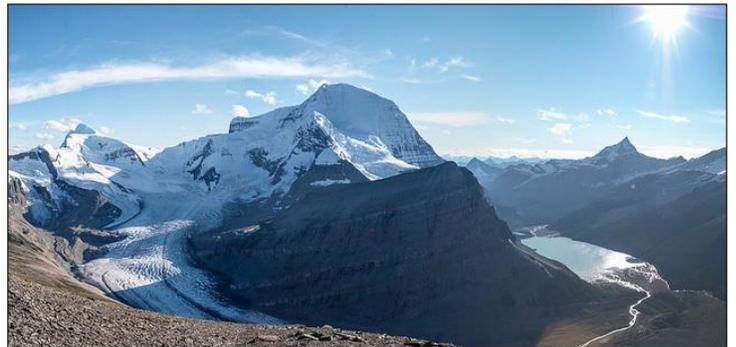


Interim report on classification categories for *Visualizing 100 years of landscape change in Mt. Robson Provincial Park*. Feb 16, 2018



Mt. Robson from Tatei Ridge by A. O. Wheeler, 1911.  
Historic images courtesy of Library and Archives Canada / Bibliothèque et Archives Canada  
and the Mountain Legacy Project



Mt. Robson from Tatei Ridge by the Mountain Legacy Project, 2011.

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<http://mountainlegacy.ca/>

<https://robsonlandscape.weebly.com>

## Classification categories

In October 2017 BC Parks, as part of the Living Lab Program, funded research with the Mountain Legacy Project (MLP) at UVic's School of Environmental Studies. The project, called "*Visualizing 100 years of landscape change in Mt. Robson Provincial Park*", was an opportunity to advance MLP's observation and analysis network into Mt. Robson Provincial Park. The goal of the research was to use historic images from the area, and their modern repeats, to begin building a better understanding of landscape level change in the Park.

Mountain Legacy has expertise in locating historical mountain images of amazing clarity and coverage. MLP teams then seek to determine the location the photos were taken from, go to the same place, and rephotograph the images as accurately as possible. MLP researchers then align and analyze the historic and modern images looking for change that will help reveal landscape-level dynamics.

One of the key components in landscape change analysis is selecting representative categories to describe the land cover shown in the image. A representative set of categories is produced and each aligned historic/modern image pair is segmented into these categories. Change in those classes as they are reflected in the pairs is then quantified and different visualizations of the changes are produced.

Selection of categories is an important part of the process – even though they, by necessity, are quite general categories, they must be related in some way to land cover classifications in use at BC Parks and/or Ministry of Environment and Climate Change Strategy (MECCS).

To this end MLP researcher Mary Sanseverino first contacted a number of scientists in several branches of Ministry of Environment and Climate Change Strategy to get a broad idea of the land cover classification schemes in use in BC.

Uptake on questions about coverage was quick and effective.

Deepa Filatow, a Provincial Bioterrain Specialist in the MECCS Knowledge Management Branch provided a great start. She suggested examining the following:

From email on January 19, 2018:

[http://a100.gov.bc.ca/appsdata/acat/documents/r40902/LANDCOVER\\_EOSD\\_legend\\_report-v2\\_1389718180168\\_9717533180.pdf](http://a100.gov.bc.ca/appsdata/acat/documents/r40902/LANDCOVER_EOSD_legend_report-v2_1389718180168_9717533180.pdf)

This report completed in 2003 has a review of the different land cover classification schemes at the time including BC, Federal and International Landover Classification.

The report includes several tables that provide crosswalks between the different classification schemes. It also highlights the pros and cons and the differences and similarities in the classes and criteria. Much of the information is still relevant to the classes used today.

Work being done by NRCAN at the North American scale is worth considering and how the classes used for the Parks study will relate to these Canada and North America wide inventories.

<http://www.nrcan.gc.ca/earth-sciences/land-surface-vegetation/land-cover/north-american-landcover/9146>

Graham Hawkins in the Forest Analysis and Inventory Branch of the Ministry of Forests Lands, Natural Resource Operations and Rural Development suggested beginning with the March 2002 BC Land Cover Classification Scheme:

[https://www.for.gov.bc.ca/hfd/library/documents/bib107006\\_2002.pdf](https://www.for.gov.bc.ca/hfd/library/documents/bib107006_2002.pdf)

Graham writes:

From email, Jan 22, 2018

We capture LCC [Land Cover Classification] attributes in the VRI [Vegetation Resource Inventory] in accordance with the coding system in this scheme, however I cannot guarantee how current or accurate this LCC information would be in any of the VRI forest cover mapsheets we have in some of the parks. With this caveat in mind, it would still be worthwhile to use the VRI coverage at least as a first run as this information is publicly accessible. It is possible that there are some other BC data sets with BCLCC [BC Land Cover Classification Scheme] attributes – I wouldn't rule that option out either.

From email, Jan 23, 2018

Let's see if BCLCC data in the VRI can be of assistance in your analyses.

Other researchers and managers who assisted with determining the draft classification scheme were David Tesch, Executive Director of the Knowledge Management Branch, Tim Salkeld, Manager, Forest Analysis and Inventory Branch, and retired Director of the Ecosystems Branch in the BC Ministry of Environment.

A meeting between MLP researcher Mary Sanseverino, Tory Stevens, Protected Area Ecologist, and Jennifer Grant Protected Areas Ecologist, both from BC Parks, Ministry of Environment & Climate Change Strategy took place on Feb 14, 2018. The classification system was discussed and the categories decided upon were as follows:



<b>Category</b>	<b>Description</b>	<b>Category</b>	<b>Description</b>
<b>Dense Coniferous</b>	Greater than 60% coniferous forest cover.	<b>Glacier</b>	Perennial snow and ice with definite lateral limits, typically flowing in a particular direction.
<b>Open Coniferous</b>	Between 15% to 60% of the area is coniferous forest.	<b>Snow Cover</b>	Snow or ice that is not part of a glacier, but is found during summer months on the landscape.
<b>Mixed Wood Forest</b>	Trees cover a minimum of 10% of the area, but neither coniferous nor broadleaf trees account for 75% or more of the total trees.	<b>Wetland</b>	'Wet' or 'aquatic moisture regime. The water table is at or near the surface, or which is saturated enough to promote wetland or aquatic processes.
<b>Shrub</b>	More than 10% of the area is vegetated, less than 10% of the area is treed, and shrubs must constitute 1/3 or more of the total vegetation cover.	<b>Water</b>	static body of water. an artificial basin of water (e.g. dam, dyke etc), a river/stream with definable banks. Gravel bars are part of a stream while islands within a stream that have definable banks are not.
<b>Herbaceous</b>	More than 5% of the area is vegetated, less than 10% of the area is treed, less than 20% is shrub, and herbs must constitute 1/3 or more of the total vegetation cover.	<b>Infra - structure</b>	Cities, towns, villages, hamlets, ribbon development, rural recreation (e.g. rural stores and isolated housing, sub-divisions, cottages, rural residential, acreage owners), transportation, industry.
<b>Barren Ground</b>	Bedrock or fragmented rock broken away from bedrock surfaces. Exposed soil where vegetation cover is less than 5%.	<b>Re-generating Area</b>	Land with evidence of recent burning. Fire boundaries clearly identified or clear sign of recent timber harvesting.

These categories were incorporated into a custom build of MLP's Image Analysis Toolkit (IAT) for use with the historic/modern image pairs from Mt. Robson Provincial Park. The Toolkit is flexible enough that any change to the categories – including incorporating new categories, collapsing, or removing categories – can be done on the fly.

When applying the categories to the images only areas that are clearly seen and identified by the classifying team will be segmented. IAT can adjust for any area in either image in an historic/modern pair that has unclassified territory. Such areas will be excluded from comparative analysis.