Whitebark Pine

RESOURCE BRIEF

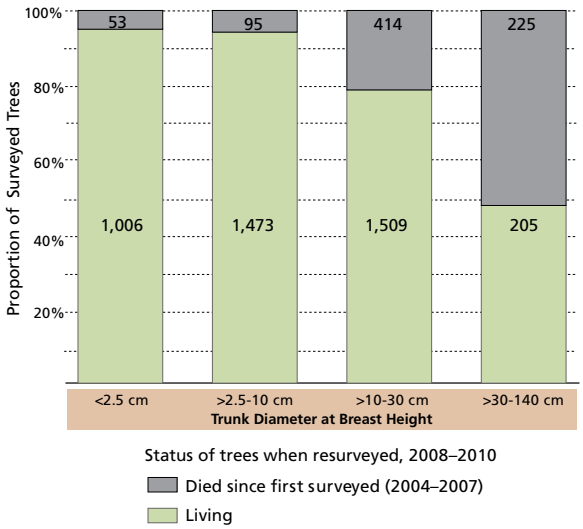
Importance

Whitebark pine (*Pinus albicaulis*) is a high-elevation tree of the northern Rocky Mountains, where it grows in nearly homogeneous stands on harsh, dry terrain but is more often found with other conifers in moister, more protected sites. It reduces erosion, acts as a nurse plant for other subalpine species, and produces seeds that are an important food for grizzly bears and other wildlife. However, the whitebark pine is threatened throughout its range by blister rust, an introduced pathogen that increases the trees' vulnerability to infestation by endemic mountain pine beetles.

Status and Trend

To track whitebark pine survival in Greater Yellowstone, an interagency monitoring program tagged 4,774 live trees >1.4 m tall in 176 transects from 2004 to 2007. When the transects were resurveyed in 2008 to 2010, 238 new trees were tall enough to be tagged but 16% (787) of the previously tagged trees had died, including more than half of the trees >30 cm in diameter. 69% of the dead trees surveyed had evidence of mountain pine beetle (Dendroctonus ponderosae), which prefer larger trees for laying their eggs. Mountain pine beetle larvae feed on the inner phloem of the bark, often girdling the tree and causing its death.

White pine blister rust (Cronartium ribicola) infected approximately 20% of the trees when first surveyed.



Proportion and number of tagged trees that had died and were still alive when resurveyed in 2008, 2009, or 2010.

Although any change in this proportion cannot be determined until all of the transects have been rechecked in 2011, the infection was found in 25% of the 984 trees rechecked in 2008, 39% of the 979 trees rechecked in 2009, and 11% of the 1,045 trees rechecked in 2010.

Aerial surveys, which measure the spatial extent of mortality rather than the percentage of individual dead trees counted on the ground, have generally arrived at higher mortality estimates for whitebark pine in greater Yellowstone. However, this could be because larger trees, which occupy more of the area in the forest canopy visible from the air, are more likely to be attacked by beetles.

Discussion

Historically, higher elevation forests have been less subject to major infestations because the pine beetles could not survive winters there. Past outbreaks in whitebark pine have been correlated with warmer periods. Whitebark pine that survive this outbreak will continue to be stressed by blister rust, which infects all size classes, causes mortality in both young and old trees, and will impair forest regeneration long after the beetle epidemic is over.

As part of its strategy for addressing the high rate of mortality, the interagency whitebark pine subcommittee of the Greater Yellowstone Coordinating Committee collected more than 1.3 million whitebark pine seeds in 2009 and continue to collect seeds, some to be put into storage and others to be sown by nurseries for future planting in the Greater Yellowstone Ecosystem.

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