**Hillslope Treatment Effectiveness and Performance Characteristics Summary**

This synthesis of post-fire treatment effectiveness reviews post-fire hillslope emergency stabilization treatment research and monitoring with an emphasis on the past decade. Since 2000, erosion barrier treatments (contour-felled logs, straw wattles), which were a mainstay of post-fire management prior to 2000, have declined in use for hillslope stabilization. At the same time, mulching treatments are increasingly being applied when values-at-risk warrant protection. This change has been motivated by research that shows the proportion of exposed mineral soil (or, conversely, the proportion of ground cover) to be the primary factor in the amount of post-fire hillslope erosion. Erosion barrier treatments provide little ground cover and have been shown to be less effective than mulch, especially during short-duration high-intensity rainfall events. Innovative options for producing and applying mulch materials have made it possible to apply ground cover over large burned areas that are inaccessible by road. Although longer-term studies on mulch treatment effectiveness are still on-going, early results and short-term studies have shown dry mulches (agricultural straw, wood chips, wood shreds, etc.) to be highly effective post-fire hillslope stabilization treatments. Consequently, mulch treatments have become commonplace in the post-fire environment to provide protection to high values-at-risk. Hydromulches, and to a lesser degree, soil binding chemical treatments, have been used after some fires but these treatments have been less effective than dry mulches in stabilizing burned hillslopes and generally decompose or degrade within a year.

Directly from:
Robichaud, Peter R.; Ashmun, Louise E.; Sims, Bruce D. 2010. Post-fire treatment effectiveness for hillslope stabilization. Gen Tech. Rep. RMRS-GTR-240. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 62 p. https://forest.moscowfsl.wsu.edu/BAERTOOLS/HillslopeTrt/

**Hillslope Treatment Effectiveness and Performance Characteristics Summary Chart**

Ratings of post-fire hillslope stabilization treatment effectiveness for three rainfall regimes (high intensity, low intensity, and high total amount; see fig. 4 and Table 1 in main text) are presented in the table below. Treatment effectiveness codes: 1=more effective; 2=somewhat effective; 3=not effective. Treatments are also rated as more likely (more) or less likely (less) to exhibit performance characteristics that impact treatment effectiveness, post-fire recovery, and/or the environment. Other phrases are used to describe the performance characteristics of treatments that are dependent on circumstances or are not effectively rated as more or less likely. Details of treatment performance characteristics can be found in the individual treatment sections of the main text.

| | | Straw mulches | Wood mulches | Hydro-mulches | Soil binders (PAM) | Contour-felled logs (LEBs) | Straw wattles |
|---|---|---|---|---|---|---|---|
| **Overall effectiveness** (rating: 1, 2, 3) | High intensity rainfall (>2 yr return interval) | **1** | **1** | **3** | **3** | **3** | **3** |
| | Low intensity rainfall | **1** | **1** | **1** | **2** | **1** | **1** |
| | High rainfall amount (>2 in [50 mm] in 6 hrs) | **1** | **1** | **2** | **3** | **2** | **2** |
| **Performance characteristics that impact effectiveness** | Resistant to wind displacement | less[a] | more[a] | more | more | more | more |
| | Remains functional for more than 1 yr | more | more | less | less | more | more |
| | Provides ground cover | more | more | more | less | less | less |
| | Increases infiltration | more | more | not known | depends on conditions | less | less |
| | Increases soil moisture retention | more | more | more | less | less | less |
| | Shortens flow paths | more | more | less | less | more | more |
| | Traps sediment | more | more | less | less | more | more |
| | Slows development of concentrated flow | more | more | more | more | less | less |
| **Other considerations** | Contains noxious weed seeds | possible | less | less | less | less | possible |
| | Delays re-vegetation | depends on mulch thickness | depends on mulch thickness | less | less | less | less |
| | Harmful to the environment | less | less | depends on components | depends on type and concentration | less | less |

[a]In wind tunnel tests, agricultural straw resisted movement in wind speeds of 15 mi $h^{-1}$ (6.5 m $s^{-1}$) and wood straw resisted movement in wind speeds of 40 mi $h^{-1}$ (18 m $s^{-1}$) (Copeland and others 2006).