SOIL AND SALINITY MOBILIZATION AND TRANSPORT IN THE COLORADO RIVER BASIN

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Federally, the evaluated potential of soil loss risk in national reports in the past and ways to adapt to be proactive in preventing accelerated soil loss on rangelands has been incomplete. The areas where it is difficult to measure due to the complexities of multiple interactions (splash, sheet and rill formation, landscape dominated by wind and water processes, presence of iron oxide nodes, etc.) is only a small fraction. Rangeland soils are generally consolidated, uncultivated, and have lower organic matter content than cropland soils. These soils can have various slopes and debris such as rock, gravel, plant litter, woody debris and biological soil crusts. The vegetation is irregular and patchy with varied heights and varieties. Our approach takes all of this into consideration by triplicating rainfall simulations at four rates on natural soils (hoofprints). The rainfall simulator conducts 2, 10, 25, and 50-year return period rainfall events on 10 different plots in triplicate. Runoff water was collected to measure salinity and sediment that could eventually reach the Colorado River. Rainfall intensity and the log of sampling time were the two most sensitive variables when modeling the data. A rainfall simulator with cameras and sensors run by a computer versus LIDAR were used per plot to eventually compare photographic evidence and expense to determine if this new method is a more cost effective and wiser choice to use on rangelands. Ultimately, the Rangeland Hydrologic Ecosystem Model (RHEM), which has now been integrated into APEX will capture the vegetation and small measures of what is being captured within the 6 m x 2 m plot, the model will be adjusted for salts and for effervescence (once the soil is dry, the salt resurfaces and attaches itself to plant roots). This also extends the plant.dat database in APEX and RHEM related parameters. We have been successful at two sites in Utah and are arranging for additional sites in Utah as well as Colorado, New Mexico and other areas residing within the Colorado River Basin initially due to the geology and the focus on the Colorado River. Having all of the data will take a minimum of three additional years to be able to compare sites and run model simulations and compare LIDAR results to the unique rainfall simulator camera and sensor data for surface runoff, sediment, and salinity.

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