



Whitebark Pine

RESOURCE BRIEF

Importance

Whitebark pine (*Pinus albicaulis*) is a critical component of many high-elevation ecosystems in the Greater Yellowstone Ecosystem. The architectural and physiological characteristics of whitebark pine influence biodiversity, forest structure and function, hydrological quality, and wildlife habitat. This long-lived conifer holds great aesthetic value as a charismatic species thriving in the most rugged locations.

Status and Trend

Grand Teton has a total of 25,500 acres of whitebark pine forests—16,800 acres are mixed with other conifers and on 8,700 acres dominated by whitebark pine. Currently whitebark pine is affected by native mountain pine beetles; the nonnative pathogen, white pine blister rust; and altered climate conditions. Recent temperature-driven shifts in beetle life cycles resulted in increased numbers of beetles within their historic range and unprecedented mortality of whitebark pine forests in high-elevation ecosystems. Overflights of the Greater Yellowstone area performed during 2009 indicate beetle activity in the visible overstory trees in 90% of all watersheds containing whitebark pine. In addition, white pine blister rust is found throughout Grand Teton Park causing extensive damage to cone bearing branches, seedlings, and saplings, which reduces the likelihood that seedlings will survive to maturity.

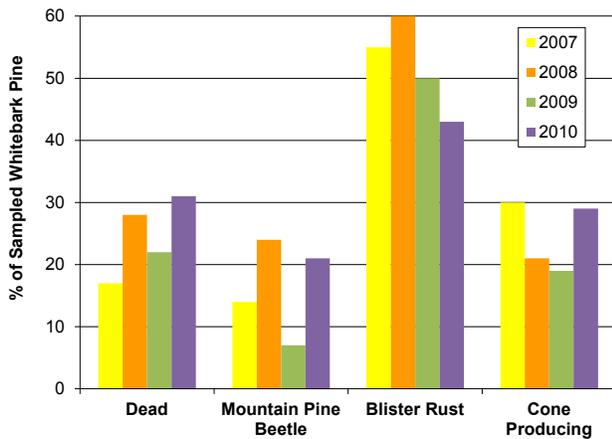
In 2007, resource managers initiated a monitoring pro-



NANCY BOCKWOLD

This whitebark pine grove shows conspicuously red as it dies from the combined attack of beetles and rust.

gram for whitebark pine and installed transects throughout the park. Ecologists track changes in the distribution and severity of blister rust and beetles, and identify areas of low beetle activity or rust infection. Whitebark pine mortality, beetle activity, blister rust severity, cone production, and recruitment vary by location. In 2010, of the whitebark pine that were sampled, 31% were dead, 21% were attacked by beetles, 43% were infected with blister rust, and 29% produced cones. Whitebark pine regeneration was present at 96% of sampled transects. The average number of blister rust cankers per infected tree increased to 22.7 per tree in 2010 from an average of 11.7 in 2007. Beetle activity and blister rust severity was significantly greater at elevations less than 9,500 feet and on south aspect transects; blister rust severity was also greatest on larger diameter whitebark. Individual whitebark with greater rust severity had significantly higher mountain pine beetle attack incidence.



Proportions of whitebark sampled in Grand Teton National Park that are dead, infested by mountain pine beetle, infected with blister rust, and are cone producing.

Discussion

In Grand Teton National Park, biologists attach packets of verbenone, a synthetic pheromone which acts as a beetle deterrent, to high value trees— those with high cone production and those that appear to be blister rust resistant. They also collect seeds from apparently disease-free park trees to test for genetic resistance as part of a range-wide study. Ecologists throughout the Greater Yellowstone Ecosystem monitor whitebark pine health, propagate blister rust-resistant seedlings, map whitebark pine distribution and stand attributes, and have prepared a Greater Yellowstone-wide whitebark pine strategy. These efforts should aid managers in preservation and restoration of this keystone species.

