USDA United States Department of Agriculture

Natural Resources Conservation Service

after the fire

Straw Mulching in the Aftermath of Wildfire

What is it? The application of straw as a protective cover over seeded or non-seeded areas to: reduce soil erosion and sedimentation; slow runoff and mobilization of ash and/or toxic debris; and aid in revegetation on bare on soils from wildfire or from soil/slope disturbances caused by the wildfire fighting effort.

When is it used? Straw Mulching is used on bare and disturbed soil areas including slopes which need protection from winter rains and/or runoff and that have a high potential for erosion. In some circumstances, such as steep slopes and where wind is an issue, straw mulching requires some type of anchoring by crimping/ "punching," netting or other methods to prevent blowing, sliding or washing away. Straw mulching is not suitable in waterways areas, including channel banks where it could easily mobilize and present issues for downstream culverts, stream crossings, drains, etc. Straw mulch forms a loose layer when applied over the soil surface.

Where necessary straw can be covered with jute or decomposable plastic netting or "punched/tucked" into the soil with a shovel, spade or by equipment on excessively steep slopes or sites exposed to high winds. The mulch should cover all areas that are seeded. On larger areas where and where no seeding will be done it is generally not feasible to cover the entire area with straw. In these critical area mulch strips 10' wide placed on the contour of the slope no further than 100' apart will help protect soil, slow runoff and trap sediment.

Methods and Materials: On gentle to moderate slopes, straw mulch can be applied by hand broadcasting to a uniform depth of no more than 2 inches. On steep slopes, the straw can be spread by hand, if accessible, or can be blown onto the slope by a straw blower contractor to achieve the same degree of cover. When applied properly, approximately 30 percent of the original ground surface can be seen. The application rate per acre should be about 2 tons (or one 75 pound bale per 800 square feet). Straw should be clean rice, barley, or wheat straw.

Anchoring of straw mulch (when necessary) can be accomplished using the following methods:

> Hand Punching: A spade or shovel is used to punch straw into the slope until all areas have straw standing perpendicularly to the slope and embedded at least 3-4 inches into the slope. It should be punched about 1-2 feet apart.
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> Roller Punching: An equipment roller equipped with straight studs not less than 6 inches long, from 4 - 6 inches wide and approximately one inch thick is rolled over the slope.
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> Netting: Netting is used on large, excessively steep areas which cannot be punched with a roller or by hand. Jute, wood excelsior or decomposable plastic netting is applied over a 2" layer of straw.

IMPORTANT NOTE: Mulch can be a fire hazard if installed when fire is still a danger especially in the interface of burned and unburned landscapes which happens to be where many firebreaks are located. Mulching should not be used while ground is still hot from fire and be delayed until just before the first rains.

Where to Get Help: Technical Assistance and practice details and guidelines are available from your local USDA Natural Resources Conservation Service office or your local Resource Conservation District regarding straw mulching and other erosion and sediment control treatments. www.ca.nrcs.usda.gov.

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Straw Mulching for Erosion Control Following Wildfire

- Straw mulching when done correctly with the right product and care can be one of the most effective measures to: reduce runoff; filter and slow toxic debris mobilization from burned structures; and control soil erosion and sedimentation following fire even without seeding.
- If mulching is deeper than 4" it can delay recovery time of existing seed bank in the soil or in cases when seeding is done in conjunction with mulching.
- Straw mulch should be as weed-free as possible such as sterile wheat or barley or rice straw. In some areas native grass straw may be available as well. *Note: "Weed free" mulch such as rice straw is not necessarily "weed free". It all depends on the source, transport carrier, and the staging area of the mulch. Rice straw is lighter and more difficult to spread. It is also generally less expensive but not always locally available. There may still be a need for weed management where ever straw is used.*
- Mulching will not prevent invasive plants from taking over, in fact, studies show that mulching can actually aid in non-native establishment by retaining more moisture for longer periods than in areas not mulched.
- Mulch can be a fire hazard if installed when fire is still a danger especially in the interface of burned and unburned landscapes which happens to be where many firebreaks are located. Mulching should not be used while ground is still hot from fire and be delayed until just before the first rains.
- Rice straw is very difficult to spread because it's light and fluffy and has a tendency to stick together. Many workers get frustrated with it and end up throwing out big solid flakes that won't let plants grow through.
- Mulching can be done in 6-10' strips along the contour and spaced at 50-100' intervals (depending on slope) to make it go a longer way on large areas needing protection. This method will also help break down long steep slopes to slow runoff and trap sediment. Where steep slopes and/or wind is an issue straw can be "tucked" in with a shovel or "tracked" in by equipment (if there is equipment access without causing more disturbance to soil/slope). Straw can also be covered with netting and secured with staples to hold in place.
- Straw mulch that is not certified as "weed free" will not only have weed seed in it but might have other non-native grass seed in it as well.
- Mulching is best used around homes & home sites, above watercourses (but not on streambanks) alongside roads and water bodies. Wide spread mulching over the watershed by hand or by plane is not cost effective nor provides significant benefits where this practice has been used in the past. Wide spread straw mulching may also contribute to the widespread establishment of non-native plants.
- Straw mulch should be used in loose form. If and whenever straw is used in bale form then installation of whole bales should only be done according to a design prepared by a certified erosion control specialist and regularly maintained throughout the first rainy season following fire. The bale structure should then be removed or replaced with a more permanent structure after the first rainy season. *Note: When straw bales get wet, they become a brick wall and have absolutely no sediment filtration function, in fact, they will act as dams impounding or redirecting runoff with undesirable consequences.*
- Mulching is not needed in areas where leaf drop is heavy from heat/smoke damaged trees.

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