

Focus:

Alberta's Species-at-Risk Whitebark Pine

By Ian Urquhart



Interactions, inter-relationships. Those are the ideas I may find especially fascinating about ecology. Whitebark pine (*Pinus albicaulis*) is a species at risk that illustrates how vital interactions between species may be to their survival.

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) designated Whitebark Pine as endangered six years ago, in April 2016. This long-lived, five needled pine only is found at high elevations in British Columbia and Alberta. In Alberta, its range is found in a narrow band just east of the B.C. border stretching from the international border with the United States to approximately 150 kilometres north of Jasper. Together

the whitebark pine forests of Canada's two western provinces account for roughly 56 percent of the species' global range.

Whitebark pine is a very long-lived species. COSEWIC's 2010 Assessment and Status Report noted the species often lives for more than 500 years with some individuals living for more than 1,000 years. It's incredible to imagine that some whitebark pines in the Canadian Rockies were growing when William the Conqueror defeated and killed King Harold of England at the Battle of Hastings in 1066.

Today, whitebark pine face their own Battle of Hastings and the species' probable fate, unless we lend vital help, sadly looks more likely to be Harold's. The species

is "imminently and severely threatened." Four factors are responsible for its dire situation: white pine blister rust, mountain pine beetle, excluding fire from the management of the whitebark pine's ecosystem, and climate change.

Humans have influenced, to the detriment of whitebark pine, all of these factors. White pine blister rust was introduced into B.C. from France in 1910. The blister rust had infected a shipment of eastern white pine seedlings but was not discovered until 1921. By 1950, after spreading quickly, the blister rust was prevalent in all major white pine regions. Infected pines not killed by blister rust will suffer from reduced seed production



Stand of Whitebark Pine
PHOTO: BY RICHARD SNIETKO,
US FOREST SERVICE

and dispersal. Consequently, many stands have completely lost their ability to regenerate.

A native species, mountain pine beetle, has lived together with whitebark pine for nearly 9,000 years. With beetle populations reaching epidemic levels it now poses a mortal threat to this high-elevation pine. Studies in the last 10 years show that approximately 90 percent of pines in stands hosting mountain pine beetle will be killed by this insect. Although the beetle is a natural threat to whitebark pine human actions have helped propel the insect's population to today's epidemic levels. Climate change, with its less severe winters and warmer summers, has helped the beetle survive and reproduce in stands throughout western Canada. Just as we have succeeded in contributing to a changing climate so too have we succeeded in preventing and suppressing wildfires. This latter success has increased the populations of the age-class of pines most susceptible to beetle attack. Our focus on fire exclusion is doubly damaging to the species since fire is the primary ecosystem disturbance that facilitates whitebark pine regeneration.

COSEWIC concluded that, while these human-influenced factors individually constituted significant threats, "these factors interact to further increase the severity of the impacts."



Clark's Nutcracker (*Nucifraga Columbiana*) BY WING-CHI POON

Whitebark pine's special significance

If we lose whitebark pine we lose more than "just another" species. COSEWIC judges this pine to be a "keystone species" in the alpine ecosystem. It's the hub of the wheel in that landscape. Its seeds are a favoured food source for birds and mammals alike. Black bears and grizzly bears both benefit from their nutritional value. It's the relationship between whitebark pine and Clark's nutcracker that first fascinated me when I attended a workshop in Waterton National Park many years ago. In one of the sessions I learned the

pine is completely dependent on Clark's nutcracker for its regeneration. Whitebark pine cones do not open to release their seeds. The cones instead must be cracked open by the nutcrackers who then remove the seeds and cache them in the ground for a rainy day. The seeds that forgetful nutcrackers never retrieve germinate to become the next generation of whitebark pine. Without this essential dependence on the nutcracker the pine's seeds would not be dispersed over a wider area and its odds of regeneration would range from slim to none. It's an amazing example of interdependence between species.



BY WALTER SIEGMUND

Genetics: One Key to the Future of Whitebark Pine

Genetic research and resources represent one key to the survival of whitebark pine. Here researchers in the U.S. and Canada seek out blister rust resistant individual pines. Disease resistant individuals offer the potential to serve as seed banks and seed donors. As the *Alberta Whitebark Pine Recovery Plan 2013-1018* stated, efforts to conserve genetic resources and to re-introduce rust-resistant whitebark pines into the landscape. Conserving genetic diversity and developing rust-resistant trees were two of the four objectives set by that strategy. 🌲