

**FINAL REPORT**

**PHASE I  
ENVIRONMENTAL SITE ASSESSMENT**

**HAMILTON CREEK IR #7,  
Lower Nicola Indian Band  
Merritt, British Columbia**

*Prepared for*

**Lower Nicola Indian Band**  
181 Nawishaskin Lane  
Merritt, B.C. V1K 0A7

*Submitted by*

**Columbia Environmental Consulting Ltd.**  
RR#2, Site 55, Compartment 10  
Penticton, BC. V2A 6J7

**Project No: 10-0374**  
April, 2011





RR#2, Site 55, Compartment 10  
Penticton, BC. V2A 6J7

April 30, 2011

**Lower Nicola Indian Band**  
181 Nawishaskin Lane  
Merritt, B.C. V1K 0A7

**Attention: John Keating and Sharon Parsons, LNIB Lands and Leasing Office**

**Subject: Final Phase I Environmental Site Assessment (ESA) of the Hamilton Creek  
IR #7, Lower Nicola Indian Band, Merritt, BC.**

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We trust that this report meets your present needs. One hard copy of the final report and a CD-ROM including the source files and an Adobe pdf version have been provided. Please do not hesitate to call if you have any questions or comments, or if you require anything further.

Yours truly,

**Columbia Environmental Consulting Ltd.**

Per: 

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Dwight Shanner, R.P.Bio  
Project Manager

## EXECUTIVE SUMMARY

Columbia Environmental Consulting Ltd. (Columbia) was contracted by the Lower Nicola Indian Band (LNIB) on behalf of Indian and Northern Affairs Canada (INAC) to conduct a Phase I Environmental Site Assessment (ESA) of the Hamilton Indian Reserve #7, herein referred to as the “Site”.

The first step in site characterization is to conduct a Phase I ESA. During this phase, information is gathered about site layout and previous activities and/or operations that may have caused contamination at the Site.

The Phase I ESA consisted of the following:

- records review;
- interviews with regulatory officials and personnel knowledgeable about the Site;
- site reconnaissance; and
- information evaluation and preparation of the report provided herein.

The Phase I ESA was conducted as per the requirements of the CSA document *Z768-01 Phase I Environmental Site Assessment, April 2003*. The Phase 1 ESA focused on preliminary areas of interest identified through historical document review, and interviews. In general, all residential structures were excluded unless information was gathered to suggest contamination or external visual observations indicated potential contamination. Specific residential structures listed for inspection at the request of the First Nation or INAC require the permission from the First Nation and the Certificate of Possession holder.

Hamilton Creek IR#7 is an irregular shape (roughly rectangular) and is 4400 acres in size and located 17 km east of Merritt, BC. Coordinates for the Site are zone 10 675263E, 5553074N on NTS map sheet 092I02. The reserve includes a Cabin (with wood heating and no utilities) and outhouse, and cattle range the current land use categorized as wild lands and agricultural. The Cabin is a non-permanent residence with a propane tank utilized for cooking fuel.

Interviewees included elders, the lands department, and the residents from the LNIB familiar with the reserve. Interviews with LNIB members had no concerns. No commercial development is on the reserve and therefore there were no environmental concerns.

No on-site APECs were identified during this investigation. No further environmental assessment is recommended for the Site at this time.

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## **1.0 INTRODUCTION**

Columbia Environmental Consulting Ltd. (Columbia) was contracted by the Lower Nicola Indian Band (LNIB) on behalf of Indian and Northern Affairs Canada (INAC) to conduct a Phase I Environmental Site Assessment (ESA) of the Hamilton Creek Indian Reserve #7, herein referred to as the “Site”.

The Site is located on Mill Creek road, approximately 17 km east of Merritt B.C., on 1:50,000 NTS mapsheet 092I02. The Site’s geographic position relative to the surrounding features is shown on Figures 1 and 2 included in Appendix A.

The Phase I ESA follows procedures outlined in the Canadian Standards Association (CSA) document *Z768-01 Phase I Environmental Site Assessment, April 2003*. This report will be used in making decisions concerning whether further investigation is necessary. John Keating and Sharon Parsons (LNIB Lands and Leasing Office) provided written authorization for the project.

### **1.1 OBJECTIVE**

The objective of this Phase I ESA is to identify and document any actual or potential human health or environmental risks associated with the Site and provide recommendations for further assessment and/or risk management. The “Areas of Potential Environmental Concern” (APECs), with their associated “Contaminants of Potential Concern” (COPC), and the person or agencies that may be responsible for causing the contamination define these risks.

### **1.2 SITE BACKGROUND**

The Hamilton IR#7 is comprised of approximately 4400 acres on one reserve. The reserve is irregular but approximately rectangular in shape, and is located approximately 17 km east of Merritt B.C. Coordinates for this Site area are 10 675263E, 5553074N. The Site, at the time of the report, contained one active farm residence that has barns, outbuildings, range land, and crop fields.

## **2.0 SCOPE OF WORK**

The first step in site characterization is to conduct a Phase I ESA. During this phase, information is gathered about site layout and previous activities and/or operations which may have caused contamination at the Site.

The Phase I ESA consisted of the following:

- records review;
- interviews with regulatory officials and personnel knowledgeable about the Site;
- site reconnaissance; and
- information evaluation and preparation of the report provided herein.

The Phase I ESA was conducted as per the requirements of the CSA document *Z768-01 Phase I Environmental Site Assessment, April 2003*.

The Phase 1 ESA focused on preliminary areas of interest identified through historical document review, and interviews. In general, all residential structures were excluded unless information was gathered to suggest contamination or external visual observations indicated potential contamination. Specific residential structures listed for inspection at the request of the First Nation or INAC require the permission from the First Nation and the Certificate of Possession holder.

### **3.0 METHODOLOGY**

#### **3.1 RECORDS REVIEW**

Records included a search for previous environmental reports, historical aerial photographs, city directories, fire insurance maps, federal and provincial agency review, Lower Nicola Indian Band records, and regional district records. The applicable search distance for the records review included the property, properties immediately adjacent to the Site, and other properties (as identified by aerial photographs, etc.) where the potential for environmental contamination to impact the Site was apparent (i.e. petroleum product storage in the immediate area). A reference of personal communications is included at the end of this report in Section 11.

#### **3.2 INTERVIEWS**

Interviews with persons knowledgeable about the Site were carried out to obtain or confirm information on the environmental characteristics of the property and historical use. Information provided by interviewees is detailed in Section 5, and included throughout the report. Dwight Shanner and Carmen Marshall from Columbia Environmental conducted the interviews on September 14, 2010.

#### **3.3 SITE VISIT**

A site visit was not conducted at this reserve as it was not deemed warranted by the assessor given the undeveloped nature of the Site and the absence of environmental concerns identified during the records review and interviews.

### **4.0 HISTORICAL RECORDS REVIEW**

#### **4.1 RECORDS REVIEW**

An outline of the history of land use on the subject property and adjacent properties was compiled through the review of the variety of information sources. These typically include historical records and a review of files retained by regulatory agencies, however; the following standard sources of information were not available:

- Fire insurance drawings;
- City/Business directories; and
- Historical Title search.

For the historical uses of the property, aerial photographs dating back to 1948, interviews, web searches, LNIB archives, and previous reports supplied by INAC were reviewed. A list of sources and references for the records review is provided in Section 11. The BC online Site Registry search results can be found in Appendix B. Correspondence can be found in Appendix C and examples of historical aerial photographs can be found in Appendix D. A list of Species at Risk potentially in the Site area can be found in Appendix E.

#### 4.1.1 REVIEW OF AERIAL PHOTOGRAPHS

Aerial photographs dated 1948, 1960, 1966, 1972, 1974, 1980 and 1991 from the University of British Columbia’s Geographic Information Centre (UBC GIC) were reviewed for information about land use at the subject property and adjacent lands. Copies of representative aerial photographs are included in Appendix D. Site details from the aerial photograph interpretation is briefly described below in the following table:

**Table A. Air Photo Review Summary**

<b>Aerial photo Year</b>	<b>Description</b>
<b>1948</b>	<i>Subject Property:</i> Quilchena Creek runs from south to the north through the reserve. No visible signs of development on the reserve. Nicola Lake is situated approximately 5 km meters north of the reserve.
	<i>Adjacent Lands:</i> Adjacent lands are undeveloped.
<b>1960</b>	<i>Subject Property:</i> No visible changes are noted.
	<i>Adjacent Lands:</i> No visible changes are noted.
<b>1966</b>	<i>Subject Property:</i> No visible changes are noted.
	<i>Adjacent Lands:</i> No visible changes are noted.
<b>1972</b>	<i>Subject Property:</i> No visible changes are noted.
	<i>Adjacent Lands:</i> Cleared vegetation for a transmission line is visible northwest of the reserve. Agricultural usage of land is visible at the outlet of Nicola Lake.
<b>1974</b>	<i>Subject Property:</i> No visible changes are noted.
	<i>Adjacent Lands:</i> Highway 5 (Coquihalla) southbound is visible approximately 14.0 km west of the reserve. Logging is visible in surrounding lands.



<b>Aerial photo Year</b>	<b>Description</b>
<b>1980</b>	<i>Subject Property:</i> No visible changes are noted.
	<i>Adjacent Lands:</i> Logging is visible in surrounding lands.
<b>1991</b>	<i>Subject Property:</i> No visible changes are noted.
	<i>Adjacent Lands:</i> Logging is visible in surrounding lands. Highway 97C (Princeton-Kamloops Highway) is present 5 km south of the reserve.

#### **4.1.2 CITY DIRECTORIES**

The Merritt Public Library was contacted in regards to any historical directories. City/Business directories were not available for the reserve.

#### **4.1.3 MERRIT FIRE DEPARTMENT**

The Merritt Fire Department was contacted regarding any historical information. No fire records were obtained pertaining to Hamilton Creek IR#7.

#### **4.1.4 HISTORICAL TITLE SEARCH**

A historical title search was not considered relevant for this project, as the subject property has remained in the authority of the federal government since its inception as a reserve.

### **4.2 AGENCY REVIEW**

Columbia contacted federal, provincial, regional, and municipal agencies to identify actual or potential environmental contamination issues on or near the subject Site. The following sections of the report present the findings of the regulatory review conducted for the subject property.

#### **4.2.1 LOWER NICOLA INDIAN BAND**

The one residence on the Site is wood heated with no utility services. Therefore no utilities maps have been created for the Site.

#### **4.2.2 FEDERAL GOVERNMENT**

The INAC Environmental Management System database, IEMS (formerly ESSIMS), had no records for the Site.

### **4.2.3 MINISTRY OF TOURISM**

The Ministry of Tourism's Archeology branch was contacted regarding any records that may exist for the Site. No records were found for the Site, however two records were identified, located off-site north of the reserve. There is no archeological overview data available for the area at this time.

### **4.2.4 BC MINISTRY OF ENVIRONMENT – SITE REGISTRY**

The contaminated sites provisions under the *Environmental Management Act* (Formerly the *Waste Management Act*) and *Contaminated Sites Regulations*, effective April 1997, require the Province to provide public information about site investigations and cleanups. The Site Registry has been established to meet this requirement. The Site Registry documents milestones in the site assessment process and provides public access to this information. It contains information regarding which sites have been investigated and/or remediated since MoE began recording this activity. The Site Registry is not a registry of only contaminated sites; it also includes sites for which a Site Profile has been submitted.

The online version of the Site Registry database searches for records of sites within a 5 kilometer radius of the subject property. The Site Registry has been collecting data only since its inception in April 1997, and not all sites of known or potential contamination within the search area may have been captured. Therefore, the searches cannot be considered a definitive method of identifying all sites of potential contamination within the search area. The Site Registry search results are presented in Appendix B and are summarized below:

#### **Subject Property**

According to the BC Online search there were no records in the Site Registry for the subject property.

#### **Adjacent Properties**

According to the BC Online search there were no records in the Site Registry for the adjacent properties when a 5 km radius search was completed using the center of the reserve as the search center.

### **4.2.5 CITY OF MERRITT**

Sean O'Flaherty of the City of Merritt was contacted requesting any information regarding environmental or contamination issues or building permits for the lands of LNIB. The City has no records regarding the subject property and adjacent lands, and do not maintain any such records for facilities operating on Reserve Lands.

### **4.2.6 MERRITT MUSEUM & ARCHIVES**

The Museum of Merritt was contacted via phone. The Museum did a search within LNIB lands, with no records found for the Hamilton Creek IR# 7.

#### 4.2.7 THE THOMPSON NICOLA REGIONAL DISTRICT

Peter Hughs of the environmental department of the Thompson Nicola Regional District (TNRD) was contacted requesting any information regarding environmental issues on or near LNIB lands. Mr. Hughs stated that the district has no records regarding the subject property and do not maintain any such records for facilities operating on reserve lands.

#### 4.2.8 TERASEN (FORMERLY BC GAS)

Toni Melliere of Terasen Gas was contacted regarding service connections to the subject property including any current or historical issues that are likely to have resulted in environmental impacts on the Site. Terasen has no record of environmental issues that may have occurred on the subject property or adjacent properties. Terasen does not keep records pertaining to service initiations and decommissions as a standard company policy.

#### 4.2.9 FORTIS BC (FORMERLY BC HYDRO)

Louise Ouelett of Transmission Distribution and Environment at Fortis BC was contacted regarding the presence of service connections to the subject property including any current or historical issues that are likely to have resulted in environmental impacts on the Site. Fortis has no record of environmental issues or transformer locations (possibly containing PCBs) that may have occurred on the subject property or adjacent properties.

#### 4.3 PREVIOUS ENVIRONMENTAL INVESTIGATIONS

No previous environmental investigation reports were identified for the Site.

#### 4.4 INTERVIEWS

Interviewees included: Marvin Shuter, Willie Basil Francis Shuter, Delia Shuter, Ira Sterling, Maggie Shuter, Harold Joe, Gloria and Geoff Sam. Interviews with LNIB members identified the following concerns:

**Table B. Summary of Information Obtained from Interviewees**

Area of Concern	Location	Description
Hamilton Creek #7	East of Highway 5 South of Nicola Lake	No permanent housing. Poor roads. Gloria and Geoff Sam have a house and information on the Reserve. House is a cabin with barns and outbuildings. No environmental concerns were noted.

## **5.0 SITE DESCRIPTION**

### **5.1 GENERAL PROPERTY DESCRIPTION**

The Lower Nicola Indian Band is comprised of ten reserves that total 17,500 acres. Nine reserves are located within the Merritt area and the most northern parcel (Hihium IR #6) is located approximately 65 km northwest of the city of Kamloops B.C.

Hamilton Creek IR#7 is an irregular shape (roughly rectangular) and is 4400 acres in size and located 17 km east of Merritt, BC. Coordinates for the Site are zone 10 675263E, 5553074N on NTS map sheet 092I02. The reserve includes a Cabin (with wood heating and no utilities) and outhouse, and cattle range the current land use categorized as wild lands and agricultural. The Cabin is a non-permanent residence with a propane tank utilized for cooking fuel.

### **5.2 TOPOGRAPHY**

LNIB Hamilton Creek IR#7 is located on the west bank of the Quilchena Creek valley. Most of the reserve is situated on the north south trending river valley wall that is sloped down to the east and is part of Mount Nicola. Quilchena Creek flows from the south toward the northern boundary of the reserve, along the eastern edge of the Site. Teenamilsts Creek flows from the west down gradient and east into Quilchena Creek along the northern portion of the Reserve. The Site is located approximately 900m above sea level with 300 m of relief ranging from 1000m on the western border of the reserve to 700m along the Quilchena Creek bed in the northeast portion of the reserve.

### **5.3 GEOLOGY**

The local geology within the Hamilton Creek IR#7 is comprised of three north south trending belts. The westernmost belt and top of valley bank is composed of the Nicola Group – Central Volcanic Facies in the intermontana belt. The formation is part of the Quesnel Terrane, and is comprised of andesitic volcanic rocks and dioritic intrusive rocks including intermediate pyroclastics and local pillowed and plagioclase porphyry flows, and diorite, quartz diorite, and gabbro. The central belt (Quilchena valley Wall) is part of an unnamed formation of alkaline volcanic rocks. The formation is in the intermontana belt, and is a younger volcanic terrane with rock types including alkali olivine basalt flows, hyaloclastite, and breccia. The easternmost belt (Quilchena Creek bed) is part of the Princeton Group formation, comprised of undivided sedimentary rocks including sandstone, conglomerate, argillite, and coal (including the Coldwater beds, and Allenby formation). The Princeton Group is an Overlap Terrane in the intermontana belt (Ministry of Energy, Mines, & Resources, 2011).

Bedrock throughout the reserve is covered with a till blanket of varying thickness made up of primarily unconsolidated compositions of silts, sands, gravels, and cobbles. Soils throughout the Site generally consists of dark brown chernozems, typical of southern interior grasslands or grey luvisols, typical of the grassland-forest transition zone (Ministry of Energy, Mines, & Resources, 2011).

## 5.4 SURFACE DRAINAGE

Surface drainage at the Site is anticipated to be primarily infiltration into the underlying soils. Surface runoff is anticipated to flow down gradient from the west to the east, toward and into Quilchena Creek, which drains into Nicola Lake to the North.

## 5.5 CLIMATE DATA

The tables below provide climate values and monthly precipitation values as collected at Merritt B.C. Metrological Station, based on data from 1971 to 2000<sup>1</sup>. The average annual precipitation is 322.2 mm.

**Table C. Climate Values for 1971-2000**

Meteorological Station Elevation:	609.0m
Daily Mean Temperature:	7.4°C
Annual Rainfall:	238.9mm
Annual Precipitation:	322.2mm
Highest Monthly Average Precipitation:	Dec, 39.6mm
Lowest Monthly Average Precipitation:	April, 14.5mm

**Table D. Precipitation Monthly Values for 1971-2000**

Month	Average Precipitation (mm)	Month	Average Precipitation (mm)	Month	Average Precipitation (mm)
January	37.2	May	26.8	September	23.6
February	23.6	June	34.1	October	23.5
March	16.6	July	25.8	November	34.7
April	14.5	August	22.1	December	36.9

## 5.6 UTILITIES

No utilities such as septic services, underground water or overhead electrical power are reported at the Site.

## 5.7 ADJACENT PROPERTIES

The adjacent lands surrounding the Site remain in an undeveloped state. Two power transmission lines are located adjacent to the northwest corner of the Site, and one single power

<sup>1</sup> [www.climate.weatheroffice.ec.gc.ca](http://www.climate.weatheroffice.ec.gc.ca)

transmission line is located to the east of the Site. The Princeton Kamloops Highway is located 14 km west and Highway 97C is located 5 km south of the Site.

## **5.8 VALUED ECOSYSTEM COMPONENTS (VECs)**

The Site is located on the floodplain of Quilchena Creek, in Bunchgrass and Interior Douglas Fir (IDF) biogeoclimatic zones south of Nicola Lake. Representative trees in this ecosystem include Douglas fir, trembling aspen, lodgepole pine, ponderosa pine, hybrid spruce, Rocky Mountain juniper. Shrubs for the area include species such as snowberry, common juniper, Saskatoon, Kinnikinnik, red osier dogwood, black gooseberry, prickly rose and false box. Herbs common to the area include bluebunch wheatgrass, pinegrass, wheatflower, bunchberry, yarrow, sedges (spp) and spike rushes to name a few (Ministry of Forests 1991).

A list of species from the BC Conservation Data Center (CDC) search, indicating species found within the area has been included in Appendix E. Characteristic wildlife in the region (CDC) include, but is not limited to, moose, mule deer, black bear, cougar, elk, grizzly, eagle, big horn sheep, badger, coyote, wolf, marmot, raven, spruce grouse, and various waterfowl.

A number of species potentially on the Site are considered Species at Risk by COSEWIC<sup>2</sup> and receive special protection for critical habitats. Provincially, red listed (being considered for designation as threatened or endangered) or blue listed (considered vulnerable) species, by the BC Ministry of the Environment, means that they require special management attention. The semi-pristine natural lands within the area of the Site are favorable for Species at Risk Act (SARA) listed species habitat. A biological inventory would be required to further investigate the potential presence of Species at Risk.

## **5.9 WATER WELLS**

The BC MoE water well database<sup>3</sup> was searched in a 5 km radius from the center of the Site. No wells were identified within the 5km radius. Two (2) off-site down gradient wells were identified 8km to the north of the Site near Nicola Lake, with usage identified as unknown and private domestic and belonging to Sage Brush Golf and Sports located on Quilchena Creek Road.

## **5.10 HISTORICAL LAND USE**

Hamilton Creek IR#7 historically has been utilized as wild lands and a cattle range. Hunting, fishing and gathering were, and are, traditional uses of the Reserve land. The adjacent lands are utilized for logging and transportation on Highway 5 and 97C.

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<sup>2</sup> COSEWIC means the Committee on the Status of Endangered Wildlife in Canada

<sup>3</sup> Ministry of Environment. 2010. Water Resource Atlas Web Mapping Application [http://www.env.gov.bc.ca/wsd/data\\_searches/wrbc/index.html](http://www.env.gov.bc.ca/wsd/data_searches/wrbc/index.html)

## 5.11 REGULATORY HISTORY

No previous notations from regulatory agencies were identified for the subject property.

## 6.0 FINDINGS

### 6.1 FUEL / CHEMICAL HANDLING AND STORAGE

The residents informed Columbia through a phone conversation that a propane tank is on the Site. Details regarding the tank are in the following table.

**Table E. Summary of Fuel Storage Tanks**

#	Location (Site ID)	Capacity	Contents	Active	Condition
1	Propane Tank-Hamilton IR #7	100 lb	Propane	Yes	In good condition based on owners assurance and used for cooking

### 6.2 SOLID WASTE MATERIALS

There is no municipal method of solid waste disposal for the Site. The on-site residence reportedly removed the solid waste generated.

### 6.3 SPILLS AND STAIN AREAS

No surface stains or debris were identified by the cabin owner or those interviewed regarding the site condition.

### 6.4 WASTEWATER DISCHARGE

No concerns with regard to wastewater discharge were identified during the records review process or conversation with the resident. The residence has an outhouse for septic.

### 6.5 AIR DISCHARGES

No concerns with regard to air quality discharge were identified during this investigation.

### 6.6 POLYCHLORINATED BIPHENYLS (PCB)

There were no records of PCB containing transformers or capacitors on the Site. No environmental concerns regarding PCBs were suspected during this investigation.

## **6.7 ASBESTOS**

The use of friable asbestos as a building material was banned in the U.S. in the mid 1970s. The manufacture of building materials containing asbestos was generally phased out in North America by the mid 1980s. The on-site cabin was built sixty (60) years ago and insulation was installed in the ceiling in 1972 (per. comm. with resident). The potential for asbestos is possible considering the age of the buildings. Hazardous building materials inspections were not within our scope of work and the cabin is still in use as a private residence.

## **6.8 HEAVY METALS**

There were no sources of potential metals impacts identified.

## **6.9 OZONE DEPLETING SUBSTANCES (ODS)**

No environmental concerns relative to ODS were identified.

## **6.10 NOISE**

No environmental issues concerning noise were identified during this investigation.

## **7.0 AREAS OF POTENTIAL ENVIRONMENTAL CONCERN**

No on-site or off-site APECs were identified during this investigation.

## **8.0 RECOMMENDATIONS**

No further environmental assessment is recommended for the Site at this time.



## 9.0 REPORT USE AND LIMITATIONS

This Phase I ESA report has been prepared for the exclusive use of Indian and Northern Affairs Canada (INAC) and the LNIB, and it is intended to provide the client with an understanding of the potential for environmental contamination by hazardous materials at the property assessed. The scope of services performed in execution of this investigation may not be appropriate to satisfy the needs of other users, and any use or re-use of this document or the findings, conclusions, or recommendations presented herein is at the sole risk of said user. The findings and recommendations in this report are based upon data and information obtained during site visits by Columbia and INAC personnel to the Site identified herein and the condition of the Site on the dates of such visits, supplemented by information and data obtained by Columbia described herein.

The findings and recommendations contained in this report are based on the expertise and experience of Columbia in conducting similar site assessments. In assessing the Site, Columbia has also relied upon representations and information furnished by individuals noted in the report with respect to existing operations and property conditions and the historical uses of the properties to the extent that the information obtained has not been contradicted by data obtained from other sources. Accordingly, Columbia accepts no responsibility for any deficiency, misstatements or inaccuracy contained in this report as a result of misstatements, omissions, misrepresentations or fraudulent information provided by others.

It should be recognized that this study was not intended to be a definitive investigation of contamination at the Site. Given that the limited scope of services for this assessment as stated in the Terms of Reference for the Phase I ESA, it is possible that currently unrecognized contamination may exist at the Site and, if present, that the levels of contamination may vary across the Site. Opinions and recommendations presented herein apply to site conditions existing at the time of our assessment and those reasonably foreseeable. Should environmentally significant changes to the Site or additional information become available, Columbia should be provided the opportunity to review this information/data and amend our opinions, as appropriate. Fungi, mycotoxins, bioaerosols and other indoor air quality issues were not included in the scope of work.

Columbia's objective is to perform our work with care, exercising the customary thoroughness and competence of earth science, environmental, and engineering consulting professionals, in accordance with the standard for professional services at the time and location those services are rendered. It is important to recognize that even the most comprehensive scope of services may fail to detect environmental liability on a particular site. Therefore, Columbia cannot act as insurers and cannot "certify" or "underwrite" that a site is free of environmental contamination, and no expressed or implied representation or warranty is included or intended in our reports, except that our work was performed, within the limits prescribed by our client, with the customary thoroughness and competence of our profession.

## 10.0 PROFESSIONAL STATEMENT

The information compiled for this document has been prepared in accordance with the requirements of the INAC Scope of Work.

Columbia certifies that the persons signing this document have demonstrable experience in the assessment of commercial and industrial sites. The work has been performed by Columbia staff under the guidance and supervision of the signatories below.

Report prepared by:

**COLUMBIA ENVIRONMENTAL CONSULTING LTD.**

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### **Personal Communications**

Bob Alexanruck. Division Manager. Ministry of Transportation. Merritt B.C. Regarding Diesel spill and gravel pit on Highway 5.

Gloria and Geoff Sam. Resident of Hamilton IR #7. Regarding the structures onsite and the land use.

Louise Ouelett. Environmental and Transmission and Distribution Department. Fortis BC. Vancouver B.C. Regarding records and locations of transformers and service dates.

Peter Hughs. Director of Environmental Services. Thompson Nicola Regional District. Regarding Environmental Records.

Sean O'Flaherty. Development Services Officer. City of Merritt. Merritt B.C. Regarding building permits on reserve or environmental issues.

Toni Melliere. Environmental Division. Terasen Gas. Vancouver B.C. Requesting Environmental records and service dates for LNIB.

**APPENDIX A**

**FIGURES**



LEGEND

RESERVE FOOTPRINT

NOTES:

Airphoto taken from Google Earth, December 2010

No.	Revision/Issue	Date



Figure 1  
Site Location

LNIB / INAC  
Phase I  
Environmental Site Assessment  
Hamilton Creek IR #7

Project	10-0374	Sheet
Date	January, 2011	
Drawn By:	SZ	Checked By:
		DS/DD



**LEGEND**

— RESERVE BOUNDARY

**NOTES:**

All elevations in metres (m)

Locations of site features were taken from:

1. Aerial photographs
2. GPS data points, and
3. Visual observations / adjustments of GPS waypoints and site features

No.	Revision/Issue	Date



**Figure 2  
Site Plan**

LNIB / INAC  
Phase I  
Environmental Site Assessment  
Hamilton Creek IR#7

<b>Project</b>	10-0374	<b>Sheet</b>
<b>Date</b>	January, 2011	
<b>Drawn By:</b>	<b>Checked By:</b>	
SZ	DS/DD	

**APPENDIX B**

**BC ONLINE SITE REGISTRY RESULTS**



## Site Registry

## Nil Search

For: [ PA95213 ] [ COLUMBIA ENVIRONMENTAL CONSULTING LTD ]

Jan 04, 2011

As Of: JAN 02, 2011

Check for Prints

04:35:59 PM

Main Menu

Return

Print

Help ?

Folio:

## Area Nil Search

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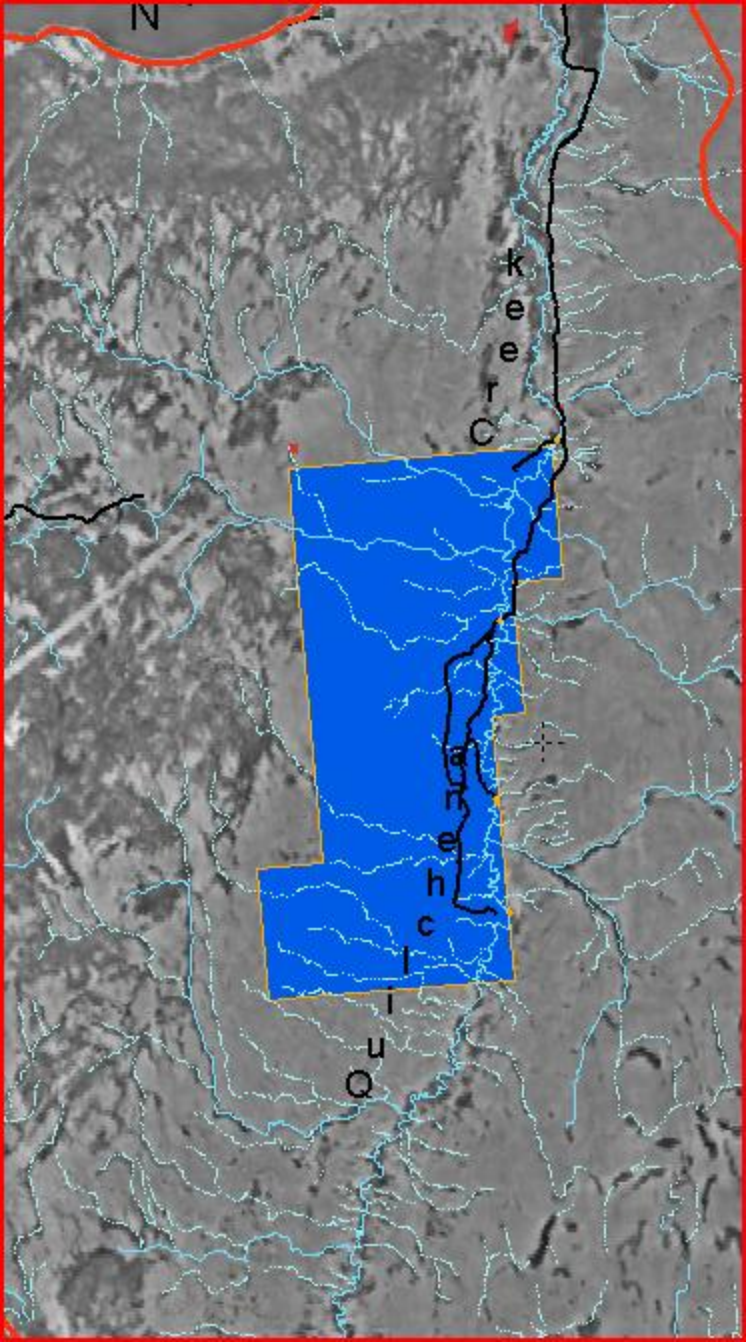
As of JAN 02, 2011, no records from Site Registry fall within 5.0 kilometers of coordinates Latitude 50 degrees, 04 minutes, 20.7 seconds, and Longitude 120 degrees, 32 minutes, 06 seconds.

You have been charged for this information.

Sites may be revealed by searching with alternate search methods. For example, a site not revealed in an Area search may be revealed by searching with another piece of information such as PID, PIN, Address or Crown Lands File Number.

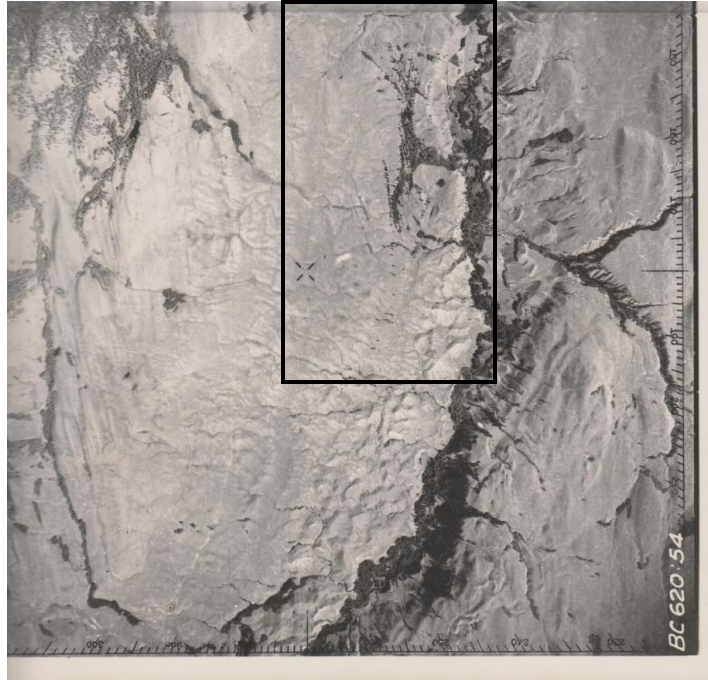
**APPENDIX C**  
**CORRESPONDENCE**

Hamilton IR #7 (Center 676511.03 5549605.09) – no sites within the IR boundaries but two just to the north. No AOA potential data for the area.

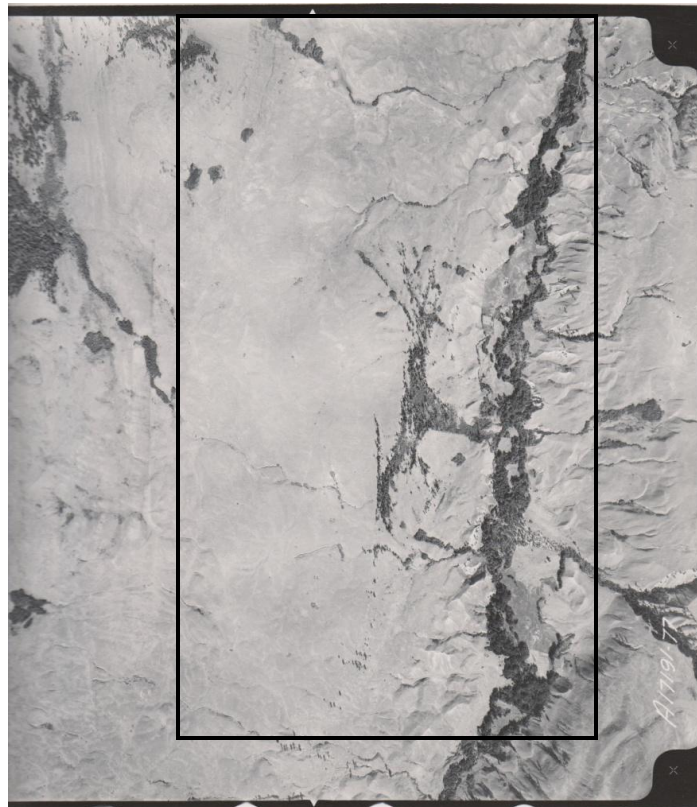


**APPENDIX D**

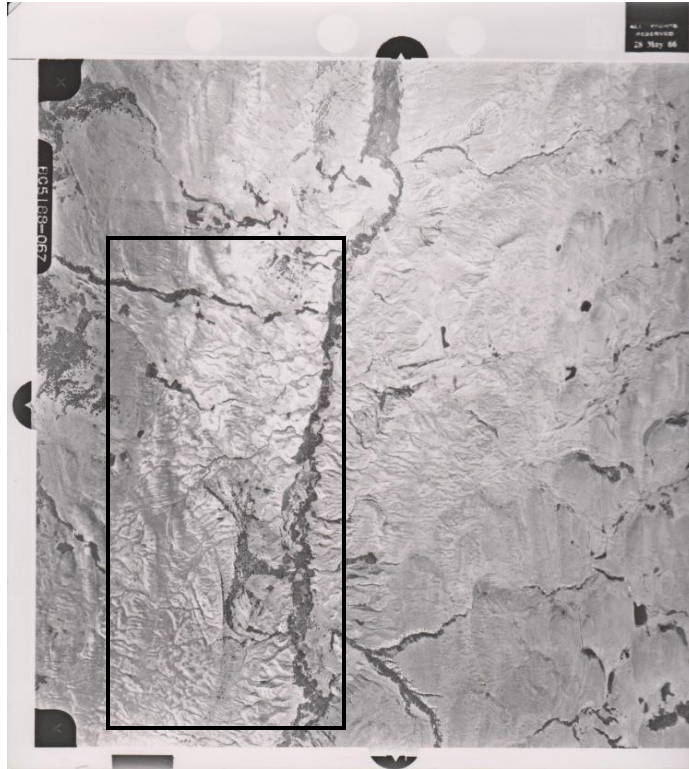
**AERIAL PHOTOGRAPHS**



**Photograph 1.** 1948 Aerial Photograph BC 620-54 001



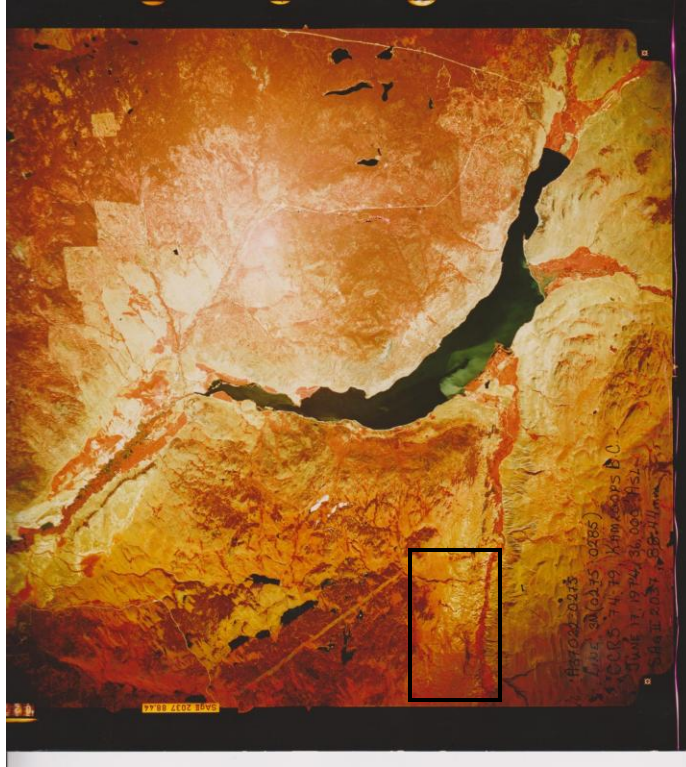
**Photograph 2.** 1960 Aerial Photograph A17191-77 001



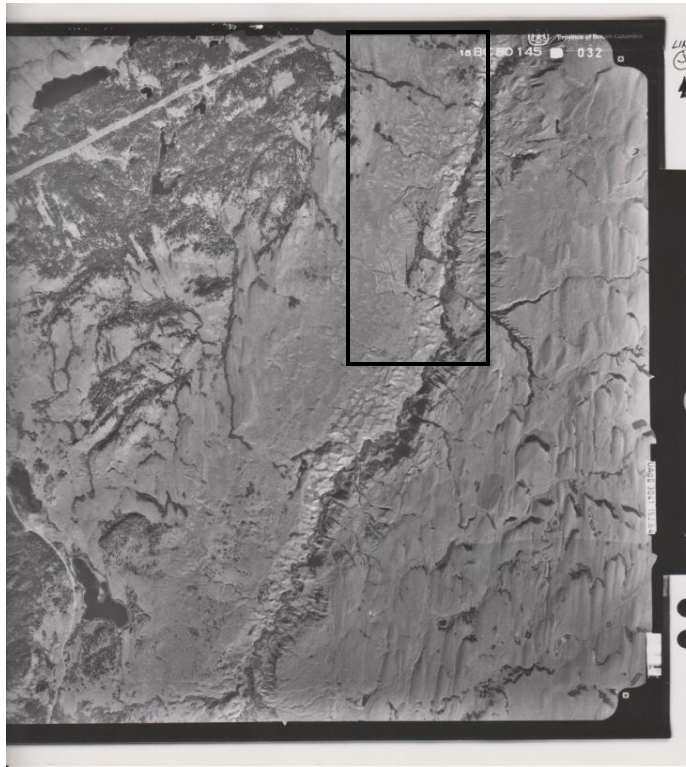
**Photograph 3.** 1966 Aerial Photograph BC5186-67 001



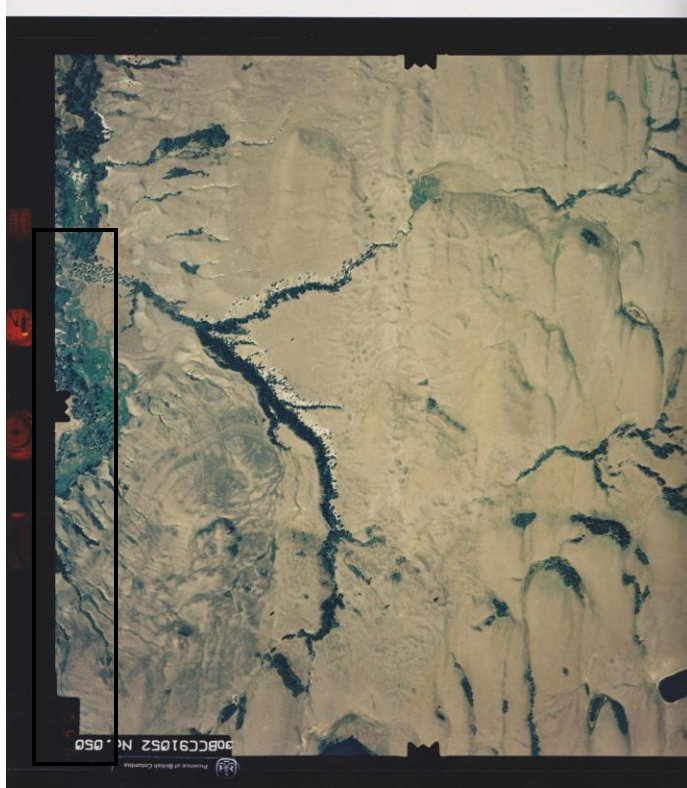
**Photograph 4.** 1972 Aerial Photograph ASA 30518-15 001



**Photograph 5.** 1974 Aerial Photograph A37022-0275



**Photograph 6.** 1980 Aerial Photograph 15BC 80145-32 001



**Photograph 6.** 1991 Aerial Photograph 30BCC91052-50 001



**APPENDIX E**  
**POTENTIAL SPECIES AT RISK**

**Table B: BC CDC Search Results for Species within the Bunchgrass Ecosystem (CDC, 2010)<sup>1</sup>**

Scientific Name	English Name	COSEWIC*	BC List**
<b>Amphibians</b>			
<i>Spea intermontana</i>	Great Basin Spadefoot	T (Apr 2007)	Blue
<i>Chrysemys picta pop. 2</i>	Western Painted Turtle - Intermountain - Rocky Mountain Population	SC (Apr 2006)	Blue
<b>Fish</b>			
<i>Acrocheilus alutaceus</i>	Chiselmouth	NAR (May 2003)	Blue
<i>Catostomus platyrhynchus</i>	Mountain Sucker	NAR (May 1991)	Blue
<i>Salvelinus confluentus</i>	Bull Trout		Blue
<b>Reptiles</b>			
<i>Coluber constrictor</i>	Racer	SC (Nov 2004)	Blue
<i>Pituophis catenifer deserticola</i>	Gopher Snake, <i>deserticola</i> subspecies	T (May 2002)	Blue
<i>Crotalus oreganus</i>	Western Rattlesnake	T (May 2004)	Blue
<b>Birds</b>			
<i>Ardea herodias herodias</i>	Great Blue Heron, <i>herodias</i> subspecies		Blue
<i>Buteo swainsoni</i>	Swainson's Hawk		Red
<i>Falco mexicanus</i>	Prairie Falcon	NAR (May 1996)	Red
<i>Falco peregrinus anatum</i>	Peregrine Falcon, <i>anatum</i> subspecies	SC (Apr 2007)	Red
<i>Grus canadensis</i>	Sandhill Crane	NAR (May 1979)	Yellow
<i>Numenius americanus</i>	Long-billed Curlew	SC (Nov 2002)	Blue
<i>Asio flammeus</i>	Short-eared Owl	SC (Mar 2008)	Blue
<i>Athene cunicularia</i>	Burrowing Owl	E (Apr 2006)	Red
<i>Megascops kennicottii macfarlanei</i>	Western Screech-Owl, <i>macfarlanei</i> subspecies	E (May 2002)	Red
<i>Otus flammeolus</i>	Flammulated Owl	SC (Apr 2010)	Blue
<i>Melanerpes lewis</i>	Lewis's Woodpecker	T (Apr 2010)	Red
<i>Sphyrapicus thyroideus thyroideus</i>	Williamson's Sapsucker, <i>thyroideus</i> subspecies	E (May 2005)	Red

Scientific Name	English Name	COSEWIC*	BC List**
<i>Contopus cooperi</i>	Olive-sided Flycatcher	T (Nov 2007)	Blue
<i>Eremophila alpestris merrilli</i>	Horned Lark, <i>merrilli</i> subspecies		Blue
<i>Hirundo rustica</i>	Barn Swallow		Blue
<i>Catherpes mexicanus</i>	Canyon Wren	NAR (May 1992)	Blue
<i>Oreoscoptes montanus</i>	Sage Thrasher	E (Nov 2000)	Red
<i>Chondestes grammacus</i>	Lark Sparrow		Red
<i>Spizella breweri breweri</i>	Brewer's Sparrow, <i>breweri</i> subspecies		Red
<i>Dolichonyx oryzivorus</i>	Bobolink	T (Apr 2010)	Blue
<i>Euphagus carolinus</i>	Rusty Blackbird	SC (Apr 2006)	Blue
<b>Mammals</b>			
<i>Perognathus parvus</i>	Great Basin Pocket Mouse		Red
<i>Corynorhinus townsendii</i>	Townsend's Big-eared Bat		Blue
<i>Euderma maculatum</i>	Spotted Bat	SC (May 2004)	Blue
<i>Myotis ciliolabrum</i>	Western Small-footed Myotis		Blue
<i>Myotis thysanodes</i>	Fringed Myotis	DD (May 2004)	Blue
<i>Gulo gulo luscus</i>	Wolverine, <i>luscus</i> subspecies	SC (May 2003)	Blue
<i>Martes pennanti</i>	Fisher		Blue
<i>Taxidea taxus</i>	American Badger	E (May 2000)	Red
<i>Ursus arctos</i>	Grizzly Bear	SC (May 2002)	Blue
<i>Ovis canadensis</i>	Bighorn Sheep		Blue
<b>Invertebrates</b>			
<i>Stylurus olivaceus</i>	Olive Clubtail		Red
<i>Hesperia nevada</i>	Nevada Skipper		Blue
<i>Pholisora catullus</i>	Common Sootywing		Blue
<i>Satyrium californica</i>	California Hairstreak		Blue
<i>Danaus plexippus</i>	Monarch	SC (Apr 2010)	Blue
<i>Prometheus umbilicatellus</i>	Umbilicate Sprite		Blue
<i>Vallonia cyclophorella</i>	Silky Vallonia		Blue
<i>Hemphillia camelus</i>	Pale Jumping-slug		Blue
<b>Vascular Plants</b>			
<i>Azolla mexicana</i>	Mexican mosquito fern	T (Nov 2008)	Red

Scientific Name	English Name	COSEWIC*	BC List**
<i>Dryopteris cristata</i>	crested wood fern		Blue
<i>Ophioglossum pusillum</i>	northern adder's-tongue		Blue
<i>Agoseris lackschewitzii</i>	pink agoseris		Blue
<i>Arabis lignifera</i>	woody-branched rockcress		Blue
<i>Arabis sparsiflora</i>	sickle-pod rockcress		Red
<i>Astragalus lentiginosus</i>	freckled milk-vetch		Blue
<i>Atriplex argentea</i> ssp. <i>argentea</i>	silvery orache		Red
<i>Atriplex truncata</i>	wedgescale orache		Red
<i>Castilleja cusickii</i>	Cusick's paintbrush		Red
<i>Centaurium exaltatum</i>	western centaury		Red
<i>Chamaerhodos erecta</i> ssp. <i>nuttallii</i>	American chamaerhodos		Blue
<i>Chamaesyce serpyllifolia</i> ssp. <i>serpyllifolia</i>	thyme-leaved spurge		Blue
<i>Chenopodium atrovirens</i>	dark lamb's-quarters		Red
<i>Crepis atribarba</i> ssp. <i>atribarba</i>	slender hawksbeard		Red
<i>Crepis modocensis</i> ssp. <i>modocensis</i>	low hawksbeard		Red
<i>Crepis modocensis</i> ssp. <i>rostrata</i>	western low hawksbeard		Red
<i>Epilobium halleanum</i>	Hall's willowherb		Blue
<i>Gaura coccinea</i>	scarlet gaura		Red
<i>Gayophytum humile</i>	dwarf groundsmoke		Blue
<i>Hackelia diffusa</i>	spreading stickseed		Blue
<i>Hedeoma hispida</i>	mock-pennyroyal		Red
<i>Hutchinsia procumbens</i>	hutchinsia		Blue
<i>Hypericum scouleri</i> ssp. <i>nortoniae</i>	western St. John's-wort		Blue
<i>Iva axillaris</i>	poverty-weed		Red

Scientific Name	English Name	COSEWIC*	BC List**
<i>Leptosiphon septentrionalis</i>	northern linanthus		Blue
<i>Lupinus argenteus</i> var. <i>laxiflorus</i>	silvery lupine		Red
<i>Lupinus bingenensis</i> var. <i>subsaccatus</i>	Suksdorf's lupine		Red
<i>Mimulus breviflorus</i>	short-flowered monkey-flower		Red
<i>Myriophyllum ussuriense</i>	Ussurian water-milfoil		Blue
<i>Navarretia intertexta</i>	needle-leaved navarretia		Red
<i>Polygonum polygaloides</i> ssp. <i>kelloggii</i>	Kellogg's knotweed		Blue
<i>Pyrola elliptica</i>	white wintergreen		Blue
<i>Salix boothii</i>	Booth's willow		Blue
<i>Salix tweedyi</i>	Tweedy's willow		Blue
<i>Sidalcea oregana</i> var. <i>procera</i>	Oregon checker-mallow		Red
<i>Sphaeralcea coccinea</i>	scarlet globe-mallow		Red
<i>Allium geyeri</i> var. <i>tenerum</i>	Geyer's onion		Blue
<i>Carex hystericina</i>	porcupine sedge		Blue
<i>Carex sychnocephala</i>	many-headed sedge		Blue
<i>Cyperus squarrosus</i>	awned cyperus		Blue
<i>Epipactis gigantea</i>	giant helleborine	SC (May 1998)	Blue
<i>Hesperostipa spartea</i>	porcupinegrass		Red
<i>Juncus confusus</i>	Colorado rush		Red
<i>Melica spectabilis</i>	purple oniongrass		Blue
<i>Olsynium douglasii</i> var. <i>inflatum</i>	satinflower		Red
<i>Poa fendleriana</i> ssp. <i>fendleriana</i>	mutton grass		Red
<i>Sphenopholis obtusata</i>	prairie wedgegrass		Red
<i>Sporobolus compositus</i> var. <i>compositus</i>	rough dropseed		Blue

Scientific Name	English Name	COSEWIC*	BC List**
<i>Stuckenia vaginata</i>	sheathing pondweed		Blue
<b>Non Vascular Plants</b>			
<i>Bryoerythrophyllum columbianum</i>	Columbian carpet moss	SC (May 2004)	Blue
<i>Microbryum vlassovii</i>	nugget moss	E (Nov 2006)	Red
<i>Pterygoneurum kozlovii</i>	alkaline wing-nerved moss	T (Nov 2004)	Red

\* SC=Special Concern; T=Threatened; E=Endangered; XT=extirpated

\*\* Blue= of special concern, Red= extirpated, endangered or threatened in British Columbia