

Dog Head Fire Private Land Fuel Treatment Effectiveness



Untreated pinon-juniper woodland



Treated pinon-juniper 0.08 miles away



Untreated pinon-juniper woodland



Treated pinon-juniper 0.34 miles away

Introduction

The Dog Head Fire began on June 14th, 2016. On June 16th, the relative humidity dropped to 2% and the wind velocity increased, producing explosive fire behavior. During that night, a sustained crown fire ran 6 miles and consumed more than 4000 acres. On June 17th, high winds continued, pushing the fire across more than 11,000 acres of public and private land. The fire consumed over 10,000 acres of the Chilili Land Grant and threatened the community of Chilili.

Although the fire destroyed a dozen homes and many other structures, fire managers were braced for much broader devastation. Weather and fire suppression resources cooperated to keep the fire west of Highway 337 and prevent further spread to the north. By the time the Dog Head Fire was 100% contained one month later, a total of 17,912 acres were consumed.

Over the last decade, local Soil and Water Conservation Districts (SWCD) have administered cost-share programs that supported fuel reduction projects on private land. The thinning projects that were impacted by the Dog Head Fire provide an opportunity to evaluate performance of the treatments. To assess whether the treatments affected fire behavior and performed as planned, a field campaign was conducted during September and October, 2016. Arid Land Innovation (ALI) and representatives of the East Torrance and Edgewood SWCDs visited the projects and assessed the fire impacts. This qualitative assessment is based solely upon the treatment details and observed fire effects.

At each affected private property, the fire perimeter and treatment boundaries were inspected. A series of photos were collected to demonstrate conditions just inside and just beyond the fire perimeter. Photos included here were collected by ALI during these site visits unless otherwise indicated. In some cases, the observed burned area matched the mapped fire perimeter closely while in others, the site conditions conflicted with the mapped perimeter. Some areas that were mapped as burned showed no evidence of fire while some burned areas were not indicated on the burn perimeter map.

Figure 1. Untreated, burned stand



Treatment Performance

Most fuel reduction treatments on private land were positioned along the flanks of the fire but two treatments on the Chilili Land Grant were directly in the line of fire. The flaming front reached the Chilili treatments on the second day of the fire, June 15th. The treatments had similar prescriptions in terms of tree density but on one of the projects, the slash had been hauled off-site (Figure 2). Slash on the second project was left scattered throughout the site. Fire effects in the scattered slash site were similar to adjacent, untreated areas and the site supported an active crown fire. In contrast, the site with slash removal performed relatively well. Tree mortality was lower in the treated stand than in the adjacent untreated forest on U.S. Forest Service property (Figure 3). Although the fire still burned hot through the treated stand, the reduced canopy bulk density within the treated stand appears to have limited crown fire activity. It should be noted, however, that the fire severity within these stands also corresponded with respective differences on the surrounding land.

Figure 2. Chilili project boundaries and fire severity



Figure 3. Treated Chilili forest on right and untreated USFS land on left (Courtesy Edgewood SWCD)



Not only did the treatments protect properties and structures, they also increased firefighter safety by providing locations for control lines and safety zones. As they scouted the area, fire managers sought out treated projects within the sea of untreated, high-density woodlands. The prevalence of control lines made it difficult to separate the performance of the thinning treatments from the associated fire suppression actions.

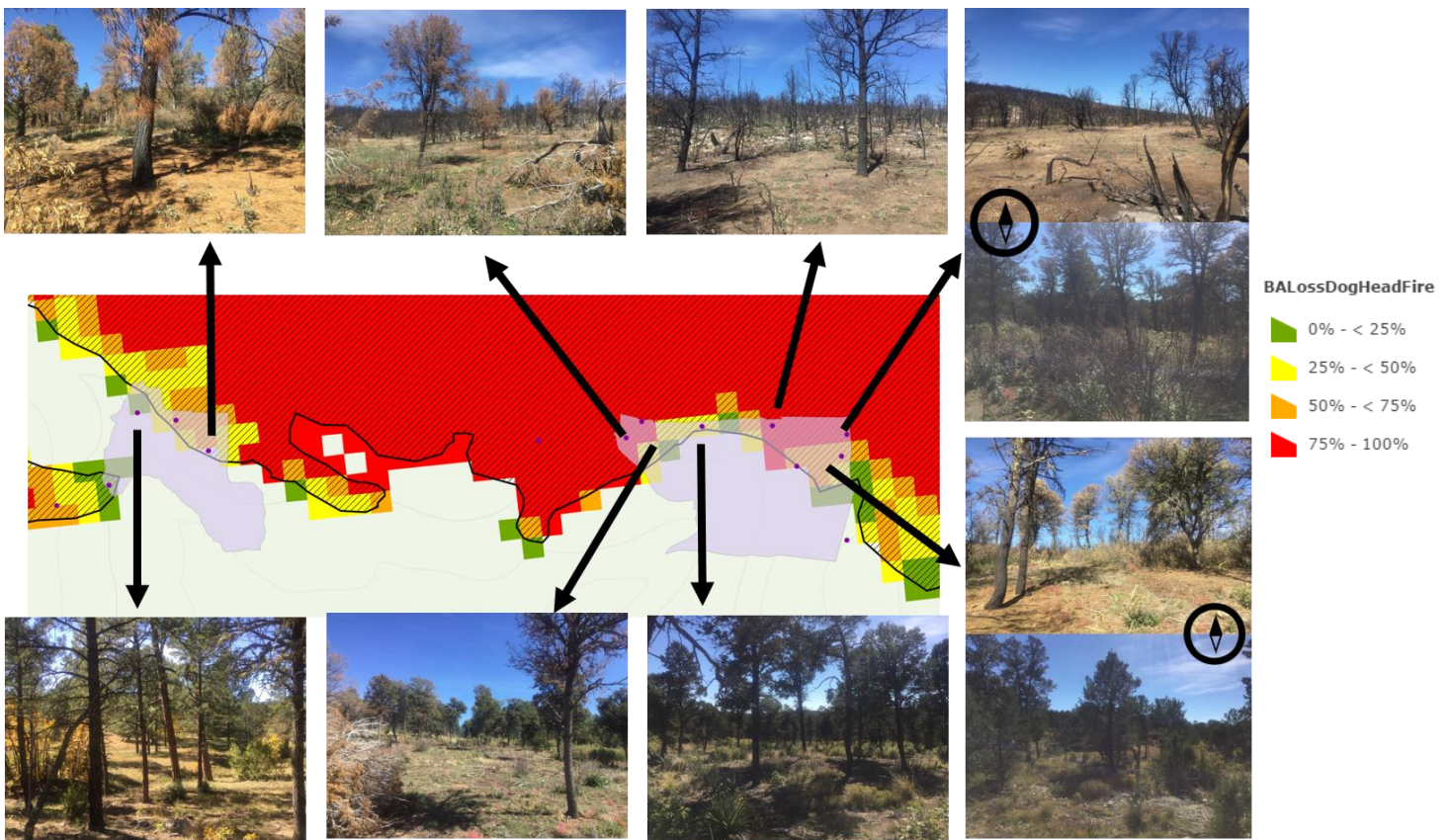
Meadow openings and reduced tree density consistently provided sites for firefighters to construct fire line, either by hand or with a bulldozer (Figure 4).

Figure 4. Dozer line constructed within thinned forest



As expected, treatments along the fire flanks performed better than treatments located at the head of the fire. Along the southern flank, the combined effects of fire line construction and reduced tree density within treated stands produced stark differences in tree mortality and fire severity north of the project boundaries (Figure 5). Red areas on the map indicate a live tree density reduction of 75-100%.

Figure 5. Photos contrasting burned areas north of treatments with treated stands.



Several of the fuel reduction treatments included meadow restoration. These meadows consistently provided effective fuel breaks that limited fire spread (Figures 6 & 7).

Figure 7. Standing in restored meadow on eastern fire boundary, looking at untreated, burned woodland



Figure 6. Looking north from restored meadow on southern flank of fire



In addition to reduced tree mortality in treated stands, soils also were apparently less severely impacted. Recovery of grasses and forbs is taking place within treated areas while adjacent untreated sites often have little growth (Figure 8). Generally, treated sites were greener than adjacent untreated areas.

Figure 8. Plant recovery within treated stand on right compared to untreated area on left



Most of the structural losses occurred along Aceves Road on the east side of the fire. Despite catastrophic losses surrounding the property, one home was likely saved as a result of a defensible space treatment that was completed in 2008 (purple polygon in Figure 9). The project was less than 3 acres but the lack of ladder fuels and reduced tree density helped protect the home (Figure 10). The fire was hot enough to melt the plastic gutters but the defensible space was adequate to prevent structural ignition.

Figure 10. Fire severity surrounding treated property on Aceves Road

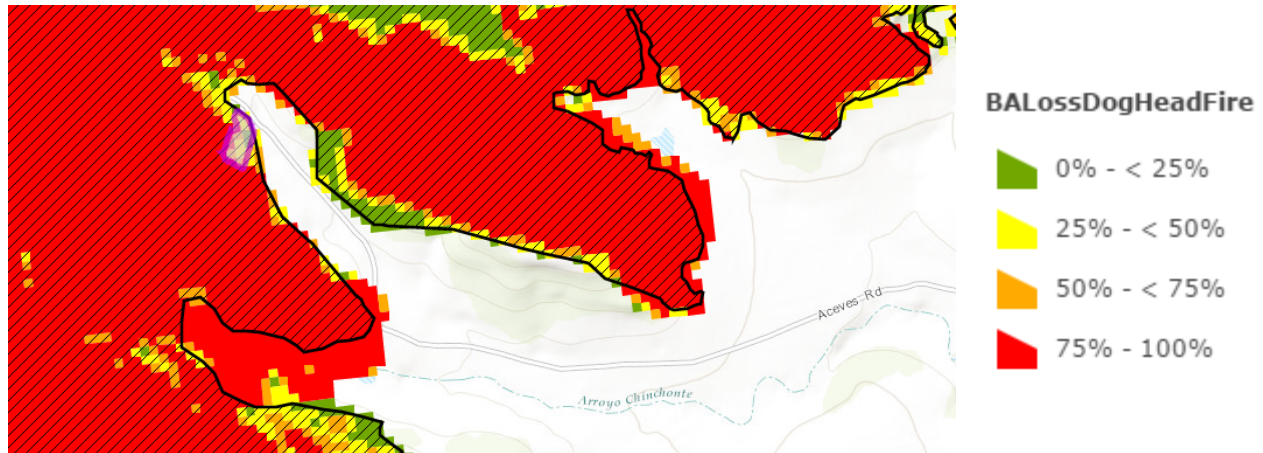


Figure 9. Intact residence with burned ponderosa forest (Photo courtesy of Edgewood SWCD)

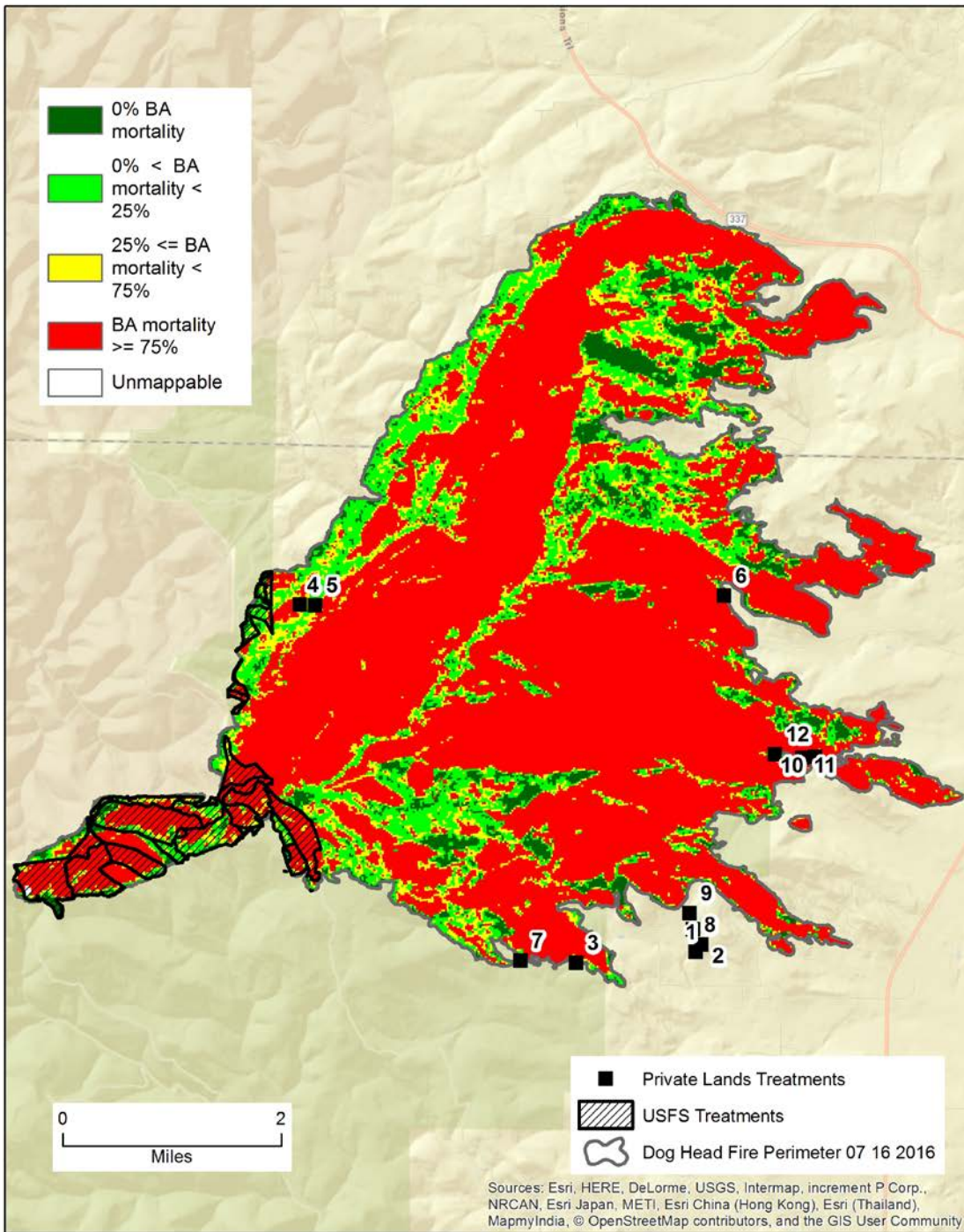


Thinning treatments generally performed as planned. Fire severity was lower on nine treated sites than on adjacent, untreated areas. Only one project experienced high severity fire. When fire did move through the nine successful treatments, it did so as low-intensity surface fire. Many of the treatments provided access for control line construction which effectively prevented fire spread within and beyond the treatment boundaries. Treatments that reduced the total fuel load seemed to be most effective in modifying fire behavior.

Private Property Treatments Affected by Dog Head Fire

Property Owner	Cost Share Partner	Acreage	Year Treated*	Visited?	Post-Treatment Basal Area	Severity within treatment	Comments	Map ID
Aceves	ESWCD	4.6	2013	yes	1.67	Unchanged	Fire barely moved into restored meadow.	8
		5.99	2014	yes	0	Unchanged	Fire moved through restored meadow.	9
		11.56	2013	yes	0	Unchanged and low	Fire barely moved into restored meadow.	10
Swenka	NRCS	200+	2005-2007	yes	?	Unchanged	Control line stopped fire at boundary of restored meadow.	None
Baker (formerly Scott)	ETSWCD	13.57	2009	yes	50.5	Unchanged and low	Fire moved hot through northeast corner of treatment but dozer and hand lines within treated area apparently held.	1
Baker (formerly Turner)	ETSWCD	7.28	2008	yes	52.5	Low and moderate	Road within treatment served as effective control line.	5
Greene	ETSWCD	1.37	2012	yes	33.1	Unchanged and low	Thinned and chipped. Surface fire spread mainly through chipped material. Some tree mortality possibly resulting from high volume of chips.	7
		9.68	2011	yes	39.5	Unchanged and low	Fire effects appear to be associated with accumulations of fuel following mastication.	6
		7.63	2010	yes	65.0	Unchanged	Northwest treatment boundary is burn boundary.	None
Wright	ESWCD	2.91	2010	yes	43.3	Moderate, unchanged, and low	Defensible space treatment and ponderosa pine thinning may have prevented structural ignition.	4
Chilili Land Grant	ESWCD	4.87	2008	no	47.5	High	Slash scattered	2
		3.81	2008	no	47.5	Moderate	Slash removed	3

*Treatment dates are estimates based on information provided by SWCD staff and/or inspection dates.



Basal Area Mortality, Dog Head Fire Area

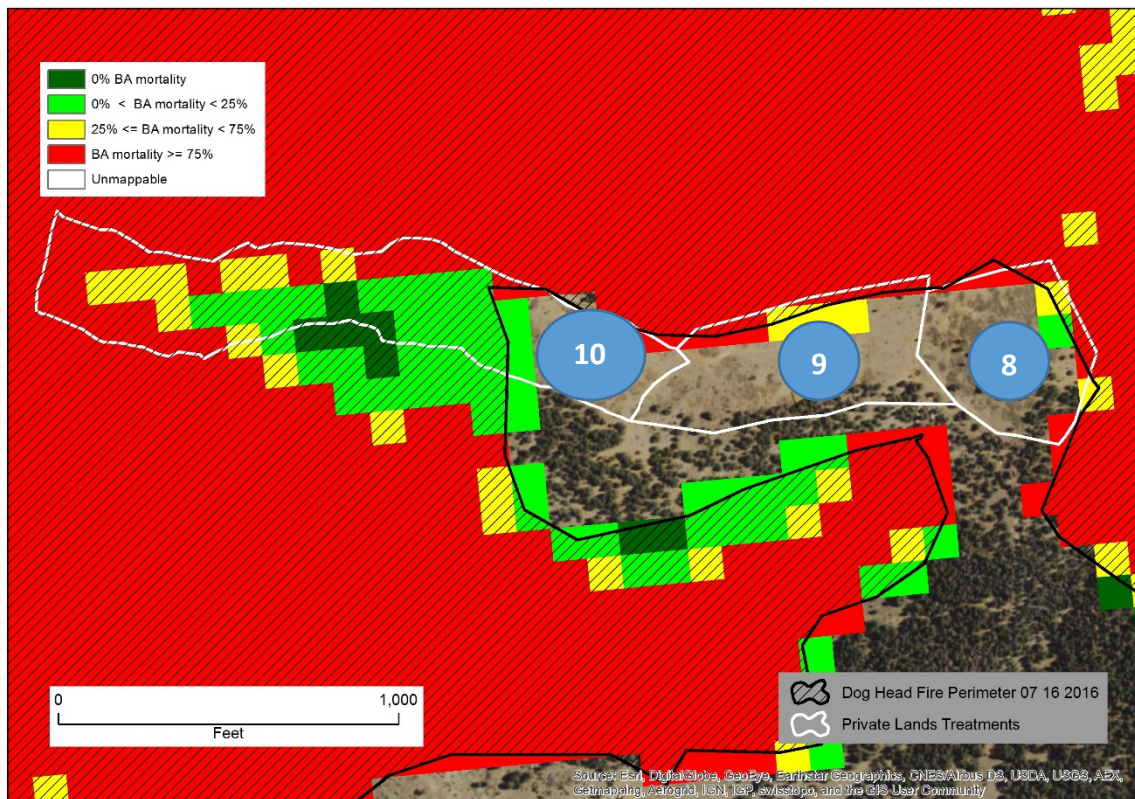
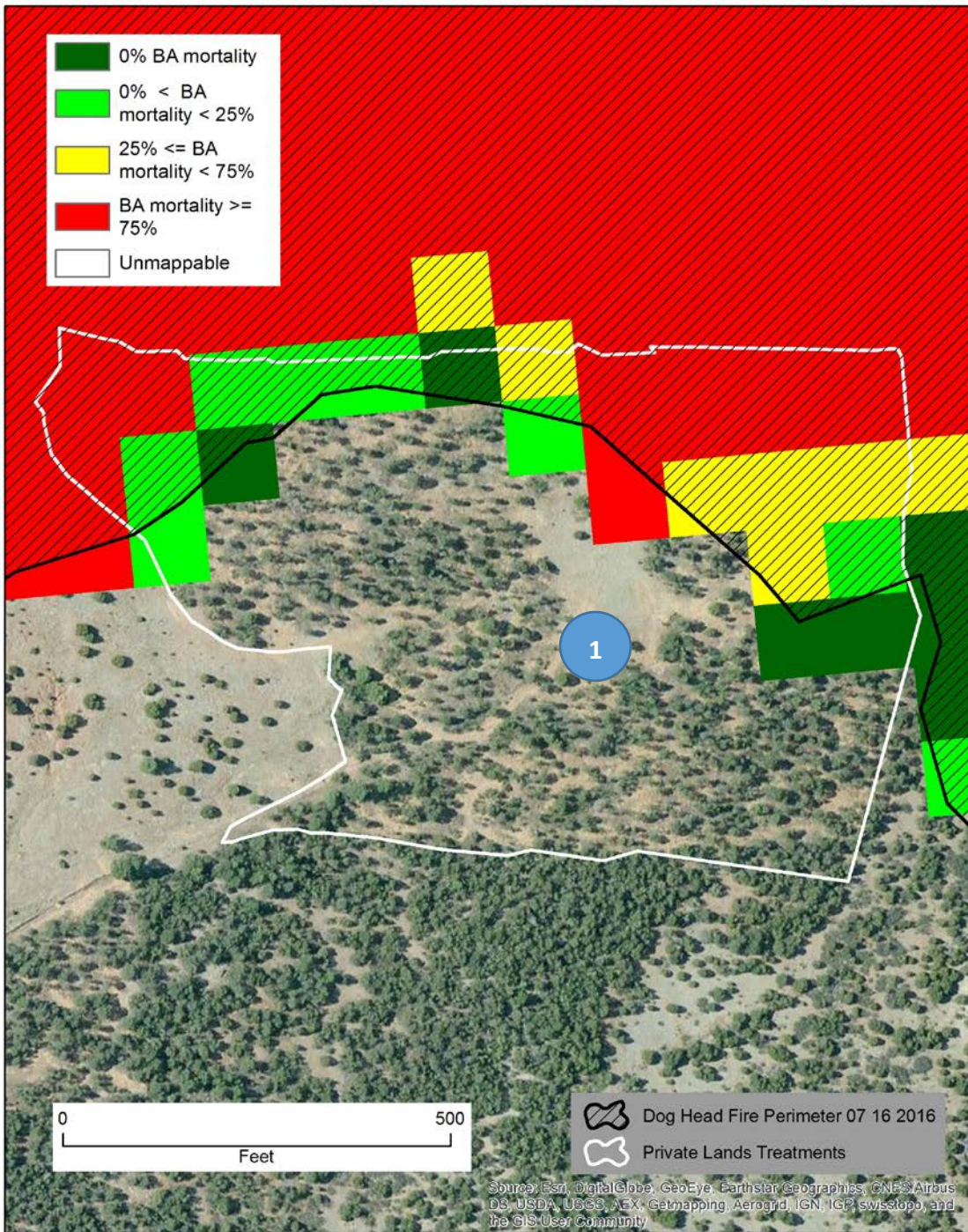


Image date: 2014

Basal Area Loss, Aceves 2013 - 2014



Basal Area Loss, Scott 2011

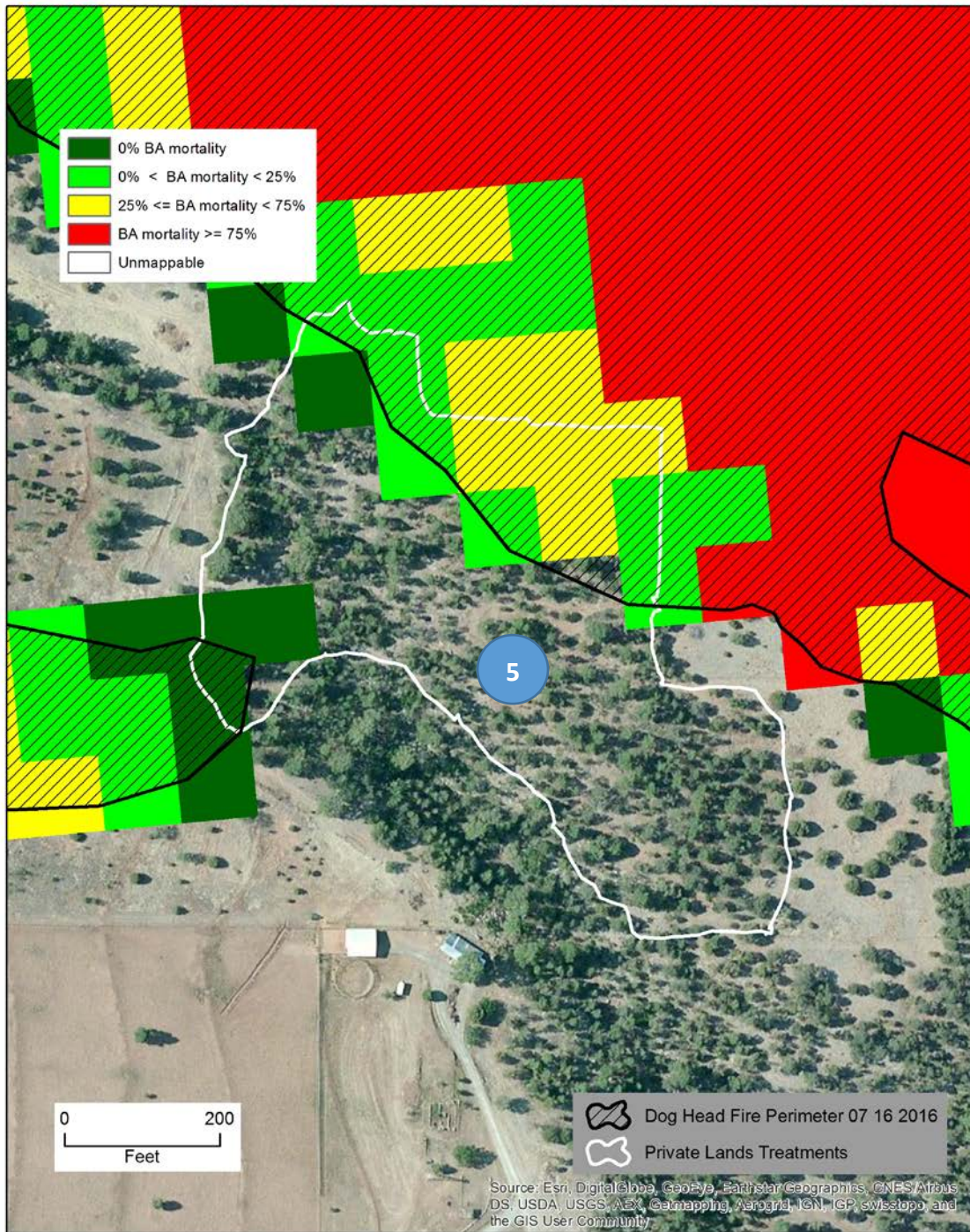
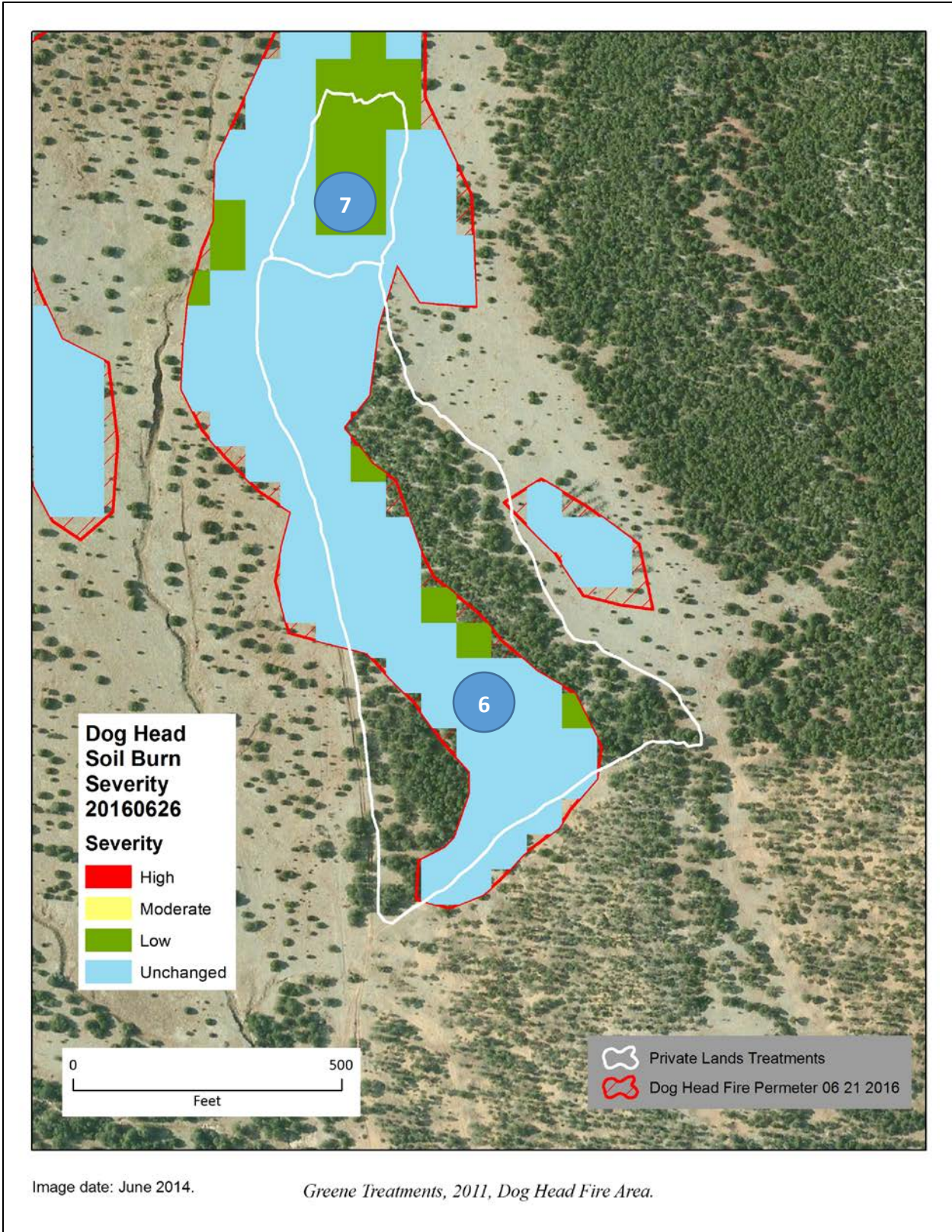


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Basal Area Loss, Turner 2009



Note: basal area loss data was not available for this property.

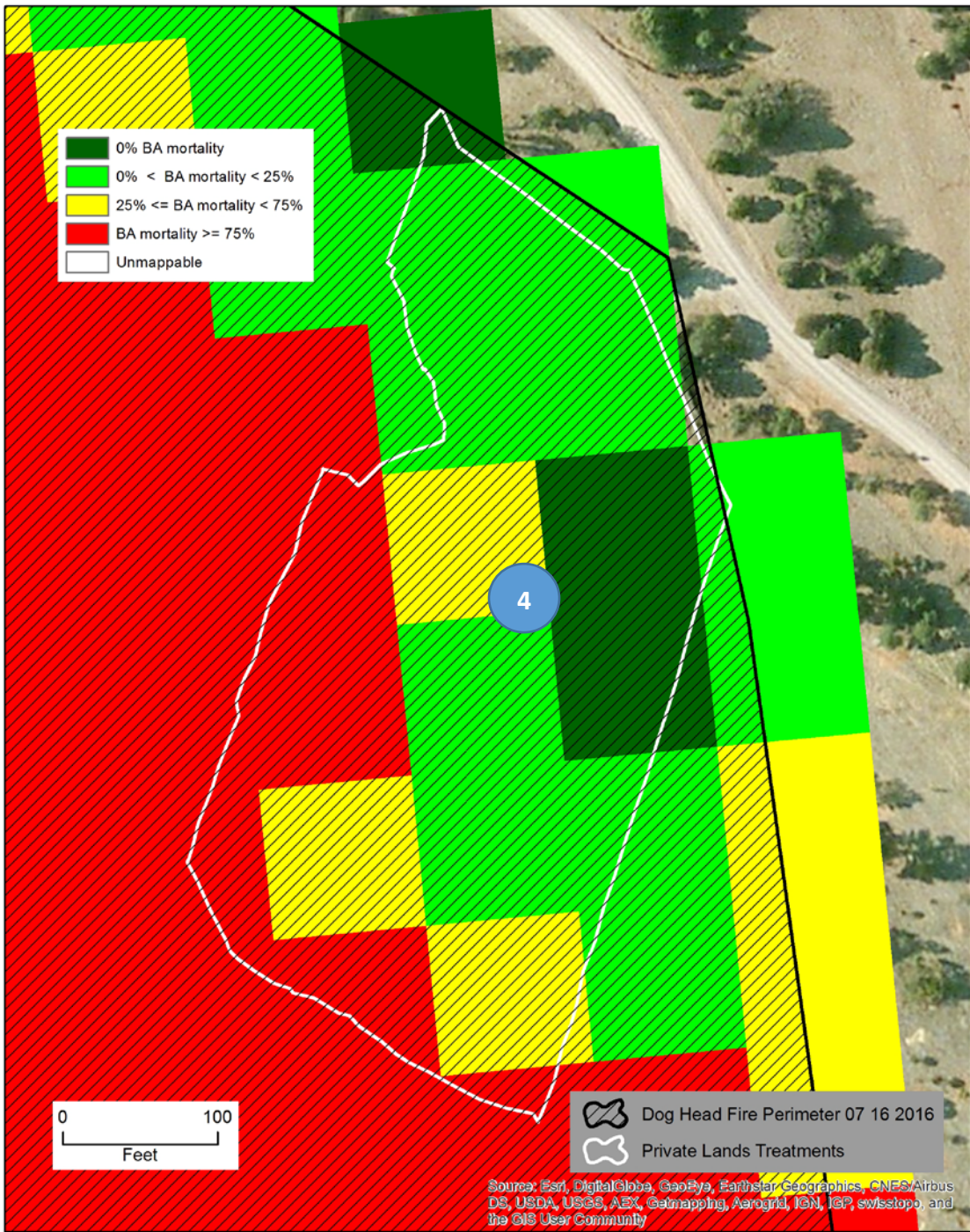


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Basal Area Loss, Wright 2008

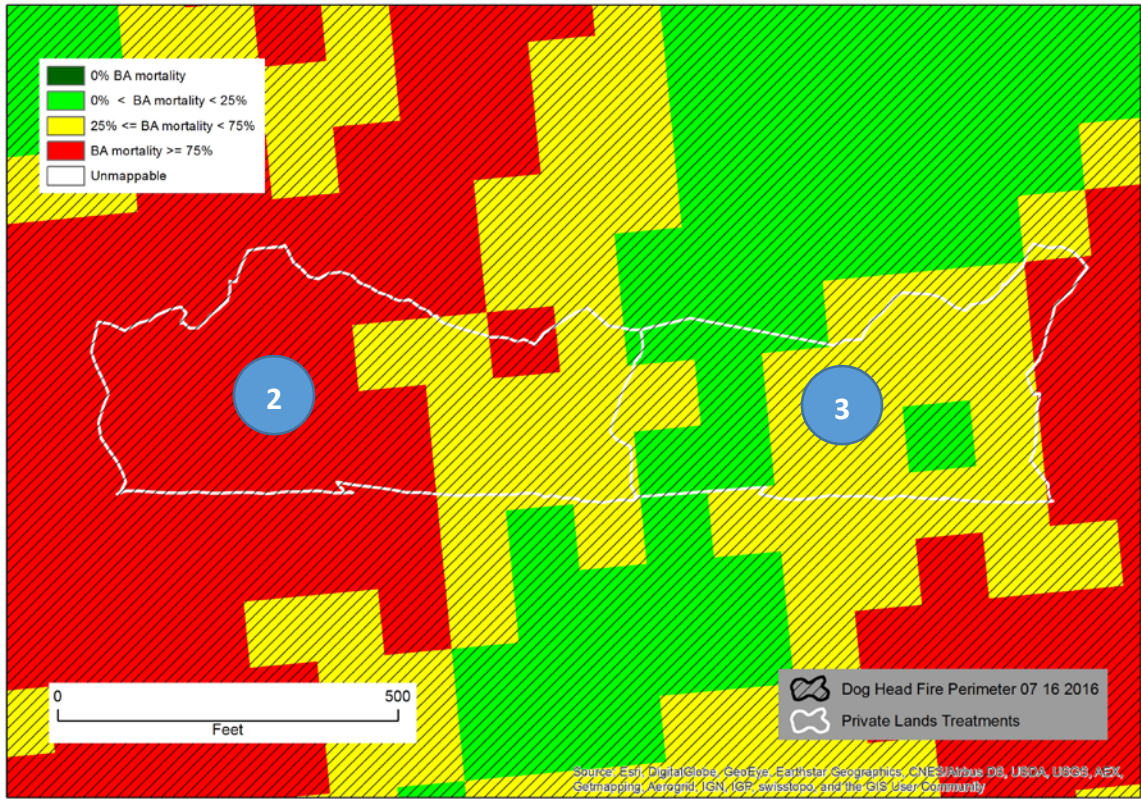


Image date: 2014

Basal Area Loss, Chilili 2009