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Using runoff collectors to understand surface runoff characteristics in remote Nevada catchments

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Population growth in Nevada and climate change are placing greater demands on water resources in an already arid region. Future water demands in the western United States will increasingly rely on groundwater, yet data to estimate groundwater recharge are extremely limited in most areas of the region. Surface water contributions to groundwater recharge from ephemeral, remote catchments are difficult and expensive to measure, and are often estimated using modeling techniques based on limited or no actual data. Understanding surface runoff is important because if runoff exists, it can move the location of recharge, affect the distribution of plant and wildlife communities, and impact the water balance of surface water resources. In this study, 16 runoff collectors were installed on hillslopes in remote catchments across Nevada in the Snake Range, the Sheep Range, and the Desatoya Range. Each runoff collector is composed of a 1-square-meter sheet metal frame that is furrowed into the surface soils of a hillslope (5-10% slope), with a subsurface 19-liter (5-gallon) bucket beneath to collect surface flows within the plot. A pressure transducer is suspended into the bucket to measure the depth of runoff collected. 10 of the collectors were deployed at monitoring transect sites in the Snake Range and 4 were deployed within the Sheep Range as a part of the Nevada NSF EPSCoR Climate Change Project. Temperature, precipitation, soil moisture, and other data collected by the NV NSF EPSCoR Project in the vicinity of the runoff collectors will be used to assess the relationship between precipitation events and runoff. In addition, nine rainfall simulation experiments were completed at one of the Sheep Range sites to simulate different sizes of storms and their impacts on surface runoff. The other 2 runoff collectors were installed near at Porter Canyon in the Desatoya Mountains as a part of an USDA ARS research grant. Data from the 16 runoff collectors and 9 rainfall simulation experiments will be used to understand the storm characteristics that promote hillslope surface runoff in remote Nevada catchments, and to analyze how these ideal conditions may alter under climate change.