OREGON STATE UNIVERSITY EXTENSION SERVICE

FIRE FAQs

Salvage cutting: What are the effects on fire behavior and severity?

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Salvage cutting is the removal of trees that have been killed or damaged by insects, disease, wind, ice, snow, volcanic activity, or wildfire. The primary purpose of salvage cutting is to recover the economic value of trees before they decay. Because dead trees decay quickly, the timing of salvage cutting is important to capture as much economic value as possible. Revenue generated from salvage cutting can be used to:

- Reforest the site and promote the development of a new forest
- Resize culverts to handle increased stream flows
- Control invasive weeds
- Seed native plants
- Conduct other restorative/mitigation treatments

Beyond generating revenue, post-fire salvage cutting can also help manage fuels and future fire behavior, as long as logging slash is treated after the harvest. Removal of hazardous standing dead fuel also contributes to firefighter safety.

Dead trees are fuel, and fuel is one of three components that affect fire behavior (how fast a fire spreads and how hot it burns); the other two components are topography and weather. Let's put aside topography and weather for the moment and discuss an example of how fuels might change after, for example, a bark beetle epidemic. How would those fuels influence the short- and long-term fire behavior and severity? Consider the following fuel sequence following a bark beetle epidemic:

- As trees die from the bark beetle infestation, green foliage turns red and dries out. If a wildfire occurs at this stage, it can result in a severe crown fire.
- After the needles fall off of the beetle-killed trees (within 2 years), crown fuels diminish and there is no longer a threat of crown fire; however, a surface fire could be sustained.
- Over the next decade, as trees decay and break off or fall over each other, they become "jackstrawed," collecting on the forest floor. During this time, an abundance of woody fuels accumulates. As grasses, shrubs, and trees begin to regenerate during the first decade after beetle kill, more potential fuel is added to the mix. This combination of light and heavy fuels can easily sustain a surface fire. Large logs can burn for long periods, particularly if the wood is rotten, heating the soil and damaging the soil structure, nutrients, wettability, and microorganisms. On steep slopes, this type of soil damage can lead to run-off, erosion, and debris flows, causing sedimentation and other problems for water quality and fish.
- Over time, young trees will grow into a mature forest. A wildfire at this point can be stand replacing, meaning the fire could spread through tree crowns and the heavy understory fuel (even though it is somewhat decayed), resulting in a severe wildfire.

Salvage loader

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EM 9195
May 2018

By removing dead and dying trees in a salvage cutting operation, forest managers can help prevent the jackstraw condition and the potential for severe soil and watershed damage. The chance of smoke emissions from a wildfire are also diminished. If the area is reforested or allowed to naturally regenerate (assuming enough seed trees are present), removing heavy fuels in a salvage operation and removing harvest slash prior to planting can reduce the potential that young forests will be severely affected by a future wildfire.

While salvage cutting decreases the heavy fuels on the ground, it can increase the amount of branches and tops on the forest floor from cutting fire-killed trees. This temporarily increases the amount of small/fine woody fuels (less than 5 inches in diameter) that could support a surface fire. To reduce the risk of a surface fire after salvage cutting, these small/light surface fuels should be piled up and burned so they do not add to long-term fire hazards.

It's important to note that, like any timber harvest, there can be other effects of salvage cutting that need to be avoided or minimized. These include compacting soil, contributing to erosion and excessive disturbance, introducing invasive weeds, maintaining stream and water quality, and preserving wildlife habitat. Salvage cutting needs to be carefully planned to avoid or minimize negative impacts.

Resources

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Published May 2018.