



Technology & Development

Welcome!!

Presenter:

James Scott Groenier, PE

Missoula Technology and Development Center

Prepared for:

ACE Conference

Erie, PA

October 2006



What am I going to discuss?

- Wood Shreddings
 - Past Projects & Publications
 - Current Projects
 - Future Projects



Technology & Development

Straw Mulch? Why Not Wood Shreddings for Erosion Control?

Addresses

Three of the **Six** Items
of the *Forest Service Strategic Plan*

**Reduce the Risk from Catastrophic Wildland Fire,
Reduce the Impacts from Invasive Species,
and
Improve Watershed Conditions**



Wood Shreddings are the Answer to Your Needs for Erosion Control !

- Advantages Of Wood Shreddings
 - No weeds are introduced
 - Shreddings do not get eaten by wildlife
 - Shreddings are manufactured from native material on site
 - Shreddings made from native material reduces future wildfire fuels



Technology & Development

Wood Shreddings are the Answer to Your Needs for Erosion Control !

- Advantages Of Wood Shreddings
 - Shreddings decompose to develop new humus layer
 - 30% coverage of shreddings is the equivalent to 70% coverage of straw (Borroughs & King 1989)
 - Rainfall simulator test have shown that 50% coverage reduced sedimentation by 92%
 - Closely simulates forest floor

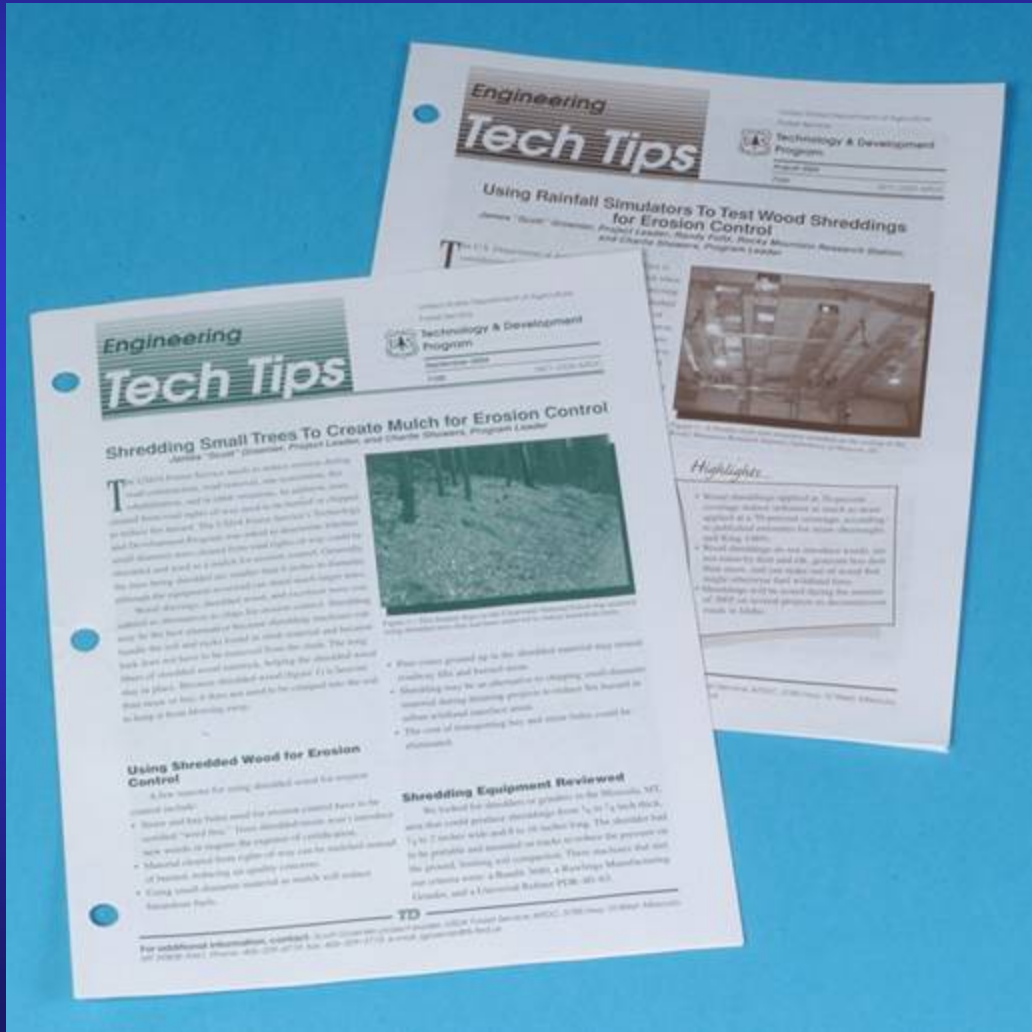


Some of the Downsides

- These questions have to be answered:
 - What is the cost of moving shredding equipment to the site?
 - What is cost of harvesting burned trees?
 - What is the time to manufacture shreddings compared to delivery time of straw?
 - How is the weight of shreddings vs. straw going to effect application?
 - Has there been any field testing of shreddings for BAER projects?



Past Shredding Projects



3 Tech Tips

Testing Wood Shreddings for Erosion Control on Decommissioned Roads – Available electronic only



Technology & Development

Shredding Small Trees To Create Mulch for Erosion Control



Bandit

3 Pieces of Machinery in
the Missoula Area

- 2 - Horizontal Shredders
- One - Tub Grinder



URL



Technology & Development

Shredding Small Trees To Create Mulch for Erosion Control (cont'd)

- Produce shreddings
 - 1/6-1/8 inch thick
 - 1/4–2 inch wide
 - 8–16 inch long





Technology & Development

Shredding Small Trees To Create Mulch for Erosion Control (cont'd)

- Past Project on the Clearwater NF



Before



After



Technology & Development

Shredding Small Trees To Create Mulch for Erosion Control (cont'd)

Past Project on the Clearwater NF



Mulching Windrows

Completed Hillslope





Technology & Development

Using Rainfall Simulators to Test Wood Shreddings for Erosion Control



Purdue Type Rainfall Simulator



1.25 Meter x 5 Meter Soil Plot

Rocky Mountain Research Station – Moscow, ID



Technology & Development

Using Rainfall Simulators to Test Wood Shreddings for Erosion Control (cont'd)



30 % Coverage



50 % Coverage



70 % Coverage



Technology & Development

Using Rainfall Simulators to Test Wood Shreddings for Erosion Control (cont'd)



Before Testing



After Testing

Rain simulator ran continuously for 25 minutes at 50 mm/hr (2 in/hr)
After 15 minutes, the flow distributor adds overland flow $\frac{1}{4}$ L/min and
At 20 minutes, the overland flow is increased to 1 L/minute.



Using Rainfall Simulators to Test Wood Shreddings for Erosion Control (cont'd)

- The soil tested was a sandy-loam
- The test results showed that the shreddings at 70 % coverage reduced sediment loss by 98%.
- Burroughs and King (1989) estimates that straw mulch at 70% cover would reduce sediment loss by 72% on this soil.
- Sediment loss reductions for 30 and 50% coverage of the wood shreddings were 79 and 92%, respectively.



Technology & Development

Testing Wood Shreddings for Erosion Control on Decommissioned Roads

- 2 Roads were decommissioned on the Payette NF and Idaho Panhandle NFs
- Seven sites were chosen for four repetitions
- Three materials tested for erosion control
 - Agricultural Straw
 - WoodStraw™ by Forest Concepts, LLC,
 - Wood Shreddings
- Bare ground plot was used for control



Technology & Development

Testing Wood Shreddings for Erosion Control on Decommissioned Roads (cont'd)



Test Plot Before Mulching



Test Plot After Mulching



Technology & Development

Testing Wood Shreddings for Erosion Control on Decommissioned Roads (cont'd)

- The plots will be monitored for three years
- Check for sediment accumulation
 - Spring after snow melt
 - Before winter
 - After major rain events
- The Rocky Mountain Research Station will write an in- depth research paper

Randy Foltz at RMRS, 208-883-2312
email: rfoltz@fs.fed.us.



Current Shredding Projects

- Developing Micro-Climates on the Lolo NF
- Rainfall Simulator testing of Decomposed Granite
 - Just like the Previous Project for Sandy-Loam
 - Completed and results are being analyzed
- Wind Tunnel Testing of Materials



Developing Micro-Climates

Why Shred Wood and Scarify Soil?

- Loosen Soil to Promote Seed Germination
- Shade Ground
 - Reduces Ground Temperature
 - Retains Moisture
- Prevent Erosion
- Contact with Ground Increases Wood Decomposition Rates
- Different Size Shreddings Decomposition at Different Rates
- Add Organics to the Soil to Create Humus



Technology & Development

Developing Micro-Climates



Before

Skip Rosquist, Lolo NF Hydrologist
329-3811



After

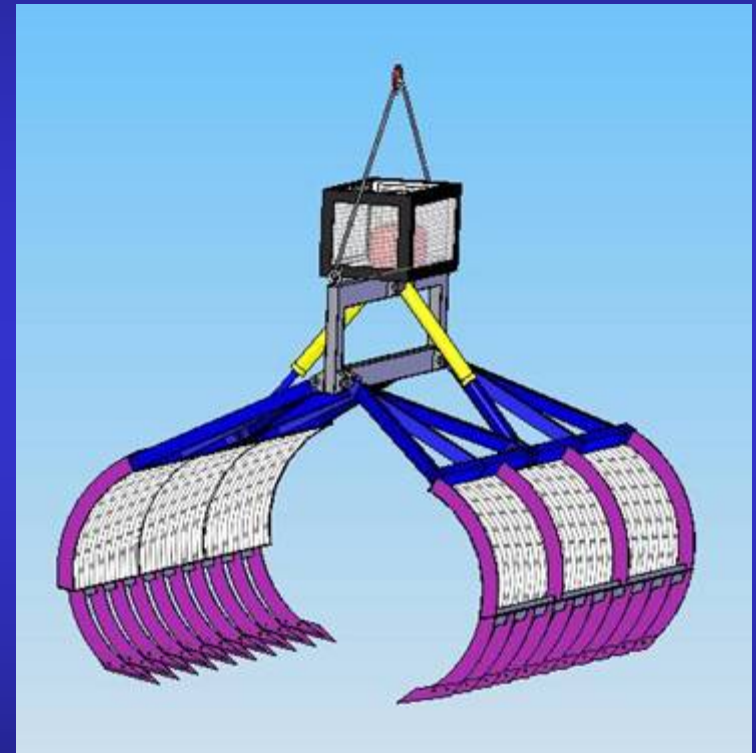


Technology & Development

Developing a Heli-Grapppler

Why develop a Heli-Grapppler?

- Safety
- Labor Costs
- Cargo Net Wear
- Smaller Staging Area Required
- Increased Application Rates



Tim Lynch, Project Leader, Fire & Aviation
329-3958



Future Shredding Projects

- Rainfall Simulator Testing with Pumice and Glacial Tills
- Full Scale BAER Project Testing
- Nutrient Requirements of Each Material to Breakdown
- Mycorrhizal Fungi Inoculant and Recovery



Technology & Development

Summary

Thanks For Letting Me Ramble On About
Wood Shreddings!!

Questions?

Website: www.fs.fed.us/eng/t-d.php

User: t-d

Password: t-d