



2017 UTAH EARTHQUAKE WORKING GROUPS

UTAH EARTHQUAKE RESEARCH PRIORITIES FOR 2018

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The 2017 Utah Earthquake Working Groups, hosted by the Utah Geological Survey (UGS), defined priorities for earthquake-related research in Utah in 2018. The priorities will be incorporated into the upcoming U.S. Geological Survey Earthquake Hazards Program, External Research Support, Request for Proposals (<http://earthquake.usgs.gov/research/external/>) for the Intermountain West.

QUATERNARY FAULTS

The Utah Quaternary Fault Parameters Working Group (UQFPWG) identified the following highest priority faults for additional investigation in 2018 (not in priority order):

- Acquire new paleoseismic information to address data gaps for (a) the five central segments of the Wasatch fault zone (including focusing on the youngest earthquakes [3-5 ka]; large, early Holocene–latest Pleistocene scarps; and secondary faulting [West Valley fault zone and Utah Lake faults and folds]), (b) the northern segment of the Oquirrh fault zone, (c) refining the latest Quaternary earthquake chronology for the Toplift Hills fault, and (d) the East and West Cache fault zones. Examples of paleoseismic data to be acquired include surface rupture extent, earthquake timing, displacement, and fault geometry.
- Use recently acquired lidar data to more accurately map the traces of the East and West Bear Lake, East and West Cache, and Hurricane fault zones, and search for and map previously undiscovered mid-valley Quaternary faults.
- Acquire earthquake timing information for the Utah Lake fault zone to investigate the relation of earthquakes on that fault system to large earthquakes on the adjacent Provo segment of the Wasatch fault zone (coseismic or independent rupture, fault pairs?).
- Acquire high-resolution aerial imagery (lidar, Structure from Motion, etc.), map high-risk (chiefly urban) Utah hazardous faults (including the East and West Bear Lake, East and West Cache, Hansel Valley, and Oquirrh fault zones), and identify new paleoseismic trench sites.
- Acquire and analyze information on salt tectonics and its relation to the Main Canyon fault, Sevier detachment/Drum Mountains fault zone, Bear River fault zone, Spanish Valley (Moab area) faults, Joes Valley fault zone, Levan and Fayette segments of the Wasatch fault zone, Scipio Valley faults, and the Gunnison fault.

and the following other priority faults for investigation in 2018 (not in priority order):

- Paragonah fault
- Enoch graben

- Clarkston fault, West Cache fault zone
- Gunnison fault
- Scipio Valley faults
- Faults beneath Bear Lake
- Eastern Bear Lake fault zone
- Carrington fault, Great Salt Lake fault zone
- Rozelle section, Great Salt Lake fault zone

Additional information about the UQFPWG is available at <http://geology.utah.gov/hazards/earthquakes-faults/utah-earthquake-working-groups/quatarnary-fault-parameters/>.

LIQUEFACTION

The Utah Liquefaction Advisory Group (ULAG) did not meet in 2017; however, the priorities identified in 2016 are applicable for investigation in 2018:

- Review and publication of liquefaction hazard maps for Salt Lake and Utah Counties — The working group agreed that the highest priority is to get liquefaction hazard maps developed by Steve Bartlett, University of Utah, for Salt Lake County and Kevin Franke, Brigham Young University for Utah County, into review and published. It was decided that more discussion is needed between the universities to reach a consensus on the type of data shown and the role the maps play in the ordinance process.
- Cone Penetration Testing (CPT) along 400 South, Salt Lake City — A proposal for CPT testing along 400 South of approximately \$15,000 to \$20,000 in conjunction with Applied Geotechnical Engineering Consultants, Inc. was discussed.
- Paleo-liquefaction and implications for future liquefaction hazard — Preparation of a paleo-liquefaction proposal to be submitted to U.S. Geological Survey, Earthquake Hazards Program, 2016 External Research Support (National Earthquake Hazards Reduction Program) was discussed. A paleo-liquefaction investigation would allow for verification of liquefaction susceptibility.
- Expand the focus of the working group to include other geologic hazards — Discussion centered on an expansion of the focus of the liquefaction working group to address other geologic hazards and geologic hazard ordinance issues. Additional funding opportunities associated with this expansion, and its benefit to working group momentum, were also discussed.
- Formation of a data standardization committee to formalize data standards and formats for geotechnical datasets. Form a multiagency committee to discuss collaboration and funding options for determining geotechnical database format and attribute standardization.

Additional information about the ULAG is available at <http://geology.utah.gov/hazards/earthquakes-faults/utah-earthquake-working-groups/liquefaction-advisory-group/>.

EARTHQUAKE GROUND SHAKING

The Utah Ground Shaking Working Group (UGSWG) did not meet in 2017; however, the priorities identified in 2016 are applicable for investigation in 2018:

- Perform geophysical or geological investigations to characterize the potential connection (tear fault?) between the north end of the East Bench fault and the southern end of the Warm Springs fault along the Salt Lake City segment of the Wasatch fault zone.
- Collect either shallow or deep shear-wave velocity data in basins outside the Salt Lake basin along the central Wasatch Front to help characterize shallow site response and/or basin effects on ground motions. The heavily populated Weber-Davis and Utah basins are the highest priority basins.
- Update the Wasatch Front Community Velocity Model (CVM) with shear-wave velocity data collected since 2008. The CVM is needed for ground motion modeling.
- Perform ground motion modeling of earthquake scenarios along major faults, such as the Wasatch, Great Salt Lake, and Oquirrh fault zones, to characterize ground shaking along the Wasatch Front. Example investigations may include modeling of coseismic rupture of the Salt Lake City segment of the Wasatch fault zone and West Valley fault zone to characterize ground shaking in the urban center of Salt Lake basin. Modeling should aim to characterize rupture effects such as directionality, basin effects, and shallow site response, including non-linear soil behavior to the extent possible.

Additional information about the UGSWG is available at <http://geology.utah.gov/hazards/earthquakes-faults/utah-earthquake-working-groups/ground-shaking-working-group/>.