



# Fire & Forest Health

## Research Objectives

Evaluate effects of fuel modification on potential fire behavior and forest ecosystem health at the watershed/fireshed scale:

- How will strategically placed area treatments (SPLATs) work in a real landscape?
- How will treatments affect tree vigor and resiliency?

## Methods

### Field measurement program

- Before/after treatment measurements;
- Control measurements in parallel w/ treatment;
- Begin field measurements in both firesheds, possibly more attention given to Sierra National Forest site because they are a bit ahead in the planning phase;
- Concentrate effort to assess tree mortality in catchments selected by water group;
- Use remote sensing to collect and analyze tree mortality outside of the catchments.

### Modeling

- Use FARSITE and FLAMMAP to assess changes in fire behavior and effects;
- Select a model that can integrate fire and forest health and water modules, possibly Fire BGC, USFS Missoula Fire Lab model.

## Immediate next steps for implementation

Finalize: treatment and reference firesheds;

Continue to specify logistics with Districts and UCST.

Optimize sampling regimes and workplans among UCST teams; Next step once project approved:

- Share fuel and vegetation sampling plan with wildlife and water teams to make sure we are collecting necessary data for all;
- Meet with spatial and water groups to specify anticipated use of remotely sensed data; and
- Learn data needs of Fire BGC model.

Discuss the selection of a modeling framework that could integrate information from the fire and forest health and water groups.

## Future opportunities

Talk with District Rangers and Fire Management Officers about a plan to implement when a wildfire occurs in any of the firesheds, as our peer review said this was important to include in study.

What questions would be of interest to study?

- This would be a great opportunity to actually evaluate the effects of SPLATS, also salvage harvest effects;
- Possible augmentation of budget for this additional work. Creation of Joint Fire Sciences proposal with assistance from Region 5.

## Questions & Hypotheses

- *Fire behavior and effects.* Treatment should alter landscape-level fire behavior and effects. We expect that the strategic fuel manipulations will modify fire behavior in the treated fireshed as predicted by Finney's (2001) model. That is, if area treatments are placed strategically, the spread rate and intensity of the fire over the entire area burned will likely be reduced.
- *Tree morbidity and mortality.* Treatment will affect tree morbidity and mortality across the firesheds, we expect that the management regime will improve tree growth and survival within the treated areas and the immediate edge environments. The removal of some fraction of the vegetation will reduce competitive stress on the remaining trees.
- *Insect-treatment interactions.* At the local level, there may be instances where insect interactions in the residual forest left after the creation of SPLATs have a negative effect on tree health. For example, if mechanical methods are used alone to reduce small tree density and the resultant activity fuels (i.e., slash) is left on site, it could provide habitat for Ips beetles to multiply. Ips beetles can seriously injure and kill trees under outbreak conditions. Alternatively, if prescribed fire is used to consume natural and activity fuels, we expect red turpentine beetles to attack residual pine trees (ponderosa, sugar, and Jeffrey pines). Such attacks may predispose these trees to the often lethal predation of mountain and western pine beetles.

## Products & Outcomes

- Assessment of real SPLAT installation;
- Modeling approach that will estimate tree mortality after simulated wildfire; and
- Creation of research site that can provide future opportunities to address other questions, such as fire-climate interaction.

## Investigators

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