WHITEBARK PINE (*PINUS ALBICAULIS*) SURVEY WALLOWA MOUNTAINS, OREGON

NORTHEAST OREGON ECOLOGY PROGRAM, U.S. FOREST SERVICE

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December 2019

INTRODUCTION

Whitebark pine 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.

There has only been one substantial collection effort of resistant material in the Blue Mountains. Screening results from that effort showed several areas that had high resistance, or elite trees. These areas warranted another visit to search for more candidate trees. Additionally, a recent habitat suitability model identified areas outside Eagle Cap Wilderness that had not been inventoried. The primary objective of this project was to conduct field inventories in 2019 to identify blister rust resistant candidate whitebark pine trees.

Whitebark pine is a candidate species for federal listing. Identifying white pine blister rust resistant individuals, seed collection, and deployment of rust resistant seedlings is a cornerstone of the R6 whitebark pine restoration strategy (Andy Bower, *personal communication*).

METHODS

For these surveys, we used output from a MAXENT habitat suitability model (Jennings 2018) for whitebark pine (*P. albicaulis*) to look for areas of good habitat suitability that are outside of the Eagle Cap Wilderness. We surveyed through the areas of high suitability while recording a Global Positioning System (GPS) track. When we located individual trees, we delineated a stand boundary that was entered into the Natural Resource Manager (NRM) Threatened, Endangered and Sensitive Plants database. While surveying, we looked for large, robust trees that appeared to be unaffected by white pine blister rust to be candidates for cone collection and infection trials at Dorena Genetic Research Center (DGRC). Candidate trees were tagged, their location coordinates recorded by GPS, and a Select Tree Register form completed and sent to DGRC.

RESULTS

Mt. Fanny

We surveyed the area at the top of Mt. Fanny above Cove, OR on September 30th, 2019. Our survey area was made up of a 3.1 mile loop that passed along the two peaks at the top of Mt. Fanny, in close vicinity to the two radio tower complexes at the top of the mountain (Figure 1). The total area surveyed was 23.74 hectares. Some of the areas that showed high habitat suitability based on the model output were inaccessible due to steep rocky slopes and 2 inches of snow. Trees in these areas were investigated from a distance with 10x magnification binoculars.

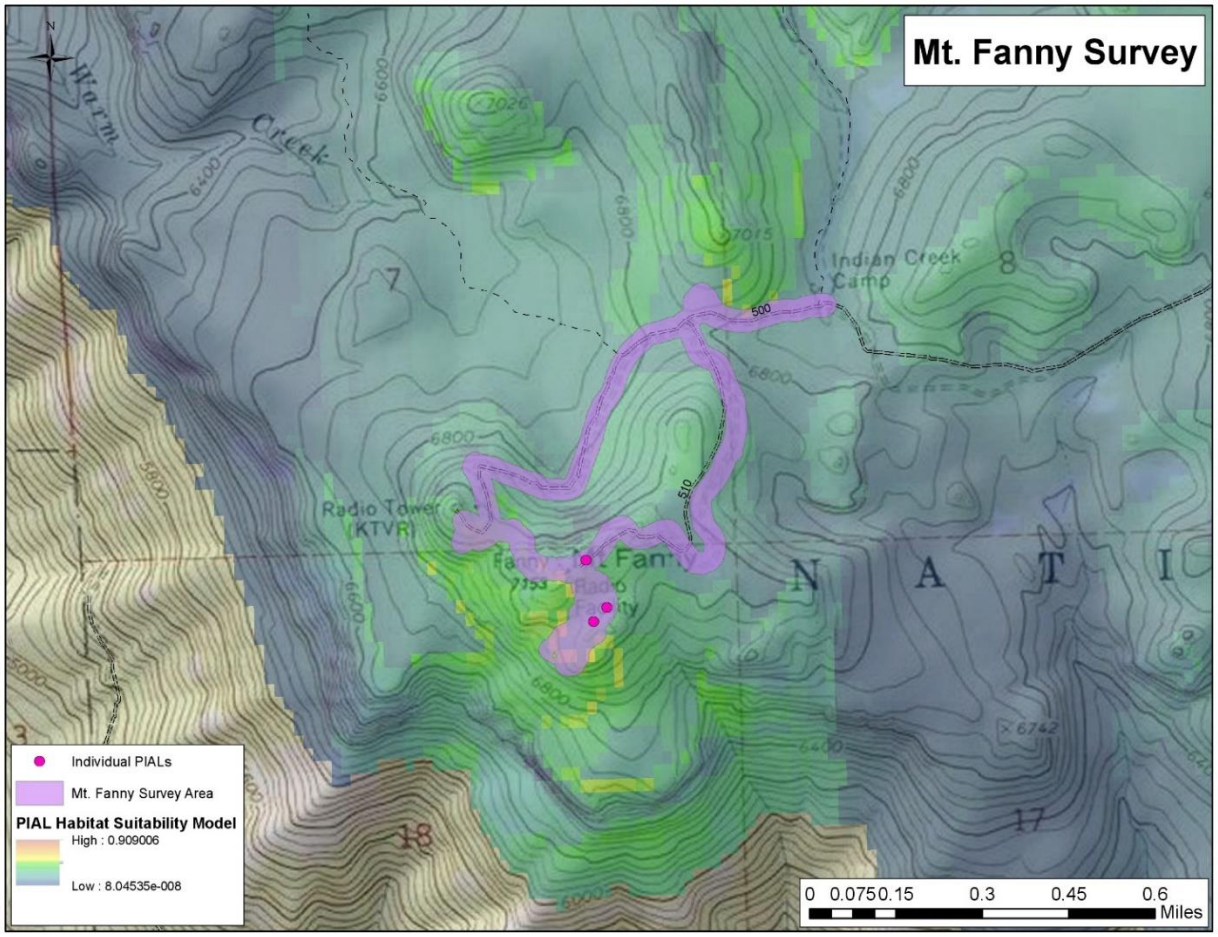

Figure 1. Survey area map for Mt. Fanny.

The forest in this area is mid-late seral and is dominated primarily by lodgepole pine (*Pinus contorta*), subalpine fir (*Abies lasiocarpa*), and mountain hemlock (*Tsuga mertensiana*). The forest is very dense and heavily shaded, especially in the mountain hemlock stands. There were very few whitebark pines in this area, and the individuals present seemed to be restricted in distribution to crumbling sandstone spines where the other tree species had difficulty growing.

The few whitebark pines that were present were heavily infected with white pine blister rust (Figure 2). There was a small fire in the area surveyed recently and, while the extent of burned trees was not great, there was a large area, including a few whitebark pines, that was covered in fire retardant (Figure 3).

While the area appears, superficially, to be similar habitat to that found in other rocky peaks of the Wallowa Mountains, the fact that the parent material is sandstone is unique. This difference in parent material coupled with a dense, dark overstory seems to be limiting growth and regeneration of whitebark pines in this area. Overall it appears that this area is not high-quality whitebark pine habitat.

Figure 3. The first whitebark pine we encountered during the Mt. Fanny survey. This tree has a reddish hue to it because it is coated in fire retardant. Photo courtesy of Rebecca Braisted.

Figure 2. This is the second whitebark pine we encountered during the Mt. Fanny survey. This was the standard state of the whitebark pines we encountered in this area – many dead branches due to blister rust. In photo: Kevin Lash. Photo courtesy of Rebecca Braisted.

Bennet Peak

We surveyed the peak to the southeast of Bennet Peak on the south side of the Wallowa Mountains near Medical Springs, OR on October 1st, 2019. Our survey area was made up of a 7.1 mi loop that included the top of the drainage above Gold King Creek (Figure 4). The total area surveyed was 46.77 hectares.

The Eagle Fire of 2015 burned a substantial portion of this area and there are currently few living trees. However, the unburned areas appear to be good whitebark pine habitat. It appears that the forest was composed of

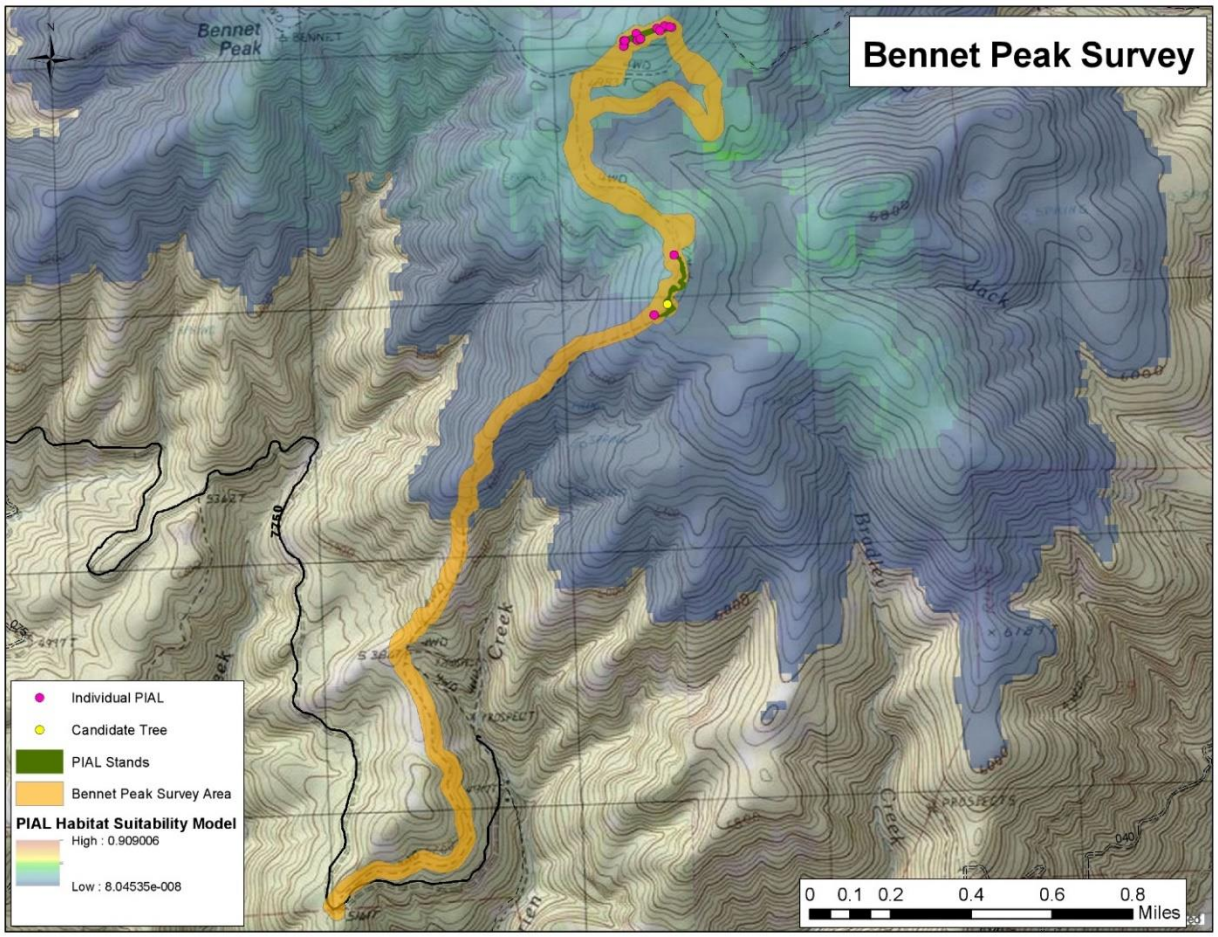

Figure 4. Survey area map for Bennet Peak.

predominantly subalpine fir, douglas-fir (*Pseudotsuga menziesii*), western larch (*Larix occidentalis*), and lodgepole pine. All of the whitebark pines found were on the forest edge (Figure 5) or were growing in the sparse forest on the top of the small peak at the top of the drainage above Gold King Creek and there was a substantial amount of blister rust infection. There was noticeable whitebark regeneration in the direct vicinity of some of the larger trees found on the forest edge (Figure 6). At the southern

Figure 5. Most of the whitebark pines encountered during the Bennet Peak survey were found growing on the edge of the forest. In the background of the plot, dead snags from the Eagle Fire in 2015 are visible. This whitebark pine was growing on the very edge of the burned area. Photo courtesy of Rebecca Braisted.

Figure 6. A young whitebark pine growing near the edge of the forest. This was one of the larger of the young trees found. The large candidate whitebark pine was located about 150ft to the left of this tree. Photo courtesy of Bec Braisted.

Figure 7. This large, robust whitebark pine individual was free of blister rust cankers despite there being a high level of infection among the trees in the area. In the photo: Kevin Lash. Photo courtesy of Bec Braisted.

edge of the peak there was a large, very healthy whitebark pine that would be a good candidate for resistance testing at Dorena (Figure 7). Though this tree was not infected by blister rust, it was infected by mistletoe. This is interesting because it is the first documented case of mistletoe infection in whitebark pine in our area (Kristen Chadwick, *personal communication)* (Figure 8). We took photos, tagged the tree, and collected a GPS point so that the tree can be located in the future.

DISCUSSION

Overall this area appears to be good whitebark pine habitat. With the majority of the other trees killed by the Eagle Fire in 2015, the whitebark pine population may be released from competition and there may be an increasing amount of whitebark pine regeneration over the next few years. Because this area is outside the Eagle Cap wilderness, the canopy is very open due to the fire, and there is a 4x4 trail that leads all the way up to the top of the mountain, we believe that this area would be a good location for out-planting trials. It should be relatively easy to bring trees

and equipment up the mountain with a UTV (utility task vehicle) and there is plenty of space for new trees to be planted. There did not appear to be extensive gopher or ground squirrel activity at the top of the mountain, so there is likely little risk of losing planted trees to rodents. However, this area is highly utilized by hunters, so human impact should be considered if plantings were to take place.

Figure 8. Actively fruiting mistletoe infection on a branch of the large candidate tree from Photo 5. A broomy growth due to mistletoe is visible on the left-most branch in Photo 5. Photo courtesy of Rebecca Braisted.

The whitebark pine surveys were intended to be conducted in conjunction with collecting data on blister rust plots for the duration of both projects. However, it proved to be difficult to both survey and ensure plots were completed. Travel time to remote plots and survey areas was not properly accounted for; therefore, only two of the seven proposed survey areas were surveyed. Additionally, the Blue Mountains experienced a wetter and colder spring than usual which delayed access to higher elevations. Because there was only limited time to complete surveys and inclement weather began to set in, we decided to focus our surveys on two areas with medium probability of whitebark pine occurring that had not been previously surveyed. The habitat suitability model was validated in these areas as a few whitebark pine stands were encountered in these areas and the model facilitated finding a potentially resist individual. We propose that steps should be taken to survey other areas where there is at least a medium probability that the habitat is suitable.

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.

Jennings, M. 2018.
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