

Mechanical Treatments to Meet Resource Needs

*By Dennis Zachman, Supervisory
Project Manager, BLM, Colorado
State Office*

Background

When fire is judged to be too risky or ineffective under acceptable prescriptions, mechanical treatments can be effective in meeting resource objectives. Properly used, mechanical treatments reduce fire hazards, improve the proper distribution of plant communities, increase plant diversity, control noxious weeds, and improve the quality and quantity of vegetation for wildlife and livestock. Treatment increases ground cover, which often results in increased soil infiltration rates and decreases in surface runoff, soil erosion, and stream sedimentation. Colorado Bureau of Land Management personnel use the following types of mechanical treatments to meet resource management objectives on public lands.

Roller Chopping Treatment

Roller chopping is a mechanical treatment that is frequently applied to Colorado mountain shrub types and pinyon-juniper stands with stem diameters as wide as 8 inches. The cost is moderate, and the method is extremely effective for knocking down brush and trees and chopping up the slash (Figure 1).

Roller chopping can be done when the soil is firm and dry enough to support the heavy equipment. In most instances, the best results are achieved when the procedure is supplemented with seeding.

Equipment

A cylindrical roller or drum, equipped with several full-length blades, is towed behind a crawler-type tractor or "cat." The drum is 4.5–6 feet in diameter and 8–12 feet wide. The blades span the width of the drum and extend outward 12–14 inches; they are spaced 18–20 inches apart around the circumference of the drum. The drum is hollow and can be filled with water to increase its weight. The empty weight of the drum is 20,000–35,000 pounds. The drum will hold 800–1,000 gallons of water, making the filled weight of the drum 26,500–43,000 pounds.

The roller chopper may be pulled straight or at a diagonal to increase the chopping action.



Figure 1. A roller chopper is effective in knocking down brush and trees and chopping up the slash.

Two roller choppers are sometimes towed in tandem and at slightly contrasting angles. The cat will usually have its blade positioned low to the ground to push over trees and brush. A whirlybird-type seeder can be located at the back of the cat and in front of the roller chopper. The heavy weight of the roller chopper crushes the trees and brush, while the blades chop them and help scratch the ground surface. A single roller chopper can treat 13–20 acres per day, depending on the size of the vegetation and terrain.

Cost

Typically, the cost of treatment is \$60 to \$90 per acre, depending on the condition of the terrain, remoteness, contractor competition, and timing. Seed application costs \$20 to \$23 per acre.

Comments and Constraints

Roller chopping should not be undertaken in extremely muddy conditions or on rocky or steep terrain. Roller chopping should be avoided when snow is on the ground and the air temperature is near 32°F to avoid snow packing between the blades on the drum. However, treatment when the air temperature is well below 32°F is effective in breaking up and mulching the woody vegetation.

The increase of litter and the blade indentations in the soil surface usually decrease the erosion rate after roller chopping. The roller chopper should be towed

up and down slopes so that the blade indentations will retard surface runoff and soil erosion. For best results, seeding is done at the time of treatment. Aerial seeding is also an option, but is not as effective.

Hydro-axe Treatment

The use of a Hydro-axe is a mechanical treatment that is frequently applied to Colorado mountain shrub types and pinyon-juniper stands with stem diameters as wide as 8 inches. This method is effective for knocking down brush and trees and chopping up the slash.

Equipment

A Hydro-axe, also known as a Hydro-mower, is an articulated tractor with a mower-mulcher mounted on the front of the machine (Figure 2). The Hydro-axe has rubber flotation-type tires that cause little disturbance to the surface of the ground. At a width of 8–9 feet,



Figure 2. The Hydro-axe leaves behind a fine, protective mulch and causes little surface disturbance.

the mower-mulcher clips and mulches plant debris from 4 to 10 inches above the ground. A single Hydro-axe can treat 6–16 acres per day, depending on the size of the vegetation and the nature of the treatment. The machine can move around trees to treat selected areas.

Cost

The cost of treatment is \$150 to \$170 per acre, depending on the vegetative material,

condition of the terrain, and nature of the treatment. Seed application costs \$20 to \$23 per acre.

Comments and Constraints

The litter that remains from this treatment is much finer than that resulting from other types of treatments, such as roller chopping. The Hydro-axe allows the operator to be precise in the areas and vegetation treated. The mulch creates a protective vegetal layer for the rubber tire tractor to travel over, thus reducing surface disturbance. Large safety zones are required when using the machine.

Contact

Dennis Zachmann, Supervisory Project Manager
BLM, Colorado State Office
2850 Youngfield Street
Lakewood, CO 80215
Phone: 303-239-3883
E-mail: Dennis_Zachmann@blm.gov

The Bureau of Land Management **RESOURCE NOTE**, which are posted on this Web site (<http://www.blm.gov/nstc/resourcenotes/resnotes.html>), are early announcements of technical and informational topics for BLM personnel and their customers. Information contained in this **RESOURCE NOTE** has not been peer-reviewed. Conclusions and opinions expressed herein do not necessarily represent those of BLM. Use of trade names does not imply U.S. government endorsement of commercial products.

Technical Editor - Deborah Harris (Debbie_Harris@blm.gov)
Science Editor - Brian St. George (Brian_St_George@blm.gov)
Graphic Designer - Ethel Coontz (Ethel_Coontz@blm.gov)

If you would like to prepare a **RESOURCE NOTE** for electronic distribution, or if you have an idea or can suggest an author for a **RESOURCE NOTE**, contact the Science Editor (e-mail: Brian_St_George@blm.gov; phone: 303-236-1930) with the **TOPIC** and the **NAME** of the writer, including **MAILING ADDRESS**, phone number, and e-mail address.

Thank you for your interest in **RESOURCE NOTES**.



National Science &
Technology Center



Bureau of Land Management