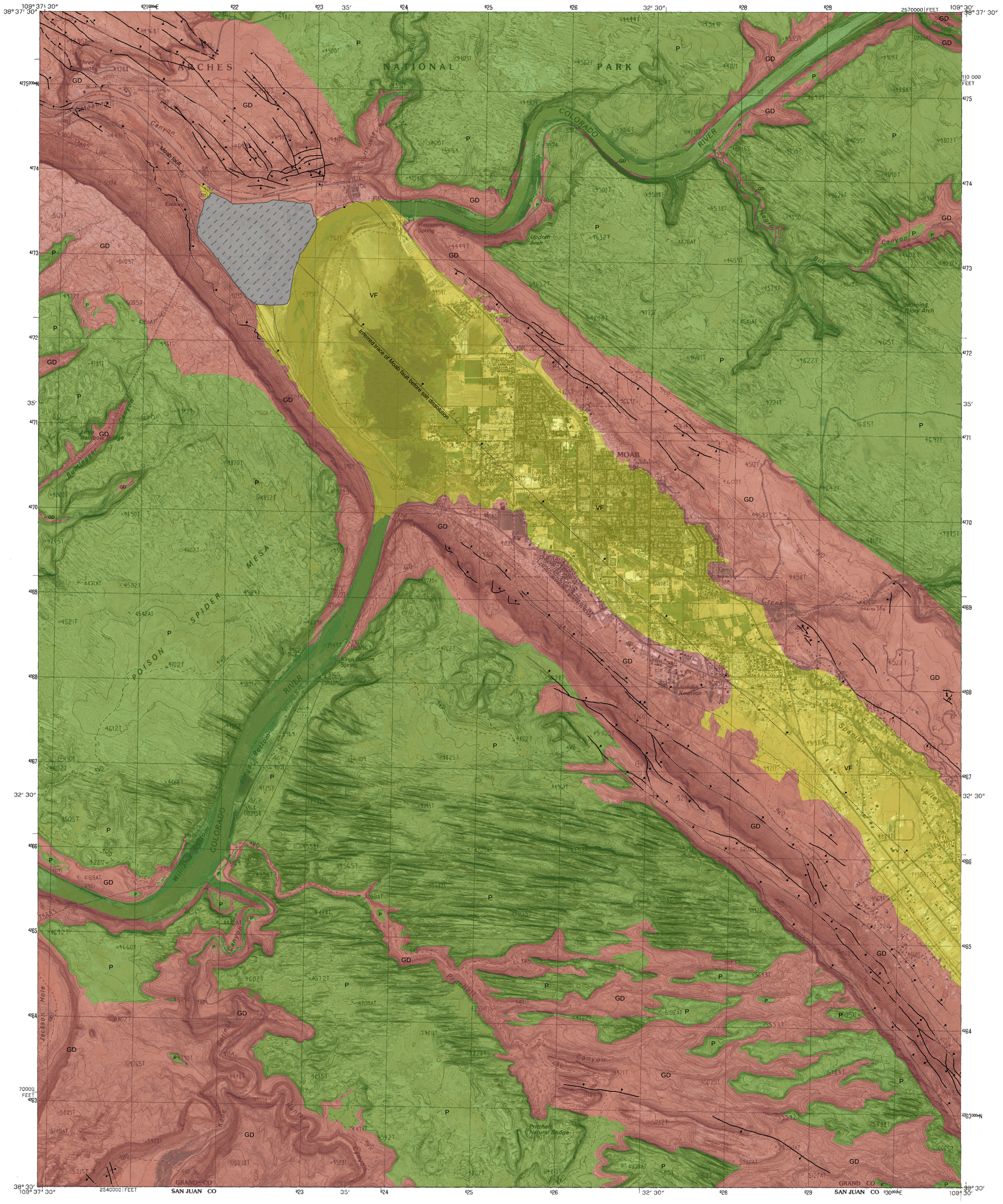
UTAH GEOLOGICAL SURVEY
a division of
Utah Department of Natural Resources



SCALE 1:24,000

1 0.5 0 1 MILE

5000 2500 0 5000 FEET

1 0.5 0 1 KILOMETER

CONTOUR INTERVAL 40 FEET

Base from USGS Moab 7.5' quadrangle (1985), slopeshade derived from USGS10-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: Adam I. Hiscock and Emily J. Kleber

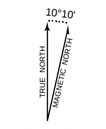
Utah Geological Survey
1594 West North Temple, Suite 3110
P.O. Box 146100, Salt Lake City, UT 84114-6100
(801) 537-3300
geology.utah.gov

SALT TECTONICS-RELATED GROUND DEFORMATION HAZARD MAP OF THE MOAB QUADRANGLE, GRAND COUNTY, UTAH

by

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

2018



APPROXIMATE MEAN DECLINATION, 2018

QUADRANGLE LOCATION

1	2	3
4	·	5
6	7	8

1. Merrimac Butte
2. The Windows Section
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

ISBN 978-1-55791-945-8

EXPLANATION

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

Well-located fault related to salt tectonics with an unknown activity class – Surface-fault-rupture-hazard investigations recommended for all structures intended for human occupancy and all International Building Code (IBC; International Code Council, 2014) Risk Category IIa, IIb, III, and IV structures (see Lund and others, 2016). Ball and bar on downthrown side of fault.

Approximately located or concealed fault related to salt tectonics with an unknown activity class – Surface-fault-rupture-hazard investigations recommended for all IBC Risk Category III and IV structures (see Lund and others, 2016). Studies for IBC Risk Category IIa and other structures for human occupancy remain prudent because a low likelihood of surface faulting still exists. Ball and bar on downthrown side of fault.

Salt Tectonics-Related Ground Deformation Hazard Categories

GD – **Ground Deformation** – Severe ground deformation related to salt tectonics, causing tilting and/or damage to structures due to differential settlement, lateral earth pressures, ground cracks or displacements in fractured rock, and ground collapse including sinkhole formation.

VF – **Potential Valley Floor Subsidence** – Potential ground subsidence causing tilting and/or damage to structures due to differential settlement, lateral earth pressures, ground cracks or displacements in fractured rock, and ground collapse, including sinkhole formation.

P – **Plateau Subsidence** – Potential regional and local subsidence causing fracturing and displacement of rock. Fractures weaken the rock and can lead to unstable conditions in road cuts and tunnels, increase potential for aquifer contamination, and increase susceptibility to rockfall and slope instability.

USING THIS MAP

This map shows the potential for ground deformation and subsidence, fractured rock and faulting related to salt tectonics. Due to the unpredictable nature of salt tectonics, we have mapped ground deformation based on analysis of geologic units, mapped faults, and existing ground deformation. Ground deformation in this area may be severe. Continued ground deformation and subsidence, possible surface fault rupture, and other hazards such as sinkhole formation, ground cracking, differential settlement, and widespread subsurface erosion can occur in the zone of ground deformation. Also mapped is the potential for valley floor subsidence which can cause tilting and/or damage to structures due to differential settlement, lateral earth pressures, ground cracks or displacements in fractured rock, and ground collapse including sinkhole formation. The plateau and canyon areas are subject to regional and local subsidence causing fracturing and displacement of rock. Fractures weaken the rock mass and can lead to unstable conditions in road cuts and tunnels, increase potential for aquifer contamination, and increase susceptibility to rockfall and slope instability. Potentially active, salt-tectonic, gravity-related faults within the Moab quadrangle are shown on the map. Surface faulting may occur along these faults or anywhere along the valley margins. Mapped faults are related to salt dissolution at depth (see Guerrero and others, 2014) and therefore have an unknown activity class. The inferred trace of the Moab fault does not include a special study zone because of the age of faulting (see associated text).

Site-specific geotechnical/geologic-hazard investigations can resolve uncertainties inherent in the generalized map scale and help ensure safety by identifying the need for detailed engineering and mitigation techniques that may be required for development in areas with ground deformation. A significant amount of risk is involved with development in the ground deformation zone. This map is not intended for use at scales other than 1:24,000. Smaller faults may not have been detected during mapping or are concealed beneath young geologic deposits. Additionally, concealed and approximately located faults by definition lack a clearly identifiable surface trace; therefore, their locations are approximate. Site-specific fault-trenching investigations should be preceded by a careful field evaluation of the site to identify the surface trace of the fault as well as other faults and fault-related features not evident at 1:24,000-scale.

For additional information about the salt-tectonics-related ground deformation hazard in the Moab quadrangle, refer to the accompanying report.