

Map of whitebark pine monitoring plots on the Inyo National Forest.

Whitebark Pine (*Pinus albicaulis*) Mortality Monitoring on the Inyo National Forest, Southern Sierra Nevada

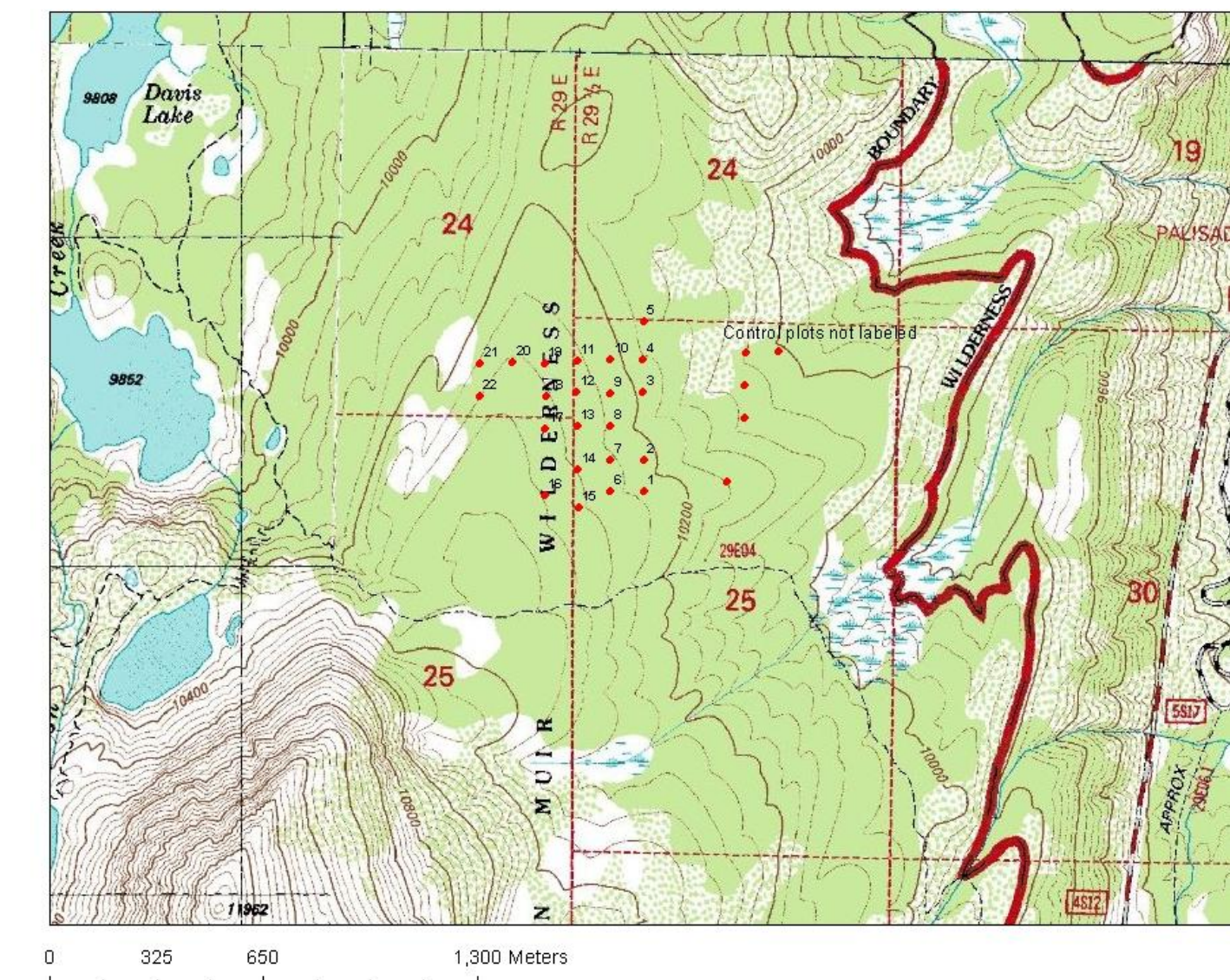
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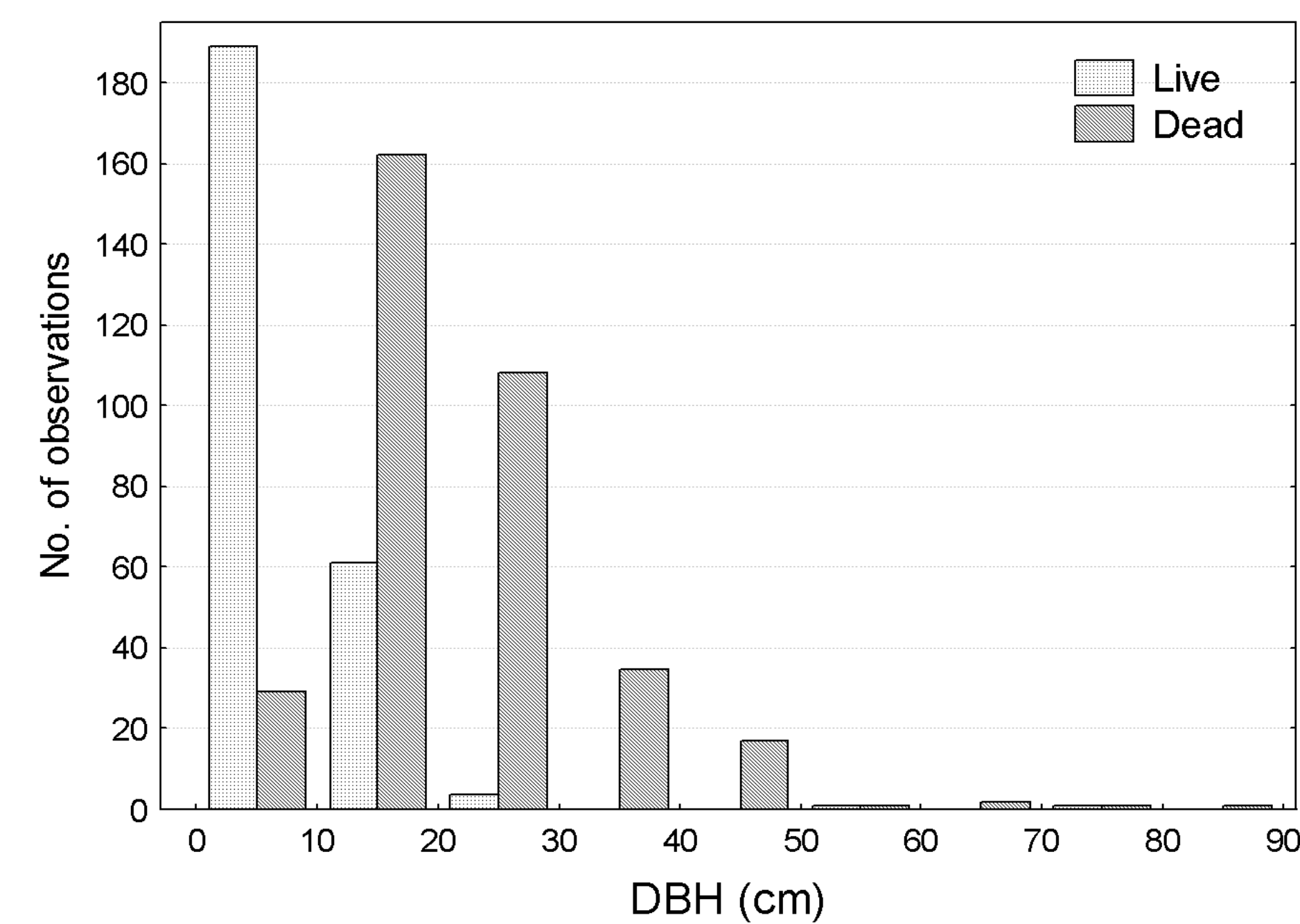
Map of whitebark pine monitoring plots at Rock Creek-Hilton Lakes, Inyo National Forest.

BACKGROUND

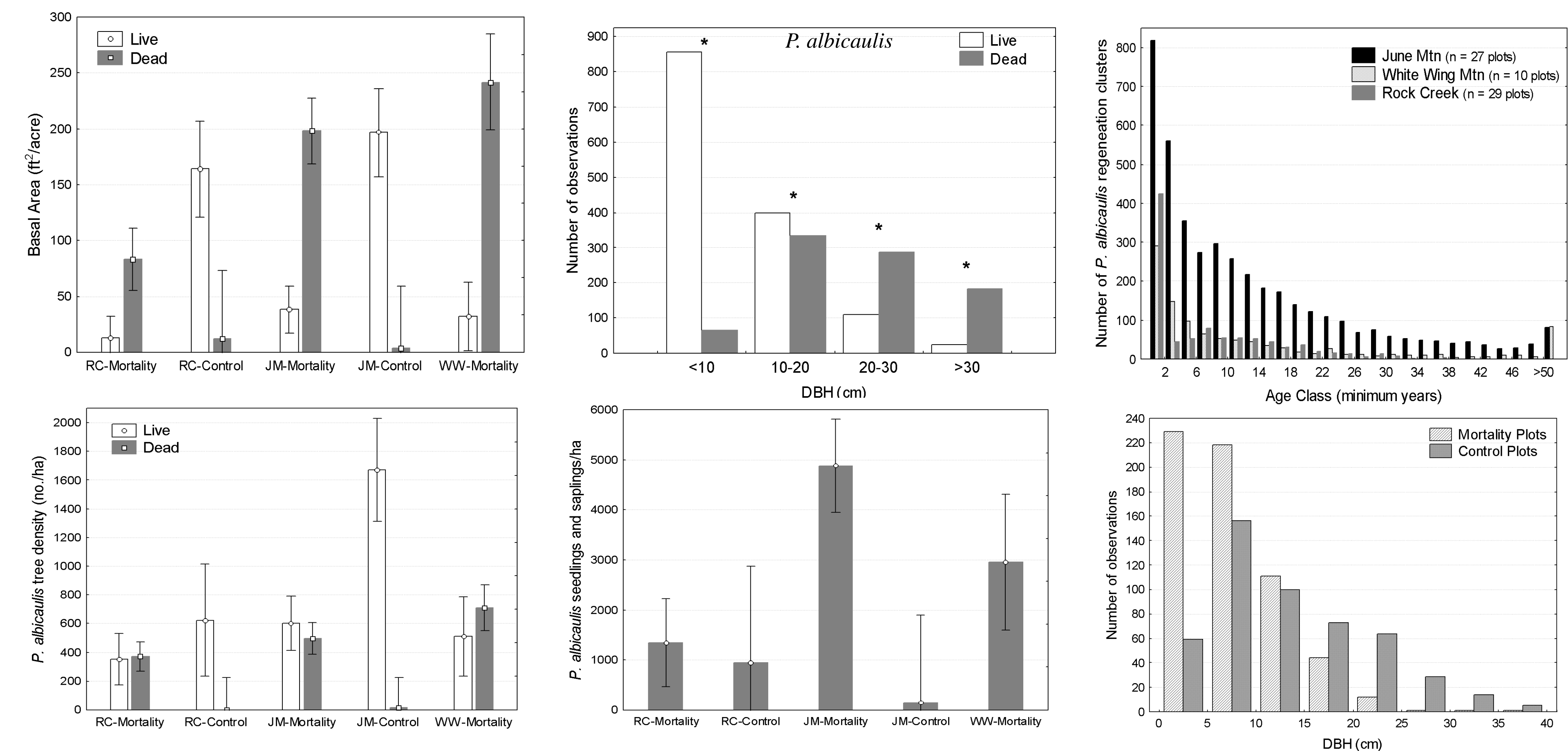
Whitebark pine (*Pinus albicaulis*) populations in the southern Sierra Nevada have recently experienced several localized mountain pine beetle (MPB) outbreaks. We monitored whitebark pine stands in areas of recent (post-2005) and severe MPB-induced mortality to evaluate patterns of tree mortality, regeneration, and size class structure in whitebark pine dominated stands of the Inyo National Forest. Our monitoring sites focused on whitebark pine dominated stands and included three sites: June Mountain, White Wing Mountain, and Rock Creek-Hilton Creek.

METHODS

- We sampled a total of 66 plots (0.05 ha), including 55 high-mortality and 11 low-mortality (control) stands between 1-4 years post-MPB outbreak.
- We placed monitoring plots on a 100-m grid within high-mortality and control whitebark pine-dominated stands.
- We recorded site and stand attributes, vegetation and ground cover, and whitebark pine regeneration in late July and August 2011 and 2012.



Size class distribution of live and dead whitebark pine trees in high-mortality plots of White Wing Mountain, Inyo National Forest.



Mean 95% CI bar graphs and histograms of stand variables measured in whitebark pine plots. * indicates that the observed mortality in each size class is significantly greater or lower than the overall expected mortality for that class ($P < 0.001$).

SUMMARY & CONCLUSIONS

- Our results indicate significant and immediate loss of basal area and tree densities of whitebark pine in MPB-impacted stands.
- MPB-related mortality was greatest in larger diameter (>20 cm dbh) whitebark pine trees.
- In mortality plots from all sites, there was a shift in the size class distribution of whitebark pine to smaller diameter classes (<15 cm dbh) relative to control plots.
- Whitebark pine regeneration was greater in high mortality than control plots at June Mountain and White Wing Mountain, but there was no difference at Rock Creek.
- All three sites showed a relatively stable production of whitebark pine regeneration at least within the past 50 years, with a pulse of new seedlings in the past 2 to 4 years in MPB-impacted stands.
- Our results indicate that whitebark pine stands are heavily impacted by MPB outbreaks, indicating low resistance but potentially high resilience to initial attack.
- Long-term monitoring will be required to track future patterns of mortality and regeneration in whitebark pine populations of the southern Sierra Nevada.



Widespread whitebark pine mortality and vegetation change approximately 2 to 4 years following mountain pine beetle attack on June Mountain ski area, Inyo National Forest.

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