Aerial Detection Survey – South Sierra Foothills July 6th-10th, 2015

Background: Most of California is well into its fourth year of exceptional drought. As the drought has become increasingly severe and prolonged, tree mortality has generally increased in most areas, sometimes dramatically. This portion of the 2015 regular survey season was conducted for normal data collection within some of the most severe and prolonged drought conditions statewide and included areas of private lands not typically surveyed since mortality and other forest health concerns are not typically expressed in these areas. Particular attention was paid to lowland pine. Current drought conditions in this area are almost entirely exceptional especially to the south. See Figure 1
Objective: Detect and map extent and severity of tree mortality and drought stress along the central Sierras particularly within the Wildland Urban Interface where wild fires can most impact life and property. Much of this area was surveyed in April, but drought stress expression and status of deciduous trees particularly oaks were not discernable at that time. Additionally, more recent conifer mortality is now apparent.
Surveyors: J. Moore, A. Jirka, L. McAfee
Methodology: Recently dead or currently injured/stressed trees were mapped visually by surveyors 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, number recently killed and/or any type of other damage (defoliation, dieback etc.) detected at each mapped location.
Details:

- Approximately 3.6 million acres were surveyed; covering the lower western foothills of the central and southern Sierras from the Sacramento area south to Visalia. Much of this area is privately owned oak woodlands and low elevation pine forests, but public areas of note include the western extents of the Stanislaus, Sierra and Sequoia National Forests, Sequoia/Kings Canyon national Park and the Giant Sequoia National Monument. See Figure 3.
- An estimated more than 6 million recently killed trees across over 500,000 acres were recorded. See Figure 3.
- Drought induced oak discoloration/defoliation often associated with suspected mortality was widespread throughout the southern portion of surveyed area. Oaks often looked dead and were recorded as such over large areas. However, oak trees are quite tenacious and early leaf drop and die back are common drought responses. See Figures 2, 4.
- Well over half of the recorded mortality was of recently killed Ponderosa pine often mixed with incense cedar in the north, other pine species further south or with white fir in higher elevation areas. See Figures 5-8.
- Incense cedar mortality was also elevated and since these trees are not killed by bark beetles, mortality was attributed directly to drought. See Figures 5, 8.
- Gray pine mortality was also somewhat elevated but not at levels seen last year. See Figures 2, 7.

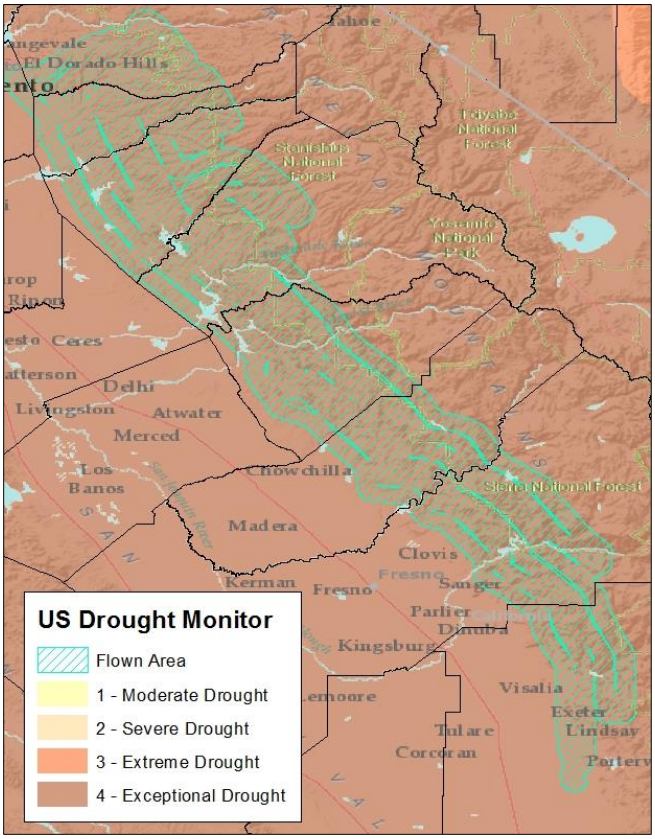

Figure 1. Flown area and drought conditions as of Aug 4, 2015 based on USGS Drought Monitor.

Summary:
Area surveyed: 3.56 million acres
Areas with mortality: 526,000 acres
Estimated number of trees killed: 6,338,000

Figure 2. Gray pine, blue and live oak mortality and discoloration near Yuba River State Park.

Direct questions pertaining to this report to Jeffrey Moore (email: jwmoore02@fs.fed.us phone: 530-759-1753). Report Date Aug 9, 2015.

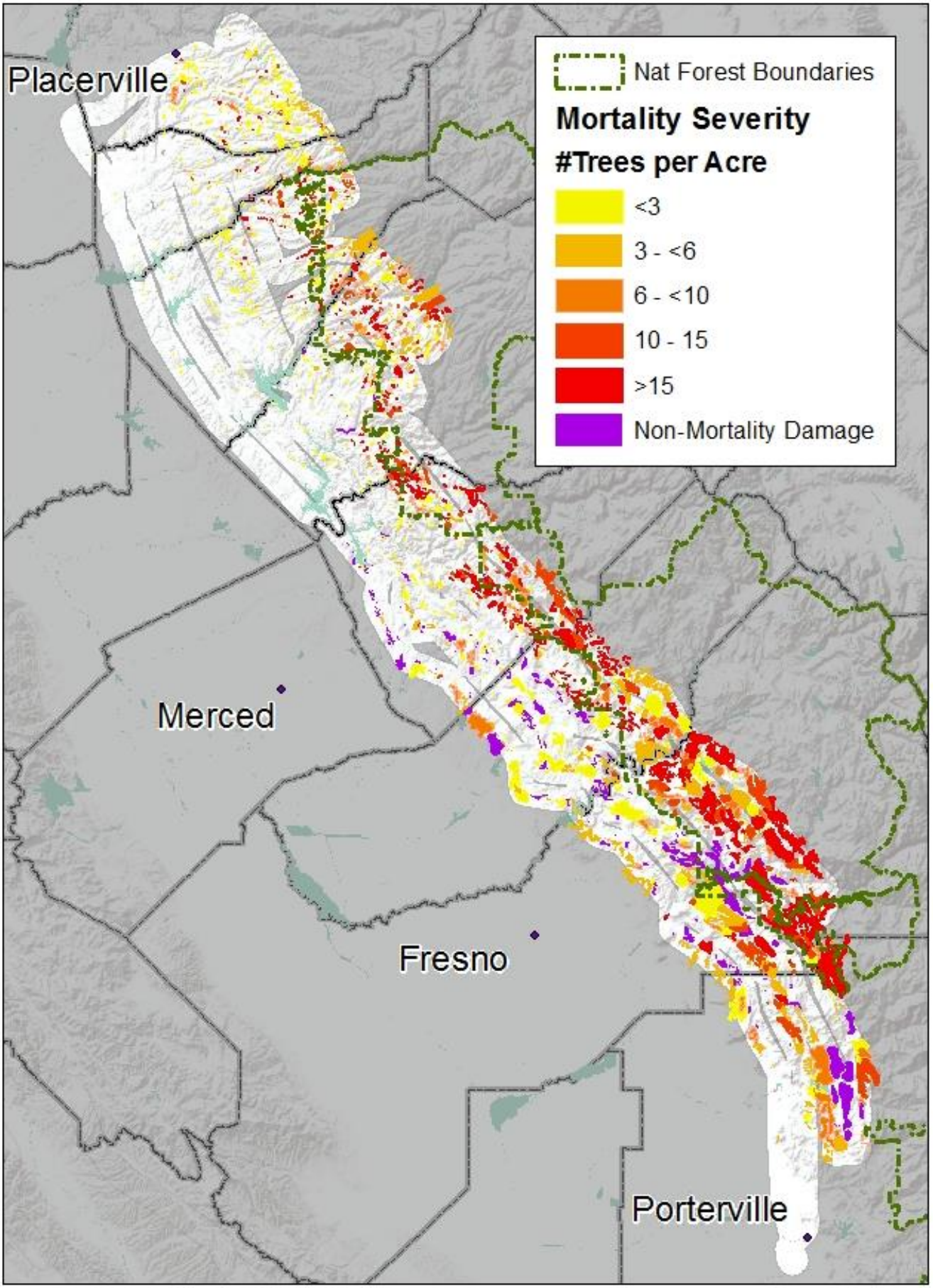

Figure 3. Map of area Surveyed depicting tree mortality and other damage.

Figure 4. Severely discolored/defoliated blue oak containing some suspect mortality east of Pine Flat Reservoir.

Figure 5. Ponderosa pine and incense cedar mortality south of Shaver Lake on the Sierra National Forest.

Figure 6. Ponderosa/Jeffrey pine mortality northeast of Pine Flat Reservoir.

Figure 7. Ponderosa and gray pine mortality and discoloration south of Briceburg.

Figure 8. Ponderosa and sugar pine along with incense cedar mortality east of Mariposa on the Stanislaus National Forest.

Figure 9. Knobcone pine mortality on the western flank of Black Mtn. east of Coulterville within the Stanislaus National Forest.