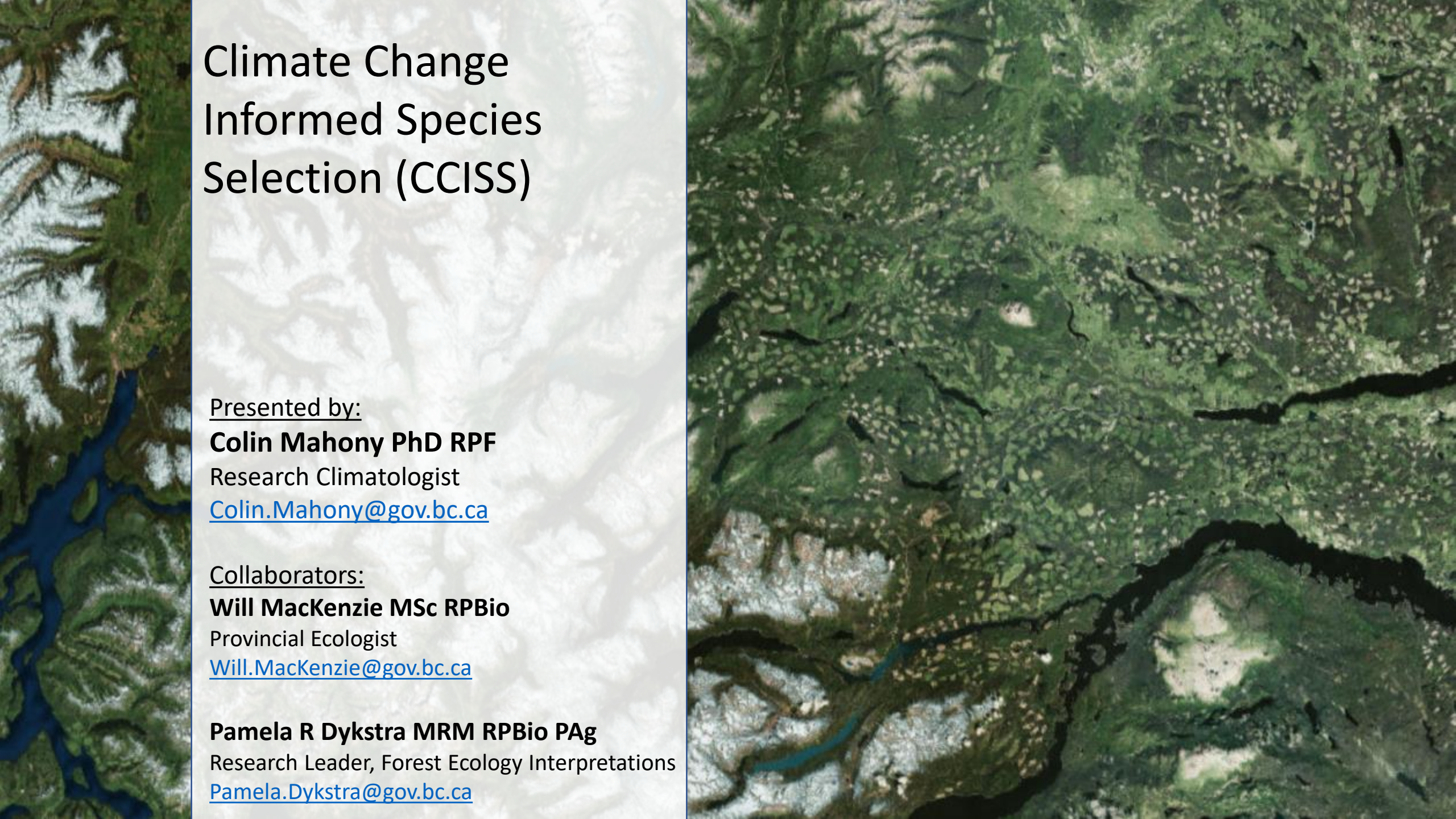


An aerial photograph of a mountainous landscape. The terrain is covered in dense green forest, with patches of white snow or ice visible on the higher elevations and in the valleys. A dark, winding river or stream flows through the lower part of the image. The overall scene is a mix of vibrant green, white, and dark brown/black tones.

Climate Change Informed Species Selection (CCISS)

Presented by:

Colin Mahony PhD RPF

Research Climatologist

Colin.Mahony@gov.bc.ca

Collaborators:

Will MacKenzie MSc RPBio

Provincial Ecologist

Will.MacKenzie@gov.bc.ca

Pamela R Dykstra MRM RPBio PAg

Research Leader, Forest Ecology Interpretations

Pamela.Dykstra@gov.bc.ca



Contents lists available at ScienceDirect

Forest Ecology and Management

journal homepage: www.elsevier.com/locate/foreco



An ecological approach to climate change-informed tree species selection for reforestation

William H. MacKenzie^{a,*}, Colin R. Mahony^b

^a BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development, 3333 Tatlow Road, Smithers, BC V0J 2N0, Canada

^b BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development, P.O. Box 9513 Stn. Prov. Govt., Victoria, BC V8W 9C2, Canada

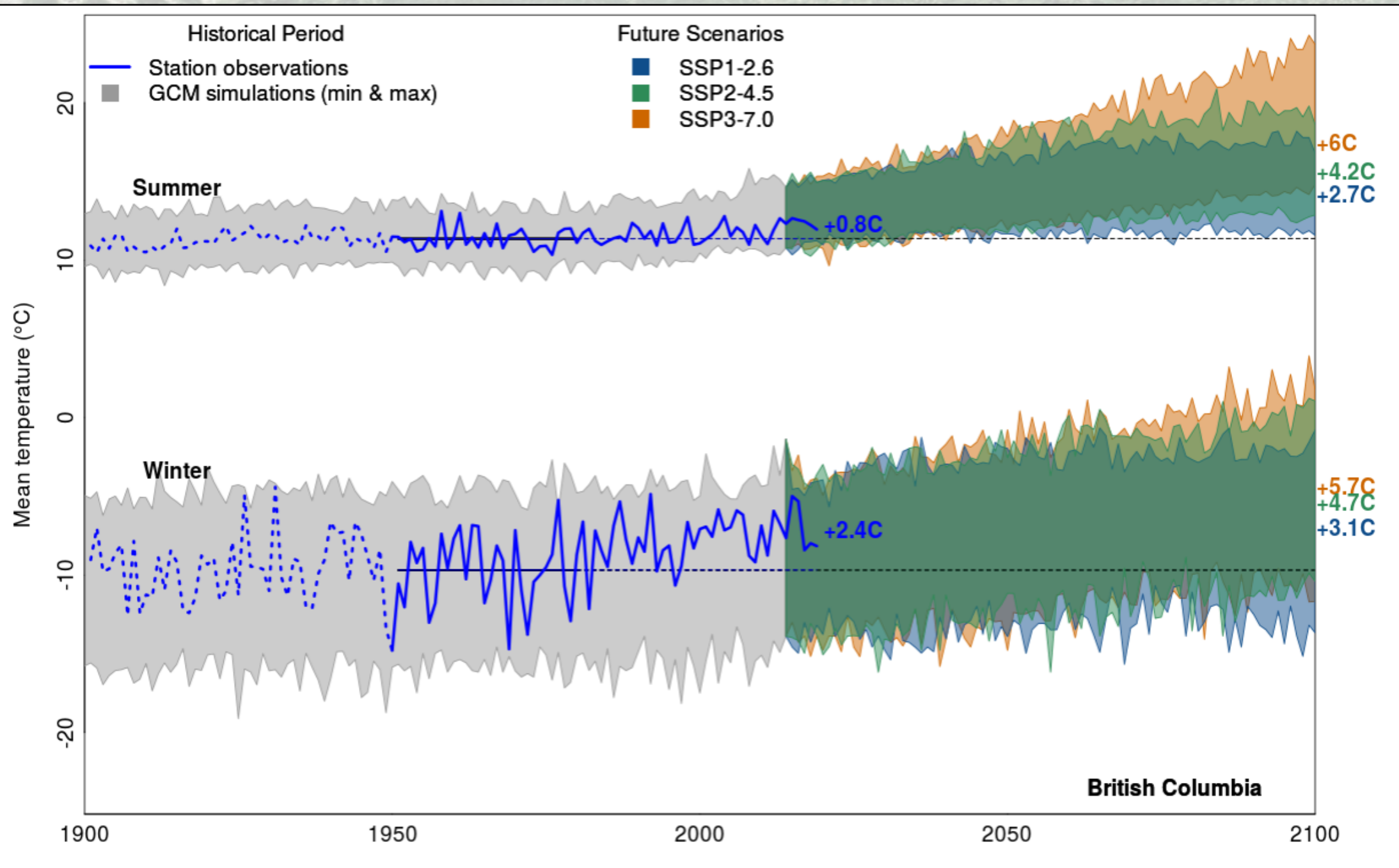
ARTICLE INFO

Keywords:

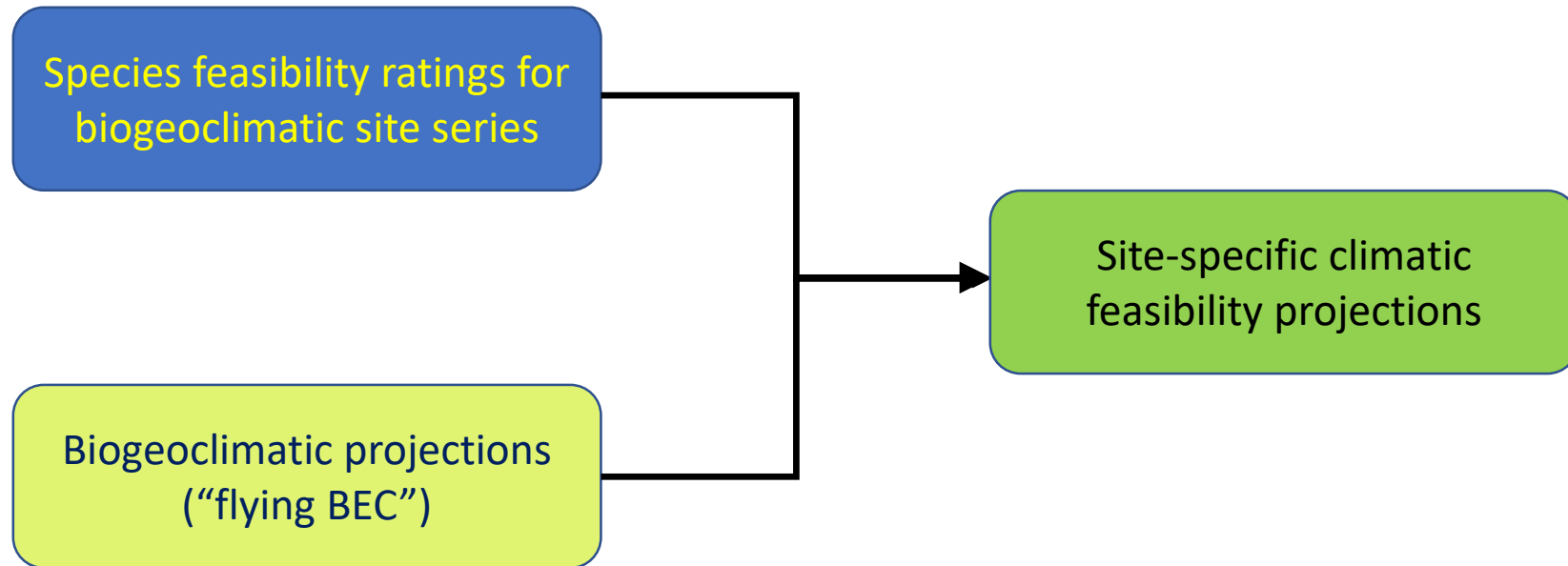
Translational ecology
Biogeoclimatic ecosystem classification
Random forests
Bioclimate envelope modelling
Assisted migration
Climate change adaptation

ABSTRACT

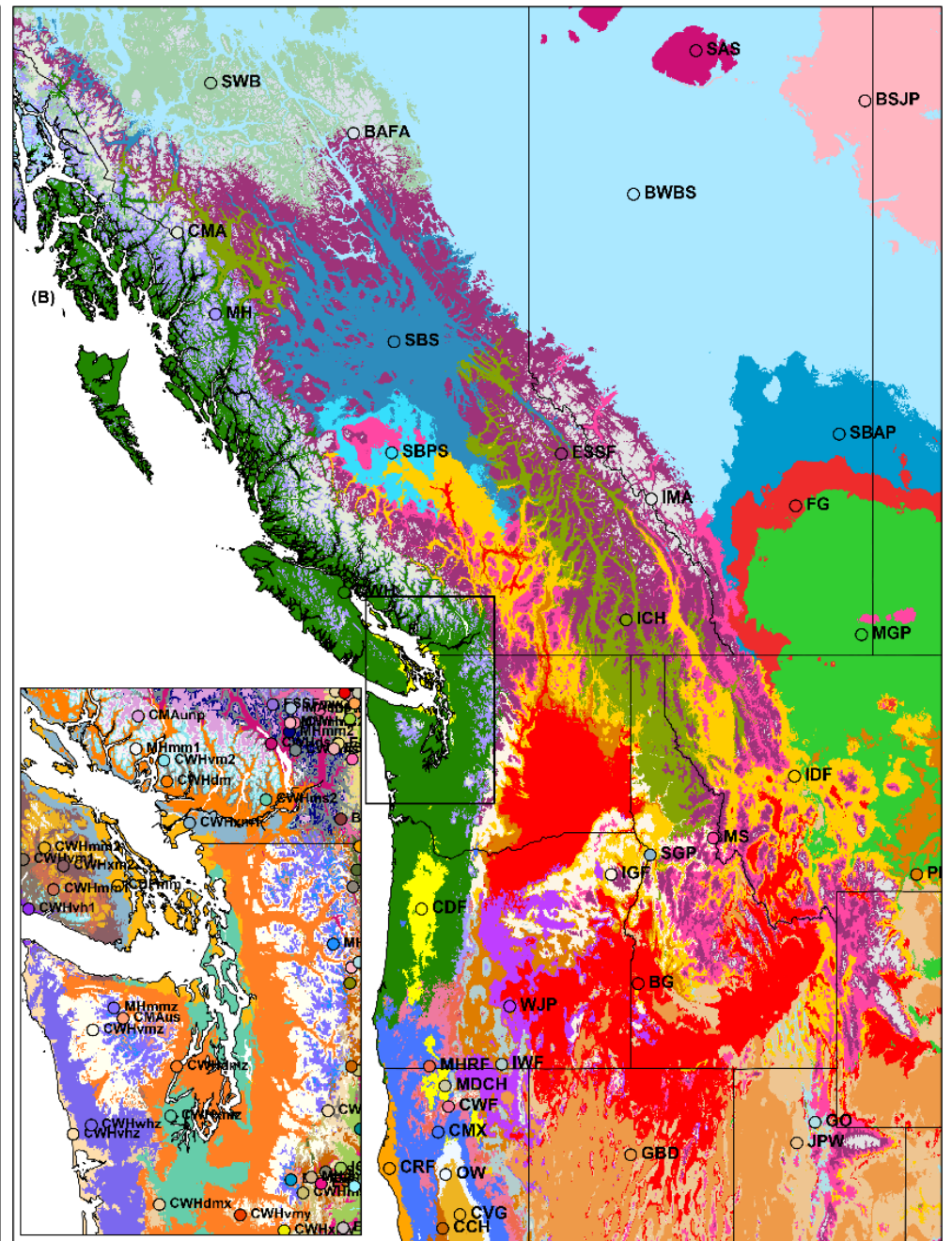
Accounting for climate change in reforestation practices has the potential to be one of the most efficacious adaptation strategies for maintaining future forest ecosystem services. There is a rich literature projecting spatial shifts in climatic suitability for tree species and strong scientific evidence for the necessity of assisted migration. However, there has been limited translation of this research into operational reforestation, due in part to mismatches to the information needs of practitioners. Here, we describe a practitioner-focused climate change informed tree species selection (CCISS) model to support reforestation decisions in British Columbia (BC). CCISS projects the climate change redistribution of bioclimate units from the multi-scaled Biogeoclimatic Ecosystem Classification (BEC) system with machine-learning for 90 modelled futures. It leverages the reforestation knowledge from BEC to make site-specific species projections of reforestation feasibility with climate change



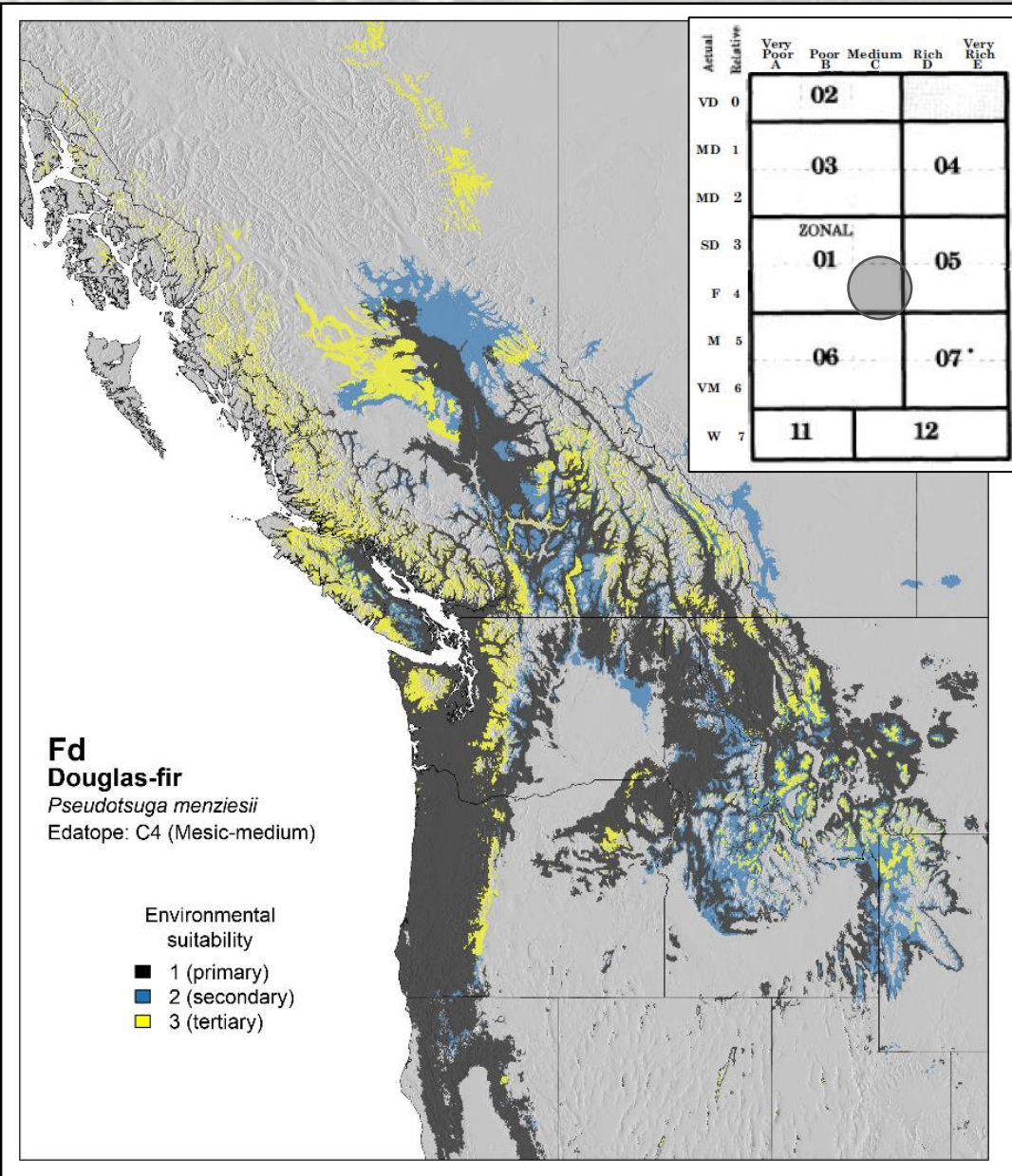
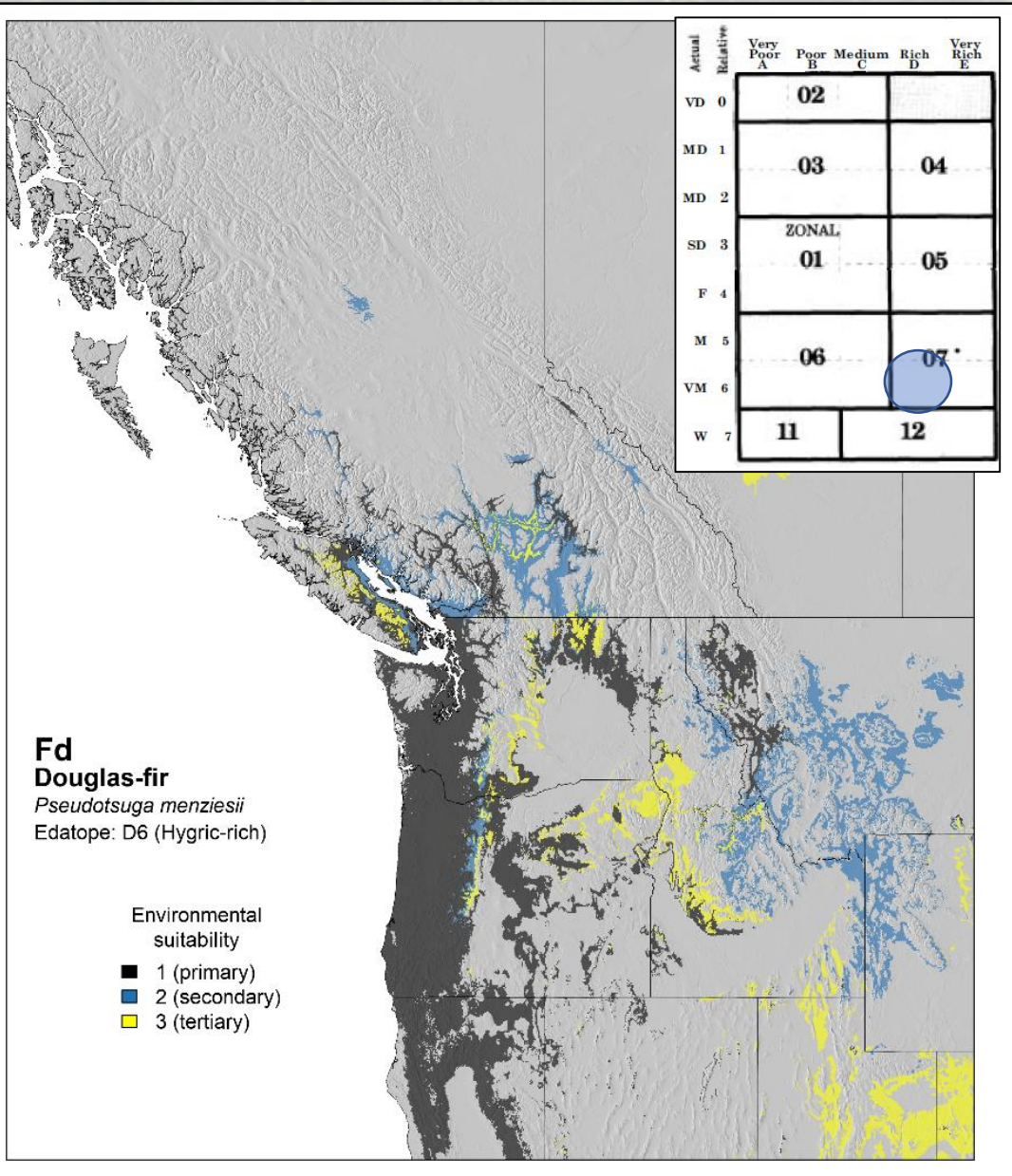
CCISS approach to climatic feasibility projections for tree species



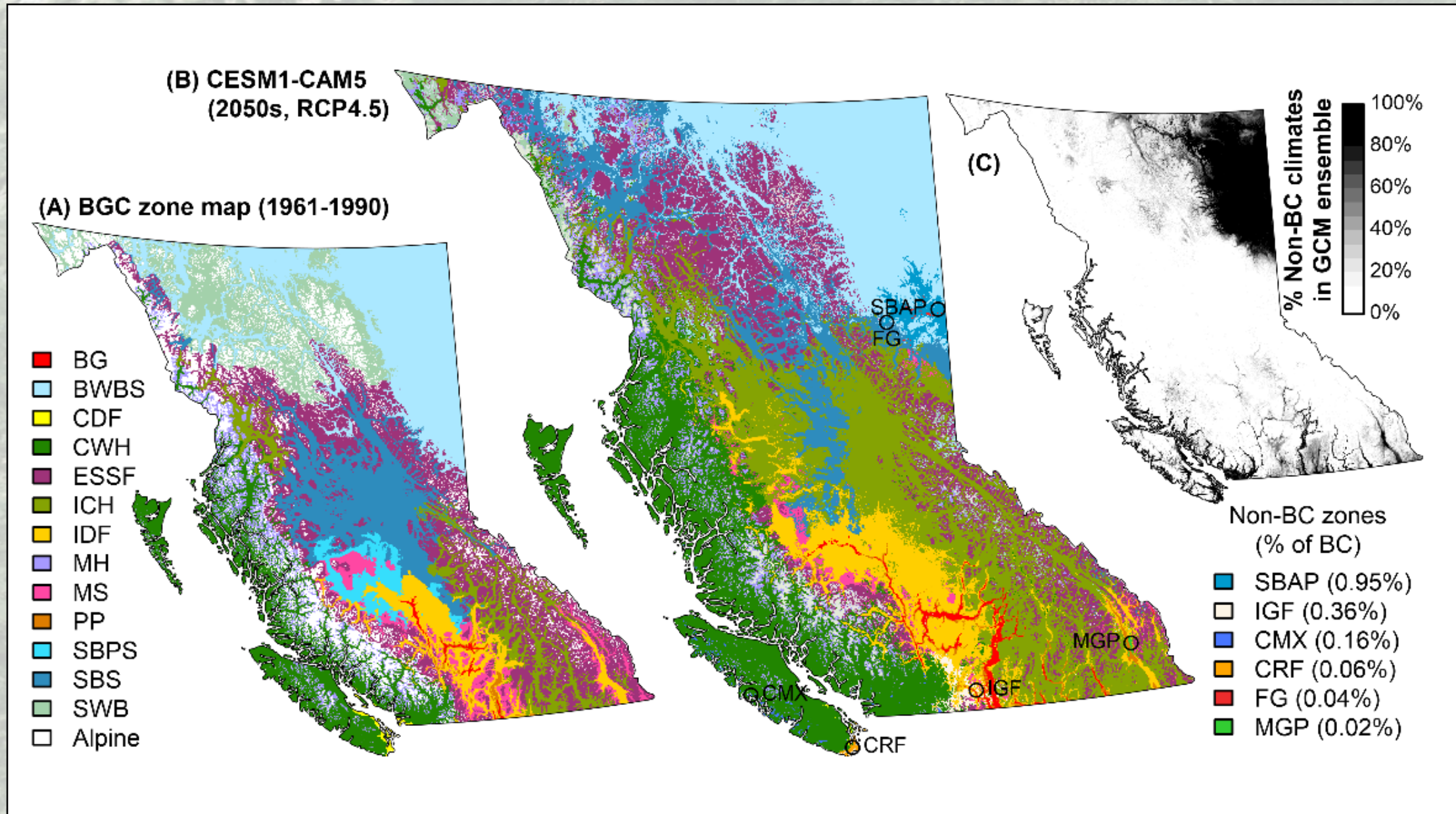
A detailed, vertical, close-up photograph of a green, textured surface, likely a plant or rock, showing intricate patterns and colors. The image is oriented vertically and displays a complex, organic texture with various shades of green, from deep forest green to lighter, almost yellowish-green areas. The surface appears to be covered in small, irregular, and sometimes elongated structures, possibly leaves, scales, or mineral deposits, creating a highly textured and somewhat chaotic pattern. The lighting is somewhat uneven, with brighter areas towards the top and darker, more shadowed regions towards the bottom, emphasizing the three-dimensional quality of the texture. The overall impression is one of a natural, unprocessed material with a rich, tactile quality.



Site-specific climatic feasibility ratings



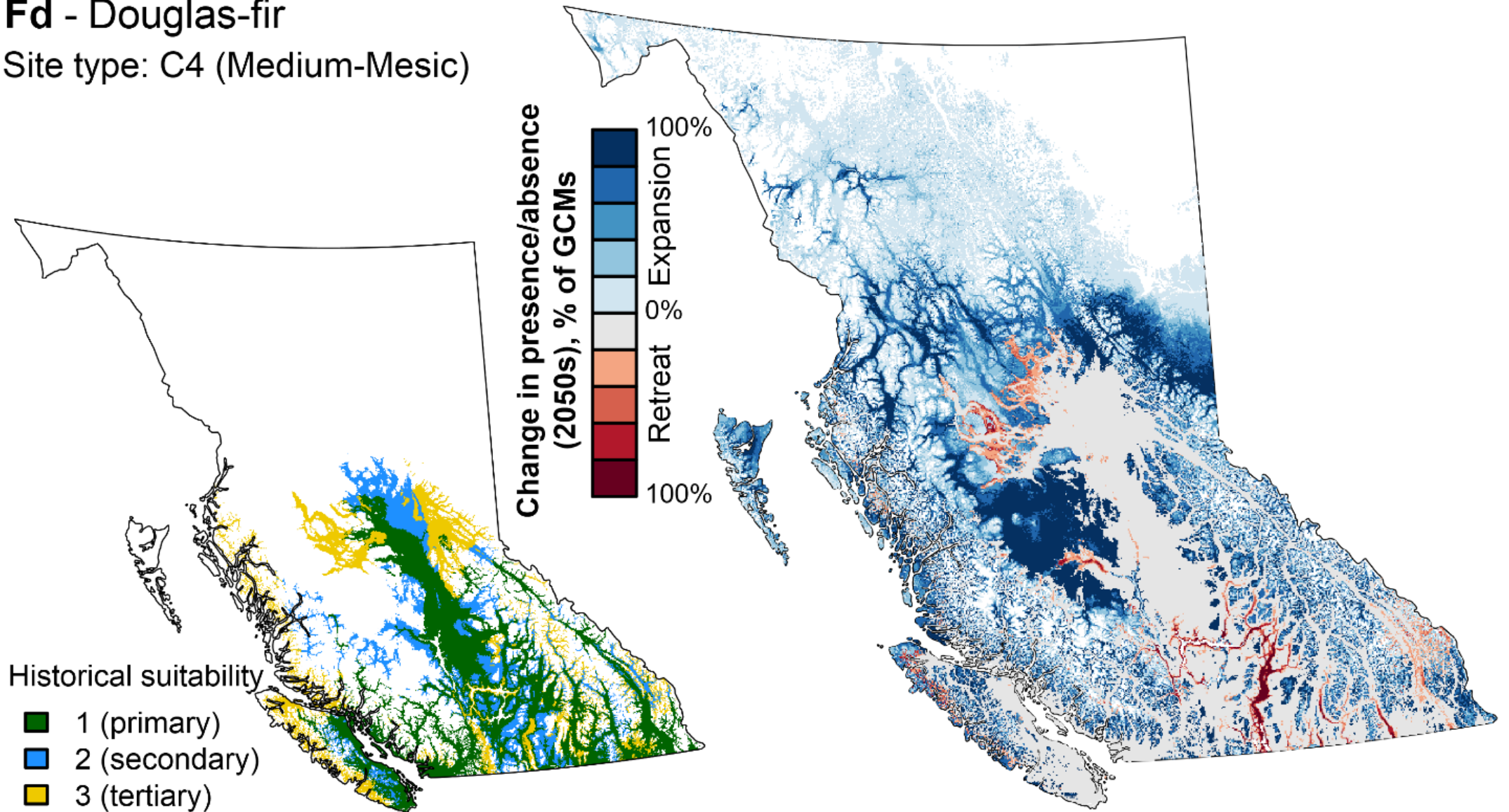
Biogeoclimatic projections



Site-specific climatic feasibility projections

Fd - Douglas-fir

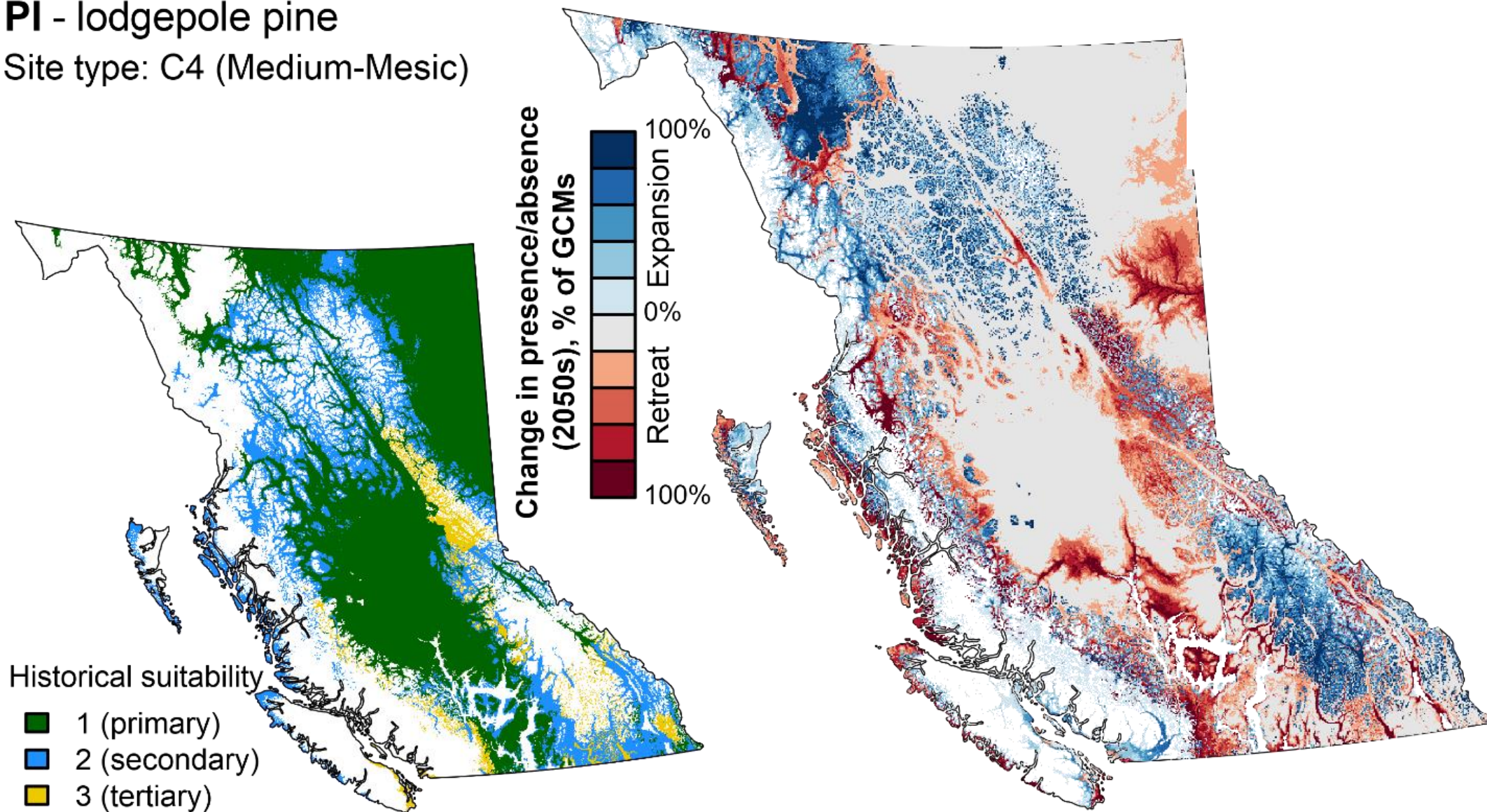
Site type: C4 (Medium-Mesic)



Site-specific climatic feasibility projections

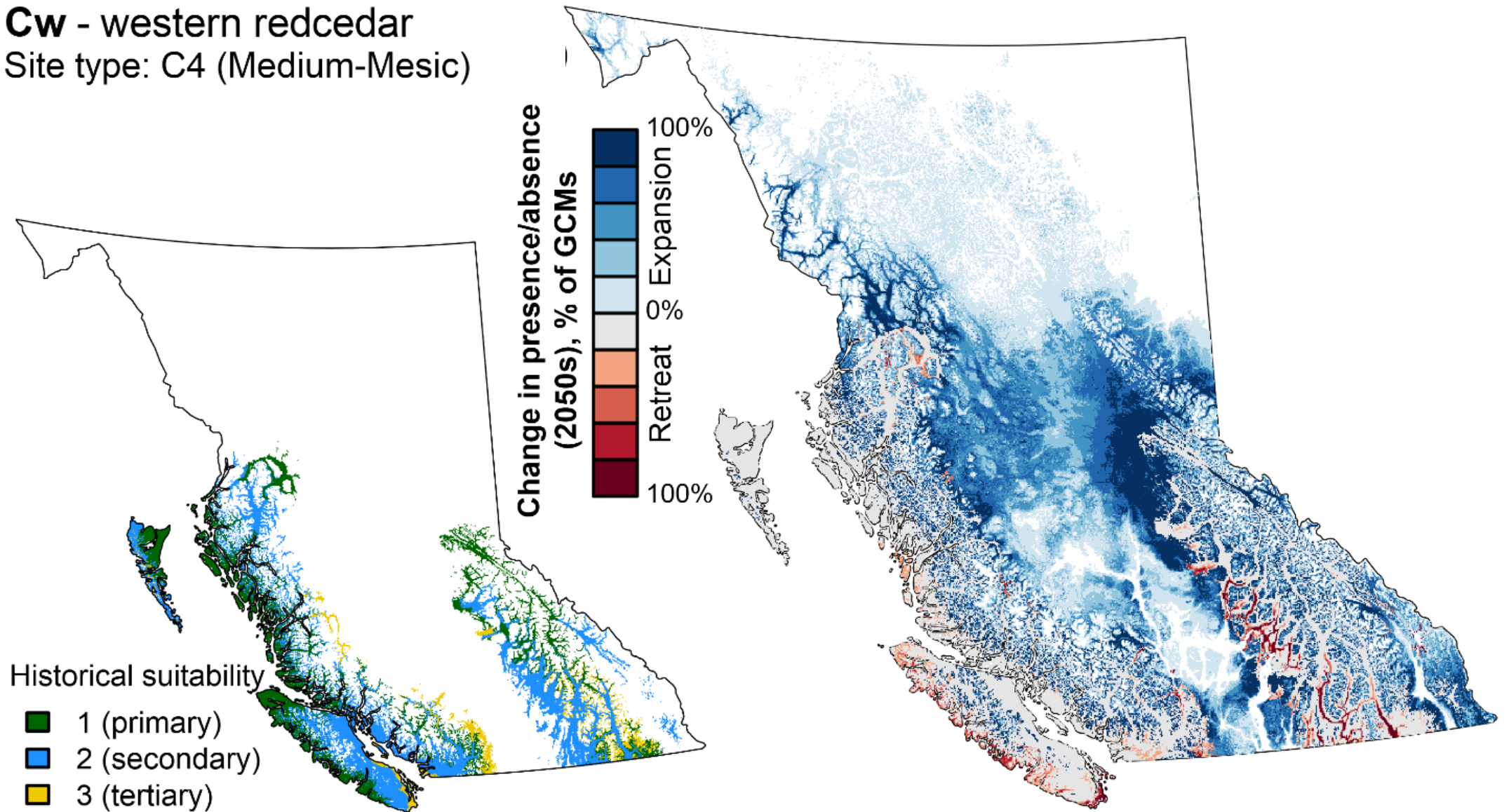
PI - lodgepole pine

Site type: C4 (Medium-Mesic)



Site-specific climatic feasibility projections

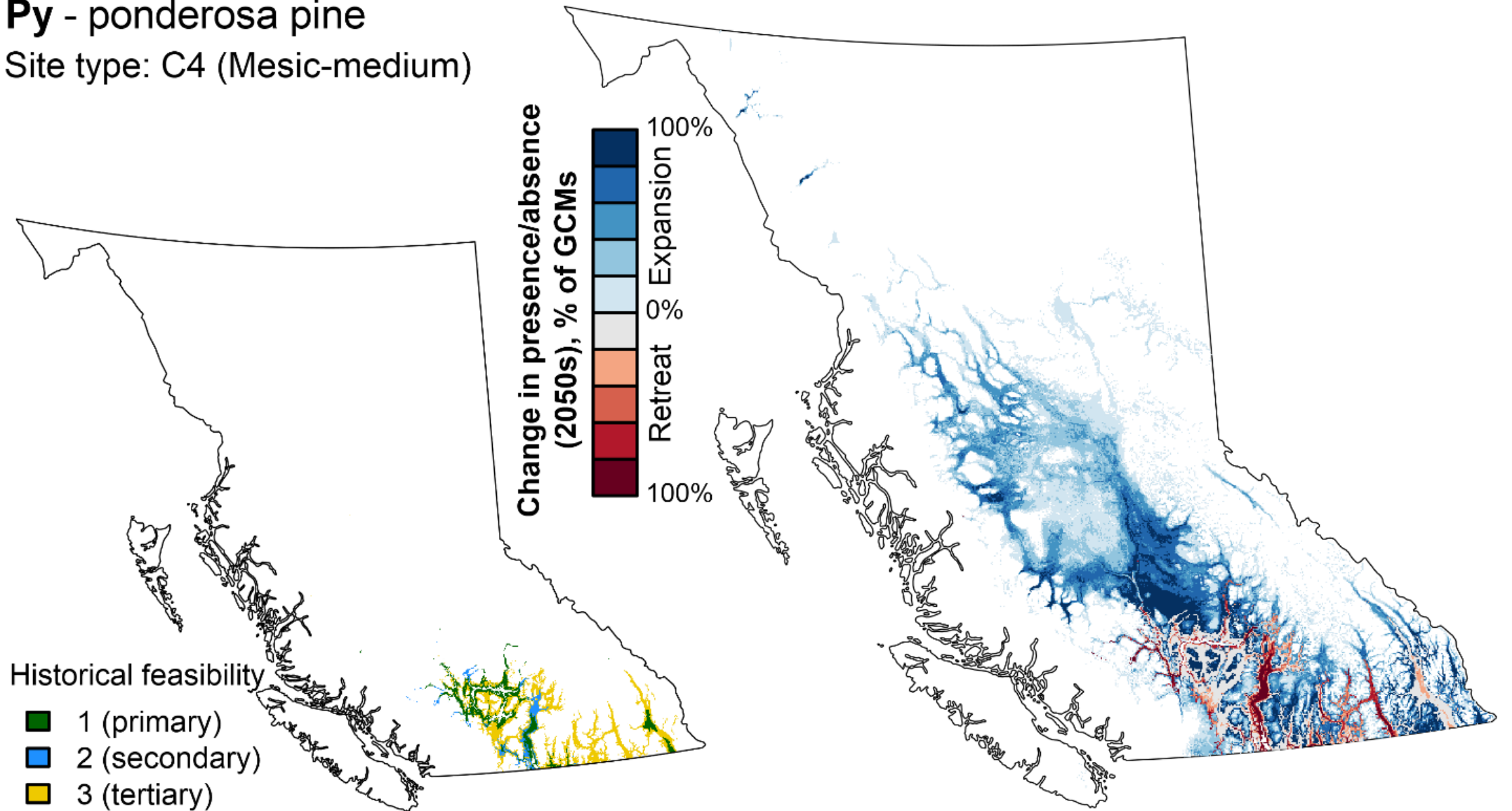
Cw - western redcedar
Site type: C4 (Medium-Mesic)



Site-specific climatic feasibility projections

Py - ponderosa pine

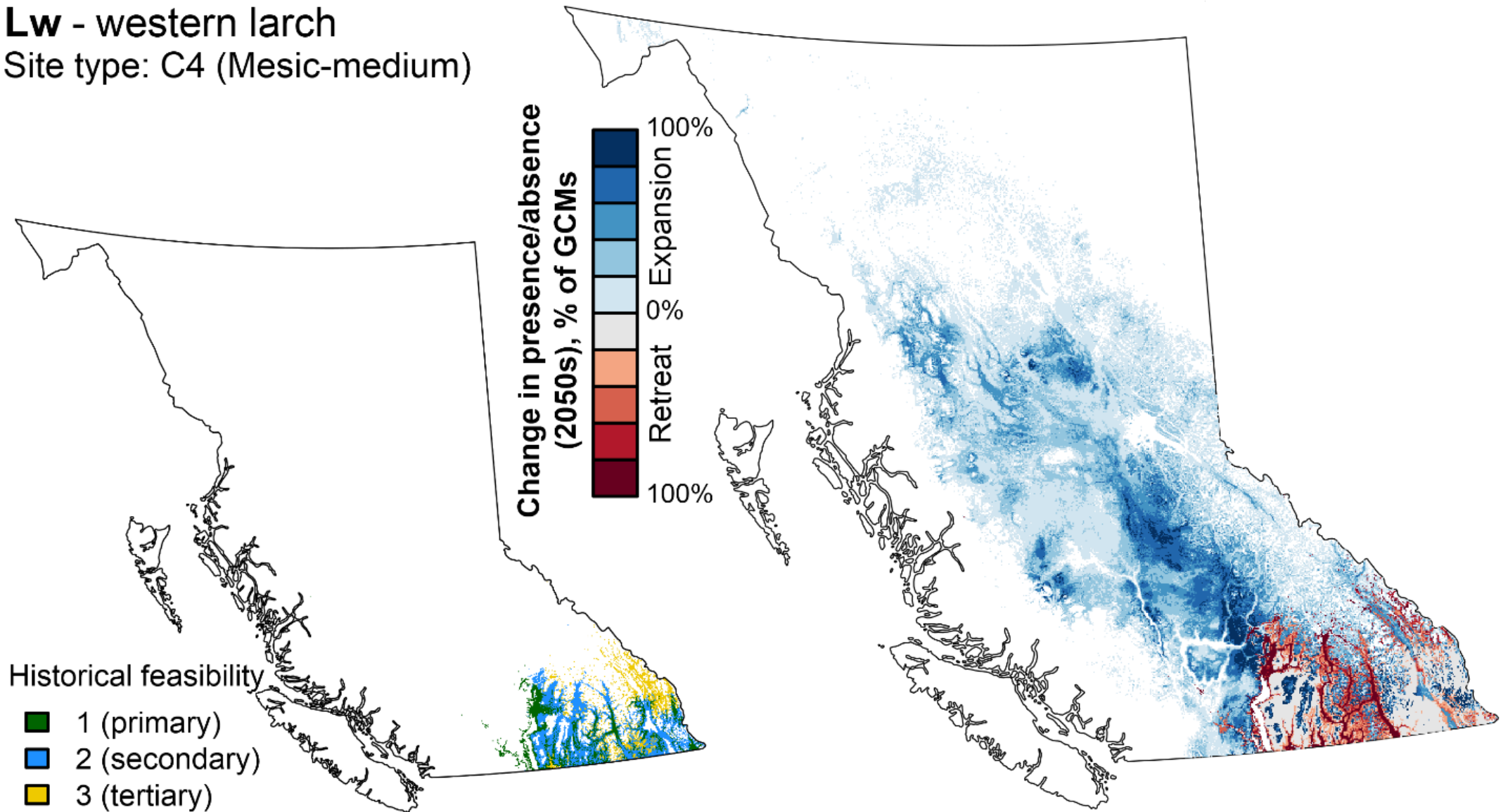
Site type: C4 (Mesic-medium)



Site-specific climatic feasibility projections

Lw - western larch

Site type: C4 (Mesic-medium)



Site-specific climatic feasibility projections

Sx – interior spruce

Site type: C4 (Mesic-medium)

