



Hydrologic Response of Mechanical Mastication in Juniper Woodland in Utah

Nathan L. Cline¹, Bruce A. Roundy¹, Fredrick B. Pierson², Patrick Kormos² and C. Jason Williams²; (1) Brigham Young University, (2) USDA ARS; Contact Author Email: ncline@byu.edu

Various vegetation control methods have been used to reduce juniper (*Juniperus ssp.*) woodland encroachment. Mechanical mastication (reducing trees to a mulch residue) has recently been used in some western states. We investigated the hydrologic impacts of rubber tire tracks from the masticating vehicle and mulch residue from juniper mastication on site with a 15% slope and gravelly loam soil on the Onaqui Mountains of Utah. Two successive rain simulations (64mm and 102mm per hour) were applied on 50 0.5 m² plots (20 control, 20 tire tracked, and 10 mulch covered). Runoff, sediment yield, ground cover, and soil resistance to penetration were measured. Tracked interspace and tracked shrub microsites were more resistant to soil penetration than non-tracked microsites. Infiltration rates of grass interspaces (>5% grass on a plot) were significantly decreased on tracked plots while no significant change in infiltration rates were found on juniper mounds or on bare interspace plots. Tracking on shrub mounds had no effect on infiltration rates, but tracking significantly decreased the time to the start of runoff for tracked shrub mounds. Mulch residue significantly increased infiltration rates and decreased sediment yields on bare interspace plots. A non-linear regression between the average depth of mulch residue across plots and cumulative sediment produced during the simulation indicates that, on average, a layer as thin as 5 mm provides minimum sediment yields. We conclude that mechanical mastication should have minimal negative hydrologic impacts on similar soils and sites.

2009. 62nd Society for Range Management Annual Meeting. Paper No. 1030-6.