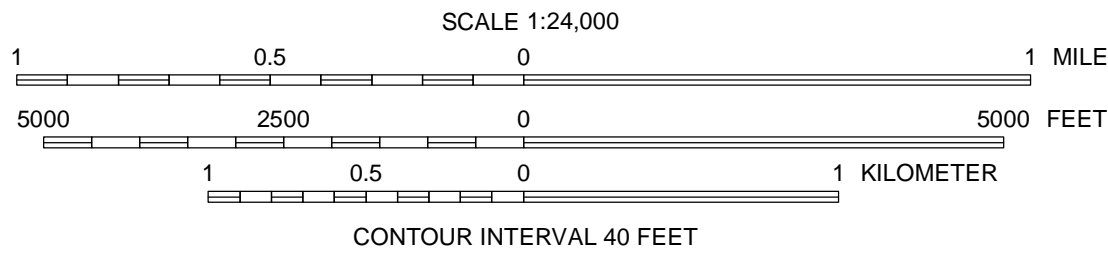


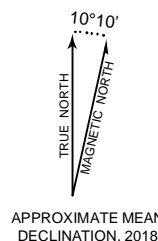
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Base from USGS Moab 7.5' quadrangle (1985), slopes derived from the USGS 10-meter National Elevation Dataset (NED) (2009), and aerial photography from the National Agriculture Imagery Program (NAIP, 2011). Projection: UTM Zone 12 Datum: NAD 1983

GIS and Cartography: Ben A. Erickson, Jessica J. Castleton, and Emily Kleber

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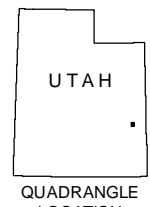


EXPANSIVE SOIL AND ROCK SUSCEPTIBILITY MAP OF THE MOAB QUADRANGLE, GRAND COUNTY, UTAH

by

Jessica J. Castleton, Ben A. Erickson and Emily J. Kleber

2018



| | | | |
|---|---|---|--------------------------|
| 1 | 2 | 3 | 1. Merrimac Butte |
| 4 | | 5 | 2. The Windows Section |
| 6 | 7 | 8 | 3. Big Bend |
| | | | 4. Gold Bar Canyon |
| | | | 5. Rill Creek |
| | | | 6. Shafer Basin |
| | | | 7. Trough Springs Canyon |
| | | | 8. Kane Springs |

ADJOINING 7.5' QUADRANGLE NAMES

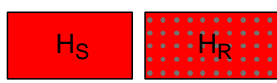


EXPLANATION

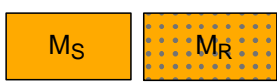


Not Mapped – Area not mapped due to significant and ongoing human disturbance.

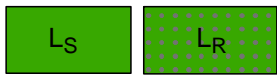
Expansive Soil and Rock Susceptibility Categories



Highly susceptible soil (H_s) and rock (H_r) – Soil or rock classified by the Natural Resources Conservation Service (NRCS) as having a high potential for volumetric change (linear extensibility greater than 6 percent); includes geologic units mapped by Doelling and others (2002) in which geotechnical testing of soils indicates an abundance of expansive clay minerals (swell/collapse test [SCT] values greater than or equal to 3 percent and/or liquid limit [LL] values greater than or equal to 45, and plasticity index [PI] values greater than or equal to 20) that will weather to clay.



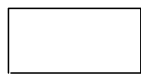
Moderately susceptible soil (M_s) and rock (M_r) – Soil or rock classified by the NRCS as having moderate susceptibility for volumetric change (linear extensibility 3–6 percent); includes concealed clay-rich deposits, including the Chinle Formation, mapped by Doelling and others (2002) in which geotechnical borehole logs indicate thick expansive clay layers are present. Typically, these units have SCT values of 2 to 3 percent and/or an LL of 20–40 and a PI of 10–30 based on geotechnical testing of soils. Includes geologic bedrock units mapped by Doelling and others (2002) that weather to clay.



Low susceptibility soil (L_s) and rock (L_r) – Soil or rock classified by the NRCS as having low potential for volumetric change (linear extensibility 0–3 percent); includes geologic units dominated by sand and gravel mapped by Doelling and others (2002) in which geotechnical testing of soil indicates a lack of expansive clay minerals (SCT values of 0–2 percent and/or an LL of 0–30, and a PI of 0–15).



Concealed (C) – Areas suspected of having highly expansive soil or rock in the shallow subsurface (≈20 feet), and that have little or no evidence of such materials at the ground surface. The likely presence of highly expansive materials in the shallow subsurface is based on the outcrop pattern of the upper members of the Chinle Formation, which indicates that expansive Chinle likely underlies thin unconsolidated deposits in those areas. The upper members of the Chinle Formation typically contain highly expansive shale and claystone, and past experience in southern Utah has shown that when wetted, highly expansive soil or rock can cause damaging differential displacements at the ground surface even when overlain by as much as 20 feet of nonexpansive material (Lund and others, 2008). Therefore, we consider areas where the upper members of the Chinle Formation may be present in the shallow subsurface as having a potential for highly expansive soil and rock problems despite the lack of surface evidence for such materials.



Area unlikely to contain expansive soil or rock.

USING THE MAP

This map shows the location of known or suspected expansive soil and rock in the Moab quadrangle. The presence and severity of expansive soil or rock, along with other geologic hazards, should be addressed in site-specific geotechnical/geologic-hazard investigations. The UGS recommends detailed expansive soil and rock testing be included with all geotechnical/geologic hazard investigations. This map is intended for use at a scale of 1:24,000, and is designed for use in general planning to indicate the need for site-specific geotechnical/geologic-hazard investigations. Site-specific geotechnical/geologic-hazard investigations can resolve uncertainties inherent in generalized mapping and help ensure safety by identifying the need for special foundation designs, mitigation, and/or construction techniques.

For additional information about expansive soil and rock in the Moab quadrangle, refer to the accompanying report.