Genetic Resource Management

Ensuring sound stewardship of the genetic resources of British Columbia's tree species to sustain well-adapted, healthy, productive forests.

Current issues and solutions for western white pine – *Pinus monticola*

Genetic Resource Management Issues

Western white pine has shifted from a major to a minor timber species after a century of rapid decline.

- White pine blister rust was inadvertently introduced to BC in the 1910s and has since caused rapid range-wide decline of all North American 5-needle pine species.
- Trees have heritable resistance mechanisms, with multigenic (quantitative) resistance found in BC to date; single-gene (MGR) resistance has been found in some US populations.



- Differences in rust hazard and resistance restricts seed transfer from the interior to the coast, but not vice versa, with broad transfer allowed within each region.
- Natural population reduction has limited markets and planting demand, further reducing its presence in ecosystems—it is now sparse on the coast, but more abundant in the interior.

Research and Management Solutions

Long-term research partnerships support restoration of the ecological and economic values of western white pine.

- Long-term partnerships between researchers and foresters in the BC Forest Service, Canadian Forest Service, USDA Forest Service, and industry are key to progress.
- First-generation tree improvement program for white pine blister rust resistance is complete, combining multiple resistance mechanisms for long-term durability.
- Partially resistant seed, including seed pollinated by 100% resistant MGR trees, is available.
- Operational breeding program has a diverse genetic base with thousands of tested trees that have been screened for white pine blister rust resistance.
- A viable reforestation option exists on many sites to reduce seedling browse and *Phellinus weirii*.



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Despite severe population declines over the past century, white pine is mostly secure in BC.

	Coast	Interior	SAN WAREAU	THE LEADER AND	
In situ	LOW	GOOD		MA APOTYCE	
<i>Ex situ</i> seed	ls GOOD	GOOD	7		
<i>Ex situ</i> archi	ives LOW	GOOD			
Inter situ	LOW	GOOD			
	In situ		Ex situ	Intersitu A plantation conserving the genetic	Current natural range of western white pine
Definition	Conserved in a protected a	area Conser	ved outside its natural habitat	resources of a representative population	
Example	Provincial park	Seed c	ollections, clonal archives	First-generation progeny trial for one seed planning unit	
Threshold	3 per zone with 5000+ m	Seeds: ature trees seeds of Archive	3 populations per region with 100 collected from $10+$ unrelated trees	0+ 100+ genotypes per region	





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