Threats to Whitebark Pine

1. Fire Suppression

Whitebark pine establishes at an early stage of forest succession and, if disturbance is minimal, is gradually replaced by other conifer trees. However, disturbances like fire and avalanches are natural in the mountain environment, constantly resetting the successional clock. Historically, sub-alpine forests burned every 90–300 years in the Canadian Rockies.

This natural fire cycle prevented forest fuels (live and dead wood) from accumulating and contributing to large, high intensity forest fires. Though high intensity fires did occasionally occur, small and patchy, low intensity fires were most common. Past forest management practices included total fire suppression. As a result, fire hazard increased because the amount of fuel in the forests built up, and the abundance of open areas for seed caching decreased. Overall, fire suppression has contributed to the reduction of whitebark pine regeneration.

2. Insects and Disease

White pine blister rust was introduced to North America from Europe in the early 1900's. Since then, it has spread and infected most whitebark pine stands. The disease damages upper cone-bearing branches and can kill the tree. Less than one per cent of all whitebark pine is blister rust resistant.

A recent study in Canada found infection rates between 40% and 75% in southern British Columbia and Alberta, including Waterton Lakes National Park. Many trees are dead in these stands. Further north, blister rust is present but infection rates are lower.

The mountain pine beetle, a native species, also attacks whitebark pine. Total fire suppression has created large stands of old, even-aged lodgepole pines. These are more prone to beetle epidemics than areas with a patchwork of various aged trees, because young trees are better able to repel the beetles. These epidemics can spread into whitebark pine stands.

Restoring Whitebark Pine Ecosystems

What is the future of whitebark pine? At the moment, no one knows if the blister rust epidemic has stabilized, or if it will continue to spread. As the range of whitebark pine shrinks, it is important to conserve remaining stands on both public and private lands. The whitebark pine ecosystem is a web of interaction among plants, animals and processes like fire. This re-enforces the importance of maintaining and preserving whole ecosystems across the landscape.

Parks Canada is evaluating the use of prescribed fire as a tool to revitalize this keystone sub-alpine species. Reintroducing fire to an area where whitebark pine is being overtaken by other conifers will help restore the health and distribution of the species. In conjunction with the use of prescribed fire, Parks Canada is undertaking long-term research to monitor and evaluate its success in restoring healthy whitebark pine populations and sub-alpine communities. The information collected will help inform and refine ecosystem management practices not only in national parks, but also across the greater landscape.

Limber Pine

This tree occurs at lower elevations than whitebark pine but shares a similar ecology. Its seeds are distributed by birds, it benefits from fire, and it is also prone to blister rust infection. Whatever steps are taken to conserve whitebark pine also apply to limber pine.

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