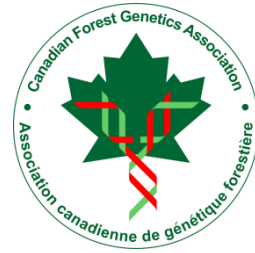


Forest Genetics 2025

Wednesday, 11:00 a.m. - 12:20 p.m.

Session 6: Genetic conservation

Moderator: Catherine Cullingham



Conservation planning for forests, tree species, and their genetic populations under climate change in Canada

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Abstract: Approximately 38% of Canada's 9.98 million km² landmass is covered by forests, totaling around 3.47 million km², with about 11% designated as protected areas. However, conservation areas only imperfectly represent Canada's forest biodiversity, and conservation efforts are managed across 13 provinces and territories, each with distinct priorities. This study provides a national overview of how different Canadian jurisdictions protect forests, tree species, and their genetic populations in the context of climate change.

The analysis utilizes level-4 ecosystem delineations (BC: BEC variants, AB: NSR variants, rest of Canada: ecodistricts), representing the finest level of what may constitute a tree population. We determine population sizes by ecosystem from forest inventory data and scaled using remotely-sensed land and tree cover data. Potential changes to species frequencies are inferred by matching historic ecosystem climates (1960s) with observed (1990s) and projected (2020s, 2050s, 2080s) climate change, using multivariate climatic distance matrices for 12 bioclimatic variables.

Results indicate that representation of forests in protected areas varies widely across jurisdictions. The highest combined diversity of species and ecological zones occurs in British Columbia, followed by Quebec and Ontario. Out of 54 tree species assessed, we identified their least protected populations of with respect to major eco zones (Level 2). Under climate change, the conservation status of western interior and boreal populations is projected to decline most severely, as these populations face the highest required migration distances necessary to track suitable climate conditions.

To support the development of an in-situ gene conservation strategy under climate change, we provide a Protected Area Selection Tool for Canada (<http://tinyurl.com/PAST-NAm>), which identifies existing protected areas as potential assisted migration targets for tree populations that are most vulnerable to climate change or that have otherwise been identified as valuable for in-situ gene conservation efforts.