

**SUMMARY**  
**Utah Quaternary Fault Parameters Working Group Meeting**  
**Tuesday, February 5, 2013**  
**Utah Department of Natural Resources Building, Room 1040**  
**1594 West North Temple, Salt Lake City**

**WELCOME AND INTRODUCTION**

Bill Lund (Utah Geological Survey [UGS]) called the 2013 Utah Quaternary Fault Parameters Working Group (UQFPWG) meeting to order at 8:20 a.m. After welcoming Working Group members and guests (attachment 1), Bill summarized the UQFPWG's past activities and outlined the Working Group's purpose and goals for the future.

**UQFPWG Purpose and Goals**

- Helps set and coordinate the earthquake-hazard research agenda for the State of Utah.
- 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/ghp/workgroups/uqfpwg.htm>).

- Searching for evidence of seismic events in lacustrine sediments of Utah Lake; Ron Harris and Quincy Nickens, Brigham Young University
- Automated fault scarp offset analysis of the Nephi segment of the Wasatch fault, Utah, utilizing LiDAR derived, high resolution DEMs; Billie Smathers, University of Utah
- Update: Paleoseismic investigation of the northern and southern strands of the Nephi segment; Chris DuRoss, Utah Geological Survey
- Results of fault trenching at the Baileys Lake site, West Valley fault zone; Mike Hylland, Utah Geological Survey

- Paleoseismology of the Salt Lake City segment and its seismologic relation to the West Valley fault zone; Chris DuRoss, Utah Geological Survey
- Summary of recent consultant's trench, Orange Street site, Taylorsville fault, West Valley fault zone; Mike Hylland, Utah Geological Survey
- Testing the role of fault segmentation in limiting earthquake magnitudes – A targeted paleoseismic investigation along the structurally segmented Wasatch fault zone; Rich Briggs, U.S. Geological Survey
- Bear River fault behavior – Clues provided by LiDAR; Suzanne Hecker, U.S. Geological Survey
- Evaluation of the Quaternary history of the Joes Valley fault zone, Utah – Background and update; Joanna Redwine, U.S. Bureau of Reclamation
- Update on GPS monitoring of the Wasatch fault; Robert Smith, University of Utah
- Large liquefaction features and evidence for earthquakes induced by Lake Bonneville in Cache Valley – A progress report; Susanne Janecke, Utah State University
- New surficial geologic mapping redefines the northernmost sections of the Washington fault zone in SW Utah and NW Arizona; Tyler Knudsen, Utah Geological Survey
- Results – Paleoseismic trenching investigation of the Northern (Fort Pearce) section of the Washington fault zone, SW Utah and NW Arizona; Bill Lund, Utah Geological Survey
- Preliminary results from a high resolution reflection profile at Hansel Valley, Utah; Pier Bruno, University of Utah/Istituto Nazionale di Geofisica e Vulcanologia, Italy
- Update on Blue Castle seismic source and fault characterization studies; Dean Ostenaar, Fugro, Inc. (no Power Point presentation available)
- Utah paleoseismic-related USGS NEHRP FTR report compilation and some new data resources; Steve Bowman, Utah Geological Survey
- Redefining “Active” faults – Proposal to evaluate paleo-seismology studies for evidence of Holocene climatic variation and basin-ward migration of faulting; Darlene Batatian, Mountain Land Development Services, LLC

## **TECHNICAL DISCUSSION ITEMS**

No technical discussion items came before the Working Group this year.

## UQFPWG 2013 FAULT STUDY 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, and four in 2011 (see table 1 below). No new faults were added to the list in 2013.

The UQFPWG conducts an annual review of progress made toward investigating the faults/fault segments on their priority list. Based on that review, the Working Group establishes a short list of the highest priority faults/fault segments for future study. The list of highest priority faults/segments is published on the UGS web site, which is then referenced by the USGS in their annual NEHRP request for proposals. The Working Group’s highest priority list for 2013 includes: (1) Acquire new paleoseismic information for the five central segments of the Wasatch fault zone to address data gaps – e.g., (a) the rupture extent of earthquakes on the Brigham City and Salt Lake City segments, (b) long-term earthquake records for the northern Provo, southern Weber, and Salt Lake City segments, and (c) the subsurface geometry and connection of the Warm Springs and East Bench faults on the Salt Lake City segment; (2) acquire long-term earthquake record for the West Valley fault zone – Taylorsville fault; and (3) improve the long-term earthquake record for Cache Valley (East and West Cache fault zones). Table 2 shows both the 2013 highest priority fault/fault segment recommendations, and the current investigation status for all faults/fault segments identified by the UQFPWG as requiring additional study.

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

<b>Fault/Fault Segment</b>	<b>Original UQFPWG Priority (2005)</b>
Nephi segment WFZ	1
West Valley fault zone	2
Weber segment WFZ – most recent event	3
Weber segment WFZ – multiple events	4
Utah Lake faults and folds	5
Great Salt Lake fault zone	6
Collinston & Clarkston Mountain segments WFZ	7
Sevier/Toroweap fault	8
Washington fault	9
Cedar City-Parowan monocline/Paragonah fault	10
Enoch graben	11
East Cache fault zone	12
Clarkston fault	13
Wasatch Range back-valley faults	14
Hurricane fault	15
Levan segment WFZ	16
Gunnison fault	17
Scipio Valley faults	18
Faults beneath Bear Lake	19
Eastern Bear Lake fault	20
Bear River fault zone	2007
Brigham City segment WFZ – most recent event	2007
Carrington fault (Great Salt Lake)	2007
Provo segment WFZ – penultimate event	2007
Rozelle section – East Great Salt Lake Fault	2007
Salt Lake City segment WFZ – northern part	2009
Warm Springs fault/East Bench fault subsurface geometry and connection	2010
Brigham City segment WFZ rupture extent (north and south ends)	2011
Long-term earthquake record northern Provo segment WFZ	2011
West Valley fault zone – Taylorsville fault	2011
Hansel Valley fault	2011
Acquire new paleoseismic information in data gaps along the five central segments of the WFZ	2012

**Table 2. UQFPWG 2013 list of highest priority Quaternary faults/fault segments requiring additional study to adequately characterize Utah's earthquake hazard to a minimally acceptable level, and status of current paleoseismic investigations for all currently identified Utah priority faults/fault segments.**

<b>2013 Highest Priority Faults/Fault Sections For Study</b>			
<b>Fault/Fault Section<sup>1</sup></b>	<b>Investigation Status</b>		<b>Investigating Institution<sup>2</sup></b>
Acquire new paleoseismic information for the five central segments of the Wasatch fault zone to address data gaps – e.g., (a) the rupture extent of earthquakes on the Brigham City and Salt Lake City segments, (b) long-term earthquake records for the northern Provo, southern Weber, and Salt Lake City segments, and (c) the subsurface geometry and connection of the Warm Springs and East Bench faults on the Salt Lake City segment	No activity		
Acquire long-term earthquake record for the West Valley fault zone – Taylorsville fault	Consultant's trench of opportunity		UGS
Improve the long-term earthquake record for Cache Valley (East and West Cache fault zones)	No activity		
<b>Other Priority Faults/Fault Sections Requiring Further Study</b>			
<b>Fault/Fault Section</b>	<b>Original UQFPWG Priority</b>	<b>Investigation Status</b>	<b>Investigating Institution<sup>2</sup></b>
Cedar City-Parowan monocline/Paragonah fault <sup>3</sup>	10	No activity	
Enoch graben	11	No activity	
Clarkston fault <sup>3</sup> (West Cache fault zone)	13	Black and others (2000)	
Gunnison fault	17	No activity	
Scipio Valley faults	18	No activity	
Faults beneath Bear Lake	19	No activity	
Eastern Bear Lake fault	20	No activity	
Carrington fault (Great Salt Lake)	2007	No activity	
Rozelle section, Great Salt Lake fault <sup>4</sup>	2007	No activity	
<b>Faults/Fault Sections Studies Complete or Ongoing</b>			
<b>Fault/Fault Section</b>	<b>Original UQFPWG Priority</b>	<b>Investigation Status</b>	<b>Investigating Institution<sup>2</sup></b>
Nephi segment WFZ	1	UGS Special Study 124 USGS Map 2966	UGS/USGS
West Valley fault zone (Granger fault)	2	Ongoing	UGS/USGS
Long-term earthquake record Nephi segment WFZ	2012	Ongoing	UGS/USGS
Weber segment WFZ – most recent event	3	UGS Special Study 130	UGS/USGS
Weber segment WFZ – multiple events	4	UGS Special Study 130	UGS/USGS
Utah Lake faults and folds	5	Ongoing	UUGG/BYU
Great Salt Lake fault zone	6	Ongoing	UUGG
Collinston & Clarkston Mountain segments WFZ	7	UGS Special Study 121	UGS
Sevier/Toroweap fault	8	UGS Special Study 122	UGS
Washington fault zone	9	Contract deliverable FTR	UGS
East Cache fault zone	12	Contract deliverable FTR	USU
Wasatch Range back-valley fault (Main Canyon fault)	14	UGS Miscellaneous Publication 10-5	USBR
Hurricane fault	15	UGS Special Study 119	UGS
Levan segment WFZ	16	UGS Map 229	UGS
Brigham City segment WFZ – most recent event	2007	Ongoing	UGS/USGS
Bear River fault zone	2007	Ongoing	USGS
Salt Lake City segment WFZ – north part	2009	Ongoing	UGS/USGS
Hansel Valley fault <sup>3</sup>	2011	McCalpin, (1985), Robinson (1986), McCalpin and others (1992), UUGG ongoing	UUGG

<sup>1</sup>Not in priority order

<sup>2</sup> BYU (Brigham Young University), UGS (Utah Geological Survey), USBR (U.S. Bureau of Reclamation), USGS (U.S. Geological Survey), USU (Utah State University), UUGG (University of Utah Department of Geology & Geophysics)

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

<sup>4</sup>Previous highest priority fault/fault segment

## **ATTACHMENT 1**

### **Meeting Attendees**

#### **Quaternary Fault Parameters Working Group (UQFPWG)**

Steve Bowman, UGS\* (UGS/UQFPWG Liaison)  
Rich Briggs, USGS\*  
Chris DuRoss, UGS\*  
Ryan Gold, USGS  
Ron Harris, BYU\*  
Suzanne Hecker, USGS\*  
Daniel Horns, UVU  
Michael Hylland, UGS\*  
Susanne Janecke, USU\*  
William Lund, UGS\* (UQFPWG Chair)  
Susan Olig, URS Corp.  
James Pechmann, UUSS  
Steve Personius, USGS  
Mark Petersen, USGS  
Joanna Redwine, USBR\*  
David Schwartz, USGS  
Bob Smith, UUGG\*  
Ivan Wong, URS Corp.\*

#### **Guests**

Darlene Batatian, Mountain Land Development Services, LLC\*  
Tony Crone, USGS retired  
Bob Biek, UGS  
Pier Bruno, UUGG\*  
Gregg Beukelman, UGS  
Jessica Castleton, UGS  
Bret Dixion, UDWRi  
Ben Erickson, UGS  
Ed Fall, Ed Fall Associates  
Rich Giraud, UGS  
Adam Hiscock, UGS  
Tyler Knudsen, UGS\*  
Greg McDonald, UGS  
Adam McKean, UGS  
Quincy Nickens, BYU\*  
Bob Oaks, USU  
Dean Ostenaar, Fugro, Inc.\*  
Daren Rasmussen, UDWRi  
David Simon, Simon-Bymaster, Inc.  
Billie Smathers, UUGG\*  
Nathan Toke, UVU  
Anna Vargo, NRCS  
Grant Willis, UGS

\*Speaker

BYU (Brigham Young University), NRCS (Natural Resources Conservation Service), UDWRi (Utah Division of Water Rights), UGS (Utah Geological Survey), USBR (U.S. Bureau of Reclamation), USGS (U.S. Geological Survey), USU (Utah State University), UUGG (University of Utah Department of Geology & Geophysics), UUSS (University of Utah Seismograph Stations), UVU (Utah Valley University)