



## **2016 UTAH EARTHQUAKE WORKING GROUP MEETINGS UTAH QUATERNARY FAULT PARAMETERS WORKING GROUP SUMMARY**

**Wednesday, February 10, 2016**

**Utah Department of Natural Resources Building, Room 2000  
1594 West North Temple, Salt Lake City, Utah**

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### **WELCOME AND INTRODUCTION**

Steve Bowman (Utah Geological Survey [UGS]) called the 2016 Utah Quaternary Fault Parameters Working Group (UQFPWG) meeting to order at 8:15 a.m. After welcoming Working Group members and guests, Steve summarized the UQFPWG's past activities and outlined the Working Group's purpose and goals for the future.

#### **UQFPWG Purpose and Goals**

- One of three standing committees created to help set and coordinate Utah's earthquake-hazard research agenda.
- Reviews ongoing paleoseismic research in Utah, and updates the Utah consensus slip-rate and recurrence-interval database as necessary.
- Provides advice/insight regarding technical issues related to fault behavior in Utah and the Basin and Range Province.
- Identifies and prioritizes future Utah Quaternary fault paleoseismic investigations.

### **TECHNICAL PRESENTATIONS**

The following presentations were made on current paleoseismic research and related activities in Utah, most presentations are available at <http://geology.utah.gov/hazards/earthquakes-faults/utah-earthquake-working-groups/quaternary-fault-parameters/>.

- Active Faulting, Soil and Rock Type, and Groundwater Elevations Beneath Salt Lake City – Vp, Vs, and Reflection Images from a Seismic Land Streamer System: Lee Liberty, Boise State University
- Late Holocene Earthquake Record at the Corner Canyon Site on the Salt Lake City Segment of the Wasatch Fault Zone: Chris DuRoss, U.S. Geological Survey (USGS)
- Preliminary Results from the Airport East Trench Site, Taylorsville Fault, West Valley Fault Zone: Adam Hiscock, UGS
- New Insight into the Paleocene Cedar City-Parowan Monocline: Bob Biek, UGS
- Field Investigations of Active Faulting in the Sevier Desert Region – Methods and Preliminary Results: Tim Stahl, University of Michigan, National Science Foundation Post-Doctoral Researcher

- Revisiting Utah Quaternary Faults – East Canyon, Moab, Joes Valley, and Wasatch Fault Zone Segment Boundaries: Jim McCalpin, GEO-HAZ Consulting, Inc.
- Updated Utah Geological Survey Surface-Fault-Rupture and Other Geologic-Hazard Investigation and Report Guidelines: William Lund, UGS, Emeritus
- Characterization of Segmentation and Long-Term Slip Rates of Wasatch Front Fault Systems, Utah: Julia Howe, University of Utah, Graduate Student
- Utah Quaternary Fault and Fold Database Status of Updates and New Web Application: Mike Hylland, UGS
- New Utah Earthquake and Quaternary Fault Map: Steve Bowman, UGS
- Paleoseismic Investigation within the Traverse Ridge Segment Boundary – Initial Plans for Summer 2016 Field Work: Nathan Toke, Utah Valley University (UVU)
- Pots Creek and Diamond Gulch Faults in Northeast Utah – A Preliminary Evaluation: Joanna Redwine and Lucy Piety, U.S. Bureau of Reclamation
- The Great Salt Lake Fault and Its Microbial Mounds: Susanne Janecke, Utah State University (USU)
- UAV-Survey and Photogrammetry Produce LiDAR-Like DEM of Scarps in Logan, Utah: Susanne Janecke, USU, and Michael Bunds, Jeremy Andreini, and Jack Wells, UVU
- New Data on Holocene Offsets and Slip Rates for the Oquirrh Fault from DEMs Made with Structure-from-Motion Methods: Michael Bunds, Jeremy Andreini, Michael Arnold, Kenneth Larsen, Andrew Fletcher, and Nathan Toke, UVU
- Update on the Working Group on Utah Earthquake Probabilities (WGUEP) Report, Data Developed, and Outreach: Ivan Wong, AECOM (WGUEP Chair)
- Basin and Range Province Seismic Hazard Summit III Summary: William Lund and Steve Bowman, UGS

## **TECHNICAL DISCUSSION ITEMS**

No technical discussion items came before the Working Group at this year's meeting.

## **UQFPWG 2017 FAULT INVESTIGATION PRIORITIES**

In 2005, the UQFPWG recommended that 20 Quaternary faults/fault segments in Utah be investigated to “adequately characterize Utah’s earthquake hazard to a minimally acceptable level” (Lund, 2005). Since then, the Working Group has added an additional 11 faults/fault segments to the list: five in 2007, one in 2009, one in 2010, four in 2011, and three general recommendations regarding the five central segments of the Wasatch fault zone, fault zone mapping, and acquisition of high resolution imagery in 2012, 2014, 2015, respectively. A new priority to investigate the relation of salt tectonics to

some Utah Quaternary faults (for example, the Joes Valley fault zone, Gunnison fault, and the Levan segment of the Wasatch fault zone) was added this year (see table 1 below).

Table 2 lists faults and fault segments in the USGS National Seismic Hazard Maps or the UGS Hazus Utah fault database (Lund, 2014) not listed in table 1 that may warrant additional investigation. Figure 1 shows the faults and fault segments listed in tables 1 and 2. Table 3 lists the current status of paleoseismic investigations for Utah priority faults and fault segments identified by the UQFPWG as priorities for investigation. Note that faults or fault segments listed in table 3 as having received some level of paleoseismic investigation does not imply that all of the paleoseismic data necessary to fully characterize those faults or fault segments has been acquired; further investigation of those structures may be necessary.

The UQFPWG conducts an annual review of progress made toward investigating the faults/fault segments on the priority list. Based on that review, the Working Group establishes a short list of the highest priority faults and fault segments for future investigation. The list of highest priority faults and fault segments is published on the UGS website (<http://geology.utah.gov/hazards/earthquakes-faults/utah-earthquake-working-groups/>), which is then referenced by the USGS Earthquake Hazards Program in their annual External Research Support (National Earthquake Hazards Reduction Program [NEHRP]) request for proposals.

The Working Group's highest priority list for 2017 includes (not in priority order):

1. Acquire new paleoseismic information to address data gaps for (a) the five central segments of the Wasatch fault zone, (b) the northern segment of the Oquirrh fault zone, (c) refining the latest Quaternary earthquake chronology for the Topliiff 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.
2. 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?).
3. Use recently acquired LiDAR data to more accurately map the traces of the Wasatch, West Valley, and Hurricane fault zones, and search for and map previously undiscovered mid-valley Quaternary faults.
4. Acquire high-resolution aerial imagery (LiDAR, Structure from Motion, etc.), and map high-risk (chiefly urban) Utah hazardous faults to identify new paleoseismic trench sites.
5. 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), Joes Valley fault zone, Levan and Fayette segments of the Wasatch fault zone, Scipio Valley faults, and the Gunnison fault.

The Working Group's other priority list for 2017 was modified by deleting the Cedar City-Parowan monocline from priority 10, based on new geologic mapping of the structure by Bob Biek, UGS, and presented to the working group at this meeting. The other fault priorities were not changed.

Table 4 shows the 2017 highest priority fault and fault segment recommendations, table 5 shows the list of other priority faults and fault segment recommendations, and both tables show the current investigation status for all faults and fault segments identified by the UQFPWG as requiring additional

investigation. All of the faults/fault sections listed in table 2 remain priorities and should be considered for future investigation if a compelling case can be made for the need to acquire additional paleoseismic data.

## **WORKING GROUP PRODUCTS**

The final agenda, speaker presentations, and this summary document are available on the UQFPWG web page at <http://geology.utah.gov/hazards/earthquakes-faults/utah-earthquake-working-groups/quaternary-fault-parameters/>. Paleoseismic investigations that developed out of the UQFPWG meetings and published by the UGS are available in the *Paleoseismology of Utah* series at <http://geology.utah.gov/hazards/technical-information/paleoseismology-of-utah-series/>. Most of the USGS NEHRP funded investigations for Utah that were not published by the UGS are compiled in UGS Miscellaneous Publication 13-03 (<http://files.geology.utah.gov/online/mp/mp13-03/mp13-03.pdf>).

### **Utah Quaternary Fault and Fold Database**

The UGS updated the *Utah Quaternary Fault and Fold Database* on July 1, 2015, incorporating new data and a complete review of previously published data through the end of 2013. 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 (<http://gis.utah.gov/data/how-to-connect-to-the-sgid-via-sde/>) as the SGID10.GEOSCIENCE.QuaternaryFaults feature class. This single, comprehensive feature class will be periodically updated as new/updated data become available (anticipated several times per year) and replaces the six previously available feature classes of variable completeness. A web map application for the database is available at <http://geology.utah.gov/resources/data-databases/qfaults/>.

## **REFERENCES**

- Lund, W.R., 2005, Consensus preferred recurrence-interval and vertical slip-rate estimates – review of Utah paleoseismic-trenching data by the Utah Quaternary Fault Parameters Working Group: Utah Geological Survey Bulletin 134, 109 p., online at <http://ugspub.nr.utah.gov/publications/bulletins/B-134.pdf>.
- Lund, W.R., 2014, Hazus loss estimation software earthquake model revised Utah fault database, updated through 2013: Utah Geological Survey Open-File Report 631, 11 p., online at <http://geology.utah.gov/online/ofr/ofr-631.pdf>.

**MEETING ATTENDANCE**  
**Working Group Members (\* Speaker)**

Steve Bowman*	Utah Geological Survey (UQFPWG Chair)
Rich Briggs	U.S. Geological Survey, Earthquake Hazards Program
Michael Bunds*	Utah Valley University
David Dinter	University of Utah, Department of Geology & Geophysics
Chris DuRoss*	U.S. Geological Survey, Earthquake Hazards Program
Ron Harris	Brigham Young University
Adam Hiscock*	Utah Geological Survey (UQFPWG UGS Liaison)
Michael Hylland*	Utah Geological Survey
Susanne Janecke*	Utah State University
William Lund*	Utah Geological Survey, Emeritus
Jim Pechmann	University of Utah Seismograph Stations
Steve Personius	U.S. Geological Survey, Earthquake Hazards Program
Joanna Redwine*	U.S. Bureau of Reclamation
Nathan Toke*	Utah Valley University
Ivan Wong*	AECOM

**Guests (\* Speaker)**

Genevieve Atwood	Earth Science Education
Dan Aubery	Utah Division of Water Resources
Gregg Beukelman	Utah Geological Survey
Bob Biek*	Utah Geological Survey
Ron Bruhn	University of Utah, Department of Geology & Geophysics, Retired
Nariah Chambers	Brigham Young University
Anthony Crone	U.S. Geological Survey, Retired
Seth Dee	Nevada Bureau of Mines and Geology
Bret Dixon	Utah Division of Water Rights
Peter Doumit	Intermountain GeoEnvironmental Services, Inc.
Richard Giraud	Utah Geological Survey
Michael Hansen	RB&G Engineering, Inc.
Doug Hawkes	Applied Geotechnical Engineering Consultants, Inc.
Danny Horns	Utah Valley University
Julia Howe*	University of Utah, Department of Geology & Geophysics
Paul Jewell	University of Utah, Department of Geology & Geophysics
Emily Kleber	Utah Geological Survey
Tyler Knudsen	Utah Geological Survey
Rich Koehler	Nevada Bureau of Mines and Geology
Elliott Lips	Great Basin Earth Science
Bill Loughlin	Loughlin Water Associates
Jim McCalpin*	GEO-HAZ Consulting, Inc.
Greg McDonald	Utah Geological Survey
Adam McKean	Utah Geological Survey
Bob Oaks	Utah State University
Kris Pankow	University of Utah Seismograph Stations
David Simon	Simon Associates
Tim Stahl *	University of Michigan
Chuck Williamson	Utah Division of Water Rights
Ana Vargo	Natural Resources Conservation Service

**Table 1.** List of Quaternary faults and fault segments identified by the UQFPWG as requiring additional investigation to adequately characterize Utah's earthquake hazard to a minimally acceptable level.

Utah Fault or Fault Segment	UQFPWG Priorities	
	2005 <sup>1</sup>	Additions
Nephi segment, Wasatch fault zone <sup>2,3</sup>	1	--
West Valley fault zone <sup>2,3</sup>	2	--
Weber segment, Wasatch fault zone <sup>2,3</sup> – most recent event	3	--
Weber segment, Wasatch fault zone <sup>2,3</sup> – multiple events	4	--
Utah Lake faults and folds <sup>3</sup>	5	--
Great Salt Lake fault zone <sup>2,3</sup>	6	--
Collinston and Clarkston Mountain segments, Wasatch fault zone <sup>3</sup>	7	--
Sevier and Toroweap faults <sup>2,3</sup>	8	--
Washington fault zone <sup>3</sup> (includes Dutchman Draw fault <sup>2</sup> )	9	--
Cedar City-Parowan monocline (removed 2016) <sup>3,4</sup> and Paragonah fault <sup>2,3</sup>	10	--
Enoch graben <sup>3</sup>	11	--
East Cache fault zone <sup>2,3</sup>	12	--
Clarkston fault <sup>2,3</sup>	13	--
Wasatch Range back-valley faults (includes Morgan fault <sup>2</sup> and Main Canyon fault <sup>3</sup> )	14	--
Hurricane fault zone <sup>2,3</sup>	15	--
Levan segment, Wasatch fault zone <sup>2,3</sup>	16	--
Gunnison fault <sup>3</sup>	17	--
Scipio Valley faults <sup>3</sup>	18	--
Faults beneath Bear Lake	19	--
Eastern Bear Lake fault zone <sup>2,3</sup>	20	--
Bear River fault zone <sup>2,3</sup>	--	2007
Brigham City segment, Wasatch fault zone <sup>2,3</sup> – most recent event	--	
Carrington fault, Great Salt Lake fault zone <sup>3</sup>	--	
Provo segment, Wasatch fault zone <sup>2,3</sup> – penultimate event	--	
Rozelle section, East Great Salt Lake fault <sup>3</sup>	--	
Salt Lake City segment, Wasatch fault zone <sup>2,3</sup> – northern part	--	2009
Warm Springs fault/East Bench fault <sup>2,3</sup> subsurface geometry and connection	--	2010
Brigham City segment, Wasatch fault zone <sup>2,3</sup> rupture extent (north and south ends)	--	2011
Northern Provo segment, Wasatch fault zone <sup>2,3</sup> – long-term earthquake record	--	
Taylorville fault, West Valley fault zone <sup>3</sup>	--	
Hansel Valley fault <sup>2,3</sup>	--	2012
Acquire new paleoseismic information to address data gaps for the five central segments of the Wasatch fault zone.	--	
Improve the long-term earthquake record for Cache Valley (East <sup>1,2,3</sup> and West Cache <sup>2,3</sup> fault zones).	--	2013
Use recently acquired LiDAR data to more accurately map the traces of the Wasatch, West Valley, and Hurricane fault zones, and search for and map as appropriate previously undiscovered mid-valley Quaternary faults.	--	2014
Acquire high resolution aerial imagery (LiDAR, Structure from Motion, etc.) and map high-risk (chiefly urban) Utah hazardous faults. Identify future paleoseismic trench sites.	--	2015
Acquire new paleoseismic information to address data gaps for the northern Oquirrh fault zone <sup>3</sup> .	--	
Acquire and analyze information on salt tectonics and its relation to the Main Canyon fault <sup>3</sup> , Sevier detachment/Drum Mountains fault zone <sup>3</sup> , Bear River fault zone <sup>2,3</sup> , Spanish Valley (Moab area), Joes Valley fault zone <sup>2,3</sup> , Levan and Fayette segments <sup>2,3</sup> of the Wasatch fault zone, Scipio Valley faults <sup>3</sup> , and the Gunnison fault <sup>3</sup> .	--	2016
Refine the latest Quaternary earthquake chronology for the Toppliff Hills fault <sup>3</sup> .	--	

<sup>1</sup> Original priorities from the 2005 UQFPWG meeting.

<sup>2</sup> Earthquake source on the USGS National Seismic Hazard Maps.

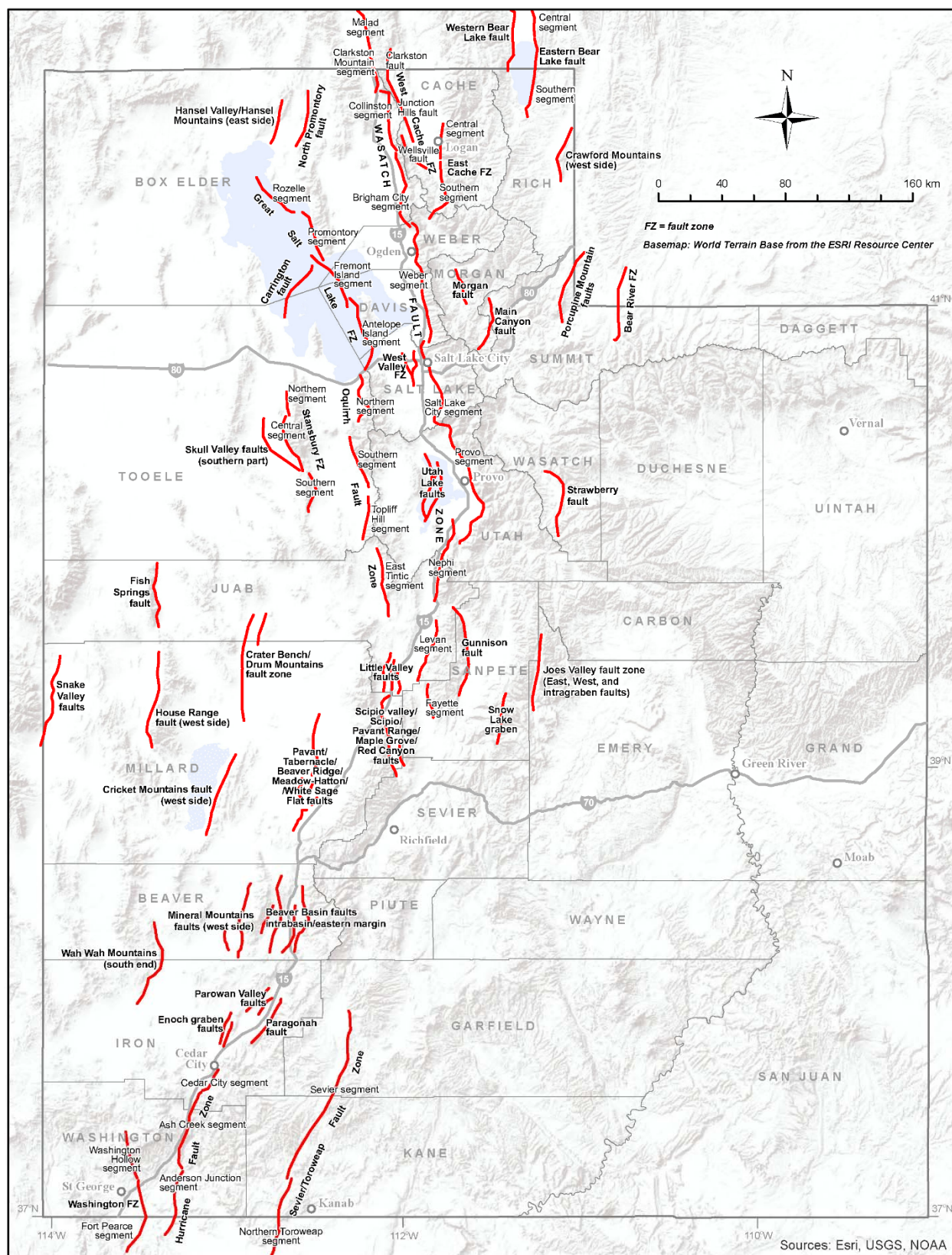
<sup>3</sup> Earthquake source listed in the UGS Hazus Utah fault database ([UGS Open-File Report 631](#)).

<sup>4</sup> Fault removed from the list at the 2016 UQFPWG meeting, based on new information about the structure.

**Table 2.** Earthquake sources (faults and fault segments) in the USGS National Seismic Hazard Maps (NSHM) or the UGS Hazus Utah fault database ([UGS Open-File Report 631](#)) not listed in table 1 and may warrant additional investigation.

Utah Fault or Fault Segment	Included In	
	NSHM	Utah Hazus
Beaver Basin intrabasin/eastern margin faults	--	Yes
Crater Bench/Drum Mountains fault zone	--	Yes
Crawford Mountains (west side)	--	Yes
Cricket Mountains fault (west side)	--	Yes
Fish Springs fault	--	Yes
House Range (west side) fault	--	Yes
Joes Valley fault zone	Yes	Yes
Little Valley faults	--	Yes
Malad segment, Wasatch fault zone	--	Yes
Mineral Mountains (west side) faults	--	Yes
North Promontory fault	Yes	Yes
Oquirrh fault zone	--	Yes
Oquirrh-Southern Oquirrh Mountains fault zone	Yes	Yes
Parowan Valley faults	--	Yes
Pavant/Tabernacle/Beaver Ridge/Meadow-Hatton/White Sage Flat faults	--	Yes
Porcupine Mountain faults	--	Yes
Scipio/Pavant Range/Maple Canyon/Red Canyon faults	--	Yes
Skull Valley faults (southern part)	--	Yes
Snake Valley faults	--	Yes
Snow Lake graben	--	Yes
Stansbury fault zone	Yes	Yes
Strawberry fault	Yes	Yes
Wah Wah Mountains (south end)	--	Yes
West Cache fault, Wellsville section	Yes	Yes
Western Bear Lake fault	--	Yes







**Table 3.** Current status of paleoseismic investigations for Utah priority faults and fault segments identified by the UQFPWG as requiring additional investigation to adequately characterize Utah's earthquake hazard to a minimally acceptable level.

Fault or Fault Segment	UQFPWG Priority <sup>1</sup>	Investigations	
		Status <sup>2,3</sup> (as of 2/2016)	Institution <sup>4</sup>
Nephi segment, Wasatch fault zone <sup>5,6</sup>	1	UGS Special Study <a href="#">124</a> and <a href="#">151</a> <a href="#">USGS SI Map 2966</a> <a href="#">UGS FTR Report</a>	UGS/USGS
Granger fault, West Valley fault zone <sup>5,6</sup>	2	<a href="#">UGS Special Study 149</a>	UGS/USGS
Weber segment, Wasatch fault zone <sup>5,6</sup> – most recent event	3	<a href="#">UGS Special Study 130</a>	UGS/USGS
Weber segment, Wasatch fault zone <sup>5,6</sup> – multiple events	4	<a href="#">UGS Special Study 130</a>	UGS/USGS
Utah Lake faults and folds <sup>6</sup>	5	<a href="#">UUGG FTR Report</a>	UUGG/ BYU
Great Salt Lake fault zone <sup>5,6</sup>	6	<a href="#">UUGG FTR Report</a>	UUGG
Collinston and Clarkston Mountain segments, Wasatch fault zone <sup>6</sup>	7	<a href="#">UGS Special Study 121</a> Map: <a href="#">UGS Open-File Report 638</a>	UGS
Sevier and Toroweap faults <sup>5,6</sup>	8	<a href="#">UGS Special Study 122</a>	UGS
Washington fault zone <sup>6</sup>	9	<a href="#">UGS Miscellaneous Publication 15-6</a>	UGS
East Cache fault zone <sup>5,6</sup>	12	<a href="#">USU FTR Report</a>	USU
Wasatch Range back-valley faults	14	No activity	--
Main Canyon fault <sup>6</sup>		<a href="#">UGS Miscellaneous Publication 10-5</a>	USBR
Hurricane fault zone <sup>5,6</sup>	15	<a href="#">UGS Special Study 119</a>	UGS
Levan segment, Wasatch fault zone <sup>5,6</sup>	16	<a href="#">UGS Map 229</a> Map: <a href="#">UGS Open-File Report 640</a>	UGS
Brigham City segment, Wasatch fault zone <sup>5,6</sup> – most recent event	2007	<a href="#">UGS Special Study 142</a>	UGS/USGS
Bear River fault zone <sup>5,6</sup>	2007	AGU Abstracts: <a href="#">2012</a> and <a href="#">2013</a> USGS ongoing	USGS/UGS
Salt Lake City segment, Wasatch fault zone <sup>5,6</sup> – north part	2009	<a href="#">UGS Special Study 149</a>	UGS/USGS
Hansel Valley fault zone <sup>5,6</sup>	2011	<a href="#">McCalpin (1985)</a> , <a href="#">Robinson (1986)</a> , <a href="#">McCalpin and others (1992)</a> UUGG ongoing	UUGG
Nephi segment, Wasatch fault zone <sup>5,6</sup> – long-term earthquake record	2012	<a href="#">UGS FTR Report</a>	UGS/USGS
Provo, Salt Lake City and Nephi segments, Wasatch fault zone <sup>5,6</sup> segmentation	2012	Ongoing	--
Flat, Maple, and Corner Canyons, and Alpine sites		USGS work ongoing <a href="#">UGS FTR Report</a>	USGS/UGS
Fort Canyon fault, Traverse Mountains salient		Ongoing	UVU
Improve the long-term earthquake record for Cache Valley (East and West Cache fault zones <sup>5,6</sup> ).	2013	<a href="#">Evans and McCalpin (2012)</a> , no other activity	USU/GEO-HAZ
Using LiDAR to map portions of the Hurricane <sup>5,6</sup> , Wasatch <sup>5,6</sup> , and West Valley <sup>5,6</sup> fault zones	2014	UGS Open-File Reports <a href="#">638</a> and <a href="#">640</a> Additional work ongoing.	UGS
Acquire high resolution aerial imagery (LiDAR, Structure from Motion, etc.) and map high-risk (chiefly urban) Utah hazardous faults. Identify future paleoseismic trench sites.	2015	One proposal funded (3DEP), second proposal not funded.	UGS/State of Utah

<sup>1</sup> See table 1 for complete working group priority list.

<sup>2</sup> FTR (Final Technical Report) to the USGS, Earthquake Hazards Program.

<sup>3</sup> Click on URL links to investigation report files available online.

<sup>4</sup> BYU (Brigham Young University), GEO-HAZ (GEO-HAZ Consulting, Inc.), USBR (U.S. Bureau of Reclamation), USGS (U.S. Geological Survey, Earthquake Hazards Program), UGS (Utah Geological Survey), USU (Utah State University), UUGG (University of Utah Department of Geology & Geophysics), UVU (Utah Valley University).

<sup>5</sup> Earthquake source on the USGS National Seismic Hazard Maps.

<sup>6</sup> Earthquake source listed in the UGS Hazus Utah fault database ([UGS Open-File Report 631](#)).

**Table 4.** Utah Quaternary Fault Parameters Working Group 2017 list of highest priority Quaternary faults or fault segments requiring additional investigation to adequately characterize Utah's earthquake hazard to a minimally acceptable level.

Fault or Fault Segment (Not in Priority Order)	Investigations	
	Status (as of 2/2016) <sup>1,2</sup>	Institution
Acquire paleoseismic information to address paleoseismic data gaps for (1) the five central segments of the Wasatch fault zone, (2) the Oquirrh fault zone, (3) refining the latest Quaternary earthquake chronology for the Topliff Hills fault, and (4) the East and West Cache fault zones. Examples of paleoseismic data to acquire include extent of surface-faulting rupture, earthquake timing, displacement, and subsurface fault geometry.	Nephi segment, Spring Lake and North Creek sites: <a href="#">UGS FTR Report</a> , Special Study ongoing	UGS/USGS
	Provo segment, Flat Canyon site: USGS ongoing, <a href="#">UGS FTR Report</a>	USGS/UGS
	Salt Lake City segment, Corner Canyon site: ongoing	UGS/USGS
	Provo segment, Dry Creek and Maple Canyon sites: USGS ongoing, <a href="#">UGS FTR Report</a>	USGS/UGS
	Fort Canyon fault, Traverse Mountains salient: ongoing	UVU
	Southern segment, East Cache fault zone: <a href="#">FTR Report</a>	USU/GEO-HAZ
Use recently acquired LiDAR data to more accurately map the traces of the Wasatch, West Valley, and Hurricane fault zones, and search for and map as appropriate previously undiscovered mid-valley Quaternary faults.	UGS Open-File Reports <a href="#">638</a> and <a href="#">640</a> The UGS is mapping portions of the Hurricane, Wasatch, and West Valley fault zones.	UGS
Acquire earthquake timing information for the Utah Lake faults to investigate the relation of earthquakes on that fault system to large earthquakes on the adjacent Provo segment of the Wasatch fault zone (independent or coseismic ruptures, fault pairs?).	No activity	--
Acquire high resolution aerial imagery (LiDAR, Structure from Motion, etc.) and map high-risk (chiefly urban) Utah hazardous faults. Identify future paleoseismic trench sites.	One proposal funded (3DEP), second proposal not funded.	UGS/State of Utah
Acquire and analyze information on salt tectonics and its relation to the Main Canyon fault, Sevier detachment/Drum Mountains faults, Bear River fault zone, Spanish Valley (Moab area), Joes Valley fault zone, Levan and Fayette segments of the Wasatch fault zone, Scipio Valley faults, and the Gunnison fault.	New priority for 2017	--

<sup>1</sup> FTR (Final Technical Report) to the USGS, Earthquake Hazards Program.

<sup>2</sup> Click on URL link to investigation report files available online.

**Table 5.** Utah Quaternary Fault Parameters Working Group 2017 list of other priority faults or fault segments requiring further investigation to adequately characterize Utah's earthquake hazard to a minimally acceptable level.

Fault or Fault Segment	UQFPWG Priority <sup>1</sup>	Investigations	
		Status (as of 2/2016) <sup>2</sup>	Institution
Paragonah fault <sup>3,4</sup>	10 <sup>5</sup>	No activity	--
Enoch graben <sup>4</sup>	11	Map: <a href="#">UGS Open-File Report 628</a>	UGS
Clarkston fault, West Cache fault zone <sup>3,4</sup>	13	<a href="#">UGS Special Study 98</a> Fault mapping proposal not funded.	UGS
Gunnison fault <sup>4</sup>	17	No activity	--
Scipio Valley faults <sup>4</sup>	18	No activity	--
Faults beneath Bear Lake	19	No activity	--
Eastern Bear Lake fault zone <sup>4</sup>	20	Fault mapping proposal not funded.	UGS
Carrington fault, Great Salt Lake fault zone <sup>4</sup>	2007	No activity	--
Rozelle section, Great Salt Lake fault zone <sup>4,6</sup>	2007	No activity	--

<sup>1</sup> See table 1 for complete working group priority list.

<sup>2</sup> Click on URL link to investigation report files available online.

<sup>3</sup> Earthquake source on the USGS National Seismic Hazard Maps.

<sup>4</sup> Earthquake source listed in the UGS Hazus Utah fault database ([UGS Open-File Report 631](#)).

<sup>5</sup> The Cedar City-Parowan monocline was removed from Priority 10 in the 2016 meeting, based on new information from geologic mapping in the area ([UGS Map 270](#) and [2016 presentation file](#)).

<sup>6</sup> Previous highest priority fault or fault segment.