



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2002MT1B

Title: Quantitative Assessment of the Effectiveness of Post-Fire Erosion Control Techniques

Project Type: Research

Focus Categories: Geomorphological Processes, Hydrology, Sediments

Keywords: soil erosion; forest fire; burn-area emergency rehabilitation

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End Date: 02/28/2005

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Matching Funds: \$30059.00

Congressional District: at large

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Abstract: Soil erosion rates in undisturbed forested watersheds are typically very low, but substantial increases in erosion rates have been observed after forest fires due to the loss of the protective vegetation and litter layers, and changes in the physical characteristics of the soil that increase the rate and amount of surface runoff. Increased erosion rates are a concern due to the loss of soil productivity, and the ecological damage caused by increased sedimentation in streams, lakes and wetlands. The objective of post fire erosion control efforts is to reduce the risk of these types of economic and environmental consequences by implementing one or more erosion control techniques. The three main types of post-fire erosion control techniques used are: 1) hillslope treatments, such as seeding, mulching and straw wattles, 2) in-stream treatments such as straw bale and log check dams, debris basins and streambank stabilization, and 3) road rehabilitation treatments such as upgrading of culverts and ditches. Hillslope treatments are generally regarded as being the most beneficial because they control erosion nearer the point of origin, thus reducing the probability that eroded soil will reach downstream water bodies. The costs associated with post-fire erosion control are extremely high. The U.S. Forest Service spent more than \$83 million on its Burn Area Emergency Rehabilitation (BAER) program between 1970 and 2000, and more than 60% of this amount was spent in the 1990s. State agencies have experienced a similar rise

in the cost of post-fire erosion control over the last decade. Public concern over the human and environmental impacts of forest fires, and the increasing likelihood of large fires near urban interfaces, means that expenditure on post-fire erosion control is likely to remain high for the foreseeable future. It is therefore essential that erosion control projects employ only the most effective treatment options. However, very few studies have attempted to determine the effectiveness of individual treatments in reducing erosion rates, and most of the studies that have been conducted used only qualitative measures of treatment effectiveness. A recent review of these studies concluded that many of the treatments may not be as effective as is widely assumed, and that there is an urgent need for quantitative, statistically defensible data on treatment effectiveness. There is a particular need to assess the effectiveness of hillslope treatments, such as aerial and hand seeding, contour logging, mulching and straw wattle installation.

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