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Use of Rainfall Simulation and Concentrated Flow Experiments to Characterize Rangeland Hydrologic and Erosional Processes in the Great Basin, USA

Fred Pierson (1), Pete Robichaud (2), Jason Williams (3), Patrick Kormos (4), Osama Al-Hamdan (5), and Jan Boll (6)

(1) USDA-Agricultural Research Service, Northwest Watershed Research Center, Boise, Idaho, United States (fred.pierson@ars.usda.gov, +208 334 1502), (2) USDA-Forest Service, Rocky Mountain Research Station, Moscow, Idaho, United States (probichaud@fs.fed.gov, +208 883 2349), (3) USDA-Agricultural Research Service, Northwest Watershed Research Center, Boise, Idaho, United States (jason.williams@ars.usda.gov, +208 422 0708), (4) Boise State University, Department of Geosciences, Boise, Idaho, United States (patrickkormos@u.boisestate.edu), (5) University of Idaho, Northwest Watershed Research Center, Boise, Idaho, United States (osama.al-hamdan@ars.usda.gov, +208 422 0700), (6) University of Idaho, Department of Biological and Agricultural Engineering, Moscow, Idaho, United States (jboll@uidaho.edu, +208 885-7324)

Much of what is known about rangeland hydrology comes from short-term, poorly replicated studies of small (0.25 - 1 m2) field plots and personal observations of hydrologic behavior on gently sloping semi-arid shrub and grassland sites. Historical rangeland models have been largely based on these limited datasets and inferences from crop land studies. In recent years, we have sought to expand the inference space through the use of rainfall simulations and concentrated flow experiments from the small to large (13.5 – 32.5 m2) plot scales on steeply sloping, disturbed and undisturbed rangeland ecosystems. We present an overview of one such multi-year rainfall simulation study and highlight how the methodology and results specifically address current voids in the understanding of hydrology and erosion processes from steeply sloping, semi-arid rangeland landscapes. We further demonstrate how the methodologies and aggregated results from studies across a range of plant communities and degrees of disturbance reveal consistent trends in runoff and erosional behavior. The aggregated results advance the understanding of rangeland hydrology and erosion processes and present a well replicated dataset from which hydrologic model parameters can be derived.