

Gene Conservation of *Pinus aristata*: a Collection with Ecological Context for Management Today and Resources for Tomorrow¹

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Pinus aristata, Rocky Mountain bristlecone pine, has a narrow geographic and elevational distribution and is threatened by rapid climate change, the introduced pathogen *Cronartium ribicola* that causes white pine blister rust (WPBR), and bark beetles. The core distribution of *P. aristata* is near and at treeline in central and southern Colorado and extends into northern New Mexico with a disjunct population in northern Arizona. The combination of low genetic diversity, moderate population isolation, and a protracted regeneration dynamic puts populations at risk for extirpation by novel stresses highlighting the need for *ex situ* gene conservation.

Populations range-wide are still healthy and offer the opportunity to sample the genetic diversity of the species. An efficient range-wide gene conservation sampling design of seed and tissue was developed and executed. Ten populations within each of six collection areas corresponding to the observed genetic substructuring were identified; 10 individual tree seed collections and a bulk collection were targeted from each of the 60 populations. Sample trees are georeferenced and sampled for seed and needle tissue; each stored for a working collection and gene conservation at -18 °C. Ecological data (physical site characteristics, stand density, species composition, disturbance history, regeneration capacity) on each population complement the genetic collection. The collection has been used to assess geographic and source-climate variation in genetic disease resistance to WPBR and other adaptive traits. The collection serves (1) to guide further collections and support proactive planting efforts to increase population resilience in the field and (2) to provide conservation and research material of the range-wide diversity for the species before constriction due to directional selection by climate change and WPBR.

More details can be found in: Schoettle, A.W.; Coop, J.D. 2017. Range-wide conservation of *Pinus aristata*: a genetic collection with ecological context for proactive management today and resources for tomorrow. *New Forests*. 48(2): 181–199. <http://link.springer.com/article/10.1007/s11056-017-9570-z>.

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