

**SECTION 6: CACHE COUNTY RISK  
ASSESSMENT & COMMUNITY SECTIONS**

## History and Background of Natural Hazards in Cache County

### **Flooding**

Portions of Cache County are at threat from both riverine and flash flooding. The Bear River flows through Cache Valley, which is located on the western side of the County, and is where the majority of residents live. Many small drainages feed the Bear River, with most streams converging at Cutler Marsh before exiting the valley via Cutler Dam, and into Box Elder County. The two main tributaries of the Bear River located in Cache County are the Logan and Blacksmith Fork Rivers. The Logan River is the largest tributary of the Bear. Other tributaries of the Bear that generally enter the valley through the eastern part of the county are Summit Creek, Little Bear River, Spring Creek, Cherry Creek, High Creek and the Cub River. All of these streams and rivers, to some degree, have had some history of flooding.

Phase II of the National Pollutant Discharge Elimination System (NPDES) administered by EPA has requirements for communities to more carefully manage their storm water discharge. While driven more by water quality concerns, this provides an important opportunity for communities to better manage their storm water systems. This is critically important because for many communities an ever increasing threat to residents comes from the potential for man-made canal failure flooding. As more development has occurred, existing irrigation canals have been increasingly relied on to accommodate storm water discharge. Irrigation officials are quick to point out that the canals were never designed for such use. Most canals have lower capacities and a narrowing channel the further you go down the canal. While this design makes sense for irrigation use, it is exactly the opposite of how you would design a canal to accommodate storm water discharge. The positions of many canals in Cache County also make them susceptible to blockage by debris or ice that can result in canal failure outflows. Cache County has had a couple of near misses in this regard. Another consideration is the connection between floods and landslides. As water saturation increases, mud/sediment/debris flows can be catastrophic.

In terms of potential damage to developed residential, commercial and industrial areas, the Logan & Blacksmith Fork Rivers pose the most significant threat for residents of Cache County. Both of these rivers drain large areas and have steep well defined stream channels. Flood level flows are produced when high temperatures occur during the early spring and accelerate the watershed snow melt rate. Often this threat can be escalated when combined with early spring rains.

A number of dams are located on the Logan River in the canyon upstream of the City of Logan. Due to their relatively small size, they do little to moderate flood potential for downstream development.

The Bear River enters Cache County on the north near Preston, Idaho. Winding through the valley it eventually enters Cutler Reservoir. The risk from rising flood waters of the Bear River through Cache County is relatively minor. Land located in the Bear River flood plain has a high water table which makes development difficult. Most of adjacent land near the Bear is used for agricultural purposes. Farmers and ranchers have seemingly adapted their agricultural activities to mitigate the cyclical high flows effects of the Bear River. Much of the adjacent agricultural uses along the Bear are operated under lease agreements with PacifiCorp who owns most of Cutler Reservoir.

In terms of historical flooding impact on development, most events have been documented on streams and rivers that drain the mountainous eastern portion of Cache County and flow into western Cache Valley. Most of the significant flooding that has historically impacted developed land has occurred on the Logan and Blacksmith Fork Rivers. However, noteworthy flooding has occurred on some of the smaller streams and creeks that enter the valley near the towns of Providence, Smithfield, and Richmond.

Localized flooding has been fairly common for many years. Damage from flooding has been relatively minor overall, but devastating to individual home and property owners. The majority of flooding in Cache County has occurred on agricultural land.

Following a development pattern like many other Utah and western communities, many early European settlements in Cache County were located near the mouths of canyons. Early settlers located there for easy access to water that could be diverted for irrigation of crops and pastures as well as fertile soils well suited for agriculture. Richmond, Smithfield, Logan, Providence Millville and Hyrum are all located near the mouths of canyons that drain some portion of the adjacent Bear River Range. The Logan River has the largest drainage basin next to the Bear at 524 square miles. The Blacksmith Fork drainage basin is the next largest at roughly 287 square miles.

Analysis of areas of Cache County mapped by FEMA for communities that participate in the National Flood Insurance Program indicate some conflict related to existing development located in what has been determined to be the 100-year floodplain. These delineated and digitized floodplains were overlaid onto current county parcel data. In this way, parcels with structures in the floodplain could be identified and tallied, and potential losses to life and property could be estimated.

While FEMA floodplains are a great planning tool for hazard mitigation, there is much of Cache County that has never been mapped by FEMA. An August 2003 report entitled Flood Hazard Identification Study: Bear River Association of Governments by the US Army Corps of Engineers was completed to help communities without floodplain data. This study generally identified areas of flooding concern for municipalities lacking data (See Appendix B for the full report). However, this report was only intended to give communities very general estimates of where flood risk may exist. Also, many flooding events happen outside of the FEMA 100-year floodplain delineations (around 40%). There are other ways that flooding occurs as well, such as canals, reservoirs/ponds, wildfire, incorrect grading, and plugged sewer and storm water systems (Scott Stoddard, personal communication, 11/13/08). FEMA is currently updating Cache County's floodplain data, which will be useful for communities in identifying their risk to floods. Below is a discussion of flooding risks

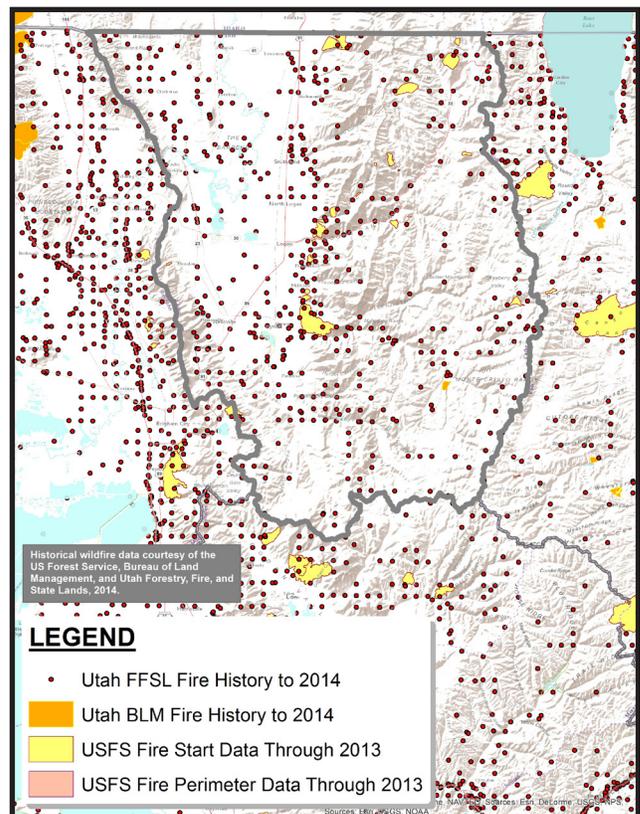
for communities in Cache County. Only those communities thought to be at risk for flooding have been included.

## Wildfires

Wildfire has always had an impact on Cache County inhabitants. In August of 2007, four wildfires burned hillsides east of Providence, River Heights, and Logan City fueled by dry grasses and juniper. Some people were evacuated from their homes while others were told to be ready just in case. Luckily, no homes were lost. To a certain extent, living with wildfires will always be a part living in Cache County.

Many of the communities in Cache County are located along the base of the Bear River Mountains in Cache Valley. Paradise, Millville, Providence, River Heights, Logan, North Logan, Hyde Park City, and Richmond all have wild land-urban interface or potential interface with wildfire high risk areas. Wellsville and Mendon on the east side of the valley have potential wildfire-urban conflict for development along the base of the Wellsville Mountains.

Below is a map showing historic wildfire locations in Cache County:



## **Landslides/Steep Slopes**

Landslide occurrences are common for portions of Cache County. The most frequent problems are associated with debris flows on alluvial fans in many of the canyon drainages. Also important to consider is the link between flooding and landslides. Saturated soils only add to the problems associated with landslides, and a combination of the flooding and landslides can be very destructive.

During the wet years of 1982 & 1983 an abnormally high numbers of landslides occurred in Cache County. A rather large land mass slid into the Porcupine Reservoir upstream of the right abutment. A slide near Nibley Road east of Hyrum occurred in the back yard of a residential home. A slide on College Hill below Utah State University blocked the Logan and Northern Irrigation Canal causing some limited flooding. The road up Millville Canyon was displaced 4 feet by a slide. A debris flow from Dry Creek above Smithfield reached the Logan, Hyde Park and Smithfield Canal (south of 300 South).

Debris flows present a significant threat for development located in the mouths of the many steep canyons located in Cache County. The dynamics of this threat changes depending on the upslope drainage conditions. Wildfire that removes sediment stabilizing vegetation can dramatically increase the risk of debris flows. The other indirect threat comes from canal flooding caused by debris flow blockage.

While there is no data that can predict landslide potential completely, the Utah Geological Survey created a landslide susceptibility map for the entire state in 2007. This is the most accurate data set to date, and was used for this analysis. However, the Utah Geological Survey is in the process of finalizing a more accurate geological hazards study specifically for Cache County. In the next update of this plan, the newer data could provide a more accurate potential loss analysis for geological hazards.

## **Earthquakes**

Cache County is located in a seismically active region within the Intermountain Seismic

Belt. The most damaging earthquake in Utah's post-European settlement history occurred near Richmond City. In 1962 a 5.7 magnitude earthquake damaged nearly three-fourths of the homes in the town. Damage to homes and buildings occurred in many surrounding areas of Cache Valley (Christenson, 1992). Some geological evidence suggests that an earthquake of seven plus magnitude has occurred in recent geological history on the West Cache Fault Zone. Logan City also suffered from a smaller earthquake of a 3.7 magnitude on July 21, 1950.

Three important fault zones exist in Cache County. The East Cache Fault bounding the eastern portion of Cache Valley, the West Cache Fault bounding the western valley, and the nearby Wasatch Fault. The majority of Cache County's population is located near the Eastern Cache Fault. Evidence points to the Temple Fork Fault as the most active in Cache County. Although miles away from the epicenter, this fault is thought to be associated with the 1962 Richmond Earthquake.

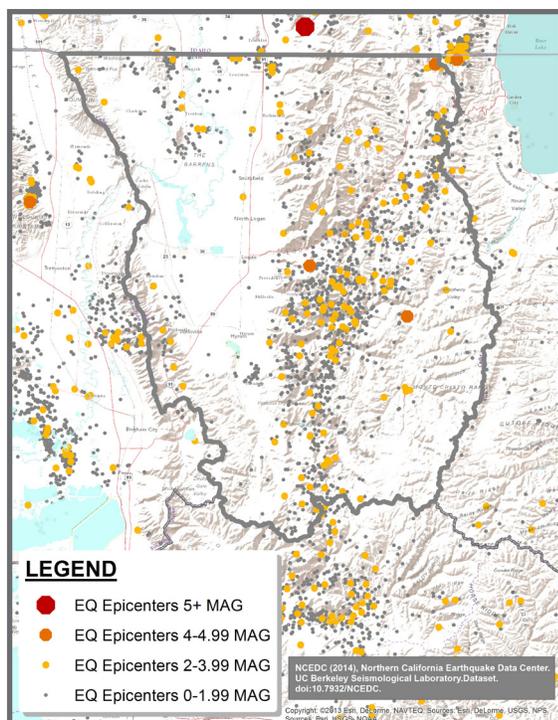
While a geological fault may not be very wide physically, damage around the fault can be detrimental. This is often referred to as the "damage zone (Susanne Janecke, personal communication, 9/25/08)." This damage zone is now thought to be much larger than recognized previously. While geologists used to recommend a general fault buffer of fifty feet on either side of the fault, they now recognize a much larger damage zone. According to the Utah Geological Survey, up thrown sides of well defined quaternary faults require planning for a 250 foot damage zone; while down thrown sides of well defined faults require planning for a 500 foot damage zone. For those faults not well defined, a general 1,000 foot damage zone should be considered (Richard Giraud, personal communication, 10/6/08; Christopher Duross, personal communication, 10/30/08; Christensen et al., 2003). Because of data inaccuracies in geologic fault data, a standard 1,000 foot damage zone was analyzed for all quaternary faults in the region.

Liquefaction is also a major concern for Cache County, as well as much of the Bear River Region. During an earthquake, soils susceptible to liquefaction such as those containing current

or historical stream and lake sandy deposits can threaten lives and damage homes and infrastructure (Utah Geological Survey, 2008). These soils can lift structures, tilt foundations, and cause major damage to infrastructure. Generally speaking, liquefaction susceptible areas in Cache County are along stream drainages and marsh/wetland areas. For this plan, two liquefaction studies were used for determining potential losses. One study was done by Utah State University and the Utah Geological Survey in 1994, and was digitized in 2001, which covered the entire county. The other was done in 2001 by the Utah Geological Survey at a more detailed scale, and only encompassed the more populated areas of the county.

The latter study is titled “Seismic-Hazard Mapping of the Central Cache Valley, Utah - A Digital Pilot Project” by McCalpin and Solomon. It provides more recent analysis and mapping of earthquake hazards for the Newton, Smithfield, Wellsville and Logan 7.5-minute USGS quadrangles. The information contained in this report is considered more accurate and the delineations more defensible.

Below is a map showing historic earthquake locations in Cache County:



## Dam Failure

There are 249 regulated dams located in Cache County. Most of these dams are small detention ponds, small agricultural reservoirs, or livestock watering facilities and most pose a minimal threat to human safety or property.

Of the 249 regulated dams most are designated as “low hazard” by the State of Utah Division of Water Rights. As defined by state statute, low hazard dams are those dams which, if they fail, would cause minimal threat to human life, and economic losses would be minor or limited to damage sustained by the owner of the structure.

A total of 3 dams have been designated as “moderate hazard” by the State of Utah in Cache County. Moderate Hazard dams which, if they fail, have a low probability of causing loss of human life, but would cause appreciable property damage, including damage to public utilities.

The State of Utah has rated 7 dams in Cache County as “high hazard” which means that, if they fail, have a high probability of causing loss of human life or extensive economic loss, including damage to critical public utilities.

Dam failure inundation maps and emergency action plans for each of the high risk dams can be found on the Utah Division of Water Right’s website at: <http://waterrights.utah.gov/cgi-bin/damview.exe?Startup>.

### *High Hazard Dams*

#### *Hyrum Dam*

Hyrum Dam and Reservoir are located directly south of Hyrum City on the Little Bear River. The dam is rated as a high hazard facility and the inundation area flows westerly towards Wellsville five miles away, and then into Cutler Marsh.

#### *Logan City – Dry Canyon*

This dam was newly constructed to mitigate flooding and potential from the Dry Canyon drainage. Many newer homes were constructed at the bottom of this canyon which can become flooded in the spring months. It is high risk, and many homes west of the dam could be damaged if

the dam was breached.

*Logan First Dam*

This facility located near the mouth of Logan Canyon has a high hazard rating. The inundation area consists of most of the Island area, much of the landscape around the Logan River Golf Course and County Fairgrounds, and continuing west towards Cutler Reservoir. There is a significant population as well as large numbers of homes and businesses within the inundation area.

*Porcupine Dam*

Porcupine Dam is located about eight miles upriver from the town of Paradise on the east fork of the Little Bear River. The dam has a high hazard rating. There is no inundation map associated with this dam. This dam was recently drained and some reinforcement work performed.

*Newton Dam*

Newton dam was constructed by the Bureau of Reclamation on Clarkston Creek three miles north of the town of Newton. This facility has a high hazard rating. There is no inundation map associated with this dam.

*Tony Grove Lake Dam*

This dam was renovated several years ago for seismic retrofitting and inlet/outlet construction. It has a high hazard rating, but would not likely affect any residential or commercial structures in the event of a failure.

*Blacksmith Fork Upper Dam*

No information available

Natural Hazard Profiles

**Table 49:** Cache County Flood Hazard Profile

<b>Frequency</b>	Some flooding occurs nearly every year in Cache County
<b>Severity</b>	Moderate
<b>Location</b>	Generally along rivers, streams, and canals.
<b>Seasonal Pattern</b>	Spring flooding as a result of snowmelt. Mid-late summer cloudburst events.
<b>Duration</b>	A few hours or up to three weeks for snowmelt flooding
<b>Speed of Onset</b>	1-6 hours
<b>Probability of Future Occurrences</b>	High - for delineated floodplains there is a 1% chance of flooding in any given year.

**Table 50:** Cache County Wildfire Hazard Profile

<b>Frequency</b>	Annually (to some extent)
<b>Severity</b>	Severe
<b>Location</b>	Mostly along the Bear River Mountains east of Cache Valley or the Wellsville Mountains west of Cache Valley.
<b>Seasonal Pattern</b>	Generally the worst from early July to mid September (depends on drought conditions)
<b>Duration</b>	A few hours to two weeks
<b>Speed of Onset</b>	1-12 hours
<b>Probability of Future Occurrences</b>	High (Based on data from 1973-2008, there is an 11.4% chance a fire of at least 1,000 acres will occur every year)

**Table 51:** Cache County Landslide/Steep Slopes Hazard Profile

<b>Frequency</b>	Periodic
<b>Severity</b>	Moderate
<b>Location</b>	Generally located in areas with steeper slopes. Debris flows mostly occur at the mouth of canyon drainages.
<b>Seasonal Pattern</b>	Generally the worst in the wetter spring months.
<b>Duration</b>	Up to two weeks
<b>Speed of Onset</b>	No warning
<b>Probability of Future Occurrences</b>	High

**Table 52:** Cache County Earthquake Hazard Profile

<b>Frequency</b>	Low magnitude events occur frequently. Larger magnitude events are rare (although not necessarily on geological time).
<b>Severity</b>	Potentially Catastrophic
<b>Location</b>	Entire county with highest frequency in the Bear River Mountain Range. Surface fault rupture is likely to occur in fault zones, and liquefaction would impact large areas of land in the lower elevations.
<b>Seasonal Pattern</b>	None
<b>Duration</b>	A few minutes with potential aftershocks
<b>Speed of Onset</b>	No warning
<b>Probability of Future Occurrences</b>	Based on 1962-2001 data, there is a 20.5% chance every year of an earthquake of 3.0 magnitude or greater.

**Table 53:** Cache County Dam Failure Hazard Profile

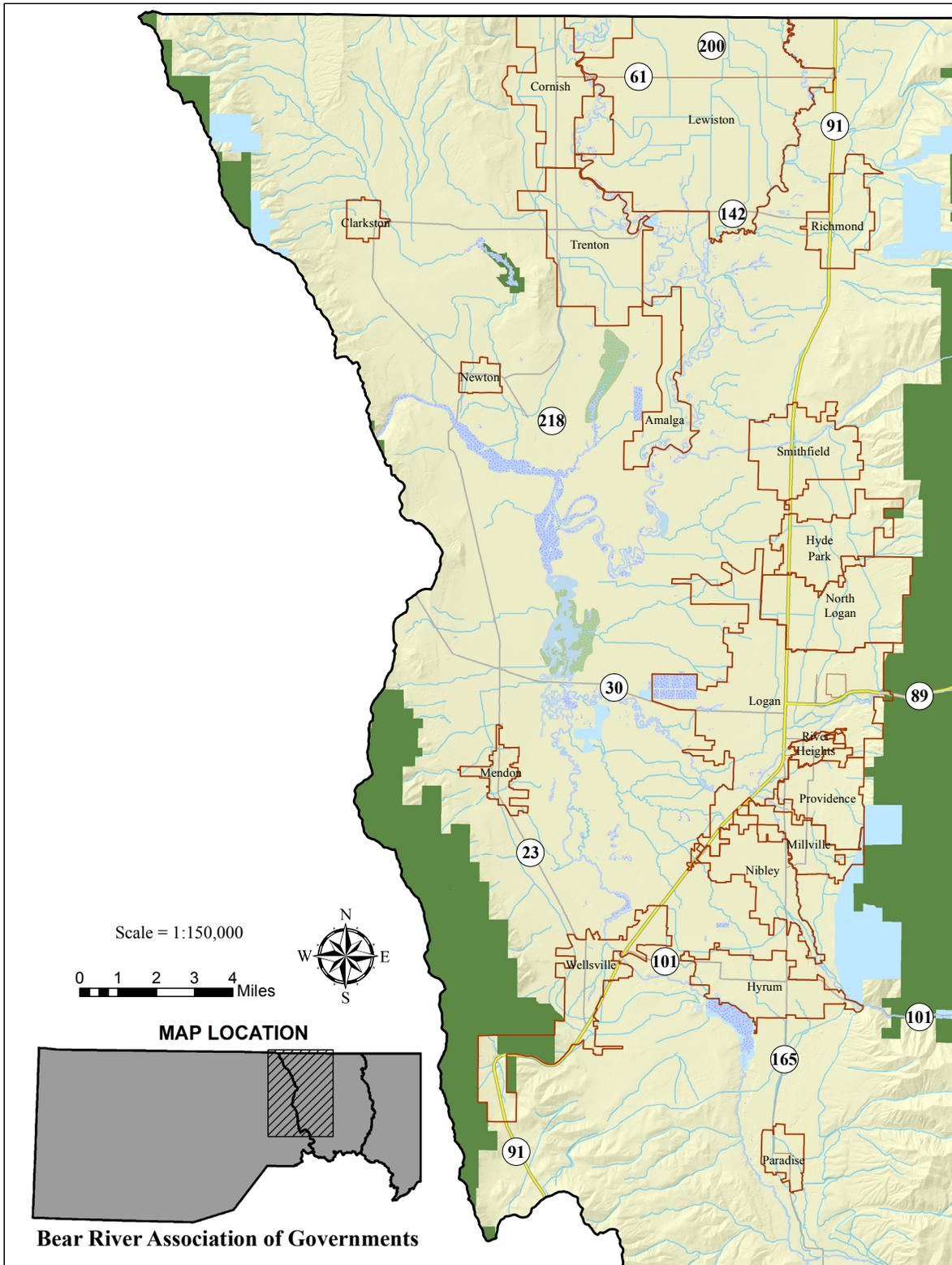
<b>Frequency</b>	Rare
<b>Severity</b>	Potentially Catastrophic
<b>Location</b>	Areas downstream of failed dam.
<b>Seasonal Pattern</b>	Anytime. Highest risk in spring during snowmelt.
<b>Duration</b>	A few hours
<b>Speed of Onset</b>	No warning
<b>Probability of Future Occurrences</b>	Low

Repetitive Loss Properties

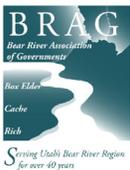
As of February 4, 2015, there were seven repetitive loss properties in the unincorporated area of Cache County, five of which were BCX Claims (FEMA, 2015). **Type of losses?**

**COUNTY-WIDE NATURAL HAZARD MAPS**

(Please see pages 6-140 to 6-148)



Bear River Association of Governments



Data Source: County and municipal boundaries, roads, streams, and lakes maintained by Utah AGRC. Land ownership layer from Utah School & Institutional Trust Lands Administration (SITLA), 2010.

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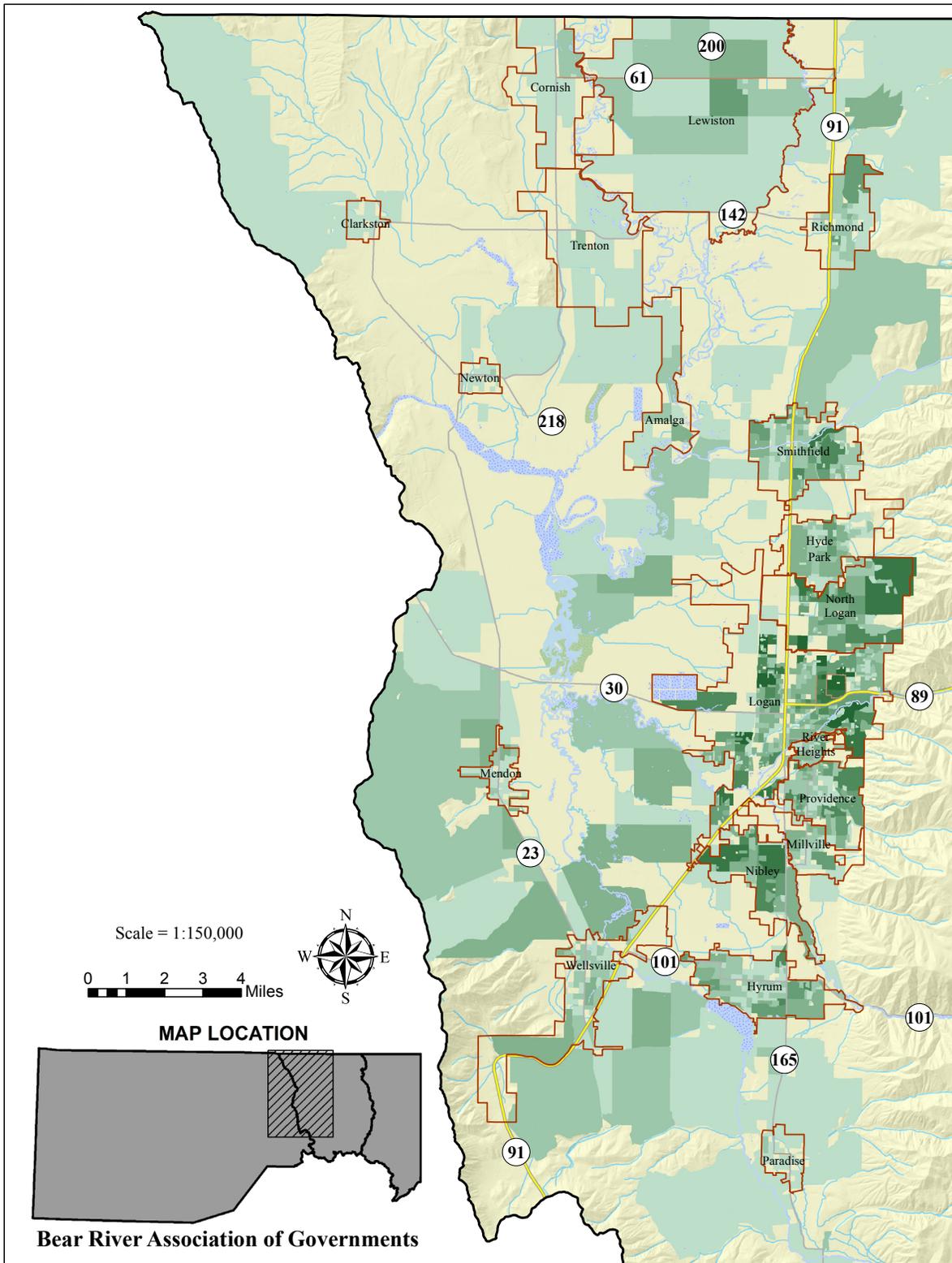
**Legend**

- County Boundary
- Municipal Boundaries
- Major Roads
- Streams
- Lakes

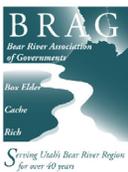
**Land Ownership**

- Private
- State Lands
- Federal Lands

**CACHE COUNTY - Land Ownership**



Bear River Association of Governments



Data Source: County and municipal boundaries, roads, streams, and lakes maintained by Utah AGRC. County population was derived from US Census Bureau, 2010.

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**Legend**

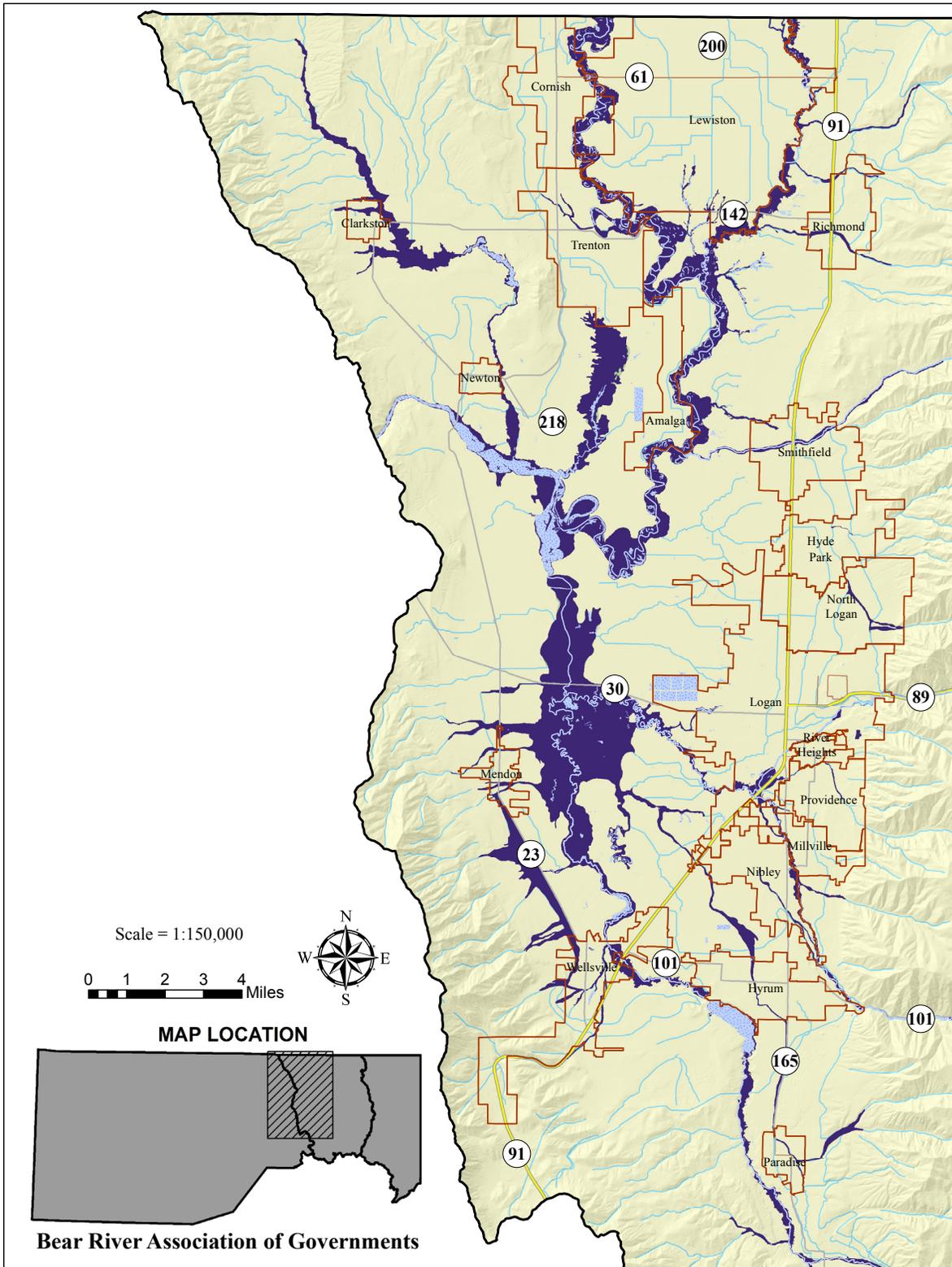
- County Boundary
- Municipal Boundaries
- Major Roads
- Streams
- Lakes

**Population Density**

\*Persons per census block

	0 - 15		143 - 229
	15 - 44		229 - 357
	44 - 83		357 - 605
	83 - 143		605 - 1067

**CACHE COUNTY - Population Density**



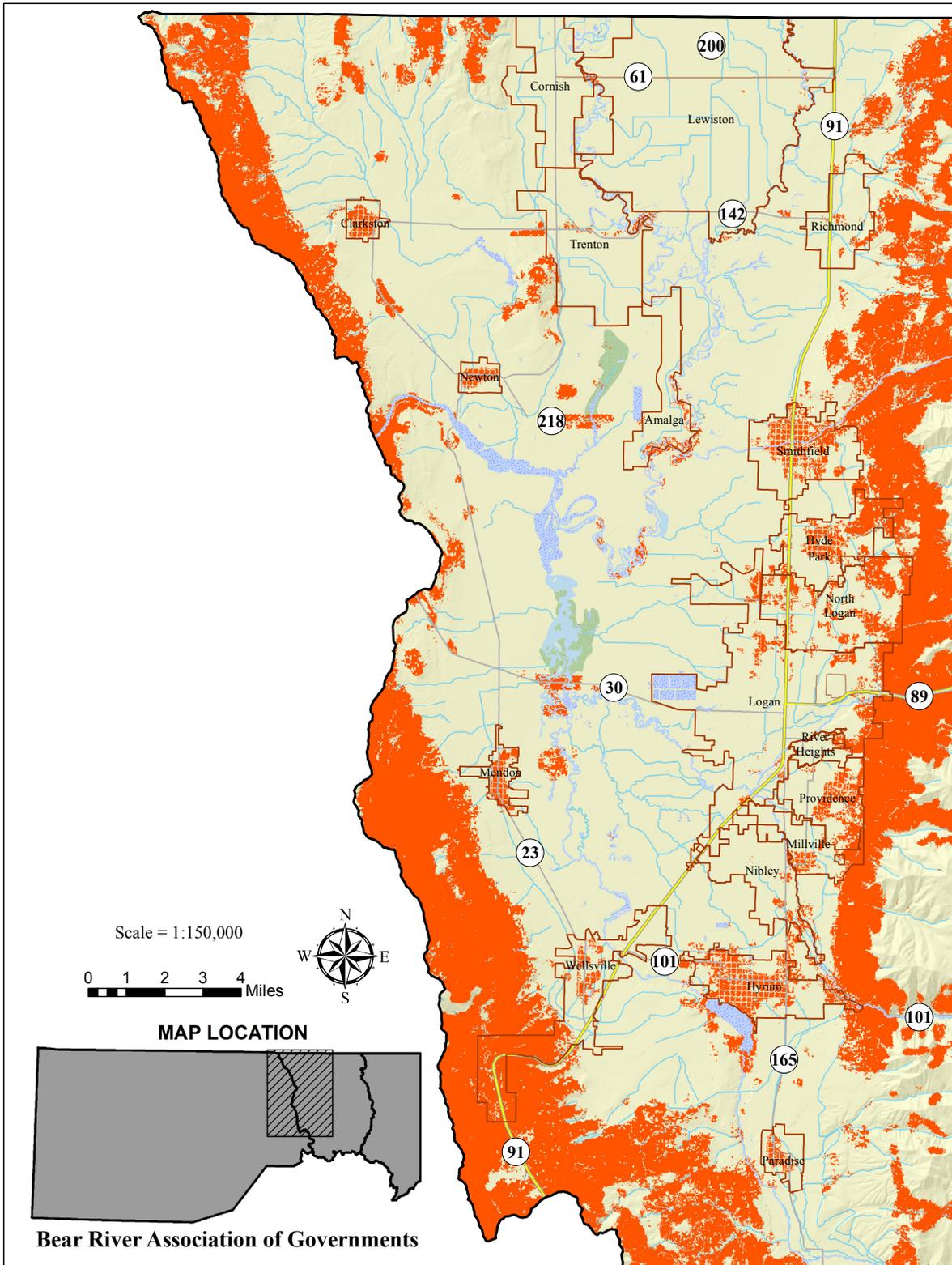
Data Source: County and municipal boundaries, roads, streams, and lakes maintained by Utah AGRC. Flood layer digitized from FEMA FIRM maps, 2010.

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**Legend**

- County Boundary
- Municipal Boundaries
- Major Roads
- Streams
- Lakes
- FEMA Flood Zone

**CACHE COUNTY - FEMA Flood Zone**



Bear River Association of Governments



Data Source: County and municipal boundaries, roads, streams and lakes maintained by Utah AGRC. Fire hazard data from the Oregon Department of Forestry study "West Wide Wildfire Risk Assessment, 2013". Combines moderate to high wildfire risk based on the Fire Risk Index (FRI).

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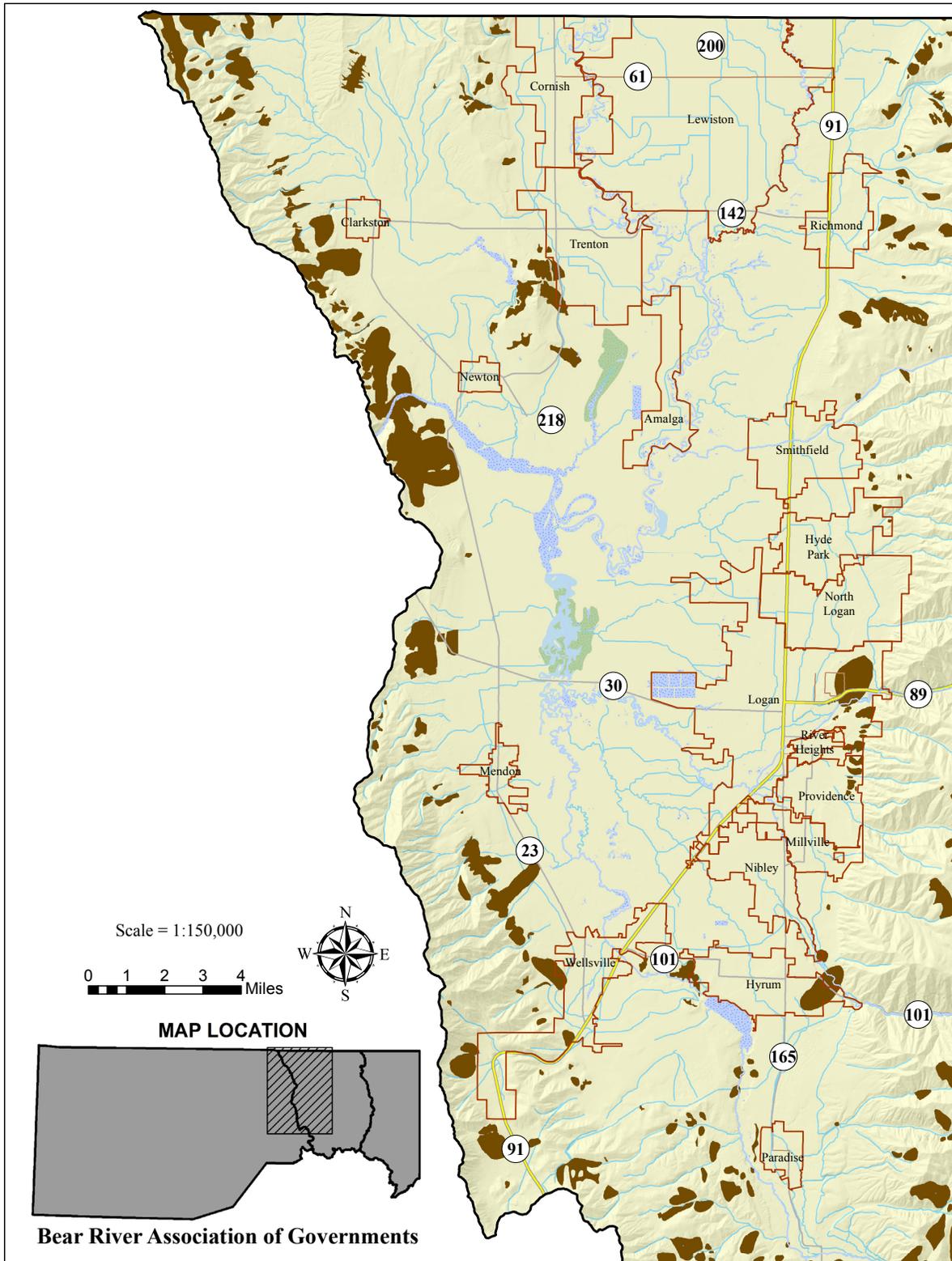
**Legend**

- County Boundary
- Municipal Boundaries
- Major Roads
- Streams
- Lakes

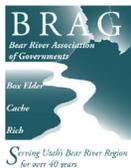
**Fire Risk**

- Moderate to High

**CACHE COUNTY - Wildfire Hazard**



**Bear River Association of Governments**



Data Source: County and municipal boundaries, roads, streams, and lakes maintained by Utah AGRC. Data obtained from the Utah Geological Survey showing landslide deposits, landslide scarps, and debris-flow travel paths, 2010.

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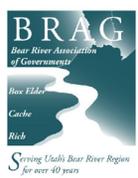
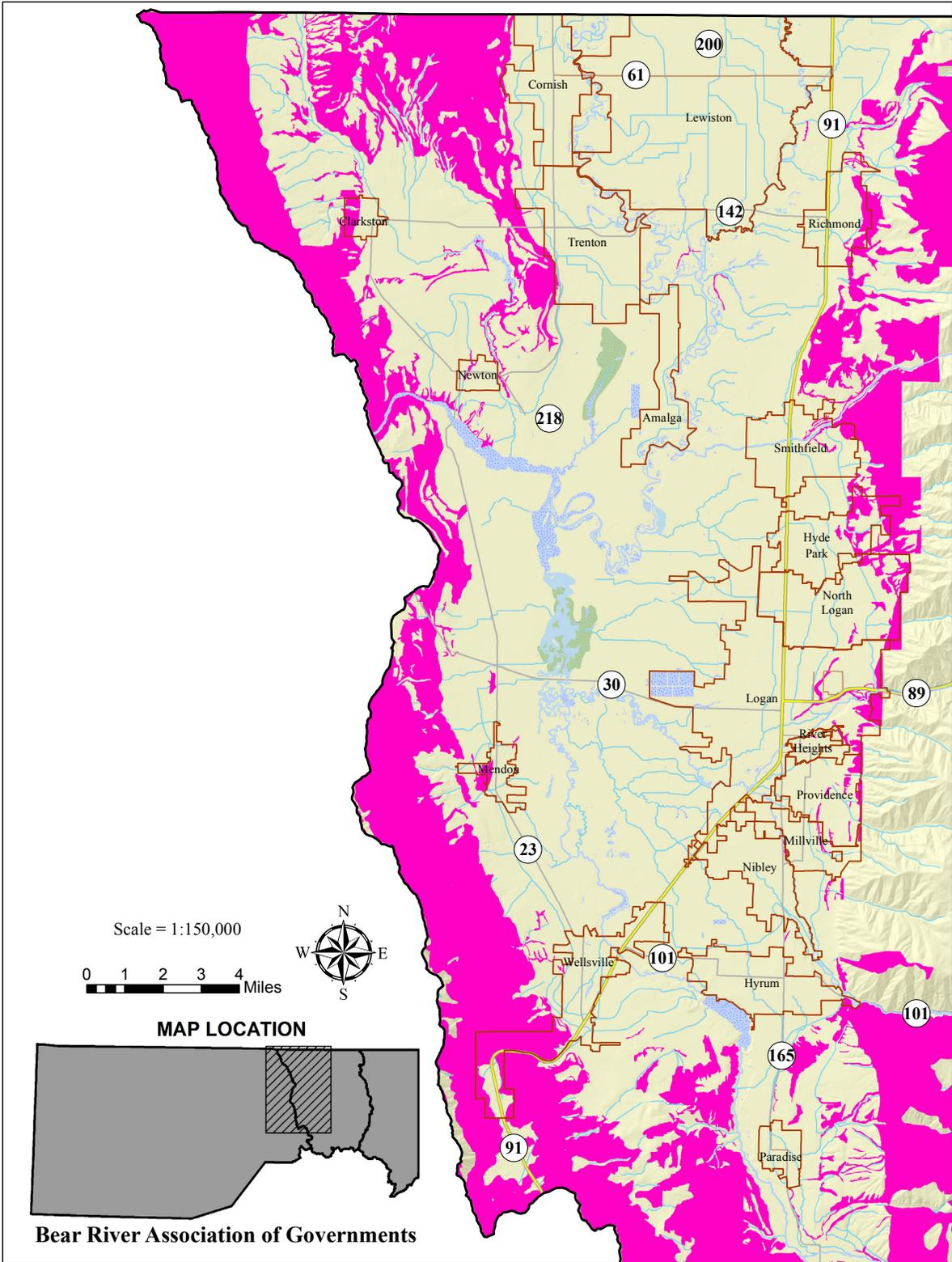
**Legend**

- County Boundary
- Municipal Boundaries
- Major Roads
- Streams
- Lakes

**Landslides**

- Deposits, scarps, and debris-flow travel paths

**CACHE COUNTY - Landslides**



Data Source: County and municipal boundaries, roads, streams, and lakes maintained by Utah AGRC. Steep slopes derived from NRCS SSURGO Soils Database 2013 - 20% slope and higher.

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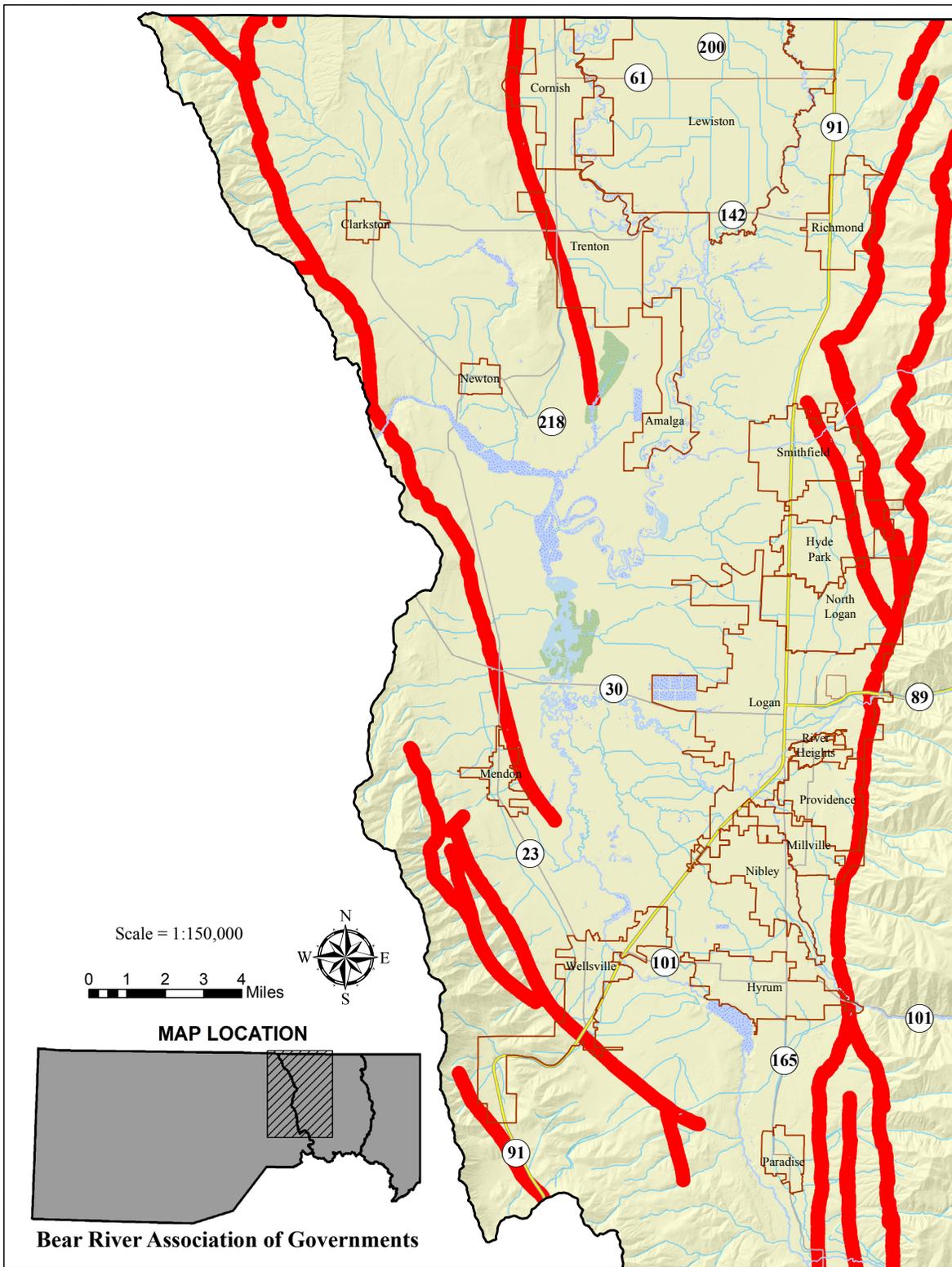
**Legend**

- County Boundary
- Municipal Boundaries
- Major Roads
- Streams
- Lakes

**Steep Slopes**

- 20% slope and higher

**CACHE COUNTY - Step Slopes**



**Bear River Association of Governments**



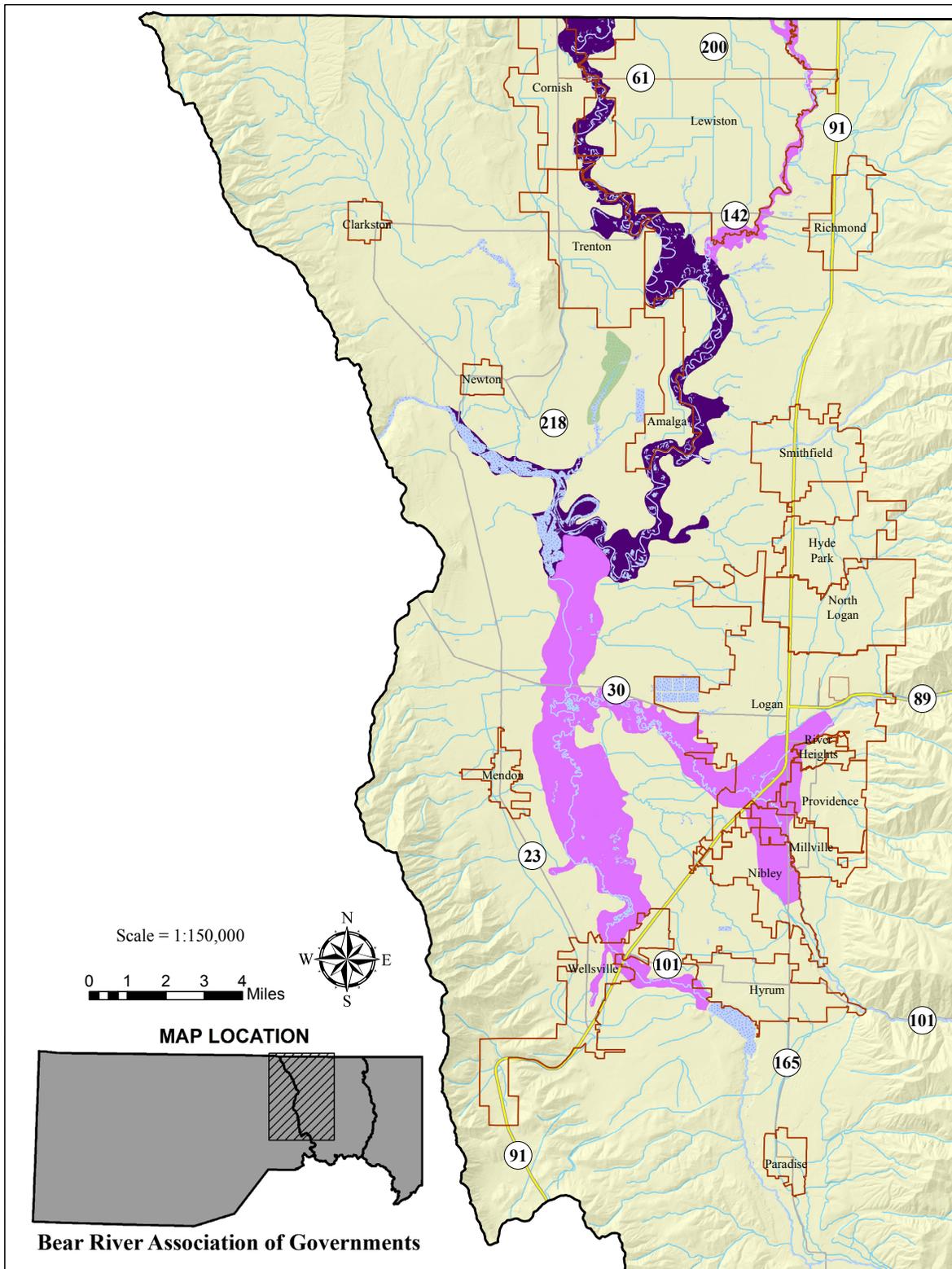
Data Source: County and municipal boundaries, roads, streams, and lakes maintained by Utah AGRC. Quaternary faults and folds were taken from the U.S. Geological Survey, 2004. Buffers of 1000 feet on both sides of faults/folds were considered damage zones for this analysis.

The information on this map was derived from digital databases by BRAG GIS. Care was taken in the creation of this map but is provided "as is." BRAG cannot accept any responsibility for any errors, omissions, or positional accuracy, and therefore, there are no warranties which accompany this product. Although information from land surveys may have been used in the creation of this product, in no way does this product represent a land survey. Users are cautioned to field verify information in this product before making any decisions.

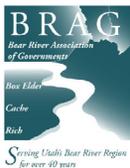
**Legend**

- County Boundary
- Municipal Boundaries
- Major Roads
- Streams
- Lakes
- Quaternary Fault Damage Zones

**CACHE COUNTY - Geological Faults**



**Bear River Association of Governments**



Data Source: County and municipal boundaries, roads, streams, and lakes maintained by Utah AGRC. Liquefaction potential was digitized and published by the Utah AGRC, 2001.

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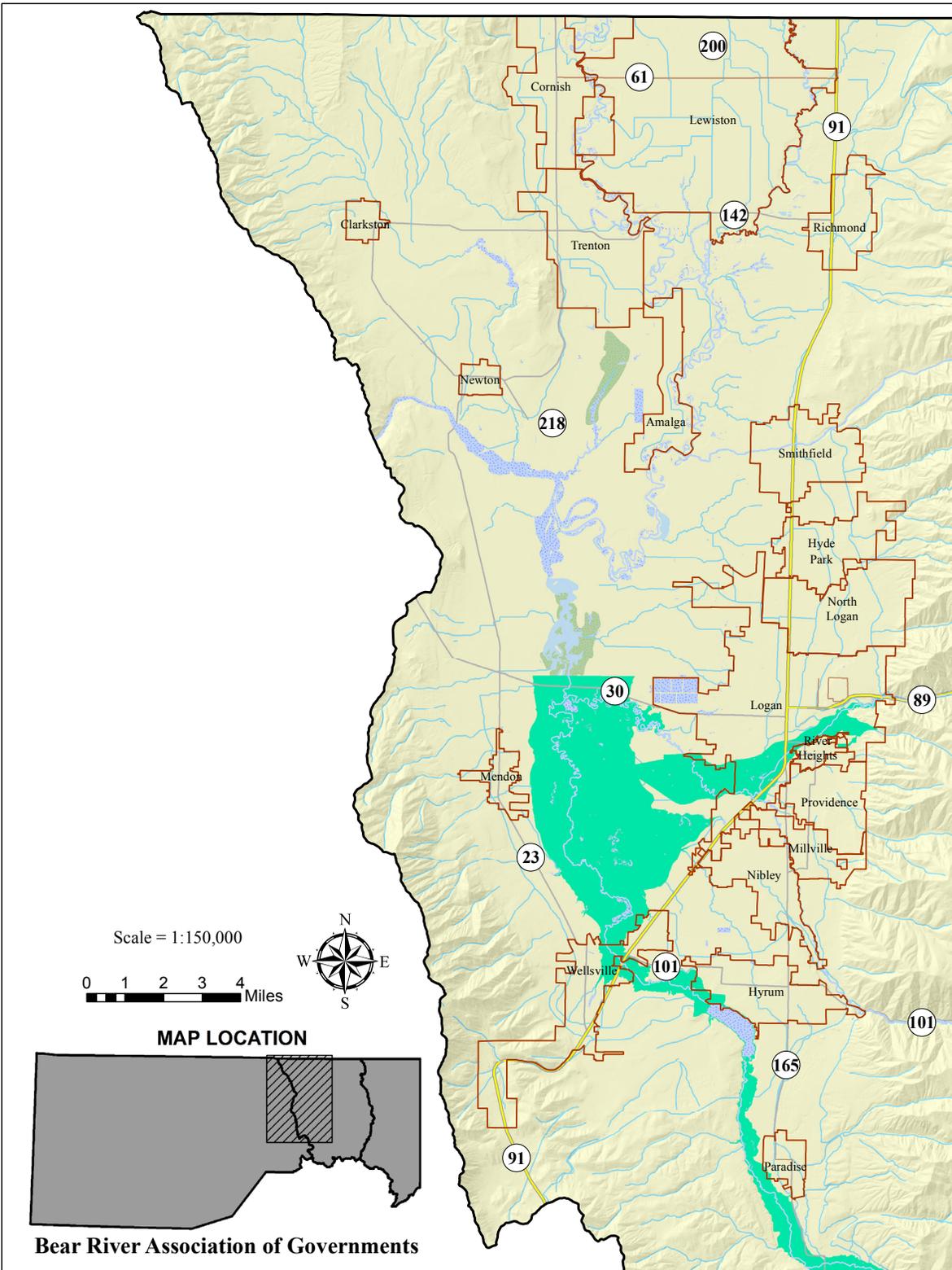
**Legend**

- County Boundary
- Municipal Boundaries
- Major Roads
- Streams
- Lakes

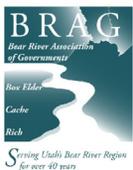
**Liquefaction Potential**

- Moderate to High
- High

**CACHE COUNTY - Liquefaction Potential**



Bear River Association of Governments



Data Source: County and municipal boundaries, roads, streams, and lakes maintained by Utah AGRC. Dam inundation areas provided by Utah Division of Water Rights, 2008.

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**Legend**

- County Boundary
- Municipal Boundaries
- Major Roads
- Streams
- Lakes

**Dam Inundation Areas**

- Probable Maximum Flood area resulting from complete dam failure.

**CACHE COUNTY - Dam Failure**

**COMMUNITY SECTIONS: NATURAL HAZARDS, POTENTIAL LOSSES, AND MITIGATION STRATEGIES**

**AMALGA**

Analysis of hazard risk involving the community of Amalga revealed that there is potential risk resulting from **flood, liquefaction, and wildfire**. These hazards have varying potential to impact life, property, infrastructure, agriculture, and environmental features within the municipal boundary. Currently, liquefaction and wildfire hazards have the greatest potential to impact the community based on potential loss values. See *the following tables* for more detailed descriptions of potential losses associated with each natural hazard analyzed in the risk assessment.

**Table 54:** Amalga Potential Loss Figures

<b>Amalga, UT, Residential &amp; Commercial Development at Risk</b>						
<b>Hazard Type</b>	<b>~Residents at Risk*</b>	<b>Residential Units at Risk</b>		<b>Commercial Units at Risk</b>		
		<b># Units</b>	<b>\$ Value**</b>	<b># Units</b>	<b>\$ Value**</b>	<b>\$ Potential Revenue Loss***</b>
Dam Failure	0	0	0	0	0	0
Faults	0	0	0	0	0	0
Wildfire	81	25	6,435,339	2	9,628,847	1,377,434
Flood	49	15	2,218,090	3	9,725,007	2,066,151
Liquefaction	94	29	7,348,420	4	9,740,432	2,754,868
Landslide	0	0	0	0	0	0
Slope	0	0	0	0	0	0
Poorly Drained Soils	0	0	0	0	0	0

\* Based on average persons per owner household for Cache County from 2013 American Community Survey, which is 3.24.  
 \*\* Current Market Value per parcel, including building and land values. Data was provided by Cache County IT personnel.  
 \*\*\* Based on average sales, receipts, or value of shipments of firms with or without paid employees, per firm (\$688,717 per firm). Derived from 2007 Survey of Business Owners for Cache County, US Census Bureau.

**Natural Hazards**

**Current Development**

**Flood.** Hazard mapping identifies flood risk areas along the northern, eastern, and southern municipal boundary, adjacent to the Bear River.

**Liquefaction.** Hazard mapping identifies high liquefaction risk along the northern, eastern, and southern municipal boundary, adjacent to the Bear River.

**Wildfire.** Hazard mapping identifies moderate-to-high wildfire risk along the southern and southeastern municipal boundary.

**Future Development**

No concerns involving potential future development within Amalga were reported by town representatives.

<b>Amalga, UT, Infrastructure at Risk</b>										
<b>Hazard Type</b>	<b>Infrastructure at Risk</b>									
	<b>Railroad Lines</b>		<b>Natural Gas Lines</b>		<b>Electrical Power lines</b>		<b>Roads</b>		<b>Canals</b>	
	<b># of Miles</b>	<b>\$ Value<sup>1</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>2</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>3</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>4</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>5</sup></b>
Dam Failure	0	0	0	0	0	0	0	0	0	0
Faults	0	0	0	0	0	0	0	0	0	0
Wildfire	0	0	0	0	0.2	25,400	0.43	225,750	0.04	60,000
Flood	0	0	0.15	210,000	0.3	38,100	0.3	157,500	0	0
Liquefaction	0	0	0.16	224,000	0.59	74,930	11.66	6,121,500	1.06	1,590,000
Landslide	0	0	0	0	0	0	0	0	0	0
Slope	0	0	0	0	0	0	0	0	0	0
Poorly Drained Soils	0	0	0	0	0	0	0	0	0	0

<sup>1</sup> Based on figures from 2009 Pre-Disaster Mitigation Plan for Bear River Region, Utah.  
<sup>2</sup> Based on average replacement cost estimates for gas lines ranging from 2-inches-20 inches in diameter. These cost are based solely on labor and material costs, and may vary based on time, scope, and site specific variations (Questar, May 2015).  
<sup>3</sup> Based on estimates from Logan Light and Power, 2015.  
<sup>4</sup> Based on estimates derived from an average 28' wide, 4" thick asphalt county road with gravel subgrade replacement. Cache County, 2015.  
<sup>5</sup> Based recent Cache County and regional project cost estimates, 2015.

<b>Amalga, UT, Critical Facilities at Risk</b>					
<b>Hazard Type</b>	<b>Critical Facilities Types</b>				
	<b>Emergency Services/Law Enforcement</b>	<b>Schools/Public Facilities</b>	<b>Health Care Facilities</b>	<b>Places of Worship</b>	<b>Infrastructure</b>
Dam Failure					
Faults					
Wildfire					1 Broadband Anchor
Flood					1 Bridge
Liquefaction	1 Fire Station			1 Place of Worship	1 Bridge, 2 Dams, 2 Broadband Anchors
Landslide					
Slope					
Poorly Drained Soils					

Note: Critical facilities were identified using multiple data sources including: Utah AGRC, UDOT, Utah Division of Water Resources, and public and community leader input.

<b>Amalga, UT, Agricultural Features at Risk</b>					
<b>Hazard Type</b>	<b>Lands at Risk</b>			<b>Farms &amp; Barns****</b>	
	<b>Agriculture Production*</b>	<b>Farm Land**</b>	<b>Grazing***</b>	<b>Century Farms</b>	<b>Historic Barns</b>
	<b># of Acres</b>			<b># of Farms</b>	<b># of Barns</b>
Dam Failure	0	0	0	0	0
Faults	0	0	0	0	0
Wildfire	115.87	126.01	0	0	0
Flood	282.28	261.97	0	0	0
Liquefaction	344.68	353.37	0	0	0
Landslide	0	0	0	0	0
Slope	0	0	0	0	0
Poorly Drained Soils	0	0	0	0	0

\* Lands that are currently associated with agricultural activities involving water related land use, as described in the 2007 Utah Division of Water Resources, *Water Related Land Use* dataset.  
 \*\*Lands that are suitable for farming purposes based on soil type and composition, as describe in the 2013 Natural Resource Conservation Service, SSURGO datasets.  
 \*\*\* Lands currently associated with grazing allotments identified as part of the Grazing Improvement Program (Utah AGRC, 2012)  
 \*\*\*\* Based on data compiled by the Bear River Association of Governments.

<b>Amalga, UT, Environmental &amp; Recreational Features at Risk</b>						
<b>Hazard Type</b>	<b>Environmental Features at Risk</b>			<b>Recreational Features at Risk</b>		
	<b>Wetland/ Riparian</b>	<b>Lakes</b>	<b>Streams</b>	<b>Parks</b>	<b>Trails</b>	<b>Amenities</b>
	<b># of Acres</b>		<b># of Miles</b>	<b># of Acres</b>	<b># of Miles</b>	<b># of Amenities</b>
Dam Failure	0	0	0	0	0	0
Faults	0	0	0	0	0	0
Wildfire	71.89	24.83	0.94	0.8	0	0
Flood	174.63	0	2.19	0	0	0
Liquefaction	179.77	64.09	3.57	0	0	0
Landslide	0	0	0	0	0	0
Slope	0	0	0	0	0	0
Poorly Drained Soils	0	0	0	0	0	0

Note: Total acres of land and miles of streams and trails were identified using multiple datas sources including: Utah AGRC, U.S. Fish and Wildlife Service, U.S. Forest Service, U.S. Geological Survey, Utah Division of Water Resources, and public and community leader input.

**Hazard Mitigation Strategies**

*for this plan update.*

\*Amalga Town did not provide mitigation strategies

**CACHE COUNTY  
(UNINCORPORATED)**

Analysis of hazard risk in the unincorporated portions of Cache County revealed that there is potential risk resulting from all hazards analyzed in the risk assessment that includes **dam failure, earthquake, flood, landslides, liquefaction, steep slopes and wildfire**. These hazards have varying potential to impact life, property, infrastructure, agriculture, and environmental features in the unincorporated areas of the county. See *the following tables* for more detailed descriptions of potential losses associated with each natural hazard analyzed in the risk assessment.

**Table 55:** Cache County Potential Loss Figures

**Natural Hazards**

**Current Development**

**Dam Failure.** Hazard mapping identifies dam failure risk in the Logan River drainage west of Logan City, The East Fork of the Little Bear River drainage and areas surrounding Avon and along the west side of Paradise to Hyrum Reservoir, below Hyrum Dam in the Little Bear River drainage above and below Wellsville, and almost all of the low elevation areas in between Logan, Nibley, Wellsville, and Mendon north to Valley View Highway.

**Earthquake.** Hazard mapping identifies several structures and businesses at risk from surface fault rupture. Areas of concern are generally the fol-

Cache County, UT, Residential & Commercial Development at Risk						
Hazard Type	~Residents at Risk*	Residential Units at Risk		Commercial Units at Risk		
		# Units	\$ Value**	# Units	\$ Value**	\$ Potential Revenue Loss***
Dam Failure	1,322	408	113,248,277	52	18,028,129	35,813,284
Faults	868	268	86,159,991	48	15,489,782	33,058,416
Wildfire	1,623	501	142,234,489	99	89,400,821	68,182,983
Flood	1,626	502	166,902,523	85	46,168,990	58,540,945
Liquefaction	1,047	323	83,138,583	70	50,248,603	48,210,190
Landslide	804	248	68,481,217	48	15,350,996	33,058,416
Slope	1,649	509	137,370,489	66	21,395,491	45,455,322
Poorly Drained Soils	0	0	0	0	0	0

\* Based on average persons per owner household for Cache County from 2013 American Community Survey, which is 3.24.

\*\* Current Market Value per parcel, including building and land values. Data was provided by Cache County IT personnel.

\*\*\* Based on average sales, receipts, or value of shipments of firms with or without paid employees, per firm (\$688,717 per firm). Derived from 2007 Survey of Business Owners for Cache County, US Census Bureau.

**Table -- : Cache County, UT, Infrastructure at Risk**

Hazard Type	Infrastructure at Risk									
	Railroad Lines		Natural Gas Lines		Electrical Power lines		Roads		Canals	
	# of Miles	\$ Value <sup>1</sup>	# of Miles	\$ Value <sup>2</sup>	# of Miles	\$ Value <sup>3</sup>	# of Miles	\$ Value <sup>4</sup>	# of Miles	\$ Value <sup>5</sup>
Dam Failure	2.07	3,105,000	1.47	2,058,000	0.1	12,700	62.37	32,744,250	20.1	30,150,000
Faults	2.97	4,455,000	6.65	9,310,000	11.02	1,399,540	102.2	53,644,500	18.82	28,230,000
Wildfire	4.14	6,210,000	5.4	7,560,000	8.19	1,040,130	90.27	47,391,750	10.04	15,060,000
Flood	1.6	2,400,000	3.07	4,298,000	2.97	377,190	49	25,725,000	22	33,000,000
Liquefaction	43.17	64,755,000	12.23	17,122,000	43.97	5,584,190	687.9	361,168,500	14.46	21,690,000
Landslide	1.69	2,535,000	8.26	11,564,000	5.81	737,870	211	110,754,000	2.67	4,005,000
Slope	2.21	3,315,000	15.57	21,798,000	12.94	1,643,380	309.2	162,351,000	11.98	17,970,000
Poorly Drained Soils	0	0	0	0	0	0	0	0	0	0

<sup>1</sup> Based on figures from 2009 Pre-Disaster Mitigation Plan for Bear River Region, Utah.

<sup>2</sup> Based on average replacement cost estimates for gas lines ranging from 2-inches-20 inches in diameter. These cost are based solely on labor and material costs, and may vary based on time, scope, and site specific variations (Questar, May 2015).

<sup>3</sup> Based on estimates from Logan Light and Power, 2015.

<sup>4</sup> Based on estimates derived from an average 28' wide, 4" thick asphalt county road with gravel subgrade replacement. Cache County, 2015.

<sup>5</sup> Based recent Cache County and regional project cost estimates, 2015.

**Cache County, UT, Critical Facilities at Risk**

Hazard Type	Critical Facilities Types				
	Emergency Services/Law Enforcement <sup>1</sup>	Schools/Public Facilities <sup>2</sup>	Health Care Facilities <sup>3</sup>	Places of Worship <sup>4</sup>	Infrastructure <sup>5</sup>
Dam Failure				1 place of worship	13 bridges, 1 broadband anchor, 7 dams
Faults					4 bridges, 1 broadband anchor, 10 dams
Wildfire					
Flood					27 bridges, 1 broadband anchor, 9 dams
Liquefaction		JBS Hyrum City, Uinta Academy	Dignified Living CV	4 places of worship	Hyrum sewer plant, 1 electrical substation, 33 bridges, 6 broadband anchors, 81 dams
Landslide					40 dams
Slope					1 bridge, 19 dams
Poorly Drained Soils		JBS Hyrum City		1 place of worship	6 bridges, 19 dams, 1 electrical substation

Note: Critical facilities were identified using multiple data sources including: Utah AGRC, UDOT, Utah Division of Water Resources, and public and community leader input.

<b>Table -- : Cache County, UT, Agricultural Features at Risk</b>					
<b>Hazard Type</b>	<b>Lands at Risk</b>			<b>Farms &amp; Barns****</b>	
	<b>Agriculture Production*</b>	<b>Farm Land**</b>	<b>Grazing***</b>	<b>Century Farms</b>	<b>Historic Barns</b>
	<b># of Acres</b>			<b># of Farms</b>	<b># of Barns</b>
Dam Failure	12,275.74	14,415.26	68.42	4.00	0.00
Faults	10,805.24	10,199.03	7,877.60	1.00	0.00
Wildfire	6,234.60	5,904.18	17,505.05	2.00	2.00
Flood	12,495.13	14,966.97	77.81	2.00	2.00
Liquefaction	12,219.20	14,615.41	0.00	2.00	1.00
Landslide	5,348.90	3,153.56	55,683.71	2.00	1.00
Slope	18,587.52	0.00	30,295.83	1.00	1.00
Poorly Drained Soils	0.00	0.00	0.00	0.00	0.00

\* Lands that are currently associated with agricultural activities involving water related land use, as described in the 2007 Utah Division of Water Resources, *Water Related Land Use* dataset.  
 \*\*Lands that are suitable for farming purposes based on soil type and composition, as describe in the 2013 Natural Resource Conservation Service, SSURGO datasets.  
 \*\*\* Lands currently associated with grazing allotments identified as part of the Grazing Improvement Program (Utah AGRC, 2012)  
 \*\*\*\* Based on data compiled by the Bear River Association of Governments.

<b>Table -- : Cache County, UT, Environmental &amp; Recreational Features at Risk</b>						
<b>Hazard Type</b>	<b>Environmental Features at Risk</b>			<b>Recreational Features at Risk</b>		
	<b>Wetland/ Riparian</b>	<b>Lakes</b>	<b>Streams</b>	<b>Parks</b>	<b>Trails</b>	<b>Amenities</b>
	<b># of Acres</b>		<b># of Miles</b>	<b># of Acres</b>	<b># of Miles</b>	<b># of Amenities</b>
Dam Failure	7,451.87	679.03	139.68	60.53	6.36	3.00
Faults	744.53	63.43	185.17	2.76	80.66	2.00
Wildfire	1,917.97	178.13	392.90	78.77	124.36	21.00
Flood	16,814.74	0.00	301.15	119.83	3.17	4.00
Liquefaction	13,917.80	1,988.15	182.56	49.42	0.00	0.00
Landslide	420.33	118.97	356.33	4.15	302.66	5.00
Slope	470.10	56.79	665.00	74.62	139.13	2.00
Poorly Drained Soils	0.00	0.00	0.00	0.00	0.00	0.00

Note: Total acres of land and miles of streams and trails were identified using multiple datas sources including: Utah AGRC, U.S. Fish and Wildlife Service, U.S. Forest Service, U.S. Geological Survey, Utah Division of Water Resources, and public and community leader input.

lowing: Southeast of Wellsville almost in a straight line to Paradise, southeast and northeast of Paradise, east of Smithfield and Richmond, northeast of Richmond, west of Newton and north of Mendon, southwest of Mendon, and scattered cabins and homes in Ant Flats and in various other unincorporated areas.

**Flood.** The unincorporated areas of Cache County have many structures located in the 100-year floodplain. Generally, as can be expected, these structures are located in drainage areas along the Little Bear, Blacksmith Fork, Logan, Bear, and Cub Rivers. Susceptible structures along the Little Bear River can be found from Hyrum Reservoir, to Paradise Town, and south along both the South and East Forks of the river. There are also structures at risk below Hyrum Dam, and in the lower drainages of the river north of Wellsville and east of Mendon. Structures are also at risk along the Hyrum Canal north of Paradise, and east of the town below Green Canyon.

**Landslides.** Hazard mapping identifies risk from landslides in unincorporated Cache County in the following areas: Northeast of Hyrum City in the Blacksmith Fork River drainage, west of Paradise Town near the Little Bear River drainage, between Mendon and Wellsville along the western bench, surrounding and south of Avon on the western and eastern hillsides, west of Newton near the county line, and a few scattered homes along the east bench from Smithfield to the Idaho State line.

**Liquefaction.** Hazard mapping identifies moderate-to-high and high liquefaction risk to low elevation areas near the Bear, Cub, Logan, Blacksmith Fork, and Little Bear River's. There is a significant amount of development and infrastructure along river corridors from the Idaho-Utah border, south to Wellsville City and Hyrum Dam with high potential losses to railroad lines.

**Steep Slopes.** Hazard mapping identifies significant risk from steep slopes in much of the unincorporated jurisdiction. Due to the characteristic northeast to southwest trending mountain ranges, much of the county's eastern and western boundaries slope upwards beyond 20%, and experience significant development pressure due to the desirable vistas these areas provide to home owners.

**Wildfire.** Hazard mapping identifies moderate-to-high wildfire risk areas along nearly the entire eastern and western boundary of the jurisdiction. There is significant development pressure along the eastern bench of the county with much of the higher value homes located in these areas. There are also a number of cabins and secondary homes at risk in the Scare Canyon and Hardware Park developments, and in Logan Canyon along U.S. 89; many in the Birch Glen area.

### Future Development

No concerns involving potential future development within Cache County were reported by county representatives.

### Hazard Mitigation Strategies

#### Table 56: Cache County Mitigation Strategies

CACHE COUNTY- COMMUNITY MITIGATION STRATEGIES										
Protecting Current Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For NFIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Cache County	Dam Failure	Protect current residents and property	Evaluate existing notification systems to ensure they are adequate to implement emergency plans developed with the FERC license process	N/A	Medium	2016	County	Cache County, Bureau of Rec., Utah Dam Safety	Minimal	County, FERC, State
Cache County	Earthquake	Protect current residents and property	Review, revise, develop land-use ordinances that require site specific geo-technical studies prior to development in areas of high risk.	N/A	High	2016	County, FEMA, State	Cache County, UGS	Minimal	USGS, UGS, BRAG, Utah League of Cities & Towns
Cache County	Flood	Protect current residents and property	Coordinate with Utah Geological Survey for landslide response procedures and strategies, update response plans	N/A	Medium	2016	County, State, FEMA	Cache County, UGS	Minimal	USGS, UGS, USU
Cache County	Flood	Protect current residents and property	Identify, assess, and inventory potential flooding areas.	N/A	High	2016	County, FEMA, Army Corps	Cache County, Utah DEM	TBD	County, FEMA, Army Corps, State, Canal Companies, UDOT
Cache County	Steep Slopes	Protect current residents and property	Review, revise, develop land-use ordinances that require site specific geo-technical studies prior to development in areas of high risk.	N/A	Medium	2016	County	Cache County, UGS	Minimal	County Planning, UGS, USGS, APA
CACHE COUNTY - COMMUNITY MITIGATION STRATEGIES										
Protecting Future Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For NFIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Cache County	Dam Failure	Protect future residents and property	Public education, evacuation planning, emergency response planning and exercises.	Assess potential flooding and vulnerability areas within identified main flow areas.	Medium	2016	County	Cache County, Bureau of Rec., Utah Dam Safety	Minimal	County, FERC, State
Cache County	Earthquake	Protect future residents and property	Continue to promote earthquake safety and preparedness	N/A	High	Ongoing	County, FEMA, State	Cache County, UGS	Minimal	Cache County, USGS, UGS, Utah DEM
Cache County	Flood	Protect future residents and property	Provide public education to residents in areas that might be susceptible to possible landslides. Update response plans.	N/A	Medium	2016-2017	County, Private Sources	Cache County, UGS	TBD	County, Army Corps, Division of NR., USFS
Cache County	Flood	Protect future residents and property	Coordinate with canal companies to keep canal gates staffed and free from debris	N/A	High	2016	County, Canal Companies	Cache County, canal companies	Minimal	County, Local, FEMA, State ESHS
Cache County	Steep Slopes	Protect future residents and property	Review, revise, develop land-use ordinances that require site specific geo-technical studies prior to development in areas of high risk.	N/A	Medium	2016	County	Cache County, UGS	Minimal	County Planning, UGS, USGS, APA

## CLARKSTON

Analysis of hazard risk involving the community of Clarkston revealed that there is potential risk resulting from **flood, steep slopes and wildfire**. These hazards have varying potential to impact life, property, infrastructure, agriculture, and environmental features within the municipal boundary. See *the following tables* for more detailed descriptions of potential losses associated with each natural hazard analyzed in the risk assessment.

### Natural Hazards

#### Current Development

**Flood.** Hazard mapping identifies flood risk areas along City Creek, Myler Creek, and Clarkston-Creek drainages.

**Steep Slopes.** Hazard mapping identifies significant risk from steep slopes along the entire western boundary of the jurisdiction.

**Table 57:** Clarkston Potential Loss Figures

Clarkston, UT, Residential & Commercial Development at Risk						
Hazard Type	~Residents at Risk*	Residential Units at Risk		Commercial Units at Risk		
		# Units	\$ Value**	# Units	\$ Value**	\$ Potential Revenue Loss***
Dam Failure	0	0	0	0	0	0
Faults	0	0	0	1	113,406	688,717
Wildfire	667	206	28,080,624	8	381,440	5,509,736
Flood	126	39	5,306,048	3	131,145	2,066,151
Liquefaction	0	0	0	0	0	0
Landslide	0	0	0	0	0	0
Slope	259	80	10,758,883	6	196,095	4,132,302
Poorly Drained Soils	0	0	0	0	0	0

\* Based on average persons per owner household for Cache County from 2013 American Community Survey, which is 3.24.  
 \*\* Current Market Value per parcel, including building and land values. Data was provided by Cache County IT personnel.  
 \*\*\* Based on average sales, receipts, or value of shipments of firms with or without paid employees, per firm (\$688,717 per firm). Derived from 2007 Survey of Business Owners for Cache County, US Census Bureau.

<b>Clarkston, UT, Infrastructure at Risk</b>										
<b>Hazard Type</b>	<b>Infrastructure at Risk</b>									
	<b>Railroad Lines</b>		<b>Natural Gas Lines</b>		<b>Electrical Power lines</b>		<b>Roads</b>		<b>Canals</b>	
	<b># of Miles</b>	<b>\$ Value<sup>1</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>2</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>3</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>4</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>5</sup></b>
Dam Failure	0	0	0	0	0	0	0	0	0	0
Faults	0	0	0	0	0	0	0	0	0	0
Wildfire	0	0	0	0	0	0	2.8	1,470,000	0	0
Flood	0	0	0	0	0	0	0.72	378,000	0	0
Liquefaction	0	0	0	0	0	0	9.26	4,861,500	0	0
Landslide	0	0	0	0	0	0	0	0	0	0
Slope	0	0	0	0	0	0	3.02	1,585,500	0	0
Poorly Drained Soils	0	0	0	0	0	0	0	0	0	0

<sup>1</sup> Based on figures from 2009 Pre-Disaster Mitigation Plan for Bear River Region, Utah.  
<sup>2</sup> Based on average replacement cost estimates for gas lines ranging from 2-inches-20 inches in diameter. These cost are based solely on labor and material costs, and may vary based on time, scope, and site specific variations (Questar, May 2015).  
<sup>3</sup> Based on estimates from Logan Light and Power, 2015.  
<sup>4</sup> Based on estimates derived from an average 28' wide, 4" thick asphalt county road with gravel subgrade replacement. Cache County, 2015.  
<sup>5</sup> Based recent Cache County and regional project cost estimates, 2015.

<b>Clarkston, UT, Critical Facilities at Risk</b>					
<b>Hazard Type</b>	<b>Critical Facilities Types</b>				
	<b>Emergency Services/Law Enforcement</b>	<b>Schools/Public Facilities</b>	<b>Health Care Facilities</b>	<b>Places of Worship</b>	<b>Infrastructure</b>
Dam Failure					
Faults					
Wildfire	1 EMS station			1 place of worship	2 broadband anchors
Flood					
Liquefaction	1 EMS station, 1 fire station			1 place of worship	4 broadband anchors
Landslide					
Slope					
Poorly Drained Soils					

Note: Critical facilities were identified using multiple data sources including: Utah AGRC, UDOT, Utah Division of Water Resources, and public and community leader input.

<b>Clarkston, UT, Agricultural Features at Risk</b>					
<b>Hazard Type</b>	<b>Lands at Risk</b>			<b>Farms &amp; Barns****</b>	
	<b>Agriculture Production*</b>	<b>Farm Land**</b>	<b>Grazing***</b>	<b>Century Farms</b>	<b>Historic Barns</b>
	<b># of Acres</b>			<b># of Farms</b>	<b># of Barns</b>
Dam Failure	0	0	0	0	0
Faults	0	0	0	0	0
Wildfire	49.8	143.44	0	1	0
Flood	43.29	65.68	0	0	0
Liquefaction	0	0	0	0	0
Landslide	0	0	0	0	0
Slope	100.52	0	0	0	0
Poorly Drained Soils	0	0	0	0	0

\* Lands that are currently associated with agricultural activities involving water related land use, as described in the 2007 Utah Division of Water Resources, *Water Related Land Use* dataset.  
 \*\*Lands that are suitable for farming purposes based on soil type and composition, as describe in the 2013 Natural Resource Conservation Service, SSURGO datasets.  
 \*\*\* Lands currently associated with grazing allotments identified as part of the Grazing Improvement Program (Utah AGRC, 2012)  
 \*\*\*\* Based on data compiled by the Bear River Association of Governments.

<b>Clarkston, UT, Environmental &amp; Recreational Features at Risk</b>						
<b>Hazard Type</b>	<b>Environmental Features at Risk</b>			<b>Recreational Features at Risk</b>		
	<b>Wetland/Riparian</b>	<b>Lakes</b>	<b>Streams</b>	<b>Parks</b>	<b>Trails</b>	<b>Amenities</b>
	<b># of Acres</b>		<b># of Miles</b>	<b># of Acres</b>	<b># of Miles</b>	<b># of Amenities</b>
Dam Failure	0	0	0	0	0	0
Faults	0	0	0	0	0	0
Wildfire	0.64	0	0.57	1.51	0	0
Flood	4.19	0	1.42	0	0	0
Liquefaction	0	0	0.3	0	0	0
Landslide	0	0	0	0	0	0
Slope	0	0	0	0	0	0
Poorly Drained Soils	0	0	0	0	0	0

Note: Total acres of land and miles of streams and trails were identified using multiple datas sources including: Utah AGRC, U.S. Fish and Wildlife Service, U.S. Forest Service, U.S. Geological Survey, Utah Division of Water Resources, and public and community leader input.

**Wildfire.** Hazard mapping identifies moderate-to-high wildfire risk in much of the developed portions of the jurisdiction with significant potential losses to homes and commercial structures.

### **Future Development**

No concerns involving potential future development within Clarkston were reported by town representatives.

### **Hazard Mitigation Strategies**

**Table 58:** Clarkston Mitigation Strategies

CLARKSTON- COMMUNITY MITIGATION STRATEGIES										
Protecting Current Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For NFIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Clarkston	Flood	Protect current residents and property	Increase awareness of floodplain and erosion risk areas within the city.	Community training on NFIP program and current status.	High	2015	County, Local	Clarkston, Utah DEM	Minimal	Local, County, BRAG, FEMA, State
Clarkston	Wildfire	Protect current residents and property	Make sure all fire fighters and emergency response crews have the proper training to defend against wildfires.	N/A	High	2015	Local	Clarkston, Utah FFSL	Minimal	Local, County, BRAG, FEMA, Utah FFSL
Clarkston	Earthquake	Protect current residents and property	Training in earthquake emergency planning and response for residents, and coordination between local and county fire, police, and EMT crews.	N/A	High	2015	Local	Clarkston, UGS, Utah DEM	Minimal	Local, County, BRAG, FEMA, Utah APA, Utah ASLA, UGS, USGS
Clarkston	Steep Slopes	Protect current residents and property	Map and document steep slope areas.	N/A	Low	2015	Local	Clarkston, UGS	Minimal	Local, County, BRAG, FEMA, Utah APA, Utah ASLA, UGS, USGS
Clarkston	Liquefaction	Protect current residents and property	Education of city and county emergency response personnel.	N/A	Low	2015	Local	Clarkston, UGS	Minimal	Local, County, BRAG
CLARKSTON - COMMUNITY MITIGATION STRATEGIES										
Protecting Future Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For NFIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Clarkston	Flood	Protect future residents and property	Increase awareness of floodplain and erosion risk areas within the city. Gather geographic floodplain data.	Community training on NFIP program and current status.	High	2015	County, Local	Clarkston, Utah DEM	Minimal	Local, County, BRAG, FEMA, State
Clarkston	Wildfire	Protect future residents and property	Work with the county and BRAG to obtain geographic wildfire data and explore better ordinances.	N/A	High	2015	Local	Clarkston, Utah FFSL, BRAG	Minimal	Local, County, BRAG, FEMA, Utah FFSL
Clarkston	Earthquake	Protect future residents and property	Work with the county and BRAG to obtain geographic earthquake data and explore better ordinances.	N/A	High	2015	Local	Clarkston, UGS, Utah DEM, BRAG	Minimal	Local, County, BRAG, FEMA, Utah APA, Utah ASLA, UGS, USGS
Clarkston	Steep Slopes	Protect future residents and property	Explore possibility of steep slope ordinance.	N/A	Low	2015	Local	Clarkston, UGS	Minimal	Local, County, BRAG, FEMA, Utah APA, Utah ASLA, UGS, USGS
Clarkston	Liquefaction	Protect future residents and property	Education of city and county emergency response personnel.	N/A	Low	2015	Local	Clarkston, UGS	Minimal	Local, County, BRAG

## CORNISH

Analysis of hazard risk involving the community of Cornish revealed that there is potential risk resulting from **earthquake, flood, liquefaction, steep slopes and wildfire**. These hazards have varying potential to impact life, property, infrastructure, agriculture, and environmental features within the municipal boundary. See *the following tables* for more detailed descriptions of potential losses associated with each natural hazard analyzed in the risk assessment.

### Natural Hazards

#### Current Development

**Earthquake.** Hazard mapping identifies structures, utilities and agricultural land at risk from surface fault rupture. Areas of concern are focused at the fault running along the eastern boundary of the jurisdiction.

**Flood.** Hazard mapping identifies several

**Table 59:** Cornish Potential Loss Figures

Cornish, UT, Residential & Commercial Development at Risk						
Hazard Type	~Residents at Risk*	Residential Units at Risk		Commercial Units at Risk		
		# Units	\$ Value**	# Units	\$ Value**	\$ Potential Revenue Loss***
Dam Failure	0	0	0	0	0	0
Faults	13	4	1,732,768	0	0	0
Wildfire	6	2	380,739	0	0	0
Flood	19	6	1,678,917	4	808,732	2,754,868
Liquefaction	26	8	1,950,554	8	1,145,024	5,509,736
Landslide	0	0	0	0	0	0
Slope	3	1	1,000,513	0	0	0
Poorly Drained Soils	0	0	0	0	0	0

\* Based on average persons per owner household for Cache County from 2013 American Community Survey, which is 3.24.  
 \*\* Current Market Value per parcel, including building and land values. Data was provided by Cache County IT personnel.  
 \*\*\* Based on average sales, receipts, or value of shipments of firms with or without paid employees, per firm (\$688,717 per firm). Derived from 2007 Survey of Business Owners for Cache County, US Census Bureau.

<b>Cornish, UT, Infrastructure at Risk</b>										
<b>Hazard Type</b>	<b>Infrastructure at Risk</b>									
	<b>Railroad Lines</b>		<b>Natural Gas Lines</b>		<b>Electrical Power lines</b>		<b>Roads</b>		<b>Canals</b>	
	<b># of Miles</b>	<b>\$ Value<sup>1</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>2</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>3</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>4</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>5</sup></b>
Dam Failure	0	0	0	0	0	0	0	0	0	0
Faults	0	0	0	0	2.13	270,510	1.86	976,500	0.54	810,000
Wildfire	0	0	0	0	0	0	0	0	0	0
Flood	0	0	0	0	0	0	0	0	0	0
Liquefaction	4.31	6,465,000	0	0	2.41	306,070	13.31	6,987,750	0.54	810,000
Landslide	0	0	0	0	0	0	0	0	0	0
Slope	0	0	0	0	0.57	72,390	0.18	94,500	0	0
Poorly Drained Soils	0	0	0	0	0	0	0	0	0	0

<sup>1</sup> Based on figures from 2009 Pre-Disaster Mitigation Plan for Bear River Region, Utah.  
<sup>2</sup> Based on average replacement cost estimates for gas lines ranging from 2-inches-20 inches in diameter. These cost are based solely on labor and material costs, and may vary based on time, scope, and site specific variations (Questar, May 2015).  
<sup>3</sup> Based on estimates from Logan Light and Power, 2015.  
<sup>4</sup> Based on estimates derived from an average 28' wide, 4" thick asphalt county road with gravel subgrade replacement. Cache County, 2015.  
<sup>5</sup> Based recent Cache County and regional project cost estimates, 2015.

<b>Cornish, UT, Critical Facilities at Risk</b>					
<b>Hazard Type</b>	<b>Critical Facilities Types</b>				
	<b>Emergency</b>	<b>Schools/Public</b>	<b>Health Care</b>	<b>Places of</b>	<b>Infrastructure</b>
Dam Failure					
Faults					2 dams
Wildfire					
Flood					
Liquefaction					1 bridge, 1 broadband anchor, 4 dams
Landslide					
Slope					
Poorly Drained Soils					

Note: Critical facilities were identified using multiple data sources including: Utah AGRC, UDOT, Utah Division of Water Resources, and public and community leader input.

<b>Cornish, UT, Agricultural Features at Risk</b>					
<b>Hazard Type</b>	<b>Lands at Risk</b>			<b>Farms &amp; Barns****</b>	
	<b>Agriculture Production*</b>	<b>Farm Land**</b>	<b>Grazing***</b>	<b>Century Farms</b>	<b>Historic Barns</b>
	<b># of Acres</b>			<b># of Farms</b>	<b># of Barns</b>
Dam Failure	0	0	0	0	0
Faults	305.49	286.5	0	0	0
Wildfire	5.35	5.47	0	0	0
Flood	133.58	155.83	0	0	0
Liquefaction	221.68	249.95	0	0	0
Landslide	0	0	0	0	0
Slope	22.79	0	0	0	0
Poorly Drained Soils	0	0	0	0	0

\* Lands that are currently associated with agricultural activities involving water related land use, as described in the 2007 Utah Division of Water Resources, *Water Related Land Use* dataset.  
 \*\*Lands that are suitable for farming purposes based on soil type and composition, as describe in the 2013 Natural Resource Conservation Service, SSURGO datasets.  
 \*\*\* Lands currently associated with grazing allotments identified as part of the Grazing Improvement Program (Utah AGRC, 2012)  
 \*\*\*\* Based on data compiled by the Bear River Association of Governments.

<b>Cornish, UT, Environmental &amp; Recreational Features at Risk</b>						
<b>Hazard Type</b>				<b>Recreational Features at Risk</b>		
	<b>Wetland/ Riparian</b>	<b>Lakes</b>	<b>Streams</b>	<b>Parks</b>	<b>Trails</b>	<b>Amenities</b>
			<b># of Miles</b>	<b># of Acres</b>	<b># of Miles</b>	<b># of Amenities</b>
Dam Failure	0	0	0	0	0	0
Faults	0	0	0.78	0	0	0
Wildfire	3.08	0.9	0.05	0	0	0
Flood	86.56	0	2.63	0	0	0
Liquefaction	90.29	8.91	4.14	0	0	0
Landslide	0	0	0	0	0	0
Slope	0	0	0	0	0	0
Poorly Drained Soils	0	0	0	0	0	0

Note: Total acres of land and miles of streams and trails were identified using multiple datas sources including: Utah AGRC, U.S. Fish and Wildlife Service, U.S. Forest Service, U.S. Geological Survey, Utah Division of Water Resources, and public and community leader input.

structures in the 100 year floodplain adjacent to the Bear River, which meanders in and out of the eastern boundary of the jurisdiction.

***Liquefaction.*** Hazard mapping identifies high liquefaction risk adjacent to the Bear River, which meanders in and out of the eastern boundary of the jurisdiction. There are several homes at risk, along with critical facilities and infrastructure.

***Steep Slopes.*** Hazard mapping identifies some risk from steep slopes to housing and infrastructure along the jurisdictions western boundary.

***Wildfire.*** Hazard mapping identifies moderate-to-high wildfire risk to some residential structures along the jurisdictions eastern boundary.

### **Future Development**

No concerns involving potential future development within Cornish were reported by town representatives.

### **Hazard Mitigation Strategies**

**Table 60:** Cornish Mitigation Strategies

CORNISH - COMMUNITY MITIGATION STRATEGIES										
Protecting Current Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For NPIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Comish	Faults	Protect current residents and property	Gather existing fault and earthquake data.	N/A	Medium	2017	UGS, USGS	Cornish, UGS	Minimal	UGS, USGS, BRAG
Comish	Wildfire	Protect current residents and property	Determine wildfire risk areas and coordinate with other jurisdictions on better response.	N/A	High	2016	Local, Utah FFSL	Cornish, Utah FFSL	Minimal	Utah FFSL, Cache County, BRAG
Comish	Flood	Protect current residents and property	Work with state floodplain manager on educating officials and the public on flood safety issues.	Work with state floodplain manager to update NPIP compliance.	Medium	2017	Local, Utah DEM, FEMA	Cornish, Utah DEM	Minimal	Utah DEM, FEMA, BRAG
Comish	Liquefaction	Protect current residents and property	Community education and outreach regarding risk areas.	N/A	High	2016	UGS, USGS	Cornish	Minimal	UGS, USGS, BRAG
Comish	Slope	Protect current residents and property	Hazard area identification and resident education.	N/A	Low	2018	UGS, USGS	Cornish	Minimal	UGS, USGS, BRAG
Comish	Severe Weather	Protect current residents and property	County and state coordination on emergency and maintenance	N/A	High	2016	NOAA	Cornish, NOAA, Utah DEM	Minimal	NOAA, BRAG
CORNISH - COMMUNITY MITIGATION STRATEGIES										
Protecting Future Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For NPIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Comish	Faults	Protect future residents and property	Explore more strict ordinances in hazard areas.	N/A	Medium	2017	UGS, USGS	Cornish, UGS	Minimal	UGS, USGS, BRAG
Comish	Wildfire	Protect future residents and property	Explore more strict ordinances in hazard areas.	N/A	High	2016	Local, Utah FFSL	Cornish, Utah FFSL	Minimal	Utah FFSL, Cache County, BRAG
Comish	Flood	Protect future residents and property	Work with state floodplain manager on educating officials and the public on flood safety issues related to future development.	Work with state floodplain manager to update NPIP compliance.	Medium	2017	Local, Utah DEM, FEMA	Cornish, Utah DEM	Minimal	Utah DEM, FEMA, BRAG
Comish	Liquefaction	Protect future residents and property	Education and public outreach on potential effects from liquefaction.	N/A	High	2016	UGS, USGS	Cornish	Minimal	UGS, USGS, BRAG
Comish	Slope	Protect future residents and property	Explore more strict ordinances in hazard areas.	N/A	Low	2018	UGS, USGS	Cornish	Minimal	UGS, USGS, BRAG
Comish	Severe Weather	Protect future residents and property	Organize communication and deployment drills to practice.	N/A	High	2016	NOAA	Cornish, Cache County	Minimal	NOAA, BRAG

## HYDE PARK

Analysis of hazard risk involving the community of Hyde Park revealed that there is potential risk resulting from **earthquake, flood, liquefaction, steep slopes and wildfire**. These hazards have varying potential to impact life, property, infrastructure, agriculture, and environmental features within the municipal boundary. See *the following tables* for more detailed descriptions of potential losses associated with each natural hazard analyzed in the risk assessment.

**Table 61:** Hyde Park Potential Loss Figures

### Natural Hazards

#### Current Development

**Earthquake.** Hazard mapping identifies several structures and businesses at risk from surface fault rupture. There are two fault lines running north to south along the eastern boundary of the jurisdiction with several homes and infrastructure in the damage zone.

**Flood.** The jurisdiction has a number of

Hyde Park, UT, Residential & Commercial Development at Risk						
Hazard Type	~Residents at Risk*	Residential Units at Risk		Commercial Units at Risk		
		# Units	\$ Value**	# Units	\$ Value**	\$ Potential Revenue Loss***
Dam Failure	0	0	0	0	0	0
Faults	395	122	39,311,608	1	24,300	688,717
Wildfire	2,748	848	15,892,243	33	185,394,777	22,727,661
Flood	55	17	5,191,187	0	0	0
Liquefaction	0	0	0	0	0	0
Landslide	0	0	0	0	0	0
Slope	279	86	27,910,860	1	24,300	688,717
Poorly Drained Soils	0	0	0	0	0	0

\* Based on average persons per owner household for Cache County from 2013 American Community Survey, which is 3.24.  
 \*\* Current Market Value per parcel, including building and land values. Data was provided by Cache County IT personnel.  
 \*\*\* Based on average sales, receipts, or value of shipments of firms with or without paid employees, per firm (\$688,717 per firm). Derived from 2007 Survey of Business Owners for Cache County, US Census Bureau.

<b>Hyde Park, UT, Infrastructure at Risk</b>										
<b>Hazard Type</b>	<b>Infrastructure at Risk</b>									
	<b>Railroad Lines</b>		<b>Natural Gas Lines</b>		<b>Electrical Power lines</b>		<b>Roads</b>		<b>Canals</b>	
	<b># of Miles</b>	<b>\$ Value<sup>1</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>2</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>3</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>4</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>5</sup></b>
Dam Failure	0	0	0	0	0	0	0	0	0	0
Faults	0	0	0	0	0	0	4.74	2,488,500	1.2	1,800,000
Wildfire	0	0	0	0	0	0	7.74	4,063,500	2.1	3,150,000
Flood	0	0	0	0	0	0	0.03	15,750	0.11	165,000
Liquefaction	0	0	0	0	0	0	34.73	18,233,250	0	0
Landslide	0	0	0	0	0	0	0	0	0	0
Slope	0	0	0	0	0	0	3.28	1,722,000	0.81	1,215,000
Poorly Drained Soils	0	0	0	0	0	0	0	0	0	0

<sup>1</sup> Based on figures from 2009 Pre-Disaster Mitigation Plan for Bear River Region, Utah.

<sup>2</sup> Based on average replacement cost estimates for gas lines ranging from 2-inches-20 inches in diameter. These cost are based solely on labor and material costs, and may vary based on time, scope, and site specific variations (Questar, May 2015).

<sup>3</sup> Based on estimates from Logan Light and Power, 2015.

<sup>4</sup> Based on estimates derived from an average 28' wide, 4" thick asphalt county road with gravel subgrade replacement. Cache County, 2015.

<sup>5</sup> Based recent Cache County and regional project cost estimates, 2015.

<b>Hyde Park, UT, Critical Facilities at Risk</b>					
<b>Hazard Type</b>	<b>Critical Facilities Types</b>				
	<b>Emergency Services/Law Enforcement</b>	<b>Schools/Public Facilities</b>	<b>Health Care Facilities</b>	<b>Places of Worship</b>	<b>Infrastructure</b>
Dam Failure					
Faults					
Wildfire				2 places of worship	
Flood					
Liquefaction	Smithfield Fire and EMS	Hyde Park City Office, Cedar Ridge Middle School	Instacare-Hyde Park	5 places of worship	1 dam, 1 bridge, 4 broadband anchors
Landslide					
Slope					
Poorly Drained Soils					

Note: Critical facilities were identified using multiple data sources including: Utah AGRC, UDOT, Utah Division of Water Resources, and public and community leader input.

<b>Hyde Park, UT, Agricultural Features at Risk</b>					
<b>Hazard Type</b>	<b>Lands at Risk</b>			<b>Farms &amp; Barns****</b>	
	<b>Agriculture Production*</b>	<b>Farm Land**</b>	<b>Grazing***</b>	<b>Century Farms</b>	<b>Historic Barns</b>
	<b># of Acres</b>			<b># of Farms</b>	<b># of Barns</b>
Dam Failure	0	0	0	0	0
Faults	320.03	207.47	0	0	0
Wildfire	254.95	618.39	0	1	0
Flood	2.78	3.71	0	0	0
Liquefaction	0	0	0	0	0
Landslide	15.78	14.44	0	0	0
Slope	214.18	0	0	0	0
Poorly Drained Soils	0	0	0	0	0

\* Lands that are currently associated with agricultural activities involving water related land use, as described in the 2007 Utah Division of Water Resources, *Water Related Land Use* dataset.  
 \*\*Lands that are suitable for farming purposes based on soil type and composition, as describe in the 2013 Natural Resource Conservation Service, SSURGO datasets.  
 \*\*\* Lands currently associated with grazing allotments identified as part of the Grazing Improvement Program (Utah AGRC, 2012)  
 \*\*\*\* Based on data compiled by the Bear River Association of Governments.

<b>Hyde Park, UT, Environmental &amp; Recreational Features at Risk</b>						
<b>Hazard Type</b>	<b>Environmental Features at Risk</b>			<b>Recreational Features at Risk</b>		
	<b>Wetland/ riparian</b>	<b>Lakes</b>	<b>Streams</b>	<b>Parks</b>	<b>Trails</b>	<b>Amenities</b>
	<b># of Acres</b>		<b># of Miles</b>	<b># of Acres</b>	<b># of Miles</b>	<b># of Amenities</b>
Dam Failure	0	0	0	0	0	0
Faults	0.27	0	3.03	0	1.14	7
Wildfire	2.77	0	4.16	4.59	0.94	9
Flood	0	0	0.43	0	0	0
	0	0	0	0	0	0
Landslide	0	0	0	0	0	0
Slope	0.02	0	2.04	1.76	1.3	8
Poorly Drained Soils	0	0	0	0	0	0

Note: Total acres of land and miles of streams and trails were identified using multiple datas sources including: Utah AGRC, U.S. Fish and Wildlife Service, U.S. Forest Service, U.S. Geological Survey, Utah Division of Water Resources, and public and community leader input.

existing homes located in the 100 year flood plain along the stream that drains Hyde Park Canyon. In addition, development near the Logan Northern and

Hyde Park Canals is a potential risk for flooding. The 2003 Cache County Storm Water Analysis report concluded that these canals through Hyde Park have deficient capacity to carry predicted flows resulting from a 10-year storm event of 3 hour duration. The problem areas predicted by this model are where the canal intersects 200 South, Center Street and 300 North in Hyde Park City (JUB Engineering, 2003).

***Landslides.*** Hazard mapping identifies minimal risk from landslides to agricultural land in the eastern bench of the jurisdiction.

***Steep Slopes.*** Hazard mapping identifies significant risk from steep slopes along the jurisdictions eastern bench. There are significant risks to residential and commercial structures, including critical infrastructure and utilities.

***Wildfire.*** Hazard mapping identifies moderate-to-high wildfire risk to a significant number of homes and infrastructure in the jurisdiction.

### **Future Development**

No concerns involving potential future development within Hyde Park were reported by city representatives.

### **Hazard Mitigation Strategies**

**Table 62:** Hyde Park Mitigation Strategies

HYDE PARK - COMMUNITY MITIGATION STRATEGIES										
Protecting Current Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For NFIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Hyde Park	Earthquake	Protect current residents and property	Training with citizens core council, officials, and citizens	N/A	High	2015	City, State	Hyde Park	\$5,000	EMT, LDS Church, Red Cross
Hyde Park	Flood	Protect current residents and property	Coordinate to get and keep canal gates free from debris.	Coordinate between cities to keep canal gates staffed and free from debris	High	2015	Canal Company, City	Hyde Park, canal companies	Minimal	Canal Company, City
Hyde Park	Wildfire	Protect current residents and property	Educate residents and enforce mow able ordinances.	Letters and Fines	High	2015	City, County Fire Dept.	Hyde Park, Utah FESL	Minimal	City, County, Fire Dept.
Hyde Park	Steep Slopes	Protect current residents and property	No building above 5100' in elevation.	N/A	Low	2015	N/A	Hyde Park, Cache County	N/A	City
HYDE PARK - COMMUNITY MITIGATION STRATEGIES										
Protecting Future Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For NFIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Hyde Park	Earthquake	Protect future residents and property	Avoid development in fault areas. Also require study by developers.	N/A	High	2015	N/A	Hyde Park, UGS	N/A	City
Hyde Park	Flood	Protect future residents and property	Coordinate to get and keep canal gates free from debris.	Coordinate between cities to keep canal gates staffed and free from debris	High	2015	Canal Company, City	Hyde Park, canal companies	Minimal	Canal Company, City
Hyde Park	Wildfire	Protect future residents and property	Educate residents and enforce mow able ordinances.	Letters and Fines	High	2015	City, County Fire Dept.	Hyde Park, Utah FESL	Minimal	City, County Fire Dept.
Hyde Park	Steep Slopes	Protect future residents and property	No building above 5100' in elevation.	N/A	Low	2015	N/A	Hyde Park, Cache County	N/A	City

**HYRUM**

Analysis of hazard risk involving the community of Hyrum revealed that there is potential risk resulting from **dam failure, earthquake, flood, landslides, liquefaction, steep slopes and wildfire**. These hazards have varying potential to impact life, property, infrastructure, agriculture, and environmental features within the municipal boundary. See *the following tables* for more detailed descriptions of potential losses associated with each natural hazard analyzed in the risk assessment.

**Table 63:** Hyrum City Potential Loss Figures

**Natural Hazards**

**Current Development**

**Dam Failure.** Hyrum Dam and Reservoir are located directly south of Hyrum City on the Little Bear River. The dam is rated as a high hazard facility and the inundation area flows westerly towards Wellsville five miles away, and then into Cutler Marsh.

**Earthquake.** Hazard mapping identifies several structures at risk from surface fault rupture in the damage zone located on the eastern boundary

<b>Hyrum, UT, Residential &amp; Commercial Development at Risk</b>						
<b>Hazard Type</b>	<b>~Residents at Risk*</b>	<b>Residential Units at Risk</b>		<b>Commercial Units at Risk</b>		
		<b># Units</b>	<b>\$ Value**</b>	<b># Units</b>	<b>\$ Value**</b>	<b>\$ Potential Revenue Loss***</b>
Dam Failure	156	48	11,311,308	1	133,395	688,717
Faults	39	12	4,243,430	1	298,374	688,717
Wildfire	4,889	1,509	248,499,198	71	27,060,849	48,898,907
Flood	165	51	11,730,433	5	1,307,580	3,443,585
Liquefaction	3	1	392,968	0	0	0
Landslide	512	158	25,267,783	10	2,692,770	6,887,170
Slope	3	1	563,104	0	0	0
Poorly Drained Soils	0	0	0	0	0	0

\* Based on average persons per owner household for Cache County from 2013 American Community Survey, which is 3.24.  
 \*\* Current Market Value per parcel, including building and land values. Data was provided by Cache County IT personnel.  
 \*\*\* Based on average sales, receipts, or value of shipments of firms with or without paid employees, per firm (\$688,717 per firm). Derived from 2007 Survey of Business Owners for Cache County, US Census Bureau.

Hyrum, UT, Infrastructure at Risk										
Hazard Type	Infrastructure at Risk									
	Railroad Lines		Natural Gas Lines		Electrical Power lines		Roads		Canals	
	# of Miles	\$ Value <sup>1</sup>	# of Miles	\$ Value <sup>2</sup>	# of Miles	\$ Value <sup>3</sup>	# of Miles	\$ Value <sup>4</sup>	# of Miles	\$ Value <sup>5</sup>
Dam Failure	0	0	0	0	0	0	1.62	850,500	0.53	795,000
Faults	0	0	0	0	0	0	0.71	372,750	0	0
Wildfire	0.32	480,000	0	0	0	0	9.97	5,234,250	1.05	1,575,000
Flood	0.1	150,000	0	0	0	0	0.76	399,000	1.98	2,970,000
Liquefaction	0.86	1,290,000	0	0	0	0	47.58	24,979,500	0.71	1,065,000
Landslide	0	0	0	0	0	0	4.84	2,541,000	0.18	270,000
Slope	0	0	0	0	0	0	0.14	73,500	0	0
Poorly Drained Soils	0	0	0	0	0	0	0	0	0	0

<sup>1</sup> Based on figures from 2009 Pre-Disaster Mitigation Plan for Bear River Region, Utah.  
<sup>2</sup> Based on average replacement cost estimates for gas lines ranging from 2-inches-20 inches in diameter. These cost are based solely on labor and material costs, and may vary based on time, scope, and site specific variations (Questar, May 2015).  
<sup>3</sup> Based on estimates from Logan Light and Power, 2015.  
<sup>4</sup> Based on estimates derived from an average 28' wide, 4" thick asphalt county road with gravel subgrade replacement. Cache County, 2015.  
<sup>5</sup> Based recent Cache County and regional project cost estimates, 2015.

Hyrum, UT, Critical Facilities at Risk					
Hazard Type	Critical Facilities Types				
	Emergency Services/Law Enforcement	Schools/Public Facilities	Health Care Facilities	Places of Worship	Infrastructure
Dam Failure	Hyrum State Park Ranger Station				1 bridge, 1 broadband anchor
Faults					Hyrum water storage
Wildfire		South Cache Center School, Mountain Crest High School, Lincoln Elementary	Cache Valley community Health Center South	3 places of worship	1 bridge, 3 broadband anchors, 1 natural gas pump station, Hyrum water storage
Flood					
Liquefaction	Hyrum fire and EMS, Hyrum City Fire Dept., Hyrum State Park Ranger Station	Lincoln Elementary School, Mountain Crest High School, South Cache Center school, Hyrum City office, Hyrum City shop		8 places of worship	1 bridge, 12 broadband anchors, Hyrum City water storage, natural gas pump station, phone switching station
Landslide					
Slope					Hyrum water storage
Poorly Drained Soils					

Note: Critical facilities were identified using multiple data sources including: Utah AGRC, UDOT, Utah Division of Water Resources, and public and community leader input.

<b>Hyrum, UT, Agricultural Features at Risk</b>					
<b>Hazard Type</b>	<b>Lands at Risk</b>			<b>Farms &amp; Barns****</b>	
	<b>Agriculture Production*</b>	<b>Farm Land**</b>	<b>Grazing***</b>	<b>Century Farms</b>	<b>Historic Barns</b>
	<b># of Acres</b>			<b># of Farms</b>	<b># of Barns</b>
Dam Failure	54.11	143.20	0.00	0.00	1.00
Faults	5.62	34.27	0.00	0.00	0.00
Wildfire	228.34	1,114.12	0.00	0.00	3.00
Flood	28.93	79.91	0.00	0.00	1.00
Liquefaction	21.23	30.20	0.00	0.00	0.00
Landslide	194.68	328.37	0.00	0.00	0.00
Slope	0.00	0.00	0.00	0.00	0.00
Poorly Drained Soils	0.00	0.00	0.00	0.00	0.00

\* Lands that are currently associated with agricultural activities involving water related land use, as described in the 2007 Utah Division of Water Resources, *Water Related Land Use* dataset.

\*\*Lands that are suitable for farming purposes based on soil type and composition, as describe in the 2013 Natural Resource Conservation Service, SSURGO datasets.

\*\*\* Lands currently associated with grazing allotments identified as part of the Grazing Improvement Program (Utah AGRC, 2012)

\*\*\*\* Based on data compiled by the Bear River Association of Governments.

<b>Hyrum, UT, Environmental &amp; Recreational Features at Risk</b>						
<b>Hazard Type</b>	<b>Environmental Features at Risk</b>			<b>Recreational Features at Risk</b>		
	<b>Wetland/ riparian</b>	<b>Lakes</b>	<b>Streams</b>	<b>Parks</b>	<b>Trails</b>	<b>Amenities</b>
	<b># of Acres</b>		<b># of Miles</b>	<b># of Acres</b>	<b># of Miles</b>	<b># of Amenities</b>
Dam Failure	72.49	8.62	0.64	0	0	0
Faults	27.16	0	0.53	0	0	0
Wildfire	115.06	1.28	2.66	13.2	0	0
Flood	73.91	0	3.23	0.06	0	0
Liquefaction	20.69	0	0.35	0	0	0
Landslide	11.82	0	0	0	0	0
Slope	1.27	0	0.25	0	0	0
Poorly Drained Soils	0	0	0	0	0	0

Note: Total acres of land and miles of streams and trails were identified using multiple datas sources including: Utah AGRC, U.S. Fish and Wildlife Service, U.S. Forest Service, U.S. Geological Survey, Utah Division of Water Resources, and public and community leader input.

of the jurisdiction. These structures are located in the Black Smith Fork drainage at the bottom of the canyon where the fault parallels the north/south trending Cache-Wasatch National Forest.

**Flood.** Hazard mapping identifies several structures at risk from flooding in the jurisdiction. Several of those structures are along the banks of the Blacksmith Fork River, at the base of the canyon, and several are in floodplains below Hyrum Dam on the Little Bear River edges. However, the majority of structures at risk can be found along the Hyrum Canal which runs north and south between 200 and 300 East on the south of Main Street, and between 100 and 200 East north of Main Street.

**Landslides.** Hazard mapping identifies risk from landslides along the jurisdiction's eastern boundary at the mouth of Blacksmith Fork Canyon.

**Liquefaction.** Hazard mapping identifies moderate-to-high liquefaction risk to several critical facilities and infrastructure below Hyrum Dam in the jurisdiction's western boundary.

**Steep Slopes.** Hazard mapping identifies minimal risk from steep slopes within the jurisdiction. Primary threats include Hyrum water storage, and some municipal infrastructure.

**Wildfire.** Hazard mapping identifies moderate-to-high wildfire risk throughout much of the jurisdiction. This is primarily due to the high amount of urban canopy within the jurisdiction, with additional threats to property, life, and infrastructure at the mouth of Blacksmith Fork Canyon.

### **Future Development**

No concerns involving potential future development within Hyrum were reported by city representatives.

### **Hazard Mitigation Strategies**

**Table 64:** Hyrum City Mitigation Strategies

HYRUM - COMMUNITY MITIGATION STRATEGIES										
Protecting Current Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For NFIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Hyrum	Flood	Protect current residents and property	Maintain supply of Sand Bags- Keep Canals cleaned	Current Emergency Prep Plan- Organized CERT program	Medium	2016	City, Canal Company, State	Hyrum	Minimal	City, Canal Company, State
Hyrum	Earthquake	Protect current residents and property	Keep emergency preparedness plan current	N/A	Medium	2016	City	Hyrum, UGS	Minimal	City, County, State
Hyrum	Wildfire	Protect current residents and property	Education- Encourage fire breaks to be created around property.	N/A	Medium	2016	City	Hyrum, Utah FFSL	Minimal	City, County, State
Hyrum	Landslide/ Steep Slopes	Protect current residents and property	Require engineering review for steep slopes and landslide risk areas.	N/A	Medium	2016	City, Private	Hyrum, UGS	Minimal	City, County, State, Federal
Hyrum	Dam Failure	Protect current residents and property	Make this a component of emergency preparedness plan.	N/A	Medium	2016	City	Hyrum, Cache County	Minimal	City, State, Federal
HYRUM - COMMUNITY MITIGATION STRATEGIES										
Protecting Future Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For NFIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Hyrum	Flood	Protect future residents and property	Enforce Flood Plan Ordinances- Sand Bags available- Canals cleaned and monitored regularly	N/A	Medium	2016	City, Canal Company	Hyrum	Minimal	City, County, State, Canal Company
Hyrum	Earthquake	Protect future residents and property	Require engineering study in higher risk areas- More specific emergency preparedness plan dealing with maintaining city services after an earthquake.	N/A	Medium	2016	City	Hyrum, UGS	Minimal	City, County, State
Hyrum	Wildfire	Protect future residents and property	Add and update necessary fire fighting equipment	N/A	Medium	2020	City, State, Federal	Hyrum, Utah DEM	\$100,000	City, County, State, Federal
Hyrum	Landslide/ Steep Slopes	Protect future residents and property	Maintain an emergency response plan as well as education.	N/A	Low	2015	City	Hyrum, UGS	Minimal	City, County, State, Federal
Hyrum	Dam Failure	Protect future residents and property	Education and implementing FERC requirements.	N/A	Medium	2016	City	Hyrum, Cache County, Utah Dam Safety	N/A	City, State, Federal

**LEWISTON**

Analysis of hazard risk involving the community of Lewiston revealed that there is potential risk resulting from **flood, liquefaction, and wildfire**. These hazards have varying potential to impact life, property, infrastructure, agriculture, and environmental features within the municipal boundary. See *the following tables* for more detailed descriptions of potential losses associated with each natural hazard analyzed in the risk assessment.

**Table 65:** Lewiston Potential Loss Figures

**Natural Hazards**

**Current Development**

**Flood.** Hazard mapping identifies several residential structures and some commercial facilities at risk in the 100 year floodplain. These threats are located along the Cub River in the eastern portion of the jurisdiction, and along the Bear River that meanders in and out of the jurisdiction’s western boundary. There are also several smaller drainages into these rivers that pose threats as well.

Lewiston, UT, Residential & Commercial Development at Risk						
Hazard Type	~Residents at Risk*	Residential Units at Risk		Commercial Units at Risk		
		# Units	\$ Value**	# Units	\$ Value**	\$ Potential Revenue Loss***
Dam Failure	0	0	0	0	0	0
Faults	0	0	0	0	0	0
Wildfire	29	9	1,255,353	1	3,863,200	688,717
Flood	16	5	1,222,860	4	1,581,974	2,754,868
Liquefaction	23	7	1,952,344	3	934,774	2,066,151
Landslide	0	0	0	0	0	0
Slope	0	0	0	0	0	0
Poorly Drained Soils	0	0	0	0	0	0

\* Based on average persons per owner household for Cache County from 2013 American Community Survey, which is 3.24.

\*\* Current Market Value per parcel, including building and land values. Data was provided by Cache County IT personnel.

\*\*\* Based on average sales, receipts, or value of shipments of firms with or without paid employees, per firm (\$688,717 per firm). Derived from 2007 Survey of Business Owners for Cache County, US Census Bureau.

<b>Lewiston, UT, Infrastructure at Risk</b>										
<b>Hazard Type</b>	<b>Infrastructure at Risk</b>									
	<b>Railroad Lines</b>		<b>Natural Gas Lines</b>		<b>Electrical Power lines</b>		<b>Roads</b>		<b>Canals</b>	
	<b># of Miles</b>	<b>\$ Value<sup>1</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>2</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>3</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>4</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>5</sup></b>
Dam Failure	0	0	0	0	0	0	0	0	0	0
Faults	0	0	0	0	0	0	0	0	0	0
Wildfire	0.06	90,000	0	0	0	0	0.02	10,500	0	0
Flood	0.03	45,000	0.12	168,000	0	0	0.63	330,750	0	0
Liquefaction	2.03	3,045,000	0.12	168,000	0	0	55.48	29,127,000	0	0
Landslide	0	0	0	0	0	0	0	0	0	0
Slope	0	0	0	0	0	0	0	0	0	0
Poorly Drained Soils	0	0	0	0	0	0	0	0	0	0

<sup>1</sup> Based on figures from 2009 Pre-Disaster Mitigation Plan for Bear River Region, Utah.  
<sup>2</sup> Based on average replacement cost estimates for gas lines ranging from 2-inches-20 inches in diameter. These cost are based solely on labor and material costs, and may vary based on time, scope, and site specific variations (Questar, May 2015).  
<sup>3</sup> Based on estimates from Logan Light and Power, 2015.  
<sup>4</sup> Based on estimates derived from an average 28' wide, 4" thick asphalt county road with gravel subgrade replacement. Cache County, 2015.  
<sup>5</sup> Based recent Cache County and regional project cost estimates, 2015.

<b>Lewiston, UT, Critical Facilities at Risk</b>					
<b>Hazard Type</b>	<b>Critical Facilities Types</b>				
	<b>Emergency</b>	<b>Schools/Public</b>	<b>Health Care</b>	<b>Places of</b>	<b>Infrastructure</b>
Dam Failure					
Faults					
Wildfire					1 bridge
Flood					3 bridges, 2 dams
Liquefaction	Lewiston City Fire Department,	Lewiston School, Sunrise Park, The		2 places of worship	4 bridges, 8 broadband, 9 dams
Landslide					
Slope					
Poorly Drained Soils					

Note: Critical facilities were identified using multiple data sources including: Utah AGRC, UDOT, Utah Division of Water Resources, and public and community leader input.

<b>Lewiston, UT, Agricultural Features at Risk</b>					
<b>Hazard Type</b>	<b>Lands at Risk</b>			<b>Farms &amp; Barns****</b>	
	<b>Agriculture Production*</b>	<b>Farm Land**</b>	<b>Grazing***</b>	<b>Century Farms</b>	<b>Historic Barns</b>
	<b># of Acres</b>			<b># of Farms</b>	<b># of Barns</b>
Dam Failure	0	0	0	0	0
Faults	0	0	0	0	0
Wildfire	15.67	25.91	0	0	0
Flood	572.91	524.26	0	0	0
Liquefaction	616.85	503.17	0	0	0
Landslide	0	0	0	0	0
Slope	0	0	0	0	0
Poorly Drained Soils	0	0	0	0	0

\* Lands that are currently associated with agricultural activities involving water related land use, as described in the 2007 Utah Division of Water Resources, *Water Related Land Use* dataset.  
 \*\*Lands that are suitable for farming purposes based on soil type and composition, as describe in the 2013 Natural Resource Conservation Service, SSURGO datasets.  
 \*\*\* Lands currently associated with grazing allotments identified as part of the Grazing Improvement Program (Utah AGRC, 2012)  
 \*\*\*\* Based on data compiled by the Bear River Association of Governments.

<b>Lewiston, UT, Environmental &amp; Recreational Features at Risk</b>						
<b>Hazard Type</b>	<b>Environmental Features at Risk</b>			<b>Recreational Features at Risk</b>		
	<b>Wetland/ riparian</b>	<b>Lakes</b>	<b>Streams</b>	<b>Parks</b>	<b>Trails</b>	<b>Amenities</b>
	<b># of Acres</b>		<b># of Miles</b>	<b># of Acres</b>	<b># of Miles</b>	<b># of Amenities</b>
Dam Failure	0	0	0	0	0	0
Faults	0	0	0	0	0	0
Wildfire	26.42	2.2	0.36	0	0	0
Flood	518.92	0	15.62	0	0	0
Liquefaction	416.24	35.6	8.67	0	0	0
Landslide	0	0	0	0	0	0
Slope	0	0	0	0	0	0
Poorly Drained Soils	0	0	0	0	0	0

Note: Total acres of land and miles of streams and trails were identified using multiple datas sources including: Utah AGRC, U.S. Fish and Wildlife Service, U.S. Forest Service, U.S. Geological Survey, Utah Division of Water Resources, and public and community leader input.

**Liquefaction.** Hazard mapping identifies moderate-to-high liquefaction risk along the Cub River in the eastern portion of the jurisdiction. Liquefaction risk is high along the Bear River along the western boundary of the jurisdiction.

**Wildfire.** Hazard mapping identifies moderate-to-high wildfire risk in a few areas around the municipal boundary, mainly to the east along Cub River.

### **Future Development**

No concerns involving potential future development within Lewiston were reported by town representatives.

### **Hazard Mitigation Strategies**

**Table 66:** Lewiston Mitigation Strategies

LEWISTON - COMMUNITY MITIGATION STRATEGIES										
Protecting Current Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For NFP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Lewiston	Flood	Protect current residents and property	Coordinate between cities to keep canal gates staffed and free from debris	Coordinate between cities to keep canal gates staffed and free from debris	Medium	2015	Local	Lewiston, canal companies	Minimal	Local, County, FEMA, State
Lewiston	Wildfire	Protect current residents and property	Work with Utah FFSL to determine risk to current residents and educate local officials and the public.	N/A	Medium	2016	Local, Utah FFSL	Lewiston, Utah FFSL	Minimal	Utah FFSL, Utah DEM, BRAG
Lewiston	Earthquake	Protect current residents and property	Emergency training planning and response for residents and coordination between local, county fire, police, EMT crews.	N/A	High	2015	Local, County, Homeland Security	Lewiston, Cache County	\$500	Cache County/ Fire, Logan Fire, Lewiston Fire
LEWISTON - COMMUNITY MITIGATION STRATEGIES										
Protecting Future Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For NFP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Lewiston	Flood	Protect future residents and property	Encourage the use of floodplains for parks, trails, and other recreational uses.	Encourage the use of floodplains for parks, trails, and other recreational uses.	Medium	2018	Local, County, FEMA, State	Lewiston, Cache County, BRAG	Minimal	County, BRAG, FEMA
Lewiston	Wildfire	Protect future residents and property	Review local ordinances and explore more strict development requirements for homes being built in wildfire areas.	N/A	Medium	2016	Local, Utah FFSL	Lewiston, Utah FFSL	Minimal	Utah FFSL, Utah DEM, BRAG
Lewiston	Earthquake	Protect future residents and property	Emergency training planning and response for residents and coordination between local, county fire, police, EMT crews.	N/A	High	2015	Local, County, Homeland Security	Lewiston, Cache County	\$500	Cache County/ Fire, Logan Fire, Lewiston Fire

**LOGAN**

Analysis of hazard risk involving the community of Logan revealed that there is potential risk resulting from **dam failure, earthquake, flood, landslides, liquefaction, steep slopes and wildfire**. These hazards have varying potential to impact life, property, infrastructure, agriculture, and environmental features within the municipal boundary. See *the following tables* for more detailed descriptions of potential losses associated with each natural hazard analyzed in the risk assessment.

**Natural Hazards**

**Current Development**

**Dam Failure.** Hazard mapping identifies dam failure risk to several structures below First Dam, particularly in “The Island” area of town, and west along the Logan River drainage to and past 1000 West. A dam breach in this area would likely fill the entire valley bottom of “The Island” that has several structures, critical facilities and municipal infrastructure.

**Table 67:** Logan City Potential Loss Figures

<b>Table -- : Logan, UT, Residential &amp; Commercial Development at Risk</b>						
<b>Hazard Type</b>	<b>~Residents at Risk*</b>	<b>Residential Units at Risk</b>		<b>Commercial Units at Risk</b>		
		<b># Units</b>	<b>\$ Value**</b>	<b># Units</b>	<b>\$ Value**</b>	<b>\$ Potential Revenue Loss***</b>
Dam Failure	7,653	2,362	450,733,610	100	138,212,345	68,871,700
Faults	927	286	95,951,688	1	3,314,300	688,717
Wildfire	2,411	744	218,643,420	140	328,459,827	96,420,380
Flood	674	208	51,441,021	31	75,900,333	21,350,227
Liquefaction	8,097	2,499	373,244,552	158	218,504,478	108,817,286
Landslide	2,735	844	187,254,417	11	5,254,164	7,575,887
Slope	975	301	111,181,098	4	247,080	2,754,868
Poorly Drained Soils	0	0	0	0	0	0

\* Based on average persons per owner household for Cache County from 2013 American Community Survey, which is 3.24.

\*\* Current Market Value per parcel, including building and land values. Data was provided by Cache County IT personnel.

\*\*\* Based on average sales, receipts, or value of shipments of firms with or without paid employees, per firm (\$688,717 per firm). Derived from 2007 Survey of Business Owners for Cache County, US Census Bureau.

<b>Table -- : Logan, UT, Infrastructure at Risk</b>										
<b>Hazard Type</b>	<b>Infrastructure at Risk</b>									
	<b>Railroad Lines</b>		<b>Natural Gas Lines</b>		<b>Electrical Power lines</b>		<b>Roads</b>		<b>Canals</b>	
	<b># of Miles</b>	<b>\$ Value<sup>1</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>2</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>3</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>4</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>5</sup></b>
Dam Failure	1.17	1,755,000	1.57	2,198,000	0.28	35,560	34.18	17,944,500	4.21	6,315,000
Faults	0	0	0	0	2.38	302,260	6.41	3,365,250	1.28	1,920,000
Wildfire	0.72	1,080,000	0	0	2.21	280,670	12.94	6,793,500	1.48	2,220,000
Flood	0.2	300,000	0.31	434,000	0	0	2.15	1,128,750	0.57	855,000
Liquefaction	6.81	10,215,000	1.9	2,660,000	2.83	359,410	193.5	101,598,000	6.57	9,855,000
Landslide	0	0	0	0	2.37	300,990	22.64	11,886,000	3.75	5,625,000
Slope	0	0	0	0	0	0	0	0	0	0
Poorly Drained Soils	0	0	0	0	0	0	0	0	0	0

<sup>1</sup> Based on figures from 2009 Pre-Disaster Mitigation Plan for Bear River Region, Utah.  
<sup>2</sup> Based on average replacement cost estimates for gas lines ranging from 2-inches-20 inches in diameter. These cost are based solely on labor and material costs, and may vary based on time, scope, and site specific variations (Questar, May 2015).  
<sup>3</sup> Based on estimates from Logan Light and Power, 2015.  
<sup>4</sup> Based on estimates derived from an average 28' wide, 4" thick asphalt county road with gravel subgrade replacement. Cache County, 2015.  
<sup>5</sup> Based recent Cache County and regional project cost estimates, 2015.

<b>Table -- : Logan, UT, Critical Facilities at Risk</b>					
<b>Hazard Type</b>	<b>Critical Facilities Types</b>				
	<b>Emergency Services/Law Enforcement</b>	<b>Schools/Public Facilities</b>	<b>Health Care Facilities</b>	<b>Places of Worship</b>	<b>Infrastructure</b>
Dam Failure	Logan Fire and EMS Station	Riverside Preschool, Wilson Elementary, Riverwood		6 places of worship	9 bridges, 5 broadband anchors, 2 dams
Faults					3 dams
Wildfire	UWCNF Logan Ranger District Office	Logan River Academy	USU Student Health Services, Logan Regional Hospital Transitional Care, Logan Nursing and Rehab Center		10 broadband anchors, 1 dam
Flood					4 bridges
Liquefaction	4 fire stations, 3 EMS stations, 3 correctional facilities, 1 law enforcement station	33 schools, 1 heliport, Riverwood Conference Center, CVTD Transit Center	26 health care centers	39 places of worship	22 bridges, 79 broadband anchors, 7 dam, 1 airport
Landslide	Logan Fire and EMS Station, UWCNF-Logan Ranger District Office	Edith Bowen Laboratory School, Hillcrest School		4 places of worship	9 broadband anchors, 1 dam
Slope				2 places of worship	2 bridges, 3 dams
Poorly Drained Soils					

Note: Critical facilities were identified using multiple data sources including: Utah AGRC, UDOT, Utah Division of Water Resources, and public and community leader input.

<b>Table -- : Logan, UT, Agricultural Features at Risk</b>					
<b>Hazard Type</b>	<b>Lands at Risk</b>			<b>Farms &amp; Barns****</b>	
	<b>Agriculture Production*</b>	<b>Farm Land**</b>	<b>Grazing***</b>	<b>Century Farms</b>	<b>Historic Barns</b>
	<b># of Acres</b>			<b># of Farms</b>	<b># of Barns</b>
Dam Failure	163.48	1,534.38	0.00	2.00	0.00
Faults	21.58	306.01	0.00	0.00	1.00
Wildfire	77.75	540.41	0.00	0.00	0.00
Flood	62.66	329.56	0.00	0.00	0.00
Liquefaction	225.27	1,871.10	0.00	2.00	0.00
Landslide	28.49	591.34	0.00	0.00	0.00
Slope	33.03	0.00	0.00	0.00	0.00
Poorly Drained Soils	0.00	0.00	0.00	0.00	0.00

\* Lands that are currently associated with agricultural activities involving water related land use, as described in the 2007 Utah Division of Water Resources, *Water Related Land Use* dataset.  
 \*\*Lands that are suitable for farming purposes based on soil type and composition, as describe in the 2013 Natural Resource Conservation Service, SSURGO datasets.  
 \*\*\* Lands currently associated with grazing allotments identified as part of the Grazing Improvement Program (Utah AGRC, 2012)  
 \*\*\*\* Based on data compiled by the Bear River Association of Governments.

<b>Table -- : Logan, UT, Environmental &amp; Recreational Features at Risk</b>						
<b>Hazard Type</b>	<b>Environmental Features at Risk</b>			<b>Recreational Features at Risk</b>		
	<b>Wetland/ riparian</b>	<b>Lakes</b>	<b>Streams</b>	<b>Parks</b>	<b>Trails</b>	<b>Amenities</b>
	<b># of Acres</b>		<b># of Miles</b>	<b># of Acres</b>	<b># of Miles</b>	<b># of Amenities</b>
Dam Failure	254.86	25.90	10.39	150.78	0.22	3
Faults	7.99	8.00	2.99	20.71	2.5	5
Wildfire	10.54	3.35	4.30	29.26	2.32	6
Flood	163.58	0	7.92	61.20	0.05	1
Liquefaction	261.06	13.80	10.53	141.99	0	0
Landslide	5.16	2.38	6.22	36.57	0.88	6
Slope	0.00	0.00	0.00	17.86	1.98	6
Poorly Drained Soils	0	0	0	0	0	0

Note: Total acres of land and miles of streams and trails were identified using multiple datas sources including: Utah AGRC, U.S. Fish and Wildlife Service, U.S. Forest Service, U.S. Geological Survey, Utah Division of Water Resources, and public and community leader input.

**Earthquake.** Hazard mapping identifies several residential structures and infrastructure at risk from surface fault rupture. Areas of concern are located along the fault damage zone which runs north/south along the jurisdiction's eastern boundary.

**Flood.** Hazard mapping identifies several residential and commercial structures at risk from flooding. There are a number of older homes located in the 100 year floodplain of the Logan River. In addition a number of newer (post 1970) homes have been constructed near the river in the floodplain (along Sumac and Thrushwood Drives). Some homes in the Country Manor Subdivision along the Blacksmith Fork River are located in the 100 year floodplain as well. The Logan City Golf Course is also located in the 100 year floodplain. The golf course can accommodate flooding with a flood water storage device and is designed to moderate flooding downstream.

**Landslides.** Hazard mapping identifies significant risk from landslides within the jurisdiction. Large portions of the "Island" area and the Utah State University campus are located in potential landslide areas. Landslides on these Lake Bonneville sediments are fairly common, as is evident in the landslide history chart for Cache County. Logan also has several drainages north and south of Dry Canyon where landslides could damage many structures. Some of the largest landslides and those that pose the greatest threat to human life and property in Cache County are the following: Utah State University (USU) and the Island area have a large landslide area which could threaten human life and cause damage to homes and infrastructure. Particularly in the Island area of Logan City, historical landslides have covered roads and damaged homes. On July 11, 2009 a landslide occurred on the hillside along which the Logan and Northern Canal runs, which destroyed a home downhill and took the lives of three individuals. According to USU campus planning, the section of campus at the top of the large landslide prone area at the base of Logan Canyon has not had any major landslide activity throughout most of the Universities history. Edith Bowen and Hillcrest Elementary Schools are both located on the upper end of this slide. While they are listed as potential losses in Table 8-11, they are not thought

by USU campus planning to be at great risk. Logan also has several large landslide areas on the south-east, where homes are being built on the foothills at the base of several small drainages.

**Liquefaction.** Hazard mapping identifies significant risk in the moderate-to-high liquefaction zone within the jurisdiction. There are several structures, critical facilities, infrastructure and other environmental/recreational amenities in liquefaction prone areas that pose a significant threat to homes and people.

**Steep Slopes.** Hazard mapping identifies significant risk from steep slopes along much of the jurisdiction's eastern boundary. There are several hundred residential structures in steep slope areas throughout the jurisdiction, primarily located along the eastern boundary, and also running parallel to the Logan River, along the northern edge of "The Island" and leading up to the USU Campus that rests on a high bluff.

**Wildfire.** Hazard mapping identifies moderate-to-high wildfire risk to a significant number of homes along the jurisdiction's eastern bench that parallels the Cache-Wasatch National Forest.

### **Future Development**

No concerns involving potential future development within Logan were reported by city representatives.

### **Hazard Mitigation Strategies**

**Table 68:** Logan City Mitigation Strategies

LOGAN - COMMUNITY MITIGATION STRATEGIES										
Protecting Current Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For N/FIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Logan	Wildfire	Protect current residents and property	Develop educational program for homeowners regarding risk and defensible space.	N/A	High	2016	Federal, State, Local	Logan, Utah FFSL	\$5,000	Utah FFSL
Logan	Flood	Protect current residents and property	Improve flood risk assessment by revising and updating regulatory floodplain maps	N/A	Medium-high	2017	Local	Logan, Utah DEM	\$100,000	City has retained consultant to model river through Logan
Logan	Landslide	Protect current residents and property	Improve data and mapping on specific landslide-prone areas to assess vulnerability	N/A	Medium	2015-2020	Local	Logan, UGS	\$50,000	Use consultant
Logan	Dam Failure	Protect current residents and property	Educate residents located with dam failure impact areas regarding notifications and emergency actions.	N/A	Low	2015-2020	Local	Logan, Utah Dam Safety	\$10,000	City staff
Logan	Earthquake	Protect current residents and property	Protect critical facilities and infrastructure by replacing 100 North Logan River Bridge	N/A	High	2015-2020	Local	Logan, Utah DEM	\$2,000,000	City will Use Consultants and Contractors
LOGAN - COMMUNITY MITIGATION STRATEGIES										
Protecting Future Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For N/FIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Logan	Wildfire	Protect future residents and property	Develop educational program for homeowners regarding risk and defensible space.	N/A	High	2016	Federal, State, Local	Logan, Utah FFSL	\$5,000	Utah FFSL
Logan	Flood	Protect future residents and property	Limit or restrict development in floodplain areas.	N/A	High	2015-2020	Local	Logan, Utah DEM	\$250,000	City staff through development reviews
Logan	Landslide	Protect future residents and property	Improve data and mapping on specific landslide-prone areas to assess vulnerability	N/A	Medium	2015-2020	Local	Logan, UGS	\$50,000	Use consultant
Logan	Dam Failure	Protect future residents and property	Educate residents located with dam failure impact areas regarding notifications and emergency actions.	N/A	Low	2015-2020	Local	Logan, Utah Dam Safety	\$10,000	City staff
Logan	Earthquake	Protect future residents and property	Conduct outreach to builders, architects, engineers, and inspectors about seismic code provisions.	N/A	Medium	2015-2020	Local, FEMA	Logan, UGS	\$10,000	International Code Council

**MENDON**

Analysis of hazard risk involving the community of Mendon revealed that there is potential risk resulting from **earthquake, flood, steep slopes, and wildfire**. These hazards have varying potential to impact life, property, infrastructure, agriculture, and environmental features within the municipal boundary. See *the following tables* for more detailed descriptions of potential losses associated with each natural hazard analyzed in the risk assessment.

**Table 69:** Mendon Potential Loss Figures

**Natural Hazards**

**Current Development**

**Earthquake.** Hazard mapping identifies several structures and infrastructure at risk from surface fault rupture. Areas of concern are located in the northeast section of the jurisdiction along Mendon Road and 600 North.

**Flood.** Hazard mapping identifies several residential structures at risk from flooding. Small streams that drain a portion of the eastern slope

<b>Mendon, UT, Residential &amp; Commercial Development at Risk</b>						
<b>Hazard Type</b>	<b>~Residents at Risk*</b>	<b>Residential Units at Risk</b>		<b>Commercial Units at Risk</b>		
		<b># Units</b>	<b>\$ Value**</b>	<b># Units</b>	<b>\$ Value**</b>	<b>\$ Potential Revenue Loss***</b>
Dam Failure	0	0	0	0	0	0
Faults	198	61	14,432,874	1	135,009	688,717
Wildfire	855	264	54,716,612	8	1,387,669	5,509,736
Flood	262	81	18,232,893	1	44,530	688,717
Liquefaction	0	0	0	0	0	0
Landslide	0	0	0	0	0	0
Slope	104	32	8,267,793	0	0	0
Poorly Drained Soils	0	0	0	0	0	0

\* Based on average persons per owner household for Cache County from 2013 American Community Survey, which is 3.24.

\*\* Current Market Value per parcel, including building and land values. Data was provided by Cache County IT personnel.

\*\*\* Based on average sales, receipts, or value of shipments of firms with or without paid employees, per firm (\$688,717 per firm). Derived from 2007 Survey of Business Owners for Cache County, US Census Bureau.

<b>Mendon, UT, Infrastructure at Risk</b>										
<b>Hazard Type</b>	<b>Infrastructure at Risk</b>									
	<b>Railroad Lines</b>		<b>Natural Gas Lines</b>		<b>Electrical Power lines</b>		<b>Roads</b>		<b>Canals</b>	
	<b># of Miles</b>	<b>\$ Value<sup>1</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>2</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>3</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>4</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>5</sup></b>
Dam Failure	0	0	0	0	0	0	0	0	0	0
Faults	0.15	225,000	0	0	0	0	1.17	614,250	0	0
Wildfire	0	0	0	0	0	0	3.1	1,627,500	0.33	495,000
Flood	0	0	0	0	0	0	2.39	1,254,750	0.29	435,000
Liquefaction	0.2	300,000	0	0	0	0	14.19	7,449,750	0	0
Landslide	0	0	0	0	0	0	0	0	0	0
Slope	0	0	0	0	0	0	1.56	819,000	0.66	990,000
Poorly Drained Soils	0	0	0	0	0	0	0	0	0	0

<sup>1</sup> Based on figures from 2009 Pre-Disaster Mitigation Plan for Bear River Region, Utah.  
<sup>2</sup> Based on average replacement cost estimates for gas lines ranging from 2-inches-20 inches in diameter. These cost are based solely on labor and material costs, and may vary based on time, scope, and site specific variations (Questar, May 2015).  
<sup>3</sup> Based on estimates from Logan Light and Power, 2015.  
<sup>4</sup> Based on estimates derived from an average 28' wide, 4" thick asphalt county road with gravel subgrade replacement. Cache County, 2015.  
<sup>5</sup> Based recent Cache County and regional project cost estimates, 2015.

<b>Mendon, UT, Critical Facilities at Risk</b>					
<b>Hazard Type</b>	<b>Critical Facilities Types</b>				
	<b>Emergency Services/Law Enforcement</b>	<b>Schools/Public Facilities</b>	<b>Health Care Facilities</b>	<b>Places of Worship</b>	<b>Infrastructure</b>
Dam Failure					
Faults		Mountainside elementary			
Wildfire				1 place of worship	1 broadband anchor
Flood				1 place of worship	
Liquefaction	Mendon Fire Department, Mendon Fire and EMS	Mountainside Elementary		2 places of worship	5 broadband anchors
Landslide					
Slope					
Poorly Drained Soils					

Note: Critical facilities were identified using multiple data sources including: Utah AGRC, UDOT, Utah Division of Water Resources, and public and community leader input.

<b>Mendon, UT, Agricultural Features at Risk</b>					
<b>Hazard Type</b>	<b>Lands at Risk</b>			<b>Farms &amp; Barns****</b>	
	<b>Agriculture Production*</b>	<b>Farm Land**</b>	<b>Grazing***</b>	<b>Century Farms</b>	<b>Historic Barns</b>
	<b># of Acres</b>			<b># of Farms</b>	<b># of Barns</b>
Dam Failure	0	0	0	0	0
Faults	31.06	79.93	0	0	0
Wildfire	59.79	258.09	0	0	1
Flood	37.38	108.28	0	0	0
Liquefaction	0	0	0	0	0
Landslide	0	0	0	0	0
Slope	40.92	0	0	0	1
Poorly Drained Soils	0	0	0	0	0

\* Lands that are currently associated with agricultural activities involving water related land use, as described in the 2007 Utah Division of Water Resources, *Water Related Land Use* dataset.  
 \*\*Lands that are suitable for farming purposes based on soil type and composition, as describe in the 2013 Natural Resource Conservation Service, SSURGO datasets.  
 \*\*\* Lands currently associated with grazing allotments identified as part of the Grazing Improvement Program (Utah AGRC, 2012)  
 \*\*\*\* Based on data compiled by the Bear River Association of Governments.

<b>Mendon, UT, Environmental &amp; Recreational Features at Risk</b>						
<b>Hazard Type</b>	<b>Environmental Features at Risk</b>			<b>Recreational Features at Risk</b>		
	<b>Wetland/ riparian</b>	<b>Lakes</b>	<b>Streams</b>	<b>Parks</b>	<b>Trails</b>	<b>Amenities</b>
	<b># of Acres</b>		<b># of Miles</b>	<b># of Acres</b>	<b># of Miles</b>	<b># of Amenities</b>
Dam Failure	0	0	0	0	0	0
Faults	3.68	0	0.09	2.76	0	0
Wildfire	14.45	0	0.87	5.58	0	0
Flood	11.25	0	2.12	2.07	0	0
Liquefaction	0	0	0	0	0	0
Landslide	0	0	0	0	0	0
Slope	0.81	0	0.8	0	0	0
Poorly Drained Soils	0	0	0	0	0	0

Note: Total acres of land and miles of streams and trails were identified using multiple datas sources including: Utah AGRC, U.S. Fish and Wildlife Service, U.S. Forest Service, U.S. Geological Survey, Utah Division of Water Resources, and public and community leader input.

of the Wellsville Mountains flow through Mendon. Several steep drainages on the west which could pose threats are Deep Canyon, Thimbleberry Canyon, and Bird Canyon. Bird canyon drainages particularly pose the greatest threat to residents and property.

***Steep Slopes.*** Hazard mapping identifies significant risk from steep slopes to residential structures and infrastructure in the central portion of the jurisdiction west of S.R. 23/100 West.

***Wildfire.*** Hazard mapping identifies moderate-to-high wildfire risk throughout much of the jurisdiction. This is primarily due to the high amount of urban canopy within the jurisdiction surrounding residential structures.

### **Future Development**

No concerns involving potential future development within Mendon were reported by city representatives.

### **Hazard Mitigation Strategies**

**Table 70:** Mendon City Mitigation Strategies

MENDON - COMMUNITY MITIGATION STRATEGIES										
Protecting Current Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For NEIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Mendon	Flood	Protect current residents and property	Landscape city owned properties to divert flood waters to proper ditching and urge homeowners to do the same. Landscape and ditch areas to not only help yourself but help others and the city.	N/A	High	2016	For City Property, and 2016-2016 storm water budget	Mendon, Utah DEM	\$5,000	N/A
Mendon	Liquefaction/ Faults	Protect current residents and property	Enforce current building codes	N/A	High	2015	N/A	Mendon	N/A	N/A
Mendon	Drought	Protect current residents and property	Understand effects to Mendon, ask USU for study of effects	N/A	Low	2020	Federal, State, Local	Mendon, USU	Unknown	USU
Mendon	Severe Weather	Protect current residents and property	Develop plan to reduce threats to community	N/A	High	2015	FEMA, State, County	Mendon, NOAA, Utah Climate Center	Unknown	FEMA, State, County
MENDON - COMMUNITY MITIGATION STRATEGIES										
Protecting Future Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For NEIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Mendon	Flood	Protect future residents and property	Require swales and ditches to carry excess water. Landscape property as to not be a liability to selves or neighbors and city.	N/A	Medium	2020	N/A	Mendon, Utah DEM	N/A	N/A
Mendon	Faults/ Liquefaction	Protect future residents and property	Help citizens prepare. Check existing city buildings to see if they meet earthquake structure code.	N/A	Medium	N/A	N/A	Mendon	N/A	N/A
Mendon	Drought	Protect future residents and property	Understand effects to Mendon, ask USU for study of effects	N/A	Low	2020	Federal, State, Local	Mendon, USU	Unknown	USU
Mendon	Severe Weather	Protect future residents and property	Develop plan to reduce threats to community	N/A	High	2015	FEMA, State, County	Mendon, NOAA, Utah Climate Center	Unknown	Unknown

**MILLVILLE**

Analysis of hazard risk involving the community of Millville revealed that there is potential risk resulting from **earthquake, flood, landslides, liquefaction, steep slopes and wildfire**. These hazards have varying potential to impact life, property, infrastructure, agriculture, and environmental features within the municipal boundary. See *the following tables* for more detailed descriptions of potential losses associated with each natural hazard analyzed in the risk assessment.

**Table 71:** Millville City Potential Losses

**Natural Hazards**

**Current Development**

**Earthquake.** Hazard mapping identifies residential structures and infrastructure at risk from surface fault rupture. Areas of concern are located in the fault that runs parallel to the Cache-Wasatch Mountains along the jurisdiction’s eastern boundary.

**Flood.** Hazard mapping identifies several structures and infrastructure at risk from potential flooding. The Lower Millville Providence Canal was demonstrated to have deficient capacities to accom-

Millville, UT, Residential & Commercial Development at Risk						
Hazard Type	~Residents at Risk*	Residential Units at Risk		Commercial Units at Risk		
		# Units	\$ Value**	# Units	\$ Value**	\$ Potential Revenue Loss***
Dam Failure	0	0	0	0	0	0
Fault	32	10	2,134,116	1	22,550	688,717
Wildfire	716	221	43,671,956	8	2,483,333	5,509,736
Flood	26	8	2,228,832	8	10,263,680	5,509,736
Liquefaction	10	3	770,046	16	25,551,317	11,019,472
Landslide	6	2	742,664	0	0	0
Slope	117	36	9,469,596	0	0	0
Poorly Drained Soils	0	0	0	0	0	0

\* Based on average persons per owner household for Cache County from 2013 American Community Survey, which is 3.24.

\*\* Current Market Value per parcel, including building and land values. Data was provided by Cache County IT personnel.

\*\*\* Based on average sales, receipts, or value of shipments of firms with or without paid employees, per firm (\$688,717 per firm). Derived from 2007 Survey of Business Owners for Cache County, US Census Bureau.

<b>Millville, UT, Infrastructure at Risk</b>										
<b>Hazard Type</b>	<b>Infrastructure at Risk</b>									
	<b>Railroad Lines</b>		<b>Natural Gas Lines</b>		<b>Electrical Power lines</b>		<b>Roads</b>		<b>Canals</b>	
	<b># of Miles</b>	<b>\$ Value<sup>1</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>2</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>3</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>4</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>5</sup></b>
Dam Failure	0	0	0	0	0	0	0	0	0	0
Fault	0	0	0	0	1.23	156,210	1.67	876,750	0	0
Wildfire	0	0	0	0	1.13	143,510	2.4	1,260,000	0.45	675,000
Flood	0	0	0	0	0	0	0.18	94,500	0.03	45,000
Liquefaction	0.53	795,000	0	0	1.51	191,770	17.39	9,129,750	0.01	15,000
Landslide	0	0	0	0	0	0	0.06	31,500	0	0
Slope	0	0	0	0	0	0	0.76	399,000	0	0
Poorly Drained Soils	0	0	0	0	0	0	0	0	0	0

<sup>1</sup> Based on figures from 2009 Pre-Disaster Mitigation Plan for Bear River Region, Utah.

<sup>2</sup> Based on average replacement cost estimates for gas lines ranging from 2-inches-20 inches in diameter. These cost are based solely on labor and material costs, and may vary based on time, scope, and site specific variations (Questar, May 2015).

<sup>3</sup> Based on estimates from Logan Light and Power, 2015.

<sup>4</sup> Based on estimates derived from an average 28' wide, 4" thick asphalt county road with gravel subgrade replacement. Cache County, 2015.

<sup>5</sup> Based recent Cache County and regional project cost estimates, 2015.

<b>Millville, UT, Critical Facilities at Risk</b>					
<b>Hazard Type</b>	<b>Critical Facilities Types</b>				
	<b>Emergency Services/Law Enforcement</b>	<b>Schools/Public Facilities</b>	<b>Health Care Facilities</b>	<b>Places of Worship</b>	<b>Infrastructure</b>
Dam Failure					
Faults					
Wildfire					
Flood					
Liquefaction		New Millville High School, Milleville Elementary		2 places of worship	5 broadband anchors
Landslide					
Slope					
Soils					

Note: Critical facilities were identified using multiple data sources including: Utah AGRC, UDOT, Utah Division of Water Resources, and public and community leader input.

<b>Millville, UT, Agricultural Features at Risk</b>					
<b>Hazard Type</b>	<b>Lands at Risk</b>			<b>Farms &amp; Barns****</b>	
	<b>Agriculture Production*</b>	<b>Farm Land**</b>	<b>Grazing***</b>	<b>Century Farms</b>	<b>Historic Barns</b>
	<b># of Acres</b>			<b># of Farms</b>	<b># of Barns</b>
Dam Failure	0	0	0	0	0
Faults	12.05	47.56	0	0	0
Wildfire	35.1	172.38	0	0	0
Flood	46.37	58.86	0	0	0
Liquefaction	242.11	289.83	0	0	0
Landslide	4.69	4.7	0	0	0
Slope	19.6	0	0	0	0
Poorly Drained Soils	0	0	0	0	0

\* Lands that are currently associated with agricultural activities involving water related land use, as described in the 2007 Utah Division of Water Resources, *Water Related Land Use* dataset.  
 \*\*Lands that are suitable for farming purposes based on soil type and composition, as describe in the 2013 Natural Resource Conservation Service, SSURGO datasets.  
 \*\*\* Lands currently associated with grazing allotments identified as part of the Grazing Improvement Program (Utah AGRC, 2012)  
 \*\*\*\* Based on data compiled by the Bear River Association of Governments.

<b>Millville, UT, Environmental &amp; Recreational Features at Risk</b>						
<b>Hazard Type</b>	<b>Environmental Features at Risk</b>			<b>Recreational Features at Risk</b>		
	<b>Wetland/ riparian</b>	<b>Lakes</b>	<b>Streams</b>	<b>Parks</b>	<b>Trails</b>	<b>Amenities</b>
	<b># of Acres</b>		<b># of Miles</b>	<b># of Acres</b>	<b># of Miles</b>	<b># of Amenities</b>
Dam Failure	0	0	0	0	0	0
Fault	0.01	0	0.6	0	1.34	1
Wildfire	14.12	0	1.07	0	0.76	1
Flood	42.06	0	1.79	0.16	0	0
Liquefaction	77.23	0	1.7	0	0	0
Landslide	0	0	0	0	0	0
Slope	0.01	0	0	0.00	0.08	1
Poorly Drained Soils	0	0	0	0	0	0

Note: Total acres of land and miles of streams and trails were identified using multiple datas sources including: Utah AGRC, U.S. Fish and Wildlife Service, U.S. Forest Service, U.S. Geological Survey, Utah Division of Water Resources, and public and community leader input.

moderate a 10 year, 3 hour duration storm event as it flows through Millville City; when it was modeled for the Cache County Storm Water Analysis report. Channel capacity for the canal was found to be deficient at 50 North, 150 North, 400 North and 2200 South in Millville City. In 2003, Millville, along with Nibley, experienced flooding from the Blacksmith Fork River. This section of river is not a natural waterway, but has a form similar to a canal, with banks built up on either side with past breach of high water flows. Potential losses can also be found on the northwest section of municipal boundaries, near the confluence of the Blacksmith Fork River and the Logan River. There are also several structures at risk on the very south end of the municipal boundaries where the Millville Canyon drainage empties into the Blacksmith Fork River. Millville floodplain analysis reveals at least 7 residential structures that intersect the delineated floodplain.

***Landslides.*** Hazard mapping identifies risk from landslides to some residential structures and infrastructure east of the Millville Cemetery.

***Liquefaction.*** Hazard mapping identifies moderate-to-high liquefaction risk to several structures and infrastructure west of S.R. 165/Main Street.

***Steep Slopes.*** Hazard mapping identifies several residential structures at risk from steep slopes north of the Millville Cemetery along the jurisdiction's eastern boundary.

***Wildfire.*** Hazard mapping identifies moderate-to-high wildfire risk areas along the jurisdiction's eastern bench and in the southwest section of town where much of the urban canopy is located.

### **Future Development**

No concerns involving potential future development within Millville were reported by city representatives.

### **Hazard Mitigation Strategies**

**Table 72:** Millville Town Mitigation Strategies

MILLVILLE - COMMUNITY MITIGATION STRATEGIES										
Protecting Current Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For NFIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Millville	Earthquake, Faults, Liquefaction	Protect current residents and property	Train residents as a CERT community emergency response team. Install ham radio station.	N/A	High	2015	Millville City, Cache County, NRCS	Millville, Utah DEM	\$7,000	Millville City
Millville	Flood	Protect current residents and property	Tree Removal, sediment removal, and bank restoration/ stabilization was addressed.	Work with state floodplain manager to assure community is complying with NFIP	High	Completed	Millville City, Cache County, NRCS	Millville, Utah DEM	\$190,000	Millville City, Cache County, NRCS
Millville	Wildfire	Protect current residents and property	Notice to restrict fireworks east of 500 East. Educate homeowners with handouts.	N/A	High	2015	Local	Millville	\$100	Millville City
Millville	Landslide/ Steep Slopes	Protect current residents and property	Landslide areas and steep slopes are identified as open space no development	N/A	High	Completed	Local	Millville, UGS	\$0	Millville City
MILLVILLE - COMMUNITY MITIGATION STRATEGIES										
Protecting Future Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For NFIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Millville	Earthquake, Faults, Liquefaction	Protect future residents and property	Train residents as a CERT community emergency response team. Install ham radio station.	N/A	High	2015	Millville City, Cache County, NRCS	Millville, Utah DEM	\$7,000	Millville City
Millville	Flood	Protect future residents and property	Tree Removal, sediment removal, and bank restoration/ stabilization was addressed.	Work with state floodplain manager to assure community is complying with NFIP	High	Completed	Millville City, Cache County, NRCS	Millville, Utah DEM	\$190,000	Millville City, Cache County, NRCS
Millville	Wildfire	Protect future residents and property	Notice to restrict fireworks east of 500 East. Educate homeowners with handouts.	N/A	High	2015	Local	Millville	\$100	Millville City
Millville	Landslide/ Steep Slopes	Protect future residents and property	Landslide areas and steep slopes are identified as open space no development	N/A	High	Completed	Local	Millville, UGS	\$0	Millville City

**NEWTON**

Analysis of hazard risk involving the community of Newton revealed that there is potential risk resulting from **flood, steep slopes and wildfire**. These hazards have varying potential to impact life, property, infrastructure, agriculture, and environmental features within the municipal boundary. See *the following tables* for more detailed descriptions of potential losses associated with each natural hazard analyzed in the risk assessment.

**Natural Hazards**

**Current Development**

**Flood.** Hazard mapping identifies several structures at risk from flooding in the 100 year floodplain located along the jurisdiction’s eastern boundary, adjacent to Newton Creek.

**Steep Slopes.** Hazard mapping identifies risk from steep slopes to several residential structures in the western portion of the jurisdiction.

**Table 73:** Newton Potential Loss Figures

Newton, UT, Residential & Commercial Development at Risk						
Hazard Type	~Residents at Risk*	Residential Units at Risk		Commercial Units at Risk		
		# Units	\$ Value**	# Units	\$ Value**	\$ Potential Revenue Loss***
Dam Failure	0	0	0	0	0	0
Faults	0	0	0	0	0	0
Wildfire	473	146	23,113,822	7	586,677	4,821,019
Flood	52	16	3,759,174	0	0	0
Liquefaction	0	0	0	0	0	0
Landslide	0	0	0	0	0	0
Slope	52	16	2,573,234	0	0	0
Poorly Drained Soils	0	0	0	0	0	0

\* Based on average persons per owner household for Cache County from 2013 American Community Survey, which is 3.24.

\*\* Current Market Value per parcel, including building and land values. Data was provided by Cache County IT personnel.

\*\*\* Based on average sales, receipts, or value of shipments of firms with or without paid employees, per firm (\$688,717 per firm). Derived from 2007 Survey of Business Owners for Cache County, US Census Bureau.

<b>Newton, UT, Infrastructure at Risk</b>										
<b>Hazard Type</b>	<b>Infrastructure at Risk</b>									
	<b>Railroad Lines</b>		<b>Natural Gas Lines</b>		<b>Electrical Power lines</b>		<b>Roads</b>		<b>Canals</b>	
	<b># of Miles</b>	<b>\$ Value<sup>1</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>2</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>3</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>4</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>5</sup></b>
Dam Failure	0	0	0	0	0	0	0	0	0	0
Faults	0	0	0	0	0	0	0	0	0	0
Wildfire	0	0	0	0	0	0	2.15	1,128,750	0	0
Flood	0	0	0	0	0	0	0.05	26,250	0	0
Liquefaction	0	0	0	0	0	0	10.45	5,486,250	0	0
Landslide	0	0	0	0	0	0	0	0	0	0
Slope	0	0	0	0	0	0	0.53	278,250	0	0
Poorly Drained Soils	0	0	0	0	0	0	0	0	0	0

<sup>1</sup> Based on figures from 2009 Pre-Disaster Mitigation Plan for Bear River Region, Utah.  
<sup>2</sup> Based on average replacement cost estimates for gas lines ranging from 2-inches-20 inches in diameter. These cost are based solely on labor and material costs, and may vary based on time, scope, and site specific variations (Questar, May 2015).  
<sup>3</sup> Based on estimates from Logan Light and Power, 2015.  
<sup>4</sup> Based on estimates derived from an average 28' wide, 4" thick asphalt county road with gravel subgrade replacement. Cache County, 2015.  
<sup>5</sup> Based recent Cache County and regional project cost estimates, 2015.

<b>Newton, UT, Critical Facilities at Risk</b>					
<b>Hazard Type</b>	<b>Critical Facilities Types</b>				
	<b>Emergency Services/Law Enforcement</b>	<b>Schools/Public Facilities</b>	<b>Health Care Facilities</b>	<b>Places of Worship</b>	<b>Infrastructure</b>
Dam Failure					
Faults					
Wildfire	Newton Fire Department and EMS			1 place of worship	3 broadband anchors
Flood					
Liquefaction					
Landslide					
Slope					
Poorly Drained Soils					

Note: Critical facilities were identified using multiple data sources including: Utah AGRC, UDOT, Utah Division of Water Resources, and public and community leader input.

<b>Newton, UT, Agricultural Features at Risk</b>					
<b>Hazard Type</b>	<b>Lands at Risk</b>			<b>Farms &amp; Barns****</b>	
	<b>Agriculture Production*</b>	<b>Farm Land**</b>	<b>Grazing***</b>	<b>Century Farms</b>	<b>Historic Barns</b>
	<b># of Acres</b>			<b># of Farms</b>	<b># of Barns</b>
Dam Failure	0	0	0	0	0
Faults	0	0	0	0	0
Wildfire	4.51	156.4	0	1	1
Flood	9.61	13.78	0	0	0
Liquefaction	0	0	0	0	0
Landslide	0	0	0	0	0
Slope	7.06	0	0	0	0
Poorly Drained Soils	0	0	0	0	0

\* Lands that are currently associated with agricultural activities involving water related land use, as described in the 2007 Utah Division of Water Resources, *Water Related Land Use* dataset.  
 \*\*Lands that are suitable for farming purposes based on soil type and composition, as describe in the 2013 Natural Resource Conservation Service, SSURGO datasets.  
 \*\*\* Lands currently associated with grazing allotments identified as part of the Grazing Improvement Program (Utah AGRC, 2012)  
 \*\*\*\* Based on data compiled by the Bear River Association of Governments.

<b>Newton, UT, Environmental &amp; Recreational Features at Risk</b>						
<b>Hazard Type</b>	<b>Environmental Features at Risk</b>			<b>Recreational Features at Risk</b>		
	<b>Wetland/ riparian</b>	<b>Lakes</b>	<b>Streams</b>	<b>Parks</b>	<b>Trails</b>	<b>Amenities</b>
	<b># of Acres</b>		<b># of Miles</b>	<b># of Acres</b>	<b># of Miles</b>	<b># of Amenities</b>
Dam Failure	0	0	0	0	0	0
Faults	0	0	0	0	0	0
Wildfire	0.02	0	0.48	2.95	0	0
Flood	1.02	0	0	0	0	0
Liquefaction	0	0	0	0	0	0
Landslide	0	0	0	0	0	0
Slope	0	0	0.45	0	0	0
Poorly Drained Soils	0	0	0	0	0	0

Note: Total acres of land and miles of streams and trails were identified using multiple datas sources including: Utah AGRC, U.S. Fish and Wildlife Service, U.S. Forest Service, U.S. Geological Survey, Utah Division of Water Resources, and public and community leader input.

**Wildfire.** Hazard mapping identifies moderate-to-high wildfire risk areas throughout much of the jurisdiction, due to the high amount of urban canopy within city limits.

### **Future Development**

No concerns involving potential future development within Newton were reported by town representatives.

### **Hazard Mitigation Strategies**

**Table 74:** Newton Mitigation Strategies

NEWTON - COMMUNITY MITIGATION STRATEGIES										
Protecting Current Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For NFIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Newton	Steep Slopes	Protect current residents and property	Work with state and other groups to determine risk at local level.	N/A	Low	2017	State, Local	Newton, UGS	Minimal	State, Local
Newton	Flood	Protect current residents and property	Making sure Fire Department and EMT's are Trained in the occurrence of a flood hazard event.	Work with State floodplain manager to determine NFIP compliance and work to update.	Medium	2015	County, Local	Newton, Utah DEM, Cache County	Minimal	County, local, FEMA, State ESHS
Newton	Earthquake	Protect current residents and property	Evaluate town for areas and infrastructure that could be effected. If the funding did come, retrofitting some infrastructure would be a possibility	N/A	Medium	2020	Local	Newton, UGS, BRAG	Minimal	Local
Newton	Wildfire	Protect current residents and property	Make sure all Fire fighters and Emergency response crews have the proper training for wildfires.	N/A	Medium	2017	Local, County	Newton, Cache County	Minimal	Local, County
NEWTON - COMMUNITY MITIGATION STRATEGIES										
Protecting Future Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For NFIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Newton	Steep Slopes	Protect future residents and property	Review current ordinances to see if improvements can be made to protect future residents from effects of steep slope.	N/A	Low	2017	State, Local	Newton, UGS	Minimal	State, Local
Newton	Flood	Protect future residents and property	Making sure Fire Department and EMT's are trained in the occurrence of a flood hazard event.	Work with State floodplain manager to determine NFIP compliance and work to update.	Medium	2015	County, Local	Newton, Utah DEM, Cache County	Minimal	County, local, FEMA, State ESHS
Newton	Earthquake	Protect future residents and property	Evaluate town for areas and infrastructure that could be effected. If the funding did come, retrofitting some infrastructure would be a possibility	N/A	Medium	2020	Local	Newton, UGS, BRAG	Minimal	Local
Newton	Wildfire	Protect future residents and property	Creating fire breaks or vegetation setback from infrastructure in wildfire prone areas.	N/A	High	2017	Local, County	Newton, Cache County	Minimal	Local, County

**NIBLEY**

Analysis of hazard risk involving the community of Nibley revealed that there is potential risk resulting from **flood, landslides, liquefaction, steep slopes and wildfire**. These hazards have varying potential to impact life, property, infrastructure, agriculture, and environmental features within the municipal boundary. See *the following tables* for more detailed descriptions of potential losses associated with each natural hazard analyzed in the risk assessment.

**Table 75:** Nibley Potential Loss Figures

**Natural Hazards**

**Current Development**

**Flood.** Hazard mapping identifies several structures and infrastructure at risk from flooding in the 100 year floodplain. There are two floodplain segments that enter the city from the southeast. One segment extends north along the Blacksmith Fork River drainage to the northern boundary of the city limit. The other extends southeast to northwest to 3200 South St. This is especially true where flooding occurred in 2003 at the confluence of Highway 165

<b>Nibley, UT, Residential &amp; Commercial Development at Risk</b>						
<b>Hazard Type</b>	<b>~Residents at Risk*</b>	<b>Residential Units at Risk</b>		<b>Commercial Units at Risk</b>		
		<b># Units</b>	<b>\$ Value**</b>	<b># Units</b>	<b>\$ Value**</b>	<b>\$ Potential Revenue Loss***</b>
Dam Failure	0	0	0	0	0	0
Faults	0	0	0	0	0	0
Wildfire	573	177	46,236,677	5	3,902,933	3,443,585
Flood	528	163	49,841,244	2	1,371,078	1,377,434
Liquefaction	1,571	485	92,305,887	10	6,254,210	6,887,170
Landslide	6	2	818,333	0	0	0
Slope	62	19	3,229,538	0	0	0
Poorly Drained Soils	0	0	0	0	0	0

\* Based on average persons per owner household for Cache County from 2013 American Community Survey, which is 3.24.  
 \*\* Current Market Value per parcel, including building and land values. Data was provided by Cache County IT personnel.  
 \*\*\* Based on average sales, receipts, or value of shipments of firms with or without paid employees, per firm (\$688,717 per firm). Derived from 2007 Survey of Business Owners for Cache County, US Census Bureau.

<b>Nibley, UT, Infrastructure at Risk</b>										
<b>Hazard Type</b>	<b>Infrastructure at Risk</b>									
	<b>Railroad Lines</b>		<b>Natural Gas Lines</b>		<b>Electrical Power lines</b>		<b>Roads</b>		<b>Canals</b>	
	<b># of Miles</b>	<b>\$ Value<sup>1</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>2</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>3</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>4</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>5</sup></b>
Dam Failure	0	0	0	0	0	0	0	0	0	0
Faults	0	0	0	0	0	0	0	0	0	0
Wildfire	0	0	0	0	0	0	1.23	645,750	1.92	2,880,000
Flood	0	0	0	0	0	0	1.6	840,000	3.56	5,340,000
Liquefaction	1.72	2,580,000	0	0	0	0	34.09	17,897,250	4.95	7,425,000
Landslide	0	0	0	0	0	0	0	0	0.16	240,000
Slope	0	0	0	0	0	0	0.15	78,750	0.04	60,000
Poorly Drained Soils	0	0	0	0	0	0	0	0	0	0

<sup>1</sup> Based on figures from 2009 Pre-Disaster Mitigation Plan for Bear River Region, Utah.

<sup>2</sup> Based on average replacement cost estimates for gas lines ranging from 2-inches-20 inches in diameter. These cost are based solely on labor and material costs, and may vary based on time, scope, and site specific variations (Questar, May 2015).

<sup>3</sup> Based on estimates from Logan Light and Power, 2015.

<sup>4</sup> Based on estimates derived from an average 28' wide, 4" thick asphalt county road with gravel subgrade replacement. Cache County, 2015.

<sup>5</sup> Based recent Cache County and regional project cost estimates, 2015.

<b>Nibley, UT, Critical Facilities at Risk</b>					
<b>Hazard Type</b>	<b>Critical Facilities Types</b>				
	<b>Emergency Services/Law Enforcement</b>	<b>Schools/Public Facilities</b>	<b>Health Care Facilities</b>	<b>Places of Worship</b>	<b>Infrastructure</b>
Dam Failure					
Faults					
Wildfire					
Flood					2 bridges
Liquefaction	Millville and Nibley First Responders	Heritage School, Nibley School, Thomas Edison-South, Nibley City Office		6 places of worship	3 bridges, 7 broadband anchors
Landslide					
Slope					
Poorly Drained Soils					

Note: Critical facilities were identified using multiple data sources including: Utah AGRC, UDOT, Utah Division of Water Resources, and public and community leader input.

<b>Nibley, UT, Agricultural Features at Risk</b>					
<b>Hazard Type</b>	<b>Lands at Risk</b>			<b>Farms &amp; Barns****</b>	
	<b>Agriculture Production*</b>	<b>Farm Land**</b>	<b>Grazing***</b>	<b>Century Farms</b>	<b>Historic Barns</b>
	<b># of Acres</b>			<b># of Farms</b>	<b># of Barns</b>
Dam Failure	0	0	0	0	0
Faults	0	0	0	0	0
Wildfire	40.52	125.96	0	0	0
Flood	94.53	156.15	0	0	0
Liquefaction	438.53	825.59	0	0	0
Landslide	14.11	11.58	0	0	0
Slope	4.06	0	0	0	0
Poorly Drained Soils	0	0	0	0	0

\* Lands that are currently associated with agricultural activities involving water related land use, as described in the 2007 Utah Division of Water Resources, *Water Related Land Use* dataset.  
 \*\*Lands that are suitable for farming purposes based on soil type and composition, as describe in the 2013 Natural Resource Conservation Service, SSURGO datasets.  
 \*\*\* Lands currently associated with grazing allotments identified as part of the Grazing Improvement Program (Utah AGRC, 2012)  
 \*\*\*\* Based on data compiled by the Bear River Association of Governments.

<b>Nibley, UT, Environmental &amp; Recreational Features at Risk</b>						
<b>Hazard Type</b>	<b>Environmental Features at Risk</b>			<b>Recreational Features at Risk</b>		
	<b>Wetland/ riparian</b>	<b>Lakes</b>	<b>Streams</b>	<b>Parks</b>	<b>Trails</b>	<b>Amenities</b>
	<b># of Acres</b>		<b># of Miles</b>	<b># of Acres</b>	<b># of Miles</b>	<b># of Amenities</b>
Dam Failure	0	0	0	0	0	0
Faults	0	0	0	0	0	0
Wildfire	31.26	0	2.6	1.45	0	0
Flood	65.82	0	5.23	6.15	0	0
Liquefaction	66.35	0	2.43	8.26	0	0
Landslide	0.1	0	0	0	0	0
Slope	4.89	0	0.04	2.15	0	0
Poorly Drained Soils	0	0	0	0	0	0

Note: Total acres of land and miles of streams and trails were identified using multiple datas sources including: Utah AGRC, U.S. Fish and Wildlife Service, U.S. Forest Service, U.S. Geological Survey, Utah Division of Water Resources, and public and community leader input.

and the Canal. The Canal also flanks the municipality on the northwest which could affect several structures closer to Highway 89-91 in the event of a flood.

***Landslides.*** Hazard mapping identifies minimal risk to residential structures from landslides in the southeast corner of the jurisdiction.

***Liquefaction.*** Hazard mapping identifies moderate-to-high liquefaction risk to a significant number of residential structures in the eastern half of the jurisdiction.

***Steep Slopes.*** Hazard mapping identifies risk from steep slopes to structures and infrastructure in the northeast section of the jurisdiction, east of S.R. 165/Main Street.

***Wildfire.*** Hazard mapping identifies moderate-to-high wildfire risk areas along the jurisdiction's eastern bench, below the Cache-Wasatch Mountains.

### **Future Development**

No concerns involving potential future development within Nibley were reported by city representatives.

### **Hazard Mitigation Strategies**

**Table 76:** Nibley City Mitigation Strategies

NIBLEY - COMMUNITY MITIGATION STRATEGIES										
Protecting Current Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For NFIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Nibley	Dam Failure	Protect current residents and property	Educate residents located with dam failure impact areas regarding notifications and emergency actions.	N/A	Low	2015-2020	Local	Nibley, Utah Dam Safety	\$10,000	City staff
Nibley	Wildfire	Protect current residents and property	Require or encourage fire resistant construction techniques	Use fire resistant building materials	Medium	2020	County, Local, State	Nibley, Utah FFSL	N/A	County, Local, State
Nibley	Landslide	Protect current residents and property	Update city ordinances to mitigate development in landslide hazard areas.	N/A	Medium	2020	CIB, City	Nibley, UGS	\$1,500	Geologic Survey, Utah State University, State of Utah
Nibley	Severe Weather	Protect current residents and property	Emergency response planning	N/A	Medium	2020	County, FEMA, State	Nibley	Minimal	Local, County, State
Nibley	Flood	Protect current residents and property	Develop and improve culinary water source	N/A	Medium	2017	County, Local	Nibley, Utah DEM	N/A	County, local, FEMA, State ESHS
Nibley	Flood	Protect current residents and property	2600 East new construction of a retention basin.	N/A	N/A	2020	N/A	Nibley, Utah DEM	N/A	N/A
Nibley	Earthquake	Protect current residents and property	Training in earthquake emergency planning and response for residents, and coordination between local and county fire, police, and EMT crews.	N/A	High	2017	County, Homeland Security	Nibley, UGS, Cache County	\$100,000	Cache County Fire, Logan Fire
NIBLEY - COMMUNITY MITIGATION STRATEGIES										
Protecting Future Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For NFIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Nibley	Dam Failure	Protect future residents and property	Education and implementing FERC requirements.	N/A	Medium	2016	City	Nibley, Utah Dam Safety	N/A	City, State, Federal
Nibley	Wildfire	Protect future residents and property	Develop a wild land urban interface code	N/A	Medium	2020	Local, State, County	Nibley, Utah FFSL	N/A	Local, State, County
Nibley	Landslide	Protect future residents and property	Improve data and mapping of landslide areas located in the city.	N/A	Medium	2020	City, State of Utah, CIB	Nibley, UGS	\$10,000	Geologic Survey, Utah State University, State of Utah
Nibley	Severe Weather	Protect future residents and property	Adopt and enforce building codes.	Enforcement of building codes	Medium	2020	City, State of Utah, CIB	Nibley	N/A	City, State of Utah, CIB
Nibley	Flood	Protect future residents and property	Review current ordinance regarding flood, fire, etc.	N/A	Medium	2020	Local, BRAG, County	Nibley, Utah DEM	Minimal	Local, County, BRAG,
Nibley	Flood	Protect future residents and property	2600 East new construction of a retention basin.	N/A	N/A	2020	N/A	Nibley, Utah DEM	N/A	N/A
Nibley	Earthquake	Protect future residents and property	Seismic retrofit of public works buildings	N/A	Medium	2020	County, FEMA, State	Nibley, UGS, Utah DEM	Minimal	USGS, Utah GS, BRAG, Utah League of Cities & Towns, APA

**NORTH LOGAN**

Analysis of hazard risk involving the community of North Logan revealed that there is potential risk resulting from **earthquakes, flood, steep slopes and wildfire**. These hazards have varying potential to impact life, property, infrastructure, agriculture, and environmental features within the municipal boundary. See *the following tables* for more detailed descriptions of potential losses associated with each natural hazard analyzed in the risk assessment.

**Table 77:** North Logan Potential Loss Figures

**Natural Hazards**

**Current Development**

**Earthquake.** Hazard mapping identifies several residential structures and infrastructure at risk from surface fault rupture. There are two forks of the damage zone that run through the jurisdiction; one zone runs along the jurisdiction’s eastern boundary, and the other is parallel to the Logan, Hyde Park, and Smithfield Canal.

**Flood.** Hazard mapping identifies several

North Logan, UT, Residential & Commercial Development at Risk						
Hazard Type	~Residents at Risk*	Residential Units at Risk		Commercial Units at Risk		
		# Units	\$ Value**	# Units	\$ Value**	\$ Potential Revenue Loss***
Dam Failure	0	0	0	0	0	0
Faults	561	173	69,075,839	2	639,530	1,377,434
Wildfire	2,692	831	283,175,908	111	178,707,789	76,447,587
Flood	133	41	12,649,599	0	0	0
Liquefaction	0	0	0	0	0	0
Landslide	0	0	0	0	0	0
Slope	619	191	74,404,937	0	0	0
Poorly Drained Soils	0	0	0	0	0	0

\* Based on average persons per owner household for Cache County from 2013 American Community Survey, which is 3.24.

\*\* Current Market Value per parcel, including building and land values. Data was provided by Cache County IT personnel.

\*\*\* Based on average sales, receipts, or value of shipments of firms with or without paid employees, per firm (\$698,717 per firm). Derived from 2007 Survey of Business Owners for Cache County, US Census Bureau.

<b>North Logan, UT, Infrastructure at Risk</b>										
<b>Hazard Type</b>	<b>Infrastructure at Risk</b>									
	<b>Railroad Lines</b>		<b>Natural Gas Lines</b>		<b>Electrical Power lines</b>		<b>Roads</b>		<b>Canals</b>	
	<b># of Miles</b>	<b>\$ Value<sup>1</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>2</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>3</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>4</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>5</sup></b>
Dam Failure	0	0	0	0	0	0	0	0	0	0
Faults	0	0	0	0	0.55	69,850	7	3,675,000	1.55	2,325,000
Wildfire	0	0	0	0	0.61	77,470	14	7,350,000	2.02	3,030,000
Flood	0	0	0	0	0.13	16,510	0.5	262,500	0.76	1,140,000
Liquefaction	0	0	0	0	0.7	88,900	57.11	29,982,750	0	0
Landslide	0	0	0	0	0	0	0	0	0	0
Slope	0	0	0	0	0.05	6,350	4.2	2,205,000	0.29	435,000
Poorly Drained Soils	0	0	0	0	0	0	0	0	0	0

<sup>1</sup> Based on figures from 2009 Pre-Disaster Mitigation Plan for Bear River Region, Utah.

<sup>2</sup> Based on average replacement cost estimates for gas lines ranging from 2-inches-20 inches in diameter. These cost are based solely on labor and material costs, and may vary based on time, scope, and site specific variations (Questar, May 2015).

<sup>3</sup> Based on estimates from Logan Light and Power, 2015.

<sup>4</sup> Based on estimates derived from an average 28' wide, 4" thick asphalt county road with gravel subgrade replacement. Cache County, 2015.

<sup>5</sup> Based recent Cache County and regional project cost estimates, 2015.

<b>North Logan, UT, Critical Facilities at Risk</b>					
<b>Hazard Type</b>	<b>Critical Facilities Types</b>				
	<b>Emergency Services/Law Enforcement</b>	<b>Schools/Public Facilities</b>	<b>Health Care Facilities</b>	<b>Places of Worship</b>	<b>Infrastructure</b>
Dam Failure					
Faults					
Wildfire				1 place of worship	2 broadband anchors, 1 dam
Flood					1 bridge, 1 dam
Liquefaction	North Logan Fire and EMS, North Logan Fire Department Station, North Park Police Department	11 schools	Cache Valley Specialty Hospital, Integrity Hospice, Cache Valley Specialty hospital Mammography	8 places of worship	2 bridges, 1 dam, 18 broadband anchors
Landslide					
Slope					
Poorly Drained Soils					

Note: Critical facilities were identified using multiple data sources including: Utah AGRC, UDOT, Utah Division of Water Resources, and public and community leader input.

<b>North Logan, UT, Agricultural Features at Risk</b>					
<b>Hazard Type</b>	<b>Lands at Risk</b>			<b>Farms &amp; Barns****</b>	
	<b>Agriculture Production*</b>	<b>Farm Land**</b>	<b>Grazing***</b>	<b>Century Farms</b>	<b>Historic Barns</b>
	<b># of Acres</b>			<b># of Farms</b>	<b># of Barns</b>
Dam Failure	0	0	0	0	0
Faults	502.51	630.72	0	0	0
Wildfire	401.09	978.1	0	0	2
Flood	44.12	110.96	0	0	2
Liquefaction	0	0	0	0	0
Landslide	0	0	0	0	0
Slope	117.37	0	0	0	0
Poorly Drained Soils	0	0	0	0	0

\* Lands that are currently associated with agricultural activities involving water related land use, as described in the 2007 Utah Division of Water Resources, *Water Related Land Use* dataset.  
 \*\*Lands that are suitable for farming purposes based on soil type and composition, as describe in the 2013 Natural Resource Conservation Service, SSURGO datasets.  
 \*\*\* Lands currently associated with grazing allotments identified as part of the Grazing Improvement Program (Utah AGRC, 2012)  
 \*\*\*\* Based on data compiled by the Bear River Association of Governments.

<b>North Logan, UT, Environmental &amp; Recreational Features at Risk</b>						
<b>Hazard Type</b>	<b>Environmental Features at Risk</b>			<b>Recreational Features at Risk</b>		
	<b>Wetland/ riparian</b>	<b>Lakes</b>	<b>Streams</b>	<b>Parks</b>	<b>Trails</b>	<b>Amenities</b>
	<b># of Acres</b>		<b># of Miles</b>	<b># of Acres</b>	<b># of Miles</b>	<b># of Amenities</b>
Dam Failure	0	0	0	0	0	0
Faults	8.52	0	5.3	25.54	0.67	3
Wildfire	24.6	0.22	6.84	36.94	0.62	5
Flood	0	0	3.24	9.22	0.3	2
Liquefaction	0	0	0	0	0	0
Landslide	0	0	0	0	0	0
Slope	2.53	0	4.37	33.04	0.35	4
Poorly Drained Soils	0	0	0	0	0	0

Note: Total acres of land and miles of streams and trails were identified using multiple datas sources including: Utah AGRC, U.S. Fish and Wildlife Service, U.S. Forest Service, U.S. Geological Survey, Utah Division of Water Resources, and public and community leader input.

residential structures and infrastructure at risk from flooding in the 100 year floodplain. The floodplain begins at the mouth of Green Canyon and flows northeast through the jurisdiction.

***Steep Slopes.*** Hazard mapping identifies significant risk from steep slopes in much of the east and northeast sections of the jurisdiction. These areas along the bench are popular in the valley for higher value homes and development.

***Wildfire.*** Hazard mapping identifies moderate-to-high wildfire risk areas along the jurisdiction's eastern bench and throughout the developed areas with urban canopy.

### **Future Development**

There is a Canyon Gates Subdivision area that will in the future have 250 newly constructed homes.

### **Hazard Mitigation Strategies**

**Table 78:** North Logan Mitigation Strategies

NORTH LOGAN - COMMUNITY MITIGATION STRATEGIES										
Protecting Current Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For NFIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
North Logan	Earthquake	Protect current residents and property	Meeting existing building codes. Training in earthquake emergency planning and response for residents	N/A	High	2017	Local, County	North Logan, UGS, Cache County	Minimal	Cache County, BRAG
North Logan	Flood	Protect current residents and property	Check for compliance of NFIP	N/A	Low	2017	County, Local	North Logan, Utah DEM	Minimal	County, Brag
North Logan	Wildfire	Protect current residents and property	Work with fire, forestry, and lands, to explore for wild land interface. Install sprinkler systems in new infrastructure.	N/A	Medium	2016	Forestry, Fire, State land	North Logan, Utah FFSL	Minimal	Brag, Local, Forestry, Fire, State land
North Logan	Landslide / Steep Slopes	Protect current residents and property	Explore the possibility of developing a landslide ordinance.	N/A	Low	2017	Local	North Logan, UGS	Minimal	Local, Federal, CIB, FEMA, UGS
NORTH LOGAN - COMMUNITY MITIGATION STRATEGIES										
Protecting Future Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For NFIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
North Logan	Earthquake	Protect future residents and property	Meeting existing building codes. Training in earthquake emergency planning and response for residents	N/A	High	2017	Local, County	North Logan, UGS, Cache County	Minimal	Cache County, BRAG
North Logan	Flood	Protect future residents and property	Check for compliance of NFIP	N/A	Low	2017	County, Local	North Logan, Utah DEM	Minimal	County, Brag
North Logan	Wildfire	Protect future residents and property	Work with fire, forestry, and lands, to explore for wild land interface. Install sprinkler systems in new infrastructure.	N/A	Medium	2016	Forestry, Fire, State land	North Logan, Utah FFSL	Minimal	Brag, Local, Forestry, Fire, State land
North Logan	Landslide / Steep Slopes	Protect future residents and property	Explore the possibility of developing a landslide ordinance.	N/A	Low	2017	Local	North Logan, UGS	Minimal	Local, Federal, CIB, FEMA, UGS

**PARADISE**

Analysis of hazard risk involving the community of Paradise revealed that there is potential risk resulting from **dam break, flood, and wildfire**. These hazards have varying potential to impact life, property, infrastructure, agriculture, and environmental features within the municipal boundary. See *the following tables* for more detailed descriptions of potential losses associated with each natural hazard analyzed in the risk assessment.

**Table 79:** Paradise Town Potential Loss Figures

**Natural Hazards**

**Current Development**

**Dam Failure.** Hazard mapping identifies dam failure risk to some residential structures and infrastructure in the southwest corner of the jurisdiction.

**Flood.** Hazard mapping identifies several residential structures and infrastructure at risk from flooding in the 100 year floodplain. The floodplain enters the town from Hyrum Canyon to the east and

<b>Paradise, UT, Residential &amp; Commercial Development at Risk</b>						
<b>Hazard Type</b>	<b>~Residents at Risk*</b>	<b>Residential Units at Risk</b>		<b>Commercial Units at Risk</b>		
		<b># Units</b>	<b>\$ Value**</b>	<b># Units</b>	<b>\$ Value**</b>	<b>\$ Potential Revenue Loss***</b>
Dam Failure	26	8	1,804,107	0	0	0
Faults	0	0	0	0	0	0
Wildfire	505	156	27,587,782	7	699,974	4,821,019
Flood	100	31	6,158,907	1	35,813	688,717
Liquefaction	0	0	0	0	0	0
Landslide	0	0	0	0	0	0
Slope	0	0	0	0	0	0
Poorly Drained Soils	0	0	0	0	0	0

\* Based on average persons per owner household for Cache County from 2013 American Community Survey, which is 3.24.

\*\* Current Market Value per parcel, including building and land values. Data was provided by Cache County IT personnel.

\*\*\* Based on average sales, receipts, or value of shipments of firms with or without paid employees, per firm (\$688,717 per firm). Derived from 2007 Survey of Business Owners for Cache County, US Census Bureau

<b>Paradise, UT, Infrastructure at Risk</b>										
<b>Hazard Type</b>	<b>Infrastructure at Risk</b>									
	<b>Railroad Lines</b>		<b>Natural Gas Lines</b>		<b>Electrical Power lines</b>		<b>Roads</b>		<b>Canals</b>	
	<b># of Miles</b>	<b>\$ Value<sup>1</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>2</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>3</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>4</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>5</sup></b>
Dam Failure	0	0	0	0	0	0	0.26	136,500	0	0
Faults	0	0	0	0	0	0	0	0	0	0
Wildfire	0	0	0	0	0	0	1.68	882,000	0.65	975,000
Flood	0	0	0	0	0	0	0.79	414,750	1.55	2,325,000
Liquefaction	0	0	0	0	0	0	14.71	7,722,750	0	0
Landslide	0	0	0	0	0	0	0	0	0	0
Slope	0	0	0	0	0	0	0	0	0.05	75,000
Poorly Drained Soils	0	0	0	0	0	0	0	0	0	0

<sup>1</sup> Based on figures from 2009 Pre-Disaster Mitigation Plan for Bear River Region, Utah.

<sup>2</sup> Based on average replacement cost estimates for gas lines ranging from 2-inches-20 inches in diameter. These cost are based solely on labor and material costs, and may vary based on time, scope, and site specific variations (Questar, May 2015).

<sup>3</sup> Based on estimates from Logan Light and Power, 2015.

<sup>4</sup> Based on estimates derived from an average 28' wide, 4" thick asphalt county road with gravel subgrade replacement. Cache County, 2015.

<sup>5</sup> Based recent Cache County and regional project cost estimates, 2015.

<b>Paradise, UT, Critical Facilities at Risk</b>					
<b>Hazard Type</b>	<b>Critical Facilities Types</b>				
	<b>Emergency Services/Law Enforcement</b>	<b>Schools/Public Facilities</b>	<b>Health Care Facilities</b>	<b>Places of Worship</b>	<b>Infrastructure</b>
Dam Failure					
Faults					
Wildfire	Paradise Fire and EMS, Paradise Fire Department				3 broadband anchors
Flood					
Liquefaction					4 broadband anchors, 2 places of worship, Paradise Fire and EMS, Paradise Fire Department
Landslide					
Slope					
Poorly Drained Soils					

Note: Critical facilities were identified using multiple data sources including: Utah AGRC, UDOT, Utah Division of Water Water Resources, and public and community leader input.

<b>Paradise, UT, Agricultural Features at Risk</b>					
<b>Hazard Type</b>	<b>Lands at Risk</b>			<b>Farms &amp; Barns****</b>	
	<b>Agriculture Production*</b>	<b>Farm Land**</b>	<b>Grazing***</b>	<b>Century Farms</b>	<b>Historic Barns</b>
	<b># of Acres</b>			<b># of Farms</b>	<b># of Barns</b>
Dam Failure	11.43	25.24	0	0	0
Faults	0	0	0	0	0
Wildfire	39.51	169.24	0	0	1
Flood	14.98	43.63	0	0	0
Liquefaction	0	0	0	0	0
Landslide	0	0	0	0	0
Slope	0.75	0	0	0	0
Poorly Drained Soils	0	0	0	0	0

\* Lands that are currently associated with agricultural activities involving water related land use, as described in the 2007 Utah Division of Water Resources, *Water Related Land Use* dataset.  
 \*\*Lands that are suitable for farming purposes based on soil type and composition, as describe in the 2013 Natural Resource Conservation Service, SSURGO datasets.  
 \*\*\* Lands currently associated with grazing allotments identified as part of the Grazing Improvement Program (Utah AGRC, 2012)  
 \*\*\*\* Based on data compiled by the Bear River Association of Governments.

<b>Paradise, UT, Environmental &amp; Recreational Features at Risk</b>						
<b>Hazard Type</b>	<b>Environmental Features at Risk</b>			<b>Recreational Features at Risk</b>		
	<b>Wetland/ riparian</b>	<b>Lakes</b>	<b>Streams</b>	<b>Parks</b>	<b>Trails</b>	<b>Amenities</b>
	<b># of Acres</b>		<b># of Miles</b>	<b># of Acres</b>	<b># of Miles</b>	<b># of Amenities</b>
Dam Failure	0	0	0	0	0	0
Faults	0	0	0	0	0	0
Wildfire	2.84	0	0.67	5.87	0	0
Flood	10.58	0	1.89	0	0	0
Liquefaction	0	0	0	0	0	0
Landslide	0	0	0	0	0	0
Slope	0	0	0.03	0	0	0
Poorly Drained Soils	0	0	0	0	0	0

Note: Total acres of land and miles of streams and trails were identified using multiple datas sources including: Utah AGRC, U.S. Fish and Wildlife Service, U.S. Forest Service, U.S. Geological Survey, Utah Division of Water Resources, and public and community leader input.

flows southeast and northwest along Paradise Canal.

**Wildfire.** Hazard mapping identifies moderate-to-high wildfire risk in areas along the eastern bench and throughout the jurisdiction's urban canopy.

### **Future Development**

No concerns involving potential future development within Paradise were reported by town representatives.

### **Hazard Mitigation Strategies**

**Table 80:** Paradise Town Mitigation Strategies

PARADISE - COMMUNITY MITIGATION STRATEGIES										
Protecting Current Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For N/FIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Paradise	Dam Failure	Protect current residents and property	Implement and communicate existing FERC Plan	N/A	Low	2016	Local	Paradise, Utah Dam Safety	None	Local
Paradise	Flood	Protect current residents and property	Monitor new buildings and subdivisions for mitigation	Help new prior flooding areas by grading.	Low	2020	County, Local	Paradise	N/A	County, local, FEMA, State ESHS
Paradise	Earthquake	Protect current residents and property	Education and EMS Training and certification	N/A	Medium	Ongoing	General Fund	Paradise, UGS, Cache County	2,000 a year	Town Fire Department
Paradise	Wildfire	Protect current residents and property	Education on the subject.	N/A	Medium	Ongoing	None	Paradise, Utah FFSL	TBD	Newsletters, community training
Paradise	Steep Slopes	Protect current residents and property	Limit building and annexation in areas with steep slopes	N/A	Medium	2020	None	Paradise, UGS	None	Not needed
PARADISE - COMMUNITY MITIGATION STRATEGIES										
Protecting Future Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For N/FIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Paradise	Dam Failure	Protect future residents and property	Limit annexation in the inundation zones.	N/A	Medium	2020	None	Paradise, Utah Dam Safety	None	Not needed
Paradise	Flood	Protect future residents and property	No building in floodplain areas.	same as action	High	2015	Local, state	Paradise, Utah DEM	Minimal	Not needed
Paradise	Earthquake	Protect future residents and property	Add generator capability for 1 or more wells	N/A	Medium	2016	Water Revenue Fund	Paradise, Utah Water Resources	5,000 a well	Water Revenue Funds
Paradise	Wildfire	Protect future residents and property	Limit building in areas of greater risk.	N/A	Medium	2020	None	Paradise, Utah FFSL	None	Not needed
Paradise	Steep Slopes	Protect future residents and property	Limit building and annexation in areas with steep slopes	N/A	Medium	2020	None	Paradise, UGS	None	Not needed

## PROVIDENCE

Analysis of hazard risk involving the community of Providence revealed that there is potential risk resulting from **earthquakes, flood, landslides, liquefaction, steep slopes and wildfire**. These hazards have varying potential to impact life, property, infrastructure, agriculture, and environmental features within the municipal boundary. See *the following tables* for more detailed descriptions of potential losses associated with each natural hazard analyzed in the risk assessment.

**Table 81:** Providence Potential Loss Figures

## Natural Hazards

### Current Development

**Earthquake.** Hazard mapping identifies several structures and infrastructure at risk from surface fault rupture. Areas of concern are located along the fault that runs along the jurisdiction’s eastern boundary.

**Flood.** Hazard mapping identifies several residential structures and infrastructure at risk from flooding in the 100 year floodplain. The Cache County Storm Water Analysis report suggests that

Providence, UT, Residential & Commercial Development at Risk						
Hazard Type	~Residents at Risk*	Residential Units at Risk		Commercial Units at Risk		
		# Units	\$ Value**	# Units	\$ Value**	\$ Potential Revenue Loss***
Dam Failure	0	0	0	0	0	0
Faults	198	61	25,486,202	2	655,448	1,377,434
Wildfire	2,709	836	225,175,521	6	8,055,898	4,132,302
Flood	233	72	22,424,862	10	7,314,905	6,887,170
Liquefaction	586	181	48,686,729	60	55,109,506	41,323,020
Landslide	275	85	29,313,515	0	0	0
Slope	421	130	42,652,140	0	0	0
Poorly Drained Soils	0	0	0	0	0	0

\* Based on average persons per owner household for Cache County from 2013 American Community Survey, which is 3.24.  
 \*\* Current Market Value per parcel, including building and land values. Data was provided by Cache County IT personnel.  
 \*\*\* Based on average sales, receipts, or value of shipments of firms with or without paid employees, per firm (\$688,717 per firm). Derived from 2007 Survey of Business Owners for Cache County, US Census Bureau.

Providence, UT, Infrastructure at Risk										
Hazard Type	Infrastructure at Risk									
	Railroad Lines		Natural Gas Lines		Electrical Power lines		Roads		Canals	
	# of Miles	\$ Value <sup>1</sup>	# of Miles	\$ Value <sup>2</sup>	# of Miles	\$ Value <sup>3</sup>	# of Miles	\$ Value <sup>4</sup>	# of Miles	\$ Value <sup>5</sup>
Dam Failure	0	0	0	0	0	0	0	0	0	0
Faults	0	0	0	0	4.1	520,700	1.57	824,250	0.01	15,000
Wildfire	0	0	0	0	3.87	491,490	7.77	4,079,250	0.56	840,000
Flood	0	0	0	0	0	0	0.35	183,750	0.08	120,000
Liquefaction	0	0	0	0	4.87	618,490	40.89	21,467,250	1.88	2,820,000
Landslide	0	0	0	0	0.91	115,570	1.04	546,000	0	0
Slope	0	0	0	0	1.37	173,990	1.51	792,750	0	0
Poorly Drained Soils	0	0	0	0	0	0	0	0	0	0

<sup>1</sup> Based on figures from 2009 Pre-Disaster Mitigation Plan for Bear River Region, Utah.

<sup>2</sup> Based on average replacement cost estimates for gas lines ranging from 2-inches-20 inches in diameter. These cost are based solely on labor and material costs, and may vary based on time, scope, and site specific variations (Questar, May 2015).

<sup>3</sup> Based on estimates from Logan Light and Power, 2015.

<sup>4</sup> Based on estimates derived from an average 28' wide, 4" thick asphalt county road with gravel subgrade replacement. Cache County, 2015.

<sup>5</sup> Based recent Cache County and regional project cost estimates, 2015.

Providence, UT, Critical Facilities at Risk					
Hazard Type	Critical Facilities Types				
	Emergency Services/Law Enforcement	Schools/Public Facilities	Health Care Facilities	Places of Worship	Infrastructure
Dam Failure					
Faults					
Wildfire				2 places of worship	
Flood					
Liquefaction		Providence Elementary, Spring Creek Middle School	Primrose Hospice, CNS Community Hospice, Providence Assisted Living, South Cache Valley Clinic, Cache Valley Assisted Living	7 places of worship	15 broadband anchors
Landslide					
Slope					
Poorly Drained Soils					

Note: Critical facilities were identified using multiple data sources including: Utah AGRC, UDOT, Utah Division of Water Resources, and public and community leader input.

<b>Providence, UT, Agricultural Features at Risk</b>					
<b>Hazard Type</b>	<b>Lands at Risk</b>			<b>Farms &amp; Barns****</b>	
	<b>Agriculture Production*</b>	<b>Farm Land**</b>	<b>Grazing***</b>	<b>Century Farms</b>	<b>Historic Barns</b>
	<b># of Acres</b>			<b># of Farms</b>	<b># of Barns</b>
Dam Failure	0	0	0	0	0
Faults	161.62	183.83	0	0	0
Wildfire	193.42	514.4	0	0	0
Flood	1.16	24.92	0	0	0
Liquefaction	119.67	285.08	0	0	1
Landslide	9.67	49.57	0	0	0
Slope	57.16	0	0	0	0
Poorly Drained Soils	0	0	0	0	0

\* Lands that are currently associated with agricultural activities involving water related land use, as described in the 2007 Utah Division of Water Resources, *Water Related Land Use* dataset.  
 \*\*Lands that are suitable for farming purposes based on soil type and composition, as describe in the 2013 Natural Resource Conservation Service, SSURGO datasets.  
 \*\*\* Lands currently associated with grazing allotments identified as part of the Grazing Improvement Program (Utah AGRC, 2012)  
 \*\*\*\* Based on data compiled by the Bear River Association of Governments.

<b>Providence, UT, Environmental &amp; Recreational Features at Risk</b>						
<b>Hazard Type</b>	<b>Environmental Features at Risk</b>			<b>Recreational Features at Risk</b>		
	<b>Wetland/ riparian</b>	<b>Lakes</b>	<b>Streams</b>	<b>Parks</b>	<b>Trails</b>	<b>Amenities</b>
	<b># of Acres</b>		<b># of Miles</b>	<b># of Acres</b>	<b># of Miles</b>	<b># of Amenities</b>
Dam Failure	0	0	0	0	0	0
Faults	0.88	0	2.38	0	1.71	4
Wildfire	16.9	0.32	2.9	0.74	0.76	3
Flood	12.18	0	0.64	0.53	0	0
Liquefaction	12.09	0	0.95	0.68	0	0
Landslide	0	0	0.38	0	0.3	1
Slope	0.01	0	0.62	0	1.47	2
Poorly Drained Soils	0	0	0	0	0	0

Note: Total acres of land and miles of streams and trails were identified using multiple datas sources including: Utah AGRC, U.S. Fish and Wildlife Service, U.S. Forest Service, U.S. Geological Survey, Utah Division of Water Resources, and public and community leader input.

capacity deficiency exists on the Lower Millville Providence Canal as the canal nears 500 South, 400 South, 200 South, 100 South and 100 North. Deficiencies also exist on the Upper Millville Providence Canal near 580 South, 300 South, 200 South, Center St., 200 North (JUB Engineering, 2003).

**Landslides.** Hazard mapping identifies risk from landslides in the northeast bench and drainages of the jurisdiction. There are also areas of concern north of Spring Creek and uphill from the Von Baer Park.

**Liquefaction.** Hazard mapping identifies moderate-to-high liquefaction risk to several structures and infrastructure in much of the jurisdiction that is west of Main Street.

**Steep Slopes.** Hazard mapping identifies significant risk from steep slopes to residential structures and infrastructure along the eastern bench of the jurisdiction. This area is popular for high value homes and development.

**Wildfire.** Hazard mapping identifies moderate-to-high wildfire risk areas along the jurisdiction's eastern bench and throughout the urban canopy that extends west from the Cache-Wasatch Mountains.

### **Future Development**

There is potential development on the east side of the city within the foothills. In this area some possible hazards that could be a potential risk include: flooding, landslide, and wildfires.

### **Hazard Mitigation Strategies**

**Table 82:** Providence Mitigation Strategies

PROVIDENCE - COMMUNITY MITIGATION STRATEGIES										
Protecting Current Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For N/FIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Providence	Drought	Protect current residents and property	Educate public about the possibility of a drought. Have water restriction plans in place to implement if a drought occurs.	N/A	Medium	2015-2016	City	Providence, NOAA	N/A	Cache County
Providence	Earthquake	Protect current residents and property	Educate citizens of the hazard of earthquakes and what they can do to prepare for such events.	N/A	Medium	2015-2020	City	Providence, UGS	\$55,000	N/A
Providence	Flooding	Protect current residents and property	City needs to continue to upsized all street culvert crossings that spring creek flows through.	Follow rules already in place with the program	Medium	Annually	City, impact fees	Providence	N/A	NFIP, County
Providence	Landslide	Protect current residents and property	Make citizens aware of the potential hazard and prepare them for what to do if it occurs.	N/A	Low	2015	City	Providence, UGS	N/A	County, internet
Providence	Wildfire	Protect current residents and property	Implement actions from previous urban wild land interface.	N/A	Medium	Ongoing	City	Providence, Utah FFSL	N/A	Cache County Fire
Providence	Severe Weather	Protect current residents and property	Education and awareness, participate in emergency preparedness planning	N/A	Medium	2015	Federal, State, Local	Providence, NOAA	\$5,000	Federal, State, Local
PROVIDENCE - COMMUNITY MITIGATION STRATEGIES										
Protecting Future Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For N/FIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Providence	Drought	Protect future residents and property	Assure that all development brings adequate water to assure enough rights to provide for the development.	N/A	Medium	2015-2016	City	Providence, Cache County	N/A	City
Providence	Earthquake	Protect future residents and property	Require future development on the east side of the city to locate the fault and plan accordingly with their developments.	N/A	Medium	2020	City	Providence, UGS	\$1,500 annually	County
Providence	Flooding	Protect future residents and property	Assure that all development is aware of and designs and plans for dealing with high run off levels and the probabilities of flooding of spring creek.	Follow rules already in place with the program	Medium	As development occurs	City	Providence, Utah DEM	\$30,000	City
Providence	Landslide	Protect future residents and property	Continue to educate citizens.	N/A	Low	Continuing	City	Providence, UGS	N/A	N/A
Providence	Wildfire	Protect future residents and property	Continue to follow actions from existing plan.	N/A	Medium	Ongoing	N/A	Providence, Utah FFSL	N/A	N/A
Providence	Severe Weather	Protect future residents and property	Encourage emergency preparedness, work with local churches to aid in preparation	N/A	Medium	2015	10,000	Providence	N/A	N/A

**RICHMOND**

Analysis of hazard risk involving the community of Richmond revealed that there is potential risk resulting from **earthquakes, flood, steep slopes and wildfire**. These hazards have varying potential to impact life, property, infrastructure, agriculture, and environmental features within the municipal boundary. See *the following tables* for more detailed descriptions of potential losses associated with each natural hazard analyzed in the risk assessment.

**Table 83:** Richmond City Potential Loss Figures

**Natural Hazards**

**Current Development**

**Earthquake.** Hazard mapping identifies some structures and infrastructure at risk from surface fault rupture. Areas of concern are along the fault that runs along the jurisdiction’s eastern boundary.

**Flood.** Hazard mapping identifies several residential structures and infrastructure at risk from flooding in the 100 year floodplain. The flood threat

<b>Richmond, UT, Residential &amp; Commercial Development at Risk</b>						
<b>Hazard Type</b>	<b>~Residents at Risk*</b>	<b>Residential Units at Risk</b>		<b>Commercial Units at Risk</b>		
		<b># Units</b>	<b>\$ Value**</b>	<b># Units</b>	<b>\$ Value**</b>	<b>\$ Potential Revenue Loss***</b>
Dam Failure	0	0	0	0	0	0
Faults	26	8	1,759,394	0	0	0
Wildfire	311	96	15,070,534	12	2,088,811	8,264,604
Flood	156	48	9,678,747	4	21,735,770	2,754,868
Liquefaction	0	0	0	0	0	0
Landslide	0	0	0	0	0	0
Slope	269	83	18,324,959	3	1,536,814	2,066,151
Poorly Drained Soils	0	0	0	0	0	0

\* Based on average persons per owner household for Cache County from 2013 American Community Survey, which is 3.24.

\*\* Current Market Value per parcel, including building and land values. Data was provided by Cache County IT personnel.

\*\*\* Based on average sales, receipts, or value of shipments of firms with or without paid employees, per firm (\$688,717 per firm). Derived from 2007 Survey of Business Owners for Cache County, US Census Bureau.

<b>Richmond, UT, Infrastructure at Risk</b>										
<b>Hazard Type</b>	<b>Infrastructure at Risk</b>									
	<b>Railroad Lines</b>		<b>Natural Gas Lines</b>		<b>Electrical Power lines</b>		<b>Roads</b>		<b>Canals</b>	
	<b># of Miles</b>	<b>\$ Value<sup>1</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>2</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>3</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>4</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>5</sup></b>
Dam Failure	0	0	0	0	0	0	0	0	0	0
Faults	0	0	0	0	0	0	0.58	304,500	0.4	600,000
Wildfire	0	0	0	0	0	0	0.53	278,250	0.55	825,000
Flood	0.07	105,000	0.17	238,000	0	0	0.93	488,250	0.16	240,000
Liquefaction	1.45	2,175,000	0	0	0	0	25.91	13,602,750	0	0
Landslide	0	0	0	0	0	0	0	0	0	0
Slope	0	0	0	0	0	0	2.62	1,375,500	0.92	1,380,000
Poorly Drained Soils	0	0	0	0	0	0	0	0	0	0

<sup>1</sup> Based on figures from 2009 Pre-Disaster Mitigation Plan for Bear River Region, Utah.  
<sup>2</sup> Based on average replacement cost estimates for gas lines ranging from 2-inches-20 inches in diameter. These cost are based solely on labor and material costs, and may vary based on time, scope, and site specific variations (Questar, May 2015).  
<sup>3</sup> Based on estimates from Logan Light and Power, 2015.  
<sup>4</sup> Based on estimates derived from an average 28' wide, 4" thick asphalt county road with gravel subgrade replacement. Cache County, 2015.  
<sup>5</sup> Based recent Cache County and regional project cost estimates, 2015.

<b>Richmond, UT, Critical Facilities at Risk</b>					
<b>Hazard Type</b>	<b>Critical Facilities Types</b>				
	<b>Emergency Services/Law Enforcement</b>	<b>Schools/Public Facilities</b>	<b>Health Care Facilities</b>	<b>Places of Worship</b>	<b>Infrastructure</b>
Dam Failure					
Faults					
Wildfire					1 broadband anchor
Flood					
Liquefaction	Richmond Fire and EMS, Richmond Fire Department	White Pine Middle School, Park School		2 places of worship	10 broadband anchors
Landslide					
Slope					
Poorly Drained Soils					

Note: Critical facilities were identified using multiple data sources including: Utah AGRC, UDOT, Utah Division of Water Resources, and public and community leader input.

<b>Richmond, UT, Agricultural Features at Risk</b>					
<b>Hazard Type</b>	<b>Lands at Risk</b>			<b>Farms &amp; Barns****</b>	
	<b>Agriculture Production*</b>	<b>Farm Land**</b>	<b>Grazing***</b>	<b>Century Farms</b>	<b>Historic Barns</b>
	<b># of Acres</b>			<b># of Farms</b>	<b># of Barns</b>
Dam Failure	0	0	0	0	0
Faults	43.49	14.19	0	0	0
Wildfire	21.35	67.49	0	1	2
Flood	36.5	81.64	0	0	0
Liquefaction	0	0	0	0	0
Landslide	0	0	0	0	0
Slope	212.19	0	0	0	0
Poorly Drained Soils	0	0	0	0	0

\* Lands that are currently associated with agricultural activities involving water related land use, as described in the 2007 Utah Division of Water Resources, *Water Related Land Use* dataset.  
 \*\*Lands that are suitable for farming purposes based on soil type and composition, as describe in the 2013 Natural Resource Conservation Service, SSURGO datasets.  
 \*\*\* Lands currently associated with grazing allotments identified as part of the Grazing Improvement Program (Utah AGRC, 2012)  
 \*\*\*\* Based on data compiled by the Bear River Association of Governments.

<b>Richmond, UT, Environmental &amp; Recreational Features at Risk</b>						
<b>Hazard Type</b>	<b>Environmental Features at Risk</b>			<b>Recreational Features at Risk</b>		
	<b>Wetland/ riparian</b>	<b>Lakes</b>	<b>Streams</b>	<b>Parks</b>	<b>Trails</b>	<b>Amenities</b>
	<b># of Acres</b>		<b># of Miles</b>	<b># of Acres</b>	<b># of Miles</b>	<b># of Amenities</b>
Dam Failure	0	0	0	0	0	0
Faults	0	0	0.39	0	0.44	2
Wildfire	0.09	0	0.62	3.52	0.22	1
Flood	12.36	0	2.59	0	0	0
Liquefaction	0	0	0	0	0	0
Landslide	0	0	0	0	0	0
Slope	5.76	0	2.02	0	0.47	2
Poorly Drained Soils	0	0	0	0	0	0

Note: Total acres of land and miles of streams and trails were identified using multiple datas sources including: Utah AGRC, U.S. Fish and Wildlife Service, U.S. Forest Service, U.S. Geological Survey, Utah Division of Water Resources, and public and community leader input.

comes from City Creek, a small tributary that drains a portion of the fairly steep mountains to the east of Richmond City. Richmond has about 50 structures at risk, mostly along City Creek, and a few more to the north along Cherry Creek. Even though a large portion of the city is identified as being in the 100 year flood plain, no significant flooding has occurred historically on City Creek. A large portion of the stream flow can be diverted into an irrigation canal above Richmond City. This may help to moderate the impacts of high stream flows.

***Steep Slopes.*** Hazard mapping identifies significant risk to residential structures and infrastructure from steep slopes in much of the jurisdiction's eastern bench. This area is popular for high value homes and new development.

***Wildfire.*** Hazard mapping identifies moderate-to-high wildfire risk areas along the eastern bench of the jurisdiction.

### **Future Development**

No concerns involving potential future development within Richmond were reported by city representatives.

### **Hazard Mitigation Strategies**

**Table 84:** Richmond City Mitigation Strategies

RICHMOND - COMMUNITY MITIGATION STRATEGIES										
Protecting Current Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For NFIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Richmond	Earthquake/Faults	Protect current residents and property	Handout for potential builders listing possible dangers.	N/A	Medium	2015	city budget	Richmond, UGS, BRAG	\$2,000	city taxes
Richmond	Earthquake/Liquefaction	Protect current residents and property	Have potential areas for liquefaction engineered.	N/A	Medium	2016	City Budget	Richmond, UGS	\$40,000-\$45,000	Will need to coordinate with Richmond City Council
Richmond	Earthquake	Protect current residents and property	Encourage upgrading of older structures.	N/A	Medium	2015	None	Richmond, Utah DEM	None	Articles in established city newsletter.
Richmond	Flood	Protect current residents and property	Education, determine flood risks	Update our NFIP ordinance to reflect the most recent changes.	High	2015	None	Richmond, Utah DEM	N/A	FEMA resources re: NFIP
Richmond	Wildfire	Protect current residents and property	Work with Utah FFSL to improve wildfire planning	N/A	High	2015-ongoing	None	Richmond, Utah FFSL	None	Continue education of citizens
Richmond	Steep Slopes	Protect current residents and property	Prevent erosion in established steep slope residential development.	N/A	Medium	2015	None	Richmond, UGS	None	Articles in city newsletter to remind property owners of the danger.
RICHMOND - COMMUNITY MITIGATION STRATEGIES										
Protecting Future Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For NFIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Richmond	Earthquake/Faults	Protect future residents and property	No practical action - work on determining	N/A	Low	Existing	None	Richmond, UGS, BRAG	None	Known potential faults are contained in the general plan.
Richmond	Earthquake/Liquefaction	Protect future residents and property	No practical action - work on determining	N/A	Low	Existing	None	Richmond, UGS	None	Known potential faults are contained in the general plan.
Richmond	Earthquake	Protect future residents and property	Ensure potential development is aware of earthquake potential.	N/A	High	Ongoing	None	Richmond, Utah DEM	None	Incorporate data in building clearance form to alert prospective builders.
Richmond	Flood	Protect future residents and property	Education, determine flood risks	Continued coordination between Richmond City and the Richmond Irrigation Company	High	Constant	None	Richmond, Utah DEM	None	Coordinate FEMA instructions with the Richmond Irrigation company
Richmond	Wildfire	Protect future residents and property	Work with Utah FFSL to improve wildfire planning	N/A	High	2015-ongoing	None	Richmond, Utah FFSL	None	Continue education of citizens
Richmond	Steep Slopes	Protect future residents and property	Restrict construction in steep slope areas per existing city code.	N/A	High	2015-ongoing	None	Richmond, UGS	None	Enforce building clearance requirements to comply with existing city code.

## RIVER HEIGHTS

Analysis of hazard risk involving the community of River Heights revealed that there is potential risk resulting from **dam break, flood, liquefaction, steep slopes and wildfire**. These hazards have varying potential to impact life, property, infrastructure, agriculture, and environmental features within the municipal boundary. See *the following tables* for more detailed descriptions of potential losses associated with each natural hazard analyzed in the risk assessment.

**Table 85:** River Heights Potential Loss Figures

## Natural Hazards

### Current Development

**Dam Failure.** Hazard mapping identifies dam failure risk to several residential structures and infrastructure below First Dam. This threat is located on the south side of the Logan River in low elevation areas throughout the jurisdiction.

**Flood.** Hazard mapping identifies some residential structures and infrastructure at risk from flooding in the 100 year floodplain. This threat is

River Heights, UT, Residential & Commercial Development at Risk						
Hazard Type	~Residents at Risk*	Residential Units at Risk		Commercial Units at Risk		
		# Units	\$ Value**	# Units	\$ Value**	\$ Potential Revenue Loss***
Dam Failure	165	51	29,479,465	0	0	0
Faults	0	0	0	0	0	0
Wildfire	136	42	14,521,972	0	0	0
Flood	32	10	2,561,785	0	0	0
Liquefaction	227	70	33,517,176	3	1,453,693	2,066,151
Landslide	0	0	0	0	0	0
Slope	110	34	13,007,114	0	0	0
Poorly Drained Soils	0	0	0	0	0	0

\* Based on average persons per owner household for Cache County from 2013 American Community Survey, which is 3.24.  
 \*\* Current Market Value per parcel, including building and land values. Data was provided by Cache County IT personnel.  
 \*\*\* Based on average sales, receipts, or value of shipments of firms with or without paid employees, per firm (\$688,717 per firm). Derived from 2007 Survey of Business Owners for Cache County, US Census Bureau.

<b>River Heights, UT, Infrastructure at Risk</b>										
<b>Hazard Type</b>	<b>Infrastructure at Risk</b>									
	<b>Railroad Lines</b>		<b>Natural Gas Lines</b>		<b>Electrical Power lines</b>		<b>Roads</b>		<b>Canals</b>	
	<b># of Miles</b>	<b>\$ Value<sup>1</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>2</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>3</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>4</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>5</sup></b>
Dam Failure	0	0	0	0	0	0	0.6	315,000	0.04	60,000
Faults	0	0	0	0	0	0	0	0	0	0
Wildfire	0	0	0	0	0	0	0.31	162,750	0	0
Flood	0	0	0	0	0	0	0.02	10,500	0	0
Liquefaction	0	0	0	0	0	0	9.71	5,097,750	0.91	1,365,000
Landslide	0	0	0	0	0	0	0	0		0
Slope	0	0	0	0	0	0	0.37	194,250	0.16	240,000
Poorly Drained Soils	0	0	0	0	0	0	0	0	0	0

<sup>1</sup> Based on figures from 2009 Pre-Disaster Mitigation Plan for Bear River Region, Utah.  
<sup>2</sup> Based on average replacement cost estimates for gas lines ranging from 2-inches-20 inches in diameter. These cost are based solely on labor and material costs, and may vary based on time, scope, and site specific variations (Questar, May 2015).  
<sup>3</sup> Based on estimates from Logan Light and Power, 2015.  
<sup>4</sup> Based on estimates derived from an average 28' wide, 4" thick asphalt county road with gravel subgrade replacement. Cache County, 2015.  
<sup>5</sup> Based recent Cache County and regional project cost estimates, 2015.

<b>River Heights, UT, Critical Facilities at Risk</b>					
<b>Hazard Type</b>	<b>Critical Facilities Types</b>				
	<b>Emergency Services/Law Enforcement</b>	<b>Schools/Public Facilities</b>	<b>Health Care Facilities</b>	<b>Places of Worship</b>	<b>Infrastructure</b>
Dam Failure					
Faults					
Wildfire					
Flood					
Liquefaction		River Heights Elementary School, Private School, Home School		1 place of worship	3 broadband anchors
Landslide					
Slope					
Poorly Drained Soils					

Note: Critical facilities were identified using multiple data sources including: Utah AGRC, UDOT, Utah Division of Water Resources, and public and community leader input.

<b>River Heights, UT, Agricultural Features at Risk</b>					
<b>Hazard Type</b>	<b>Lands at Risk</b>			<b>Farms &amp; Barns****</b>	
	<b>Agriculture Production*</b>	<b>Farm Land**</b>	<b>Grazing***</b>	<b>Century Farms</b>	<b>Historic Barns</b>
	<b># of Acres</b>			<b># of Farms</b>	<b># of Barns</b>
Dam Failure	9.68	27.64	0	0	0
Faults	0	0	0	0	0
Wildfire	6.52	19.27	0	0	0
Flood	0.28	3.49	0	0	0
Liquefaction	26.83	54.81	0	0	0
Landslide	0	0	0	0	0
Slope	0.02	0	0	0	0
Poorly Drained Soils	0	0	0	0	0

\* Lands that are currently associated with agricultural activities involving water related land use, as described in the 2007 Utah Division of Water Resources, *Water Related Land Use* dataset.  
 \*\*Lands that are suitable for farming purposes based on soil type and composition, as describe in the 2013 Natural Resource Conservation Service, SSURGO datasets.  
 \*\*\* Lands currently associated with grazing allotments identified as part of the Grazing Improvement Program (Utah AGRC, 2012)  
 \*\*\*\* Based on data compiled by the Bear River Association of Governments.

<b>River Heights, UT, Environmental &amp; Recreational Features at Risk</b>						
<b>Hazard Type</b>	<b>Environmental Features at Risk</b>			<b>Recreational Features at Risk</b>		
	<b>Wetland/ riparian</b>	<b>Lakes</b>	<b>Streams</b>	<b>Parks</b>	<b>Trails</b>	<b>Amenities</b>
	<b># of Acres</b>		<b># of Miles</b>	<b># of Acres</b>	<b># of Miles</b>	<b># of Amenities</b>
Dam Failure	4.12	0	0	0	0	0
Faults	0	0	0	0	0	0
Wildfire	0	0.29	0	0	0	0
Flood	1.22	0	0.22	0.02	0	0
Liquefaction	11.34	0	0.04	0.03	0	0
Landslide	0	0	0	0	0	0
Slope	0.14	0	0	0	0	0
Poorly Drained Soils	0	0	0	0	0	0

Note: Total acres of land and miles of streams and trails were identified using multiple datas sources including: Utah AGRC, U.S. Fish and Wildlife Service, U.S. Forest Service, U.S. Geological Survey, Utah Division of Water Resources, and public and community leader input.

from Dry Canyon/Spring Creek that enters the jurisdiction from the south and flow along its southern boundary to the west.

***Liquefaction.*** Hazard mapping identifies moderate-to-high liquefaction risk to several structures and infrastructure extending west through the boundary of the jurisdiction around 400 West.

***Steep Slopes.*** Hazard mapping identifies some risk from steep slopes to residential structures and infrastructure in the northeast portion of the jurisdiction's eastern bench. There are also some areas leading down to "The Island" north of the jurisdiction.

***Wildfire.*** Hazard mapping identifies moderate-to-high wildfire risk areas along the jurisdiction's eastern bench and extending west into the urban canopy.

### **Future Development**

No concerns involving potential future development within River Heights were reported by city representatives.

### **Hazard Mitigation Strategies**

**Table 86:** River Heights Mitigation Strategies

RIVER HEIGHTS - COMMUNITY MITIGATION STRATEGIES										
Protecting Current Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For NFIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
River Heights	Wildfire	Protect current residents and property	Maintain fire hydrants, protect water supply for adequate fire fighting (shut off pumps), reduce fire hazards through city ordinances	N/A	High	2017	City general fund	River Heights	TBD	Local, Utah FFSL, County
River Heights	Earthquake	Protect current residents and property	New building codes, develop EOP, new water lines (avoid breakage), neighborhood block captains/area specialists, CERT training, disaster assistance flags	N/A	Medium	Ongoing	City general fund	River Heights, Cache County	TBD	Local, County EOC
River Heights	Dam Failure	Protect current residents and property	Work with the Utah Division of Water Rights and other groups to utilize Emergency Action Plans on a local level.	N/A	Low	2020	Utah Division of Water Rights, Local	River Heights, Utah Dam Safety	Minimal	Utah Division of Water Rights, Local
River Heights	Drought	Protect current residents and property	Protect water supply to ensure adequate water for consumption and fire protection, monitor water use/supply, encourage water conservation, higher rates for overages, electronic meters, rations if needed	N/A	High	Ongoing	City general fund	River Heights, NOAA, Utah Climate Center	Minimal	Local, County
River Heights	Severe Weather	Protect current residents and property	Services to keep roads open, water/sewer working, EP/BC, CERT training, maintain snow plows, disaster assistance flags in every home	N/A	Medium	Ongoing	City general fund	River Heights	TBD	Local, County
River Heights	Flood	Protect current residents and property	Work with Utah DEM and others to determine local flood risk and specific flood hazard areas in town.	Work with state floodplain manager to assure ongoing compliance with NFIP.	Medium	2017	City, FEMA, Utah DEM	River Heights, Utah DEM, BRAG	Minimal	City, FEMA, Utah DEM
River Heights	Slope	Protect current residents and property	Determine where steep slopes are and site specific risk to homes and residences.	N/A	Medium	2017	City, UGS, USGS	River Heights, UGS	Minimal	City, UGS, USGS
River Heights	Power Outage	Protect current residents and property	Encourage residents to prepare for long-term outages, education, EP specialists, CERT training, emergency generator for water system, write EOP with designated shelter	N/A	Medium	2018	FEMA, City	River Heights, Cache County	\$100,000	FEMA, City
RIVER HEIGHTS - COMMUNITY MITIGATION STRATEGIES										
Protecting Future Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For NFIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
River Heights	Wildfire	Protect future residents and property	Maintain fire hydrants, protect water supply for adequate fire fighting (shut off pumps), reduce fire hazards through city ordinances	N/A	High	2017	City general fund	River Heights	TBD	Local, Utah FFSL, County
River Heights	Earthquake	Protect future residents and property	New building codes, develop EOP, new water lines (avoid breakage), neighborhood block captains/area specialists, CERT training, disaster assistance flags	N/A	Medium	Ongoing	City general fund	River Heights, Cache County	TBD	Local, County EOC
River Heights	Dam Failure	Protect future residents and property	Work with the Utah Division of Water Rights and other groups to utilize Emergency Action Plans on a local level.	N/A	Low	2020	Utah Division of Water Rights, Local	River Heights, Utah Dam Safety	Minimal	Utah Division of Water Rights, Local
River Heights	Drought	Protect future residents and property	Protect water supply to ensure adequate water for consumption and fire protection, monitor water use/supply, encourage water conservation, higher rates for overages, electronic meters, rations if needed	N/A	High	Ongoing	City general fund	River Heights, NOAA, Utah Climate Center	Minimal	Local, County
River Heights	Severe Weather	Protect future residents and property	Services to keep roads open, water/sewer working, EP/BC, CERT training, maintain snow plows, disaster assistance flags in every home	N/A	Medium	Ongoing	City general fund	River Heights	TBD	Local, County
River Heights	Flood	Protect future residents and property	Review current floodplain ordinance and see where improvements can be made.	Work with state floodplain manager to assure ongoing compliance with NFIP.	Medium	2017	City, FEMA, Utah DEM	River Heights, Utah DEM, BRAG	Minimal	City, FEMA, Utah DEM
River Heights	Slope	Protect future residents and property	Review current slope ordinances and determine how improvements can be made.	N/A	Medium	2017	City, UGS, USGS	River Heights, UGS	Minimal	City, UGS, USGS
River Heights	Power Outage	Protect future residents and property	Encourage residents to prepare for long-term outages, education, EP specialists, CERT training, emergency generator for water system, write EOP with designated shelter	N/A	Medium	2018	FEMA, City	River Heights, Cache County	\$100,000	FEMA, City

**SMITHFIELD**

Analysis of hazard risk involving the community of Smithfield revealed that there is potential risk resulting from **earthquakes, flood, steep slopes and wildfire**. These hazards have varying potential to impact life, property, infrastructure, agriculture, and environmental features within the municipal boundary. See *the following tables* for more detailed descriptions of potential losses associated with each natural hazard analyzed in the risk assessment.

**Table 87:** Smithfield Potential Loss Figures

**Natural Hazards**

**Current Development**

*Earthquake.* Hazard mapping identifies several structures and infrastructure at risk from surface fault rupture. There are two forks of the fault damage zone that run parallel along the eastern bench of the Cache-Wasatch Mountains. This threatens development along the jurisdiction’s far eastern boundary, and also along the secondary fault line that bisects the area between U.S. 91/Main Street and the eastern boundary of the jurisdiction.

<b>Smithfield, UT, Residential &amp; Commercial Development at Risk</b>						
<b>Hazard Type</b>	<b>~Residents at Risk*</b>	<b>Residential Units at Risk</b>		<b>Commercial Units at Risk</b>		
		<b># Units</b>	<b>\$ Value**</b>	<b># Units</b>	<b>\$ Value**</b>	<b>\$ Potential Revenue Loss***</b>
Dam Failure	0	0	0	0	0	0
Faults	1,160	358	85,751,065	2	386,861	1,377,434
Wildfire	6,600	2,037	371,562,670	40	14,372,411	27,548,680
Flood	632	195	38,263,597	11	2,309,198	7,575,887
Liquefaction	0	0	0	0	0	0
Landslide	19	6	1,705,658	0	0	0
Slope	382	118	29,701,233	0	0	0
Poorly Drained Soils	0	0	0	0	0	0

\* Based on average persons per owner household for Cache County from 2013 American Community Survey, which is 3.24.  
 \*\* Current Market Value per parcel, including building and land values. Data was provided by Cache County IT personnel.  
 \*\*\* Based on average sales, receipts, or value of shipments of firms with or without paid employees, per firm (\$688,717 per firm). Derived from 2007 Survey of Business Owners for Cache County, US Census Bureau.

<b>Smithfield, UT, Infrastructure at Risk</b>										
<b>Hazard Type</b>	<b>Infrastructure at Risk</b>									
	<b>Railroad Lines</b>		<b>Natural Gas Lines</b>		<b>Electrical Power lines</b>		<b>Roads</b>		<b>Canals</b>	
	<b># of Miles</b>	<b>\$ Value<sup>1</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>2</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>3</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>4</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>5</sup></b>
Dam Failure	0	0	0	0	0	0	0	0	0	0
Faults	0	0	0	0	0	0	7.51	3,942,750	1.61	2,415,000
Wildfire	0.55	825,000	0	0	0.02	2,540	13.68	7,182,000	7.89	11,835,000
Flood	0.15	225,000	0.09	126,000	0	0	3.99	2,094,750	3.42	5,130,000
Liquefaction	2.86	4,290,000	0	0	0.42	53,340	63.91	33,552,750		0
Landslide	0	0	0	0	0	0	0.07	36,750	0	0
Slope	0	0	0	0	0.09	11,430	1.07	561,750	0.51	765,000
Poorly Drained Soils	0	0	0	0	0	0	0	0	0	0

<sup>1</sup> Based on figures from 2009 Pre-Disaster Mitigation Plan for Bear River Region, Utah.

<sup>2</sup> Based on average replacement cost estimates for gas lines ranging from 2-inches-20 inches in diameter. These cost are based solely on labor and material costs, and may vary based on time, scope, and site specific variations (Questar, May 2015).

<sup>3</sup> Based on estimates from Logan Light and Power, 2015.

<sup>4</sup> Based on estimates derived from an average 28' wide, 4" thick asphalt county road with gravel subgrade replacement. Cache County, 2015.

<sup>5</sup> Based recent Cache County and regional project cost estimates, 2015.

<b>Smithfield, UT, Critical Facilities at Risk</b>					
<b>Hazard Type</b>	<b>Critical Facilities Types</b>				
	<b>Emergency Services/Law Enforcement</b>	<b>Schools/Public Facilities</b>	<b>Health Care Facilities</b>	<b>Places of Worship</b>	<b>Infrastructure</b>
Dam Failure					
Faults				1 place of worship	
Wildfire	Smithfield Fire and EMS, Smithfield Fire Department, Smithfield Police		Smithfield Clinic, Summit Clinic	1 place of worship	7 broadband anchors
Flood					
Liquefaction	Smithfield Police Department, Smithfield Fire and EMS, Smithfield Fire Department	Birch Creek Elementary, Sunrise School, Sky View High, Summit School	Smithfield Health Clinic, Summit Clinic	9 places of worship	15 broadband anchors, 1 dam
Landslide					
Slope					1 dam
Poorly Drained Soils					

Note: Critical facilities were identified using multiple data sources including: Utah AGRC, UDOT, Utah Division of Water Resources, and public and community leader input.

<b>Smithfield, UT, Agricultural Features at Risk</b>					
<b>Hazard Type</b>	<b>Lands at Risk</b>			<b>Farms &amp; Barns****</b>	
	<b>Agriculture Production*</b>	<b>Farm Land**</b>	<b>Grazing***</b>	<b>Century Farms</b>	<b>Historic Barns</b>
	<b># of Acres</b>			<b># of Farms</b>	<b># of Barns</b>
Dam Failure	0	0	0	0	0
Faults	105.82	396.17	0	0	0
Wildfire	56.03	888.8	0	0	1
Flood	14.93	156.9	0	0	0
Liquefaction	0	0	0	0	0
Landslide	0	1.68	0	0	0
Slope	54.44	0	0	0	0
Poorly Drained Soils	0	0	0	0	0

\* Lands that are currently associated with agricultural activities involving water related land use, as described in the 2007 Utah Division of Water Resources, *Water Related Land Use* dataset.  
 \*\*Lands that are suitable for farming purposes based on soil type and composition, as describe in the 2013 Natural Resource Conservation Service, SSURGO datasets.  
 \*\*\* Lands currently associated with grazing allotments identified as part of the Grazing Improvement Program (Utah AGRC, 2012)  
 \*\*\*\* Based on data compiled by the Bear River Association of Governments.

<b>Smithfield, UT, Environmental &amp; Recreational Features at Risk</b>						
<b>Hazard Type</b>	<b>Environmental Features at Risk</b>			<b>Recreational Features at Risk</b>		
	<b>Wetland/ riparian</b>	<b>Lakes</b>	<b>Streams</b>	<b>Parks</b>	<b>Trails</b>	<b>Amenities</b>
	<b># of Acres</b>		<b># of Miles</b>	<b># of Acres</b>	<b># of Miles</b>	<b># of Amenities</b>
Dam Failure	0	0	0	0	0	0
Faults	1.25	1.25	2.38	14.23	0	0
Wildfire	2.4	1.14	3.71	66.62	0	0
Flood	5.28	0	3.57	0	0	0
Liquefaction	0	0	0	63.37	0	0
Landslide	0	0	0.06	0	0	0
Slope	0	0.3	0.67	14.24	0.03	0
Poorly Drained Soils	0	0	0	0	0	0

Note: Total acres of land and miles of streams and trails were identified using multiple datas sources including: Utah AGRC, U.S. Fish and Wildlife Service, U.S. Forest Service, U.S. Geological Survey, Utah Division of Water Resources, and public and community leader input.

**Flood.** Hazard mapping identifies several residential structures and infrastructure at risk from flooding in the 100 year floodplain. There are over 200 structures in the floodplain, with the majority in the Summit Creek drainage through the middle of town. However, in post-settlement history the impacts to Smithfield residences have been minimal from Summit Creek. During the 1983 flooding that impacted nearly the whole state; Smithfield did experience some rising flows in Summit Creek that were contained by sandbagging. There are also some structures in the floodplain in the drainage north of Saddleback Road.

**Steep Slopes.** Hazard mapping identifies significant risk from steep slopes in much of the jurisdiction's eastern bench area. There are also steep slope risks that extend into the jurisdiction on both sides of the Smithfield Canyon/Summit Creek drainage.

**Wildfire.** Hazard mapping identifies moderate-to-high wildfire risk areas along the jurisdiction's eastern bench and extending into the urban canopy.

### **Future Development**

No concerns involving potential future development within Smithfield were reported by city representatives.

### **Hazard Mitigation Strategies**

**Table 88:** Smithfield City Mitigation Strategies

SMITHFIELD - COMMUNITY MITIGATION STRATEGIES										
Protecting Current Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For NFIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Smithfield	Wildfire	Protect current residents and property	Identify, map, and assess potential wildfire hazard areas.	N/A	Medium	2020	CIB, City	Smithfield, Utah FFSL	\$3,000	City Fire Agency, State Fire Marshal, FEMA
Smithfield	Flooding	Protect current residents and property	Increase awareness of floodplain and erosion risk areas within the city.	N/A	High	2017	City	Smithfield, Utah DEM	\$2,000	City, Geologic Survey, USU
Smithfield	Earthquake	Protect current residents and property	Update ordinances, planning and city codes to reduce earthquake risks.	N/A	Medium	2018	City	Smithfield, UGS	\$1,000	City, FEMA, ICC
Smithfield	Landslide	Protect current residents and property	Update city ordinances to mitigate development in landslide hazard areas.	N/A	Medium	2020	CIB, City	Smithfield, UGS	\$1,500	Geologic Survey, Utah State University, State of Utah
Smithfield	Drought	Protect current residents and property	Update ordinance to encourage drought tolerant landscaping	N/A	Medium	2018	City, DWQ, CIB	Smithfield, Utah Climate Center, USU	\$2,000	City, DWQ, RWAU
Smithfield	Drought	Protect current residents and property	Monitoring the water supply and its functions can save water in the long run through creating a drought ordinance.	N/A	High	2017	City, CIB or DWQ	Smithfield, Utah Climate Center, USU	\$2,000	City RWAU, CIB, DWQ
SMITHFIELD - COMMUNITY MITIGATION STRATEGIES										
Protecting Future Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For NFIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Smithfield	Wildfire	Protect future residents and property	Update city ordinances to create a wildfire overlay zone including special conditions for developments in these areas.	N/A	Medium	2025	CIB, City, FEMA	Smithfield, Utah FFSL	\$2,000	FEMA, City, State Fire Marshal, City Fire Department
Smithfield	Flooding	Protect future residents and property	Update, enforce and follow the cities general plan to reduce development in the flood plain.	N/A	High	2016	CIB, City	Smithfield, Utah DEM	\$40,000	CIB, City
Smithfield	Earthquake	Protect future residents and property	Adopt and enforce building codes to reduce earthquake damage to structures.	N/A	High	2016	City	Smithfield, UGS	\$1,500	City, ICC
Smithfield	Landslide	Protect future residents and property	Improve data and mapping of landslide areas located in the city.	N/A	Medium	2020	City, State of Utah, CIB	Smithfield, UGS	\$10,000	Geologic Survey, Utah State University, State of Utah
Smithfield	Drought	Protect future residents and property	Update ordinance and general plan to require a percentage of landscaping to be low water use or xeriscaping.	N/A	High	2020	City, DWQ, RWAU, Irrigation Companies	Smithfield, Utah Climate Center, USU	\$5,000	City, CIB, DWQ, RWAU
Smithfield	Drought	Protect future residents and property	Update subdivision regulations to encourage or require new developments to utilize secondary water.	N/A	High	2018	City	Smithfield, Utah Climate Center, USU	\$1,500	City, RWAU, DWQ

## TRENTON

Analysis of hazard risk involving the community of Trenton revealed that there is potential risk resulting from **earthquakes, flood, landslides, liquefaction, steep slopes and wildfire**. These hazards have varying potential to impact life, property, infrastructure, agriculture, and environmental features within the municipal boundary. See *the following tables* for more detailed descriptions of potential losses associated with each natural hazard analyzed in the risk assessment.

**Table 89:** Trenton Town Potential Loss Figures

## Natural Hazards

### Current Development

**Earthquake.** Hazard mapping identifies several structures and infrastructure at risk from surface fault rupture. Areas of concern are located along the fault damage zone that runs north to south along the jurisdiction’s western bench. This area is mostly used for agricultural production with railroad and other critical utilities.

**Flood.** Hazard mapping identifies several residential structures and infrastructure at risk from

Trenton, UT, Residential & Commercial Development at Risk						
Hazard Type	~Residents at Risk*	Residential Units at Risk		Commercial Units at Risk		
		# Units	\$ Value**	# Units	\$ Value**	\$ Potential Revenue Loss***
Dam Failure	0	0	0	0	0	0
Faults	62	19	3,628,922	2	346,985	1,377,434
Wildfire	123	38	5,213,718	3	1,883,341	2,066,151
Flood	49	15	2,810,743	1	439,925	688,717
Liquefaction	42	13	2,288,090	0	0	0
Landslide	16	5	1,252,786	0	0	0
Slope	0	0	0	1	216,710	688,717
Poorly Drained Soils	0	0	0	0	0	0

\* Based on average persons per owner household for Cache County from 2013 American Community Survey, which is 3.24.

\*\* Current Market Value per parcel, including building and land values. Data was provided by Cache County IT personnel.

\*\*\* Based on average sales, receipts, or value of shipments of firms with or without paid employees, per firm (\$688,717 per firm). Derived from 2007 Survey of Business Owners for Cache County, US Census Bureau.

<b>Trenton UT, Infrastructure at Risk</b>										
<b>Hazard Type</b>	<b>Infrastructure at Risk</b>									
	<b>Railroad Lines</b>		<b>Natural Gas Lines</b>		<b>Electrical Power lines</b>		<b>Roads</b>		<b>Canals</b>	
	<b># of Miles</b>	<b>\$ Value<sup>1</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>2</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>3</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>4</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>5</sup></b>
Dam Failure	0	0	0	0	0	0	0	0	0	0
Faults	1.27	1,905,000	0.28	392,000	0	0	4.52	2,373,000	2.63	3,945,000
Wildfire	0.39	585,000	0	0	0	0	0.89	467,250	0.08	120,000
Flood	0.16	240,000	0.61	854,000	0	0	0.27	141,750	0	0
Liquefaction	5.6	8,400,000	0.46	644,000	0	0	25.15	13,203,750	0	0
Landslide	0	0	0	0	0	0	1.4	735,000	0.63	945,000
Slope	0	0	0	0	0	0	0	0	0	0
Poorly Drained Soils	0	0	0	0	0	0	0	0	0	0

<sup>1</sup> Based on figures from 2009 Pre-Disaster Mitigation Plan for Bear River Region, Utah.

<sup>2</sup> Based on average replacement cost estimates for gas lines ranging from 2-inches-20 inches in diameter. These cost are based solely on labor and material costs, and may vary based on time, scope, and site specific variations (Questar, May 2015).

<sup>3</sup> Based on estimates from Logan Light and Power, 2015.

<sup>4</sup> Based on estimates derived from an average 28' wide, 4" thick asphalt county road with gravel subgrade replacement. Cache County, 2015.

<sup>5</sup> Based recent Cache County and regional project cost estimates, 2015.

<b>Trenton, UT, Critical Facilities at Risk</b>					
<b>Hazard Type</b>	<b>Critical Facilities Types</b>				
	<b>Emergency Services/Law Enforcement</b>	<b>Schools/Public Facilities</b>	<b>Health Care Facilities</b>	<b>Places of Worship</b>	<b>Infrastructure</b>
Dam Failure					
Faults					1 dam
Wildfire	Trenton Fire Department and				2 broadband anchors
Flood					
Liquefaction	Trenton Fire Department and EMS			1 place of worship	4 broadband anchors, 3 dams
Landslide					
Slope					
Poorly Drained Soils					

Note: Critical facilities were identified using multiple data sources including: Utah AGRC, UDOT, Utah Division of Water Resources, and public and community leader input.

<b>Trenton, UT, Agricultural Features at Risk</b>					
<b>Hazard Type</b>	<b>Lands at Risk</b>			<b>Farms &amp; Barns****</b>	
	<b>Agriculture Production*</b>	<b>Farm Land**</b>	<b>Grazing***</b>	<b>Century Farms</b>	<b>Historic Barns</b>
	<b># of Acres</b>			<b># of Farms</b>	<b># of Barns</b>
Dam Failure	0	0	0	0	0
Faults	596.08	528.11	0	0	0
Wildfire	27.15	61.16	0	0	1
Flood	315.95	412	0	0	0
Liquefaction	411.46	503.77	0	0	0
Landslide	43.48	67.21	0	0	0
Slope	29.48	0	0	0	0
Poorly Drained Soils	0	0	0	0	0

\* Lands that are currently associated with agricultural activities involving water related land use, as described in the 2007 Utah Division of Water Resources, *Water Related Land Use* dataset.  
 \*\*Lands that are suitable for farming purposes based on soil type and composition, as describe in the 2013 Natural Resource Conservation Service, SSURGO datasets.  
 \*\*\* Lands currently associated with grazing allotments identified as part of the Grazing Improvement Program (Utah AGRC, 2012)  
 \*\*\*\* Based on data compiled by the Bear River Association of Governments.

<b>Trenton, UT, Environmental &amp; Recreational Features at Risk</b>						
<b>Hazard Type</b>	<b>Environmental Features at Risk</b>			<b>Recreational Features at Risk</b>		
	<b>Wetland/ riparian</b>	<b>Lakes</b>	<b>Streams</b>	<b>Parks</b>	<b>Trails</b>	<b>Amenities</b>
	<b># of Acres</b>		<b># of Miles</b>	<b># of Acres</b>	<b># of Miles</b>	<b># of Amenities</b>
Dam Failure	0	0	0	0	0	0
Faults	10.97	0	5.47	0	0	0
Wildfire	34.48	1.18	0.43	0	0	0
Flood	410.35	0	7.57	0	0	0
Liquefaction	365.84	58.94	5.96	0	0	0
Landslide	0	0	0.69	0	0	0
Slope	0	0	0.03	0	0	0
Poorly Drained Soils	0	0	0	0	0	0

Note: Total acres of land and miles of streams and trails were identified using multiple datas sources including: Utah AGRC, U.S. Fish and Wildlife Service, U.S. Forest Service, U.S. Geological Survey, Utah Division of Water Resources, and public and community leader input.

flooding in the 100 year floodplain. Areas of concern are focused around the Bear River and low-lying areas around it. Potential flood hazard threats also include flows from Ransom Hollow Creek.

***Landslides.*** Hazard mapping identifies risk from landslides in the southwest section of the jurisdiction; along the western bench and around the small drainages entering the valley.

***Liquefaction.*** Hazard mapping identifies high liquefaction risk to structures and infrastructure in areas adjacent to the Bear River, including a large area of Ransom Hollow.

***Steep Slopes.*** Hazard mapping identifies significant risk from steep slopes in much of the western bench of the jurisdiction.

***Wildfire.*** Hazard mapping identifies moderate-to-high wildfire risk areas along the Bear River and along the western bench of the jurisdiction.

### **Future Development**

No concerns involving potential future development within Trenton were reported by town representatives.

### **Hazard Mitigation Strategies**

**Table 90:** Trenton Town Mitigation Strategies

TRENTON - COMMUNITY MITIGATION STRATEGIES										
Protecting Current Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For NFIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Trenton	Flooding	Protect current residents and property	long run through creating a drought ordinance	N/A	Low	Ongoing	Road funds	Trenton, Utah DEM	Minimal	Local, State
Trenton	Earthquake	Protect current residents and property	Training in earthquake emergency planning and response for residents, and coordination between local and county fire, police, and EMT crews.	N/A	Low	Every few Years	Donated time by residents	Trenton, UGS, Cache County	N/A	Cache County Fire, Logan Fire, Church leaders
Trenton	Landslide/ Steep Slopes	Protect current residents and property	No steep slope with in town boundaries, only county land.	N/A	Low	2018	Local, County, State	Trenton, UGS	N/A	Local, County, State
Trenton	Wildfire	Protect current residents and property	Require a safe zone	N/A	Low	2018	Local, County	Trenton, Utah FFSL	\$1,000	N/A
TRENTON - COMMUNITY MITIGATION STRATEGIES										
Protecting Future Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For NFIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Trenton	Flooding	Protect future residents and property	Not allow building in flood plain	N/A	Low	Ongoing	Local, County	Trenton, Utah DEM	Minimal	Local
Trenton	Earthquake	Protect future residents and property	Require construction codes that meet earthquake standards.	N/A	Low	2017	County, FEMA, State	Trenton, UGS, Cache County	Minimal	County Planning,
Trenton	Landslide/ Steep Slope	Protect future residents and property	Not allow building close to steep slopes	N/A	Medium	2018	County	Trenton, UGS	Minimal	County Planning, Local, State
Trenton	Wildfire	Protect future residents and property	Encourage residence to clear up old grass and trees.	N/A	Low	2016	Local,	Trenton, Utah FFSL	Minimal	County Planning

## WELLSVILLE

Analysis of hazard risk involving Rich County revealed that there is potential risk resulting from **dam failure, faults, wildfire, flood, Liquefaction, landslide, poor soils, and steep slopes**. These hazards have varying potential to impact life, property, infrastructure, agriculture, and recreational features within municipal boundaries. Currently, liquefaction and wildfire hazards have the greatest potential to impact the community based on potential loss values. Other natural hazard types not mentioned were found to have no potential impacts to Rich County. See *the following tables* for more detailed descriptions of potential losses associated with each natural hazard associated with jurisdictional elements.

**Table 91:** Wellsville City Potential Loss Figures

## Natural Hazards

### Current Development

**Dam failure.** Wellsville has a very high risk of being affected by dam failure. Situated below Hyrum dam. If it were to fail the northeastern part of Wellsville would likely experience significant damage to structures, human life, infrastructure, critical facilities, environmental features, and agriculture.

**Faults.** Wellsville has a great potential for earthquakes. The predominant and most active faulting probability is on the East Cache Fault, and is also near the West Cache Fault. Significant damage would likely affect human life, structures, infrastructure, agriculture and environmental features, and one critical facility.

Wellsville, UT, Residential & Commercial Development at Risk						
Hazard Type	~Residents at Risk*	Residential Units at Risk		Commercial Units at Risk		
		# Units	\$ Value**	# Units	\$ Value**	\$ Potential Revenue Loss***
Dam Failure	314.28	97	20,581,672	6	2,085,128	4,132,302
Faults	288.36	89	26,255,773	7	2,930,499	4,821,019
Wildfire	1,266.84	391	70,321,964	56	7,064,117	38,568,152
Flood	557.28	172	37,985,381	9	2,352,259	6,198,453
Liquefaction	385.56	119	22,751,711	4	1,762,769	2,754,868
Landslide	45.36	14	3,617,803	2	1,330,265	1,377,434
Slope	71.28	22	7,093,701	44	5,379,160	30,303,548
Poorly Drained Soils	0	0	0	0	0	0

\* Based on average persons per owner household for Cache County from 2013 American Community Survey, which is 3.24.  
 \*\* Current Market Value per parcel, including building and land values. Data was provided by Cache County IT personnel.  
 \*\*\* Based on average sales, receipts, or value of shipments of firms with or without paid employees, per firm (\$688,717 per firm). Derived from 2007 Survey of Business Owners for Cache County, US Census Bureau.

<b>Wellsville, UT, Infrastructure at Risk</b>										
<b>Hazard Type</b>	<b>Infrastructure at Risk</b>									
	<b>Railroad Lines</b>		<b>Natural Gas Lines</b>		<b>Electrical Power Lines</b>		<b>Roads</b>		<b>Canals</b>	
	<b># of Miles</b>	<b>\$ Value<sup>1</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>2</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>3</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>4</sup></b>	<b># of Miles</b>	<b>\$ Value<sup>5</sup></b>
Dam Failure	0.67	1,005,000	1.26	1,764,000	0	0	4.32	2,268,000	0	0
Faults	0	0	0.36	504,000	0.49	62,230	3.84	2,016,000	0.91	1,365,000
Wildfire	0.36	540,000	0	0	0.1	12,700	6.13	3,218,250	0.22	330,000
Flood	0.38	570,000	0.59	826,000	0	0	4.23	2,220,750	0.85	1,275,000
Liquefaction	1.7	2,550,000	0.8	1,120,000	1.1	139,700	44.56	23,394,000	0	0
Landslide	0	0	0	0	0	0	1.46	766,500	0.06	90,000
Slope	0	0	0	0	0	0	3.52	1,848,000	0	0
Poorly Drained Soils	0	0	0	0	0	0		0	0	0

<sup>1</sup> Based on figures from 2009 Pre-Disaster Mitigation Plan for Bear River Region, Utah.  
<sup>2</sup> Based on average replacement cost estimates for gas lines ranging from 2-inches-20 inches in diameter. These cost are based solely on labor and material costs, and may vary based on time, scope, and site specific variations (Questar, May 2015).  
<sup>3</sup> Based on estimates from Logan Light and Power, 2015.  
<sup>4</sup> Based on estimates derived from an average 28' wide, 4" thick asphalt county road with gravel subgrade replacement. Cache County, 2015.  
<sup>5</sup> Based recent Cache County and regional project cost estimates, 2015.

<b>Wellsville, UT, Critical Facilities at Risk</b>					
<b>Hazard Type</b>	<b>Critical Facilities Types</b>				
	<b>Emergency Services/Law Enforcement</b>	<b>Schools/Public Facilities</b>	<b>Health Care Facilities</b>	<b>Places of Worship</b>	<b>Infrastructure</b>
Dam Failure					2 bridges
Faults					1 place of worship
Wildfire					
Flood		Willow Valley Middle School			2 bridges, 1 broadband anchor
Liquefaction	Wellsville Fire and EMS, Wellsville Fire Department Station	Wellsville School, Willow valley Middle,			4 places of worship, 2 bridges, 1 dam, 7 broadband anchors
Landslide					
Slope					
Poorly Drained Soils					

Note: Critical facilities were identified using multiple data sources including: Utah AGRC, UDOT, Utah Division of Water Resources, and public and community leader input.

**Wildfire.** Wellsville has moderate to high risks for wildfire in most of the jurisdiction. Wildfire hazards have varying potential to impact life, property, critical facilities, infrastructure, agriculture, and recreational features.

**Flood.** A large portion of the northeast corner of Wellsville is located on a flood plain. The majority of the flooding risk comes from Hyrum Reservoir located upstream from Wellsville. If flooding were to happen Wellsville would likely experience significant damage to human life, structures, infrastructure, agriculture and environmental features, as well as critical facilities.

**Liquefaction.** Wellsville has a moderate to high risk for liquefaction. If an earthquake were to occur, it is likely that there would be a potential impact on human life, structures, infrastructure, critical facilities, environmental and recreational features, as well as some agriculture.

**Landslide.** Wellsville has the potential risk of landslides in the western part of the city. Landslides have the potential to impact life, property, infrastructure, and environmental, recreational and agricultural features in the jurisdiction.

**Steep Slopes.** Wellsville has risks associated with steep slopes within its western mountain region. Steep slopes have the potential to impact life, property, infrastructure, and environmental, recreational and agricultural features in the jurisdiction.

### **Future Development**

No concerns involving potential future development within Wellsville were reported by city representatives.

### **Hazard Mitigation Strategies**

**Table 92:** Wellsville Town Mitigation Strategies

WELLSVILLE - COMMUNITY MITIGATION STRATEGIES										
Protecting Current Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For N/FIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Wellsville	Dam Failure	Protect current residents and property	Educate residents located with dam failure impact areas regarding notifications and emergency actions.	N/A	Low	2015-2020	Local	Wellsville, Bureau of Reclamation, Utah Dam Safety	\$10,000	City staff
Wellsville	Flood	Protect current residents and property	Update ordinances for floods and flood regions.	N/A	Medium	2020	Canal Company, City	Wellsville, Utah DEM	Minimal	Canal Company, City
Wellsville	Wildfire	Protect current residents and property	Coordinate with agencies on response and prevention.	N/A	High	2016	N/A	Wellsville, Utah PFSL	Minimal	FFSL, County
Wellsville	Landslide	Protect current residents and property	Explore possibility of landslide element in geological hazard ordinance	N/A	Medium	2017	Local	Wellsville, UGS	Minimal	Utah GS, BRAG, City
Wellsville	Earthquake	Protect current residents and property	Update ordinances, planning, and city codes to reduce earthquake risks.	N/A	Medium	2017	Local, BRAG, State	Wellsville, UGS	Minimal	Local, BRAG, State
WELLSVILLE - COMMUNITY MITIGATION STRATEGIES										
Protecting Future Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For N/FIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Wellsville	Dam Failure	Protect future residents and property	Make this a component of emergency preparedness plan.	N/A	Medium	2016	City	Wellsville, Bureau of Reclamation, Utah Dam Safety	Minimal	City, State, Federal
Wellsville	Flood	Protect future residents and property	Update ordinances for floods and flood regions.	N/A	Medium	2020	Canal Company, City	Wellsville, Utah DEM	Minimal	Canal Company, City
Wellsville	Wildfire	Protect future residents and property	Coordinate with agencies on response and prevention.	N/A	High	2016	N/A	Wellsville, Utah PFSL	Minimal	FFSL, County
Wellsville	Landslide	Protect future residents and property	Explore possibility of landslide element in geological hazard ordinance	N/A	Medium	2017	N/A	Wellsville, UGS	Minimal	Utah GS, BRAG, City
Wellsville	Earthquake	Protect future residents and property	Update ordinances, planning, and city codes to reduce earthquake risks.	N/A	Medium	2017	Local, BRAG, State	Wellsville, UGS	Minimal	Local, BRAG, State