Forest Health Protection Aerial Detection Survey

Southern Sierra Nevada Range

July 6th-9th, August 31st-Sep 3rd, Oct 20th- 22nd 2015

Background: Many of California's forests are overly dense with trees and experiencing four years of exceptional drought. Tree mortality continues to increase in most areas, sometimes dramatically with an estimated more than 10 million trees killed in this area. This portion of the 2015 regular survey was conducted primarily along the central to southern Sierra Nevada Range including most of the Inyo, Humboldt-Toiyabe, Sierra and Stanislaus Nationals Forests, Yosemite and Sequoia-Kings Canyon National Parks, portions of Eldorado and Sequoia NFs along with surrounding State and Private lands primarily along the western foothills. Surveys of this area had begun in early July 2015, but were delayed for months due to flight restrictions, smoke obscuration and safety concerns created by the Rough Fire. The far southern tip of the Sierra Nevada Range was flown earlier and those results were included in the report on Southern California. Additionally, the Sierra Nevada crest around Mount Whitney was not surveyed in 2015 due to lack of detected activity in the area, significant snow accumulations and because the high altitude requires crew to be on supplemental oxygen which was not available when the opportunity to fly finally presented itself. Drought conditions throughout most of this surveyed area are categorized as exceptional according to the National Drought Monitor. (Fig. 1)

Objective: Detect and map extent and severity of tree mortality and other damage including drought stress throughout the southern Sierra Nevada Range of CA, extending into portions of the Great Basin of Nevada and the White Mountain Range.

Surveyors: A. Jirka, J. Moore, K. Mathews, C. Nelson

Methodology: Surveyors mapped recently dead or currently injured/stressed trees using a digital aerial sketch-mapping system while flying in a light fixed-wing aircraft approximately 1,000 feet above ground level. Surveyors recorded the species of tree affected, estimated number of recently killed trees and/or any type of other damage (defoliation, dieback etc.) detected at each mapped location.

Details:

- More than 8.5 million acres were surveyed (Fig. 1, 3); primarily on the Sierra, Inyo and Humboldt-Toiyabe NFs, Yosemite and Sequoia-Kings Canyon National Parks and western portions of the Stanislaus, Eldorado and Sequoia National Forests (Fig. 3). Other areas of note include the western foothills of the southern Sierra Nevada range, mostly privately owned, the White Mountain Range to the southeast, interspersed BLM lands mostly in Nevada, and several State Parks.
- Pine mortality in particular was severe and widespread becoming progressively intense to the south. (Fig. 2, 3, 4). Ponderosa pine is the most common component of the lower elevation mixed conifer type and was also the most impacted pine species. However sugar pine and other conifers were heavily impacted here as well. (Fig. 2, 4).
- In higher elevations, California red fir, Jeffrey, sugar and lodgepole pine also exhibited heightened rates of tree mortality. (Fig 5, 9, 10).
- Scattered live oak and gray pine mortality was also common along the low elevation foothills. (Fig. 6).
- Severe drought-induced discoloration/defoliation in blue oak and other oak species was severe on a landscape scale primarily on private lands along the low elevation foothills (Fig. 7).
- Mortality in high elevation 5 needle pine was spotty in more eastern areas of the Inyo but at higher levels than in previous years as was juniper and pinyon mortality on the Humboldt-Toiyabe NF and surrounding areas. (Fig. 8).
- Marssonina leaf blight was also common on quaking aspen and willow in many places to the east. (Fig 11).

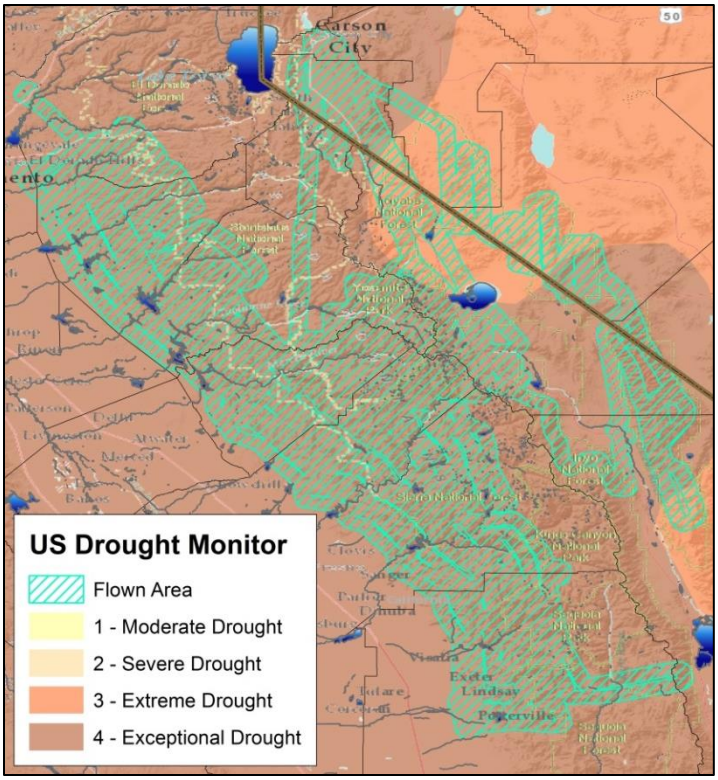

Figure 1. Flown area and drought conditions as of Dec 1st, 2015 based on USGS Drought Monitor.

Summary:
Acres surveyed: 8.527 million
Acres with mortality: 613,000
Estimated number of dead trees: 10,717,000

Figure 2. Widespread mixed conifer mortality east of Porterville on the Sequoia NF.

FULL 8.12

Direct questions pertaining to this report to Jeffrey Moore (email: jwmoore02@fs.fed.us phone: 530-759-1753). Report Date Dec 7, 2015.

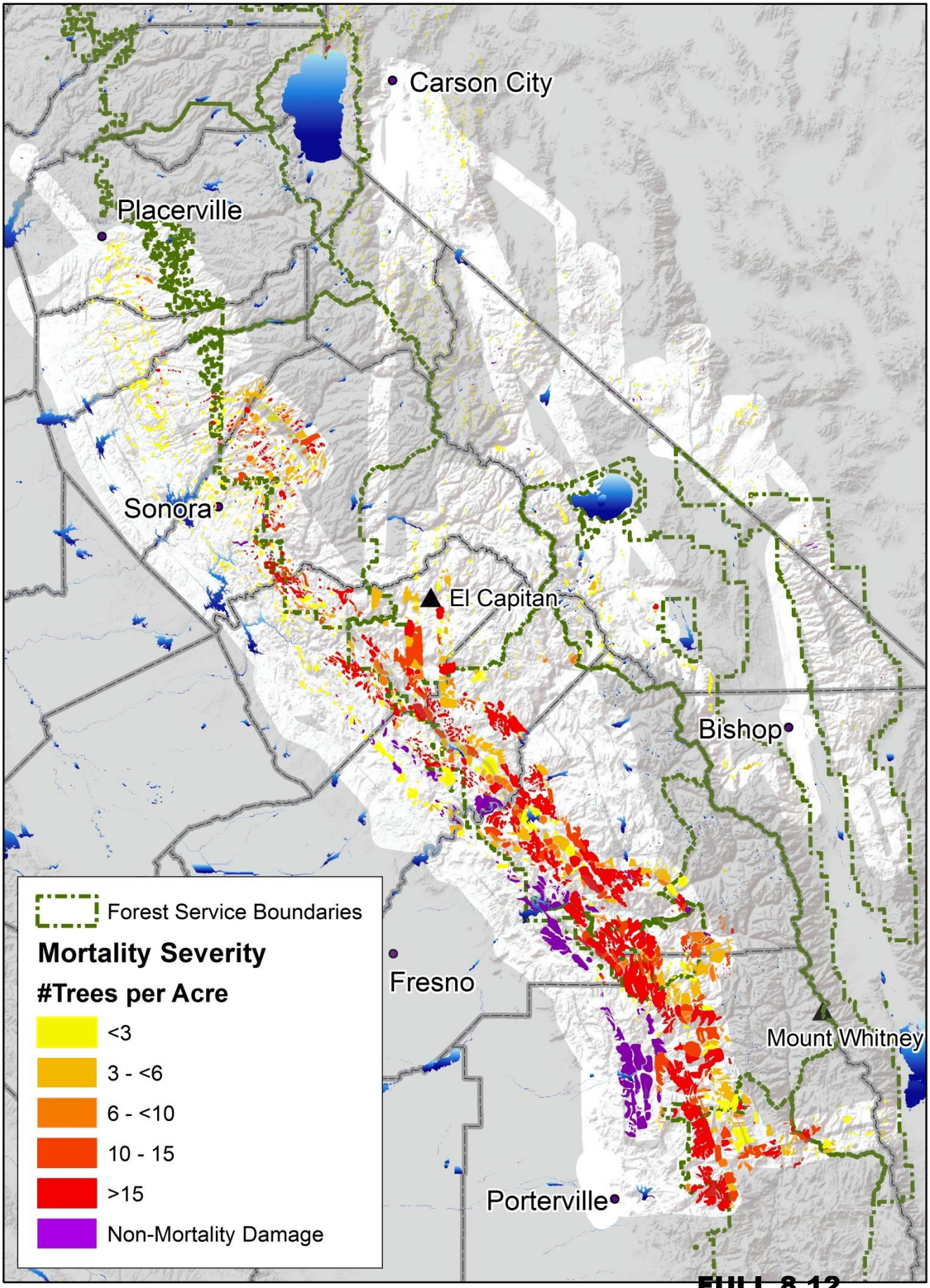

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Figure 3. Map of area surveyed depicting tree mortality and other damage.

Figure 4. Overview of widespread, intense, mixed conifer (mostly ponderosa pine) mortality on the low elevation pine Eco zone northwestern Sequoia NF.

Figure 5. In higher elevation mixed conifer, mortality was typically not as intense fu[illegible] and usually mixed; Such as this area on the Sierra NF showing mostly white fir mortality with Jeffrey and sugar pine mixed in.

FULL 8.12

Figure 6. Ongoing severe live oak mortality and oak drought stress near Hammond west of Sequoia-Kings Canyon National Park.

Figure 7. Landscape scale defoliation and discoloration of blue and other deciduous oaks was common such as this area east of Fresno.

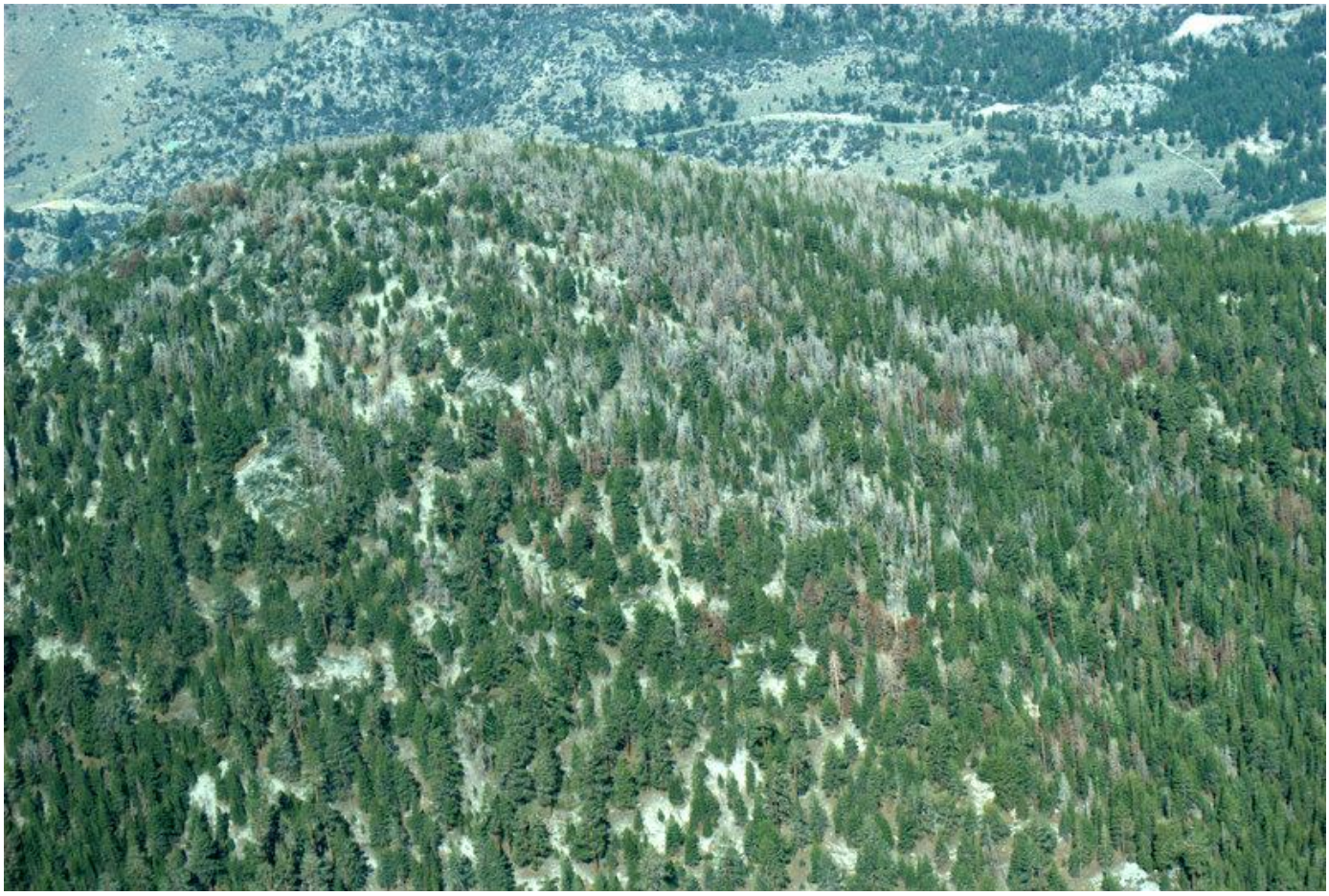

Figure 8. Ongoing whitebark pine mortality near Mammoth on the Inyo National Forest.

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Figure 9. Widespread fairly intense California red fir mortality and branch flagging, near Jordan Peak Sequoia NF.

Figure 10. Severe Jeffrey pine mortality near Wawona, northern Sierra National Forest.

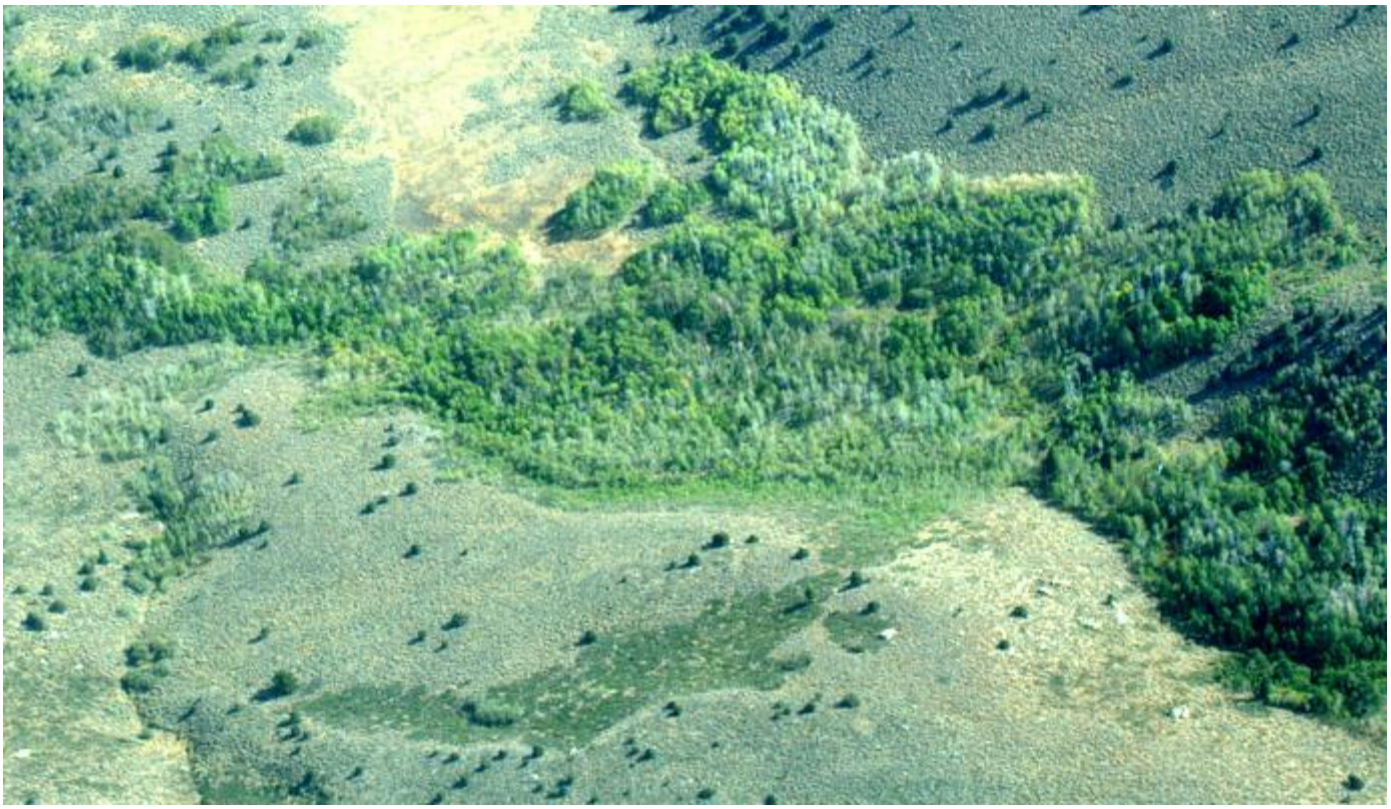

Figure 11. Marssonina leaf blight on aspen and willow, Humboldt-Toiyabe National Forest.

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