The Influence of Woodland Encroachment on Runoff and Erosion in Sagebrush Steppe Systems in the Great Basin Region, USA

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STATEMENT OF PROBLEM:
- Pinyon and juniper woodlands have expanded 10 to 30% in the past 30 years in the Great Basin Region and Colorado Plateau, USA.
- The conversion of sagebrush steppe to pinyon and juniper woodlands has been linked to increases in overland flow and erosion from these landscapes.

PROJECT BACKGROUND:
- The Sagebrush Steppe Treatment Evaluation Project (SageSTEP, www.sagestep.org) was implemented in 2005 as a 5 year interdisciplinary research study to evaluate restoration methodologies for sagebrush rangelands degraded by woodland and grassland encroachment over a six state area within the Great Basin.
- The hydrologic component of SageSTEP focuses on the relationships and thresholds between changes in vegetation and groundcover and runoff/erosion processes.

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METHODS:
- 140 Replications in 2006
- 64 mm / hour 45 minutes
- 102 mm / hour 45 minutes
- 1 to 3 minute Grab Samples
- Samples Processed for Volume of Interspace Sediment Yield (g m^-2)

SUMMARY:
- Shrubs coppices produce a low amount of Runoff and Erosion.
- Although tree coppices have high Runoff attributed to strong Soil Water Repellency, thick Litter Depth and strong Aggregate Stability protect the microsites from Erosion.
- Interspace microsites have the highest % Bare Ground and contribute the greatest Runoff and Erosion rates.
- Runoff and Erosion increase with increasing % Bare Ground.
- Woodland encroachment increases interspace and tree coppice microsites and decreases shrub coppice microsites, which increases % Bare Ground, Runoff, and Erosion.
- Future larger scales studies will evaluate the connectivity of interspace microsites as affected by woodland encroachment.
- The hydrologic impacts of woodland control practices such as controlled burning, mechanical cutting, and mechanical mastication treatments on trees will be examined to improve the understanding of managing woodland encroachment in Sage Steppe ecosystems.

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