

Landforms and Surface Cover of Vehicle Endurance and Dust Test Courses at U.S. Army Yuma Proving Ground

This was the final report to Yuma Proving Ground (YPG) for a project that encompassed several objectives pertaining to comparing the vehicle test course conditions at YPG with other deserts of interest worldwide. The goal, summarized, was to provide detailed descriptions of the vehicle test courses at YPG, which fed into another large project characterizing deserts around the world. The overall study was to expand knowledge of the world's desert terrains of interest, including related factors such as dust, that link to the objective of improving the fidelity of testing by U.S. Army Test and Evaluation Command. Our report on YPG test courses was supplemented as more information became available on OCONUS areas and in anticipation of new test courses being established. We presented results of research that employed current knowledge, technology, and data to provide a systematic characterization of the desert terrain traversed by the vehicle endurance and dust courses at YPG.

Summary of Project Details: We characterized 9 vehicle durability test courses and three dust courses in terms of multiple parameters relevant to military activities. Those parameters included landform type, geology, surface cover, soil type, dust emission potential, degree of desert pavement development, and slope of the terrain traversed by, and adjacent to each test course. Terrain characterization of the test course areas was done by geomorphic mapping using expert-based interpretation of aerial imagery coupled with field verification. Pre-existing soils data were assimilated with the geomorphic mapping results to determine further terrain characteristics of each map unit, and digital elevation models were used to create percent slope maps for each course. The results were then discussed with experienced vehicle test engineers to determine the significance of the data on the YPG test courses compared to the overview of the terrain inventories of other desert areas.

Management Implications:

The results of this project were presented in eight maps for each test course. Each map depicted a terrain or soil characteristic that could impact military operations, and thus affects suitability of courses, or proposed new test courses, for durability testing of military vehicles. The map types were:

- Satellite imagery
- Landform
- Geology
- Surface cover
- Soil type
- Dust content
- Desert pavement
- Percent slope

We found that while the test courses differed in their measured characteristics and did not traverse all landform types, they did cross-reference with deserts around the world.

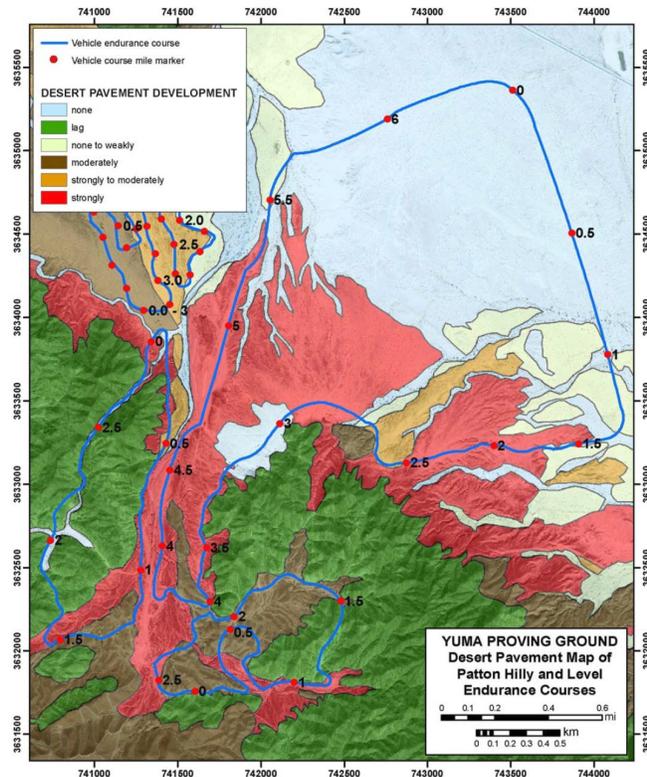


Figure 3-7. Desert pavement map showing geomorphic surfaces with different degrees of desert pavement development in the area of the Patton Hilly Trails (PHT), Patton Level Trails (PLT), and Patton Hilly Gravel (PHG) vehicle endurance courses.