



## Effect of Plant Species Composition on Rangeland Hydrology and Erosion

Kenneth E. Spaeth<sup>1</sup>, F.B. Pierson<sup>2</sup> and P.R. Robichaud<sup>3</sup>; (1) USDA-NRCS, (2) USDA-ARS, (3) US Forest Service;  
Contact Author Email: ken.spaeth@ftw.usda.gov

Hydrology and erosion studies on range and forestland have shown that litter and vegetation cover are correlated with increased infiltration and reduced runoff and erosion. Rainfall simulation experiments were conducted on a burned and unburned mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) ecological site in Nevada (1999-2001) and sub-alpine fir (*Abies lasiocarpa*) forest site in Montana (2000-2002, 2005). The objective of these studies was to summarize hydrology and soil loss relationships immediately after the fire, postfire years, and nonburned sites. Plant species foliar and ground cover, hydrologic assessments (infiltration and runoff), sediment loss, and soil/topographic factors were assessed via indirect gradient analysis. Non-metric multidimensional scaling ordination using four infiltration parameters [minimum infiltration rate (mm/h-1), final infiltration rate (mm/h-1), time to minimum infiltration (min), and cumulative infiltration (mm/h-1)] showed discrete groupings between coppice and interspace microsites. Coppice microsites were associated with higher infiltration; interspace with higher runoff and sediment yield. Hydrologic relationships were associated with discrete plant taxa: Higher runoff was correlated with Sandberg bluegrass (*Poa secunda*) and western aster (*Symphotrichum ascendens*). Greater infiltration capacity was correlated with increasing foliar cover of *A. tridentata*, Idaho fescue (*Festuca idahoensis*), bottlebrush squirreltail (*Elymus elymoides*), lodgepole lupine (*Lupinus parviflorus*). The relevance of discrete plant associations with hydrology and erosion is being recognized in rangeland hydrology and erosion prediction models such as the Rangeland Hydrology and Erosion Model (RHEM) currently under development by the United States Department of Agriculture.

2009. 62nd Society for Range Management Annual Meeting. Paper No. 07-9.