

Science

B R I E F I N G

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REDUCING POST-FIRE HILLSLOPE EROSION

BACKGROUND

Post-fire erosion can be a major issue when trying to protect downstream values at risk. Mulch treatments (agricultural straw, wood strands, wood shreds, and hydromulch) are frequently recommended as a technique used to mitigate post-fire increases in runoff and erosion rates. However, the comparative effectiveness of the various mulch treatments is not well established.

RESEARCH

Research Activity: The effectiveness of post-fire treatments at reducing sediment yields was measured with sediment fences on hillslope plots for 4 to 7 years after four wildfires in the western United States. Wheat straw mulch, wood strand mulch, and hydromulch treatments initially increased total ground cover to more than 60%, but not all the mulches reduced sediment yields nor did the effectiveness of the mulches last the same amount of time. Wood strands reduced annual sediment yields by 79% and 96% during the first post-fire year at the two fires where it was tested and also reduced sediment yields in various later post-fire years at both fires. Wheat straw mulch reduced annual sediment yields by 97–99% in the first post-fire year at two of the four fires where it was tested. Wheat straw mulch was also effective in the third and fourth post-fire years at one of the fires. Hydromulch did not reduce sediment yields compared to the controls at either of the fires where it was studied. In general, the effects of these mulches on sediment yields corresponded with their longevity. The additional proportion of ground cover provided applied mulch is the primary treatment factor that appears to control reductions in sediment yields and hillslope erosion.

Management Implications: Managers need to know treatment purpose and effectiveness to determine the best treatment(s) for a specific location and adapt treatments to improve their effectiveness. For example, the formulation and application rate of mulches can be modified to enhance specific qualities, such as longevity, adherence to soil, interlocking of mulch strands, etc. Information about treatment performance (physical characteristics about the materials) and hillslope treatment effectiveness (reduction in runoff, peak flows, and/or sediment yields) should be monitored and assessed to determine effectiveness of mitigation techniques used to limit erosion from timber-harvested and burned areas.



Aerial application of hydromulch, a matrix of organic fibers mixed with water that binds to the soil surface.



A wood strand mulch plot at the Hayman fire in central Colorado.

KEY POINTS

- Dry mulch treatments (agricultural straw, wood strands, wood shreds) are increasingly used as post-fire hillslope stabilization treatments.
- Dry mulches can be highly effective in reducing post-fire runoff and erosion
- Innovative options for producing and applying mulch materials have been adapted for use on large burned areas that are inaccessible by road.
- Hydromulches have been used after some fires. Recent research shows that they have been less effective than dry mulches in stabilizing burned hillslopes and generally decompose or degrade within a year.

MORE INFORMATION

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