

Health of Whitebark Pine Forests after Mountain Pine Beetle Outbreaks in the Intermountain West (INT-EM-08-02)

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Introduction

Whitebark pine (WBP) is a keystone species of high-elevation ecosystems and is currently at risk due to a combination of white pine blister rust, forest succession, and recent outbreaks of mountain pine beetle (MPB). We quantified WBP health following MPB outbreaks to determine potential restoration needs in severely impacted areas.



Whitebark Pine Forest After MPB Outbreak on Avalanche Peak, Yellowstone National Park

Objectives/Methods

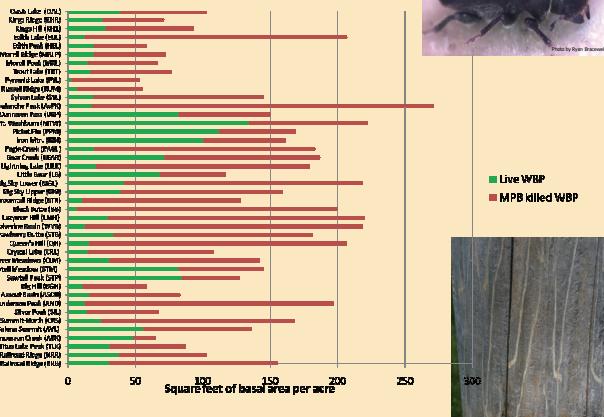
1. Quantify the extent and severity of MPB impacts in 42 WBP stands following outbreaks in ID, MT, Greater Yellowstone Area (GYA).
 2. Compare current outbreak losses with losses from the 1930's in central Idaho.
 3. Document blister rust status of remaining mature live whitebark pine.
 4. Record health & amount of all natural regeneration.
 5. Determine probable stand trajectory based on health and abundance of other tree species.



Blister rust stem canker

Results

Mountain Pine Beetle Impacts



- 30–97% of WBP tallied in each area were killed by MPB during the recent outbreak
 - WBP density dropped by more than 80% on over half of areas surveyed
 - Over 50% WBP basal area (BA) was lost on 81% of areas

MPB damage

Comparing current MPB outbreak with the 1930's outbreak in Central Idaho

- In 4 of 6 stands attacked in both periods, more WBP BA was killed in the 1930's.

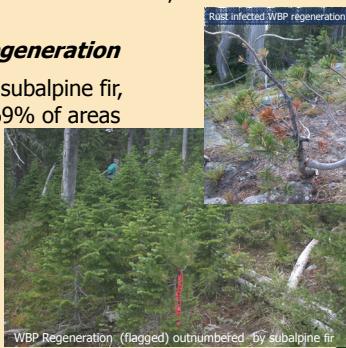
White Pine Blister Rust

Infection levels on remaining live mature WBP in the sampled areas averaged:

- 64% in northern Idaho, western Montana, & GYA
 - 4% in central Idaho

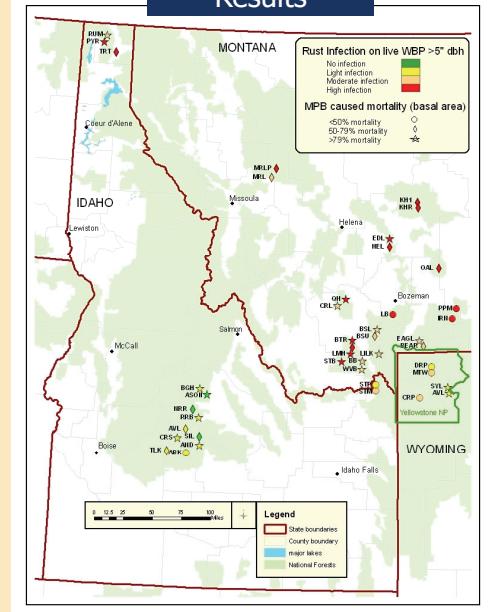
Regeneration

- Other species, primarily subalpine fir, outnumbered WBP in 69% of areas
 - Blister rust infected 0-81% of the WBP regeneration
 - About 40% of sites had infection levels exceeding 20%



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Results



Probable Stand Trajectory

- BA of other tree species became greater than live WBP BA after MPB outbreaks on:
 - **90%** of sites in Northern ID & Western MT
 - **32%** of sites in the GYA
 - **20%** of sites in Central Idaho



Based on blister rust and MPB impacts on WBP, and abundance of other tree species, at least 70% of sites will likely convert from WBP to other cover types without restoration efforts or wildfire.