

Assessing range-wide genetic structure in subalpine larch

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Subalpine larch (*Larix lyallii*)



Subalpine larch (*Larix lyallii*)



Barry Jaquish

Subalpine larch (*Larix lyallii*)



Lee Rentz, Pinterest (The Enchantments)

Conservation Concern



Small geographic
range



Narrow ecological
niche



Long generation
time

Conservation Status

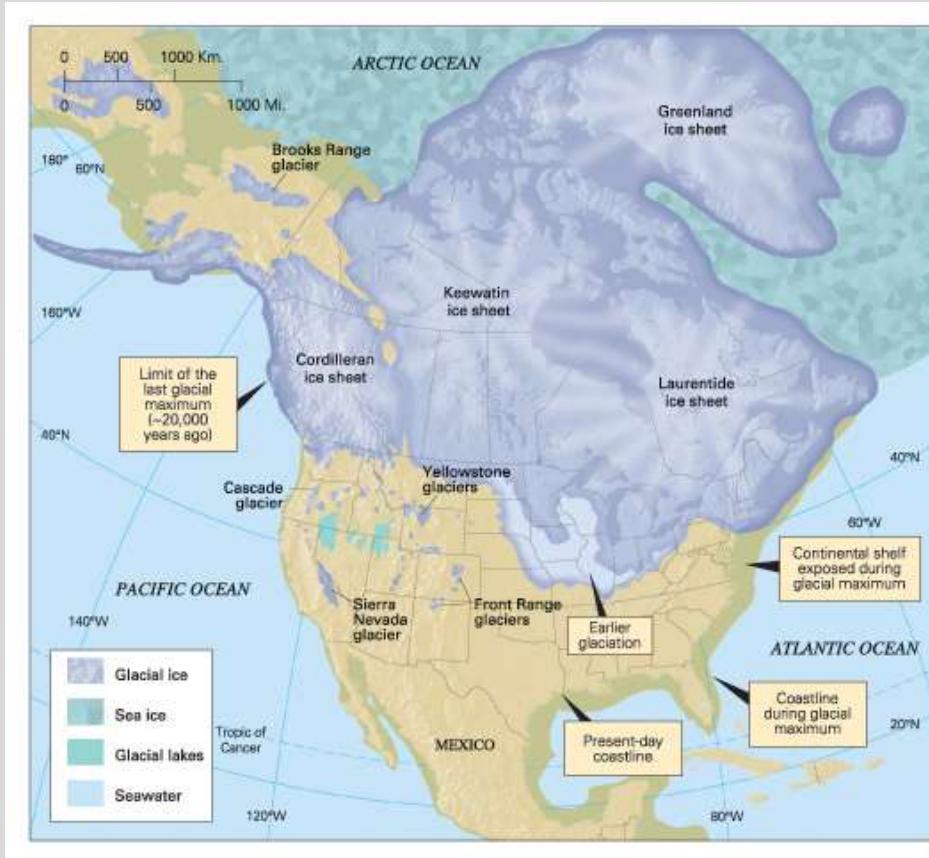
FGC GCTAC seeks to “adequately conserve the genetic diversity of all forest tree species native to BC by 2020 through a combination of *in situ*, *ex situ* and *intra situ* conservation.”

ex situ: two seed collections from WK;
196 clones from 19 populations grafted at Kal

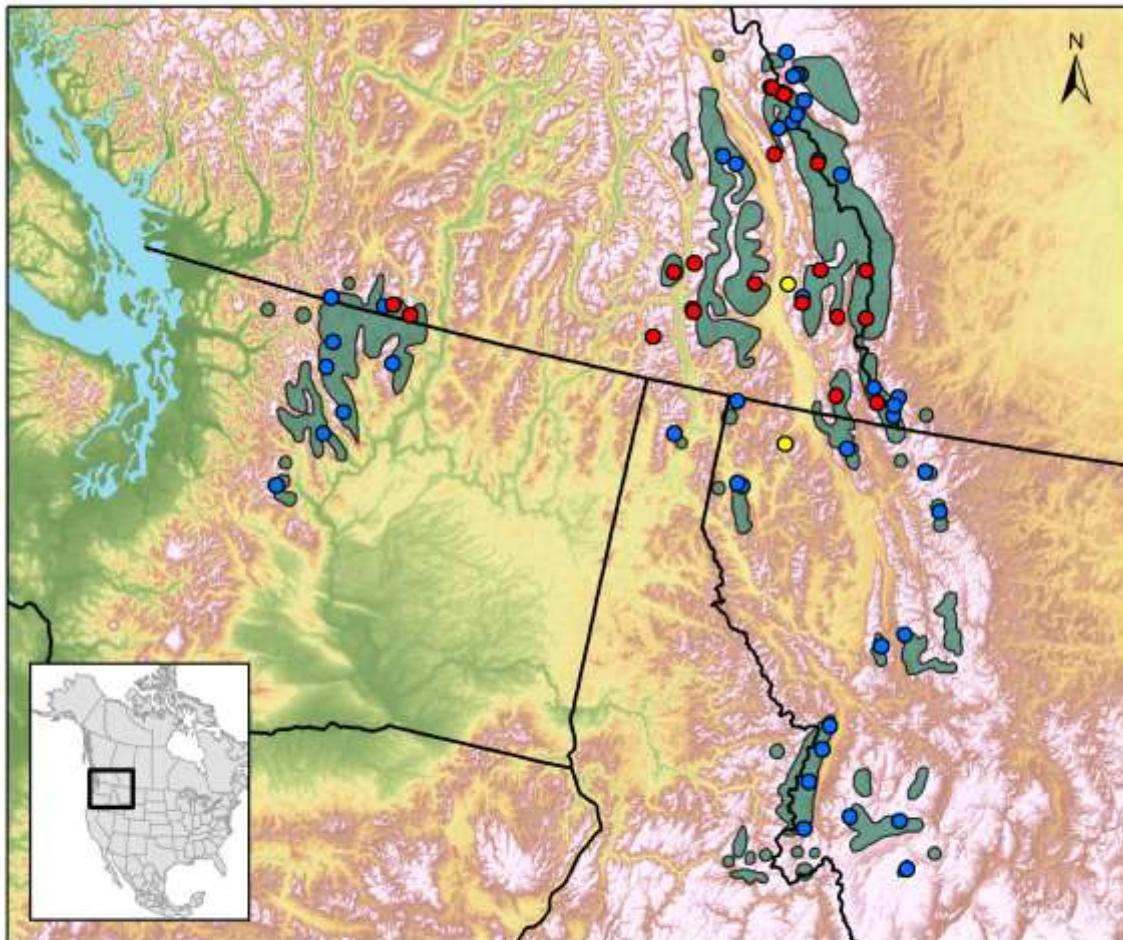
in situ: five 10 ha reserves in AT, nine in ESSF



Pleistocene Glaciation



Sampled 64 populations



Populations:
46 field
18 orchard

Trees:
1493 *L. lyallii*
20 *L. occidentalis*
1513 total









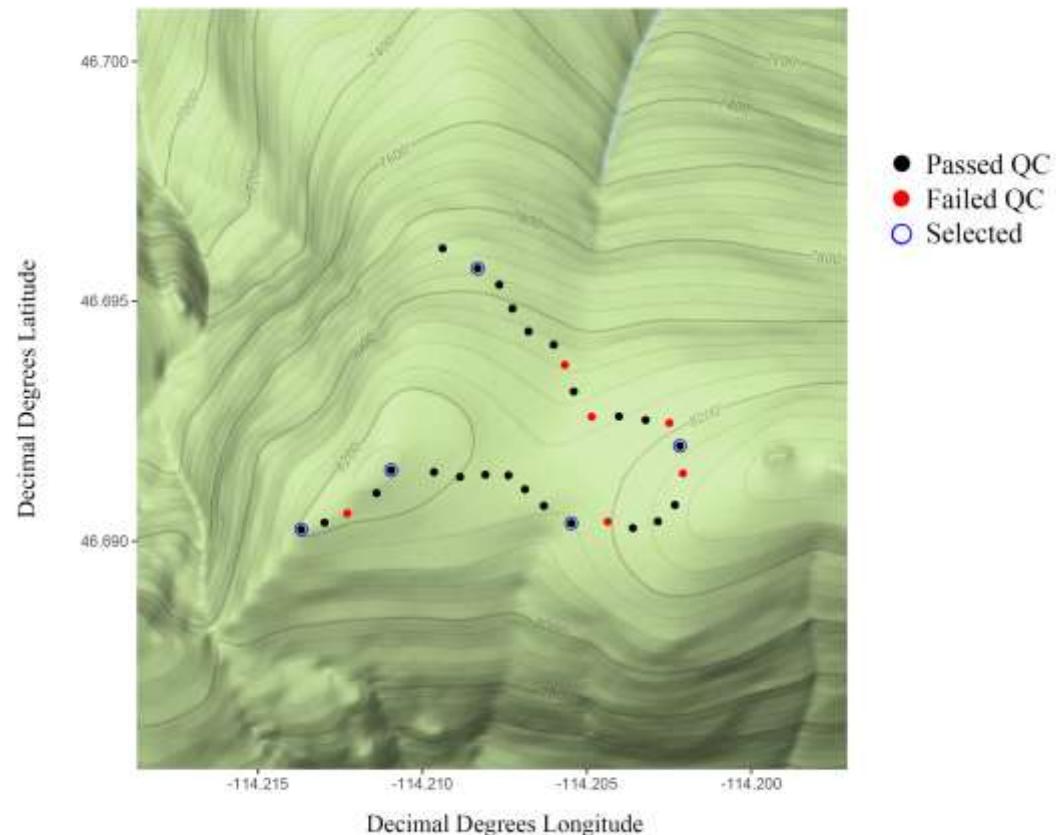
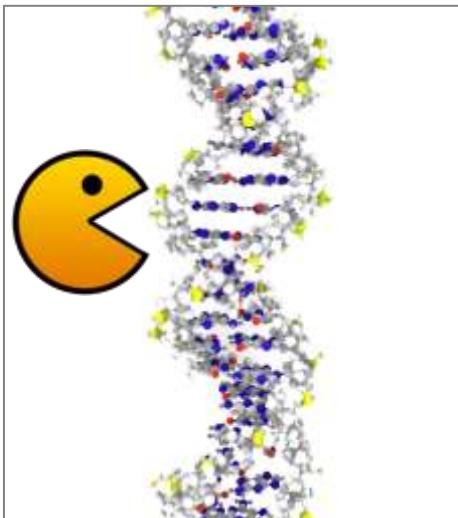






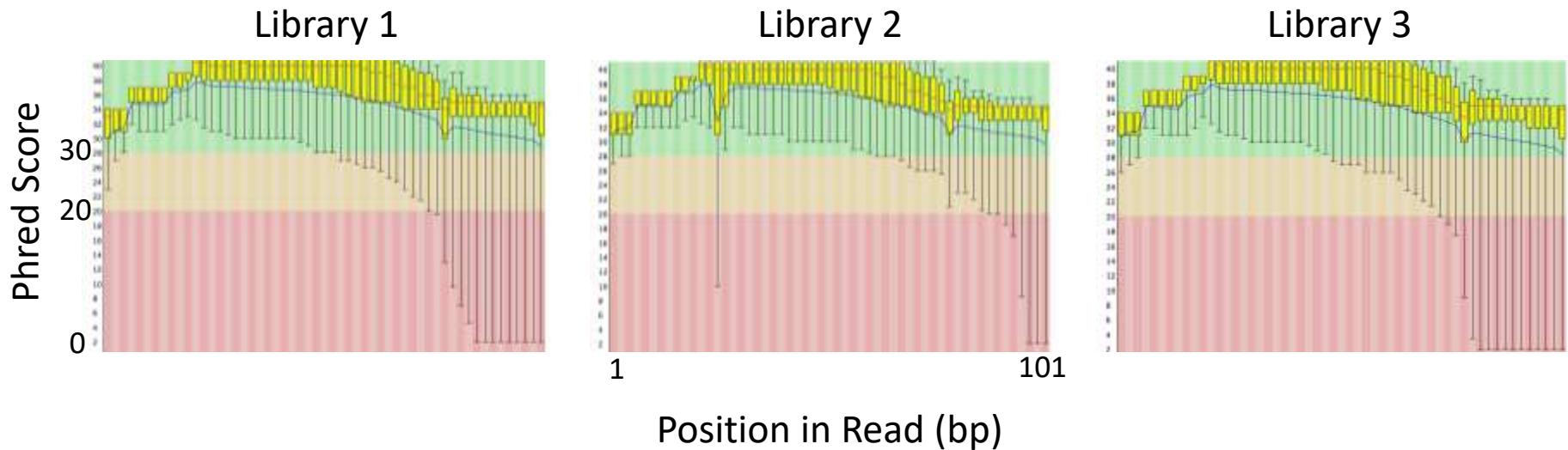
Sbf1 RAD-seq

- DNA extraction
- 285 samples
- Median 5 per pop.



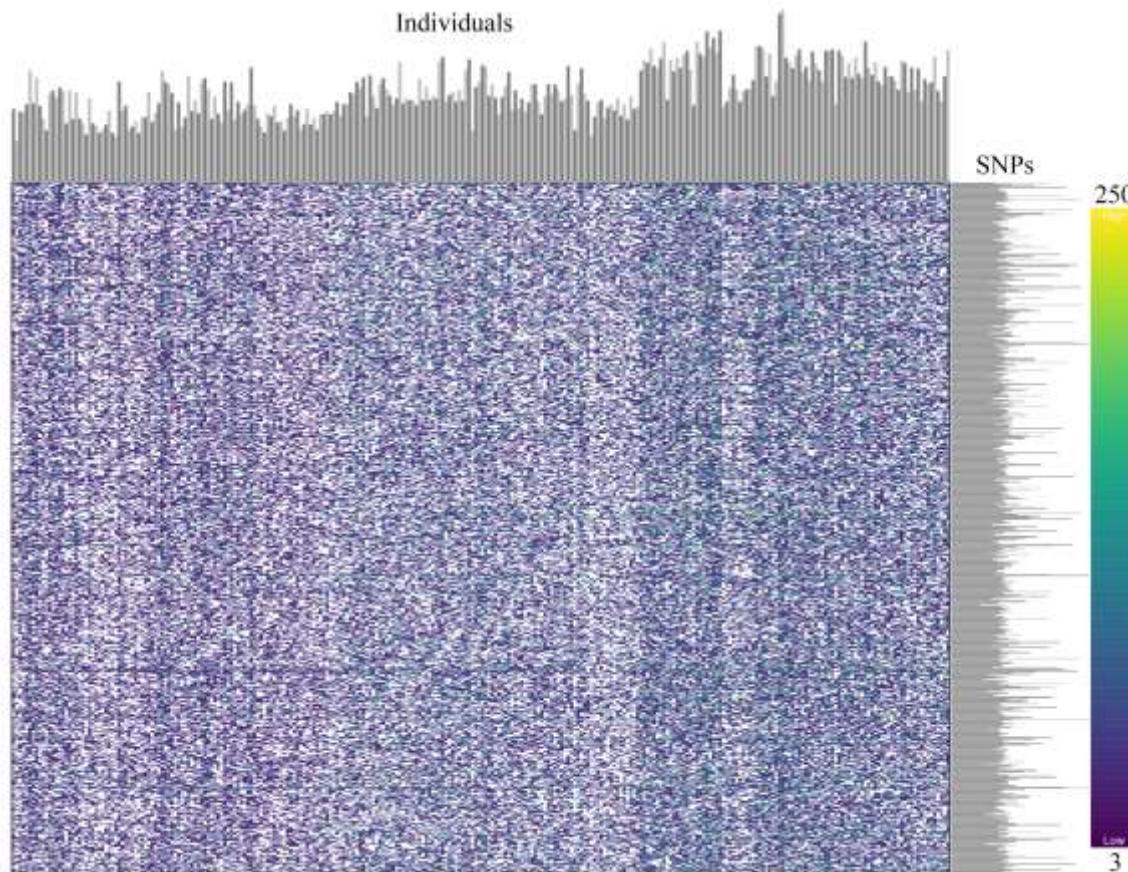
Illumina Hi-Seq 2000

- Three lanes of sequencing
- Average = 152,181,454 reads per lane
- Aligned to draft of the Siberian larch genome



794 SNP Genotypes

44 % missing data; mean depth 50X



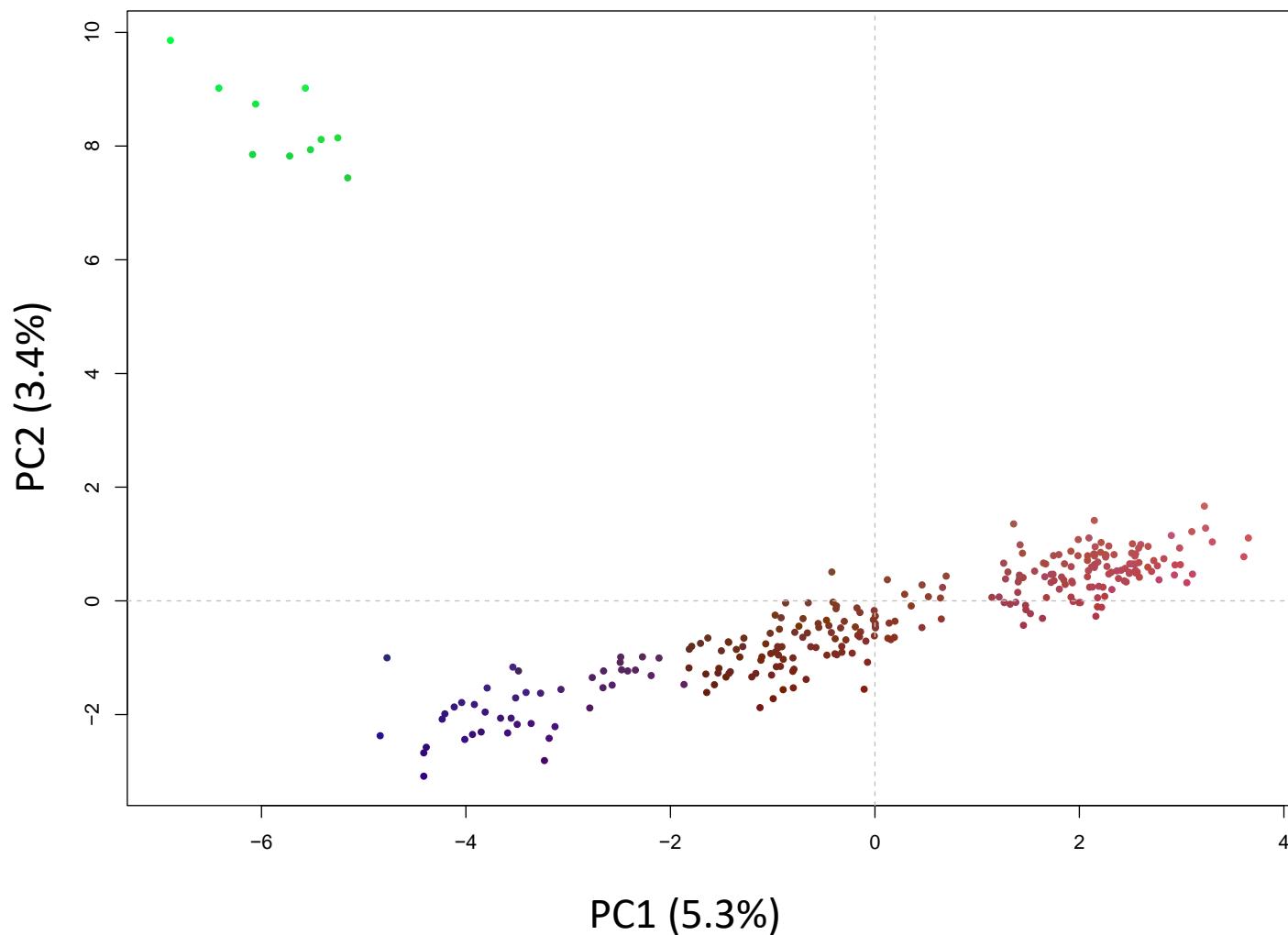
733 neutral SNPs identified using BayeScan F_{ST} outlier method

Results



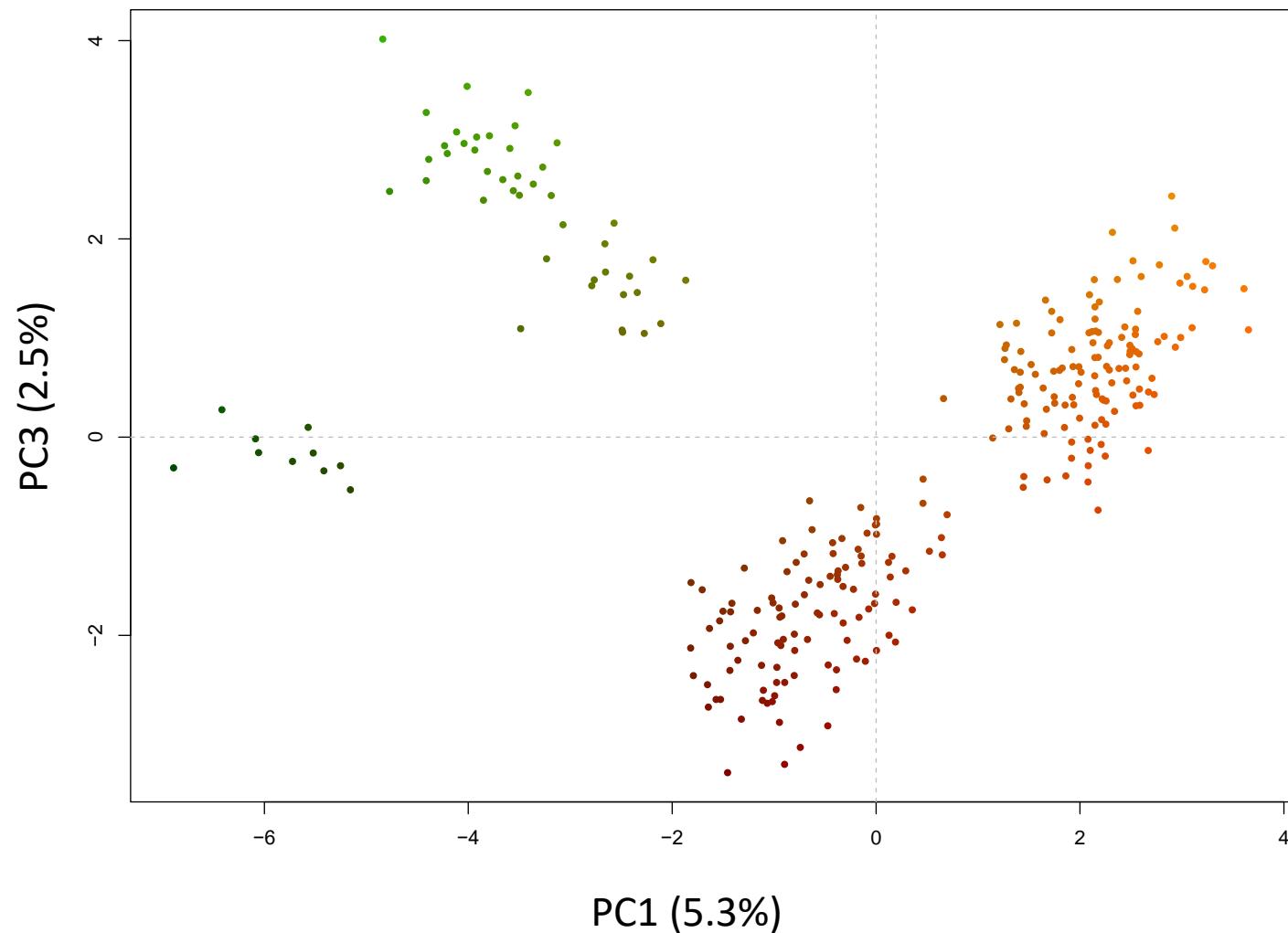
PCA

missing data imputed using mean



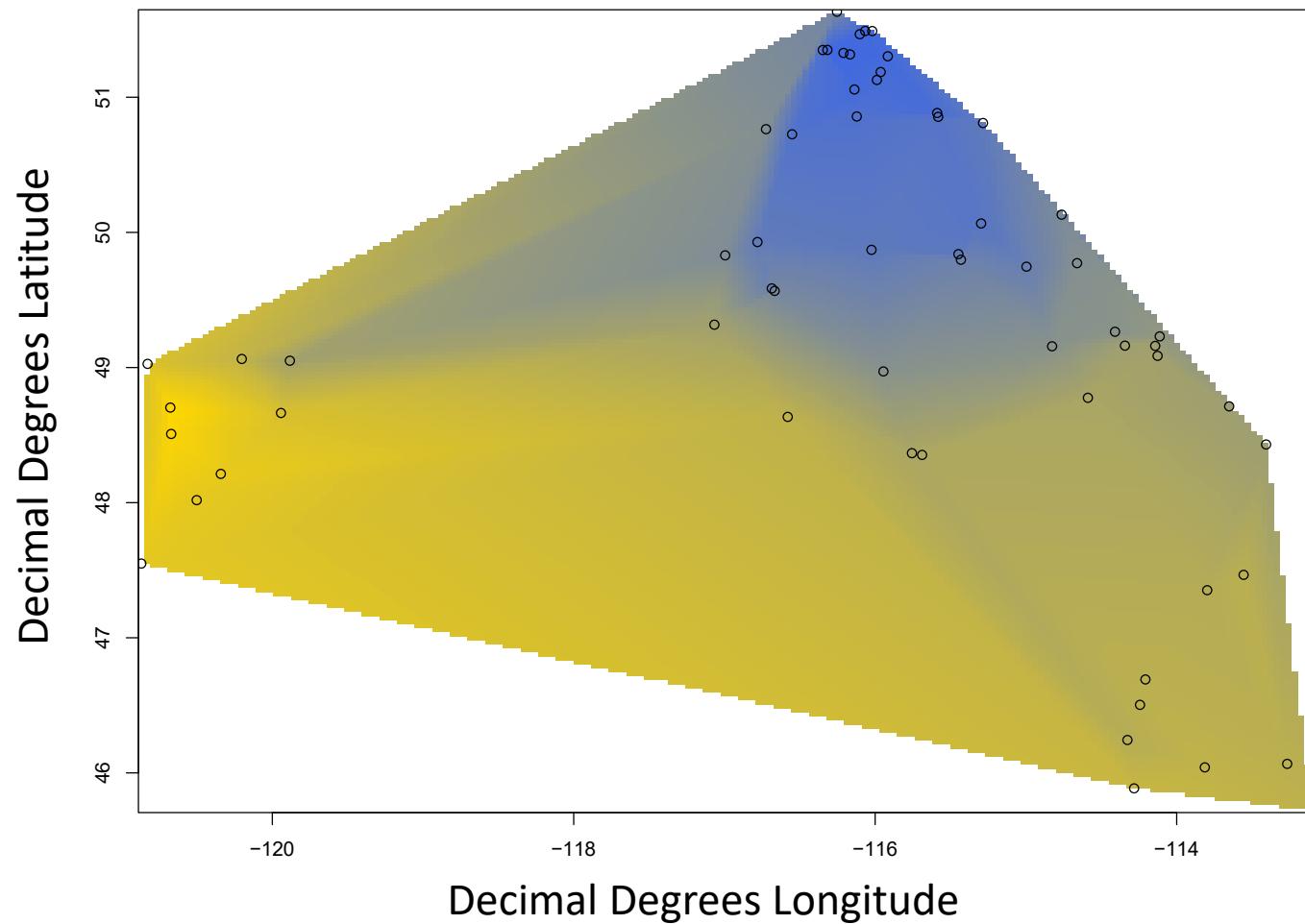
PCA

missing data imputed using mean

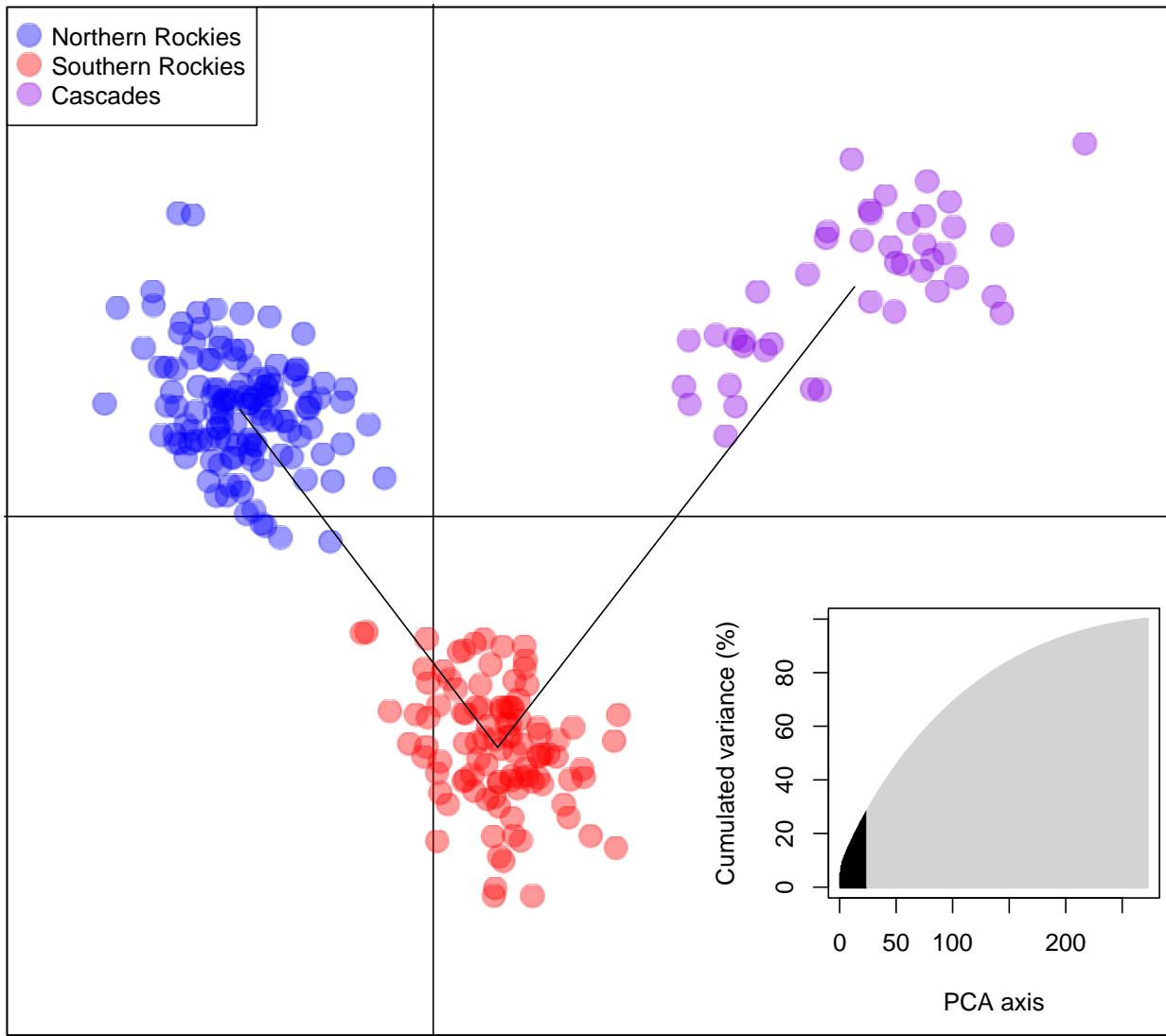


sPCA

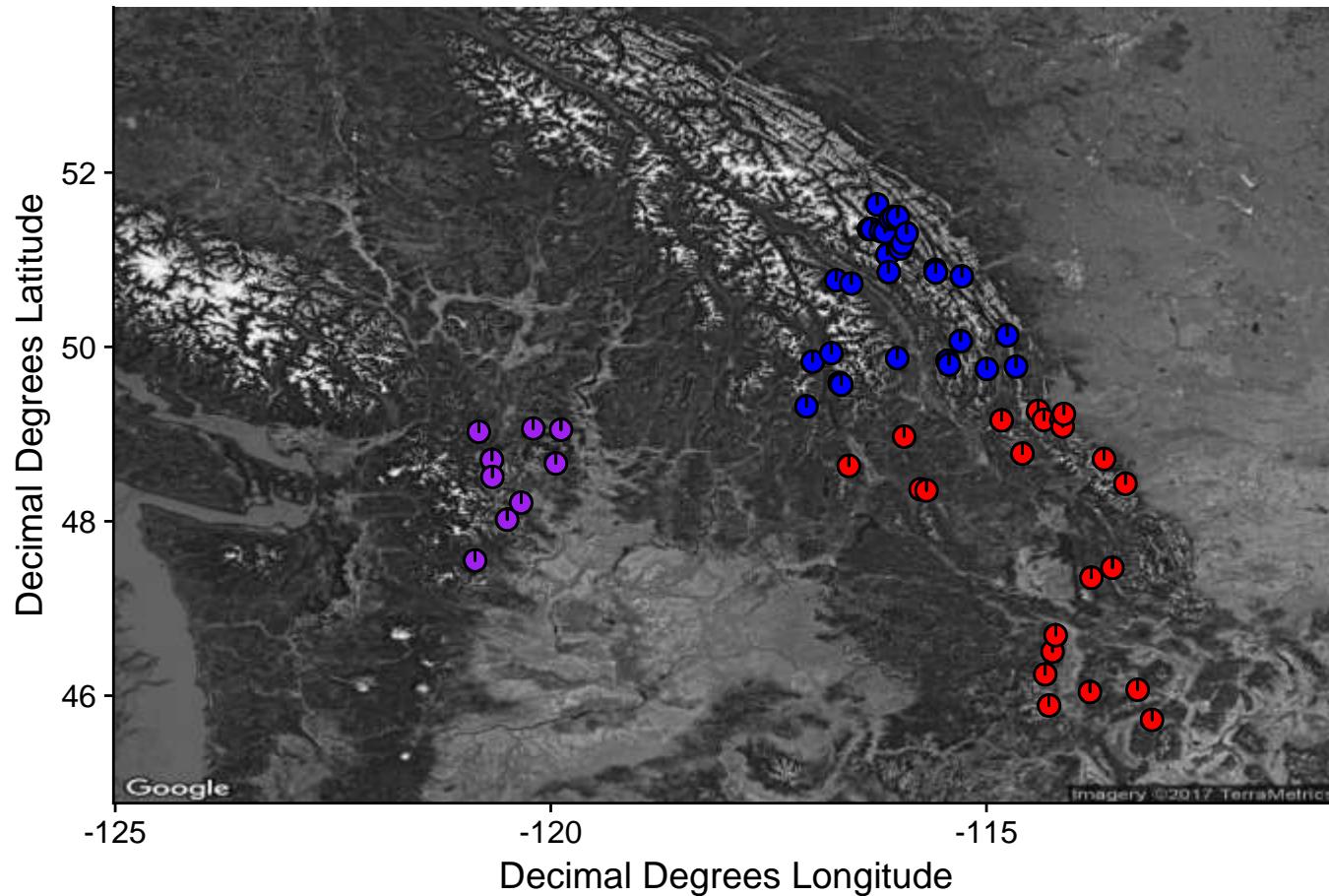
Mantel multivariate test of global spatial structure $p < 0.001$ for subalpine larch



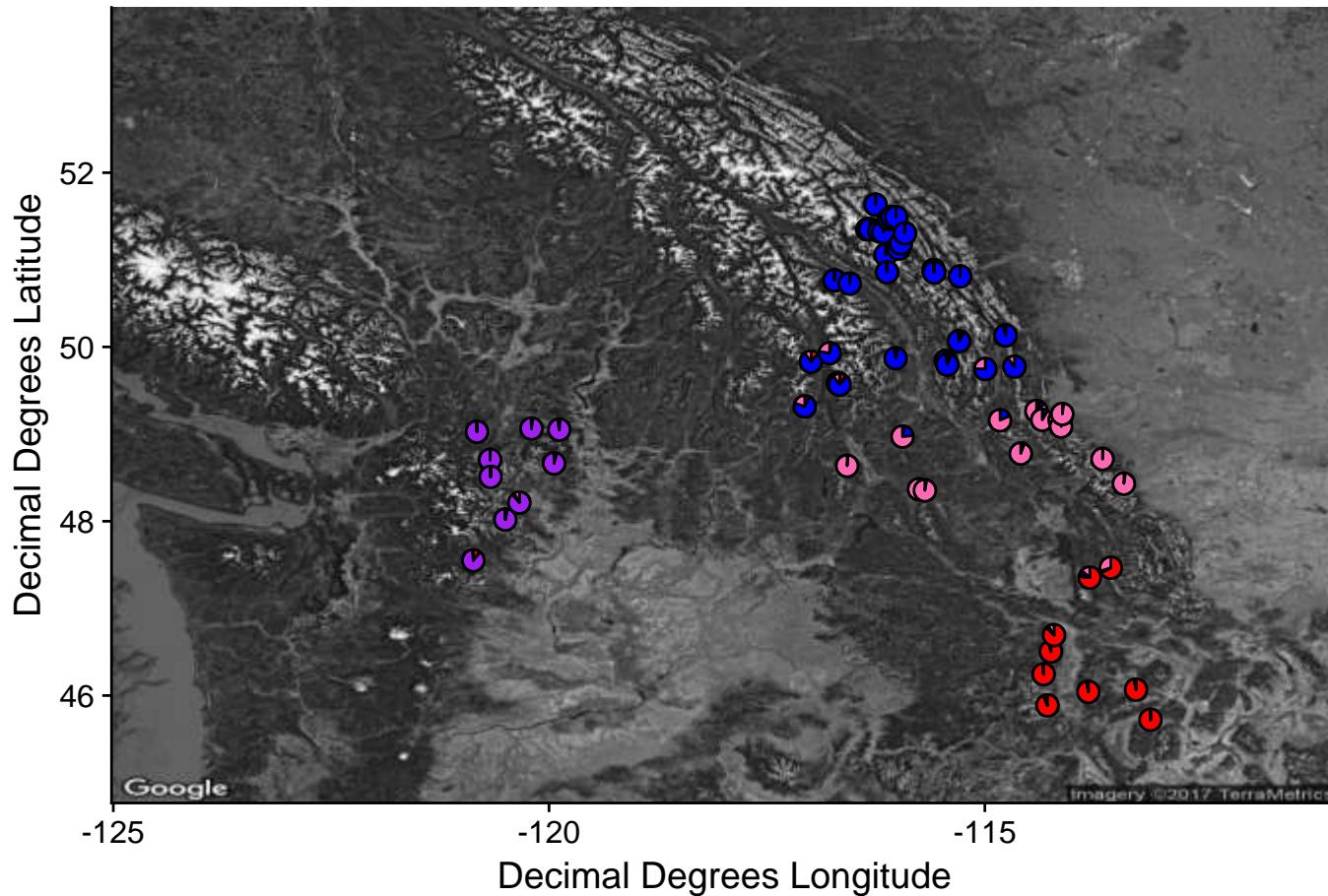
DAPC K3 (2)



DAPC K3

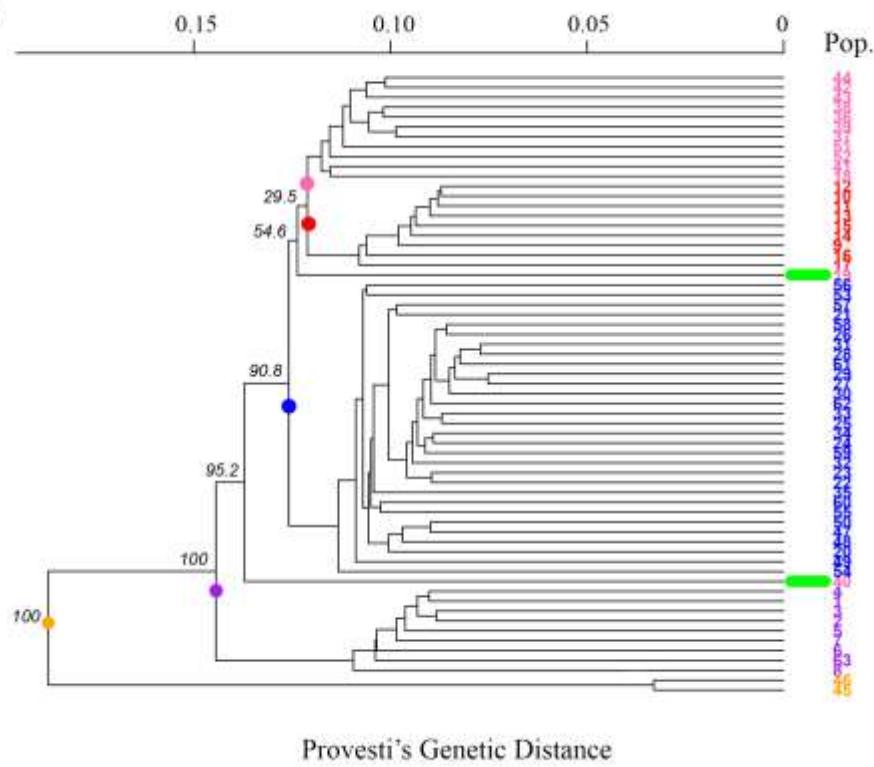


Structure K4

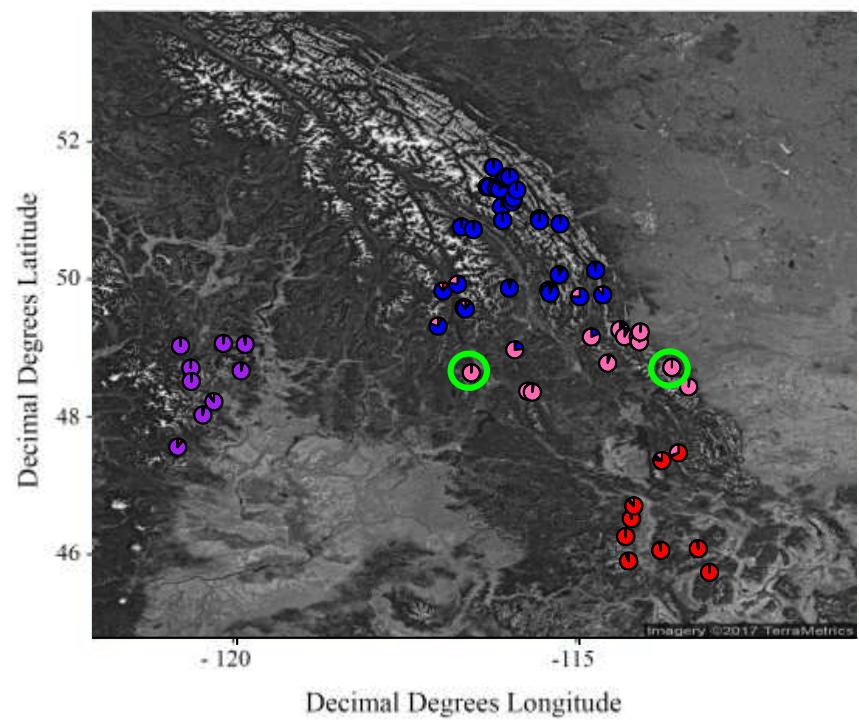


Phylogeography

A)



B)



Implications



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Genoa Alger

FGC GCTAC

UVic NSERC CREATE



NSERC
CRSNG



University
of Victoria

FGC

Forest Genetics Council
of British Columbia



CENTRE for
FOREST BIOLOGY
University of Victoria

A marmot is resting on a rocky hillside. It has brown and black fur with a light-colored belly and a bushy tail. It is surrounded by large rocks, green grass, and small white flowers. The background shows more rocky terrain and some green shrubs.

Questions?

Genetic Differentiation

