Summit on Wildfire Prevention
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Background & Introduction
I grew up in the Sierra Nevada and over the past 20 years have lived and worked throughout northern California. In the past 10 years I have conducted research and monitoring on effectiveness of fuel treatments during wildfires---measuring the fuels and fire behavior as it passes through[1]. We have done this throughout the country, from Minnesota to Florida, Montana, Arizona and especially California.

Effectiveness of Fuel Treatments
Last year, we found on the Antelope Fire that fuel treatments were useful during fire suppression, although sometimes the fire overcame crews and they had to move elsewhere. In this area, where there were numerous treated areas throughout the landscape, crews were able to then move and utilize another treated area (Figure 1). This is in contrast to the situation on the Moonlight fire that occurred next to it later last summer. There were only a few areas treated and when it was too dangerous for crews to remain there they had to flee and there were no other fuel treatments to "anchor" on to and use. Because they had to retreat farther back, more ground was burned in the fire. We documented evidence of reduced fire behavior through treated areas both during the fire and after the fire (Figure 2). It was clear that overall treated areas had substantially less evidence of intense fire behavior and effects. In one portion of the Antelope fire one area treated had surface fire and another untreated area had crown fire—both burned in similar conditions (Figure 3).

We also evaluated the type of vegetation treatment done and its effect on changing fire behavior and effects. We found that the most effective treatment type was a combination of thinning and burning. However, anytime there was thinning of any kind, commercial or pre-commercial, there was a beneficial reduction in fire behavior and effects (Figure 4). What is most important in effectiveness is that treatments are intensive

1. *For more detail and most reports on fuel treatment effectiveness, see http://www.fs.fed.u./adaptivemanagement/*

enough and that they occupy enough of the landscape to be effective. It is also clear that leaving large areas untreated, makes it more likely for fires to pick up “steam” and become more difficult to control and emit more smoke. The best types of treatments to reduce the level of smoke emissions during wildfires are those that reduce both surface fuels and the forest, such as thinning and burning. In steeper country, prescribed burning alone may be more practical. This provides some short-term smoke exposure and emissions, but in the long-run reduces the much greater levels that come during fire season and with crown fires, when it is drier and more vegetation is consumed. Whatever the treatment, we know that fuel treatments have the potential to reduce at least the amount of smoke emissions from wildfires. This is shown with an example analysis from Idaho, that shows the reduction in potential emissions before and after a treatment (Figure 5).

Diameter Limits for Fuels Management on Sierra Nevada National Forests

When Dr. Jerry Franklin and I originally crafted a plan to actively manage old-growth forests for the Sierra Nevada, as part of the Sierra Nevada Ecosystem Project, we felt that having some upper limit on the size of trees removed was important in old-growth. We advocated active management, meaning something is done, and felt that only smaller diameter “ladder fuels” should be emphasized. This was then adopted in the 2001 Sierra Nevada Forest plan amendment and extended to all suitable owl habitat, with a limit of 12”. Since then, my extensive experience on wildfires and evaluating fire behavior, fuels and fire effects, I have changed my view and feel that diameter limits lead to inaction or such limited treatment that it is often not effective. Dr. Franklin, independently came to the same conclusion for drier forests, for reasons of forest health, specifically threat of loss of old-growth trees from drought stress and insects. Further, it is my view that there is insufficient science behind existing fire behavior models to support choice of canopy cover thresholds for reduced crown fire threat—such as 40% or 50% cover. In fact, based on my observations and research on fires and that of very experienced Fire Behavior Analysts working for me, canopy cover should be reduced to less than 40% if the likelihood of crown fires is to be substantially reduced. This does not mean that I advocate forests with less than 40% canopy cover everywhere--but certainly more areas in fuel treatment locations at this level, and in particular around communities at risk. What is important to consider in balancing wildlife and fuel hazard reduction needs is to evaluate management of the entire landscape and of entire populations and not manage for all owl habitat the same everywhere.

Closing

We live in a fire environment in California. We will always have fire. It is how we manage the landscape and fires that will determine how much smoke we are exposed to and how intensely forests burn.

Figure 1. Map showing the overlap of fire suppression actions (denoted by the colored dots) and areas treated for fuel reduction or density reduction (denoted by polygons) during the Antelope Fire, Plumas National Forest 2007. The fuel treatment areas in the center of the map were also used for suppression, although not denoted by dots here, but when the fire overwhelmed or spotted across the treatment areas, the control line was moved farther east to the next set of nearby treated areas.

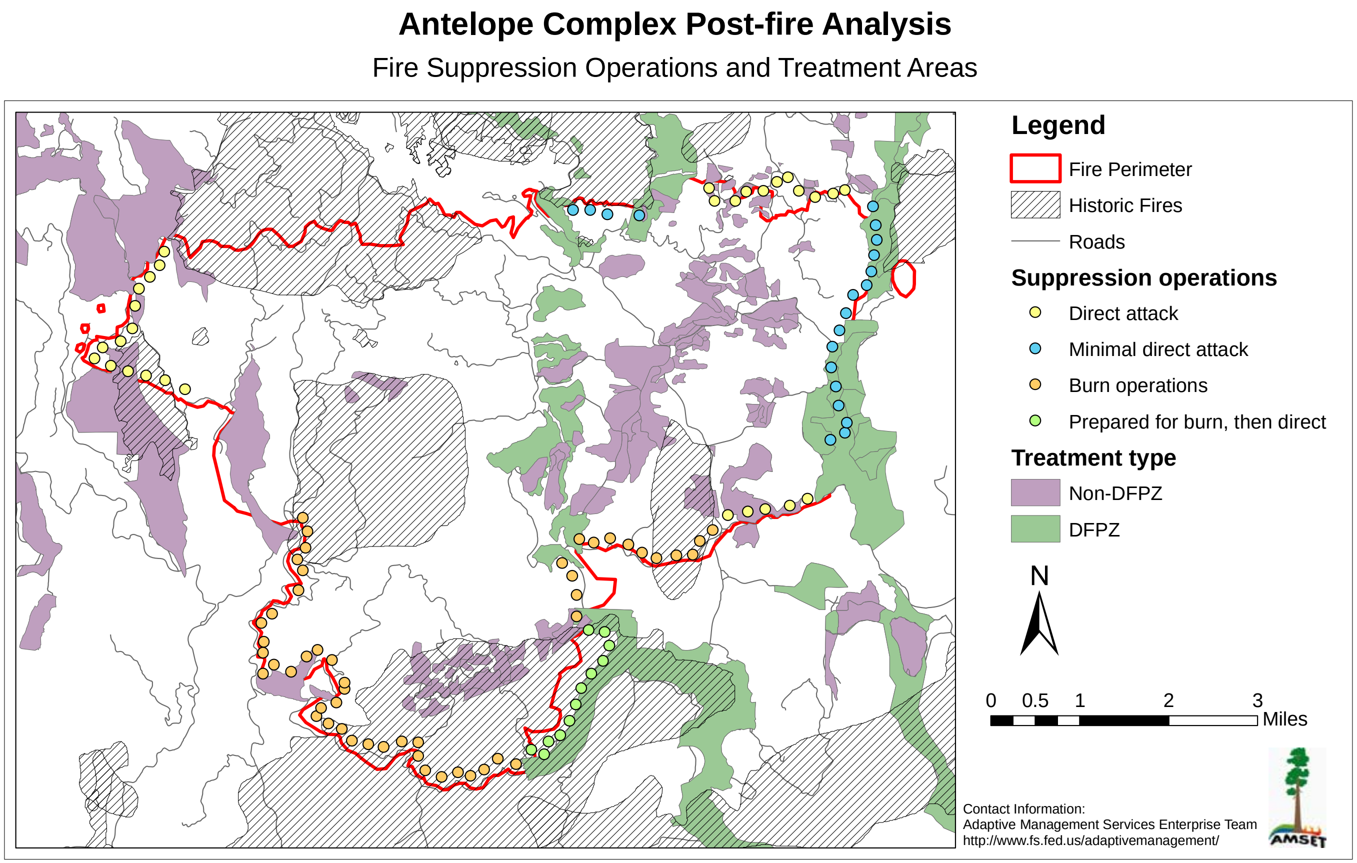

Figure 2. Photographs showing how fire burned through treated and untreated areas near Antelope Lake on the Antelope Fire on the same day in the vicinity of each other. The photo on the left is in untreated owl habitat. The photo on the right is from an area treated as a “Defensible Fuel Profile Zone”.

Figure 3. Photographs from specialized fire behavior data gathering instruments captured as fire burned through a treated area on the left, and an untreated area on the right. Weather conditions were similar during the passage of fire through both stands. The treated area burned as a lower intensity surface fire and the untreated area as a crown fire.

Figure 4. Summary of evidence of fire behavior in treated compared to untreated areas from field plots collected in the Antelope Fire on the Plumas National Forest, 2007. The treated areas show more than 65% of the area burned with fire behavior that was low or less. The untreated areas burned with more than 50% of the area as high or very high fire behavior.

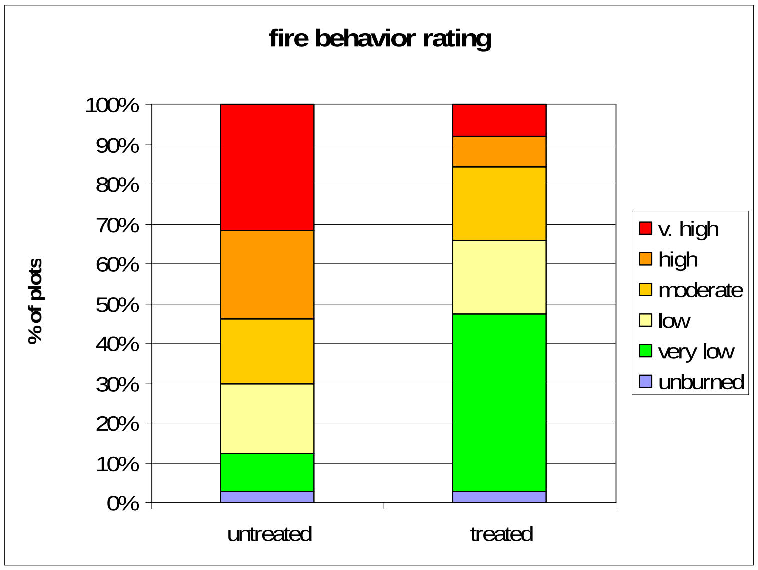

Figure 5. Changes in potential smoke emissions before and after a “treatment” in Idaho. Note that after treatment, the potential smoke emissions are substantially reduced. Reduced likelihood of crown fire, further reduces the likelihood of potential emissions during wildfires, since tree crowns then emit smoke when burning. This analysis does not depict the even greater reduction in potential emissions from reduced likelihood of crown fire.