WHITEBARK PINE (*PINUS ALBICAULIS*) PERMANENT MONITORING PLOTS

NORTHEAST OREGON ECOLOGY PROGRAM, U.S. FOREST SERVICE

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INTRODUCTION

Whitebark pine (*Pinus albicaulis*) is recognized as a "keystone" species in high-elevation forests, providing high-quality food to various animals and playing a role in stabilizing soils, colonizing disturbed areas, and moderating snow melt (Aubry et al. 2008). There are several factors leading to whitebark pine's status as a candidate species for federal listing. Among those factors are the species vulnerability to white pine blister rust, susceptibility to infestation by mountain pine beetle, wildfire, competition by subalpine fire, and climate change.

The permanent plot network in Region 6 is designed to monitor changes in stand structure, regeneration, and impacts from white pine blister rust (WPBR) and mountain pine beetle (MPB) as well as damaging agents on other tree species. The project is the continuation of work done throughout the region over the last 10 years to monitor the health and status of whitebark pine on Federal lands and maintain consistent data standards. The region has developed permanent plot monitoring protocols that are standardized and implemented so that data is comparable across R6. Additionally, the methods have been adopted by Washington State Department of Natural Resources (WDNR), the Confederated Tribes of Warm Springs, Colville Bureau of Indian Affairs (BIA), Yakima BIA, and were used by the Bureau of Land Management (BLM) when they did a general inventory of whitebark pine on their lands. To date we have 290 plots installed in Region 6 across National Forest System (NFS), BIA, and WDNR lands.

In the Wallowa and Elkhorn Mountains 200 permanent whitebark pine plots were installed in the early 2000s using a different protocol from the one that was standardized in the region. Since the Wallowa and Elkhorn plots were installed, there has been active mountain pine beetle (MPB) activity causing substantial mortality in the overstory of whitebark pine. In 2011, a subset of the original plots were resampled with the standard Region 6 protocol for inclusion into the regional dataset (66 from the Elkhorn Mountains and 76 from the Wallowa Mountains). This 2019 plot monitoring project aids in tracking changes in stand structure since the MPB outbreak. Additionally, recent analyses show that previous infection levels of WPBR on some plots were inaccurate; therefore, this project helps inform the WPBR incidence in these key areas.

Additionally, three plots installed in the Diamond Peak Wilderness on the Willamette National Forest were scheduled for a 5-year remeasurement in 2019.

METHODS

The number of permanent plots in the Wallowa and Elkhorn Mountains were still thought to be too numerous to monitor effectively. Therefore, another selection of plots was conducted to carry forward. The plots were chosen by grouping plots into distinct geographic areas within each mountain range to ensure good distribution, then randomly choosing 4-6 plots within each grouping prior to data collection for a total of 47 plots (Figure 1). This method of blocking the plots allowed us to retain a geographic spread but avoid biased plot selection. Plots were resampled using the standard protocols developed by the region.

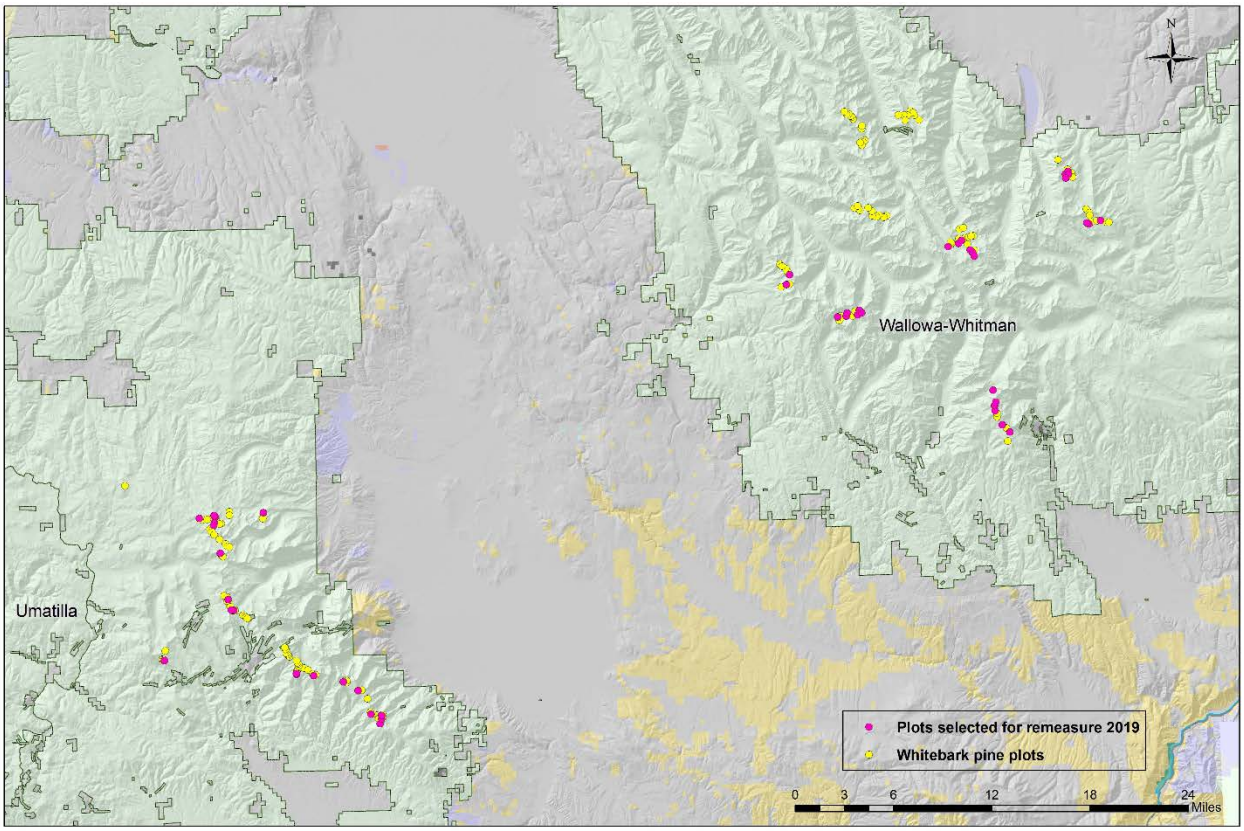

Figure 1. Two hundred whitebark pine monitoring plots (yellow circles) were installed in 2005 on the Wallowa-Whitman National Forest. Forty-seven plots (pink circles) were randomly selected for monitoring in 2019.

RESULTS

On the Wallowa-Whitman National Forest, 20% (19 plots – Elkhorn Mountains, 21 plots – Wallowa Mountains) of the original 200 plots were resampled with the intention of maintaining these into the future. Due to logistics (access and inclement weather) three geographic areas of

the Wallowa Mountains were not sampled; therefore, only 40 of the 47 plots selected for resampling were visited (Figured 1.). The Willamette NF plots in the Diamond Peak Wilderness were revisited and data collected using the regional standard protocol. One new plot was installed at Vinegar Hill, which is home to the Umatilla National Forest's small population of whitebark pine.

Datasheets and pictures were uploaded into a USFS Pinyon folder for storage and shared with staff in the Northwest Oregon and Blue Mountains Forest Insect and Disease Service Centers. Data will be entered into the Region 6 whitebark pine monitoring database.

DISCUSSION

The Willamette National Forest team noticed a continuing decline in WBP trees within both transects as a result of very high WPBR infection rates. The overall impression of the Blue Mountains crew was that most plots had moderate levels of WPBR in the stands they encountered, with the exception of Anthony Lakes in the Elkhorn Mountains which had high levels of rust infection. Trees that seemed unaffected in the plots were young saplings that had presumably not yet been infected. Teams explored potential additional plot locations and documented additional distribution data. This expansion of the known habitat will be entered into Natural Resource Manager Threatened, Endangered and Sensitive Plants database this winter.

CONCLUSION

We recommend that 3-4 additional plots be added to the subset of plots to be monitored in each of the 3 distinct geographic areas in the Wallowa Mountains. If necessary, plots can be removed from other areas where up to 6 plots were sampled to make continuation of this monitoring feasible. Additionally, we recommend that if all plots in the Blue Mountains (including plots in the Strawberry Mountains of the Malheur National Forest) are sampled during the same season, two crews are needed to get the work completed. On average, it took about 4 days to complete 3-4 plots, taking into account travel to and from the plots. The highest number of plots completed was 6 in 4 days because the plots were relatively closer together compared with other plot clusters. Another option would be to have each mountain range sampled in 3 consecutive years to stagger the resampling effort.

REFERENCES

Aubry, C., D. Goheen, R. Shoal, T. Ohlson, T. Lorenz, A. Bower, C. Mehmel, and R. Sniezko. 2008. Whitebark Pine Restoration Strategy for the Pacific Northwest Region, 2009-2013. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Region. 96 pp.