

REDUCING HAZARDOUS FUELS ON WOODLAND PROPERTY

M. Bennett and S. Fitzgerald

Disposing of Woody Material

Thinning to reduce hazardous fuels often generates large amounts of woody residues, such as small-diameter logs, tree tops, and branches. This publication discusses several options for economically and effectively using and disposing of woody material.

Using thinned materials

During thinning operations, trees are felled, limbed, and bucked into logs of varying lengths. The logs often can be used rather than left in the woods or piled and burned. Ways to use small logs include selling commercial products, such as sawlogs, posts and poles, and firewood.

Some thinnings may pay for themselves or even generate a profit. However, most thinnings to reduce fire hazard have a net cost. The amount of cost will vary considerably, depending on the difficulty and size of the job and the amount of salable material available. Sale of products may help offset these costs.

Sawlogs

Markets for small-diameter logs vary considerably with the locale and current economic conditions. Merchantable sawlogs generally must be at least 5 inches in diameter at the small end (inside bark) and at least 12 feet long, though longer logs are much preferred. Usually, a standing tree must be at least 8 inches in diameter at chest height (4.5 feet from the ground) to generate a sawlog. Sawlogs typically are sold by the board foot or the ton.

The expense of handling small sawlogs—bucking, yarding, sorting, and loading—is considerable. In recent years, a variety of small-scale, low-impact logging equipment

has been developed to more efficiently process this material. To justify the cost of moving in equipment, you should have one truckload or more of logs and approximately 1 week's worth of work to do.

Selling even small amounts of forest products poses certain requirements. For example, you must file a harvest notification with the Oregon Department of Forestry (ODF), and you may owe taxes on sale proceeds.

Biomass

Biomass utilization is yet another option. Biomass includes tree limbs, tops, and other woody material that traditionally is left in the woods after thinning or logging.

Recently, there has been considerable interest in using this material as fuel for biomass power plants. However, the cost of gathering small-diameter material and transporting it from the woods to a power facility has been prohibitive in most cases.

In addition, biomass utilization generally requires on-site chipping, large landings, good road access to accommodate chip vans, and relatively short hauling distances. These requirements may be difficult to meet on many woodland properties. Nevertheless, recent increases in the price paid per ton of biomass have made it economically viable to utilize in some locales.



Figure 1. Milling small-diameter logs.
Photo: Jim Reeb.

Max Bennett, Extension forester, Jackson and Josephine counties; and Stephen Fitzgerald, Extension silviculture and wildland fire education specialist, Deschutes County; both of Oregon State University.



Figure 2. Precommercial thinning with limbed and lopped slash.

Posts and poles

Some area markets for posts and poles permit sale of logs down to 2 or 3 inches in diameter (measured at the small end, inside bark). Small-diameter poles also can be used for home projects such as fence and deck supports. Peeling bark off poles helps to preserve them.

Firewood

Much small-diameter wood unsuitable for sawlogs or posts and poles can become firewood for sale or home use. Hardwoods are preferred. Douglas-fir, lodgepole pine, and western larch are the first choices among conifers.

Cutting lumber with a portable sawmill

Another option is to hire a portable sawmill operator (Figure 1). The mill can produce lumber from your logs for home use. Mill operators generally charge by the hour or board foot.

Slash disposal options

Once you have used all the material you can, the next step is to treat the remaining woody residue, known as slash. Left untreated, slash can pose a significant fire hazard. In fact, after a thinning harvest, Oregon's forest protection laws may require you to reduce slash. Contact the Oregon Department of Forestry (<http://egov.oregon.gov/ODF/> or the office nearest your woodland site) for more information.



Figure 3. This slash load is excessive and should be piled and burned.

Cut and scatter

Understory trees, branches, brush, and other ladder fuels are cut, sectioned into smaller pieces, and scattered across the site (Figure 2). Larger logs may be removed and used. However, this method does not eliminate fuels—it just redistributes them. Typically, it also increases the total amount of surface fuels and creates a continuous layer of fuels across the ground. Though this method reduces “ladder” fuels (those that can carry fire up into the canopy), overall fire hazard may be increased initially (Figure 3).

As the material decays over time, the fire hazard declines. However, a common problem in dry forests is that slash accumulations may take a decade or more to decompose to the point they no longer are a significant fire hazard. Thus, use the cut-and-scatter method only if ladder fuels and slash loads are light.

Contact with the soil surface speeds decomposition. Depth of the slash also is important. A shallow, compact fuel bed will generate shorter flame lengths in a fire than a deeper, more loosely packed fuel bed.

While the cut-and-scatter method often is used for precommercially thinning ladder fuels (such as small understory trees and saplings), it is used also to treat tops, branches, and other nonmerchantable material generated in commercial thinning operations.

Guidelines for cut-and-scatter method

- Cut material into pieces (see Figure 2) and scatter to a depth of 12 inches or less, ideally, but no more than 18 inches.
- Cutting material in fall gives more time for it to break down before the next fire season; also, snow loads may compact it further.
- Do **not** use this method of slash disposal within a home's defensible space (that is, within 100 feet of the home).
- Use this method in low-density stands where either existing surface fuel loads or ladder fuels are light, where decomposition will be rapid, and where a potential short-term increase in fire hazard is acceptable. Consult an ODF Stewardship Forester for recommendations.

Pile and burn

The slash is cut, piled, and burned. Piling often is by hand on steeper slopes and other areas inaccessible to heavy equipment, or on jobs too small to justify the cost of moving in equipment. Hand piling also is used in dense stands where equipment is difficult to maneuver or where the risk of damage to remaining trees or soil is unacceptable. Hand piling generally is limited to material less than 6 inches in diameter.

Small dozers traditionally are used for machine piling. Use a dozer only when soil is dry or frozen, to minimize the risk of soil compaction; also, take care not to rub off the bark on any live trees, especially in spring. Use a toothed brush blade, if possible, to help keep soil out of the pile.



Figure 4. After this stand in southwest Oregon was thinned, the debris was piled by hand.

Photo: Leanne Mruzik.



Figure 5. A properly made burn pile. It will burn when the pile has dried even if the surrounding forest is wet.

Photo: Leanne Mruzik.

Other mechanized slash piling options include small tracked machines with booms and grapples. These and other mechanized slash and fuels reduction methods are addressed in EC 1575-E, *Reducing Hazardous Fuels on Woodland Property: Mechanical Treatments*.

Piling and burning is very effective at reducing slash to acceptable levels (Figure 4). You have the option to cut, pile, and immediately burn (“swamper burning”); or to cut, pile, cover, and burn later in the wet, winter months.

Risks of pile burning

Pile burning has significant risks. A landowner who does not follow burning restrictions and regulations may be held liable if the fire escapes and becomes a wildfire. Burning piles on warm, windy days poses fire escape risks. Piles may smolder for days or even weeks, roaring back to life in windy, warm weather, even during dry winter conditions.

Another risk of pile burning is that it usually leaves large, blackened circles and may scorch and damage other trees and vegetation if piles are too close or burn too hot.

Guidelines for pile-and-burn method

Before piling, determine the best placement for each pile.

- Look for an open area away from structures, firewood, propane tanks, power lines, and hazardous materials.
- Place piles at least 10 feet away from trees, snags, brush, and downed logs.
- Place piles at least 100 feet from streams and drainages. Avoid piling in ditches.

Construct hand piles with burning in mind.

- Place small branches, twigs, and brush less than 0.5 inch in diameter at the bottom of the pile, as kindling, for easier ignition and better consumption of the larger material.

Rules on thinning

Thinning is regulated by the Oregon Forest Practices Act. Before a thinning operation—whether commercial or precommercial—you must submit a Notification of Operations with the Oregon Department of Forestry (ODF). ODF must receive the notification at least 15 days before activity begins. Under some circumstances, you may be required to submit a written plan.

- Lay limbs and stems parallel and in the same direction to minimize “air pockets.”
- On a hillside, align material in the same direction as the slope, to prevent the pile from rolling.
- Pile sizes can vary but should be at least 4 feet wide and 4 feet high (Figure 5, page 3).



Figure 6. Whole-tree chipper in pine stand.

Cover hand piles if material is not going to be burned immediately. Covering hand piles allows you to burn during rainy or wet periods and provides a dry ignition spot.

- Cover a hand pile when it is about 80 percent complete. After covering, put the rest of the material on top of the cover to hold it.
- Remove the cover before burning. Or, if the cover is made from pure polyethylene plastic, it can be left on the pile and burned.

Burn piles only when conditions are safe.

- Before burning, obtain a burn permit. Check with both your local fire department and ODF.
- Burn hand piles when burning restrictions are lifted, during daylight, and when it's wet or rainy with little or no wind.
- Have a shovel and water nearby and ready to use.
- Check carefully to make sure the piles are out before you leave the area.

Chipping

Chipping can be a very effective method of slash disposal. A layer of chips a few inches deep spread across the ground poses relatively little fire hazard. Chipping results in a neat appearance, and the mulch holds soil moisture, covers exposed soil, and inhibits weed germination. Depending on moisture levels and the depth of the chips, they may decompose rapidly or slowly. There is no evidence that chips spread over the soil surface “tie up” nitrogen in the soil. However, chips may inhibit the growth of some ground vegetation.

Chipping is well suited to homesite and defensible-space thinning. However, chips should not be deeper than a few inches and should **not** be used at all around a home's foundation because they could ignite from an ember.

Many contractors, including arborists and tree service companies, have large chippers that can process relatively large-diameter material efficiently. Homeowners can rent chippers, but the machines are usually smaller and productivity is much lower. In general, chipping is very labor intensive and costly. Most of the labor is in dragging the material to the chipper and feeding it by hand. The material also can be piled first and the chipper moved around to each of the piles. Chipping requires fairly level ground and good access, since most chippers are towed by a truck or tractor.

Self-propelled, whole-tree chippers also have been developed and may be available for contract work in some areas (Figure 6).

Haul away

Slash may be carried to a Dumpster or a pickup and hauled away. This is labor intensive and best suited for relatively small amounts of material near homesites, where access is good. The material can be hauled to a landfill or other disposal site. Some counties occasionally have “free days” where residents can bring in slash and debris for free. Contact your local landfill manager. A few landfill sites may have biomass power facilities that offer slash disposal for free or a low fee.

Table 1.—Summary of woody material disposal options.

Considerations	Option				
	Utilization	Cut and scatter	Cut, pile, burn	Chip	Haul away
Objective and effectiveness	Remove small logs; sell when feasible to offset treatment costs. Follow with slash treatment.	Reduce ladder fuels and redistribute fuel load. Not as effective as other treatments, except when fuels loads are light.	Remove woody residue generated in thinning. Reduce ladder and surface fuels. Very effective.	Remove woody residue generated in thinning. Reduce ladder and surface fuels. Effective	Remove woody residue generated in thinning. Reduce ladder and surface fuels. Very effective.
Use near home?	Yes	No	Yes	Yes	Yes
Use in riparian zone?	Maybe	Yes	Maybe	Maybe; depends on access.	Yes
Slope	All ground-based, mechanized log-handling equipment usually limited to slopes of less than 35%.	All slopes.	All slopes.	Yes, if slopes are less than 40%	Flat or nearly flat terrain.
Equipment needed	Small log-handling equipment; e.g., all-surface vehicle (ASV).	Chainsaw	Can be done by hand or using equipment.	Chipper that can handle material up to 6 inches or larger	Truck
Site disturbance	Varies	Little	Some; can be considerable with mechanized piling.	Little	Little
Contract cost range per acre	Highly variable	\$25–\$100	\$275–\$1,500 (major cost is piling).	\$500–\$1,500	Highly variable
Advantages	Can offset treatment costs.	Cheap and easy to implement.	Very effective way to reduce slash and fuels.	Effective; neat appearance.	Effective; neat appearance.
Disadvantages	May not be feasible. Cost may greatly exceed benefit.	Less effective than other treatments; the fire hazard may remain for several years.	Labor intensive and costly.	Labor intensive and costly.	Labor intensive and costly.
ODF notification requirement	Yes	Yes	Yes	Yes	Maybe

© 2008 Oregon State University. Extension work is a cooperative program of Oregon State University, the U.S. Department of Agriculture, and Oregon counties. Oregon State University Extension Service offers educational programs, activities, and materials without discrimination based on age, color, disability, gender identity or expression, marital status, national origin, race, religion, sex, sexual orientation, or veteran's status. Oregon State University Extension Service is an Equal Opportunity Employer.

Trade-name products and services are mentioned as illustrations only. This does not mean that the Oregon State University Extension Service either endorses these products and services or intends to discriminate against products and services not mentioned.

Published August 2008.