

# 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 larch – *Larix occidentalis*

## Genetic Resource Management Issues

How will western larch respond to predicted rates of climate change, and is it adequately conserved?

- Western larch has a relatively small natural range; however, its use in reforestation is expanding due to the availability of high-quality seed, early rapid growth, and high-value wood.
- Within its natural range, western larch is ecologically and commercially important, and has high genetic variability.
- Bioclimatic models show that the key climatic factors influencing the distribution of western larch are summer moisture availability, winter temperature, and growing-season duration.
- Bioclimatic modelling and genetic analyses predict that climatically suitable areas for western larch will expand to the north and west; some local populations will becoming increasingly maladapted.



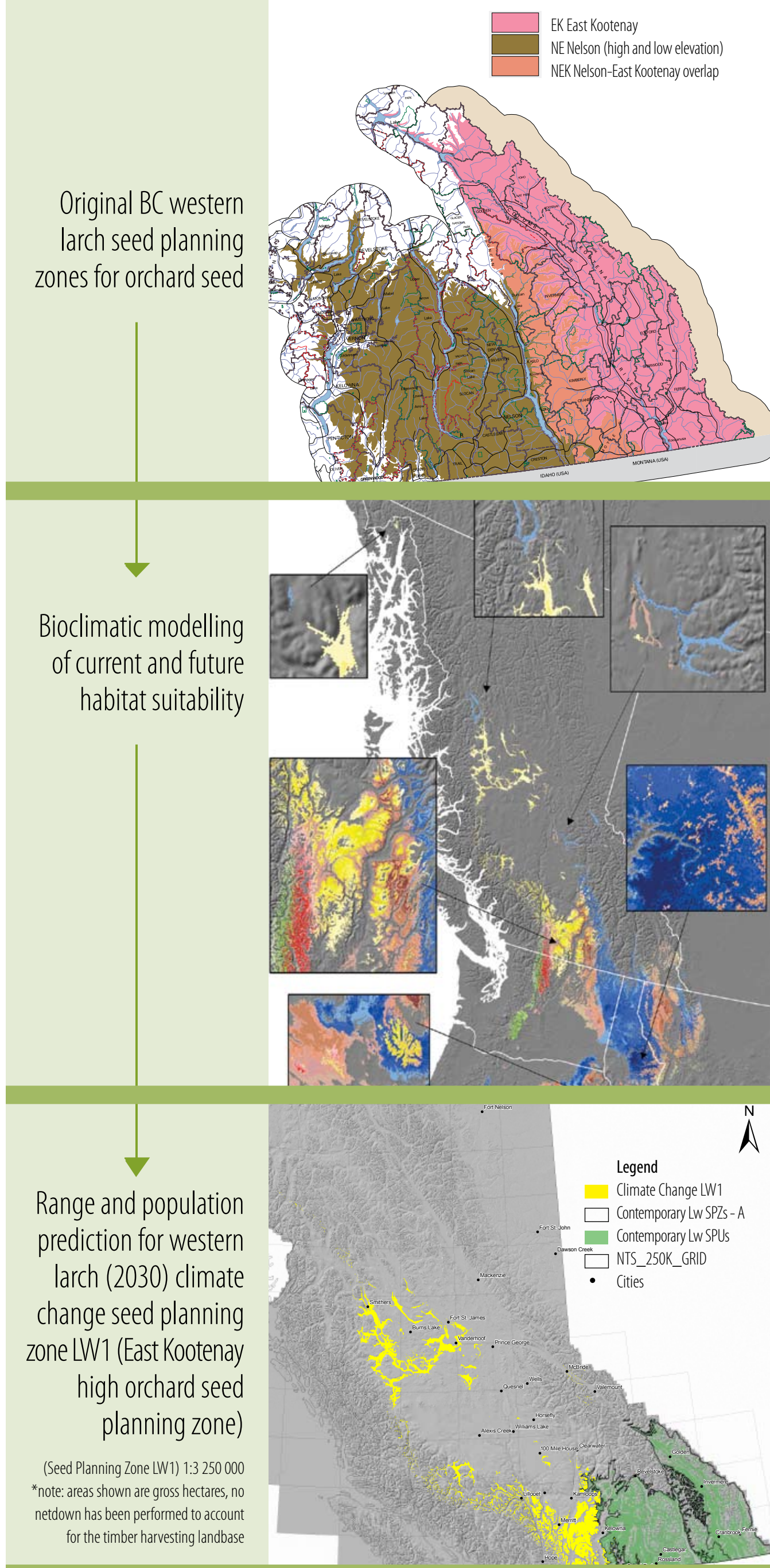
## Research and Management Solutions

Proactive policy changes to reforestation guidelines are supported by collaborative long-term research results.

- BC first-generation western larch seed orchards are in full production; second-generation progeny testing is planned to begin in 2013.
- Range-wide provenance and progeny tests combined with protected gene archive plantations provide a broad genetic base for improvement, conservation, and sustainability.
- As a result of range-wide testing and bioclimatic modelling, western larch is the first species to incorporate climate-based seed transfer; implementation began in spring 2010.
- The new system will expand the current three BC seed orchard zones to five climatic zones (see maps on right).
- Monitoring will assess the accuracy of productivity predictions for western larch seedlots outside its natural range.
- Westernlarch is slightly under-represented across BC in protected areas, but is well conserved in clonal archives, genetic tests, and seed banks.

Conservation status by seed planning zone			
	EK East Kootenay	NE Nelson Low	NE Nelson High
In situ	LOW	LOW	LOW
Ex situ seeds	GOOD	GOOD	GOOD
Ex situ archives	GOOD	GOOD	GOOD
Inter situ	GOOD	GOOD	GOOD

	In situ	Ex situ	Inter situ
Definition	Conserved in a protected area	Conserved outside its natural habitat	A plantation conserving the genetic resources of a representative population
Example	Provincial park	Seed collections, clonal archives	First-generation progeny trial for one seed planning unit
Threshold	3 per zone with 5000+ mature trees	Seeds: 3 populations per region with 1000+ seeds collected from 10+ unrelated trees Archives: 100+ genotypes per region	100+ genotypes per region



Ministry of  
Forests, Lands and  
Natural Resource Operations