2018 UTAH EARTHQUAKE WORKING GROUP MEETINGS
BASIN AND RANGE PROVINCE EARTHQUAKE WORKING GROUP
AGENDA

Thursday, February 15, 2018
Utah Department of Natural Resources Building, Auditorium (1st floor)
1594 West North Temple, Salt Lake City, Utah

The Utah Geological Survey (UGS) has reactivated the Basin and Range Province Earthquake Working Group (BRPEWG), due to the general lack of other Basin and Range Province (BRP)/ Intermountain West (IW) state earthquake working groups and the need for effective communication and collaboration in applied earthquake-hazard research within the region. BRPEWG was previously convened in 2006 and 2011, in response to U.S. Geological Survey (USGS) National Seismic Hazard Map update issues, and was hosted by the UGS. The meeting is open to all interested.

8:00 Refreshments

8:00 Welcome and Overview of Meeting: Steve Bowman, Utah Geological Survey

8:30 State Presentations on Technical Issues Facing the Basin and Range Province

8:30 – Arizona: Phil Pearthree, Arizona Geological Survey

9:00 – California: Gordon Seitz, California Geological Survey

9:30 – Colorado: Matt Morgan, Colorado Geological Survey

10:00 Break (15 minutes)

10:15 State Presentations on Technical Issues Facing the Basin and Range Province (continued)

10:15 – Idaho: Zach Lifton, Idaho Geological Survey

10:45 – Montana: Mike Stickney, Montana Bureau of Mines and Geology

11:15 – Nevada: Rich Koehler, Nevada Bureau of Mines and Geology

11:45 Lunch (1 hour, register at http://2018uewg.eventbrite.com for on-site hot lunch)

12:45 State Presentations on Technical Issues Facing the Basin and Range Province (continued)

12:45 – New Mexico: Andy Jochems, New Mexico Bureau of Geology and Mineral Resources

1:15 – Oregon: Ian Madin, Oregon Department of Geology and Mineral Industries

1:45 – Utah: Emily Kleber, Utah Geological Survey

2:15 – Wyoming: Seth Wittke, Wyoming Geological Survey

2:45 Break (15 minutes)

3:00 Special Presentation – Investigation of Cascadia Triggered Landslides: Bill Burns, Oregon Department of Geology and Mineral Industries

3:15 Discussion – Benefits of Incorporating Consultant Surface-Fault-Rupture Investigations into Urban Geologic and Quaternary Fault Mapping, Adam McKean, Utah Geological Survey

3:30 Discussion – Basin and Range Province Earthquake Hazards Issues and Investigation Priorities

- How do we want to move forward as a working group?
    - Suggest meeting yearly in February with the Utah Earthquake Working Groups.
- Cross-border Quaternary fault issues (fault trace mapping discrepancies, lack of mapping, fault parameter discrepancies, and poorly defined or lack of parameter data).
    - Determine fault trace issues (mapped fault ends, offsets, etc.) at state borders and collaboratively work to resolve?
    - When consensus-based Quaternary fault parameters exist in one state for faults crossing into another, can agreement be made to adopt the parameters for the entire fault, if relevant? Examples: East Bear Lake, East and West Cache, Hurricane, Washington, and Wasatch fault zones (Utah parameters).
- Quaternary fault investigation priorities in the region outside Utah.

  Existing state priorities
    - Nevada: http://www.nbmg.unr.edu/_docs/Earthquakes/NBMG_priorities_NEHRP.pdf
    - Utah: https://geology.utah.gov/docs/pdf/NEHRP-2018_Priorities.pdf
- Possible development of consensus-based Quaternary fault slip-rate and recurrence interval parameters for the region modeled after the Utah consensus parameters.
    - Utah Consensus Parameters: In 2003, the Utah Quaternary Fault Parameters Working Group began developing consensus slip-rate (SR) and recurrence-interval (RI) data for all Utah trenched faults (Lund, 2005; https://ugspub.nr.utah.gov/publications/bulletins/B-134.pdf), based on a comprehensive evaluation of paleoseismic-trenching data available at that time for Utah's Quaternary faults, and where the data permitted, assigned consensus preferred RI and vertical SR estimates for the faults and/or fault sections reviewed. Trenching data were available for 33 of Utah's known 211 Quaternary faults/fault sections and related structures. The available paleoseismic trenching data are most abundant on the six central, active segments of the Wasatch fault zone, and are much less abundant for faults elsewhere in Utah.

      Based on recent work by the Working Group on Utah Earthquake Probabilities that included a comprehensive evaluation of all paleoseismic data in the Wasatch Front region as defined by the group (northern Utah, southeast Idaho, and southwest Wyoming; https://ugspub.nr.utah.gov/publications/misc_pubs/mp-16-3/mp-16-3.pdf), and the UGS Hazus Utah fault database (https://ugspub.nr.utah.gov/publications/open_file_reports/ofr-631.pdf), the UGS is incorporating these updated Quaternary fault parameters in the UGS

Utah Quaternary Fault and Fold Database for release in 2018.

- Coordination and funding opportunities for acquiring new lidar data, such as the USGS 3D Elevation Program (3DEP) and multi-state/multi-agency partnerships.
    - 2018: Utah planning acquisition in Rich and Summit Counties bordering Wyoming.
    - 2019: Utah planning acquisition in Box Elder County bordering Idaho.
    - Other planned acquisitions?
- Interest in paleoseismic investigation best practices to assist those states with limited expertise.
    - Such as a short course similar to that at the Basin and Range Province Seismic Hazards Summit III (https://ugspub.nr.utah.gov/publications/misc_pubs/mp-15-5/mp-15-5_short_course.pdf)?
    - Online resources?

5:00 Adjourn

Working Group Members

Steve Bowman	Utah Geological Survey (BRPEWG Co-Chair)
Chris DuRoss	U.S. Geological Survey, Earthquake Hazards Program
Ryan Gold	U.S. Geological Survey, Earthquake Hazards Program, Intermountain West Coordinator
Adam Hiscock	Utah Geological Survey (BRPEWG UGS Liaison)
Andy Jochems	New Mexico Bureau of Geology and Mineral Resources
Emily Kleber	Utah Geological Survey
Rich Koehler	Nevada Bureau of Mines and Geology (BRPEWG Co-Chair)
Zach Lifton	Idaho Geological Survey
William Lund	Utah Geological Survey, Emeritus
Matt Morgan	Colorado Geological Survey
Phil Pearthree	Arizona Geological Survey
Gordon Seitz	California Geological Survey
Mike Stickney	Montana Bureau of Mines and Geology
Seth Wittke	Wyoming Geological Survey

Publications

While the BRPEWG has changed focus somewhat, previous meeting (I and II) agendas, presentations, and published papers are available at https://geology.utah.gov/?page_id=6503. If states have publications of interest to the group, please forward these to the UGS and we will add them to this section.

The UGS published a new 1:500,000-scale statewide earthquake epicenter and Quaternary fault map in 2017, based on the updated *Utah Quaternary Fault and Fold Database* and a completely revised earthquake catalog, as Map 277: *Utah Earthquakes (1850 to 2016) and Quaternary Faults* (https://ugspub.nr.utah.gov/publications/maps/m-277.pdf). The earthquake catalog was published as OFR 667 (https://ugspub.nr.utah.gov/publications/open_file_reports/ofr-667/ofr-667.pdf), and the data is available at https://ugspub.nr.utah.gov/publications/open_file_reports/ofr-667/ofr-667.zip). Professionally printed 44" x 62" copies are available from the Natural Resources Map & Bookstore (https://www.utahmapstore.com/m277.html).

Utah Quaternary Fault and Fold Database

The UGS updated the *Utah Quaternary Fault and Fold Database* on January 1, 2017, incorporating new data and a complete review of previously published data through the end of 2013. Ongoing updates are being reviewed by UGS for 2013–2017 published Quaternary faults. Users of any Quaternary fault trace and related data acquired from the UGS or the Utah Automated Geographic Reference Center (AGRC) State Geographic Information Database (SGID) in the past are advised to use the updated database available from the AGRC SGID (https://gis.utah.gov/data/geoscience/quaternary-faults/). This single, comprehensive feature class will be periodically updated as new and/or updated data become available and replaces the six previously available feature classes of variable completeness. A web mapping application for the database is available at https://geology.utah.gov/resources/data-databases/qfaults/.

Utah Lidar Elevation Data Availability

A significant amount of high-resolution (≤ 1 meter) lidar elevation data in the state of Utah is now available totaling over 6846 square miles (mi^2) from AGRC (https://gis.utah.gov/data/elevation-terrain-data/) and OpenTopography (http://opentopography.org). UGS and AGRC led partnerships of multiple, diverse local, state, and federal agencies, and non-governmental organizations have been instrumental in acquiring new, high-quality public domain lidar data. Figure 3 shows the existing and planned lidar data available in Utah. An additional 14,452 mi^2 is planned for acquisition in 2018. For major Quaternary faults, data is now available for the East and West Cache, Hurricane, Wasatch, and West Valley fault zones. The UGS is using this data to map fault traces associated with these fault zones at scales of 1:10,000, where possible, or 1:24,000, where the ground surface has been significantly disturbed by urbanization and other activities. The mapping is used to define Special Study Zones around fault traces, where paleoseismic investigations are highly recommended by the UGS for new development (see Lund and others, 2016, *Guidelines for Evaluating Surface-Fault-Rupture Hazards in Utah*, in UGS Circular 122, pages 33 to 58, https://ugspub.nr.utah.gov/publications/circular/c-122.pdf).

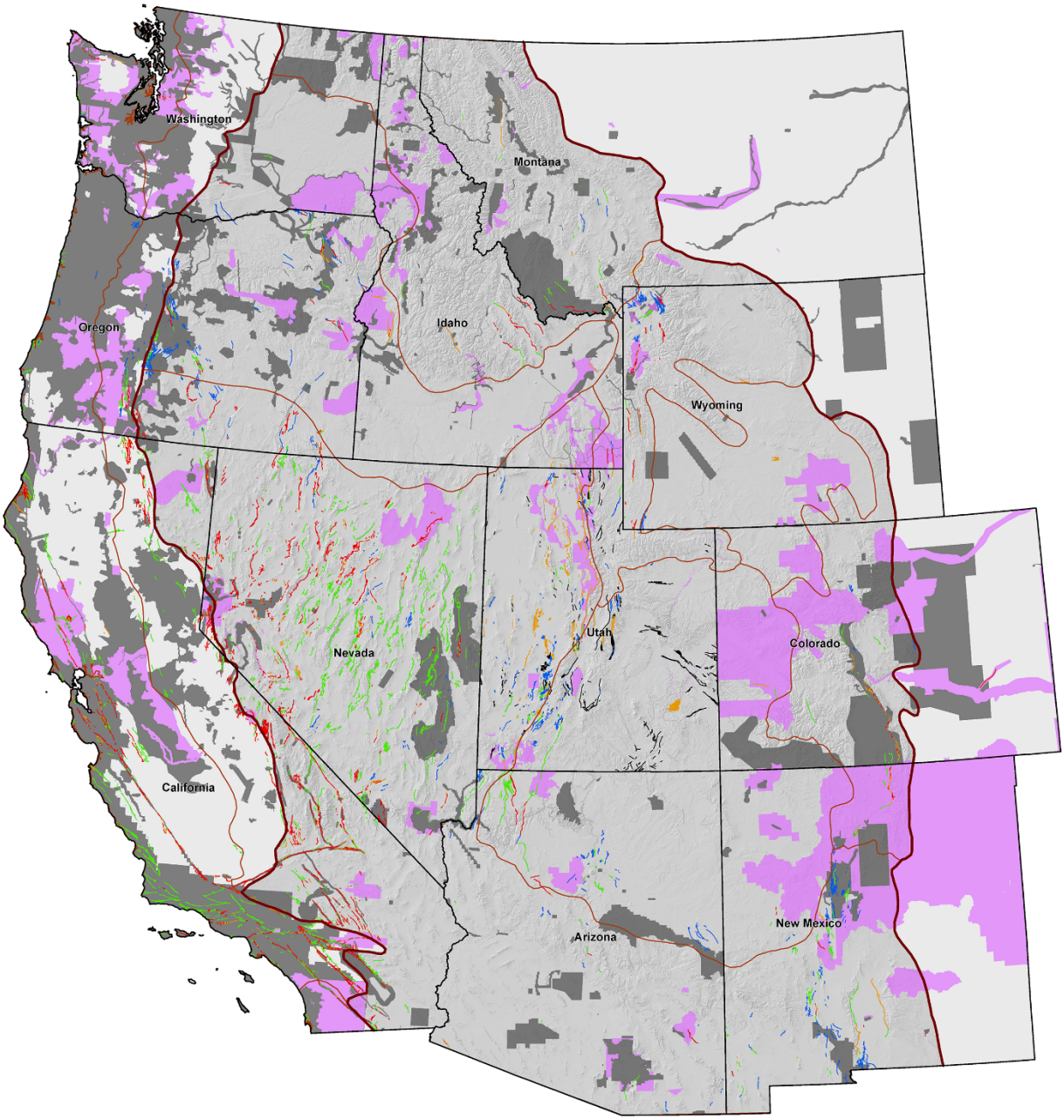

Figure 1. Map of lidar data availability in Basin and Range, and Intermountain West (thick dark red outline) area. Existing USGS QL2 or better lidar data in purple and ≥QL3 in dark gray. Quaternary faults outside Utah from the *Quaternary Fault and Fold Database of the United States* (USGS, 2006), and for Utah from the *Utah Quaternary Fault and Fold Database;* Utah Geological Survey, 2017. Faults colored the same as the *Quaternary Fault and Fold Database of the United States*. Major physiographic provinces in narrow dark red lines.

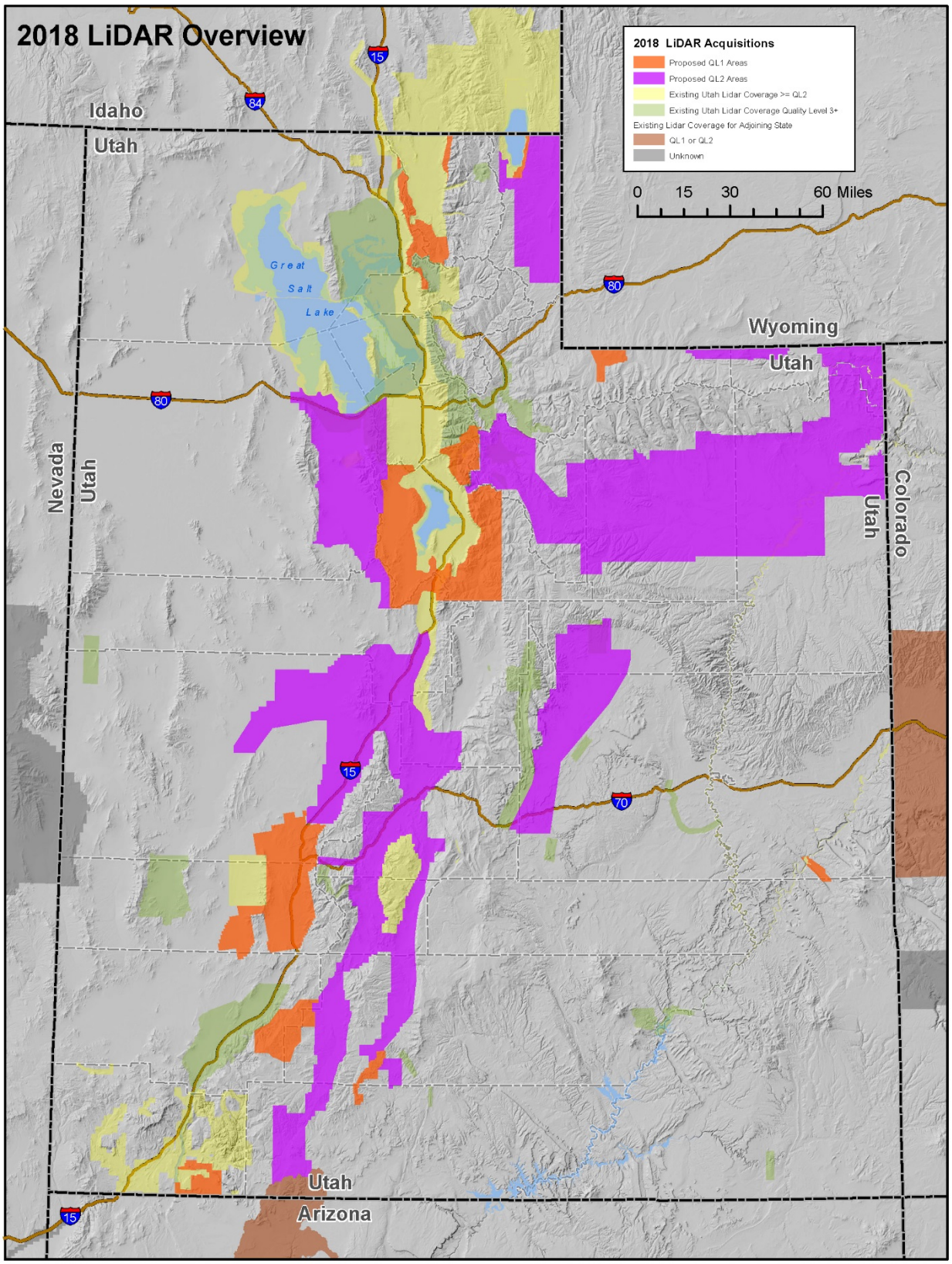

Figure 2. Map of lidar data availability in Utah and the surrounding area. Proposed data to be acquired in 2018 with USGS Quality Level (QL) 1 (0.5 m) in bright orange and QL2 (1 m) in purple, data acquired prior to 2018 with QL2 or better in yellow and ≥QL3 in green, other state ≤QL2 data in dark orange, and unknown quality in gray.