



Small watershed response to porous rock check dams in a semiarid watershed

Mary Nichols, Viktor Polyakov, and Mark Nearing

USDA-ARS, Southwest Watershed Research Center, Tucson, United States (mary.nichols@ars.usda.gov)

Rock check dams are used throughout the world as technique for mitigating erosion problems on degraded lands. Increasingly, they are being used in restoration efforts on rangelands in the southwestern US, however, their impact on watershed response and channel morphology is not well quantified. In 2008, 37 porous rock structures were built on two small (4.0 and 3.1 ha) instrumented watersheds on an alluvial fan at the base of the Santa Rita Mountains in southern Arizona, USA. 35 years of historical rainfall and runoff, and sediment data are available to compare with 7 years of data collected after check dam construction. In addition, post construction measurements of channel geometry and longitudinal channel profiles were compared with pre-construction measurements to characterize the impact of check dams on sediment retention and channel morphology. The primary impact of the check dams is was retention of channel sediment and reduction in channel gradient; however response varied between the proximal watersheds with 80% of the check dams on one of the watersheds filled to 100% of their capacity after 7 runoff seasons. In addition, initial impact on precipitation runoff ratios is was not persistent. The contrasting watershed experiences lower sediment yields and only 20% of the check dams on this watershed are were filled to capacity and continue to influence runoff during small events. Within the watersheds the mean gradient of the channel reach immediately upstream of the structures has been reduced by 35% (from 0.061 to 0.039) and 34% on (from 0.071 to 0.047).