

Engineering Tech Tips



United States Department of Agriculture
Forest Service



Technology & Development
Program

November 2005

7100

0571-2342P-MTDC

Testing Wood Shreddings for Erosion Control on Decommissioned Roads

James Scott Groenier, Project Leader; Randy Foltz, Rocky Mountain Research Station;
and Charles Showers, Program Leader

Erosion needs to be controlled when roads are being constructed or decommissioned (removed), after lands have been burned by wildland fires, and when lands have been disturbed by other activities. This tech tip is the third in a series on using wood shreddings for erosion control. The first tech tip, *Shredding Small Trees To Create Mulch for Erosion Control* (0471-2335-MTDC, <http://www.fs.fed.us/t-d/pubs/htmlpubs/htm04712335/index.htm>) discussed the benefits of using wood shreddings rather than straw for erosion control, described three commercially available pieces of equipment that could manufacture shreddings, and presented information on a project that used wood shreddings to control erosion. The second tech tip, *Using Rainfall Simulators To Test Wood Shreddings for Erosion*

Control (0571-2329P-MTDC, <http://www.fs.fed.us/t-d/pubs/htmlpubs/htm05712329/index.htm>) discussed testing shreddings using a rainfall simulator at the Rocky Mountain Research Station's (RMRS) laboratory in Moscow, ID.

Monitoring Erosion After Road Decommissioning

The Payette National Forest in Idaho decommissions 20 to 45 miles of road per year. The forest has allowed a 3-year erosion control study to be conducted on Mud Creek Road, National Forest Road 051. The road was decommissioned (figure 1) and sites were chosen for four repetitions (each

Highlights...

- When dirt roads on national forests are decommissioned (removed), the bare ground is exposed to erosion until vegetation becomes established.
- Research is underway to determine whether straw, WoodStraw (produced by Forest Concepts, LLC), or wood shreddings are more effective at controlling erosion.
- The Rocky Mountain Research Station will prepare a full research report based on 3 years of monitoring the amount of sedimentation eroded from test plots on a decommissioned road in the Payette National Forest, ID.

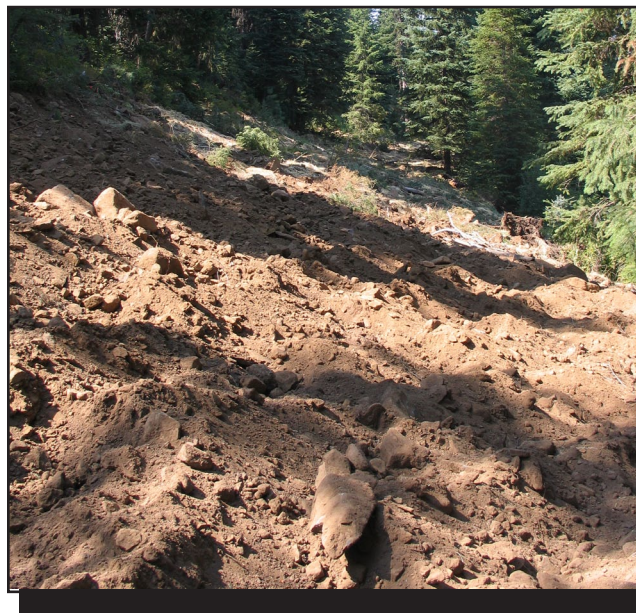


Figure 1—Mud Creek Road after it was decommissioned in the Payette National Forest, ID.

with four plots) treated with one of the three materials being tested: straw, WoodStraw (produced by Forest Concepts, LLC), and wood shreddings (figure 2). Erosion from the treated plots will be compared to erosion from plots with bare ground (figure 3) that are being used as controls. Each plot is about 600 square feet. The location of each treatment was chosen randomly. The plots are bordered by a collection system made from 22-gauge metal troughs fabricated at the RMRS laboratory in Moscow, ID. The troughs funnel water and sediment to a tank.



Figure 2—A test plot covered with wood shreddings to reduce erosion.



Figure 3—A plot with the bare ground exposed. Erosion on plots with bare ground will be compared to that on plots with erosion control treatments.

Constructing Plots

Sites with similar properties were selected for the plots. The remainder of the decommissioned road was scattered with slash and seeded. The first step in constructing a plot was to lay out a 600-square-foot area and run a string line to mark the edges. Dirt and debris underneath the string line were cleared away and a trench was dug for the collection troughs. After the trench had been dug, a layer of bentonite was laid into the trench to provide a seal around the sections of metal trough (figure 4). Silicone caulking was applied to areas where the sections of trough overlapped (figure 5), each section was placed in the trench (figure 6), wooden stakes were driven to hold the troughs in place (figure 7), and the sections of trough were fastened to the wooden stakes with screws (figure 8). A tank collected water and sediment (figure 9) at the trough's outlet. The tank has a drain hole and pipe to allow drainage.

Monitoring Plots

Erosion on the plots will be monitored for 3 years, and the tanks will be checked for accumulated sediment. The plots will be checked in the spring after snowmelt (early May), before winter (late October), and after major rainfalls.

RMRS will prepare an indepth research paper on the study when the project is completed. For more information on the research project, contact Randy Foltz at RMRS, 208–883–2312 or e-mail: rfoltz@fs.fed.us.



Figure 4—Applying bentonite to seal the trench around the trough.



Figure 7—Driving the wooden stakes that hold the sections of trough in place.



Figure 5—Applying silicone caulking to the trough's overlapping sections.



Figure 8—Screwing sections of trough to the wooden stakes.



Figure 6—Placing a section of trough in the trench.



Figure 9—These tanks collect sediment and water from the test plots.

About the Authors

James Scott Groenier, professional engineer, began working for MTDC as a project leader in 2003. Groenier earned a bachelor's degree in civil and environmental engineering from the University of Wisconsin at Madison and a master's degree in civil engineering from Montana State University. He worked for the Wisconsin and Illinois State Departments of Transportation and with an engineering consulting firm before joining the Forest Service in 1992. He worked as the east zone structural engineer for the Eastern Region and as a civil engineer for the Ashley and Tongass National Forests before coming to MTDC.

Randy Foltz is a research engineer with the Forest Service. His current research is on the environmental impact

of forest road removal (road obliteration), the use of wood-based materials to reduce erosion, and the impacts of all-terrain vehicles on erosion and the infiltration of water into the soil. Other research topics have included the erodibility of road aggregates and the benefits of lowered tire pressure in reducing erosion from forest roads.

Charles Showers, professional engineer, became engineering program leader at MTDC in the spring of 2002 after serving 2 years as operations program leader. Showers came to MTDC after 9 years as assistant forest engineer on the Payette National Forest. He began his Forest Service career on the Boise National Forest after completing 8 years as a construction project engineer with the Idaho Transportation Department.

Library Card

Groenier, James Scott; Foltz, Randy; Showers, Charles. 2005. Testing wood shreddings for erosion control on decommissioned roads. Tech Tip 0571-2342P-MTDC. Missoula, MT: U.S. Department of Agriculture, Forest Service, Missoula Technology and Development Center. 4 p.

Describes test plots established to measure erosion on a decommissioned road in the Payette National Forest in Idaho. Four repetitions of three different treatments to control erosion are being compared against four plots where the bare ground was exposed. The treatments being tested include straw, WoodStraw (produced by Forest Concepts, LLC), and wood shreddings. The amount of sedimentation eroded from each

of the plots will be monitored for 3 years. The research is being conducted by the U. S. Department of Agriculture, Forest Service, Rocky Mountain Research Station's laboratory in Moscow, ID. The other tech tips in this series on evaluating wood shreddings for erosion control include:

- *Shredding Small Trees To Create Mulch for Erosion Control* (Tech Tip 0471-2335-MTDC)
- *Using Rainfall Simulators To Test Wood Shreddings for Erosion Control* (Tech Tip 0571-2329P-MTDC)

Keywords: Idaho, overland flow, Payette National Forest, research, sedimentation, soil conservation, straw, WoodStraw

Single copies of this document may be ordered from:

USDA Forest Service, Missoula Technology and Development Center
5785 Hwy. 10 West; Missoula, MT 59808-9361
Phone: 406-329-3978; Fax: 406-329-3719
E-mail: wo_mtdc_pubs@fs.fed.us

Electronic copies of MTDC's documents are available on the Internet at:
<http://www.fs.fed.us/eng/>

Forest Service and Bureau of Land Management employees can search a more complete collection of MTDC's documents, CDs, DVDs, and videos on their internal computer network at:
<http://fswbweb.mtdc.wo.fs.fed.us/search/>

For additional information about using wood shreddings for erosion control, contact MTDC:

Phone: 406-329-3900; Fax: 406-329-3719

For additional information about the road decommissioning erosion control test, contact Randy Foltz at the RMRS Moscow Forestry Sciences Laboratory:

1221 South Main; Moscow, ID 83843
Phone: 208-883-2312; Fax: 208-883-2318
E-mail: rfoltz@fs.fed.us

For further information about road decommissioning on the Payette National Forest, contact Tom Crawford at the Payette National Forest: Phone: 208-634-0619; E-mail: tcrawford@fs.fed.us



The Forest Service, United States Department of Agriculture (USDA), has developed this information for the guidance of its employees, its contractors, and its cooperating Federal and State agencies and is not responsible for the interpretation or use of this information by anyone except its own employees. The use of trade, firm, or corporation names in this document is for the information and convenience of the reader and does not constitute an endorsement by the Department of any product or service to the exclusion of others that may be suitable.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex,

marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410, or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.