U.S. Army Impacts on Mojave Desert Sediment, Past and Present

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The United States Army is a significant landholder in the Mojave (California) and Sonoran Deserts (Arizona). The arid southwest has played, and continues to play, a vital role in our National Security. From 1942 to 1944 General Patton's Desert Training Center (DTC) trained over 1,000,000 troops for World War II. Today, our armed forces prepare for a variety of conflicts in these same locales. Each training exercise, however, leaves a number of different impacts on the desert surface. In order to maintain the fragile desert environment, a prerequisite to maintaining the southwest as the premier training facility in the world, it is important to understand the magnitude and the persistence of desert surface disturbance.

Camp Iron Mountain (of the former DTC) is located on a broad, low-gradient alluvial plain (piedmont) that extends from the Iron Mountains, CA. Today, the abandoned camp is a network of remnant rock alignments and road berms. Centimeter-scale mapping of the impacted drainage network inside of the camp suggests that channels are narrower (~1 m) and shallower (~ 1.5 cm) than channels on the same piedmont outside of the camp boundaries; thus, the drainage network has yet to reach pre-training conditions after a half century. Tracing of 400 painted and numbered pebbles over two years (2000 to 2002) suggests surface sediment has moved an average of 0.18 m/y. This speed underestimates long-term rates because there were not any rare, decadal to centennial flow events during the study period. Long-term sediment transport estimates (10,000 y), based on cosmogenic ^{10}Be and ^{26}Al, suggest movement of 0.6 to 1.2 m/y. Although WWII Army training has measurable and persisting effects on the drainage network, it probably does not have measurable nor persisting effects on the sediment transport down desert piedmonts 50 years after camp abandonment.

Conversely, present day training has measurable effects on sediment movement. Since 1980, the National Training Center (Fort Irwin, CA) has staged large-scale maneuvers 10 months each year; thousands of wheeled and tracked vehicles traverse the desert surface. The 2-year average speed of 400 pebbles on the East Range Road piedmont is 0.34 m/y; there were not any large flow events. Long-term average cosmogenic nuclide based speeds range from 0.08 to 0.23 m/y. The 2-year average sediment speeds at East Range Road suggest training has increased sediment movement, and possibly sediment erosion.

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