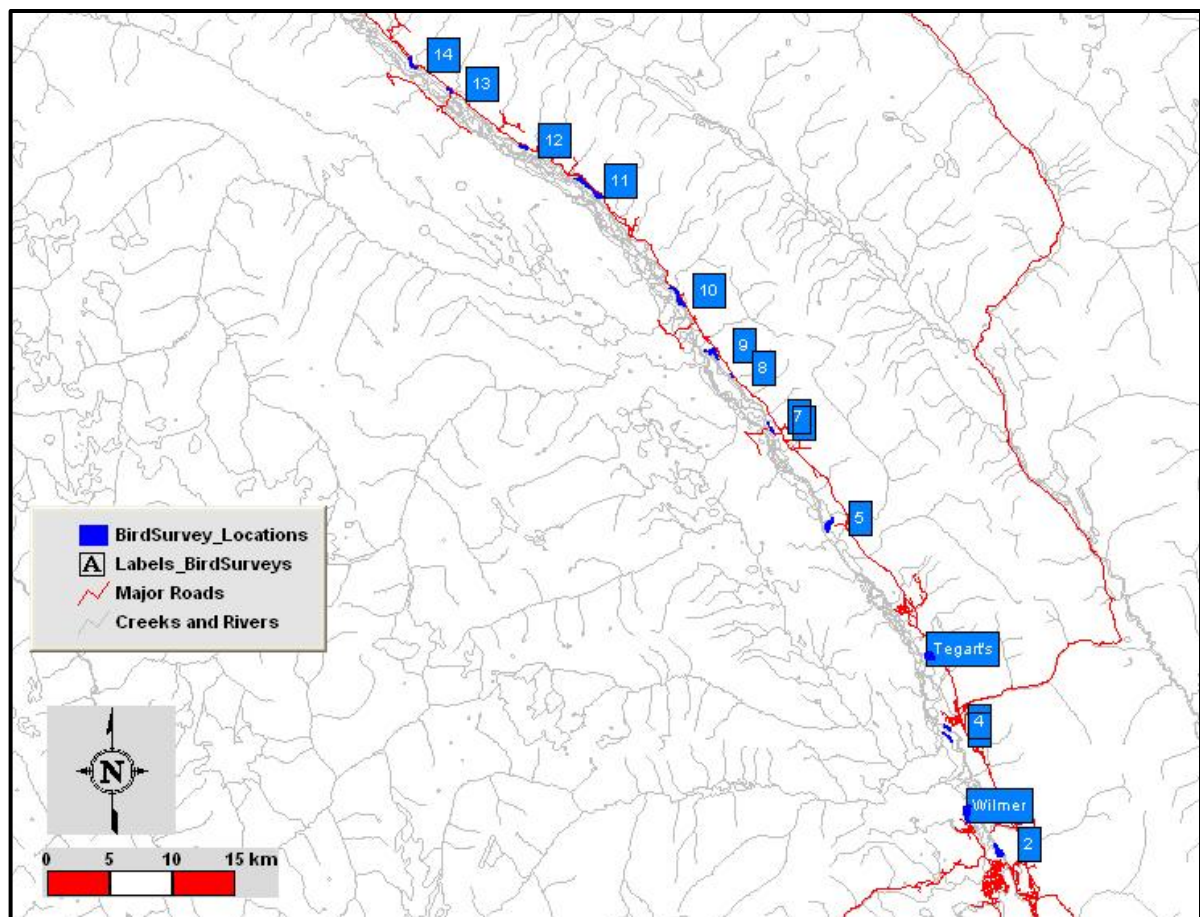


Figure 15 Breeding Bird Surveys

Additional information regarding general and specific bird inventories are available through:

- **Columbia Basin Fish and Wildlife Compensation Program (CBFWCP)**
- **Wings Over the Rockies Festival – Invermere.**

- **BC Field Ornithologists**

2.3 Cultural and Recreation Inventories

The Cultural and Recreation references are primarily associated with human development, activities and impact.

2.3.1 Baseline Thematic Mapping

The Baseline Thematic Mapping inventory includes 20 land use classes defined for the Province of B.C. Each polygon has a land use code, area, perimeter, elevation, slope and aspect as attributes. The classification was made from LandSat Thematic Mapper (TM) satellite imagery available at the time of mapping, highlighting areas of similar land use. This inventory is a valuable tool for those wishing to track changes in overall land use over time.

Contact: BC Ministry of Sustainable Resource Development

Web: <http://srmwww.gov.bc.ca/bmgs/catalog/digatlas.htm> or
<http://srmwww.gov.bc.ca/dss/index.htm>

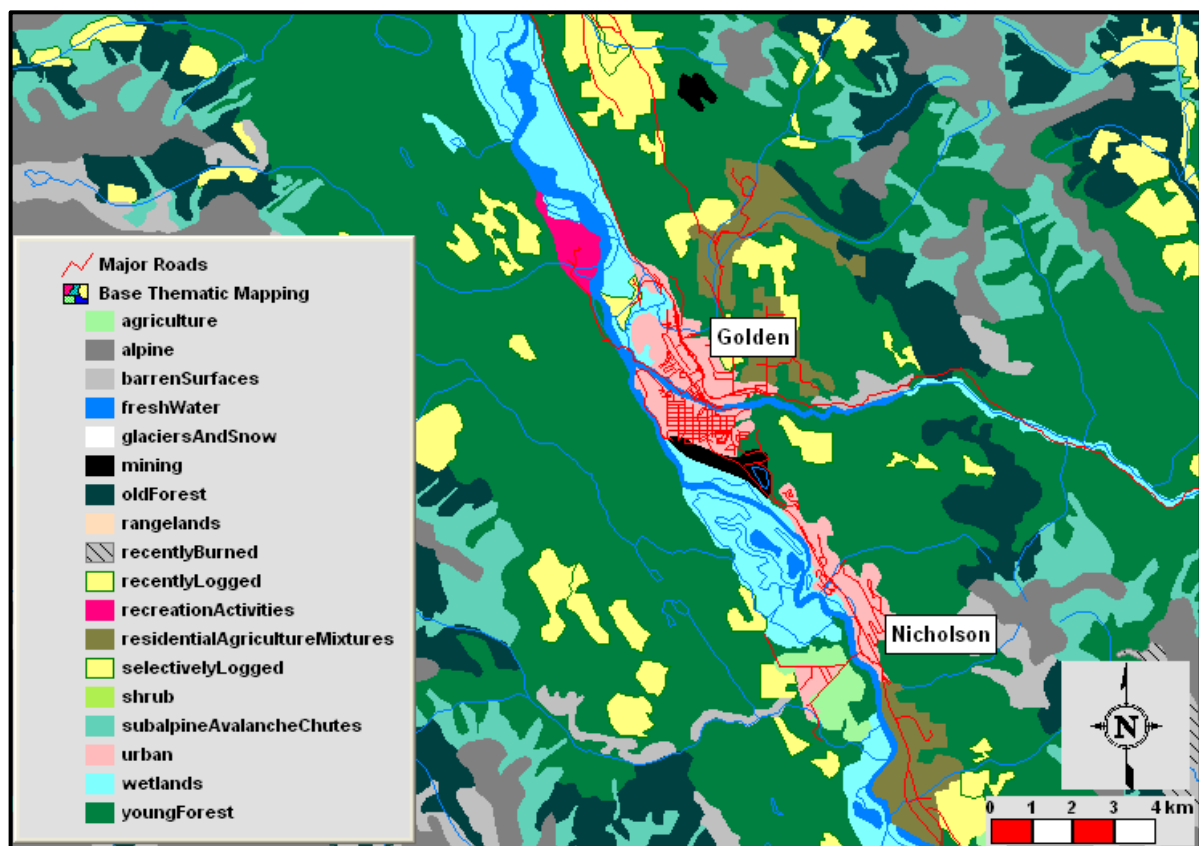


Figure 16. Baseline Thematic Mapping

Additional information on land use and ecosystem descriptions may be found in the recent report, *Canadian Rocky Mountains Ecoregional Assessment*, May of 2004. A copy of this report is found in the CRGA Reference Library and for further information, users should contact:

- **Nature Conservancy Canada, Canadian Rocky Mountains Office, Invermere**

2.3.2 Fire Interface Hazard Mapping

The Fire Interface Hazard Mapping project is a large scale inventory recently completed by the Ministry of Forests to evaluate fire interface risks and hazards adjacent to populated areas. Using combinations of topography, vegetation cover and proximity to human development, areas of similar characteristics are rated from Low to Extreme in terms of fires start risk and interface values. This enables residents and communities to target fire hazard mitigation efforts aimed at lessening the risk of catastrophic fire.

Additional information on Fire Hazard and Risk mapping, the Home Owners Fire Smart Manual or Protecting Your Community may be found at:

Contact: BC Government - **Ministry of Forests Protection Branch**; or
Local **Ministry of Forests District Office**

Web: <http://www.for.gov.bc.ca/protect/>

Note: Many municipalities (i.e. Radium Hot Springs) have already begun dealing with their local risks and hazards through either improved mapping or actual fuel management projects to address area of higher concern.

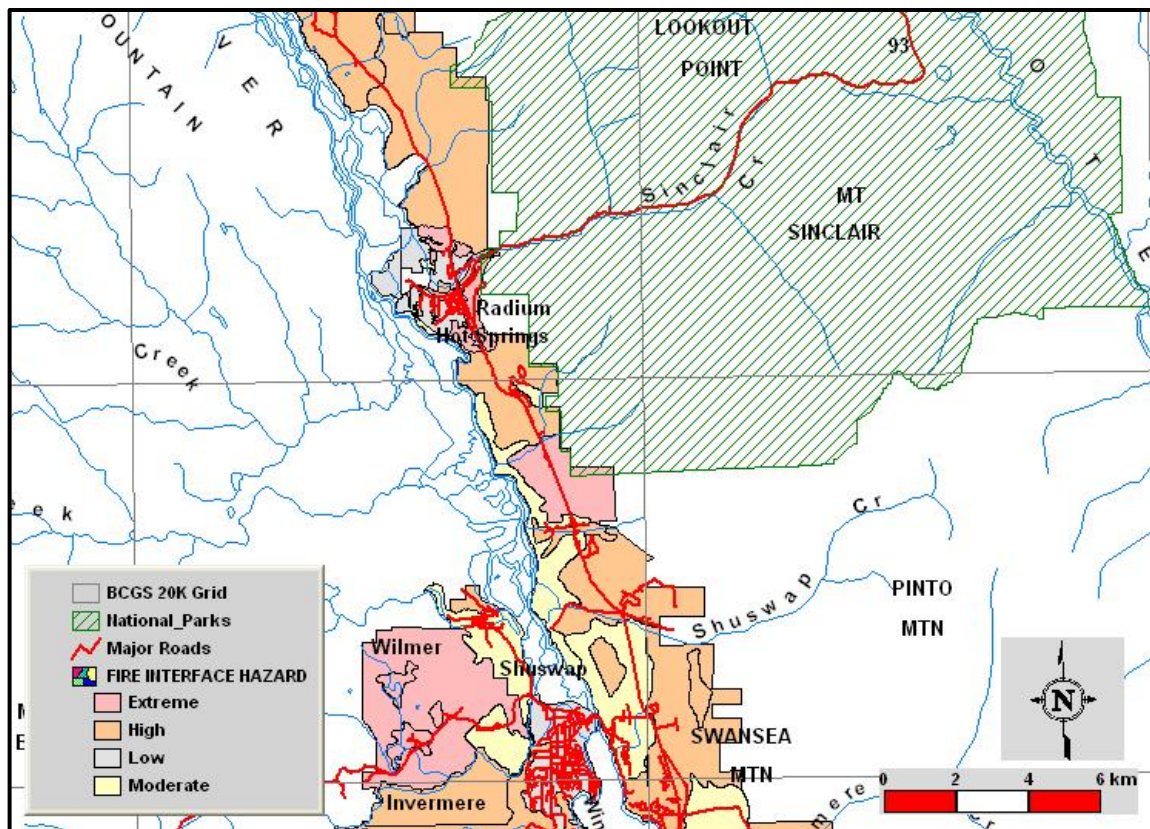


Figure 17. Fire Interface Hazard Mapping.

- For valley residents living in municipalities, Fire Interface Hazard information may be obtained through their local Municipal Offices.

2.3.3 Watershed Boundaries & Water Intakes

The watershed boundaries have been computer-generated from the Digital Elevation Model (DEM) product of the TRIM mapping described earlier in this report. Although related to existing mapping associated with water license administration, the primary use for this inventory is in watershed planning and analysis. Both the Community and Domestic Watershed boundaries, as well as Water Intake locations (termed Points of Diversion, or PODs) are available through the BC Government MSRM (Kootenay Region) data warehouse.

Contact: BC Gov – Ministry of Sustainable Resource Management –Kootenay Contact Centre

Web: <http://srmwww.gov.bc.ca/kor/gis/gisdata.htm>

Note: Some watersheds feeding rural water intake systems are not currently designated as being “Domestic” and therefore may not appear.

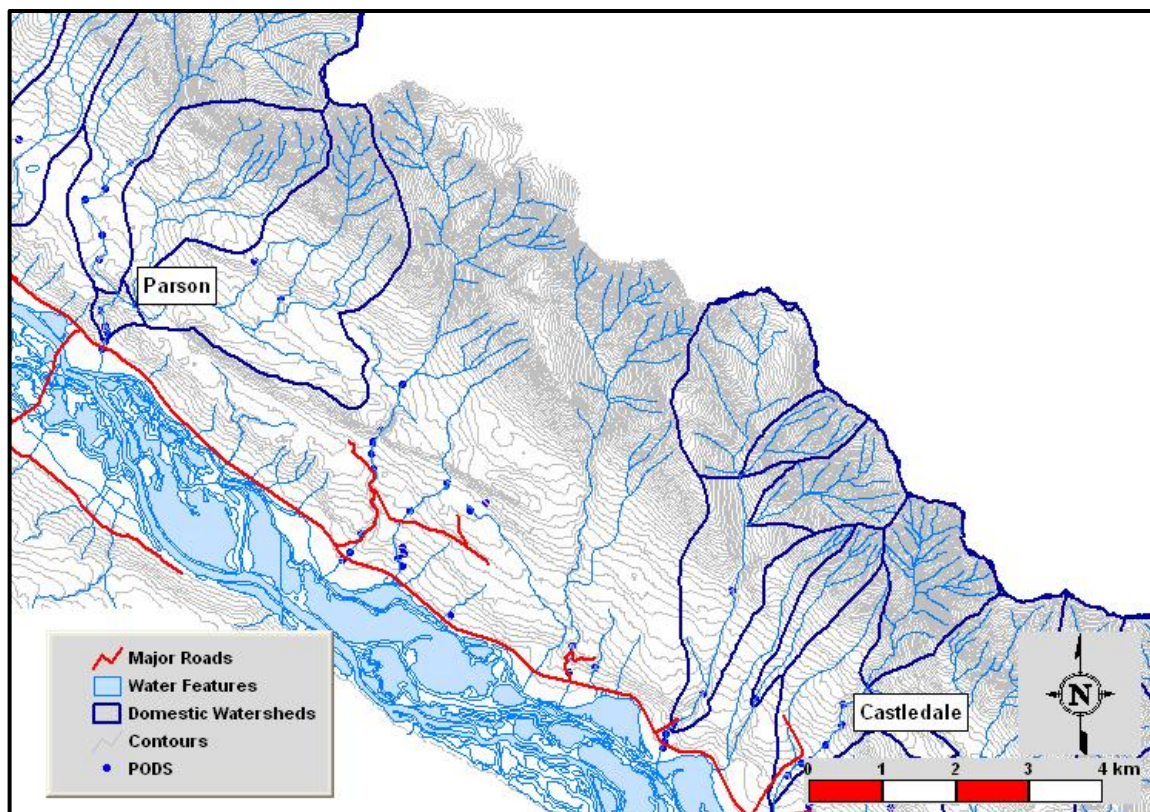


Figure 18. Watershed Boundaries & Water Intakes.

Additional information regarding designated watersheds, water rights and restoration are available at:

- Land and Water B.C. <http://www.lwbc.bc.ca/03water/licencing/index.html>

- **Local Forestry Companies**
- **Sustainable Fisheries Foundation**

2.3.4 Flood Plain and Erosion Hazard Mapping

To quote from the NSFE Legend, “It is the mandate of the Ministry of (Water, Land and Air Protection) to help reduce the threat to public safety and property damage through the identification of Non-Standard Flooding and Erosion (NSFE) areas (such as alluvial and debris flow fans).” A series of these non-standard flood and erosion hazard maps tied to specific creek locations has been produced and are available at:

Contact: BC Government Ministry of Water, Land and Air Protection – Kootenay Region

Web: <http://wlapwww.gov.bc.ca/kor/water/mainframe.htm>

Note: Responsibility for flood control and erosion hazards on private lands rests with the Regional Districts and, where appropriate, Municipalities. This is normally addressed through building code restrictions and regulations for development issues as well as education and public works programs to mitigate existing hazards.

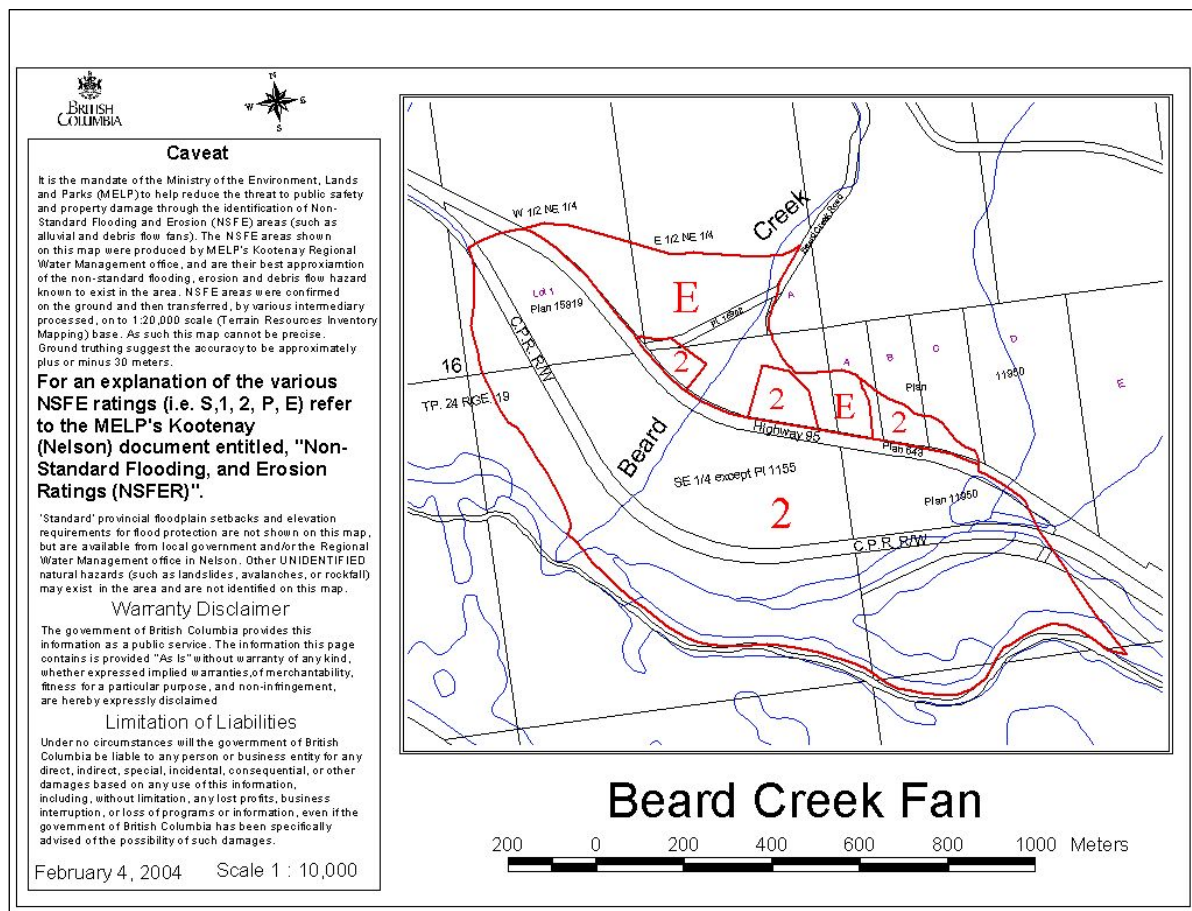


Figure 19. Flood Plain and Erosion Hazard Mapping.

Additional information regarding Flood and Erosion Hazard Mapping may be found at:

- The NSFE ratings: <http://wlapwww.gov.bc.ca/kor/water/NSFERatingguide.htm>
- BC Government Ministry of Water, Land and Air Protection

- Flood Hazard Mitigation: **FEMA**

2.3.5 Archaeological and Cultural Inventories

The sometimes sensitive nature of archaeological inventories requires those organizations collecting this information to control the access and distribution of their resulting data. As a consequence of the need to protect these irreplaceable resources, access to information about historical artifact and site evidence is generally limited. This helps to maintain the integrity of particular sites as well as limiting the exposure of those same areas from both casual and professional “souvenir” hunters.

Operationally, there are several sources for archaeological and archival information which will willingly share their understanding and site knowledge for legitimate scientific and referral purposes.

First Nations

The **Ktunaxa/Kinbasket Tribal Council (KKTC)** and associated **Treaty Council** support a Land and Resources division who, in addition to their information support roles, track traditional use information, archaeological potential and specific archaeological site details. Access to this information is primarily through a referral process which requires details of a proposed development or impact to be forwarded to the KKTC for review and advice on existing values. In cases where the archaeological evidence is unclear or not yet known, a preliminary field reconnaissance may be undertaken to confirm or discount the area as having archaeological significance.

Archaeology Branch of the B.C. Ministry of Sustainable Resource Management

Referencing their web site, (<http://srmwww.gov.bc.ca/arch/>) , “*the Archaeological Registry Section administers the Provincial Heritage Register under the Heritage Conservation Act, and records, maintains, and distributes heritage resource information. This information supports land use planning and impact assessments at the provincial, regional, and local levels, and is typically supplied to private industry, other government agencies, first nations, archaeologists, and the general public.*”

Archaeologists collecting specific information on newly discovered sites routinely forward this information to the Archaeology Branch for incorporation into the provincial registry.

Historical and Archival Information

There are several additional sources for good historical information regarding the upper Columbia River valley, found primarily within existing historical societies. Of

note are the Windermere District and the Golden and District Historical Societies, both of which support local museums. Another excellent source is found at the Royal B.C. Museum in their archives section. (<http://rbcm1.rbcm.gov.bc.ca/>).

2.4 Jurisdictional Inventories

Information sources having either legal or management implications to Columbia River wetland activities. These include inventories such as land ownership or current management documents which require review and referral prior to proceeding with projects.

2.4.1 Columbia Wetlands Wildlife Management Area

The Columbia Wetlands Wildlife Management Area (CWWMA) was established in 1996 after being recommended for “special management” consideration during earlier regional land use planning processes. Covering virtually all of the contiguous wetlands from Fairmont to Donald with the primary exception of private lands, the boundary also extends upslope in some areas to include dryer forest and grassland ecosystems. Management of the CWWMA is the responsibility of the Ministry of Water, Land and Air Protection, and is guided by The Columbia Wetlands Wildlife Management Area: Operational Management Plan.

Contact: BC Government - Ministry of Water, Land & Air Protection- Environmental Stewardship office in Cranbrook

Web: <http://srmwww.gov.bc.ca/kor/gis/gisdata.htm> under “Wild”(life) directory.

Note: As of September 2004, the effective period for the Operational Management Plan mentioned above has been extended and is still in effect.

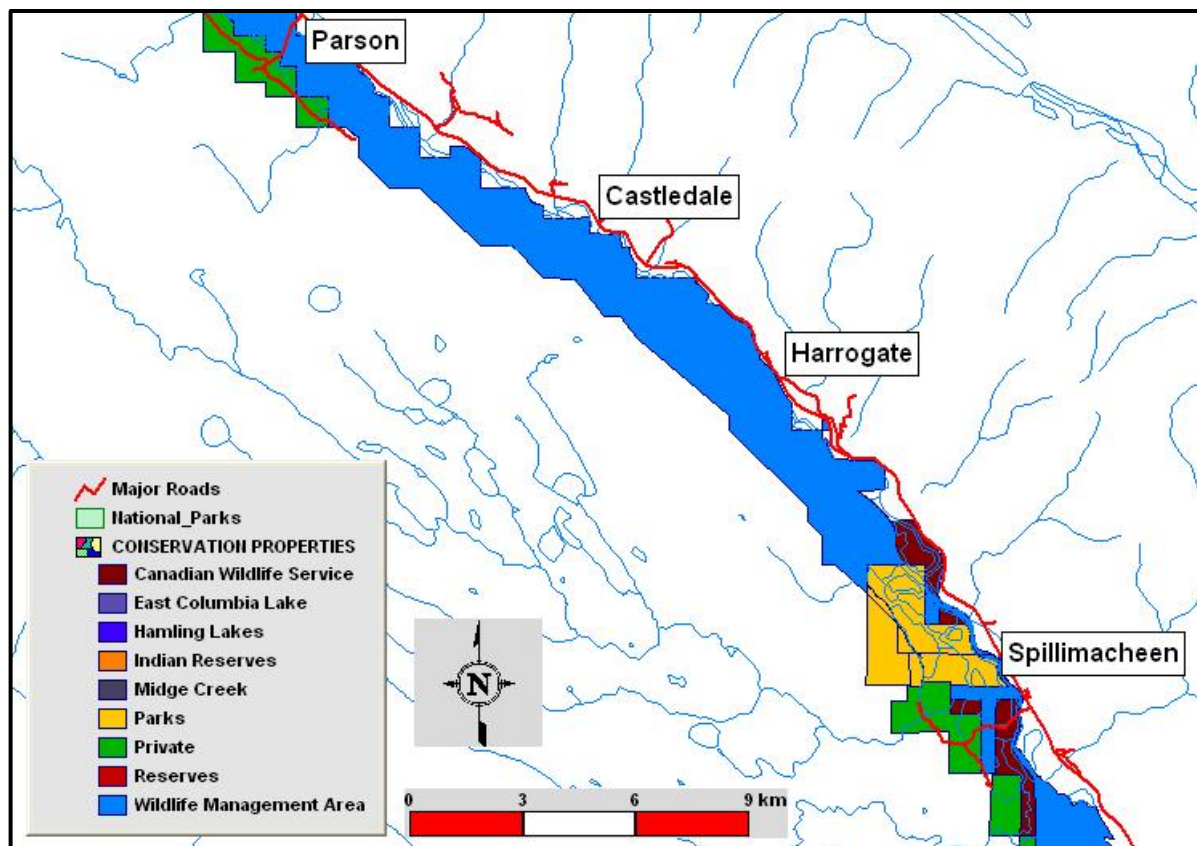


Figure 20. Columbia River Wetlands Wildlife Management Area.

Additional background and information available from:

- **Living Lakes**
- **East Kootenay Environmental Society**
- **Columbia Basin Fish & Wildlife Compensation Program**

2.4.2 Regional and Municipal Cadastre and Ownership

Both the Regional District of East Kootenay and the Columbia Shuswap R.D. maintain digital inventories using in-house resources. Of particular interest are the legal cadastral and parcel lines tied to parcel ID's and address data, which together with tax roll and ownership information maintained by the BC Assessment Authority, permit property searches. In most cases there is a fee for these services. Golden, Radium and Invermere also maintain cadastral and ownership information through a third party service: Urban Systems (Calgary)

In the future, these offices will link to an ongoing joint agency project to integrate the cadastral and ownership inventories of provincial, regional, municipal and major utilities. Additional information regarding this Integrated Cadastral Information Society (ICIS) project may be found through the Base Mapping and Geomatics web site at:

Contacts (Cadastre Info): Appropriate Regional and Municipal offices

Contact (ICIS) BC Government Ministry of Sustainable Resource Management

Web: <http://srmwww.gov.bc.ca/bmgs/cbm/index.html>,

Or directly from the ICIS Web Site at: <http://www.icisociety.ca/index.jsp>.

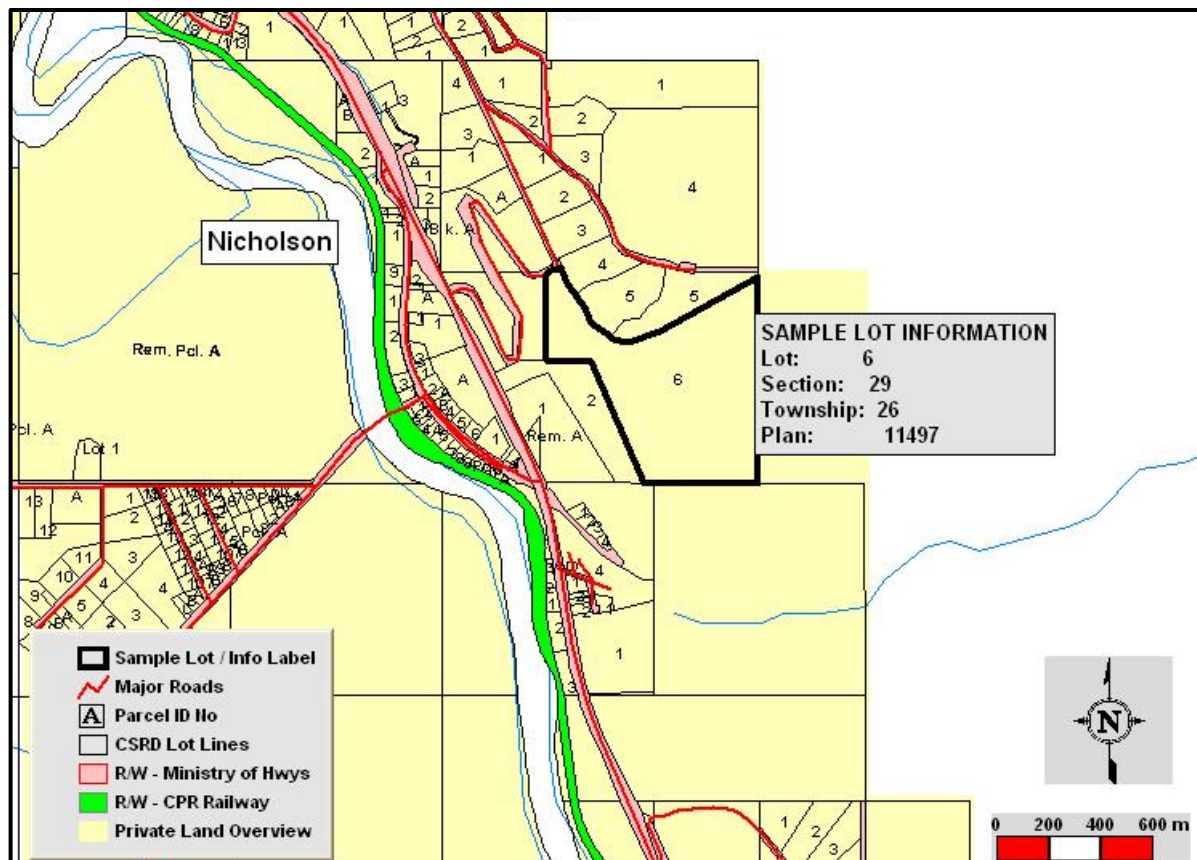


Figure 21. Regional District Cadastre and Ownership.

- **BC Assessment Authority Web Site:** <http://bcassessment.gov.bc.ca/index.html>

2.4.3 Administrative Boundaries

Activities in the vicinity of the upper Columbia River project area are guided and managed through any number of agencies according to their jurisdiction. The **Ministry of Water, Land and Air Protection** is responsible for the entire CWWMA through their Kootenay office(s), while forest management on Crown Lands is divided between two Forest Districts. The **Columbia Forest District** manages that part of the area running from Donald in the north to approximately Carbonate Creek in the south, where the **Rocky Mountain Forest District** begins and includes the remainder of the wetlands and adjacent areas south to Canal Flats.

Regional District responsibilities are divided at the boundary between the **CSRD** and **RDEK** just north of Spillimacheen. In addition, forest management activities are the responsibility of TEMBECs Tree Farm License for the areas bordering the wetlands on the west between Spillimacheen and approx Carbonate Ck in the north.

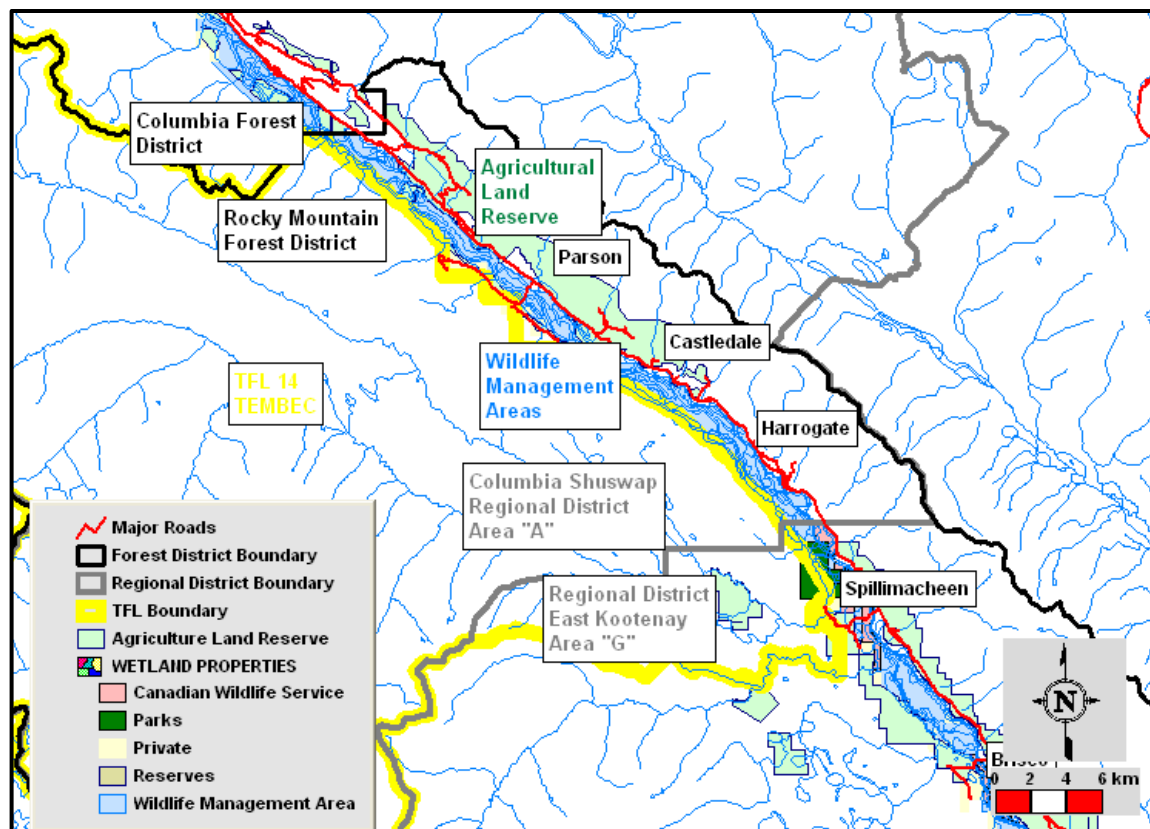


Figure 22. Administrative Boundaries

Located within the study area are also the incorporated communities of **Golden, Radium Hot Springs and Invermere**, with each municipality coordinating all aspects of residential, commercial, infrastructure and recreational development.

Lastly, the Federal **Canadian Coast Guard** is charged with administering boating regulations on the main channel of the Columbia River under the Navigable Waters Act.

2.4.4 Agricultural Land Reserve

The Agricultural Land Reserve (ALR) is a provincial zone in which agriculture is recognized as the priority use. Farming is encouraged and non-agricultural uses are controlled. It includes private and public lands that may be farmed, forested or vacant land.

The ALR takes precedence over, but does not replace other legislation and bylaws that may apply to the land. Local and regional governments, as well as other provincial agencies, are expected to plan in accordance with the provincial policy of preserving agricultural land.

Contact: Provincial Agricultural Land Commission

Web: <http://www.landcommission.gov.bc.ca/>

Note: Due to the numerous applications and reviews completed every year for designated lands to be removed from the ALR, data currency is an issue when referring to a specific dataset.

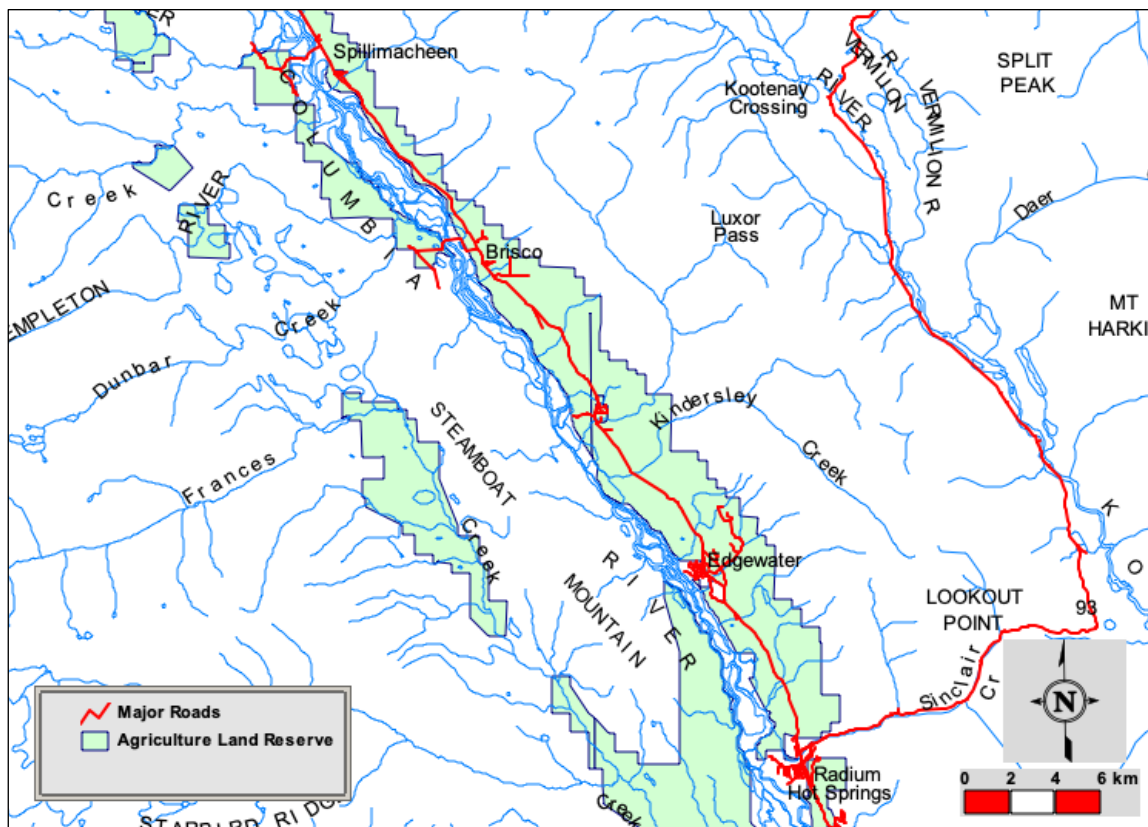


Figure 23. Agricultural Land Reserve

Additional information on land use, crown land tenures and purchases, and zoning may be found through:

- Land & Water BC at: <http://www.lwbc.bc.ca/> ; or
- Local Municipal Offices