

Prescribed Burning.

Prescribed Burning and Slash Disposal

Prescribed Burning is the controlled application of fire to forest and woodland fuels in either their natural or modified state. Prescribed Burning is done within site-specific environmental conditions to confine the fire to a predetermined area.

The objective is to produce the fire behavior and characteristics required to attain fire treatment, ecological restoration, and resource management objectives.

Prescribed fire methods vary and include *hand pile burning*, *swamper burning*, *broadcast underburning*, and *patch burning*. All of these methods can be used to reduce fuel hazards and improve the ecological health of fire-adapted landscapes like those in the Cascade region.

When choosing the right prescribed fire activity for a property it is very important to consult fuel management and forestry professionals, especially when considering broadcast underburning.

Prescribed fire methods are very site-specific. Not all methods are appropriate for every location.

Prescribed fire prescriptions must be determined on a unit-by-unit or section-by-section basis.

The details needed for burning will develop as on-the-ground work progresses along with knowledge of site conditions.

Prescribed Burning Methods and Treatments

Swamper Burning

Swamper burning is a prescribed fire method in which fuels are gradually and continually added (usually over the course of a day) to a hand or machine pile. In Cascade areas with a high concentration of homes, swamper burning for slash treatments may be a good option. Swamper burning is recommended within denser vegetation zones, following an initial *first-entry thinning treatment* where high concentrations of slash will be generated. Swamper burning is also a first step of preparation prior to broadcast underburning activities.

Since 1993, Lomakatsi has used the swamper burning method on thousands of acres of private, state, and federal land throughout Southern Oregon and Northern California for fuel reduction.

Prescribed Burning.

Lomakatsi believes the swamper burning method not only accomplishes fuel reduction goals, it also provides an extra degree of protection for nearby residences. Swamper burning is favored for the following reasons:

1. Less smoke present at any given time when you drag and burn downed slash than when lighting many hand piles at once.
2. More fuels are consumed as a result of this method. There is little opportunity for piles that are lit to extinguish in the center during ignition.
3. Swamper burning minimizes the scorching of leave-trees and sensitive vegetation zones. Slash can be dragged away from leave-trees and transported to burning piles in more open locations.
4. The danger level of crown scorching and the potential for runaway fire is lessened because piles are more manageable in a swamper burn situation than in a larger *touch-off* hand pile burn.
5. The visual appearance of hundreds of hand piles burning at one time can be frightening for residents. Swamper burning is a good tool to educate landowners about working with and becoming more comfortable with fire, and the fire-adapted landscape in which they live.
6. Swamper burning methods are safer and more manageable, both in appearance and execution. In light of recent prescribed-fire disasters in the Southwest, safety cannot be overstated in terms of developing and maintaining community trust for landowners, contractors, and agencies involved in the application of prescribed fire.
7. In a swamper-burning situation, materials for special forest products and small-diameter utilization can be more efficiently sorted by hand crews than during the standard industrial forestry approach of stacking larger hand piles where good materials are wasted during burning.

The swamper burn method is site-specific; one size does not fit all. For prescribed fire activities in montane chaparral, sagebrush-bitterbrush, and foothill woodland where fuels burn hotter than conifer forests, the swamper burning approach will achieve positive end results, provide a safer burn, and prepare site conditions for the future reintroduction of low-intensity fire.

Prescribed Burning.

Swamper Burning Prescription

Burn-pile locations will be placed at a minimum of ten feet outside the drip zones of the largest overstory leave-trees.

Place burn piles in the most open areas to avoid damage to surrounding trees.

Construct small piles (comprised of mainly smaller fine fuels such as live and dead branches) approximately every fifteen to twenty-five feet to serve as *pilot ignition piles*. Piles can be constructed roughly three feet high and covered with *slash paper*. After stacking enough material for the base of the pile, place a sheet over the material then stack about 1/3 more on top to hold down the protection sheet, which will keep the pile dry for easier ignition.

Leave the remainder of slash on the ground until you burn. Swamper and all burning operations will need to be conducted in the winter months. The Klamath-Lake ODF District doesn't recommend any spring burning on private lands. Check with your local fire department or Oregon Department of Forestry for permitting details. Desired sub-merchantable materials will be sorted for special forest products, small-diameter poles, and firewood. Products can be yarded to roadside locations.

When the burning is executed, ignite pilot piles in smaller sections (ten piles at a time), with the remaining slash dragged to the burning piles in a rotational fashion. Add slash to the piles while keeping flame lengths reasonable. When those piles have become manageable, crew members with hand-carried *drip torches* can move ahead to ignite other piles, while a mop-up crew will stay behind and clean up the remaining slash and burn out the surrounding slash in the piles.

Depending on the time of year, a *scratch line* or *scalping* down to *bare mineral soil* may need to be placed around the piles in an effort to prevent the fire from burning outside the pile ring.

Prescribed Burning.

After visible flames have burned down, hot embers will remain in the burn ring. Depending on what fuel type you are burning, these hot embers may remain for several days. It is important to inspect the area where you were burning several times throughout the following days until the fires are dead out. In regions like the East Cascades, fuels on the ground can dry out rapidly even after several days of rain. Pay close attention to prevent fire from escaping.

Following burning, a good restoration practice is to sow native grass seed into the mineral-rich ashes of some of the burn locations to restore the native grass community. Native grass can establish itself well in disturbed locations like burn spots. It may be possible to acquire native grass seed for specific locations from the US Forest Service or a local nursery in the area. Seed can be sown by hand; experimentation with amounts will produce different results. Seeding rates will vary, so check when purchasing the seed as to how much to use per location. The best time to sow native grass seeds is November thru March during their dormant time, depending on elevation. Sowing native grasses not only restores herbaceous plant communities to the site, it is a good preventative measure for noxious weed mitigation.

Retain woody material during burn operations. It is important to leave some coarse woody debris. Decisions of what to leave on the site are based on slope percentage, aspect, and location.

Hand Pile and Burn

Following thinning operations, landowners may consider the method of *hand pile and burn*, whereby slash can be gathered into piles located in open areas and burned. Slash is piled soon after it is cut, then covered with slash paper. Some people use plastic to keep piles dry and then burn the plastic. However, burning plastic is toxic, especially for those doing the burning. If using plastic in preparations, remove the plastic sheets before burning.

Slash piles are usually burned in the fall and winter during moist days. At this time, the piles will be relatively dry while surrounding vegetation will be damp, minimizing the spread of fire beyond the pile.

Slash Piling Specifications

Prescribed Burning.

Pile debris ranging from two to eight inches in diameter, at least two feet or more in length. On slopes greater than 55%, small-diameter (greater than eight inches) coarse woody debris may be left for soil stability. Some favorable small-diameter materials may be yarded for special forest product utilization.

Piles should be placed away from old stumps and fallen logs to minimize their ignition. In an effort to prevent holdover fire potential (i.e., a fire not burning out completely), make sure piles aren't located on top of old stump holes or decomposing logs. Be sure to place piles a sufficient distance from the drip lines of trees to prevent scorch.

Construct piles up and down slopes and create a secure base to prevent the rolling of materials. Smaller fuels form the initial core for later ignition, with larger fuels placed on the top and sides.

Piles ideally range from a minimal size of three feet high by five feet in diameter to a maximum size of five feet high by seven feet in diameter, except when insufficient slash is available in the area.

Make piles as compact as possible. Limbing, aligning the material, and placing heavier material on top of the pile will obtain compaction. Air space between logs and limbs is not to exceed three inches in cross dimension after piling.

Place slash paper on the piles such that the covering does not go beyond half the length of each side of the piles, as measured from the top (or center/mid-point). The goal is to have the center core of the pile covered (not the entire pile) for successful ignition when lighting the pile at a later time.

Secure slash paper on piles by placing heavy materials on top of the paper. Place it to provide the best protection from rain and snow, in order to enable later ignition.

For piles that may cause unavoidable scorch to residual trees upon combustion, burn them during periods of rain or snow to minimize damage. Each pile should be *chunked* at least once during burning operations. Include any creep in the chunk to keep the fire confined to the piled area. Chunk piles after they have had sufficient time to burn down. It is important that a person, or perhaps several people, remain on site until the piles have consumed all materials and have been reduced to a smoldering condition. Pile burn locations carry the concern of a 'holdover' fire and

Prescribed Burning.

should be checked and inspected daily until deemed safe, to ensure fires are completely extinguished especially around windy conditions.

Escaped burn piles are responsible for numerous wildfires in the Southern Oregon and it is important that landowners are aware of the liability issues surrounding the use of burning.



Hand Pile

Burning Ignition

Piles are constructed



Broadcast Underburning

Broadcast underburning is a method that allows a prescribed fire to burn in the understory over a designated area within well-defined boundaries. Broadcast underburning is done to reduce fuel hazards and/or as a silvicultural restoration treatment.

In order to effectively and responsibly reintroduce fire (i.e., to ensure it will burn on the ground and not in crowns), thinning and brushing must first take place. Thinning actions reduce stand densities, ladder fuels, the build-up of brush and excessive surface fuels.

Before burning in forested stands, a few preventative measures should be taken to ensure the survival of overstory trees. Often a thick layer of duff or thatch will accumulate beneath mature trees. In many cases, feeder roots will grow into the duff layer close to the surface of the ground. The loss of these roots due to extreme heat and/or fire can cause tree mortality. Duff should be raked back several feet with a McLeod to prevent unwanted impacts. Such treatments are especially important beneath large pines, which often accumulate thick mounds of debris, colonized by sensitive roots.

Favorable conditions for igniting fires include low winds, moderate humidity, fairly moderate temperatures, and a small amount of soil moisture to protect soils from baking. Aboveground fine fuels should be dry enough to ignite and carry fires. The idea is to reduce fine fuels in the

Prescribed Burning.

form of duff or grasses without compromising or impacting soils, fungal associates, sensitive tree roots, etc. Burn intensities will vary depending on the vegetation type, the amount of ground and surface fuels, and the restoration objectives on the site.

In certain locations, where surface fuels are less and grasses persist in the understory (e.g. oak woodlands and savannahs), flashy underburns are the desired outcome. Flashy underburns are best accomplished in the fall and enable safer broadcast burning of a larger area, which can usually be achieved the second dry day following a rain. The top several inches of the surface of the fine fuels to be dry, and the moisture content below sufficient to safely carry the fire quickly (flashy) and consume the top layer of the surface fuels, while leaving some organic material to protect the soil.

In other locations where surface fuels consist of deep, heavier leaf litter mixed with duff (e.g. ponderosa pine and mixed conifer forests), a slower-creeping fire may be more appropriate. The slow creeping fire will consume more depth of surface and ground fuels. The native people of northern California and southern Oregon referred to this type of burning as 'cool burning'; the fire creeps along and consumes fuels without getting hot and out of control.

Prior to execution of any broadcast underburning activities a *burn plan* should be drafted on a unit-by-unit basis. During any underburn operation a fire engine and a certified *ignition specialist* and wildland firefighters need to be present to carry it out. If a broadcast burn is conducted, the local fire department and Oregon Department of Forestry should be consulted in the development of the burn plan. A burn plan will describe the layout of the property and determine locations for firebreaks (skid roads, spur roads, and main access roads), *fire ignition*, *escape routes* (in case the fire becomes a wildfire, a reality to consider in all levels of prescribed fire activities), *water pump chance*, and adjacent properties. Prior to considering broadcast burning be sure to contact Oregon Department of Forestry to obtain all the necessary permits and legal requirements.

Prescribed Burning.

For ecosystem health and the long-term maintenance of fuel levels, broadcast burning is an important and recommended activity. Although there are many risks involved, it is critical that landowners, agencies, and communities not only learn to live with fire, but also become accustomed to using it.

Broadcast Burn Fire Preparation Example

Thin and remove ladder fuels and *jackpots*, and prune to head height. Separate ground-to-crown and crown-to-crown live and dead fuels.

Lop and scatter tree branches and tops; cut to twelve- to eighteen-inch lengths on the ground for broadcast burn.

Pile all other slash three to four feet high, five to six feet at base.

Use flagging to mark all desired leave-species like seedlings and native shrubs, and create a *blackline* around them (slowly burning out from desired leave-species so they will be retained when the main broadcast burn is initiated).

Blackline (backburn) all retained doghair thickets and gulches before broadcast burning.

Pull back heavy duff from leave-trees to prevent root steaming and possible mortality. Use a McLeod tool for this task.

Leave slash less than two to three inches in diameter on the forest floor.

Put slash of two to three inches to eight inches in diameter in piles or near roads for firewood.

Leave slash greater than eight inches diameter on the forest floor.

Patch Burning

Following initial thinning and slash treatment by either hand pile burning or swamper burning, patch burning may be used in site-specific locations. Patch burning is performed by defining and isolating a small area of fuels to burn and applying fire only to that area. This method is sometimes used in the management of invasive blackberries where the area around the patch is thinned, a scratch line is created around the thinned area, then the inside patch is ignited.

Patch burning can also be used to burn surface fuels within a variable-density treatment where unthinned areas are retained and a diversity of mosaic burn conditions is desired.

Prescribed Burning.

If performed properly, patch burning can be a very effective method of reducing fuels and reducing costs. In the right conditions it works well in chaparral and sagebrush, as these plant types often have lots of dead fuel, and patches can be isolated and burned.

Similar to all prescribed fire methods, only perform the activities by consulting and hiring skilled fire or forestry professionals.