



UI Extension Forestry Information Series II

Fire No. 12

Forest Fire Risk Reduction for Slash

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Leaving more slash in the woods may be good for forest fertility, but there is a fire hazard associated with slash, particularly on drier sites, where woody material decomposes more slowly. Most western states have rules to keep fire risk within acceptable limits. In Idaho, logging slash must be reduced to an acceptable level to release the landowner or operator from liability for any forest fires that start on or move through the property.

Slash is often broadly described as branches and tops from logging or accumulated from a storm, but this article focuses primarily on material smaller than three inches in diameter. Material larger than three inches in diameter (coarse woody debris) is often best left in place, as it is much less of a fire hazard and benefits wildlife and soil health.



Slash is broadly described as branches and tops accumulated on the forest floor from logging or a storm.

Photo By Chris Schnepf, University of Idaho Extension, Bugwood.org

How high is the hazard?

Before reducing slash, you must determine how high the hazard is. The most fundamental measure of slash hazard is in tons/acre, but slash hazard is more than weight. Idaho Department of Lands (IDL) fire wardens typically determine the potential fire hazard based on a number of factors, including:

- Number, size, and species of trees to be cut and resulting slash load (tons/acre)
- Size of unit (larger units are more hazardous)
- Slope and aspect (steep south or southwest facing slopes are most hazardous)
- Condition of the unit and adjoining areas prior to activity
- Proximity to structures, etc. (e.g. campgrounds, home sites, etc.)
- Presence of snags and cull trees
- Deterioration rate of slash
- Time of year activity takes place (May-June is most hazardous)

Before deciding on a slash reduction strategy, contact your local IDL Fire Warden to determine how much of a slash hazard you have (or are likely to have, if before the harvest). Presuming you have enough slash to warrant further treatment, there are many methods to reduce fire risk to acceptable levels. These methods may be used alone or in combination.

Pile and Burn

The most common approach to reduce slash hazard on family forests is to pile it and burn it. Piles can be created by hand or by using a bulldozer or other equipment. Typically, a piece of plastic or roofing paper is placed on top of each pile to keep a good

portion of it dry. Piles are usually burned in the fall, to lessen the chance that the fire will spread or that any embers continue smoldering into the next wildfire season. For more information on constructing and burning piles, see the publications cited in the reference section of this article.

Piling and burning effectively reduces slash hazard, but it does have disadvantages. First, it costs time and money (especially hand piling), though these costs are usually figured into a logging job that removes sawlogs. Second, there is some risk associated with burning piles, both to trees on the site, if the piles are constructed too close to standing trees, and to surrounding forests, if they are not burned carefully. Finally, immediately piling fresh slash concentrates nutrients in a few piles and removes some nutrients when they are burned.

One way to reduce nutrient loss is to let the slash sit for 6 months before piling and burning, to allow more of the nutrients to leach into the soil. Most states have some kind of grace period (e.g., a year or two) in which to treat the slash before the landowner is held liable for any fire that moves from their property to another. In some cases, you may also be able to get an extension of this time period from your local state forestry office. There will be some extra expense however, if you have to re-locate equipment back to the site to pile slash.

Lop and scatter

Relatively small amounts of slash can be cut into smaller pieces (so they lay flatter to the ground) and scattered about the forest floor. This method, commonly referred to as “lop and scatter”, is fairly standard with pre-commercial thinning slash, but it can be used for logging slash as well. The objective is to reduce the slash to a depth of 24 inches (preferably less). For the first few years after the treatment there will be some elevated fire risk (and it may not be too visually appealing either) but after one good winter’s snow, the material is typically compressed, needles fall off, and it is mostly out of sight. The slash will decompose more quickly on wetter sites.

Chipping

Chipping has been around for a long time but hasn’t been used much because of the cost. However, there is a lot of renewed interest in chipping and related



Chipping has become a popular post-harvest treatment.

Photo by Chris Schnepf, University of Idaho Extension, Bugwood.org

technologies for biomass fuels. Many people also like the way chipping looks. Local air quality ordinances also sometimes forbid burning, and chipping on site may be cheaper than hauling slash to a dump.

There may or may not be a viable market for the chips. The quantity and quality of the chips and the distance to the site that uses the chips play into whether chip removal is economically viable. There is also a potential nutrient loss issue if chipped fresh slash is removed from the site.

If you decide to chip and leave the chips on the site, disperse the chips around so they are less than one inch deep. Chips will also help retain soil moisture, but chips piled uniformly deeper than that can interfere with air and water movement into the soil and other soil functions as they buffer soil temperature. Try not to bury or mix the chips in with the soil, as fungi take nitrogen out of the soil to decay buried chips. Chips can also interfere with the growth of new or sprouted understory plants, which may be good or bad, depending on the species of plants and your management objectives.

Busting/Crushing/Shredding/Mulching/Masticating/Grinding

A lot of terms are used to describe different practices that use power equipment to reduce the size and stature of slash and brush into smaller pieces that lay flatter on the ground. Interest in these tools has peaked recently as groups look for lower-cost

mechanized methods to create and maintain lower fire risk around homes and communities.

There are many different machines for reducing slash hazard. Typically they involve some type of attachment to an excavator, a bobcat, caterpillar, or similar machine. All of these machines vary in their maneuverability in tight stands (some can be used on sites with trees spaced as close 12-15 feet), ability to work on slopes, and degree of rutting, compacting and other forms of soil disturbance. Most forest owners will probably hire a contractor to do this work, but some forest owners may be interested in purchasing a machine, particularly those machines that can do multiple tasks, such as move snow or skid logs. The USDA Forest Service Technology and Development Program have an excellent publication reviewing many of these tools, titled "Small Scale Forestry Equipment" (see references at end of this article).

If you do bust slash into smaller pieces, be careful not to break up older or larger material. Again, IDL Fire Wardens do not count pieces larger than three inches as slash hazard. Changing material that is "three-inch-plus" to "three-inch-minus" unnecessarily increases your fire hazard.

Soil disturbance and compaction

Using heavy equipment for piling and burning, slash busting, or chipping can compact soils. Compaction



Reducing the size and stature of slash and brush into smaller pieces that lay flatter on the ground can reduce fire risk around homes.

Photo by David M. Moehring, Mississippi State University, Bugwood.org.

can be reduced by using equipment with lower ground pressure (e.g. smaller cats, tracks instead of tires), working during drier seasons when soils are less likely to compact, and limiting the surface area covered by cabling or carrying slash to the machine. Machines mounted on an excavator arm also help reduce the area covered by tracks.

Prescribed fire

There are many types of prescribed fire. After a clearcut, slash is typically burned in a broadcast burn that consumes the finer fuels and chars coarse woody debris. A prescribed under burn takes place under a canopy of trees and burns up material in the understory without killing overstory trees. With prescribed burning there is always a balance between choosing the time of the year when the fire is most controllable (e.g., when there is a certain amount of current or anticipated rain and snow), versus conditions that are dry enough to get a good burn. Air conditions and location of the site have a bearing as well. Most areas have guidelines to minimize impacts to air quality from forest burning.

Ideally "cool" burns - prescribed burns where temperature is high enough to reduce slash hazard but not so high as to volatilize most of the nutrients - are desirable. Burning when the lower duff layers are moist helps retain nutrients. Typically this has meant burning in spring or fall.



Prescribed fire is a common forest management tool that reduces slash by consuming the finer fuels and charring coarse woody debris.

Photo by Dale Wade, Rx Fire Doctor, Bugwood.org.

One down side of burning in the spring is for birds that nest on the ground that time of the year. The impact of prescribed burning on ground-nesting birds has not been studied formally, but as long as a relatively small percentage of a watershed is burned in any one year, bird populations should not suffer too greatly.

Obviously, prescribed burning has risks. If the fire gets away, a landowner can be held responsible for damage to others' properties and the cost of suppressing the escaped fire. Professional foresters who are trained and experienced with assessing the risks associated with prescribed fire and implementing appropriate safeguards, are indispensable to family forest owners wishing to prescribe fire on their forests.

Customize a strategy for your property

All of the fire risk reduction strategies referred to thus far are ways of directly reducing or modifying slash fuels from logging or thinning. There are other ways to reduce fire risk that should be used together with these methods. If fire risk is these approaches may be sufficient in of themselves. They include:

- making water available;
- limiting access (e.g., gating roads); and
- creating fuel breaks, fire trails, or fire lines to isolate the slash into smaller subunits and break up the continuity.

No strategy will eliminate fire risk completely, especially when fire danger is extreme. But looking at a combination of different strategies for each site, gives you the best chance of reducing fire risk and meeting other objectives, such as forest nutrition. For on-site help in devising a strategy to reduce fire hazards from slash, check with your local Idaho Department of Lands Fire Warden.

For more information

Windell, K. and Beckley, B. 1999. *Small-area forestry equipment*. Tech. Rep. 9924-2820-MTDC. Missoula, MT. U.S. Department of Agriculture, Forest Service, Missoula Technology and Development Center, 40 p. <http://www.fs.fed.us/eng/pubs/>

Bennett, M and S. Fitzgerald. 2005. *Reducing hazardous fuels on woodland properties: mechanical fuels reduction*. Forest facts sheet. Oregon Forest Resources Institute. 4 p. www.oregonforests.org

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Shiplett, Brian. 2005. *Take the risk out of slash burning*. Idaho Department of Lands Foresters Forum. Fire Management No. 2. 2 p. <http://www.idl.idaho.gov/Bureau/ForestAssist/foresterforum/firemngmt2.pdf>



By using a combination of strategies, you can reduce fire risk and meet other management objectives, such as increasing forest nutrition and retaining soil moisture.

Photo by Chris Schenpf, University of Idaho Extension, Bugwood.org